Baseline Ecological Risk Assessment (River Study Area)

Volume IIIA of Remedial Investigation Report

Chlor-Alkali (Former) Superfund Site
Berlin, New Hampshire

Remedial Investigation/Feasibility Study
EPA Task Order No. 0013-RI-CO-01BQ

REMEDIAL ACTION CONTRACT
No. EP-S1-06-03

FOR

US Environmental Protection Agency
Region 1

BY

Nobis Engineering, Inc.

Nobis Project No. 80013

March 2014

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TABLE OF CONTENTS
BASELINE ECOLOGICAL RISK ASSESSMENT
RIVER STUDY AREA
CHLOR-ALKALI FACILITY (FORMER) SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

SECTION **PAGE**

AC ACRONYMS AC-1

1.0 INTRODUCTION 1
1.1 Purpose and Approach 1
1.2 Ecological Risk Assessment Guidance 2
1.3 Report Overview 3

2.0 PROBLEM FORMULATION 5
2.1 Scope and Introduction 5
2.1.1 Site Description and History 6
2.1.2 Androscoggin River Study Area (RSA) 8
2.2 Screening-level Problem Formulation and Ecological Effects Evaluation (Step 1) 8
2.2.1 Ecological Setting 8
2.2.1.1 General Characteristics of the Androscoggin River in the River Study Area 10
2.2.1.2 Androscoggin RSA Reach Descriptions 12
2.2.1.3 Riverine Habitat 18
2.2.1.4 Flora and Fauna of the Androscoggin RSA 21
2.2.2 Preliminary Conceptual Site Model 26
2.2.2.1 Potentially Exposed Populations 26
2.2.3 Preliminary Endpoints 28
2.2.4 Site Studies and Available Data 29
2.2.4.1 Chemistry Data 29
2.2.4.2 Epifaunal Invertebrate Study 37
2.2.4.3 Toxicity Tests 38
2.2.5 Data Evaluation and Reduction 42
2.2.5.1 Data Usability and Data Validation 42
2.2.5.2 Data Reduction 43
2.2.5.3 Calculation of Dioxin/Furan and PCB Congener Toxic Equivalency 44
2.2.5.4 Data Summary 45
2.2.6 Development of Screening-Level Benchmarks 46
2.2.6.1 Surface Water Benchmarks 46
2.2.6.2 Sediment Benchmarks 47
2.2.6.3 Fish Tissue Benchmarks 49
2.3 Preliminary Exposure Estimates and Risk Calculation (Step 2) 50
2.3.1 Screening Methodology 51
2.3.2 Chemicals of Potential Ecological Concern 51
2.4 BERA Problem Formulation (Step 3) 52

TABLE OF CONTENTS (cont.)
BASELINE ECOLOGICAL RISK ASSESSMENT
RIVER STUDY AREA
CHLOR-ALKALI FACILITY (FORMER) SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

SECTION **PAGE**

2.4.1 Final Conceptual Model 52
2.4.1.1 Contaminant Fate and Transport 53
2.4.1.2 Ecotoxicity 62
2.4.1.3 Final Conceptual Model Diagram 73
2.4.1.4 Risk Questions/Hypotheses 74
2.4.2 Final Endpoints 74
2.4.3 Weight-of-Evidence Approach 75

3.0 ANALYSIS PHASE 78
3.1 Exposure Characterization 79
3.1.1 Medium-Specific Chemical Characterization 80
3.1.2 Avian and Mammalian Receptor Exposure Modeling 82
3.1.2.1 Modeling Approaches 82
3.2 Ecological Effects Characterization 91
3.2.1 Ecological Response Analysis 94
3.2.1.1 Stressor-Response Analysis 94
3.2.1.2 Causality 101
3.2.1.3 Linking Measurement Endpoints to Assessment Endpoints 102

4.0 RISK CHARACTERIZATION 104
4.1 Risk Estimation 104
4.1.1 Introduction 104
4.1.1.1 Field Studies 106
4.1.1.2 Toxicity Studies 106
4.1.1.3 Hazard Quotient Analyses 106
4.1.1.4 Incremental Risk Analysis 108
4.1.2 Risk to Aquatic Biota 108
4.1.2.1 Benthic Invertebrate Community 109
4.1.2.2 Fish Population 117
4.1.3 Risk to Avian Life 120
4.1.3.1 Insectivorous Birds 120
4.1.3.2 Piscivorous Birds 123
4.1.4 Risk to Mammalian Life 126
4.1.4.1 Insectivorous Mammals – Bats 126
4.1.4.2 Piscivorous Mammals – Mink 127
4.1.5 Uncertainty Analysis 128
4.1.5.1 General Uncertainties 130
4.1.5.2 Individual Field Study Uncertainties 133
4.1.5.3 Hazard Quotient Uncertainties 136

TABLE OF CONTENTS (cont.)
BASELINE ECOLOGICAL RISK ASSESSMENT
RIVER STUDY AREA
CHLOR-ALKALI FACILITY (FORMER) SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

SECTION **PAGE**

4.2 Risk Description 147
4.2.1 Introduction 147
4.2.2 Weight-of-Evidence Analysis 148
4.2.2.1 Magnitude of Response 148
4.2.2.2 Concurrence Among Endpoints 151
4.2.3 Risk Summary 151
4.3 Risk Conclusions 152

5.0 REFERENCES 155

TABLES

NUMBER

2-1 List of Fish Species of the Upper Androscoggin River
2-2 List of Amphibians and Reptiles of the Upper Androscoggin River Valley
2-3 Summary List of Potential Bird Species in the Upper Androscoggin River Valley
2-4 Summary List of Mammals of the Upper Androscoggin River Valley
2-5 Androscoggin River Data Available for Ecological Risk Assessment Use
2-6 Sediment Collection and Analyses Summary
2-7 Surface Water Collection and Analyses Summary
2-8 Pore Water Collection and Analyses Summary
2-9 Benthic Invertebrate Collection and Analyses Summary
2-10 Crayfish Collection and Analyses Summary
2-11 Fish Collection and Analyses Summary
2-12 Songbird Collection and Analyses Summary
2-13 Tree Swallow Collection and Analyses Summary
2-14 Bald Eagle Collection and Analyses Summary
2-15 Bat Collection and Analyses Summary
2-16 Toxic Equivalency Factors
2-17 Summary of Chemicals Detected in Surface Water – 2009
2-18 Summary of Chemicals Detected in Pore Water – 2009 and 2010
2-19 Summary of Chemicals Detected in Sediment – 2006, 2009, and 2010
2-20 Summary of Chemicals Detected in Larvae – 2009
2-21 Summary of Chemicals Detected in Rock Basket Composite – 2009
2-22 Summary of Chemicals Detected in Oligochaetes – 2009 and 2010
2-23 Summary of Chemicals Detected in Crayfish – 2009 and 2011

TABLE OF CONTENTS (cont.)
BASELINE ECOLOGICAL RISK ASSESSMENT
RIVER STUDY AREA
CHLOR-ALKALI FACILITY (FORMER) SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

TABLES (cont.)

NUMBER

2-24 Summary of Chemicals Detected in Fish – Smallmouth Bass (Fillet) and White Sucker (Whole Body) – 2009 and 2011
2-25 Summary of Chemicals Detected in Songbird Blood and Feathers – 2010
2-26 Summary of Chemicals Detected in Tree Swallow Blood – Adult – 2010
2-27 Summary of Chemicals Detected in Tree Swallow Blood – Nestling – 2010
2-28 Summary of Chemicals Detected in Tree Swallow Feather – Adult – 2010
2-29 Summary of Chemicals Detected in Tree Swallow Feather – Nestling – 2010
2-30 Summary of Chemicals Detected in Tree Swallow Eggs – 2010
2-31 Summary of Chemicals Detected in Bald Eagle Blood, Feathers, and Plasma – 2008 and 2011
2-32 Summary of Chemicals Detected in Bat Blood and Fur – 2010
2-33 Screening Benchmarks
2-34 COPEC Screening – Surface Water
2-35 COPEC Screening – Pore Water
2-36 COPEC Screening – Sediment
2-37 COPEC Screening – Crayfish
2-38 COPEC Screening – Fish
2-39 Final Ecological Assessment and Measurement Endpoints
2-40 Attributes for Judging Measurement Endpoints
2-41 BERA Endpoints and Weight-of-Evidence Documentation
3-1 Exposure Point Concentrations for Food Chain Modeling
3-2 Calculation of Field Metabolic Rates
3-3 Assimilation Efficiency (AE) and Gross Energy (GE) of Anticipated Prey Items
3-4 Dietary Exposure Parameters for the Belted Kingfisher
3-5 Dietary Exposure Parameters for the Mink
3-6 Total Daily Intakes – Kingfisher – RME
3-7 Total Daily Intakes – Mink – RME
3-8 Total Daily Intakes – Kingfisher – CTE
3-9 Total Daily Intakes – Mink – CTE
3-10 Summary of Tissue-Specific No Effect and Effect CBRs for Fish, Birds and Mammals
3-11 Summary of No Effect and Effect TRVs for Birds and Mammals
4-1 Summary of Risk Estimation Approach by Receptor Group and Measurement Endpoint
4-2 Wilcoxon Rank Sum (WRS) Test Results Comparing Data Upstream and Downstream
4-3 Kruskal-Wallis Rank Sum (KWRS) Test Results Comparing Data Grouped by Sampling Distance
4-4 NH Benthic Index of Biotic Integrity and Benthic Invertebrate Community Metrics

TABLE OF CONTENTS (cont.)
BASELINE ECOLOGICAL RISK ASSESSMENT
RIVER STUDY AREA
CHLOR-ALKALI FACILITY (FORMER) SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

TABLES (cont.)

NUMBER

4-5 Background Comparison Summary – Mercury
4-6 Summary of Exceeded TECs and PECs
4-7 Wilcoxon Rank Sum (WRS) Results Comparing the Effect of Reference Reach and Downstream Reach Sediments on 28-Day Survival and Growth of *H. azteca* and *C. dilutus*
4-8 Kruskal-Wallis Rank Sum (KWRS) Results Comparing the Effect of Reference Reach and Downstream Reach Sediments on 28-Day Survival and Growth of *H. azteca* and *C. dilutes*
4-9 Results of 7-Day Toxicity Tests with the Cladoceran, *Ceriodaphnia dubia*, and Fathead Minnow, *Pimephales promelas*
4-10 Summary of RME HQs Calculated Using No-Effects-Based TRVs – Kingfisher
4-11 Summary of RME HQs Calculated Using Effects-Based TRVs – Kingfisher
4-12 Summary of CTE HQs Calculated Using No-Effects-Based TRVs – Kingfisher
4-13 Summary of CTE HQs Calculated Using Effects-Based TRVs – Kingfisher
4-14 Incremental Risk – RME Case – No-Effects-Based TRVs
4-15 Incremental Risk – RME Case – Effects-Based TRVs
4-16 Incremental Risk – CTE Case – No-Effects-Based TRVs
4-17 Incremental Risk – CTE Case – Effects-Based TRVs
4-18 Summary of RME HQs Calculated Using No-Effects-Based TRVs – Mink
4-19 Summary of RME HQs Calculated Using Effects-Based TRVs – Mink
4-20 Summary of CTE HQs Calculated Using No-Effects-Based TRVs – Mink
4-21 Summary of CTE HQs Calculated Using Effects-Based TRVs – Mink
4-22 Summary of Major Uncertainties per Assessment Endpoint as Identified by Receptor
4-23 Scoring Sheet for Evidence of Harm and Magnitude – AR3
4-24 Scoring Sheet for Evidence of Harm and Magnitude – AR4
4-25 Scoring Sheet for Evidence of Harm and Magnitude – AR5
4-26 Scoring Sheet for Evidence of Harm and Magnitude – AR6
4-27 Scoring Sheet for Evidence of Harm and Magnitude – AR7
4-28 Scoring Sheet for Evidence of Harm and Magnitude – AR8
4-29 Scoring Sheet for Evidence of Harm and Magnitude – AR9
4-30 Concurrence of Endpoints – AR3
4-31 Concurrence of Endpoints – AR4
4-32 Concurrence of Endpoints – AR5
4-33 Concurrence of Endpoints – AR6
4-34 Concurrence of Endpoints – AR7
4-35 Concurrence of Endpoints – AR8
4-36 Concurrence of Endpoints – AR9
4-37 Summary of the Evidence for Ecological Risk – AR3

TABLE OF CONTENTS (cont.)
BASELINE ECOLOGICAL RISK ASSESSMENT
RIVER STUDY AREA
CHLOR-ALKALI FACILITY (FORMER) SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

TABLES (cont.)

NUMBER

4-38 Summary of the Evidence for Ecological Risk – AR4
4-39 Summary of the Evidence for Ecological Risk – AR5
4-40 Summary of the Evidence for Ecological Risk – AR6
4-41 Summary of the Evidence for Ecological Risk – AR7
4-42 Summary of the Evidence for Ecological Risk – AR8
4-43 Summary of the Evidence for Ecological Risk – AR9

TABLE OF CONTENTS (cont.)
BASELINE ECOLOGICAL RISK ASSESSMENT
RIVER STUDY AREA
CHLOR-ALKALI FACILITY (FORMER) SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

FIGURES

NUMBER

1-1 Generic Eight-Step Ecological Risk Assessment Process for Superfund
2-1 Study Area (Cell House Property, Facility Study Area)
2-2 River Study Area Plan
2-3 Sample Locations in Reaches 1 and 2
2-4 Sample Locations in Reaches 3, 4, 5, and 6
2-5 Sample Locations in Reaches 8 and 9
2-6 Conceptual Site Model
4-1 Total Mercury Concentrations in 2009 and 2010 Benthic Invertebrate Samples Compared with CBRs
4-2 Total Mercury Concentrations in 2009 and 2011 Whole Body Crayfish Samples Compared with CBRs
4-3 Total PCBs Concentrations in 2009 Crayfish Samples
4-4 Total Mercury Concentrations in Sediment Samples – 2006, 2009, and 2010
4-5 96-hr Chlor-Alkali Pore Water Toxicity Testing Using *C. tentans* (+1 SD) (August 2010)
4-6 96-hr Chlor-Alkali Pore Water Toxicity Testing Using *H. azteca* (+1 SD) (August 2010)
4-7 Total Mercury Concentrations in 2009 and 2011 Smallmouth Bass (Fillet) Samples Compared with CBRs
4-8 Total Mercury Concentrations in 2009 and 2011 White Sucker (Whole Body), Samples Compared with CBRs
4-9 Total PCBs Concentrations in 2009 Smallmouth Bass (Fillet) Samples Compared with CBRs
4-10 Total PCBs Concentrations in 2009 White Sucker (Whole Body) Samples Compared with CBRs
4-11 2,3,7,8-TCDD and PCB Dioxin-like Congener TEQ Concentrations in 2009 Smallmouth Bass (Fillet) Samples Compared with CBRs
4-12 2,3,7,8-TCDD and PCB Dioxin-like Congener TEQ Concentrations in 2009 White Sucker (Whole Body) Samples Compared with CBRs
4-13 Summary of Percent Survival (± 1 SD) for 7-Day Chlor-Alkali Surface Water Test Using *P. promelas*
4-14 Summary Dry Biomass (± 1 SD) for 7-Day Chlor-Alkali Surface Water Test Using *P. promelas*
4-15 Percent Survival (± 1 SD) for 8-Day C. dubia Chlor-Alkali Surface Water Toxicity Testing
4-16 Average Brooder Reproduction (± 1 SD) for 8-Day *C. dubia* Chlor-Alkali Surface Water Toxicity Test

TABLE OF CONTENTS (cont.)
BASELINE ECOLOGICAL RISK ASSESSMENT
RIVER STUDY AREA
CHLOR-ALKALI FACILITY (FORMER) SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

FIGURES (cont.)

NUMBER

4-17 Total Mercury Concentrations in 2010 Tree Swallow Blood Samples Compared with CBRs
4-18 Total Mercury Concentrations in 2010 Tree Swallow Feather Samples Compared with CBRs
4-19 Total Mercury Concentrations in 2010 Tree Swallow Egg Samples Compared with CBRs
4-20 Total PCBs Concentrations in 2010 Tree Swallow Egg Samples Compared with CBRs
4-21 2,3,7,8-TCDD and PCB Dioxin-like Congener TEQ Concentrations in 2010 Tree Swallow Egg Samples Compared with CBRs
4-22 Total Mercury Concentrations in 2010 Songbird Blood and Feather Samples Compared with CBRs
4-23 Total PCBs Concentrations in 2010 Songbird Blood Compared with CBRs
4-24 2,3,7,8-TCDD and PCB Dioxin-like Congener TEQ Concentrations in 2010 Songbird Blood Samples Compared with CBRs
4-25 Total Mercury Concentrations in 2008 Bald Eagle Blood and Feather Samples Compared with CBRs
4-26 Total PCBs Concentrations in 2011 Bald Eagle Plasma Samples Compared with CBRs
4-27 2,3,7,8-TCDD and PCB Dioxin-like Congener TEQ Concentrations in 2008 and 2011 Bald Eagle Plasma Samples Compared with CBRs
4-28 Total Mercury Concentrations in 2010 Bat Blood and Fur Samples Compared with CBRs
4-29 Total PCBs Concentrations in 2010 Bat Blood Samples Compared with CBRs
4-30 PCB Dioxin-like Congener TEQ Concentrations in 2010 Bat Blood Samples Compared with CBRs
4-31 Mercury Concentrations in Bat Blood versus Bat Fur – A1 and A9
4-32 Mercury Concentrations in Bat Blood versus Bat Fur – A9
4-33 Average Mercury Concentrations in Bass Axial Muscle from the Androscoggin River and Regional Waters

TABLE OF CONTENTS (cont.)
BASELINE ECOLOGICAL RISK ASSESSMENT
RIVER STUDY AREA
CHLOR-ALKALI FACILITY (FORMER) SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

APPENDICES

A	NH Natural Heritage Search Results
B	Two Species, 96-Hour, Acute Toxicity Testing Results Using Pore Water Samples Collected from the Androscoggin River in Areas Associated with Former Chlor-Alkali Facility in Berlin, NH
C	Two Species, Chronic Toxicity Testing Results Using Surface Water Samples Collected from the Androscoggin River in Areas Associated With Former Chlor-Alkali Facility in Berlin, NH
D	28 Day *Hyalella azteca* Survival and Growth Sediment Toxicity Test
E	20 Day *Chironomus dilutus*, Survival and Growth Sediment Toxicity Test
F	Sample Lists
G	Raw Data
H	ProUCL Outputs
I	USGS Open File Report 2013-1076 - Characterization of Mercury Contamination in the Androscoggin River, Coos County, New Hampshire
J	Statistical Comparisons
K	Sample-specific Sediment Hazard Quotients

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ACRONYMS

µm	micrometer
µg/kg	microgram per kilogram
2,3,7,8-TCDD	2,3,7,8-tetrachloro-dibenzo-p-dioxin
AE	Assimilation Efficiency
AHH	Arylhydrocarbon hydroxylase
AhR	Arylhydrocarbon-Receptor
amsl	above mean sea level
Avatar	Avatar Environmental, LLC
BERA	Baseline Ecological Risk Assessment
B-IBI	Benthic Index of Biotic Integrity
BRI	Biodiversity Research Institute
BW-day	Body Weight per Day
CBR	Critical body residue
CCC	Criteria Continuous Concentration
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CETIS™	Comprehensive Environmental Toxicity Information System™
CHP	Cell House Property
cm	centimeter
CMC	Criteria Maximum Concentration
COPEC	Chemical of Potential Ecological Concern
CSM	Conceptual Site Model
CTE	Central Tendency Exposure
CYP1A1	Cytochrome P4501A1
CYP1A2	Cytochrome P4501A2
DMA	Direct Mercury Analyzer
DNA	Deoxyribonucleic Acid
DO	Dissolved oxygen
DOC	Dissolved organic carbon
DQO	Data Quality Objective
DW	Dry weight
EC_{20}	20% Effective Concentration
EFSA	Eastern Facility Study Area

ACRONYMS (cont.)

EPA	United States Environmental Protection Agency
EPC	Exposure Point Concentration
EPT	Ephemeroptera, Plecoptera, and Trichoptera
EqP	Equilibrium partitioning-based
ERA	Ecological Risk Assessment
ERAGS	Ecological Risk Assessment Guidance for Superfund
ERL	Effect Range Low value
EROD	Ethoxyresorufin-O-Deethylase
ESAT	Environmental Services Assistance Team
FCV	Final chronic value
FIR	Food intake rate
FMR	Field metabolic rate
FS	Feasibility Study
FSA	Facility Study Area
ft	feet
ft/mi	feet per mile
ft^3	cubic foot/feet
ft^3/s	cubic feet per second
FW	fresh weight
g	gram
GE	Gross Energy
Hg II	divalent mercury
Hg	mercury
$HgCl_2$	mercuric chloride
HHRA	Human Health Risk Assessment
HM	Heavy metals
HQ	Hazard Quotient
IR	Incremental Risk
Kcal	Kilocalorie
Kg	Kilogram
KM	Kaplan-Meier
km	Kilometer

ACRONYMS (cont.)

K_{oc}	Soil or sediment to water partition coefficient
KWRS	Kruskal Wallis Rank Sum
l/kg	Liter per kilogram
LC_{50}	Lethal Concentration – 50%
LD_{50}	Lethal Dose – 50%
LEL	Lowest Effect Level
LOAEL	Lowest Observed Adverse Effect Level
meHg	Methylmercury
mL	milliliter
mm	millimeter
NADC	North American Dismantling Corporation
ND	Non-detect
NEL	No-Effect Level
ng/l	Nanogram per liter
NHDES	New Hampshire Department of Environmental Services
NHNHB	New Hampshire Natural Heritage Bureau
NOAEL	No Observed Adverse Effect Level
Nobis	Nobis Engineering, Inc.
NPL	National Priorities List
OCDD	Octachlorodibenzo-p-dioxin
OCDF	Octachlorodibenzofuran
OEME	Office of Environmental Measurement and Evaluation
OMEE	Ontario Ministry of the Environment and Energy
PA/SI	Preliminary Assessment/Site Inspection
PAH	Polycyclic aromatic hydrocarbon
PCBs	Polychlorinated biphenyls
PCDDs	Polychlorinated dibenzo-p-dioxins
PCDFs	Polychlorinated dibenzofurans
PEC	Probable Effect Concentration
PWQOs/Gs	Provincial Water Quality Objectives and Guidelines
RAGS	Risk Assessment Guidance for Superfund
RI	Remedial Investigation

ACRONYMS (cont.)

RM	River Mile
RME	Reasonable Maximum Exposure
RSA	Androscoggin River Study Area
SARA	Superfund Amendments and Reauthorization Act
SCV	Secondary Chronic Value
SEL	Significant-Effect Level
SFSA	Southern Facility Study Area
Site	Chlor-Alkali Facility (Former) Superfund Site
SLC	Screening Level Concentration
SLERA	Screening-Level Ecological Risk Assessment
SMDP	Scientific/Management Decision Points
SQB	Sediment Quality Benchmark
SQC	Sediment Quality Criteria
SQG	Sediment Quality Guideline
SQL	Sample Quantitation Limit
SSLC	Species Screening Level Concentration
SVOCs	Semi-volatile organic compounds
T&E	Threatened and Endangered
TAC	Test Acceptability Criteria
TCDD	Tetrachlorodibenzo-p-dioxin
TCDF	Tetrachlorodibenzofuran
TDI	Total Daily Intake
TEC	Threshold Effect Concentration
TEFs	Toxic Equivalency Factors
TEL	Threshold Effect Level
TEQ	Toxic Equivalency Quotient
tHg	Total Mercury
TOC	Total Organic Carbon
TRG	Tissue Residue Guideline
TRV	Toxicity Reference Value
UCL	Upper Confidence Limit
UF	Uncertainty Factor

ACRONYMS (cont.)

USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VOCs	Volatile organic compounds
WHO	World Health Organization
WOE	Weight-of-Evidence
WQC	National Recommended Water Quality Criteria
WRS	Wilcoxon Rank Sum
WW	Wet weight

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1.0 INTRODUCTION

Nobis Engineering, Inc. (Nobis), and Avatar Environmental, LLC (Avatar) have prepared this Baseline Ecological Risk Assessment (BERA) for the United States Environmental Protection Agency (EPA) in support of the Remedial Investigation (RI) and Feasibility Study (FS) for the Androscoggin River Study Area (RSA) of the Chlor-Alkali Facility (Former) Superfund Site (Site). The BERA was completed under EPA Contract No. EP-S1-06-03, Task Order No. 0013-RI-CO-01BQ. The Site, located in Berlin, New Hampshire, was placed on the National Priorities List (NPL) in 2005. This BERA was developed consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 under the authority of EPA Region 1.

Volume I of the RI report presents the investigation results, the nature and extent of contamination, and the contaminant fate and transport. Volume II presents the Human Health Risk Assessment (HHRA). Volume III presents the Ecological Risk Assessment, and consists of Volume IIIA – River BERA, and Volume IIIB – Terrestrial Screening-Level Ecological Risk Assessment (SLERA).

1.1 Purpose and Approach

This BERA documents the potential exposure and consequent risk to ecological receptors exposed to contamination in the portion of the Androscoggin River downstream of the defunct Brown Company's former chemical plant. Historical information regarding the former chemical plant processes indicates the potential direct and indirect discharge of mercury and other chemicals to the river while the plant was in operation. Current investigations indicate that contaminants continue to migrate to the river through bedrock fractures underlying the footprint of the former chemical plant. Based on the results of this information as well as those of earlier investigations (see Section 1.4 of the RI Report, Volume I), the RSA for this BERA extends from the Pontook Reservoir dam at River Mile (RM 28) to the Shelburne Dam (RM 6) located approximately 6 miles upstream of the Maine state line. The former chemical plant is situated in the Cell House Property (CHP), which is immediately adjacent to Sawmill Dam (RM 16.5). To determine the background conditions of the river upstream CHP, a reference reach was established from Sawmill Dam to approximately 1 mile north of the Pontook Reservoir. The RSA is described in additional detail in Section 2.2.1.

This BERA was prepared in parallel with the HHRA conducted for the RSA by the Nobis/Avatar Team.

1.2 Ecological Risk Assessment Guidance

The objective of an Ecological Risk Assessment (ERA) is to characterize and quantify, where appropriate, the current impact and the potential ecological risks that would occur should no remedial action be taken. Results of the BERA will identify potential ecological risks posed by hazardous substances, pollutants, or contaminants in the RSA. The BERA results will be used during the FS to aid in the development and selection of remedial alternatives should there be an unacceptable level of risk to the ecological communities of the Androscoggin River. EPA's *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (hereafter, referred to as the Guidance) (EPA, 1997) will serve as the primary source in developing this BERA. This Guidance describes a progressive and iterative process that is consistent with and incorporates the basic and fundamental approach to performing ERAs outlined by EPA's Risk Assessment Forum in its *Framework for Ecological Risk Assessment* (Framework) (EPA, 1992) and *Guidelines for Ecological Risk Assessment* (Guidelines) (EPA, 1998). This Guidance outlines an 8-step process and includes several scientific/management decision points (SMDPs) (see Figure 1-1). The purpose of the SMDPs is to re-evaluate the scope, focus, and direction of the ERA as relevant information and data become available.

Although this BERA does not explicitly require the six SMDPs outlined in the Guidance, meetings between EPA's risk managers and the risk assessment team were conducted on a regular basis over the course of the RI to evaluate and direct the work in support of the ecological risk assessment. All work performed for the BERA was subject to oversight by the EPA as well as input from a variety of other stakeholders including the New Hampshire Department of Environmental Services (NHDES), the U.S. Fish & Wildlife Service (USFWS), and the U.S. Geological Survey (USGS).

In addition to and incorporated within the framework of the guidance discussed previously, the following documents were used in the development of this BERA:

- Guidelines for Ecological Risk Assessment (EPA, 1998).
- Framework for Ecological Risk Assessment (EPA, 1992).
- Wildlife Exposure Factors Handbook, Volumes I and II (EPA 600R-93/187a and 187b) (EPA, 1993).
- Risk Assessment Guidance for Superfund (RAGS), Volume II: Environmental Evaluation Manual (EPA 540/1-89/001) (EPA, 1989).
- Ecological Assessment of Hazardous Waste Sites: A Field and Laboratory Reference Document (EPA 600/3-89/013) (Suter II, 1989).
- Ecological Risk Assessment Issue Papers (EPA/630R-94/009) (Suter II et al., 1994).
- ECO Updates, Volumes 1-4 (EPA Office of Solid Waste and Emergency Response) (EPA, 1991-1994).
- Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities (EPA 530-D-99-001A) (EPA, 1999).

1.3 Report Overview

The remainder of this report describes the comprehensive ERA process. The components of the ERA process and their specific objectives are listed and described below.

Problem Formulation (Section 2) — The Problem Formulation step for the RSA BERA presents the goals and focus of the ecological risk assessment. It is a formal process to develop and evaluate a preliminary hypothesis concerning the likelihood and causes of ecological effects that may have occurred, or may be occurring, from the release of mercury, polychlorinated biphenyls (PCBs), and dioxin/furans from the former chemical plant. This step addresses the following:

- Overview of site history, and site characterization.
- Preliminary description of the ecosystem potentially at risk.
- Summarization of the ecological conceptual site model (CSM).
- Selection of assessment and measurement endpoints.
- Determination of evaluation criteria for measurement endpoints for Weight of Evidence (WOE) evaluation.
- Calculation of numerical weight and measurement endpoints for WOE approach.

Analysis Phase (Section 3) – This section is based on the CSM developed during the Problem Formulation and consists of two primary components: 1) Characterization of Exposure and 2) Characterization of Ecological Effects. In the Characterization of Exposure the potential adverse effects to ecological receptors caused by exposure to chemical stressors is assessed by evaluating the co-occurrence of the stressors and the ecological receptors. The Characterization of Ecological Effects evaluates effects data to assess: 1) the link between elicited effects and stressor levels; 2) the relationship between the elicited effects and the associated assessment endpoint; and 3) the validity of the exposure model (i.e., are conditions under which the effects occur consistent with the CSM) (EPA, 1996).

Risk Characterization (Section 4) – This section is divided into two stages: 1) Risk Estimation and 2) Risk Description. Risk Estimation integrates exposure and stressor-response information from the Analysis Phase; estimates the likelihood of adverse effects on the assessment endpoint of concern; and addresses the uncertainty, assumptions, and limitations. Risk Description provides a complete and informative synthesis of the overall conclusions regarding risk estimates and supports the development of risk management decisions. The WOE evaluation integrates different types of environmental data and analyses (e.g., different measurement endpoint results) to characterize risk posed to the ecology of the Androscoggin River considering all assessment endpoints.

2.0 PROBLEM FORMULATION

Section 2 presents the Problem Formulation step of the BERA.

2.1 Scope and Introduction

As previously mentioned (see Section 1.2), the primary guidance used to perform the Androscoggin RSA BERA is the EPA's interim final document entitled *Ecological Risk Assessment Guidance for Superfund (ERAGS): Process for Designing and Conducting Ecological Risk Assessments* (EPA, 1997). This guidance outlines an 8-step process intended to ensure that the "risk assessment is proceeding in a direction that is acceptable to the risk assessor and the risk manager." Figure 1-1 describes the 8-step ecological risk assessment process and indicates the SMDPs in that process and includes:

Step:

1) Screening-level problem formulation and ecological effects evaluation.
2) Screening-level preliminary exposure estimates and risk calculation.
3) Baseline risk assessment problem formulation.
4) Study design and data quality objectives (DQOs).
5) Field verification of sampling design.
6) Site investigation and analysis of exposure and effects.
7) Risk characterization.
8) Risk management.

This section encompasses Steps 1 through 3 that together are considered the "Problem Formulation Phase," which is the first stage in the development of an ERA. The Problem Formulation Phase is a systematic process that identifies key factors to be addressed in the ERA. The first two steps are essentially a SLERA. In Step 1 (Screening-Level Problem Formulation and Ecological Effects Evaluation), the following information is provided:

1) Description of habitats potentially affected;
2) List of flora and fauna present or potential for these habitats;
3) Preliminary CSM (e.g., pathways by which the receptors may be exposed);
4) Preliminary assessment and measurement endpoints;

5) Data available to evaluate the RSA; and
6) Screening benchmarks appropriate to use to screen for ecological risk.

In Step 2 (Screening-level Preliminary Exposure Estimates and Risk Calculation), site-specific concentration data are compared with ecological screening-level benchmarks to determine if the potential for ecological risk exists; and, if so, the chemicals of potential ecological concern (COPECs) for each exposure medium are defined. The decision to continue beyond the screening-level steps does not indicate that risk is unacceptable or that risk reduction is necessary, rather it indicates that a more focused evaluation and characterization of the potential for risk and accompanying uncertainty is needed.

If potential ecological effects are noted in Step 2, the BERA process continues to Step 3 – Baseline Problem Formulation. Step 3 includes the final CSM, the final assessment and measurement endpoints, and a discussion of WOE approach to be used in the risk characterization.

Altogether, in the problem formulation phase, the risk assessment objectives are stated, the problem is defined in the form of a CSM, and the approach for analyzing and characterizing the ecological risk(s) is determined. The problem formulation typically results in several primary products that include:

1) COPECs that will be evaluated for potential ecological risks in the BERA;
2) Complete exposure pathways that integrate fate and transport information with potential ecological receptor occurrence;
3) Assessment endpoints that adequately reflect the risk management goals and the ecosystem(s) under investigation;
4) CSM that describes key relationships between the contaminant(s) and assessment endpoints; and
5) Risk questions that the ERA will address.

2.1.1 Site Description and History

The Site is located in the City of Berlin, Coos County, New Hampshire. For the RI, principal areas evaluated included the Cell House Property (CHP), the Facility Study Area (FSA), and the

RSA (Figures 2-1 and 2-2). For the purpose of this report, the term “Study Area” is used to describe the area investigated during the RI that includes the CHP and FSA, which represents the area occupied by the former chemical plant and adjoining areas. The Study Area was part of a former pulp and paper mills complex that encompassed more than 170 acres. Over the years, land occupied by the former mill complex was divided and sold to new owners.

This BERA evaluates the potential ecological risk to flora and fauna inhabiting the Androscoggin River that may have resulted from chemical releases from the former chemical plant, and subsequent overland runoff to the river as well as contaminants leaching to groundwater and migration to the river. To relate the RSA BERA to the operations of the former chemical plant, the following narrative presents a brief description and history. A more comprehensive discussion of the site description is presented in Section 1.2 of the Volume I of RI Report.

The CHP is a 4.6-acre property on the east bank of the Androscoggin River immediately downstream of the Sawmill Dam (Figure 2-1). The CHP is bounded on the north by the Sawmill Dam and the Androscoggin River; on the east by a former penstock canal as well as inactive and overgrown industrial areas with Hutchins Street beyond; on the south by inactive and overgrown industrial areas containing a derelict railroad siding and rail bridge; and on the western boundary by the Androscoggin River.

The CHP consists of a relatively flat parcel currently covered with a landfill containing demolition debris. Ground surface elevation of the capped area ranges between 1,090 feet (ft) and 1,102 ft above mean sea level (amsl).

The area immediately adjacent to the CHP is designated the FSA, which was subdivided as the Southern FSA (SFSA) and the Eastern FSA (EFSA) for remedial investigation purposes. The SFSA and the EFSA represent a 38-acre area that lies to the south, east, and north of the CHP (Figure 2-1). The SFSA was previously used as a rail yard and included portions of the former chemical plant. Some of the contaminants present in the SFSA may be related to past rail yard activities (i.e., loading and unloading of chemicals) or support activities of the former chemical plant.

Although the area surrounding the Study Area is largely industrial, residential communities lie to the east, west, and south.

The detailed Site history is provided in Section 1.3 of the RI Report, Volume 1.

2.1.2 Androscoggin River Study Area (RSA)

A general description of the Androscoggin River and a detailed discussion of the characteristics of each of the river reaches evaluated as part of the RSA BERA are presented in Section 2.2.1 – Ecological Setting.

2.2 Screening-level Problem Formulation and Ecological Effects Evaluation (Step 1)

The components of Step 1 in the ERA process are as follows:

- Ecological Setting,
- Preliminary CSM,
- Preliminary Endpoints,
- Site Studies and Available Data,
- Data Evaluation and Reduction,
- Data Summary, and
- Development of Screening-Level Benchmarks.

2.2.1 Ecological Setting

The problem formulation assesses the extent to which COPECs and ecological habitats and associated receptor species co-occur, resulting in exposure and the potential for adverse effects to those species. A principal component in determining the flora and fauna potentially at risk is the description and evaluation of the ecological setting.

This subsection of the problem formulation presents an ecological characterization of the Androscoggin RSA. Information on types of habitat, flora, and fauna utilizing those habitats, and the potential occurrence of threatened and endangered (T&E) species is used in conjunction with data describing site-related contaminant distributions. In this report, the description of the ecological setting is presented into the following subsections: 1) general characteristics of the Androscoggin River in the RSA; 2) reach-specific habitat characteristics and observed and

potential flora and fauna occurring in those habitats; and 3) potential threatened and endangered species and habitats of special concern.

Due to the length and complexity of the Androscoggin River ecosystem in the RSA, it would be impractical to attempt to describe this ecosystem in more than general terms. In an effort to describe key ecological characteristics of the Androscoggin River watershed, information compiled by a number of state, federal, and private agencies was reviewed and summarized herein. Specific information evaluated included habitat descriptions, population surveys and inventories, threatened and endangered species accounts, localized habitats of special concern, and any general information pertaining to the ecological communities directly or indirectly associated with the Androscoggin River. Agencies and source documents include, among others:

Agency or Author(s)	Document(s)
New Hampshire Fish and Game Department	New Hampshire Wildlife Action Plan
New Hampshire Division of Forests and Lands, New Hampshire Natural Heritage Bureau	Natural Communities of New Hampshire Threatened and Endangered Species - Data Check Results Letter, Androscoggin River, Coos County
New Hampshire Division of Environmental Services	New Hampshire Water Resources Primer, Chapter 2: Rivers and Streams
U. S. Fish and Wildlife Service	Federally Listed Endangered and Threatened Species in New Hampshire
U. S. Geological Survey	Characterization of Mercury Contamination in the Androscoggin River, Coos County, New Hampshire
University of New Hampshire	An Introduction to Rare Plants and Animals of New Hampshire
DeGraff, Richard M. and M. Yamasaki	New England Wildlife – Habitat, Natural History, and Distribution

The initial component of the ecological setting provides a physical description of the RSA. In addition to providing a general discussion of the Androscoggin River in the RSA, it also provides a more detailed description of each of the reaches potentially affected by the discharge of contaminants to the Androscoggin River, as well as those unaffected reaches that serve as a basis for background or reference conditions.

2.2.1.1 General Characteristics of the Androscoggin River in the River Study Area

The Androscoggin River originates at the outlet of Umbagog Lake in Errol, New Hampshire, at approximately the New Hampshire-Maine border and runs for 170 miles where it empties into the Gulf of Maine at Merrymeeting Bay in Brunswick, Maine. The River is one of the major New England river basins, extending from the Canadian border to the Atlantic Ocean. It drains a total land area of approximately 3,450 square miles with approximately one-fifth, or 716 square miles, of the watershed in New Hampshire (Androscoggin River Watershed Council, 2008).

In New Hampshire, the Androscoggin watershed extends from its source in Errol, New Hampshire where the Magalloway River joins the outlet of Umbagog Lake to the Maine state line, a river distance of about 45 miles (Figures 2-3 through 2-5). The river flows generally south and includes significant bends at the towns of Errol and Milan and the city of Berlin before turning east at Gorham, New Hampshire where it crosses the northern end of the White Mountains and enters Maine about 6 miles below Shelburne.

The Androscoggin River watershed in New Hampshire includes 1,264 miles of river and streams (NHDES, 2008). The drainage area is covered by 87% forest, 6.2% surface water, 3% wetlands, 2% barren lands, and 1% agriculture fields, and 0.3% urban (EPA, 2006). A variety of land uses occur in the watershed including agriculture, silviculture, state and national wildlife refuges and parks, residential developments, recreational lands (e.g., golf course) and commercial, industrial, and urbanized areas located principally within the city limits of Berlin, New Hampshire. All of these land uses represent potential point and non-point sources of chemical and non-chemical stressors (e.g., sediment) to the Androscoggin River and the fish and wildlife that inhabit and forage the river. Major tributaries to the Androscoggin River in this regional watershed include the Magalloway River, Clear Stream, and Mollidgewock Brook, which enter the Androscoggin River near Errol; Chickwolnepy Stream in Milan; Dead River in Berlin; and Moose Brook, Moose River, and Peabody River, which discharge to the Androscoggin River in Gorham.

Flow in the Androscoggin RSA is regulated by eight hydroelectric dams and is controlled in response to power demands, floods, and structure maintenance. The USGS maintains two river flow gauges on the Androscoggin River in the RSA. The uppermost gauging station is below the

Errol Dam at Errol, New Hampshire. River flow in this reach of the river is largely regulated by the opening or closing of the Errol Dam and historically has ranged from 16,500 to a nominal flow of < 1 cubic feet per second (ft^3/s) when the dam is closed. The mean annual flow between 1905 and 2011 was 1,919 ft^3/s.

A second USGS gauging station is located below the Androscoggin River Dam at Gorham, New Hampshire. The mean annual flow measured at the USGS gauge in Gorham, New Hampshire, is 2,110 ft^3/s with May typically having the highest average annual flow (4,210 ft^3/s) and August the lowest (1,960 ft^3/s) (Degnan et al., 2011).

Due to the regional topography, elevation gradient, and the placement of dams, the river in the RSA demonstrates diverse flow characteristics. The average channel slope in the investigation area from the CHP (Sawmill Dam) to the Maine State line is 26.1 feet per mile (ft/mi). In the reference reach (AR1 & AR2), the river is relatively shallow and of moderate velocity until the flow is impeded by Sawmill Dam. The dam serves to moderate flow and stream velocity to create a riverine pool of moderate depth above the dam. From approximately the Sawmill Dam at the north end of Berlin to Androscoggin River Dam, the historical character of the river included narrow gorges, falls, and fast-flowing waters. Because of these characteristics, industry constructed numerous dams in this energetic section of the river to power pulp and paper mills, textile mills, other industry, and most recently hydroelectric facilities. These hydroelectric facilities, characterized as “run-of-river” projects, are usually located on the river where there is a natural drop in the river channel such as a fall or gorge, and an acceptable supply of water. In the town of Berlin, erosion-resistant bedrock forms a channel with near continuous cascades (FEMA, 1981). The river gradient in the reach between Sawmill and Cascade Dams is approximately 100 ft/mi and between Sawmill and Androscoggin River Dams, the river drops from an elevation of 1,082 ft amsl at Sawmill Dam to 760 ft amsl at Androscoggin River Dam, a gradient of about 46 ft/mi. As a result of the dam placement, much of the river immediately upstream of the dams can be characterized as riverine pools although the flow characteristics are periodically altered by the dam operations. Downstream of the Androscoggin River Dam, the channel has a moderate gradient and is braided and anabranched (i.e., channel splitting, forming islands) with localized meandering sections (Degnan et al., 2011).

From the source of the Androscoggin to the Maine State line, the dams and other features of consideration are included in the table below.

Feature	River Distance km[1, 2] (mile)	Latitude[2]	Longitude[2]	Elevation[2] (ft)
Errol Dam[3]	~ 70 (44)	44.787 º	71.126 º	1247
Pontook Dam	~ 45 (28)	44.633 º	71.249 º	1158
Sawmill Dam	26.3 (16.2)	44.486 º	71.166 º	1082
CHP	26.3 (16.2)	44.478 º	71.167 º	1069
Riverside Dam	25.8 (16.0)	44.476 º	71.162 º	1062
Smith Hydro Dam	25.1 (15.6)	44.468 º	71.174 º	1002
Berlin POTW	23.8 (14.8)	44.459 º	71.183 º	902
Cross Power Dam	23.5 (14.6)	44.486 º	71.166 º	902
Cascade Dam	22.6 (14.0)	44.448 º	71.187 º	892
Gorham Dam	18.0 (11.2)	44.408 º	71.194 º	803
Androscoggin River Dam	14.2 (8.8)	44.390 º	71.167 º	760
Shelburne Dam	9.6 (6.0)	44.403 º	71.114 º	734
Maine State Line	0	44.387 º	71.015 º	682

Notes:

1 River distance was measured from where the Androscoggin meets the Maine State Line

2 Elevation as well as Latitude and Longitude are taken from Google Earth. River distance is from USGS map.

3 Errol Dam forms the source of the Androscoggin River and Lake Umbagog.

4 Note that in discussing the riverine pool upstream of the dam, the name of the pool is that of the retaining dam.

Because of the moderate to swift flow regime as well as the limited meander, much of the shoreline of the Androscoggin RSA is relatively high-banked with moderate to steep slope. Consequently, floodplains are characterized, in most places, by terraced landforms, well elevated (>10 ft) above the river. Sedimentation requirements needed for low-lying floodplain development are limited and few low-lying floodplains occur throughout the RSA upstream. Minor floodplains in the RSA are located 1) along the western shoreline below Cascade Dam (known locally as Cascade Flats). Floodplains that are more significant occur along the southern shoreline of the Shelburne Reservoir below Androscoggin River Dam.

2.2.1.2 Androscoggin RSA Reach Descriptions

The RSA consists of two principal subareas of the river including:

1) the potentially affected reach of the Androscoggin River from Sawmill Dam adjacent the CHP downriver to the Maine state line a distance of approximately 16.3 miles; and
2) a background or reference reach extending approximately 12.5 miles from Sawmill Dam upstream to approximately 1 mile north of the Pontook Dam (Figure 2-3).

A. Potentially Affected Reaches

There are seven distinct reaches identified in the potentially affected portion of the river between the CHP and the Maine state line. They include:

- AR3—Sawmill Dam to Riverside Dam;
- AR4—Riverside Dam to Smith Hydro Dam;
- AR5—Smith Hydro Dam to Cross Power Dam;
- AR6—Cross Power Dam to Cascade Dam;
- AR7—Cascade Dam to Gorham Dam;
- AR8—Gorham Dam to Androscoggin River Dam; and
- AR9—Androscoggin River Dam to Shelburne Dam.

The following narrative provides a general description of each of the reaches in the affected portion of the RSA.

1. AR3 (Sawmill Dam, RM 16.2 to Riverside Dam, RM 16.0)

The AR3 reach runs immediately adjacent the former chemical plant (including the CHP and the SFSA). The river flows from the pool upstream of Sawmill Dam either through the power house located on the west bank of the river or over the spillway into the tailrace that runs along the CHP perimeter on the eastern side of the river. The east bank of AR3 borders the CHP and the SFSA and is characterized by a steep fractured bedrock outcrop with a subtending ledge at approximately river level. In August 2009, AR3 varied between 200 and 250 ft wide with an average depth of 6.8 ft and a maximum depth of about 15.8 ft. The substrate of the river in this reach is characterized as very stony, sometimes shallow, with some debris present. As previously noted, beads of elemental mercury and mercury amalgam have been found emanating from bedrock fractures along the east bank, directly below Sawmill Dam and adjacent to the CHP. Approximately 300 meters south of Sawmill Dam, the river deepens and

the current moves strongly beneath an inactive railroad trestle that spans the river. Within 200 ft downstream of the railroad trestle, Riverside Dam begins along the eastern riverbank and runs diagonally across the river. Habitat types occurring in AR3 include a riffle section immediately below the dam spillway and in the tailrace. Below the riffle area, the river widens from a short riverine run to a broad pool. Note that during certain dam maintenance operations, the river flow is diverted to an outfall located well downriver of the dam. In some cases, this results in the exposure of the river bottom (i.e., bedrock, gravel bars, and sediment). During these periods, contaminants sequestered in these areas may be a risk to birds and mammals that forage these substrates that would not otherwise be available.

2. AR4 (Riverside Dam, RM 16.0 to Smith Hydro Dam, RM 15.6)

At the head of AR4, Riverside dam directs flow at the western end of the dam to a penstock that discharges to the J. Brodie Smith Hydroelectric Generating Station (Public Service Company of New Hampshire) about 0.3 miles downstream. Habitat in this reach consists largely of a riffle section that runs along the eastern side of the river from Riverside Dam to the confluence with the penstock flow. The river is narrowly confined within steep banks once beyond the power house and runs downstream for approximately 300 meters before broadening into a broad pool upstream of Smith Hydroelectric Dam. The main flow of the river at this point flows along the west bank before entering into another penstock. River water from the dam either flows either through the penstock or through a waste gate located directly east of the inlet to the penstock. To ensure uninhibited flow, sediment that accumulates immediately upstream of the penstock, is dredged on an annual basis. Dredging typically occurs during the low flow period in late summer (generally August-September). As noted for Reach 3, the lowering of the river during maintenance operations results in the exposure of a large area of the river bottom upstream of the dam. During this period, mudflats are exposed along the eastern shoreline between the Smith Dam and the boat launch. In addition, aggregation bars of pebble and gravel are exposed from the shoreline to the approximate location of the river channel. Contaminants sequestered in sediment in these areas may be a risk to birds and mammals that forage these substrates that would not otherwise be available.

3. AR5 (Smith Hydro, RM 15.6 to Cross Power Dam, RM 14.6)

This 1-mile segment of the river is located at the base of one of the larger historical falls on the Androscoggin River. As such, the river at this point resides within a gorge with flow determined

largely by the discharge of the Smith Hydropower dam. At high flow or flow diversion during dredging operations, the river spills to its natural channel. The riverbed in this area is characteristic of heavy scour and is dominated by bedrock outcropping as well as alluvial boulder, rock, and stone. This riffle stretch runs about 0.4 miles before joining with the flow from the generating station discharge. At this point, the river widens to form a run and deepens until it reaches a maximum width of about 400 ft to form the riverine pool above the Cross Power Dam. At a location approximately 0.2 miles upstream of the Cross Power Dam, the Berlin wastewater treatment plant, which is designed to treat an average flow of 2.64 million gallons per day of wastewater, discharges treated wastewater to the Androscoggin River.

4. AR6 (Cross Power Dam, RM 14.6 to Cascade Dam, RM 14.0)

A relatively short reach of 0.6 miles, AR6 is about 200 ft wide and shallow in the area immediately below the spillway. Downriver, the reach deepens and broadens to about 500 ft, above Cascade Dam. Alluvial fan deposits consisting of sand, gravel, and silt are found on the east bank of the river upstream from the Cascade Dam. It appears that this reach may be commonly fished as a residential neighborhood and a boat launching area on the western bank are located just upstream of the train trestle.

5. AR7 (Cascade Dam, RM 14.0 to Gorham Dam, RM 11.2)

This reach contains stretches of both shallow water riffles and deeper riverine glides. Shallow waters are located immediately below Cascade Dam and on a one-mile stretch occurring in the middle of the reach. These 2.8 miles reach averages 200 to 250 ft in width. The bordering land use of the upper portion of the reach is largely industrial (former Cascade Plant) with a residential neighborhood, Cascade Flats, along the western shoreline. The eastern shoreline is heavily forested throughout the length of AR7. Alluvial fan deposits, consisting of sand, gravel, and silt are found on the east bank of the river upstream from the Gorham Dam.

6. AR8 (Gorham Dam 11.2, RM to Androscoggin River Dam, RM 8.8)

At the Gorham dam, the Androscoggin River flows through two waterways. The natural channel of the river flows from the dam along the western portion of this reach. A manmade waterway for hydroelectric generation occurs immediately to the east of this where it joins the main river

approximately 1 mile below the Gorham Dam. It is in this reach that the Androscoggin River begins its bend to the east and the Maine line.

Fairly extensive residential and commercial development occurs on the southern bank of the river in this reach. Again, the northern shoreline is exclusively forest.

Stratified sand, gravel, and silt alluvium is the dominant deposit beneath the river channel from the backwater behind the Gorham Dam.

7. AR9 (Androscoggin River Dam, RM 8.8 to Shelburne Dam, RM 6.0)

The river channel at the Androscoggin River Dam is bisected into northern and southern channels by an island located approximately in the middle of the river. Between this island and the northern shoreline, a dam was built to deepen the river and increase water volume for hydroelectric power generation. On the southern side of this island, the river forms a natural forebay that directs flow to a hydroelectric plant located at the foot of the island. The northern and southern channels rejoin below the island in a narrow (~ 200 ft wide) glide of about ½ mile at which point the Peabody River tributary enters on the south side of the river. Just below this confluence and at the head of the reservoir, the river is braided with localized meandering sections of shallow riffles and a number of small islands located in the middle of the river. Below these islands, the river widens to form the Shelburne Reservoir with a maximum width of about ¼ mile and depth ranging from 3 to 5 ft. Alluvial fan deposits, consisting of sand, gravel, and silt are found on the south bank near the Androscoggin River Dam and along Shelburne Reservoir. Stratified sand, gravel, and silt alluvium is the dominant deposit beneath the river channel from Androscoggin River Dam to the New Hampshire–Maine State border. During an observed period of maintenance of the Shelburne dam, the reservoir was dewatered to the extent that large expanses of typically subaqueous shoreline were exposed. Moreover, many of the aggregation bars and otherwise shallow portions of the reservoir were also exposed. Again, during these periods, contaminants sequestered in these areas may be a risk to birds and mammals that forage these substrates that would not be available otherwise.

Along the southern border of Shelburne Reservoir, a previous cove along the shoreline was separated from the main river by the construction of a levee to support a railroad. The placement of this levee resulted in the formation of a shallow pond (Reflection Pond) of about

35 acres. It is assumed that the pond is connected to the reservoir by culverts along the levee, however, the extent of connectivity is not known.

B. Reference Reaches

Two primary reference reaches were established in the portion of the river upstream of the CHP and include:

1. AR1—Above Pontook Dam (Pontook Reservoir)

The Pontook Reservoir is a 280-acre impoundment on the Androscoggin River in Coos County in northern New Hampshire, United States. The dam and impoundment are located in the town of Dummer, New Hampshire. The reservoir was created for hydroelectric power generation. Land use adjacent to Pontook Reservoir is largely forested wetland and upland forest. This area served as a reference area for the bird and bat studies.

2. AR2—Pontook Dam to Sawmill Dam

Reach 2 (AR2) represents a 12-mile stretch of the Androscoggin River that originates at the Pontook Reservoir and terminates at the Sawmill Dam – the start of Reach 3. Exiting the Pontook Reservoir, the Androscoggin River flows through two waterways. The natural channel of the river flows from Pontook Dam to the southeast through this reach for approximately 2 miles where it enters the west side of Wheeler Bay (Figure 2-3). This portion of the river averages 150 ft to 200 ft in width and is characterized by shallow, quick flowing waters with a riverbed consisting principally of rock, cobble, and pebble. A second channel, used for hydroelectric generation, which is manmade, is located east of the natural river channel and flows from Pontook Reservoir to the north end of Wheeler Bay, a distance of about 1 mile. Wheeler Bay is a shallow embayment formed by an acute bend and broadening of the Androscoggin River. This embayment encompasses approximately 38 acres of relatively shallow water with a number of vegetated islands that provide habitat for a variety of marsh birds. In August 2009, the Wheeler Bay AR2 ranged in width from 300 to 1,000 ft with an average depth of 4.0 ft and a maximum depth of 15.0 ft (Degnan et al., 2011).

Wheeler Bay is located in a rural setting in the town of Dummer, New Hampshire. The landscape in the vicinity of this embayment is predominantly agricultural (crop fields and

pasture) and upland forest. There are a few residents along the eastern shore of Wheeler Bay. Wheeler Bay, located approximately 10 miles upriver of the CHP and FSA, is unaffected by site-related contaminants or the effects of urbanization. This location served as the reference reach for the biological, sediment, and biogeochemical studies of the Androscoggin River conducted for this RSA.

From Wheeler Bay, Reach 2 of the Androscoggin River flows for approximately 10 miles where it approaches the city of Berlin and the CHP and FSA at Sawmill Dam. This portion of the reach averages 250 ft in width and is characterized by moderate water velocity and moderate depth with few shallow areas. The Chickwolnepy Stream, a principal tributary to the upper Androscoggin River in New Hampshire, joins the river from the east across from the town of Milan. Small man-made "islands" called “boom piers” occur throughout this Reach 2. These boom piers were built to divide the floating logs to their respective mills. At the time, the Brown Company and the International Paper Company shared the river to float logs from the forests far upriver to their mills at Berlin.

2.2.1.3 Riverine Habitat

The Androscoggin River provides habitat for an ecologically important and rich assemblage of floral and faunal species with numerous life histories and feeding strategies. These species exist in a variety of riverine microhabitats determined largely by flow gradient and substrate.

A. Riffle Habitat

Representative riverine habitat throughout the Androscoggin RSA includes riffle areas characterized by swift, shallow (typically 1 to 3 ft deep) well-aerated waters with underlying sediment beds of cobble (64 – 256 millimeter [mm]), pebble (16-64 mm), gravel (2-16 mm) and sand. As a dominant feature of coldwater streams, riffles represent a food source and a shelter from predators, as well as a hedge against oxygen depletion. Where riffle sections occur with little riparian vegetation to shade the stream, sunlight may be adequate for periphyton and filamentous algal communities to colonize the rocky substrate. These algae and associates (bacteria, protozoa, etc.) serve as a forage base for grazing larval insects and fish. Swift current in riffles dislodge insect nymphs from the rocks, adding to the "biological drift,” of organisms in flowing water. This drift serves as a nutritional forage base for insectivorous fish such as brook trout, as well as crustacea and other insect species. Because of their large array of

microhabitats, riffles typically display the greatest diversity of benthic invertebrates. These areas are well oxygenated and support a benthic invertebrate assemblage dominated by nymph stages of sensitive invertebrate tax such as mayflies (*Ephemeroptera*), stoneflies (*Plecoptera*), caddisflies (*Trichoptera*), dragonflies/damselflies (*Odonata*) and various beetle larvae, e.g., water pennies, (*Psephenidae*). Crayfish (*Cambaridae*) are also a representative species of riffle habitat. In addition to benthic invertebrates, riffle habitat supports a variety of fish species adapted to these conditions. Principal fish species in riffle habitat include darters (*Percidae*), shiners and dace (*Cyprinidae*), and juvenile trout (*Salmonidae*).

B. Riverine Run

Exiting the high-energy riffle stretches below dams and other river shallows, the riverine habitat generally evolves to river runs or flats. Runs represent lotic habitats of moderate current and depth (>5 ft). Water surface is generally flat and sufficiently non-turbid to allow light to penetrate and aquatic vascular plants to develop. Sediment substrate in this riverine habitat type is largely determined by flow velocity and typically includes pebbles, sand, and silt. These sediments support a variety of burrowing invertebrate species including mayfly nymphs, worms (*Oligochaeta*), dipteran larvae (e.g., blackfly midge, *Simuliidae*), leeches (*Hirudinea*), and crayfish. Depending on the strength of the current and the composition of the substrate, these sections of the river may also support freshwater mussels (*Alasmidonta*).

In the upper portion of the RSA between Pontook and Sawmill Dam, submerged logs - remnants of the earlier log drives - litter the bottom of the river providing habitat for a variety of invertebrate and fish species and trapping detritus thus providing a food source for invertebrate detritivores.

As habitat, riverine runs typically represent the greatest diversity in riverine fishes. Runs provide flow-sensitive spawning habitat for such nest-building fishes as smallmouth bass, fallfish, river chub, creek chub, and redbreast sunfish as well as broadcast spawners such as yellow perch. Additional fish species utilizing these reaches of the RSA include northern pike, white sucker, trout, and a variety of cyprinids (chubs, shiners, and dace) and centrarchids (sunfish). Brook trout, rainbow trout, brown trout, and landlocked salmon, from both wild and hatchery stocks, provide the principal recreational fisheries in the main river between Umbagog Lake and the

New Hampshire border. Table 2-1 provides a list of fish species that occur or are expected to occur in the Androscoggin RSA.

C. Riverine Pools

Above each of the dams, the Androscoggin River forms pools of slow-moving water of moderate to deep depth. The upriver extent of each of the pools is largely determined by the height of the dam relative to the upriver gradient. The dams serve as sediment traps for the downstream transport of detritus and bed sediments. Suspended solids in the water column deposit here as the stream velocity slows to below that required to keep sediments suspended. As these areas represent the principal points of deposition and sediment collection, the accumulated sediments in the pooled areas immediately above the dam are expected to contain the highest contaminant levels. In addition, due to the accumulation of detritus and fine-grained organic material, these areas may represent principal sources of mercury methylation.

Benthic organisms in the sediments of the pooled area are represented by those species most adapted to organic substrate. As with the riverine run habitat, macroinvertebrate colonization is dominated by burrowing organisms such as aquatic oligochaetes, leeches, larval beetles and flies and mollusks (snails and clams).

Principal fish species in riverine pools are generally the same as those expected in riverine runs.

D. Exposed Sedimentation Bars and Shoreline Flats

During most of the year, the bottom of the river and the adjacent shoreline is inundated and these areas are inaccessible as foraging habitat for birds and mammals. However, during periods of low flow or dam maintenance, sediment bars and adjacent shoreline flats may become exposed. This was observed to be particularly true of Reaches 3, 4, and 9 at the time of dam maintenance. During these periods, birds such as willets and sandpipers and mammals such as raccoon and fox may forage these areas and feed on a variety of macroinvertebrates including oligochaetes, snails (*Gastropoda*), clams (*Pelecypoda*), etc. The extent and duration of these periods is unknown but is expected to be variable depending on seasonal precipitation and the maintenance requirements of the dams.

2.2.1.4 Flora and Fauna of the Androscoggin RSA

The principal riverine flora and faunal communities associated with the Androscoggin RSA are discussed below.

A. Riverine Flora

Algae and plants living in the river represent the primary producers within the riverine trophic complex. They are generally categorized as microflora—small to microscopic plants that live on rock surfaces or sediments such as algae, and macrophytes—larger, generally rooted vascular plants that predominantly occur in shallow quiescent areas of the river. The following narrative is a general discussion of the significance of the plant communities within the riverine ecosystem of the RSA.

1. Microflora/Periphyton

Microscopic and filamentous algae (periphyton) live on the sediments of submerged and exposed river bottoms and adjacent wetlands as well as soils of adjacent floodplains. These periphyton are most conspicuous on the surface of hard substrates, submerged woody debris, and vascular plants. These forms of algae can account for significant primary productivity in riverine habitat and serve as a forage base for aquatic herbivores. Because of their direct contact with contaminants retained on surface sediments, potential exposure is significant. However, little is known about the effects of mercury-contaminated sediments on these microflora. Accumulation of mercury in benthic algae may result in potential exposure to aquatic scrapers/grazers that feed on these algae such as water pennies, snails, and mayflies.

2. Macrophytes

The distribution of macrophytes throughout the river is largely a function of river depth, sediment type, and flow regime. The extent to which macrophytes occur in the Androscoggin River in the vicinity of the CHP and downstream is not known. Mercury at elevated levels in soils, and presumably sediments, has been shown to produce phytotoxic effects in vascular plants. Moreover, the uptake and accumulation of mercury and other metals and select chlorinated organic chemicals in plants (principally roots and tubers) serve as mechanisms of trophic

transport resulting in exposure of those invertebrate (i.e., aquatic insects) and vertebrate species (i.e., muskrat and ducks) that feed on aquatic plants and their associated detritus.

B. Riverine Fauna

As a result of information obtained from the New Hampshire Fish and Game Department, the New Hampshire Division of Forests and Lands, the USFWS, the New Hampshire Audubon Society, as well as available literature, lists of the dominant aquatic species and wildlife associated with the Androscoggin River Valley were developed and are included as tables for each of the faunal groups:

- Table 2-1 – Fish,
- Table 2-2 – Amphibians and Reptiles,
- Table 2-3 – Birds, and
- Table 2-4 – Mammals.

These tables should not be considered comprehensive aquatic life and wildlife inventories; rather, they reflect key species that may come in direct or indirect contact with mercury, dioxin/furan and PCB contamination in the Androscoggin RSA. In addition, the species listed on these tables provide a general overview of the community structure and diversity found along the course of the river. The following narrative is a general discussion of the significance of the animal communities within the riverine ecosystem of the RSA.

1. Benthic Macroinvertebrate Community

The composition of the benthic community in a specific area of a river is largely a function of the substrate type, i.e., a different species assemblage would occur in coarse mineral sediments than that found in organic muck. In general, the benthic macroinvertebrate community is dominated by adult and various larval stages of insects. These organisms are the primary consumers of algae, detritus, and meiofauna living in the river sediment. Included in this macroinvertebrate community are mollusks, including various species of snails and mussels, and arthropods, such as amphipods and crayfish. The macroinvertebrate community represents the primary consumers in a riverine system and is largely responsible for nutrient cycling. Moreover, the invertebrates provide forage for a range of secondary consumers including other invertebrates, fish, birds, mammals, and herptiles.

Because of their direct contact with sediment, benthic organisms may be directly exposed to the mercury, PCBs, and dioxin/furans that may occur in these substrates. Direct contact with potentially contaminated sediment, resuspended sediments, contaminated detrital material, and forage, represents an active pathway of mercury exposure in the aquatic system. Elevated levels of mercury and chlorinated organic compounds such as PCBs and dioxin/furans in sediments have demonstrated both acute and chronic effects in the benthic community. Acute lethal effects result from direct exposure to high concentrations of mercury in sediments and floodplain soils in metal sensitive species. Chronic effects resulting from low-level exposure have been shown to inhibit growth and depress reproduction. Moreover, the uptake and accumulation of mercury and other metals and select chlorinated organic chemicals in macroinvertebrates such as crayfish and oligochaetes serve as mechanisms of trophic transport resulting in exposure to the variety of animals that use the benthos as a forage base, including other invertebrates, fish, birds, mammals, and herptiles.

2. Plankton

Located throughout the water column, freshwater plankton consist of pelagic fauna such as rotifers, daphnids, and other minute crustacea. As plankton are predominantly grazers of microscopic algae, their distribution in freshwater is largely associated with that of phytoplankton. They are most commonly associated with slow flowing waters, lakes, and ponds. Exposure to mercury and chlorinated compounds is expected to occur through the assimilation of these chemicals to the extent they are actively and passively transported across the gill membrane of the organism as well as from the consumption of particulate organic matter to which metals and other chemicals may have absorbed. As with the benthic invertebrates, exposure to elevated levels of mercury, and chlorinated organic compounds has been shown to result in adverse effects to the plankton community.

3. Fish

A number of fish species representing a number of feeding guilds inhabit the Androscoggin River in the vicinity of the CHP and the FSA. Table 2-1 provides a partial list of freshwater fish species that commonly occur in these waters. Because of its proximity to the mountains, and relatively undisturbed forested watershed, this portion of the river accommodates a year-long cold-water fishery in which natural, reproducing populations of rainbow and brook trout occur.

Exposure to metals occurs in fish through assimilation of dissolved metals and other chemicals across the gill membrane. In addition, fish accumulate mercury and chlorinated compounds such as PCBs and dioxin/furans and through the consumption of contaminated prey. Algae, insects, worms, arthropods, and fish have been shown to accumulate mercury and chlorinated lipophilic organic chemicals. As a result, predation of these organisms may result in the dietary transfer and accumulation of mercury in these fish.

Fish serve as a significant forage base for a variety of piscivorous and omnivorous birds, mammals, and herptiles. Biomagnification of mercury, PCBs, and dioxin/furans in successively higher trophic levels of fish poses a risk of significant exposure to those organisms feeding at the top of the food chain.

4. Amphibians and Reptiles

Table 2-2 provides a list of some of the more common amphibians and reptiles observed in the upper portion of the Androscoggin watershed and that use the river as habitat. Amphibians and reptiles may be exposed to mercury and other site-related chemicals in surface water, sediment/soil, and various prey items, including terrestrial earthworms, and aquatic insects, other herptiles, and fish.

5. Birds

The Androscoggin River supports a variety of herbivorous, piscivorous, and omnivorous bird species many of which are seasonal transients. Table 2-3 provides a list of some of the more common birds (and associated feeding types) observed in the upper portion of the watershed and that use the river as habitat.

i. Herbivorous Birds

Herbivorous birds, such as ducks, may be exposed to mercury in the Androscoggin River through the ingestion of surface water, the consumption of aquatic plants, and other vegetative matter, and the incidental ingestion of sediment primarily during foraging. Herbivorous birds that may be exposed to mercury, PCBs, and dioxin/furans include dabbling ducks and Canada geese.

ii. Piscivorous Birds

The Androscoggin River supports a number of piscivorous birds including the belted kingfisher, the common loon, osprey, and the bald eagle. These species prey on a variety of aquatic organisms including fish, crayfish, reptiles, and amphibians. Because mercury and other contaminants have been shown to accumulate in prey items, piscivorous birds may be exposed to these chemicals through the consumption of those prey.

6. Mammals

The Androscoggin River supports a variety of herbivorous, piscivorous, and omnivorous mammals. Table 2-4 provides a list of some of the more common mammals (and associated feeding types) observed in the upper portion of the watershed and that use the river as habitat.

i. Herbivorous Mammals

Herbivorous mammals constitute a smaller and less conspicuous portion of the river's fauna. Similar to the birds, herbivorous mammals such as the muskrat, are exposed to contaminants through incidental ingestion of contaminated sediments and soils as well as through the uptake and assimilation of contaminants in vegetation.

ii. Piscivorous Mammals

Piscivorous mammals are potentially exposed to mercury through the consumption of fish, other aquatic organisms, and herptiles in their diet, the consumption of water, and the incidental ingestion of soil/sediment while foraging. As mercury has been shown to accumulate in these prey items, their consumption by such mammals as mink (*Mustela vison*), otter (*Lutra canadensis*), and raccoon (*Procyon lotor*) may result in significant exposure.

C. Threatened and Endangered Species, and Species and Habitats of Special Concern

The New Hampshire Natural Heritage Bureau (NHNHB) database was searched to determine the potential presence of any endangered, threatened, or rare plant, animals or communities within the Androscoggin RSA in Coos County, New Hampshire (NHNHB, 2012). This database is the most extensive information source currently available. The report generated (August

2012) summarized data collected from literature sources, herbaria, museums, universities, and field surveys by staff and cooperating biologists. The information provided by NHNHB is the most comprehensive database available for assessing the presence of threatened or endangered species or species and communities of special concern; however, this database is constantly being expanded and updated and cannot be interpreted as the definitive word on the presence of critical species and habitats within a given locale. The results of the NHNHB database search for the Androscoggin watershed in Coos County are presented in Appendix A. In addition, the USFWS' "Federally Listed Endangered and Threatened Species in New Hampshire" (November 2012) was obtained. Of the two species USFWS T&E species listed for New Hampshire, only two have the potential to be present in the vicinity of the study area: Canada lynx (*Lynx canadensis*) and the bald eagle (*Haliaeetus leucocephalus*). The mountain lion (*Puma concolor*) is a historic resident of the entire state and is listed as endangered. Although sightings of mountain lions have been documented, there is little if any evidence at this time that a breeding population exists in New England. The bald eagle is delisted as a USFWS T&E species, but is protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. Coos County, among others, is listed as part of the eagle's distribution area. Bald eagles occur in the Androscoggin RSA, with nests located on Pontook Reservoir at the upper end of the RSA and in the vicinity of Shelburne Reservoir at the lower end of the RSA.

2.2.2 Preliminary Conceptual Site Model

Based on the habitat types and potential contaminant migration, a preliminary CSM was developed for the Androscoggin RSA in the *Draft Conceptual Site Model Technical Memorandum, Chlor-Alkali (Former) Superfund Site* (Nobis, 2008). Together with Figure 2-6, the CSM narrative presented herein draws from that document and outlines the exposure pathways and routes, exposure media, and routes of exposure. Potential ecological exposure pathways illustrate ways in which stressors (e.g., contaminants) are transferred from a contaminated medium to ecological receptors.

2.2.2.1 Potentially Exposed Populations

Section 2.2.1 described the biotic communities of the Androscoggin River potentially exposed to the current and historical releases of COPECs. In this section, the receptors are defined. Some receptors are defined as biological communities and exposure and the potential risk from that

exposure are addressed on a community level basis. For other receptors, specific species serve to represent a surrogate of a population of birds or mammals that potentially incur the highest levels of exposure based on the nature and extent of the COPECs, e.g., potential exposure of piscivorous birds and mammals to mercury, PCBs, and dioxin/furans in fish and crayfish.

Potential receptors addressed on the community level include:

- Periphyton community,
- Macroflora community,
- Plankton community,
- Benthic macroinvertebrate community, and
- Fish community.

Potential receptors addressed on a species-specific level are presented below. Because of the additional information gathered during the field efforts, these receptors differ slightly from what was presented in the *Draft Conceptual Site Model – Technical Memorandum* (Nobis, 2008). Examples include: 1) herbivorous receptors were not evaluated because based on river characteristics and the limited available aquatic vegetation, the use of the river by herbivorous birds and mammals is likely to be limited 2) only one piscivorous bird was evaluated because kingfisher were often observed along the river and provides a more conservative estimate of dietary exposure than other piscivores such as great blue heron, osprey or loon.

A. Birds

1. **Insectivorous birds** – Exposure of insectivorous birds to COPECs is assessed through comparison of various tissue concentrations (i.e., blood, feather, and egg) found in tree swallows (*Tachycineta bicolor*) and various riparian songbirds with critical residue levels for those tissues.

2. **Piscivorous birds** – Exposure of piscivorous birds to COPECs is assessed through dietary exposure modeling of a representative receptor species. The belted kingfisher, *Ceryle alcyon*, was selected as the surrogate species due to its limited forage range and its predation of fish and crayfish.

B. Mammals

1. **Insectivorous mammals** — Exposure of insectivorous mammals to COPECs will be assessed through comparison of various tissue concentrations (blood and fur) found in little brown (*Myotis lucifugus)* and big brown *(Eptesicus fuscus)* bats with critical residue levels for those tissues.

2. **Piscivorous mammals** — Exposure of piscivorous mammals to COPECs was assessed through dietary exposure modeling of a representative receptor species. Because of its predominant aquatic diet, i.e., fish, crayfish, mollusks and herptiles, the mink, *Mustela vison*, was selected as the surrogate piscivorous mammal.

C. Reptiles and Amphibians (Herptiles)

As noted, reptiles and amphibians may be directly exposed to COPECs in sediments and water and indirectly through food chain exposure. Dietary models are not yet sufficiently developed with which to assess dietary exposure to herptiles. Moreover, toxicological data with which to assess risk generally is limited to direct exposure to contaminants in water.

2.2.3 Preliminary Endpoints

A critical early step when conducting an ERA is deciding which aspects of the environment will be selected for evaluation, because not all organisms or ecosystem features can be studied (EPA, 2003). Endpoints are defined as ecological characteristics (e.g., invertebrate survival) that may be adversely affected by site contaminants (EPA, 1992). In the ERA process, two distinct types of endpoints are identified: assessment endpoints and measurement endpoints.

Assessment endpoints are “explicit expressions of environmental values to be protected, operationally defined as an ecological entity and its attributes” (EPA, 1998).

A measurement endpoint is defined as “a measurable ecological characteristic that is related to the valued characteristic chosen as the assessment endpoint.” Measurement endpoints link the conditions existing on-site to the goals established by the assessment endpoints through the integration of modeled, literature, field, or laboratory data (Maughan, 1993).

It is desirable to have more than one measurement endpoint for each assessment endpoint (if the assessment cannot be measured directly), thereby providing multiple lines of evidence for the evaluation. However, in Steps 1 and 2 of the ERA process, known as the screening-level ERA that is often used as the COPEC selection process, it is important to quickly determine what contaminants, if any, have the potential to cause harm to the ecological receptors on-site. As such, the preliminary measurement endpoints are medium-specific benchmarks that are used as conservative screening levels to determine COPECs as noted below.

Receptor	Assessment Endpoint	Measurement Endpoint
Aquatic (Pelagic) Life	Survival, growth, or reproduction	Comparison of surface water chemistry with freshwater benchmark values.
Benthic Invertebrates	Survival, growth, or reproduction	Comparison of sediment chemistry with freshwater sediment benchmark values.
Piscivorous Mammals/Birds	Survival, growth, or reproduction	Comparison of fish chemistry with food chain-based benchmark values.

Specific benchmarks to be used are presented in Subsection 2.2.6.

2.2.4 Site Studies and Available Data

As Sections 1.3 (Site History) and 1.4 (Previous Environmental Investigations) of the RI Report, Volume 1, investigations have been ongoing for over 10 years. The available data from each source was reviewed and a determination was made as to its usability for this BERA. The objectives of the usability evaluation for each of the available datasets included the determination of: 1) the reliability of historical data, 2) the adequacy of spatial coverage, and 3) the adequacy of sample size. Data used in this BERA can be generally grouped in three categories: media chemistry, biological field studies, and toxicity testing. The sections below discuss these three groups of data relevant to the BERA. A summary of all of the sampling for media chemistry, biological field studies, and toxicity testing is presented on Table 2-5.

2.2.4.1 Chemistry Data

The results of the chemical analysis of the various exposure media are used to assess the level of potential exposure posed by contaminants to ecological organisms that contact these media,

use these media as habitat (e.g., sediment and benthic invertebrates) or use these media as forage (e.g., fish and vegetation). For this evaluation, two data sets were reviewed:

- USEPA 2006 Investigation, and
- USEPA, USGS and Nobis 2009 – 2011 Investigations.

Field collected invertebrate, fish, avian, and mammalian tissue are used to assess effects to the organisms themselves and to determine whether there is a difference in contaminant concentrations between the study and reference areas. The results of the tissue analysis are summarized in Subsection 2.2.5.4; comparisons of tissue concentrations with critical body residues (CBRs) and the comparison of contaminant concentrations between the study and reference areas are presented in Section 4.

A. EPA 2006 Investigation Data

EPA conducted field sampling during an extended site visit in 2006. Nineteen sediment samples were collected on September 18-19, 2006 and analyzed for inorganics and volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs) (including polycyclic aromatic hydrocarbons [PAHs]), pesticides and PCBs (as Aroclors), inorganics, and conventional parameters (see Table 2-6). These sediment data were evaluated and considered reliable for use in this BERA.

B. EPA, USGS, and Nobis 2009-2011 Investigation Data

EPA, USGS, and Nobis conducted extensive field sampling investigations from 2009 to 2010 in support of the current RI/FS. The 2009 RSA sampling included analyses of surface water, pore water, and sediment, (including toxicity evaluations of these media), epifaunal and infaunal invertebrates, crayfish, and fish (smallmouth bass and white sucker). The 2010 sampling included analyses of oligochaetes, bat tissue (blood and fur), song bird feathers, and tree swallow tissue (blood, feathers, eggs). Bald eagle samples (plasma, blood, and feathers) were collected in 2008 and 2011. Also in 2011, additional fish and crayfish tissue were collected to complement the sampling conducted in 2009.

The narrative below provides a brief description of the various chemistry data that were collected to support this ecological risk assessment. For a comprehensive and detailed

description of the field collection methods, sample processing and chemical analysis, the reader is referred to the *Quality Assurance Project Plan, Chlor Alkali Superfund Site, Berlin NH, Androscoggin River Investigation* (Nobis, 2009, as amended 2010).

1. Surface Water Collection

Surface water samples were collected throughout the Androscoggin RSA to characterize the nature and extent of chemical contamination in the RSA resulting from potential past and current migration of chemicals from the former chemical plant. These data were used to evaluate the potential ecological risk to species inhabiting the Androscoggin River.

USGS collected surface water samples from RSA Reaches AR2, AR3, AR4, AR8, and AR9 during low stream flow conditions in September 2009 using standard USGS surface-water sampling protocols (Wilde et al., 2005). These samples were processed using trace-metal clean techniques (Olson and DeWild, 1999). Dissolved (0.45 µm filtered) and total (non-filtered) water samples were analyzed for total mercury (tHg), divalent mercury (Hg II), methylmercury (meHg), target analyte list metals, VOCs, SVOCs, dioxins/furans, pesticides, PCB congeners, total organic carbon (TOC), and sulfate. Conventional field measurements were also taken at each sampling station and included specific conductance, pH, dissolved oxygen (DO), and water temperature (Table 2-7).

2. Pore Water Collection

Pore water sampling was conducted in coordination with other studies to evaluate Hg-speciation and the potential availability of in-situ Hg for Hg II-methylation. The results of the pore water chemistry analyses are intended to explain the differences in meHg production rates and bioavailable Hg II patterns among different sites in the RSA.

USGS collected *in-situ* pore water samples from RSA Reaches AR2, AR4, AR5, AR6, AR7, AR8, and AR9 during low streamflow conditions in September 2009 and August 2010. Samples were collected using a push-point sampler as described in Zimmerman and others (2005), and were processed using trace-metal clean techniques (Olson and DeWild, 1999). A push-point sampler is designed to sample pore-water with minimal disturbance to the sediment matrix. Pore-water samples were collected at depths between 7 to 15 centimeter (cm) below the sediment/surface water interface using a peristaltic pump with Teflon tubing. Specific

conductance was used to monitor chemical differences between surface water and pore-water during sampling and to ensure that surface water was not drawn down into the pore-water sampling zone. Other field parameters measured with a flow-through multiprobe sonde (YSI model 600 XL) included pH, DO, oxidation-reduction potential, and water temperature. Both dissolved (filter passing) and total (non-filtered) pore water samples collected during 2009 were preserved for tHg, Hg II, and meHg; total recoverable metals, and dissolved organic carbon (DOC) analyses. Samples collected in 2010 were analyzed for tHg and meHg only. (See Table 2-8.)

3. Sediment Collection

Sediment samples were collected throughout the Androscoggin RSA to characterize the nature and extent of chemical contamination in the RSA resulting from potential past and current migration of chemicals from the CHP. These data were used to evaluate the potential ecological risk to species inhabiting the sediments of the Androscoggin River.

Streambed sediment samples of 0–10 cm depth were collected from undisturbed, continuously wetted, depositional zones in the river. Samples were collected from RSA Reaches AR2, AR4, AR6, AR8, and AR9 in 2009 and were composites of 5–10 representative sub-samples over a 5–10 m^2 area of relatively homogeneous sediment (Shelton and Capel, 1994). Samples were analyzed for VOCs, SVOCs, dioxins/furans, pesticides, PCB congeners, TAL metals, tHg, Hg II, meHg, conventional parameters, and acid volatile sulfide/simultaneously extracted metals (AVS/SEM). (See Table 2-6.)

Bulk sediments were also collected from these locations for toxicity evaluations.

4. Infaunal Invertebrate Collection

As previously noted, infaunal worms (Annelida, Oligochaeta spp.) represent a significant forage base for fish and invertebrates in river sediments and in particular those organic-rich sediments that collect upstream of the dams. It is also expected that these areas of sedimentation represent principal sources of sequestered contaminants in the river. To support the assessment of ecological exposure and to better understand the accumulation and trophic dynamics of contaminants in the RSA, oligochaetes were collected from the top 15 cm of sediment in the same locations as the pore water and sediment samples. Oligochaetes were

collected for tissue analysis in 2009 at AR2, AR6, AR8, and AR9 and again in 2010 at AR2, AR4, AR 5, AR 6, AR 7, AR 8, and AR 9. Tissue samples were analyzed for tHg using a Milestone Direct Mercury Analyzer (DMA) at the New England Regional Laboratory in North Chelmsford, MA (Nobis Engineering, 2009) (See Table 2-9).

5. Crayfish Tissue Collection

Crayfish were collected for chemical analysis to evaluate the health of a key epifaunal species of the Androscoggin River and to assess the potential exposure and consequent risk to avian and mammalian piscivores feeding on crayfish. Crayfish represent a major prey species for fish (smallmouth bass), birds (belted kingfisher), and mammals (mink). Moreover, as epifaunal residents that scavenge and inhabit the sediment of the RSA, crayfish represent an ecologically significant vector of contaminant exposure to species that feed on them. Crayfish were collected concurrent with the fish collection effort in 2009 using baited crayfish traps. In 2009, crayfish were collected from RSA Reaches AR2, AR3, AR4, AR6, AR8, and AR9. In 2009, crayfish were composited into several samples for each reach and analyzed for VOCs, SVOCs, dioxins/furans, pesticides, PCB congeners, TAL metals, tHg, and lipids. (See Table 2-10). In 2011, individual crayfish were collected for tHg analysis from AR2, AR5, AR6, and AR7 to complement the previous crayfish sampling.

6. Fish Tissue Collection

The objectives of fish collection from RSA and subsequent tissue contaminant analyses included: 1) an evaluation of the health of the fish community based on contaminant residue levels; 2) assessment of the potential exposure and consequent risk to avian and mammalian piscivores feeding on these fish; and 3) provide data to inform the trophic transfer dynamics of contaminants in the RSA.

Two species of fish were collected for chemical tissue analysis from various reaches of the Androscoggin RSA. The smallmouth bass, *Micropterus dolomieu*, is one of the most abundant fish in this section of the Androscoggin River and was selected to represent a trophic level 3, water-column predator. The white sucker, *Catostomus commersonii*, was selected to represent a trophic level 1, bottom-feeding scavenger. Chemical concentrations in fish tissue were used to assess the health of the fish community in the RSA as well as the potential risk to avian and mammalian piscivores that forage on these fish. Fish were collected using electrofishing, gill

nets, and rod and reel. Smallmouth bass were initially collected in 5 reaches (AR2, AR3, AR4, AR6, AR8, and AR9) and white sucker in 3 reaches (AR2, AR8, and AR9) during the 2009 sampling campaign. In 2011, additional fish were collected from AR2, AR5, AR 6, and AR7 to complement the fish sampling conducted in 2009. Smallmouth bass axial muscle tissue (i.e., fillet) and white sucker whole-body tissue were analyzed for VOCs, SVOCs, dioxins/furans, pesticides, PCB congeners, TAL metals, tHg, and lipids. (See Table 2-11.)

7. Song Bird Study

In August 2010, song bird sampling was conducted by Biodiversity Research Institute (BRI) upstream and downstream of the CHP and FSA in Berlin, NH to assess potential exposure of insectivorous birds to mercury, dioxin/furan, and PCB contamination. Sites were located within marsh/wetland habitats of the Pontook (upstream; Reach AR1) and Shelburne (downstream, AR9) Reservoirs. In each of these areas, two sampling plots were identified within which marsh birds were collected. Target species for marsh bird sampling included: red-winged blackbird (*Agelaius phoeniceus*), swamp sparrow (*Melospiza georgiana*) and song sparrow (*Melospiza melodia*), although samples were collected from other species. Birds were collected and processed using standard procedures described by the American Ornithologists' Union. Avian metrics included age, sex, weight, wing cord, and body condition indicated by the thickness of fat layer. Chemical analyses of these tissues combined with additional data collected from other avian studies were used to provide additional insight to the ecological risk posed by the Site. Approximately 40 birds were sampled. Blood was analyzed for dioxin/furans, PCB congeners, and tHg. Feathers were analyzed for tHg only. (See Table 2-12.)

8. Tree Swallow Study

The objective of the tree swallow study was to evaluate the extent to which mercury, PCBs and dioxin/furans originating from the site represent a potential risk to aerial insect feeding birds foraging on emerging insects following larval hatch.

The tree swallow (*Tachycineta bicolor*) was selected as a potential indicator of mercury availability in the insect food chain because of its tendency to feed on aquatic insects as they emerge from a water body and because it is a cavity nester that will readily use artificial nest boxes. Limited availability of natural cavities and its acceptance of wooden nest boxes permit easy accessibility for sampling at specific locations of interest. Tree swallows also nest relatively

densely so that adequate sample sizes can frequently be obtained. Lastly, comparative information about mercury exposure and effects is available from previous studies with tree swallows (Bishop et al., 1995; Evers et al., 2005; Gerrard and St. Louis, 2001).

Tree swallows prefer to nest in open areas, usually near water (Robertson et al., 1992). Tree swallows are mostly insectivorous, and prefer flying insects (*Diptera*, *Coleoptera*, etc.) (Beal, 1918). During the breeding season in Ontario, Canada, tree swallows consumed small insects (<1 cm) – mostly adult flies (*Diptera*) and small leafhoppers (*Homoptera*) (Quinney and Ankney, 1985). In New Jersey, swallows fed primarily on adult midges (*Chironomidae*) (Kraus, 1989). In a study conducted in New York State, McCarty and Winkler (McCarty and Winkler) found at least 11 orders of insects in the diet of tree swallow nestlings, with insects in the 3-5 mm range comprising the largest proportion of the diet. *Diptera* (*Nematocera* and *Brachycera*) were the most frequent items followed by *Hemiptera* and *Odonata* (McCarty and Winkler, 1999). In New Hampshire, on the Androscoggin River and other study sites, tree swallows foraged directly over the water, and adult tree swallows frequently carried damselflies (*Odonata*) to feed to nestlings. In general, tree swallows feed within ±400 m of their nest box (Quinney and Ankney, 1985) so residue in their tissues (especially blood) reflects sediment contamination near the nest. Nest boxes were placed in areas of suitable habitats along the Androscoggin River to assess mercury exposures that result from foraging on emergent aquatic insects. Nest boxes were placed on the Androscoggin River in AR3, (below Sawmill Dam), AR4 (above Smith Hydro Dam), Reach 8 (below the Gorham Dam) and Reach 9 (Shelburne Reservoir), to attract tree swallows. Nest boxes were also placed in comparable reference locations (AR1 - Pontook Reservoir and AR2 – Wheeler Bay) in an effort to establish baseline conditions.

For avian receptors, blood is the best tissue for evaluating short-term dietary uptake of mercury (Evers et al., 2005). The half-life of methylmercury in the blood of molting chicks is typically less than 10 days (Fournier et al., 2002; Monteiro and Furness, 2001). The half-life of mercury in non-molting adult birds has been shown to range from 40-75 days (Heinz and Hoffman, 2004; Monteiro and Furness, 2001). Because methylmercury and chlorinated organic compounds are known to transfer from maternal blood to eggs and are strongly correlated to female blood levels, eggs can serve as good predictors of maternal and juvenile exposure to mercury, PCBs, and dioxin/furans.

Feather mercury levels frequently reflect blood levels at the time of molt (Bishop et al., 2000); however, methylmercury deposited into muscle tissue may also be available for elimination into feathers. Therefore, for individuals with high mercury exposure, feather mercury levels can be used to evaluate chronic exposures (Evers et al., 2005). Blood (adult and juvenile), feathers (adult), and eggs were collected from tree swallows nesting along the Androscoggin River and appropriate reference areas. Sex, age, and breeding status were determined for each bird. Venipuncture of the cutaneous ulnar vein with a 26 gauge sterile disposable needle allowed collection of 1-2 capillary tubes of blood into heparinized tubes for total mercury analysis. The capillary tubes were sealed with cretoseal and placed in 10 cubic centimeters plastic vacutainer, labeled with date, site, species, age, and sex information. All birds captured were banded with USFWS issued metal bands and were released unharmed within 15-20 minutes of capture. All samples collected were submitted for total mercury analysis.

The results of the tissue analysis are used to determine tree swallow exposure to mercury and subsequently compared to critical residue benchmarks to evaluate potential adverse effects that may result from mercury exposure. Swallows began laying eggs in late May. Eggs were marked, measured and weighed, and collected one egg per clutch (after at least 3 eggs were present) to avoid nest abandonment. The first egg, one of the first two eggs, or the heaviest egg in each clutch was collected. When a nest was abandoned, the complete clutch was collected. A small blood sample was collected from most females, several males, and most nestlings. Two outer tail feathers were collected from the adult swallows only. All samples were collected for tHg analysis and egg samples were analyzed for dioxin/furan and PCB congener analysis. (See Table 2-13.)

9. Bald Eagle Study

A variety of tissue samples were collected by the USFWS from two sets of bald eagle nests on the Androscoggin River in the Chlor-Alkali Study Area. One nest was located upstream of the CHP in the vicinity of Pontook Reservoir while the second nest was located downstream of the CHP in the vicinity of Shelburne Reservoir. Nests were sampled in 2008 for adult eagle feathers, chick blood, chick plasma, and fish collected from one of the nests. In 2011, plasma was again collected from eagle chicks from both nests. Although these samples were collected as part of a separate monitoring program conducted by USFWS, it was thought that due to nest proximity to the study area, the result of chemical analyses of these tissues combined with

additional data collected from the nests (i.e., chick survival) might provide additional insight to the ecological risk posed by the Study Area. These samples and their respective analyses are presented in Table 2-14.

10. Bat Study

Bat sampling was conducted by BRI in August 2010 upstream and downstream of the CHP to assess potential exposure of bats to mercury, dioxin/furan, and PCB contamination. Sites were located proximate to the Pontook (upstream) and Shelburne (downstream) Reservoirs. Bats were captured using two triple high mist nets at all sites. Nets were strung between trees along small access roads or across streams that are used as corridors. As bat activity is generally highest on roads near water, roads were chosen proximate to the river and surrounded by mature trees that provide good roosting habitat. Nets were set at dusk and monitored every thirty minutes until midnight.

Little brown bat (*Myotis lucifugus*) and big brown bat (*Eptesicus fuscus*) blood and fur were sampled at the AR1 reference site (Pontook Reservoir), and downstream at AR9 by BRI. All bats captured were identified to species, checked for reproductive status, banded, sexed, aged, and standard measurements are taken (forearm length, body condition, and weight). All bats are released at the capture site unharmed. Blood samples were analyzed for tHg, dioxin/furans, and PCB congeners. Fur samples were submitted for tHg analysis (Table 2-15).

2.2.4.2 Epifaunal Invertebrate Study

An epifaunal invertebrate study was conducted by USGS to evaluate the extent to which CHP related contaminants in the RSA affect that portion of the sediment invertebrate community that is non-boring and lives on the sediment surface and hard substrates. Epifauna represent that component of the invertebrate community that inhabits the water-sediment interface and hard substrate surfaces of the river. These hard surfaces include rocks, logs, debris, etc. Species of the epifaunal community generally inhabit the high current areas of the river are specially adapted to attaching or clinging to rocks.

Epifaunal invertebrate samples were collected following NHDES Benthic Index of Biotic Integrity (B-IBI) protocols (David Neils, NHDES, written communication, 2008). Rock baskets (16.5 cm x 28 cm) containing 3.8 to 7.6 cm diameter gravel were placed in riffle habitats upstream from

water-chemistry sampling sites at water depths deep enough to maintain continuous flow over the artificial substrate. Four baskets per site were anchored to the streambed by 1.3 cm steel reinforcing rod. Three of the four rock baskets were used to evaluate invertebrate assemblages; the fourth rock basket was used for invertebrate tissue-chemistry. The rock baskets were deployed in RSA reaches AR2, AR3, AR4, AR8, and AR9 on August 6 and 7, 2009, and retrieved 6.5 weeks later on September 21 and 22, 2009.

Rock baskets were retrieved by placing a 500 mesh D-frame net downstream of the rock basket, and gently lifting and sliding the rock basket into the net. Rock baskets were emptied into 500 mm sieve buckets. The empty basket cages were gently scrubbed and rinsed into 5-gallon pails and the contents were poured into the sieve bucket. Rocks in the sieve buckets were all gently brushed and rinsed to remove organisms and detritus and returned to basket cage. Leaves and detritus in the sieve bucket were rinsed, inspected for organisms, and returned to the stream.

Contents of sieve bucket were transferred to jars and preserved with 70% ethanol. Samples for tissue-chemistry were thoroughly rinsed with site water, placed in glass jars, and frozen for subsequent analysis of tHg using a Milestone DMA at USEPA's laboratory in Chelmsford, Massachusetts. Invertebrate assemblage samples were processed according to NHDES B-IBI protocols (Neils, 2009) with a 300 organism count and identified to genus/species level by Lotic, Inc., in Unity, Maine. After the contents of the other three rock baskets were counted and identified, samples of specific larvae (i.e., mayflies, dragonflies, and water pennies) were processed for tHg analysis (Table 2-9).

Macroinvertebrate assemblages were evaluated for organism abundance, and species richness. NHDES metrics were calculated to determine whether the assemblages are significantly different from those in background locations (using the method of Neils, 2011).

The results of this study are presented in Subsection 4.1.2.1.

2.2.4.3 Toxicity Tests

Surface water and pore water toxicity tests were conducted by the TechLaw USEPA Region 1 Environmental Services Assistance Team (ESAT), North Chelmsford, Massachusetts; whereas,

whole sediment toxicity tests were run by EnviroSystems Incorporated, Hampton, New Hampshire.

A. Pore Water

The objective of the pore water toxicity testing was to determine if the survival of two benthic invertebrate test species exposed to pore water collected from the substrate of the Androscoggin River downstream of the CHP differed significantly from samples collected at reference locations upstream of the CHP. A comprehensive discussion of the methods used for these tests is provided in the following report: *Two Species, 96-Hour, Acute Toxicity Testing Results Using Pore Water Samples Collected from the Androscoggin River in Areas Associated with Former Chlor-Alkali Facility in Berlin, NH* (TechLaw Inc., 2010). This report is presented in its entirety in Appendix B. The following narrative is brief summary of the methods.

Pore water toxicity testing was conducted in both 2009 and 2010. Based on the results of pore water and sediment chemistry data from the 2009 investigations, the approach was refined and repeated in 2010. The results of the 2010 pore water toxicity testing were used in this BERA. In August 2010, USGS collected two sets of pore water samples collected from each of AR4, AR5, AR6, AR7, and AR8 and three sets of pore water samples from AR9. In addition, three reference area pore water samples were collected from AR2. 96-hour acute toxicity tests were performed using second-to-third instar-larval stage (age 11 to 12 days) *Chironomus tentans* and 14 to 21 day old *Hyalella azteca*. Both the *C. tentans* and *H. azteca* tests were conducted at the EPA's Office of Environmental Measurement and Evaluation (OEME) Biology Section Laboratory in accordance with *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates* (2001a). Laboratory control samples were used only to verify that the organisms were healthy, and that the test passed the Test Acceptability Criteria (TAC) specified by EPA (2000). Populations of both species used for toxicity testing are monitored for quality through an on-going reference toxicity testing program at the OEME Laboratory.

Initial test parameters consisting of pH, conductivity, DO, temperature, alkalinity, and hardness were evaluated on each sample at the start of the *C. tentans* and the *H. azteca* tests. The final test parameters for each species consisted of pH, conductivity, DO, and temperature measured in a composite sample of the waste water from each sample. These analyses were performed to

identify changes, which could have affected the test outcome. Statistical analyses for the *C. tentans* and *H. azteca* tests were conducted using Comprehensive Environmental Toxicity Information™ (CETIS™) according to the EPA decision tree (EPA, 2000). The *C. tentans* survival data were analyzed using a Fisher Exact/Bonferroni-Holm test to determine if a significant difference existed between the response to pore water collected from the reference site (Wheeler Bay) and that of pore water samples collected downriver of the CHP. References were also compared with each other using a Fisher Exact Method. The reference samples (AR2-4 and AR2-5) were tested once for toxicity in the first test. The survival data from these two reference samples were then used for the second, third and fourth tests to compare them with samples collected downstream from the CHP.

The *H. azteca* survival data were analyzed using a Modified Levene's test to check for homogeneity of variance, and Shapiro-Wilk W test to check for normality. The Wilcoxon Rank Sum (WRS) Two-Sample Test was used to determine if a significant difference existed between each of the reference samples by plotting them against each other. The reference sample data set had unequal variances and was not normally distributed. Reference sample AR2-4 was not used in the statistical comparisons because it experienced complete mortality. The Steel's Many-One Rank test was used to determine if a significant difference in survival existed between the remaining reference (AR2-5) and the pore water samples collected downstream of the former chemical plant. Survival data were analyzed using the Bartlett test method to check for homogeneity of variance, and the Shapiro-Wilk W test to check for normal distribution.

The results of this study are presented in Subsection 4.1.2.1.

B. Surface Water

Surface water toxicity testing was conducted to determine the extent to which site-related contamination could be affecting vertebrate and invertebrate species inhabiting the water column. A comprehensive discussion of the methods used for these tests is provided in the following report: *Two Species, Chronic Toxicity Testing Results Using Surface Water Samples Collected from the Androscoggin River in Areas Associated with Former Chlor-Alkali Facility in Berlin, NH* (TechLaw, 2010). This report is presented in its entirety in Appendix C. The following narrative is brief summary of the methods.

Chronic 7-day *Ceriodaphnia dubia* (cladoceran) and *Pimephales promelas* (fathead minnow) toxicity tests were con ducted using four site (AR2, AR4, AR8, and AR9) and one reference area (AR2) surface water samples (TechLaw, 2009). Surface water toxicity testing was conducted in 2009. The tests were performed according to the methods described in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms - Chronic Toxicity Test Method for C. dubia* (EPA, 2008c) and *Chronic Toxicity Test Methods for P. promelas* (EPA, 2008b). Toxicological endpoints for *C. dubia* were survival and reproduction; endpoints for *P. promelas* were survival and growth. Laboratory control samples were used only to verify that the organisms were healthy, and that the test passed the TAC specified by EPA (2000).

Statistical analyses for the *P. promelas* and *C. dubia* tests were conducted using CETIS™ according to the EPA decision tree (EPA, 2000). Survival, growth, and reproduction data were analyzed separately for each species. Data were analyzed using Bartlett's test to check for homogeneity of variance, and Shapiro-Wilk W test to check for normality.

The results of this study are presented in Subsection 4.1.2.1.

C. Sediment

Bulk sediment toxicity testing was performed to determine the potential toxicological impacts that exposure to sediments in the Androscoggin RSA would have on freshwater benthic invertebrates. Sediment samples were collected at locations coinciding with pore-water samples, and were used for toxicity tests with the amphipod *Hyallela azteca* (28-day exposures) and the midge *Chironomus dilutus* (20-day exposure). Toxicity endpoints evaluated included survival and growth (EnviroSystems Inc., 2010a, 2010b). Sediments were collected from AR2, AR4, AR5, AR6, AR7, AR8, and AR9 for these studies. A comprehensive discussion of methods and results are provided in *28 Day Hyalella azteca Survival and Growth Sediment Toxicity Test*, and *20 Day Chironomus dilutus, Survival and Growth Sediment Toxicity Test*. These reports are provided in their entirety in Appendices D and E, respectively.

The results of this study are presented in Subsection 4.1.2.1.

2.2.5 Data Evaluation and Reduction

The following narrative provides a discussion of the data evaluation and data reduction procedures that were used to summarize medium-specific data.

The objectives of the data evaluation and reduction are as follows:

- Discuss the quality of the data that are incorporated into the ERA;
- Provide a discussion of data treatment as it pertains to qualified data, duplicate samples, and multiple sampling rounds; and
- Summarize data statistically so that appropriate exposure information is readily available and in a form that permits effective comparisons between data groups.

2.2.5.1 Data Usability and Data Validation

EPA Region 1 discusses data usability issues that should be considered in the risk assessment process in its Risk Update 3 (EPA, 1995). Data usability is defined as the process of ensuring that the quality of the data meets the intended uses and satisfies the DQOs established for sampling and analysis. Data usability involves assessing both the analytical quality, sampling methodology, and field errors that may be inherent in the data. Factors evaluated include the level of validation (data validation tier) and data quality indicators such as completeness, comparability, precision and accuracy, and analytical detection limits.

EPA Region 1 recommends that all data used in the risk assessment process be validated using Tier II or Tier III validation procedures. In a Tier II validation, quality control checks are conducted, analytical procedures are assessed, and data are qualified accordingly. In a Tier III validation, in addition to meeting the Tier II requirements, the raw laboratory data are examined to check for calculation errors, compound misidentification, and transcription errors. A Data Validation report is produced for both Tier II and Tier III validations.

For the 2009 data, validation was performed by either by Nobis or EPA's ESAT contractor. In general, the analytical data was validated using EPA Tiers II and Tier III data validation procedures. If problems were indicated in the data as a result of the Tier II validation for analyses other than PCBs and dioxin/furans, then Tier III data validation was performed.

Validation of PCBs and dioxins/furans data was performed by the EPA ESAT contractor using Tier III protocols.

The available analytical data for surface water, pore water, sediment, infauna, epifauna, crayfish, fish (smallmouth bass fillet and white sucker whole body), and bird and bat tissue collected in between 2009 and 2011 by EPA, Nobis, and USGS were used in the ERA. Sediment data collected by EPA in 2006 was also used. Surface water detection limits were found to be elevated compared with those attained in later years, with only calcium, iron, magnesium, and manganese having detected concentrations. These analytes were not included in the later sampling and are generally considered to be of less concern from a toxicity standpoint. Sample lists are presented in Appendix F. Raw data used in this BERA are presented in Appendix G.

2.2.5.2 Data Reduction

Data reduction involves the evaluation of data qualifiers and their potential use in the BERA process and describes the treatment of field duplicate samples. The following guidelines were used in developing the data sets to evaluate risk:

- All “U” qualified data represent samples for which the analyte was not present or was below the sample quantitation limit (SQL) and reported as a non-detect (ND).
- If an analyte was not detected in any sample (U-qualified) from a given medium, it was not considered quantitatively for that medium. Potential effects of this decision are discussed in the uncertainty analysis.
- If an analyte was detected within a medium, but not within a specific sample, the full SQL value was used for ND results when calculating summary statistics. Note, the summary statistic calculations are different from Upper Confidence Limit (UCL) calculations where ProUCL determines concentrations to use for censored (i.e., nondetect) data (Subsection 3.1.1).
- Estimated values (J-qualified) were used at the reported value.

When field duplicate samples were collected, the following approach was used to calculate the concentrations to be evaluated in the ERA:

- If the analyte was detected in either the primary, or duplicate sample and was ND in the other sample, the detected concentration was used.

- If the analyte was either detected or ND in both the original (primary) sample and the field duplicate, the average concentration was used in the ERA unless there was a 50 percent or greater relative percent difference in solid media or a 30 percent or greater relative percent difference in aqueous media, in which case the higher of the two concentrations was used.

2.2.5.3 Calculation of Dioxin/Furan and PCB Congener Toxic Equivalency

Dioxin/furans were analyzed for and detected in various media in the RSA. Polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) (dioxins and furans, respectively) are commonly found as complex mixtures when detected in environmental media. Receptors are likely to be exposed to variable distributions of individual dioxin and furan compounds, referred to as “congeners,” that vary by source and pathway of exposure. There are over 200 PCDD and PCDF congeners. Currently, 17 of these congeners are designated as carcinogens by EPA (Van den Berg et al., 2006).

The World Health Organization (WHO) (Van den Berg et al., 1998) (Van den Berg et al., 2006) has developed toxic equivalency factors (TEFs) to evaluate the relative toxic potencies and risks. These TEFs have been adopted for use by EPA (EPA, 2008d). The TEFs relate the aryl hydrocarbon receptor (AhR) mediated toxicity of the individual dioxin or PCB congener to the AhR-mediated toxicity of the reference compound 2,3,7,8-tetrachloro-dibenzo-p-dioxin (2,3,7,8-TCDD), which is believed to be the most toxic of all the congeners whose toxicity is mediated through the AhR. The TEFs were developed from scientific review of the toxicological studies, along with consideration of chemical structure, persistence, and resistance to metabolism. The TEF value assigned to each dioxin/furan and PCB congener is shown in Table 2-16.

A 2,3,7,8-TCDD toxic equivalency quotient (TEQ) was calculated for each dioxin/furan and PCB congener sample by multiplying the concentration of each congener by its respective TEF. If a given congener was not detected in any samples in a given medium, it was not included in the TEQ calculation. If the congener was detected at least once in a sample set, the TEQ

concentration was determined by multiplying the detected concentrations and the non-detects at the SQL with the TEFs. For a given sample location, the individual dioxin/furan congener TEQs and PCB congener TEQs were added to obtain a total 2,3,7,8-TCDD TEQ and PCB Dioxin-like Congener TEQ, respectively for that sample. To apply this TEF concept, the TEF of each congener present in a mixture is multiplied by the respective mass concentration and the products are summed to yield the 2,3,7,8-TCDD TEQ of the mixture, as determined by the equations:

$$2,3,7,8 - TCDD\ TEQ = \sum_{n1}(PCDD_i \times TEF_i) + \sum_{n2}(PCDF_i \times TEF_i)$$

Where:

2,3,7,8-TCDD TEQ	=	Toxic equivalency quotient concentration.
PCDD	=	Polychlorinated dibenzo-p-dioxin concentration.
PCDF	=	Polychlorinated dibenzofuran concentration.
TEF	=	Toxic equivalency factor.

$$PCB\ Dioxin - like\ Congener\ TEQ = \sum_{n1} PCB\ Dioxin - like\ Congner\ Concentration_i \times TEF_i$$

Where:

PCB Dioxin-like Congener TEQ	=	Toxic equivalency quotient concentration.
TEF	=	Toxic equivalency factor.

2.2.5.4 Data Summary

Tables 2-17 through 2-32 present the medium- and reach-specific data summaries for the RSA environmental media. (Note that the raw data are presented in Appendix G.)

2.2.6 Development of Screening-Level Benchmarks

Based primarily on the preliminary CSM and the available screening-level ecological toxicity values or "benchmarks" for receptors in various media, preliminary assessment and measurement endpoints were selected for this SLERA.

Ecological benchmarks represent medium-specific contaminant concentrations considered protective of biota inhabiting that medium. Ecological benchmarks were obtained from a variety of sources including Federal and state regulatory values, EPA, and other agency reports, and scientific literature. At the site, the potential direct exposure media include sediment and surface water. In addition, benchmarks are available based on food-chain exposures to fish. As such, the following ecological benchmarks were compiled (Table 2-33).

2.2.6.1 Surface Water Benchmarks

The following hierarchy of sources was used to obtain surface water benchmarks:

1. Water Quality Criteria for Toxic Substances (NH, 2008) — The State of New Hampshire has derived water quality criteria for the protection of aquatic life. As for the Federal National Recommended Water Quality Criteria (WQC) (EPA, 2012) discussed below, acute and chronic criteria are provided.

2. Federal WQC for the Protection of Aquatic Life (EPA, 2012) — This document provides a compilation of the WQC for a wide variety of pollutants, predominantly metals and pesticides, in freshwater and marine. Two sets of criteria for each environment are provided in this guidance, i.e., criteria maximum concentrations (CMCs), and criteria continuous concentrations (CCCs). CMCs represent acute criteria applied as 1-hour average concentrations not to be exceeded more than once in any 3-year period. CCCs represent chronic criteria applied as 4-day average concentrations not to be exceeded more than once in any 3-year period. As the CCC is the more conservative, it was used in this SLERA.

3. Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities (EPA, 1999) — Freshwater Toxicity Reference Values (TRVs). TRV values provided in by EPA in this report were identified from screening toxicity values

developed and/or adopted by federal and/or state regulatory agencies. For compounds with no available screening toxicity value, TRVs were determined using toxicity values from available scientific literature, followed by the use of surrogates. Uncertainty factors (UFs) were applied to toxicity values, as necessary, to meet convert toxicity values to a chronic no observed adverse effect level (NOAEL).

4. Toxicological Benchmarks for Screening Potential Contaminants of Concern for Effects on Aquatic Biota—Tier II Values (Suter II and Tsao, 1996) — Using the method described in the *Proposed Water Quality Guidance for the Great Lakes System* (EPA, 1993b), Suter and Tsao developed Tier II values for those constituents that do not have Federal WQC. Tier II values include secondary acute values (SAVs) and secondary chronic values (SCVs), which correspond to the CMCs and CCCs in Federal WQC. SCVs were used in this ERA. The Tier II method was developed so that aquatic benchmarks could be established with fewer data than required for WQC. The Tier II values presented by Suter and Tsao include values developed by EPA (1993b), as well as other Tier II values calculated by the authors using the EPA methodology and information from additional toxicological studies that were rigorously evaluated prior to use.

2.2.6.2 Sediment Benchmarks

The following hierarchy of sources was used to obtain sediment benchmarks:

1. **Threshold Effect Concentrations (MacDonald et al., 2000) —** MacDonald et al. evaluated the predictive ability of previously derived probable effect concentrations (PECs) for major classes of compounds including metals, PAHs, pesticides and PCBs. A database was developed from 92 published reports that included a total of 1657 samples with high-quality matching sediment toxicity and chemistry data. The database was composed primarily of 10- to 14-day or 28- to 42-day toxicity tests with the amphipod *Hyalella azteca* (designated as the HA10 or HA28 tests) and 10- to 14-day toxicity tests with the midges *Chironomus tentans* or *C. riparius* (designated as the CS10 test). Endpoints reported in these tests were primarily survival or growth. From these data, both threshold effect concentrations (TECs) and PECs were developed. TECs were used in this screening.

TECs identify contaminant concentrations below which harmful effects on sediment-dwelling organisms are not expected. TECs include the following sediment quality guidelines (SQGs): threshold effect levels (TELs), effect range low values (ERLs), lowest effect levels (LELs), minimal effect threshold, and sediment quality advisory levels. TECs were calculated by determining the geometric mean of the SQGs. Consensus-based TECs were calculated only if three or more published SQGs were available for a chemical.

2. **Ontario Ministry of the Environment and Energy (OMEE) Sediment Quality Guidelines (Fletcher et al., 2008; Persaud et al., 1996) –** OMEE provides screening benchmarks for various metals, pesticides, PCBs, and PAHs in freshwater sediments. The OMEE SQGs define three (3) levels of chronic effects on benthic organisms:

   The no-effect level (NEL) is defined as the level at which no toxic effects have been observed on aquatic organisms and food chain biomagnification is not expected.

   The LEL indicates a level of sediment contamination that can be tolerated by most benthic organisms.

   The significant-effect level (SEL) indicates a level of contamination at which pronounced disturbance of sediment-dwelling organisms will occur and the contaminant concentration will be detrimental to the majority of benthic species.

   The NEL for non-polar organics is calculated using Provincial Water Quality Objectives and Guidelines (PWQOs/Gs). The PWQO/G is multiplied by an organic carbon-normalized sediment to water partition coefficient (Koc). The value is converted to a bulk sediment basis by assuming a 1% TOC concentration.

   The LEL and SEL are based on screening level concentrations (SLCs). The SLC uses field data on the co-occurrence of benthic infaunal species and concentration data. The SLC is an estimate of the highest concentration of a contaminant that can be tolerated by a specific proportion of benthic species. Calculation of the SLC is a two-step process. A species SLC (SSLC) is calculated as the 90th percentile of the frequency distribution of

the contaminant concentrations over all of the sites (n ≥ 10) where the species is present. The chemical-specific SLC is then calculated as the 5th percentile of the SSLC distribution. The LEL for metals, nutrients, and polar organics is the 5th percentile of the SLC. For non-polar organics, the SLC is calculated as above, but using the organic carbon normalized sediment concentrations. The SLC is then converted back to bulk sediment concentration, assuming a TOC of 1%. The SEL for metals, nutrients, and polar organics is calculated as the 95th percentile of all SSLCs. For non-polar organics, the SLC is calculated using the organic carbon normalized sediment concentrations. The SEL is converted back to bulk sediment concentrations based on site-specific TOC concentrations (1% minimum and 10% maximum).

NELs followed by LELs were used for this screening assessment.

3. **Ecotox Thresholds (EPA, 1996a) —** Ecotox thresholds were developed for sediments using three different methods. The preferred method was to derived sediment quality criteria (SQC) using the equilibrium partitioning-based guidelines (EPA, 1993b). Alternative method 1 was the derivation of sediment quality benchmarks (SQBs), which are essentially SQCs derived with tier II surface water values instead of WQCs or final chronic values (FCVs). Lastly, if neither an SQC nor an SQB were calculated, the ERL from Long et al., 1995 are suggested for use. ERLs were not considered in this assessment as some toxicity values used to derive them were from estuarine environments. Estimated SQCs and SQBs assumed a 1% TOC.

4. **Equilibrium Partitioning-based Benchmarks (Jones et al., 1997) —** Jones et al. developed equilibrium partitioning-based (EqP) benchmarks following guidance as in EPA (EPA, 1993b) Guidelines for Deriving Site-Specific Sediment Quality Criteria for the Protection of Benthic Organisms. Values were developed using national WQC, secondary chronic values, and lowest chronic values for fish, daphnids, and non-daphnid invertebrates. Bulk sediment values were estimated assuming a 1% TOC. EqP-based benchmarks are not applicable to sediments with less than 0.2% TOC.

2.2.6.3 Fish Tissue Benchmarks

The lowest value per analyte from the following sources was used as the fish tissue benchmark.

1. **Residue Guidelines for the Protection of Wildlife Consumers of Aquatic Biota (CCME, 2001) —** To address substances for which aquatic food sources are the main routes of exposure, guidelines in aquatic prey items were developed to protect, restore, and sustain the wildlife that consumes them. Values are based on the lower calculated tissue residue guideline (TRG) of the mammalian and avian species with the highest food ingestion to body weight ratios for Canadian wildlife (female mink and Wilson's storm petrel).

2. **Niagara River Biota Contamination Project: Fish Flesh Criteria for Piscivorous Wildlife (Newell et al., 1987) —** Fish flesh criteria to protect piscivorous wildlife were derived for 19 organochlorines. Values are based on the mammalian and species with the highest food ingestion to body weight ratios: mink and a "generic" bird given that several birds consume about 20% of their body weight per day. Values based on noncancer and cancer effects were calculated when possible, although only noncancer effects were considered in this assessment.

3. **Toxicological Benchmarks for Wildlife:1996 Revision (Sample et al., 1996) —** Food–based Benchmarks for piscivores. NOAEL and Lowest Observed Adverse Effect Level (LOAEL) based values of contaminants in food were calculated for numerous receptors. Toxicity values identified in the document were integrated with the amount of food consumed to derive the concentration. For the purposes of this assessment, only piscivores (i.e., mink, river otter, belted kingfisher, osprey, and great blue heron) were considered and it was assumed that their sole dietary item was fish. To be conservative, the lowest NOAEL-based value from the five species noted was used in this screening.

2.3 Preliminary Exposure Estimates and Risk Calculation (Step 2)

The components of the Preliminary Exposure Estimates and Risk Calculation (Step 2) are as follows:

- Screening Methodology, and
- Selection of COPECs.

The potential for ecological risk associated with chemical contamination of the Androscoggin River is first assessed using a screening-level approach. This approach is intended to serve as the screening-level ecological effects/risk characterization with which to evaluate whether past chemical plant activities and current levels of contamination in each of the principal habitats: (1) clearly indicate little or no potential for adverse effects to ecological resources at the RSA; (2) clearly indicate the potential for adverse effects to ecological resources at the RSA; or (3) indicate that the available data are inadequate to make a determination. As it is expected that concentrations in the site-related media are high enough to warrant a BERA be performed, it also provides a final list of COPECs to be carried through the BERA.

Note that the results presented below are based on a conservative screening and that risk estimates for COPECs will be developed later in the BERA process (i.e., Step 7).

2.3.1 Screening Methodology

For the ecological screening analysis, the maximum detected concentration for each chemical in each medium was compared with ecological screening-level values that represent potential scenarios of ecological exposure for that medium.

In this portion of the assessment, potential risks were estimated by comparing single-point estimates of exposure with effects levels, i.e., the hazard quotient (HQ) approach. The HQ approach allows for a standard interpretation of the results (i.e., the HQ reflects the magnitude by which the sample concentration exceeds or is less than the benchmark value). In general, if an HQ exceeds one, the potential for risk exists. Although the HQ method does not measure risk in terms of likelihood or probability of effects at the individual or population level, it does provide a benchmark for judging potential risk (EPA, 1994).

Tables 2-34 through 2-38 present medium-specific benchmark screenings.

2.3.2 Chemicals of Potential Ecological Concern

Although there were a number of chemicals that exceeded ecological benchmarks and background concentrations, most of these have limited significance as site-related contaminants. Based on historical manufacturing processes as well as current conditions in the Androscoggin River, previous and current investigations have focused on mercury,

methylmercury, PCBs, and dioxins/furans. Because of their bioaccumulative ability as well as expressed reproductive toxicity at very low doses, these chemicals represent the dominant risk to the flora and fauna of the Androscoggin River ecosystem in the vicinity of the former chemical plant and are the focus of this BERA

2.4 BERA Problem Formulation (Step 3)

EPA defines a risk management goal as "a general statement of the desired condition or direction of preference for the entity to be protected" (EPA, 2001b). This goal is often developed independently of the risk assessment process, but important to guide the process toward the ultimate goal.

The following risk management goal is proposed:

> *Maintenance (or return) of surface water and sediment quality, food source, and habitat conditions capable of supporting a functioning aquatic ecosystem for the aquatic plant and animal populations (including individuals of protected species) inhabiting or utilizing the Androscoggin within the RSA.*

The final CSM and assessment/measurement endpoints were developed with this goal, as well as the results of the SLERA (i.e., Steps 1 and 2 presented herein), in mind.

2.4.1 Final Conceptual Model

As noted previously, the CSM provides a description and visual representation of the fate, transport, and effects that COPECs may have on the environment and as such, helps identify appropriate measures (measurement endpoints) that can be used to evaluate the assessment endpoints. In essence, the CSM presents a series of working hypotheses regarding how the contaminants might affect ecological components of the natural environment. Risk hypotheses are specific assumptions about potential risk to assessment endpoints and may be based on theory and logic, empirical data, or mathematical or probability models (EPA, 1998). The hypotheses are formulated using professional judgment and available information of the ecosystem at risk, potential COPEC sources and characteristics, and observed or predicted effects on assessment endpoints. As with the entire ERA process, the development of a CSM is

a complex, non-linear process, with many parallel activities that may result in modifications to the CSM as additional information becomes available.

Given that the SLERA indicated the potential for concentrations of contaminants in soil and vernal pools may be high enough to adversely affect ecological receptors, the fate and transport, bioavailability, and ecotoxicity of the COPECs were examined more closely to determine if changes to the preliminary CSM would be necessary. These topics, as well as the resulting final CSM diagram, are presented below.

2.4.1.1 Contaminant Fate and Transport

For an exposure pathway to be complete, a contaminant must be able to travel from the source to ecological receptors and be taken up by the receptors via one or more exposure routes. The fate and transport evaluation for this CSM development focused on the following:

- Source of contamination;
- Transport mechanisms and exposure media;
- Routes of exposure and key receptors; and
- Ecotoxicity.

A. Source of Contamination

As previously discussed in Section 2.1.1, there are numerous source areas for contamination that result from historical activities at the former chemical plant. These sources have been generally characterized as the landfill and mercury-containing non-aqueous phase liquid within the bedrock crevices and fractures adjacent to the western CHP and FSA boundary.

B. Transport Mechanisms and Exposure Media

COPECs have reached the Androscoggin River primarily through the following transport mechanisms:

- Surface runoff and deposition;
- Suspension and windblown transport;
- Trophic transfer through the aquatic food chain; and

- Migration of COPECs to sediment and surface water.

The release of COPECs to potential receptors at any given location depends greatly on their chemical speciation and ambient conditions that affect bioavailability. Once absorbed or assimilated into biota, metals are subject to numerous fate and transport processes including storage, metabolism, elimination, and accumulation.

The exposure media of concern for the BERA are surface water, pore water, sediment, benthic invertebrates, the aquatic community, the amphibian community, birds, and mammals.

The remainder of this section presents a brief discussion of environmental fate and transport mechanisms associated with mercury, PCBs, and dioxins/furans in environmental media with a specific focus on freshwater aquatic ecosystems. The fate of mercury depends on the form released into the environment, the potential transformation from one form to another, and the environmental conditions present (Morel et al., 1998; NOAA, 1996). The primary objectives of this section are to present overviews of mercury cycling and of the methylation process and partitioning of mercury that occurs in the environment, and discuss the bioaccumulation potential and the likely exposure pathways within the Androscoggin River drainage. It should be noted that although general understanding of mercury fate and transport has increased substantially over the past decade, there remain substantial gaps that limit the ability to confidently predict the disposition of mercury within a specific ecosystem.

1. Mercury

Mercury fate and transport in the riverine system and in the ecosystem are described in the following sections.

i. Fate in Aquatic Systems

Once mercury has entered an aquatic system, it is subject to an array of chemical and biological reactions, including:

- Binding to sediments and undergoing a conversion to immobile compounds.
- Hg II in surface water can be reduced to Hg0 and reemitted to the atmosphere by a process known as evasion.

- Hg0 in the atmosphere may be oxidized (via photocatalytic reactions) to form Hg II and re-deposited to surface water.
- Hg II can be methylated in sediments, water column or in biota to form methylmercury (EPA, 1996a). Methylmercury can then be volatilized from water; bound to particulates; or, as will be discussed later, incorporated into biological tissue.
- Methylmercury can be demethylated to elemental mercury, which can be reemitted to the atmosphere.

A variety of complexation/dissociation, precipitation/dissolution, adsorption/desorption and methylation/demethylation reactions affect the speciation and partitioning of mercury in the water column and sediment (ALCOA, 1996; Fitzgerald et al., 1994). Each of the reactions listed above are determined by numerous controlling environmental factors such as temperature, pH, ozone concentration, microbial activity, DOC, alkalinity, sulfate availability, sediment characteristics, and others. Most of the mercury in the water column is bound to organic matter; either dissolved carbon or suspended particulate matter. Typically, 25-60% of the mercury present in the water column is particulate-bound with the remainder in the dissolved or DOC-bound phase.

Hg^0 is produced in freshwater by humic acid reduction of Hg II or the demethylation of methylmercury mediated by sunlight (EPA, 1997) Once in a water body, mercury can remain in the water column, volatilize into the atmosphere, settle in to the sediment or be taken up by aquatic biota. In general, mercury in aquatic environments has a strong affinity to remain bound to bottom sediment or suspended matter. For most aquatic environments, sediments serve as a sink and subsequent reservoir for mercury contamination and recycling, with as much as 90 percent of the total mercury in aquatic systems found in sediments (Faust and Aly, 1981).

ii. Mercury Methylation and Partitioning

In aquatic systems, Hg II is converted to methylmercury by a process known as methylation. Methylation is a key step in the introduction of mercury into the food chain. Methylmercury is the form of mercury of greatest concern from both an ecological and human health based risk perspective because methylmercury has been shown to accumulate in the food chain, magnify in successive trophic levels, and because it is the most toxic form of mercury (Eisler, 1987; EPA, 1996a; Wiener et al., 2003). In aquatic environments, the percent of total mercury in

surface water that exists as methylmercury varies. In general, methylmercury makes up less than 10 percent of the total mercury in oxic surface water (Babiarz et al., 1998). The highest relative methylmercury surface water concentrations are detected in anoxic surface waters associated with wetland areas (EPA, 1997; Krabbenhoft et al., 1998). The density of wetland complexes within a water body or river system may be the single most important factor governing the methylation process (Krabbenhoft et al., 1999). This fact is typically attributed to the high degree of methylation occurring in sediments where sulfate-reducing bacteria are found in high densities (Rudd, 1995). In general, sulfate-reducing bacteria are considered to be the primary methylating agent in aquatic environments (Gilmour et al., 1992; Wiener et al., 2003; Winfrey and Rudd, 1990), with most methylation occurring at the oxic-anoxic interfaces in sediment and wetlands (Branfireon et al., 1996; Pak and Bartha, 1998). However, it is recognized that there is a large degree of uncertainty and variability among water bodies concerning the dominant processes regulating mercury methylation (EPA, 1997).

Most of the mercury in the water column is expected to bind to organic matter (EPA, 1997). In aquatic biota such as phyto- and zooplankton, methylmercury comprises 10 to 90 percent of the total mercury present (Huckabee et al., 1979; May et al., 1987; Watras and Bloom). However, in fish, methylmercury generally comprises 90-99 percent of the total body burden (Bloom, 1992; Wiener and Spry, 1996). For this assessment, it is conservatively assumed that all total mercury detected in fish tissue is methylmercury.

Both methylation and demethylation of mercury takes place in aquatic environments. Most research indicates that biological processes are more important in the production and breakdown of methylmercury than abiotic chemical reactions. As previously discussed, biotic methylation of mercury is principally mediated by anaerobic sulfate-reducing bacteria at the sediment-water interface (Gilmour and Henry, 1991; Regnall and Tunlid, 1991), although aerobic bacteria and fungi can also contribute to the methylation process (Yannai et al., 1991). Methylation is the greatest at the sediment-water interface, but it also occurs, to a lesser degree within the water column (NOAA, 1996). In addition to biotic methylation processes, abiotic methylation can be an important process within wetland complexes (Lee et al., 1985; Weber, 1993). Metals acting as catalysts and humic and fulvic acids are all that is required for abiotic methylation of Hg II.

Physico-chemical factors, such as low oxygen conditions, increased temperature, reduced pH, sulfate enrichment, and dissolved organic matter have also been shown to accelerate the production of methylmercury at the sediment-water interface and within the water column (Bodaly et al., 1993; Chen and Folt, 2005; Scheuhammer and Graham, 1999; Winfrey and Rudd, 1990). The acidification of aquatic environments resulting from sulfate deposition plays an important role in the increased presence of methylmercury in aquatic biota. In acidified lakes there is often a clear inverse correlation between pH and concentration of methylmercury in zooplankton and fish (Westcott and Kalff, 1996; Wren and MacCrimmon, 1983). However, increased sulfide concentrations in sediments are often correlated with decreasing methylmercury concentrations in biota (Benoit et al., 1999; Winfrey and Rudd, 1990). Apparently low concentrations of sulfide enhance the methylation process because Hg-S is a neutral complex that has a high formulation constant and diffusion rate; as sulfide concentrations in sediment increase, the speciation of mercury goes from predominantly neutral HgS^0 to charged $HgHS_2^{-1}$ and HgS_2^{-2}, which cannot diffuse across microbial cell membranes and are therefore unavailable for methylation (Benoit et al., 1999). Elevated levels of chlorides have also been observed to inhibit methylation in sediments in a similar fashion (ATSDR, 1999; Benoit et al., 1999; Winfrey and Rudd, 1990).

Environmental factors that influence the enhancement of methylation indirectly influence the bioavailability and accumulation potential. Human activities that alter the biogeochemical character of aquatic systems have been shown to greatly influence the rate of mercury methylation and subsequent availability (Gilmour and Henry, 1991). A prime example of this type of action occurs when soils are flooded for the creation of reservoirs; flooding increases the decomposition of vegetation and dissolution of organic carbon, which in turn increases the release of mercury bound to organic material in water and results in increased mercury methylation rates (Chan et al., 2003). Kelly et al. (1997) also showed that after flooding, the methylmercury concentration in surface water was increased 39-fold. Given the conditions that seem to favor the production of methylmercury, it is not surprising that drainage areas with high concentrations of wetland complexes typically have the highest relative concentrations of methylmercury in surface waters and in the fauna inhabiting those waters (Zillioux et al., 1993).

iii. Bioaccumulation and Exposure Pathways

The most significant mercury exposure pathway is an aquatic food chain pathway in which mercury is biomagnified and exposure to upper level aquatic and terrestrial receptors may result in significant toxic effects.

The conversion of inorganic or complexed mercury to methylated forms is the initial step in the mercury bioaccumulation process. Methylmercury is soluble, mobile, and rapidly enters the food chain (ATSDR, 1999; Mason et al., 1995; Wiener et al., 2003). There is more accumulation of methylmercury in biological tissue than accumulation of inorganic forms of mercury (ATSDR, 1999; Wiener and Spry, 1996). Within aquatic systems, methylmercury can enter the food chain immediately via diffusion, is subsequently tightly bound to biological organics such as proteins, and is stored in tissues rather than excreted (Eisler, 1987; TCI, 1992). As such, plants and animals may absorb mercury from direct exposure to contaminated media (i.e., water) and animals may further accumulate mercury through the ingestion of contaminated food. Although inorganic forms of mercury may also be absorbed or ingested, these compounds are typically not absorbed through cell membranes into muscles and organs and are eliminated from organisms relatively quickly (TCI, 1992; Wiener et al., 2003). Methylmercury on the other hand, tends to be tightly bound to sulfhydryl groups in proteins found in many cellular components, and is stored in skeletal muscle and organ tissues rather than excreted (Harrison et al., 1990; Ribeyre and Boudou, 1984; Spry and Wiener, 1991), where the demethylation process tends to be very slow. Even if concentrations of mercury in sediment and surface water decrease over time, levels in fish may not decrease because of the slow rate of elimination of methylmercury (NOAA, 1996).

Three terms are used to describe the mechanisms by which mercury (primarily methylmercury) accumulates in biological tissues:

- **Bioconcentration –** uptake and retention of chemical directly from an organism's surrounding media (e.g., fish take up mercury from the water column through gill membranes and other external surface tissues).

- **Bioaccumulation –** uptake and retention of a chemical from the environment into biological tissue from all possible pathways (including diet).

- **Biomagnification –** increase in chemical concentrations in organisms at successively higher trophic levels as a result of the ingestion of contaminated organisms at lower trophic levels. Biomagnification has been demonstrated by elevated levels in higher trophic level fish compared with fish lower in the food chain (ATSDR, 1999). Some estimates indicate that levels of methylmercury in carnivorous fish are biomagnified between 10,000 – 100,000 times the concentration detected in water (EPA, 1996a).

Mercury is unique in that it is one of the few metals that are known to bioconcentrate, bioaccumulate, and biomagnify.

In aquatic systems, aquatic plants (e.g., phytoplankton, algae, duckweed) and aquatic animals at all levels of the food chain (e.g., zooplankton → benthic invertebrates → fish) can all be directly exposed to mercury. Sediments, which serve as a sink for contaminated mercury, may be a primary source of exposure to rooted aquatic macrophytes (e.g., hyacinth, *Spartina* spp., common reed) via root uptake and translocation and benthic invertebrates via sediment ingestion. Sediments are also known to be a major long-term source of mercury contamination in surface water via mobilization reactions previously discussed. The entry of mercury into the base of the aquatic food web and subsequent trophic transfer at the lower trophic levels is not completely understood (Wiener et al., 2003). However, as was previously discussed, the conversion of inorganic mercury to methylmercury by sulfate-reducing bacteria is the essential first step in the aquatic food chain bioaccumulation process. The abundance of methylmercury in lower trophic levels is directly linked to the supply (i.e., net production) of methylmercury. The accumulation of methylmercury by the planktonic community is the next critical step in the bioaccumulation and biomagnification process. Recent studies in lakes by Chen and Folt (2005) have shown that planktonic densities are negatively correlated with the biomagnification potential of mercury within a given aquatic system; they have labeled these correlations they observed: algal bloom dilution and zooplankton density dilution. One factor that remains supported by recent studies on mercury cycling is that methylmercury concentrations in surface water are strongly correlated with concentrations in subsequent trophic levels.

The food-chain structure and feeding habits of its constituents can also have a substantial influence on the bioaccumulation and magnification of methylmercury (Cabana and Rasmussen, 1994; Cabana et al., 1994; MacCrimmon et al., 1983; Phillips et al., 1980), with the fraction of

total mercury that exists as methylmercury in aquatic organisms increasing sequentially from lower trophic level producers to piscivorous fish (May et al., 1987; Watras and Bloom, 1992). In addition, the size and age of exposed fish are positively correlated to the methylmercury content of fish tissue (Huckabee et al., 1979; Lange et al., 1993). Several studies have also concluded that approximately 90% of the total methylmercury present in fish tissue results from dietary uptake (Hall et al., 1997; Harris and Bodaly, 1998).

2. PCBs

PCBs are formed when hydrogen atoms on a biphenyl molecule are replaced by 1 to 10 chlorine atoms. First manufactured approximately 75 years ago, PCBs are extremely persistent contaminants that are now ubiquitous in the global ecosystem (Eisler, 1986). There are 209 possible configurations of PCB molecules, based on the number and position of chlorine substitutions on the biphenyl ring; these individual PCB configurations are known as congeners. Although all possible congeners have been synthesized, only approximately 175 of the 209 congeners were included in the various commercial formulations. Groups of PCB congeners with similar numbers of substituted chlorine atoms are referred to as homologs, including: mono-, di-, tri-, tetra-, penta-, hexa-, hepta-, octa-, nona-, and decachlorobiphenyl (EPA, 1996b). Aroclors (Aroclor is a trade name of the Monsanto Company) are commercial mixtures of PCB congeners that were formulated to have specific physical properties, which are based, in general, on the overall amount of chlorine substitution. The level of chlorination affects various physicochemical properties of the PCB molecule, such as the octanol/water partition coefficient, solubility, vapor pressure, and Henry's Law constant. These properties affect processes such as volatilization, and partitioning to water, sediment, and floodplain soil.

Similarly, the level of chlorination also controls (in part) biologically mediated processes such as biotransformation, uptake, and bioaccumulation (Weston Solutions, 2004a). In general, more chlorinated PCBs have greater stability and environmental persistence (Welsh, 1996). PCBs in the environment occur as mixtures of congeners that differ in composition from commercial mixtures because of partitioning, contaminant transformation, and preferential bioaccumulation over time (Aulerich et al., 1986; EPA, 1980; Hornshaw et al., 1983). Some congeners are retained in sediment, soil, and biological tissue. Bioaccumulated PCBs appear to be more toxic than commercial PCBs (Aulerich et al., 1986; Hornshaw et al., 1983).

3. Dioxins/Furans

Dioxins and furans, similar to PCBs, are characterized by low solubility, low vapor pressure, and high affinity for organic carbon (log Koc values as high as 7.39), which suggests that they will strongly adsorb to sediment or soil and that their vertical movement in either medium will be limited. The leaching of dioxins and furans is unlikely if water is the only transporting medium; however, saturation of sorbed sites and the presence of organic solvents or petroleum may result in vertical migration in sediment or soil. Volatilization from soil during warm months may also be a major partitioning mechanism. In general, the higher the degree of chlorination, the lower the relative degree of volatilization from soil or water.

In the atmosphere, dioxins and furans are typically adsorbed to particulates with the vapor-phase tending to be negligible (Paustenbach et al., 1992). Vapor pressure and ambient temperature are the two environmental factors controlling the phase of congeners in the atmosphere. Congeners having a vapor pressure greater than 10^{-4} mm Hg will exist primarily in the vapor phase. Dioxins and furans have relatively long residence times in the atmosphere and are removed by wet, dry, and gas-phase (vapor phase onto plant surface) deposition (ATSDR, 1998).

Contamination of plant foliage via atmospheric deposition is the primary mechanism of accumulation in terrestrial plants. Dioxin and furan adsorption to particulates in the water column increases with increasing chlorination. Dioxins and furans are removed from the water column primarily by binding with particulates, sediment, or biota and, to a lesser extent, by volatilization (Paustenbach et al., 1992). Resuspension of sediment-bound dioxins and furans can increase their transport and availability for uptake by aquatic biota. The primary route of exposure to dioxins and furans for lower trophic-level organisms is uptake from water. Bioaccumulation appears to increase with increasing chlorination up to tetrachlorodibenzo-p-dioxins (TCDDs) and tetrachlorodibenzofurans (TCDFs). For higher trophic-level organisms, the predominant route of exposure is via food chain transfer.

Photolysis of dioxins and furans in sediment or soil is a relatively slow process when compared with aquatic photolysis rates. However, the addition of organic solvents to contaminated sediment or soil can enhance photolytic transformation. Field and laboratory studies have shown that several microorganisms (e.g., fungi and bacteria) are capable of degrading different

congeners. In general, the rate of biodegradation decreases with increasing chlorination. In the atmosphere, dioxin and furan reactions with hydroxyl radicals appear to be the most significant source of transformation. Vapor-phase dioxins and furans may also undergo photolytic degradation. The estimated half-life for TCDD reactions with hydroxyl radicals is 2 to 8 days, and the estimated photolytic lifetime ranges from 1 to 7 days (ATSDR, 1998). Octachlorodibenzo-p-dioxins (OCDDs) and octachlorodibenzofurans (OCDFs), with their low vapor pressure, partition to the particulate phase. Atmospheric photodegradation of these highly chlorinated congeners is less likely. Dioxins and furans in aquatic environments are primarily associated with particulate matter. Photodegradation of bound dioxins and furans occurs near the water's surface and decreases with water depth. Biodegradation in the water column does not appear to be a significant transformation mechanism. Limited biodegradation of dioxins and furans has been observed in sediment, with degradation rate decreasing with increasing chlorination.

C. Routes of Exposure and Key Receptors

Numerous studies have evaluated potential ecological risks at sites where mercury is the primary. COPEC have determined that the exposure pathways of greatest concern were direct contact with surface water, pore water, and sediment; surface water and sediment ingestion; and ingestion exposure resulting from food chain transfer. A list of the key receptors and exposure pathways that will be evaluated was presented in Section 2.2.2. Primary exposure to a key receptor such as a bat species would be from aquatic invertebrates; therefore, bats were evaluated in the aquatic BERA.

2.4.1.2 Ecotoxicity

EPA regulates metals and their inorganic and organometallic compounds because they have the potential to cause environmental harm. Metals, unlike organic pollutants, do not degrade and have complex environmental chemistry that needs to be considered when assessing potential risk. Because some metals are essential for living organisms (and when not present in sufficient concentration can limit growth, survival and reproduction) and occur naturally in the environment, special attention to metal forms, bioavailability, bioaccumulation, and toxicity need to be considered in the risk assessment process.

In general, heavy metals are systemic toxins with specific neurotoxic, nephrotoxic, fetotoxic, and teratogenic effects. Heavy metals can directly influence behavior by impairing mental and neurological function, influencing neurotransmitter production and utilization, and altering numerous metabolic body processes. Systems in which toxic metal elements can induce impairment and dysfunction include the blood and cardiovascular, eliminative pathways (colon, liver, kidneys, skin), endocrine (hormonal), energy production pathways, enzymatic, gastrointestinal, immune, nervous (central and peripheral), reproductive, and urinary.

Other critical factors that need to be considered when evaluating metals-related ecological toxicity are: 1) metals naturally vary in concentration across geographic regions and endemic organisms have evolved under these conditions; therefore, making an understanding of local background concentrations important; and 2) metals occur in mixtures and can interact with each other in numerous ways including synergistically and antagonistically.

A. Mercury Toxicity

Elemental mercury has no known metabolic function, and its presence in living organisms is undesirable and potentially hazardous (Eisler, 1987). Elemental mercury as vapor is most often absorbed through the lungs, although small amounts may be absorbed through the skin. Elemental mercury as a liquid can be absorbed through the skin and gastrointestinal tract; however, only 0.01% of liquid mercury ingested is absorbed (Goyer, 1986). Elemental mercury is insoluble in water, but is extremely lipophilic. Much of the Hg^0 entering the lung is taken up by red blood cells where a majority of it is oxidized to a mercuric form. The Hg^0 remaining in the blood is able to cross the blood-brain barrier and placenta because of its high lipid solubility. Once in the brain, Hg^0 is also oxidized and tends to bind with different proteins and accumulates at a rate 10 times faster than in other tissues.

Mercuric chloride ($HgCl_2$) is the most commonly encountered naturally occurring mercuric form. $HgCl_2$ exposure is typically through the oral exposure route; however, only 7-15% of the $HgCl_2$ ingested is absorbed through the gastrointestinal tract. Mercuric mercury can also cross the blood-brain barrier and can cross into the placenta in mammals or eggs in birds, but not as effectively as Hg^0 or methylmercury. The cortex of the kidney is where most mercuric mercury is accumulated. Mercuric mercury is excreted primarily through the feces although urine and fur (in mammals) act as minor excretion routes.

Organic mercury (primarily methylmercury) is more toxic than inorganic mercury, most likely due to its greater lipid solubility, leading to greater bioavailability. Methylmercury and other organic mercury compounds are readily absorbed by inhalation (nearly 100% absorption) and through the gastrointestinal tract (80-90% absorption). Organomercurial can also be absorbed through the skin. Methylmercury is distributed primarily by red blood cells to the brain and to a lesser extent to the liver and kidney. Once inside cells, organic mercury tends to form unique bonds with proteins and is more readily transported across the blood-brain barrier and to the placenta or to eggs than the inorganic form. The major route of excretion for methylmercury is in feces, with hair and feathers acting as minor routes of excretion for mammals and birds, respectively. Organomercury is also more biologically stable and resistant to degradation than inorganic mercury, the form that can be more readily eliminated from the body (NAS, 1980). As previously discussed, bioaccumulation and biomagnification of methylmercury along food chains is well documented (Eisler, 1987).

Although organomercury is more easily absorbed and more toxic, inorganic forms present in the environment are also of concern since inorganic forms can be microbially methylated in aquatic media (Hill and Schaffer, 1976).

Mercury seems to affect all classes of vertebrates in a like manner. Mercury is also a mutagen, teratogen, and carcinogen. It has the potential to produce severe neurological, embryocidal, cytochemical, and histopathological effects in exposed wildlife (Eisler, 1987).

The following subsections present an overview of mercury toxicity in mammals, birds, and aquatic life. Primary emphasis is placed on toxic effects specifically attributed to methylmercury.

1. Mammals

Larger mammals seem to be more resistant to mercury than small mammals. Mercury concentrations in mammals are usually higher in fish-eating furbearers than in herbivorous species; seemingly reflecting the amounts of fish and other aquatic organisms in the diet. In river otter and mink exposed to high mercury levels, the residues were highest in the fur, followed by the liver, kidney, muscle, and brain (Eisler, 1987). A similar relationship was observed by Yates et al. (Yates et al.) for river otter and mink samples collected in the northeast

from 1982-2003. Lake et al. (Lake et al.) also observed that mercury concentrations in mink livers collected from 1999-2004 in Rhode Island were higher than corresponding muscle concentrations; however, their analysis also noticed a substantial difference in mercury levels in mink sampled in freshwater and saltwater environments, with higher levels generally associated with freshwater habitats.

Symptoms of methylmercury poisoning generally do not occur immediately upon exposure, with a substantial latent period (weeks to years) passing between cessation of exposure and the onset of symptoms (Eisler, 1987).

The primary endpoint of concern with mammalian exposure to methylmercury is neurotoxicity (EPA, 1996a). Methylmercury irreversibly destroys the neurons of the central nervous system (Eisler, 1987). In studies with laboratory rats, pathological changes in the cerebellum were evident in methylmercury treated rats. Toxicological studies with small mammals indicate that when methylmercury concentrations in the brain exceed 12,000 to 20,000 micrograms per kilogram (µg/kg) wet weight (WW), frequently observed effects include blindness, spasticity, and seizures (Burbbacher et al., 1990). Other potential sites of damage include the posterior spinal roots, peripheral nerves, and peripheral sensory fibers (Suzuki, 1979). Other frequently observed signs of methylmercury intoxication include lethargy, weakness, ataxia, paralysis, tremors, convulsions, and visual impairment (Wiener et al., 2003). Many of the neurological effects reported for mammals exposed to methylmercury could be life threatening in the wild, with local population level impacts a real concern if exposure is widespread.

Aside from nervous system damage, chronic mercury toxicosis causes digestive, genitourinary, respiratory, and muscular dysfunction; and skin, visual (NAS, 1980), auditory, and sensory (EPA, 1996a) problems.

The kidney is a target organ for inorganic mercury toxicity. Inorganic mercury exposures in rats have resulted in several forms of glomerular nephritis. Inorganic mercury also, through differing mechanisms including autoimmunity, causes changes in the renin angiotensin system (RAS) and kallikrein-kinin system (Carmignani et al., 1992). Renin is an enzyme produced by the kidney that acts on angiotensinogin to form angiotensin, a powerful vasopressor and stimulator of aldosterone production and secretion. Kallikrein is an enzyme present in the blood, plasma, urine, and body tissue that forms kinin. Kinin is a potent vasodilator that influences smooth

muscle contraction, inducing hypotension (Thomas, 1985). The kallikrein-kinin system also influences the synthesis and release of aldosterone (Carmignani et al., 1992). Aldosterone affects the regulation of sodium, chloride, and potassium metabolism (Thomas, 1985). Therefore, inorganic mercury modifies systemic hemodynamics (Carmignani et al., 1992).

Dose-response studies of mink (Wobeser and Swift, 1976) and otter (O'Connor and Nielson, 1980) have shown that total mercury concentrations of 20,000-25,000 µg/kg WW in liver and 15,000-19,000 µg/kg WW in brain tissue may result in mortality. These concentration ranges also appear to be appropriate benchmarks for lethal effects, observed in fox (*Vulpes vulpes*), marten (*Martes martes*), the Florida panther (*Felix concolo*), and feral cats (Wiener et al., 2003). Dietary concentrations of methylmercury >1,800 µg/kg WW are sufficient to cause mercury intoxication in piscivorous mammals (Thompson and Graham, 1996; Wobeser and Swift, 1976). An Ontario study considered otter populations to have reduced survivorship when mercury concentrations in fur exceeded 20,000 µg/kg (Mierle et al., 2000). It is also worth noting that fur mercury levels in mink and otter are strongly correlated with corresponding brain mercury levels (Evers et al., 2002).

2. Avian

As with mammals, the threat of mercury to birds is largely an aquatic one (Wiener et al., 2003). In avian species, mercury intoxication causes muscular incoordination, falling, slowness, fluffed feathers, calmness, withdrawal, hypoactivity, hyperactivity, and eyelid drooping. Subtle effects of mercury include adverse effects on growth, development, reproduction, blood and tissue chemistry, metabolism, behavior, and histopathology (Eisler, 1987).

The most sensitive toxic endpoints for avian exposure to methylmercury are reproductive effects. Avian species exposed to methylmercury experienced a reduction in fertility, egg number, and survival; and defective shells (EPA, 1996a). When methylmercury chloride was given to hens, 55% of the absorbed dose accumulated in the egg, with 80% of that associated with albumin (NAS, 1980). Mercury levels in eggs are a good indicator of avian exposure within the bird breeding territory (Heinz and Hoffman, 2003).

Studies have also shown that when exposed to methylmercury, a decreased number of ducklings approach maternal calls (EPA, 1996a). Behavioral alterations noted in pigeons

exposed to methylmercury were changes in posture and motor coordination, with "spastic paralysis" (Eisler, 1987).

Mercury levels in avian blood are the best tissue for evaluating short-term dietary uptake (Evers et al., 2005). Evers et al. (Evers et al., 2003) observed that blood mercury levels of >3,000 µg/kg in territorial loons resulted in 40% fewer young than pairs below the NOAEL of approximately 1,000 µg/kg in blood. Evers et al. (2003) also observed that loons with high mercury blood levels have higher ratios of chronic stress and may therefore have compromised immune systems. This study also found several atypical behaviors, such as reduced nest brooding and foraging, associated with increased mercury blood levels.

High inorganic mercury levels in drinking water decreased growth rate; decreased food and water consumption; and elevated hemoglobin, hematocrit, and erythrocyte content in chickens (Eisler, 1987).

3. Aquatic Life

The potential toxicity of mercury to aquatic life is higher in surface waters exhibiting elevated temperatures, lower oxygen content, and the presence of other metals (NOAA, 1996). Freshwater invertebrates are relatively tolerant of mercury, except in the larval stages. In general, mercury tolerance and sensitivity is reflected in the following scale:

Tolerant	← - - - - - - - →	Sensitive
Insects	Annelids, Fish, Gastropods	Crustaceans

As with most organisms, methylmercury is the most toxic form to freshwater invertebrates. Bottom feeders accumulate more methylmercury than other invertebrates, but methylmercury generally represents less than 60% of the organisms' total mercury burden. The kinetics and associated effects of mercury contamination of freshwater benthic organisms has received relatively little study; however several studies exist that have been able to demonstrate a relationship between total mercury concentrations in tissue and adverse effects on growth and behavior (Wiener et al., 2006). Water concentrations from 1E+06 to 1E+07 nanograms per liter (ng/L) can be acutely toxic or lethal to some invertebrate larval stages (associated tissue concentrations not presented). Calculated tissue LC_{50} ranges from 200 µg/kg for a sensitive

crayfish (*Procambus clarkia*) to 2.1E+06 µg/kg for the freshwater snail *Amnicola* were reported by Wren and Stepheson (1991).

Higher residues of mercury were found in piscivorous game fish than in herbivorous, insectivorous, and omnivorous species. The highest mercury concentrations in fish occur in the blood, spleen, kidney, and liver (EPA, 1996a). Body burdens in fish vary greatly depending on age, weight, length, species, temperature, and local physical/chemical properties of the water. Exposure occurs through two principal mechanisms: Adsorption at the gill and ingestion of prey species. Comparisons of toxicity tests have indicated that methylmercury is 30 times more acutely toxic than inorganic mercury to freshwater species. Chronic exposure to low concentrations of mercury may result in fish populations tolerant to toxic effects of the contamination (NOAA, 1996).

Fish are more sensitive to sublethal effects from chronic exposure to inorganic and organic mercury than invertebrates, but are less sensitive to acute effects. Fish early life stages (especially in salmonids) are generally the most sensitive. Mercury can be transferred from adult female fish to the developing eggs (NOAA, 1996).

In fish species, acute lethality is preceded by flaring of gill covers, increased frequency of respiratory movements, loss of equilibrium, and sluggishness. Death from chronic exposure to mercury is preceded by emaciation from appetite loss, cataracts, and various erratic behaviors. Spry and Wiener (1991) reported LC_{50} values ranging from 3.3E+07 ng/L to 6.87E+08 ng/L for two-month old rainbow trout and adult white suckers, respectively. At sublethal doses, mercury adversely affects reproduction, growth, behavior, metabolism, blood chemistry, osmoregulation, and oxygen exchange (Eisler, 1987).

As with many terrestrial vertebrates, methylmercury is lipid soluble and penetrates the blood-brain barrier. Neurotoxicity results from the accumulation of methylmercury in the cerebellum and cerebral cortex, where it binds to sulfhydryl groups, causing pathological changes. Inside cells, methylmercury inhibits protein and ribonucleic acid synthesis. Neurotoxicity is observed in adult fish as incoordination, inability to feed, lethargy, diminished responsiveness, abnormal movement, and brain lesions (NOAA, 1996).

Inorganic mercury has a high affinity for binding to thiol and sulfhydryl groups of proteins, thereby altering protein production or synthesis. This results in reproductive impairment, growth retardation/inhibition, and teratogenicity. Olfactory and chemoreceptor impairment in salmonids and other fish have also been noted from inorganic mercury exposure. This may interfere with normal migratory behavior, and disruption of simple upstream movement (NOAA, 1996).

B. PCBs Toxicity

The toxicology of PCBs varies considerably among congeners, depending on the number and location of chlorines on the biphenyl molecule, and also between animal species due to differences in absorption, metabolism, mechanism of action, and potential toxic effects (Eisler and Belisle, 1996). PCB congeners vary in toxicity in many ways, including mode of action, potency, and potential for interaction. PCB congeners may interact with each other and with other chemicals when combined in a complex commercial PCB mixture.

The following discussion of PCB toxicology focuses primarily on the general mechanisms of PCB toxicity. PCB congeners differ in their biological activities, and different animal species vary in their sensitivity to the individual congeners. Multiple and diverse mechanisms are involved in the toxicological responses of animals to PCB exposures. The mechanism of Ah-receptor binding is an initial step in producing toxic effects, and is the basis for the WHO TEFs approach for ranking the relative potency of PCBs, PCDDs, and PCDFs (Van den Berg et al., 1998). The WHO TEFs only apply to Ah-receptor21 mediated biochemical responses and toxic effects. The relationship between PCB molecular structure and the potential for toxic effects independent of Ah-receptor mediation is not clearly understood. Research through the 1990s found increasing evidence for alternative mechanisms for several PCB-induced effects such as neurotoxicity and disruption of neutrofil function independent of Ah-receptor mediation (ATSDR, 2000). In addition, there is a third category, where PCB toxicity may be initiated by both Ah-receptor-dependent and independent mechanisms. PCBs are able to induce hepatic Phase I enzymes (CYP oxygenases) and Phase II enzymes (e.g., UDP glucuronyltransferases, epoxide hydrolase, glutathione transferase). Most commercial PCB mixtures induce both 3-methylcholanthrene type (CYP1A1 and 1A2) and phenobarbital-type (CYP2B1, 2B2, and 3A) CYPs. Non-ortho and mono-ortho PCBs can assume a coplanar molecular configuration and bind to the Ah receptor causing CYP1A1/1A2 induction in rodents (Safe, 1994).

Effects from PCBs involving the Ah-receptor-initiated mechanisms include body weight wasting, thymic atrophy, porphyria, and porphyria cutanea tardea (Safe, 1994). There are many examples of the complexity of the relationship between PCB molecular structure and toxic effects independent of Ah-receptor initiation. For example, some PCBs with two ortho chlorines and lateral chlorines induce both types of CYPs but demonstrate little Ah-receptor affinity. Di-ortho PCBs with one or two para chlorines predominantly induce CYP2B1/2B2/3A and have no affinity for the Ah receptor (Connor et al., 1995). The induction of phenobarbital type CYPs by PCBs is independent of the Ah receptor. PCBs with at least two ortho chlorines and one or two para chlorines are the most potent CYP inducers. Neurological and neurodevelopmental effects involving changes in brain dopamine levels are PCB-induced effects that are Ah-receptor independent. Scientists have hypothesized that the effect on dopamine levels is related to decreased dopamine synthesis by PCB inhibition of certain enzymes or decreased dopamine uptake into vesicles (ATSDR, 2000). It is also possible that a connection exists between disruption of Ca2+ homeostatic mechanisms and neurological and neurodevelopmental effects. It is clear that Ah-receptor-independent mechanisms are important in the induction of neurotoxic effects by PCBs.

In vitro studies have indicated that PCBs can induce functional changes such as degranulation in neutrofils (ATSDR, 2000). These functional changes may be related to PCB toxicity such as immunological effects and tissue damage. Immunological effects that involve neutrofils include defenses against pathogens and inflammatory responses leading to tissue injury. There are a number of effects that involve both Ah-receptor-dependent and -independent mechanisms. These include liver hypertrophy, neurodevelopmental, or reproduction effects involving changes in steroid hormone homeostasis and/or thyroid hormone disruption, immunological effects, and cancer (ATSDR, 2000; Safe, 1994). Safe (1994) reviewed numerous studies of PCB-induced hepatoxicity in mammals including rats, mice, rabbits, guinea pigs, monkeys, and mink exposed to Aroclors including 1221, 1242, 1248, 1254, and 1260. From these studies, it appears that PCB-induced liver toxicity is mediated by both Ah-receptor-dependent and -independent mechanisms. Reproductive impairment following PCB exposure has been observed in mink, one of the most sensitive mammals to PCB toxicity (Eisler and Belisle, 1996; Moore et al., 1999). Although congeners with high Ah-receptor affinity are more potent than congeners with low Ah-receptor affinity, there is evidence that Ah-receptor-independent mechanisms may be involved. Review of the scientific literature indicates that animals exposed to PCBs have an increased risk of cancer.

Lifetime oral exposures to a number of commercial PCB mixtures (Aroclors 1016, 1242, 1254, and 1260) have produced liver tumors in female rats and Aroclor 1260 has produced liver tumors in male rats. Mixtures with high chlorine content such as Aroclor 1254 were generally more potent than mixtures with low chlorine content such as Aroclor 1016 (Mayes et al., 1998).

C. Dioxins/Furans Toxicity

Many halogenated aromatic compounds have been described as exhibiting dioxin-like behavior, such as PCDFs and some coplanar PCBs, based on similarities in toxicity and mechanism of action. The primary toxic mechanism of action is binding of the PCDD, PCDF, or coplanar PCB compound to the Ah receptor (described in the previous section). Because 2,3,7,8-TCDD binds to the Ah receptor with a high affinity and has a high toxic potency, it has been the focus of experimental toxicity studies. EPA, regulatory agencies in other countries, and international organizations such as WHO, use a TEF approach to reflect the varied toxicity of the different PCDDs, PCDFs, and PCBs.

The impact of dioxins in the environment is directly related to their highly lipophilic and hydrophobic nature as well as to the toxic effects of these compounds on plants and animals. These toxic effects have been extensively studied in the laboratory and through evaluation of animals exposed to dioxins in the environment. The toxicology of PCDD/PCDF varies considerably between congeners and between animal species in absorption, metabolism, mechanism of action, and potency of toxic and carcinogenic effects.

The following discussion of PCDD and PCDF toxicology focuses primarily on the general mechanisms of toxicity. 2,3,7,8-TCDD and equivalents share a mechanism of toxicity that initially involves binding of the individual congener to the systolic Ah receptor in all animal species. After initial binding, the ligand-receptor complex is translocated to the nucleus of the cell. It then becomes associated with the deoxyribonucleic acid (DNA) and causes transcription of one or more contaminated genes (EPA, 1993a). The physiological effects that follow are species-specific but there are many similarities, including the induction of enzyme systems such as cytochrome P4501A1, “wasting syndrome,” decreased immunocompetence, reproductive effects, edema, and mortality. The Ah receptor is present in all mammalian and bird species that have been tested, as well as in many species of fish. It is unclear whether the Ah receptor is

present in amphibians and reptiles. A protein similar to the Ah receptor has been identified in terrestrial invertebrates, but there is no evidence to support the existence of an Ah-receptor type protein in aquatic invertebrates (EPA, 1993b). 2,3,7,8-TCDD toxicity and the toxicity of the other 74 individual PCDD congeners is mediated by the Ah receptor.

Differences between species in sensitivity to 2,3,7,8-TCDD may be related to the size and binding efficiency of the Ah receptor, pharmacokinetic differences between species, and additional contributing factors. Ah-receptor affinity is determined by the chlorine substitution pattern of the individual dioxin congener. 2,3,7,8-TCDD is substituted in all four lateral positions and has the highest affinity for the Ah receptor in most species. Less active congeners have an additional one, two, or four nonlateral chlorine substituents or have lateral chlorine substituents removed. 2,3,7,8-TCDD and structurally related halogenated aromatic compounds induce microsomal hepatic enzymes such as hepatic aryl hydrocarbon hydroxylase (AHH) and ethoxyresorufin-O-deethylase (EROD).

Both AHH and EROD are markers of CYP1A1 activity. Increased synthesis of cytochrome P4501A1 (CYP1A1) is induced by an individual dioxin congener binding to the Ah receptor. CYP1A1 functions in the detoxification or activation of endogenous and exogenous chemicals. Cytochrome P4501A2 (CYP1A2) is only induced in hepatic tissue and has a similar function to CYP1A1. Effects observed in the offspring of animals exposed to 2,3,7,8-TCDD include fetal/newborn mortality, structural malformations, impaired development of the reproductive system, neurodevelopmental effects, immunotoxicity, and thymic atrophy. Impaired development of the reproductive system and neurobehavioral effects in the developing organism are the most sensitive endpoints of 2,3,7,8-TCDD exposure (ATSDR, 1998). 2,3,7,8-TCDD is a potent animal carcinogen and has tested positive for carcinogenicity in 19 different studies in four animal species: mice, rat, hamsters, and fish (Huff, 1992; Johnson et al., 1992).

EPA classifies 2,3,7,8-TCDD as a B2, probable human carcinogen (Evers et al., 2002). The exact mechanism of how 2,3,7,8-TCDD causes carcinogenicity is not well understood but the evidence indicates that direct DNA damage through formation of DNA adducts is not the mechanism. The carcinogenicity of 2,3,7,8-TCDD is thought to involve the Ah receptor. 2,3,7,8-TCDD is considered a nongenotoxic carcinogen and has tested as not mutagenic in the Salmonella/Ames test. 2,3,7,8-TCDD is a potent tumor promoter and is either a weak initiator or a non-initiator. 2,3,7,8-TCDD and the other carcinogenic dioxin congeners are whole and

complete carcinogens as tested in mice, rats, hamsters, and fish. PCDD/PCDFs disrupt normal homeostatic processes that regulate cell growth and differentiation. These disruptions produce a wide range of toxic effects and histopathological changes. The PCDD/PCDF congeners vary in many ways including affinity for the Ah receptor, potency, and potential for interaction.

2.4.1.3 Final Conceptual Model Diagram

CSM diagrams are visual representations of the multiple relationships between COPECs and receptors and the pathways of exposure at a site. Evaluation and inclusion of each relationship in the CSM diagram are based on several criteria:

- Data availability;
- Strength of relationship between COPECs and effects;
- Endpoint significance;
- Relative importance or influence of COPECs;
- Importance of effects to ecosystem function.

Information used to develop the CSM is often one of the most significant sources of uncertainty in a risk assessment. This uncertainty arises from lack of knowledge of how ecosystems function in general, and how the system being evaluated functions specifically; how COPECs move through the environment and cause adverse effects; and how the confounding variables associated with multiple contaminants interact.

The availability of historical data on COPECs and receptors, and a comprehensive ecological characterization reduces the uncertainty associated with the development of the CSM at this Site. In addition, the BERA approach presented in this document tries to address some of the key issues identified by EPA in its *Framework for Metals Risk Assessment* (EPA, 2007), thereby reducing some of the uncertainties frequently encountered in ERAs at sites where metals are the primary contaminants of concern.

Although general uncertainties associated with assumptions are addressed throughout this BERA, a detailed discussion of specific uncertainties and their implications for the interpretation of risk results is reserved for the Risk Characterization.

Given the available information on fate and transport, bioaccumulation, and ecotoxicity of the COPECs, the preliminary CSM presented in Section 2.2.2, Figure 2-6 remains unchanged and is adopted as the final CSM. Again, this flow diagram provides a working, dynamic representation of the relationships that exist between COPECs and key ecological receptors that may be modified as additional information becomes available, and is not meant to characterize all possible mechanisms of exposure or potentially impacted species.

2.4.1.4 Risk Questions/Hypotheses

Risk hypotheses are specific assumptions about potential risk to assessment endpoints and may be based on theory and logic, empirical data, and mathematical or probability models. The hypotheses are formulated using professional judgment and available information of the ecosystem at risk, potential stressor sources and characteristics, and observed or predicted effects on assessment endpoints.

As a component of the development of the CSM, testable hypotheses or “risk questions” are developed to provide the basis for the study design and selection of measurement endpoints. These hypotheses represent statements regarding anticipated ecological effects and define the focus of the individual lines of evidence. In general, the primary question to be asked by the risk hypothesis is “what probabilities are associated with effects of differing magnitudes as a result of exposure of the assessment endpoint to the COPEC?” For this BERA, the major line of evidence used to answer this question is the comparison of an estimated or measured exposure concentration of a COPEC to concentrations known from the literature to be toxic to receptors associated with the assessment endpoint.

2.4.2 Final Endpoints

As noted previously, a critical early step when conducting an ERA is deciding which aspects of the environment will be selected for evaluation, because not all organisms or ecosystem features can be studied (EPA, 2003). It is, therefore, essential that risk assessors understand the potential relationship of site-related contamination to ecological endpoints so that well informed risk management decisions can be made at the end of the ERA process (Suter II, 1989). Final assessment and measurement endpoints are discussed below.

Given the available chemistry data, results of the benchmark screening, and bioavailability information, the final measurement endpoints that are used to evaluate potential ecological risks resulting from exposure to RSA media are presented in Table 2-39 with their corresponding assessment endpoints. Note that amphibians and reptiles will not be evaluated herein because of the lack of breeding habitats in the river proper, from which contaminant concentrations are available and the lack of detects and low concentrations compared with surface water criteria.

Although many of the endpoints presented here are linked to organism-level effects (e.g., survival and reproduction), these endpoints are in fact strong indicators of potential population-level effects (e.g., viability of the kingfisher population within the ARI area). Extrapolation from organism-level to population-level effects may be logically achieved based on the predictive nature of the endpoint.

2.4.3 Weight-of-Evidence Approach

The assessment methods that are used in this BERA consider a variety of endpoints and effects that differ in their suitability for, and sensitivity to, assessing the potential risks at the RSA. In assessing ecological risk, not all measurement endpoints are equivalent in their ecological significance or in their ability to predict risk. For example, it can be argued that comparison of chemical concentrations in sediments to benchmark values is less compelling than the results derived from a site-specific sediment toxicity test.

To account for the strengths and weaknesses of different measurement endpoints that will be used in this assessment and to provide a framework for evaluating multiple lines of evidence, a WOE approach will be used. The objective of this WOE framework is to provide a more rigorous consideration of the strengths and weaknesses of various measurements, the nature of uncertainty associated with them, and their potential utility in the ERA. The framework for the WOE approach used in this assessment was developed by the Massachusetts Weight-of-Evidence Workgroup (the Workgroup) and is detailed in the *Special Report of the Massachusetts Weight-of-Evidence Workgroup: A Weight-of-Evidence Approach for Evaluating Ecological Risks* (Menzie et al., 1996). In this paper, the Workgroup defines the WOE approach as:

> *"…the process by which measurement endpoints are related to an assessment endpoint to evaluate whether a significant risk of harm is posed to the*

environment. The approach is planned and initiated at the problem formulation stage, and results are integrated at the risk characterization stage."

According to Menzie et al. (1996), WOE is reflected in three characteristics of measurement endpoints: (1) the weight assigned to each measurement endpoint; (2) the magnitude of response observed in the measurement endpoint; and (3) the degree of concurrence among outcomes of multiple measurement endpoints for a given assessment endpoint. The weight assigned to each measurement endpoint is determined prior to the actual assessment of risk. The magnitude of response and degree of concurrence are determined as part of the Risk Characterization (the final step in the BERA process).

The approach provides the option of performing either a quantitative or a qualitative WOE evaluation. Regardless of what form the WOE takes, it should provide clear and transparent documentation of the thought processes used when determining potential ecological risk. For this assessment, a more qualitative approach using a low-medium-high significance rating is used to assign weights to different measurement endpoints. The discussion that follows provides a detailed description of the steps taken to conduct the initial WOE for this BERA.

First, weights are assigned to measurement endpoints based on 10 attributes (summarized in Table 2-40) related to: (1) strength of association between assessment and measurement endpoints; (2) data and study quality; and (3) study design and execution. In either a quantitative or a qualitative WOE analysis, the process of assigning weights to measurement endpoints can incorporate two elements:

1. The relative importance assigned to each attribute, a process referred to as "attribute scaling."
2. The score that each measurement endpoint receives with respect to each attribute, typically referred to as "attribute weighting."

For this BERA, it was assumed that all attributes were of equal importance so there was no "attribute scaling" conducted. The second element of the measurement endpoint weighting process, "attribute weighting," was performed for measurement endpoints using a qualitative scale ranging from low to high and following "attribute weighting" guidelines used by EPA in the Aquatic BERA for the Ely Mine Site (EPA, 2010). This process, even when following guidelines,

is somewhat subjective and was accomplished using the combined professional judgment of the ecological risk assessors.

After assigning a weight for each of the 10 attributes, a total measurement endpoint value was determined by summing the 10 attribute weights. Consistency in the weighting process was ensured by assigning each attribute weight a numerical score of 1 (low) through 10 (high). The final qualitative measurement endpoint value was determined by applying the following classification scale to the sum of the attribute weights: ≤30 (Low), 30<x≤45 (Low/Moderate), 45<x≤60 (Moderate), 60<x≤75 (Moderate/High), and >75 (High).

In general, overall endpoint weights developed using the aforementioned approach follow a basic hierarchy:

- Low = generic benchmarks;
- Low-Moderate = food chain modeling using estimated tissue concentrations;
- Moderate = laboratory acute toxicity testing, food chain modeling using measured tissue concentrations and comparing measured tissue concentrations to critical body residues (CBRs);
- Moderate-High = laboratory chronic toxicity testing; and
- High = In-situ population studies (e.g., B-IBI).

The results of this first step are presented in Table 2-41.

The second step of the WOE approach is to evaluate the magnitude of response in the measurement endpoint. This is accomplished by considering the potential risk to the population/community being evaluated and the level of confidence associated with that risk determination.

The third step of the WOE process evaluates the degree of concurrence among measurement endpoints. This is accomplished by presenting the risk results for each line of evidence, their associated weights, and key uncertainties together.

As previously discussed, the second and third steps will be more fully developed in Section 4 – Risk Characterization.

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3.0 ANALYSIS PHASE

The Analysis Phase of an ERA consists of the technical evaluation of data as it relates to the potential exposure to and effects from the COPECs identified during the Problem Formulation (EPA, 1992a; Norton et al., 1992). The Analysis Phase is based on the conceptual model developed during the Problem Formulation and consists of two primary components: 1) Characterization of Exposure and 2) Ecological Effects Characterization. Information typically associated with the Analysis Phase includes exposure source information; measurements of stressor levels (i.e., chemical concentrations); and direct and indirect measurements of exposure (e.g., exposure models) and biological effects. The format of the Analysis Phase follows EPA's *Guidelines for Ecological Risk Assessment* (EPA, 1998).

The Analysis Phase focuses solely on discussions of exposure and potential effects. The Risk Characterization, the final phase of this BERA, presents the integration and interpretation of exposure and effects information.

A major portion the Analysis Phase is focused on the evaluation and analysis of data. In this BERA, as in most ERAs, direct measurements of exposure and effects were not available for all aspects of the analysis, and in some situations, the absence of data required that certain assumptions and their associated uncertainties be recognized. Uncertainty and variability present in the Analysis Phase can take three forms - parameter variability, measurement error, and extrapolation uncertainty (EPA, 1992a):

- Parameter variability refers to the true heterogeneity of parameters used in the assessment; an example of the variability of a parameter would be the range of chemical concentrations in soil. Variability can often be quantified by presenting a distribution, or by presenting one or more points of a distribution of the parameter (e.g., mean, range, and 95th percent UCL).

- Measurement error is the difference between the true value and the measured value that are introduced through experimental design or procedures used for measurement and sampling.

- Extrapolation uncertainty, one of the principal forms of uncertainty, is present in any ERA in which the measurement and assessment endpoints are not identical. One of the more common forms of extrapolation uncertainty is encountered when laboratory analyses are used to evaluate an attribute of a natural system (e.g., use of laboratory-derived toxicity values). Although this type of uncertainty is unavoidable, it can also be reduced by careful attention to study design and the use of good professional judgment and common sense (Norton et al., 1992).

Key assumptions and simplifications made during the Analysis Phase are presented and their associated uncertainties are discussed in this section.

The Analysis Phase is organized into two subsections: the Exposure Characterization (Subsection 3.1) and the Ecological Effects Characterization (Subsection 3.2). As stated previously, the information presented in these subsections is integrated with the Risk Characterization to estimate the potential for adverse ecological risks resulting from COPECs.

3.1 Exposure Characterization

The objective of the exposure characterization is to combine the spatial and temporal distributions of both the ecological component (i.e., potential species, communities, or habitats) and the chemical stressors to evaluate their co-occurrence (Norton et al., 1992). The most common approach for characterizing ecological exposure is to measure the concentrations of stressors and combine them with assumptions about receptor co-occurrence or uptake (EPA, 1992a). The exposure characterization attempts to evaluate quantifiable routes of exposure (e.g., direct contact with surface soil and ingestion small mammals) through which species or communities present at the RSA may be exposed to COPECs.

In general, a chemical exposure characterization has three objectives: (1) characterize releases to the environment; (2) describe the spatial and temporal distributions within the environment; and (3) characterize contact with the ecological component of concern (EPA, 1992a; Suter II et al., 1994).

Characterization of historical releases to the terrestrial areas and vernal pools at the RSA has been presented in the Problem Formulation (Section 2) of this BERA, and is not addressed

further in this section. The Characterization of Exposure is based on measured COPEC exposure concentrations.

The Exposure Characterization is divided into two sections that 1) describe the spatial and temporal distributions of COPECs at the RSA, and 2) characterize potential contact between target receptors and COPECs in the exposure media.

The following discussion provides a brief description of information that is provided in each subsection. Subsection 3.1.1 presents stressor concentrations in sediment that were used to directly assess exposure. (Note no COPECs were identified in surface water or pore water.) Subsection 3.1.1 also presents tissue (benthic invertebrates, crayfish, fish, bird, and bat) concentrations that were used to identify potential exposure for avian and mammalian receptor models. Subsection 3.1.2 presents the quantitative approach that was used to model exposure to avian and mammalian receptors.

3.1.1 Medium-Specific Chemical Characterization

This section of the exposure characterization summarizes the distribution of COPECs in different media to which receptors identified in the problem formulation may be exposed.

Analytical data are organized into spatially relevant groups for each of the media. The term “spatially relevant group” refers, in large part, to how a representative exposure of a target species to COPECs in a specific medium is defined. Typically, an animal’s foraging area is used to estimate the areal extent within which an animal is expected to contact an environmental medium, for example soils. The size and the spatial attributes of the foraging area are species-dependent, and the data groupings for each of the target receptors reflect this dependency. For example, since the foraging radius of a mink is much larger than that of a song bird, the calculation of an exposure point concentration (EPC) for these species would incorporate different data groupings. In many cases, not only is the size of the foraging area species-dependent, but it is also dependent on a number of factors including life stage, dietary requirements, and the proximity of sufficient food to meet those requirements. As discussed in Section 2, this BERA study area is divided into reaches that reflect distinct flow and habitat conditions. Reach designations also proportion the Androscoggin River into logical management

units. Exposures for target receptors were assessed on a reach-by-reach basis to facilitate discussion of potential risks and subsequent remediation decisions.

Finally, the EPCs in selected environmental media (i.e., primarily sediment and biological tissue) within the study area are determined. An EPC is the concentration term used in modeling intake that is an estimate of the arithmetic average concentration for a contaminant based on a set of site sampling results (EPA, 1992b). Calculation of the EPC is presented below.

EPC Calculation

EPCs were calculated only for those media that were used in the wildlife modeling efforts. EPCs were calculated on a reach-specific basis.

According to EPA regional guidance (EPA, 1991-1994), risk assessments are conducted using an EPC for each COPEC. The EPC represents the concentration to which a receptor is assumed to be continuously exposed while in contact with an environmental medium. For crayfish and fish, the EPC is generally defined as the 95 percent UCL on the mean and is calculated using EPA's ProUCL software (EPA, 2011b). The following general guidelines were used to determine reasonable maximum exposure (RME) EPCs.

- If fewer than 8 samples were collected, the maximum detected concentration was selected as the EPC.

- If 8 or more samples were collected and the dataset contained more than 5 percent but less than 50 percent detects and at least 4 detects, a nonparametric-based UCL (either Kaplan-Meier (KM) or bootstrapping derived), as per ProUCL's non-parametric-based UCL recommendation, was calculated. Note that the bootstrapping method was not considered unless there were at least 10 detects.

- If 8 or more samples were collected and the dataset contained at least 50 percent detects, the appropriate distribution of the dataset was determined and UCLs were selected as guided by the ProUCL supporting documentation. Note that for datasets with censored results (i.e., non-detects), UCLs calculated using estimation procedures (e.g., KM, bootstrapping) were considered instead of employing the simple substitution

method (e.g., using one-half the SQL for non-detects) for selecting appropriate UCLs as guided by the ProUCL supporting documentation. Note, the UCL calculations are different from the summary statistic calculations where the sample quantitation limit was used for nondetect concentrations in that ProUCL determined concentrations to use for censored (i.e., nondetect) data.

Support documentation (ProUCL Outputs) for the calculation of the UCLs is presented in Appendix H.

Mean values were used for the central tendency exposure (CTE) scenario. Maximum detected concentrations, data distributions, 95% UCLs, and selected EPCs are presented in Table 3-1.

3.1.2 Avian and Mammalian Receptor Exposure Modeling

The potential for food chain impacts of bioaccumulative chemicals in both aquatic and terrestrial systems is well recognized. Because of the significant biomagnification potential associated with mercury and other COPECs and the potential risk to terminal receptors in the food chain, representative upper trophic level receptors are evaluated as part of this BERA. Because fish generally represent the terminal receptor in aquatic systems, avian and mammalian species foraging upon these fish may be at substantially higher risk than those receptors at a lower trophic level. Consequently, piscivorous avian and mammalian species that forage from the affected portions of the Androscoggin River were evaluated as representative ecological receptors.

3.1.2.1 Modeling Approaches

Two modeling approaches exist for quantifying risk and they differ dramatically in the level of effort involved and in their abilities to distinguish variability and uncertainty (Thompson and Graham, 1996). The first and most commonly used approach is the “point estimate” or “deterministic” approach, which involves selecting a single number for each of the model inputs from which a point estimate of risk is generated. Choosing single numbers for inputs reduces the level of effort required for the exposure modeling process, but unavoidably ignores uncertainty and variability in the risk estimate. In contrast, the probabilistic approach (e.g., Monte Carlo simulation) can be a viable statistical tool for analyzing uncertainty and variability.

These input distributions are then propagated through the model to produce a probability distribution of risk.

Exposure modeling, whether probabilistic or deterministic, represents one of many ways to characterize exposure. As was previously mentioned, a number of receptor-specific exposure models are considered in this BERA. In an attempt to limit the effort expended as part of the exposure modeling process and still identify potential ecological risks, a “tiered approach” that includes a conservative worst-case (i.e., RME) and more realistic average (i.e., CTE) approach was used (see Section 3.1.1).

Exposure models used in this BERA take the following general form:

$$TDI = FT \times \left[\left(FIR \times \sum_{i=1}^{n} C_i \times P_i \right) + SIR \times C_{sed} + WIR \times C_{sw} \right]$$

Where:

TDI	=	Total daily intake (mg/kg BW-day)
FT	=	Foraging time in the exposure area (unitless)
FIR	=	Body weight normalized food intake rate (kg WW/kg BW-day)
C_i	=	Concentration in the ith prey item (mg/kg WW)
P_i	=	Proportion of the ith prey item in the diet (unitless)
SIR	=	Sediment ingestion rate (kg DW/kg BW-day)
C_{sed}	=	Concentration in sediment (mg/kg DW)
WIR	=	Water ingestion rate (L/kg BW-day)
C_{sw}	=	Concentration in unfiltered surface water (mg/L)

Because of the difficulties in measuring intake of free-ranging wildlife, data on food intake rates (FIRs) are not available for many species. Using FIRs for captive animals potentially underestimates the intake rates because these animals do not expend as much energy as their wild counterparts do, since activities for captive animals do not include behaviors such as

foraging and avoiding predators. Therefore, allometric equations using measurements of free metabolic rates (FMRs) are used to determine FIRs.

The FMR represents the daily energy requirement that must be consumed by an animal to maintain among other things, body temperature, organ function, digestion, and reproduction. To maintain these physiological functions as well as to perform daily behavioral activities such as foraging, avoiding predators, defending territories, and mating, the animal must replace the lost energy by metabolizing and assimilating the energy in its food (i.e., its metabolic fuel). The balance between an animal's energy loss and replenishment is reflected in the quality and quantity of food in the animal's diet. Assuming that the animal's habitat supports a variety of food items, selection of diet may reflect a preference toward more energy-rich foods (i.e., higher gross energy), although one must consider the energy expended in pursuit of prey.

Not all food that is consumed by an animal is converted to usable energy. Depending on the digestibility of the dietary item and the physiology of a particular animal, a substantial portion of the energy may be lost through clearance. Assimilation Efficiency is a measure of the percentage of food energy (i.e., item-specific gross energy) that is assimilated across the gut wall and is available for metabolism.

The equation used to determine FIRs is as follows:

$$FIR\,(kg\,ww/kg\ BW\text{ - }day) = \frac{FMR}{\sum_{i=1}^{n}\left(AE_i \times GE_i \times P_i\right)}$$

Where:

FIR	=	Body weight normalized field ingestion rate (kg WW/kg BW-day equals g WW/g BW-day)
FMR	=	Field metabolic rate (kcal/g BW-day; see Table 3-2)
AEi	=	Assimilation efficiency of the ith food item (unitless; see Table 3-3)
GEi	=	Gross energy of the ith food item (kcal/g; see Table 3-3)
Pi	=	Proportion of diet comprised of the ith food item (unitless; see Tables 3-4 and 3-5)

Exposure parameters for the calculation of TDI for each the belted kingfisher and mink are presented in Tables 3-4 and 3-5.

A. Belted Kingfisher

The belted kingfisher (*Ceryle alcyon*) was selected as the representative species for smaller piscivorous birds because the Androscoggin River provides habitat that is suitable for kingfisher and it is within the normal range of the species during the breeding season. Sightings of kingfisher were common along the Androscoggin River and they were observed foraging at several locations. Kingfisher feed primarily on fish and are susceptible to exposure to COPECs through food transfer and bioaccumulation of COPECs in their prey.

The belted kingfisher is a pigeon-sized member of the Alcedinidae family and is a common bird in North America. Body size for adult birds ranges from 125 to 215 grams (g) with little difference between males and females (Hamas, 1994). The breeding range spans the majority of the continent, excluding the far north and the higher elevations of the Rocky Mountains (DeGraaf and Yamasaki, 2001; Hamas, 1994). Nest construction begins in late April (Ellison, 1985), with egg dates ranging from May 14 to June 6 (Veit and Peterson, 1993). In the northern setting of the Androscoggin River drainage, kingfishers will generally have only one brood per year (Hamas, 1994), with an average of 6 to 7 eggs per clutch (DeGraaf and Yamasaki, 2001).

Kingfisher feed primarily on fish, although they may also consume large numbers of crayfish (EPA, 1995). Kingfisher have also been known to consume mollusks, frogs, small snakes, salamanders, insects, crabs, and even mice and young birds (Bull and Farrand, 1977; Hamas, 1994; Landrum et al., 1993). The kingfisher generally feeds by diving to catch fish that swim on the surface or in shallow water. Clear water less than 2 ft deep is preferred. Prey species include trout, salmon, suckers, perch, minnows, killifish, and sticklebacks (EPA, 1993). Prey length varies from 2.5 cm (Salyer and Lagler, 1946) to a maximum of 17.8 cm (Salyer and Lagler, 1946) depending upon location and prey availability. However, typical prey length is less than 10 cm (Imhof, 1962; Prose, 1985; Salyer and Lagler, 1946).

Kingfisher nest in earthen banks devoid of vegetation in burrows that they dig using their bills and feet (Landrum et al., 1993). Selection and defense of territories by kingfishers depend on season and prey availability. The birds aggressively defend their territories to protect nests

during the breeding season (Hamas, 1994). Although the home range of this species varies seasonally, it has been estimated as approximately 0.8 to 2.2 kilometer (km) of shoreline (Brooks and Davis, 1987; Salyer and Lagler, 1946). Given the size of their foraging range, it was assumed that kingfisher would forage solely within each reach.

Body weights of belted kingfisher vary slightly between sexes (Hamas, 1994). Dunning (1993) reported a body weight range of 125 to 215 g with a mean of 148 g. Mean body weights have been reported in this range by Alexander (1977) and Salyer and Lagler (1946). Brooks and Davis (1987) calculated mean body weights of 136 g and 158 g for birds in Pennsylvania and in Ohio, respectively. Hamas (1994) recorded body weights of male and female kingfishers in Minnesota in spring and found females to be slightly heavier than males, 152 and 144 g, respectively. Salyer and Lagler (1946) reported a mean body mass of 170 g for birds in Michigan. A body weight of 150 g was assumed based on the means from the available literature-based body weight data.

Alexander (1977) found that the kingfisher diet included fish (46%), amphibians (27%), insects (19%), crustacea (5%), and birds and mammals (1%). In Michigan trout streams, Salyer and Lagler (1946) found trout comprised 30% of the diet, with other fish (29%) and crustacea (41%) completing the diet. Davis (1982) found that kingfishers in Ohio fed mostly on fish (86%) and crayfish (13%). White (1936) found only fish in fecal pellets of kingfisher inhabiting Nova Scotia riparian streams. Combining these data, the kingfisher's diet is composed of an average of 73% fish (range of 46 to 100%), 15% crustaceans (range of 0 to 41%), and other prey items making up the difference (i.e., insects 5% and amphibians 7%). Because of their small contribution to the overall diet, insects and amphibians were excluded from this modeling effort. Assuming fish and crayfish represent 100% of its diet, the mean proportion of fish and crayfish in the diet of kingfishers was normalized to 83% and 17%, respectively.

The FIR was derived using allometric equations for estimating the metabolic rate of free-living birds using the procedures noted in Section 3.1.2. There were insufficient data to generate an allometric equation for Coraciiformes, of which belted kingfishers are members, so the "All birds" equation was used. For kingfisher, mean assimilation efficiencies were 77% for aquatic invertebrates and 79% for fish. The mean gross energies were 1.1 kcal/g WW for aquatic invertebrates and 1.2 kcal/g WW for fish (EPA, 1993). The calculated FMR is 0.51 kcal/g body weight per day (BW-day) and the subsequent FIR of the kingfisher is 0.54 kg WW/kg BW-day.

For this assessment, exposure to kingfisher is assumed to occur through ingestion of fish and crayfish, as well as incidental ingestion of sediments and surface water. As noted previously, the concentrations of fish and crayfish EPCs are based on total mercury, but assumed to be 100% methylmercury. Because prey items are expected to represent the greatest contribution to mercury exposure, the incidental sediment and surface water ingestion portions of the mercury total daily intake (TDI) calculation were performed using methylmercury and not total mercury.

The FIR of the kingfisher is 0.54 kg WW/kg BW-day (calculated, see Tables 3-2 through 3-4). It is assumed that the kingfisher's diet is comprised of 17% benthic invertebrates (crayfish), and 83% fish.

The sediment ingestion rate of the kingfisher is assumed to be 4.5E-03 kg dry weight per kg (DW/kg) BW-day (and that the soil ingestion rate is 3.3%, similar to that of a mallard – Beyer et al., 1994; assuming 75% water content in the diet – EPA, 1993). A water ingestion rate of 0.11 liter per kilogram (L/kg) BW-day was used (EPA, 1993). It is conservatively assumed that the kingfisher obtains 100% of its food and drinking water from each reach (P_i =1; P_S=1; P_W=1). Table 3-4 presents the exposure model and summarizes the exposure factors used to estimate COPEC exposure to the kingfisher.

B. Mink

The mink was selected as a representative species for piscivorous mammals because they are known to occur in the Androscoggin River watershed, the area contains suitable mink habitat, and their prey are directly and indirectly (through their diet) exposed to COPECs. Piscivorous mammals such as mink are at risk to COPECs exposure because of their preference for high trophic level aquatic prey. Their diet, consisting of fish, crayfish, amphibians, and waterfowl (Linscombe et al., 1982) makes mink susceptible to exposure to bioaccumulative substances like mercury (Moore and Caux, 1997; Moore et al., 1999). Consequently, mink or other piscivorous mammals, inhabiting the Androscoggin River have a high potential for significant exposure to COPECs.

The mink is a small fur-bearing animal belonging to the mustelid family. Mustelids are characterized by long, slender bodies, short legs, and the presence of a musk gland and, in

addition to the mink, include the least (*Mustela nivalis*) and long-tailed (*Mustela frenata*) weasels, striped (*Mephitis mephitis*) and spotted skunks (*Spilogale putorius*) and river otter (*Lutra canadensis*) (EPA, 1993). Mink are one of the most widespread mammalian carnivores in North America. Its range includes much of the continental USA and Canada.

Mink are found in a variety of wetland, riverine, and lacustrine habitats such as wetlands, small streams, rivers, lakes, tidal flats, cattail marshes, bogs, swamps, and bottomland woods. Habitats associated with small streams are preferred to habitats near large, broad rivers. They prefer irregular shorelines with bushy cover that provides ample prey and den sites. This species will also use upland habitat, provided there is sufficient cover and prey.

Mink are almost exclusively carnivorous. A number of factors influence the composition of the mink's diet. Mink diet varies with season, habitat and availability of prey (Proulx et al., 1987). Shallow water and low flow conditions in streams and rivers contribute to effective aquatic foraging by mink. Commonly important items include fish, crayfish, clams, frogs, snakes, muskrat, voles, and birds. Mink tend to consume more fish in winter and crayfish in spring and summer. In autumn, terrestrial species may increase in importance as prey. Females tend to feed on smaller prey (e.g., fish, crustaceans, and birds), whereas males prefer larger prey (e.g., rabbit and muskrat) (Birks and Dunstone, 1985). Females will take juvenile rabbits in summer (Birks and Dunstone, 1985). Melquist et al. (1981) found that fish taken by mink were mostly cyprinids between 7 and 12 cm long. Similarly, Hamilton (1940) recorded that the average length of fish taken by mink ranged from 7.6 to 10.2 cm. According to Alexander (1977), mink in rivers and streams in lower Michigan and New York consume fish ranging from 15 to 18 cm. Although mink are known to take fish up to 20 cm in length, this is based upon predation of live fish. Because mink will also eat carrion, which does not include the inherent difficulties of procuring larger prey, the concentration data used in this BERA is not limited to fish of ≤ 20 cm but includes all fish lengths.

The size of a water body and water depth can also affect habitat use by this species. For example, large open water areas are not suitable for mink, unless water is shallow. It is hypothesized that mink lack the underwater endurance necessary for locating and pursuing prey (Dunstone and O'Connor, 1979). In large open water areas, mink are capable of efficient hunting only when water is shallow or fish density is high (Allen, 1986; Dunstone, 1983). In streams and rivers, pools less than 3 ft deep appear to provide optimal foraging opportunities for

mink (Allen, 1986; Burgess, 1978). Mink are common where abundant deadfall and debris create cover for foraging. Logjams in streams create habitat for crayfish and fish prey, and they provide shelter for mink.

Since foraging in riverine and lacustrine systems occurs primarily along the shoreline, cover and structural diversity within the riparian vegetative community affect habitat use by mink. Cover can be provided by overhanging or emergent vegetation, rocks or rock crevices, exposed roots, debris, logjams, undercut banks, or boulders (Allen, 1986). The availability of suitable den sites may also affect habitat use by mink. Typically, several dens sites are located close to preferred foraging sites within an individual's home range (Allen, 1986). Dens are established in burrows excavated by other animals (typically muskrats), tree root cavities, rock piles, logjams, and beaver lodges. Several dens may be established and used at the same time. Dens are found within 200 meters of the shoreline (Allen, 1986; Eagle and Sargeant, 1985; Lariviere, 1999).

The actual shape of home territories ranges from linear for riverine habitats to circular for marsh habitats (Birks and Lin, 1982; EPA, 1993). Home range size depends on food availability, age and sex of mink, season, and social stability. Adult males have larger home ranges (average 85.4% larger) than adult females and adults occupy larger home ranges than juveniles (Allen, 1986; Birks and Lin, 1982; Gerell, 1970; Lariviere, 1999; Whitaker J.O. Jr. and Hamilton W.J. Jr., 1998). Expressed as shoreline length, the average adult home range encompasses 2,600 meters for males and 1,800 meters for females in stream and riverine habitats (Whitaker J.O. Jr. and Hamilton W.J. Jr., 1998). However, linear home ranges may be larger depending of the availability of food and the condition of habitat (Lariviere, 1999). Population density ranges from 3 to 20 mink per square mile. Adult males occupy home ranges that are exclusive of other adult males, but include the home ranges of one or more females (Birks and Dunstone, 1985; Mitchell, 1961; Whitaker J.O. Jr. and Hamilton W.J. Jr., 1998). For this BERA, it was assumed that mink would forage solely within each reach.

Average body weights (WW of wild animals) of female mink range from 550 g (Mitchell, 1961) to 970 g (Hornshaw et al., 1983) and males range from 630 g to 1,000 g (Whitaker J.O. Jr. and Hamilton W.J. Jr., 1998). For this assessment, a body weight of 946 g was assumed based on the mean weights of males and females during spring (from Mitchell, 1961 as presented in EPA, 1995).

The primary food items in the mink diet include small mammals, fish, benthic invertebrates (crayfish), birds (waterfowl), and amphibians (Alexander, 1977; Burgess and Bider, 1980; Cowan and Reilly, 1973; Gilbert and Nancekivell, 1982; Hamilton W.J. Jr., 1959; Melquist et al., 1981; Proulx et al., 1987). Combining the available data, an average of 23% (range of 0 to 64.7%) of the mink diet consists of fish. Mammals comprise 15% of the diet, reptiles and amphibians constitute an average of 15% (range of 0 to 30%) of the diet, birds (i.e., waterfowl) 11% (range of 0 to 39%) of the diet, and invertebrates constitute 36% of the diet. Because site-specific data were available for only crayfish and fish, and these prey items are likely to accumulate more mercury from the Androscoggin River than the terrestrial components of the diet, it was conservatively assumed that the mink's diet consists of only crayfish (i.e., invertebrates) and fish. Assuming that fish and crayfish represent 100% of the mink diet, the mean proportion of fish and crayfish in the diet of the mink was normalized to 39% and 61%, respectively.

For this BERA, FIR was estimated using an allometric equation rather than using literature-reported values for captive mink. An allometric model-derived FIR better approximates the increased energy demand of wild mink resulting from higher activity levels incurred while foraging, defending and inspecting territory, and avoiding predators (Buechner and Golley, 1967; Koplin et al., 1980; Lamprey, 1964). The FIR was derived using allometric equations for estimating the metabolic rate of free-living mammals using the procedures noted in Subsection 3.1.2. There were sufficient data to generate an allometric equation for Carnivora, of which mink are members. For mink, mean assimilation efficiencies were 87% for crayfish (based on insects) and 91% for fish. The mean gross energy from these prey was 1.1 kcal/g WW for crayfish (based on a surrogate crustacean, shrimp) and 1.2 kcal/g WW for fish (EPA, 1993). Based on these data, the calculated FMR is 0.16 kcal/g BW-day and the subsequent FIR of the mink is 0.16 kg WW/kg BW-day.

The exposure of the mink to site-specific COPECs is assumed to occur through the ingestion of benthic invertebrates (e.g., crayfish) and fish, as well as the incidental ingestion of sediment, and consumption of surface water (incidental or purposeful). As noted previously, the concentrations of fish and crayfish EPCs are based on total mercury, but assumed to be 100% methylmercury. Because prey items are expected to be the greatest contributor to contaminant concentration, sediment and surface water concentrations of methylmercury were used to calculate exposure and a TDI was calculated for mercury (as methylmercury) only.

The FIR of the mink is 0.16 kg WW/kg BW-day (calculated, see Tables 3-2, 3-3, and 3-5). It is assumed that the mink's diet is comprised of 61% crayfish and 39% fish. The sediment ingestion rate of the mink is assumed to be 1.1E-03 kg DW/kg BW-day (assuming 75% water content in the diet – (EPA, 1993a); and that the soil ingestion rate is 2.8%, similar to that of a red fox – (Beyer et al., 1994). A water ingestion rate of 0.1 L/kg BW-day was used (EPA, 1999). It is conservatively assumed that the mink obtains 100% of its food and drinking water from the Site (P_i =1; P_S=1; P_W=1). Table 3-5 presents the exposure model and summarizes the exposure factors used to estimate COPEC exposure to the mink.

C. Total Daily Intakes

TDIs for the two target receptors modeled are presented in Tables 3-6 through 3-9 for RME and CTE exposures.

3.2 Ecological Effects Characterization

The Ecological Effects Characterization is the qualitative and quantitative description of the relationship between the stressor and response (effects) in the exposed individuals, populations, or ecosystems (Suter II et al., 1994); and, more specifically (in this assessment), the relationship between observed inorganic chemical levels and the assessment and measurement endpoints identified during the Problem Formulation (Norton et al., 1992). Specifically, for this BERA, ecological effects associated with the evaluation of the most recent data are primarily characterized by the following measurement endpoints:

1. Results of 7-day *Ceriodaphnia dubia* and *Pimephales promelas* toxicity tests.
2. Comparisons of the B-IBI with the reference area.
3. Comparisons with MacDonald et al. (2000) consensus-based sediment guidelines and reference area concentrations.
4. Results of acute 96-hr *Chironomus tentans* and *Hyalella azteca* toxicity tests.
5. Results of 20-day *Chironomus dilutus* and 28-day *Hyalella azteca* bulk sediment toxicity tests.
6. Comparisons of crayfish tissue concentrations with literature-based no-effect and effect levels and reference area concentrations.

7. Comparisons of fish tissue concentrations with literature-based no-effect and effect levels, reference area concentrations, and regional mercury fish tissue levels.
8. Comparisons of avian tissue (i.e., blood, egg, and feather) concentrations with literature-based no-effect and effect levels and reference area concentrations.
9. Comparisons of mammal tissue (i.e., blood and fur) concentrations with literature-based no-effect and effect levels and reference area.
10. Comparisons of modeled avian and mammalian exposure doses with literature-based toxicity data.

(Note: All discussions of comparisons to reference concentrations are reserved for Section 4.)

In general, most risk assessments have found that using a “suite” of stressor-response approaches, such as those selected for this RSA provides a more complete Ecological Effects Characterization (EPA, 1998).

Because assessment endpoints frequently cannot be measured directly, one or more measurement endpoints are selected as surrogates to characterize assessment endpoints. Measurement endpoint selection is accomplished by first establishing the relationship between the stressor and assessment endpoint, then identifying relevant surrogates and any additional extrapolations, analyses, and assumptions necessary to predict or infer changes in the assessment endpoint.

As the cause-effect relationship between the measurement endpoint and the assessment endpoint becomes stronger, the uncertainty in extrapolation of the effects data in the risk assessment is reduced. Similarly, the more closely related the test species is to the species of interest, the less uncertainty there is in the risk assessment (Suter II, 1993). Extrapolations that frequently occur in an ERA include those from laboratory to field conditions, across taxonomic classifications, and across spatial and temporal scales.

This BERA concentrates on evaluating direct effects that may be associated with contaminant exposure in various media throughout the affected portion of the Androscoggin River. The collection of extensive sediment, surface water, and biological tissue data as part of the 2009-2011 sampling program and the subsequent analysis of those data are intended to reduce the uncertainties that can be associated with the estimating concentrations in tissues.

Another component integral to the Ecological Effects Characterization involves the selection of stressor-response data that best illustrate a causal relationship. Attributing the causality of effects, particularly with complex mixtures of chemicals and stressors, continues to be a challenge in ERAs. Individual stressors rarely occur alone; typically, there are other chemical, biological, or physical stressors that co-occur and that may alter or compound the effects and risk associated with the subject stressor, thereby increasing the difficulty and uncertainty when trying to identify causality.

As stated previously, the most valuable approach for assessing effects and causality is to provide multiple lines of evidence. The key lines of evidence that can be provided to assist in assigning cause-and-effect relationships, which were formalized by Hill (1965) and adapted to risk assessment by Suter (1993), are summarized as follows:

- Analogy — Cause-and-effect relationship similar to well-established cases.
- Experiment — Changes in effects should follow experimental treatments representing the hypothesized cause.
- Coherence — Implicit relationships should be consistent with available evidence.
- Plausibility — Underlying theory should make it plausible that the effect resulted from the cause.
- Biological gradient — Effect should increase with increasing exposure.
- Temporality — Cause must precede its effect.
- Strength — High magnitude of effect is associated with exposure to stressor.
- Specificity — The more specific the cause, the more convincing the association with an effect.
- Consistency — Consistent association of an effect with a hypothesized cause.

This approach is similar to and consistent with several of the attributes used to assess potential weights associated with each measurement endpoint (see Subsection 2.4.3).

Whereas information relevant to illustrating the relationship between stressor and its response is provided in the Ecological Effects Characterization, the interpretation of the strength of this relationship is presented in the Risk Characterization.

The remainder of the Ecological Effects Characterization focuses on the Ecological Response Analysis, which examines the relationship between stressor levels and potential adverse ecological effects.

3.2.1 Ecological Response Analysis

The ecological response analysis provides information on three main subject areas:

- **Stressor-Response Analysis —** Provides a description of the potential types of stressor-response relationships; a description of the specific effects information used in this BERA; and a general discussion of the qualitative WOE associated with each measurement endpoint or endpoint group.

- **Causality —** Provides a description of the general criteria used to assess the strength of causal relationships between stressors and response.

- **Linking Measures of Effects to Assessment Endpoints —** Provides a discussion of the type of extrapolations typically required to link measurement and assessment endpoints.

These subject areas examine the relationship between stressor levels and effects, present the supporting evidence that the stressor causes the effect, and provide a link between the measurable effect and the assessment endpoint (EPA, 1998). This information is combined and assessed in the Lines of Evidence portion of the Risk Characterization. The following subsections provide a more detailed discussion of the key components essential to developing a comprehensive ecological response analysis.

3.2.1.1 Stressor-Response Analysis

The stressor-response relationship used in an assessment depends on the scope and nature of the ERA defined in the problem formulation. Several different relationships can be established, including:

- Single point estimates of effect;
- Stressor-response curves;

- NELs and LELs; and
- Cumulative effects distributions.

The majority of quantitative stressor-response techniques have been developed for univariate analysis. These studies, in which one response variable (e.g., incidence of abnormalities, mortality) is measured, reflect the simplest stressor-response relationship. Multivariate techniques, those in which the response of interest is a function of many individual variables (e.g., organism abundance in an aquatic community), also have a long history of use in ecological evaluations (EPA, 1998).

The different stressor-response relationships have inherent uncertainties. Point estimates (e.g., EC_{50}) can be useful in simple assessments or to compare risks, but provide little information regarding uncertainty and variability surrounding the point estimate (EPA, 1998).

Stressor-response curves are advantageous in that all of the available experimental data are used, and values other than the data points measured can be interpolated (Suter II, 1993). However, sufficient data points necessary to describe the curve may not be available. Stressor-response modeling has been recognized as the most appropriate analysis method for toxicity test data and is considered the best approach for analyzing data at contaminated sites (Suter II, 1996). Often, particular levels of effect (e.g., LD_{50}) are determined from curve-fitting analyses. These are point estimates interpolated from the fitted line. Although the level of uncertainty is minimized at the midpoint of the regression curve, the percentage levels selected (e.g., 10%, 50%, 95%) may not be protective for the assessment endpoint (EPA, 1998).

When effects at lower stressor levels are of interest, a NEL is frequently established based on comparisons between experimental treatments and control treatments. Statistical hypothesis testing is generally used for this purpose. With this method, the risk assessor does not pick an effect level of concern, and the NEL is determined by the experimental conditions (e.g., number of replicates and data variability). Numerous authors (Hoekstra and Van Ewijk, 1992; Laskowski, 1995; Suter II, 1996) have discussed the limitations and drawbacks associated with the use of NOEL in ecotoxicology and ERAs; principal among these concerns include the following:

- Loss of important information regarding significance level;
- No accounting for natural variability; and
- Terms suggest effects are low in magnitude and importance, which may not be the case.

Uncertainty also exists with using this relationship when the stressor levels or receptors in the control differ from those used in the experiment. Statistical hypothesis testing is also often used in observational field studies to compare site and reference conditions. General limitations with using hypothesis testing in ERAs have been discussed in detail by Suter (1996). Suter's overarching concern is that hypothesis testing typically does a poor job at estimating risk. However, confidence in statistical hypothesis testing can be increased through the use of experimental field studies, in conjunction with laboratory studies and observational studies (EPA, 1998).

Multiple-point estimates that can be displayed as cumulative effects distribution functions are generated from combining experimental data. Distributions—frequently referred to as species sensitivity distributions—can be used to identify stressor levels that affect different numbers of species or portions of populations. This approach has been used by EPA and other regulatory agencies to develop chemical- and medium-specific criteria and benchmarks (Posthuma et al., 2002). The amount of data necessary to derive these distributions is often a limiting factor; to date, sufficient data needed to apply this approach is restricted primarily to toxicity testing of aquatic organisms. Cumulative effects distribution functions can also be derived from probabilistic methods such as the Monte Carlo analysis (EPA, 1998).

The measures of effect evaluated in this BERA use several of the above approaches. The specific ecological effects to be characterized in this BERA were listed at the beginning of Subsection 3.2, Ecological Effects Characterization.

The remainder of the Ecological Effects Characterization is divided into the following subsections:

- Abiotic (i.e., soil and surface water) Toxicity Values,
- Critical Body Residues, and
- Wildlife TRVs.

To avoid confusion, it should be reiterated that the actual comparison of exposure concentrations to guidelines or benchmarks and the integration and interpretation of exposure and effects data are reserved for the Risk Characterization. The primary function of the Ecological Effects Characterization is to present relevant stressor-response data.

Abiotic Media Toxicity Values

The screening exercise in Section 2 indicated no COPECs for direct effects from surface water or pore water; therefore, the only abiotic medium compared with direct effect toxicity values was sediment.

MacDonald et al. (2000) TECs and PECs were used in this assessment. The derivation of TECs were presented in Section 2.2.6.2. PECs identify contaminant concentrations above which harmful effects on sediment-dwelling organisms are expected to occur frequently. PECs were calculated by determining the geometric mean of the SQGs. Consensus-based PECs were calculated only if three or more published SQGs were available for a chemical. The following COPEC-specific values were used for this assessment.

COPEC	TEC (mg/kg DW)	PEC (mg/kg DW)
Mercury	0.18	1.06
2,3,7,8-TCDD TEQ	NA	NA
PCB dioxin-like congener TEQ	NA	NA
tPCBs	0.0598	0.676

NA = Not available.

Critical Body Residues

To investigate the exposure and potential effects associated with environmental contaminants such as mercury, the chemical concentration in the environmental exposure medium such as water or sediment have been commonly adopted as the dose metric. Traditionally, eco-risk assessors have focused primarily upon indirect quantification of dose of a chemical from exposure estimates based upon chemical concentrations in one or more environmental compartments (e.g., water, sediment, food, soil) as opposed to direct measurement of chemical residues in target tissues or body fluids of the organism of concern. However, the potential

effects of COPECs on exposed organisms are the function of the concentration, the form present, the duration of exposure, and environmental factors affecting bioavailability (such as pH, DOC content, temperature, assimilation efficiency, and metabolism; see Section 2.4.1), which makes exposure modeling a more difficult and uncertain approach for estimating a dose metric. Using body residues rather than relying solely on sediment and surface water concentrations as a dose metric circumvents some exposure modeling problems such as differential bioavailability, varying feeding habitats, and physiological/metabolic variability, thereby providing a clearer connection between exposure and potential effects.

Body residues are surrogates for the contaminant concentration at the Site and should reflect the potential for toxicity to and genetic differences of the organisms being evaluated (Fisher et al., 1999; Hwang, 2003). The use of body residues to reduce uncertainties associated with determining exposure and potential effects of contaminants has been advocated by numerous scientists over the past two decades (Jarvinen and Ankley, 1999; Landrum et al., 1992; McCarty, 1986; McCarty et al., 1991; Van Hoogen and Opperhuizen, 1988). In an effort to encourage the use of body residue levels in the ERA process, the United States Army Corps of Engineers and the EPA currently support an online Environmental Residue-Effects Database (USACE/EPA, 2011) that summarizes chemical-specific residues and effects for numerous organisms.

To determine potential effects in macrobenthos, crayfish, fish, birds, and mammals, site-specific tissue concentrations are compared with CBRs.

The focus of this BERA is an evaluation of local population-level endpoints (see Table 2-39). It was therefore decided not to focus on toxicological endpoints if they occurred at a level of organization below that of the whole organism. Examples of such endpoints included various blood parameters (e.g., hematocrit, ratio of red to white blood cells, leucocyte counts), concentrations of hormones, genetic damage, tissue-level damage, or organ-level damage. The reason for this approach is that it there tends to be a high degree of uncertainty present when trying to link effects observed at the sub-organism level to population-type responses of interest to this BERA.

As such, endpoints of interest included behavioral changes (because mercury is a potent neurotoxin), mortality within and across generations, whole organism growth, or reproduction.

Depending on the study and the receptor species, the last category included a wide array of responses, such as a decrease in fertility, clutch size, embryo implantation success, number of offspring per exposed female, or skewed sex ratios.

CBRs were identified using the following sources:

- *Nyanza Superfund Supplemental Ecological Risk Assessment* (Nobis, 2008) — EPA Region 1 conducted an extensive literature review to create a database of CBRs to quantify the relationship between measured mercury concentrations in selected tissues and toxicological responses. When available, mercury CBRs were adopted from that report.

- *Ecological Risk Assessment for General Electric/Housatonic River Site, Rest of River* (Weston Solutions, 2004) — EPA Region 1 conducted an extensive literature review to determine CBRs for tPCBs and TEQ in selected tissues. When available, tPCB and TEQ CBRs were adopted from that report.

- *Environmental Residue-Effects Database* (USACE/EPA, 2011) – The database is a compilation of data, taken from the literature, where biological effects (e.g., reduced survival, growth) and tissue contaminant concentrations were simultaneously measured in the same organism. The database is limited to those instances where biological effects observed in an organism are linked to a specific contaminant within its tissues. A mercury CBR for benthos was obtained from this resource.

- *PCB Residue Effects Database* (EPA, 2012) – EPA developed the PCBRes to assist scientists and risk assessors in correlating PCB and dioxin-like compound residues with toxic effects. This database also includes expression of critical residue values based upon PCB Aroclors and total PCB-based congener specific methods because PCBs occur as complex mixtures. Because PCB toxicity occurs via the AhR, PCB toxicity has also been expressed using the sum of the dioxin-like PCBs after adjustment using TEF. Limited dioxin and furan compounds in single and mixture studies are also included. The tPCB and TEQ CBRs were obtained from this resource when not available from the Housatonic River Report.

Table 3-10 summarizes the CBRs for whole body fish/muscle, bird and mammal blood, bird eggs, feathers, and fur; however, it should be noted that more than one CBR may be included in the risk characterization to illustrate the range and potential severity of effects.

Wildlife TRVs

To evaluate the potential for toxicity to birds and mammals at the site, a hierarchy of sources was searched as follows: Ecological Soil Screening Level documents, United States Army Center for Health Promotion and Preventive Medicine's *Wildlife Toxicity Assessment Reports, EPA's Screening Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities* (1999), Sample et al. (1996), EcoTox, and peer-reviewed primary literature. Studies that met the following criteria could be used for TRVs development:

- Test species similar to the target receptor;
- In vivo study;
- Oral administration via food, drinking water, or gavage (feeding study preferred);
- NOAEL or LOAEL identifiable; and
- Effects of potential "ecological significance" evaluated (e.g., lethality and reproductive effects).

Primary considerations in the TRV selection process include study species, study duration, effect level, and toxicological endpoint. The following paragraphs present the considerations that were used in the study and dose selection process.

Studies using the site-specific target wildlife species were sought preferentially. However, toxicological data for the target wildlife species were often unavailable; therefore, studies were chosen that, to the extent possible, used species related to the target species and that had similar diets and digestive systems.

Suitable chronic exposure studies were given preference over acute studies. Chronic exposure represents the extended exposure of an organism to a chemical, generally greater than one-tenth of the typical life span of the species. Acute exposure represents either an instantaneous single-dose exposure or a continuous exposure of minutes to a few days duration.

Endpoints that could directly affect the target species at the population level were given preference (e.g., reproductive effects and mortality of adults or offspring). The next preference was given to serious histopathological effects (e.g., necrosis or damage to liver, kidney, or brain) that alter primary body functions. In the absence of preferred data, consideration was given to effects such as alterations in biochemical functions of an organ or alterations in normal behavior that could be correlated with decreased survivability. Other effects such as altered body weight, decreased liver size, and changes in blood chemistry are not readily associated with decreased survivability or longevity and were used only in the absence of the preferred toxicity data.

Best professional judgment was used to select the most appropriate studies, doses, and endpoints for use in TRV development. Because only chronic studies were selected for use in TRV development, no duration-based UFs were necessary to be applied.

If the NOAEL or LOAEL were unbounded, then it was assumed that the chronic LOAEL was 5 times the chronic NOAEL; and in the opposite circumstance, the chronic NOAEL was 5 times less than the chronic LOAEL (USACHPPM, 2000).

Body scaling factors were not used to account for intertaxon variability between test species and the target receptor species. The effect of this decision, if any, will be discussed in the uncertainty analysis. Target receptor-specific avian and mammalian TRVs are presented in Table 3-11.

The values summarized in Table 3-11 can be considered conservative but for the most part realistic. The degree of conservatism built into the TRVs likely protects a range of potential wildlife receptors.

3.2.1.2 Causality

In a chemical risk assessment context, causality is defined as the relationship between one or more stressors and the response to the stressor(s). Uncertainty in the conclusions of an ERA would be high without the proper support linking a cause (stressor) to an effect (response).

General criteria for affirming causality for observational data are: (1) strength of association; (2) predictive performance; (3) demonstration of a stressor-response relationship; and (4) consistency of association. All these criteria need not be satisfied to infer causality; rather, each criterion incrementally reinforces causality. The same is true when evaluating the following criteria for rejecting causality. Criteria for rejecting causality in observational data are (1) inconsistency in association; (2) temporal incompatibility; and (3) factual implausibility. Other factors relevant to assessing causality are the specificity of association and theoretical and biological plausibility (EPA, 1998). The use of multiple criteria to assess causality is in fact a WOE approach. A similar WOE approach is applied in Section 2.4.3 to assess the confidence associated with any prediction of adverse ecological impacts.

Most of the studies used to evaluate potential ecological risk for this BERA (i.e., benchmark comparisons and exposure and effect modeling) are predictive in nature and do not readily lend themselves to a direct assessment of causality. Where possible, causality is evaluated qualitatively.

3.2.1.3 Linking Measurement Endpoints to Assessment Endpoints

When assessment endpoints are different from their measurement endpoints, the two must be linked to evaluate the environmental values of concern. At times, extrapolations need to be used to link the endpoints. Extrapolations from the measurement to the assessment endpoints may include comparisons:

- Between taxa (e.g., rat to mink).
- Between responses (e.g., mortality to growth).
- From laboratory to field.
- Between geographic areas.
- Between spatial scales.
- Between exposure durations (e.g., acute to chronic).
- Between individual effects and population, community, or ecosystem effects.

Extrapolations have a level of uncertainty associated with the adequacy of the data on which they are based. Linkages can be based on professional judgment or empirical (e.g., allometric

extrapolation equations) or process models (e.g., trophic transfer models). A common tool employed in risk assessments to deal with the uncertainty encountered when trying to link measurement and assessment endpoints is the use of uncertainty or safety factors (Chapman et al., 1998; Duke and Taggart, 2000; Suter II et al., 2000). Basically, UFs are conservative empirical factors used to reduce the probability of underestimating risk. Examples of UFs frequently used in ERAs include acute-to-chronic ratios, interspecies adjustment factors, and no-effect-to-effect ratios. A more detailed evaluation of the implication of using UFs is presented in Section 4.1.5, the Uncertainty Analysis.

4.0 RISK CHARACTERIZATION

The Risk Characterization is the final phase of the ERA, the purpose of which is to evaluate the likelihood that adverse effects have occurred or may occur as a result of exposure to the COPECs (EPA, 1992, 1998). The goal of the Risk Characterization is to provide estimates of risk to the assessment endpoints identified in the Problem Formulation (Section 2) by integrating information presented in the Analysis Phase (Section 3) and by interpreting individual and population level effects.

The following Risk Characterization is divided into two stages: risk estimation and risk description. The Risk Estimation (Subsection 4.1) integrates exposure and effects information from the Analysis Phase and estimates the likelihood of adverse effects on the assessment endpoint of concern. A summary of the qualitative and quantitative elements of uncertainty also is included as part of the risk estimation. The Risk Description (Subsection 4.2) provides a weight of evidence analysis with a complete and informative synthesis of the overall conclusions regarding risk estimates; addresses the uncertainty, assumptions, and limitations; and is useful for risk management decision making.

The ultimate goal of the Risk Characterization is to fully describe the strengths and weaknesses of the risk assessment so that risk managers fully understand the conclusions reached in the BERA.

4.1 Risk Estimation

The following subsections discusses the risk estimate of aquatic biota, avian life, and mammalian life and presents the uncertainty analysis.

4.1.1 Introduction

The risk estimation describes the likelihood of adverse effects to assessment endpoints by integrating exposure and effects data (EPA, 1992). The risk estimation process uses exposure and ecological effects information described in the Analysis Phase. However, it is important to recognize that the interpretation and synthesis of the results presented in the Risk Estimation are reserved for the Risk Description (Subsection 4.2).

Risk estimates can range from highly quantitative to highly qualitative estimations. For example, a qualitative approach might consist of the direct comparison of site-specific tissue concentrations with literature or database-derived effect levels, whereas a quantitative approach is typical for the evaluation of detailed exposure and effects models like those used to evaluate effects to kingfisher or mink (see Subsections 4.1.3.2 and 4.1.4.2).

Risks can be estimated by using one or a combination of the following approaches: (1) estimates expressed as qualitative categories; (2) estimates comparing single-point estimates of exposure and effects, i.e., the HQ approach; (3) estimates incorporating the entire stressor-response relationship (e.g., toxicity tests); (4) estimates that quantitatively incorporate variability in exposure and effects estimates (e.g., Monte Carlo analysis); (5) estimates based on process models that rely on theoretical approximations of exposure and effects (e.g., sediment equilibrium partitioning); and (6) estimates based on empirical approaches, including field data (e.g., tissue sampling). This BERA combines several of these approaches to estimate the potential risks to ecological receptors (see Table 4-1).

The risk estimation is formatted such that the risks for each RSA reach are presented by measurement endpoint within the ecological entity (or receptor) for an assessment endpoint as follows:

- Risk to Aquatic Biota (Section 4.1.2);
- Benthic Invertebrate Community (Section 4.1.2.1);
- Fish Population (Section 4.1.2.2);
- Risk to Avian Life (Section 4.1.3);
- Insectivorous Birds (Section 4.1.3.1);
- Piscivorous Birds (Section 4.1.3.2);
- Risk to Mammalian Life (Section 4.1.4);
- Insectivorous Mammals (Section 4.1.4.1); and
- Piscivorous Mammals (Section 4.1.4.2).

The general approaches for evaluating risks from the field studies, laboratory toxicity studies, HQs, and reference area/regional mercury level comparisons are presented in subsections below.

The following sections describe how HQs are calculated, how background concentrations are used, and a description of the incremental risk analysis approach. The remainder of the section describes the risks and the uncertainties associated with the estimates.

4.1.1.1 Field Studies

Field studies were essentially used to determine exposure to selected receptors known to forage in the Androscoggin River. Tissue samples were collected for residue analysis. Residue concentrations were used to compare with CBRs to determine if body burdens are indicative of those associated with adverse effects. Comparisons of tissue concentrations with CBRs are discussed in more detail in the Hazard Quotient Analyses (Subsection 4.1.1.3).

4.1.1.2 Toxicity Studies

Statistical analyses were used to analyze the results of the bioassays conducted by USGS, USEPA, and EnviroSystems, Inc. on pore water, surface water, and sediment. A potential for ecological risk was assumed in this BERA if the bioassay responses observed in site-related samples were statistically different (generally, $p \leq 0.05$) from those observed in the reference or laboratory control samples.

4.1.1.3 Hazard Quotient Analyses

HQs were developed to determine potential effects to target receptors from exposure to COPEC-contaminated sediment, surface water, and prey items. The HQ approach used for this evaluation simplifies the comparison process and allows for a more standardized interpretation of the results (i.e., the HQ reflects the magnitude by which the sample concentration exceeds or is less than the guideline, benchmark, or TRV). In general, if an HQ exceeds 1, some potential for risk is expected (EPA, 1993a). While the quotient method does not measure risk in terms of likelihood of effects at the individual or population level, it does provide a functional benchmark for judging potential risk (EPA, 1994).

HQs were calculated specific to each receptor and exposure area evaluated in this BERA as follows:

$$HQ = EEL/TRV$$

Where:

HQ = hazard quotient (unitless)

EEL = estimated exposure level (medium concentration in units of mg COPEC/kg; or for dietary exposure to wildlife target receptors: estimated dose in units of mg/kg BW-day)

TRV = toxicity reference value (benchmarks in units of mg COPEC/kg medium; or for dietary exposure to wildlife target receptors: dose in units of mg/kg BW-day)

Potential risks to community and individual target receptors from exposure to COPECs for each exposure area are presented in Sections 4.1.2 through 4.1.4 below.

For community-based measurement endpoints, the mercury, PCB, and dioxin/furan concentrations in each of the potential exposure medium within each RSA reach are compared with medium- and chemical-specific ecological benchmarks. For individual target species, the contaminant concentrations in each of the tissues are compared with CBRs. Lastly, for each target receptor for which food chain exposures were modeled, the predicted daily doses were compared with TRVs. Specifically, HQs were calculated comparing the following data and toxicity values:

- Macrobenthos concentrations with macrobenthic CBRs;
- Sediment concentrations with freshwater sediment TECs and PECs from MacDonald et al. (2000) consensus-based values;
- Crayfish concentrations with crayfish CBRs;
- Fish concentrations with fish CBRs;
- Avian and mammalian tissue concentrations with avian and mammalian CBRs, respectively; and
- Modeled avian and mammalian exposure doses with TRVs.

4.1.1.4 Incremental Risk Analysis

All media contain ambient levels of chemical constituents associated with numerous anthropogenic sources. In the northeastern United States, atmospheric deposition of mercury is a well- studied source of ambient levels in surface waters and in the biota that inhabit these waters. In addition, the widespread distribution of PCBs and Dioxin/furans from anthropogenic sources is well recognized. As this BERA attempts to define the risk to the Androscoggin River that the releases from the facility (which is a former chemical plant) has contributed to mercury, PCBs and dioxin concentrations in environmental media, the effect of non-site related, ambient levels needs to be accounted for. Potential risk to COPECs derived from site-related activities should be differentiated from risks associated with local reference (background) conditions. This objective is achieved by calculating the Incremental Risk (IR) for each inorganic COPEC using the HQ method, as follows:

$$IR_i = \text{site } HQ_i - \text{background } HQ_i$$

Where:

HQ is the hazard quotient for COPEC i.

Background risk exceeded site risk if the IR for a particular COPEC was negative. If the IR was above 1.0, then the site risk exceeded background and the incremental risk is high enough to suggest the potential for site-related risk. IR was only calculated for ecological receptors where the site-related HQ exceeded 1.0. For this assessment, incremental risks are considered crucial for determining site-specific risks.

4.1.2 Risk to Aquatic Biota

The following subsections present the risk to the benthic invertebrate community and the fish population.

4.1.2.1 Benthic Invertebrate Community

A. Rock Basket Study

Epifaunal invertebrate samples were collected and analyzed by USGS following NHDES B-IBI protocols (David Neils, NHDES, written communication, 2008). The epifaunal invertebrate assemblage metrics used to evaluate the nature and extent of potential CHP-related effects on the epifaunal community were organism abundance (a general indicator of productivity); two taxonomic structure and compositional metrics: species richness and Ephemeroptera, Plecoptera, and Trichoptera (EPT) richness; and one indicator taxa and functional group metric: Hilsenhoff Biotic Index (HBI). Metrics were selected to meet the following criteria: a) address functional, structural and indicator components of biological integrity; b) demonstrate minimal natural variability within the reference stream category; and c) demonstrate response to impact. A comprehensive discussion of methods and results is provided in the report, *Characterization of Mercury Contamination in the Androscoggin River, Coos County, New Hampshire* (Chalmers et al., 2013). This report is provided in its entirety in Appendix I.

Epifaunal community metrics were tested by USGS for statistical significance using a non-parametric WRS test comparison of medians grouped either upstream (reference) or downstream of the CHP and FSA (Table 4-2). The non-parametric WRS test comparison of medians grouped metrics from the rock basket samples collected upstream (reference) and downstream of the CHP and FSA. The first quartile (25th percentile), median (50th percentile), and third quartile (75th percentile) are shown, along with the results from the metric comparisons.

Based on the results, invertebrate abundance among sites appeared to reflect flow conditions more than any contaminant toxicity. The highest invertebrate abundance occurred at AR3 adjacent to the former chemical plant. The increase in invertebrate abundance at AR3 compared with other sites was mainly due to an increase in the abundance of dipterans (Simuliidae) which presumably favored the steady lower-velocity water conditions at this site. Abundance downstream of the point source was not significantly different from the reference site.

In addition to the broad comparison between upstream and downstream sites, a statistical comparison using the Kruskal Wallis Rank Sum (KWRS) Test (Table 4-3) was conducted to

determine the differences in epifaunal community metrics among the reference reach (AR2), near stream reaches (AR3 and AR4) and far stream reaches (AR8 and AR9). The non-parametric KWRS test compared medians grouped by distance from the former chemical plant. Spatial groupings included: Reference Reach (AR2) located 16 km upstream from site, Near Reaches (AR3 and AR4) located between 1 to 4 km downstream of the site and Far Reaches (AR8 and 9) located between 8 to 16 km downstream of the site. The first quartile (25th percentile), median (50th percentile), and third quartile (75th percentile) are shown. Non-significant differences are indicated as 'NS'. Based on this analysis, although species richness and EPT richness were both highest at AR9, no significant difference was observed in either metric among the spatial groupings of far stream reaches (AR8, AR9), near stream reaches (AR3, AR4) or the reference reach (AR2).

The results of both the WRS and the KWRS statistical evaluations indicated that there was no significant difference in epifaunal invertebrate colonization of hard substrates between the reference location and those downstream of the Site.

In addition to the Rank Sum tests, The NHDES B-IBI was developed by USGS for the epifaunal invertebrate community (Table 4-4). The following seven community metrics that comprise the NH B-IBI includes

- Total taxa (+),
- % Plecoptera (Stoneflies) (+),
- % Chironomidae (predominantly midges) (-),
- % Non-insects (-),
- % Clinger taxa (+)
- Number of tolerant taxa (-), and
- % individual in intolerant taxa (+).

A (+) indicates a metric that improves B-IBI score as it increases, (-) indicates a metric that improves B-IBI score as it decreases. All examined reaches passed NHDES B-IBI for “Hill” type streams in New Hampshire, having B-IBI assessments greater than the threshold of 58, the value NHDES has determined for clean streams (David Neils, NHDES, written communications, April, 2011).

B. Macrobenthic CBRs

Figure 4-1 shows total mercury concentrations in macrobenthos plotted by river reach. None of the concentrations exceeded the NEL of 2,700 µg/kg WW. CBRs were not available for macrobenthos for TEQs or tPCBs.

C. Comparison of Macrobenthic Tissue Concentrations with Site-Specific Reference Concentrations

Sufficient data were not available to run statistical analyses between the potentially Site-impacted reaches and the reference reach (AR2). Visual comparisons of mercury concentrations in larvae samples indicate that concentrations in AR3 are greater than those in AR2 (Figure 4-1). Concentrations in rock basket samples in AR3, AR4, AR8, and AR9 are all greater than that in AR2 (note only 1 sample/reach). In addition, infaunal invertebrates oligochaetes collected from sediments in each reach demonstrated that mercury concentrations in oligochaetes were, in general, higher in the downstream reaches than in the reference reach, AR2. Concentrations of organics were not available from the reference reaches.

D. Crayfish CBRs

Figure 4-2 shows total mercury concentrations in crayfish plotted by river reach. None of the concentrations exceeded the NEL or effect-level CBRs (1,500 and 3,250 µg/kg WW, respectively). CBRs were not available for crayfish for TEQs or tPCBs.

E. Comparison of Crayfish Tissue Concentrations with Site-Specific Reference Concentrations

Figures 4-2 shows total mercury concentrations in crayfish plotted by river reach. Sufficient data were not available to run statistical analyses between the potentially Site-impacted reaches and the reference reach (AR2) for the 2009 mercury data. However, visual comparisons of mercury concentrations in crayfish samples indicate that concentrations in AR4 were lower than those in AR2, but those in AR3, AR6, AR8, and AR9 are greater than those in AR2. Sufficient data were available for the 2010 sampling year to run statistical analyses between the potentially Site-impacted reaches and the reference reach for mercury. Based on the 2010 data, all reaches

(AR5, AR6, and AR7) had mean/median mercury concentrations significantly greater (α=0.05) than the reference area (AR2; see Table 4-5 and Appendix J).

Sufficient data were not available to run statistical analyses between the potentially Site-impacted reaches and the reference reach (AR2) for tPCB data. However, visual comparisons of tPCB concentrations in crayfish samples indicate that all concentrations available from downstream reaches were higher than in AR2 (Figure 4-3).

F. Sediment Benchmark Comparisons

Figure 4-4 shows total mercury concentrations in sediment plotted by river reach. Sediment effects were estimated by comparing sediment chemical concentrations, by sample, with sediment quality guidelines for mercury, PCBs, and Dioxin/Furans developed by MacDonald et al. (2000).

Table 4-6 summarizes the HQs calculated based on the MacDonald et al. (2000) TEC and PECs, presenting the frequency with which benchmark values were exceeded (HQ >1). Individual sample HQs are provided in Appendix K. Note that only mercury had concentrations exceeding the TEC; therefore, it is the only COPEC presented in the tables and discussed in the subsections below.

Each of the potentially Site-impacted reaches (i.e., Reach 3 through 9) had at least one sample with mercury concentrations exceeding the TEC. Of the samples with total mercury concentrations that exceed the TEC, 17 have HQs less than 10, and 1 has an HQ greater than 10 and less than 100 (HQ = 44). The PEC was exceeded by only one sample concentration – that in AR9-00-SDCH0002-0-090917, which had an HQ of 7.5.

In Reach 2, the reference area, the magnitude of the TEC- and PEC-based HQs for total mercury were all less than 1; up to 0.21 to 0.036, respectively.

Comparison of Sediment Concentrations with Site-Specific Reference Concentrations

Figure 4-4 shows total mercury concentrations in sediment plotted by river reach. Sufficient data were available only for the 2010 sampling year to run statistical analyses between the

potentially Site-impacted reaches and the reference reach. Based on the 2010 data, all reaches had mean/median concentrations significantly greater (α=0.05) than the reference area (see Table 4-5 and Appendix H).

G. Toxicity Tests

1. Pore Water

Pore water toxicity tests were performed to determine if responses by two benthic invertebrate test species exposed to pore water collected from the substrate of the Androscoggin River downstream of the CHP differed significantly from those in samples collected at reference locations upstream of the CHP. Laboratory control samples were used only to verify that the organisms were healthy, and that the test passed the TAC specified by EPA (2000).

The following discussion summarizes the results of acute and chronic toxicity testing of pore water conducted by USGS and USEPA. A comprehensive discussion of methods and results is provided in the following report: *Two Species, 96-Hour, Acute Toxicity Testing Results Using Pore Water Samples Collected from the Androscoggin River in Areas Associated with Former Chlor-Alkali Facility in Berlin, NH* (TechLaw Inc., 2010). This report is presented in its entirety in Appendix B.

96-hour acute toxicity tests were performed using second-to-third instar-larval stage (age 11 to 12 days) *Chironomus tentans* and 14 to 21 day old *Hyalella azteca*. Both the C. tentans and *H. azteca* tests were conducted at the EPA's OEME Biology Section Laboratory. Populations of both species are monitored for quality through an on-going reference toxicity testing program at the OEME Laboratory.

The USGS obtained 15 pore water samples from the Androscoggin River between August 23 and 27, 2010 upstream and downstream of the former chemical plant. Two upstream reference samples came from Wheeler Bay (AR2-4 and AR2-5). Thirteen more samples were collected downstream of the former chemical plant as follows:

- Two samples (AR4-1 and AR4-2) upgradient from Smith Hydro Dam,
- Two samples (AR5-1 and AR5-2) upgradient from Cross Power Dam,
- Two samples (AR6-2 and AR6-3) upgradient from Cascade Dam,

- Two samples (AR7-1 and AR7-2) upgradient from Gorham Dam,
- Two samples (AR8-4 and AR8-5) upgradient from Androscoggin River Dam, and
- Three samples (AR 9-5, AR9-6, and AR9-7) from Shelburne Reservoir upgradient from Shelburne Dam.

Initial test parameters consisting of pH, conductivity, DO, temperature, alkalinity, and hardness, were evaluated on each sample at the start of the *C. tentans* and the *H. azteca* tests. The final test parameters for each species consisted of pH, conductivity, DO, and temperature measured in a composite sample of the waste water from each sample. These analyses were performed in order to identify changes, which could have affected the test outcome.

Statistical analyses for the *C. tentans* and *H. azteca* tests were conducted using CETIS™ according to the EPA decision tree (EPA, 2000). The *C. tentans* survival data were analyzed using a Fisher Exact/Bonferroni-Holm test to determine if a significant difference existed between the response to pore water collected from the reference site (Wheeler Bay) and that of pore water samples collected downriver of the CHP. References were also compared with each other using a Fisher Exact Method. The reference samples (AR2-4 and AR2-5) were tested once for toxicity in the first test. The survival data from these two reference samples were then used for the second, third and fourth tests to compare them with samples collected downstream from the CHP.

The *H. azteca* survival data were analyzed using a Modified Levene's test to check for homogeneity of variance, and Shapiro-Wilk W test to check for normality. The WRS Two-Sample Test was used to determine if a significant difference existed between each of the reference samples by plotting them against each other. The reference sample data set had unequal variances and was not normally distributed. Reference sample AR2-4 was not used in the statistical comparisons because it experienced complete mortality. The Steel Many-One Rank test was used to determine if a significant difference in survival existed between the remaining reference (AR2-5) and the pore water samples collected downstream of the former chemical plant. Survival data were analyzed using the Bartlett test method to check for homogeneity of variance, and the Shapiro-Wilk W test to check for normal distribution.

H. *C. tentans* Survival

Survival was the single endpoint measured after 96 hours of exposure to either the laboratory control or pore water from the reference locations upstream and sample locations downstream of the CHP.

All four *C. tentans* laboratory controls met the minimum TAC of 90% survival (EPA, 2000). The 96-hr survival data were evaluated using the Fisher Exact/Bonferroni-Holm method to determine if a significant (α =0.05) difference existed in survival between the area adjacent to the former chemical plant and the reference samples. The results of the comparisons are summarized in Figure 4-5.

The reference samples had survival rates between 80 and 100%. The response data were evaluated to determine if a significant (α =0.05) difference in survival existed between the Site-impacted pore water samples and the reference samples. No statistically significant effects were observed.

I. *H. azteca* Survival

As with *C. tentans*, the toxicity endpoint measured for the *H. azteca* test was survival after 96 hours of exposure to either the laboratory control or pore water from the reference locations upstream and sample locations downstream of the CHP.

All four *H. azteca* laboratory control samples met the minimum TAC of 90% survival, indicating that the test organisms were healthy. The 96-hour survival data were evaluated to determine if a significant (α =0.05) difference existed in survival between the Site-impacted pore water samples and the reference sample. Only one of the two reference samples (AR2-5) was retained for comparison in the *H. azteca* statistics because the second reference sample (AR2-4) showed 100% mortality after 96 hrs. The reason for that mortality is unclear.

No significant differences in survival were observed between reference sample AR2-5 and pore wafer samples collected downstream of the CHP with two exceptions. A significant effect was seen when survival in the reference pore water sample was compared with survival in pore water samples tested at AR6-2 (20%) and AR4-2 (0%). The results of the comparisons are summarized in Figure 4-6.

2. Sediment Toxicity

Sediment toxicity tests were performed to determine the extent to which chemical contamination of the sediment in the Androscoggin River may be adversely affecting the benthic invertebrate community downstream of the CHP. Bulk sediment toxicity was evaluated for the freshwater amphipod, *Hyallela azteca*, and the freshwater midge, *Chironomus dilutus*.

A 28-day survival and growth toxicity test was conducted using the freshwater amphipod, *H. azteca*. As noted previously in Section 2.2.4.3, toxicity tests utilized protocols developed by the EPA and ASTM. The following discussion summarizes the results of this study. A comprehensive discussion of methods and results is provided in *28 Day Hyalella azteca Survival and Growth Sediment Toxicity Test* (EnviroSystems Inc., 2010b). This report is provided in its entirety in Appendix D.

A 20-day survival and growth toxicity test was conducted using the freshwater midge, *C. dilutus*. The following discussion summarizes the results of this study. A comprehensive discussion of methods and results is provided in *20 Day Chironomus dilutus, Survival and Growth Sediment Toxicity Test*, (EnviroSystems Inc., 2010a). This report is provided in its entirety in Appendix K.

Sediment toxicity was tested for statistical significance using a non-parametric WRS test comparison of medians grouped broadly into either the upstream (reference) reach or the reaches downstream from the former chemical plant (Table 4-7). The non-parametric WRS test comparison of medians grouped metrics from samples collected upstream (reference) and downstream from the former chemical plant. The first quartile (25th percentile), median (50th percentile), and third quartile (75th percentile) are shown, along with all results from all metric comparisons.

The results of the WRS test demonstrated no significant difference ($p < 0.05$) in the survival and growth of the two species exposed to sediment in the Androscoggin River upstream and downstream of the former chemical plant. In addition to the WRS test to evaluate the comparative toxicity of sediments upstream of the former chemical plant with those downstream of the former chemical plant, a non-parametric, KWRS was performed to compare toxicity of

sediment in the reference reach (AR2), the ‘near’ downstream reaches (AR4, AR5 and AR6), and the ‘far’ downstream reaches (AR7, AR8 and AR9) (Table 4-8).

The first quartile (25th percentile), median (50th percentile), and third quartile (75th percentile) are shown. Non-significant differences are indicated as 'NS'. Based on this analysis, no significant difference was observed in the survival and growth of *H. azteca* and *C. dilutus* among the spatial groupings of far stream reaches (AR7, AR8, AR9), near stream reaches (AR4, AR5, and AR6) or the reference reach (AR2).

4.1.2.2 Fish Population

A. Fish CBR Comparisons

Figures 4-7 and 4-8 show total mercury concentrations in fish plotted by river reach. The majority of smallmouth bass fillet concentrations exceeded the NEL of 380 µg/kg WW; whereas, only one of the concentrations (from AR7) exceeded the effect level of 980 µg/kg WW. Only one whole body white sucker concentration (from AR7) was above the NEL. All white sucker concentrations were below the effect level.

Figures 4-9 through 4-12 show total PCB and TEQ concentrations in fish plotted by river reach. None of the concentrations exceeded NELs for either COPEC.

Comparison of Fish Tissue Concentrations with Site-Specific Reference Concentrations

Sufficient fish tissue data were not available to run statistical analyses between the potentially Site-impacted reaches and the reference reach (AR2). Visual comparisons of plotted mercury concentrations in smallmouth bass samples indicate that concentrations in AR3 and AR4 are similar to those in AR2, with the concentrations in rest of the downstream reaches being, in general, higher than those in AR2. Comparisons of mercury concentrations in white sucker samples indicate that concentrations in AR5 are similar to those in AR2. White sucker tissue data were not available from AR3 or AR4. Attempts to collect white suckers in these reaches were not successful. White suckers typically inhabit pools and areas of low to moderate velocity (USFWS, 1984). High gradient flows or some other physicochemical property in reaches AR3 and AR4 may have resulted in unsuitable habitat conditions for white suckers in these sections

of the river. Mercury concentrations in fish collected from the rest of the downstream reaches were, in general, higher than those observed in AR2.

Visual comparisons of total PCB concentrations in smallmouth bass samples indicate the lowest concentrations in AR2, and highest concentrations in AR3 and AR4 (Figure 4-9). Total PCB concentrations were available for white sucker in AR2, AR8, and AR9. Concentrations in AR9 were similar to those in AR2, but those in AR8 were substantially higher (Figure 4-10).

Visual comparisons of TEQ concentrations in smallmouth bass indicate lower concentrations in AR2, with the highest concentrations in AR8 (Figure 4-11). Only PCB dioxin-like congener concentrations were available in the reference reach. Overall, TEQ concentrations only were available for AR2, AR8, and AR9; with concentrations in AR9 being similar to those in AR2, and those in AR8 being substantially higher (Figure 4-12; see Table 2-5 for available data).

B. Surface Water Toxicity Tests

The objective of this study was to determine if the responses of the cladoceran, *Ceriodaphnia dubia* and the fathead minnow *Pimephales promelas* exposed to surface water collected from the Androscoggin River downstream of the CHP differed significantly from those observed in surface water collected at reference locations upstream of the CHP. The toxicity endpoints for *P. promelas* were survival and growth; the measurement endpoints for *C. dubia* were survival and reproduction following 8 days of exposure. A comprehensive discussion of the results of these tests is provided in the following report: *Two Species, Chronic Toxicity Testing Results Using Surface Water Samples Collected from the Androscoggin River in Areas Associated with Former Chlor-Alkali Facility in Berlin, NH* (TechLaw Inc., 2009).

A summary of the results is presented on Table 4-9. Statistical analyses for the *P. promelas* and *C. dubia* tests were conducted using CETIS™ according to the EPA decision tree (EPA, 2000). Survival, growth, and reproduction data were analyzed separately for each species. Data were analyzed using Bartlett's test to check for homogeneity of variance, and Shapiro-Wilk W test to check for normality. All data for *C. dubia* and *P. promelas* demonstrated normal distribution and homogeneous variance and were therefore analyzed using Dunnett's Multiple Comparison Test. Dunnett's Test was also used to determine if a significant difference existed between the results

observed for the reference locations and those found for the test locations downstream of the CHP.

1. *P. promelas*

The 7-day survival data were evaluated to determine if there was a significant difference ($p \leq 0.05$) in fathead minnow survival in water collected from the upstream reference locations and survival in water samples collected from locations downstream of the CHP. Biomass data were also evaluated to determine whether minnow growth differed significantly between reference surface water and water collected from locations downstream of the CHP. Based on the results, no significant effects were observed in survival and growth of fathead minnows exposed to surface water downstream of the CHP.

Figures 4-13 and 4-14 demonstrate the results of the effects of exposure to surface water collected at varying locations on the Androscoggin River the on survival and growth of the fathead minnow, *P. promelas*.

Based on the results of these tests, the surface water downstream of the CHP is not expected to effect the survival and growth of fish species similar to the cyprinid, fathead minnow.

2. *C. dubia*

The effects of surface water on survival and reproduction of *C. dubia* were measured after 8 days of exposure to laboratory control water and surface water from the reference location upstream (AR2) and sample locations downstream of the CHP (AR3, AR4, AR8, and AR9).

Figures 4-15 and 4-16 demonstrate the results of the effects of exposure to surface water collected at varying locations on the Androscoggin River on the survival and neonate production of the cladoeran, *C. dubia*. The 8-day survival data were evaluated to determine if there was a significant difference ($p \leq 0.05$) in survival of *C. dubia* in surface water at reference locations and surface water downstream of the CHP. Based on these results, no significant effects on survival or reproduction ($p \leq 0.05$) were observed. As such, it appears that that surface water in the Androscoggin River downstream of the CHP poses no risk for chronic toxicity to *C. dubia* and possibly other cladocerans inhabiting the river.

4.1.3 Risk to Avian Life

4.1.3.1 Insectivorous Birds

A. Tree Swallows

1. Tree Swallow CBR Comparisons

Figure 4-17 shows total mercury concentrations in adult and nestling tree swallow blood plotted by river reach. The majority of adult blood concentrations were below the NEL of 600 µg/kg fresh weight, with the exception of 3 of 8 samples from AR9. All of the nestling blood concentrations were well below the NEL. All concentrations were below the effect level of 1,250 µg/kg fresh weight.

Figure 4-18 shows total mercury concentrations in adult and nestling tree swallow feathers plotted by river reach. The 75th percentile and median/mean concentrations in adult feathers were greater than the NEL in AR1 and AR2, respectively. The one sample from AR3 had a concentration less than the NEL; whereas, the one concentration from AR4, 25th percentile from AR8, and mean/median concentrations from AR9 were greater than the NEL. For nestling feathers, 6 of 7 concentrations from AR2 were below the NEL, with all of the other concentrations (AR1, AR4, AR8, and AR9) being above the NEL. None of the concentrations was above the effect level of 9,100 µg/kg fresh weight.

Figure 4-19 shows total mercury concentrations in tree swallow eggs plotted by river reach. At least one sample from each of the downstream reaches (i.e., AR3, AR4, AR8, and AR9) exceeded the NEL of 800 µg/kg fresh weight. All concentrations were below the effect level of 1,600 µg/kg fresh weight.

TEQ and total PCB data were not available for tree swallow blood or feathers. Figures 4-20 and 4-21 show total PCB and TEQ concentrations in tree swallow eggs plotted by river reach. Only one total PCB concentration (from AR3) exceeded the total PCB no-effect value of 900 µg/kg and the effect value of 1,000 µg/kg. Concentrations of 2,3,7,8-TCDD TEQ and PCB Dioxin-like Congener TEQ in all of the downstream reaches exceeded both the NEL and effect level of 0.124 µg/kg TEQ and 0.16 µg/kg TEQ, respectively.

Comparison of Tree Swallow Tissue Concentrations among River Reaches and Site-Specific Reference

Sufficient data were not available to run statistical analyses between concentrations of total mercury in tree swallow tissues from the potentially Site-impacted reaches and the reference reaches (AR1 and AR2).

Visual comparisons of concentrations in adult blood indicate that concentrations in the downstream reaches are, in general, higher than those in the reference reaches. In addition, visual comparisons of concentrations in nestling blood revealed no substantial difference between the Site-impacted and reference reaches.

Visual comparisons of concentrations in adult feathers indicate that concentrations in the downstream reaches are similar to those in AR1 and AR2. Comparisons of concentrations in nestling blood revealed potentially higher concentrations in AR8 and AR9 than in the reference reaches.

Visual comparisons of concentrations in eggs indicate that concentrations in the downstream reaches are higher than those in AR1 and AR2.

The tPCB and TEQ concentrations were available for eggs only. The one concentration available for AR3 was substantially higher than those in AR1 and AR2, with concentrations in AR8 and AR9 a few times higher than in the reference reaches (Figure 4-20). The pattern was similar for TEQ concentrations (Figure 4-21).

B. Songbirds

1. Songbirds CBR Comparisons

Figure 4-22 shows total mercury concentrations in songbird blood plotted by river reach. Samples were collected only from AR1 and AR9. All but one concentration in each reach were below the NEL of 600 µg/kg fresh weight. The concentrations above the NEL also were marginally above the effect level of 1,250 µg/kg fresh weight.

Figure 4-22 also shows total mercury concentrations in songbird primary and tail feathers plotted by river reach. The median and mean concentrations in both types of feathers were between the no-effect and effect levels for AR1. The median and mean concentrations in songbird feathers from AR9 were at or greater than the NEL. Three concentrations (one each from an AR9 primary feather sample and AR1 and AR9 tail feather sample were greater than the effect level of 9,100 µg/kg fresh weight.

Jackson et al. (2011) recently published a study in which the varying levels of nesting success of the Carolina Wren were modeled from regression equations of blood, feather, and egg mercury concentrations. Blood and tail feather mercury concentrations associated with a 10% reduction in nest success were 700 µg/kg ww and 3,000 µg/kg ww, respectively. These values fall between the no-effect and effect level CBRs selected for use herein. Three of the 36 samples from AR9 had blood concentrations exceeding the 10% reduction level. The highest songbird blood concentration would be associated with an approximately 20% reduction in nest success. For feathers, 4 of 35 primary feather samples and 5 of 32 tail feather samples exceeded the 10% reduction level. The highest primary and tail feather concentrations would be associated with approximately 50% and 60% reductions in nest success, respectively.

Figures 4-23 and 4-24 show tPCB and TEQ concentrations in songbird blood plotted by river reach. None of the concentrations exceeded the respective no-effect level CBRs. TEQ and tPCB data were not available for songbird feathers.

Comparison of Songbird Tissue Concentrations among River Reaches and Site-Specific Reference

Sufficient data were available to for the Nobis/Avatar Team to run statistical analyses between the potentially Site-impacted reach and the reference reach. Concentrations from AR9 for blood, primary feathers and tail feathers were not significantly greater (α=0.05) than the reference area (see Table 4-5 and Appendix J).

Sufficient data were not available to run statistically analyses between Site and reference organic concentrations. The tPCB concentrations are higher in AR9 than in AR2; whereas PCB dioxin-like concentrations are similar between the two (Figures 4-23 and 4-24). Note that 2,3,7,8-TCDD TEQ concentrations were not available in bird blood.

4.1.3.2 Piscivorous Birds

A. Kingfisher

HQs based on food chain modeling for the kingfisher are presented in Tables 4-10 through 4-13.

1. Site Impacted Areas

HQs for the kingfisher where at least one of the evaluated combinations (i.e., NOAEL-based RME and CTE and LOAEL-based RME and CTE exposure) exceed 1 are summarized below.

Reach	HQ Range (LOAEL-based CTE exposure to NOAEL-based RME exposure)/COPEC			
	Hg	tPCB	2,3,7,8-TCDD TEQ	PCB Dioxin-like TEQ
AR3	2.0 to 5.7	---	---	---
AR4	1.9 to 3.8	2.0 to 10	---	0.27 to 2.7
AR5	1.7 to 4.6	---	---	---
AR6	2.4 to 5.7	---	---	---
AR7	2.4 to 6.6	---	---	---
AR8	2.9 to 7.7	0.21 to 1.5	0.085 to 1.5	---
AR9	2.6 to 6.0	0.12 to 1.2	0.09 to 1.6	---

It should be noted, that with the exception of 2,3,7,8-TCDD TEQ in Reach 3 RME no-effect-based TRV HQ (where crayfish ingestion contributed an HQ of 1.3 to the total HQ), only the ingestion of fish contributed HQs greater than 1.0. In addition, surface water ingestion contributed no more than 0.000003% to the total risk and incidental ingestion of sediment generally contributed <1% to total risks.

2. Reference Area

The methylmercury HQs for kingfisher foraging in Reach 2 range from 1.5 (CTE – Effect TRV) to 4.4 (RME – No-Effect TRV). HQs for the other COPECs are well below 1.0 (i.e., maximum of 0.059).

3. Incremental Risk

As discussed previously, incremental HQs were derived in order to differentiate site-related risks from those associated with background conditions. Tables 4-14 and 4-15 present the incremental RME NOAEL- and LOAEL-based HQs developed for wildlife receptors in each reach. Dietary exposures of kingfisher to COPECs resulting in NOAEL-based incremental HQs greater than one for the RME scenario are as follows:

Reach	Incremental Risk HQ Range (LOAEL-based to NOAEL-based RME exposure)/COPEC			
	Hg	tPCB	2,3,7,8-TCDD TEQ	PCB Dioxin-like TEQ
AR3	<1 to 1.3	---	<1 to 1.3	---
AR4	---	2.0 to 10	---	<1 to 2.6
AR5	---	---	---	---
AR6	<1 to 1.3	---	---	---
AR7	1.1 to 2.2	---	---	---
AR8	1.7 to 3.3	<1 to 1.5	<1 to 1.4	---
AR9	<1 to 1.6	---	<1 to 1.5	---

Dietary exposures of kingfisher resulting in NOAEL-based incremental HQs greater than one for the CTE scenario (Tables 4-16 and 4-17) are as follows:

Reach	Incremental Risk HQ Range (LOAEL-based to NOAEL-based CTE exposure)/COPEC		
	Hg	tPCB	PCB Dioxin-like TEQ
AR3	---	---	---
AR4	---	2.0 to 10	<1 to 2.6
AR5	---	---	---
AR6	<1 to 1.8	---	---
AR7	<1 to 1.9	---	---
AR8	1.4 to 2.8	---	---
AR9	1.1 to 2.2	---	---

B. Bald Eagle

1. Bald Eagle CBR Comparisons

Figure 4-25 shows total mercury concentrations in bald eagle blood plotted by river reach. Both of the concentrations from AR1 were below the NEL of 600 µg/kg fresh weight. One of the two concentrations in blood from AR9 was greater than the NEL, but below the effect level of 1,250 µg/kg WW.

Figure 4-25 also shows total mercury concentrations in bald eagle feathers plotted by river reach. All of the concentrations were above the effect level of 9,100 µg/kg fresh weight. CBRs were not available for feathers for TEQs or tPCBs.

Figures 4-26 and 4-27 show total PCB and TEQ concentrations in eagle plasma plotted by river reach. None of the concentrations exceeded the respective NEL CBRs. TEQ and total PCB data were not available for eagle feathers.

2. Comparison of Bald Eagle Tissue Concentrations among River Reaches and Site-Specific Reference

Sufficient data were not available to run statistical analyses between concentrations of total mercury in bald eagle tissues from the potentially Site-impacted reach (AR9) and the reference reach (AR2).

Visual comparisons of mercury concentrations in adult blood indicate that concentrations in the two reaches for which data exist are similar. Concentrations in feathers indicate that samples from AR9 have higher feather concentrations than those collected from eagles nesting in AR9 (Figure 4-25).

Visual comparisons of total PCB concentrations in plasma from AR9 were higher than those in AR1 (Figure 4-26). TEQ concentrations in plasma were similar between AR1 and AR9 (Figure 4-27).

4.1.4 Risk to Mammalian Life

4.1.4.1 Insectivorous Mammals – Bats

Bat CBR Comparisons

Figure 4-28 shows total mercury concentrations in bat blood plotted by river reach. All four of the concentrations from AR1 and all but 1 of 12 concentrations from AR9 were below the NEL of 630 µg/kg fresh weight. The concentration from AR9 that exceeded the no-effect concentration was lower than the effect concentration of 1,500 µg/kg WW.

Figure 4-28 also shows total mercury concentrations in bat fur plotted by river reach. All but 1 of 11 concentrations from AR1 were below the no-effect concentration of 7,710 µg/kg fresh weight. All but 1 of 27 concentrations from AR9 were above the no-effect concentration, with the median and mean concentrations exceeding the effect level of 19,030 µg/kg WW.

Figures 4-29 and 4-30 show total PCB and TEQ concentrations in bat blood plotted by river reach. None of the concentrations exceeded the NEL CBRs for TEQ or total PCB. TEQ and total PCB data were not available for fur.

Comparison of Bat Tissue Concentrations among River Reaches and Site-Specific Reference

Sufficient data were not available to run statistical analyses between concentrations of total mercury in bat blood from the potentially Site-impacted reach (AR9) and the reference reach (AR2). Visual comparisons do indicate that the median and mean concentrations from AR9 are greater than the maximum detected in AR1 (Figure 4-28).

Sufficient data were available for bat fur for the Nobis/Avatar Team to run statistical analyses between the potentially Site-impacted reaches and the reference reach mercury concentrations. Mercury concentrations in AR9 were significantly greater (Wilcoxon-Mann-Whitney Test; $\alpha=0.05$) than the reference area (AR1; see Table 4-5 and Appendix J).

Sufficient data were not available for bat blood to run statistical analyses for organics. Visual comparisons indicate that total PCB and TEQ concentrations are greater in AR9 than in AR1 (Figures 4-29 and 4-30). Organic concentrations in bat fur were not available.

4.1.4.2 Piscivorous Mammals – Mink

HQs based on food chain modeling TDIs for the mink are presented in Tables 4-18 through 4-21.

Site Impacted Areas

HQs for the mink where at least one of the evaluated combinations (i.e., NOAEL-based RME and CTE and LOAEL-based RME and CTE exposure) exceed 1 are summarized below.

Reach	HQ Range (LOAEL-based CTE exposure to NOAEL-based RME exposure)/COPEC			
	Hg	tPCB	2,3,7,8-TCDD TEQ	PCB Dioxin-like TEQ
AR3	1.0 to 3.6	---	0.18 to 3.3	---
AR4	0.85 to 2.1	0.32 to 1.6	---	0.56 to 5.7
AR5	0.89 to 3.0	---	---	---
AR6	1.1 to 3.3	---	---	---
AR7	1.1 to 3.7	---	---	---
AR8	1.2 to 4.1	---	---	0.084 to 1.3
AR9	1.2 to 3.4	---	0.12 to 2.1	---

It should be noted, that with the exception of mercury in Reach 3 and PCB dioxin-like congener TEQ in Reach 4, only the ingestion of fish contributed HQs greater than 1.0. In addition, surface water ingestion contributed no more than 0.00002% to the total risk and incidental ingestion generally contributed <1% to total risks.

Reference Area

The methylmercury HQs for mink foraging in Reach 2 range from 0.68 (CTE – Effect TRV) to 2.4 (RME – No-Effect TRV). Only no-effect-based TRV HQs exceeded 1.0. HQs for the other COPECs are well below 1.0 (i.e., maximum of 0.16).

Incremental Risk

As discussed previously, incremental HQs were derived in order to differentiate Site-related risks from those associated with background conditions. Tables 4-14 and 4-15 present the incremental RME NOAEL- and LOAEL-based HQs developed for wildlife receptors in each reach. Dietary exposures of mink to COPECs resulting in NOAEL-=based incremental HQs greater than one for the RME scenario are as follows:

Reach	Incremental Risk HQ Range (LOAEL-based to NOAEL-based RME exposure)/COPEC			
	Hg	Total PCB	2,3,7,8-TCDD TEQ	PCB Dioxin-like TEQ
AR3	<1 to 1.2	---	<1 to 3.2	---
AR4	---	<1 to 1.6	---	<1 to 5.5
AR5	---	---	---	---
AR6	---	---	---	---
AR7	<1 to 1.2	---	---	---
AR8	<1 to 1.6	---	---	<1 to 1.1
AR9	---	---	<1 to 2.0	---

Dietary exposures of mink resulting in NOAEL-based incremental HQs greater than one for the CTE scenario (Tables 4-16 and 4-17) are as follows:

Reach	Incremental Risk HQ Range (LOAEL-based to NOAEL-based CTE exposure)/COPEC			
	Hg	Total PCB	2,3,7,8-TCDD TEQ	PCB Dioxin-like TEQ
AR3	---	---	<1 to 1.8	---
AR4	---	<1 to 1.6	---	<1 to 5.5
AR5	---	---	---	---
AR6	<1 to 1.1	---	---	---
AR7		---	---	---
AR8	<1 to 1.4	---	---	---
AR9	<1 to 1.2	---	<1 to 1.2	---

4.1.5 Uncertainty Analysis

As mentioned previously, one of the major components of the Risk Characterization is the discussion of the uncertainties associated with estimating risk. Many of the uncertainties

associated with the measurement endpoints selected as part of this BERA were discussed throughout the Problem Formulation and Analysis Phase. The primary objective of the Uncertainty Analysis is to combine and summarize the uncertainty present throughout the ERA process so that this information can be combined with risk estimation information to more completely describe actual or potential risk and to assess the ecological significance of observed or predicted impacts. As stated previously, the actual integration and interpretation of the information presented in the Risk Estimation section are provided in the Risk Description (Section 4.2).

The Uncertainty Analysis identifies and, to the extent possible, quantifies the uncertainties present in the Problem Formulation, Analysis Phase, and Risk Characterization. As previously discussed, virtually every step in an ERA involves numerous assumptions that contribute to the total uncertainty in the final evaluation of risk. The uncertainties that are incorporated in this BERA may result in an increase or decrease in the estimated potential for adverse ecological effects. When methodologies and input factors for this BERA were selected, conservative, yet realistic approaches and values were used when site-specific information was unavailable (e.g., dietary intake values for avian and mammalian exposure models). This approach to handling uncertainty may tend to overestimate risks; however, it should be noted that only conservative assumptions compatible with sound scientific evidence or processes were used.

Uncertainties in ERAs may be identified as belonging to one or more of the four following categories: conceptual model formulation uncertainty, data and information uncertainty, natural variability (stochasticity), and error (EPA, 1992). These are not discrete categories, and overlap does exist among them. EPA's Ecological Framework document provides a more detailed discussion of these generic uncertainty categories (EPA, 1992).

After discussing general uncertainties (Subsection 4.1.5.1) associated with the ERA process used for this BERA, the Uncertainty Analysis follows the order of presentation of endpoints used in the previous subsection on Risk Estimation and discusses uncertainties specific to each endpoint. Where possible, the effect of a given uncertainty, i.e., under- or overestimate of risk, is noted. In instances where the direction of the uncertainty is unknown, i.e., may under-or overestimate risk, the effect generally is not stated. Table 4-22 summarizes the major uncertainties for each endpoint.

4.1.5.1 General Uncertainties

There are numerous uncertainties that may be associated with this BERA in general, or to one or more measurement endpoints specifically that were used in this BERA. In an effort to limit the repetitious listing of common uncertainties, the general uncertainty categories previously presented (i.e., conceptual model formulation, information and data, natural variability, and error) are used to highlight common uncertainties present throughout the assessment. The general uncertainties associated with these categories are described below.

Conceptual Model Formulation

- Food web and trophic dynamics within a system (which directly impacts bioavailability of COPECs) are complex and not completely understood.

- Detected concentrations in soil, prey items, and surface water may not be indicative of bioavailable concentrations. This is addressed throughout the remainder of the Uncertainty Analysis.

- Target receptors identified in the Problem Formulation were selected to represent a variety of organisms with similar feeding and behavioral strategies and to assist in the evaluation of measurement endpoints. However, species-specific exposure and susceptibility to toxic effects within similar feeding groups may vary and result in differing risk potential. Target receptors were selected with the intent of optimizing exposure and assuming that a significant portion of their life cycles was restricted to the area of contamination. The assumption that avian and mammalian target receptors spend a significant portion of their life cycles at the Site may be conservative (i.e., overestimate risk) for some receptors (e.g., mink).

Information and Data

- Factors unrelated to COPEC contamination may influence the number and composition of species that reproduce or forage on-site and the frequency of their exposure to site-related contamination. Examples of these types of factors include habitat modification in the vicinity of the Site, natural population fluctuations, off-site contaminant release, and migration.

- There is uncertainty surrounding the extrapolation of laboratory data to field conditions.

- Surface water grab samples represent snapshots of surface water conditions in the river; they may not reflect chronic water conditions and unless taken frequently over time may not capture acute COPEC pulses.

- Media sampling was typically not random; most sampling strategies used were designed to identify “worst-case” situations or delineate the areal extent of contamination, which would tend to overestimate risk.

- Because of the complexity of community and population dynamics, it is not possible to evaluate all possible exposures or effects, so target receptors are selected for evaluation. However, numerous authors (Cairns J. Jr., 1988; Chapman, 1995; Forbes et al., 2001) have expressed concern regarding the extrapolation of individual species effects evaluations to population level impacts, let alone how species-level impacts might affect community dynamics.

Natural Variability (Stochasticity)

- Fluctuations in seasonal or annual temperature and precipitation may temporarily affect habitat suitability and subsequent receptor exposure.

- Within a target species, there exists variability in species sensitivity to COPEC-related toxicity.

- Water body characteristics, such as DOC, sediment TOC, sunlight, water clarity, anoxia, and sulfate concentrations, appear to affect methylation and demethylation reactions. Variations in these properties can cause significant variations in fish concentrations among lakes (EPA, 1997), and likely riverine and wetland habitats. Fish mercury levels are sensitive to factors that promote methylmercury mobility from the sediments to the water column; these factors include sediment DOC, pH, temperature, and sediment-pore water partition coefficients.

- There is considerable uncertainty and apparent variability in the movement of mercury from the abiotic (e.g., sediment and surface water) elements of the aquatic system through the aquatic food chain (EPA, 1997).

- Spatial and temporal variations in sediment conditions (both physical and chemical) are often observed at very small scales. Given the heterogeneity of the sediment environment, sample size and location greatly affect the certainty associated with determination of effects.

Error

- Analytical variability in the analysis of COPECs in prey tissue, sediment, and surface water causes some uncertainty in sample-specific concentrations and the calculation of EPCs.

- The use of summary statistics and estimates of variability are reflective of the sampling strategy and sample sizes. Non-random sampling may introduce bias.

- The hazard quotient approach used throughout the assessment fails to account for uncertainty in the point estimates used and typically compounds conservatism by using "worst case" assumptions when selecting parameter estimates.

- Quantification of no observed effect and lowest observed effect concentrations (this also includes NOAELs and LOAELs) depends critically on experiment size and variability, and as such has been criticized by numerous authors (Chapman et al., 1998; Hoekstra and Van Ewijk, 1992; Laskowski, 1995) as having limited value in assessing risk.

- Factors like recruitment, natural attenuation of COPECs, adaptive tolerance, the small size of the impacted area relative to the range of most species, and adaptive reproduction potential could not assessed. These factors tend to mitigate the degree and significance of impacts to chemical stressors, therefore results presented using the current approach tend to overestimate risk.

4.1.5.2 Individual Field Study Uncertainties

A. General Field Study Uncertainties

- Several authors (Heinz and Hoffman, 1998; Hoffman and Heinz, 1998; Thompson and Graham, 1996; Wolfe and Norman, 1998; Wren and Stokes, 1988) have reported that, in birds, selenium can act as an antagonist to the toxic effects of mercury. Because selenium concentrations were not measured as part of the supplemental biological sampling program, there is no way to assess if mercury toxicity may be impacted by co-located selenium levels.

- It is virtually impossible to tell if samples collected include "non-healthy" individuals because their foraging and nesting skills may be compromised by effects tied to mercury exposure.

- Field studies that collect samples from contaminated media and biota that are taken from an exposed environment and used as replicates in hypothesis testing are, in fact, pseudoreplicates (Hurlbert, 1984; Suter II, 1996) and the results of hypothesis testing need to be interpreted with caution.

- It is possible that only individuals with low mercury exposure as immatures survive to reach the adult age class. None of the field studies evaluated long-term survival of exposed juveniles.

B. Avian Field Study Uncertainties

- Avian tissues were primarily collected in spring and early summer when methylmercury concentrations in surface water tend to be lower than during low-flow and warmer conditions (i.e., summer and early autumn). Therefore, it may be reasonable to assume that avian blood levels may be higher in late summer and early fall.

- Avian field studies did not attempt to directly measure reproductive effects (i.e., hatching or fledging success); therefore, tissue residue levels could only be compared to literature-based effect levels to determine potential effects.

- Egg laying order has a significant impact on the concentration of mercury in eggs (Evers et al., 2005; Kennamer et al., 2005); therefore, the results of egg comparisons (to literature-based values) may reflect effects associated more with laying order than locational effects.

- Mercury concentrations in feathers will vary with time of molt, feather type, individual age, and species (Evers et al., 1998; Montiero et al., 1995; Rimmer et al., 2005). In general, mercury concentrations in feathers are reflective of blood levels at the time of molt (Bearhop et al., 2000), but can also be reflective of concentrations in muscle tissue for individuals that have been exposed to high levels of mercury in the environment (Burger, 1993). Therefore, mercury feather concentrations observed for this study are likely indicative of long-term mercury exposure and may be more representative of exposure concentrations present at locations other than those found within the RSA or reference locations.

C. Target Receptor-Specific Field Study Uncertainties

1. Song Bird

The diets of the song birds from which blood and feathers were analyzed include non-aquatic invertebrates (e.g., beetles, bees, spiders) that may not be exposed to contamination associated with the Androscoggin River.

2. Bat

There is significant uncertainty with the mercury levels reported in bat fur. Based on the results, the mean concentration of mercury in 27 fur samples from bats collected in the vicinity of AR9 (Shelburne Reservoir) is 71.4 milligrams per kilogram (mg/kg) WW with a maximum mercury level of 196 mg/kg WW. In a recent paper, Osborne et al. (2011) evaluated mercury contamination in a variety of organisms including bats from 44 sites located in 10 subregions throughout New England and the Mid-Atlantic States. In this study, 802 bats representing 13 species were sampled between 2006 and 2008. Using these data, Nam et al. (2012) evaluated the fur Hg levels in 441 little brown bats, *Myotis lucifugus*, the bat species sampled as part of the Androscoggin River investigation. These data resulted in a mean mercury level in fur of 5.5 mg/kg WW and a maximum

recorded value of 35 mg/kg WW. In a subregional analysis of bats collected in southern New Hampshire - the subregion with the highest mean mercury levels – the mean concentration was 12.0 mg/kg. Based on a comparison with the results of this regional data, mercury levels in fur of the little brown bat collected in the vicinity of Shelburne Reservoir appears to be extraordinarily high. The mean value in the Androscoggin investigation is 14-fold higher than the mean mercury level of 441 bats collected throughout New England and the Mid-Atlantic. A similar comparison with the results from the southern New Hampshire subregion, indicate the mean mercury level in bat fur from the Shelburne area to be 6-fold higher. Moreover, the maximum mercury level in fur from this investigation was approximately 5.5-fold higher than any level seen in any little brown bat collected from New England and the Mid-Atlantic.

In evaluating further, Hg levels in bat fur were regressed against paired blood levels of the same animals. A regression coefficient (r^2) of 0.85 was observed for the entire set (AR1 and AR9) of paired bat data (n=16; see Figure 4-31); and an r^2 of 0.84 was observed for the paired bat data for the Shelburne Reservoir reach (AR9) only (n=12; see Figure 4-32). There were insufficient paired data for a regression of the background location data at AR1 (n=4). Consequently, a statistical analysis of the comparative regressions was not possible. However, the results of the regression indicate a strong functional dependence of Hg in fur based on the mercury levels in blood. Were the elevated Hg levels in the fur of the AR9 bats an anomaly, one might expect a blood-fur association of less strength, unless there was a systematic analytical error. As this does not appear to be the case, the bat population consuming insects in the vicinity of the Shelburne reservoir may be at risk to changes in brain neurochemistry (Nam et al., 2012). Note that the ecological significance of changes in neurochemistry to a bat population is not known. Nevertheless, because the health of the little brown bat population throughout the northeastern U.S. is seriously compromised by White-nose syndrome, concern is warranted for any additional stress. Further investigation of mercury levels in the little brown bat population in the Shelburne Reservoir area may be warranted.

4.1.5.3 Hazard Quotient Uncertainties

When sufficient data are available to quantify exposure and effects estimates, the simplest approach for comparing estimates is the ratio approach (EPA, 1998). As presented in Section 4.1.1.3, the HQ is being used throughout this BERA to evaluate risk to target receptors and communities. The advantages to using this approach are: 1) it is quick and simple to use; 2) risk managers are familiar with its application; and 3) it provides an efficient means to identify high- or low- risk situations. There are however, a number of limitations associated with this approach that have been discussed by several authors (Smith and Cairns, 1993; Suter II, 1993; Suter II et al., 2000) and include: 1) inability to provide incremental quantification of risk (e.g., an HQ of 10, does not necessarily mean 10X more risk than an HQ of 1; 2) not appropriate for evaluating secondary effects; and 3) the quotient approach does not explicitly consider uncertainty.

A. Benchmark Comparisons

1. Sediment Benchmarks

In general, sediment benchmarks do not address possible synergistic, antagonistic, or additive effects of contaminant mixtures; do not consider unmeasured chemicals; and are not useful for chemicals for which little or no toxicological information is available (Geisy and Hoke, 1990). Specific uncertainties with the values used in this BERA are noted below.

- The TEC value, below which concentrations are not expected to cause adverse effects, may underestimate the potential for toxic effects caused by mercury. Out of 79 samples evaluated, the number of samples predicted to be not toxic (based on the TEC value) was 35. The actual number of samples observed to be not toxic was 12, giving a percentage of samples correctly predicted to be not toxic of 34.3%.

- The PEC value, above which concentrations are expected to cause adverse effects, is a reliable indicator of effects from mercury. Out of 79 samples evaluated, the number of samples predicted to be toxic (based on the PEC value) was 4. The actual number of samples observed to be toxic was 4, giving a percentage of samples correctly predicted to be toxic as 100%.

The sediment benchmarks used in this evaluation were developed using the co-occurrence-based approach which involves compiling sets of sediment data that contain some information on sediment biological characteristics, such as laboratory measured toxicity or benthic organism assemblages and the total concentration of potential contaminants in the sediment. Several authors have provided detailed discussions of the limitations associated with the approach to assessing potential ecological effects associated with sediment contamination (Lee and Jones-Lee, 2002; O'Connor, 1999; O'Connor et al., 1998). The following list highlights the primary uncertainties identified with the sediment co-occurrence approach.

- Approach assumes there is always a causal relationship between the concentration of each contaminant in sediment and the ecological impact of that sediment.
- Presumes that the effect reported for each sediment evaluated was caused independently by each of the measured contaminants in the sediment.
- Assumes no other chemical or condition not included in the database has any influence on the effect(s) observed.
- Presumes that all effects information used to develop the benchmark is directly related to ecologically significant impacts to the benthic community.
- Does not consider bioaccumulation and food chain effects.

B. Critical Body Residue Comparisons

Although the concentrations in tissues associated with adverse effects have been measured in some studies, the significance of the link between the concentration within tissues and exhibition of toxic effects is not known. Comparisons between tissue concentrations and literature values may under- or overestimate the potential for adverse effects in target receptors, because toxicity may be dependent upon the concentration within a particular organ not well represented by whole body or component (e.g., fillet tissue and feather) concentrations. In addition, many CBRs are based on laboratory studies that do not have the ability to consider potential adaptive behavior by organisms within a contaminated area.

The following list of uncertainties highlights some of the major limitations associated with using CBRs to assess ecological risks.

- The influence of the kinetics of uptake and depuration on biological response for mercury must be understood when interpreting the relation of tissue residues to effects (e.g., short-term exposure to highly toxic concentrations may result in lower residue levels than long-term exposure to lower concentrations).

- For the body residue approach to be most effective, there needs to be a clear understanding of the mechanisms or modes of actions for the COEC. If this information is not available, inappropriate tissues might be sampled.

- The tissue residue approach may not be effective for chemicals that are metabolized to more active forms; in which case the parent chemical residue level may not correlate with effects.

In addition, the interpretation and application of toxicological data in the ecological effects characterization are potentially the greatest sources of uncertainty in the CBR comparisons. Appropriate toxicity data specific to target receptors were not always available; therefore, application of literature-derived toxicity data to the species of concern was sometimes necessary. When selecting toxicological data to compare with site-specific conditions, every effort was made to use data for the most closely related species to the target receptors. However, species sensitivity may vary even among closely related species. Variations in species sensitivity may be due to differences in some of the following factors: toxicity, tolerance thresholds, toxic symptoms exhibited, time period until toxic effects are observed, and metabolism of the ingested chemical. Because study designs and presentation of results can be quite different, steps were taken to make sure the concentrations and/or doses were comparable. As such, the primary uncertainties potentially associated with the derivation of mercury CBRs are noted below:

- To facilitate direct comparison between CBRs and site-specific tissue concentrations, all data that were reported in DW were converted to WW. Assumptions made were as follows: crayfish and fish–80% moisture; bird blood–80% moisture; bird eggs–76% moisture; feathers and fur–fresh weight (FW) equals WW. The available measured moisture contents in site-specific data, ranged, in general, from 68 to 74%

for crayfish and 66 to 81% for fish (moisture content not available for other tissues). Considering the range and distribution of moisture content in crayfish and fish site-specific values may be higher or lower than the assumed, but for the most part, the values modified from DW to WW are lower than what would be calculated using sample-specific information (i.e., conservative).

- Some blood concentrations identified in the literature were reported on a per volume (milliliter [mL]) instead of a per weight (e.g., g) basis. It was assumed that blood density was not different from one, and therefore, values in µg/mL were equal to those in µg/g. This may under- or overestimate CBR values.

Specific target receptor mercury CBR uncertainties are noted below:

1. **Crayfish**

- Except for the studies by Parks et al. (1988) and Brant et al. (2002), who exposed crayfish for 68 days and 140 days, respectively, all the other studies in the CBR database used much shorter exposure durations (two-four weeks). Such a pattern was not surprising because most studies deemed suitable for CBR development were of a physiological nature. With some exceptions, the authors were mostly interested in measuring the uptake and/or depuration dynamics of mercury but not in quantifying its long-term toxicology. Hence, they selected sub-lethal mercury concentrations and relatively-short exposure periods. The available information also indicated that tissue residue levels did not reach steady state for at least four weeks, indicating that some of the no-effect tissue residue levels did not reflect equilibrium conditions. Lastly, it is not known if the higher subchronic no-effect tissue residues, from which the median was calculated and used as the no-effect CBR, might have become effect tissue residues given a longer exposure period. Therefore, the no-effect CBR for crayfish may underestimate risk.

- In the development of crayfish CBRs, only Evans et al. (2000) investigated the potential link between mercury tissue residues and toxic responses in the early life stages of the decapods. Adults generally show lower sensitivity than early life stages, therefore, the CBRs for crayfish may underestimate risk.

- None of the studies included in the crayfish database investigated the link between mercury residues in decapods and effect on their reproductive potential, which is generally considered a more sensitive endpoint than survival, growth, weight gain, on which the no-effect CBR was based. Therefore, the no-effect CBR for crayfish may underestimate risk. It is not known if increased time to seek shelter (endpoint in effect CBR basis) is more or less sensitive than reproduction.

- None of the studies included in the crayfish database were performed to determine true NOELs and/or LOELs (i.e., dose-responses were not established). Hence, the no-effect mercury thresholds in the database were most likely lower (i.e., more conservative) than the true NOEL for the target species, whereas the available effect mercury thresholds were probably higher (i.e., less conservative) than the true LOELs for the target species.

- It was assumed that mercury residues measured in crayfish muscle and whole body were equivalent. A limited data review (three papers) indicated that the ratio between muscle and whole body mercury concentration in crayfish, and in decapods by extrapolation, varied between around 0.5 and 2.0 depending on the form of the mercury used, the uptake route, and the exposure duration. It also suggested that the muscle and whole body tissue residue data may be roughly interchangeable within a margin of error equivalent to a factor of 2.

- The NEL CBR was the median NEL from nine studies. Species evaluated in the studies were all decapods and included crayfish (*Astacus astacus* and *A. leptodactylus*), shrimp, crab, and lobster. Crayfish for which site-specific data were available are *Oronectes virilis* and *O. rusticus*. Given the differences in taxonomy, some differences in toxicokinetics are expected. It is not known if these differences would lead to an overall under- or overestimate of risk.

2. Fish

- The no-effect and effect level CBRs were based on studies that used fathead minnow (*Pimephales promelas*) and mummichog (*Fundulus heteroclitus*). Fish for

which site-specific data were available are smallmouth bass and white sucker. Given the differences in taxonomy, some differences in toxicokinetics are expected. It is not known if these differences would lead to an overall under- or overestimate of risk.

- There was a paucity of fish residue studies on which to base the no-effect (n=3) and effect CBR (n=5); therefore, it is difficult to assess whether the fish CBRs were conservative or not.

3. Avian

This BERA was conducted using avian mercury CBR information compiled by ESAT in 2004 and 2006 for the Nyanza Superfund Site Ecological Risk Assessment.

In general, generic values were used to estimate risks to kingfisher; whereas, the tree swallow values were used to estimate risks to tree swallows and songbirds. Uncertainties associated with the derivation of the avian mercury CBRs include the following:

- Avian residue data were combined across age groups (i.e., pre-fledged and post-fledged) for blood and feathers to increase the size of the data set from which CBRs could be derived. In addition, if data were available for both pre-fledge and post-fledge birds of the same species, the more conservative of the two sets of values was selected. This is a conservative approach that may overestimate risks.

- The generic egg CBRs are values suggested in a review study. It is likely that the values of 500 and 1,000 µg tHg/kg WW (no-effect and effect CBRs, respectively) would need to be adjusted downward to protect sensitive bird species; and the use of these values therefore, is more likely to underestimate than overestimate risk.

- The tree swallow egg CBRs are based on one egg injection study by Heinz (2003) with reproduction as the endpoint. Reproductive endpoints are generally more sensitive than others are and the use of these values likely provides good to conservative estimates of risk.

- Only a generic bird blood CBR was developed. It is an effect-based CBR developed using the most sensitive endpoint found (i.e., behavioral changes resulting in a drop in the overall fitness of chicks). This value, 1,250 µg tHg/kg WW, is lower than any of the NELs identified, and may be overly conservative. This effect-based CBR was divided by two to obtain a no-effect CBR. It is not known if this extrapolated CBR is conservative or not.

- A generic effect CBR for bird feathers was developed from the most sensitive endpoint found (i.e., reproductive impacts). This value, 9,100 µg tHg/kg WW, is lower than many of the NELs identified, and may be overly conservative. (See following bullets for further discussion.)

- A tree swallow-specific feather no-effect CBR was developed from one study (Gerrard and St. Louis, 2001) that reported no detrimental effects on clutch size, incubation time, hatchability, nestling growth, or fledging success in pre-fledging tree swallow chicks with feathers containing an average of 1,210 µg tHg/kg WW. Because this NEL is unbounded, the true NOAEL is likely higher and use of this value may be overly conservative.

- Because no generic feather no-effect CBR was developed, the tree swallow-specific feather no-effect CBR was used as a surrogate. While this value is likely conservative for use in assessing tree swallows, it is not known in which direction the uncertainty lies when applying this CBR to other species.

4. Mammalian

- A blood no-effect CBR was developed for mink based on a value in blood that did not result in brain levels known to cause toxicity. This value provides a conservative NEL for bat blood.

- The fur CBRs were based on a mink study assessing reproduction. Reproductive endpoints are generally more sensitive than others are and the use of these values likely provides good to conservative estimates of risk.

C. TRV Comparisons with Exposure Modeling Results

Uncertainties associated with the wildlife modeling and subsequent comparisons with TRVs can be divided into two categories: those associated with the exposure estimate (i.e., estimating daily intake) and those associated with the TRVs. General uncertainties associated with each are discussed below, followed by target-receptor specific uncertainties.

1. General Exposure Characterization Uncertainties Associated with Wildlife Dose Modeling

In the exposure assessment, numerous assumptions were made to estimate daily intakes for selected target species (i.e., belted kingfisher and mink). Because site-specific receptor information was not available, assumptions were made regarding ingestion rates, frequency of exposure, and EPCs. This BERA used a deterministic approach for calculating exposures (both RME and CTE); exposure parameters used were point estimates and did not incorporate information regarding parameter-specific variability. In general, an effort was made to use modeling assumptions that were conservative, yet realistic. The primary assumptions used in the exposure characterization follow.

- Prey tissue data collected during two collection efforts (2009 and 2011), both in August, were used to determine EPCs. Due to the seasonal variations of tissue concentrations, the use of data from only one season may under-or overestimate the exposure of wildlife to COPECs during any given season.

- Tissue residue concentrations detected in the soil invertebrates and small mammals collected were assumed to be representative of other prey items of the same trophic level that may be ingested by the target receptors. This assumption may under- or overestimate risk, depending upon the actual prey items ingested.

- Risks were calculated for each COPEC alone. Calculating risk in this manner does not account for additivity, synergism, or antagonism of other contaminants to which receptors may be exposed. Calculating risks on a chemical-by-chemical basis may result in an over- or underestimation of total potential risk.

- The ingestion route is the only exposure route evaluated in this analysis because there is limited information to assess other potential exposure routes such as dermal absorption and inhalation. Exposure via dermal absorption and inhalation may be of particular concern for species that clean themselves by rolling in any dry surface (i.e., shrew pups). By not estimating exposure by these pathways, risks are likely underestimated.

- Average body weights were used to estimate exposure intakes for all target receptors. This approach may under- or overestimate daily intake for individuals depending upon their sex, age, breeding status, and time of year.

- Risks were calculated on a reach-specific basis and it was assumed that all of the receptors obtained 100% of their diet within a reach. Given the feeding ranges of the kingfisher and mink in particular, this may be a conservative assumption.

- Although soil ingestion rates are presented as a percentage of the diet, it was conservatively assumed that any soil ingestion intake was in addition to 100% of the dietary (food) intake, and not part of the total diet. This may overestimate the intake of contaminants.

2. General Effects Characterization Uncertainties Associated with TRV Development

The interpretation and application of toxicological data in the ecological effects characterization are potentially the greatest sources of uncertainty in the estimate of risk from avian and mammalian food chain modeling. Appropriate toxicity data specific to target receptors were not always available; therefore, application of literature-derived toxicity data to the species of concern was sometimes necessary. When selecting toxicological data to compare with site-specific conditions, avian TRVs were selected from the lowest-available bird NOAELs and LOAELs. However, species sensitivity may vary even among closely related species. Variations in species sensitivity may be due to differences in some of the following factors: toxicity, tolerance thresholds, toxic symptoms exhibited, time period until toxic effects are observed, and metabolism of the ingested chemical. Because study designs and presentation of results can be quite

different, steps were taken to make sure the concentrations and/or doses were comparable. As such, the primary uncertainties potentially associated with the derivation of TRVs are noted below.

- The medium in which a chemical is administered in toxicity tests can have a substantial effect on its gastrointestinal absorption. However, sufficient information was not available with which to make adjustments to account for differences between the bioavailability of the administered form in the toxicity test and dietary items/soil. For example, if a TRV value were based on a study that administered compound X via corn oil gavage, the target receptor exposure dose would have to be calculated based on the relative bioavailability of the chemical in corn oil as it compares with the bioavailability of the chemical in dietary items (e.g., plants or small mammals). An inability to account for differences in bioavailability may over- or underestimate potential hazards to site receptors.

- In calculating TRVs, adjustments (UFs) were not applied to toxicity data to account for differences in species. The possibility exists that the indicator species may be more sensitive to a certain chemical exposure than the test species. It may also be possible that the animal used in the laboratory or field study from which the TRV is derived may be more sensitive than the receptor species. Therefore, the TRVs may be overly conservative, or may not be adequately protective.

3. Target Receptor-Specific Uncertainties

i. Kingfisher

- Because it was assumed that dietary exposure represented the most important pathway for exposure of kingfisher to mercury and it was assumed that the total mercury concentrations in prey were comprised mostly of the methylmercury form, it was assumed that the only contaminant in sediments and surface water was methylmercury. Because there are toxic effects associated with inorganic mercury, risk to the kingfisher is underestimated. However, given the small contribution of sediment and surface water ingestion to the TDI, the underestimation is likely insignificant.

- Site-specific dietary component data were not available. Although kingfishers are known to feed predominantly on fish, they also may consume crayfish, mollusks, and some amphibian and reptile species (EPA, 1993b). Only crayfish and fish were included in this analysis because the other potential dietary items have a small contribution to total diet and site-specific tissue concentrations are not available for them. As noted previously, the surrogates for the prey items not included are assumed to be conservative; and therefore, potentially overestimate risk.

- Given that typical prey length is less than 10 cm (Imhof, 1962; Prose, 1985; Salyer and Lagler, 1946) and larger fish, such as those submitted for chemical analysis from the site tend to have higher mercury concentrations, use of these data likely overestimates the TDI.

- FIRs were calculated based on the FMR of the kingfisher because FIRs for kingfishers were not available. The “all birds” regression model from Nagy et al. (1999) was selected as being the most appropriate for the kingfisher. Information on piscivores, such as the pied kingfisher (*Ceryle rudis*), were included in the data to which the regression was fitted. However, the body weight of the pied kingfisher is approximately half that of the belted kingfisher; and therefore it is inappropriate to make comparisons of actual and calculated FMRs for the purposes of determining direction of uncertainty.

- The fraction of prey that is contaminated was assumed to be 100% from each reach. Given the small foraging range of the kingfisher and abundance of prey along the Androscoggin, this assumption would be valid. However, very few kingfisher burrows were located along the Androscoggin River. Because the burrows were not located in the banks of the river, the birds must travel to a water source to forage. Because of the numerous streams in the Androscoggin River drainage, it is possible that kingfisher nesting outside of the river are also foraging in other waters. Therefore, assuming that 100% of the kingfisher’s diet is obtained from each reach likely overestimates risk.

- The assumption that sediment comprises 3.3% of the kingfisher's diet (on a dry-weight basis), based on data for a mallard (EPA, 1993b) may over- or underestimate the daily intake of mercury from incidental sediment ingestion.

- The avian TRV used to estimate the potential for risk was based on a study of great egrets. Kingfisher and egrets are not of the same order; therefore, it is possible that there are taxonomic differences between the two in the mercury toxicokinetics. It is not known what effect this may have on risks.

ii. Mink

- Because it was assumed that dietary exposure represented the most important pathway for exposure of mink to mercury and it was assumed that the total mercury concentrations in prey were comprised mostly of the methylmercury form, it was also assumed that the only contaminant in sediments and surface water was methylmercury.

- There should be little uncertainty associated with the selected mammalian TRVs, as the values were based on a study using the target species (i.e., mink) and assessed reproductive effects. However, the daily doses selected as the TRVs were derived by multiplying the concentration in food by an estimated FIR from EPA, 1993a. This FIR is for adult female farm-raised mink during the winter season. As noted previously, the food requirements of farm-raised or captive animals are generally less than that of their wild counterparts. Assuming a lower FIR would produce a lower dose, therefore adding a layer of conservatism to the selected values.

4.2 Risk Description

4.2.1 Introduction

The risk description is the part of the ERA in which the risk assessors integrate and interpret the available information into conclusions about risks to the assessment endpoints.

The risk description incorporates two primary elements. The first is the lines of evidence evaluation, which provides a process and framework for determining confidence in the risk

estimate. The second is the determination of ecological adversity, which represents whether the valued structural or functional attributes of the ecological entities under consideration are altered, the degree of adversity to the entities, and if recovery is possible (EPA, 1998). The following risk description is divided into two subsections: Weight-of-Evidence Analysis (Subsection 4.2.2) and the Risk Summary (Subsection 4.2.3).

4.2.2 Weight-of-Evidence Analysis

As discussed in the Problem Formulation, the actual evaluation of how well a measurement endpoint and its one or more lines of evidence represent an assessment endpoint is determined in the Weight-of-Evidence (WOE) analysis. The goal of the WOE analysis is to integrate all relevant findings of the ERA in an effort to determine the occurrence or potential for adverse ecological impacts. This is accomplished by: 1) assigning weights to each measurement endpoint; 2) evaluating the magnitude of response with respect to each measurement endpoint; and 3) determining the concurrence among the measurement endpoint(s) used to answer the question(s) posed by the assessment endpoint.

Weights were assigned to measurement endpoints (see Section 2.4.3) based on 10 attributes (see Table 2-40) in relation to: 1) strength of association between assessment and measurement endpoints; 2) data and study quality; and 3) study design and execution.

4.2.2.1 Magnitude of Response

The second step of the WOE approach outlined by Menzie et al. (1996) is to evaluate the magnitude of response in the measurement endpoint, considering two questions:

1) Does the measurement endpoint indicate the presence of risk (possible, unlikely, or undetermined)?
2) Is the response low or high?

Specifically, likelihood and magnitude of response determinations were made for each COPEC within an endpoint. Criteria for determining evidence of harm and magnitude of response for all lines of evidence are provided below.

Sample-by-sample Comparisons with Sediment Screening Values:

- If ≤10% of the detected site concentrations have TEC-based HQs >1 and none of the PEC-based HQs >1, "Risk?" = "Unlikely."
- If >10% of the detected site concentrations have TEC-based HQs >1 and none of the PEC-based HQs >1, "Risk?" = "Undetermined."
- If ≥10% of the detected site concentrations were greater than the TEC and at least one of the PEC-based HQs >1, "Risk?" = "Possible."
    - If "Risk" was noted as "Possible," and <10% of the PEC-based HQs greater than one were >10, "Magnitude" = "Low;" else "Magnitude" = "High."

Comparisons with Critical Body Residues:

There are differences in the number of tissue samples that were collected by medium. For categories with least 5 samples, the following convention was used to determine risk/magnitude:

- If a sufficient number of samples was collected to perform a statistical comparison between site and background concentrations and site concentrations were not statistically different from background, "Risk?" = "Unlikely." Else, follow the following hierarchy.
- If the 75th percentile < the No-effect-based CBR, "Risk?" = "Unlikely."
- If >10% of the detected site concentrations have No-effect-based HQs >1 and none of the Effect-based HQs >1, "Risk?" = "Undetermined."
- If the maximum > the Effect-based CBR, "Risk?" = "Possible."
    - If "Risk" was noted as "Possible," and the 75th percentile < the Effect-based CBR, "Magnitude" = "Low;" else "Magnitude" = "High."

For categories with less than 5 samples, the following convention was used to determine risk/magnitude:

- If the maximum < the No-effect-based CBR, "Risk?" = "Unlikely."
- If the maximum > the No-effect-based CBR but < the Effect-based CBR, "Risk?" = "Undetermined."
- If the maximum > the Effect-based CBR, "Risk?" = "Possible."

- If “Risk” was noted as “Possible,” and the maximum concentration is less than 10 times the Effect-based CBR, “Magnitude” = “Low;” else “Magnitude” = “High.”

Statistical Testing

Statistics were used to analyze the results of the community analyses and all the toxicity tests (sediment, pore water, surface water). A potential for ecological risk was assumed if the responses observed in the site samples were statistically different from those in the reference samples. If a difference is observed, it was assumed that the magnitude was “High.” Lastly, because attribution to specific COPECs could not be determined, it was assumed that the results applied to each of the four COPECs.

Estimated Daily Intake Comparisons with TRVs:

An “Interpretive Ecological Risk Matrix” was developed. A general matrix is as follows.

RME Case	CTE Case	Population Risk?	Magnitude	Confidence
N<1 & L<1	N<1 & L<1	Unlikely	---	High
N>1 & L<1	N<1 & L<1	Unlikely	---	Moderate
N>1 & L>1	N<1 & L<1	Undetermined	---	Low
N>1 & L<1	N>1 & L<1	Undetermined	---	Low
N>1 & L>1	N>1 & L<1	Possible	Low	Moderate
N>1 & L>1	N>1 & L>1	Possible	If RME Case HQs < 5 then “Low,” else “High”	High

Notes:
N = an HQ based on dividing an exposure by its appropriate no effect benchmark
L = an HQ based on dividing an exposure by its appropriate effect benchmark

In addition, it is important to note that “unlikely” indicates that *population-level* effects are unlikely to the receptors represented by the measurement endpoint and that “possible” indicates that there is a potential for adverse *population-level* effects to the receptors represented by the measurement endpoint. The confidence rating was assigned using professional judgment based on the combination of the RME and CTE case results. For example, if HQs for a COPEC did not exceed one under any circumstance, it is assumed that there is a high level of confidence in

stating that population risks are “unlikely.” The confidence rating will be employed in the “Risk Conclusions.”

Tables 4-23 through 4-29 present the results of the evidence of harm and magnitude for reaches 3 through 9. In the case of modeling results, it is the HQs from the IR calculation (i.e., the risk attributable releases from the Androscoggin River) that were used to determine magnitude of response.

4.2.2.2 Concurrence Among Endpoints

The third step of the WOE process evaluates the degree of concurrence among measurement endpoints by plotting the output of the endpoint weighting and magnitude of response on a matrix for all measurement endpoints per assessment endpoint.

When evaluating concurrence among measurement endpoints, there is an examination of the agreement or lack thereof among measurement endpoints as they relate to a specific assessment endpoint. Logical connection, interdependence, and correlations among measurement endpoints need to be considered.

Agreement between different lines of evidence increases confidence in the conclusions derived in the risk estimation. When lines of evidence disagree, it is important to distinguish between true inconsistencies and those related to uncertainty and variability associated with each measurement endpoint. The evaluation process involves more than just listing the evidence that supports or refutes the risk estimate. This BERA presents in detail the considerations and interpretations involved in evaluating all lines of evidence. As with assigning qualitative significance ratings to the measurement endpoints, professional judgment is required when evaluating the various results and conflicting lines of evidence.

Completed matrices illustrating the results of the WOE assessment for each COPEC are presented in Tables 4-30 through 4-36.

4.2.3 Risk Summary

The results of the ecological risk characterization require interpretation to aid the risk manager in making remedial decisions and to promote understanding by the stakeholders and the public

(Suter II et al., 2000). The purpose of this section is to summarize the major findings of this BERA and to discuss the implications of these findings for the target communities and receptors in the ARI area. Specifically each assessment endpoint is evaluated to determine if adverse impacts are anticipated and whether those impacts can be considered significant. The criteria for interpreting significant changes in an assessment endpoint include:

- Intensity of effects,
- Spatial and temporal scale, and
- Potential for recovery.

The whole process of determining significant adverse effects requires professional judgment and therefore, justification for decisions made during this final step in the risk assessment process is essential. Tables 4-37 through 4-43 provide a summary of the risk findings for each assessment endpoint per reach. Potential for recovery from contamination in this system is not specifically addressed in this assessment. Overall risks to ecological receptors are relatively low, compared with standard ecological risk assessment points of departure such as an HQ of 1, statistically significant differences from controls or reference, and biotic indices different from reference.

4.3 Risk Conclusions

Data collected from a variety of physical, chemical, and biological investigations were used to evaluate the effect of past and current contaminant discharges from the CHP on the ecology of the Androscoggin River. Based on these data, this BERA concludes that with the possible exception of mercury in bats foraging in the vicinity of the Shelburne Reservoir, the risk from mercury, PCB, and dioxin/furan exposure to the flora and fauna inhabiting the Androscoggin River is of limited ecological significance. None of the many ecological evaluations conducted as part of this assessment provide compelling evidence that the levels of these contaminants in the surface waters and sediments throughout the study area were sufficiently high to induce population or community level effects above the regional variability in reproduction, maintenance, and survival of the flora and fauna of the Androscoggin River.

In addition, Rose et al. (1999) collected largemouth bass from 24 of Massachusetts' least impacted water bodies to determine the distribution, patterns of variability, and potential

controlling physicochemical factors associated with mercury uptake in the edible tissue (fillet). Figure 4-33 presents a comparison of the mean mercury concentrations in the axial muscle (fillet) of the largemouth bass from each of the 18 regional lakes from Rose et al. (1999) and the mercury levels in the smallmouth bass fillet tissue from the Androscoggin. (Note: sufficient data were not provided for regional data to normalize concentrations to a standard length. Therefore, neither the regional nor the site-specific concentrations were normalized to a standard length for this exercise.) The visual comparison indicates that the mean mercury levels in the fillet tissue of smallmouth bass in the Androscoggin River are within the range of those observed in largemouth bass collected from the least impacted regional areas.

Potential ecological risks are presented on a reach-specific basis below.

Reach	Affected Receptor/COPEC Attribution
AR3	Invertivorous birds from total PCB and TEQs.
AR4	None identified
AR5	None identified
AR6	Benthic community; possibly from PCBs.
AR7	None identified
AR8	None identified
AR9	Insectivorous mammals; possibly from mercury.

Potential significant ecological risk in the RSA appears to be limited to the following:

- Decrease in survival of infaunal larval insects inhabiting sediments in some portion of the reach of the Androscoggin River between Cross Power Dam and Cascade Dam (AR6) based on pore water acute toxicity test results in *H. azteca*, possibly attributable to PCB concentrations (see discussion in Table 4-40). Note that the concurrence of endpoints assessing the benthic community (i.e., comparison of sediment concentrations with SQVs, Acute 96-hr *Chironomus tentans* and *Hyalella azteca* toxicity tests, and comparison of macrobenthic invertebrate and crayfish tissue concentrations with CBRs) is equivocal (see Table 4-33) as to whether this affect is of significance for the community as a whole.

- Decreased reproductive success in aerial insectivores (tree swallow) inhabiting the reach adjacent the Site area (i.e., AR3) based on egg tissue concentrations of tPCBs and TEQs.

There is significant uncertainty with the concentrations of mercury in bat fur (as discussed in Subsection 4.1.5.2 and Table 4-43) and there is some concern that elevated mercury in bats poses a population risk.

Although elevated levels of mercury, PCBs and TEQ in sediment and select tissues suggest a limited risk, the attribution of these contaminant levels and the consequent risk to the Study Area is confounded by numerous other historical and current sources.

Overall, the ecological risk associated with study area contaminants in the Androscoggin River is of limited ecological significance.

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5.0 REFERENCES

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TABLES

Table 2-1
List of Fish Species of the Upper Androscoggin River
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Native Species

- Eastern brook trout (*Salvelinus fontinalis*)
- Brown bullhead (hornpout; *Ameiurus nebulosus*) – possibly introduced
- White sucker (*Catostomus commersonii*)
- Creek chub (*Semotilus atromaculatus*)
- Blacknose dace (*Rhinichthys atratulus*)
- Fallfish (*Semotilus corporalis*)
- Common shiner (*Luxilus cornutus*)
- Golden shiner (*Notemigonus crysoleucas*)
- Lake chub (*Couesius plumbeus*)
- Rainbow smelt (*Osmerus mordax*)
- Creek chubsucker (*Erimyzon obongus*)
- Slimy sculpin (*Cottus cognatus*)
- Longnose sucker (*Catostomus catostomus*)
- Longnose dace (*Rhinichthys cataractae*)
- American eel (*Angullia rostrata*)
- Pearl dace (*Margariscus margarita*)
- Finescale dace (*Phoxinus neogaeus*)
- Northern redbelly dace (*Phoxinus eos*)
- Pumpkinseed (*Lepomis gibbosus*)
- Redbreast sunfish (*Lepomis auritus*)
- Chain pickerel (*Esox niger*)
- Yellow perch (*Perca flavescens*)
- Burbot (*Lota lota*)
- Threespine stickleback (*Gasterosteus aculeatus*)

Introduced Species

- Brown trout (*Salmo trutta*) – includes hatchery-reared
- Rainbow trout (*Onchorhynchus mykiss*) – includes hatchery-reared
- Splake (*Salvelinus namaycush x Salvelinus fontinalis*)
- Smallmouth bass (*Micropterus dolomieu*)
- Largemouth bass (*Micropterus salmoides*)
- Landlocked salmon (*Salmo salar*)
- Fathead minnow (*Pimephales promelas*)
- Northern pike (*Esox lucius*)
- Bluegill (*Lepomis macrochirus*)
- Landlocked alewife (*Alosa pseudoharengus*)
- Black crappie (*Pomoxis nigromaculatus*)

Sources:
Atlas of North American Fishes (1980, et seq.)
New England Wadeable Stream Survey (NEWS): Development of Common Assessments in the Framework of the Biological Condition Gradient (2007)

Table 2-2
List of Amphibians and Reptiles of the Upper Androscoggin River Valley
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

- Blue-spotted salamander (*Ambystoma laterale*)
- Northern dusky salamander (*Desmognathus fuscus*)
- Red-spotted newt (*Notophthalmus viridescens*)
- Northern redback salamander (*Plethodon cinereus*)
- Spotted salamander (*Ambystoma maculatum*)
- Northern spring salamander (*Gyrinophilus porphyriticus*)
- Northern two-lined salamander (*Eurycea bislineata*)
- Bullfrog (*Rana catesbeiana*)
- Green frog (*Rana clamitans*)
- Northern leopard frog (*Rana pipiens*)
- Pickerel frog (*Rana palustris*)
- Wood frog (*Rana sylvatica*)
- Spring peeper (*Pseudacris crucifer*)
- Gray treefrog (*Hyla versicolor*)
- American toad (*Bufo americanus*)
- Eastern painted turtle (*Chrysemys picta*)
- Common snapping turtle (*Chelydra serpentina*)
- Wood turtle (*Glyptemys insculpta*)
- Common garter snake (*Thamnophis sirtalis*)
- Ribbon snake (*Thamnophis sauritus*)
- Northern red-belly snake (*Storeria o. occipitomaculata*)
- Northern ringneck snake (*Diadophis p. edwardsii*)
- Eastern smooth green snake (*Opheodrys vernalis*)
- Eastern milk snake (*Lampropeltis t. triangulum*)

Source: Degraff, R.F. and M. Yamasaki. *New England Wildlife: Habitat, Natural History, and Distribution* (2001).

Table 2-3
Summary List of Potential Bird Species in the Upper Androscoggin River Valley
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

- Common loon (*Gavia immer*)
- Pie-billed grebe (*Podilymbus podiceps**)
- American bittern (*Botaurus lentiginosus*)
- Great blue heron (*Ardea herodias*)
- Green heron (*Butorides virescens*)
- Turkey vulture (*Cathartes aura*)
- Canada goose (*Branta canadensis*)
- Wood duck (*Aix sponsa*)
- American black duck (*Anas rubripe*)
- Mallard (*Anas platyrhynchos*)
- Green-winged teal (*Anas crecca*)
- Ring-necked duck (*Aythya collaris*)
- Common goldeneye (*Bucephala clangula*)
- Hooded merganser (*Lophodyte scucullatu*)
- Common merganser (*Mergus merganser*)
- Osprey (*Pandion haliaetus*)
- Bald eagle (*Haliaeetus leucocephalus* *NH)
- Red-eyed vireo (*Vireo olivaceous*)
- Gray jay (*Perisoreus canadensis*)
- Blue jay (*Cyanocitta cristata*)
- American crow (*Corvus brachyrhynchos*)
- Common raven (*Corvus corax*)
- Horned lark (*Eremophila alpestris*)
- Tree swallow (*Tachycineta bicolor*)
- Northern rough-winged swallow (*Stelgidopteryx serripennis*)
- Bank swallow (*Riparia• riparia*)
- Cliff swallow (*Petrochelidon pyrrhonota*)
- Barn swallow (*Hirundo rustica*)
- Black-capped chickadee (*Poecile atricapillus*)
- Red-breasted nuthatch (*Sitta canadensis*)
- White-breasted nuthatch (*Sitta carolinensis*)
- Brown creeper (*Certhia americana*)
- Northern cardinal (*Cardinalis cardinalis*)
- Rose-breasted grosbeak (*Pheucticus ludovicianus*)
- Indigo bunting (*Passerina cyanea*)
- Bobolink (*Dolichonyx oryzivorus*)
- Red-winged blackbird (*Agelaius phoeniceus*)
- Eastern meadowlark (*Sturnella magna*)
- Rusty blackbird (*Euphagus carolinus*)
- Common grackle (*Quiscalus quiscula*)
- Brown-headed cowbird (*Molothrus ater*)
- Baltimore oriole (*Icterus galbula*)
- Pine grosbeak (*Pinicola enucleator*)
- Purple finch (*Carpodacus purpureus*)
- House finch (*Carpodacus mexicanus*)
- Northern harrier (*Circus cyaneus*)
- Sharp-shinned hawk (*Accipiter striatus*)
- Cooper's hawk (*Accipiter cooperii*)
- Northern goshawk (*Accipiter gentilis*)
- Red- shouldered hawk (*Buteo lineatus*)
- Broad-winged hawk (*Buteo platypterus*)
- Red-tailed hawk (*Buteo jamaicensis*)
- Rough-legged hawk (*Buteo lagopus*)
- American kestrel (*Falco sparverius*)
- Peregrine falcon (*Falco peregrinus*)
- Ruffed grouse (*Bonasa umbellus*)
- Spruce grouse (*Falcipennis canadensis*)
- Virginia rail (*Rallus limicola*)
- Sora (*Porzana carolina*)
- Killdeer (*Charadrius vociferus*)
- Spotted sandpiper (*Actitis macularia*)
- Common snipe (*Gallinago gallinago*)
- House wren (*Troglodytes aedon*)
- Winter wren (*Troglodytes troglodytes*)
- Golden-crowned kinglet (*Regulus satrapa*)
- Ruby-crowned kinglet (*Regulus calendula)*
- Eastern bluebird (*Sialia sialis*)
- Veery (*Catharus fuscescens*)

Table 2-3
Summary List of Potential Bird Species in the Upper Androscoggin River Valley
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

- Bicknell's thrush (*Catharus bicknelli*)
- Swainson's thrush (*Catharus ustulatus*)
- Hermit thrush (*Catharus guttatus*)
- Wood thrush (*Hylocichla mustelina*)
- American robin (*Turdus migratorius*)
- Gray catbird (*Dumetella carolinensis*)
- Northern mockingbird (*Mimus polyglottos*)
- Brown thrasher (*Toxostoma rufum*)
- Bohemian waxwing (*Bombycilla garrulus*)
- Cedar waxwing (*Bombycilla cedrorum*)
- American woodcock (*Scolopax minor*)
- Herring gull (*Larus argentatus*)
- Rock dove (*Columba livia*)
- Mourning dove (*Zenaida macroura*)
- Black-billed cuckoo (*Coccyzus erythropthalmus*)
- Yellow-billed cuckoo (*Coccyzus america nus*)
- Great horned owl (*Bubo virginianus*)
- Snowy owl (*Nyctea scandiaca*)
- Barred owl (*Strix varia*)
- Long -eared owl (*Asio otus*)
- Boreal owl (*Aegolius funereus*)
- Northern saw-whet owl (*Aegolius acadicus*)
- Common nighthawk (*Chordeiles minor*)
- Whip-poor-will (*Caprimulgus vociferus*)
- Chimney swift (*Chaetura pelagica*)
- Ruby-throated hummingbird (*Archilochus colubris*)
- Blue-winged warbler (*Vermivora pinu*)
- Golden-winged warbler (*Vermivora chrysoptera*)
- Tennessee warbler (*Vermivora peregrina*)
- Nashville warbler (*Vermivora ruficapilla*)
- Northern parula (*Parula americana*)
- Yellow warbler (*Dendroica petechial*)
- Chestnut-sided warbler (*Dendroica pensylvanica*)
- Magnolia warbler (*Dendroica magnolia*)
- Black-throated green warbler (*Dendroica virens*)
- Yellow-rumped warbler (*Dendroica coronata*)
- Black-throated blue warbler (*Dendroica caerulescens*)
- Blackburnian warbler (*Dendroica fusca*)
- Common yellowthroat (*Geothlypis trychas*)
- Blue-headed vireo (*Vireo solitaries*)
- American redstart (*Setophaga ruticilla*)
- Belted kingfisher (*Ceryle alcyon*)
- Yellow bellied sapsucker (*Sphyrapicus varius*)
- Downy woodpecker (*Picoides pubescens*)
- Hairy woodpecker (*Picoides villosus*)
- Northern flicker (*Colaptes•auratus*)
- Pileated woodpecker (*Dryocopus pileatus*)
- Olive-sided flycatcher (*Contopus cooperi*)
- Eastern wood-pewee (*Contopus virens*)
- Alder flycatcher (*Empidonax alnorum*)
- Willow flycatcher (*Empidonax traillii*)
- Least flycatcher (*Empidonax minimus*)
- Eastern phoebe (*Sayornis phoebe*)
- Great-crested flycatcher (*Myiarchus crinitus*)
- Eastern kingbird (*Tyrannus tyrannus*)
- Northern shrike (*Lanius excubitor*)
- Philadelphia vireo (*Vireo philadelphicus*)
- Ovenbird (*Seiurus aurocapillus*)
- Northern waterthrush (*Seiurus noveboracensis*)
- Mourning warbler (*Oporornis philadelphia*)
- Canada warbler (*Wilsonia canadensis*)
- Scarlet tanager (*Piranga olivacea*)
- Eastern towhee (*Pipilo erythrophthalmus*)
- American tree sparrow (*Spizella arborea*)
- Chipping sparrow (*Spizella passerina*)
- Field sparrow (*Spizella pusilla*)

Table 2-3
Summary List of Potential Bird Species in the Upper Androscoggin River Valley
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

- Vesper sparrow (*Pooecetes gramineus*)
- Savannah sparrow (*Passerculus sandwichensis*)
- Song sparrow (*Melospiza melodia*)
- Swamp sparrow (*Melospiza georgiana*)
- White-throated sparrow (*Zonotrichia albicollis*)
- Dark-eyed junco (*Junco hyemalis*)
- Snow bunting (*Plectrophenax nivalis*)
- Lapland longspur (*Calcarius lapponicus*)
- Red crossbill (*Loxia curvirostra*)
- White-winged crossbill (*Loxia leucoptera*)
- Common redpoll (*Carduelis flammea*)
- Hoary redpoll (*Carduelis hornemanni*)
- Pine siskin (*Carduelis pinus*)
- American goldfinch (*Carduelis tristis*)
- Evening grosbeak (*Coccothraustes vespertinus*)
- House sparrow (*Passer domesticus*)

Source: Degraff, R.F. and M. Yamasaki. *New England Wildlife: Habitat, Natural History, and Distribution* (2001).

Table 2-4
Summary List of Mammals of the Upper Androscoggin River Valley
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

- Virginia opossum (*Didelphis virginiana*)
- Masked shrew (*Sorex cinereus*)
- Long-tailed shrew (*Sorex dispar*)
- Smoky shrew (*Sorex fumeus*)
- Pygmy shrew (*Sorex hoyi*)
- Water shrew (*Sorex palustris*)
- Northern short-tailed shrew (*Blarina brevicauda*)
- Hairy-tailed mole (*Parascalops breweri*)
- Eastern mole (*Scalopus aquaticus*)
- Star-nosed mole (*Condylura cristata*)
- Eastern small-footed bat (*Myotis leibii*)
- Little brown bat (*Myotis lucifugus*)
- Silver-haired bat (*Lasionycteris noctivagans*)
- Big brown bat (*Eptesicus fuscus*)
- Red bat (*Lasiurus borealis*)
- Hoary bat (*Lasiurus cinereus*)
- Snowshoe hare (*Lepus americanus*)
- Eastern chipmunk (*Tamias striatus*)
- Woodchuck (*Marmota monax*)
- Gray squirrel (*Sciurus carolinensis*)
- Red squirrel (*Tamiasciurus hudsonicus*)
- Northern flying squirrel (*Glaucomys sabrinus*)
- Southern flying squirrel (*Glaucomys volans*)
- American beaver (*Castor canadensis*)
- Meadow jumping mouse (*Zapus hudsonius*)
- Woodland jumping mouse (*Napaeozapus insignis*)
- White-footed mouse (*Peromyscus leucopus*)
- Deer mouse (*Peromyscus maniculatus*)
- Southern red-backed vole (*Myodes gapperi*)
- Rock vole (*Microtus chrotorrhinus*)
- Meadow vole (*Microtus pennsylvanicus*)
- Woodland vole (*Microtus pinetorum*)
- Muskrat (*Ondatra zibethicus*)
- Northern Bog Lemming (*Synaptomys borealis*)
- Southern bog lemming (*Synaptomys cooperi*)
- Norway rat (*Rattus norvegicus*) – introduced
- House mouse (*Mus musculus*) – introduced
- Meadow jumping mouse (*Zapus hudsonius*)
- Woodland jumping mouse (*Napaeozapus insignis*)
- Porcupine (*Erethizon dorsatum*)
- Coyote (*Canis latrans*)
- Red fox (*Vulpes vulpes*)
- Gray fox (*Urocyon cinereoargenteus*)
- Black bear (*Ursus americanus*)
- Raccoon (*Procyon lotor*)
- American marten (*Martes americana*)
- Fisher (*Martes pennant*)
- Ermine (*Mustela ermine*)
- Long-tailed weasel (*Mustela frenata*)
- Mink (*Mustela vison*)
- Striped Skunk (*Mephitis mephitis*)
- River otter (*Lontra canadensis*)
- Bobcat (*Lynx rufus*)
- White-tailed deer (*Odocoileus virginianus*)
- Moose (*Alces alces*)
- Lynx (*Lynx canadensis*)

Source: Degraff (R.F. and M. Yamasaki. *New England Wildlife: Habitat, Natural History, and Distribution* (2001).

Table 2-5
Androscoggin River Data Available for Ecological Risk Asssessment Use
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Location	Year	Sample Description	Sample Method	Sample Type	Number of Samples																				
					VOCs	SVOCs	PAHs	Dioxin Congeners	Dioxin Homologs	Pesticides	total PCBs	PCB Homologs	PCB Congener	Inorganics	Mercury	Mercury, Divalent	Methylmercury	Conventionals	Ceriodaphnia	Pimephales promelas	Chironomus tentans	Hyalella azteca (96-hr)	Hyalella azteca (28 day)	Chironomus dilutus	Community Analysis
AR1	2010	Bat Blood					1	1			1	1		4											
	2010	Bat Fur												11											
	2010	Song Bird Blood					2	2			2	2		19											
	2008	Eagle Blood												2											
	2008	Eagle Feathers												2											
	2008	Eagle Plasma					2	2																	
	2011	Eagle Plasma					2	2			2	2													
	2010	Song Bird Feather												37											
	2010	Tree Swallow - Blood Adult												7											
	2010	Tree Swallow - Blood Nestling												6											
	2010	Tree Swallow - Feather Adult												8											
	2010	Tree Swallow - Feather Nestling												6											
	2010	Tree Swallow Egg	Composite				1	1			1	1													
	2010	Tree Swallow Egg												6											
AR2	2009	Burrow Mayfly Larve												2											
	2009	Crayfish	Composite		2	2	2	2	2	2		2	2	2	2			2							
	2011	Crayfish	Individual												10										
	2009	Oligochaetes													3										
	2010	Oligochaetes													2										
	2009	Porewater	Grab	D										3	3	3	3	3							
	2009	Porewater	Grab	T										3	3	3	3	3			3	3			
	2010	Porewater		D											2		2								
	2009	Rock Basket Composite													1										1
	2009	Sediment	Grab		3	3	3	3	3	3		3	3	3	3	3	3	3					3	3	
	2006	Sediment			3	3	3			3	3			3	3			3							
	2010	Sediment													8		2								
	2009	Smallmouth Bass	Fillet-Skin Off											5	5			5							
	2011	Smallmouth bass	Fillet-Skin Off												5										
	2009	Smallmouth Bass	Fillet-Skin On		3	3	3	3	3	3		3	3					3							
	2011	Smallmouth bass	Fillet-Skin On												7										
	2011	Smallmouth bass	Offal												7										
	2009	Surface Water	Grab	D										1	1	1	1	1							
	2009	Surface Water	Grab	T										1	1	1	1	1	1	1					
	2010	Tree Swallow - Blood Adult													4										
	2010	Tree Swallow - Blood Nestling													7										
	2010	Tree Swallow - Feather Adult													6										
	2010	Tree Swallow - Feather Nestling													7										
	2010	Tree Swallow Egg	Composite					1	1			1	1												
	2010	Tree Swallow Egg													7										
	2009	White Sucker	Composite		2	2	2	2	2	2		2	2	2	2			2							
	2011	White Sucker	Composite												5										

Table 2-5
Androscoggin River Data Available for Ecological Risk Asssessment Use
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Location	Year	Sample Description	Sample Method	Sample Type	Number of Samples																				
					VOCs	SVOCs	PAHs	Dioxin Congeners	Dioxin Homologs	Pesticides	total PCBs	PCB Homologs	PCB Congener	Inorganics	Mercury	Mercury, Divalent	Methylmercury	Conventionals	*Ceriodaphnia*	*Pimephales promelas*	*Chironomus tentans*	*Hyalella azteca* (96-hr)	*Hyalella azteca* (28 day)	*Chironomus dilutus*	Community Analysis
AR3	2009	Crayfish	Composite		2	2	2	2	2	2		2	2	2	2			2							
	2009	Dragonfly Larvae													1										
	2009	Mayfly Larvae													3										
	2009	Rock Basket Composite													1										1
	2006	Sediment			1	1	1			1	1			2	2			1							
	2009	Smallmouth Bass	Fillet-Skin Off		1	1	1	1	1	1		1	1	4	4			5							
	2009	Smallmouth Bass	Fillet-Skin On		2	2	2	2	2	2		2	2	1	1			3							
	2009	Stonefly Larvae													2										
	2009	Surface Water	Grab	D										1	1	1	1	1							
	2009	Surface Water	Grab	T										1	1	1	1	1	1	1					
	2010	Tree Swallow - Blood Adult													1										
	2010	Tree Swallow - Feather Adult													1										
	2010	Tree Swallow Egg	Composite					1	1			1	1												
	2010	Tree Swallow Egg													1										
	2009	Water Pennies													2										
AR4	2009	Crayfish	Composite		2	2	2	2	2	2		2	2	2	2			2							
	2010	Oligochaetes													1										
	2010	Porewater		D											2		2								
	2009	Rock Basket Composite													1										1
	2009	Sediment	Grab		2	2	2	2	2	2		2	2	2	2			2							
	2006	Sediment			2	2	2			2	2			2	2			2							
	2010	Sediment													8		2								
	2009	Smallmouth Bass	Fillet-Skin Off											1	1			1							
	2009	Smallmouth Bass	Fillet-Skin On		1	1	1	1	1	1		1	1					1							
	2009	Surface Water	Grab	D										1	1	1	1	1							
	2009	Surface Water	Grab	T										1	1	1	1	1	1	1					
	2010	Tree Swallow - Blood Adult													1										
	2010	Tree Swallow - Blood Nestling													2										
	2010	Tree Swallow - Feather Adult													1										
	2010	Tree Swallow - Feather Nestling													1										
	2010	Tree Swallow Egg													1										
AR5	2011	Crayfish	Individual												10										
	2010	Oligochaetes						1	1			1	1		2										
	2010	Porewater		D											2		2								
	2010	Sediment													8		2								
	2011	Smallmouth bass	Fillet-Skin Off												5										
	2011	Smallmouth bass	Fillet-Skin On												7										
	2011	Smallmouth bass	Offal												7										
	2011	White Sucker	Composite												5										

Table 2-5
Androscoggin River Data Available for Ecological Risk Asssessment Use
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Location	Year	Sample Description	Sample Method	Sample Type	Number of Samples																				
						VOCs	SVOCs	PAHs	Dioxin Congeners	Dioxin Homologs	Pesticides	total PCBs	PCB Homologs	PCB Congener	Inorganics	Mercury	Mercury, Divalent	Methylmercury	Conventionals	Ceriodaphnia	Pimephales promelas	Chironomus tentans	Hyalella azteca (96-hr)	Hyalella azteca (28 day)	Chironomus dilutus	Community Analysis
AR6	2009	Crayfish	Composite		1	1	1	1	1	1		1	1	1	1			1								
	2011	Crayfish	Individual												10											
	2009	Oligochaetes													1											
	2010	Oligochaetes						1	1			1	1		1											
	2009	Porewater	Grab	D										1	1	1	1	1								
	2009	Porewater	Grab	T										1	1	1	1	1			1	1				
	2010	Porewater		D											2		2									
	2009	Sediment	Grab		1	1	1	1	1	1		1	1	1	1	1	1	1					1	1		
	2006	Sediment			1	1	1			1	1			1	1			1								
	2010	Sediment													8		2									
	2009	Smallmouth Bass	Fillet-Skin Off											5	5			5								
	2011	Smallmouth bass	Fillet-Skin Off												5											
	2009	Smallmouth Bass	Fillet-Skin On		5	5	5	5	5	5		5	5					5								
	2011	Smallmouth bass	Fillet-Skin On												7											
	2011	Smallmouth bass	Offal												7											
	2011	White Sucker	Composite												5											
AR7	2011	Crayfish	Individual												10											
	2010	Oligochaetes													2											
	2010	Porewater		D											2		2									
	2006	Sediment			1	1	1			1	1			1	1			1								
	2010	Sediment													8		2									
	2011	Smallmouth bass	Fillet-Skin Off												5											
	2011	Smallmouth bass	Fillet-Skin On												7											
	2011	Smallmouth bass	Offal												7											
	2011	White Sucker	Composite												5											
AR8	2009	Crayfish	Composite		2	2	2	2	2	2		2	2	2	2			2								
	2009	Oligochaetes													3											
	2010	Oligochaetes						1	1			1	1		2											
	2009	Porewater	Grab	D										3	2	2	2	2								
	2009	Porewater	Grab	T										3	3	3	3	3			3	3				
	2010	Porewater		D											2		2									
	2009	Rock Basket Composite													1											1
	2009	Sediment	Grab		3	3	3	3	3	3		3	3	3	3	3	3	3					3	3		
	2006	Sediment			2	2	2			2	2			2	2			2								
	2010	Sediment													8		2									
	2009	Smallmouth Bass	Fillet-Skin Off											5	5			5								
	2009	Smallmouth Bass	Fillet-Skin On		5	5	5	5	5	5		5	5					5								
	2009	Surface Water	Grab	D										1	1	1	1	1								
	2009	Surface Water	Grab	T										2	1	1	1	1	1	1						
	2010	Tree Swallow - Blood Adult													5											
	2010	Tree Swallow - Blood Nestling													3											

Table 2-5
Androscoggin River Data Available for Ecological Risk Asssessment Use
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Location	Year	Sample Description	Sample Method	Sample Type	Number of Samples																			
					VOCs	SVOCs	PAHs	Dioxin Congeners	Dioxin Homologs	Pesticides	total PCBs	PCB Homologs	PCB Congener	Inorganics	Mercury	Mercury, Divalent	Methylmercury	Conventionals	*Ceriodaphnia*	*Pimephales promelas*	*Chironomus tentans*	*Hyalella azteca* (96-hr)	*Hyalella azteca* (28 day)	*Chironomus dilutus*	Community Analysis
AR8, cont'd	2010	Tree Swallow - Feather Adult												7											
	2010	Tree Swallow - Feather Nestling												3											
	2010	Tree Swallow Egg	Composite					1	1			1	1												
	2010	Tree Swallow Egg												5											
	2009	White Sucker	Composite		2	2	2	2	2	2		2	2	2	2			2							
AR9	2010	Bat Blood						3	3			3	3		12										
	2010	Bat Fur													27										
	2010	Song Bird Blood						3	3			3	3		36										
	2009	Crayfish	Composite		2	2	2	2	2	2		2	2	2	2			2							
	2008	Eagle Blood													2										
	2008	Eagle Feathers													2										
	2008	Eagle Plasma						2	2																
	2011	Eagle Plasma						1	1			1	1												
	2008	Eagle Prey - WS	Composite					1	1						1			1							
	2009	Oligochaetes													3										
	2010	Oligochaetes						1	1			1	1		3										
	2009	Porewater	Grab	D										4	4	4	4	4							
	2009	Porewater	Grab	T										4	4	4	4	4			4	4			
	2010	Porewater		D											3		3								
	2009	Rock Basket Composite													1										1
	2009	Sediment	Grab		4	4	4	4	4	4		4	4	4	4	4	4	4					4	4	
	2010	Sediment													12		3								
	2009	Smallmouth Bass	Fillet-Skin Off											7	7			7							
	2009	Smallmouth Bass	Fillet-Skin On		7	7	7	7	7	7		7	7					7							
	2010	Song Bird Feather													67										
	2009	Surface Water	Grab	D										1	1	1	1	1							
	2009	Surface Water	Grab	T										1	1	1	1	1	1	1					
	2010	Tree Swallow - Blood Adult													8										
	2010	Tree Swallow - Blood Nestling													4										
	2010	Tree Swallow - Feather Adult													12										
	2010	Tree Swallow - Feather Nestling													5										
	2010	Tree Swallow Egg	Composite					1	1			1	1												
	2010	Tree Swallow Egg													9										
	2009	White Sucker	Composite		2	2	2	2	2	2		2	2	2	2			2							

D = Dissolved (i.e., filtered sample)
T = Total (i.e., non-filtered sample)

Ceriodaphnia = 8 day survival and reproduction
Pimephales promelas = 8 day survival and growth
Chironomus tentans = 96 hour survival

Hyalella azteca = 96 hour survival or 28 day survival growth, and reproduction as noted.
Chironomus dilutus = 20 day survival and growth

Table 2-6
Sediment Collection and Analyses Summary
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Year Sampled	Analyses										
		VOCs	SVOCs	Dioxins/Furans	Pesticides	Aroclors	PCB Congeners	TAL Metals	tHg	Divalent Hg	MeHg	Conventionals
AR2	2006	X	X		X	X		X	X			X
	2009	X	X	X	X		X	X	X	X	X	X
	2010								X		X	
AR3	2006	X	X		X	X		X	X			X
AR4	2006	X	X		X	X		X	X			X
	2009	X	X	X	X		X	X	X			X
	2010								X		X	
AR5	2010								X		X	
AR6	2006	X	X		X	X		X	X			X
	2009	X	X	X	X		X	X	X	X	X	X
	2010								X		X	
AR7	2006	X	X		X	X		X	X			X
	2010								X		X	
AR8	2006	X	X		X	X		X	X			X
	2009	X	X	X	X		X	X	X	X	X	X
	2010								X		X	
AR9	2009	X	X	X	X		X	X	X	X	X	X
	2010								X		X	

Notes:
2006 samples collected by EPA.
2009 samples collected by Nobis.
2010 samples collected by USGS.

Table 2-7
Surface Water Collection and Analyses Summary
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Analyses				
	TAL Metals	tHg	Hg II	MeHg	Conventionals
AR2	X	X	X	X	X
AR3	X	X	X	X	X
AR4	X	X	X	X	X
AR8	X	X	X	X	X
AR9	X	X	X	X	X

Note:
All samples collected in 2009.

Table 2-8
Pore Water Collection and Analyses Summary
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Year Sampled	Analyses				
		TAL Metals	tHg	Divalent Hg	MeHg	Conventionals
AR2	2009	X	X	X	X	X
	2010		X		X	
AR4	2010		X		X	
AR5	2010		X		X	
AR6	2009	X	X	X	X	X
	2010		X		X	
AR7	2010		X		X	
AR8	2009	X	X	X	X	X
	2010		X		X	
AR9	2009	X	X	X	X	X
	2010		X		X	

Table 2-9
Benthic Invertebrate Collection and Analyses Summary
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample Type	Analyses			
		Year Sampled	Dioxins/Furans	PCB Congeners	tHg
AR2	Burrow Mayfly Larve	2009			X
	Oligochaetes	2009			X
		2010			X
	Rock Basket Composite	2009			X
AR3	Dragonfly Larvae	2009			X
	Mayfly Larvae	2009			X
	Rock Basket Composite	2009			X
	Water Pennies	2009			X
AR4	Oligochaetes	2010			X
	Rock Basket Composite	2009			X
AR5	Oligochaetes	2010	X	X	X
AR6	Oligochaetes	2009			X
		2010	X	X	X
AR7	Oligochaetes	2010			X
AR8	Oligochaetes	2009			X
		2010	X	X	X
	Rock Basket Composite	2009			X
AR9	Oligochaetes	2009			X
		2010	X	X	X
	Rock Basket Composite	2009			X

Table 2-10
Crayfish Collection and Analyses Summary
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Year Sampled	Analyses							
		VOCs	SVOCs	Dioxins/Furans	Pesticides	PCB Congeners	TAL Metals	tHg	Lipids
AR2	2009	X	X	X	X	X	X	X	X
	2011							X	
AR3	2009	X	X	X	X	X	X	X	X
AR4	2009	X	X	X	X	X	X	X	X
AR5	2011							X	
AR6	2009	X	X	X	X	X	X	X	X
	2011							X	
AR7	2011							X	
AR8	2009	X	X	X	X	X	X	X	X
AR9	2009	X	X	X	X	X	X	X	X

Table 2-11
Fish Collection and Analyses Summary
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Year Sampled	Species	Analyses							
			VOCs	SVOCs	Dioxins/Furans	Pesticides	PCB Congeners	TAL Metals	tHg	Lipids
AR2	2009	Smallmouth Bass	X	X	X	X	X	X	X	X
		White Sucker	X	X	X	X	X	X	X	X
	2011	Smallmouth bass							X	
		White Sucker							X	
AR3	2009	Smallmouth Bass	X	X	X	X	X	X	X	X
AR4	2009	Smallmouth Bass	X	X	X	X	X	X	X	X
AR5	2011	Smallmouth bass							X	
		White Sucker							X	
AR6	2009	Smallmouth Bass	X	X	X	X	X	X	X	X
	2011	Smallmouth Bass							X	
		White Sucker							X	
AR7	2011	Smallmouth Bass							X	
		White Sucker							X	
AR8	2009	Smallmouth Bass	X	X	X	X	X	X	X	X
		White Sucker	X	X	X	X	X	X	X	X
AR9	2009	Smallmouth Bass	X	X	X	X	X	X	X	X
		White Sucker	X	X	X	X	X	X	X	X

Notes:
Smallmouth bass samples were fillets.
White sucker samples were whole body.

Table 2-12
Songbird Collection and Analyses Summary
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Tissue Type	Reach	Analyses		
		Dioxins/Furans	PCB Congeners	tHg
Blood	AR1	X	X	X
	AR9	X	X	X
Feather	AR1			X
	AR9			X

Notes:
All samples collected in 2010.
Species include:
Acadian flycatcher
Alder flycatcher
American goldfinch
American redstart
Black-and-white warbler
Black-capped chickadee
Black-throated green warbler
Cedar waxing
Common yellowthroat
Chestnut-sided warbler
Downy woodpecker
Eastern kingbird
Gray catbird
Least flycatcher
Magnolia warbler
Nashville warbler
Red-winged blackbird
Song sparrow
Swamp sparrow
Traill's flycatcher
White-breasted nuthatch
Wilson's warbler
Yellow-bellied flycatcher
Yellow warbler

Table 2-13
Tree Swallow Collection and Analyses Summary
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Age/Tissue Type	Analyses		
		Dioxins/Furans	PCB Congeners	tHg
AR1	Adult Blood			X
	Adult Feather			X
	Egg	X	X	X
	Nestling Blood			X
	Nestling Feather			X
AR2	Adult Blood			X
	Adult Feather			X
	Egg	X	X	X
	Nestling Blood			X
	Nestling Feather			X
AR3	Adult Blood			X
	Adult Feather			X
	Egg	X	X	X
AR4	Adult Blood			X
	Adult Feather			X
	Egg			X
	Nestling Blood			X
	Nestling Feather			X
AR8	Adult Blood			X
	Adult Feather			X
	Egg	X	X	X
	Nestling Blood			X
	Nestling Feather			X
AR9	Adult Blood			X
	Adult Feather			X
	Egg	X	X	X
	Nestling Blood			X
	Nestling Feather			X

Note:
All samples collected in 2010.

Table 2-14
Bald Eagle Collection and Analyses Summary
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Year Sampled	Tissue Type	Analyses			
			Dioxins/Furans	PCB Congeners	tHg	Lipids
AR1	2008	Blood			X	
		Feathers			X	
		Plasma	X			
	2011	Plasma	X	X		
AR9	2008	Blood			X	
		Feathers			X	
		Plasma	X			
		Prey	X		X	X
	2011	Plasma	X	X		

Note:
All samples collected from nestlings.

Table 2-15
Bat Collection and Analyses Summary
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Tissue Type	Analyses		
		Dioxins/Furans	PCB Congeners	tHg
AR1	Blood	X	X	X
	Fur			X
AR9	Blood	X	X	X
	Fur			X

Note:
All samples collected in 2010.

Table 2-16
Toxic Equivalency Factors
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Congener[a]	TEF[b] (unitless)		
	Mammals	Birds	Fish
1,2,3,4,6,7,8-HpCDD	0.01	< 0.001	0.001
1,2,3,4,6,7,8-HpCDF	0.01	0.01	0.01
1,2,3,4,7,8-HxCDD	0.1	0.05	0.5
1,2,3,4,7,8,9-HpCDF	0.01	0.01	0.01
1,2,3,4,7,8-HxCDF	0.1	0.1	0.1
1,2,3,6,7,8-HxCDD	0.1	0.01	0.01
1,2,3,6,7,8-HxCDF	0.1	0.1	0.1
1,2,3,7,8,9-HxCDD	0.1	0.1	0.01
1,2,3,7,8,9-HxCDF	0.1	0.1	0.1
1,2,3,7,8-PeCDD	1	1	1
1,2,3,7,8-PeCDF	0.03	0.1	0.05
2,3,4,6,7,8-HxCDF	0.1	0.1	0.1
2,3,4,7,8-PeCDF	0.3	1	0.5
2,3,7,8-TCDD	1	1	1
2,3,7,8-TCDF	0.1	1	0.05
OCDD	0.0003	0.0001	< 0.0001
OCDF	0.0003	0.0001	< 0.0001
PCB #77	0.0001	0.05	0.0001
PCB #81	0.0003	0.1	0.0005
PCB #126	0.1	0.1	0.005
PCB #169	0.03	0.001	0.00005
PCB #105	0.00003	0.0001	< 0.000005
PCB #114	0.00003	0.0001	< 0.000005
PCB #118	0.00003	0.00001	< 0.000005
PCB #123	0.00003	0.00001	< 0.000005
PCB #156	0.00003	0.0001	< 0.000005
PCB #157	0.00003	0.0001	< 0.000005
PCB #167	0.00003	0.00001	< 0.000005
PCB #189	0.00003	0.00001	< 0.000005
PCB #153	0	0	0

Source: EPA, 2008d.

[a]Dioxins/furans are abbreviated as follows:

HpCDD = Heptachlorodibenzodioxin.
HpCDF = Heptachlorodibenzofuran.
HxCDD = Hexachlorodibenzodioxin.
HxCDF = Hexachlorodibenzofuran.
PeCDD = Pentachlorodibenzo-p-dioxin.
PeCDF = Pentachlorodibenzofuran.
TCDD = Tetrachlorodibenzo-p-dioxin.
TCDF = Tetrachlorodibenzofuran.
OCDD = Octachlorodibenzodioxin.
OCDF = Octachlorodibenzofuran.

[b]Less than (<) values used as the TEF.

Table 2-17
Summary of Chemicals Detected in Surface Water - 2009
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Sample Type/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR2/Total							
Inorganics (excepting mercury)							
Strontium	µg/L	1/1	1.56E+01 - 1.56E+01	AR2-WB-SWCHUF01-0-090914	NA	1.56E+01	NC
Sulfate	µg/L	1/1	2.30E+03 - 2.30E+03	AR2-WB-SWCHUF01-0-090914	NA	2.30E+03	NC
Mercury							
Mercury	µg/L	1/1	1.00E-03 - 1.00E-03	AR2-WB-SWCHUF01-0-090914	NA	1.00E-03	NC
Mercury, divalent	µg/L	1/1	7.00E-05 - 7.00E-05	AR2-WB-SWCHUF01-0-090914	NA	7.00E-05	NC
Methylmercury	µg/L	1/1	5.00E-05 - 5.00E-05	AR2-WB-SWCHUF01-0-090914	NA	5.00E-05	NC
Conventionals							
Total organic carbon (TOC)	µg/L	1/1	5.34E+03 - 5.34E+03	AR2-WB-SWCHUF01-0-090914	NA	5.34E+03	NC
AR2/Dissolved							
Inorganics (excepting mercury)							
Chromium	µg/L	1/1	3.70E-01 - 3.70E-01	AR2-WB-SWCHFI01-0-090914	NA	3.70E-01	NC
Strontium	µg/L	1/1	1.48E+01 - 1.48E+01	AR2-WB-SWCHFI01-0-090914	NA	1.48E+01	NC
Sulfate	µg/L	1/1	2.33E+03 - 2.33E+03	AR2-WB-SWCHFI01-0-090914	NA	2.33E+03	NC
Mercury							
Mercury	µg/L	1/1	8.50E-04 - 8.50E-04	AR2-WB-SWCHFI01-0-090914	NA	8.50E-04	NC
Mercury, divalent	µg/L	1/1	5.00E-05 - 5.00E-05	AR2-WB-SWCHFI01-0-090914	NA	5.00E-05	NC
Conventionals							
Dissolved organic carbon	µg/L	1/1	5.03E+03 - 5.03E+03	AR2-WB-SWCHFI01-0-090914	NA	5.03E+03	NC
AR3/Total							
Inorganics (excepting mercury)							
Strontium	µg/L	1/1	1.52E+01 - 1.52E+01	AR3-00-SWCHUF01-0-090915	NA	1.52E+01	NC
Sulfate	µg/L	1/1	2.34E+03 - 2.34E+03	AR3-00-SWCHUF01-0-090915	NA	2.34E+03	NC
Mercury							
Mercury	µg/L	1/1	1.04E-03 - 1.04E-03	AR3-00-SWCHUF01-0-090915	NA	1.04E-03	NC
Mercury, divalent	µg/L	1/1	6.00E-05 - 6.00E-05	AR3-00-SWCHUF01-0-090915	NA	6.00E-05	NC
Conventionals							
Total organic carbon (TOC)	µg/L	1/1	5.34E+03 - 5.34E+03	AR3-00-SWCHUF01-0-090915	NA	5.34E+03	NC
AR3/Dissolved							
Inorganics (excepting mercury)							
Strontium	µg/L	1/1	1.54E+01 - 1.54E+01	AR3-00-SWCHFI01-0-090915	NA	1.54E+01	NC
Sulfate	µg/L	1/1	2.30E+03 - 2.30E+03	AR3-00-SWCHFI01-0-090915	NA	2.30E+03	NC
Mercury							
Mercury	µg/L	1/1	7.00E-04 - 7.00E-04	AR3-00-SWCHFI01-0-090915	NA	7.00E-04	NC
Conventionals							
Dissolved organic carbon	µg/L	1/1	4.86E+03 - 4.86E+03	AR3-00-SWCHFI01-0-090915	NA	4.86E+03	NC

Table 2-17
Summary of Chemicals Detected in Surface Water - 2009
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Sample Type/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR4/Total							
Inorganics (excepting mercury)							
Strontium	µg/L	1/1	1.55E+01 - 1.55E+01	AR4-00-SWCHUF01-0-090915	NA	1.55E+01	NC
Sulfate	µg/L	1/1	2.44E+03 - 2.44E+03	AR4-00-SWCHUF01-0-090915	NA	2.44E+03	NC
Mercury							
Mercury	µg/L	1/1	9.90E-04 - 9.90E-04	AR4-00-SWCHUF01-0-090915	NA	9.90E-04	NC
Mercury, divalent	µg/L	1/1	4.00E-05 - 4.00E-05	AR4-00-SWCHUF01-0-090915	NA	4.00E-05	NC
Methylmercury	µg/L	1/1	5.00E-05 - 5.00E-05	AR4-00-SWCHUF01-0-090915	NA	5.00E-05	NC
Conventionals							
Total organic carbon (TOC)	µg/L	1/1	5.27E+03 - 5.27E+03	AR4-00-SWCHUF01-0-090915	NA	5.27E+03	NC
AR4/Dissolved							
Inorganics (excepting mercury)							
Strontium	µg/L	1/1	1.53E+01 - 1.53E+01	AR4-00-SWCHFI01-0-090915	NA	1.53E+01	NC
Sulfate	µg/L	1/1	2.41E+03 - 2.41E+03	AR4-00-SWCHFI01-0-090915	NA	2.41E+03	NC
Mercury							
Mercury	µg/L	1/1	8.70E-04 - 8.70E-04	AR4-00-SWCHFI01-0-090915	NA	8.70E-04	NC
Mercury, divalent	µg/L	1/1	8.00E-05 - 8.00E-05	AR4-00-SWCHFI01-0-090915	NA	8.00E-05	NC
Methylmercury	µg/L	1/1	6.00E-05 - 6.00E-05	AR4-00-SWCHFI01-0-090915	NA	6.00E-05	NC
Conventionals							
Dissolved organic carbon	µg/L	1/1	5.22E+03 - 5.22E+03	AR4-00-SWCHFI01-0-090915	NA	5.22E+03	NC
AR8/Total							
Inorganics (excepting mercury)							
Strontium	µg/L	1/1	1.67E+01 - 1.67E+01	AR8-00-SWCHUF01-0-090914	NA	1.67E+01	NC
Sulfate	µg/L	2/2	2.75E+03 - 2.75E+03	AR8-00-SWCHFI01-0-090914, AR8-00-SWCHUF01-0-090914	NA	2.75E+03	0.00E+00
Mercury							
Mercury	µg/L	1/1	2.17E-03 - 2.17E-03	AR8-00-SWCHUF01-0-090914	NA	2.17E-03	NC
Mercury, divalent	µg/L	1/1	6.00E-05 - 6.00E-05	AR8-00-SWCHUF01-0-090914	NA	6.00E-05	NC
Conventionals							
Total organic carbon (TOC)	µg/L	1/1	5.18E+03 - 5.18E+03	AR8-00-SWCHUF01-0-090914	NA	5.18E+03	NC
AR8/Dissolved							
Inorganics (excepting mercury)							
Strontium	µg/L	1/1	1.59E+01 - 1.59E+01	AR8-00-SWCHFI01-0-090914	NA	1.59E+01	NC
Mercury							
Mercury	µg/L	1/1	1.00E-03 - 1.00E-03	AR8-00-SWCHFI01-0-090914	NA	1.00E-03	NC
Mercury, divalent	µg/L	1/1	7.00E-05 - 7.00E-05	AR8-00-SWCHFI01-0-090914	NA	7.00E-05	NC
Methylmercury	µg/L	1/1	6.00E-05 - 6.00E-05	AR8-00-SWCHFI01-0-090914	NA	6.00E-05	NC

Table 2-17
Summary of Chemicals Detected in Surface Water - 2009
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Sample Type/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Conventionals							
Dissolved organic carbon	µg/L	1/1	5.03E+03 - 5.03E+03	AR8-00-SWCHFI01-0-090914	NA	5.03E+03	NC
AR9/Total							
Inorganics (excepting mercury)							
Strontium	µg/L	1/1	1.65E+01 - 1.71E+01	AR9-00-SWCHUF01-0-090914	NA	1.68E+01	NC
Sulfate	µg/L	1/1	2.67E+03 - 2.68E+03	AR9-00-SWCHUF01-1-090914	NA	2.68E+03	NC
Mercury							
Mercury	µg/L	1/1	4.40E-04 - 6.70E-04	AR9-00-SWCHUF01-1-090914	NA	6.70E-04	NC
Mercury, divalent	µg/L	1/1	7.00E-05 - 7.00E-05	AR9-00-SWCHUF01-1-090914	8.00E-05 - 8.00E-05	7.00E-05	NC
Methylmercury	µg/L	1/1	5.00E-05 - 6.00E-05	AR9-00-SWCHUF01-0-090914	NA	5.50E-05	NC
Conventionals							
Total organic carbon (TOC)	µg/L	1/1	5.12E+03 - 5.48E+03	AR9-00-SWCHUF01-1-090914	NA	5.30E+03	NC
AR9/Dissolved							
Inorganics (excepting mercury)							
Copper	µg/L	1/1	5.90E-01 - 5.90E-01	AR9-00-SWCHFI01-0-090914	2.00E+00 - 2.00E+00	5.90E-01	NC
Strontium	µg/L	1/1	1.62E+01 - 1.67E+01	AR9-00-SWCHFI01-1-090914	NA	1.65E+01	NC
Sulfate	µg/L	1/1	2.63E+03 - 2.66E+03	AR9-00-SWCHFI01-1-090914	NA	2.65E+03	NC
Mercury							
Mercury	µg/L	1/1	1.20E-04 - 9.40E-04	AR9-00-SWCHFI01-0-090914	NA	9.40E-04	NC
Mercury, divalent	µg/L	1/1	4.00E-05 - 6.00E-05	AR9-00-SWCHFI01-1-090914	NA	6.00E-05	NC
Conventionals							
Dissolved organic carbon	µg/L	1/1	4.76E+03 - 5.41E+03	AR9-00-SWCHFI01-0-090914	NA	5.09E+03	NC

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/L = Micrograms per liter.

Table 2-18
Summary of Chemicals Detected in Pore Water - 2009 and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Sample Type/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR2/Total/2009							
Inorganics (excepting mercury)							
Arsenic	µg/L	3/3	4.20E+00 - 2.09E+01	AR2-WB-PWCHUF01-0-090916	NA	1.11E+01	8.74E+00
Beryllium	µg/L	1/3	1.60E+00 - 1.60E+00	AR2-WB-PWCHUF01-0-090916	5.00E-01 - 5.00E-01	8.67E-01	6.35E-01
Chromium	µg/L	2/3	1.50E+00 - 4.95E+01	AR2-WB-PWCHUF01-0-090916	1.00E+01 - 1.00E+01	2.03E+01	2.56E+01
Copper	µg/L	1/3	4.38E+01 - 4.38E+01	AR2-WB-PWCHUF01-0-090916	2.00E+00 - 2.00E+00	1.59E+01	2.41E+01
Lead	µg/L	2/2	1.50E+00 - 3.45E+01	AR2-WB-PWCHUF01-0-090916	NA	1.80E+01	2.33E+01
Nickel	µg/L	1/1	4.64E+01 - 4.64E+01	AR2-WB-PWCHUF01-0-090916	NA	4.64E+01	NC
Strontium	µg/L	3/3	3.09E+01 - 6.50E+01	AR2-WB-PWCHUF02-0-090916	NA	4.68E+01	1.72E+01
Sulfate	µg/L	2/3	5.10E+02 - 1.28E+03	AR2-WB-PWCHUF03-0-090916	8.90E+02 - 8.90E+02	8.93E+02	3.85E+02
Vanadium	µg/L	3/3	6.20E-01 - 8.68E+01	AR2-WB-PWCHUF01-0-090916	NA	3.03E+01	4.90E+01
Zinc	µg/L	1/1	1.72E+02 - 1.72E+02	AR2-WB-PWCHUF01-0-090916	NA	1.72E+02	NC
Mercury							
Mercury	µg/L	2/3	4.82E-03 - 1.49E-02	AR2-WB-PWCHUF01-0-090916	5.00E-03 - 5.00E-03	8.24E-03	5.77E-03
Mercury, divalent	µg/L	1/3	8.00E-05 - 8.00E-05	AR2-WB-PWCHUF01-0-090916	8.00E-05 - 1.30E-04	9.67E-05	2.89E-05
Conventionals							
Total organic carbon (TOC)	µg/L	2/3	1.14E+04 - 1.17E+04	AR2-WB-PWCHUF01-0-090916	8.72E+03 - 8.72E+03	1.06E+04	1.64E+03
AR2/Dissolved/2009							
Inorganics (excepting mercury)							
Arsenic	µg/L	3/3	3.70E+00 - 1.55E+01	AR2-WB-PWCHFI01-0-090916	NA	9.00E+00	5.99E+00
Chromium	µg/L	3/3	4.70E-01 - 1.00E+00	AR2-WB-PWCHFI01-0-090916	NA	6.63E-01	2.93E-01
Strontium	µg/L	3/3	2.82E+01 - 6.24E+01	AR2-WB-PWCHFI02-0-090916	NA	4.01E+01	1.94E+01
Sulfate	µg/L	1/3	2.05E+03 - 2.05E+03	AR2-WB-PWCHFI01-0-090916	9.50E+02 - 1.35E+03	1.45E+03	5.57E+02
Vanadium	µg/L	3/3	4.10E-01 - 1.20E+00	AR2-WB-PWCHFI01-0-090916	NA	7.27E-01	4.18E-01
Mercury							
Mercury	µg/L	2/3	7.00E-04 - 1.02E-02	AR2-WB-PWCHFI03-0-090916	5.00E-03 - 5.00E-03	5.30E-03	4.76E-03
Methylmercury	µg/L	1/3	6.00E-05 - 6.00E-05	AR2-WB-PWCHFI03-0-090916	1.00E-04 - 1.20E-04	9.33E-05	3.06E-05
Conventionals							
Dissolved organic carbon	µg/L	2/3	8.01E+03 - 1.03E+04	AR2-WB-PWCHFI02-0-090916	8.03E+03 - 8.03E+03	8.78E+03	1.32E+03
AR6/Total/2009							
Inorganics (excepting mercury)							
Arsenic	µg/L	1/1	4.40E+00 - 4.40E+00	AR6-00-PWCHUF01-090918	NA	4.40E+00	NC
Strontium	µg/L	1/1	7.43E+01 - 7.43E+01	AR6-00-PWCHUF01-090918	NA	7.43E+01	NC
Sulfate	µg/L	1/1	2.95E+03 - 2.95E+03	AR6-00-PWCHUF01-090918	NA	2.95E+03	NC
Vanadium	µg/L	1/1	2.10E+00 - 2.10E+00	AR6-00-PWCHUF01-090918	NA	2.10E+00	NC

Table 2-18
Summary of Chemicals Detected in Pore Water - 2009 and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Sample Type/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Conventionals							
Total organic carbon (TOC)	µg/L	1/1	1.51E+04 - 1.51E+04	AR6-00-PWCHUF01-090918	NA	1.51E+04	NC
AR6/Dissolved/2009							
Inorganics (excepting mercury)							
Arsenic	µg/L	1/1	4.20E+00 - 4.20E+00	AR6-00-PWCHFI01-0-090918	NA	4.20E+00	NC
Chromium	µg/L	1/1	9.60E-01 - 9.60E-01	AR6-00-PWCHFI01-0-090918	NA	9.60E-01	NC
Copper	µg/L	1/1	2.00E-01 - 2.00E-01	AR6-00-PWCHFI01-0-090918	NA	2.00E-01	NC
Lead	µg/L	1/1	8.40E-02 - 8.40E-02	AR6-00-PWCHFI01-0-090918	NA	8.40E-02	NC
Strontium	µg/L	1/1	7.27E+01 - 7.27E+01	AR6-00-PWCHFI01-0-090918	NA	7.27E+01	NC
Vanadium	µg/L	1/1	1.50E+00 - 1.50E+00	AR6-00-PWCHFI01-0-090918	NA	1.50E+00	NC
Zinc	µg/L	1/1	3.50E+00 - 3.50E+00	AR6-00-PWCHFI01-0-090918	NA	3.50E+00	NC
Conventionals							
Dissolved organic carbon	µg/L	1/1	1.48E+04 - 1.48E+04	AR6-00-PWCHFI01-0-090918	NA	1.48E+04	NC
AR8/Total/2009							
Inorganics (excepting mercury)							
Arsenic	µg/L	2/3	4.50E+00 - 6.70E+00	AR8-00-PWCHUF03-0-090918	1.00E+00 - 1.00E+00	4.07E+00	2.87E+00
Chromium	µg/L	1/3	2.90E+00 - 2.90E+00	AR8-00-PWCHUF01-0-090918	1.00E+01 - 1.00E+01	7.63E+00	4.10E+00
Copper	µg/L	1/3	4.60E+00 - 4.60E+00	AR8-00-PWCHUF01-0-090918	2.00E+00 - 2.00E+00	2.87E+00	1.50E+00
Lead	µg/L	1/3	4.40E+00 - 4.40E+00	AR8-00-PWCHUF01-0-090918	1.00E+00 - 1.00E+00	2.13E+00	1.96E+00
Nickel	µg/L	3/3	6.10E-01 - 1.30E+01	AR8-00-PWCHUF01-0-090918	NA	5.24E+00	6.76E+00
Strontium	µg/L	3/3	3.48E+01 - 8.21E+01	AR8-00-PWCHUF02-0-090918	NA	5.45E+01	2.46E+01
Sulfate	µg/L	2/3	1.62E+03 - 3.28E+04	AR8-00-PWCHUF01-0-090918	9.90E+02 - 9.90E+02	1.18E+04	1.82E+04
Vanadium	µg/L	2/3	1.60E+00 - 6.00E+00	AR8-00-PWCHUF01-0-090918	5.00E+00 - 5.00E+00	4.20E+00	2.31E+00
Zinc	µg/L	1/3	4.41E+01 - 4.41E+01	AR8-00-PWCHUF01-0-090918	6.00E+01 - 6.00E+01	5.47E+01	9.18E+00
Mercury							
Mercury	µg/L	3/3	4.49E-03 - 2.82E-02	AR8-00-PWCHUF01-0-090918	NA	1.27E-02	1.35E-02
Methylmercury	µg/L	2/3	1.00E-04 - 2.35E-03	AR8-00-PWCHUF01-0-090918	1.00E-04 - 1.00E-04	8.50E-04	1.30E-03
Conventionals							
Total organic carbon (TOC)	µg/L	3/3	9.18E+03 - 2.31E+04	AR8-00-PWCHUF01-0-090918	NA	1.48E+04	7.34E+03
AR8/Dissolved/2009							
Inorganics (excepting mercury)							
Arsenic	µg/L	2/3	4.00E+00 - 6.50E+00	AR8-00-PWCHFI03-0-090918	1.00E+00 - 1.00E+00	3.83E+00	2.75E+00
Chromium	µg/L	3/3	6.90E-01 - 2.80E+00	AR8-00-PWCHFI01-0-090918	NA	1.40E+00	1.21E+00
Copper	µg/L	1/3	5.00E-01 - 5.00E-01	AR8-00-PWCHFI01-0-090918	2.00E+00 - 2.00E+00	1.50E+00	8.66E-01
Lead	µg/L	2/3	3.00E-01 - 1.40E+00	AR8-00-PWCHFI01-0-090918	1.00E+00 - 1.00E+00	9.00E-01	5.57E-01
Nickel	µg/L	3/3	5.50E-01 - 1.15E+01	AR8-00-PWCHFI01-0-090918	NA	4.75E+00	5.90E+00

Table 2-18
Summary of Chemicals Detected in Pore Water - 2009 and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Sample Type/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Strontium	µg/L	3/3	3.39E+01 - 7.90E+01	AR8-00-PWCHFI02-0-090918	NA	5.06E+01	2.47E+01
Sulfate	µg/L	1/2	2.74E+04 - 2.74E+04	AR8-00-PWCHFI01-0-090918	8.20E+02 - 8.20E+02	1.41E+04	1.88E+04
Vanadium	µg/L	2/3	1.30E+00 - 4.90E+00	AR8-00-PWCHFI01-0-090918	5.00E+00 - 5.00E+00	3.73E+00	2.11E+00
Zinc	µg/L	3/3	3.40E+00 - 3.45E+01	AR8-00-PWCHFI01-0-090918	NA	1.38E+01	1.79E+01
Mercury							
Mercury	µg/L	1/2	7.90E-03 - 7.90E-03	AR8-00-PWCHFI01-0-090918	5.00E-03 - 5.00E-03	6.45E-03	2.05E-03
Methylmercury	µg/L	1/2	6.30E-04 - 6.30E-04	AR8-00-PWCHFI01-0-090918	1.00E-04 - 1.00E-04	3.65E-04	3.75E-04
Conventionals							
Dissolved organic carbon	µg/L	2/2	1.17E+04 - 1.99E+04	AR8-00-PWCHFI01-0-090918	NA	1.58E+04	5.80E+03
AR9/Total/2009							
Inorganics (excepting mercury)							
Arsenic	µg/L	3/4	2.60E+00 - 3.20E+00	AR9-00-PWCHUF04-0-090917	1.80E+00 - 1.80E+00	2.61E+00	5.89E-01
Chromium	µg/L	2/4	3.90E-01 - 2.50E+00	AR9-00-PWCHUF02-1-090917	1.00E+01 - 1.00E+01	6.13E+00	4.48E+00
Copper	µg/L	1/4	4.10E+00 - 4.10E+00	AR9-00-PWCHUF02-1-090917	2.00E+00 - 2.00E+00	2.53E+00	1.05E+00
Lead	µg/L	2/4	6.50E-01 - 3.60E+00	AR9-00-PWCHUF02-1-090917	1.00E+00 - 1.00E+00	1.56E+00	1.37E+00
Nickel	µg/L	2/2	7.50E-01 - 2.90E+00	AR9-00-PWCHUF04-0-090917	NA	1.83E+00	1.52E+00
Strontium	µg/L	4/4	3.49E+01 - 1.63E+02	AR9-00-PWCHUF02-0-090917	NA	7.40E+01	5.92E+01
Sulfate	µg/L	4/4	1.77E+03 - 3.10E+04	AR9-00-PWCHUF04-0-090917	NA	1.65E+04	1.20E+04
Vanadium	µg/L	2/4	9.60E-01 - 4.90E+00	AR9-00-PWCHUF02-1-090917	5.00E+00 - 5.00E+00	4.13E+00	1.68E+00
Zinc	µg/L	2/3	1.91E+01 - 4.20E+01	AR9-00-PWCHUF04-0-090917	6.00E+01 - 6.00E+01	4.04E+01	2.05E+01
Mercury							
Mercury	µg/L	4/4	2.49E-03 - 6.20E-03	AR9-00-PWCHUF03-0-090917	5.00E-03 - 5.00E-03	4.52E-03	1.53E-03
Methylmercury	µg/L	2/4	1.00E-04 - 1.70E-04	AR9-00-PWCHUF04-0-090917	1.00E-04 - 1.00E-04	1.18E-04	3.50E-05
Conventionals							
Total organic carbon (TOC)	µg/L	4/4	5.45E+03 - 1.41E+04	AR9-00-PWCHUF04-0-090917	NA	1.09E+04	3.81E+03
AR9/Dissolved/2009							
Inorganics (excepting mercury)							
Arsenic	µg/L	4/4	1.90E+00 - 3.00E+00	AR9-00-PWCHFI04-0-090917	NA	2.46E+00	4.50E-01
Chromium	µg/L	4/4	4.10E-01 - 1.20E+00	AR9-00-PWCHFI01-0-090917	NA	7.49E-01	3.34E-01
Copper	µg/L	1/4	1.90E-01 - 1.90E-01	AR9-00-PWCHFI04-0-090917	2.00E+00 - 2.00E+00	1.55E+00	9.05E-01
Lead	µg/L	2/4	1.20E-01 - 1.40E-01	AR9-00-PWCHFI03-0-090917	1.00E+00 - 1.00E+00	5.65E-01	5.02E-01
Nickel	µg/L	2/4	9.30E-01 - 3.20E+00	AR9-00-PWCHFI04-0-090917	4.00E+01 - 4.00E+01	2.10E+01	2.19E+01
Strontium	µg/L	4/4	3.28E+01 - 1.49E+02	AR9-00-PWCHFI02-0-090917	NA	7.02E+01	5.34E+01
Sulfate	µg/L	2/4	1.53E+04 - 2.76E+04	AR9-00-PWCHFI04-0-090917	1.85E+03 - 1.40E+04	1.46E+04	1.05E+04
Vanadium	µg/L	4/4	3.30E-01 - 1.50E+00	AR9-00-PWCHFI01-0-090917	NA	7.59E-01	5.15E-01
Zinc	µg/L	2/4	1.11E+01 - 3.81E+01	AR9-00-PWCHFI04-0-090917	6.00E+01 - 6.00E+01	4.23E+01	2.32E+01

Table 2-18
Summary of Chemicals Detected in Pore Water - 2009 and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Sample Type/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Mercury							
Mercury	µg/L	1/4	6.06E-03 - 6.06E-03	AR9-00-PWCHFI01-0-090917	5.00E-03 - 5.00E-03	5.27E-03	5.30E-04
Mercury, divalent	µg/L	2/4	1.90E-04 - 1.90E-04	AR9-00-PWCHFI02-1-090917, AR9-00-PWCHFI04-0-090917	8.00E-05 - 1.30E-04	1.48E-04	5.32E-05
Methylmercury	µg/L	3/4	7.00E-05 - 2.90E-04	AR9-00-PWCHFI01-0-090917	1.00E-04 - 1.00E-04	1.50E-04	9.76E-05
Conventionals							
Dissolved organic carbon	µg/L	4/4	5.77E+03 - 1.38E+04	AR9-00-PWCHFI04-0-090917	NA	1.06E+04	3.45E+03
AR2/Dissolved/2010							
Mercury	µg/L	2/2	2.63E-04 - 1.34E-03	AR2-4 N	NA	8.04E-04	7.65E-04
Methylmercury	µg/L	2/2	9.89E-05 - 2.83E-04	AR2-4 N	NA	1.91E-04	1.30E-04
AR4/Dissolved/2010							
Mercury	µg/L	2/2	8.68E-03 - 1.71E-02	AR4-2 N	NA	1.29E-02	5.98E-03
Methylmercury	µg/L	2/2	1.89E-04 - 2.75E-03	AR4-2 N	NA	1.47E-03	1.81E-03
AR5/Dissolved/2010							
Mercury	µg/L	2/2	1.32E-03 - 8.47E-03	AR5-2 N	NA	4.90E-03	5.06E-03
Methylmercury	µg/L	2/2	5.15E-04 - 1.90E-03	AR5-2 N	NA	1.21E-03	9.78E-04
AR6/Dissolved/2010							
Mercury	µg/L	2/2	8.53E-04 - 1.15E-03	AR6-3 N	NA	1.00E-03	2.12E-04
Methylmercury	µg/L	2/2	3.23E-04 - 5.33E-04	AR6-3 N	NA	4.28E-04	1.48E-04
AR7/Dissolved/2010							
Mercury	µg/L	2/2	9.37E-04 - 1.72E-03	AR7-1 N	NA	1.33E-03	5.52E-04
Methylmercury	µg/L	2/2	2.52E-04 - 7.63E-04	AR7-1 N	NA	5.07E-04	3.62E-04
AR8/Dissolved/2010							
Mercury	µg/L	2/2	1.88E-03 - 2.30E-03	AR8-4 N	NA	2.09E-03	2.94E-04
Methylmercury	µg/L	2/2	1.08E-04 - 5.51E-04	AR8-4 N	NA	3.29E-04	3.14E-04
AR9/Dissolved/2010							
Mercury	µg/L	3/3	7.33E-04 - 5.80E-03	AR9-7 N	NA	2.74E-03	2.69E-03
Methylmercury	µg/L	3/3	2.86E-04 - 1.58E-03	AR9-7 N	NA	7.28E-04	7.42E-04

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/L = Micrograms per liter.

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR2/2006							
Dioxin Congeners							
Dioxin/Furan - Toxic Equivalent	mg/kg dw	2/2	1.00E-08 - 4.00E-08	DUP02-SD-20060919, BG02-SD-20060919	NA	4.00E-08	0.00E+00
Inorganics (excepting mercury)							
Aluminum	mg/kg dw	3/3	3.70E+03 - 5.80E+03	BG03-SD-20060919	NA	4.50E+03	1.14E+03
Barium	mg/kg dw	3/3	1.30E+01 - 1.90E+01	BG03-SD-20060919	NA	1.63E+01	3.06E+00
Calcium	mg/kg dw	3/3	8.20E+02 - 1.10E+03	BG01-SD-20060919	NA	9.73E+02	1.42E+02
Chromium	mg/kg dw	3/3	6.40E+00 - 1.40E+01	BG03-SD-20060919	NA	9.27E+00	4.13E+00
Cobalt	mg/kg dw	3/3	3.80E+00 - 5.50E+00	BG03-SD-20060919	NA	4.57E+00	8.62E-01
Copper	mg/kg dw	3/3	3.60E+00 - 5.40E+00	BG03-SD-20060919	NA	4.30E+00	9.64E-01
Iron	mg/kg dw	3/3	6.90E+03 - 1.20E+04	BG03-SD-20060919	NA	9.10E+03	2.62E+03
Magnesium	mg/kg dw	3/3	1.90E+03 - 3.40E+03	BG03-SD-20060919	NA	2.50E+03	7.94E+02
Manganese	mg/kg dw	3/3	2.10E+02 - 4.20E+02	BG03-SD-20060919	NA	2.93E+02	1.12E+02
Potassium	mg/kg dw	3/3	5.20E+02 - 8.00E+02	BG03-SD-20060919	NA	6.50E+02	1.41E+02
Vanadium	mg/kg dw	3/3	1.20E+01 - 2.70E+01	BG03-SD-20060919	NA	1.77E+01	8.14E+00
Zinc	mg/kg dw	3/3	2.10E+01 - 2.80E+01	BG03-SD-20060919	NA	2.43E+01	3.51E+00
Conventionals							
Total Organic Carbon (TOC)	mg/kg dw	3/3	8.94E+02 - 1.54E+03	BG02-SD-20060919	NA	1.20E+03	3.24E+02
AR3/2006							
Dioxin Congeners							
Dioxin/Furan - Toxic Equivalent	mg/kg dw	1/1	1.57E-06 - 1.57E-06	BH01-SD-20060918	NA	1.57E-06	NC
Inorganics (excepting mercury)							
Aluminum	mg/kg dw	2/2	3.60E+03 - 3.80E+03	BH02-SD-20060918	NA	3.70E+03	1.41E+02
Barium	mg/kg dw	2/2	1.30E+01 - 1.60E+01	BH01-SD-20060918	NA	1.45E+01	2.12E+00
Calcium	mg/kg dw	2/2	9.00E+02 - 1.20E+03	BH01-SD-20060918	NA	1.05E+03	2.12E+02
Chromium	mg/kg dw	2/2	5.00E+00 - 5.50E+00	BH02-SD-20060918	NA	5.25E+00	3.54E-01
Cobalt	mg/kg dw	2/2	3.60E+00 - 3.80E+00	BH01-SD-20060918	NA	3.70E+00	1.41E-01
Copper	mg/kg dw	2/2	3.90E+00 - 5.20E+00	BH01-SD-20060918	NA	4.55E+00	9.19E-01
Iron	mg/kg dw	2/2	7.60E+03 - 8.00E+03	BH01-SD-20060918	NA	7.80E+03	2.83E+02
Magnesium	mg/kg dw	2/2	1.90E+03 - 2.00E+03	BH02-SD-20060918	NA	1.95E+03	7.07E+01
Manganese	mg/kg dw	2/2	1.80E+02 - 1.90E+02	BH01-SD-20060918	NA	1.85E+02	7.07E+00
Potassium	mg/kg dw	1/2	6.40E+02 - 6.40E+02	BH01-SD-20060918	4.90E+02 - 4.90E+02	5.65E+02	1.06E+02
Vanadium	mg/kg dw	2/2	1.30E+01 - 1.40E+01	BH01-SD-20060918	NA	1.35E+01	7.07E-01
Zinc	mg/kg dw	2/2	2.20E+01 - 2.20E+01	BH02-SD-20060918, BH01-SD-20060918	NA	2.20E+01	0.00E+00

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Mercury							
Mercury	mg/kg dw	2/2	1.50E-01 - 2.20E-01	BH02-SD-20060918	NA	1.85E-01	4.95E-02
Conventionals							
Total Organic Carbon (TOC)	mg/kg dw	1/1	1.82E+03 - 1.82E+03	BH01-SD-20060918	NA	1.82E+03	NC
AR4/2006							
Semivolatile Organic Compounds							
Benzoic Acid	mg/kg dw	1/2	1.30E+00 - 1.30E+00	SH2-0-SD-20060918	9.30E-01 - 9.30E-01	1.12E+00	2.62E-01
Polycyclic Aromatic Hydrocarbons							
Benzo(a)anthracene	mg/kg dw	1/2	2.80E+00 - 2.80E+00	SH1-0-SD-20060918	1.30E+00 - 1.30E+00	2.05E+00	1.06E+00
Benzo(a)pyrene	mg/kg dw	1/2	2.70E+00 - 2.70E+00	SH1-0-SD-20060918	1.30E+00 - 1.30E+00	2.00E+00	9.90E-01
Benzo(b)fluoranthene	mg/kg dw	1/2	4.10E+00 - 4.10E+00	SH1-0-SD-20060918	1.30E+00 - 1.30E+00	2.70E+00	1.98E+00
Benzo(g,h,i)perylene	mg/kg dw	1/2	1.60E+00 - 1.60E+00	SH1-0-SD-20060918	1.30E+00 - 1.30E+00	1.45E+00	2.12E-01
Benzo(k)fluoranthene	mg/kg dw	1/2	1.40E+00 - 1.40E+00	SH1-0-SD-20060918	1.30E+00 - 1.30E+00	1.35E+00	7.07E-02
Chrysene	mg/kg dw	1/2	3.20E+00 - 3.20E+00	SH1-0-SD-20060918	1.30E+00 - 1.30E+00	2.25E+00	1.34E+00
Fluoranthene	mg/kg dw	2/2	1.50E+00 - 5.90E+00	SH1-0-SD-20060918	NA	3.70E+00	3.11E+00
Indeno(1,2,3-cd)pyrene	mg/kg dw	1/2	1.70E+00 - 1.70E+00	SH1-0-SD-20060918	1.30E+00 - 1.30E+00	1.50E+00	2.83E-01
Phenanthrene	mg/kg dw	1/2	2.60E+00 - 2.60E+00	SH1-0-SD-20060918	1.30E+00 - 1.30E+00	1.95E+00	9.19E-01
Pyrene	mg/kg dw	2/2	1.60E+00 - 5.40E+00	SH1-0-SD-20060918	NA	3.50E+00	2.69E+00
Dioxin Congeners							
Dioxin/Furan - Toxic Equivalent	mg/kg dw	1/1	5.33E-06 - 5.33E-06	SH1-0-SD-20060918	NA	5.33E-06	NC
Inorganics (excepting mercury)							
Aluminum	mg/kg dw	2/2	4.80E+03 - 1.20E+04	SH2-0-SD-20060918	NA	8.40E+03	5.09E+03
Barium	mg/kg dw	2/2	3.00E+01 - 5.90E+01	SH2-0-SD-20060918	NA	4.45E+01	2.05E+01
Calcium	mg/kg dw	2/2	1.10E+03 - 2.20E+03	SH2-0-SD-20060918	NA	1.65E+03	7.78E+02
Chromium	mg/kg dw	2/2	1.10E+01 - 1.90E+01	SH2-0-SD-20060918	NA	1.50E+01	5.66E+00
Cobalt	mg/kg dw	2/2	4.30E+00 - 1.10E+01	SH2-0-SD-20060918	NA	7.65E+00	4.74E+00
Copper	mg/kg dw	2/2	1.30E+01 - 1.80E+01	SH2-0-SD-20060918	NA	1.55E+01	3.54E+00
Iron	mg/kg dw	2/2	7.90E+03 - 1.70E+04	SH2-0-SD-20060918	NA	1.25E+04	6.43E+03
Lead	mg/kg dw	1/2	2.10E+01 - 2.10E+01	SH2-0-SD-20060918	2.00E+01 - 2.00E+01	2.05E+01	7.07E-01
Magnesium	mg/kg dw	2/2	2.10E+03 - 4.10E+03	SH2-0-SD-20060918	NA	3.10E+03	1.41E+03
Manganese	mg/kg dw	2/2	1.10E+02 - 3.80E+02	SH2-0-SD-20060918	NA	2.45E+02	1.91E+02
Nickel	mg/kg dw	1/2	1.60E+01 - 1.60E+01	SH2-0-SD-20060918	1.20E+01 - 1.20E+01	1.40E+01	2.83E+00
Potassium	mg/kg dw	2/2	9.30E+02 - 1.30E+03	SH2-0-SD-20060918	NA	1.12E+03	2.62E+02
Vanadium	mg/kg dw	2/2	1.80E+01 - 3.00E+01	SH2-0-SD-20060918	NA	2.40E+01	8.49E+00
Zinc	mg/kg dw	2/2	4.80E+01 - 7.50E+01	SH2-0-SD-20060918	NA	6.15E+01	1.91E+01

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Mercury							
Mercury	mg/kg dw	2/2	4.80E-02 - 1.60E-01	SH2-0-SD-20060918	NA	1.04E-01	7.92E-02
Conventionals							
Total Organic Carbon (TOC)	mg/kg dw	2/2	1.69E+04 - 2.64E+04	SH2-0-SD-20060918	NA	2.17E+04	6.72E+03
AR6/2006							
Semivolatile Organic Compounds							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	mg/kg dw	1/1	8.00E-01 - 8.00E-01	DUP01-SD-20060919	1.30E+00 - 1.30E+00	8.00E-01	NC
Benzo(b)fluoranthene	mg/kg dw	1/1	9.30E-01 - 9.30E-01	DUP01-SD-20060919	1.30E+00 - 1.30E+00	9.30E-01	NC
Fluoranthene	mg/kg dw	1/1	8.60E-01 - 8.60E-01	DUP01-SD-20060919	1.30E+00 - 1.30E+00	8.60E-01	NC
Pyrene	mg/kg dw	1/1	1.00E+00 - 1.00E+00	DUP01-SD-20060919	1.30E+00 - 1.30E+00	1.00E+00	NC
Dioxin Congeners							
Dioxin/Furan - Toxic Equivalent	mg/kg dw	1/1	2.36E-05 - 2.92E-05	DUP01-SD-20060919	NA	2.64E-05	NC
Inorganics (excepting mercury)							
Aluminum	mg/kg dw	1/1	3.70E+03 - 4.40E+03	DUP01-SD-20060919	NA	4.05E+03	NC
Barium	mg/kg dw	1/1	2.20E+01 - 3.00E+01	DUP01-SD-20060919	NA	2.60E+01	NC
Calcium	mg/kg dw	1/1	7.70E+02 - 1.10E+03	DUP01-SD-20060919	NA	9.35E+02	NC
Chromium	mg/kg dw	1/1	5.90E+00 - 6.10E+00	MD01-SD-20060919	NA	6.00E+00	NC
Cobalt	mg/kg dw	1/1	3.90E+00 - 4.60E+00	DUP01-SD-20060919	NA	4.25E+00	NC
Copper	mg/kg dw	1/1	8.90E+00 - 1.10E+01	MD01-SD-20060919	NA	9.95E+00	NC
Iron	mg/kg dw	1/1	7.90E+03 - 8.30E+03	MD01-SD-20060919	NA	8.10E+03	NC
Magnesium	mg/kg dw	1/1	1.70E+03 - 2.50E+03	DUP01-SD-20060919	NA	2.10E+03	NC
Manganese	mg/kg dw	1/1	1.70E+02 - 2.20E+02	DUP01-SD-20060919	NA	1.95E+02	NC
Potassium	mg/kg dw	1/1	5.40E+02 - 9.30E+02	DUP01-SD-20060919	NA	9.30E+02	NC
Vanadium	mg/kg dw	1/1	1.20E+01 - 1.40E+01	DUP01-SD-20060919	NA	1.30E+01	NC
Zinc	mg/kg dw	1/1	2.60E+01 - 2.80E+01	MD01-SD-20060919	NA	2.70E+01	NC
Mercury							
Mercury	mg/kg dw	1/1	1.10E-01 - 1.10E-01	MD01-SD-20060919, DUP01-SD-20060919	NA	1.10E-01	NC
Conventionals							
Total Organic Carbon (TOC)	mg/kg dw	1/1	1.31E+03 - 1.36E+03	MD01-SD-20060919	NA	1.34E+03	NC
AR7/2006							
Semivolatile Organic Compounds							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)anthracene	mg/kg dw	1/1	1.00E+00 - 1.00E+00	RHD01-SD-20060919	NA	1.00E+00	NC
Benzo(a)pyrene	mg/kg dw	1/1	8.80E-01 - 8.80E-01	RHD01-SD-20060919	NA	8.80E-01	NC

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Benzo(b)fluoranthene	mg/kg dw	1/1	1.10E+00 - 1.10E+00	RHD01-SD-20060919	NA	1.10E+00	NC
Chrysene	mg/kg dw	1/1	9.90E-01 - 9.90E-01	RHD01-SD-20060919	NA	9.90E-01	NC
Fluoranthene	mg/kg dw	1/1	2.10E+00 - 2.10E+00	RHD01-SD-20060919	NA	2.10E+00	NC
Phenanthrene	mg/kg dw	1/1	1.40E+00 - 1.40E+00	RHD01-SD-20060919	NA	1.40E+00	NC
Pyrene	mg/kg dw	1/1	2.20E+00 - 2.20E+00	RHD01-SD-20060919	NA	2.20E+00	NC
Dioxin Congeners							
Dioxin/Furan - Toxic Equivalent	mg/kg dw	1/1	1.98E-04 - 1.98E-04	RHD01-SD-20060919	NA	1.98E-04	NC
Inorganics (excepting mercury)							
Aluminum	mg/kg dw	1/1	4.70E+03 - 4.70E+03	RHD01-SD-20060919	NA	4.70E+03	NC
Barium	mg/kg dw	1/1	2.80E+01 - 2.80E+01	RHD01-SD-20060919	NA	2.80E+01	NC
Calcium	mg/kg dw	1/1	1.00E+03 - 1.00E+03	RHD01-SD-20060919	NA	1.00E+03	NC
Chromium	mg/kg dw	1/1	8.00E+00 - 8.00E+00	RHD01-SD-20060919	NA	8.00E+00	NC
Cobalt	mg/kg dw	1/1	4.80E+00 - 4.80E+00	RHD01-SD-20060919	NA	4.80E+00	NC
Copper	mg/kg dw	1/1	1.10E+01 - 1.10E+01	RHD01-SD-20060919	NA	1.10E+01	NC
Iron	mg/kg dw	1/1	9.00E+03 - 9.00E+03	RHD01-SD-20060919	NA	9.00E+03	NC
Magnesium	mg/kg dw	1/1	2.10E+03 - 2.10E+03	RHD01-SD-20060919	NA	2.10E+03	NC
Manganese	mg/kg dw	1/1	2.50E+02 - 2.50E+02	RHD01-SD-20060919	NA	2.50E+02	NC
Potassium	mg/kg dw	1/1	7.30E+02 - 7.30E+02	RHD01-SD-20060919	NA	7.30E+02	NC
Vanadium	mg/kg dw	1/1	1.50E+01 - 1.50E+01	RHD01-SD-20060919	NA	1.50E+01	NC
Zinc	mg/kg dw	1/1	3.80E+01 - 3.80E+01	RHD01-SD-20060919	NA	3.80E+01	NC
Mercury							
Mercury	mg/kg dw	1/1	1.10E-01 - 1.10E-01	RHD01-SD-20060919	NA	1.10E-01	NC
Conventionals							
Total Organic Carbon (TOC)	mg/kg dw	1/1	3.56E+03 - 3.56E+03	RHD01-SD-20060919	NA	3.56E+03	NC
AR8/2006							
Semivolatile Organic Compounds							
Polycyclic Aromatic Hydrocarbons							
Benzo(a)anthracene	mg/kg dw	1/2	2.00E+00 - 2.00E+00	DPWD02-SD-20060919	1.20E+00 - 1.20E+00	1.60E+00	5.66E-01
Benzo(a)pyrene	mg/kg dw	1/2	2.00E+00 - 2.00E+00	DPWD02-SD-20060919	1.20E+00 - 1.20E+00	1.60E+00	5.66E-01
Benzo(b)fluoranthene	mg/kg dw	1/2	2.70E+00 - 2.70E+00	DPWD02-SD-20060919	1.20E+00 - 1.20E+00	1.95E+00	1.06E+00
Benzo(g,h,i)perylene	mg/kg dw	1/2	1.10E+00 - 1.10E+00	DPWD02-SD-20060919	1.20E+00 - 1.20E+00	1.15E+00	7.07E-02
Chrysene	mg/kg dw	1/2	2.00E+00 - 2.00E+00	DPWD02-SD-20060919	1.20E+00 - 1.20E+00	1.60E+00	5.66E-01
Fluoranthene	mg/kg dw	1/2	2.70E+00 - 2.70E+00	DPWD02-SD-20060919	1.20E+00 - 1.20E+00	1.95E+00	1.06E+00
Indeno(1,2,3-cd)pyrene	mg/kg dw	1/2	1.10E+00 - 1.10E+00	DPWD02-SD-20060919	1.20E+00 - 1.20E+00	1.15E+00	7.07E-02
Phenanthrene	mg/kg dw	1/2	1.00E+00 - 1.00E+00	DPWD02-SD-20060919	1.20E+00 - 1.20E+00	1.10E+00	1.41E-01
Pyrene	mg/kg dw	2/2	1.20E+00 - 3.00E+00	DPWD02-SD-20060919	NA	2.10E+00	1.27E+00

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Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Dioxin Congeners							
Dioxin/Furan - Toxic Equivalent	mg/kg dw	1/1	2.36E-05 - 2.36E-05	DPWD01-SD-20060919	NA	2.36E-05	NC
Inorganics (excepting mercury)							
Aluminum	mg/kg dw	2/2	5.70E+03 - 9.00E+03	DPWD02-SD-20060919	NA	7.35E+03	2.33E+03
Barium	mg/kg dw	2/2	3.40E+01 - 4.80E+01	DPWD02-SD-20060919	NA	4.10E+01	9.90E+00
Calcium	mg/kg dw	2/2	1.30E+03 - 1.90E+03	DPWD02-SD-20060919	NA	1.60E+03	4.24E+02
Chromium	mg/kg dw	2/2	9.90E+00 - 1.60E+01	DPWD02-SD-20060919	NA	1.30E+01	4.31E+00
Cobalt	mg/kg dw	2/2	6.10E+00 - 9.40E+00	DPWD02-SD-20060919	NA	7.75E+00	2.33E+00
Copper	mg/kg dw	2/2	1.00E+01 - 1.90E+01	DPWD02-SD-20060919	NA	1.45E+01	6.36E+00
Iron	mg/kg dw	2/2	1.00E+04 - 1.50E+04	DPWD02-SD-20060919	NA	1.25E+04	3.54E+03
Magnesium	mg/kg dw	2/2	2.40E+03 - 3.50E+03	DPWD02-SD-20060919	NA	2.95E+03	7.78E+02
Manganese	mg/kg dw	2/2	3.00E+02 - 3.30E+02	DPWD01-SD-20060919	NA	3.15E+02	2.12E+01
Nickel	mg/kg dw	1/2	1.20E+01 - 1.20E+01	DPWD02-SD-20060919	1.10E+01 - 1.10E+01	1.15E+01	7.07E-01
Potassium	mg/kg dw	2/2	7.40E+02 - 1.20E+03	DPWD02-SD-20060919	NA	9.70E+02	3.25E+02
Vanadium	mg/kg dw	2/2	1.60E+01 - 2.50E+01	DPWD02-SD-20060919	NA	2.05E+01	6.36E+00
Zinc	mg/kg dw	2/2	5.10E+01 - 7.60E+01	DPWD02-SD-20060919	NA	6.35E+01	1.77E+01
Mercury							
Mercury	mg/kg dw	2/2	1.00E-01 - 1.70E-01	DPWD02-SD-20060919	NA	1.35E-01	4.95E-02
Conventionals							
Total Organic Carbon (TOC)	mg/kg dw	2/2	8.30E+03 - 3.06E+04	DPWD02-SD-20060919	NA	1.95E+04	1.58E+04
AR2/2009							
Volatile Organic Compounds							
Acetophenone	mg/kg dw	3/3	6.00E-02 - 1.00E-01	AR2-WB-SDCH0001-0-090916	NA	8.10E-02	2.01E-02
Benzaldehyde	mg/kg dw	3/3	1.60E-02 - 2.80E-02	AR2-WB-SDCH0001-0-090916, AR2-WB-SDCH0002-0-090916	NA	2.40E-02	6.93E-03
Semivolatile Organic Compounds							
Bis(2-Ethylhexyl)Phthalate	mg/kg dw	3/3	8.20E-03 - 1.30E-02	AR2-WB-SDCH0002-0-090916	NA	1.02E-02	2.50E-03
Diethylphthalate	mg/kg dw	1/3	1.60E-03 - 1.60E-03	AR2-WB-SDCH0003-0-090916	8.90E-03 - 1.30E-02	7.83E-03	5.77E-03
Di-n-butyl phthalate	mg/kg dw	1/3	9.50E-03 - 9.50E-03	AR2-WB-SDCH0003-0-090916	1.80E-02 - 2.60E-02	1.78E-02	8.25E-03
Polycyclic Aromatic Hydrocarbons							
Acenaphthylene	mg/kg dw	3/3	5.00E-03 - 6.10E-03	AR2-WB-SDCH0001-0-090916	NA	5.50E-03	5.57E-04
Anthracene	mg/kg dw	3/3	3.20E-03 - 4.20E-03	AR2-WB-SDCH0003-0-090916	NA	3.60E-03	5.29E-04
Benzo(a)anthracene	mg/kg dw	3/3	1.10E-02 - 1.30E-02	AR2-WB-SDCH0001-0-090916	NA	1.20E-02	1.00E-03
Benzo(a)pyrene	mg/kg dw	3/3	1.20E-02 - 1.50E-02	AR2-WB-SDCH0001-0-090916	NA	1.37E-02	1.53E-03
Benzo(b)fluoranthene	mg/kg dw	3/3	1.80E-02 - 2.00E-02	AR2-WB-SDCH0001-0-090916, AR2-WB-SDCH0002-0-090916	NA	1.93E-02	1.15E-03

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Benzo(g,h,i)perylene	mg/kg dw	3/3	1.10E-02 - 1.30E-02	AR2-WB-SDCH0001-0-090916	NA	1.20E-02	1.00E-03
Benzo(k)fluoranthene	mg/kg dw	3/3	6.70E-03 - 7.70E-03	AR2-WB-SDCH0001-0-090916	NA	7.07E-03	5.51E-04
Carbazole	mg/kg dw	3/3	1.40E-03 - 2.20E-03	AR2-WB-SDCH0002-0-090916	NA	1.80E-03	4.00E-04
Chrysene	mg/kg dw	3/3	1.70E-02 - 2.00E-02	AR2-WB-SDCH0001-0-090916	NA	1.80E-02	1.73E-03
Fluoranthene	mg/kg dw	3/3	2.50E-02 - 2.60E-02	AR2-WB-SDCH0001-0-090916	NA	2.53E-02	5.77E-04
Fluorene	mg/kg dw	1/3	1.40E-03 - 1.40E-03	AR2-WB-SDCH0001-0-090916	1.10E-02 - 1.30E-02	8.47E-03	6.20E-03
Indeno(1,2,3-cd)pyrene	mg/kg dw	3/3	1.20E-02 - 1.50E-02	AR2-WB-SDCH0001-0-090916	NA	1.37E-02	1.53E-03
Phenanthrene	mg/kg dw	3/3	1.30E-02 - 1.30E-02	AR2-WB-SDCH0001-0-090916, AR2-WB-SDCH0002-0-090916, AR2-WB-SDCH0003-0-090916	NA	1.30E-02	1.90E-10
Pyrene	mg/kg dw	3/3	2.80E-02 - 3.00E-02	AR2-WB-SDCH0001-0-090916, AR2-WB-SDCH0003-0-090916	NA	2.93E-02	1.15E-03
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	mg/kg dw	3/3	1.67E-06 - 1.82E-06	AR2-WB-SDCH0003-0-090916	NA	1.73E-06	7.81E-08
2,3,7,8-TCDD TEQ (fish)	mg/kg dw	3/3	1.13E-06 - 1.30E-06	AR2-WB-SDCH0003-0-090916	NA	1.19E-06	9.48E-08
2,3,7,8-TCDD TEQ (mammal)	mg/kg dw	3/3	1.02E-06 - 1.16E-06	AR2-WB-SDCH0003-0-090916	NA	1.08E-06	7.27E-08
Dioxin Homologues							
Heptachlorodibenzofuran (total)	mg/kg dw	3/3	8.05E-07 - 2.03E-06	AR2-WB-SDCH0002-0-090916	NA	1.30E-06	6.48E-07
Heptachlorodibenzo-p-dioxin (total)	mg/kg dw	3/3	6.84E-06 - 7.31E-06	AR2-WB-SDCH0002-0-090916	NA	7.15E-06	2.69E-07
Hexachlorodibenzofuran (total)	mg/kg dw	3/3	9.63E-07 - 2.19E-06	AR2-WB-SDCH0001-0-090916	NA	1.73E-06	6.72E-07
Hexachlorodibenzo-p-dioxin (total)	mg/kg dw	3/3	6.87E-07 - 1.54E-06	AR2-WB-SDCH0002-0-090916	NA	1.13E-06	4.27E-07
Pentachlorodibenzofuran (total)	mg/kg dw	3/3	7.48E-07 - 1.93E-06	AR2-WB-SDCH0002-0-090916	NA	1.35E-06	5.91E-07
Tetrachlorodibenzofuran (total)	mg/kg dw	3/3	1.49E-06 - 3.61E-06	AR2-WB-SDCH0002-0-090916	NA	2.46E-06	1.07E-06
PCB Homologues							
Decachlorobiphenyl	mg/kg dw	3/3	4.03E-06 - 1.08E-05	AR2-WB-SDCH0003-0-090916	NA	7.16E-06	3.41E-06
Total HpCB	mg/kg dw	3/3	7.64E-05 - 5.65E-04	AR2-WB-SDCH0003-0-090916	NA	2.47E-04	2.76E-04
Total HxCB	mg/kg dw	1/3	4.12E-04 - 4.12E-04	AR2-WB-SDCH0003-0-090916	8.75E-05 - 1.19E-04	2.06E-04	1.79E-04
Total PCB homologues	mg/kg dw	3/3	1.23E-04 - 1.26E-03	AR2-WB-SDCH0003-0-090916	NA	5.17E-04	6.44E-04
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	mg/kg dw	1/3	1.07E-07 - 1.07E-07	AR2-WB-SDCH0003-0-090916	1.03E-07 - 1.66E-07	1.25E-07	3.53E-08
PCB Dioxin-like Congener TEQ (fish)	mg/kg dw	1/3	5.01E-10 - 5.01E-10	AR2-WB-SDCH0003-0-090916	4.02E-10 - 5.05E-10	4.69E-10	5.82E-11
PCB Dioxin-like Congener TEQ (mammal)	mg/kg dw	1/3	1.96E-09 - 1.96E-09	AR2-WB-SDCH0003-0-090916	1.39E-09 - 1.40E-09	1.58E-09	3.30E-10
tPCBs	mg/kg dw	1/3	7.09E-05 - 7.09E-05	AR2-WB-SDCH0003-0-090916	4.99E-05 - 5.11E-05	5.73E-05	1.18E-05
Inorganics (excepting mercury)							
Arsenic	mg/kg dw	3/3	2.10E+00 - 2.50E+00	AR2-WB-SDCH0003-0-090916	NA	2.27E+00	2.08E-01
Beryllium	mg/kg dw	3/3	2.70E-01 - 3.70E-01	AR2-WB-SDCH0003-0-090916	NA	3.10E-01	5.29E-02

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Cadmium	mg/kg dw	3/3	5.90E-01 - 7.70E-01	AR2-WB-SDCH0003-0-090916	NA	6.53E-01	1.01E-01
Chromium	mg/kg dw	3/3	1.06E+01 - 1.49E+01	AR2-WB-SDCH0003-0-090916	NA	1.23E+01	2.29E+00
Copper	mg/kg dw	3/3	8.10E+00 - 1.17E+01	AR2-WB-SDCH0003-0-090916	NA	9.60E+00	1.87E+00
Lead	mg/kg dw	3/3	7.10E+00 - 9.40E+00	AR2-WB-SDCH0003-0-090916	NA	7.97E+00	1.25E+00
Nickel	mg/kg dw	3/3	1.05E+01 - 1.52E+01	AR2-WB-SDCH0003-0-090916	NA	1.25E+01	2.44E+00
Selenium	mg/kg dw	3/3	6.30E-01 - 7.50E-01	AR2-WB-SDCH0003-0-090916	NA	6.80E-01	6.24E-02
Strontium	mg/kg dw	3/3	4.60E+00 - 6.70E+00	AR2-WB-SDCH0003-0-090916	NA	5.50E+00	1.08E+00
Vanadium	mg/kg dw	3/3	1.27E+01 - 1.82E+01	AR2-WB-SDCH0003-0-090916	NA	1.51E+01	2.82E+00
Zinc	mg/kg dw	3/3	4.64E+01 - 6.59E+01	AR2-WB-SDCH0003-0-090916	NA	5.44E+01	1.02E+01
Mercury							
Mercury, divalent	mg/kg dw	2/3	1.70E-04 - 3.30E-04	AR2-WB-SDCH0003-0-090916	4.50E-04 - 4.50E-04	3.17E-04	1.40E-04
Methylmercury	mg/kg dw	2/3	1.00E-04 - 2.10E-04	AR2-WB-SDCH0002-0-090916	9.00E-04 - 9.00E-04	4.03E-04	4.34E-04
Conventionals							
Residue, total	%	3/3	3.98E+01 - 5.62E+01	AR2-WB-SDCH0001-0-090916	NA	4.72E+01	8.33E+00
Sulfide	mg/kg dw	3/3	1.78E+01 - 3.35E+01	AR2-WB-SDCH0002-0-090916	NA	2.30E+01	9.06E+00
Total organic carbon (TOC)	%	3/3	1.92E+00 - 3.22E+00	AR2-WB-SDCH0002-0-090916	NA	2.43E+00	6.92E-01
AR4/2009							
Volatile Organic Compounds							
Acetophenone	mg/kg dw	2/2	1.50E-02 - 2.70E-02	AR4-00-SDCH0002-0-091008	NA	2.10E-02	8.49E-03
Semivolatile Organic Compounds							
Bis(2-Ethylhexyl)Phthalate	mg/kg dw	1/2	8.30E-03 - 8.30E-03	AR4-00-SDCH0002-0-091008	5.50E-03 - 5.50E-03	6.90E-03	1.98E-03
Dibenzofuran	mg/kg dw	2/2	9.50E-03 - 9.60E-03	AR4-00-SDCH0002-0-091008	NA	9.55E-03	7.07E-05
Phenol	mg/kg dw	1/2	2.10E-03 - 2.10E-03	AR4-00-SDCH0001-0-091008	1.70E-02 - 1.70E-02	9.55E-03	1.05E-02
Polycyclic Aromatic Hydrocarbons							
2-Methylnaphthalene	mg/kg dw	2/2	2.90E-03 - 3.10E-03	AR4-00-SDCH0001-0-091008	NA	3.00E-03	1.41E-04
Acenaphthene	mg/kg dw	2/2	1.20E-02 - 1.50E-02	AR4-00-SDCH0002-0-091008	NA	1.35E-02	2.12E-03
Acenaphthylene	mg/kg dw	2/2	2.60E-02 - 2.90E-02	AR4-00-SDCH0001-0-091008	NA	2.75E-02	2.12E-03
Anthracene	mg/kg dw	2/2	7.00E-02 - 7.10E-02	AR4-00-SDCH0001-0-091008	NA	7.05E-02	7.07E-04
Benzo(a)anthracene	mg/kg dw	2/2	3.80E-01 - 4.60E-01	AR4-00-SDCH0001-0-091008	NA	4.20E-01	5.66E-02
Benzo(a)pyrene	mg/kg dw	2/2	4.40E-01 - 6.40E-01	AR4-00-SDCH0001-0-091008	NA	5.40E-01	1.41E-01
Benzo(b)fluoranthene	mg/kg dw	2/2	6.70E-01 - 8.00E-01	AR4-00-SDCH0001-0-091008	NA	7.35E-01	9.19E-02
Benzo(g,h,i)perylene	mg/kg dw	2/2	2.90E-01 - 4.00E-01	AR4-00-SDCH0001-0-091008	NA	3.45E-01	7.78E-02
Benzo(k)fluoranthene	mg/kg dw	2/2	1.70E-01 - 2.40E-01	AR4-00-SDCH0001-0-091008	NA	2.05E-01	4.95E-02
Carbazole	mg/kg dw	2/2	2.10E-02 - 2.80E-02	AR4-00-SDCH0002-0-091008	NA	2.45E-02	4.95E-03
Chrysene	mg/kg dw	2/2	4.30E-01 - 5.10E-01	AR4-00-SDCH0001-0-091008	NA	4.70E-01	5.66E-02
Dibenz(a,h)anthracene	mg/kg dw	2/2	6.80E-02 - 7.50E-02	AR4-00-SDCH0001-0-091008	NA	7.15E-02	4.95E-03

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Fluoranthene	mg/kg dw	2/2	6.20E-01 - 6.80E-01	AR4-00-SDCH0002-0-091008	NA	6.50E-01	4.24E-02
Fluorene	mg/kg dw	2/2	1.70E-02 - 1.80E-02	AR4-00-SDCH0002-0-091008	NA	1.75E-02	7.07E-04
Indeno(1,2,3-cd)pyrene	mg/kg dw	2/2	3.40E-01 - 4.70E-01	AR4-00-SDCH0001-0-091008	NA	4.05E-01	9.19E-02
Naphthalene	mg/kg dw	2/2	4.70E-03 - 1.10E-02	AR4-00-SDCH0001-0-091008	NA	7.85E-03	4.45E-03
Phenanthrene	mg/kg dw	2/2	2.20E-01 - 2.40E-01	AR4-00-SDCH0002-0-091008	NA	2.30E-01	1.41E-02
Pyrene	mg/kg dw	2/2	6.50E-01 - 6.60E-01	AR4-00-SDCH0001-0-091008	NA	6.55E-01	7.07E-03
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	mg/kg dw	2/2	8.88E-06 - 1.10E-05	AR4-00-SDCH0002-0-091008	NA	9.93E-06	1.48E-06
2,3,7,8-TCDD TEQ (fish)	mg/kg dw	2/2	2.65E-06 - 3.17E-06	AR4-00-SDCH0002-0-091008	NA	2.91E-06	3.64E-07
2,3,7,8-TCDD TEQ (mammal)	mg/kg dw	2/2	2.48E-06 - 2.90E-06	AR4-00-SDCH0002-0-091008	NA	2.69E-06	2.92E-07
Dioxin Homologues							
Heptachlorodibenzofuran (total)	mg/kg dw	2/2	5.57E-06 - 7.59E-06	AR4-00-SDCH0002-0-091008	NA	6.58E-06	1.43E-06
Heptachlorodibenzo-p-dioxin (total)	mg/kg dw	2/2	1.23E-05 - 1.29E-05	AR4-00-SDCH0002-0-091008	NA	1.26E-05	4.24E-07
Hexachlorodibenzofuran (total)	mg/kg dw	2/2	7.82E-06 - 9.18E-06	AR4-00-SDCH0001-0-091008	NA	8.50E-06	9.62E-07
Hexachlorodibenzo-p-dioxin (total)	mg/kg dw	2/2	1.82E-06 - 2.26E-06	AR4-00-SDCH0001-0-091008	NA	2.04E-06	3.11E-07
Pentachlorodibenzofuran (total)	mg/kg dw	2/2	1.10E-05 - 1.38E-05	AR4-00-SDCH0002-0-091008	NA	1.24E-05	1.98E-06
Pentachlorodibenzo-p-dioxin (total)	mg/kg dw	1/2	2.32E-07 - 2.32E-07	AR4-00-SDCH0001-0-091008	1.04E-07 - 1.04E-07	1.68E-07	9.05E-08
Tetrachlorodibenzo(p)dioxin (total)	mg/kg dw	1/2	6.91E-07 - 6.91E-07	AR4-00-SDCH0002-0-091008	9.78E-08 - 9.78E-08	3.94E-07	4.19E-07
Tetrachlorodibenzofuran (total)	mg/kg dw	2/2	1.43E-05 - 2.24E-05	AR4-00-SDCH0002-0-091008	NA	1.84E-05	5.73E-06
Pesticides							
4,4'-DDT	mg/kg dw	1/2	1.30E-03 - 1.30E-03	AR4-00-SDCH0001-0-091008	2.80E-03 - 2.80E-03	2.05E-03	1.06E-03
PCB Homologues							
Decachlorobiphenyl	mg/kg dw	2/2	6.39E-06 - 6.52E-06	AR4-00-SDCH0001-0-091008	NA	6.46E-06	9.19E-08
Total HpCB	mg/kg dw	2/2	2.27E-03 - 4.27E-03	AR4-00-SDCH0001-0-091008	NA	3.27E-03	1.41E-03
Total HxCB	mg/kg dw	2/2	5.01E-03 - 1.48E-02	AR4-00-SDCH0001-0-091008	NA	9.91E-03	6.92E-03
Total PCB homologues	mg/kg dw	2/2	1.11E-02 - 3.52E-02	AR4-00-SDCH0001-0-091008	NA	2.32E-02	1.70E-02
Total PeCB	mg/kg dw	2/2	2.93E-03 - 1.33E-02	AR4-00-SDCH0001-0-091008	NA	8.12E-03	7.33E-03
Total TeCB	mg/kg dw	2/2	4.42E-04 - 2.22E-03	AR4-00-SDCH0001-0-091008	NA	1.33E-03	1.26E-03
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	mg/kg dw	2/2	1.42E-07 - 7.80E-07	AR4-00-SDCH0001-0-091008	NA	4.61E-07	4.52E-07
PCB Dioxin-like Congener TEQ (fish)	mg/kg dw	2/2	1.27E-09 - 1.89E-08	AR4-00-SDCH0001-0-091008	NA	1.01E-08	1.24E-08
PCB Dioxin-like Congener TEQ (mammal)	mg/kg dw	2/2	6.28E-09 - 1.07E-07	AR4-00-SDCH0001-0-091008	NA	5.66E-08	7.12E-08
tPCBs	mg/kg dw	2/2	2.13E-04 - 3.55E-03	AR4-00-SDCH0001-0-091008	NA	1.88E-03	2.36E-03

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Inorganics (excepting mercury)							
Arsenic	mg/kg dw	1/2	9.90E-01 - 9.90E-01	AR4-00-SDCH0001-0-091008	1.00E+00 - 1.00E+00	9.95E-01	7.07E-03
Beryllium	mg/kg dw	2/2	1.20E-01 - 1.40E-01	AR4-00-SDCH0001-0-091008	NA	1.30E-01	1.41E-02
Cadmium	mg/kg dw	2/2	7.80E-02 - 9.10E-02	AR4-00-SDCH0002-0-091008	NA	8.45E-02	9.19E-03
Chromium	mg/kg dw	2/2	4.70E+00 - 5.10E+00	AR4-00-SDCH0002-0-091008	NA	4.90E+00	2.83E-01
Copper	mg/kg dw	2/2	5.50E+00 - 5.80E+00	AR4-00-SDCH0002-0-091008	NA	5.65E+00	2.12E-01
Lead	mg/kg dw	2/2	5.60E+00 - 6.10E+00	AR4-00-SDCH0001-0-091008	NA	5.85E+00	3.54E-01
Nickel	mg/kg dw	2/2	3.90E+00 - 4.10E+00	AR4-00-SDCH0002-0-091008	NA	4.00E+00	1.41E-01
Strontium	mg/kg dw	2/2	2.20E+00 - 2.80E+00	AR4-00-SDCH0002-0-091008	NA	2.50E+00	4.24E-01
Vanadium	mg/kg dw	2/2	8.80E+00 - 9.00E+00	AR4-00-SDCH0001-0-091008	NA	8.90E+00	1.41E-01
Zinc	mg/kg dw	2/2	2.92E+01 - 3.03E+01	AR4-00-SDCH0002-0-091008	NA	2.98E+01	7.78E-01
Mercury							
Mercury	mg/kg dw	2/2	2.20E-02 - 6.20E-02	AR4-00-SDCH0001-0-091008	NA	4.20E-02	2.83E-02
Conventionals							
Residue, total	%	2/2	8.96E+01 - 9.18E+01	AR4-00-SDCH0001-0-091008	NA	9.07E+01	1.56E+00
Sulfide	mg/kg dw	2/2	3.49E+00 - 7.31E+00	AR4-00-SDCH0001-0-091008	NA	5.40E+00	2.70E+00
Total organic carbon (TOC)	%	2/2	3.33E-01 - 7.61E-01	AR4-00-SDCH0002-0-091008	NA	5.47E-01	3.03E-01
AR6/2009							
Semivolatile Organic Compounds							
Dibenzofuran	mg/kg dw	1/1	1.80E-02 - 1.80E-02	AR6-00-SDCH0001-0-090918	NA	1.80E-02	NC
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	mg/kg dw	1/1	3.40E-02 - 3.40E-02	AR6-00-SDCH0001-0-090918	NA	3.40E-02	NC
Acenaphthylene	mg/kg dw	1/1	2.80E-02 - 2.80E-02	AR6-00-SDCH0001-0-090918	NA	2.80E-02	NC
Anthracene	mg/kg dw	1/1	1.50E-01 - 1.50E-01	AR6-00-SDCH0001-0-090918	NA	1.50E-01	NC
Benzo(a)anthracene	mg/kg dw	1/1	9.00E-01 - 9.00E-01	AR6-00-SDCH0001-0-090918	NA	9.00E-01	NC
Benzo(a)pyrene	mg/kg dw	1/1	8.80E-01 - 8.80E-01	AR6-00-SDCH0001-0-090918	NA	8.80E-01	NC
Benzo(b)fluoranthene	mg/kg dw	1/1	1.20E+00 - 1.20E+00	AR6-00-SDCH0001-0-090918	NA	1.20E+00	NC
Benzo(g,h,i)perylene	mg/kg dw	1/1	4.80E-01 - 4.80E-01	AR6-00-SDCH0001-0-090918	NA	4.80E-01	NC
Benzo(k)fluoranthene	mg/kg dw	1/1	4.00E-01 - 4.00E-01	AR6-00-SDCH0001-0-090918	NA	4.00E-01	NC
Carbazole	mg/kg dw	1/1	6.10E-02 - 6.10E-02	AR6-00-SDCH0001-0-090918	NA	6.10E-02	NC
Chrysene	mg/kg dw	1/1	9.20E-01 - 9.20E-01	AR6-00-SDCH0001-0-090918	NA	9.20E-01	NC
Dibenz(a,h)anthracene	mg/kg dw	1/1	4.70E-02 - 4.70E-02	AR6-00-SDCH0001-0-090918	NA	4.70E-02	NC
Fluoranthene	mg/kg dw	1/1	1.40E+00 - 1.40E+00	AR6-00-SDCH0001-0-090918	NA	1.40E+00	NC
Fluorene	mg/kg dw	1/1	3.30E-02 - 3.30E-02	AR6-00-SDCH0001-0-090918	NA	3.30E-02	NC
Indeno(1,2,3-cd)pyrene	mg/kg dw	1/1	6.20E-01 - 6.20E-01	AR6-00-SDCH0001-0-090918	NA	6.20E-01	NC
Phenanthrene	mg/kg dw	1/1	5.30E-01 - 5.30E-01	AR6-00-SDCH0001-0-090918	NA	5.30E-01	NC
Pyrene	mg/kg dw	1/1	1.20E+00 - 1.20E+00	AR6-00-SDCH0001-0-090918	NA	1.20E+00	NC

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	mg/kg dw	1/1	6.72E-05 - 6.72E-05	AR6-00-SDCH0001-0-090918	NA	6.72E-05	NC
2,3,7,8-TCDD TEQ (fish)	mg/kg dw	1/1	1.86E-05 - 1.86E-05	AR6-00-SDCH0001-0-090918	NA	1.86E-05	NC
2,3,7,8-TCDD TEQ (mammal)	mg/kg dw	1/1	1.65E-05 - 1.65E-05	AR6-00-SDCH0001-0-090918	NA	1.65E-05	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	mg/kg dw	1/1	3.24E-05 - 3.24E-05	AR6-00-SDCH0001-0-090918	NA	3.24E-05	NC
Heptachlorodibenzo-p-dioxin (total)	mg/kg dw	1/1	2.18E-05 - 2.18E-05	AR6-00-SDCH0001-0-090918	NA	2.18E-05	NC
Hexachlorodibenzofuran (total)	mg/kg dw	1/1	6.74E-05 - 6.74E-05	AR6-00-SDCH0001-0-090918	NA	6.74E-05	NC
Hexachlorodibenzo-p-dioxin (total)	mg/kg dw	1/1	3.14E-06 - 3.14E-06	AR6-00-SDCH0001-0-090918	NA	3.14E-06	NC
Pentachlorodibenzofuran (total)	mg/kg dw	1/1	1.01E-04 - 1.01E-04	AR6-00-SDCH0001-0-090918	NA	1.01E-04	NC
Tetrachlorodibenzofuran (total)	mg/kg dw	1/1	1.61E-04 - 1.61E-04	AR6-00-SDCH0001-0-090918	NA	1.61E-04	NC
PCB Homologues							
Decachlorobiphenyl	mg/kg dw	1/1	6.25E-05 - 6.25E-05	AR6-00-SDCH0001-0-090918	NA	6.25E-05	NC
Total HpCB	mg/kg dw	1/1	7.62E-02 - 7.62E-02	AR6-00-SDCH0001-0-090918	NA	7.62E-02	NC
Total HxCB	mg/kg dw	1/1	7.74E-02 - 7.74E-02	AR6-00-SDCH0001-0-090918	NA	7.74E-02	NC
Total PCB homologues	mg/kg dw	1/1	2.02E-01 - 2.02E-01	AR6-00-SDCH0001-0-090918	NA	2.02E-01	NC
Total PeCB	mg/kg dw	1/1	2.60E-02 - 2.60E-02	AR6-00-SDCH0001-0-090918	NA	2.60E-02	NC
Total TeCB	mg/kg dw	1/1	6.34E-03 - 6.34E-03	AR6-00-SDCH0001-0-090918	NA	6.34E-03	NC
Total TrCB	mg/kg dw	1/1	1.02E-03 - 1.02E-03	AR6-00-SDCH0001-0-090918	NA	1.02E-03	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	mg/kg dw	1/1	1.83E-06 - 1.83E-06	AR6-00-SDCH0001-0-090918	NA	1.83E-06	NC
PCB Dioxin-like Congener TEQ (fish)	mg/kg dw	1/1	3.89E-08 - 3.89E-08	AR6-00-SDCH0001-0-090918	NA	3.89E-08	NC
PCB Dioxin-like Congener TEQ (mammal)	mg/kg dw	1/1	2.18E-07 - 2.18E-07	AR6-00-SDCH0001-0-090918	NA	2.18E-07	NC
tPCBs	mg/kg dw	1/1	7.34E-03 - 7.34E-03	AR6-00-SDCH0001-0-090918	NA	7.34E-03	NC
Inorganics (excepting mercury)							
Arsenic	mg/kg dw	1/1	1.80E+00 - 1.80E+00	AR6-00-SDCH0001-0-090918	NA	1.80E+00	NC
Beryllium	mg/kg dw	1/1	3.10E-01 - 3.10E-01	AR6-00-SDCH0001-0-090918	NA	3.10E-01	NC
Cadmium	mg/kg dw	1/1	5.90E-01 - 5.90E-01	AR6-00-SDCH0001-0-090918	NA	5.90E-01	NC
Chromium	mg/kg dw	1/1	1.16E+01 - 1.16E+01	AR6-00-SDCH0001-0-090918	NA	1.16E+01	NC
Copper	mg/kg dw	1/1	1.44E+01 - 1.44E+01	AR6-00-SDCH0001-0-090918	NA	1.44E+01	NC
Lead	mg/kg dw	1/1	1.16E+01 - 1.16E+01	AR6-00-SDCH0001-0-090918	NA	1.16E+01	NC
Nickel	mg/kg dw	1/1	9.90E+00 - 9.90E+00	AR6-00-SDCH0001-0-090918	NA	9.90E+00	NC
Selenium	mg/kg dw	1/1	5.80E-01 - 5.80E-01	AR6-00-SDCH0001-0-090918	NA	5.80E-01	NC
Strontium	mg/kg dw	1/1	5.50E+00 - 5.50E+00	AR6-00-SDCH0001-0-090918	NA	5.50E+00	NC
Vanadium	mg/kg dw	1/1	1.70E+01 - 1.70E+01	AR6-00-SDCH0001-0-090918	NA	1.70E+01	NC
Zinc	mg/kg dw	1/1	5.74E+01 - 5.74E+01	AR6-00-SDCH0001-0-090918	NA	5.74E+01	NC

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Mercury							
Mercury	mg/kg dw	1/1	2.60E-01 - 2.60E-01	AR6-00-SDCH0001-0-090918	NA	2.60E-01	NC
Methylmercury	mg/kg dw	1/1	2.80E-04 - 2.80E-04	AR6-00-SDCH0001-0-090918	NA	2.80E-04	NC
Conventionals							
Residue, total	%	1/1	5.63E+01 - 5.63E+01	AR6-00-SDCH0001-0-090918	NA	5.63E+01	NC
Sulfide	mg/kg dw	1/1	2.57E+00 - 2.57E+00	AR6-00-SDCH0001-0-090918	NA	2.57E+00	NC
Total organic carbon (TOC)	%	1/1	1.66E+00 - 1.66E+00	AR6-00-SDCH0001-0-090918	NA	1.66E+00	NC
AR8/2009							
Volatile Organic Compounds							
1,1'-Biphenyl	mg/kg dw	3/3	2.20E-03 - 3.70E-03	AR8-00-SDCH0001-0-090918	NA	3.07E-03	7.77E-04
Acetophenone	mg/kg dw	3/3	1.50E-02 - 1.60E-02	AR8-00-SDCH0002-0-090918, AR8-00-SDCH0003-0-090918	NA	1.57E-02	5.77E-04
Benzaldehyde	mg/kg dw	2/3	8.70E-03 - 9.50E-03	AR8-00-SDCH0002-0-090918	1.60E-02 - 1.60E-02	1.14E-02	4.00E-03
Hexachlorobenzene	mg/kg dw	1/3	1.30E-03 - 1.30E-03	AR8-00-SDCH0002-0-090918	3.90E-03 - 4.50E-03	3.23E-03	1.70E-03
Semivolatile Organic Compounds							
Bis(2-Ethylhexyl)Phthalate	mg/kg dw	3/3	2.10E-02 - 3.60E-02	AR8-00-SDCH0001-0-090918	NA	3.03E-02	8.14E-03
Dibenzofuran	mg/kg dw	3/3	1.20E-02 - 2.70E-02	AR8-00-SDCH0001-0-090918	NA	2.10E-02	7.94E-03
Diethylphthalate	mg/kg dw	1/3	1.60E-03 - 1.60E-03	AR8-00-SDCH0003-0-090918	7.70E-03 - 8.60E-03	5.97E-03	3.81E-03
Di-n-butyl phthalate	mg/kg dw	3/3	7.90E-03 - 1.30E-02	AR8-00-SDCH0001-0-090918	NA	1.10E-02	2.70E-03
Phenol	mg/kg dw	3/3	6.50E-03 - 1.00E-02	AR8-00-SDCH0001-0-090918	NA	8.60E-03	1.85E-03
Polycyclic Aromatic Hydrocarbons							
2-Methylnaphthalene	mg/kg dw	3/3	5.20E-03 - 1.00E-02	AR8-00-SDCH0001-0-090918	NA	8.37E-03	2.74E-03
Acenaphthene	mg/kg dw	3/3	2.70E-02 - 5.40E-02	AR8-00-SDCH0003-0-090918	NA	4.30E-02	1.42E-02
Acenaphthylene	mg/kg dw	3/3	3.00E-02 - 4.60E-02	AR8-00-SDCH0001-0-090918	NA	3.80E-02	8.00E-03
Anthracene	mg/kg dw	3/3	1.30E-01 - 2.60E-01	AR8-00-SDCH0003-0-090918	NA	2.07E-01	6.81E-02
Benzo(a)anthracene	mg/kg dw	3/3	7.90E-01 - 1.40E+00	AR8-00-SDCH0001-0-090918	NA	1.16E+00	3.27E-01
Benzo(a)pyrene	mg/kg dw	3/3	8.40E-01 - 1.30E+00	AR8-00-SDCH0001-0-090918, AR8-00-SDCH0003-0-090918	NA	1.15E+00	2.66E-01
Benzo(b)fluoranthene	mg/kg dw	3/3	1.10E+00 - 1.80E+00	AR8-00-SDCH0001-0-090918	NA	1.53E+00	3.79E-01
Benzo(g,h,i)perylene	mg/kg dw	3/3	4.60E-01 - 8.10E-01	AR8-00-SDCH0003-0-090918	NA	6.27E-01	1.76E-01
Benzo(k)fluoranthene	mg/kg dw	3/3	5.30E-01 - 6.70E-01	AR8-00-SDCH0003-0-090918	NA	6.10E-01	7.21E-02
Carbazole	mg/kg dw	3/3	4.00E-02 - 8.80E-02	AR8-00-SDCH0003-0-090918	NA	7.03E-02	2.64E-02
Chrysene	mg/kg dw	3/3	8.20E-01 - 1.50E+00	AR8-00-SDCH0001-0-090918, AR8-00-SDCH0003-0-090918	NA	1.27E+00	3.93E-01
Dibenz(a,h)anthracene	mg/kg dw	3/3	3.80E-02 - 6.60E-02	AR8-00-SDCH0001-0-090918	NA	5.50E-02	1.49E-02
Fluoranthene	mg/kg dw	3/3	1.20E+00 - 2.20E+00	AR8-00-SDCH0003-0-090918	NA	1.80E+00	5.29E-01

Table 2-19
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River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Fluorene	mg/kg dw	3/3	3.20E-02 - 6.00E-02	AR8-00-SDCH0003-0-090918	NA	4.90E-02	1.49E-02
Indeno(1,2,3-cd)pyrene	mg/kg dw	3/3	4.90E-01 - 8.00E-01	AR8-00-SDCH0003-0-090918	NA	6.70E-01	1.61E-01
Naphthalene	mg/kg dw	3/3	9.80E-03 - 1.70E-02	AR8-00-SDCH0003-0-090918	NA	1.43E-02	3.90E-03
Phenanthrene	mg/kg dw	3/3	5.30E-01 - 9.30E-01	AR8-00-SDCH0003-0-090918	NA	7.53E-01	2.04E-01
Pyrene	mg/kg dw	3/3	1.30E+00 - 2.10E+00	AR8-00-SDCH0003-0-090918	NA	1.77E+00	4.16E-01
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	mg/kg dw	3/3	6.42E-05 - 1.31E-04	AR8-00-SDCH0001-0-090918	NA	1.02E-04	3.43E-05
2,3,7,8-TCDD TEQ (fish)	mg/kg dw	3/3	1.84E-05 - 4.06E-05	AR8-00-SDCH0002-0-090918	NA	2.92E-05	1.11E-05
2,3,7,8-TCDD TEQ (mammal)	mg/kg dw	3/3	1.59E-05 - 3.42E-05	AR8-00-SDCH0002-0-090918	NA	2.53E-05	9.18E-06
Dioxin Homologues							
Heptachlorodibenzofuran (total)	mg/kg dw	3/3	2.54E-05 - 8.69E-05	AR8-00-SDCH0002-0-090918	NA	4.59E-05	3.55E-05
Heptachlorodibenzo-p-dioxin (total)	mg/kg dw	3/3	2.86E-05 - 3.56E-05	AR8-00-SDCH0001-0-090918	NA	3.23E-05	3.52E-06
Hexachlorodibenzofuran (total)	mg/kg dw	3/3	5.88E-05 - 1.99E-04	AR8-00-SDCH0002-0-090918	NA	1.07E-04	8.01E-05
Hexachlorodibenzo-p-dioxin (total)	mg/kg dw	3/3	5.85E-06 - 9.72E-06	AR8-00-SDCH0001-0-090918	NA	7.26E-06	2.14E-06
Pentachlorodibenzofuran (total)	mg/kg dw	3/3	1.02E-04 - 2.15E-04	AR8-00-SDCH0002-0-090918	NA	1.60E-04	5.66E-05
Pentachlorodibenzo-p-dioxin (total)	mg/kg dw	2/3	4.49E-07 - 9.45E-07	AR8-00-SDCH0001-0-090918	2.63E-07 - 2.63E-07	5.52E-07	3.53E-07
Tetrachlorodibenzofuran (total)	mg/kg dw	3/3	1.34E-04 - 3.97E-04	AR8-00-SDCH0001-0-090918	NA	2.36E-04	1.41E-04
Pesticides							
o,p'-DDT	mg/kg dw	2/3	5.10E-04 - 4.40E-03	AR8-00-SDCH0003-0-090918	3.90E-03 - 3.90E-03	2.94E-03	2.12E-03
PCB Homologues							
Decachlorobiphenyl	mg/kg dw	3/3	2.13E-05 - 2.48E-05	AR8-00-SDCH0002-0-090918	NA	2.26E-05	1.92E-06
Total HpCB	mg/kg dw	3/3	3.57E-03 - 8.55E-03	AR8-00-SDCH0001-0-090918	NA	5.35E-03	2.78E-03
Total HxCB	mg/kg dw	3/3	5.17E-03 - 9.09E-03	AR8-00-SDCH0001-0-090918	NA	6.62E-03	2.15E-03
Total PCB homologues	mg/kg dw	3/3	1.31E-02 - 2.38E-02	AR8-00-SDCH0001-0-090918	NA	1.68E-02	6.07E-03
Total PeCB	mg/kg dw	3/3	2.26E-03 - 2.79E-03	AR8-00-SDCH0001-0-090918	NA	2.46E-03	2.86E-04
Total TeCB	mg/kg dw	3/3	7.51E-04 - 1.01E-03	AR8-00-SDCH0003-0-090918	NA	8.70E-04	1.31E-04
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	mg/kg dw	3/3	2.41E-07 - 5.09E-07	AR8-00-SDCH0002-0-090918	NA	3.49E-07	1.42E-07
PCB Dioxin-like Congener TEQ (fish)	mg/kg dw	3/3	2.48E-09 - 4.06E-09	AR8-00-SDCH0001-0-090918	NA	3.32E-09	7.90E-10
PCB Dioxin-like Congener TEQ (mammal)	mg/kg dw	3/3	1.27E-08 - 2.17E-08	AR8-00-SDCH0001-0-090918	NA	1.66E-08	4.60E-09
tPCBs	mg/kg dw	3/3	4.33E-04 - 7.41E-04	AR8-00-SDCH0001-0-090918	NA	5.68E-04	1.57E-04
Inorganics (excepting mercury)							
Arsenic	mg/kg dw	3/3	1.70E+00 - 3.60E+00	AR8-00-SDCH0002-0-090918	NA	2.33E+00	1.10E+00
Beryllium	mg/kg dw	3/3	3.00E-01 - 3.50E-01	AR8-00-SDCH0001-0-090918, AR8-00-SDCH0003-0-090918	NA	3.33E-01	2.89E-02
Cadmium	mg/kg dw	3/3	5.30E-01 - 5.60E-01	AR8-00-SDCH0001-0-090918	NA	5.40E-01	1.73E-02

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River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Chromium	mg/kg dw	3/3	1.03E+01 - 1.34E+01	AR8-00-SDCH0001-0-090918	NA	1.16E+01	1.59E+00
Copper	mg/kg dw	3/3	1.38E+01 - 1.90E+01	AR8-00-SDCH0001-0-090918	NA	1.68E+01	2.71E+00
Lead	mg/kg dw	3/3	1.10E+01 - 1.66E+01	AR8-00-SDCH0003-0-090918	NA	1.44E+01	2.99E+00
Nickel	mg/kg dw	3/3	8.70E+00 - 9.50E+00	AR8-00-SDCH0001-0-090918	NA	8.97E+00	4.62E-01
Selenium	mg/kg dw	3/3	5.40E-01 - 6.50E-01	AR8-00-SDCH0003-0-090918	NA	6.07E-01	5.86E-02
Strontium	mg/kg dw	3/3	5.40E+00 - 5.80E+00	AR8-00-SDCH0001-0-090918	NA	5.63E+00	2.08E-01
Vanadium	mg/kg dw	3/3	1.49E+01 - 1.63E+01	AR8-00-SDCH0001-0-090918	NA	1.57E+01	7.21E-01
Zinc	mg/kg dw	3/3	5.52E+01 - 5.73E+01	AR8-00-SDCH0001-0-090918	NA	5.65E+01	1.16E+00
Mercury							
Mercury	mg/kg dw	1/3	1.90E-01 - 1.90E-01	AR8-00-SDCH0002-0-090918	1.00E-01 - 1.10E-01	1.33E-01	4.93E-02
Methylmercury	mg/kg dw	3/3	5.30E-04 - 1.03E-03	AR8-00-SDCH0002-0-090918	NA	8.53E-04	2.80E-04
Conventionals							
Residue, total	%	3/3	5.64E+01 - 6.53E+01	AR8-00-SDCH0001-0-090918	NA	5.99E+01	4.76E+00
Sulfide	mg/kg dw	3/3	1.97E+00 - 3.50E+00	AR8-00-SDCH0002-0-090918	NA	2.77E+00	7.67E-01
Total organic carbon (TOC)	%	3/3	1.64E+00 - 2.09E+00	AR8-00-SDCH0003-0-090918	NA	1.83E+00	2.35E-01
AR9/2009							
Volatile Organic Compounds							
Acetophenone	mg/kg dw	1/4	3.80E-02 - 3.80E-02	AR9-00-SDCH0001-0-090917	1.90E-01 - 4.90E-01	2.80E-01	1.95E-01
Benzaldehyde	mg/kg dw	1/4	1.10E-02 - 1.10E-02	AR9-00-SDCH0001-0-090917	7.60E-02 - 2.00E-01	1.12E-01	8.17E-02
Semivolatile Organic Compounds							
4-Methylphenol	mg/kg dw	1/4	7.60E-03 - 7.60E-03	AR9-00-SDCH0001-0-090917	3.80E-02 - 9.80E-02	5.57E-02	3.89E-02
Bis(2-Ethylhexyl)Phthalate	mg/kg dw	1/4	2.30E-02 - 2.30E-02	AR9-00-SDCH0001-0-090917	3.80E-02 - 9.80E-02	5.95E-02	3.28E-02
Dibenzofuran	mg/kg dw	4/4	8.70E-03 - 7.00E-02	AR9-00-SDCH0003-0-090917	NA	3.34E-02	2.69E-02
Phenol	mg/kg dw	1/4	8.80E-03 - 8.80E-03	AR9-00-SDCH0001-0-090917	1.20E-01 - 3.00E-01	1.65E-01	1.25E-01
Polycyclic Aromatic Hydrocarbons							
2-Methylnaphthalene	mg/kg dw	3/4	4.50E-03 - 3.30E-02	AR9-00-SDCH0003-0-090917	4.40E-02 - 7.30E-02	2.51E-02	1.71E-02
Acenaphthene	mg/kg dw	4/4	1.80E-02 - 1.40E-01	AR9-00-SDCH0003-0-090917	NA	7.46E-02	5.14E-02
Acenaphthylene	mg/kg dw	4/4	2.00E-02 - 5.50E-02	AR9-00-SDCH0003-0-090917	NA	3.53E-02	1.67E-02
Anthracene	mg/kg dw	4/4	9.20E-02 - 4.30E-01	AR9-00-SDCH0003-0-090917	NA	2.53E-01	1.38E-01
Benzo(a)anthracene	mg/kg dw	4/4	5.90E-01 - 2.40E+00	AR9-00-SDCH0002-1-090917	NA	1.62E+00	8.77E-01
Benzo(a)pyrene	mg/kg dw	4/4	6.00E-01 - 2.90E+00	AR9-00-SDCH0002-1-090917	NA	1.65E+00	1.05E+00
Benzo(b)fluoranthene	mg/kg dw	4/4	7.80E-01 - 3.80E+00	AR9-00-SDCH0002-1-090917	NA	2.25E+00	1.40E+00
Benzo(g,h,i)perylene	mg/kg dw	4/4	3.70E-01 - 2.30E+00	AR9-00-SDCH0002-1-090917	NA	1.10E+00	8.79E-01
Benzo(k)fluoranthene	mg/kg dw	4/4	3.50E-01 - 1.40E+00	AR9-00-SDCH0002-1-090917	NA	8.20E-01	4.74E-01
Carbazole	mg/kg dw	4/4	2.50E-02 - 1.40E-01	AR9-00-SDCH0003-0-090917	NA	7.90E-02	4.90E-02
Chrysene	mg/kg dw	4/4	6.20E-01 - 2.70E+00	AR9-00-SDCH0002-1-090917	NA	1.73E+00	9.84E-01

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Dibenz(a,h)anthracene	mg/kg dw	4/4	3.00E-02 - 3.50E-01	AR9-00-SDCH0003-0-090917	NA	1.45E-01	1.45E-01
Fluoranthene	mg/kg dw	4/4	8.10E-01 - 3.80E+00	AR9-00-SDCH0002-1-090917	NA	2.50E+00	1.44E+00
Fluorene	mg/kg dw	4/4	2.10E-02 - 1.50E-01	AR9-00-SDCH0003-0-090917	NA	8.05E-02	5.49E-02
Indeno(1,2,3-cd)pyrene	mg/kg dw	4/4	3.80E-01 - 1.60E+00	AR9-00-SDCH0002-1-090917, AR9-00-SDCH0003-0-090917	NA	1.09E+00	6.13E-01
Naphthalene	mg/kg dw	3/4	1.00E-02 - 5.00E-02	AR9-00-SDCH0003-0-090917	4.40E-02 - 7.30E-02	3.23E-02	1.83E-02
Phenanthrene	mg/kg dw	4/4	3.10E-01 - 1.70E+00	AR9-00-SDCH0003-0-090917	NA	9.49E-01	5.88E-01
Pyrene	mg/kg dw	4/4	8.60E-01 - 3.40E+00	AR9-00-SDCH0003-0-090917	NA	2.27E+00	1.24E+00
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	mg/kg dw	4/4	4.26E-05 - 1.37E-03	AR9-00-SDCH0003-0-090917	NA	4.28E-04	6.32E-04
2,3,7,8-TCDD TEQ (fish)	mg/kg dw	4/4	1.02E-05 - 3.50E-04	AR9-00-SDCH0003-0-090917	NA	1.06E-04	1.63E-04
2,3,7,8-TCDD TEQ (mammal)	mg/kg dw	4/4	9.39E-06 - 2.91E-04	AR9-00-SDCH0003-0-090917	NA	8.99E-05	1.34E-04
Dioxin Homologues							
Heptachlorodibenzofuran (total)	mg/kg dw	4/4	1.10E-05 - 1.25E-04	AR9-00-SDCH0003-0-090917	NA	6.45E-05	5.28E-05
Heptachlorodibenzo-p-dioxin (total)	mg/kg dw	4/4	6.99E-06 - 7.07E-04	AR9-00-SDCH0004-0-090917	NA	1.88E-04	3.46E-04
Hexachlorodibenzofuran (total)	mg/kg dw	4/4	2.84E-05 - 6.79E-04	AR9-00-SDCH0003-0-090917	NA	2.17E-04	3.09E-04
Hexachlorodibenzo-p-dioxin (total)	mg/kg dw	4/4	5.48E-07 - 2.62E-05	AR9-00-SDCH0004-0-090917	NA	8.92E-06	1.16E-05
Pentachlorodibenzofuran (total)	mg/kg dw	4/4	4.65E-05 - 1.92E-03	AR9-00-SDCH0003-0-090917	NA	5.80E-04	8.96E-04
Pentachlorodibenzo-p-dioxin (total)	mg/kg dw	1/4	3.53E-07 - 3.53E-07	AR9-00-SDCH0004-0-090917	2.16E-07 - 3.12E-07	2.88E-07	4.43E-08
Tetrachlorodibenzofuran (total)	mg/kg dw	4/4	9.00E-05 - 2.59E-03	AR9-00-SDCH0003-0-090917	NA	8.74E-04	1.16E-03
Pesticides							
gamma-BHC (Lindane)	mg/kg dw	2/4	5.70E-04 - 1.20E-03	AR9-00-SDCH0003-0-090917	3.60E-03 - 4.40E-03	2.47E-03	1.87E-03
o,p'-DDT	mg/kg dw	3/4	1.40E-03 - 3.10E-03	AR9-00-SDCH0004-0-090917	3.60E-03 - 4.40E-03	2.90E-03	1.24E-03
PCB Homologues							
Decachlorobiphenyl	mg/kg dw	4/4	8.25E-06 - 6.13E-05	AR9-00-SDCH0002-1-090917	NA	3.29E-05	2.41E-05
Total DiCB	mg/kg dw	1/4	3.87E-04 - 3.87E-04	AR9-00-SDCH0003-0-090917	6.83E-05 - 2.04E-04	1.93E-04	1.41E-04
Total HpCB	mg/kg dw	4/4	5.23E-03 - 2.26E-02	AR9-00-SDCH0003-0-090917	NA	9.90E-03	8.49E-03
Total HxCB	mg/kg dw	4/4	6.21E-03 - 1.27E-01	AR9-00-SDCH0003-0-090917	NA	3.82E-02	5.93E-02
Total MoCB	mg/kg dw	2/4	6.07E-05 - 1.02E-04	AR9-00-SDCH0003-0-090917	9.78E-06 - 2.76E-05	5.00E-05	4.06E-05
Total PCB homologues	mg/kg dw	4/4	1.57E-02 - 3.10E-01	AR9-00-SDCH0003-0-090917	NA	9.31E-02	1.45E-01
Total PeCB	mg/kg dw	4/4	2.22E-03 - 1.34E-01	AR9-00-SDCH0003-0-090917	NA	3.63E-02	6.51E-02
Total TeCB	mg/kg dw	4/4	6.51E-04 - 2.30E-02	AR9-00-SDCH0003-0-090917	NA	6.76E-03	1.08E-02
Total TrCB	mg/kg dw	1/4	7.19E-04 - 7.19E-04	AR9-00-SDCH0003-0-090917	1.23E-04 - 2.88E-04	3.52E-04	2.56E-04

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	mg/kg dw	4/4	2.42E-07 - 3.40E-06	AR9-00-SDCH0003-0-090917	NA	1.10E-06	1.53E-06
PCB Dioxin-like Congener TEQ (fish)	mg/kg dw	4/4	2.72E-09 - 1.99E-07	AR9-00-SDCH0003-0-090917	NA	5.30E-08	9.72E-08
PCB Dioxin-like Congener TEQ (mammal)	mg/kg dw	4/4	1.41E-08 - 1.17E-06	AR9-00-SDCH0003-0-090917	NA	3.11E-07	5.75E-07
tPCBs	mg/kg dw	4/4	4.77E-04 - 3.91E-02	AR9-00-SDCH0003-0-090917	NA	1.04E-02	1.92E-02
Inorganics (excepting mercury)							
Arsenic	mg/kg dw	4/4	1.30E+00 - 7.30E+00	AR9-00-SDCH0002-1-090917	1.00E+00 - 1.00E+00	2.90E+00	2.94E+00
Beryllium	mg/kg dw	4/4	2.50E-01 - 3.50E-01	AR9-00-SDCH0003-0-090917	NA	2.86E-01	4.39E-02
Cadmium	mg/kg dw	4/4	3.70E-01 - 5.60E-01	AR9-00-SDCH0003-0-090917	NA	4.49E-01	8.87E-02
Chromium	mg/kg dw	4/4	6.90E+00 - 1.07E+01	AR9-00-SDCH0003-0-090917	NA	8.66E+00	1.72E+00
Copper	mg/kg dw	4/4	8.50E+00 - 2.89E+01	AR9-00-SDCH0003-0-090917	NA	1.57E+01	8.95E+00
Lead	mg/kg dw	4/4	6.60E+00 - 1.47E+01	AR9-00-SDCH0003-0-090917	NA	1.08E+01	3.94E+00
Nickel	mg/kg dw	4/4	5.20E+00 - 8.10E+00	AR9-00-SDCH0003-0-090917	NA	6.50E+00	1.34E+00
Selenium	mg/kg dw	4/4	5.30E-01 - 1.10E+00	AR9-00-SDCH0003-0-090917	3.50E+00 - 3.50E+00	7.70E-01	2.39E-01
Strontium	mg/kg dw	4/4	4.00E+00 - 8.00E+00	AR9-00-SDCH0004-0-090917	NA	5.85E+00	2.00E+00
Vanadium	mg/kg dw	4/4	1.07E+01 - 1.55E+01	AR9-00-SDCH0003-0-090917	NA	1.29E+01	2.05E+00
Zinc	mg/kg dw	4/4	3.74E+01 - 5.36E+01	AR9-00-SDCH0003-0-090917	NA	4.59E+01	6.63E+00
Mercury							
Mercury	mg/kg dw	1/4	7.90E+00 - 7.90E+00	AR9-00-SDCH0002-0-090917	1.00E-01 - 1.00E-01	2.05E+00	3.90E+00
Mercury, divalent	mg/kg dw	1/4	1.20E-04 - 1.20E-04	AR9-00-SDCH0002-0-090917	4.50E-04 - 4.50E-04	3.68E-04	1.65E-04
Methylmercury	mg/kg dw	4/4	2.20E-04 - 2.04E-03	AR9-00-SDCH0004-0-090917	NA	1.17E-03	5.94E-04
Conventionals							
Residue, total	%	4/4	5.09E+01 - 6.91E+01	AR9-00-SDCH0002-0-090917	NA	5.84E+01	6.88E+00
Sulfide	mg/kg dw	4/4	1.34E+00 - 3.72E+00	AR9-00-SDCH0004-0-090917	NA	2.39E+00	9.46E-01
Total organic carbon (TOC)	%	4/4	1.08E+00 - 3.90E+00	AR9-00-SDCH0002-1-090917	NA	2.67E+00	1.42E+00
AR2/2010							
Mercury	mg/kg dw	8/8	1.09E-02 - 3.79E-02	AR2-5 FD3	NA	2.53E-02	8.21E-03
Methylmercury	mg/kg dw	2/2	2.32E-04 - 4.75E-04	AR2-4 N	NA	3.53E-04	1.72E-04
AR4/2010							
Mercury	mg/kg dw	8/8	3.71E-02 - 2.96E-01	AR4-1 N	NA	1.03E-01	8.22E-02
Methylmercury	mg/kg dw	2/2	2.38E-04 - 7.39E-04	AR4-2 N	NA	4.88E-04	3.55E-04
AR5/2010							
Mercury	mg/kg dw	8/8	1.16E-01 - 6.62E-01	AR5-2 FD3	NA	2.72E-01	0.20214815
Methylmercury	mg/kg dw	2/2	1.26E-03 - 1.39E-03	AR5-2 N	NA	1.32E-03	9.13E-05

Table 2-19
Summary of Chemicals Detected in Sediment - 2006, 2009, and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR6/2010							
Mercury	mg/kg dw	8/8	5.77E-02 - 3.33E-01	AR6-3 N	NA	1.47E-01	9.70E-02
Methylmercury	mg/kg dw	2/2	6.54E-04 - 1.70E-03	AR6-3 N	NA	1.18E-03	7.38E-04
AR7/2010							
Mercury	mg/kg dw	8/8	9.04E-02 - 3.59E-01	AR7-1 FD2	NA	1.72E-01	0.09001137
Methylmercury	mg/kg dw	2/2	7.84E-04 - 1.29E-03	AR7-2 N	NA	1.03E-03	3.54E-04
AR8/2010							
Mercury	mg/kg dw	8/8	8.15E-02 - 3.21E-01	AR8-5 N	NA	1.46E-01	7.40E-02
Methylmercury	mg/kg dw	2/2	6.52E-04 - 9.57E-04	AR8-4 N	NA	8.05E-04	2.16E-04
AR9/2010							
Mercury	mg/kg dw	12/12	2.34E-02 - 3.75E-01	AR9-7 N	NA	1.12E-01	9.87E-02
Methylmercury	mg/kg dw	3/3	3.39E-04 - 1.61E-03	AR9-7 N	NA	1.06E-03	6.52E-04

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
mg/kg dw = Milligrams per kilogram dry weight.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.

Table 2-20
Summary of Chemicals Detected in Larvae - 2009
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR2 [a]							
Mercury	µg/kg ww	2/2	1.02E+01 - 1.06E+01	AR2-IT-01A	NA	1.04E+01	3.08E-01
AR3 [b]							
Mercury	µg/kg ww	8/8	3.00E+01 - 1.88E+03	AR3-ET-01A	NA	2.91E+02	6.42E+02

Notes:
[a]Burrow mayfly larve.
[b]Dragonfly, mayfly, stonefly, and water penny larve.
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg ww = Micrograms per kilograms wet weight.

Table 2-21
Summary of Chemicals Detected in Rock Basket Composite - 2009
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR2							
Mercury	µg/kg ww	1/1	4.53E+01 - 4.59E+01	AR2-RB- DUP	NA	4.56E+01	NC
AR3							
Mercury	µg/kg ww	1/1	2.35E+02 - 2.35E+02	AR3-RB	NA	2.35E+02	NC
AR4							
Mercury	µg/kg ww	1/1	1.22E+02 - 1.22E+02	AR4-RB	NA	1.22E+02	NC
AR8							
Mercury	µg/kg ww	1/1	5.74E+01 - 5.74E+01	AR8-RB	NA	5.74E+01	NC
AR9							
Mercury	µg/kg ww	1/1	7.14E+01 - 7.14E+01	AR9-RB	NA	7.14E+01	NC

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one samp
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg ww = Micrograms per kilograms wet weight.

Table 2-22
Summary of Chemicals Detected in Oligochaetes - 2009 and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR2/2009							
Mercury	µg/kg ww	3/3	1.83E+01 - 2.23E+01	AR2-IT-01B	NA	1.98E+01	1.66E+00
AR6/2009							
Mercury	µg/kg ww	1/1	3.45E+01 - 3.45E+01	AR6-IT-01	NA	3.45E+01	NC
AR8/2009							
Mercury	µg/kg ww	3/3	2.36E+01 - 3.63E+01	AR8-IT-01	NA	3.16E+01	7.02E+00
AR9/2009							
Mercury	µg/kg ww	3/3	3.07E+01 - 4.71E+01	AR9-IT-04	NA	3.97E+01	8.29E+00
AR2/2010							
Mercury	µg/kg ww	2/2	1.68E+01 - 2.16E+01	AR2-IT-05-100823	NA	1.88E+01	2.80E+00
AR4/2010							
Mercury	µg/kg ww	1/1	2.21E+01 - 2.21E+01	AR4-IT-01-100827	NA	2.21E+01	NC
AR5/2010							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	1/1	1.49E-02 - 1.49E-02	AR5-IT-02-100827	NA	1.49E-02	NC
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	1/1	3.09E-03 - 3.09E-03	AR5-IT-02-100827	NA	3.09E-03	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	1/1	2.51E-03 - 2.51E-03	AR5-IT-02-100827	NA	2.51E-03	NC
Heptachlorodibenzo-p-dioxin (total)	µg/kg ww	1/1	2.92E-03 - 2.92E-03	AR5-IT-02-100827	NA	2.92E-03	NC
Hexachlorodibenzofuran (total)	µg/kg ww	1/1	6.11E-03 - 6.11E-03	AR5-IT-02-100827	NA	6.11E-03	NC
Hexachlorodibenzo-p-dioxin (total)	µg/kg ww	1/1	8.64E-04 - 8.64E-04	AR5-IT-02-100827	NA	8.64E-04	NC
Pentachlorodibenzofuran (total)	µg/kg ww	1/1	1.53E-02 - 1.53E-02	AR5-IT-02-100827	NA	1.53E-02	NC
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	1/1	7.53E-04 - 7.53E-04	AR5-IT-02-100827	NA	7.53E-04	NC
Tetrachlorodibenzofuran (total)	µg/kg ww	1/1	3.40E-02 - 3.40E-02	AR5-IT-02-100827	NA	3.40E-02	NC
PCB Homologues							
Decachlorobiphenyl	µg/kg ww	1/1	2.09E-02 - 2.09E-02	AR5-IT-02-100827	NA	2.09E-02	NC
Total HpCB	µg/kg ww	1/1	6.44E+00 - 6.44E+00	AR5-IT-02-100827	NA	6.44E+00	NC
Total HxCB	µg/kg ww	1/1	1.09E+01 - 1.09E+01	AR5-IT-02-100827	NA	1.09E+01	NC
Total PCB homologues	µg/kg ww	1/1	2.61E+01 - 2.61E+01	AR5-IT-02-100827	NA	2.61E+01	NC
Total PeCB	µg/kg ww	1/1	5.52E+00 - 5.52E+00	AR5-IT-02-100827	NA	5.52E+00	NC
Total TeCB	µg/kg ww	1/1	2.02E+00 - 2.02E+00	AR5-IT-02-100827	NA	2.02E+00	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	1/1	4.06E-04 - 4.06E-04	AR5-IT-02-100827	NA	4.06E-04	NC
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	1/1	9.83E-05 - 9.83E-05	AR5-IT-02-100827	NA	9.83E-05	NC
tPCBs	µg/kg ww	1/1	6.88E-01 - 6.88E-01	AR5-IT-02-100827	NA	6.88E-01	NC

Table 2-22
Summary of Chemicals Detected in Oligochaetes - 2009 and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Mercury							
Mercury	µg/kg ww	2/2	3.94E+01 - 4.43E+01	AR5-IT-02-100827	NA	4.18E+01	3.46E+00
AR6/2010							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	1/1	2.38E-02 - 2.38E-02	AR6-IT-03-100826	NA	2.38E-02	NC
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	1/1	4.63E-03 - 4.63E-03	AR6-IT-03-100826	NA	4.63E-03	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	1/1	4.40E-03 - 4.40E-03	AR6-IT-03-100826	NA	4.40E-03	NC
Heptachlorodibenzo-p-dioxin (total)	µg/kg ww	1/1	6.70E-03 - 6.70E-03	AR6-IT-03-100826	NA	6.70E-03	NC
Hexachlorodibenzofuran (total)	µg/kg ww	1/1	8.86E-03 - 8.86E-03	AR6-IT-03-100826	NA	8.86E-03	NC
Hexachlorodibenzo-p-dioxin (total)	µg/kg ww	1/1	1.95E-03 - 1.95E-03	AR6-IT-03-100826	NA	1.95E-03	NC
Pentachlorodibenzofuran (total)	µg/kg ww	1/1	2.40E-02 - 2.40E-02	AR6-IT-03-100826	NA	2.40E-02	NC
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	1/1	4.64E-04 - 4.64E-04	AR6-IT-03-100826	NA	4.64E-04	NC
Tetrachlorodibenzofuran (total)	µg/kg ww	1/1	4.47E-02 - 4.47E-02	AR6-IT-03-100826	NA	4.47E-02	NC
PCB Homologues							
Decachlorobiphenyl	µg/kg ww	1/1	4.89E-02 - 4.89E-02	AR6-IT-03-100826	NA	4.89E-02	NC
Total HpCB	µg/kg ww	1/1	9.03E+01 - 9.03E+01	AR6-IT-03-100826	NA	9.03E+01	NC
Total HxCB	µg/kg ww	1/1	2.07E+02 - 2.07E+02	AR6-IT-03-100826	NA	2.07E+02	NC
Total PCB homologues	µg/kg ww	1/1	3.62E+02 - 3.62E+02	AR6-IT-03-100826	NA	3.62E+02	NC
Total PeCB	µg/kg ww	1/1	4.19E+01 - 4.19E+01	AR6-IT-03-100826	NA	4.19E+01	NC
Total TeCB	µg/kg ww	1/1	5.30E+00 - 5.30E+00	AR6-IT-03-100826	NA	5.30E+00	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	1/1	9.31E-04 - 9.31E-04	AR6-IT-03-100826	NA	9.31E-04	NC
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	1/1	1.00E-03 - 1.00E-03	AR6-IT-03-100826	NA	1.00E-03	NC
tPCBs	µg/kg ww	1/1	3.62E+00 - 3.62E+00	AR6-IT-03-100826	NA	3.62E+00	NC
Mercury							
Mercury	µg/kg ww	1/1	4.52E+01 - 4.52E+01	AR6-IT-03-100826	NA	4.52E+01	NC
AR7/2010							
Mercury	µg/kg ww	2/2	2.55E+01 - 2.99E+01	AR7-IT-02-100826	NA	2.77E+01	3.14E+00
AR8/2010							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	1/1	1.14E-02 - 1.14E-02	AR8-IT-04-100824	NA	1.14E-02	NC
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	1/1	2.47E-03 - 2.47E-03	AR8-IT-04-100824	NA	2.47E-03	NC

Table 2-22
Summary of Chemicals Detected in Oligochaetes - 2009 and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	1/1	3.13E-03 - 3.13E-03	AR8-IT-04-100824	NA	3.13E-03	NC
Heptachlorodibenzo-p-dioxin (total)	µg/kg ww	1/1	5.32E-03 - 5.32E-03	AR8-IT-04-100824	NA	5.32E-03	NC
Hexachlorodibenzofuran (total)	µg/kg ww	1/1	5.80E-03 - 5.80E-03	AR8-IT-04-100824	NA	5.80E-03	NC
Hexachlorodibenzo-p-dioxin (total)	µg/kg ww	1/1	1.59E-03 - 1.59E-03	AR8-IT-04-100824	NA	1.59E-03	NC
Pentachlorodibenzofuran (total)	µg/kg ww	1/1	1.36E-02 - 1.36E-02	AR8-IT-04-100824	NA	1.36E-02	NC
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	1/1	5.83E-04 - 5.83E-04	AR8-IT-04-100824	NA	5.83E-04	NC
Tetrachlorodibenzofuran (total)	µg/kg ww	1/1	2.03E-02 - 2.03E-02	AR8-IT-04-100824	NA	2.03E-02	NC
PCB Homologues							
Decachlorobiphenyl	µg/kg ww	1/1	2.86E-02 - 2.86E-02	AR8-IT-04-100824	NA	2.86E-02	NC
Total HpCB	µg/kg ww	1/1	2.11E+01 - 2.11E+01	AR8-IT-04-100824	NA	2.11E+01	NC
Total HxCB	µg/kg ww	1/1	3.20E+01 - 3.20E+01	AR8-IT-04-100824	NA	3.20E+01	NC
Total PCB homologues	µg/kg ww	1/1	6.59E+01 - 6.59E+01	AR8-IT-04-100824	NA	6.59E+01	NC
Total PeCB	µg/kg ww	1/1	7.07E+00 - 7.07E+00	AR8-IT-04-100824	NA	7.07E+00	NC
Total TeCB	µg/kg ww	1/1	1.17E+00 - 1.17E+00	AR8-IT-04-100824	NA	1.17E+00	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	1/1	5.04E-04 - 5.04E-04	AR8-IT-04-100824	NA	5.04E-04	NC
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	1/1	4.16E-04 - 4.16E-04	AR8-IT-04-100824	NA	4.16E-04	NC
tPCBs	µg/kg ww	1/1	9.62E-01 - 9.62E-01	AR8-IT-04-100824	NA	9.62E-01	NC
Mercury							
Mercury	µg/kg ww	2/2	3.08E+01 - 3.13E+01	AR8-IT-05-100824	NA	3.10E+01	3.57E-01
AR9/2010							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	1/1	4.08E-01 - 4.08E-01	AR9-IT-07-100825	NA	4.08E-01	NC
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	1/1	8.78E-02 - 8.78E-02	AR9-IT-07-100825	NA	8.78E-02	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	1/1	7.66E-02 - 7.66E-02	AR9-IT-07-100825	NA	7.66E-02	NC
Hexachlorodibenzofuran (total)	µg/kg ww	1/1	2.45E-01 - 2.45E-01	AR9-IT-07-100825	NA	2.45E-01	NC
Pentachlorodibenzofuran (total)	µg/kg ww	1/1	5.32E-01 - 5.32E-01	AR9-IT-07-100825	NA	5.32E-01	NC
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	1/1	3.33E-04 - 3.33E-04	AR9-IT-07-100825	NA	3.33E-04	NC
Tetrachlorodibenzofuran (total)	µg/kg ww	1/1	7.20E-01 - 7.20E-01	AR9-IT-07-100825	NA	7.20E-01	NC
PCB Homologues							
Decachlorobiphenyl	µg/kg ww	1/1	3.66E-02 - 3.66E-02	AR9-IT-07-100825	NA	3.66E-02	NC
Total HpCB	µg/kg ww	1/1	4.07E+00 - 4.07E+00	AR9-IT-07-100825	NA	4.07E+00	NC
Total HxCB	µg/kg ww	1/1	6.04E+00 - 6.04E+00	AR9-IT-07-100825	NA	6.04E+00	NC
Total PCB homologues	µg/kg ww	1/1	1.32E+01 - 1.32E+01	AR9-IT-07-100825	NA	1.32E+01	NC

Table 2-22
Summary of Chemicals Detected in Oligochaetes - 2009 and 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Total PeCB	µg/kg ww	1/1	1.61E+00 - 1.61E+00	AR9-IT-07-100825	NA	1.61E+00	NC
Total TeCB	µg/kg ww	1/1	5.06E-01 - 5.06E-01	AR9-IT-07-100825	NA	5.06E-01	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	1/1	1.81E-04 - 1.81E-04	AR9-IT-07-100825	NA	1.81E-04	NC
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	1/1	2.36E-04 - 2.36E-04	AR9-IT-07-100825	NA	2.36E-04	NC
tPCBs	µg/kg ww	1/1	2.83E-01 - 2.83E-01	AR9-IT-07-100825	NA	2.83E-01	NC
Mercury							
Mercury	µg/kg ww	3/3	1.74E+01 - 2.01E+02	AR9-IT-07-100825	NA	7.99E+01	1.05E+02

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg ww = Micrograms per kilograms wet weight.

Table 2-23
Summary of Chemicals Detected in Crayfish - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR2/2009							
Semivolatile Organic Compounds							
Di-n-octyl phthalate	µg/kg ww	1/2	1.90E+01 - 1.90E+01	AR2-WB-CC00WB02-0-090824	2.00E+01 - 2.00E+01	1.95E+01	7.07E-01
Phenol	µg/kg ww	1/2	5.30E+01 - 5.30E+01	AR2-WB-CC00WB01-0-090824	4.70E+01 - 4.70E+01	5.00E+01	4.24E+00
Dioxin Homologues							
Pentachlorodibenzofuran (total)	µg/kg ww	2/2	1.30E-04 - 2.47E-04	AR2-WB-CC00WB02-0-090824	NA	1.89E-04	8.27E-05
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	1/2	4.69E-04 - 4.69E-04	AR2-WB-CC00WB02-0-090824	1.50E-04 - 1.50E-04	3.10E-04	2.26E-04
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	2/2	4.74E-04 - 7.69E-04	AR2-WB-CC00WB02-0-090824	NA	6.22E-04	2.09E-04
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	2/2	3.35E-04 - 6.13E-04	AR2-WB-CC00WB02-0-090824	NA	4.74E-04	1.96E-04
tPCBs	µg/kg ww	2/2	2.22E+00 - 2.23E+00	AR2-WB-CC00WB01-0-090824	NA	2.23E+00	4.81E-03
Inorganics (excepting mercury)							
Beryllium	µg/kg ww	2/2	2.10E+00 - 3.10E+00	AR2-WB-CC00WB02-0-090824	NA	2.60E+00	7.07E-01
Cadmium	µg/kg ww	2/2	1.50E+02 - 1.75E+02	AR2-WB-CC00WB01-0-090824	NA	1.63E+02	1.77E+01
Copper	µg/kg ww	2/2	2.26E+04 - 2.27E+04	AR2-WB-CC00WB01-0-090824	NA	2.27E+04	7.07E+01
Lead	µg/kg ww	2/2	2.26E+02 - 3.28E+02	AR2-WB-CC00WB01-0-090824	NA	2.77E+02	7.21E+01
Nickel	µg/kg ww	2/2	1.07E+03 - 1.23E+03	AR2-WB-CC00WB01-0-090824	NA	1.15E+03	1.13E+02
Selenium	µg/kg ww	2/2	1.54E+02 - 1.70E+02	AR2-WB-CC00WB02-0-090824	NA	1.62E+02	1.13E+01
Strontium	µg/kg ww	2/2	9.90E+04 - 1.02E+05	AR2-WB-CC00WB01-0-090824	NA	1.01E+05	2.12E+03
Vanadium	µg/kg ww	2/2	1.61E+02 - 2.08E+02	AR2-WB-CC00WB02-0-090824	NA	1.85E+02	3.32E+01
Zinc	µg/kg ww	2/2	2.74E+04 - 3.13E+04	AR2-WB-CC00WB02-0-090824	NA	2.94E+04	2.76E+03
Mercury							
Mercury	µg/kg ww	2/2	6.81E+01 - 7.50E+01	AR2-WB-CC00WB02-0-090824	NA	7.16E+01	4.88E+00
Conventionals							
Lipids, total	%	2/2	3.30E-01 - 3.70E-01	AR2-WB-CC00WB02-0-090824	NA	3.50E-01	2.83E-02
Residue, total	%	2/2	2.67E+01 - 2.80E+01	AR2-WB-CC00WB02-0-090824	NA	2.74E+01	9.19E-01
AR3/2009							
Volatile Organic Compounds							
Hexachlorobenzene	µg/kg ww	2/2	1.90E+00 - 6.70E+00	AR3-00-CC00WB01-0-090826	NA	4.30E+00	3.39E+00
Semivolatile Organic Compounds							
Bis(2-Ethylhexyl)Phthalate	µg/kg ww	1/2	1.90E+01 - 1.90E+01	AR3-00-CC00WB02-0-090827	2.00E+01 - 2.00E+01	1.95E+01	7.07E-01
Di-n-octyl phthalate	µg/kg ww	1/2	5.00E+01 - 5.00E+01	AR3-00-CC00WB02-0-090827	2.00E+01 - 2.00E+01	3.50E+01	2.12E+01
Polycyclic Aromatic Hydrocarbons							
Anthracene	µg/kg ww	1/2	1.00E+01 - 1.00E+01	AR3-00-CC00WB02-0-090827	2.00E+01 - 2.00E+01	1.50E+01	7.07E+00
Phenanthrene	µg/kg ww	1/2	8.80E+00 - 8.80E+00	AR3-00-CC00WB02-0-090827	2.00E+01 - 2.00E+01	1.44E+01	7.92E+00

Table 2-23
Summary of Chemicals Detected in Crayfish - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	2/2	2.13E-02 - 1.93E-01	AR3-00-CC00WB01-0-090826	NA	1.07E-01	1.22E-01
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	2/2	3.87E-03 - 3.30E-02	AR3-00-CC00WB01-0-090826	NA	1.85E-02	2.06E-02
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	2/2	2.71E-04 - 3.56E-03	AR3-00-CC00WB01-0-090826	NA	1.92E-03	2.33E-03
Hexachlorodibenzofuran (total)	µg/kg ww	2/2	2.78E-03 - 4.34E-02	AR3-00-CC00WB01-0-090826	NA	2.31E-02	2.87E-02
Pentachlorodibenzofuran (total)	µg/kg ww	2/2	1.91E-02 - 1.79E-01	AR3-00-CC00WB01-0-090826	NA	9.91E-02	1.13E-01
Pentachlorodibenzo-p-dioxin (total)	µg/kg ww	1/2	5.46E-04 - 5.46E-04	AR3-00-CC00WB01-0-090826	1.92E-04 - 1.92E-04	3.69E-04	2.50E-04
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	2/2	8.93E-04 - 1.31E-03	AR3-00-CC00WB01-0-090826	NA	1.10E-03	2.95E-04
Tetrachlorodibenzofuran (total)	µg/kg ww	2/2	4.22E-02 - 3.91E-01	AR3-00-CC00WB01-0-090826	NA	2.17E-01	2.47E-01
Pesticides							
4,4'-DDE	µg/kg ww	1/2	1.90E+00 - 1.90E+00	AR3-00-CC00WB01-0-090826	9.60E-01 - 9.60E-01	1.43E+00	6.65E-01
4,4'-DDT	µg/kg ww	2/2	1.80E+00 - 4.10E+00	AR3-00-CC00WB01-0-090826	NA	2.95E+00	1.63E+00
beta-Chlordane	µg/kg ww	1/2	2.30E+00 - 2.30E+00	AR3-00-CC00WB01-0-090826	9.60E-01 - 9.60E-01	1.63E+00	9.48E-01
Heptachlor epoxide	µg/kg ww	2/2	6.10E-01 - 1.20E+00	AR3-00-CC00WB01-0-090826	NA	9.05E-01	4.17E-01
o,p'-DDT	µg/kg ww	2/2	2.30E+00 - 4.10E+00	AR3-00-CC00WB01-0-090826	NA	3.20E+00	1.27E+00
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	2/2	2.47E-03 - 5.57E-03	AR3-00-CC00WB01-0-090826	NA	4.02E-03	2.19E-03
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	2/2	1.78E-03 - 3.95E-03	AR3-00-CC00WB01-0-090826	NA	2.87E-03	1.54E-03
tPCBs	µg/kg ww	2/2	3.30E+01 - 6.02E+01	AR3-00-CC00WB01-0-090826	NA	4.66E+01	1.93E+01
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	2/2	1.88E+02 - 1.93E+02	AR3-00-CC00WB02-0-090827	NA	1.91E+02	3.54E+00
Beryllium	µg/kg ww	2/2	2.20E+00 - 3.70E+00	AR3-00-CC00WB01-0-090826	NA	2.95E+00	1.06E+00
Cadmium	µg/kg ww	2/2	1.27E+02 - 1.27E+02	AR3-00-CC00WB01-0-090826;	NA	1.27E+02	0.00E+00
Chromium	µg/kg ww	2/2	2.53E+02 - 4.98E+02	AR3-00-CC00WB01-0-090826	NA	3.76E+02	1.73E+02
Copper	µg/kg ww	2/2	2.85E+04 - 2.93E+04	AR3-00-CC00WB01-0-090826	NA	2.89E+04	5.66E+02
Lead	µg/kg ww	2/2	1.41E+02 - 1.98E+02	AR3-00-CC00WB01-0-090826	NA	1.70E+02	4.03E+01
Nickel	µg/kg ww	2/2	8.89E+02 - 1.36E+03	AR3-00-CC00WB01-0-090826	NA	1.12E+03	3.33E+02
Selenium	µg/kg ww	2/2	2.32E+02 - 2.91E+02	AR3-00-CC00WB01-0-090826	NA	2.62E+02	4.17E+01
Strontium	µg/kg ww	2/2	1.18E+05 - 1.19E+05	AR3-00-CC00WB02-0-090827	NA	1.19E+05	7.07E+02
Vanadium	µg/kg ww	2/2	1.82E+02 - 2.36E+02	AR3-00-CC00WB01-0-090826	NA	2.09E+02	3.82E+01
Zinc	µg/kg ww	2/2	2.45E+04 - 2.87E+04	AR3-00-CC00WB01-0-090826	NA	2.66E+04	2.97E+03
Mercury							
Mercury	µg/kg ww	2/2	1.11E+02 - 1.58E+02	AR3-00-CC00WB01-0-090826	NA	1.35E+02	3.32E+01

Table 2-23
Summary of Chemicals Detected in Crayfish - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Conventionals							
Lipids, total	%	2/2	4.40E-01 - 8.20E-01	AR3-00-CC00WB01-0-090826	NA	6.30E-01	2.69E-01
Residue, total	%	2/2	2.94E+01 - 3.03E+01	AR3-00-CC00WB01-0-090826	NA	2.99E+01	6.36E-01
AR4/2009							
Volatile Organic Compounds							
Benzaldehyde	µg/kg ww	1/2	3.70E+02 - 3.70E+02	AR4-00-CC00WB02-0-090827	9.50E+02 - 9.50E+02	6.60E+02	4.10E+02
Semivolatile Organic Compounds							
Bis(2-Ethylhexyl)Phthalate	µg/kg ww	1/2	1.90E+01 - 1.90E+01	AR4-00-CC00WB01-0-090826	2.00E+01 - 2.00E+01	1.95E+01	07106781186
Polycyclic Aromatic Hydrocarbons							
Anthracene	µg/kg ww	1/2	2.10E+01 - 2.10E+01	AR4-00-CC00WB02-0-090827	1.90E+01 - 1.90E+01	2.00E+01	1.41E+00
Benzo(b)fluoranthene	µg/kg ww	2/2	4.20E+00 - 6.20E+00	AR4-00-CC00WB01-0-090826	NA	5.20E+00	1.41E+00
Benzo(g,h,i)perylene	µg/kg ww	1/2	6.20E+00 - 6.20E+00	AR4-00-CC00WB01-0-090826	2.00E+01 - 2.00E+01	1.31E+01	9.76E+00
Benzo(k)fluoranthene	µg/kg ww	1/2	2.40E+00 - 2.40E+00	AR4-00-CC00WB02-0-090827	1.90E+01 - 1.90E+01	1.07E+01	1.17E+01
Fluoranthene	µg/kg ww	1/2	1.30E+01 - 1.30E+01	AR4-00-CC00WB02-0-090827	1.90E+01 - 1.90E+01	1.60E+01	4.24E+00
Indeno(1,2,3-cd)pyrene	µg/kg ww	1/2	6.80E+00 - 6.80E+00	AR4-00-CC00WB01-0-090826	2.00E+01 - 2.00E+01	1.34E+01	9.33E+00
Naphthalene	µg/kg ww	1/2	4.90E+00 - 4.90E+00	AR4-00-CC00WB02-0-090827	1.90E+01 - 1.90E+01	1.20E+01	9.97E+00
Phenanthrene	µg/kg ww	2/2	8.80E+00 - 1.10E+01	AR4-00-CC00WB02-0-090827	NA	9.90E+00	1.56E+00
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	2/2	2.81E-03 - 3.75E-03	AR4-00-CC00WB02-0-090827	NA	3.28E-03	6.69E-04
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	2/2	1.03E-03 - 1.49E-03	AR4-00-CC00WB02-0-090827	NA	1.26E-03	3.23E-04
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	1/2	3.69E-04 - 3.69E-04	AR4-00-CC00WB01-0-090826	2.25E-04 - 2.25E-04	2.97E-04	1.02E-04
Heptachlorodibenzo-p-dioxin (total)	µg/kg ww	2/2	7.49E-04 - 1.59E-03	AR4-00-CC00WB02-0-090827	NA	1.17E-03	5.95E-04
Hexachlorodibenzofuran (total)	µg/kg ww	2/2	1.68E-03 - 2.24E-03	AR4-00-CC00WB02-0-090827	NA	1.96E-03	3.96E-04
Hexachlorodibenzo-p-dioxin (total)	µg/kg ww	2/2	4.96E-04 - 8.40E-04	AR4-00-CC00WB02-0-090827	NA	6.68E-04	2.43E-04
Pentachlorodibenzofuran (total)	µg/kg ww	2/2	3.30E-03 - 5.09E-03	AR4-00-CC00WB02-0-090827	NA	4.20E-03	1.27E-03
Pentachlorodibenzo-p-dioxin (total)	µg/kg ww	2/2	2.58E-04 - 2.89E-04	AR4-00-CC00WB01-0-090826	NA	2.74E-04	2.19E-05
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	2/2	4.10E-04 - 5.39E-04	AR4-00-CC00WB01-0-090826	NA	4.75E-04	9.12E-05
Tetrachlorodibenzofuran (total)	µg/kg ww	2/2	4.57E-03 - 8.44E-03	AR4-00-CC00WB02-0-090827	NA	6.51E-03	2.74E-03
Pesticides							
4,4'-DDT	µg/kg ww	2/2	6.40E+00 - 9.70E+00	AR4-00-CC00WB02-0-090827	NA	8.05E+00	2.33E+00
beta-Chlordane	µg/kg ww	2/2	3.90E+00 - 5.80E+00	AR4-00-CC00WB02-0-090827	NA	4.85E+00	1.34E+00
Endosulfan I	µg/kg ww	1/2	1.20E+00 - 1.20E+00	AR4-00-CC00WB02-0-090827	9.90E-01 - 9.90E-01	1.10E+00	1.48E-01
Endrin aldehyde	µg/kg ww	1/2	1.30E+00 - 1.30E+00	AR4-00-CC00WB02-0-090827	9.90E-01 - 9.90E-01	1.15E+00	2.19E-01
Heptachlor epoxide	µg/kg ww	1/2	2.00E+00 - 2.00E+00	AR4-00-CC00WB01-0-090826	9.90E-01 - 9.90E-01	1.50E+00	7.14E-01
o,p'-DDT	µg/kg ww	2/2	6.20E+00 - 9.70E+00	AR4-00-CC00WB02-0-090827	NA	7.95E+00	2.47E+00

Table 2-23
Summary of Chemicals Detected in Crayfish - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	2/2	1.88E-02 - 2.32E-02	AR4-00-CC00WB02-0-090827	NA	2.10E-02	3.09E-03
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	2/2	1.05E-02 - 1.30E-02	AR4-00-CC00WB02-0-090827	NA	1.17E-02	1.79E-03
tPCBs	µg/kg ww	2/2	1.36E+02 - 1.83E+02	AR4-00-CC00WB02-0-090827	NA	1.59E+02	3.33E+01
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	2/2	2.60E+02 - 3.39E+02	AR4-00-CC00WB02-0-090827	NA	3.00E+02	5.59E+01
Beryllium	µg/kg ww	2/2	1.30E+00 - 1.50E+00	AR4-00-CC00WB01-0-090826	NA	1.40E+00	1.41E-01
Cadmium	µg/kg ww	2/2	1.03E+02 - 1.18E+02	AR4-00-CC00WB02-0-090827	NA	1.11E+02	1.06E+01
Chromium	µg/kg ww	2/2	1.97E+02 - 9.70E+02	AR4-00-CC00WB02-0-090827	NA	5.84E+02	5.47E+02
Copper	µg/kg ww	2/2	2.69E+04 - 3.25E+04	AR4-00-CC00WB02-0-090827	NA	2.97E+04	3.96E+03
Lead	µg/kg ww	2/2	1.48E+02 - 1.56E+02	AR4-00-CC00WB02-0-090827	NA	1.52E+02	5.66E+00
Nickel	µg/kg ww	2/2	9.03E+02 - 1.43E+03	AR4-00-CC00WB02-0-090827	NA	1.17E+03	3.73E+02
Selenium	µg/kg ww	2/2	2.57E+02 - 3.56E+02	AR4-00-CC00WB02-0-090827	NA	3.07E+02	7.00E+01
Strontium	µg/kg ww	2/2	1.11E+05 - 1.13E+05	AR4-00-CC00WB02-0-090827	NA	1.12E+05	1.41E+03
Vanadium	µg/kg ww	2/2	1.80E+02 - 2.06E+02	AR4-00-CC00WB02-0-090827	NA	1.93E+02	1.84E+01
Zinc	µg/kg ww	2/2	2.23E+04 - 2.65E+04	AR4-00-CC00WB02-0-090827	NA	2.44E+04	2.97E+03
Mercury							
Mercury	µg/kg ww	2/2	5.09E+01 - 5.66E+01	AR4-00-CC00WB01-0-090826	NA	5.38E+01	4.03E+00
Conventionals							
Lipids, total	%	2/2	9.90E-01 - 1.30E+00	AR4-00-CC00WB02-0-090827	NA	1.15E+00	2.19E-01
Residue, total	%	2/2	2.92E+01 - 3.18E+01	AR4-00-CC00WB02-0-090827	NA	3.05E+01	1.84E+00
AR6/2009							
Volatile Organic Compounds							
Benzaldehyde	µg/kg ww	1/1	1.60E+03 - 1.60E+03	AR7-00-CC00WB01-0-090828	NA	1.60E+03	NC
Semivolatile Organic Compounds							
Dibenzofuran	µg/kg ww	1/1	1.00E+01 - 1.00E+01	AR7-00-CC00WB01-0-090828	NA	1.00E+01	NC
Phenol	µg/kg ww	1/1	5.40E+01 - 5.40E+01	AR7-00-CC00WB01-0-090828	NA	5.40E+01	NC
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	µg/kg ww	1/1	1.90E+01 - 1.90E+01	AR7-00-CC00WB01-0-090828	NA	1.90E+01	NC
Acenaphthylene	µg/kg ww	1/1	3.50E+01 - 3.50E+01	AR7-00-CC00WB01-0-090828	NA	3.50E+01	NC
Anthracene	µg/kg ww	1/1	8.40E+01 - 8.40E+01	AR7-00-CC00WB01-0-090828	NA	8.40E+01	NC
Benzo(a)anthracene	µg/kg ww	1/1	2.10E+02 - 2.10E+02	AR7-00-CC00WB01-0-090828	NA	2.10E+02	NC
Benzo(a)pyrene	µg/kg ww	1/1	1.70E+02 - 1.70E+02	AR7-00-CC00WB01-0-090828	NA	1.70E+02	NC
Benzo(b)fluoranthene	µg/kg ww	1/1	5.40E+02 - 5.40E+02	AR7-00-CC00WB01-0-090828	NA	5.40E+02	NC
Benzo(g,h,i)perylene	µg/kg ww	1/1	1.60E+02 - 1.60E+02	AR7-00-CC00WB01-0-090828	NA	1.60E+02	NC
Benzo(k)fluoranthene	µg/kg ww	1/1	1.90E+02 - 1.90E+02	AR7-00-CC00WB01-0-090828	NA	1.90E+02	NC

Table 2-23
Summary of Chemicals Detected in Crayfish - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Carbazole	µg/kg ww	1/1	1.10E+02 - 1.10E+02	AR7-00-CC00WB01-0-090828	NA	1.10E+02	NC
Chrysene	µg/kg ww	1/1	9.20E+02 - 9.20E+02	AR7-00-CC00WB01-0-090828	NA	9.20E+02	NC
Dibenz(a,h)anthracene	µg/kg ww	1/1	4.50E+01 - 4.50E+01	AR7-00-CC00WB01-0-090828	NA	4.50E+01	NC
Fluoranthene	µg/kg ww	1/1	5.10E+03 - 5.10E+03	AR7-00-CC00WB01-0-090828	NA	5.10E+03	NC
Fluorene	µg/kg ww	1/1	3.80E+01 - 3.80E+01	AR7-00-CC00WB01-0-090828	NA	3.80E+01	NC
Indeno(1,2,3-cd)pyrene	µg/kg ww	1/1	2.20E+02 - 2.20E+02	AR7-00-CC00WB01-0-090828	NA	2.20E+02	NC
Phenanthrene	µg/kg ww	1/1	1.60E+03 - 1.60E+03	AR7-00-CC00WB01-0-090828	NA	1.60E+03	NC
Pyrene	µg/kg ww	1/1	1.80E+03 - 1.80E+03	AR7-00-CC00WB01-0-090828	NA	1.80E+03	NC
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	1/1	1.00E-02 - 1.00E-02	AR7-00-CC00WB01-0-090828	NA	1.00E-02	NC
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	1/1	2.18E-03 - 2.18E-03	AR7-00-CC00WB01-0-090828	NA	2.18E-03	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	1/1	6.14E-04 - 6.14E-04	AR7-00-CC00WB01-0-090828	NA	6.14E-04	NC
Heptachlorodibenzo-p-dioxin (total)	µg/kg ww	1/1	9.76E-04 - 9.76E-04	AR7-00-CC00WB01-0-090828	NA	9.76E-04	NC
Hexachlorodibenzofuran (total)	µg/kg ww	1/1	3.96E-03 - 3.96E-03	AR7-00-CC00WB01-0-090828	NA	3.96E-03	NC
Pentachlorodibenzofuran (total)	µg/kg ww	1/1	1.19E-02 - 1.19E-02	AR7-00-CC00WB01-0-090828	NA	1.19E-02	NC
Pentachlorodibenzo-p-dioxin (total)	µg/kg ww	1/1	2.76E-04 - 2.76E-04	AR7-00-CC00WB01-0-090828	NA	2.76E-04	NC
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	1/1	1.58E-03 - 1.58E-03	AR7-00-CC00WB01-0-090828	NA	1.58E-03	NC
Tetrachlorodibenzofuran (total)	µg/kg ww	1/1	2.06E-02 - 2.06E-02	AR7-00-CC00WB01-0-090828	NA	2.06E-02	NC
Pesticides							
4,4'-DDT	µg/kg ww	1/1	1.60E+00 - 1.60E+00	AR7-00-CC00WB01-0-090828	NA	1.60E+00	NC
Endosulfan II	µg/kg ww	1/1	8.20E-01 - 8.20E-01	AR7-00-CC00WB01-0-090828	NA	8.20E-01	NC
Heptachlor epoxide	µg/kg ww	1/1	6.10E-01 - 6.10E-01	AR7-00-CC00WB01-0-090828	NA	6.10E-01	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	1/1	2.33E-03 - 2.33E-03	AR7-00-CC00WB01-0-090828	NA	2.33E-03	NC
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	1/1	9.16E-04 - 9.16E-04	AR7-00-CC00WB01-0-090828	NA	9.16E-04	NC
tPCBs	µg/kg ww	1/1	2.57E+01 - 2.57E+01	AR7-00-CC00WB01-0-090828	NA	2.57E+01	NC
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	1/1	1.57E+02 - 1.57E+02	AR7-00-CC00WB01-0-090828	NA	1.57E+02	NC
Beryllium	µg/kg ww	1/1	2.80E+00 - 2.80E+00	AR7-00-CC00WB01-0-090828	NA	2.80E+00	NC
Cadmium	µg/kg ww	1/1	1.12E+02 - 1.12E+02	AR7-00-CC00WB01-0-090828	NA	1.12E+02	NC
Chromium	µg/kg ww	1/1	2.22E+02 - 2.22E+02	AR7-00-CC00WB01-0-090828	NA	2.22E+02	NC
Copper	µg/kg ww	1/1	2.27E+04 - 2.27E+04	AR7-00-CC00WB01-0-090828	NA	2.27E+04	NC
Lead	µg/kg ww	1/1	2.26E+02 - 2.26E+02	AR7-00-CC00WB01-0-090828	NA	2.26E+02	NC
Nickel	µg/kg ww	1/1	1.13E+03 - 1.13E+03	AR7-00-CC00WB01-0-090828	NA	1.13E+03	NC
Selenium	µg/kg ww	1/1	3.37E+02 - 3.37E+02	AR7-00-CC00WB01-0-090828	NA	3.37E+02	NC

Table 2-23
Summary of Chemicals Detected in Crayfish - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Strontium	µg/kg ww	1/1	1.42E+05 - 1.42E+05	AR7-00-CC00WB01-0-090828	NA	1.42E+05	NC
Vanadium	µg/kg ww	1/1	2.91E+02 - 2.91E+02	AR7-00-CC00WB01-0-090828	NA	2.91E+02	NC
Zinc	µg/kg ww	1/1	2.01E+04 - 2.01E+04	AR7-00-CC00WB01-0-090828	NA	2.01E+04	NC
Mercury							
Mercury	µg/kg ww	1/1	8.56E+01 - 8.56E+01	AR7-00-CC00WB01-0-090828	NA	8.56E+01	NC
Conventionals							
Lipids, total	%	1/1	1.70E+00 - 1.70E+00	AR7-00-CC00WB01-0-090828	NA	1.70E+00	NC
Residue, total	%	1/1	3.10E+01 - 3.10E+01	AR7-00-CC00WB01-0-090828	NA	3.10E+01	NC
AR8/2009							
Volatile Organic Compounds							
Acetophenone	µg/kg ww	1/2	2.50E+02 - 2.60E+02	AR8-00-CC00WB02-1-090826	2.30E+01 - 2.30E+01	1.39E+02	1.64E+02
Semivolatile Organic Compounds							
2-Methylphenol	µg/kg ww	2/2	4.50E+00 - 5.10E+00	AR8-00-CC00WB01-0-090826	1.90E+01 - 1.90E+01	4.80E+00	4.24E-01
Bis(2-chloroisopropyl) ether	µg/kg ww	1/2	4.40E+02 - 4.40E+02	AR8-00-CC00WB01-0-090826	9.40E+01 - 1.00E+02	2.69E+02	2.43E+02
Phenol	µg/kg ww	1/2	1.00E+02 - 1.00E+02	AR8-00-CC00WB02-1-090826, AR8-00-CC00WB02-0-090826	4.70E+01 - 4.70E+01	7.35E+01	3.75E+01
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	µg/kg ww	1/2	2.60E+00 - 2.60E+00	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	1.08E+01	1.16E+01
Anthracene	µg/kg ww	1/2	5.80E+00 - 1.30E+01	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	1.60E+01	4.24E+00
Benzo(a)anthracene	µg/kg ww	1/2	1.30E+01 - 3.50E+01	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	2.70E+01	1.13E+01
Benzo(a)pyrene	µg/kg ww	1/2	1.10E+01 - 3.00E+01	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	2.45E+01	7.78E+00
Benzo(b)fluoranthene	µg/kg ww	2/2	3.90E+00 - 4.10E+01	AR8-00-CC00WB02-1-090826	NA	2.25E+01	2.62E+01
Benzo(g,h,i)perylene	µg/kg ww	1/2	1.10E+01 - 3.00E+01	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	2.45E+01	7.78E+00
Benzo(k)fluoranthene	µg/kg ww	1/2	5.20E+00 - 1.50E+01	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	1.70E+01	2.83E+00
Chrysene	µg/kg ww	1/2	2.70E+01 - 9.20E+01	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	5.55E+01	5.16E+01
Dibenz(a,h)anthracene	µg/kg ww	1/2	1.20E+01 - 1.20E+01	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	1.55E+01	4.95E+00
Fluoranthene	µg/kg ww	1/2	2.20E+01 - 7.10E+01	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	4.50E+01	3.68E+01
Fluorene	µg/kg ww	1/2	3.40E+00 - 3.40E+00	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	1.12E+01	1.10E+01
Indeno(1,2,3-cd)pyrene	µg/kg ww	1/2	1.30E+01 - 3.50E+01	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	2.70E+01	1.13E+01
Phenanthrene	µg/kg ww	2/2	6.90E+00 - 4.20E+01	AR8-00-CC00WB02-1-090826	NA	2.45E+01	2.48E+01
Pyrene	µg/kg ww	1/2	1.40E+01 - 3.20E+01	AR8-00-CC00WB02-1-090826	1.90E+01 - 1.90E+01	2.55E+01	9.19E+00
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	2/2	1.76E-02 - 1.78E-02	AR8-00-CC00WB01-0-090826	NA	1.77E-02	1.49E-04
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	2/2	3.56E-03 - 3.77E-03	AR8-00-CC00WB01-0-090826	NA	3.66E-03	1.48E-04

Table 2-23
Summary of Chemicals Detected in Crayfish - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	1/2	9.88E-04 - 9.88E-04	AR8-00-CC00WB01-0-090826	2.54E-04 - 3.69E-04	6.50E-04	4.78E-04
Heptachlorodibenzo-p-dioxin (total)	µg/kg ww	2/2	6.51E-04 - 1.94E-03	AR8-00-CC00WB01-0-090826	NA	1.30E-03	9.11E-04
Hexachlorodibenzofuran (total)	µg/kg ww	2/2	3.82E-03 - 7.08E-03	AR8-00-CC00WB01-0-090826	NA	5.83E-03	1.76E-03
Hexachlorodibenzo-p-dioxin (total)	µg/kg ww	1/2	1.81E-03 - 1.81E-03	AR8-00-CC00WB01-0-090826	3.43E-04 - 3.44E-04	1.08E-03	1.04E-03
Pentachlorodibenzofuran (total)	µg/kg ww	2/2	2.32E-02 - 2.43E-02	AR8-00-CC00WB02-1-090826	NA	2.39E-02	2.47E-04
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	2/2	3.81E-04 - 8.33E-04	AR8-00-CC00WB02-1-090826	1.93E-04 - 1.93E-04	6.07E-04	3.20E-04
Tetrachlorodibenzofuran (total)	µg/kg ww	2/2	3.74E-02 - 4.47E-02	AR8-00-CC00WB02-1-090826	NA	3.98E-02	1.80E-03
Pesticides							
4,4'-DDE	µg/kg ww	1/2	1.20E+00 - 1.20E+00	AR8-00-CC00WB01-0-090826	9.70E-01 - 9.90E-01	1.09E+00	1.56E-01
beta-Chlordane	µg/kg ww	1/2	6.20E-01 - 6.20E-01	AR8-00-CC00WB02-1-090826	9.90E-01 - 9.90E-01	8.05E-01	2.62E-01
Endosulfan II	µg/kg ww	1/2	3.00E-01 - 3.00E-01	AR8-00-CC00WB01-0-090826	9.70E-01 - 9.90E-01	6.40E-01	4.81E-01
Heptachlor epoxide	µg/kg ww	1/2	5.50E-01 - 6.40E-01	AR8-00-CC00WB02-0-090826	9.90E-01 - 9.90E-01	7.93E-01	2.79E-01
o,p'-DDD	µg/kg ww	1/2	1.50E+00 - 1.50E+00	AR8-00-CC00WB01-0-090826	9.70E-01 - 9.90E-01	1.24E+00	3.68E-01
trans-Nonachlor	µg/kg ww	1/2	1.80E+00 - 1.80E+00	AR8-00-CC00WB02-0-090826	9.70E-01 - 9.90E-01	1.40E+00	5.73E-01
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	2/2	3.43E-03 - 5.79E-03	AR8-00-CC00WB01-0-090826	NA	4.61E-03	1.67E-03
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	2/2	2.82E-03 - 4.93E-03	AR8-00-CC00WB01-0-090826	NA	3.88E-03	1.49E-03
tPCBs	µg/kg ww	2/2	4.61E+01 - 2.14E+02	AR8-00-CC00WB01-0-090826	NA	1.30E+02	1.19E+02
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	2/2	1.78E+02 - 2.20E+02	AR8-00-CC00WB02-1-090826	NA	1.94E+02	2.30E+01
Beryllium	µg/kg ww	2/2	2.90E+00 - 4.00E+00	AR8-00-CC00WB02-1-090826	NA	3.38E+00	1.06E-01
Cadmium	µg/kg ww	2/2	9.00E+01 - 1.30E+02	AR8-00-CC00WB01-0-090826	NA	1.14E+02	2.30E+01
Chromium	µg/kg ww	2/2	7.96E+02 - 2.14E+03	AR8-00-CC00WB02-1-090826	NA	1.61E+03	7.57E+02
Copper	µg/kg ww	2/2	3.06E+04 - 3.63E+04	AR8-00-CC00WB02-1-090826	NA	3.40E+04	8.13E+02
Lead	µg/kg ww	2/2	3.27E+02 - 5.66E+02	AR8-00-CC00WB02-1-090826	NA	4.84E+02	1.17E+02
Nickel	µg/kg ww	2/2	1.27E+03 - 2.25E+03	AR8-00-CC00WB02-1-090826	NA	1.81E+03	6.22E+02
Selenium	µg/kg ww	2/2	1.61E+02 - 1.95E+02	AR8-00-CC00WB01-0-090826	NA	1.80E+02	2.09E+01
Strontium	µg/kg ww	2/2	1.16E+05 - 1.27E+05	AR8-00-CC00WB02-0-090826	NA	1.21E+05	3.54E+02
Vanadium	µg/kg ww	2/2	2.21E+02 - 2.85E+02	AR8-00-CC00WB02-1-090826	NA	2.45E+02	3.36E+01
Zinc	µg/kg ww	2/2	2.41E+04 - 3.00E+04	AR8-00-CC00WB02-1-090826	NA	2.68E+04	3.89E+02
Mercury							
Mercury	µg/kg ww	2/2	6.11E+01 - 7.42E+01	AR8-00-CC00WB02-0-090826	NA	7.08E+01	4.49E+00
Conventionals							
Lipids, total	%	2/2	7.30E-01 - 9.70E-01	AR8-00-CC00WB01-0-090826	NA	8.55E-01	1.63E-01
Residue, total	%	2/2	2.86E+01 - 2.98E+01	AR8-00-CC00WB01-0-090826	NA	2.92E+01	8.49E-01

Table 2-23
Summary of Chemicals Detected in Crayfish - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR9/2009							
Semivolatile Organic Compounds							
Bis(2-Ethylhexyl)Phthalate	µg/kg ww	1/2	2.00E+01 - 2.00E+01	AR9-00-CC00WB01-0-090825	1.90E+01 - 1.90E+01	1.95E+01	7.07E-01
Polycyclic Aromatic Hydrocarbons							
Anthracene	µg/kg ww	1/2	1.20E+01 - 1.20E+01	AR9-00-CC00WB01-0-090825	1.90E+01 - 1.90E+01	1.55E+01	4.95E+00
Benzo(a)anthracene	µg/kg ww	1/2	6.80E+00 - 6.80E+00	AR9-00-CC00WB02-0-090825	2.00E+01 - 2.00E+01	1.34E+01	9.33E+00
Benzo(a)pyrene	µg/kg ww	2/2	4.50E+00 - 7.30E+00	AR9-00-CC00WB01-0-090825	NA	5.90E+00	1.98E+00
Benzo(b)fluoranthene	µg/kg ww	2/2	7.40E+00 - 8.00E+00	AR9-00-CC00WB01-0-090825	NA	7.70E+00	4.24E-01
Benzo(g,h,i)perylene	µg/kg ww	2/2	6.60E+00 - 7.70E+00	AR9-00-CC00WB02-0-090825	NA	7.15E+00	7.78E-01
Benzo(k)fluoranthene	µg/kg ww	2/2	3.20E+00 - 3.30E+00	AR9-00-CC00WB01-0-090825	NA	3.25E+00	7.07E-02
Fluoranthene	µg/kg ww	1/2	1.40E+01 - 1.40E+01	AR9-00-CC00WB01-0-090825	1.90E+01 - 1.90E+01	1.65E+01	3.54E+00
Indeno(1,2,3-cd)pyrene	µg/kg ww	2/2	6.80E+00 - 7.50E+00	AR9-00-CC00WB02-0-090825	NA	7.15E+00	4.95E-01
Phenanthrene	µg/kg ww	2/2	8.90E+00 - 9.30E+00	AR9-00-CC00WB02-0-090825	NA	9.10E+00	2.83E-01
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	2/2	1.94E-02 - 8.54E-02	AR9-00-CC00WB01-0-090825	NA	5.24E-02	4.67E-02
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	2/2	4.11E-03 - 1.59E-02	AR9-00-CC00WB01-0-090825	NA	1.00E-02	8.36E-03
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	2/2	3.59E-04 - 8.86E-04	AR9-00-CC00WB01-0-090825	NA	6.23E-04	3.73E-04
Hexachlorodibenzofuran (total)	µg/kg ww	2/2	6.28E-03 - 2.37E-02	AR9-00-CC00WB01-0-090825	NA	1.50E-02	1.23E-02
Pentachlorodibenzofuran (total)	µg/kg ww	2/2	2.85E-02 - 1.04E-01	AR9-00-CC00WB01-0-090825	NA	6.63E-02	5.34E-02
Tetrachlorodibenzofuran (total)	µg/kg ww	2/2	3.99E-02 - 1.97E-01	AR9-00-CC00WB01-0-090825	NA	1.18E-01	1.11E-01
Pesticides							
4,4'-DDT	µg/kg ww	2/2	1.90E+00 - 2.00E+00	AR9-00-CC00WB01-0-090825	NA	1.95E+00	7.07E-02
Heptachlor epoxide	µg/kg ww	1/2	3.10E-01 - 3.10E-01	AR9-00-CC00WB02-0-090825	9.90E-01 - 9.90E-01	6.50E-01	4.81E-01
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	2/2	1.05E-03 - 1.41E-03	AR9-00-CC00WB02-0-090825	NA	1.23E-03	2.48E-04
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	2/2	7.35E-04 - 9.70E-04	AR9-00-CC00WB02-0-090825	NA	8.53E-04	1.67E-04
tPCBs	µg/kg ww	2/2	2.81E+01 - 3.94E+01	AR9-00-CC00WB02-0-090825	NA	3.38E+01	7.99E+00
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	2/2	1.89E+02 - 2.50E+02	AR9-00-CC00WB01-0-090825	NA	2.20E+02	4.31E+01
Beryllium	µg/kg ww	2/2	6.60E+00 - 7.10E+00	AR9-00-CC00WB01-0-090825	NA	6.85E+00	3.54E-01
Cadmium	µg/kg ww	2/2	9.69E+01 - 1.08E+02	AR9-00-CC00WB01-0-090825	NA	1.02E+02	7.85E+00
Chromium	µg/kg ww	2/2	4.92E+02 - 6.81E+02	AR9-00-CC00WB01-0-090825	NA	5.87E+02	1.34E+02
Copper	µg/kg ww	2/2	2.92E+04 - 3.89E+04	AR9-00-CC00WB01-0-090825	NA	3.41E+04	6.86E+03
Lead	µg/kg ww	2/2	3.06E+02 - 6.83E+02	AR9-00-CC00WB01-0-090825	NA	4.95E+02	2.67E+02
Nickel	µg/kg ww	2/2	7.79E+02 - 1.15E+03	AR9-00-CC00WB01-0-090825	NA	9.65E+02	2.62E+02

Table 2-23
Summary of Chemicals Detected in Crayfish - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Year/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Selenium	µg/kg ww	2/2	1.12E+02 - 2.39E+02	AR9-00-CC00WB01-0-090825	NA	1.76E+02	8.98E+01
Strontium	µg/kg ww	2/2	9.10E+04 - 9.50E+04	AR9-00-CC00WB01-0-090825	NA	9.30E+04	2.83E+03
Vanadium	µg/kg ww	2/2	3.70E+02 - 5.17E+02	AR9-00-CC00WB01-0-090825	NA	4.44E+02	1.04E+02
Zinc	µg/kg ww	2/2	2.34E+04 - 2.74E+04	AR9-00-CC00WB01-0-090825	NA	2.54E+04	2.83E+03
Mercury							
Mercury	µg/kg ww	2/2	6.84E+01 - 1.04E+02	AR9-00-CC00WB01-0-090825	NA	8.62E+01	2.52E+01
Conventionals							
Lipids, total	%	2/2	5.40E-01 - 7.40E-01	AR9-00-CC00WB01-0-090825	NA	6.40E-01	1.41E-01
Residue, total	%	2/2	2.59E+01 - 2.86E+01	AR9-00-CC00WB01-0-090825	NA	2.73E+01	1.91E+00
AR2/2011							
Mercury	µg/kg ww	10/10	4.21E+01 - 6.44E+01	AR2-WB-CIWB08	NA	5.47E+01	8.12E+00
AR5/2011							
Mercury	µg/kg ww	10/10	6.64E+01 - 1.76E+02	AR5-0-CIWB07	NA	1.16E+02	3.82E+01
AR6/2011							
Mercury	µg/kg ww	10/10	7.02E+01 - 1.38E+02	AR6-0-CIWB08	NA	9.36E+01	2.00E+01
AR7/2011							
Mercury	µg/kg ww	10/10	4.62E+01 - 1.22E+02	AR7-0-CIWB02	NA	8.44E+01	2.79E+01

Notes;
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg ww = Micrograms per kilograms wet weight.

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Smallmouth Bass/2009/AR2							
Semivolatile Organic Compounds							
4-Methylphenol	µg/kg ww	1/3	1.40E+01 - 1.40E+01	AR2-WB-FFSBSO04-0-090824	2.00E+01 - 2.00E+01	1.80E+01	3.46E+00
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	1/3	1.38E-03 - 1.38E-03	AR2-WB-FFSBSO05-0-090824	9.08E-04 - 1.13E-03	1.14E-03	2.35E-04
2,3,7,8-TCDD TEQ (fish)	µg/kg ww	1/3	9.46E-04 - 9.46E-04	AR2-WB-FFSBSO05-0-090824	4.90E-04 - 6.23E-04	6.86E-04	2.35E-04
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	1/3	9.33E-04 - 9.33E-04	AR2-WB-FFSBSO05-0-090824	4.82E-04 - 6.16E-04	6.77E-04	2.31E-04
Dioxin Homologues							
Hexachlorodibenzofuran (total)	µg/kg ww	1/3	2.02E-04 - 2.02E-04	AR2-WB-FFSBSO05-0-090824	1.75E-04 - 1.81E-04	1.86E-04	1.42E-05
Pesticides							
4,4'-DDE	µg/kg ww	2/3	2.20E+00 - 3.20E+00	AR2-WB-FFSBSO04-0-090824	1.90E+00 - 1.90E+00	2.43E+00	6.81E-01
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	3/3	9.34E-04 - 1.38E-03	AR2-WB-FFSBSO04-0-090824	NA	1.18E-03	2.24E-04
PCB Dioxin-like Congener TEQ (fish)	µg/kg ww	3/3	2.62E-05 - 3.64E-05	AR2-WB-FFSBSO04-0-090824	NA	3.10E-05	5.12E-06
PCB Dioxin-like Congener TEQ (mammal	µg/kg ww	3/3	6.41E-04 - 8.28E-04	AR2-WB-FFSBSO04-0-090824	NA	7.14E-04	1.00E-04
tPCBs	µg/kg ww	3/3	2.30E+00 - 1.22E+01	AR2-WB-FFSBSO04-0-090824	NA	6.39E+00	5.19E+00
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	1/5	1.18E+02 - 1.18E+02	AR2-WB-FFSBSR04-0-090824	1.01E+02 - 1.22E+02	1.13E+02	9.75E+00
Cadmium	µg/kg ww	3/5	1.10E+00 - 1.40E+00	AR2-WB-FFSBSR04-0-090824	4.10E+00 - 4.40E+00	2.46E+00	1.64E+00
Chromium	µg/kg ww	1/5	8.90E+01 - 8.90E+01	AR2-WB-FFSBSR02-0-090824	4.00E+01 - 1.89E+02	8.10E+01	6.37E+01
Copper	µg/kg ww	5/5	1.79E+02 - 2.44E+02	AR2-WB-FFSBSR01-0-090824	NA	2.07E+02	3.32E+01
Lead	µg/kg ww	2/5	2.10E+00 - 4.71E+01	AR2-WB-FFSBSR02-0-090824	4.00E+00 - 4.40E+00	1.24E+01	1.94E+01
Nickel	µg/kg ww	2/5	2.20E+01 - 4.80E+01	AR2-WB-FFSBSR01-0-090824	4.00E+01 - 4.40E+01	3.94E+01	1.01E+01
Selenium	µg/kg ww	5/5	2.22E+02 - 3.03E+02	AR2-WB-FFSBSR05-0-090824	NA	2.63E+02	3.11E+01
Strontium	µg/kg ww	1/5	1.13E+03 - 1.13E+03	AR2-WB-FFSBSR02-0-090824	1.38E+02 - 3.59E+02	4.29E+02	4.05E+02
Vanadium	µg/kg ww	5/5	1.80E+01 - 2.10E+01	AR2-WB-FFSBSR04-0-090824	NA	1.96E+01	1.14E+00
Zinc	µg/kg ww	5/5	3.31E+03 - 4.07E+03	AR2-WB-FFSBSR02-0-090824	NA	3.65E+03	2.74E+02
Mercury							
Mercury	µg/kg ww	5/5	3.02E+02 - 4.32E+02	AR2-WB-FFSBSR01-0-090824	NA	3.92E+02	5.26E+01
Conventionals							
Lipids, total	%	3/3	6.80E-01 - 1.10E+00	AR2-WB-FFSBSO04-0-090824	NA	9.60E-01	2.42E-01
Lipids, total	%	3/3	6.80E-01 - 1.10E+00	AR2-WB-FFSBSO05-0-090824	NA	9.60E-01	2.42E-01
Residue, total	%	8/8	2.05E+01 - 2.59E+01	AR2-WB-FFSBSO05-0-090824	NA	2.27E+01	2.08E+00

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Smallmouth Bass/2009/AR3							
Semivolatile Organic Compounds							
Polycyclic Aromatic Hydrocarbons							
2-Methylnaphthalene	µg/kg ww	1/2	4.30E+00 - 4.30E+00	AR3-00-FFSBSO03-0-090827	2.00E+01 - 2.00E+01	1.22E+01	1.11E+01
Benzo(g,h,i)perylene	µg/kg ww	1/2	5.10E+00 - 5.10E+00	AR3-00-FFSBSO02-0-090827	1.90E+01 - 1.90E+01	1.21E+01	9.83E+00
Indeno(1,2,3-cd)pyrene	µg/kg ww	1/2	7.20E+00 - 7.20E+00	AR3-00-FFSBSO02-0-090827	1.90E+01 - 1.90E+01	1.31E+01	8.34E+00
Naphthalene	µg/kg ww	1/2	6.00E+00 - 6.00E+00	AR3-00-FFSBSO03-0-090827	2.00E+01 - 2.00E+01	1.30E+01	9.90E+00
Phenanthrene	µg/kg ww	1/2	2.70E+00 - 2.70E+00	AR3-00-FFSBSO03-0-090827	2.00E+01 - 2.00E+01	1.14E+01	1.22E+01
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	2/2	1.40E-03 - 2.10E-03	AR3-00-FFSBSO03-0-090827	NA	1.75E-03	4.95E-04
2,3,7,8-TCDD TEQ (fish)	µg/kg ww	2/2	5.68E-04 - 7.96E-04	AR3-00-FFSBSO03-0-090827	NA	6.82E-04	1.61E-04
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	2/2	5.54E-04 - 7.24E-04	AR3-00-FFSBSO03-0-090827	NA	6.39E-04	1.21E-04
Dioxin Homologues							
Pentachlorodibenzofuran (total)	µg/kg ww	2/2	2.45E-04 - 8.40E-04	AR3-00-FFSBSO03-0-090827	NA	5.43E-04	4.21E-04
Tetrachlorodibenzofuran (total)	µg/kg ww	2/2	7.43E-04 - 1.05E-03	AR3-00-FFSBSO03-0-090827	NA	8.97E-04	2.17E-04
Pesticides							
4,4'-DDE	µg/kg ww	1/2	2.00E+00 - 2.00E+00	AR3-00-FFSBSO02-0-090827	1.90E+00 - 1.90E+00	1.95E+00	7.07E-02
4,4'-DDT	µg/kg ww	2/2	4.30E+00 - 9.00E+00	AR3-00-FFSBSO02-0-090827	NA	6.65E+00	3.32E+00
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	2/2	2.23E-03 - 3.74E-03	AR3-00-FFSBSO02-0-090827	NA	2.98E-03	1.07E-03
PCB Dioxin-like Congener TEQ (fish)	µg/kg ww	2/2	8.31E-05 - 1.60E-04	AR3-00-FFSBSO02-0-090827	NA	1.22E-04	5.46E-05
PCB Dioxin-like Congener TEQ (mammal	µg/kg ww	2/2	1.81E-03 - 3.41E-03	AR3-00-FFSBSO02-0-090827	NA	2.61E-03	1.13E-03
tPCBs	µg/kg ww	2/2	6.42E+01 - 1.20E+02	AR3-00-FFSBSO02-0-090827	NA	9.20E+01	3.94E+01
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	4/4	7.20E+01 - 1.60E+02	AR3-00-FFSBSR04-0-090827	NA	1.08E+02	3.91E+01
Cadmium	µg/kg ww	2/4	1.80E+00 - 2.50E+00	AR3-00-FFSBSR05-0-090827	4.20E+00 - 4.40E+00	3.23E+00	1.28E+00
Chromium	µg/kg ww	4/4	4.70E+01 - 7.70E+01	AR3-00-FFSBSR02-0-090827	NA	6.20E+01	1.68E+01
Copper	µg/kg ww	4/4	1.58E+02 - 2.14E+02	AR3-00-FFSBSR02-0-090827	NA	1.84E+02	2.31E+01
Lead	µg/kg ww	4/4	1.00E+00 - 9.10E+00	AR3-00-FFSBSR05-0-090827	NA	4.68E+00	3.42E+00
Nickel	µg/kg ww	4/4	1.00E+01 - 2.40E+01	AR3-00-FFSBSR05-0-090827	NA	1.68E+01	6.80E+00
Selenium	µg/kg ww	4/4	4.02E+02 - 5.17E+02	AR3-00-FFSBSR05-0-090827	NA	4.53E+02	4.88E+01
Strontium	µg/kg ww	4/4	3.07E+02 - 1.78E+03	AR3-00-FFSBSR05-0-090827	NA	8.21E+02	6.85E+02
Vanadium	µg/kg ww	4/4	1.40E+01 - 1.70E+01	AR3-00-FFSBSR04-0-090827	NA	1.55E+01	1.29E+00
Zinc	µg/kg ww	4/4	3.73E+03 - 4.38E+03	AR3-00-FFSBSR05-0-090827	NA	3.92E+03	3.07E+02
Mercury							
Mercury	µg/kg ww	4/4	2.51E+02 - 5.68E+02	AR3-00-FFSBSR02-0-090827	NA	3.79E+02	1.39E+02

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Conventionals							
Lipids, total	%	2/2	7.00E-01 - 8.60E-01	AR3-00-FFSBSO02-0-090827	NA	7.80E-01	1.13E-01
Residue, total	%	6/6	2.07E+01 - 2.50E+01	AR3-00-FFSBSO03-0-090827	NA	2.25E+01	1.68E+00
Smallmouth Bass/2009/AR4							
Volatile Organic Compounds							
Hexachlorobenzene	µg/kg ww	1/1	1.00E+00 - 1.00E+00	AR4-00-FFSBSO01-0-090826	NA	1.00E+00	NC
Semivolatile Organic Compounds							
Polycyclic Aromatic Hydrocarbons							
Phenanthrene	µg/kg ww	1/1	2.80E+00 - 2.80E+00	AR4-00-FFSBSO01-0-090826	NA	2.80E+00	NC
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	1/1	9.15E-03 - 9.15E-03	AR4-00-FFSBSO01-0-090826	NA	9.15E-03	NC
2,3,7,8-TCDD TEQ (fish)	µg/kg ww	1/1	2.59E-03 - 2.59E-03	AR4-00-FFSBSO01-0-090826	NA	2.59E-03	NC
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	1/1	2.30E-03 - 2.30E-03	AR4-00-FFSBSO01-0-090826	NA	2.30E-03	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	1/1	4.60E-04 - 4.60E-04	AR4-00-FFSBSO01-0-090826	NA	4.60E-04	NC
Hexachlorodibenzofuran (total)	µg/kg ww	1/1	2.35E-03 - 2.35E-03	AR4-00-FFSBSO01-0-090826	NA	2.35E-03	NC
Pentachlorodibenzofuran (total)	µg/kg ww	1/1	5.74E-03 - 5.74E-03	AR4-00-FFSBSO01-0-090826	NA	5.74E-03	NC
Tetrachlorodibenzofuran (total)	µg/kg ww	1/1	5.86E-03 - 5.86E-03	AR4-00-FFSBSO01-0-090826	NA	5.86E-03	NC
Pesticides							
4,4'-DDT	µg/kg ww	1/1	2.10E+02 - 2.10E+02	AR4-00-FFSBSO01-0-090826	NA	2.10E+02	NC
beta-BHC	µg/kg ww	1/1	1.40E+00 - 1.40E+00	AR4-00-FFSBSO01-0-090826	NA	1.40E+00	NC
Endosulfan I	µg/kg ww	1/1	5.30E-01 - 5.30E-01	AR4-00-FFSBSO01-0-090826	NA	5.30E-01	NC
o,p'-DDD	µg/kg ww	1/1	5.60E+01 - 5.60E+01	AR4-00-FFSBSO01-0-090826	NA	5.60E+01	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	1/1	7.88E-02 - 7.88E-02	AR4-00-FFSBSO01-0-090826	NA	7.88E-02	NC
PCB Dioxin-like Congener TEQ (fish)	µg/kg ww	1/1	3.61E-03 - 3.61E-03	AR4-00-FFSBSO01-0-090826	NA	3.61E-03	NC
PCB Dioxin-like Congener TEQ (mammal	µg/kg ww	1/1	7.10E-02 - 7.10E-02	AR4-00-FFSBSO01-0-090826	NA	7.10E-02	NC
tPCBs	µg/kg ww	1/1	3.21E+03 - 3.21E+03	AR4-00-FFSBSO01-0-090826	NA	3.21E+03	NC
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	1/1	9.80E+01 - 9.80E+01	AR4-00-FFSBSR01-0-090826	NA	9.80E+01	NC
Chromium	µg/kg ww	1/1	8.60E+01 - 8.60E+01	AR4-00-FFSBSR01-0-090826	NA	8.60E+01	NC
Copper	µg/kg ww	1/1	2.00E+02 - 2.00E+02	AR4-00-FFSBSR01-0-090826	NA	2.00E+02	NC
Lead	µg/kg ww	1/1	1.60E+00 - 1.60E+00	AR4-00-FFSBSR01-0-090826	NA	1.60E+00	NC
Nickel	µg/kg ww	1/1	1.40E+01 - 1.40E+01	AR4-00-FFSBSR01-0-090826	NA	1.40E+01	NC
Selenium	µg/kg ww	1/1	2.39E+02 - 2.39E+02	AR4-00-FFSBSR01-0-090826	NA	2.39E+02	NC
Strontium	µg/kg ww	1/1	1.83E+02 - 1.83E+02	AR4-00-FFSBSR01-0-090826	NA	1.83E+02	NC

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Vanadium	µg/kg ww	1/1	2.00E+01 - 2.00E+01	AR4-00-FFSBSR01-0-090826	NA	2.00E+01	NC
Zinc	µg/kg ww	1/1	3.36E+03 - 3.36E+03	AR4-00-FFSBSR01-0-090826	NA	3.36E+03	NC
Mercury							
Mercury	µg/kg ww	1/1	3.92E+02 - 3.92E+02	AR4-00-FFSBSR01-0-090826	NA	3.92E+02	NC
Conventionals							
Lipids, total	%	1/1	1.80E+00 - 1.80E+00	AR4-00-FFSBSO01-0-090826	NA	1.80E+00	NC
Residue, total	%	2/2	2.22E+01 - 2.57E+01	AR4-00-FFSBSO01-0-090826	NA	2.40E+01	2.47E+00
Smallmouth Bass/2009/AR6							
Semivolatile Organic Compounds							
Polycyclic Aromatic Hydrocarbons							
2-Methylnaphthalene	µg/kg ww	1/5	5.10E+00 - 5.10E+00	AR7-00-FFSBSO03-0-090827	1.90E+01 - 2.00E+01	1.66E+01	6.46E+00
Naphthalene	µg/kg ww	2/5	5.10E+00 - 8.20E+00	AR7-00-FFSBSO03-0-090827	1.90E+01 - 2.00E+01	1.43E+01	7.04E+00
Phenanthrene	µg/kg ww	4/5	3.60E+00 - 4.80E+00	AR7-00-FFSBSO03-0-090827	2.00E+01 - 2.00E+01	7.18E+00	7.18E+00
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	5/5	1.96E-03 - 9.20E-03	AR7-00-FFSBSO03-0-090827	NA	5.53E-03	2.95E-03
2,3,7,8-TCDD TEQ (fish)	µg/kg ww	5/5	7.18E-04 - 2.32E-03	AR7-00-FFSBSO03-0-090827	NA	1.46E-03	6.76E-04
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	5/5	6.65E-04 - 1.97E-03	AR7-00-FFSBSO03-0-090827	NA	1.29E-03	5.43E-04
Dioxin Homologues							
Hexachlorodibenzofuran (total)	µg/kg ww	1/5	2.49E-04 - 2.49E-04	AR7-00-FFSBSO01-0-090827	1.67E-04 - 1.86E-04	1.93E-04	3.21E-05
Pentachlorodibenzofuran (total)	µg/kg ww	5/5	3.20E-04 - 4.80E-03	AR7-00-FFSBSO03-0-090827	NA	2.54E-03	1.83E-03
Tetrachlorodibenzofuran (total)	µg/kg ww	4/5	2.03E-03 - 5.59E-03	AR7-00-FFSBSO03-0-090827	1.03E-03 - 1.03E-03	3.45E-03	1.91E-03
Pesticides							
4,4'-DDE	µg/kg ww	2/5	2.70E+00 - 3.20E+00	AR7-00-FFSBSO01-0-090827	1.90E+00 - 2.00E+00	2.36E+00	5.68E-01
4,4'-DDT	µg/kg ww	5/5	1.70E+00 - 6.20E+00	AR7-00-FFSBSO01-0-090827	NA	3.70E+00	1.99E+00
beta-Chlordane	µg/kg ww	2/5	1.10E+00 - 1.30E+00	AR7-00-FFSBSO01-0-090827	1.90E+00 - 2.00E+00	1.66E+00	4.28E-01
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	5/5	1.30E-03 - 3.39E-03	AR7-00-FFSBSO05-0-090828	NA	2.30E-03	8.25E-04
PCB Dioxin-like Congener TEQ (fish)	µg/kg ww	5/5	4.28E-05 - 1.25E-04	AR7-00-FFSBSO05-0-090828	NA	7.94E-05	3.36E-05
PCB Dioxin-like Congener TEQ (mammal	µg/kg ww	5/5	9.91E-04 - 2.64E-03	AR7-00-FFSBSO05-0-090828	NA	1.74E-03	6.69E-04
tPCBs	µg/kg ww	5/5	1.91E+01 - 7.50E+01	AR7-00-FFSBSO05-0-090828	NA	4.68E+01	2.22E+01
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	5/5	6.40E+01 - 5.53E+02	AR7-00-FFSBSR04-0-090827	NA	2.06E+02	1.98E+02
Chromium	µg/kg ww	5/5	2.90E+01 - 4.93E+02	AR7-00-FFSBSR04-0-090827	NA	1.51E+02	1.93E+02
Copper	µg/kg ww	5/5	1.93E+02 - 3.15E+02	AR7-00-FFSBSR03-0-090827	NA	2.44E+02	5.00E+01
Lead	µg/kg ww	5/5	2.40E+00 - 1.02E+01	AR7-00-FFSBSR02-0-090827	NA	5.40E+00	3.39E+00
Nickel	µg/kg ww	4/5	7.00E+00 - 7.50E+01	AR7-00-FFSBSR04-0-090827	4.20E+01 - 4.20E+01	3.48E+01	2.59E+01

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Selenium	µg/kg ww	5/5	3.02E+02 - 4.30E+02	AR7-00-FFSBSR04-0-090827	NA	3.64E+02	5.37E+01
Strontium	µg/kg ww	5/5	1.97E+02 - 2.16E+03	AR7-00-FFSBSR01-0-090827	NA	7.92E+02	7.99E+02
Vanadium	µg/kg ww	5/5	1.30E+01 - 2.90E+01	AR7-00-FFSBSR01-0-090827	NA	1.86E+01	6.35E+00
Zinc	µg/kg ww	5/5	3.24E+03 - 4.48E+03	AR7-00-FFSBSR01-0-090827	NA	3.72E+03	4.63E+02
Mercury							
Mercury	µg/kg ww	5/5	3.18E+02 - 8.58E+02	AR7-00-FFSBSR05-0-090828	NA	5.04E+02	2.22E+02
Conventionals							
Lipids, total	%	5/5	3.80E-01 - 2.10E+00	AR7-00-FFSBSO01-0-090827	NA	1.05E+00	6.72E-01
Residue, total	%	10/10	2.08E+01 - 2.91E+01	AR7-00-FFSBSO03-0-090827	NA	2.39E+01	2.53E+00
Smallmouth Bass/2009/AR8							
Semivolatile Organic Compounds							
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	µg/kg ww	1/5	2.10E+00 - 2.10E+00	AR8-00-FFSBSO02-0-090826	2.00E+01 - 2.00E+01	1.64E+01	8.01E+00
Fluorene	µg/kg ww	1/5	3.80E+00 - 3.80E+00	AR8-00-FFSBSO02-0-090826	2.00E+01 - 2.00E+01	1.68E+01	7.24E+00
Phenanthrene	µg/kg ww	3/5	2.80E+00 - 6.90E+00	AR8-00-FFSBSO02-0-090826	2.00E+01 - 2.00E+01	1.09E+01	8.43E+00
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	5/5	5.08E-03 - 3.38E-02	AR8-00-FFSBSO01-0-090826	NA	1.51E-02	1.18E-02
2,3,7,8-TCDD TEQ (fish)	µg/kg ww	5/5	1.32E-03 - 8.98E-03	AR8-00-FFSBSO01-0-090826	NA	3.97E-03	3.15E-03
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	5/5	1.21E-03 - 6.96E-03	AR8-00-FFSBSO01-0-090826	NA	3.18E-03	2.37E-03
Dioxin Homologues							
Hexachlorodibenzofuran (total)	µg/kg ww	3/5	2.79E-04 - 3.08E-03	AR8-00-FFSBSO01-0-090826	1.73E-04 - 2.08E-04	9.34E-04	1.24E-03
Pentachlorodibenzofuran (total)	µg/kg ww	5/5	1.39E-03 - 2.42E-02	AR8-00-FFSBSO01-0-090826	NA	9.50E-03	9.10E-03
Tetrachlorodibenzofuran (total)	µg/kg ww	5/5	3.11E-03 - 1.93E-02	AR8-00-FFSBSO01-0-090826	NA	8.71E-03	6.61E-03
Pesticides							
4,4'-DDE	µg/kg ww	4/5	3.00E+00 - 7.60E+00	AR8-00-FFSBSO02-0-090826	1.50E+00 - 1.50E+00	4.52E+00	2.44E+00
4,4'-DDT	µg/kg ww	4/5	7.00E+00 - 2.90E+01	AR8-00-FFSBSO01-0-090826	1.10E+01 - 1.10E+01	1.46E+01	8.41E+00
beta-Chlordane	µg/kg ww	5/5	1.20E+00 - 5.80E+00	AR8-00-FFSBSO01-0-090826	NA	2.94E+00	1.72E+00
Endosulfan II	µg/kg ww	5/5	3.80E-01 - 1.60E+00	AR8-00-FFSBSO01-0-090826	NA	1.04E+00	5.05E-01
o,p'-DDD	µg/kg ww	5/5	1.20E+00 - 4.30E+00	AR8-00-FFSBSO01-0-090826	NA	2.72E+00	1.14E+00
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	5/5	3.74E-03 - 2.49E-02	AR8-00-FFSBSO03-0-090826	NA	1.08E-02	8.16E-03
PCB Dioxin-like Congener TEQ (fish)	µg/kg ww	5/5	1.50E-04 - 4.07E-04	AR8-00-FFSBSO05-0-090826	NA	3.32E-04	1.05E-04
PCB Dioxin-like Congener TEQ (mammal	µg/kg ww	5/5	3.16E-03 - 8.16E-03	AR8-00-FFSBSO01-0-090826	NA	6.77E-03	2.11E-03
tPCBs	µg/kg ww	5/5	1.26E+02 - 4.53E+02	AR8-00-FFSBSO01-0-090826	NA	2.98E+02	1.20E+02
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	5/5	4.60E+01 - 8.80E+01	AR8-00-FFSBSR01-0-090826	NA	6.48E+01	1.93E+01

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Chromium	µg/kg ww	5/5	6.50E+01 - 2.69E+02	AR8-00-FFSBSR04-0-090826	NA	1.25E+02	8.39E+01
Copper	µg/kg ww	5/5	1.77E+02 - 2.62E+02	AR8-00-FFSBSR01-0-090826	NA	2.03E+02	3.52E+01
Lead	µg/kg ww	1/5	9.90E+00 - 9.90E+00	AR8-00-FFSBSR02-0-090826	4.20E+00 - 4.50E+00	5.46E+00	2.48E+00
Nickel	µg/kg ww	5/5	5.00E+00 - 1.21E+02	AR8-00-FFSBSR04-0-090826	NA	3.56E+01	4.85E+01
Selenium	µg/kg ww	5/5	2.49E+02 - 3.92E+02	AR8-00-FFSBSR02-0-090826	NA	3.12E+02	5.86E+01
Strontium	µg/kg ww	5/5	7.90E+01 - 5.14E+02	AR8-00-FFSBSR01-0-090826	NA	2.83E+02	1.84E+02
Vanadium	µg/kg ww	5/5	1.60E+01 - 5.50E+01	AR8-00-FFSBSR02-0-090826	NA	2.60E+01	1.63E+01
Zinc	µg/kg ww	5/5	3.11E+03 - 4.17E+03	AR8-00-FFSBSR01-0-090826	NA	3.48E+03	4.05E+02
Mercury							
Mercury	µg/kg ww	5/5	5.19E+02 - 7.95E+02	AR8-00-FFSBSR03-0-090826	NA	6.69E+02	1.05E+02
Conventionals							
Lipids, total	%	5/5	1.00E+00 - 1.80E+00	AR8-00-FFSBSO02-0-090826	NA	1.40E+00	3.16E-01
Residue, total	%	10/10	2.12E+01 - 2.71E+01	AR8-00-FFSBSO04-0-090826	NA	2.43E+01	2.05E+00
Smallmouth Bass/2009/AR9							
Semivolatile Organic Compounds							
Caprolactam	µg/kg ww	5/7	1.80E+02 - 4.30E+02	AR9-00-FFSBSO06-0-090825, AR9-00-FFSBSO08-0-090825	9.40E+01 - 9.90E+01	2.33E+02	1.42E+02
Phenol	µg/kg ww	1/7	4.70E+01 - 4.70E+01	AR9-00-FFSBSO02-0-090825	4.60E+01 - 5.00E+01	4.78E+01	1.22E+00
Polycyclic Aromatic Hydrocarbons							
Acenaphthene	µg/kg ww	3/7	1.90E+00 - 3.10E+00	AR9-00-FFSBSO02-0-090825	1.90E+01 - 2.00E+01	1.22E+01	9.09E+00
Fluorene	µg/kg ww	5/7	2.50E+00 - 4.80E+00	AR9-00-FFSBSO04-1-090825	1.90E+01 - 2.00E+01	8.01E+00	7.89E+00
Phenanthrene	µg/kg ww	6/7	4.20E+00 - 1.10E+01	AR9-00-FFSBSO02-0-090825	2.00E+01 - 2.00E+01	9.35E+00	5.17E+00
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	7/7	3.82E-03 - 2.36E-02	AR9-00-FFSBSO04-0-090825	NA	1.16E-02	6.56E-03
2,3,7,8-TCDD TEQ (fish)	µg/kg ww	7/7	1.04E-03 - 4.28E-03	AR9-00-FFSBSO04-0-090825	NA	2.10E-03	1.10E-03
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	7/7	9.95E-04 - 4.40E-03	AR9-00-FFSBSO04-0-090825	NA	2.13E-03	1.14E-03
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg ww	1/7	5.55E-04 - 5.55E-04	AR9-00-FFSBSO04-1-090825	2.65E-04 - 6.02E-04	3.57E-04	9.19E-05
Hexachlorodibenzofuran (total)	µg/kg ww	2/7	3.31E-04 - 1.15E-03	AR9-00-FFSBSO04-1-090825	1.64E-04 - 2.59E-04	3.58E-04	3.54E-04
Pentachlorodibenzofuran (total)	µg/kg ww	7/7	1.20E-03 - 6.74E-03	AR9-00-FFSBSO04-1-090825	NA	3.20E-03	1.88E-03
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	1/7	1.21E-03 - 1.21E-03	AR9-00-FFSBSO04-1-090825	1.64E-04 - 2.85E-04	3.36E-04	3.86E-04
Tetrachlorodibenzofuran (total)	µg/kg ww	6/7	4.54E-03 - 2.01E-02	AR9-00-FFSBSO04-1-090825	2.49E-03 - 2.49E-03	8.98E-03	5.28E-03
Pesticides							
4,4'-DDE	µg/kg ww	6/7	2.90E+00 - 7.90E+00	AR9-00-FFSBSO02-0-090825	9.90E-01 - 9.90E-01	4.71E+00	2.31E+00
4,4'-DDT	µg/kg ww	5/7	3.30E+00 - 1.90E+01	AR9-00-FFSBSO04-0-090825	6.60E+00 - 1.30E+01	1.01E+01	4.52E+00
beta-BHC	µg/kg ww	4/7	8.30E-01 - 3.90E+00	AR9-00-FFSBSO02-0-090825	9.70E-01 - 9.90E-01	1.52E+00	1.14E+00

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
beta-Chlordane	µg/kg ww	7/7	5.10E-01 - 4.00E+00	AR9-00-FFSBSO04-0-090825	NA	2.39E+00	1.13E+00
Endosulfan I	µg/kg ww	1/7	3.40E-01 - 3.40E-01	AR9-00-FFSBSO04-0-090825	9.40E-01 - 9.90E-01	8.81E-01	2.39E-01
Endosulfan II	µg/kg ww	6/7	5.40E-01 - 1.60E+00	AR9-00-FFSBSO04-0-090825	9.90E-01 - 9.90E-01	1.01E+00	3.78E-01
o,p'-DDD	µg/kg ww	6/7	1.60E+00 - 3.70E+00	AR9-00-FFSBSO04-0-090825	9.90E-01 - 9.90E-01	2.36E+00	8.86E-01
trans-Nonachlor	µg/kg ww	2/7	9.70E-01 - 1.30E+00	AR9-00-FFSBSO02-0-090825	9.40E-01 - 9.90E-01	1.02E+00	1.25E-01
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	7/7	2.56E-03 - 1.10E-02	AR9-00-FFSBSO04-0-090825	NA	7.11E-03	3.19E-03
PCB Dioxin-like Congener TEQ (fish)	µg/kg ww	7/7	9.33E-05 - 4.52E-04	AR9-00-FFSBSO06-0-090825	NA	2.84E-04	1.35E-04
PCB Dioxin-like Congener TEQ (mammal	µg/kg ww	7/7	1.96E-03 - 9.20E-03	AR9-00-FFSBSO04-0-090825	NA	5.60E-03	2.66E-03
tPCBs	µg/kg ww	7/7	8.32E+01 - 3.66E+02	AR9-00-FFSBSO04-0-090825	NA	2.41E+02	1.07E+02
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	7/7	1.70E+01 - 4.00E+01	AR9-00-FFSBSR08-0-090825	NA	2.99E+01	7.90E+00
Beryllium	µg/kg ww	1/7	4.70E+00 - 4.70E+00	AR9-00-FFSBSR05-0-090825	3.50E+00 - 4.70E+00	4.30E+00	4.04E-01
Cadmium	µg/kg ww	1/7	1.40E+00 - 1.40E+00	AR9-00-FFSBSR01-0-090825	3.50E+00 - 4.70E+00	3.89E+00	1.16E+00
Chromium	µg/kg ww	1/7	4.81E+02 - 4.81E+02	AR9-00-FFSBSR03-0-090825	3.50E+01 - 1.18E+02	1.21E+02	1.61E+02
Copper	µg/kg ww	7/7	1.83E+02 - 3.53E+02	AR9-00-FFSBSR08-0-090825	NA	2.28E+02	5.63E+01
Lead	µg/kg ww	4/7	1.30E+00 - 9.00E+00	AR9-00-FFSBSR05-0-090825	3.50E+00 - 4.30E+00	5.00E+00	2.62E+00
Nickel	µg/kg ww	5/7	7.00E+00 - 1.36E+02	AR9-00-FFSBSR05-0-090825	3.50E+01 - 4.30E+01	4.06E+01	4.38E+01
Selenium	µg/kg ww	7/7	1.77E+02 - 3.94E+02	AR9-00-FFSBSR06-0-090825	NA	3.40E+02	3.63E+01
Strontium	µg/kg ww	7/7	6.90E+01 - 9.86E+03	AR9-00-FFSBSR05-0-090825	NA	1.60E+03	3.65E+03
Vanadium	µg/kg ww	7/7	1.20E+01 - 4.50E+01	AR9-00-FFSBSR05-0-090825	NA	2.39E+01	1.10E+01
Zinc	µg/kg ww	7/7	3.30E+03 - 5.55E+03	AR9-00-FFSBSR05-0-090825	NA	3.68E+03	4.69E+02
Mercury							
Mercury	µg/kg ww	7/7	4.07E+02 - 6.35E+02	AR9-00-FFSBSR02-0-090825	NA	5.81E+02	8.02E+01
Conventionals							
Lipids, total	%	7/7	4.30E-01 - 3.90E+00	AR9-00-FFSBSO04-0-090825	NA	1.94E+00	1.12E+00
Residue, total	%	14/14	1.92E+01 - 3.39E+01	AR9-00-FFSBSO02-0-090825	NA	2.49E+01	3.61E+00
Smallmouth Bass/2011/AR2							
Mercury	µg/kg ww	5/5	2.75E+02 - 5.64E+02	AR2-WB-FFSMBSR03	NA	4.16E+02	1.03E+02
Smallmouth Bass/2011/AR5							
Mercury	µg/kg ww	5/5	4.42E+02 - 6.54E+02	AR5-0-FFSMBSR02	NA	5.32E+02	7.70E+01
Smallmouth Bass/2011/AR6							
Mercury	µg/kg ww	5/5	5.81E+02 - 8.43E+02	AR6-0-FFSMBSR02	NA	6.77E+02	1.05E+02
Smallmouth Bass/2011/AR7							
Mercury	µg/kg ww	5/5	5.64E+02 - 1.23E+03	AR7-0-FFSMBSR01	NA	7.24E+02	2.84E+02

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
White Sucker/2009/AR2							
Volatile Organic Compounds							
Hexachlorobenzene	µg/kg ww	1/2	1.30E+00 - 1.30E+00	AR2-WB-FCWSWB02-0-090824	1.00E+00 - 1.00E+00	1.15E+00	2.12E-01
Semivolatile Organic Compounds							
Bis(2-Ethylhexyl)Phthalate	µg/kg ww	2/2	1.90E+01 - 2.00E+01	AR2-WB-FCWSWB01-0-090824	NA	1.95E+01	7.07E-01
Polycyclic Aromatic Hydrocarbons							
2-Methylnaphthalene	µg/kg ww	1/2	5.50E+00 - 5.50E+00	AR2-WB-FCWSWB02-0-090824	2.00E+01 - 2.00E+01	1.28E+01	1.03E+01
Anthracene	µg/kg ww	2/2	5.70E+00 - 1.70E+01	AR2-WB-FCWSWB01-0-090824	NA	1.14E+01	7.99E+00
Naphthalene	µg/kg ww	1/2	7.50E+00 - 7.50E+00	AR2-WB-FCWSWB02-0-090824	2.00E+01 - 2.00E+01	1.38E+01	8.84E+00
Phenanthrene	µg/kg ww	1/2	4.00E+00 - 4.00E+00	AR2-WB-FCWSWB02-0-090824	2.00E+01 - 2.00E+01	1.20E+01	1.13E+01
Dioxin Homologues							
Pentachlorodibenzofuran (total)	µg/kg ww	1/2	3.26E-04 - 3.26E-04	AR2-WB-FCWSWB02-0-090824	1.19E-04 - 1.19E-04	2.23E-04	1.46E-04
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	1/2	6.02E-04 - 6.02E-04	AR2-WB-FCWSWB01-0-090824	1.97E-04 - 1.97E-04	4.00E-04	2.86E-04
Pesticides							
4,4'-DDD	µg/kg ww	2/2	1.60E+00 - 2.90E+00	AR2-WB-FCWSWB02-0-090824	NA	2.25E+00	9.19E-01
4,4'-DDE	µg/kg ww	2/2	9.20E+00 - 1.20E+01	AR2-WB-FCWSWB01-0-090824	NA	1.06E+01	1.98E+00
4,4'-DDT	µg/kg ww	2/2	2.30E+00 - 2.40E+00	AR2-WB-FCWSWB02-0-090824	NA	2.35E+00	7.07E-02
alpha-Chlordane	µg/kg ww	2/2	4.90E-01 - 5.60E-01	AR2-WB-FCWSWB01-0-090824	NA	5.25E-01	4.95E-02
beta-BHC	µg/kg ww	2/2	4.00E+00 - 6.30E+00	AR2-WB-FCWSWB01-0-090824	NA	5.15E+00	1.63E+00
cis-Nonachlor	µg/kg ww	1/2	8.70E-01 - 8.70E-01	AR2-WB-FCWSWB01-0-090824	1.20E+00 - 1.20E+00	1.04E+00	2.33E-01
Dieldrin	µg/kg ww	2/2	2.10E-01 - 3.30E-01	AR2-WB-FCWSWB02-0-090824	NA	2.70E-01	8.49E-02
Endosulfan I	µg/kg ww	1/2	3.80E-01 - 3.80E-01	AR2-WB-FCWSWB01-0-090824	9.70E-01 - 9.70E-01	6.75E-01	4.17E-01
Heptachlor	µg/kg ww	1/2	9.60E-01 - 9.60E-01	AR2-WB-FCWSWB01-0-090824	9.70E-01 - 9.70E-01	9.65E-01	7.07E-03
o,p'-DDT	µg/kg ww	1/2	5.60E-01 - 5.60E-01	AR2-WB-FCWSWB02-0-090824	1.00E+00 - 1.00E+00	7.80E-01	3.11E-01
trans-Nonachlor	µg/kg ww	1/2	8.40E-01 - 8.40E-01	AR2-WB-FCWSWB01-0-090824	9.90E-01 - 9.90E-01	9.15E-01	1.06E-01
PCB Homologues							
Decachlorobiphenyl	µg/kg ww	2/2	2.52E-02 - 5.15E-02	AR2-WB-FCWSWB01-0-090824	NA	3.84E-02	1.86E-02
Total HpCB	µg/kg ww	1/1	4.06E+00 - 4.06E+00	AR2-WB-FCWSWB02-0-090824	NA	4.06E+00	NC
Total HxCB	µg/kg ww	1/1	5.00E+00 - 5.00E+00	AR2-WB-FCWSWB02-0-090824	NA	5.00E+00	NC
Total PCB homologues	µg/kg ww	1/1	1.25E+01 - 1.25E+01	AR2-WB-FCWSWB02-0-090824	NA	1.25E+01	NC
Total PeCB	µg/kg ww	1/1	2.22E+00 - 2.22E+00	AR2-WB-FCWSWB02-0-090824	NA	2.22E+00	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	2/2	1.21E-03 - 1.68E-03	AR2-WB-FCWSWB01-0-090824	NA	1.44E-03	3.32E-04
PCB Dioxin-like Congener TEQ (fish)	µg/kg ww	2/2	3.32E-05 - 6.59E-05	AR2-WB-FCWSWB01-0-090824	NA	4.96E-05	2.32E-05
PCB Dioxin-like Congener TEQ (mammal	µg/kg ww	2/2	7.07E-04 - 1.55E-03	AR2-WB-FCWSWB01-0-090824	NA	1.13E-03	5.96E-04
tPCBs	µg/kg ww	2/2	6.66E-01 - 1.12E+01	AR2-WB-FCWSWB01-0-090824	NA	5.91E+00	7.41E+00

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	1/2	2.10E+01 - 2.10E+01	AR2-WB-FCWSWB02-0-090824	1.21E+02 - 1.21E+02	7.10E+01	7.07E+01
Beryllium	µg/kg ww	1/2	1.10E+00 - 1.10E+00	AR2-WB-FCWSWB01-0-090824	5.50E+00 - 5.50E+00	3.30E+00	3.11E+00
Cadmium	µg/kg ww	2/2	3.99E+01 - 4.97E+01	AR2-WB-FCWSWB01-0-090824	NA	4.48E+01	6.93E+00
Chromium	µg/kg ww	1/2	3.30E+01 - 3.30E+01	AR2-WB-FCWSWB02-0-090824	1.14E+02 - 1.14E+02	7.35E+01	5.73E+01
Copper	µg/kg ww	2/2	6.39E+02 - 1.87E+03	AR2-WB-FCWSWB01-0-090824	NA	1.25E+03	8.70E+02
Lead	µg/kg ww	2/2	6.60E+00 - 6.29E+01	AR2-WB-FCWSWB01-0-090824	NA	3.48E+01	3.98E+01
Nickel	µg/kg ww	2/2	1.64E+02 - 3.14E+02	AR2-WB-FCWSWB01-0-090824	NA	2.39E+02	1.06E+02
Selenium	µg/kg ww	2/2	2.31E+02 - 2.34E+02	AR2-WB-FCWSWB01-0-090824	NA	2.33E+02	2.12E+00
Strontium	µg/kg ww	2/2	1.00E+04 - 1.40E+04	AR2-WB-FCWSWB01-0-090824	NA	1.20E+04	2.83E+03
Vanadium	µg/kg ww	2/2	4.50E+01 - 1.14E+02	AR2-WB-FCWSWB01-0-090824	NA	7.95E+01	4.88E+01
Zinc	µg/kg ww	2/2	1.65E+04 - 1.77E+04	AR2-WB-FCWSWB01-0-090824	NA	1.71E+04	8.49E+02
Mercury							
Mercury	µg/kg ww	2/2	1.34E+02 - 1.35E+02	AR2-WB-FCWSWB02-0-090824	NA	1.35E+02	7.07E-01
Conventionals							
Lipids, total	%	2/2	3.90E+00 - 7.00E+00	AR2-WB-FCWSWB02-0-090824	NA	5.45E+00	2.19E+00
Residue, total	%	2/2	2.47E+01 - 2.85E+01	AR2-WB-FCWSWB02-0-090824	NA	2.66E+01	2.69E+00
White Sucker/2009/AR8							
Volatile Organic Compounds							
Acetophenone	µg/kg ww	1/2	1.40E+02 - 1.40E+02	AR8-00-FCWSWB01-0-090826	8.70E+01 - 8.70E+01	1.14E+02	3.75E+01
Semivolatile Organic Compounds							
Bis(2-Chloroethoxy)Methane	µg/kg ww	1/2	2.00E+01 - 2.00E+01	AR8-00-FCWSWB02-0-090826	2.00E+01 - 2.00E+01	2.00E+01	0.00E+00
Bis(2-Ethylhexyl)Phthalate	µg/kg ww	1/2	2.00E+01 - 2.00E+01	AR8-00-FCWSWB02-0-090826	2.00E+01 - 2.00E+01	2.00E+01	0.00E+00
Phenol	µg/kg ww	1/2	5.90E+01 - 5.90E+01	AR8-00-FCWSWB01-0-090826	4.90E+01 - 4.90E+01	5.40E+01	7.07E+00
Polycyclic Aromatic Hydrocarbons							
2-Methylnaphthalene	µg/kg ww	2/2	4.10E+00 - 4.90E+00	AR8-00-FCWSWB02-0-090826	NA	4.50E+00	5.66E-01
Acenaphthene	µg/kg ww	1/2	5.30E+00 - 5.30E+00	AR8-00-FCWSWB01-0-090826	2.00E+01 - 2.00E+01	1.27E+01	1.04E+01
Anthracene	µg/kg ww	2/2	9.70E+00 - 1.30E+01	AR8-00-FCWSWB02-0-090826	NA	1.14E+01	2.33E+00
Fluoranthene	µg/kg ww	1/2	9.50E+00 - 9.50E+00	AR8-00-FCWSWB01-0-090826	2.00E+01 - 2.00E+01	1.48E+01	7.42E+00
Fluorene	µg/kg ww	1/2	6.40E+00 - 6.40E+00	AR8-00-FCWSWB01-0-090826	2.00E+01 - 2.00E+01	1.32E+01	9.62E+00
Indeno(1,2,3-cd)pyrene	µg/kg ww	1/2	2.00E+01 - 2.00E+01	AR8-00-FCWSWB01-0-090826	2.00E+01 - 2.00E+01	2.00E+01	0.00E+00
Naphthalene	µg/kg ww	1/2	1.50E+01 - 1.50E+01	AR8-00-FCWSWB02-0-090826	2.00E+01 - 2.00E+01	1.75E+01	3.54E+00
Phenanthrene	µg/kg ww	2/2	9.10E+00 - 1.50E+01	AR8-00-FCWSWB01-0-090826	NA	1.21E+01	4.17E+00
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	2/2	3.71E-02 - 4.14E-02	AR8-00-FCWSWB02-0-090826	NA	3.93E-02	3.06E-03
2,3,7,8-TCDD TEQ (fish)	µg/kg ww	2/2	4.39E-03 - 4.46E-03	AR8-00-FCWSWB02-0-090826	NA	4.43E-03	5.26E-05

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	2/2	5.01E-03 - 5.49E-03	AR8-00-FCWSWB02-0-090826	NA	5.25E-03	3.40E-04
tPCBs	µg/kg ww	2/2	2.32E+02 - 4.01E+02	AR8-00-FCWSWB02-0-090826	NA	3.16E+02	1.19E+02
Dioxin Homologues							
Hexachlorodibenzofuran (total)	µg/kg ww	2/2	9.66E-04 - 1.43E-03	AR8-00-FCWSWB01-0-090826	NA	1.20E-03	3.28E-04
Pentachlorodibenzofuran (total)	µg/kg ww	2/2	7.26E-03 - 9.12E-03	AR8-00-FCWSWB01-0-090826	NA	8.19E-03	1.32E-03
Tetrachlorodibenzo(p)dioxin (total)	µg/kg ww	1/2	2.66E-04 - 2.66E-04	AR8-00-FCWSWB01-0-090826	1.59E-04 - 1.59E-04	2.13E-04	7.57E-05
Tetrachlorodibenzofuran (total)	µg/kg ww	2/2	3.40E-02 - 4.16E-02	AR8-00-FCWSWB02-0-090826	NA	3.78E-02	5.37E-03
Pesticides							
4,4'-DDD	µg/kg ww	1/2	4.20E+00 - 4.20E+00	AR8-00-FCWSWB02-0-090826	9.70E-01 - 9.70E-01	2.59E+00	2.28E+00
4,4'-DDE	µg/kg ww	2/2	7.50E+00 - 1.20E+01	AR8-00-FCWSWB02-0-090826	NA	9.75E+00	3.18E+00
4,4'-DDT	µg/kg ww	1/2	3.60E+01 - 3.60E+01	AR8-00-FCWSWB02-0-090826	2.10E+01 - 2.10E+01	2.85E+01	1.06E+01
alpha-Chlordane	µg/kg ww	1/2	1.20E+00 - 1.20E+00	AR8-00-FCWSWB02-0-090826	9.70E-01 - 9.70E-01	1.09E+00	1.63E-01
beta-BHC	µg/kg ww	1/2	1.00E+01 - 1.00E+01	AR8-00-FCWSWB02-0-090826	9.70E-01 - 9.70E-01	5.49E+00	6.39E+00
beta-Chlordane	µg/kg ww	2/2	7.00E+00 - 7.10E+00	AR8-00-FCWSWB01-0-090826	NA	7.05E+00	7.07E-02
Endosulfan II	µg/kg ww	1/2	2.40E+00 - 2.40E+00	AR8-00-FCWSWB01-0-090826	2.50E+00 - 2.50E+00	2.45E+00	7.07E-02
o,p'-DDD	µg/kg ww	2/2	7.00E+00 - 7.60E+00	AR8-00-FCWSWB01-0-090826	NA	7.30E+00	4.24E-01
trans-Nonachlor	µg/kg ww	2/2	6.40E-01 - 7.30E-01	AR8-00-FCWSWB01-0-090826	NA	6.85E-01	6.36E-02
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	2/2	5.81E-03 - 1.30E-02	AR8-00-FCWSWB02-0-090826	NA	9.43E-03	5.12E-03
PCB Dioxin-like Congener TEQ (fish)	µg/kg ww	2/2	2.66E-04 - 5.58E-04	AR8-00-FCWSWB02-0-090826	NA	4.12E-04	2.06E-04
PCB Dioxin-like Congener TEQ (mammal	µg/kg ww	2/2	5.28E-03 - 1.30E-02	AR8-00-FCWSWB02-0-090826	NA	9.12E-03	5.42E-03
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	2/2	4.70E+01 - 6.90E+01	AR8-00-FCWSWB01-0-090826	NA	5.80E+01	1.56E+01
Cadmium	µg/kg ww	2/2	2.82E+01 - 2.88E+01	AR8-00-FCWSWB02-0-090826	NA	2.85E+01	4.24E-01
Chromium	µg/kg ww	2/2	5.68E+02 - 9.56E+02	AR8-00-FCWSWB02-0-090826	NA	7.62E+02	2.74E+02
Copper	µg/kg ww	2/2	6.59E+02 - 7.90E+02	AR8-00-FCWSWB02-0-090826	NA	7.25E+02	9.26E+01
Lead	µg/kg ww	2/2	8.33E+01 - 1.26E+02	AR8-00-FCWSWB01-0-090826	NA	1.05E+02	3.02E+01
Nickel	µg/kg ww	2/2	4.75E+02 - 7.18E+02	AR8-00-FCWSWB02-0-090826	NA	5.97E+02	1.72E+02
Selenium	µg/kg ww	2/2	3.24E+02 - 3.58E+02	AR8-00-FCWSWB01-0-090826	NA	3.41E+02	2.40E+01
Strontium	µg/kg ww	2/2	1.20E+04 - 1.20E+04	AR8-00-FCWSWB01-0-090826, AR8-00-FCWSWB02-0-090826	NA	1.20E+04	0.00E+00
Vanadium	µg/kg ww	2/2	1.14E+02 - 1.59E+02	AR8-00-FCWSWB01-0-090826	NA	1.37E+02	3.18E+01
Zinc	µg/kg ww	2/2	1.49E+04 - 1.66E+04	AR8-00-FCWSWB02-0-090826	NA	1.58E+04	1.20E+03
Mercury							
Mercury	µg/kg ww	2/2	3.43E+02 - 3.77E+02	AR8-00-FCWSWB02-0-090826	NA	3.60E+02	2.40E+01

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Conventionals							
Lipids, total	%	2/2	3.70E+00 - 5.10E+00	AR8-00-FCWSWB01-0-090826	NA	4.40E+00	9.90E-01
Residue, total	%	2/2	2.53E+01 - 2.72E+01	AR8-00-FCWSWB01-0-090826	NA	2.63E+01	1.34E+00
White Sucker/2009/AR9							
Semivolatile Organic Compounds							
Bis(2-Chloroethoxy)Methane	µg/kg ww	2/2	1.90E+01 - 2.00E+01	AR2-WB-FCWSWB01-0-090825; AR2-WB-FCWSWB02-0-090825	NA	1.98E+01	3.54E-01
Bis(2-Ethylhexyl)Phthalate	µg/kg ww	2/2	1.90E+01 - 2.00E+01	AR2-WB-FCWSWB01-0-090825; AR2-WB-FCWSWB02-0-090825	NA	2.33E+02	3.89E+01
Dibenzofuran	µg/kg ww	1/2	4.70E+00 - 4.70E+00	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	1.24E+01	1.08E+01
Polycyclic Aromatic Hydrocarbons							
2-Methylnaphthalene	µg/kg ww	1/2	5.00E+00 - 5.00E+00	AR2-WB-FCWSWB01-0-090825	1.90E+01 - 2.00E+01	1.25E+01	1.06E+01
Acenaphthylene	µg/kg ww	1/2	3.90E+00 - 3.90E+00	AR2-WB-FCWSWB01-0-090825	1.90E+01 - 2.00E+01	1.20E+01	1.14E+01
Anthracene	µg/kg ww	2/2	2.40E+01 - 2.40E+01	AR2-WB-FCWSWB01-1-090825, AR2-WB-FCWSWB02-0-090825	2.00E+01 - 2.00E+01	2.40E+01	0.00E+00
Benzo(a)anthracene	µg/kg ww	1/2	5.90E+01 - 5.90E+01	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	3.95E+01	2.76E+01
Benzo(a)pyrene	µg/kg ww	1/2	4.90E+01 - 4.90E+01	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	3.45E+01	2.05E+01
Benzo(b)fluoranthene	µg/kg ww	1/2	7.40E+01 - 7.40E+01	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	4.70E+01	3.82E+01
Benzo(g,h,i)perylene	µg/kg ww	1/2	5.20E+01 - 5.20E+01	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	3.60E+01	2.26E+01
Benzo(k)fluoranthene	µg/kg ww	1/2	2.80E+01 - 2.80E+01	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	2.40E+01	5.66E+00
Chrysene	µg/kg ww	1/2	8.10E+01 - 8.10E+01	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	5.05E+01	4.31E+01
Dibenz(a,h)anthracene	µg/kg ww	1/2	2.10E+01 - 2.10E+01	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	2.05E+01	7.07E-01
Fluoranthene	µg/kg ww	1/2	8.20E+00 - 1.30E+02	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	7.50E+01	7.78E+01
Fluorene	µg/kg ww	2/2	5.00E+00 - 7.80E+00	AR2-WB-FCWSWB01-1-090825	NA	5.78E+00	1.10E+00
Indeno(1,2,3-cd)pyrene	µg/kg ww	1/2	6.70E+01 - 6.70E+01	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	4.35E+01	3.32E+01
Phenanthrene	µg/kg ww	2/2	9.10E+00 - 5.10E+01	AR2-WB-FCWSWB01-1-090825	NA	3.01E+01	2.96E+01
Pyrene	µg/kg ww	1/2	6.30E+01 - 6.30E+01	AR2-WB-FCWSWB01-1-090825	2.00E+01 - 2.00E+01	4.15E+01	3.04E+01
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	2/2	1.63E-02 - 2.16E-02	AR2-WB-FCWSWB02-0-090825	NA	1.90E-02	3.73E-03
2,3,7,8-TCDD TEQ (fish)	µg/kg ww	2/2	2.01E-03 - 2.43E-03	AR2-WB-FCWSWB02-0-090825	NA	2.22E-03	2.98E-04
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	2/2	2.30E-03 - 2.88E-03	AR2-WB-FCWSWB02-0-090825	NA	2.59E-03	4.15E-04
Dioxin Homologues							
Hexachlorodibenzofuran (total)	µg/kg ww	1/2	6.30E-04 - 6.30E-04	AR2-WB-FCWSWB02-0-090825	2.31E-04 - 2.76E-04	4.42E-04	2.66E-04
Pentachlorodibenzofuran (total)	µg/kg ww	2/2	2.92E-03 - 4.51E-03	AR2-WB-FCWSWB02-0-090825	NA	4.08E-03	6.15E-04
Tetrachlorodibenzofuran (total)	µg/kg ww	2/2	1.12E-02 - 1.90E-02	AR2-WB-FCWSWB02-0-090825	NA	1.67E-02	3.32E-03

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Pesticides							
4,4'-DDD	µg/kg ww	1/2	9.50E-01 - 1.90E+00	AR2-WB-FCWSWB01-1-090825	2.90E+00 - 2.90E+00	2.40E+00	7.07E-01
4,4'-DDE	µg/kg ww	2/2	3.40E+00 - 8.30E+00	AR2-WB-FCWSWB01-1-090825	NA	7.00E+00	1.84E+00
alpha-Chlordane	µg/kg ww	2/2	8.80E-01 - 9.50E-01	AR2-WB-FCWSWB01-1-090825	9.60E-01 - 9.60E-01	9.15E-01	4.95E-02
beta-BHC	µg/kg ww	2/2	7.10E+00 - 8.80E+00	AR2-WB-FCWSWB02-0-090825	NA	8.03E+00	1.10E+00
beta-Chlordane	µg/kg ww	2/2	1.00E+00 - 4.30E+00	AR2-WB-FCWSWB01-1-090825	NA	4.10E+00	2.83E-01
cis-Nonachlor	µg/kg ww	1/2	1.60E+01 - 1.60E+01	AR2-WB-FCWSWB02-0-090825	9.60E-01 - 9.60E-01	8.48E+00	1.06E+01
Endosulfan I	µg/kg ww	2/2	6.40E-01 - 1.10E+00	AR2-WB-FCWSWB02-0-090825	9.60E-01 - 9.60E-01	8.70E-01	3.25E-01
Endosulfan II	µg/kg ww	2/2	6.30E-01 - 1.90E+00	AR2-WB-FCWSWB01-1-090825	NA	1.65E+00	3.54E-01
Heptachlor	µg/kg ww	2/2	7.10E-01 - 1.00E+00	AR2-WB-FCWSWB02-0-090825	NA	8.65E-01	1.91E-01
Heptachlor epoxide	µg/kg ww	1/2	1.60E+00 - 1.60E+00	AR2-WB-FCWSWB02-0-090825	9.60E-01 - 1.20E+00	1.34E+00	3.68E-01
o,p'-DDD	µg/kg ww	2/2	3.40E+00 - 4.60E+00	AR2-WB-FCWSWB01-1-090825	9.60E-01 - 9.60E-01	4.00E+00	8.49E-01
trans-Nonachlor	µg/kg ww	2/2	3.90E-01 - 5.00E-01	AR2-WB-FCWSWB01-1-090825	9.60E-01 - 9.60E-01	4.45E-01	7.78E-02
PCB Homologues							
Decachlorobiphenyl	µg/kg ww	2/2	2.24E-02 - 1.06E-01	AR2-WB-FCWSWB01-1-090825	NA	1.04E-01	2.83E-03
Total HpCB	µg/kg ww	2/2	1.92E+00 - 1.64E+02	AR2-WB-FCWSWB01-1-090825	NA	1.46E+02	2.55E+01
Total HxCB	µg/kg ww	2/2	2.36E+00 - 1.67E+02	AR2-WB-FCWSWB01-1-090825	NA	1.56E+02	1.56E+01
Total PCB homologues	µg/kg ww	2/2	5.99E+00 - 4.08E+02	AR2-WB-FCWSWB01-1-090825	NA	3.76E+02	4.60E+01
Total PeCB	µg/kg ww	2/2	1.06E+00 - 3.88E+01	AR2-WB-FCWSWB01-1-090825	NA	3.71E+01	2.40E+00
Total TeCB	µg/kg ww	2/2	5.93E+00 - 6.41E+00	AR2-WB-FCWSWB02-0-090825	5.67E-01 - 5.67E-01	6.17E+00	3.39E-01
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	2/2	4.09E-03 - 4.47E-03	AR2-WB-FCWSWB02-0-090825	NA	4.28E-03	2.66E-04
PCB Dioxin-like Congener TEQ (fish)	µg/kg ww	2/2	1.49E-04 - 1.67E-04	AR2-WB-FCWSWB02-0-090825	NA	1.58E-04	1.30E-05
PCB Dioxin-like Congener TEQ (mammal	µg/kg ww	2/2	4.63E-03 - 5.06E-03	AR2-WB-FCWSWB01-0-090825	NA	4.84E-03	3.05E-04
tPCBs	µg/kg ww	2/2	8.76E+00 - 1.20E+01	AR2-WB-FCWSWB01-0-090825	NA	1.04E+01	2.30E+00
Inorganics (excepting mercury)							
Arsenic	µg/kg ww	2/2	4.00E+01 - 4.20E+01	AR2-WB-FCWSWB01-0-090825, AR2-WB-FCWSWB01-1-090825	NA	4.10E+01	1.41E+00
Beryllium	µg/kg ww	2/2	1.30E+00 - 2.10E+00	AR2-WB-FCWSWB02-0-090825	NA	1.83E+00	3.89E-01
Cadmium	µg/kg ww	2/2	4.73E+01 - 5.85E+01	AR2-WB-FCWSWB01-1-090825	NA	5.06E+01	3.25E+00
Chromium	µg/kg ww	2/2	3.46E+02 - 8.88E+02	AR2-WB-FCWSWB01-0-090825	NA	6.17E+02	3.83E+02
Copper	µg/kg ww	2/2	6.39E+02 - 7.51E+02	AR2-WB-FCWSWB01-1-090825	NA	6.71E+02	4.45E+01
Lead	µg/kg ww	2/2	6.81E+01 - 1.16E+02	AR2-WB-FCWSWB01-1-090825	NA	1.02E+02	1.97E+01
Nickel	µg/kg ww	2/2	3.76E+02 - 4.64E+02	AR2-WB-FCWSWB01-0-090825	NA	4.03E+02	3.75E+01
Selenium	µg/kg ww	2/2	1.69E+02 - 2.02E+02	AR2-WB-FCWSWB02-0-090825	NA	1.92E+02	1.48E+01

Table 2-24
Summary of Chemicals Detected in Fish - Smallmouth Bass (Fillet) and White Sucker (Whole Body) - 2009 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Species/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Strontium	µg/kg ww	2/2	1.20E+04 - 1.40E+04	AR2-WB-FCWSWB01-1-090825, AR2-WB-FCWSWB02-0-090825	NA	1.35E+04	7.07E+02
Vanadium	µg/kg ww	2/2	1.42E+02 - 2.33E+02	AR2-WB-FCWSWB01-1-090825	NA	1.97E+02	1.31E+01
Zinc	µg/kg ww	2/2	1.69E+04 - 2.06E+04	AR2-WB-FCWSWB01-1-090825	NA	1.87E+04	1.06E+02
Mercury							
Mercury	µg/kg ww	2/2	2.38E+02 - 3.06E+02	AR2-WB-FCWSWB02-0-090825	NA	2.89E+02	2.47E+01
Conventionals							
Lipids, total	%	2/2	3.90E+00 - 4.70E+00	AR2-WB-FCWSWB01-1-090825	NA	4.25E+00	7.07E-02
Residue, total	%	2/2	2.53E+01 - 2.59E+01	AR2-WB-FCWSWB01-0-090825	NA	2.56E+01	3.54E-01
White Sucker/2011/AR2							
Mercury	µg/kg ww	5/5	9.34E+01 - 1.53E+02	AR2-WB-FCWSWB05	NA	1.23E+02	2.19E+01
White Sucker/2011/AR5							
Mercury	µg/kg ww	5/5	5.71E+01 - 1.63E+02	AR5-0-FCWSWB03	NA	1.07E+02	4.42E+01
White Sucker/2011/AR6							
Mercury	µg/kg ww	5/5	1.29E+02 - 3.56E+02	AR6-0-FCWSWB04	NA	2.29E+02	8.20E+01
White Sucker/2011/AR7							
Mercury	µg/kg ww	5/5	1.12E+02 - 4.50E+02	AR7-0-FCWSWB04	NA	2.35E+02	1.30E+02

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg ww = Micrograms per kilograms wet weight.

Table 2-25
Summary of Chemicals Detected in Songbird Blood and Feathers - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Tissue/Reach/Species/(Feather Type)/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Blood/AR1/All Species							
Mercury	µg/kg fw	19/19	1.59E+01 - 1.38E+03	AR1-01-BBSOSP01-0-100811	NA	2.91E+02	3.89E+02
Blood/AR1/Swamp Sparrow							
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	2/2	1.72E-02 - 6.56E-02	AR1-01-BBSWSPC1-0-101102	NA	4.14E-02	3.42E-02
Total HpCB	µg/kg fw	2/2	3.66E-01 - 2.76E+00	AR1-01-BBSWSPC1-0-101102	NA	1.56E+00	1.69E+00
Total HxCB	µg/kg fw	2/2	5.53E-01 - 2.75E+00	AR1-01-BBSWSPC1-0-101102	NA	1.65E+00	1.55E+00
Total NoCB	µg/kg fw	2/2	2.98E-02 - 2.34E-01	AR1-01-BBSWSPC1-0-101102	NA	1.32E-01	1.44E-01
Total OcCB	µg/kg fw	2/2	1.52E-01 - 1.22E+00	AR1-01-BBSWSPC1-0-101102	NA	6.86E-01	7.55E-01
Total PCB homologues	µg/kg fw	2/2	1.12E+00 - 7.03E+00	AR1-01-BBSWSPC1-0-101102	NA	4.08E+00	4.18E+00
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg fw	2/2	3.03E-05 - 3.03E-05	AR1-01-BBSWSPC1-0-101102	NA	1.99E-05	1.46E-05
tPCBs	µg/kg fw	2/2	1.41E+00 - 3.21E+00	AR1-01-BBSWSPC1-0-101102	NA	2.31E+00	1.27E+00
Blood/AR9/All Species							
Mercury	µg/kg fw	36/36	6.24E+00 - 1.23E+03	AR9-01-BBSOSP02-0-100802	NA	2.46E+02	2.66E+02
Blood/AR9/Eastern Kingbird							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg fw	1/1	1.14E-02 - 1.14E-02	AR9-01-BBEAKIC1-0-101102	NA	1.14E-02	NC
Dioxin Homologues							
Pentachlorodibenzofuran (total)	µg/kg fw	1/1	1.14E-02 - 1.14E-02	AR9-01-BBEAKIC1-0-101102	NA	1.14E-02	NC
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	1/1	2.78E-01 - 2.78E-01	AR9-01-BBEAKIC1-0-101102	NA	2.78E-01	NC
Total HpCB	µg/kg fw	1/1	6.23E+01 - 6.23E+01	AR9-01-BBEAKIC1-0-101102	NA	6.23E+01	NC
Total HxCB	µg/kg fw	1/1	5.69E+01 - 5.69E+01	AR9-01-BBEAKIC1-0-101102	NA	5.69E+01	NC
Total NoCB	µg/kg fw	1/1	1.64E+00 - 1.64E+00	AR9-01-BBEAKIC1-0-101102	NA	1.64E+00	NC
Total OcCB	µg/kg fw	1/1	2.11E+01 - 2.11E+01	AR9-01-BBEAKIC1-0-101102	NA	2.11E+01	NC
Total PCB homologues	µg/kg fw	1/1	1.47E+02 - 1.47E+02	AR9-01-BBEAKIC1-0-101102	NA	1.47E+02	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg fw	1/1	2.49E-04 - 2.49E-04	AR9-01-BBEAKIC1-0-101102	NA	2.49E-04	NC
tPCBs	µg/kg fw	1/1	1.02E+01 - 1.02E+01	AR9-01-BBEAKIC1-0-101102	NA	1.02E+01	NC
Blood/AR9/Swamp Sparrow							
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	2/2	5.17E-02 - 7.09E-02	AR9-01-BBSWSPC2-0-101102	NA	6.13E-02	1.36E-02
Total HpCB	µg/kg fw	2/2	1.66E+01 - 2.16E+01	AR9-01-BBSWSPC2-0-101102	NA	1.91E+01	3.54E+00
Total HxCB	µg/kg fw	2/2	1.59E+01 - 1.61E+01	AR9-01-BBSWSPC2-0-101102	NA	1.60E+01	1.41E-01
Total NoCB	µg/kg fw	2/2	3.34E-01 - 4.56E-01	AR9-01-BBSWSPC2-0-101102	NA	3.95E-01	8.63E-02

Table 2-25
Summary of Chemicals Detected in Songbird Blood and Feathers - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Tissue/Reach/Species/(Feather Type)/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Total OcCB	µg/kg fw	2/2	4.56E+00 - 6.75E+00	AR9-01-BBSWSPC2-0-101102	NA	5.66E+00	1.55E+00
Total PCB homologues	µg/kg fw	2/2	3.74E+01 - 4.50E+01	AR9-01-BBSWSPC2-0-101102	NA	4.12E+01	5.37E+00
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg fw	2/2	6.70E-05 - 7.91E-05	AR9-01-BBSWSPC2-0-101102	NA	7.30E-05	8.53E-06
tPCBs	µg/kg fw	2/2	4.46E+00 - 4.76E+00	AR9-01-BBSWSPC2-0-101102	NA	4.61E+00	2.09E-01
Feathers/AR1/All Species/Primary							
Mercury	µg/kg fw	19/19	1.55E+02 - 5.68E+03	AR1-01-BFYWAR01-0-100811P	NA	2.49E+03	1.50E+03
Feathers/AR1/All Species/Tail							
Mercury	µg/kg fw	18/18	2.18E+02 - 2.26E+04	AR1-01-BFSOSP01-0-100811T	NA	3.89E+03	4.92E+03
Feathers/AR9/All Species/Primary							
Mercury	µg/kg fw	35/35	5.67E+01 - 9.40E+03	AR9-01-BFSWSP05-0-100810P	NA	1.49E+03	1.78E+03
Feathers/AR9/All Species/Tail							
Mercury	µg/kg fw	32/32	3.95E+01 - 1.05E+04	AR9-01-BFSWSP05-0-100810T	NA	1.86E+03	2.22E+03

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg fw = Micrograms per kilograms fresh weight.

Table 2-26
Summary of Chemicals Detected in Tree Swallow Blood - Adult - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR1							
Mercury	µg/kg fw	7/7	2.78E+02 - 4.34E+02	AR1-0-BBTS0006-100616	NA	3.34E+02	6.46E+01
AR2							
Mercury	µg/kg fw	4/4	2.34E+02 - 3.39E+02	AR2-0-BBTS0002-100603	NA	2.99E+02	4.53E+01
AR3							
Mercury	µg/kg fw	1/1	4.66E+02 - 4.66E+02	AR3-0-BBTS0001-100609	NA	4.66E+02	NC
AR4							
Mercury	µg/kg fw	1/1	4.91E+02 - 4.91E+02	AR4-0-BBTS0001-100609	NA	4.91E+02	NC
AR8							
Mercury	µg/kg fw	5/5	4.16E+02 - 5.89E+02	AR8-0-BBTS0003-100609	NA	4.94E+02	7.97E+01
AR9							
Mercury	µg/kg fw	8/8	3.04E+02 - 6.78E+02	AR9-2-BBTS0002-100608	NA	5.45E+02	1.31E+02

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg fw = Micrograms per kilograms fresh weight.

Table 2-27
Summary of Chemicals Detected in Tree Swallow Blood - Nestling - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR1							
Mercury	µg/kg fw	6/6	3.99E+01 - 7.12E+01	AR1-0-BBTS0008-100622	NA	4.90E+01	1.32E+01
AR2							
Mercury	µg/kg fw	7/7	2.09E+01 - 4.01E+01	AR2-0-BBTS0011-100630	NA	3.11E+01	7.16E+00
AR4							
Mercury	µg/kg fw	2/2	4.18E+01 - 5.30E+01	AR4-0-BBTS0002-100623	NA	4.74E+01	7.94E+00
AR8							
Mercury	µg/kg fw	3/3	3.09E+01 - 8.35E+01	AR8-0-BBTS0006-100623	NA	5.37E+01	2.70E+01
AR9							
Mercury	µg/kg fw	4/4	3.65E+01 - 7.29E+01	AR9-2-BBTS0004-100617	NA	5.95E+01	1.73E+01

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg fw = Micrograms per kilograms fresh weight.

Table 2-28
Summary of Chemicals Detected in Tree Swallow Feather - Adult - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR1							
Mercury	µg/kg fw	8/8	8.83E+02 - 2.04E+03	AR1-0-BFTS0001-100602	NA	1.19E+03	3.73E+02
AR2							
Mercury	µg/kg fw	6/6	8.18E+02 - 2.42E+03	AR2-0-BFTS0005-100609	NA	1.38E+03	5.63E+02
AR3							
Mercury	µg/kg fw	1/1	1.01E+03 - 1.01E+03	AR3-0-BFTS0001-100609	NA	1.01E+03	NC
AR4							
Mercury	µg/kg fw	1/1	1.61E+03 - 1.61E+03	AR4-0-BFTS0001-100609	NA	1.61E+03	NC
AR8							
Mercury	µg/kg fw	7/7	9.53E+02 - 1.88E+03	AR8-0-BFTS0004-100602	NA	1.40E+03	3.70E+02
AR9							
Mercury	µg/kg fw	12/12	7.75E+02 - 1.84E+03	AR9-2-BFTS0003-100601	NA	1.33E+03	3.64E+02

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg fw = Micrograms per kilograms fresh weight.

Table 2-29
Summary of Chemicals Detected in Tree Swallow Feather - Nestling - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR1							
Mercury	µg/kg fw	6/6	1.43E+03 - 1.78E+03	AR1-0-BFTS0009-100622	NA	1.53E+03	1.40E+02
AR2							
Mercury	µg/kg fw	7/7	8.83E+02 - 1.31E+03	AR2-0-BFTS0010-100623	NA	1.07E+03	1.48E+02
AR4							
Mercury	µg/kg fw	1/1	1.64E+03 - 1.64E+03	AR4-0-BFTS0003-100623	NA	1.64E+03	NC
AR8							
Mercury	µg/kg fw	3/3	1.26E+03 - 2.52E+03	AR8-0-BFTS0008-100623	NA	1.73E+03	6.86E+02
AR9							
Mercury	µg/kg fw	5/5	1.65E+03 - 2.45E+03	AR9-1-BFTS0004-100623	NA	1.99E+03	3.43E+02

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg fw = Micrograms per kilograms fresh weight.

Table 2-30
Summary of Chemicals Detected in Tree Swallow Eggs - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR1							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg fw	1/1	1.03E-01 - 1.03E-01	AR1-0-BETSC001-101112	NA	1.03E-01	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg fw	1/1	7.11E-03 - 7.11E-03	AR1-0-BETSC001-101112	NA	7.11E-03	NC
Heptachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	1.42E-01 - 1.42E-01	AR1-0-BETSC001-101112	NA	1.42E-01	NC
Hexachlorodibenzofuran (total)	µg/kg fw	1/1	2.90E-02 - 2.90E-02	AR1-0-BETSC001-101112	NA	2.90E-02	NC
Hexachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	2.33E-01 - 2.33E-01	AR1-0-BETSC001-101112	NA	2.33E-01	NC
Pentachlorodibenzofuran (total)	µg/kg fw	1/1	4.32E-02 - 4.32E-02	AR1-0-BETSC001-101112	NA	4.32E-02	NC
Tetrachlorodibenzo(p)dioxin (total)	µg/kg fw	1/1	5.63E-03 - 5.63E-03	AR1-0-BETSC001-101112	NA	5.63E-03	NC
Tetrachlorodibenzofuran (total)	µg/kg fw	1/1	4.04E-02 - 4.04E-02	AR1-0-BETSC001-101112	NA	4.04E-02	NC
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	1/1	1.04E+01 - 1.04E+01	AR1-0-BETSC001-101112	NA	1.04E+01	NC
Total HpCB	µg/kg fw	1/1	3.40E+02 - 3.40E+02	AR1-0-BETSC001-101112	NA	3.40E+02	NC
Total HxCB	µg/kg fw	1/1	3.68E+02 - 3.68E+02	AR1-0-BETSC001-101112	NA	3.68E+02	NC
Total PCB homologues	µg/kg fw	1/1	9.88E+02 - 9.88E+02	AR1-0-BETSC001-101112	NA	9.88E+02	NC
Total PeCB	µg/kg fw	1/1	1.27E+02 - 1.27E+02	AR1-0-BETSC001-101112	NA	1.27E+02	NC
Total TeCB	µg/kg fw	1/1	2.93E+01 - 2.93E+01	AR1-0-BETSC001-101112	NA	2.93E+01	NC
Total TrCB	µg/kg fw	1/1	5.94E+00 - 5.94E+00	AR1-0-BETSC001-101112	NA	5.94E+00	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg fw	1/1	1.00E-01 - 1.00E-01	AR1-0-BETSC001-101112	NA	1.00E-01	NC
tPCBs	µg/kg fw	1/1	7.31E+01 - 7.31E+01	AR1-0-BETSC001-101112	NA	7.31E+01	NC
Mercury							
Mercury	µg/kg fw	6/6	4.90E+02 - 7.06E+02	AR1-0-BETS0009	NA	5.55E+02	7.79E+01
AR2							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg fw	1/1	7.20E-02 - 7.20E-02	AR2-0-BETSC001-101112	NA	7.20E-02	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg fw	1/1	2.01E-02 - 2.01E-02	AR2-0-BETSC001-101112	NA	2.01E-02	NC
Heptachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	2.62E-01 - 2.62E-01	AR2-0-BETSC001-101112	NA	2.62E-01	NC
Hexachlorodibenzofuran (total)	µg/kg fw	1/1	2.51E-02 - 2.51E-02	AR2-0-BETSC001-101112	NA	2.51E-02	NC
Hexachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	1.64E-01 - 1.64E-01	AR2-0-BETSC001-101112	NA	1.64E-01	NC
Pentachlorodibenzofuran (total)	µg/kg fw	1/1	3.13E-02 - 3.13E-02	AR2-0-BETSC001-101112	NA	3.13E-02	NC
Tetrachlorodibenzo(p)dioxin (total)	µg/kg fw	1/1	4.75E-03 - 4.75E-03	AR2-0-BETSC001-101112	NA	4.75E-03	NC
Tetrachlorodibenzofuran (total)	µg/kg fw	1/1	2.68E-02 - 2.68E-02	AR2-0-BETSC001-101112	NA	2.68E-02	NC

Table 2-30
Summary of Chemicals Detected in Tree Swallow Eggs - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	1/1	4.13E+00 - 4.13E+00	AR2-0-BETSC001-101112	NA	4.13E+00	NC
Total HpCB	µg/kg fw	1/1	3.53E+02 - 3.53E+02	AR2-0-BETSC001-101112	NA	3.53E+02	NC
Total HxCB	µg/kg fw	1/1	3.35E+02 - 3.35E+02	AR2-0-BETSC001-101112	NA	3.35E+02	NC
Total PCB homologues	µg/kg fw	1/1	9.00E+02 - 9.00E+02	AR2-0-BETSC001-101112	NA	9.00E+02	NC
Total PeCB	µg/kg fw	1/1	8.73E+01 - 8.73E+01	AR2-0-BETSC001-101112	NA	8.73E+01	NC
Total TeCB	µg/kg fw	1/1	2.46E+01 - 2.46E+01	AR2-0-BETSC001-101112	NA	2.46E+01	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg fw	1/1	9.31E-02 - 9.31E-02	AR2-0-BETSC001-101112	NA	9.31E-02	NC
tPCBs	µg/kg fw	1/1	6.65E+01 - 6.65E+01	AR2-0-BETSC001-101112	NA	6.65E+01	NC
Mercury							
Mercury	µg/kg fw	7/7	4.26E+02 - 7.77E+02	AR2-0-BETS0011	NA	5.51E+02	1.12E+02
AR3							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg fw	1/1	5.65E-01 - 5.65E-01	AR3-0-BETSC001-101112	NA	5.65E-01	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg fw	1/1	2.09E-02 - 2.09E-02	AR3-0-BETSC001-101112	NA	2.09E-02	NC
Heptachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	1.48E-01 - 1.48E-01	AR3-0-BETSC001-101112	NA	1.48E-01	NC
Hexachlorodibenzofuran (total)	µg/kg fw	1/1	1.04E-01 - 1.04E-01	AR3-0-BETSC001-101112	NA	1.04E-01	NC
Hexachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	1.33E-01 - 1.33E-01	AR3-0-BETSC001-101112	NA	1.33E-01	NC
Pentachlorodibenzofuran (total)	µg/kg fw	1/1	2.00E-01 - 2.00E-01	AR3-0-BETSC001-101112	NA	2.00E-01	NC
Tetrachlorodibenzo(p)dioxin (total)	µg/kg fw	1/1	1.31E-02 - 1.31E-02	AR3-0-BETSC001-101112	NA	1.31E-02	NC
Tetrachlorodibenzofuran (total)	µg/kg fw	1/1	4.32E-01 - 4.32E-01	AR3-0-BETSC001-101112	NA	4.32E-01	NC
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	1/1	6.89E+00 - 6.89E+00	AR3-0-BETSC001-101112	NA	6.89E+00	NC
Total HpCB	µg/kg fw	1/1	2.65E+03 - 2.65E+03	AR3-0-BETSC001-101112	NA	2.65E+03	NC
Total HxCB	µg/kg fw	1/1	4.09E+03 - 4.09E+03	AR3-0-BETSC001-101112	NA	4.09E+03	NC
Total PCB homologues	µg/kg fw	1/1	1.06E+04 - 1.06E+04	AR3-0-BETSC001-101112	NA	1.06E+04	NC
Total PeCB	µg/kg fw	1/1	2.64E+03 - 2.64E+03	AR3-0-BETSC001-101112	NA	2.64E+03	NC
Total TeCB	µg/kg fw	1/1	6.92E+02 - 6.92E+02	AR3-0-BETSC001-101112	NA	6.92E+02	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg fw	1/1	1.13E+00 - 1.13E+00	AR3-0-BETSC001-101112	NA	1.13E+00	NC
tPCBs	µg/kg fw	1/1	1.17E+03 - 1.17E+03	AR3-0-BETSC001-101112	NA	1.17E+03	NC
Mercury							
Mercury	µg/kg fw	1/1	8.13E+02 - 8.13E+02	AR3-0-BETS0001	NA	8.13E+02	NC

Table 2-30
Summary of Chemicals Detected in Tree Swallow Eggs - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR4							
Mercury	µg/kg fw	1/1	8.47E+02 - 8.47E+02	AR4-0-BETS0001	NA	8.47E+02	NC
AR8							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg fw	1/1	2.80E-01 - 2.80E-01	AR8-0-BETSC001-101112	NA	2.80E-01	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg fw	1/1	1.53E-02 - 1.53E-02	AR8-0-BETSC001-101112	NA	1.53E-02	NC
Heptachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	1.69E-01 - 1.69E-01	AR8-0-BETSC001-101112	NA	1.69E-01	NC
Hexachlorodibenzofuran (total)	µg/kg fw	1/1	5.60E-02 - 5.60E-02	AR8-0-BETSC001-101112	NA	5.60E-02	NC
Hexachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	1.58E-01 - 1.58E-01	AR8-0-BETSC001-101112	NA	1.58E-01	NC
Pentachlorodibenzofuran (total)	µg/kg fw	1/1	1.05E-01 - 1.05E-01	AR8-0-BETSC001-101112	NA	1.05E-01	NC
Tetrachlorodibenzo(p)dioxin (total)	µg/kg fw	1/1	8.06E-03 - 8.06E-03	AR8-0-BETSC001-101112	NA	8.06E-03	NC
Tetrachlorodibenzofuran (total)	µg/kg fw	1/1	2.02E-01 - 2.02E-01	AR8-0-BETSC001-101112	NA	2.02E-01	NC
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	1/1	9.31E+00 - 9.31E+00	AR8-0-BETSC001-101112	NA	9.31E+00	NC
Total HpCB	µg/kg fw	1/1	1.05E+03 - 1.05E+03	AR8-0-BETSC001-101112	NA	1.05E+03	NC
Total HxCB	µg/kg fw	1/1	1.29E+03 - 1.29E+03	AR8-0-BETSC001-101112	NA	1.29E+03	NC
Total PCB homologues	µg/kg fw	1/1	2.94E+03 - 2.94E+03	AR8-0-BETSC001-101112	NA	2.94E+03	NC
Total PeCB	µg/kg fw	1/1	2.95E+02 - 2.95E+02	AR8-0-BETSC001-101112	NA	2.95E+02	NC
Total TeCB	µg/kg fw	1/1	8.28E+01 - 8.28E+01	AR8-0-BETSC001-101112	NA	8.28E+01	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg fw	1/1	2.31E-01 - 2.31E-01	AR8-0-BETSC001-101112	NA	2.31E-01	NC
tPCBs	µg/kg fw	1/1	1.65E+02 - 1.65E+02	AR8-0-BETSC001-101112	NA	1.65E+02	NC
Mercury							
Mercury	µg/kg fw	5/5	5.81E+02 - 8.39E+02	AR8-0-BETS0007	NA	7.52E+02	1.03E+02
AR9							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg fw	1/1	3.45E-01 - 3.45E-01	AR9-1-BETSC001-101112	NA	3.45E-01	NC
Dioxin Homologues							
Heptachlorodibenzofuran (total)	µg/kg fw	1/1	2.10E-02 - 2.10E-02	AR9-1-BETSC001-101112	NA	2.10E-02	NC
Heptachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	1.64E-01 - 1.64E-01	AR9-1-BETSC001-101112	NA	1.64E-01	NC
Hexachlorodibenzofuran (total)	µg/kg fw	1/1	6.84E-02 - 6.84E-02	AR9-1-BETSC001-101112	NA	6.84E-02	NC
Hexachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	1.54E-01 - 1.54E-01	AR9-1-BETSC001-101112	NA	1.54E-01	NC
Pentachlorodibenzofuran (total)	µg/kg fw	1/1	1.29E-01 - 1.29E-01	AR9-1-BETSC001-101112	NA	1.29E-01	NC

Table 2-30
Summary of Chemicals Detected in Tree Swallow Eggs - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Pentachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	2.88E-02 - 2.88E-02	AR9-1-BETSC001-101112	NA	2.88E-02	NC
Tetrachlorodibenzo(p)dioxin (total)	µg/kg fw	1/1	7.34E-03 - 7.34E-03	AR9-1-BETSC001-101112	NA	7.34E-03	NC
Tetrachlorodibenzofuran (total)	µg/kg fw	1/1	2.58E-01 - 2.58E-01	AR9-1-BETSC001-101112	NA	2.58E-01	NC
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	1/1	5.96E+00 - 5.96E+00	AR9-1-BETSC001-101112	NA	5.96E+00	NC
Total HpCB	µg/kg fw	1/1	1.66E+03 - 1.66E+03	AR9-1-BETSC001-101112	NA	1.66E+03	NC
Total HxCB	µg/kg fw	1/1	1.95E+03 - 1.95E+03	AR9-1-BETSC001-101112	NA	1.95E+03	NC
Total PCB homologues	µg/kg fw	1/1	4.36E+03 - 4.36E+03	AR9-1-BETSC001-101112	NA	4.36E+03	NC
Total PeCB	µg/kg fw	1/1	4.16E+02 - 4.16E+02	AR9-1-BETSC001-101112	NA	4.16E+02	NC
Total TeCB	µg/kg fw	1/1	1.02E+02 - 1.02E+02	AR9-1-BETSC001-101112	NA	1.02E+02	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg fw	1/1	1.99E-01 - 1.99E-01	AR9-1-BETSC001-101112	NA	1.99E-01	NC
tPCBs	µg/kg fw	1/1	2.01E+02 - 2.01E+02	AR9-1-BETSC001-101112	NA	2.01E+02	NC
Mercury							
Mercury	µg/kg fw	9/9	5.44E+02 - 8.15E+02	AR9-1-BETS0001	NA	6.88E+02	1.10E+02

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg fw = Micrograms per kilograms fresh weight.

Table 2-31
Summary of Chemicals Detected in Bald Eagle Blood, Feathers, and Plasma - 2008 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Sample Type/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Blood/2008/AR1							
Mercury	µg/kg fw	2/2	4.42E+02 - 5.39E+02	AR1-00-BBBE0001-0-080604	NA	4.91E+02	6.86E+01
Blood/2008/AR9							
Mercury	µg/kg fw	2/2	4.34E+02 - 6.35E+02	AR9-00-BBBE0001-0-080604	NA	5.35E+02	1.42E+02
Feathers/2008/AR1							
Mercury	µg/kg fw	2/2	9.49E+03 - 1.51E+04	AR1-00-BFBE0001-0-080604	NA	1.23E+04	3.97E+03
Feathers/2008/AR9							
Mercury	µg/kg fw	2/2	1.82E+04 - 2.33E+04	AR9-00-BFBE0002-0-080604	NA	2.08E+04	3.61E+03
Plasma/2008/AR1							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg fw	2/2	3.79E-03 - 6.78E-03	AR1-00-BPBE0001-0-0-80604	NA	5.28E-03	2.11E-03
Dioxin Homologues							
Pentachlorodibenzofuran (total)	µg/kg fw	2/2	1.13E-03 - 2.26E-03	AR1-00-BPBE0001-0-0-80604	NA	1.70E-03	7.99E-04
Plasma/2008/AR9							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg fw	2/2	2.43E-03 - 4.47E-03	AR9-00-BPBE0002-0-0-80604	NA	3.45E-03	1.45E-03
Dioxin Homologues							
Pentachlorodibenzofuran (total)	µg/kg fw	2/2	8.49E-04 - 1.35E-03	AR9-00-BPBE0002-0-0-80604	NA	1.10E-03	3.54E-04
Plasma/2011/AR1							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg fw	2/2	1.25E-03 - 5.68E-03	AR1-00-BPBE0002-N-110623	NA	3.47E-03	3.13E-03
Dioxin Homologues							
Hexachlorodibenzofuran (total)	µg/kg fw	2/2	7.99E-04 - 1.54E-02	AR1-00-BPBE0002-N-110623	NA	8.10E-03	1.03E-02
Hexachlorodibenzo-p-dioxin (total)	µg/kg fw	1/2	6.89E-03 - 6.89E-03	AR1-00-BPBE0002-N-110623	1.34E-04 - 1.34E-04	3.51E-03	4.78E-03
Tetrachlorodibenzofuran (total)	µg/kg fw	2/2	4.44E-03 - 5.52E-03	AR1-00-BPBE0002-N-110623	NA	4.98E-03	7.64E-04
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	2/2	2.35E-02 - 3.39E-02	AR1-00-BPBE0002-N-110623	NA	2.87E-02	7.35E-03
Total HpCB	µg/kg fw	2/2	1.93E+00 - 2.30E+00	AR1-00-BPBE0002-N-110623	NA	2.12E+00	2.62E-01
Total HxCB	µg/kg fw	2/2	2.28E+00 - 2.81E+00	AR1-00-BPBE0002-N-110623	NA	2.55E+00	3.75E-01
Total PCB homologues	µg/kg fw	2/2	6.18E+00 - 7.35E+00	AR1-00-BPBE0002-N-110623	NA	6.77E+00	8.27E-01
Total PeCB	µg/kg fw	2/2	8.51E-01 - 9.74E-01	AR1-00-BPBE0002-N-110623	NA	9.13E-01	8.70E-02
Total TeCB	µg/kg fw	2/2	2.01E-01 - 2.05E-01	AR1-00-BPBE0002-N-110623	NA	2.03E-01	2.83E-03
Total TrCB	µg/kg fw	2/2	6.01E-02 - 6.83E-02	AR1-00-BPBE0001-N-110623	NA	6.42E-02	5.80E-03
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg fw	2/2	3.27E-04 - 1.99E-03	AR1-00-BPBE0001-N-110623	NA	1.16E-03	1.18E-03
tPCBs	µg/kg fw	2/2	5.51E-01 - 6.39E-01	AR1-00-BPBE0001-N-110623	NA	5.95E-01	6.19E-02

Table 2-31
Summary of Chemicals Detected in Bald Eagle Blood, Feathers, and Plasma - 2008 and 2011
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Sample Type/Year/Reach/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
Plasma/2011/AR9							
Dioxin Congeners							
2,3,7,8-TCDD TEQ (bird)	µg/kg fw	1/1	3.11E-03 - 3.11E-03	AR9-00-BPBE0001-N-110623	NA	3.11E-03	NC
Dioxin Homologues							
Hexachlorodibenzofuran (total)	µg/kg fw	1/1	6.22E-03 - 6.22E-03	AR9-00-BPBE0001-N-110623	NA	6.22E-03	NC
Hexachlorodibenzo-p-dioxin (total)	µg/kg fw	1/1	2.58E-04 - 2.58E-04	AR9-00-BPBE0001-N-110623	NA	2.58E-04	NC
Pentachlorodibenzofuran (total)	µg/kg fw	1/1	8.18E-03 - 8.18E-03	AR9-00-BPBE0001-N-110623	NA	8.18E-03	NC
Tetrachlorodibenzofuran (total)	µg/kg fw	1/1	2.40E-02 - 2.40E-02	AR9-00-BPBE0001-N-110623	NA	2.40E-02	NC
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	1/1	1.29E-01 - 1.29E-01	AR9-00-BPBE0001-N-110623	NA	1.29E-01	NC
Total HpCB	µg/kg fw	1/1	2.48E+01 - 2.48E+01	AR9-00-BPBE0001-N-110623	NA	2.48E+01	NC
Total HxCB	µg/kg fw	1/1	3.22E+01 - 3.22E+01	AR9-00-BPBE0001-N-110623	NA	3.22E+01	NC
Total MoCB	µg/kg fw	1/1	1.55E-02 - 1.55E-02	AR9-00-BPBE0001-N-110623	NA	1.55E-02	NC
Total PCB homologues	µg/kg fw	1/1	7.80E+01 - 7.80E+01	AR9-00-BPBE0001-N-110623	NA	7.80E+01	NC
Total PeCB	µg/kg fw	1/1	7.45E+00 - 7.45E+00	AR9-00-BPBE0001-N-110623	NA	7.45E+00	NC
Total TeCB	µg/kg fw	1/1	3.46E+00 - 3.46E+00	AR9-00-BPBE0001-N-110623	NA	3.46E+00	NC
Total TrCB	µg/kg fw	1/1	2.37E+00 - 2.37E+00	AR9-00-BPBE0001-N-110623	NA	2.37E+00	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (bird)	µg/kg fw	1/1	1.09E-03 - 1.09E-03	AR9-00-BPBE0001-N-110623	NA	1.09E-03	NC
tPCBs	µg/kg fw	1/1	2.83E+00 - 2.83E+00	AR9-00-BPBE0001-N-110623	NA	2.83E+00	NC

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg fw = Micrograms per kilograms fresh weight.

Table 2-32
Summary of Chemicals Detected in Bat Blood and Fur - 2010
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Sample Type/Analyte	Units	FOD	Range of Detects	Maximum Detect Sample ID	Range of SQLs	Average	Standard Deviation
AR1/Blood							
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	1/1	3.55E-02 - 3.55E-02	AR1-00-BTBMYLUC1-0-101102	NA	3.55E-02	NC
Total HpCB	µg/kg fw	1/1	2.24E+00 - 2.24E+00	AR1-00-BTBMYLUC1-0-101102	NA	2.24E+00	NC
Total HxCB	µg/kg fw	1/1	2.16E+00 - 2.16E+00	AR1-00-BTBMYLUC1-0-101102	NA	2.16E+00	NC
Total PCB homologues	µg/kg fw	1/1	5.42E+00 - 5.42E+00	AR1-00-BTBMYLUC1-0-101102	NA	5.42E+00	NC
PCB Congeners							
PCB Dioxin-like Congener TEQ (mammal	µg/kg fw	1/1	2.66E-05 - 2.66E-05	AR1-00-BTBMYLUC1-0-101102	NA	2.66E-05	NC
tPCBs	µg/kg fw	1/1	2.53E+00 - 2.53E+00	AR1-00-BTBMYLUC1-0-101102	NA	2.53E+00	NC
Mercury							
Mercury	µg/kg fw	4/4	1.31E+02 - 3.83E+02	AR1-0-BTBMYLU10-0-100809	NA	2.45E+02	1.13E+02
AR9/Blood							
Dioxin Homologues							
Heptachlorodibenzo-p-dioxin (total)	µg/kg fw	1/3	2.51E-02 - 2.51E-02	AR9-0-BTBMYLUC1-0-101102	1.01E-02 - 1.78E-02	1.77E-02	7.50E-03
PCB Homologues							
Decachlorobiphenyl	µg/kg fw	3/3	3.51E-02 - 6.96E-02	AR9-0-BTBMYLUC1-0-101102	NA	5.35E-02	1.74E-02
Total HpCB	µg/kg fw	3/3	8.88E+00 - 9.87E+00	AR9-0-BTBMYLUC3-0-101102	NA	9.22E+00	5.60E-01
Total HxCB	µg/kg fw	3/3	9.37E+00 - 1.13E+01	AR9-0-BTBMYLUC1-0-101102	NA	1.02E+01	9.97E-01
Total PCB homologues	µg/kg fw	3/3	2.21E+01 - 3.01E+01	AR9-0-BTBMYLUC1-0-101102	NA	2.51E+01	4.34E+00
PCB Congeners							
PCB Dioxin-like Congener TEQ (mammal	µg/kg fw	3/3	6.51E-05 - 9.79E-05	AR9-0-BTBMYLUC1-0-101102	NA	7.74E-05	1.79E-05
tPCBs	µg/kg fw	3/3	7.71E+00 - 1.04E+01	AR9-0-BTBMYLUC1-0-101102	NA	8.60E+00	1.54E+00
Mercury							
Mercury	µg/kg fw	12/12	1.42E+02 - 1.42E+03	AR9-0-BTBMYLU24-0-100810	NA	5.21E+02	3.59E+02
AR1/Fur							
Mercury	µg/kg fw	11/11	2.60E+03 - 4.06E+04	AR1-00-BTFMYLU10-0-100812	NA	9.36E+03	1.14E+04
AR9/Fur							
Mercury	µg/kg fw	27/27	1.12E+03 - 1.97E+05	AR9-0-BTFMYLU01-0-100809	NA	7.14E+04	6.70E+04

Notes:
FOD = Frequency of detection. Number of sampling locations at which chemical was deteted compared with total number of sampling locatoins; duplicates at a location were considered one sample.
NA = Not applicable.
NC = Insufficient data to calculate.
SQL = Sample quantitation limit. Range from samples with non-detects.
µg/kg fw = Micrograms per kilograms fresh weight.

Table 2-33
Screening Benchmarks
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

	Screening Benchmarks								
	Surface Water			Sediment			Biota		
Analyte	**µg/L**	**Basis**	**Source**	**mg/kg**	**Basis**	**Source**	**µg/kg ww**	**Basis**	**Source**
Volatile Organic Compounds									
1,1'-Biphenyl	NE			1.1		EPA, 1996	NE		
Acetophenone	NE								
Benzaldehyde	NE			NBA					
Hexachlorobenzene	NE			0.01	NEL	Fletcher et al., 2008	330		NYDEC, 2000
Semivolatile Organic Compounds									
2-Methylphenol	NE			NE			1158600	River otter	Sample et al., 1996
4-Methylphenol	NE			NBA			NE		
Benzoic Acid	NE						NE		
Bis(2-Chloroethoxy)Methane	NE			NE					
Bis(2-chloroisopropyl) ether	NE			NE					
Bis(2-Ethylhexyl)Phthalate	NE			890	SCB	Jones et al., 1997	2170	Belted kingfisher	Sample et al., 1996
Caprolactam	NE			NE					
Dibenzofuran	NE			2	SQB	EPA, 1996			
Diethylphthalate	NE			0.63	SQB	EPA, 1996	NE		
Di-n-butyl phthalate	NE			11	SQB	EPA, 1996	NE		
Di-n-octyl phthalate	NE			NE					
Phenol	NE			0.031	NAWQC	Jones et al., 1997			
Polycyclic Aromatic Hydrocarbons									
2-Methylnaphthalene	NE			0.176	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Acenaphthene	NE			0.62	SQC	EPA, 1996	2200	River otter BAP	Sample et al., 1996
Acenaphthylene	NE			0.0572	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Anthracene	NE			0.0572	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Benzo(a)anthracene	NE			0.108	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Benzo(a)pyrene	NE			0.15	TEC	MacDonald et al., 2000	2200	River otter	Sample et al., 1996
Benzo(b)fluoranthene	NE			0.24	LEL	Fletcher et al., 2008	2200	River otter BAP	Sample et al., 1996
Benzo(g,h,i)perylene	NE			0.17	LEL	Fletcher et al., 2008	2200	River otter BAP	Sample et al., 1996
Benzo(k)fluoranthene	NE			0.24	LEL	Fletcher et al., 2008	2200	River otter BAP	Sample et al., 1996
Carbazole	NE			0.0572	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Chrysene	NE			0.166	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Dibenz(a,h)anthracene	NE			0.033	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Fluoranthene	NE			0.423	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Fluorene	NE			0.0774	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Indeno(1,2,3-cd)pyrene	NE			0.2	LEL	Fletcher et al., 2008	2200	River otter BAP	Sample et al., 1996
Naphthalene	NE			0.176	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Phenanthrene	NE			0.204	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Pyrene	NE			0.195	TEC	MacDonald et al., 2000	2200	River otter BAP	Sample et al., 1996
Dioxin Congeners									
2,3,7,8-TCDD TEQ (bird)	NE			NE			0.00475	1998 WHO TEFs used in calculation	CCME, 2001
2,3,7,8-TCDD TEQ (fish)	NE			NBA			NE		
2,3,7,8-TCDD TEQ (mammal)	NE			NE			0.00071	1998 WHO TEFs used in calculation	CCME, 2001
Pesticides									
4,4'-DDD	NE			NE			200		NYDEC, 2000
4,4'-DDE	NE			NE			200		NYDEC, 2000
4,4'-DDT	NE			0.00416	TEC	MacDonald et al., 2000	200		NYDEC, 2000
alpha-Chlordane	NE			NE			500		NYDEC, 2000
beta-BHC	NE			NE			1630	River otter	Sample et al., 1996
beta-Chlordane	NE			NE			500		NYDEC, 2000

Table 2-33
Screening Benchmarks
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Screening Benchmarks								
	Surface Water			Sediment			Biota		
	µg/L	Basis	Source	mg/kg	Basis	Source	µg/kg ww	Basis	Source
cis-Nonachlor	NE			NE			500	Chlordane	NYDEC, 2000
Endosulfan I	NE			NE			610	River otter Endosulfan	Sample et al., 1996
Endosulfan II	NE			NE			610	River otter Endosulfan	Sample et al., 1996
Endrin aldehyde	NE			NE			20	Belted kingfisher endrin	Sample et al., 1996
gamma-BHC (Lindane)	NE			0.00237	TEC	MacDonald et al., 2000	NE		
Heptachlor	NE			NE			200		NYDEC, 2000
Heptachlor epoxide	NE			NE			200		NYDEC, 2000
o,p'-DDD	NE			NE			200	DDT	NYDEC, 2000
o,p'-DDT	NE			0.00416	TEC	MacDonald et al., 2000	200		NYDEC, 2000
trans-Nonachlor	NE			NE			500	Chlordane	NYDEC, 2000
PCB Homologues									
Total PCB homologues	NE			0.0598	TEC	MacDonald et al., 2000	110		NYDEC, 2000
PCB Congeners									
tPCBs	NE			0.0598	TEC	MacDonald et al., 2000	110		NYDEC, 2000
PCB Dioxin-like Congener TEQ (bird)	NE			NE			0.00071	1998 WHO TEFs used in calculation	CCME, 2001
PCB Dioxin-like Congener TEQ (fish)	NE			NBA			NE		
PCB Dioxin-like Congener TEQ (mammal)	NE			NE			0.00071	1998 WHO TEFs used in calculation	CCME, 2001
Inorganics (excepting mercury)									
Aluminum	NE						NE		
Arsenic	150	dissolved	NH Code Env-WQ 1700	9.79	TEC	MacDonald et al., 2000	277	River otter Arsenite	Sample et al., 1996
Barium	NE						NE		
Beryllium	NE						2680	River otter Beryllium sulfate	Sample et al., 1996
Cadmium	NE			0.99	TEC	MacDonald et al., 2000	2860	Belted kingfisher Cadmium chloride	Sample et al., 1996
Chromium	11	Chromium VI	EPA, 2012	43.4	TEC	MacDonald et al., 2000	1970	Belted kingfisher Chromium III	Sample et al., 1996
Copper	2.7	Hardness-based	NH Code Env-WQ 1700	31.6	TEC	MacDonald et al., 2000	61800	River otter Copper sulfate	Sample et al., 1996
Lead	0.54	Hardness-based	NH Code Env-WQ 1700	35.8	TEC	MacDonald et al., 2000	2230	Belted kingfisher Lead acetate	Sample et al., 1996
Calcium	NE						NE		
Cobalt	NE			50	LEL	OMEE, 1996	NE		
Iron	NE			20000	LEL	Fletcher et al., 2008	NE		
Magnesium	NE						NE		
Manganese	NE			460	LEL	Fletcher et al., 2008	NE		
Nickel	16.1	Hardness-based	NH Code Env-WQ 1700	22.7	TEC	MacDonald et al., 2000	152740	Belted kingfisher Nickel sulfate	Sample et al., 1996
Potassium	NE						NE		
Selenium	NE						789	Belted kingfisher Selanomethio-nine	Sample et al., 1996
Strontium	1500	CSV	Suter and Tsao, 1996				1069000	River otter Strontium chloride	Sample et al., 1996
Sulfate				NE			NE		
Vanadium	20	CSV	Suter and Tsao, 1996				793	River otter Sodium metavanadate	Sample et al., 1996
Zinc	36.5	Hardness-based	NH Code Env-WQ 1700	121	TEC	MacDonald et al., 2000	28600	Belted kingfisher Zinc sulfate	Sample et al., 1996
Mercury									
Mercury	0.77	dissolved	NH Code Env-WQ 1700	0.18	TEC	MacDonald et al., 2000	13	Belted kingfisher Methyl mercury dicyandiamide	Sample et al., 1996
Mercury, divalent	0.77	Mercury	NH Code Env-WQ 1700	0.18	TEC	MacDonald et al., 2000	NE		
Methylmercury	0.77	Mercury II	EPA, 2012				NE		

NE = Not evaluated. Chemical not detected within medium.
LEL = Low effect level.
NEL = No effect level.
SQB = Sediment quality benchmark.
SQC = Sediment quality criteria.
TEC = Threshold effect concentration.

Table 2-34
COPEC Screening - Surface Water
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Units	FOD	Range of Detects	Range of SQLs	Range of Detects - Background	Benchmark	Basis	Source	Ratio	Surface Water COPEC?	Comment
Total											
Inorganics (excepting mercury)											
Strontium	µg/L	4/4	1.52E+01 - 1.71E+01	NA	1.56E+01 - 1.56E+01	1500	CSV	Suter and Tsao, 1996	0.011	No	LTB
Mercury											
Mercury	µg/L	4/4	4.40E-04 - 2.17E-03	NA	1.00E-03 - 1.00E-03	0.77	dissolved	NH Code Env-WQ 1700	0.0028	No	LTB
Mercury, divalent	µg/L	4/4	4.00E-05 - 7.00E-05	8.00E-05 - 8.00E-05	7.00E-05 - 7.00E-05	0.77	Mercury value	NH Code Env-WQ 1700	0.000091	No	LTB
Methylmercury	µg/L	2/4	5.00E-05 - 6.00E-05	1.00E-04 - 1.00E-04	5.00E-05 - 5.00E-05	0.77		EPA, 2012	0.000078	No	LTB
Dissolved											
Inorganics (excepting mercury)											
Copper	µg/L	1/4	5.90E-01 - 5.90E-01	1.00E+00 - 2.00E+00	ND	2.7	Hardness-based	NH Code Env-WQ 1700	0.22	No	LTB
Strontium	µg/L	4/4	1.53E+01 - 1.67E+01	NA	1.48E+01 - 1.48E+01	1500	CSV	Suter and Tsao, 1996	0.011	No	LTB
Mercury											
Mercury	µg/L	4/4	1.20E-04 - 1.00E-03	NA	8.50E-04 - 8.50E-04	0.77	dissolved	NH Code Env-WQ 1700	0.0013	No	LTB
Mercury, divalent	µg/L	3/4	4.00E-05 - 8.00E-05	8.00E-05 - 8.00E-05	5.00E-05 - 5.00E-05	0.77	Mercury value	NH Code Env-WQ 1700	0.00010	No	LTB
Methylmercury	µg/L	2/4	6.00E-05 - 6.00E-05	1.00E-04 - 1.00E-04	ND	0.77		EPA, 2012	0.000078	No	LTB

Notes:
COPEC = Chemical of potential ecological concern.
µg/L = Micrograms per liter.
CSV = Chronic secondary value.
FOD = Frequency of detection. Number of sampling locations at which chemical was detected compared with total number of sampling locations; duplicates at a location were considered one sample.
Hardness-based = Value calculated based on a conservative default hardness of 25 mg/L.
LTB = Less than benchmark.
NA = Not applicable.
ND = Not detected.
SQL = Sample quantitation limit. Range from samples with non-detects.

Table 2-35
COPEC Screening - Pore Water
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Units	FOD	Range of Detects	Range of SQLs	Range of Detects - Background	Benchmark	Basis	Source	Ratio	Pore Water COPEC?	Comment
Total											
Inorganics (excepting mercury)											
Arsenic	µg/L	6/8	2.60E+00 - 6.70E+00	1.00E+00 - 1.80E+00	4.20E+00 - 2.09E+01	150	dissolved	NH Code Env-WQ 1700	0.045	No	LTB
Chromium	µg/L	3/8	3.90E-01 - 2.90E+00	1.00E+01 - 1.00E+01	1.50E+00 - 4.95E+01	11	Chromium VI	EPA, 2012	0.26	No	LTB
Copper	µg/L	2/8	4.10E+00 - 4.60E+00	2.00E+00 - 2.00E+00	4.38E+01 - 4.38E+01	2.7	Hardness-based	NH Code Env-WQ 1700	1.7	Yes	GTB
Lead	µg/L	3/8	6.50E-01 - 4.40E+00	1.00E+00 - 1.00E+00	1.50E+00 - 3.45E+01	0.54	Hardness-based	NH Code Env-WQ 1700	8.1	Yes	GTB
Nickel	µg/L	5/6	6.10E-01 - 1.30E+01	4.00E+01 - 4.00E+01	4.64E+01 - 4.64E+01	16.1	Hardness-based	NH Code Env-WQ 1700	0.81	No	LTB
Strontium	µg/L	8/8	3.48E+01 - 1.63E+02	NA	3.09E+01 - 6.50E+01	1500	CSV	Suter and Tsao, 1996	0.11	No	LTB
Vanadium	µg/L	5/8	9.60E-01 - 6.00E+00	5.00E+00 - 5.00E+00	6.20E-01 - 8.68E+01	20	CSV	Suter and Tsao, 1996	0.30	No	LTB
Zinc	µg/L	3/7	1.91E+01 - 4.41E+01	6.00E+01 - 6.00E+01	1.72E+02 - 1.72E+02	36.5	Hardness-based	NH Code Env-WQ 1700	1.2	Yes	GTB
Mercury											
Mercury	µg/L	7/8	2.49E-03 - 2.82E-02	5.00E-03 - 5.00E-03	4.82E-03 - 1.49E-02	0.77	dissolved	NH Code Env-WQ 1700	0.037	No	LTB
Methylmercury	µg/L	4/8	1.00E-04 - 2.35E-03	1.00E-04 - 1.00E-04	ND	0.77	Mercury II	EPA, 2012	0.0031	No	LTB
Dissolved											
Inorganics (excepting mercury)											
Arsenic	µg/L	7/8	1.90E+00 - 6.50E+00	1.00E+00 - 1.00E+00	3.70E+00 - 1.55E+01	150	dissolved	NH Code Env-WQ 1700	0.043	No	LTB
Chromium	µg/L	8/8	4.10E-01 - 2.80E+00	NA	4.70E-01 - 1.00E+00	11	Chromium VI	EPA, 2012	0.25	No	LTB
Copper	µg/L	3/8	1.90E-01 - 5.00E-01	2.00E+00 - 2.00E+00	ND	2.7	Hardness-based	NH Code Env-WQ 1700	0.19	No	LTB
Lead	µg/L	5/8	8.40E-02 - 1.40E+00	1.00E+00 - 1.00E+00	ND	0.54	Hardness-based	NH Code Env-WQ 1700	2.6	Yes	GTB
Nickel	µg/L	5/8	5.50E-01 - 1.15E+01	4.00E+01 - 4.00E+01	ND	16.1	Hardness-based	NH Code Env-WQ 1700	0.71	No	LTB
Strontium	µg/L	8/8	3.28E+01 - 1.49E+02	NA	2.82E+01 - 6.24E+01	1500	CSV	Suter and Tsao, 1996	0.099	No	LTB
Vanadium	µg/L	7/8	3.30E-01 - 4.90E+00	5.00E+00 - 5.00E+00	4.10E-01 - 1.20E+00	20	CSV	Suter and Tsao, 1996	0.25	No	LTB
Zinc	µg/L	6/8	3.40E+00 - 3.81E+01	6.00E+01 - 6.00E+01	ND	36.5	Hardness-based	NH Code Env-WQ 1700	1.0	Yes	GTB
Mercury											
Mercury	µg/L	15/20	7.33E-04 - 1.71E-02	5.00E-03 - 5.00E-03	2.63E-04 - 1.02E-02	0.77	dissolved	NH Code Env-WQ 1700	0.022	No	LTB
Mercury, divalent	µg/L	2/7	1.90E-04 - 1.90E-04	8.00E-05 - 1.50E-04	ND	0.77	Mercury	NH Code Env-WQ 1700	0.00025	No	LTB
Methylmercury	µg/L	17/20	7.00E-05 - 2.75E-03	1.00E-04 - 1.00E-04	6.00E-05 - 2.83E-04	0.77	Mercury II	EPA, 2012	0.0036	No	LTB

Notes:
COPEC = Chemical of potential ecological concern.
µg/L = Micrograms per liter.
CSV = Chronic secondary value.
GTB = Greater than benchmark.
LTB = Less than benchmark.
NA = Not applicable.
ND = Not detected.
SQL = Sample quantitation limit. Range from samples with non-detects.
FOD = Frequency of detection. Number of sampling locations at which chemical was detected compared with total number of sampling locations; duplicates at a location were considered one sample.
Hardness-based = Value calculated based on a conservative default hardness of 25 mg/L.

Table 2-36
COPEC Screening - Sediment
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Units	FOD	Range of Detects	Range of SQLs	Range of Detects - Background	Benchmark	Basis	Source	Ratio	Sediment COPEC?	Comment
Volatile Organic Compounds											
1,1'-Biphenyl	mg/kg dw	3/10	2.20E-03 - 3.70E-03	1.10E-02 - 2.00E-01	ND	1.1		EPA, 1996	0.0034	No	LTB
Acetophenone	mg/kg dw	6/17	1.50E-02 - 3.80E-02	1.90E-01 - 1.30E+00	6.00E-02 - 1.00E-01					Yes	NBA
Benzaldehyde	mg/kg dw	3/10	8.70E-03 - 1.10E-02	1.10E-02 - 2.00E-01	1.60E-02 - 2.80E-02	NBA				Yes	NBA
Hexachlorobenzene	mg/kg dw	1/17	1.30E-03 - 1.30E-03	2.80E-03 - 1.30E+00	ND	0.01	NEL	Fletcher et al., 2008	0.13	No	LTB
Semivolatile Organic Compounds											
4-Methylphenol	mg/kg dw	1/10	7.60E-03 - 7.60E-03	5.50E-03 - 9.80E-02	ND	NBA				Yes	NBA
Benzoic Acid	mg/kg dw	1/7	1.30E+00 - 1.30E+00	7.80E-01 - 1.30E+00	ND					Yes	NBA
Bis(2-Ethylhexyl)Phthalate	mg/kg dw	5/17	8.30E-03 3.60E-02	5.50E-03 1.30E+00	8.20E-03 1.30E-02	890	SCB	Jones et al., 1997	0.000040	No	LTB
Dibenzofuran	mg/kg dw	10/17	8.70E-03 - 7.00E-02	7.80E-01 - 1.30E+00	ND	2	SQB	EPA, 1996	0.035	No	LTB
Diethylphthalate	mg/kg dw	1/17	1.60E-03 - 1.60E-03	5.50E-03 - 1.30E+00	1.60E-03 - 1.60E-03	0.63	SQB	EPA, 1996	0.0025	No	LTB
Di-n-butyl phthalate	mg/kg dw	3/17	7.90E-03 - 1.30E-02	1.10E-02 - 1.30E+00	9.50E-03 - 9.50E-03	11	SQB	EPA, 1996	0.0012	No	LTB
Phenol	mg/kg dw	5/17	2.10E-03 - 1.00E-02	1.70E-02 - 1.30E+00	ND	0.031	NAWQC	Jones et al., 1997	0.32	No	LTB
Polycyclic Aromatic Hydrocarbons											
2-Methylnaphthalene	mg/kg dw	8/17	2.90E-03 - 3.30E-02	4.40E-02 - 1.30E+00	ND	0.176	TEC	MacDonald et al., 2000	0.19	No	LTB
Acenaphthene	mg/kg dw	10/17	1.20E-02 - 1.40E-01	7.80E-01 - 1.30E+00	ND	0.62	SQC	EPA, 1996	0.23	No	LTB
Acenaphthylene	mg/kg dw	10/17	2.00E-02 - 5.50E-02	7.80E-01 - 1.30E+00	5.00E-03 - 6.10E-03	0.0572	TEC	MacDonald et al., 2000	0.96	No	LTB
Anthracene	mg/kg dw	10/17	7.00E-02 - 4.30E-01	7.80E-01 - 1.30E+00	3.20E-03 - 4.20E-03	0.0572	TEC	MacDonald et al., 2000	7.5	Yes	GTB
Benzo(a)anthracene	mg/kg dw	13/17	3.80E-01 - 2.80E+00	7.80E-01 - 1.30E+00	1.10E-02 - 1.30E-02	0.108	TEC	MacDonald et al., 2000	26	Yes	GTB
Benzo(a)pyrene	mg/kg dw	14/17	4.40E-01 - 2.90E+00	7.90E-01 - 1.30E+00	1.20E-02 - 1.50E-02	0.15	TEC	MacDonald et al., 2000	19	Yes	GTB
Benzo(b)fluoranthene	mg/kg dw	14/17	6.70E-01 - 4.10E+00	7.90E-01 - 1.30E+00	1.80E-02 - 2.00E-02	0.24	LEL	Fletcher et al., 2008	17	Yes	GTB
Benzo(g,h,i)perylene	mg/kg dw	12/17	2.90E-01 - 2.30E+00	7.80E-01 - 1.30E+00	1.10E-02 - 1.30E-02	0.17	LEL	Fletcher et al., 2008	14	Yes	GTB
Benzo(k)fluoranthene	mg/kg dw	11/17	1.70E-01 - 1.40E+00	7.80E-01 - 1.30E+00	6.70E-03 - 7.70E-03	0.24	LEL	Fletcher et al., 2008	5.8	Yes	GTB
Carbazole	mg/kg dw	10/17	2.10E-02 - 1.40E-01	7.80E-01 - 1.30E+00	1.40E-03 - 2.20E-03	0.0572	TEC	MacDonald et al., 2000	2.4	Yes	GTB
Chrysene	mg/kg dw	13/17	4.30E-01 - 3.20E+00	7.80E-01 - 1.30E+00	1.70E-02 - 2.00E-02	0.166	TEC	MacDonald et al., 2000	19	Yes	GTB
Dibenz(a,h)anthracene	mg/kg dw	10/17	3.00E-02 - 3.50E-01	7.80E-01 - 1.30E+00	ND	0.033	TEC	MacDonald et al., 2000	11	Yes	GTB
Fluoranthene	mg/kg dw	15/17	6.20E-01 - 5.90E+00	7.90E-01 - 1.30E+00	2.50E-02 - 2.60E-02	0.423	TEC	MacDonald et al., 2000	14	Yes	GTB
Fluorene	mg/kg dw	10/17	1.70E-02 - 1.50E-01	7.80E-01 - 1.30E+00	1.40E-03 - 1.40E-03	0.0774	TEC	MacDonald et al., 2000	1.9	Yes	GTB
Indeno(1,2,3-cd)pyrene	mg/kg dw	12/17	3.40E-01 - 1.70E+00	7.80E-01 - 1.30E+00	1.20E-02 - 1.50E-02	0.2	LEL	Fletcher et al., 2008	8.5	Yes	GTB
Naphthalene	mg/kg dw	8/17	4.70E-03 - 5.00E-02	4.40E-02 - 1.30E+00	ND	0.176	TEC	MacDonald et al., 2000	0.28	No	LTB
Phenanthrene	mg/kg dw	13/17	2.20E-01 - 2.60E+00	7.80E-01 - 1.30E+00	1.30E-02 - 1.30E-02	0.204	TEC	MacDonald et al., 2000	13	Yes	GTB
Pyrene	mg/kg dw	16/17	6.50E-01 - 5.40E+00	7.90E-01 - 1.30E+00	2.80E-02 - 3.00E-02	0.195	TEC	MacDonald et al., 2000	28	Yes	GTB
Dioxin Congeners											
2,3,7,8-TCDD TEQ (fish)	mg/kg dw	10/10	2.65E-06 - 3.50E-04	NA	1.13E-06 - 1.30E-06	NBA				Yes	NBA
Pesticides											
4,4'-DDT	mg/kg dw	1/10	1.30E-03 - 1.30E-03	2.80E-03 - 4.90E-03	ND	0.00416	TEC	MacDonald et al., 2000	0.31	No	LTB
gamma-BHC (Lindane)	mg/kg dw	2/10	5.70E-04 - 1.20E-03	2.80E-03 - 4.50E-03	ND	0.00237	TEC	MacDonald et al., 2000	0.51	No	LTB
o,p'-DDT	mg/kg dw	5/10	5.10E-04 - 4.40E-03	2.80E-03 - 4.50E-03	ND	0.00416	TEC	MacDonald et al., 2000	1.1	Yes	GTB
PCB Homologues											
Total PCB homologues	mg/kg dw	10/10	1.11E-02 - 3.10E-01	NA	1.23E-04 - 1.26E-03	0.0598	TEC	MacDonald et al., 2000	5.2	Yes	GTB
PCB Congeners											
PCB Dioxin-like Congener TEQ (fish)	mg/kg dw	10/10	1.27E-09 - 1.99E-07	NA	5.01E-10 - 5.01E-10	NBA				Yes	NBA
tPCBs_all	mg/kg dw	10/10	2.13E-04 3.91E-02	NA	7.09E-05 7.09E-05	0.0598	TEC	MacDonald et al., 2000	0.65	No	LTB

Table 2-36
COPEC Screening - Sediment
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Units	FOD	Range of Detects	Range of SQLs	Range of Detects - Background	Benchmark	Basis	Source	Ratio	Sediment COPEC?	Comment
Inorganics (excepting mercury)											
Aluminum	mg/kg dw	8/8	3.60E+03 - 1.20E+04	NA	3.70E+03 - 5.80E+03					Yes	NBA
Arsenic	mg/kg dw	9/18	9.90E-01 - 7.30E+00	1.00E+00 - 2.00E+01	2.10E+00 - 2.50E+00	9.79	TEC	MacDonald et al., 2000	0.75	No	LTB
Barium	mg/kg dw	8/8	1.30E+01 - 5.90E+01	NA	1.30E+01 - 1.90E+01					Yes	NBA
Beryllium	mg/kg dw	10/18	1.20E-01 - 3.50E-01	8.60E-01 - 9.80E-01	2.70E-01 - 3.70E-01					Yes	NBA
Cadmium	mg/kg dw	10/18	7.80E-02 - 5.90E-01	2.60E+00 - 2.90E+00	5.90E-01 - 7.70E-01	0.99	TEC	MacDonald et al., 2000	0.60	No	LTB
Calcium	mg/kg dw	8/8	7.70E+02 - 2.20E+03	NA	8.20E+02 - 1.10E+03					Yes	NBA
Chromium	mg/kg dw	18/18	4.70E+00 - 1.90E+01	NA	6.40E+00 - 1.49E+01	43.4	TEC	MacDonald et al., 2000	0.44	No	LTB
Cobalt	mg/kg dw	8/8	3.60E+00 - 1.10E+01	NA	3.80E+00 - 5.50E+00	50	LEL	OMEE, 1996	0.22	No	LTB
Copper	mg/kg dw	18/18	3.90E+00 - 2.89E+01	NA	3.60E+00 - 1.17E+01	31.6	TEC	MacDonald et al., 2000	0.91	No	LTB
Iron	mg/kg dw	8/8	7.60E+03 - 1.70E+04	NA	6.90E+03 - 1.20E+04	20000	LEL	Fletcher et al., 2008	0.85	No	LTB
Lead	mg/kg dw	11/18	5.60E+00 - 2.10E+01	1.70E+01 - 2.00E+01	7.10E+00 - 9.40E+00	35.8	TEC	MacDonald et al., 2000	0.59	No	LTB
Magnesium	mg/kg dw	8/8	1.70E+03 - 4.10E+03	NA	1.90E+03 - 3.40E+03					Yes	NBA
Manganese	mg/kg dw	8/8	1.10E+02 - 3.80E+02	NA	2.10E+02 - 4.20E+02	460	LEL	Fletcher et al., 2008	0.83	No	LTB
Nickel	mg/kg dw	12/18	3.90E+00 - 1.60E+01	1.00E+01 - 1.20E+01	1.05E+01 - 1.52E+01	22.7	TEC	MacDonald et al., 2000	0.70	No	LTB
Potassium	mg/kg dw	7/8	5.40E+02 - 1.30E+03	4.90E+02 - 4.90E+02	5.20E+02 - 8.00E+02					Yes	NBA
Selenium	mg/kg dw	8/18	5.30E-01 - 1.10E+00	3.50E+00 - 9.80E+00	6.30E-01 - 7.50E-01					Yes	NBA
Strontium	mg/kg dw	10/10	2.20E+00 - 8.00E+00	NA	4.60E+00 - 6.70E+00					Yes	NBA
Vanadium	mg/kg dw	18/18	8.80E+00 - 3.00E+01	NA	1.20E+01 - 2.70E+01					Yes	NBA
Zinc	mg/kg dw	18/18	2.20E+01 - 7.60E+01	NA	2.10E+01 - 6.59E+01	121	TEC	MacDonald et al., 2000	0.63	No	LTB
Mercury											
Mercury	mg/kg dw	65/70	2.20E-02 - 7.90E+00	1.00E-01 - 1.10E-01	1.09E-02 - 3.79E-02	0.18	TEC	MacDonald et al., 2000	44	Yes	GTB
Mercury, divalent	mg/kg dw	1/8	1.20E-04 - 1.20E-04	4.50E-04 - 4.50E-04	1.70E-04 - 3.30E-04	0.18	TEC	MacDonald et al., 2000	0.00067	No	LTB
Methylmercury	mg/kg dw	21/21	2.20E-04 - 2.04E-03	NA	1.00E-04 - 4.75E-04					Yes	NBA

Notes:
COPEC = Chemical of potential ecological concern.
FOD = Frequency of detection. Number of sampling locations at which chemical was detected compared with total number of sampling locations; duplicates at a location were considered one sample.
GTB = Greater than benchmark.
LEL = Lowest effect level.
LTB = Less than benchmark.
mg/kg dw = Milligrams per kilogram, dry weight.
NA = Not applicable.
NAWQC = National ambient water quality criteria-based equilibrium partitioning coefficient calculated value.
NBA = No benchmark available.
ND = Not detected.
NEL = No effect level.
Secontary chronic-based value.
SQL = Sample quantitation limit. Range from samples with non-detects.
TEC = Threshold effect concentration.

Table 2-37
COPEC Screening - Crayfish
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Units	FOD	Range of Detects	Range of SQLs	Range of Detects - Background	Benchmark	Basis	Source	Ratio	Crayfish Modeling COPEC?	Comment
Volatile Organic Compounds											
Acetophenone	µg/kg	1/9	2.50E+02 - 2.60E+02	1.90E+01 - 4.30E+01	ND					Yes	NBA
Benzaldehyde	µg/kg	2/9	3.70E+02 - 1.60E+03	9.40E+02 - 1.00E+03	ND					Yes	NBA
Hexachlorobenzene	µg/kg	2/9	1.90E+00 - 6.70E+00	9.70E-01 - 2.00E+00	ND	330		NYDEC, 2000	0.020	No	LTB
Semivolatile Organic Compounds											
Polycyclic Aromatic Hydrocarbons											
2-Methylphenol	µg/kg	2/9	4.50E+00 - 5.10E+00	1.90E+01 - 2.00E+01	ND	1158600	River otter	Sample et al., 1996	0.0000044	No	LTB
Bis(2-chloroisopropyl) ether	µg/kg	1/9	4.40E+02 4.40E+02	6.90E+01 4.90E+02						Yes	NBA
Bis(2-Ethylhexyl)Phthalate	µg/kg	3/9	1.90E+01 2.00E+01	1.90E+01 9.80E+01		2170	Belted kingfisher	Sample et al., 1996	0.01	No	
Dibenzofuran	µg/kg	1/9	1.00E+01 - 1.00E+01	1.90E+01 - 2.00E+01	ND					Yes	NBA
Di-n-octyl phthalate	µg/kg	1/9	5.00E+01 - 5.00E+01	1.90E+01 - 2.00E+01	1.90E+01 - 1.90E+01					Yes	NBA
Phenol	µg/kg	2/9	5.40E+01 - 1.00E+02	4.70E+01 - 5.00E+01	5.30E+01 - 5.30E+01					Yes	NBA
Acenaphthene	µg/kg	2/9	2.60E+00 - 1.90E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.009	No	LTB
Acenaphthylene	µg/kg	1/9	3.50E+01 - 3.50E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.016	No	LTB
Anthracene	µg/kg	5/9	5.80E+00 - 8.40E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.038	No	LTB
Benzo(a)anthracene	µg/kg	3/9	6.80E+00 - 2.10E+02	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.10	No	LTB
Benzo(a)pyrene	µg/kg	4/9	4.50E+00 - 1.70E+02	1.90E+01 - 2.00E+01	ND	2200	River otter	Sample et al., 1996	0.077	No	LTB
Benzo(b)fluoranthene	µg/kg	7/9	3.90E+00 - 5.40E+02	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.25	No	LTB
Benzo(g,h,i)perylene	µg/kg	5/9	6.20E+00 - 1.60E+02	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.073	No	LTB
Benzo(k)fluoranthene	µg/kg	5/9	2.40E+00 - 1.90E+02	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.086	No	LTB
Carbazole	µg/kg	1/9	1.10E+02 - 1.10E+02	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.0500	No	LTB
Chrysene	µg/kg	2/9	2.70E+01 - 9.20E+02	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.42	No	LTB
Dibenz(a,h)anthracene	µg/kg	2/9	1.20E+01 - 4.50E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.020	No	LTB
Fluoranthene	µg/kg	4/9	1.30E+01 - 5.10E+03	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	2.3	Yes	GTB
Fluorene	µg/kg	2/9	3.40E+00 - 3.80E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.017	No	LTB
Indeno(1,2,3-cd)pyrene	µg/kg	5/9	6.80E+00 - 2.20E+02	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.10	No	LTB
Naphthalene	µg/kg	1/9	4.90E+00 - 4.90E+00	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.0022	No	LTB
Phenanthrene	µg/kg	8/9	6.90E+00 - 1.60E+03	2.00E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.73	No	LTB
Pyrene	µg/kg	2/9	1.40E+01 - 1.80E+03	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.82	No	LTB
Dioxin Congeners											
2,3,7,8-TCDD TEQ (bird)	µg/kg	9/9	2.81E-03 - 1.93E-01	NA	ND	0.00475	1998 WHO TEFs used in calculation	CCME, 2001	41	Yes	GTB
2,3,7,8-TCDD TEQ (mammal)	µg/kg	9/9	1.03E-03 - 3.30E-02	NA	ND	0.00071	1998 WHO TEFs used in calculation	CCME, 2001	47	Yes	GTB
Pesticides											
4,4'-DDE	µg/kg	2/9	1.20E+00 - 1.90E+00	9.60E-01 - 2.00E+00	ND	200		NYDEC, 2000	0.010	No	LTB
4,4'-DDT	µg/kg	7/9	1.60E+00 - 9.70E+00	1.70E+00 - 9.00E+00	ND	200		NYDEC, 2000	0.049	No	LTB
beta-Chlordane	µg/kg	4/9	6.20E-01 - 5.80E+00	9.60E-01 - 2.00E+00	ND	500		NYDEC, 2000	0.012	No	LTB
Endosulfan I	µg/kg	1/9	1.20E+00 - 1.20E+00	9.60E-01 - 2.00E+00	ND	610	River otter Endosulfan	Sample et al., 1996	0.0020	No	LTB
Endosulfan II	µg/kg	2/9	3.00E-01 - 8.20E-01	9.60E-01 - 1.00E+00	ND	610	River otter Endosulfan	Sample et al., 1996	0.0013	No	LTB

Table 2-37
COPEC Screening - Crayfish
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Units	FOD	Range of Detects	Range of SQLs	Range of Detects - Background	Benchmark	Basis	Source	Ratio	Crayfish Modeling COPEC?	Comment
Endrin aldehyde	µg/kg	1/9	1.30E+00 - 1.30E+00	9.60E-01 - 2.00E+00	ND	20	Belted kingfisher endrin	Sample et al., 1996	0.0650	No	LTB
Heptachlor epoxide	µg/kg	6/9	3.10E-01 - 2.00E+00	9.90E-01 - 9.90E-01	ND	200		NYDEC, 2000	0.010	No	LTB
o,p'-DDD	µg/kg	1/9	1.50E+00 - 1.50E+00	9.60E-01 - 2.00E+00	ND	200	DDT	NYDEC, 2000	0.0075	No	LTB
o,p'-DDT	µg/kg	4/9	2.30E+00 - 9.70E+00	9.70E-01 - 2.00E+00	ND	200		NYDEC, 2000	0.049	No	LTB
trans-Nonachlor	µg/kg	1/9	1.80E+00 - 1.80E+00	9.60E-01 - 2.00E+00	ND	500	Chlordane	NYDEC, 2000	0.0036	No	LTB
PCB Congeners											
PCB Dioxin-like Congener TEQ (bird)	µg/kg	9/9	1.05E-03 - 2.32E-02	NA	4.74E-04 - 7.69E-04	0.00071	1998 WHO TEFs used in calculation	CCME, 2001	33	Yes	GTB
PCB Dioxin-like Congener TEQ (mammal)	µg/kg	9/9	7.35E-04 - 1.30E-02	NA	3.35E-04 - 6.13E-04	0.00071	1998 WHO TEFs used in calculation	CCME, 2001	18	Yes	GTB
tPCBs_all	µg/kg	9/9	2.57E+01 - 2.14E+02	NA	2.22E+00 - 2.23E+00	110		NYDEC, 2000	1.9	Yes	GTB
tPCBs_detects	µg/kg	9/9	2.48E+01 - 2.13E+02	NA	5.82E-01 - 6.25E-01	110		NYDEC, 2000	1.9	Yes	GTB
Inorganics (excepting mercury)											
Arsenic	µg/kg	9/9	1.57E+02 - 3.39E+02	NA	ND	277	River otter Arsenite	Sample et al., 1996	1.2	Yes	GTB
Beryllium	µg/kg	9/9	1.30E+00 - 7.10E+00	NA	2.10E+00 - 3.10E+00	2680	River otter Beryllium sulfate	Sample et al., 1996	0.0026	No	LTB
Cadmium	µg/kg	9/9	9.00E+01 - 1.30E+02	NA	1.50E+02 - 1.75E+02	2860	Belted kingfisher Cadmium chloride	Sample et al., 1996	0.045	No	LTB
Chromium	µg/kg	9/9	1.97E+02 - 2.14E+03	NA	ND	1970	Belted kingfisher Chromium III	Sample et al., 1996	1.1	Yes	GTB
Copper	µg/kg	9/9	2.27E+04 - 3.89E+04	NA	2.26E+04 - 2.27E+04	61800	River otter Copper sulfate	Sample et al., 1996	0.63	No	LTB
Lead	µg/kg	9/9	1.41E+02 - 6.83E+02	NA	2.26E+02 - 3.28E+02	2230	Belted kingfisher Lead acetate	Sample et al., 1996	0.31	No	LTB
Nickel	µg/kg	9/9	7.79E+02 - 2.25E+03	NA	1.07E+03 - 1.23E+03	152740	Belted kingfisher Nickel sulfate	Sample et al., 1996	0.015	No	LTB
Selenium	µg/kg	9/9	1.12E+02 - 3.56E+02	NA	1.54E+02 - 1.70E+02	789	Belted kingfisher Selanomethio-nine	Sample et al., 1996	0.45	No	LTB
Strontium	µg/kg	9/9	9.10E+04 - 1.42E+05	NA	9.90E+04 - 1.02E+05	1069000	River otter Strontium chloride	Sample et al., 1996	0.13	No	LTB
Vanadium	µg/kg	9/9	1.80E+02 - 5.17E+02	NA	1.61E+02 - 2.08E+02	793	River otter Sodium metavanadate	Sample et al., 1996	0.65	No	LTB
Zinc	µg/kg	9/9	2.01E+04 - 3.00E+04	NA	2.74E+04 - 3.13E+04	28600	Belted kingfisher Zinc sulfate	Sample et al., 1996	1.0	Yes	GTB

Table 2-37
COPEC Screening - Crayfish
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Units	FOD	Range of Detects	Range of SQLs	Range of Detects - Background	Benchmark	Basis	Source	Ratio	Crayfish Modeling COPEC?	Comment
Mercury											
Mercury	µg/kg	39/39	4.62E+01 - 1.76E+02	NA	4.21E+01 - 7.50E+01	13	Belted kingfisher Methyl mercury dicyandiamide	Sample et al., 1996	14	Yes	GTB

Notes:
COPEC = Chemical of potential ecological concern.
µg/kg ww = Micrograms per kilogram, wet weight.
BAP = Benzo(a)pyrene.
FOD = Frequency of detection. Number of sampling locations at which chemical was detected compared with total number of sampling locations; duplicates at a location were considered one sample.
GTB = Greater than benchmark.
LTB = Less than benchmark.
NA = Not applicable.
NBA = No benchmark available.
ND = Not detected.
SQL = Sample quantitation limit. Range from samples with non-detects.

Table 2-38
COPEC Screening - Fish
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Units	FOD	Range of Detects	Range of SQLs	Range of Detects - Background	Benchmark	Basis	Source	Ratio	Fish Modeling COPEC?	Comment
Volatile Organic Compounds											
Acetophenone	µg/kg ww	1/24	1.40E+02 - 1.40E+02	1.90E+01 - 1.20E+02	ND					Yes	NBA
Hexachlorobenzene	µg/kg ww	1/24	1.00E+00 - 1.00E+00	9.40E-01 - 2.30E+00	1.30E+00 - 1.30E+00	330		NYDEC, 2000	0.0030	No	LTB
Semivolatile Organic Compounds											
Bis(2-Chloroethoxy)Methane	µg/kg ww	3/24	1.90E+01 2.00E+01	1.90E+01 2.00E+01						Yes	NBA
Bis(2-Ethylhexyl)Phthalate	µg/kg ww	3/24	1.90E+01 2.00E+01	1.90E+01 2.00E+01	1.90E+01 2.00E+01	2170	Belted kingfisher	Sample et al., 1996	0.00921659	No	LTB
Caprolactam	µg/kg ww	5/24	1.80E+02 - 4.30E+02	9.20E+01 - 4.00E+02	ND					Yes	NBA
Dibenzofuran	µg/kg ww	1/24	4.70E+00 - 4.70E+00	1.90E+01 - 2.00E+01	ND					Yes	NBA
Phenol	µg/kg ww	2/24	4.70E+01 - 5.90E+01	4.60E+01 - 5.00E+01	ND					Yes	NBA
Polycyclic Aromatic Hydrocarbons											
2-Methylnaphthalene	µg/kg ww	5/24	4.10E+00 - 5.10E+00	1.90E+01 - 2.00E+01	5.50E+00 - 5.50E+00	2200	River otter BAP	Sample et al., 1996	0.0023	No	LTB
Acenaphthene	µg/kg ww	5/24	1.90E+00 - 5.30E+00	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.0024	No	LTB
Acenaphthylene	µg/kg ww	1/24	3.90E+00 - 3.90E+00	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.0018	No	LTB
Anthracene	µg/kg ww	4/24	9.70E+00 - 2.40E+01	1.90E+01 - 2.00E+01	5.70E+00 - 1.70E+01	2200	River otter BAP	Sample et al., 1996	0.011	No	LTB
Benzo(a)anthracene	µg/kg ww	1/24	5.90E+01 - 5.90E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.027	No	LTB
Benzo(a)pyrene	µg/kg ww	1/24	4.90E+01 - 4.90E+01	1.90E+01 - 2.00E+01	ND	2200	River otter	Sample et al., 1996	0.022	No	LTB
Benzo(b)fluoranthene	µg/kg ww	1/24	7.40E+01 - 7.40E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.034	No	LTB
Benzo(g,h,i)perylene	µg/kg ww	2/24	5.10E+00 - 5.20E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.024	No	LTB
Benzo(k)fluoranthene	µg/kg ww	1/24	2.80E+01 - 2.80E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.013	No	LTB
Chrysene	µg/kg ww	1/24	8.10E+01 - 8.10E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.037	No	LTB
Dibenz(a,h)anthracene	µg/kg ww	1/24	2.10E+01 - 2.10E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.0095	No	LTB
Fluoranthene	µg/kg ww	2/24	8.20E+00 - 1.30E+02	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.059	No	LTB
Fluorene	µg/kg ww	9/24	2.50E+00 - 7.80E+00	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.0035	No	LTB
Indeno(1,2,3-cd)pyrene	µg/kg ww	3/24	7.20E+00 - 6.70E+01	1.90E+01 - 2.00E+01	ND	2200	River otter BAP	Sample et al., 1996	0.030	No	LTB
Naphthalene	µg/kg ww	4/24	5.10E+00 - 1.50E+01	1.90E+01 - 2.00E+01	7.50E+00 - 7.50E+00	2200	River otter BAP	Sample et al., 1996	0.0068	No	LTB
Phenanthrene	µg/kg ww	19/24	2.70E+00 - 5.10E+01	2.00E+01 - 2.00E+01	4.00E+00 - 4.00E+00	2200	River otter BAP	Sample et al., 1996	0.023	No	LTB
Pyrene	µg/kg ww	1/24	6.30E+01 6.30E+01	1.90E+01 2.00E+01		2200	River otter BAP	Sample et al., 1996	0.029	No	LTB

Table 2-38
COPEC Screening - Fish
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Units	FOD	Range of Detects	Range of SQLs	Range of Detects - Background	Benchmark	Basis	Source	Ratio	Fish Modeling COPEC?	Comment
Dioxin Congeners											
2,3,7,8-TCDD TEQ (bird)	µg/kg ww	24/24	1.40E-03 - 4.14E-02	NA	1.38E-03 - 1.38E-03	0.00475	1998 WHO TEFs used in calculation	CCME, 2001	8.7	Yes	GTB
2,3,7,8-TCDD TEQ (mammal)	µg/kg ww	24/24	5.54E-04 - 6.96E-03	NA	9.33E-04 - 9.33E-04	0.00071	1998 WHO TEFs used in calculation	CCME, 2001	9.8	Yes	GTB
Pesticides											
4,4'-DDD	µg/kg ww	2/24	9.50E-01 - 4.20E+00	9.40E-01 - 2.90E+00	1.60E+00 - 2.90E+00	200		NYDEC, 2000	0.021	No	LTB
4,4'-DDE	µg/kg ww	17/24	2.00E+00 - 1.20E+01	9.90E-01 - 2.00E+00	2.20E+00 - 1.20E+01	200		NYDEC, 2000	0.060	No	LTB
4,4'-DDT	µg/kg ww	18/24	1.70E+00 - 2.10E+02	6.60E+00 - 2.10E+01	2.30E+00 - 2.40E+00	200		NYDEC, 2000	1.1	Yes	GTB
alpha-Chlordane	µg/kg ww	3/24	8.80E-01 - 1.20E+00	9.40E-01 - 2.00E+00	4.90E-01 - 5.60E-01	500		NYDEC, 2000	0.0024	No	LTB
beta-BHC	µg/kg ww	8/24	8.30E-01 - 1.00E+01	9.60E-01 - 2.00E+00	4.00E+00 - 6.30E+00	1630	River otter	Sample et al., 1996	0.0061	No	LTB
beta-Chlordane	µg/kg ww	18/24	5.10E-01 - 7.10E+00	1.70E+00 - 2.00E+00	ND	500		NYDEC, 2000	0.014	No	LTB
cis-Nonachlor	µg/kg ww	1/24	1.60E+01 - 1.60E+01	9.60E-01 - 1.70E+02	8.70E-01 - 8.70E-01	500	Chlordane	NYDEC, 2000	0.032	No	LTB
Endosulfan I	µg/kg ww	4/24	3.40E-01 - 1.10E+00	9.40E-01 - 2.00E+00	3.80E-01 - 3.80E-01	610	River otter Endosulfan	Sample et al., 1996	0.00180328	No	LTB
Endosulfan II	µg/kg ww	14/24	3.80E-01 - 2.40E+00	9.90E-01 - 2.70E+00	ND	610	River otter Endosulfan	Sample et al., 1996	0.00393443	No	LTB
Heptachlor	µg/kg ww	2/24	7.10E-01 - 1.00E+00	9.40E-01 - 2.00E+00	9.60E-01 - 9.60E-01	200		NYDEC, 2000	0.0050	No	LTB
Heptachlor epoxide	µg/kg ww	1/24	1.60E+00 - 1.60E+00	9.40E-01 - 2.00E+00	ND	200		NYDEC, 2000	0.0080	No	LTB
o,p'-DDD	µg/kg ww	16/24	1.20E+00 - 5.60E+01	9.60E-01 - 2.00E+00	ND	200		NYDEC, 2000	0.28	No	LTB
trans-Nonachlor	µg/kg ww	6/24	3.90E-01 - 1.30E+00	9.40E-01 - 2.00E+00	8.40E-01 - 8.40E-01	500	Chlordane	NYDEC, 2000	0.0026	No	LTB
PCB Homologues											
Total PCB homologues	µg/kg ww	2/2	5.99E+00 - 4.08E+02	NA	1.25E+01 - 1.25E+01	110		NYDEC, 2000	3.7	Yes	GTB
PCB Congeners											
tPCBs	µg/kg ww	24/24	8.76E+00 - 3.21E+03	NA	6.66E-01 1.22E+01	110		NYDEC, 2000	29.2	Yes	GTB
PCB Dioxin-like Congener TEQ (bird)	µg/kg ww	24/24	1.30E-03 - 7.88E-02	NA	9.34E-04 - 1.68E-03	0.00475	1998 WHO TEFs used in calculation	CCME, 2001	17	Yes	GTB
PCB Dioxin-like Congener TEQ (mammal)	µg/kg ww	24/24	9.91E-04 - 7.10E-02	NA	6.41E-04 - 1.55E-03	0.00071	1998 WHO TEFs used in calculation	CCME, 2001	100	Yes	GTB
tPCBs	µg/kg ww	24/24	8.76E+00 3.21E+03	NA	6.66E-01 1.22E+01	110		NYDEC, 2000	29	Yes	GTB

Table 2-38
COPEC Screening - Fish
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Analyte	Units	FOD	Range of Detects	Range of SQLs	Range of Detects - Background	Benchmark	Basis	Source	Ratio	Fish Modeling COPEC?	Comment
Inorganics (excepting mercury)											
Arsenic	µg/kg ww	26/26	1.70E+01 - 5.53E+02	NA	2.10E+01 - 1.18E+02	277	River otter Arsenite	Sample et al., 1996	2.0	Yes	GTB
Beryllium	µg/kg ww	3/26	1.30E+00 - 4.70E+00	3.50E+00 - 5.40E+00	1.10E+00 - 1.10E+00	2680	River otter Beryllium sulfate	Sample et al., 1996	0.0018	No	LTB
Cadmium	µg/kg ww	7/26	1.40E+00 - 5.85E+01	3.50E+00 - 4.70E+00	1.10E+00 - 4.97E+01	2860	Belted kingfisher Cadmium chloride	Sample et al., 1996	0.020	No	LTB
Chromium	µg/kg ww	20/26	2.90E+01 - 9.56E+02	3.50E+01 - 1.18E+02	3.30E+01 - 8.90E+01	1970	Belted kingfisher Chromium III	Sample et al., 1996	0.49	No	LTB
Copper	µg/kg ww	26/26	1.58E+02 - 7.90E+02	NA	1.79E+02 - 1.87E+03	61800	River otter Copper sulfate	Sample et al., 1996	0.013	No	LTB
Lead	µg/kg ww	19/26	1.00E+00 - 1.26E+02	3.50E+00 - 4.50E+00	2.10E+00 - 6.29E+01	2230	Belted kingfisher Lead acetate	Sample et al., 1996	0.057	No	LTB
Nickel	µg/kg ww	23/26	5.00E+00 - 7.18E+02	3.50E+01 - 4.30E+01	2.20E+01 - 3.14E+02	152740	Belted kingfisher Nickel sulfate	Sample et al., 1996	0.0047	No	LTB
Selenium	µg/kg ww	26/26	1.69E+02 - 5.17E+02	NA	2.22E+02 - 3.03E+02	789	Belted kingfisher Selanomethio-nine	Sample et al., 1996	0.66	No	LTB
Strontium	µg/kg ww	26/26	6.90E+01 - 1.40E+04	NA	1.13E+03 - 1.40E+04	1069000	River otter Strontium chloride	Sample et al., 1996	0.013	No	LTB
Vanadium	µg/kg ww	26/26	1.20E+01 - 2.33E+02	NA	1.80E+01 - 1.14E+02	793	River otter Sodium metavanadate	Sample et al., 1996	0.29	No	LTB
Zinc	µg/kg ww	26/26	3.11E+03 - 2.06E+04	NA	3.31E+03 - 1.77E+04	28600	Belted kingfisher Zinc sulfate	Sample et al., 1996	0.72	No	LTB
Mercury											
Mercury	µg/kg ww	56/56	5.71E+01 - 1.23E+03	NA	1.34E+02 - 4.32E+02	13	Belted kingfisher Methylmercury dicyandiamide	Sample et al., 1996	95	Yes	GTB

Notes:
COPEC = Chemical of potential ecological concern.
µg/kg ww = Micrograms per kilogram, wet weight.
BAP = Benzo(a)pyrene.
FOD = Frequency of detection. Number of sampling locations at which chemical was detected compared with total number of sampling locations; duplicates at a location were considered one samp
GTB = Greater than benchmark.
LTB = Less than benchmark.
NA = Not applicable.
NBA = No benchmark available.
ND = Not detected.
SQL = Sample quantitation limit. Range from samples with non-detects.

Table 2-39
Final Ecological Assessment and Measurement Endpoints
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Assessment Endpoint		Measurement Endpoint
Receptor	**Ecological Attribute**	
Benthic Invertebrate Community	Community structure, survival, and reproduction	Benthic Index of Biotic Integrity (IBI) determined from samples collected from rock baskets.
		Comparison of sediment chemistry with sediment quality values (SQVs) and values from other literature sources.
		Acute 96-hr *Chironomus tentans* and *Hyalella azteca* toxicity tests using site-specific pore water samples to determine survival.
		Bulk sediment *Chironomus dilutus* (20-day) and *Hyalella azteca* (28-day) toxicity tests using site-specific sediment samples to determine survival and growth.
		Comparison of COPECs concentrations in macrobenthic invertebrate and crayfish tissue with reference area concentrations and with residue effect levels from the literature.
Fish Population	Survival and reproduction	Chronic 7-day *Ceriodaphnia dubia* and *Pimephales promelas* toxicity tests using site-specific surface water samples to determine survival and growth.
		Comparison of COPECs concentrations in fish tissue with reference area concentrations and with residue effect levels from the literature.
Insectivorous Birds (as represented by tree swallows and song birds)	Reproduction, survival, and neurological effects	Comparison of site-specific egg, blood, and feather concentrations in tree swallows and song birds with reference area concentrations and residue effect levels from literature.
Piscivorous Birds (as represented by belted kingfisher and bald eagle)	Survival, reproduction, and neurological effects	Quantitative comparison of kingfisher daily intakes based on dietary intake of COPECs in fish and crayfish with literature-based values.
		Comparison of site-specific blood and feather concentrations in bald eagles with reference area concentrations and residue effect levels from the literature.
Insectivorous Mammals (as represented by the bat)	Survival, reproduction, and neurological effects	Comparison of site-specific blood and fur concentrations in bats with reference area concentrations, and residue effect levels from the literature.
Piscivorous Mammals (as represented by the mink)	Survival, reproduction, and neurological effects	Quantitative comparison of mink daily intakes based on dietary intake of COPECs in fish and crayfish with literature-based values.

Table 2-40
Attributes for Judging Measurement Endpoints
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

1. Strength of Association Between Assessment and Measurement Endpoints
Biological linkage between measurement endpoint and assessment endpoint—This attribute refers to the extent to which the measurement endpoint is representative of, correlated with, or applicable to the assessment endpoint. If there is no biological linkage between a measurement endpoint (e.g., a study that may have been performed for some other purpose) and the assessment endpoint of interest, then that study should not be used to evaluate the stated assessment endpoint. Biological linkage pertains to similarity of effect, target organ, mechanism of action, and level of ecological organization. **Correlation of stressor to response**—This attribute relates to the degree to which a correlation is observed between levels of exposure to a stressor and levels of response and the strength of that correlation. **Utility of measure**—This attribute relates to the ability to judge results of the study against well-accepted standards, criteria, or objective measures. As such, the attribute describes the applicability, certainty, and scientific basis of the measure, as well as the sensitivity of a benchmark in detecting environmental harm. Examples of objective standards or measures for judgment might include ambient water quality criteria, sediment quality criteria, biological indices, and toxicity or exposure thresholds recognized by the scientific or regulatory community as measures of environmental harm.
2. Data and Overall Study Quality
Quality of data and overall study—This attribute reflects the degree to which data quality objectives and other recognized characteristics of high quality studies are met. The key factor affecting the quality of the data is the appropriateness of data collection and analysis practices. The key factor of the quality of the study is the appropriateness and implementation of the experimental design and the minimization of confounding factors. If data are judged to be of poor or no quality, the study would be rejected for use in the ERA.
3. Design and Execution
Site-specificity—This attribute relates to the extent to which media, species, environmental conditions, and habitat types that are used in the study design reflect the site of interest. **Sensitivity of the measurement endpoint to detecting changes**—This attribute relates to the ability to detect a response in the measurement endpoint, expressed as a percentage of the total possible variability that the endpoint is able to detect. Additionally, this attribute reflects the ability of the measurement endpoint to discriminate between responses to a stressor and those resulting from natural or design variability and uncertainty. **Spatial representativeness**—This attribute relates to the degree of compatibility or overlap between the study area, locations of measurements or samples, locations of stressors, and locations of ecological receptors and their points of potential exposure. **Temporal representativeness**—This attribute relates to the temporal compatibility or overlap between the measurement endpoint (when data were collected or the period for which data are representative) and the period during which effects of concern would be likely to be detected. Also linked to this attribute is the number of measurement or sampling events over time and the expected variability over time. **Quantitativeness**—This attribute relates to the degree to which numbers can be used to describe the magnitude of response of the measurement endpoint to the stressor. Some measurement endpoints may yield qualitative or hierarchical results, whereas others may be more quantitative. **Use of a standard method**—The extent to which the study follows specific protocols recommended by a recognized scientific authority for conducting the method correctly. Examples of standard methods are study designs or chemical measures published in the Federal Register or the Code of Federal Regulations, developed by ASTM, or repeatedly published in the peer-reviewed scientific literature, including impact assessments, field surveys, toxicity tests, benchmark approaches, toxicity quotients, and tissue residue analyses. This attribute also reflects the suitability and applicability of the method to the endpoint and the site, as well as the need for modification of the method.

Source: Menzie et al., 1996.

Table 2-41
BERA Endpoints and Weight-of-Evidence Documentation
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Assessment Endpoint	Measures of Effect	Descriptive Score[a]	Numeric Score[b]	Attributes									
				Biological Linkage	Correlation of Stressor/Response	Utility of Measure	Quality of Data	Site-Specificity	Sensitivity	Spatial Representativeness	Temporal Representativeness	Quantitativeness	Standard Measure
1.Community structure, survival, and reproduction of benthic invertebrates	1.A: Biotic Integrity Index	H	82	10	7	9	7	10	7	8	8	8	8
	1.B: Compare COPEC levels in sediment to conservative benchmarks	L	27	2	2	2	7	1	2	2	3	2	4
	1.C: Acute 96-hr *Chironomus tentans* toxicity test	M	56	5	6	6	7	5	6	4	3	6	8
	1.D: Acute 96-hr *Hyalella azteca* toxicity test	M	56	5	6	6	7	5	6	4	3	6	8
	1.E: 20-day *Chironomus dilutus* bulk sediment toxicity test	M/H	64	6	7	6	7	5	6	5	7	7	8
	1.F: 28-day *Hyalella azteca* bulk sediment toxicity test	M/H	64	6	7	6	7	5	6	5	7	7	8
	1.G: Compare COPEC levels in macrobenthos to CBRs	M	60	5	4	5	6	8	5	6	8	8	5
	1.H: Compare COPEC levels in crayfish to CBRs	M	60	5	4	5	6	8	5	6	8	8	5
2. Survival and reproduction of the fish population	2.A: Chronic 7-day *Ceriodaphnia dubia* toxicity test	M	56	5	6	6	7	5	6	4	3	6	8
	2.B: Chronic 7-day *Pimephales promelas* toxicity test	M	56	5	6	6	7	5	6	4	3	6	8
	2.C: Compare COPEC levels in fish tissue to CBRs	M	60	5	4	5	6	8	5	6	8	8	5
3. Survival, growth, or reproduction of insectivorous birds	3.A: Compare COPEC levels in tree swallows and song birds to CBRs	M	60	5	4	5	6	8	5	6	8	8	5
4. Survival, growth, or reproduction of piscivorous birds	4.A: Use food chain modeling to calculate CTE and RME doses for comparison to TRVs	M	49	4	7	3	5	6	3	6	6	3	6
	4.B: Compare COPEC levels in bald eagles to CBRs	M	60	5	4	5	6	8	5	6	8	8	5
5. Survival, growth, or reproduction of insectivorous mammals	5.A: Compare COPEC levels in bats to CBRs	M	60	5	4	5	6	8	5	6	8	8	5
6. Survival, growth, or reproduction of piscivorous mammals	6.A: Use food chain modeling to calculate CTE and RME doses for comparison to TRVs	M	49	4	7	3	5	6	3	6	6	3	6

Notes:

[a]See text for description.

[b]The numeric scores represent the sum of all the individual attribute scores for each measure of effect.

Table 3-1
Exposure Point Concentrations for Food Chain Modeling
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Crayfish				Fish				Sediment EPC* (mg/kg DW)		Surface Water* (mg/L)	
	RME			CTE	RME			CTE				
	Distribution	EPC (mg/kg WW)	Basis	EPC (mg/kg WW)	Distribution	EPC (mg/kg WW)	Basis	EPC (mg/kg WW)	RME	CTE	RME	CTE
AR2												
Mercury	Lognormal	6.27E-02	Student's-t	5.75E-02	Not discernable	4.51E-01	95% Chebyshev (Mean, Sd)	2.90E-01	4.75E-04	3.83E-04	5.00E-08	5.00E-08
tPCBs	ND	2.23E-03	Maximum	2.23E-03	ND	1.22E-02	Maximum	6.20E-03	7.09E-05	5.73E-05	NA	NA
2,3,7,8-TCDD TEQ (bird)	NA	NA	NA	NA	ND	1.38E-06	Maximum	1.12E-06	1.82E-06	1.73E-06	NA	NA
2,3,7,8-TCDD TEQ (mammal)	NA	NA	NA	NA	ND	9.33E-07	Maximum	5.32E-07	1.16E-06	1.08E-06	NA	NA
PCB Dioxin-like Congener TEQ (bird)	ND	7.69E-07	Maximum	6.22E-07	ND	1.68E-06	Maximum	1.28E-06	1.07E-07	1.25E-07	NA	NA
PCB Dioxin-like Congener TEQ (mammal)	ND	6.13E-07	Maximum	4.74E-07	ND	1.55E-06	Maximum	8.80E-07	1.96E-09	1.58E-09	NA	NA
AR3												
Mercury	ND	1.58E-01	Maximum	1.35E-01	ND	5.68E-01	Maximum	3.79E-01	NA	NA	NA	NA
tPCBs	ND	6.02E-02	Maximum	4.66E-02	ND	1.20E-01	Maximum	9.20E-02	NA	NA	NA	NA
2,3,7,8-TCDD TEQ (bird)	ND	1.93E-04	Maximum	1.07E-04	ND	2.10E-06	Maximum	1.75E-06	NA	NA	NA	NA
2,3,7,8-TCDD TEQ (mammal)	ND	3.30E-05	Maximum	1.85E-05	ND	7.24E-07	Maximum	6.39E-07	NA	NA	NA	NA
PCB Dioxin-like Congener TEQ (bird)	ND	5.57E-06	Maximum	4.02E-06	ND	3.74E-06	Maximum	2.98E-06	NA	NA	NA	NA
PCB Dioxin-like Congener TEQ (mammal)	ND	3.95E-06	Maximum	2.87E-06	ND	3.41E-06	Maximum	2.61E-06	NA	NA	NA	NA
AR4												
Mercury	ND	5.66E-02	Maximum	5.38E-02	ND	3.92E-01	Maximum	3.92E-01	7.39E-04	4.88E-04	5.00E-08	5.00E-08
tPCBs	ND	1.83E-01	Maximum	1.59E-01	ND	3.21E+00	Maximum	3.21E+00	3.55E-03	1.88E-03	NA	NA
2,3,7,8-TCDD TEQ (bird)	ND	3.75E-06	Maximum	3.28E-06	ND	9.15E-06	Maximum	9.15E-06	1.10E-05	9.93E-06	NA	NA
2,3,7,8-TCDD TEQ (mammal)	ND	1.49E-06	Maximum	1.26E-06	ND	2.30E-06	Maximum	2.30E-06	2.90E-06	2.69E-06	NA	NA
PCB Dioxin-like Congener TEQ (bird)	ND	2.32E-05	Maximum	2.10E-05	ND	7.88E-05	Maximum	7.88E-05	7.80E-07	4.61E-07	NA	NA
PCB Dioxin-like Congener TEQ (mammal)	ND	1.30E-05	Maximum	1.17E-05	ND	7.10E-05	Maximum	7.10E-05	1.07E-07	5.66E-08	NA	NA
AR5												
Mercury	Normal	1.38E-01	Student's-t	1.16E-01	Normal	4.54E-01	Student's-t	3.20E-01	1.39E-03	1.32E-03	NA	NA
AR6												
Mercury	Normal	1.03E-01	Student's-t	9.29E-02	Normal	5.77E-01	Student's-t	4.70E-01	1.70E-03	8.77E-04	NA	NA
tPCBs	ND	2.57E-02	Maximum	2.57E-02	ND	7.50E-02	Maximum	4.68E-02	7.34E-03	7.34E-03	NA	NA
2,3,7,8-TCDD TEQ (bird)	ND	1.00E-05	Maximum	1.00E-05	ND	9.20E-06	Maximum	5.53E-06	6.72E-05	6.72E-05	NA	NA
2,3,7,8-TCDD TEQ (mammal)	ND	2.18E-06	Maximum	2.18E-06	ND	1.97E-06	Maximum	1.29E-06	1.65E-05	1.65E-05	NA	NA
PCB Dioxin-like Congener TEQ (bird)	ND	2.33E-06	Maximum	2.33E-06	ND	3.39E-06	Maximum	2.30E-06	1.83E-06	1.83E-06	NA	NA
PCB Dioxin-like Congener TEQ (mammal)	ND	9.16E-07	Maximum	9.16E-07	ND	2.64E-06	Maximum	1.74E-06	2.18E-07	2.18E-07	NA	NA

Table 3-1
Exposure Point Concentrations for Food Chain Modeling
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Crayfish				Fish				Sediment EPC* (mg/kg DW)		Surface Water* (mg/L)	
	RME			CTE	RME			CTE				
	Distribution	EPC (mg/kg WW)	Basis	EPC (mg/kg WW)	Distribution	EPC (mg/kg WW)	Basis	EPC (mg/kg WW)	RME	CTE	RME	CTE
AR7												
Mercury	Normal	1.01E-01	Student's-t	8.44E-02	Normal	6.72E-01	Student's-t	4.80E-01	1.29E-03	1.03E-03	NA	NA
AR8												
Mercury	ND	7.42E-02	Maximum	7.08E-02	ND	7.95E-01	Maximum	5.81E-01	1.03E-03	8.34E-04	NA	NA
tPCBs	ND	2.14E-01	Maximum	1.30E-01	ND	4.53E-01	Maximum	3.03E-01	7.41E-04	5.68E-04	NA	NA
2,3,7,8-TCDD TEQ (bird)	ND	1.78E-05	Maximum	1.77E-05	ND	4.14E-05	Maximum	2.20E-05	1.31E-04	1.02E-04	NA	NA
2,3,7,8-TCDD TEQ (mammal)	ND	3.77E-06	Maximum	3.66E-06	ND	6.96E-06	Maximum	3.77E-06	3.42E-05	2.53E-05	NA	NA
PCB Dioxin-like Congener TEQ (bird)	ND	5.79E-06	Maximum	4.61E-06	ND	2.49E-05	Maximum	1.04E-05	5.09E-07	3.49E-07	NA	NA
PCB Dioxin-like Congener TEQ (mammal)	ND	4.93E-06	Maximum	3.88E-06	ND	1.30E-05	Maximum	7.44E-06	2.17E-08	1.66E-08	NA	NA
AR9												
Mercury	ND	1.04E-01	Maximum	8.62E-02	Not discernable	6.07E-01	Student's-t	5.16E-01	2.04E-03	1.12E-03	6.00E-08	5.50E-08
tPCBs	ND	3.94E-02	Maximum	3.38E-02	Normal	2.76E-01	Student's-t	1.90E-01	3.91E-02	1.04E-02	NA	NA
2,3,7,8-TCDD TEQ (bird)	ND	8.54E-05	Maximum	5.24E-05	Normal	1.73E-05	Student's-t	1.32E-05	1.37E-03	4.28E-04	NA	NA
2,3,7,8-TCDD TEQ (mammal)	ND	1.59E-05	Maximum	1.00E-05	Normal	2.86E-06	Student's-t	2.23E-06	2.91E-04	8.99E-05	NA	NA
PCB Dioxin-like Congener TEQ (bird)	ND	1.41E-06	Maximum	1.23E-06	Normal	8.36E-06	Student's-t	6.48E-06	3.40E-06	1.10E-06	NA	NA
PCB Dioxin-like Congener TEQ (mammal)	ND	9.70E-07	Maximum	8.53E-07	Normal	6.88E-06	Student's-t	5.43E-06	1.17E-06	3.11E-07	NA	NA

Notes:
*Sediment and surface water did not have sufficient samples numbers to test distributions or calculate UCLs. RME EPCs for these media are always based on the maximum detected concentration.
Note: All biotic mercury is assumed to be methylmercury. Therefore, the sediment and surface water mercury conentratrations presented are actaully from methyl mercury results.
CTE = Central tendency exposure. EPCs = arithmetic mean.
NA = Not analyzed.
ND = Not determined. Too few samples.
RME = Reasonable maximum exposure. EPCs calculated as noted in this table.

Table 3-2
Calculation of Field Metabolic Rates*
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

$$\text{FMR (kcal/g BW - day)} = a \times BW^{b} \times \frac{1\,\text{kcal}}{4.18\,76\,\text{kJ}} \div BW$$

Target Receptor	Allometric Equation Basis	a	b	Body Weight in Grams	FMR (kcal/g BW-day)
Kingfisher	Birds – All Birds	10.5	0.681	150 (mean body weight based on means from Dunning, 1993; Alexander, 1977; Salyer and Lagler, 1946; Brooks and Davis, 1987; and Hamas, 1994)	0.51
Mink	Mammals – Carnivora	1.67	0.869	946 (mean adult body weight based on male and female means in spring; Mitchell, 1961 as in EPA, 1995)	0.16

*From Nagy et al., 1999 unless otherwise indicated.

Table 3-3
Assimilation Efficiency (AE) and Gross Energy (GE) of Anticipated Prey Items
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Predator/Prey Item	Assimilation Efficiency (unitless)	Basis of Value	Gross Energy (kcal/g ww)	Basis of Value
Birds				
Crayfish	0.77	Waterfowl – aquatic invertebrates	1.1	Shrimp
Fish	0.79	Eagles/seabirds – fish	1.2	Bony fishes
Mammals				
Crayfish	0.87	Small mammals – insects	1.1	Shrimp
Fish	0.91	Mammals – fish	1.2	Bony fishes

Source: EPA, 1993a.

Table 3-4
Dietary Exposure Parameters for the Belted Kingfisher
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Parameter	Definition	Value	Reference
FT	Foraging time in the exposure area (unitless).	1	Professional judgment
FIR_{PB}	Food ingestion rate of piscivorous birds (kg WW/kg BW-day).	0.54	Calculated
C_{BI}	Concentration of COEC in benthic invertebrates (i.e., crayfish; mg COEC/kg WW; converted from µg/kg by dividing by 1E+03).	Reach-specific	Table 3-1
P_{BI}	Proportion of diet comprised of benthic invertebrates (unitless).	0.17	Mean of Alexander, 1977; Salyer and Lagler, 1948; Davis, 1982; and White, 1936 and assuming only crayfish and fish comprise the kingfisher's diet.
C_F	Concentration of COEC in fish (mg COEC/kg WW; converted from µg/kg by dividing by 1E+03).	Reach-specific	Table 3-1
P_F	Proportion of diet comprised of fish (unitless).	0.83	Mean of Alexander, 1977; Salyer and Lagler, 1948; Davis, 1982; and White, 1936 and assuming only crayfish and fish comprise the kingfisher's diet.
SIR	Sediment ingestion rate for piscivorous birds (kg DW/kg BW-day).	4.5E-03	Based on a WW ingestion rate of 0.28 kg/kg-day (EPA, 1993a), assuming 75% water content in the diet (based on bony fish), and conservatively assuming a kingfisher ingests 3.3% of the dry food intake based on the mallard, an aquatic avian species known to feed on aquatic plants and invertebrates (Beyer et al., 1994)
CSed	Concentration of COEC in bed sediment (mg COEC/kg DW soil).	Reach-specific	Table 3-1
WIR	Water ingestion rate for piscivorous bird (L/kg BW-day).	0.11	Estimated based on 0.059 x $BW^{0.67}$ (kg) and a mean body weight of 0.150 kg (Dunning, 1993; Alexander, 1977; Salyer and Lagler, 1946; Brooks and Davis, 1987; and Hamas, 1994)
C_W	Concentration of COEC in water column (mg COEC/L water; converted from ng/L by dividing by 1E+06).	Reach-specific	Table 3-1

Table 3-5
Dietary Exposure Parameters for the Mink
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Parameter	Definition	Value	Reference
FT	Foraging time in the exposure area (unitless).	1	Professional judgment
FIR_{PM}	Food ingestion rate of piscivorous mammal (kg WW/kg BW-day).	0.16	Calculated
C_{BI}	Concentration of COEC in benthic invertebrates (i.e., crayfish; mg COEC/kg WW; converted from µg/kg by dividing by 1E+03).	Reach-specific	Table 3-1
P_{BI}	Proportion of diet comprised of benthic invertebrates (unitless).	0.61	Mean of Alexander, 1977; Burgess and Bider, 1980; Cowan and Reilly, 1973; Gilbert and Nanckivell, 1982; Hamilton, 1959 and 1940; Melquist et al., 1981; Proulx et al., 1987 and assuming only crayfish and fish comprise the mink's diet.
C_F	Concentration of COEC in fish (mg COEC/kg WW; converted from µg/kg by dividing by 1E+03).	Reach-specific	Table 3-1
P_F	Proportion of diet comprised of fish (unitless).	0.39	Mean of Alexander, 1977; Burgess and Bider, 1980; Cowan and Reilly, 1973; Gilbert and Nanckivell, 1982; Hamilton, 1959 and 1940; Melquist et al., 1981; Proulx et al., 1987 and assuming only crayfish and fish comprise the mink's diet.
SIR	Sediment ingestion rate for piscivorous mammals (kg DW/kg BW-day).	1.1E-03	Based on a WW ingestion rate of 0.16 kg/kg-day, assuming 75% water content in the diet (based on bony fish), and conservatively assuming a mink ingests 2.8% of the dry food intake based on the red fox, an omnivorous terrestrial receptor (Beyer et al., 1994)
C_{Sed}	Concentration of COEC in sediment (mg COEC/kg DW soil).	Reach-specific	Table 3-1
IR_W	Water ingestion rate for piscivorous mammals (L/kg BW-day).	0.1	Estimated based on 0.099 x $BW^{0.9}$ (kg) and a mean body weight of 0.946 kg (EPA, 1995)
C_W	Concentration of COEC in water column (mg COEC/L water; converted from ng/L by dividing by 1E+06).	Reach-specific	Table 3-1

Table 3-6
Total Daily Intakes - Kingfisher - RME
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Intake (mg/kg-day) from				Total Intake
	Crayfish	Fish	Sediment	Water	(mg/kg-day)
AR2					
Mercury	5.75E-03	2.02E-01	2.14E-06	5.50E-09	2.08E-01
tPCBs	2.05E-04	5.48E-03	3.19E-07	NA	5.69E-03
2,3,7,8-TCDD TEQ (bird)	NA	6.17E-07	8.20E-09	NA	6.26E-07
PCB Dioxin-like Congener TEQ (bird)	7.06E-08	7.52E-07	4.80E-10	NA	8.24E-07
AR3					
Mercury	1.45E-02	2.55E-01	NA	NA	2.69E-01
tPCBs	5.53E-03	5.37E-02	NA	NA	5.92E-02
2,3,7,8-TCDD TEQ (bird)	1.77E-05	9.43E-07	NA	NA	1.87E-05
PCB Dioxin-like Congener TEQ (bird)	5.11E-07	1.68E-06	NA	NA	2.19E-06
AR4					
Mercury	5.20E-03	1.76E-01	3.33E-06	5.50E-09	1.81E-01
tPCBs	1.68E-02	1.44E+00	1.60E-05	NA	1.46E+00
2,3,7,8-TCDD TEQ (bird)	3.45E-07	4.10E-06	4.94E-08	NA	4.49E-06
PCB Dioxin-like Congener TEQ (bird)	2.13E-06	3.53E-05	3.51E-09	NA	3.75E-05
AR5					
Mercury	1.27E-02	2.03E-01	6.25E-06	NA	2.16E-01
AR6					
Mercury	9.48E-03	2.59E-01	7.64E-06	NA	2.68E-01
tPCBs	2.36E-03	3.36E-02	3.30E-05	NA	3.60E-02
2,3,7,8-TCDD TEQ (bird)	9.19E-07	4.12E-06	3.03E-07	NA	5.35E-06
PCB Dioxin-like Congener TEQ (bird)	2.14E-07	1.52E-06	8.23E-09	NA	1.74E-06
AR7					
Mercury	9.24E-03	3.01E-01	5.78E-06	NA	3.10E-01
AR8					
Mercury	6.81E-03	3.56E-01	4.64E-06	NA	3.63E-01
tPCBs	1.97E-02	2.03E-01	3.34E-06	NA	2.23E-01
2,3,7,8-TCDD TEQ (bird)	1.63E-06	1.86E-05	5.90E-07	NA	2.08E-05
PCB Dioxin-like Congener TEQ (bird)	5.32E-07	1.12E-05	2.29E-09	NA	1.17E-05
AR9					
Mercury	9.55E-03	2.72E-01	9.18E-06	6.60E-09	2.81E-01
tPCBs	3.62E-03	1.23E-01	1.76E-04	NA	1.27E-01
2,3,7,8-TCDD TEQ (bird)	7.84E-06	7.75E-06	6.17E-06	NA	2.18E-05
PCB Dioxin-like Congener TEQ (bird)	1.29E-07	3.75E-06	1.53E-08	NA	3.89E-06

Note:
NA = Not analyzed.

Table 3-7
Total Daily Intakes - Mink - RME
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Intake (mg/kg-day) from				Total Intake
	Crayfish	Fish	Sediment	Water	(mg/kg-day)
AR2					
Mercury	6.12E-03	2.81E-02	5.22E-07	5.00E-09	3.43E-02
tPCBs	2.18E-04	7.63E-04	7.80E-08	NA	9.81E-04
2,3,7,8-TCDD TEQ (mammal)	NA	5.82E-08	1.28E-09	NA	5.95E-08
PCB Dioxin-like Congener TEQ (mammal)	5.98E-08	9.67E-08	2.16E-12	NA	1.57E-07
AR3					
Mercury	1.54E-02	3.54E-02	NA	NA	5.09E-02
tPCBs	5.88E-03	7.48E-03	NA	NA	1.34E-02
2,3,7,8-TCDD TEQ (mammal)	3.23E-06	4.52E-08	NA	NA	3.27E-06
PCB Dioxin-like Congener TEQ (mammal)	3.86E-07	2.13E-07	NA	NA	5.98E-07
AR4					
Mercury	5.52E-03	2.45E-02	8.13E-07	5.00E-09	3.00E-02
tPCBs	1.79E-02	2.00E-01	3.90E-06	NA	2.18E-01
2,3,7,8-TCDD TEQ (mammal)	1.45E-07	1.43E-07	3.18E-09	NA	2.92E-07
PCB Dioxin-like Congener TEQ (mammal)	1.27E-06	4.43E-06	1.18E-10	NA	5.70E-06
AR5					
Mercury	1.35E-02	2.83E-02	1.53E-06	NA	4.18E-02
AR6					
Mercury	1.01E-02	3.60E-02	1.87E-06	NA	4.61E-02
tPCBs	2.51E-03	4.68E-03	8.08E-06	NA	7.20E-03
2,3,7,8-TCDD TEQ (mammal)	2.13E-07	1.23E-07	1.81E-08	NA	3.54E-07
PCB Dioxin-like Congener TEQ (mammal)	8.94E-08	1.65E-07	2.40E-10	NA	2.54E-07
AR7					
Mercury	9.82E-03	4.19E-02	1.41E-06	NA	5.17E-02
AR8					
Mercury	7.24E-03	4.96E-02	1.13E-06	NA	5.69E-02
tPCBs	2.09E-02	2.82E-02	8.15E-07	NA	4.92E-02
2,3,7,8-TCDD TEQ (mammal)	3.68E-07	4.34E-07	3.76E-08	NA	8.40E-07
PCB Dioxin-like Congener TEQ (mammal)	4.81E-07	8.08E-07	2.38E-11	NA	1.29E-06
AR9					
Mercury	1.02E-02	3.78E-02	2.24E-06	6.00E-09	4.80E-02
tPCBs	3.85E-03	1.72E-02	4.30E-05	NA	2.11E-02
2,3,7,8-TCDD TEQ (mammal)	1.56E-06	1.78E-07	3.20E-07	NA	2.05E-06
PCB Dioxin-like Congener TEQ (mammal)	9.47E-08	4.29E-07	1.29E-09	NA	5.25E-07

Note:
NA = Not analyzed.

Table 3-8
Total Daily Intakes - Kingfisher - CTE
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Intake (mg/kg-day) from				Total Intake
	Crayfish	Fish	Sediment	Water	(mg/kg-day)
AR2					
Mercury	5.28E-03	1.30E-01	1.73E-06	5.50E-09	1.35E-01
tPCBs	2.04E-04	2.78E-03	2.58E-07	NA	2.98E-03
2,3,7,8-TCDD TEQ (bird)	NA	5.03E-07	7.80E-09	NA	5.11E-07
PCB Dioxin-like Congener TEQ (bird)	5.71E-08	5.75E-07	5.63E-10	NA	6.33E-07
AR3					
Mercury	1.23E-02	1.70E-01	NA	NA	1.82E-01
tPCBs	4.28E-03	4.12E-02	NA	NA	4.55E-02
2,3,7,8-TCDD TEQ (bird)	9.85E-06	7.86E-07	NA	NA	1.06E-05
PCB Dioxin-like Congener TEQ (bird)	3.69E-07	1.34E-06	NA	NA	1.71E-06
AR4					
Mercury	4.93E-03	1.76E-01	2.20E-06	5.50E-09	1.81E-01
tPCBs	1.46E-02	1.44E+00	8.46E-06	NA	1.45E+00
2,3,7,8-TCDD TEQ (bird)	3.01E-07	4.10E-06	4.47E-08	NA	4.45E-06
PCB Dioxin-like Congener TEQ (bird)	1.93E-06	3.53E-05	2.07E-09	NA	3.73E-05
AR5					
Mercury	1.07E-02	1.43E-01	5.96E-06	NA	1.54E-01
AR6					
Mercury	8.52E-03	2.11E-01	3.95E-06	NA	2.19E-01
tPCBs	2.36E-03	2.10E-02	3.30E-05	NA	2.34E-02
2,3,7,8-TCDD TEQ (bird)	9.19E-07	2.48E-06	3.03E-07	NA	3.70E-06
PCB Dioxin-like Congener TEQ (bird)	2.14E-07	1.03E-06	8.23E-09	NA	1.25E-06
AR7					
Mercury	7.75E-03	2.15E-01	4.66E-06	NA	2.23E-01
AR8					
Mercury	6.50E-03	2.60E-01	3.75E-06	NA	2.67E-01
tPCBs	1.20E-02	1.36E-01	2.56E-06	NA	1.48E-01
2,3,7,8-TCDD TEQ (bird)	1.62E-06	9.86E-06	4.59E-07	NA	1.19E-05
PCB Dioxin-like Congener TEQ (bird)	4.23E-07	4.67E-06	1.57E-09	NA	5.09E-06
AR9					
Mercury	7.91E-03	2.31E-01	5.04E-06	6.05E-09	2.39E-01
tPCBs	3.10E-03	8.52E-02	4.66E-05	NA	8.83E-02
2,3,7,8-TCDD TEQ (bird)	4.81E-06	5.92E-06	1.92E-06	NA	1.27E-05
PCB Dioxin-like Congener TEQ (bird)	1.13E-07	2.91E-06	4.97E-09	NA	3.02E-06

Note:
NA = Not analyzed.

Table 3-9
Total Daily Intakes - Mink - CTE
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Intake (mg/kg-day) from				Total Intake (mg/kg-day)
	Crayfish	Fish	Sediment	Water	
AR2					
Mercury	5.61E-03	1.81E-02	4.22E-07	5.00E-09	2.37E-02
tPCBs	2.17E-04	3.87E-04	6.31E-08	NA	6.04E-04
2,3,7,8-TCDD TEQ (mammal)	NA	3.32E-08	1.19E-09	NA	3.44E-08
PCB Dioxin-like Congener TEQ (mammal)	4.63E-08	5.49E-08	1.74E-12	NA	1.01E-07
AR3					
Mercury	1.31E-02	2.36E-02	NA	NA	3.67E-02
tPCBs	4.55E-03	5.74E-03	NA	NA	1.03E-02
2,3,7,8-TCDD TEQ (mammal)	1.80E-06	3.99E-08	NA	NA	1.84E-06
PCB Dioxin-like Congener TEQ (mammal)	2.80E-07	1.63E-07	NA	NA	4.42E-07
AR4					
Mercury	5.25E-03	2.45E-02	5.37E-07	5.00E-09	2.97E-02
tPCBs	1.56E-02	2.00E-01	2.07E-06	NA	2.16E-01
2,3,7,8-TCDD TEQ (mammal)	1.23E-07	1.43E-07	2.96E-09	NA	2.69E-07
PCB Dioxin-like Congener TEQ (mammal)	1.14E-06	4.43E-06	6.23E-11	NA	5.57E-06
AR5					
Mercury	1.13E-02	2.00E-02	1.46E-06	NA	3.13E-02
AR6					
Mercury	9.06E-03	2.93E-02	9.65E-07	NA	3.84E-02
tPCBs	2.51E-03	2.92E-03	8.08E-06	NA	5.44E-03
2,3,7,8-TCDD TEQ (mammal)	2.13E-07	8.03E-08	1.81E-08	NA	3.12E-07
PCB Dioxin-like Congener TEQ (mammal)	8.94E-08	1.08E-07	2.40E-10	NA	1.98E-07
AR7					
Mercury	8.24E-03	2.99E-02	1.14E-06	NA	3.82E-02
AR8					
Mercury	6.91E-03	3.63E-02	9.17E-07	NA	4.32E-02
tPCBs	1.27E-02	1.89E-02	6.25E-07	NA	3.16E-02
2,3,7,8-TCDD TEQ (mammal)	3.57E-07	2.35E-07	2.79E-08	NA	6.21E-07
PCB Dioxin-like Congener TEQ (mammal)	3.78E-07	4.64E-07	1.83E-11	NA	8.43E-07
AR9					
Mercury	8.41E-03	3.22E-02	1.23E-06	5.50E-09	4.06E-02
tPCBs	3.30E-03	1.19E-02	1.14E-05	NA	1.52E-02
2,3,7,8-TCDD TEQ (mammal)	9.78E-07	1.39E-07	9.89E-08	NA	1.22E-06
PCB Dioxin-like Congener TEQ (mammal)	8.32E-08	3.39E-07	3.42E-10	NA	4.23E-07

Note:
NA = Not analyzed.

Table 3-10
Summary of Tissue-Specific No Effect and Effect CBRs for Fish, Birds and Mammals
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Tissue Type	Critical Body Residues (CBR; µg/kg wet weight or fresh weight tissue)					
		Mercury[a]		TEQ		tPCB	
		No Effect	Effect	No Effect	Effect	No Effect	Effect
Benthos	Whole body	2,700	NA	NA		NA	
Crayfish	Whole body/muscle	1,500	3,250	NA		NA	
Fish	Whole body/muscle	380	980	0.05[b]	0.3[b]	66,000[b]	150,000[b]
Birds	Eggs	800	1,600	0.124[c]	0.16[d]	900[e]	1,000[f]
	Blood	600	1,250	0.0118[g]	0.360[h]	590[g]	18,000[h]
	Feathers	1,200	9,100	NA		NA	
Mammals	Blood	630	1,500	0.000551[i]	0.00142[i]	70[i]	180[i]
	Fur	7,700	19,000	NA		NA	

Notes:
[a]Nobis, 2008 with the exception of the benthos value, which is Odin et al., 1994; as cited in ERED.
[b]Weston, 2004.
[c]Bruggeman et al., 2003; as cited in PCBRes.
[d]Powell et al., 1996; as cited in PCBRes.
[e]Britton and Hudson, 1973; as cited in PCBRes.
[f]Cecil et al., 1974; as cited in PCBRes.
[g]Hansen et al., 1975; as cited in PCBRes.
[h]Platonow and Funnell, 1972; as cited in PCBRes.
[i]Grant et al., 1974; as cited in PCBRes.

Table 3-11
Summary of No Effect and Effect TRVs for Birds and Mammals
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Toxicity Reference Values (TRVs; mg/kg BW-day)					
	Mercury (as Methylmercury)		TEQ		tPCB	
	No Effect	Effect	No Effect	Effect	No Effect	Effect
Birds	0.047[a]	0.093[a]	1.4E-05[b]	1.4E-04[b]	0.144[c]	0.72[c]
Mammals	0.014[a]	0.035[a]	1E-06[b]	1E-05[b]	0.137[b]	0.685[b]

[a]Nobis, 2008.
[b]Sample et al., 1996.
[c]EPA, 1999.

Note: Endpoints for toxicity values are reproductive.

Table 4-1
Summary of Risk Estimation Approach by Receptor Group and Measurement Endpoint
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Assessment Endpoint		Measurement Endpoint	Reach(es)	Risk Estimation Approach
Receptor	**Ecological Attribute**			
Benthic Invertebrate Community	Community structure, survival, and reproduction	Benthic Index of Biotic Integrity (IBI) determined from samples collected from rock baskets.	AR2-AR4, AR8 and AR9	Statistical Testing
		Comparison of sediment chemistry with sediment quality values (SQVs) and values from other literature sources.	AR3-AR9	HQ Method
		Acute 96-hr *Chironomus tentans* and *Hyalella azteca* toxicity tests using site-specific pore water samples to determine survival.	AR2, AR4-AR9	Statistical Testing
		Bulk sediment *Chironomus dilutus* (20-day) and *Hyalella azteca* (28-day) toxicity tests using site-specific sediment samples to determine survival and growth.	AR2, AR4 and AR5, AR8, and AR9	Statistical Testing
		Comparison of COPECs concentrations in macrobenthic invertebrate and crayfish tissue with reference area concentrations and with residue effect levels from the literature.	Macrobenthic = AR3, AR4, AR6-AR9 Crayfish = AR3-AR9	HQ Method/ Qualitative evaluation of the data
Fish Population	Survival and reproduction	Chronic 7-day *Ceriodaphnia dubia* and *Pimephales promelas* toxicity tests using site-specific surface water samples to determine survival and growth.	AR2-4, AR8, and AR9	Statistical Testing
		Comparison of COPECs concentrations in fish tissue with reference area concentrations and with residue effect levels from the literature.	AR3-AR9	HQ Method/ Qualitative evaluation of the data
Insectivorous Birds (as represented by tree swallows and song birds)	Reproduction, survival, and neurological effects	Comparison of site-specific egg, blood, and feather concentrations in tree swallows and song birds with reference area concentrations and residue effect levels from literature.	Tree Swallow = AR3, AR4, AR8, and AR9 Songbird = AR9	HQ Method/ Qualitative evaluation of the data
Piscivorous Birds (as represented by belted kingfisher and bald eagle)	Survival, reproduction, and neurological effects	Quantitative comparison of kingfisher daily intakes based on dietary intake of COPECs in fish and crayfish with literature-based values.	AR3-AR9	HQ Method
		Comparison of site-specific blood and feather concentrations in bald eagles with reference area concentrations and residue effect levels from the literature.	AR9	HQ Method/ Qualitative evaluation of the data
Insectivorous Mammals (as represented by the bat)	Survival, reproduction, and neurological effects	Comparison of site-specific blood and fur concentrations in bats with reference area concentrations, and residue effect levels from the literature.	AR9	HQ Method/ Qualitative evaluation of the data
Piscivorous Mammals (as represented by the mink)	Survival, reproduction, and neurological effects	Quantitative comparison of mink daily intakes based on dietary intake of COPECs in fish and crayfish with literature-based values.	AR3-AR9	HQ Method/Qualitative evaluation of the data

Table 4-2
Wilcoxon Rank Sum (WRS) Test Results Comparing Data Upstream and Downstream
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Parameter	Year	Reference Stream Reach[a]				Downstream Reach[b]				WRS
		25th	Median	75th	N	25th	Median	75th	N	
Abundance[c]	2009	288	316	486	3	148	604	1020	12	NS
Species richness[d]	2009	19	20	20	3	17	20	23	12	NS
EPT richness[e]	2009	16	16	16	3	13	15	17	12	NS
HBI[f]	2009	4.15	4.20	4.31	3	4.04	4.36	5.01	12	NS

[a]Reference Stream Reach – AR2
[b]Downstream Reach – AR3, AR4, AR8, AR9
[c]Abundance – the number of organisms that colonized an individual rock basket
[d]Species richness – The number of different species that
[e]EPT richness – the number of Ephemeroptera, Plecoptera, and Trichoptera that colonized an individual rock basket
[f]HBI – Hilsenhoff Biotic Index - A benthic invertebrate community index that assigns a pollution tolerance value for each family of benthic invertebrates

NS = Not statistically significant.

Table 4-3
Kruskal-Wallis Rank Sum (KWRS) Test Results Comparing Data Grouped by Sampling Distance
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Parameter	Reference Stream Reach[a]				Near Stream Reaches[b]				Far Stream Reaches[c]				KWRS
	25th	Median	75th	N	25th	Median	75th	N	25th	Median	75th	N	
Abundance[d]	288	316	486	3	69.5	587	1510	6	322	604	890	6	NS
Species richness[e]	19	20	20	3	18	19	20	6	17	22	24	6	NS
EPT richness[f]	16	16	16	3	13	14	15	6	13	17	19	6	NS
HBI[g]	4.15	4.20	4.31	3	3.54	4.71	5.66	6	4.26	4.36	4.46	6	NS

[a]Reference Stream Reach - AR2
[b]Near Stream Reach – AR3, AR4
[c]Far Stream Reach - AR8, AR9
[d]Abundance – the number of organisms that colonized an individual rock basket
[e]Species richness - The number of different species that
[f]EPT richness – the number of Ephemeroptera, Plecoptera, and Trichoptera that colonized an individual rock basket
[g]HBI – Hilsenhoff Biotic Index - A benthic invertebrate community index that assigns a pollution tolerance value for each family of benthic invertebrates

NS = Not statistically significant.

Table 4-4
NH Benthic Index of Biotic Integrity and Benthic Invertebrate Community Metrics*
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Total Taxa by species	Non-Insect (percent)	Intolerant Taxa (percent)	Tolerant taxa (percent)	Clingers (percent)	Chironomidae (percent)	Plecoptera (percent)	B-IBI score
AR2	19.3	0.0	18.6	6.5	91.8	2.4	2.0	70.8
AR3	21.0	0.2	6.9	58.5	93.2	3.4	5.0	67.9
AR4	19.7	0.2	39.7	7.5	87.2	3.4	9.3	75.8
AR8	19.7	0.2	20.4	0.2	72.3	19.6	2.0	66.5
AR9	23.7	0.3	8.1	3.6	87.4	8.2	2.4	66.4

*Values represent the mean of 3 replicates in Reaches AR2, AR3, AR8 and AR9; and 4 replicates in AR4.

Table 4-5
Background Comparison Summary - Mercury
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Medium/Location	P-Value	Conclusion at α=0.05
Crayfish		
AR5	9.13E-05	S
AR6	9.13E-05	S
AR7	0.00701	S
Sediment		
AR4	0.0006797	S
AR5	0.0004696	S
AR6	0.0004696	S
AR7	0.004696	S
AR8	0.004696	S
AR9	0.0006829	S
Songbird Blood		
AR9	0.655	NS
Songbird Feathers - Primary		
AR9	0.997	NS
Songbird Feathers - Tail		
AR9	0.997	NS
Bat Fur		
AR9	0.00603	S

Notes:
Comparisons made only for groupings with at least 8 samples.
Results from Wilcoxon-Mann-Whitney Test run in ProUCL (See Appendix X.)
NS = Not statistically significantly different from background.
S = Statistically significantly different from background.

Table 4-6
Summary of Exceeded TECs and PECs
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/COPEC	Frequency of Exceeding TEC	Number of TEC HQs > 1 < 10	Number of TEC HQs > 10 < 100	Frequency of Exceeding PEC	Number of PEC HQs > 1 < 10
AR2					
Mercury	0/8	0	0	0/8	0
AR3					
Mercury	1/2	1	0	0/2	0
AR4					
Mercury	1/12	1	0	0/12	0
AR5					
Mercury	4/8	4	0	0/8	0
AR6					
Mercury	4/10	4	0	0/10	0
AR7					
Mercury	3/9	3	0	0/9	0
AR8					
Mercury	2/11	2	0	0/11	0
AR9					
Mercury	3/13	2	1	1/13	1

Notes:
PEC = Probably effects concentration.
TEC = Threshold effects concentration.

Table 4-7
Wilcoxon Rank Sum (WRS) Results Comparing the Effect of Reference Reach and Downstream Reach Sediments on 28-Day Survival and Growth of *H. azteca* and *C. dilutus*
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Parameter	Unit	Years	Reference Reach (AR2)				Downstream Reach (AR6-AR9)				WRS
			25th	Median	75th	N	25th	Median	75th	N	
Hyalella azteca survival	%	2009, 2010	78	80	80	5	74	79	85	21	NS
Hyalella azteca biomass	mg dry wt.	2009, 2010	0.38	0.39	0.40	5	0.34	0.43	0.50	21	NS
Chironomus dilutus survival	%	2009, 2010	70	76	83	5	61	75	80	21	NS
Chironomus dilutus biomass	mg dry wt.	2009, 2010	0.44	0.50	1.25	5	0.30	1.15	1.29	21	NS

Data Source: *Characterization of Mercury Contamination in the Androscoggin River, Coos County, New Hampshire* (Chalmers et al., in press).

NS = Not statistically significant.

Table 4-8
Kruskal-Wallis Rank Sum (KWRS) Results Comparing the Effect of Reference Reach and Downstream Reach Sediments on 28-Day Survival and Growth of *H. azteca* and *C. dilutus*
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Parameter	Reference Stream Reach[a]				Near Stream Reaches[b]				Far Stream Reaches[c]				KWRS
	25th	Median	75th	N	25th	Median	75th	N	25th	Median	75th	N	
Hyalella azteca survival	78	80	80	5	77	79	86	7	72	80	84	14	NS
Hyalella azteca biomass	0.38	0.39	0.40	5	0.43	0.43	0.49	7	0.33	0.42	0.50	14	NS
Chironomus dilutus survival	70	76	83	5	66	80	88	7	60	73	76	14	NS
Chironomus dilutus biomass	0.44	0.50	1.25	5	1.25	1.29	1.48	7	0.30	0.67	1.19	14	NS

[a]Reference Reach – AR2
[b]Near Stream Reach – AR4, AR5, and AR6
[c]Far Stream Reach – AR7, AR8, AR9

NS = Not statistically significant.

Table 4-9
Results of 7-Day Toxicity Tests with the Cladoceran, *Ceriodaphnia dubia*, and Fathead Minnow, *Pimephales promelas*
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Site	*Ceriodaphnia dubia*		*Pimephales promelas*	
	Survival (%)	Reproduction (%)	Survival (%)	Mean dry biomass (mg)
Lab Control	90	67	100	0.642
AR2 - Wheeler Bay	100	80	85	0.511
AR3 - Sawmill Dam	90	100	83	0.503
AR4 - Smith Dam	90	78	98	0.565
AR8 - Gorham Dam	90	78	83	0.517
AR9 - Shelburne Dam	100	100	75	0.454

Table 4-10
Summary of RME HQs Calculated Using No-Effects-Based TRVs - Kingfisher
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Crayfish		Fish		Sediment		Surface Water		HQ - Total
	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	
AR2									
Mercury	0.12	3%	4.3	97%	4.5E-05	0.001%	1.2E-07	0.000003%	4.4
tPCBs	0.0014	4%	0.038	96%	2.2E-06	0.006%	NA	---	0.039
2,3,7,8-TCDD TEQ (bird)	NA	---	0.044	99%	5.9E-04	1%	NA	---	0.045
PCB Dioxin-like Congener TEQ (bird)	0.0050	9%	0.054	91%	3.4E-05	0.06%	NA	---	0.059
AR3									
Mercury	0.31	5%	5.4	95%	NA	---	NA	---	5.7
tPCBs	0.038	9%	0.37	91%	NA	---	NA	---	0.41
2,3,7,8-TCDD TEQ (bird)	1.3	95%	0.067	5%	NA	---	NA	---	1.3
PCB Dioxin-like Congener TEQ (bird)	0.037	23%	0.12	77%	NA	---	NA	---	0.16
AR4									
Mercury	0.11	3%	3.7	97%	7.1E-05	0.002%	1.2E-07	0.000003%	3.8
tPCBs	0.12	1%	10	99%	1.1E-04	0.001%	NA	---	10.1
2,3,7,8-TCDD TEQ (bird)	0.025	8%	0.29	91%	3.5E-03	1%	NA	---	0.32
PCB Dioxin-like Congener TEQ (bird)	0.15	6%	2.5	94%	2.5E-04	0.009%	NA	---	2.7
AR5									
Mercury	0.27	6%	4.3	94%	1.3E-04	0.003%	NA	---	4.6
AR6									
Mercury	0.20	4%	5.5	96%	1.6E-04	0.003%	NA	---	5.7
tPCBs	0.016	7%	0.23	93%	2.3E-04	0.09%	NA	---	0.25
2,3,7,8-TCDD TEQ (bird)	0.066	17%	0.29	77%	2.2E-02	6%	NA	---	0.38
PCB Dioxin-like Congener TEQ (bird)	0.015	12%	0.11	87%	5.9E-04	0.5%	NA	---	0.12
AR7									
Mercury	0.20	3%	6.4	97%	1.2E-04	0.002%	NA	---	6.6
AR8									
Mercury	0.14	2%	7.6	98%	9.9E-05	0.001%	NA	---	7.7
tPCBs	0.14	9%	1.4	91%	2.3E-05	0.001%	NA	---	1.5
2,3,7,8-TCDD TEQ (bird)	0.12	8%	1.3	89%	4.2E-02	3%	NA	---	1.5
PCB Dioxin-like Congener TEQ (bird)	0.038	5%	0.80	95%	1.6E-04	0.02%	NA	---	0.84
AR9									
Mercury	0.20	3%	5.8	97%	2.0E-04	0.003%	1.4E-07	0.000002%	6.0
tPCBs	0.025	3%	0.86	97%	1.2E-03	0.1%	NA	---	0.88
2,3,7,8-TCDD TEQ (bird)	0.56	36%	0.55	36%	4.4E-01	28%	NA	---	1.6
PCB Dioxin-like Congener TEQ (bird)	0.0092	3%	0.27	96%	1.1E-03	0.4%	NA	---	0.28

Notes: Shading indicates HQ>1.0.
% Contribution = % contribution of pathway to total HQ.
NA = Not analyzed.
NTV = No toxicity value.

Table 4-11
Summary of RME HQs Calculated Using Effects-Based TRVs - Kingfisher
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Crayfish		Fish		Sediment		Surface Water		HQ - Total
	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	
AR2									
Mercury	0.062	3%	2.2	97%	2.3E-05	0.001%	5.9E-08	0.000003%	2.2
tPCBs	0.00028	4%	0.0076	96%	4.4E-07	0.006%	NA	---	0.0079
2,3,7,8-TCDD TEQ (bird)	NA	---	0.0044	99%	5.9E-05	1%	NA	---	0.0045
PCB Dioxin-like Congener TEQ (bird)	0.00050	9%	0.0054	91%	3.4E-06	0.06%	NA	---	0.0059
AR3									
Mercury	0.16	5%	2.7	95%	NA	---	NA	---	2.9
tPCBs	0.0077	9%	0.075	91%	NA	---	NA	---	0.082
2,3,7,8-TCDD TEQ (bird)	0.13	95%	0.0067	5%	NA	---	NA	---	0.13
PCB Dioxin-like Congener TEQ (bird)	0.0037	23%	0.012	77%	NA	---	NA	---	0.016
AR4									
Mercury	0.056	3%	1.9	97%	3.6E-05	0.002%	5.9E-08	0.000003%	1.9
tPCBs	0.023	1%	2.0	99%	2.2E-05	0.001%	NA	---	2.0
2,3,7,8-TCDD TEQ (bird)	0.0025	8%	0.029	91%	3.5E-04	1%	NA	---	0.032
PCB Dioxin-like Congener TEQ (bird)	0.015	6%	0.25	94%	2.5E-05	0.009%	NA	---	0.27
AR5									
Mercury	0.14	6%	2.2	94%	6.7E-05	0.003%	NA	---	2.3
AR6									
Mercury	0.10	4%	2.8	96%	8.2E-05	0.003%	NA	---	2.9
tPCBs	0.0033	7%	0.047	93%	4.6E-05	0.09%	NA	---	0.050
2,3,7,8-TCDD TEQ (bird)	0.0066	17%	0.029	77%	2.2E-03	6%	NA	---	0.038
PCB Dioxin-like Congener TEQ (bird)	0.0015	12%	0.011	87%	5.9E-05	0.5%	NA	---	0.012
AR7									
Mercury	0.10	3%	3.2	97%	6.2E-05	0.002%	NA	---	3.3
AR8									
Mercury	0.07	2%	3.8	98%	5.0E-05	0.001%	NA	---	3.9
tPCBs	0.027	9%	0.28	91%	4.6E-06	0.001%	NA	---	0.31
2,3,7,8-TCDD TEQ (bird)	0.012	8%	0.13	89%	4.2E-03	3%	NA	---	0.15
PCB Dioxin-like Congener TEQ (bird)	0.0038	5%	0.080	95%	1.6E-05	0.02%	NA	---	0.084
AR9									
Mercury	0.10	3%	2.9	97%	9.9E-05	0.003%	7.1E-08	0.000002%	3.0
tPCBs	0.0050	3%	0.17	97%	2.4E-04	0.14%	NA	---	0.18
2,3,7,8-TCDD TEQ (bird)	0.056	36%	0.055	36%	4.4E-02	28%	NA	---	0.16
PCB Dioxin-like Congener TEQ (bird)	0.00092	3%	0.027	96%	1.1E-04	0.4%	NA	---	0.028

Notes: Shading indicates HQ>1.0.
% Contribution = % contribution of pathway to total HQ.
NA = Not analyzed.
NTV = No toxicity value.

Table 4-12
Summary of CTE HQs Calculated Using No-Effects-Based TRVs - Kingfisher
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Crayfish		Fish		Sediment		Surface Water		HQ - Total
	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	
AR2									
Mercury	0.11	4%	2.8	96%	3.7E-05	0.001%	1.2E-07	0.000004%	2.9
tPCBs	0.0014	7%	0.019	93%	1.8E-06	0.009%	NA	---	0.021
2,3,7,8-TCDD TEQ (bird)	NA	---	0.036	98%	5.6E-04	2%	NA	---	0.036
PCB Dioxin-like Congener TEQ (bird)	0.0041	9%	0.041	91%	4.0E-05	0.09%	NA	---	0.045
AR3									
Mercury	0.26	7%	3.6	93%	NA	---	NA	---	3.9
tPCBs	0.030	9%	0.29	91%	NA	---	NA	---	0.32
2,3,7,8-TCDD TEQ (bird)	0.70	93%	0.056	7%	NA	---	NA	---	0.8
PCB Dioxin-like Congener TEQ (bird)	0.026	22%	0.10	78%	NA	---	NA	---	0.12
AR4									
Mercury	0.10	3%	3.7	97%	4.7E-05	0.001%	1.2E-07	0.000003%	3.8
tPCBs	0.10	1%	10	99%	5.9E-05	0.0006%	NA	---	10
2,3,7,8-TCDD TEQ (bird)	0.022	7%	0.29	92%	3.2E-03	1%	NA	---	0.32
PCB Dioxin-like Congener TEQ (bird)	0.14	5%	2.5	95%	1.5E-04	0.006%	NA	---	2.7
AR5									
Mercury	0.23	7%	3.0	93%	1.3E-04	0.004%	NA	---	3.3
AR6									
Mercury	0.18	4%	4.5	96%	8.4E-05	0.002%	NA	---	4.7
tPCBs	0.016	10%	0.15	90%	2.3E-04	0.1%	NA	---	0.16
2,3,7,8-TCDD TEQ (bird)	0.066	25%	0.18	67%	2.2E-02	8%	NA	---	0.26
PCB Dioxin-like Congener TEQ (bird)	0.015	17%	0.074	82%	5.9E-04	0.7%	NA	---	0.089
AR7									
Mercury	0.16	3%	4.6	97%	9.9E-05	0.002%	NA	---	4.7
AR8									
Mercury	0.14	2%	5.5	98%	8.0E-05	0.001%	NA	---	5.7
tPCBs	0.083	8%	0.94	92%	1.8E-05	0.002%	NA	---	1.0
2,3,7,8-TCDD TEQ (bird)	0.12	14%	0.70	83%	3.3E-02	4%	NA	---	0.85
PCB Dioxin-like Congener TEQ (bird)	0.030	8%	0.33	92%	1.1E-04	0.03%	NA	---	0.36
AR9									
Mercury	0.17	3%	4.9	97%	1.1E-04	0.002%	1.3E-07	0.000003%	5.1
tPCBs	0.022	4%	0.59	96%	3.2E-04	0.05%	NA	---	0.61
2,3,7,8-TCDD TEQ (bird)	0.34	38%	0.42	47%	1.4E-01	15%	NA	---	0.90
PCB Dioxin-like Congener TEQ (bird)	0.0081	4%	0.21	96%	3.6E-04	0.2%	NA	---	0.22

Notes: Shading indicates HQ>1.0.
% Contribution = % contribution of pathway to total HQ.
NA = Not analyzed.
NTV = No toxicity value.

Table 4-13
Summary of CTE HQs Calculated Using Effects-Based TRVs - Kingfisher
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Crayfish		Fish		Sediment		Surface Water		HQ - Total
	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	
AR2									
Mercury	0.057	4%	1.4	96%	1.9E-05	0.001%	5.9E-08	0.000004%	1.5
tPCBs	0.00028	7%	0.0039	93%	3.6E-07	0.009%	NA	---	0.0041
2,3,7,8-TCDD TEQ (bird)	NA	---	0.0036	98%	5.6E-05	2%	NA	---	0.0036
PCB Dioxin-like Congener TEQ (bird)	0.00041	9%	0.0041	91%	4.0E-06	0.09%	NA	---	0.0045
AR3									
Mercury	0.13	7%	1.8	93%	NA	---	NA	---	2.0
tPCBs	0.0059	9%	0.057	91%	NA	---	NA	---	0.063
2,3,7,8-TCDD TEQ (bird)	0.070	93%	0.0056	7%	NA	---	NA	---	0.076
PCB Dioxin-like Congener TEQ (bird)	0.0026	22%	0.010	78%	NA	---	NA	---	0.012
AR4									
Mercury	0.053	3%	1.9	97%	2.4E-05	0.001%	5.9E-08	0.000003%	1.9
tPCBs	0.020	1%	2.0	99%	1.2E-05	0.001%	NA	---	2.0
2,3,7,8-TCDD TEQ (bird)	0.0022	7%	0.029	92%	3.2E-04	1%	NA	---	0.032
PCB Dioxin-like Congener TEQ (bird)	0.014	5%	0.25	95%	1.5E-05	0.006%	NA	---	0.27
AR5									
Mercury	0.11	7%	1.5	93%	6.4E-05	0.004%	NA	---	1.7
AR6									
Mercury	0.092	4%	2.3	96%	4.2E-05	0.002%	NA	---	2.4
tPCBs	0.0033	10%	0.029	90%	4.6E-05	0.1%	NA	---	0.032
2,3,7,8-TCDD TEQ (bird)	0.0066	25%	0.018	67%	2.2E-03	8%	NA	---	0.026
PCB Dioxin-like Congener TEQ (bird)	0.0015	17%	0.0074	82%	5.9E-05	0.7%	NA	---	0.0089
AR7									
Mercury	0.083	3%	2.3	97%	5.0E-05	0.002%	NA	---	2.4
AR8									
Mercury	0.070	2%	2.8	98%	4.0E-05	0.001%	NA	---	2.9
tPCBs	0.017	8%	0.19	92%	3.6E-06	0.002%	NA	---	0.21
2,3,7,8-TCDD TEQ (bird)	0.012	14%	0.070	83%	3.3E-03	4%	NA	---	0.085
PCB Dioxin-like Congener TEQ (bird)	0.0030	8%	0.033	92%	1.1E-05	0.03%	NA	---	0.036
AR9									
Mercury	0.085	3%	2.5	97%	5.4E-05	0.002%	6.5E-08	0.000003%	2.6
tPCBs	0.0043	4%	0.12	96%	6.5E-05	0.05%	NA	---	0.12
2,3,7,8-TCDD TEQ (bird)	0.034	38%	0.042	47%	1.4E-02	15%	NA	---	0.090
PCB Dioxin-like Congener TEQ (bird)	0.00081	4%	0.021	96%	3.6E-05	0.2%	NA	---	0.022

Notes: Shading indicates HQ>1.0.
% Contribution = % contribution of pathway to total HQ.
NA = Not analyzed.
NTV = No toxicity value.

Table 4-14
Incremental Risk - RME Case - No-Effects-Based TRVs
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Analyte	AR3	AR4	AR5	AR6	AR7	AR8	AR9
Kingfisher							
Mercury	1.3	<1	0.18	1.3	2.2	3.3	1.6
tPCBs	NC	10	NA	NC	NA	1.5	NC
2,3,7,8-TCDD TEQ (bird)	1.3	NC	NA	NC	NA	1.4	1.5
PCB Dioxin-like Congener TEQ (bird)	NC	2.6	NA	NC	NA	NC	NC
Mink							
Mercury	1.2	<1	0.54	0.85	1.2	1.6	1.0
tPCBs	NC	1.6	NA	NC	NA	NC	NC
2,3,7,8-TCDD TEQ (mammal)	3.2	NC	NA	NC	NA	NC	2.0
PCB Dioxin-like Congener TEQ (mammal)	NC	5.5	NA	NC	NA	1.1	NC

Notes:
NA = HQ not available for background; residual risk not available.
NC = Site HQ < 1; residual risk not calculated.
Shading indicates residual risk >1.0.

Table 4-15
Incremental Risk - RME Case - Effects-Based TRVs
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Analyte	AR3	AR4	AR5	AR6	AR7	AR8	AR9
Kingfisher							
Mercury	0.66	<1	0.09	0.65	1.1	1.7	0.79
tPCBs	NC	2.0	NA	NC	NA	NC	NC
2,3,7,8-TCDD TEQ (bird)	NC	NC	NA	NC	NA	NC	NC
PCB Dioxin-like Congener TEQ (bird)	NC	NC	NA	NC	NA	NC	NC
Mink							
Mercury	0.47	NC	0.22	0.34	0.50	0.65	0.39
tPCBs	NC	NC	NA	NC	NA	NC	NC
2,3,7,8-TCDD TEQ (mammal)	NC	NC	NA	NC	NA	NC	NC
PCB Dioxin-like Congener TEQ (mammal)	NC	NC	NA	NC	NA	NC	NC

Notes:
NA = HQ not available for background; residual risk not available.
NC = Site HQ < 1; residual risk not calculated.
Shading indicates residual risk >1.0.

Table 4-16
Incremental Risk - CTE Case - No-Effects-Based TRVs
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Analyte	AR3	AR4	AR5	AR6	AR7	AR8	AR9
Kingfisher							
Mercury	1.0	1.0	0.40	1.8	1.9	2.8	2.2
tPCBs	NC	10	NA	NC	NA	1.0	NC
2,3,7,8-TCDD TEQ (bird)	NC	NC	NA	NC	NA	NC	NC
PCB Dioxin-like Congener TEQ (bird)	NC	2.6	NA	NC	NA	NC	NC
Mink							
Mercury	0.9	0.4	0.54	1.1	1.0	1.4	1.2
tPCBs	NC	1.6	NA	NC	NA	NC	NC
2,3,7,8-TCDD TEQ (mammal)	1.8	NC	NA	NC	NA	NC	1.2
PCB Dioxin-like Congener TEQ (mammal)	NC	5.5	NA	NC	NA	NC	NC

Notes:
NA = HQ not available for background; residual risk not available.
NC = Site HQ < 1; residual risk not calculated.
Shading indicates residual risk >1.0.

Table 4-17
Incremental Risk - CTE Case - Effects-Based TRvs
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Analyte	AR3	AR4	AR5	AR6	AR7	AR8	AR9
Kingfisher							
Mercury	0.50	0.49	0.20	0.90	0.94	1.4	1.1
tPCBs	NC	2.0	NA	NC	NA	NC	NC
2,3,7,8-TCDD TEQ (bird)	NC	NC	NA	NC	NA	NC	NC
PCB Dioxin-like Congener TEQ (bird)	NC	NC	NA	NC	NA	NC	NC
Mink							
Mercury	0.37	NC	NC	0.42	0.41	0.56	0.48
tPCBs	NC	NC	NA	NC	NA	NC	NC
2,3,7,8-TCDD TEQ (mammal)	NC	NC	NA	NC	NA	NC	NC
PCB Dioxin-like Congener TEQ (mammal)	NC	NC	NA	NC	NA	NC	NC

Notes:
NA = HQ not available for background; residual risk not available.
NC = Site HQ < 1; residual risk not calculated.
Shading indicates residual risk >1.0.

Table 4-18
Summary of RME HQs Calculated Using No-Effects-Based TRVs - Mink
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Crayfish		Fish		Sediment		Surface Water		HQ - Total
	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	
AR2									
Mercury	0.44	18%	2.0	82%	3.7E-05	0.002%	3.6E-07	0.00001%	2.4
tPCBs	0.0016	22%	0.0056	78%	5.7E-07	0.008%	NA	---	0.0072
2,3,7,8-TCDD TEQ (mammal)	NA	---	0.058	98%	1.3E-03	2%	NA	---	0.059
PCB Dioxin-like Congener TEQ (mammal)	0.060	38%	0.097	62%	2.2E-06	0.001%	NA	---	0.16
AR3									
Mercury	1.1	30%	2.5	70%	NA	---	NA	---	3.6
tPCBs	0.043	44%	0.055	56%	NA	---	NA	---	0.098
2,3,7,8-TCDD TEQ (mammal)	3.2	99%	0.045	1%	NA	---	NA	---	3.3
PCB Dioxin-like Congener TEQ (mammal)	0.39	64%	0.21	36%	NA	---	NA	---	0.60
AR4									
Mercury	0.39	18%	1.7	82%	5.8E-05	0.003%	3.6E-07	0.00002%	2.1
tPCBs	0.13	8%	1.5	92%	2.8E-05	0.002%	NA	---	1.6
2,3,7,8-TCDD TEQ (mammal)	0.15	50%	0.14	49%	3.2E-03	1%	NA	---	0.29
PCB Dioxin-like Congener TEQ (mammal)	1.3	22%	4.4	78%	1.2E-04	0.002%	NA	---	5.7
AR5									
Mercury	0.96	32%	2.0	68%	1.1E-04	0.004%	NA	---	3.0
AR6									
Mercury	0.72	22%	2.6	78%	1.3E-04	0.004%	NA	---	3.3
tPCBs	0.018	35%	0.034	65%	5.9E-05	0.1%	NA	---	0.053
2,3,7,8-TCDD TEQ (mammal)	0.21	60%	0.12	35%	1.8E-02	5%	NA	---	0.35
PCB Dioxin-like Congener TEQ (mammal)	0.089	35%	0.16	65%	2.4E-04	0.09%	NA	---	0.25
AR7									
Mercury	0.70	19%	3.0	81%	1.0E-04	0.003%	NA	---	3.7
AR8									
Mercury	0.52	13%	3.5	87%	8.1E-05	0.002%	NA	---	4.1
tPCBs	0.15	43%	0.21	57%	6.0E-06	0.002%	NA	---	0.36
2,3,7,8-TCDD TEQ (mammal)	0.37	44%	0.43	52%	3.8E-02	4%	NA	---	0.84
PCB Dioxin-like Congener TEQ (mammal)	0.48	37%	0.81	63%	2.4E-05	0.002%	NA	---	1.3
AR9									
Mercury	0.73	21%	2.7	79%	1.6E-04	0.005%	4.3E-07	0.00001%	3.4
tPCBs	0.028	18%	0.13	82%	3.1E-04	0.2%	NA	---	0.15
2,3,7,8-TCDD TEQ (mammal)	1.6	76%	0.18	9%	3.2E-01	16%	NA	---	2.1
PCB Dioxin-like Congener TEQ (mammal)	0.095	18%	0.43	82%	1.3E-03	0.2%	NA	---	0.53

Notes: Shading indicates HQ>1.0.
% Contribution = % contribution of pathway to total HQ.
NA = Not analyzed.
NTV = No toxicity value.

Table 4-19
Summary of RME HQs Calculated Using Effects-Based TRVs - Mink
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Crayfish		Fish		Sediment		Surface Water		HQ - Total
	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	
AR2									
Mercury	0.17	18%	0.80	82%	1.5E-05	0.002%	1.4E-07	0.00001%	0.98
tPCBs	0.00032	22%	0.0011	78%	1.1E-07	0.008%	NA	---	0.0014
2,3,7,8-TCDD TEQ (mammal)	NA	---	0.0058	98%	1.3E-04	2%	NA	---	0.0059
PCB Dioxin-like Congener TEQ (mammal)	0.0060	38%	0.010	62%	2.2E-07	0.001%	NA	---	0.016
AR3									
Mercury	0.44	30%	1.0	70%	NA	---	NA	---	1.5
tPCBs	0.0086	44%	0.011	56%	NA	---	NA	---	0.020
2,3,7,8-TCDD TEQ (mammal)	0.32	99%	0.0045	1%	NA	---	NA	---	0.33
PCB Dioxin-like Congener TEQ (mammal)	0.039	64%	0.021	36%	NA	---	NA	---	0.060
AR4									
Mercury	0.16	18%	0.70	82%	2.3E-05	0.003%	1.4E-07	0.00002%	0.86
tPCBs	0.026	8%	0.29	92%	5.7E-06	0.002%	NA	---	0.32
2,3,7,8-TCDD TEQ (mammal)	0.015	50%	0.014	49%	3.2E-04	1%	NA	---	0.029
PCB Dioxin-like Congener TEQ (mammal)	0.13	22%	0.44	78%	1.2E-05	0.002%	NA	---	0.57
AR5									
Mercury	0.39	32%	0.81	68%	4.4E-05	0.004%	NA	---	1.2
AR6									
Mercury	0.29	22%	1.0	78%	5.3E-05	0.004%	NA	---	1.3
tPCBs	0.0037	35%	0.0068	65%	1.2E-05	0.1%	NA	---	0.011
2,3,7,8-TCDD TEQ (mammal)	0.021	60%	0.012	35%	1.8E-03	5%	NA	---	0.035
PCB Dioxin-like Congener TEQ (mammal)	0.0089	35%	0.016	65%	2.4E-05	0.09%	NA	---	0.025
AR7									
Mercury	0.28	19%	1.2	81%	4.0E-05	0.003%	NA	---	1.5
AR8									
Mercury	0.21	13%	1.4	87%	3.2E-05	0.002%	NA	---	1.6
tPCBs	0.031	43%	0.041	57%	1.2E-06	0.002%	NA	---	0.072
2,3,7,8-TCDD TEQ (mammal)	0.037	44%	0.043	52%	3.8E-03	4%	NA	---	0.084
PCB Dioxin-like Congener TEQ (mammal)	0.048	37%	0.081	63%	2.4E-06	0.002%	NA	---	0.13
AR9									
Mercury	0.29	21%	1.1	79%	6.4E-05	0.005%	1.7E-07	0.00001%	1.4
tPCBs	0.0056	18%	0.025	82%	6.3E-05	0.2%	NA	---	0.031
2,3,7,8-TCDD TEQ (mammal)	0.16	76%	0.018	9%	3.2E-02	16%	NA	---	0.21
PCB Dioxin-like Congener TEQ (mammal)	0.0095	18%	0.043	82%	1.3E-04	0.2%	NA	---	0.053

Notes: Shading indicates HQ>1.0.
% Contribution = % contribution of pathway to total HQ.
NA = Not analyzed.
NTV = No toxicity value.

Table 4-20
Summary of CTE HQs Calculated Using No-Effects-Based TRVs - Mink
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Crayfish		Fish		Sediment		Surface Water		HQ - Total
	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	
AR2									
Mercury	0.40	24%	1.3	76%	3.0E-05	0.002%	3.6E-07	0.00002%	1.7
tPCBs	0.0016	36%	0.0028	64%	4.6E-07	0.01%	NA	---	0.0044
2,3,7,8-TCDD TEQ (mammal)	NA	---	0.033	97%	1.2E-03	3%	NA	---	0.034
PCB Dioxin-like Congener TEQ (mammal)	0.046	46%	0.055	54%	1.7E-06	0.002%	NA	---	0.10
AR3									
Mercury	0.94	36%	1.7	64%	NA	---	NA	---	2.6
tPCBs	0.033	44%	0.042	56%	NA	---	NA	---	0.075
2,3,7,8-TCDD TEQ (mammal)	1.8	98%	0.040	2%	NA	---	NA	---	1.8
PCB Dioxin-like Congener TEQ (mammal)	0.28	63%	0.16	37%	NA	---	NA	---	0.44
AR4									
Mercury	0.37	18%	1.7	82%	3.8E-05	0.002%	3.6E-07	0.00002%	2.1
tPCBs	0.11	7%	1.5	93%	1.5E-05	0.001%	NA	---	1.6
2,3,7,8-TCDD TEQ (mammal)	0.12	46%	0.14	53%	3.0E-03	1%	NA	---	0.27
PCB Dioxin-like Congener TEQ (mammal)	1.1	21%	4.4	79%	6.2E-05	0.001%	NA	---	5.6
AR5									
Mercury	0.81	36%	1.4	64%	1.0E-04	0.005%	NA	---	2.2
AR6									
Mercury	0.65	24%	2.1	76%	6.9E-05	0.003%	NA	---	2.7
tPCBs	0.018	46%	0.021	54%	5.9E-05	0.1%	NA	---	0.040
2,3,7,8-TCDD TEQ (mammal)	0.21	68%	0.080	26%	1.8E-02	6%	NA	---	0.31
PCB Dioxin-like Congener TEQ (mammal)	0.089	45%	0.11	55%	2.4E-04	0.1%	NA	---	0.20
AR7									
Mercury	0.59	22%	2.1	78%	8.1E-05	0.003%	NA	---	2.7
AR8									
Mercury	0.49	16%	2.6	84%	6.6E-05	0.002%	NA	---	3.1
tPCBs	0.093	40%	0.14	60%	4.6E-06	0.002%	NA	---	0.23
2,3,7,8-TCDD TEQ (mammal)	0.36	58%	0.24	38%	2.8E-02	4%	NA	---	0.62
PCB Dioxin-like Congener TEQ (mammal)	0.38	45%	0.46	55%	1.8E-05	0.002%	NA	---	0.84
AR9									
Mercury	0.60	21%	2.3	79%	8.8E-05	0.003%	3.9E-07	0.00001%	2.9
tPCBs	0.024	22%	0.087	78%	8.3E-05	0.08%	NA	---	0.11
2,3,7,8-TCDD TEQ (mammal)	1.0	80%	0.14	11%	9.9E-02	8%	NA	---	1.2
PCB Dioxin-like Congener TEQ (mammal)	0.083	20%	0.34	80%	3.4E-04	0.08%	NA	---	0.42

Notes: Shading indicates HQ>1.0.
% Contribution = % contribution of pathway to total HQ.
NA = Not analyzed.
NTV = No toxicity value.

Table 4-21
Summary of CTE HQs Calculated Using Effects-Based TRVs - Mink
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Analyte	Crayfish		Fish		Sediment		Surface Water		HQ - Total
	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	HQ	% Contribution	
AR2									
Mercury	0.16	24%	0.52	76%	1.2E-05	0.002%	1.4E-07	0.00002%	0.68
tPCBs	0.00032	36%	0.0006	64%	9.2E-08	0.01%	NA	---	0.00088
2,3,7,8-TCDD TEQ (mammal)	NA	---	0.0033	97%	1.2E-04	3%	NA	---	0.0034
PCB Dioxin-like Congener TEQ (mammal)	0.0046	46%	0.0055	54%	1.7E-07	0.002%	NA	---	0.010
AR3									
Mercury	0.38	36%	0.67	64%	NA	---	NA	---	1.0
tPCBs	0.0066	44%	0.0084	56%	NA	---	NA	---	0.015
2,3,7,8-TCDD TEQ (mammal)	0.18	98%	0.0040	2%	NA	---	NA	---	0.18
PCB Dioxin-like Congener TEQ (mammal)	0.028	63%	0.016	37%	NA	---	NA	---	0.044
AR4									
Mercury	0.15	18%	0.70	82%	1.5E-05	0.002%	1.4E-07	0.00002%	0.85
tPCBs	0.023	7%	0.29	93%	3.0E-06	0.001%	NA	---	0.32
2,3,7,8-TCDD TEQ (mammal)	0.012	46%	0.014	53%	3.0E-04	1%	NA	---	0.027
PCB Dioxin-like Congener TEQ (mammal)	0.11	21%	0.44	79%	6.2E-06	0.001%	NA	---	0.56
AR5									
Mercury	0.32	36%	0.57	64%	4.2E-05	0.005%	NA	---	0.89
AR6									
Mercury	0.26	24%	0.84	76%	2.8E-05	0.003%	NA	---	1.1
tPCBs	0.0037	46%	0.0043	54%	1.2E-05	0.1%	NA	---	0.0079
2,3,7,8-TCDD TEQ (mammal)	0.021	68%	0.0080	26%	1.8E-03	6%	NA	---	0.031
PCB Dioxin-like Congener TEQ (mammal)	0.0089	45%	0.011	55%	2.4E-05	0.1%	NA	---	0.020
AR7									
Mercury	0.24	22%	0.86	78%	3.3E-05	0.003%	NA	---	1.1
AR8									
Mercury	0.20	16%	1.0	84%	2.6E-05	0.002%	NA	---	1.2
tPCBs	0.019	40%	0.028	60%	9.1E-07	0.002%	NA	---	0.046
2,3,7,8-TCDD TEQ (mammal)	0.036	58%	0.024	38%	2.8E-03	4%	NA	---	0.062
PCB Dioxin-like Congener TEQ (mammal)	0.038	45%	0.046	55%	1.8E-06	0.002%	NA	---	0.084
AR9									
Mercury	0.24	21%	0.92	79%	3.5E-05	0.003%	1.6E-07	0.00001%	1.2
tPCBs	0.0048	22%	0.017	78%	1.7E-05	0.08%	NA	---	0.022
2,3,7,8-TCDD TEQ (mammal)	0.10	80%	0.014	11%	9.9E-03	8%	NA	---	0.12
PCB Dioxin-like Congener TEQ (mammal)	0.0083	20%	0.034	80%	3.4E-05	0.08%	NA	---	0.042

Notes: Shading indicates HQ>1.0.
% Contribution = % contribution of pathway to total HQ.
NA = Not analyzed.
NTV = No toxicity value.

Table 4-22
Summary of Major Uncertainties per Assessment Endpoint as Identified by Receptor
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor	Qualitative Description of Uncertainty	Potential Effect on Risk
Benthic Invertebrate Community	Out of 79 samples evaluated, the number of samples predicted to be not toxic (based on the mercury TEC value) was 35. The actual number of samples observed to be not toxic was 12, giving a percentage of samples correctly predicted to be not toxic of 34.3%.	Small overestimation of risk
	Out of 79 samples evaluated, the number of samples predicted to be toxic (based on the mercury PEC value) was 4. The actual number of samples observed to be toxic was 4, giving a percentage of samples correctly predicted to be toxic as 100%.	No effect on risk.
	Overall potential effect on ecological risk = Slight underestimation of low end risks	
Fish Population	Literature-based CBRs were developed based on species different from smallmouth bass and white sucker.	Unknown effect on risk.
	Overall potential effect on ecological risk = Unknown effect	
Insectivorous Birds	Samples were collected during times of lower surface water methylation.	Slight underestimate of risk.
	Tree swallows and songbirds tend to be migratory and mercury feather concentrations are indicative of long-term exposure that may be more representative of concentrations at other locations.	Unknown effect on risk.
	The diets of songbirds from which samples were collected include non-aquatic invertebrates that may not be exposed to contamination associated with the Androscoggin River.	Moderate overestimate of risk.
	CBRs developed were generally conservative in nature.	Moderate overestimate of risk.
	Overall potential effect on ecological risk = Moderate overestimation	
Insectivorous Mammals	CBRs developed were based on mammals other than bats and there may be differences in responses between taxonomic groups.	Unknown effect on risk
	As noted in the uncertainty analysis, confidence in the bat fur mercury concentrations is low as the values substantially higher than any others reported in the region, without corresponding high abiotic media values.	Large overestimate of risk
	Overall potential effect on ecological risk = Large overestimation	
Piscivorous Birds and Mammals	Some of the exposure parameters used in food chain modeling (i.e., body weight, ingestion rates) represented average and species-specific values, but were not site-specific.	Minimal effect on risk
	Smallmouth bass concentrations analyzed in fillets only and were from large fish. Concentrations in wholebody fish of appropriate prey size are substantially less.	Large overestimate of risk.
	The TRVs were conservative and not species-specific.	Large overestimate of risk
	HQs were calculated only for individual COPECs, without considering the potential for cumulative risk from multiple COPECs, synergism, or antagonism.	Unknown effect on risk
	Ingestion was the only route evaluated.	Small underestimation of risk
	Overall potential effect on ecological risk = Moderate overestimation	

Table 4-23
Scoring Sheet for Evidence of Harm and Magnitude – AR3
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Measurement Endpoint	Weighting Score	Evidence of Harm	Magnitude
Benthic Invertebrate Community			
IBI	High	Unlikely - All COPECs	---
Comparison with SQVs	Low	Undetermined – Hg	---
Macrobenthos CBR Comparisons	Moderate	Unlikely – Hg	---
Crayfish CBR Comparisons	Moderate	Unlikely – Hg and tPCB	---
20-day *Chironomus dilutus* toxicity test	Moderate-High	Unlikely - All COPECs	---
28-day *Hyalella azteca* toxicity test	Moderate-High	Unlikely - All COPECs	---
Fish Community			
Fish CBR Comparisons	Moderate	Unlikely – Organic COPECs	---
		Undetermined – Hg	---
7-day *Ceriodaphnia dubia* toxicity test	Moderate	Unlikely - All COPECs	---
7-day *Pimephales promelas* toxicity test	Moderate	Unlikely - All COPECs	---
Insectivorous Birds			
Tree Swallow CBR Comparisons – blood	Moderate	Unlikely – Hg	---
Tree Swallow CBR Comparisons – feathers	Moderate	Unlikely – Hg	---
Tree Swallow CBR Comparisons – eggs	Moderate	Undetermined – Hg	---
		Possible – Organic COPECs	Low
Piscivorous Birds			
Kingfisher Food Chain Modeling	Moderate	Unlikely – All COPECs	---
Piscivorous Mammals			
Mink TRV Food Chain Modeling	Moderate	Unlikely – Hg, tPCB, PCB Dioxin-like Congener TEQ	---
		Undetermined – 2,3,7,8-TCDD TEQ	---

--- = Not applicable.
Adapted from: Menzie et al., 1996.

Table 4-24
Scoring Sheet for Evidence of Harm and Magnitude – AR4
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Measurement Endpoint	Weighting Score	Evidence of Harm	Magnitude
Benthic Invertebrate Community			
IBI	High	Unlikely - All COPECs	---
Comparison with SQVs	Low	Unlikely – All COPECs	---
Macrobenthos CBR Comparisons	Moderate	Unlikely – Hg	---
Crayfish CBR Comparisons	Moderate	Unlikely – Hg and tPCB	---
Acute 96-hr *Chironomus tentans* toxicity test	Moderate	Unlikely - All COPECs	---
Acute 96-hr *Hyalella azteca* toxicity test	Moderate	Possible - All COPECs	High
20-day *Chironomus dilutus* toxicity test	Moderate-High	Unlikely - All COPECs	---
28-day *Hyalella azteca* toxicity test	Moderate-High	Unlikely - All COPECs	---
Fish Community			
Fish CBR Comparisons	Moderate	Unlikely – Organic COPECs	---
		Undetermined – Hg	---
7-day *Ceriodaphnia dubia* toxicity test	Moderate	Unlikely - All COPECs	---
7-day *Pimephales promelas* toxicity test	Moderate	Unlikely - All COPECs	---
Insectivorous Birds			
Tree Swallow CBR Comparisons – blood	Moderate	Unlikely – Hg	---
Tree Swallow CBR Comparisons – feathers	Moderate	Undetermined – Hg	---
Tree Swallow CBR Comparisons – eggs	Moderate	Undetermined – Hg	---
Piscivorous Birds			
Kingfisher Food Chain Modeling	Moderate	Unlikely – Hg and 2,3,7,8-TCDD TEQ	---
		Possible – tPCB	High
		Possible – PCB Dioxin-like Congener TEQ	Low
Piscivorous Mammals			
Mink TRV Food Chain Modeling	Moderate	Unlikely – Hg, tPCB, and 2,3,7,8-TCDD TEQ	---
		Undetermined – PCB Dioxin-like Congener TEQ	---

--- = Not applicable.
Adapted from: Menzie et al., 1996.

Table 4-25
Scoring Sheet for Evidence of Harm and Magnitude – AR5
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Measurement Endpoint	Weighting Score	Evidence of Harm	Magnitude
Benthic Invertebrate Community			
Comparison with SQVs	Low	Undetermined – Hg	---
Macrobenthos CBR Comparisons	Moderate	Unlikely – tPCB	---
Crayfish CBR Comparisons	Moderate	Unlikely – Hg	---
Acute 96-hr *Chironomus tentans* toxicity test	Moderate	Unlikely - All COPECs	---
Acute 96-hr *Hyalella azteca* toxicity test	Moderate	Unlikely - All COPECs	---
Fish Community			
Fish CBR Comparisons	Moderate	Undetermined – Hg	---
Piscivorous Birds			
Kingfisher Food Chain Modeling	Moderate	Unlikely – All COPECs	---
Piscivorous Mammals			
Mink TRV Food Chain Modeling	Moderate	Unlikely – All COPECs	---

--- = Not applicable.
Adapted from: Menzie et al., 1996.

Table 4-26
Scoring Sheet for Evidence of Harm and Magnitude – AR6
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Measurement Endpoint	Weighting Score	Evidence of Harm	Magnitude
Benthic Invertebrate Community			
Comparison with SQVs	Low	Unlikely – Organic COPECs	---
		Undetermined – Hg	---
Macrobenthos CBR Comparisons	Moderate	Unlikely – Hg and tPCB	---
Crayfish CBR Comparisons	Moderate	Unlikely – Hg and tPCB	---
Acute 96-hr *Chironomus tentans* toxicity test	Moderate	Unlikely - All COPECs	---
Acute 96-hr *Hyalella azteca* toxicity test	Moderate	Possible - All COPECs	High
Fish Community			
Fish CBR Comparisons	Moderate	Unlikely – Organic COPECs	---
		Undetermined – Hg	---
Piscivorous Birds			
Kingfisher Food Chain Modeling	Moderate	Unlikely – Organic COPECs	---
		Undetermined – Hg	---
Piscivorous Mammals			
Mink TRV Food Chain Modeling	Moderate	Unlikely – Organic COPECs	---
		Undetermined – Hg	---

--- = Not applicable.
Adapted from: Menzie et al., 1996.

Table 4-27
Scoring Sheet for Evidence of Harm and Magnitude – AR7
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Measurement Endpoint	Weighting Score	Evidence of Harm	Magnitude
Benthic Invertebrate Community			
Comparison with SQVs	Low	Undetermined – Hg	---
Crayfish CBR Comparisons	Moderate	Unlikely – Hg	---
Acute 96-hr *Chironomus tentans* toxicity test	Moderate	Unlikely - All COPECs	---
Acute 96-hr *Hyalella azteca* toxicity test	Moderate	Unlikely - All COPECs	---
Fish Community			
Fish CBR Comparisons	Moderate	Possible – Hg	Low
Piscivorous Birds			
Kingfisher Food Chain Modeling	Moderate	Unlikely – Organic COPECs	---
		Possible – Hg	Low
Piscivorous Mammals			
Mink TRV Food Chain Modeling	Moderate	Unlikely – All COPECs	---

--- = Not applicable.
Adapted from: Menzie et al., 1996.

Table 4-28
Scoring Sheet for Evidence of Harm and Magnitude – AR8
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Measurement Endpoint	Weighting Score	Evidence of Harm	Magnitude
Benthic Invertebrate Community			
IBI	High	Unlikely - All COPECs	---
Comparison with SQVs	Low	Unlikely – Organic COPECs	---
		Undetermined – Hg	---
Macrobenthos CBR Comparisons	Moderate	Unlikely – tPCB	---
Crayfish CBR Comparisons	Moderate	Unlikely – Hg and tPCB	---
Acute 96-hr *Chironomus tentans* toxicity test	Moderate	Unlikely - All COPECs	---
Acute 96-hr *Hyalella azteca* toxicity test	Moderate	Unlikely - All COPECs	---
20-day *Chironomus dilutus* toxicity test	Moderate-High	Unlikely - All COPECs	---
28-day *Hyalella azteca* toxicity test	Moderate-High	Unlikely - All COPECs	---
Fish Community			
Fish CBR Comparisons	Moderate	Unlikely – Organic COPECs	---
		Undetermined – Hg	---
7-day *Ceriodaphnia dubia* toxicity test	Moderate	Unlikely - All COPECs	---
7-day *Pimephales promelas* toxicity test	Moderate	Unlikely - All COPECs	---
Insectivorous Birds			
Tree Swallow CBR Comparisons – blood	Moderate	Unlikely – Hg	---
Tree Swallow CBR Comparisons – feathers	Moderate	Undetermined – Hg	---
Tree Swallow CBR Comparisons – eggs	Moderate	Unlikely – tPCB	---
		Undetermined – Hg	---
		Possible – 2,3,7,8-TCDD TEQ and PCB Dioxin-like Congener TEQ	Low
Piscivorous Birds			
Kingfisher Food Chain Modeling	Moderate	Unlikely – Organic COPECs	---
		Possible – Hg	Low
Piscivorous Mammals			
Mink TRV Food Chain Modeling	Moderate	Unlikely – Organic COPECs	---
		Undetermined – Hg	---

--- = Not applicable.
Adapted from: Menzie et al., 1996.

Table 4-29
Scoring Sheet for Evidence of Harm and Magnitude – AR9
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor/Measurement Endpoint	Weighting Score	Evidence of Harm	Magnitude
Benthic Invertebrate Community			
IBI	High	Unlikely - All COPECs	---
Comparison with SQVs	Low	Unlikely – Organic COPECs	---
		Possible – Hg	Low
Macrobenthos CBR Comparisons	Moderate	Unlikely – Hg and tPCB	---
Crayfish CBR Comparisons	Moderate	Unlikely – Hg and tPCB	---
Acute 96-hr *Chironomus tentans* toxicity test	Moderate	Unlikely - All COPECs	---
Acute 96-hr *Hyalella azteca* toxicity test	Moderate	Unlikely - All COPECs	---
20-day *Chironomus dilutus* toxicity test	Moderate-High	Unlikely - All COPECs	---
28-day *Hyalella azteca* toxicity test	Moderate-High	Unlikely - All COPECs	---
Fish Community			
Fish CBR Comparisons	Moderate	Unlikely – Organic COPECs	---
		Undetermined – Hg	---
7-day *Ceriodaphnia dubia* toxicity test	Moderate	Unlikely - All COPECs	---
7-day *Pimephales promelas* toxicity test	Moderate	Unlikely - All COPECs	---
Insectivorous Birds			
Tree Swallow CBR Comparisons – blood	Moderate	Undetermined – Hg	---
Tree Swallow CBR Comparisons – feathers	Moderate	Undetermined – Hg	---
Tree Swallow CBR Comparisons – eggs	Moderate	Unlikely – Hg and tPCB	---
		Possible – 2,3,7,8-TCDD TEQ and PCB Dioxin-like Congener TEQ	Low
Songbird CBR Comparisons – blood	Moderate	Unlikely – All COPECs	---
Songbird CBR Comparisons – feathers	Moderate	Unlikely – All COPECs	---
Piscivorous Birds			
Kingfisher Food Chain Modeling	Moderate	Unlikely – Organic COPECs	---
		Possible – Hg	Low
Bald Eagle CBR Comparisons – Blood/Plasma	Moderate	Unlikely – Organic COPECs	---
		Undetermined – Hg	---
Bald Eagle CBR Comparisons –Feathers	Moderate	Possible – Hg	Low
Insectivorous Mammals			
Bat CBR Comparisons – Blood	Moderate	Unlikely – Hg, tPCB, and PCB Dioxin-like Congener TEQ	---
Bat CBR Comparisons – Fur	Moderate	Possible – Hg	High
Piscivorous Mammals			
Mink TRV Food Chain Modeling	Moderate	Unlikely – tPCB and PCB Dioxin-like Congener TEQ	---
		Undetermined – Hg and 2,3,7,8-TCDD TEQ	---

--- = Not applicable.
Adapted from: Menzie et al., 1996.

Table 4-30
Concurrence of Endpoints – AR3
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 1 of 2

COPEC: Mercury

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined	SQV		FIC, TSE		
Unlikely			MBC, CFC, TSB, TSF, KFT, MIT, CCD1, CPP	CHA, CCD2	IBI

COPEC: tPCBs

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low			TSE		
Undetermined					
Unlikely			CFC, FIC, KFT, MIT, CCD1, CPP	CHA, CCD2	IBI

Table 4-30
Concurrence of Endpoints – AR3
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

COPEC: 2,3,7,8-TCDD TEQ

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low			TSE		
Undetermined			MIT		
Unlikely			CFC, KFT, CCD1, CPP	CHA, CCD2	IBI

COPEC: PCB Dioxin-like Congener TEQ

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low			TSE		
Undetermined					
Unlikely			FIC, KFT, MIT, CCD1, CPP	CHA, CCD2	IBI

ACT Acute *Chironomus tentans*
AHA Acute *Hyalella azteca*
BAB Bat blood
BAF Bat fur
BEB Bald eagle blood/plasma
BEF Bald eagle feathers
CCD1 Chronic *Ceriodaphnia dubia*
CCD2 Chronic *Chironomus dilutes*
CFC Crayfish CBR
CHA Chronic *Hyalella azteca*
CPP Chronic *Pimephales promelas*
FIC Fish CBR
IBI Index of biotic integrity
KFT Kingfisher TRV
MBC Macrobenthic CBR
MIT Mink TRV
SBB Songbird blood
SBF Songbird feather
SQV Sediment quality value
TSB Tree swallow blood
TSE Tree swallow egg
TSF Tree swallow feather

Table 4-31
Concurrence of Endpoints – AR4
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 1 of 2

COPEC: Mercury

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High			AHA		
Possible/Low					
Undetermined			FIC, TSF, TSE		
Unlikely	SQV		MBC, CFC, ACT, TSB, KFT, MIT, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

COPEC: tPCBs

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High			AHA, KFT		
Possible/Low					
Undetermined					
Unlikely	SQV		CFC, ACT, FIC, MIT, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

Table 4-31
Concurrence of Endpoints – AR4
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 2 of 2

COPEC: 2,3,7,8-TCDD TEQ

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High			AHA		
Possible/Low					
Undetermined					
Unlikely	SQV		ACT, FIC, KFT, MIT, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

COPEC: PCB Dioxin-like Congener TEQ

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High			AHA		
Possible/Low			KFT		
Undetermined			MIT		
Unlikely	SQV		ACT, FIC, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

Table 4-32
Concurrence of Endpoints – AR5
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 1 of 2

COPEC: Mercury

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined	SQV		FIC		
Unlikely			ACT, AHA, CFC, KFT, MIT		

Acronyms - See Table 4-30

COPEC: tPCBs

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined					
Unlikely			ACT, AHA, MBC, KFT, MIT		

Acronyms - See Table 4-30

Table 4-32
Concurrence of Endpoints – AR5
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 2 of 2

COPEC: 2,3,7,8-TCDD TEQ

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined					
Unlikely			ACT, AHA, KFT, MIT		

Acronyms - See Table 4-30

COPEC: PCB Dioxin-like Congener TEQ

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined					
Unlikely			ACT, AHA, KFT, MIT		

Acronyms - See Table 4-30

Table 4-33
Concurrence of Endpoints – AR6
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 1 of 2

COPEC: Mercury

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High			AHA		
Possible/Low					
Undetermined	SQV		FIC, KFT, MIT		
Unlikely			ACT, MBC, CFC, ACT, AHA		

Acronyms - See Table 4-30

COPEC: tPCBs

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High			AHA		
Possible/Low					
Undetermined					
Unlikely	SQV		MBC, CFC, ACT, FIC, KFT, MIT, ACT, AHA		

Acronyms - See Table 4-30

Table 4-33
Concurrence of Endpoints – AR6
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 2 of 2

COPEC: 2,3,7,8-TCDD TEQ

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High			AHA		
Possible/Low					
Undetermined					
Unlikely	SQV		ACT, FIC, KFT, MIT, ACT, AHA		

Acronyms - See Table 4-30

COPEC: PCB Dioxin-like Congener TEQ

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High			AHA		
Possible/Low					
Undetermined					
Unlikely	SQV		ACT, FIC, KFT, MIT, ACT, AHA		

Acronyms - See Table 4-30

Table 4-34
Concurrence of Endpoints – AR7
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 1 of 2

COPEC: Mercury

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low			FIC, KFT		
Undetermined	SQV				
Unlikely			ACT, AHA, CFC, MIT		

Acronyms - See Table 4-30

COPEC: tPCBs

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined					
Unlikely			ACT, AHA, KFT, MIT		

Acronyms - See Table 4-30

Table 4-34
Concurrence of Endpoints – AR7
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 2 of 2

COPEC: 2,3,7,8-TCDD TEQ

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined					
Unlikely			ACT, AHA, KFT, MIT		

Acronyms - See Table 4-30

COPEC: PCB Dioxin-like Congener TEQ

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined					
Unlikely			ACT, AHA, KFT, MIT		

Acronyms - See Table 4-30

Table 4-35
Concurrence of Endpoints – AR8
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

COPEC: Mercury

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low			KFT		
Undetermined	SQV		FIC, TSF, TSE, MIT		
Unlikely			CFC, ACT, AHA, TSB, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

COPEC: tPCBs

Weighting factor (increasing confidence or weight) →

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined					
Unlikely	SQV		MBC, CFC, ACT, AHA, FIC, TSE, KFT, MIT, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

Table 4-35
Concurrence of Endpoints – AR8
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 2 of 2

COPEC: 2,3,7,8-TCDD TEQ

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined			TSE		
Unlikely	SQV		ACT, AHA, FIC, KFT, MIT, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

COPEC: PCB Dioxin-like Congener TEQ

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined			TSE		
Unlikely	SQV		ACT, AHA, FIC, KFT, MIT, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

Table 4-36
Concurrence of Endpoints – AR9
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 1 of 2

COPEC: Mercury

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High			BAF		
Possible/Low	SQV		KFT, BEF		
Undetermined			FIC, TSB, TSF, BEB, MIT		
Unlikely			MBC, CFC, ACT, AHA, TSE, SBB, SBF, BAB, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

COPEC: tPCBs

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low					
Undetermined					
Unlikely	SQV		MBC, CFC, ACT, AHA, FIC, TSE, SBB, SBF, KFT, BEB, BEF, MIT, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

Table 4-36
Concurrence of Endpoints – AR9
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 2 of 2

COPEC: 2,3,7,8-TCDD TEQ

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low			TSE		
Undetermined			MIT		
Unlikely	SQV		ACT, AHA, FIC, SBB, SBF, KFT, BEB, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

COPEC: PCB Dioxin-like Congener TEQ

Weighting factor (increasing confidence or weight)

Harm/Magnitude	Low	Low-Moderate	Moderate	Moderate-High	High
Possible/High					
Possible/Low			TSE		
Undetermined					
Unlikely	SQV		ACT, AHA, FIC, SBB, SBF, KFT, BEB, BAB, MIT, CCD1, CPP	CHA, CCD2	IBI

Acronyms - See Table 4-30

Table 4-37
Summary of the Evidence for Ecological Risk – AR3
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 1 of 2

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	***Overall Risk Conclusion***
Benthic Community	Benthic Index of Biotic Integrity (IBI)	H	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in the benthic community in AR3.***
	Compare sediment concentrations to SQVs	L	It was concluded that the potential for adverse effects from mercury in sediment were undetermined.	The mercury TEC may underestimate risk.	One of the two mercury concentrations available from AR3 exceeded the TEC with an HQ of 1.2. The PEC was not exceeded.	
	Bulk sediment *Chironomus dilutus* (20-day) and *Hyalella azteca* (28-day) toxicity tests.	M/H	It was concluded that adverse effects are not occurring.	NA	No comment.	
	Compare macrobenthic invertebrate and crayfish tissue concentrations with CBRs.	M	It was concluded that adverse effects are not occurring.	CBR values for all COPECs/receptors are not available.	No comment.	
Aquatic Community	Chronic 7-day *Ceriodaphnia dubia* and *Pimephales promelas* toxicity tests.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in the aquatic community in AR3.***
	Compare fish tissue concentrations with CBRs.	M	It was concluded that the potential for adverse effects from mercury in surface water were undetermined.	Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Half of the smallmouth bass mercury concentrations (2 of 4) were between the no-effect and effect-based CBR. White sucker were not collected from AR3.	

Table 4-37
Summary of the Evidence for Ecological Risk – AR3
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	*Overall Risk Conclusion*
Invertivorous Birds	Compare egg, blood, and feather concentrations in tree swallows with CBRs.	M	It was concluded that the potential for adverse effects from COPECs in tree swallow blood and feathers was unlikely and in eggs was undetermined or possible.	Only one tree swallow egg sample was available from AR3.	The mercury concentration from the one egg was 813 µg/kg, just marginally above the no-effect level of 800 µg/kg, and the tPCB and TEQ concentrations were greater than their respective effect levels.	***Risks to invertivorous birds may be possible due to concentrations of tPCB and TEQs in AR3.***
Piscivorous Birds	Compare modeled intakes with TRVs.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in piscivorous birds in AR3.***
Piscivorous Mammals	Compare modeled intakes with TRVs.	M	It was concluded that adverse effects are not occurring from mercury, tPCBs, and PCB dioxin-like TEQ and was undetermined for 2,3,7,8-TCDD TEQ.	RME EPCs were based on maximum concentrations and likely overestimate exposure to a great extent. In addition, no white sucker concentrations were available and smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Incremental risks were 3.2 for the NOAEL-based RME exposure and 1.2 for the NOAEL-based CTE exposure. LOAEL-based toxicity values were not exceeded.	***Population effects from the COPECs are not expected to occur in piscivorous mammals in AR3.***

L= Low M= Moderate M/H = Moderate/High H = High

Table 4-38
Summary of the Evidence for Ecological Risk – AR4
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Page 1 of 2

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	***Overall Risk Conclusion***
Benthic Community	Benthic Index of Biotic Integrity (IBI)	H	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in the benthic community in AR4.***
	Compare sediment concentrations to SQVs	L	It was concluded that adverse effects are not occurring.	NA	No comment.	
	Acute 96-hr *Chironomus tentans* and *Hyalella azteca* toxicity tests.	M	It was concluded that the potential for adverse effects from COPECs in pore water were high.	NA	Toxicity noted in one of two samples from AR4. Chronic toxicity tests did not reveal toxicity.	
	Bulk sediment *Chironomus dilutus* (20-day) and *Hyalella azteca* (28-day) toxicity tests.	M/H	It was concluded that adverse effects are not occurring.	NA	No comment.	
	Compare macrobenthic invertebrate and crayfish tissue concentrations with CBRs.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	
Aquatic Community	Chronic 7-day *Ceriodaphnia dubia* and *Pimephales promelas* toxicity tests.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in the aquatic community in AR4.***
	Compare fish tissue concentrations with CBRs.	M	It was concluded that the potential for adverse effects from mercury in surface water were undetermined.	Only one smallmouth bass sample available; in addition concentrations were from the fillet. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	The mercury concentration from the one smallmouth bass sample was 392 µg/kg, just marginally above the no-effect level of 380 µg/kg.	

Table 4-38
Summary of the Evidence for Ecological Risk – AR4
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	*Overall Risk Conclusion*
Invertivorous Birds	Compare egg, blood, and feather concentrations in tree swallows with CBRs.	M	It was concluded that the potential for adverse effects from mercury in tree swallow feathers and eggs was undetermined and for all other COPECs/tree swallow tissue was unlikely.	Only one sample each of tree swallow feathers and eggs were available from AR4.	Mercury concentrations in the tree swallow egg and feather samples fell between the no-effect and effect-based CBRs.	***Population effects from the COPECs are not expected to occur in insectivorous birds in AR4.***
Piscivorous Birds	Compare modeled intakes with TRVs.	M	It was concluded that adverse effects are possible from tPCB and PCB dioxin-like TEQ.	RME EPCs were based on maximum concentrations and likely overestimate exposure to a great extent. In addition, no white sucker concentrations were available and smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Incremental risks for tPCBs were 10 for both the NOAEL-based RME and the NOAEL-based CTE exposures and 2.0 for both LOAEL-based exposures. Incremental risks for PCB dioxin-like TEQ were 2.6 for both the NOAEL-based RME and the NOAEL-based CTE exposures. LOAEL-based toxicity values were not exceeded	***Population effects from the COPECs are not expected to occur in piscivorous birds in AR4.***
Piscivorous Mammals	Compare modeled intakes with TRVs.	M	It was concluded that adverse effects are not occurring from mercury, tPCBs, and 2,3,7,8-TCDD TEQ and was undetermined for PCB dioxin-like TEQ.	RME EPCs were based on maximum concentrations and likely overestimate exposure to a great extent. In addition, no white sucker concentrations were available and smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Incremental risks were 5.5 for both the NOAEL-based RME and the NOAEL-based CTE exposures. LOAEL-based toxicity values were not exceeded.	***Population effects from the COPECs are not expected to occur in piscivorous mammals in AR4.***

L= Low M= Moderate M/H = Moderate/High H = High

Table 4-39
Summary of the Evidence for Ecological Risk – AR5
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	*Overall Risk Conclusion*
Benthic Community	Compare sediment concentrations to SQVs	L	It was concluded that the potential for adverse effects from mercury in sediment were undetermined.	The mercury TEC may underestimate risk.	Four of the eight mercury concentrations available from AR5 exceeded the TEC. The PEC was not exceeded.	***Population effects from the COPECs are not expected to occur in the benthic community in AR5.***
	Compare macrobenthic invertebrate and crayfish tissue concentrations with CBRs.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	
	Acute 96-hr *Chironomus tentans* and *Hyalella azteca* toxicity tests.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	
Aquatic Community	Compare fish tissue concentrations with CBRs.	M	It was concluded that the potential for adverse effects from mercury in surface water were undetermined.	Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	All five of the smallmouth bass samples had concentrations that fell between the no-effect and effect levels. None of the five white sucker concentrations exceeded the no-effect level.	***Population effects from the COPECs are not expected to occur in the aquatic community in AR5.***
Piscivorous Birds	Compare modeled intakes with TRVs.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in piscivorous birds in AR5.***
Piscivorous Mammals	Compare modeled intakes with TRVs.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in piscivorous mammals in AR5.***

L= Low M= Moderate M/H = Moderate/High H = High

Table 4-40
Summary of the Evidence for Ecological Risk – AR6
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	***Overall Risk Conclusion***
Benthic Community	Compare sediment concentrations to SQVs.	L	It was concluded that the potential for adverse effects from mercury in sediment were undetermined.	The mercury TEC may underestimate risk.	Three of the ten mercury concentrations available from AR6 exceeded the TEC with a maximum HQ of 1.8. The PEC was not exceeded.	***Low-level risks to the benthic community may be possible to due concentrations of PCBs in AR6.***
	Acute 96-hr *Chironomus tentans* and *Hyalella azteca* toxicity tests.	M	It was concluded that the potential for adverse effects from COPECs in pore water were high.	NA	Toxicity noted in one of two samples from AR6. Attribution not possible; however sediment concentrations of tPCBs/PCB-dioxin-like TEQs appear to be higher in AR6 than in the other reaches.	
	Compare macrobenthic invertebrate and crayfish tissue concentrations with CBRs.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	
Aquatic Community	Compare fish tissue concentrations with CBRs.	M	It was concluded that the potential for adverse effects from mercury in surface water were undetermined.	Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	The majority of the ten smallmouth bass samples had concentrations that fell between the no-effect and effect levels. None of the five white sucker concentrations exceeded the no-effect level.	***Population effects from the COPECs are not expected to occur in the aquatic community in AR6.***
Piscivorous Birds	Compare modeled intakes with TRVs.	M	It was concluded that the potential for adverse effects from mercury were undetermined.	Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Incremental risks were 1.3 for the NOAEL-based RME exposure and 1.8 for the NOAEL-based CTE exposure. LOAEL-based toxicity values were not exceeded.	***Population effects from the COPECs are not expected to occur in piscivorous birds in AR6.***
Piscivorous Mammals	Compare modeled intakes with TRVs.	M	It was concluded that the potential for adverse effects from were undetermined.	Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Incremental risks were <1.0 for the NOAEL-based RME exposure and 1.1 for the NOAEL-based CTE exposure. LOAEL-based toxicity values were not exceeded.	***Population effects from the COPECs are not expected to occur in piscivorous mammals in AR6.***

L= Low M= Moderate M/H = Moderate/High H = High

Table 4-41
Summary of the Evidence for Ecological Risk – AR7
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	*Overall Risk Conclusion*
Benthic Community	Compare sediment concentrations to SQVs.	L	It was concluded that the potential for adverse effects from mercury in sediment were undetermined.	The mercury TEC may underestimate risk.	Three of the nine mercury concentrations available from AR7 exceeded the TEC with a maximum HQ of 2.8. The PEC was not exceeded.	***Population effects from the COPECs are not expected to occur in the benthic community in AR7.***
	Compare crayfish tissue concentrations with CBRs.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	
	Acute 96-hr *Chironomus tentans* and *Hyalella azteca* toxicity tests.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	
Aquatic Community	Compare fish tissue concentrations with CBRs.	M	It was concluded that the potential for adverse effects from mercury in surface water were possible.	Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Of the five samples of smallmouth bass, four of the concentrations fell between the no-effect and effect level and the maximum detected concentration exceeded the effect level. Of the five samples of white sucker, only the maximum detected concentration exceeded the no-effect level.	***Population effects from the COPECs are not expected to occur in the aquatic community in AR7.***
Piscivorous Birds	Compare modeled intakes with TRVs.	M	It was concluded that the potential for adverse effects from mercury were possible.	Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Incremental risks were 2.2 for the NOAEL-based RME exposure and 1.8 for the NOAEL-based CTE exposure. The LOAEL-based RME exposure incremental risk was 1.1. LOAEL-based CTE HQ <1.0.	***Population effects from the COPECs are not expected to occur in piscivorous birds in AR7.***
Piscivorous Mammals	Compare modeled intakes with TRVs.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in piscivorous mammals in AR7.***

L= Low M= Moderate M/H = Moderate/High H = High

Table 4-42
Summary of the Evidence for Ecological Risk – AR8
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	***Overall Risk Conclusion***
Benthic Community	Benthic Index of Biotic Integrity (IBI)	H	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in the benthic community in AR8.***
	Compare sediment concentrations to SQVs.	L	It was concluded that the potential for adverse effects from mercury in sediment were undetermined.	The mercury TEC may underestimate risk.	Two of the 11 mercury concentrations available from AR8 exceeded the TEC with a maximum HQ of 1.8. The PEC was not exceeded.	
	Acute 96-hr *Chironomus tentans* and *Hyalella azteca* toxicity tests.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	
	Bulk sediment *Chironomus dilutus* (20-day) and *Hyalella azteca* (28-day) toxicity tests.	M/H	It was concluded that adverse effects are not occurring.	NA	No comment.	
	Compare macrobenthic invertebrate and crayfish tissue concentrations with CBRs.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	
Aquatic Community	Chronic 7-day *Ceriodaphnia dubia* and *Pimephales promelas* toxicity tests.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in the aquatic community in AR8.***
	Compare fish tissue concentrations with CBRs.	M	It was concluded that the potential for adverse effects from mercury in surface water were undetermined.	Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	All five of the smallmouth bass samples had concentrations that fell between the no-effect and effect levels. Neither of the two white sucker concentrations exceeded the no-effect level.	

Table 4-42
Summary of the Evidence for Ecological Risk – AR8
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	*Overall Risk Conclusion*
Invertivorous Birds	Compare egg, blood, and feather concentrations in tree swallows with CBRs.	M	It was concluded that adverse effects are not occurring based on blood concentrations; that the potential for adverse effects from mercury in feathers and eggs was undetermined; and from 2,3,7,8-TCDD TEQ and PCB dioxin-like TEQ in eggs were possible.	Only one sample was analyzed for PCBs and dioxins.	The one sample had concentrations of TEQs marginally exceeded the effect level with HQs of 1.7 and 1.4 for 2,3,7,8-TCDD TEQ and PCB dioxin-like TEQ, respectively.	***Population effects from the COPECs are not expected to occur in invertivorous birds in AR8.***
Piscivorous Birds	Compare modeled intakes with TRVs.	M	It was concluded that the potential for adverse effects from mercury were possible.	RME EPCs were based on maximum concentrations and likely overestimate exposure to a great extent. Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Incremental risks were 3.3 for the NOAEL-based RME exposure and 2.8 for the NOAEL-based CTE exposure. Incremental risks were 1.7 for the LOAEL-based RME exposure and 1.4 for the LOAEL-based CTE exposure.	***Population effects from the COPECs are not expected to occur in piscivorous birds in AR8.***
Piscivorous Mammals	Compare modeled intakes with TRVs.	M	It was concluded that the potential for adverse effects from mercury were undetermined.	RME EPCs were based on maximum concentrations and likely overestimate exposure to a great extent. Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Incremental risks were 1.6 for the NOAEL-based RME exposure and 1.4 for the NOAEL-based CTE exposure. LOAEL-based toxicity values were not exceeded.	***Population effects from the COPECs are not expected to occur in piscivorous mammals in AR8.***

L= Low M= Moderate M/H = Moderate/High H = High

Table 4-43
Summary of the Evidence for Ecological Risk – AR9
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	*Overall Risk Conclusion*
Benthic Community	Benthic Index of Biotic Integrity (IBI)	H	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in the benthic community in AR9.***
	Compare sediment concentrations to SQVs.	L	It was concluded that the potential for adverse effects from mercury in sediment were undetermined.	The mercury TEC may underestimate risk.	Two of the 13 mercury concentrations available from AR9 exceeded the TEC. HQs exceeding 1.0 were 2.1 and 44. The sample that exceeded the TEC with an HQ of 44 also had concentrations exceeding the PEC, with an HQ of 7.5 (tHg = 7.9 mg/kg). The 7.9 mg/kg concentration is the highest detected in the RSA out of 70 samples and is more than an order of magnitude greater than the next highest concentration of 0.66 mg/kg. Lastly, this concentration is in the reach farthest from the source. It is likely to be an anomaly and not representative of general site conditions.	
	Acute 96-hr *Chironomus tentans* and *Hyalella azteca* toxicity tests.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	
	Bulk sediment *Chironomus dilutus* (20-day) and *Hyalella azteca* (28-day) toxicity tests.	M/H	It was concluded that adverse effects are not occurring.	NA	No comment.	
	Compare macrobenthic invertebrate and crayfish tissue concentrations with CBRs.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	

Table 4-43
Summary of the Evidence for Ecological Risk – AR9
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	*Overall Risk Conclusion*
Aquatic Community	Chronic 7-day *Ceriodaphnia dubia* and *Pimephales promelas* toxicity tests.	M	It was concluded that adverse effects are not occurring.	NA	No comment.	***Population effects from the COPECs are not expected to occur in the aquatic community in AR9.***
	Compare fish tissue concentrations with CBRs.	M	It was concluded that the potential for adverse effects from mercury in surface water were undetermined.	Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	All seven of the smallmouth bass samples had concentrations that fell between the no-effect and effect levels. Neither of the two white sucker concentrations exceeded the no-effect level.	
Invertivorous Birds	Compare egg, blood, and feather concentrations in tree swallows and song birds with CBRs.	M	It was concluded that adverse effects are not occurring based on concentrations in songbirds; the potential for adverse effects from tree swallow blood and feathers from mercury is undetermined; and risks are possible based on TEQ concentrations in tree swallow eggs.	Only one sample was analyzed for PCBs and dioxins.	Concentrations of mercury in all nestling tree swallow blood samples and in the majority of adult tree swallow blood samples were below the no-effect level. The maximum no-effect based HQ was 1.1. None of the mercury blood levels were above the effect level. Concentrations of mercury in all of the nestling tree swallow feather samples and the majority of adult tree swallow feather samples were above the no-effect level. The maximum no-effect based HQ was 2.0. None of the mercury feather levels were above the effect level. The one sample had concentrations of TEQs marginally exceeded the effect level with HQs of 2.2 and 1.2 for 2,3,7,8-TCDD TEQ and PCB dioxin-like TEQ, respectively.	***Population effects from the COPECs are not expected to occur in invertivorous birds in AR9.***

Table 4-43
Summary of the Evidence for Ecological Risk – AR9
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

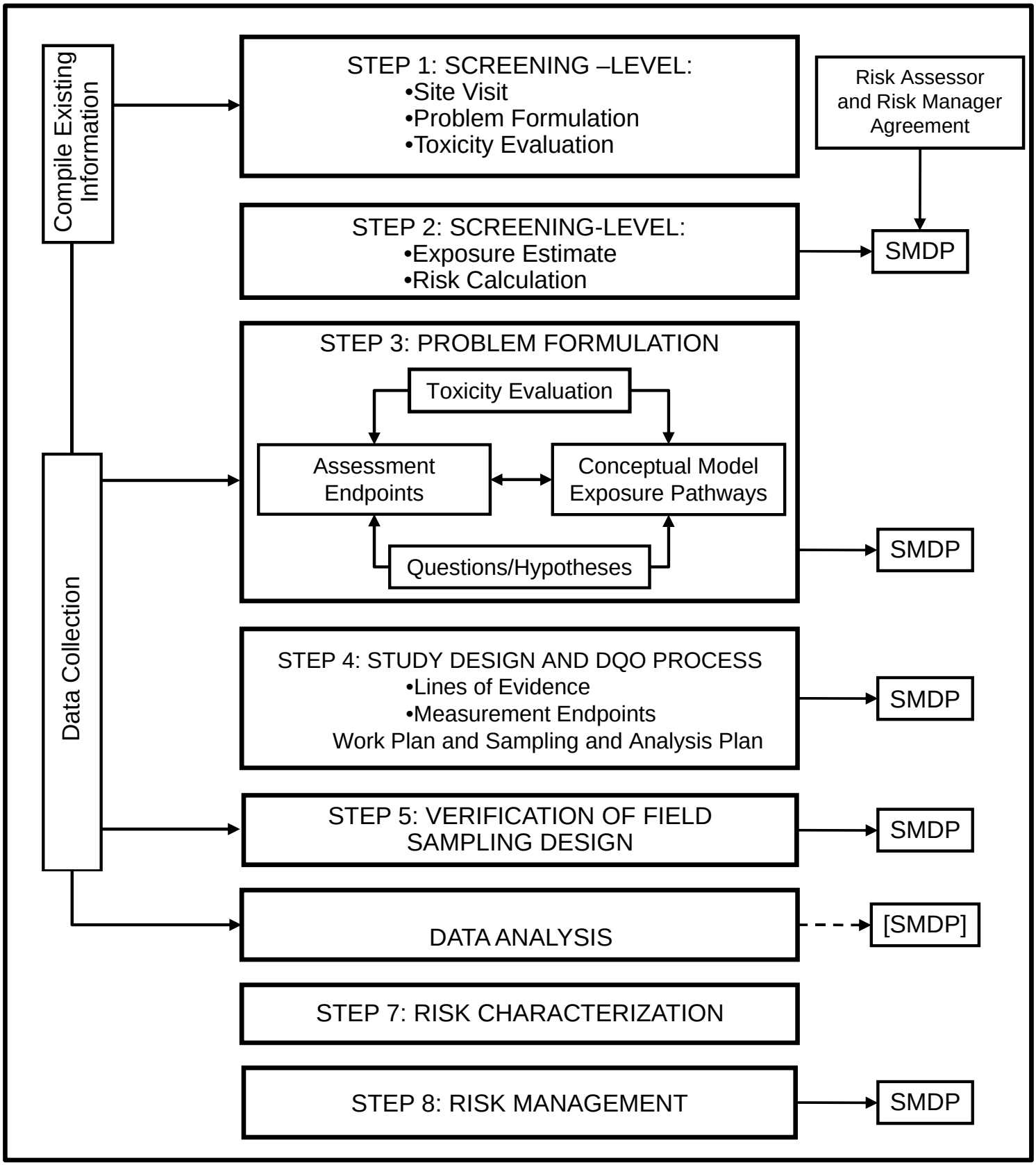
Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	*Overall Risk Conclusion*
Piscivorous Birds	Compare modeled intakes with TRVs.	M	It was concluded that the potential for adverse effects from mercury were possible.	RME EPCs for crayfish were based on maximum concentrations and likely overestimate exposure. Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Incremental risks were 1.6 for the NOAEL-based RME exposure and 2.2 for the NOAEL-based CTE exposure. The LOAEL-based RME exposure incremental risk was <1.0; but the LOAEL-based CTE HQ = 1.1.	***Population effects from the COPECs are not expected to occur in piscivorous birds in AR9.***
	Compare blood and feather concentrations in bald eagles with CBRs.	M	It was concluded that the potential for adverse effects from mercury were undetermined from blood concentrations and possible form feather concentrations.	Only two samples were analyze from AR9. Bald eagles have a huge foraging range and body burden likely reflects exposure to areas in addition to the RSA.	The HQ for the one blood sample with concentrations greater than the no-effect level was 1.1. Feather concentrations were greater than the effect level CBR for both AR1 and AR9. The HQ for AR9 = 2.6, with incremental risk being less than 1.0.	
Insectivorous Mammals	Compare blood and fur concentrations in bats CBRs.	M	It was concluded that adverse effects are not occurring based on concentrations in bat blood and are possible based on concentrations in bat fur.	CBRs are based on mink data. As noted in the uncertainty analysis, Note that confidence in the mercury results for the bat fur is limited by the occurrence of extraordinarily high levels of mercury detected in this investigation compared with levels observed in more comprehensive regional investigations in New England and the Mid-Atlantic.	Bat fur concentrations in AR9 are significantly different (at α=0.05) from those in AR1.	***Population effects from the COPECs are not expected to occur in insectivorous mammals in AR9.***

Table 4-43
Summary of the Evidence for Ecological Risk – AR9
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Receptor Group	Measurement Endpoint	WOE	Results Summary	Major Uncertainties	Comment	*Overall Risk Conclusion*
Piscivorous Mammals	Compare modeled intakes with TRVs.	M	It was concluded that adverse effects are not occurring based on concentrations of PCBs and risks are undetermined for mercury and 2,3,7,8-TCDD TEQ.	RME EPCs for crayfish were based on maximum concentrations and likely overestimate exposure. Smallmouth bass concentrations were from fillet samples. Given that mercury tends to accumulate in the axial muscle, whole body concentrations would be lower.	Incremental risks were 2.0 for the NOAEL-based RME exposure and 1.2 for the NOAEL-based CTE exposure. LOAEL-based toxicity values were not exceeded.	***Population effects from the COPECs are not expected to occur in piscivorous mammals in AR9.***

L= Low M= Moderate M/H = Moderate/High H = High

FIGURES



Legend:
SMDP - Scientific/management decision point
[SMDP] - only if change to the sampling and analysis plan is necessary

Source: EPA (U.S. Environmental Protection Agency), Environmental Response Team. 1997. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments.* Interim Final. EPA 540-R-97-006.

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

FIGURE 1-1

GENERIC EIGHT-STEP ECOLOGICAL RISK ASSESSMENT PROCESS FOR SUPERFUND

N

Legend

- Former Railroad
- Approximate Dam Locations
- Approximate Limit of the Former Chemical Plant Structure Footprints (approx. 1928)
- Approximate Limit of the Cell House Property
- Approximate Limit of the Facility Study Area
- Approximate Limit of Cap

APPROXIMATE SCALE

200 100 0 200 Feet

NOTES:

1. Aerial ortho-photo flown in October 2009 and was provided by York Land Services under contract to Nobis Engineering, Inc.
2. Approximate limit of cap provided by Weston Solutions, February 2005. Final Site Investigation Report; Former Chlor Alkali Facility.
3. Limit of Facility Study Area was provided by the Enlarged Investigation Area Plan; Prepared for North American Dismantling Corp., by York Land Services, September 2008.

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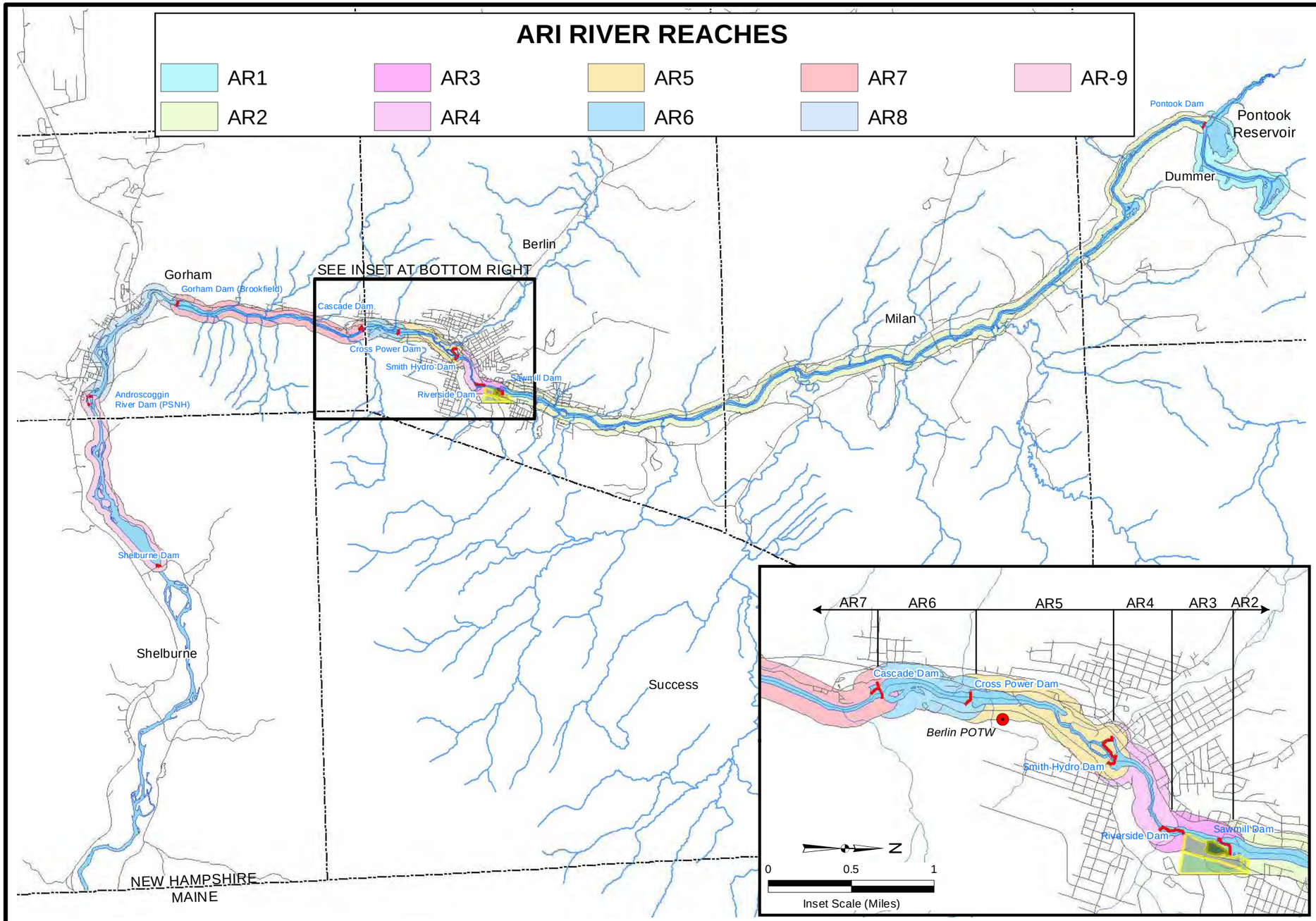
FIGURE 2-1

STUDY AREA (CELL HOUSE PROPERTY, FACILITY STUDY AREA)
CHLOR-ALKALI FACILITY (FORMER)
BERLIN, NH

PREPARED BY: JH | CHECKED BY: LC
PROJECT NO. 80013 | DATE: FEBRUARY 2013

Path: R:\80000 Task Orders\80013 Chlor-Alkali\Technical Data (TD)\GIS Data\Maps and Figures\BERA\2-1_Study_Area.mxd Date Printed: 2/5/2013



N

Legend

- Street
- Stream
- Town Boundary
- Dam
- River Study Area
- Eastern and Southern Facility Study Area
- Cell House Property

APPROXIMATE SCALE

8,500 4,250 0 8,500 Feet

NOTES:

1. Stream/river location and transportation data provided by NH GRANIT (accessed in 2007).
2. Approximate CHP Boundary based on Weston Solutions, February 2005, Final Site Investigation Report; Former Chlor Alkali Facility.
3. Limit of Facility Study Area based on the Enlarged Investigation Area Plan; Prepared for North American Dismantling Corp., by York Land Services, September 2008.
4. Gorham Dam (Brookfield) and Androscoggin River Dam (PSNH) are from One Stop Web Geographic Information Systems/New Hampshire Department of Environmental Services, accessed December 2013.

AR1-Above Pontook Dam
AR2-Between Pontook Dam and Sawmill Dam
AR3-Between Sawmill Dam and Riverside Dam
AR4-Between Riverside Dam and Smith Hydro Dam
AR5-Between Smith Hydro Dam and Cross Power Dam
AR6-Between Cross Power Dam and Cascade Dam
AR7-Between Cascade Dam and Gorham Dam (Brookfield)
AR8-Between Gorham Dam (Brookfield) and Androscoggin River Dam (PSNH) Dam
AR9-Between Androscoggin River Dam (PSNH) and Shelburne Dam

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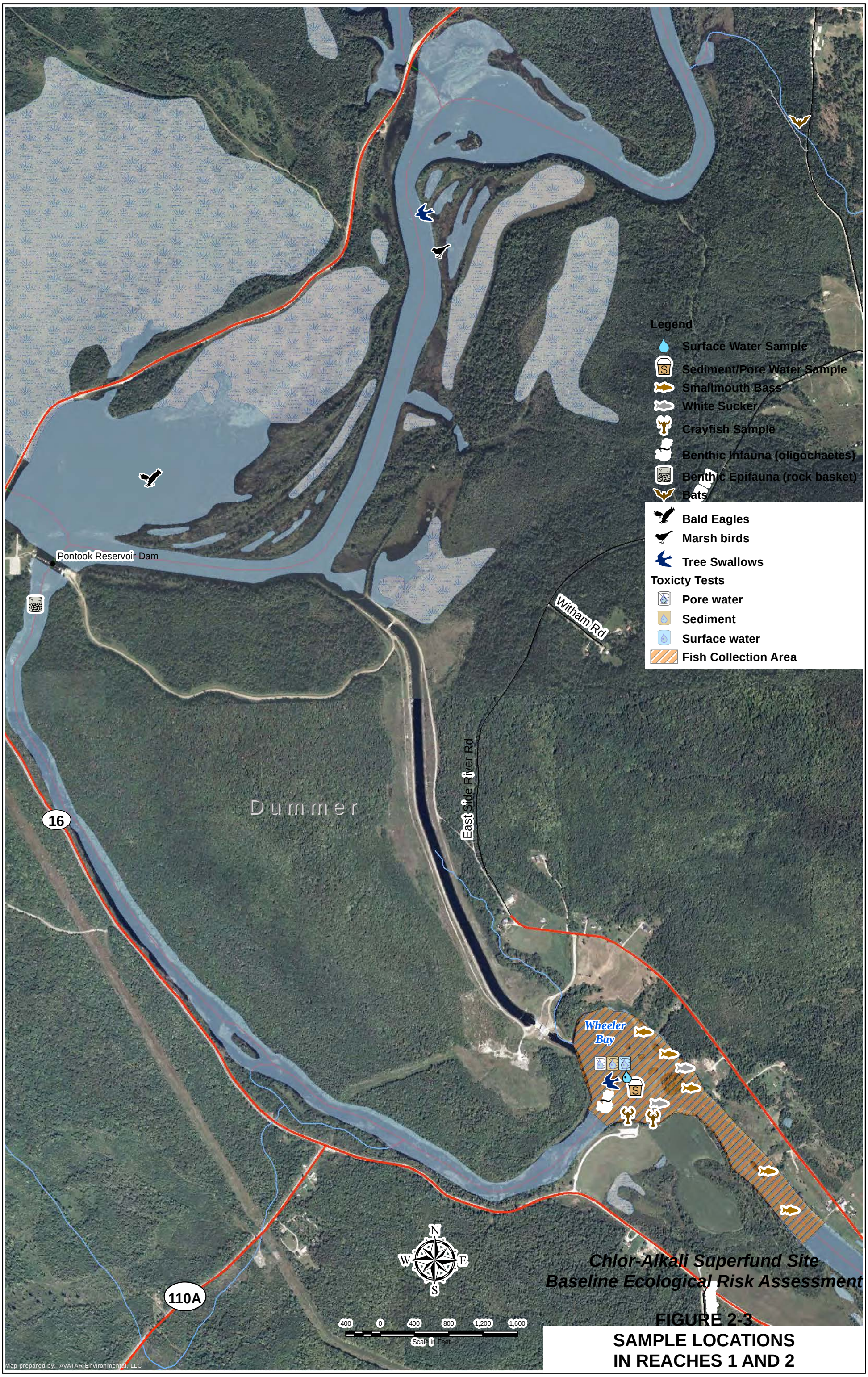
FIGURE 2-2

RIVER STUDY AREA PLAN
CHLOR-ALKALI FACILITY (FORMER SITE)
BERLIN, NH

PREPARED BY: JH | CHECKED BY: JL
PROJECT NO. 80013 | DATE: DEC 2013

R:\80000 Task Orders\80013 Chlor-Alkali\Technical Data (TD)\GIS Data\Maps and Figures\RI_Report\Draft\Figure_1-5_RSA_Reaches_Plan.mxd

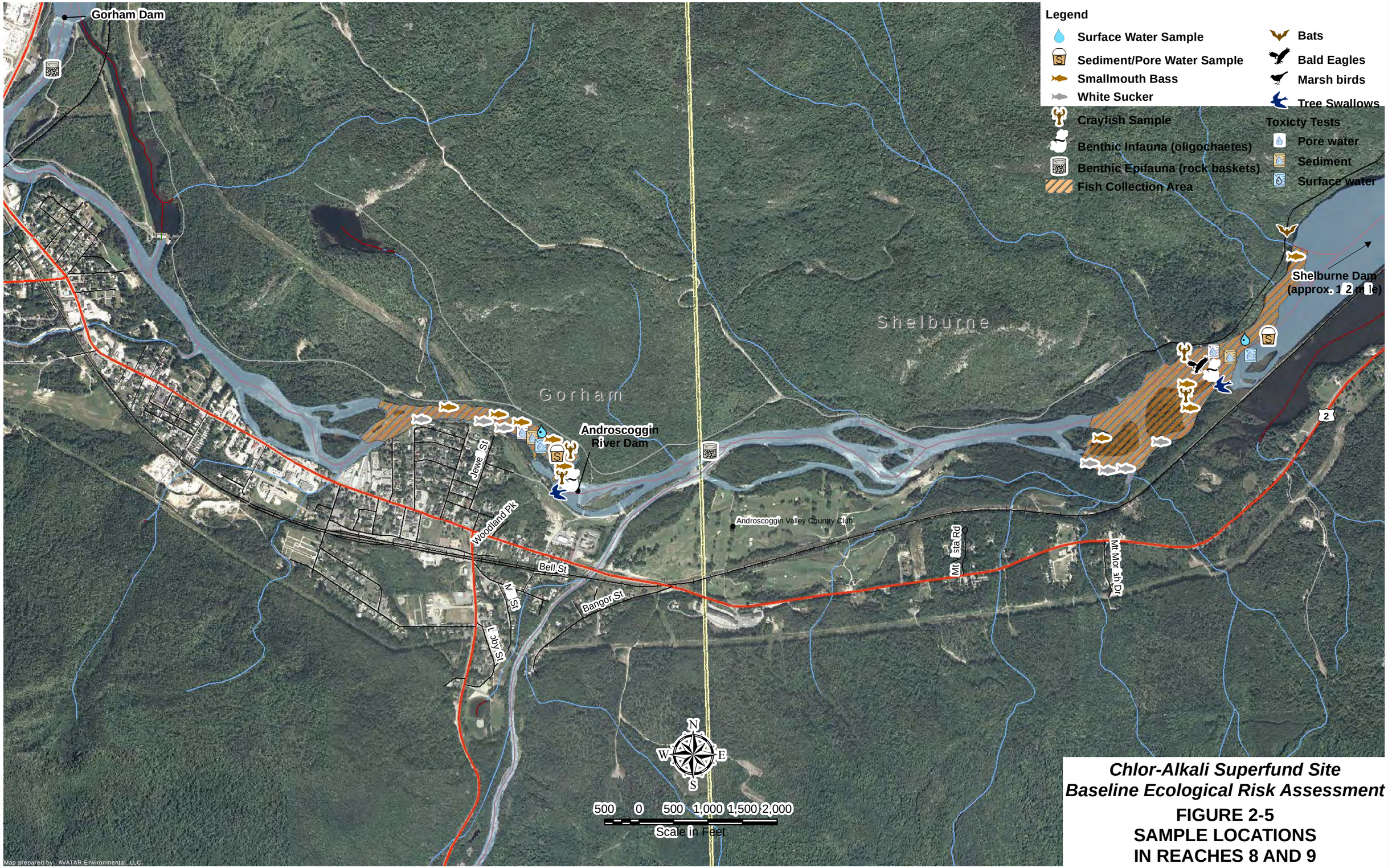


Chlor-Alkali Superfund Site
Baseline Ecological Risk Assessment

FIGURE 2-3
SAMPLE LOCATIONS IN REACHES 1 AND 2

Chlor-Alkali Superfund Site
Baseline Ecological Risk Assessment

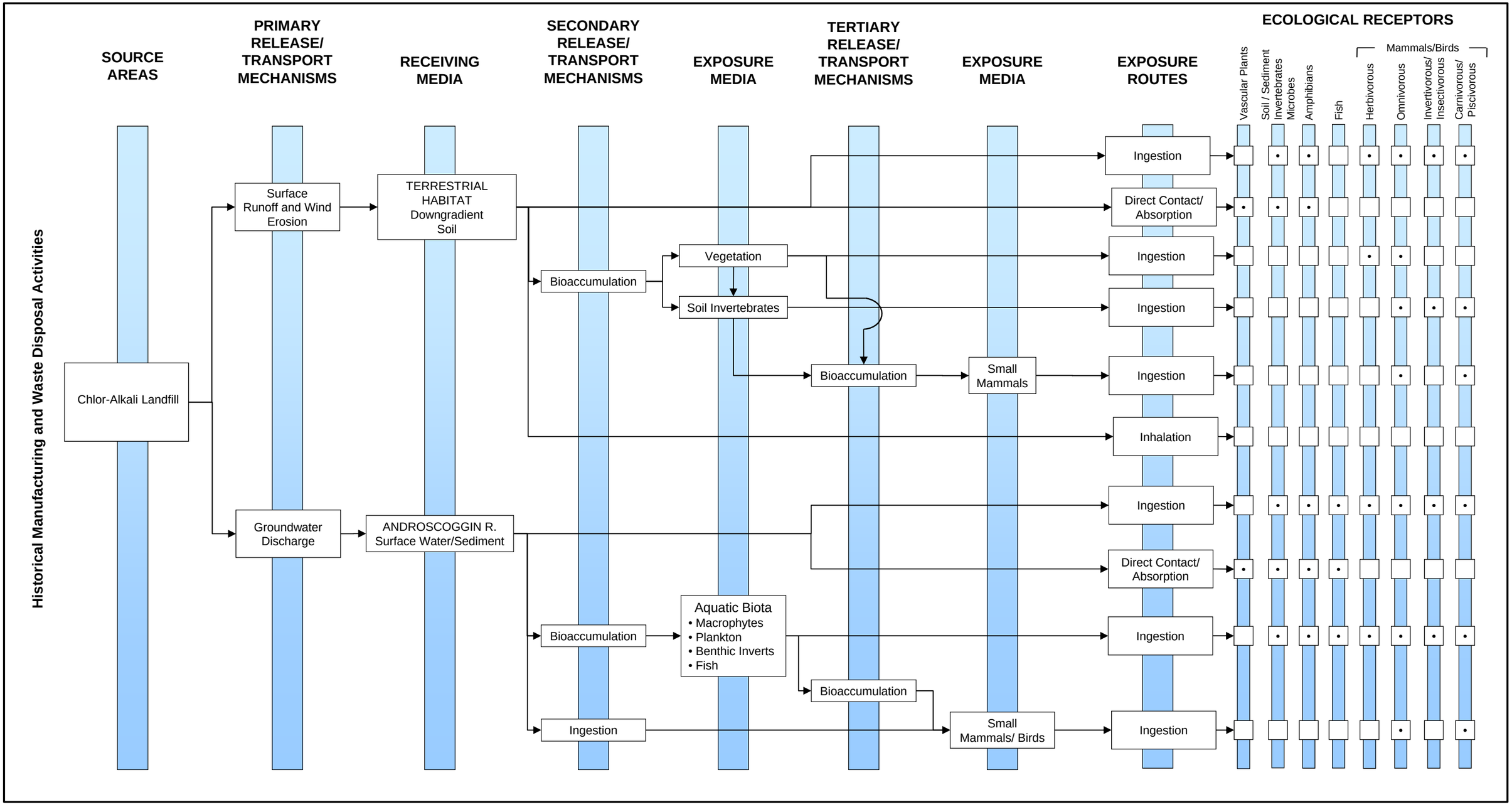
FIGURE 2-4
SAMPLE LOCATIONS
IN REACHES 3, 4, 5, AND 6



Chlor-Alkali Superfund Site
Baseline Ecological Risk Assessment

FIGURE 2-5
SAMPLE LOCATIONS
IN REACHES 8 AND 9

Figure 2-6
Conceptual Site Model

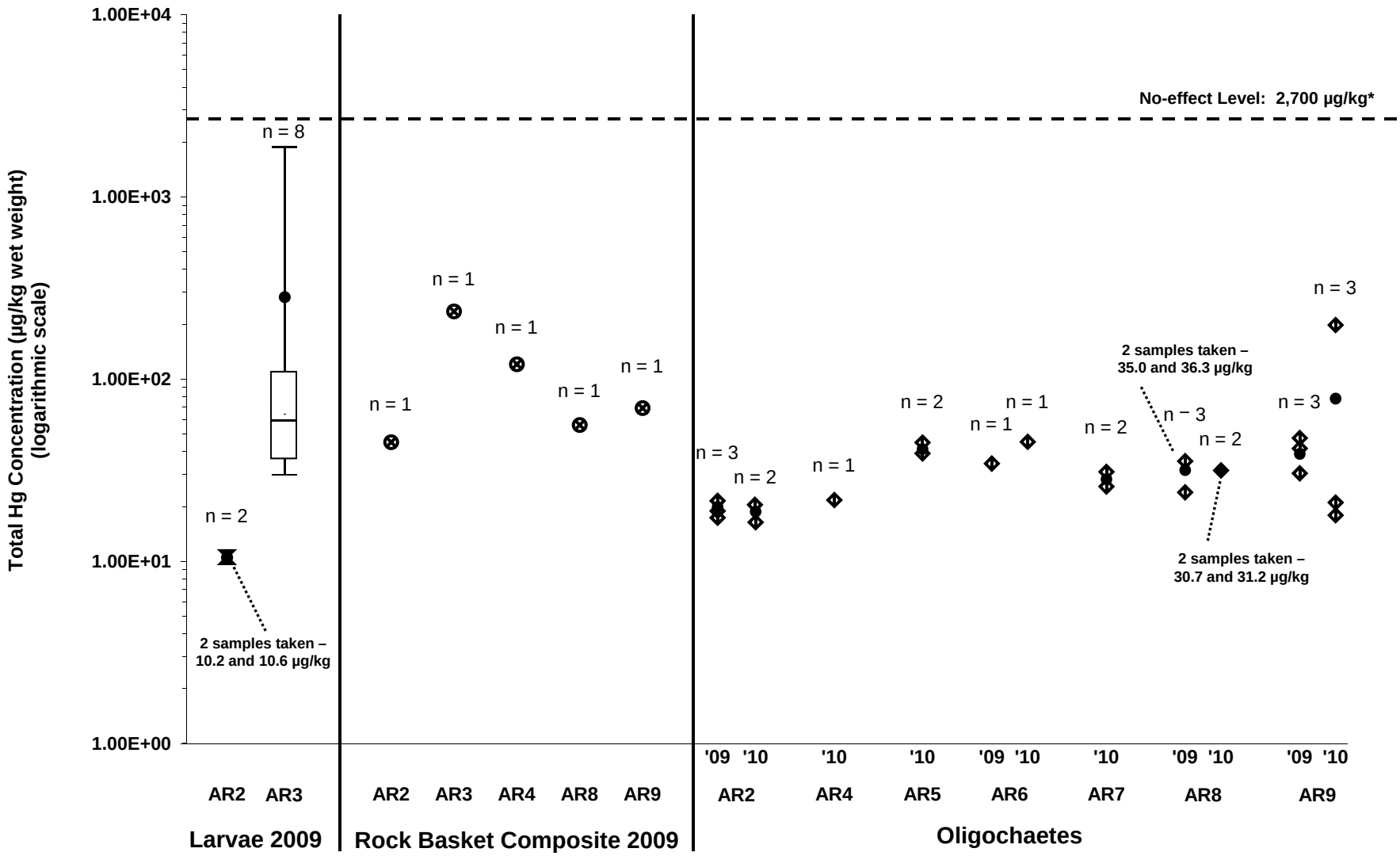


• = Complete exposure pathway.

□ = Incomplete or insignificant exposure pathway.

Potential receptors include the following:

- Herbivores – Muskrat, Deer Mouse, Canada Goose, Mourning Dove
- Omnivores – Raccoon, White-footed Mouse, Eastern Kingbird
- Invertivores – Short-tailed Shrew, American Robin
- Carnivores/Piscivores – Mink, Red Fox, Kingfisher, Great Blue Heron



Legend:

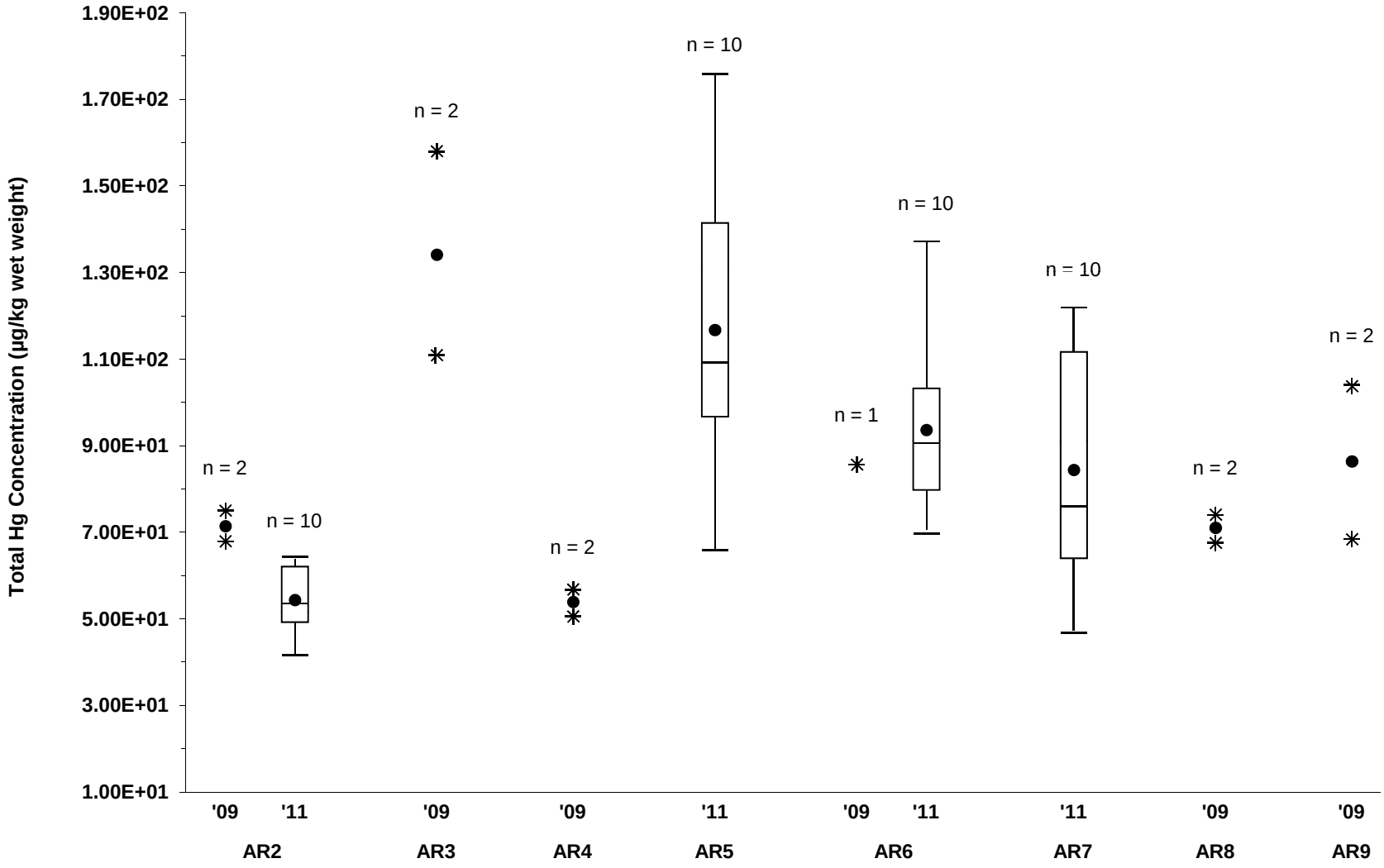
- Larvae
- Rock Basket Composite
- Oligochaetes
- Mean Concentration

- Maximum concentration
- 75th Percentile concentration
- 50th Percentile concentration
- 25th Percentile concentration
- Minimum concentration

*NOED for growth and mortality in *Hexagenia* nymphs (Odin et al., 1994). An effect level CBR was not available.

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Figure 4-1
Total Mercury Concentrations in 2009 and 2010 Benthic Invertebrate Samples Compared with CBRs



Legend:

✳ - Whole body crayfish sample (includes individual whole body and composites)

● - Mean Concentration

Maximum concentration

75th Percentile concentration

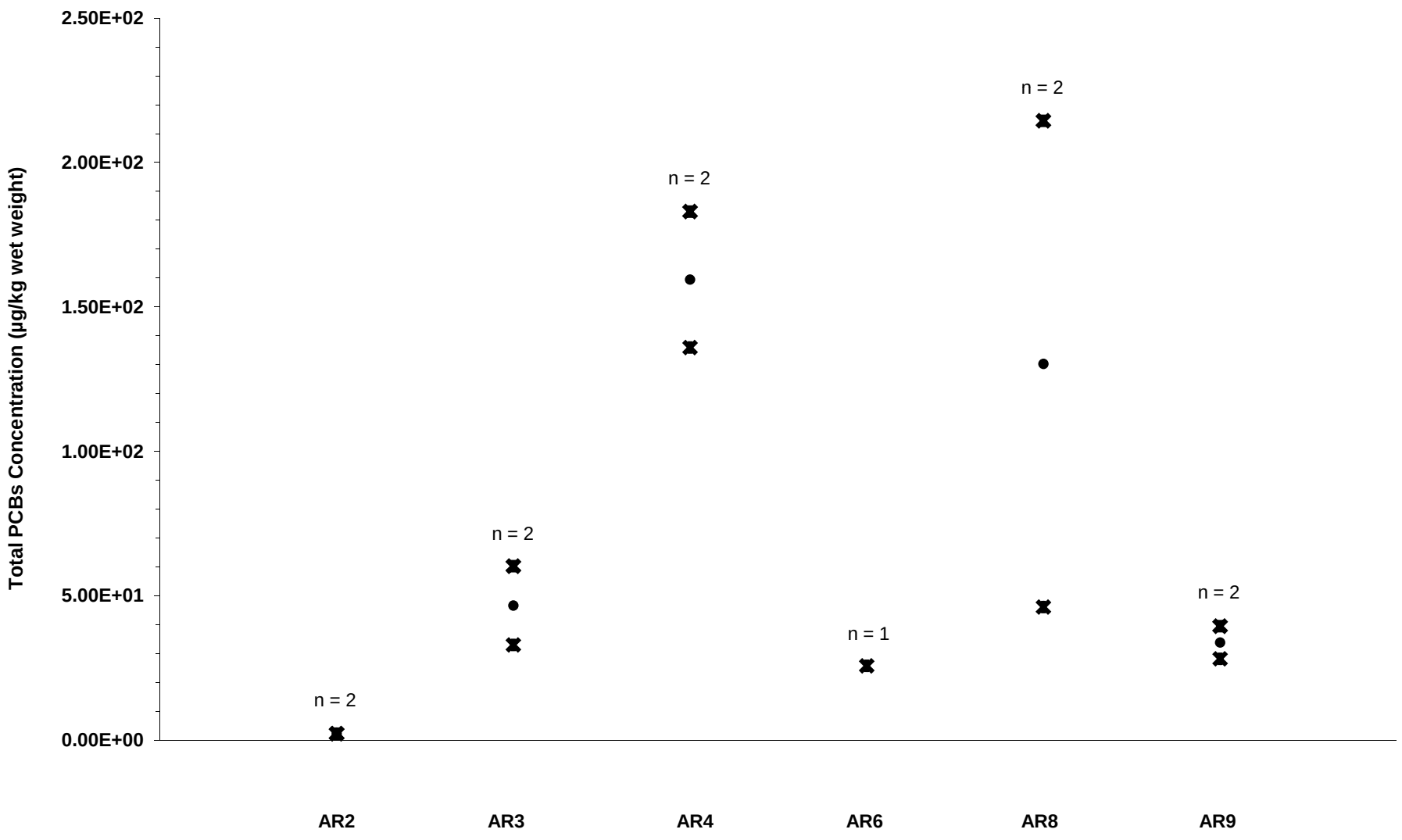
50th Percentile concentration

25th Percentile concentration

Minimum concentration

Note: No-effect and effect level of 1,500 µg/kg and 3,250 µg/kg (Brant et al., 2002) not shown because they are greater than the maximum detected concentration.

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-2
Total Mercury Concentrations in 2009 and 2011
Whole Body Crayfish Samples Compared with CBRs



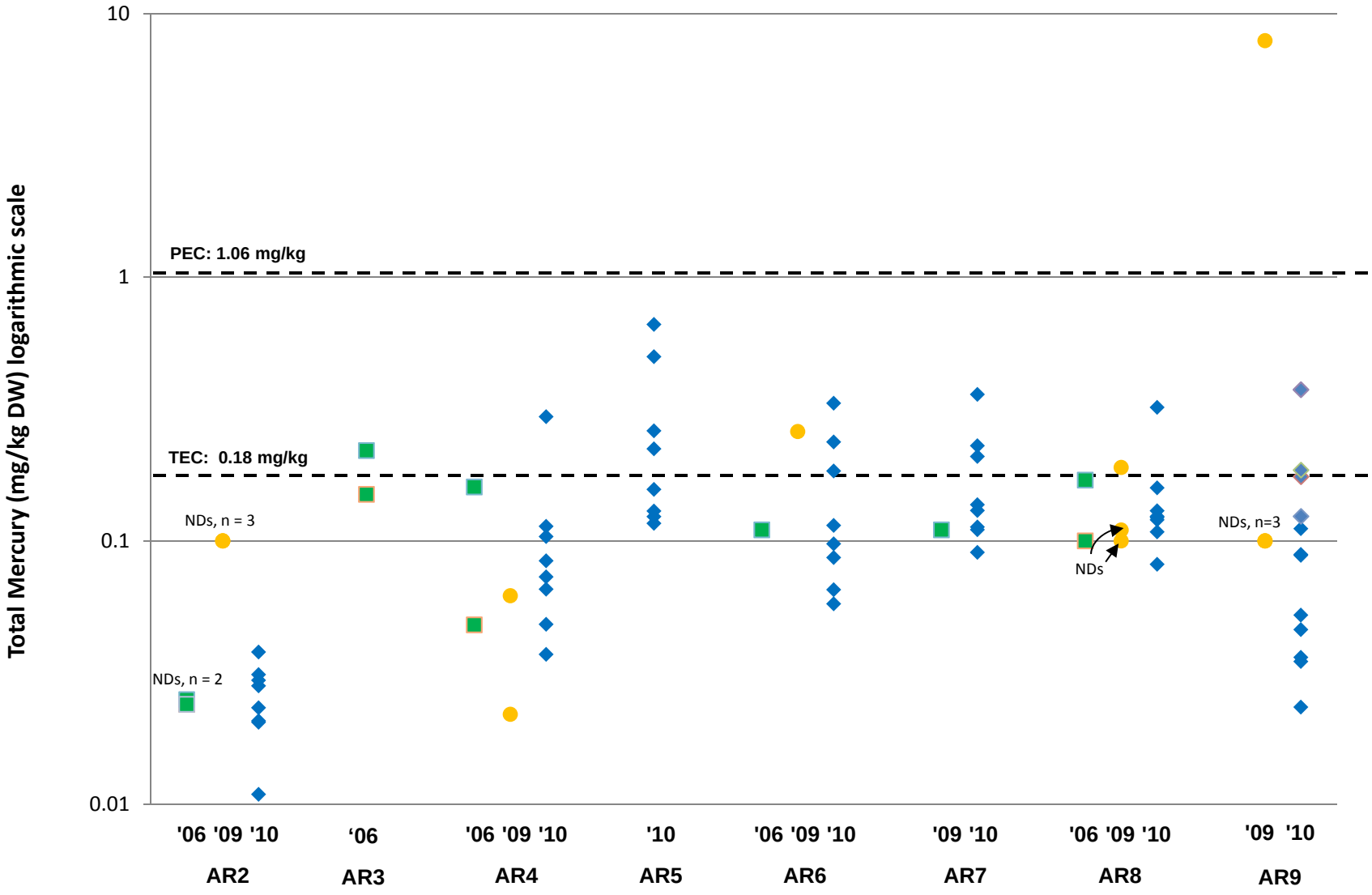
Legend:

✖ - Crayfish

● - Mean Concentration

Note: CBRs not available.

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-3
Total PCBs Concentrations in 2009
Crayfish Samples



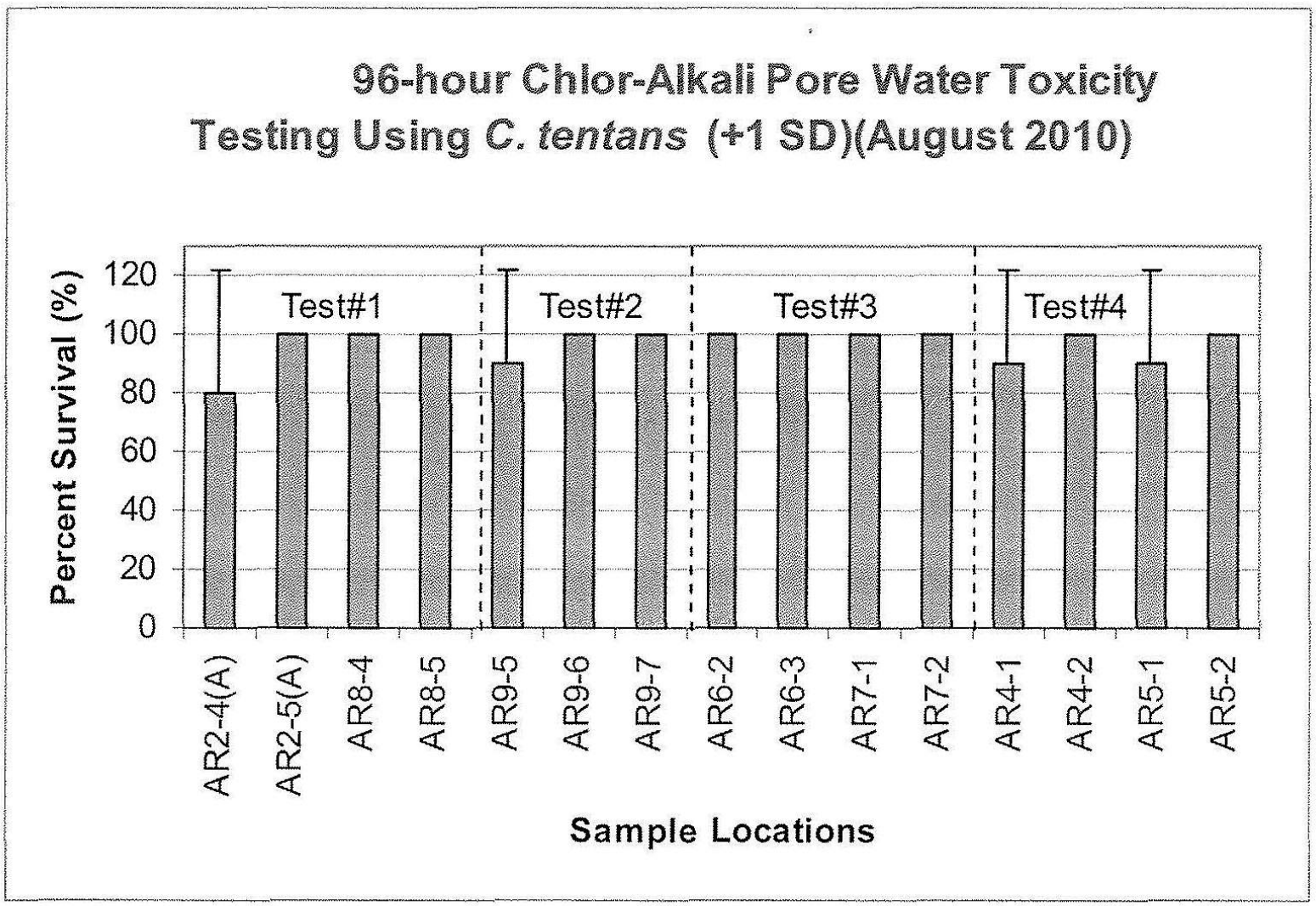
AR2 – Pontook Dam to Sawmill Dam
AR3 – Sawmill Dam to Riverside Dam
AR4 – Riverside Dam to Smith Hydro Dam
AR5 – Smith Hydo Dam to Cross Power Dam
AR6 – Cross Power Dam to Cascade Dam
AR7 – Cascade Dam to Gorham Dam
AR8 – Gorham Dam to Androscoggin River Dam
AR9 – Androscoggin River Dam to Shelburne Dam

Note: AR3 not sampled in 2009 as the river in that segment was drained at that time for dam maintenance.

Dashed lines represents the threshold effect concentration and probable effect concentration as noted (MacDonald et al., 2000).

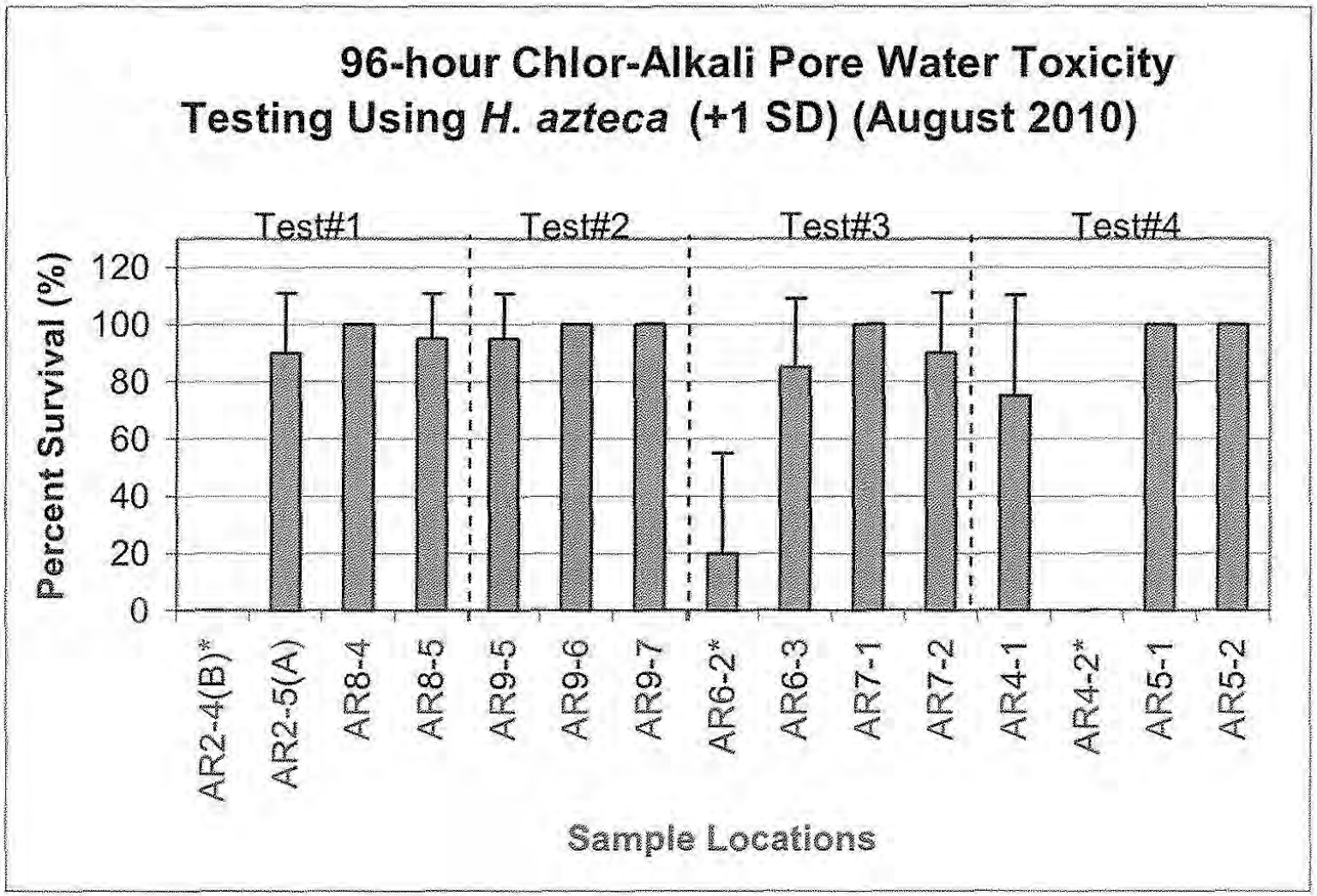
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-4
Total Mercury Concentrations in Sediment Samples – 2006, 2009, and 2010

FIGURE 4-5

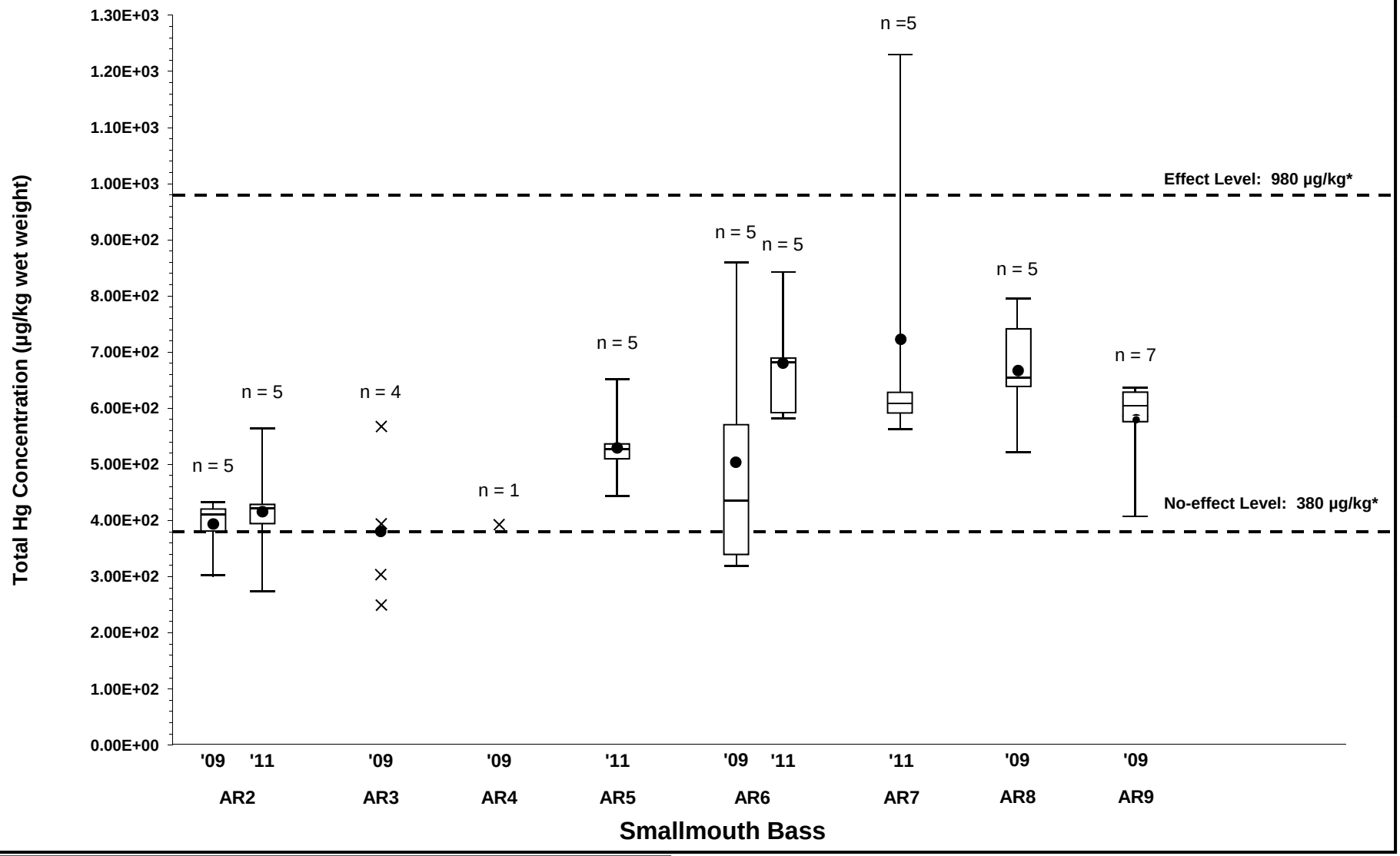


A = Reference location
Dashed lines separate tests started on a different day.
Note: No sample locations showed a significant difference from the reference locations.

FIGURE 4-6



A = Reference locations
B = Originally assigned as a reference sample but discarded due to complete mortality
* = Indicates significantly different survival from that measured in the upstream reference sample
Dashed line indicates a test started on a different day.



Legend:

*Critical body residues (CBRs) are the geometric means for no-effect and lowest effect whole body mercury concentrations based on reproductive effects in fathead minnow and mummichog (Snarski and Olson, 1982; Matta et al., 2001 and Snarski and Olson, 1982; Hammerschmidt et al., 2002; Drevnick and Sandheinrich, 2003; Sandheinrich and Miller, 2006).

× - Smallmouth Bass

● - Mean Concentration

Maximum concentration

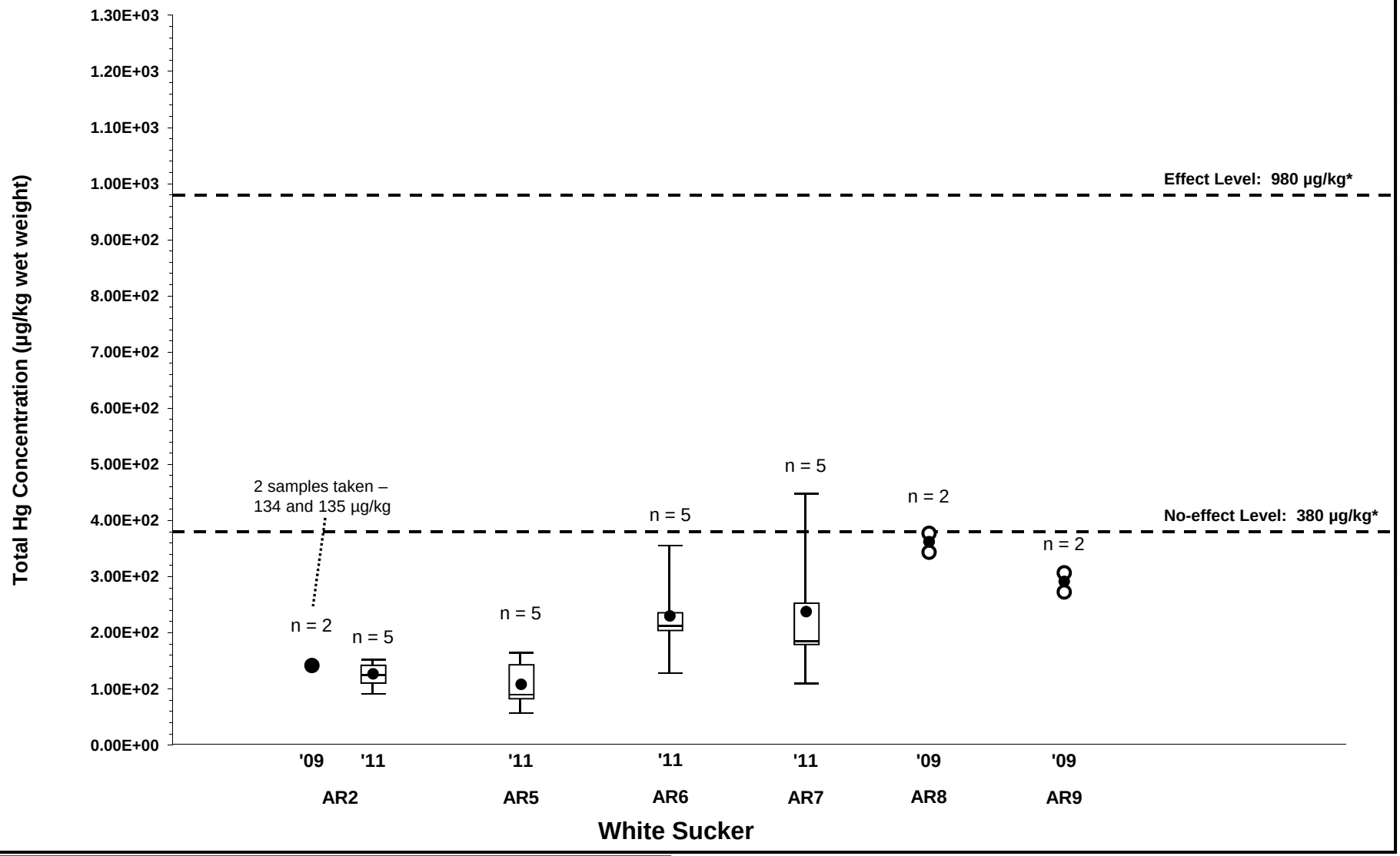
75th Percentile concentration

50th Percentile concentration

25th Percentile concentration

Minimum concentration

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-7
Total Mercury Concentrations in 2009 and 2011
Smallmouth Bass (Fillet)
Samples Compared with CBRs

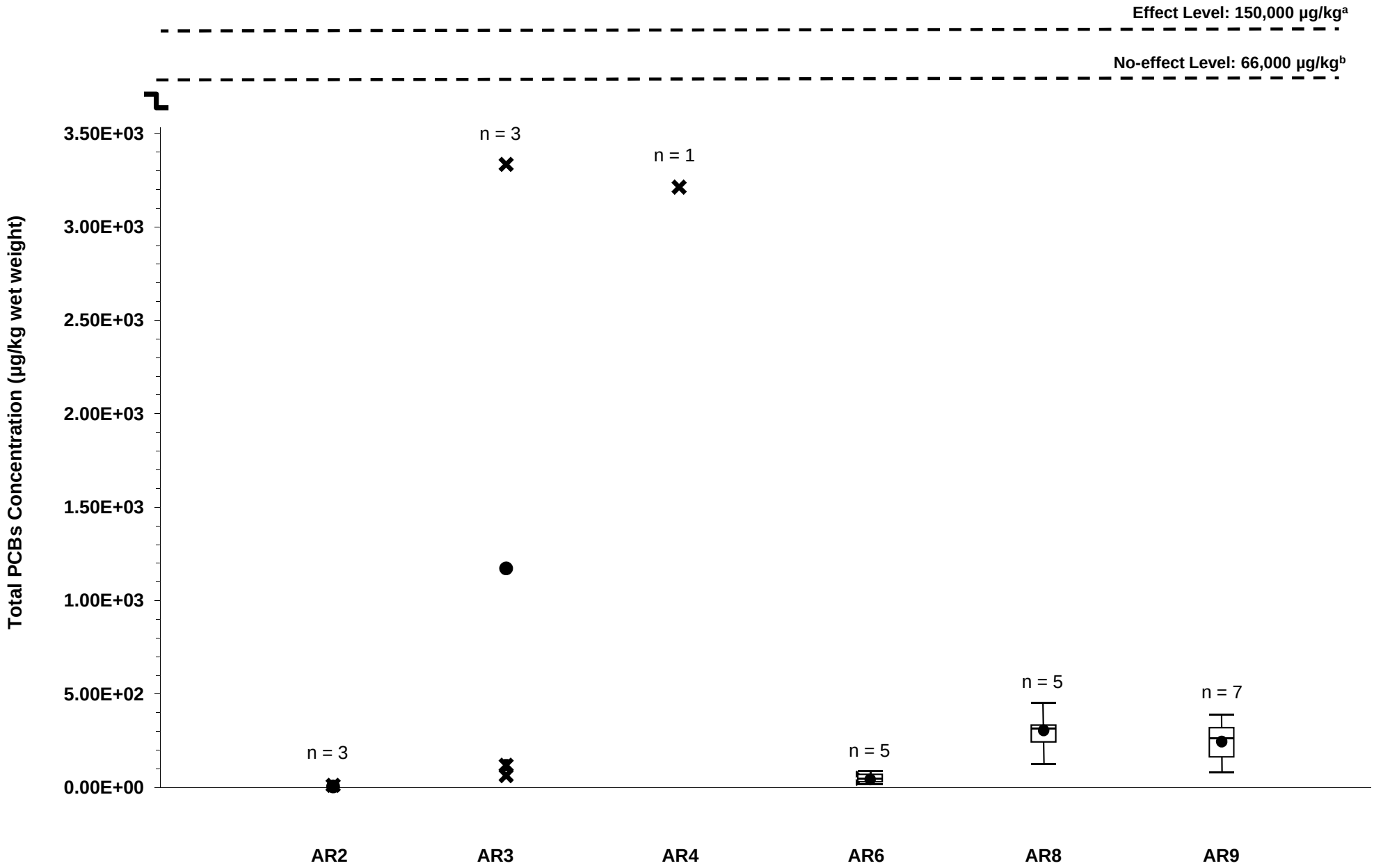


Legend:

*Critical body residues (CBRs) are the geometric means for no-effect and lowest effect whole body mercury concentrations based on reproductive effects in fathead minnow and mummichog (Snarski and Olson, 1982; Matta et al., 2001 and Snarski and Olson, 1982; Hammerschmidt et al., 2002; Drevnick and Sandheinrich, 2003; Sandheinrich and Miller, 2006).

- White Sucker
- Mean Concentration
- Maximum concentration
- 75th Percentile concentration
- 50th Percentile concentration
- 25th Percentile concentration
- Minimum concentration

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-8
Total Mercury Concentrations in 2009 and 2011
White Sucker (Whole Body)
Samples Compared with CBRs



Legend:

✖ - Smallmouth Bass

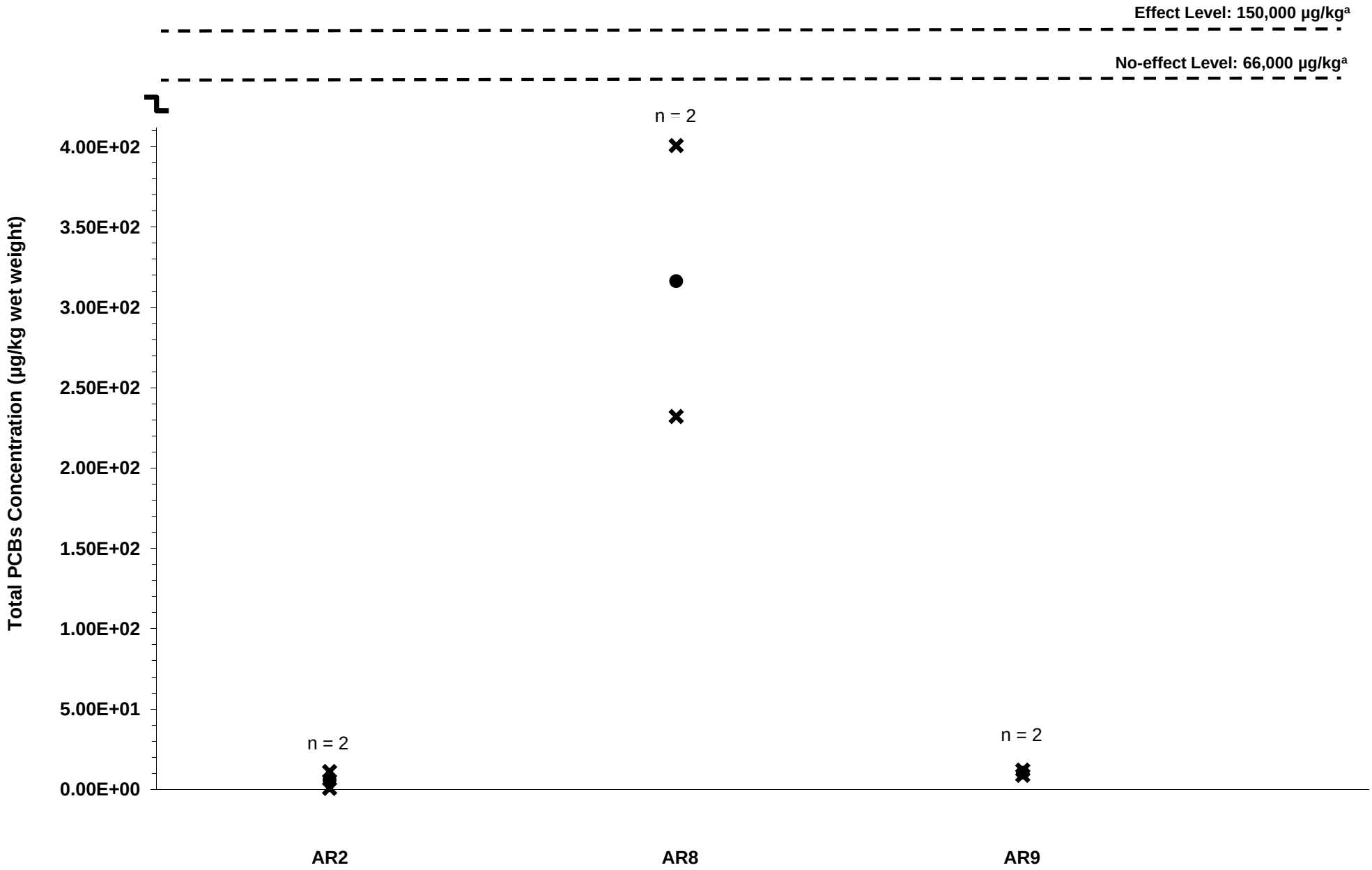
● - Mean Concentration

[a]Effect level of 150,000 µg/kg equals the high risk threshold based on mortality of adults and large reproductive and developmental effects (EPA, 2004).

[b]No-effect level of 66,000 µg/kg based on Phase II study results (EPA, 2004).

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Figure 4-9
Total PCBs Concentrations in 2009
Smallmouth Bass (Fillet) Samples Compared with CBRs



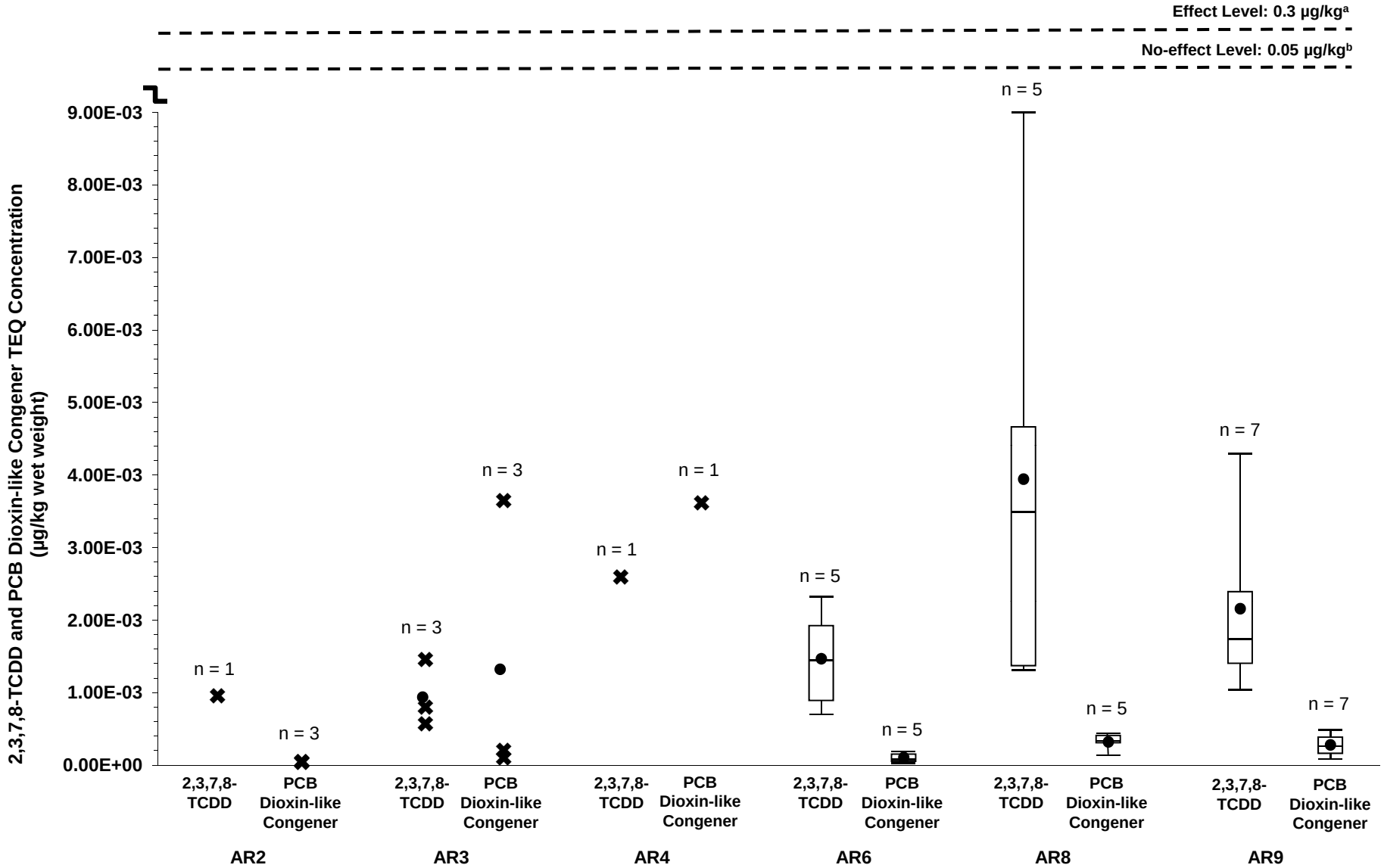
Legend:

✖ - White Sucker

● - Mean Concentration

[a]Effect level of 150,000 µg/kg equals the high risk threshold based on mortality of adults and large reproductive and developmental effects (EPA, 2004).
[b]No-effect level of 66,000 µg/kg based on Phase II study results (EPA, 2004).

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-10
Total PCBs Concentrations in 2009
White Sucker (Whole Body) Samples Compared with CBRs



Legend:

✖ - Smallmouth Bass

● - Mean Concentration

[a]Effect level of 0.3 µg/kg equals the high risk threshold based on mortality of adults and large reproductive and developmental effects (EPA, 2004).

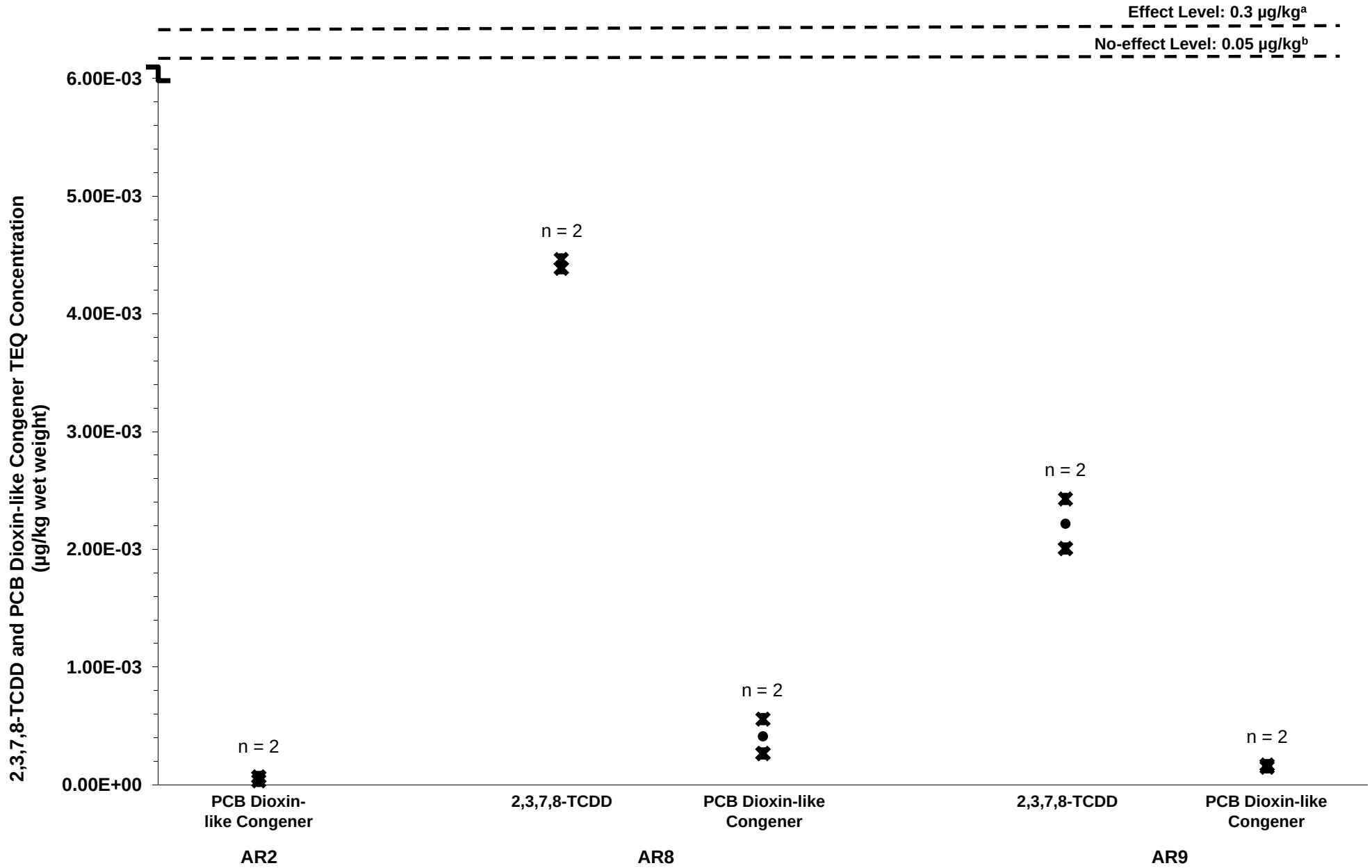
[b]No-effect level of 0.05 µg/kg based on literature review for New England fish species (EPA, 2004).

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Figure 4-11

2,3,7,8-TCDD and PCB Dioxin-like Congener TEQ Concentrations in 2009

Smallmouth Bass (Fillet) Samples Compared with CBRs



Legend:

✖ - White Sucker

● - Mean Concentration

[a]Effect level of 0.3 µg/kg equals the high risk threshold based on mortality of adults and large reproductive and developmental effects (EPA, 2004).

[b]No-effect level of 0.05 µg/kg based on literature review for New England fish species (EPA, 2004).

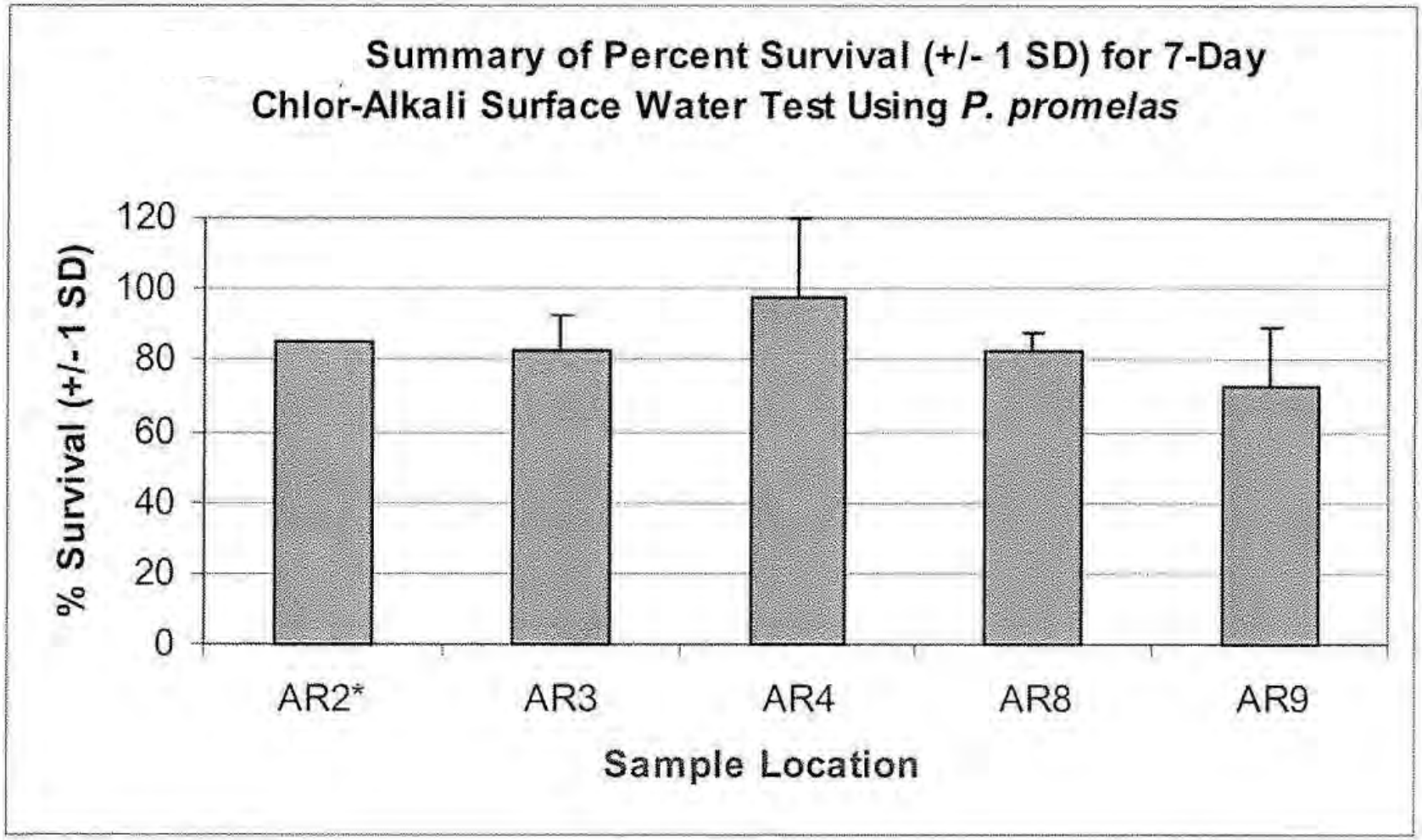
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Figure 4-12

2,3,7,8-TCDD and PCB Dioxin-like Congener TEQ Concentrations in 2009

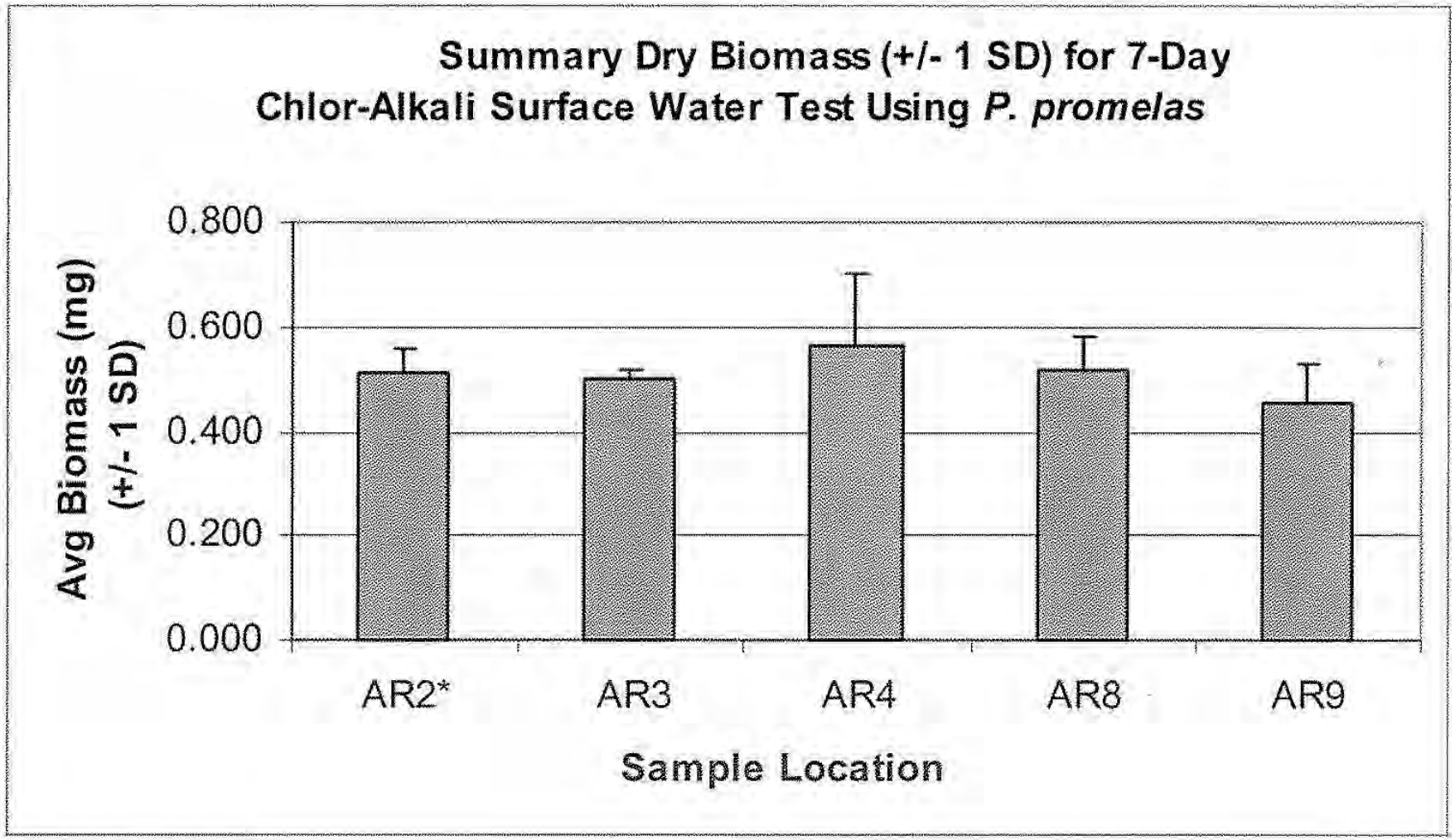
White Sucker (Whole Body) Samples Compared with CBRs

FIGURE 4-13



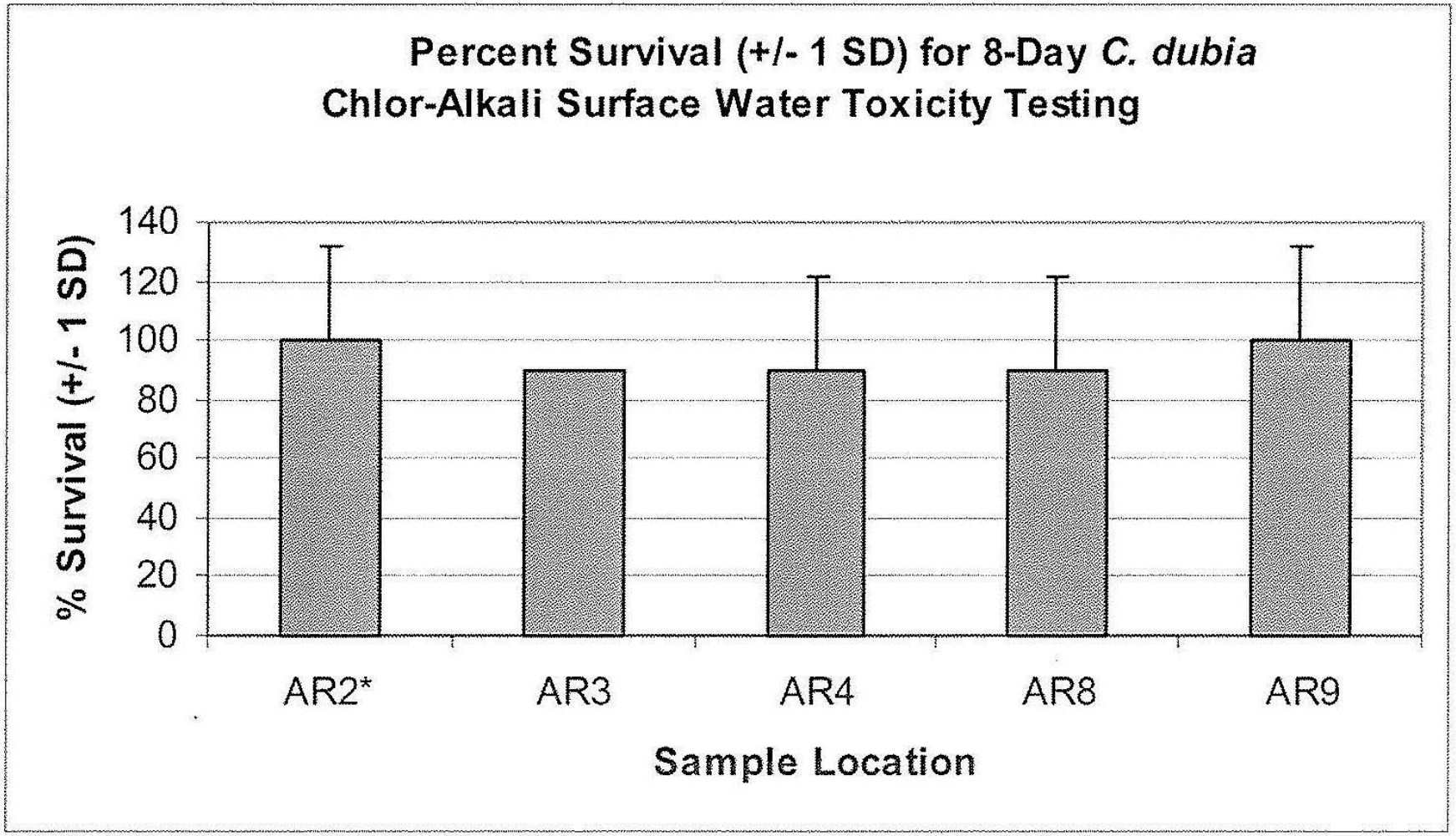
*Reference location

FIGURE 4-14



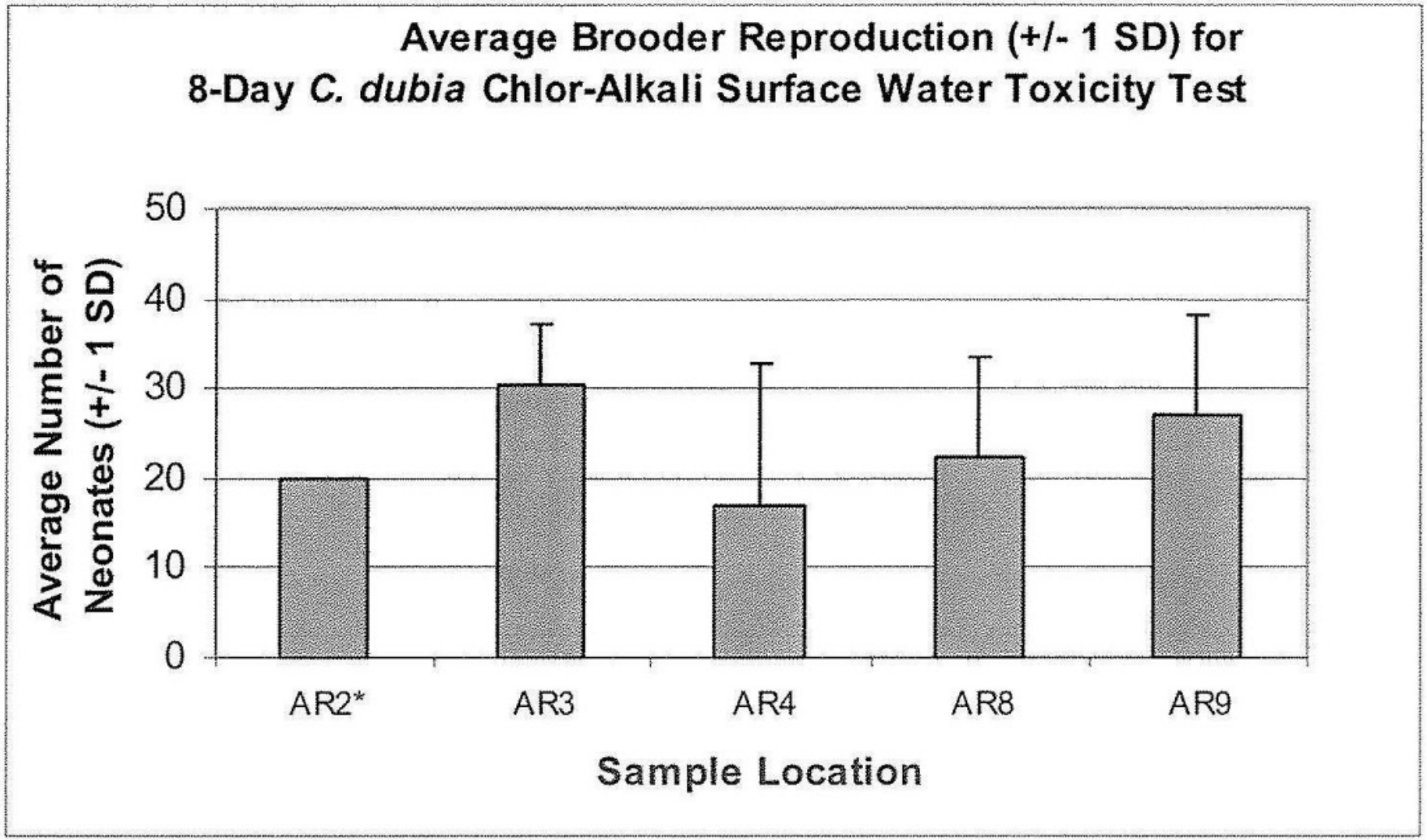
*Reference location

FIGURE 4-15

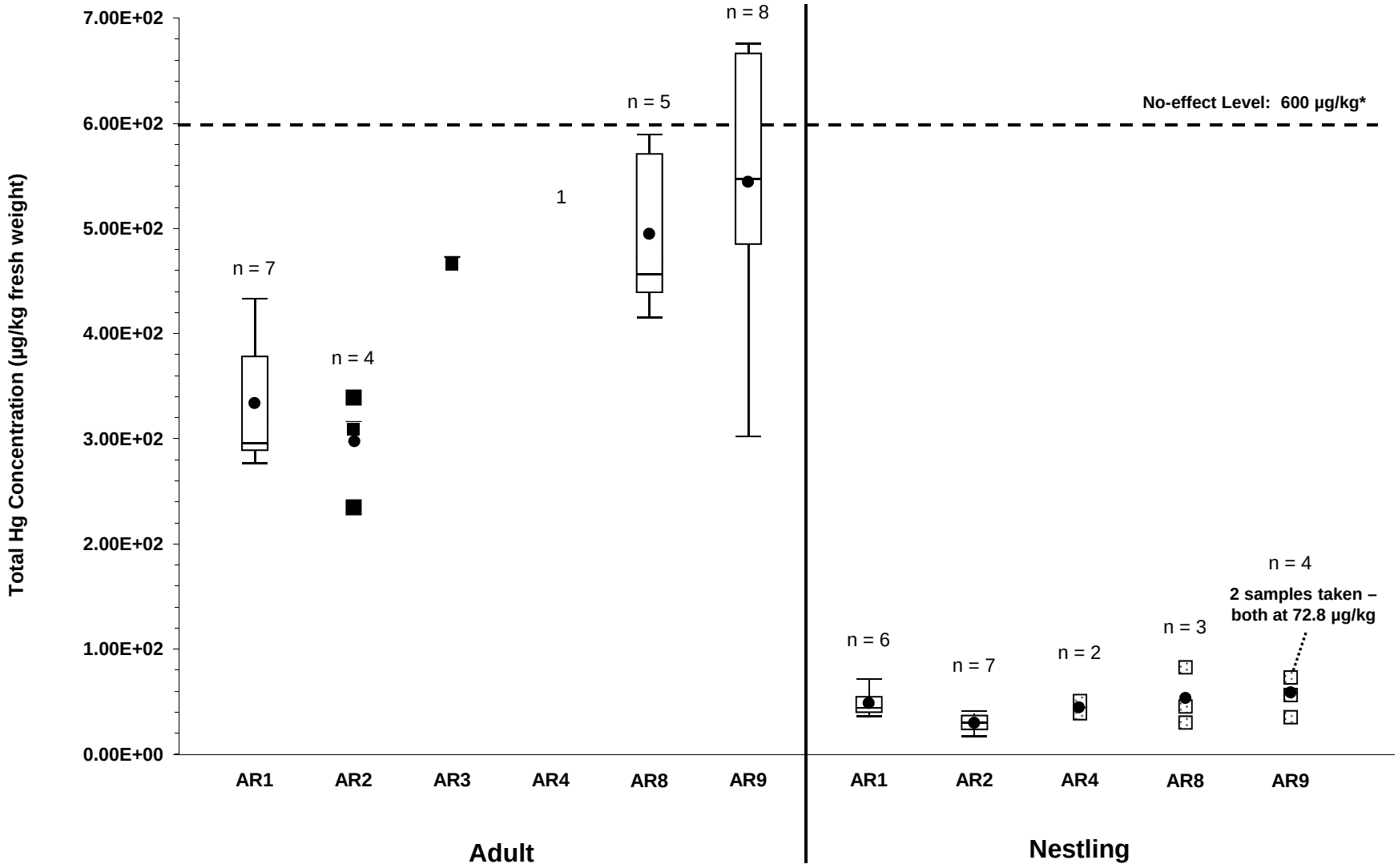


*Reference location

FIGURE 4-16



*Reference location



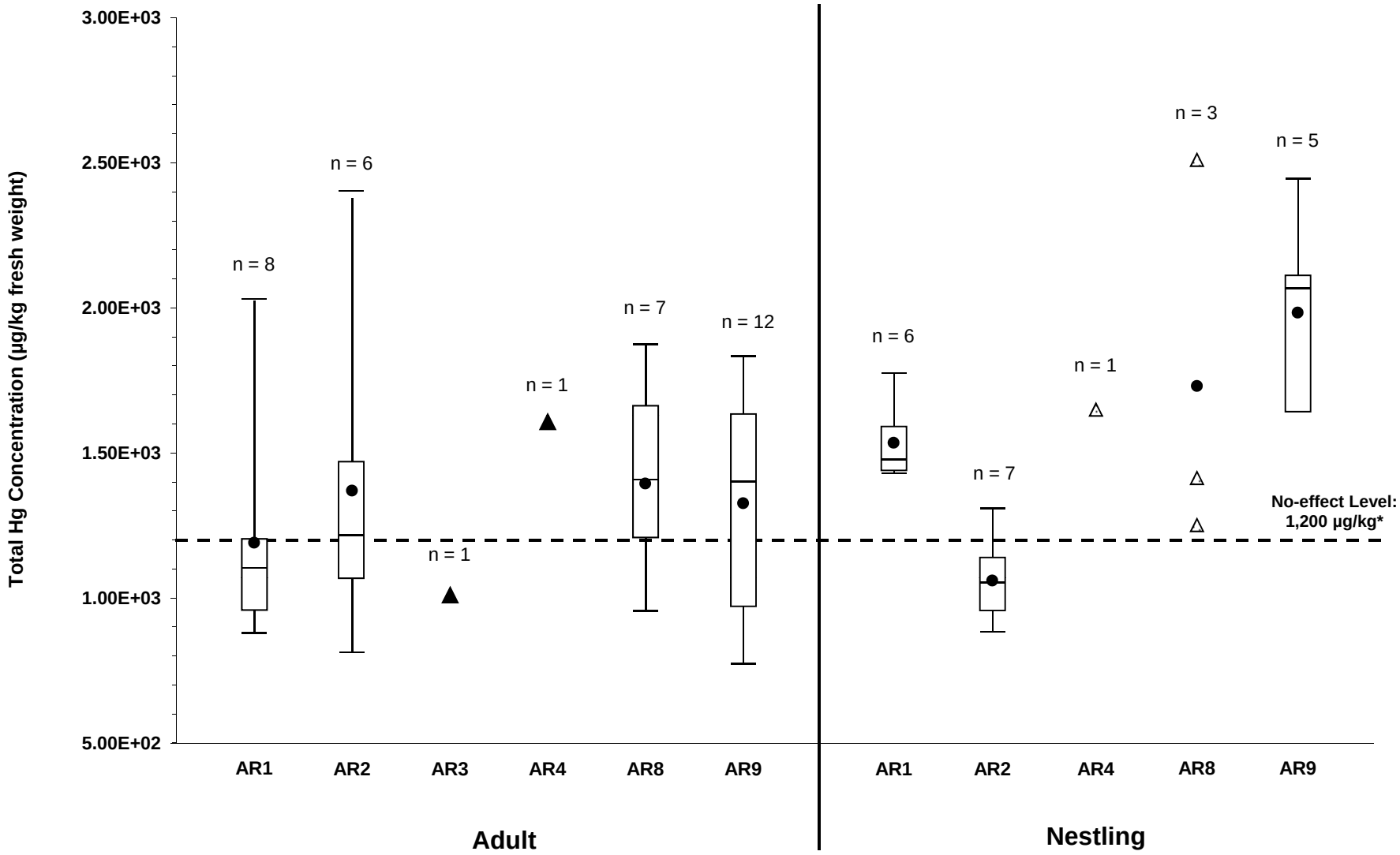
Legend:

- ■ - Adult blood sample
- ⊡ - Nestling blood sample
- ● - Mean Concentration

Maximum concentration
75th Percentile concentration
50th Percentile concentration
25th Percentile concentration
Minimum concentration

*Critical body residues (CBRs) based on reproductive effects in tree swallows. Effect level of 1,250 µg/kg (Nocera and Taylor, 1998) not shown because it is greater than the maximum detected concentration. No-effect CBR was calculated as approximately ½ the effect CBR.

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-17
Total Mercury Concentrations in 2010
Tree Swallow Blood Samples Compared with CBRs



Legend:

▲ - Adult feather sample

△ - Nestling feather sample

● - Mean Concentration

Maximum concentration

75th Percentile concentration

50th Percentile concentration

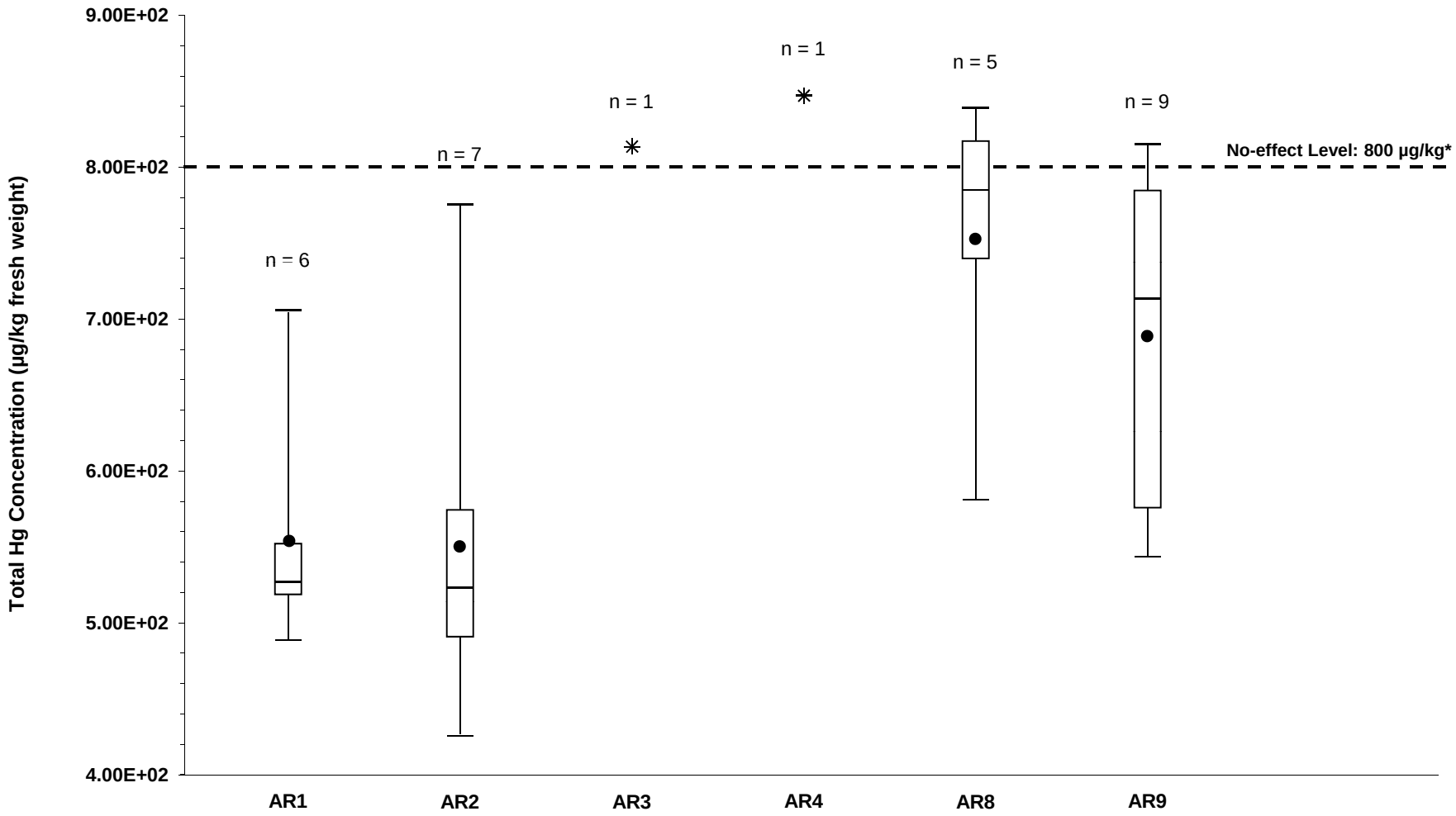
25th Percentile concentration

Minimum concentration

*CBR based on reproductive effects in tree swallows. The effect CBR based on reproductive effects in mallards at 9,100 µg/kg not shown because the value is greater than the maximum detected concentration.

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Figure 4-18
Total Mercury Concentrations in
2010 Tree Swallow Feather Samples Compared with CBRs



Legend:

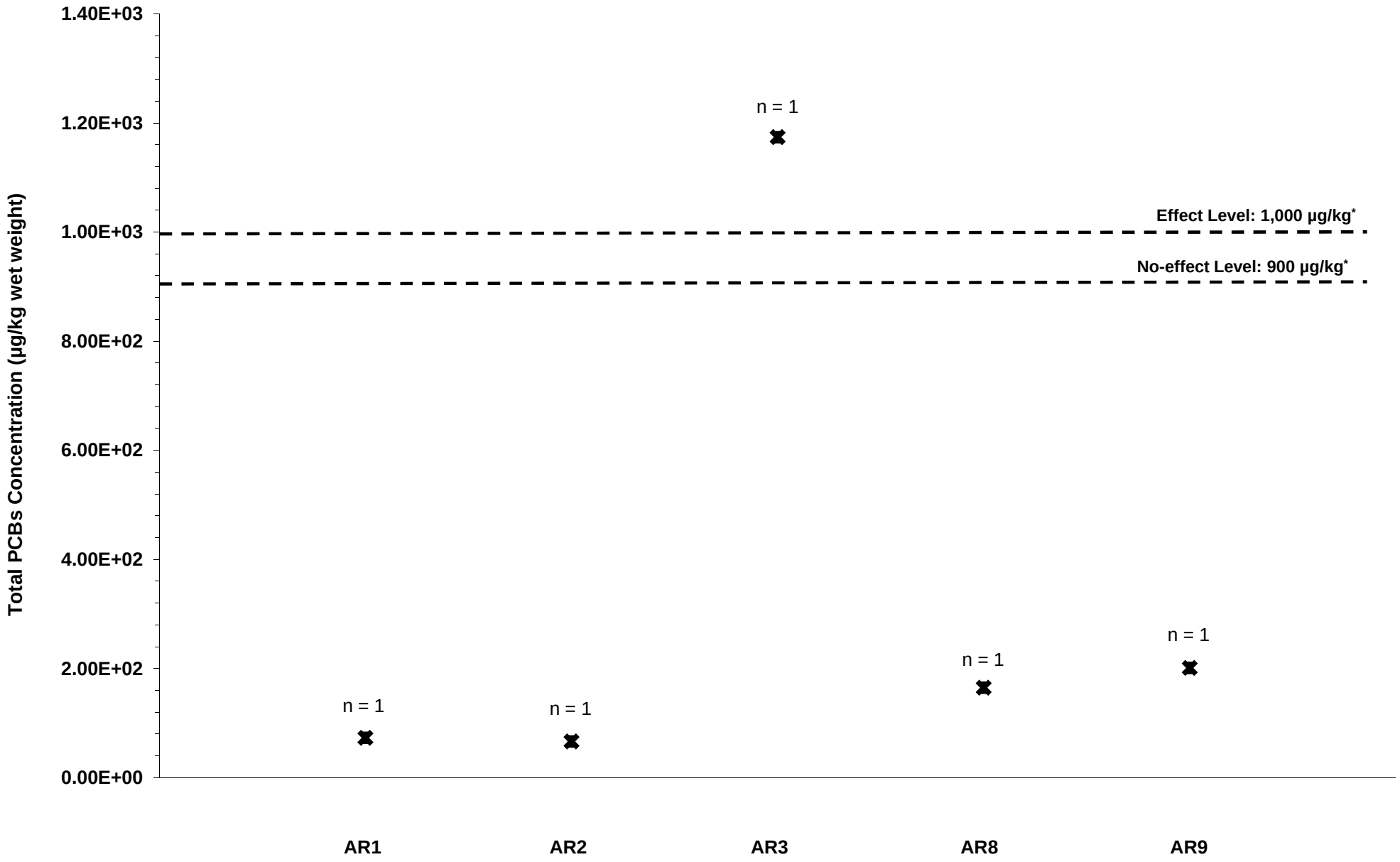
✳ - Egg

● - Mean Concentration

Maximum concentration
75th Percentile concentration
50th Percentile concentration
25th Percentile concentration
Minimum concentration

*The effect CBR at 1,600 µg/kg is not shown because the value is greater than the maximum detected concentration. CBRs based on reproductive effects in tree swallows.

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-19
Total Mercury Concentrations in
2010 Tree Swallow Egg Samples Compared with CBRs

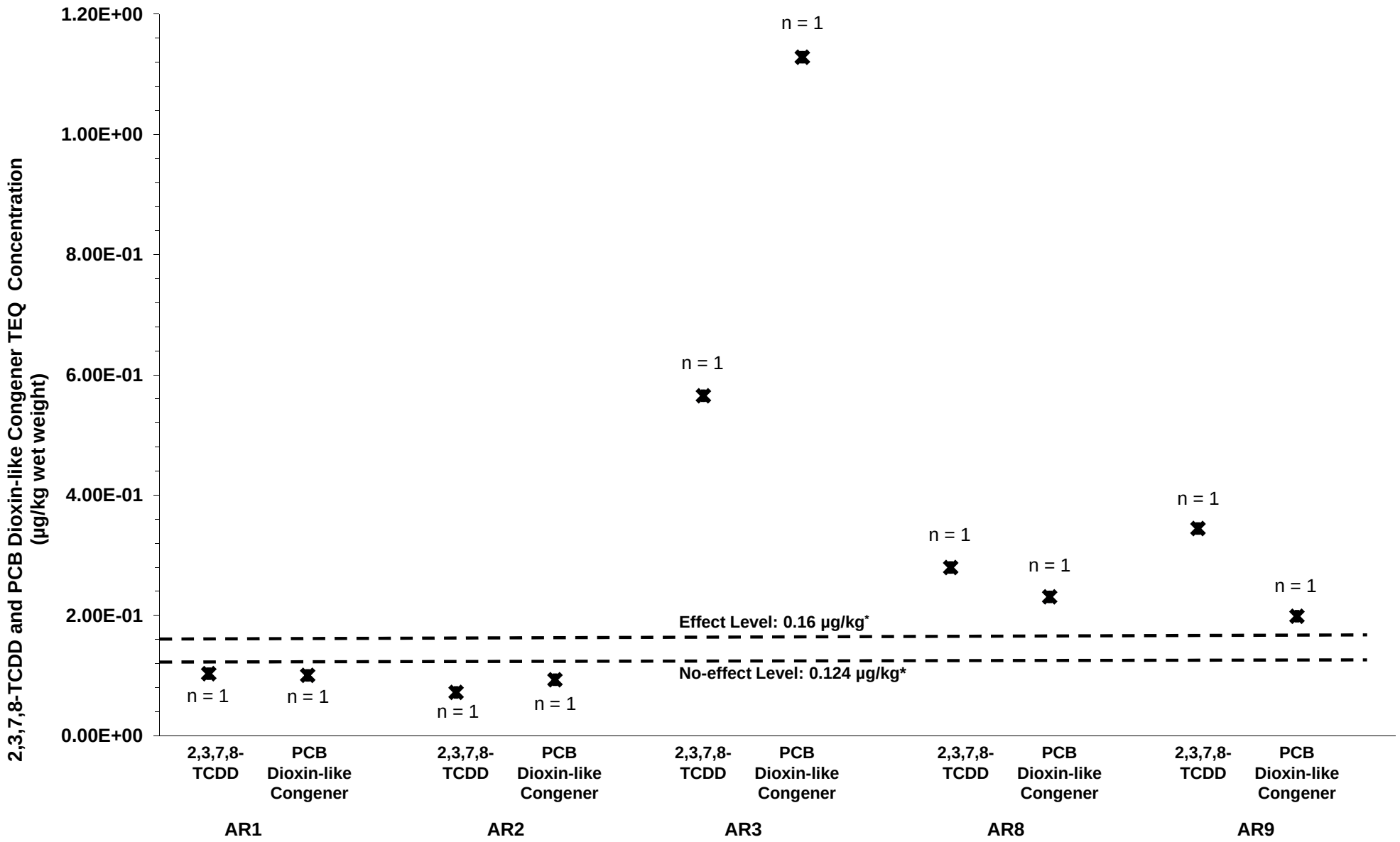


Legend:

✖ - Tree Swallow Egg

*No-effect and effect levels of 900 µg/kg and 1,000 µg/kg based on reduced hatchling (EPA, 2004).

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-20
Total PCBs Concentrations in 2010
Tree Swallow Egg Samples Compared with CBRs



Legend:

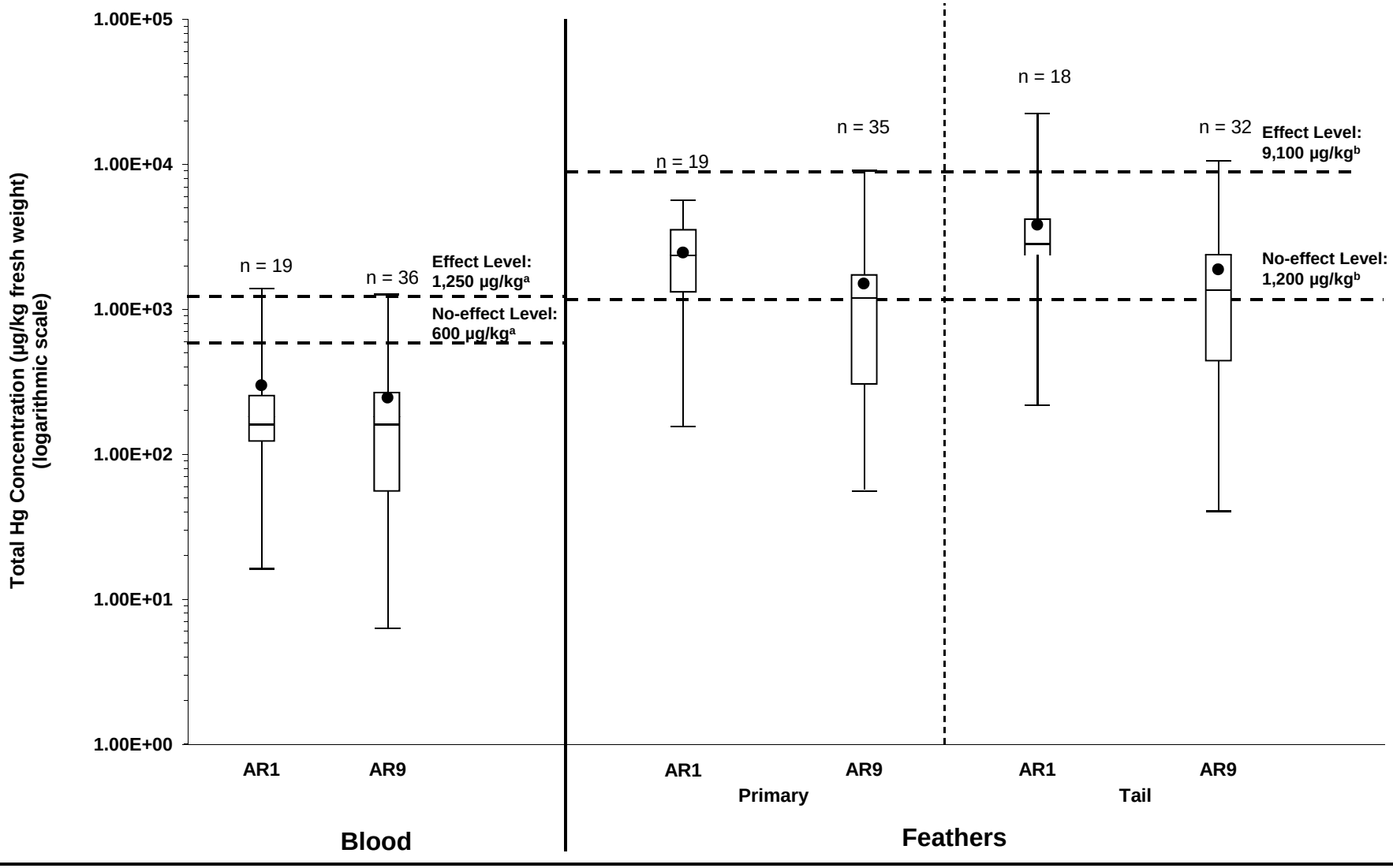
✖ - Tree Swallow Egg

● - Mean Concentration

*No-effect and effect levels of 0.124 µg/kg and 0.16 µg/kg based on mortality (Bruggeman et al., 2003 and Powell et al., 1996, respectively).

River Study Area
Chlor-Alkali Facility (Former)Superfund Site
Berlin, New Hampshire

Figure 4-21
2,3,7,8-TCDD and PCB Dioxin-like Congener TEQ Concentrations in 2010
Tree Swallow Egg Samples Compared with CBRs



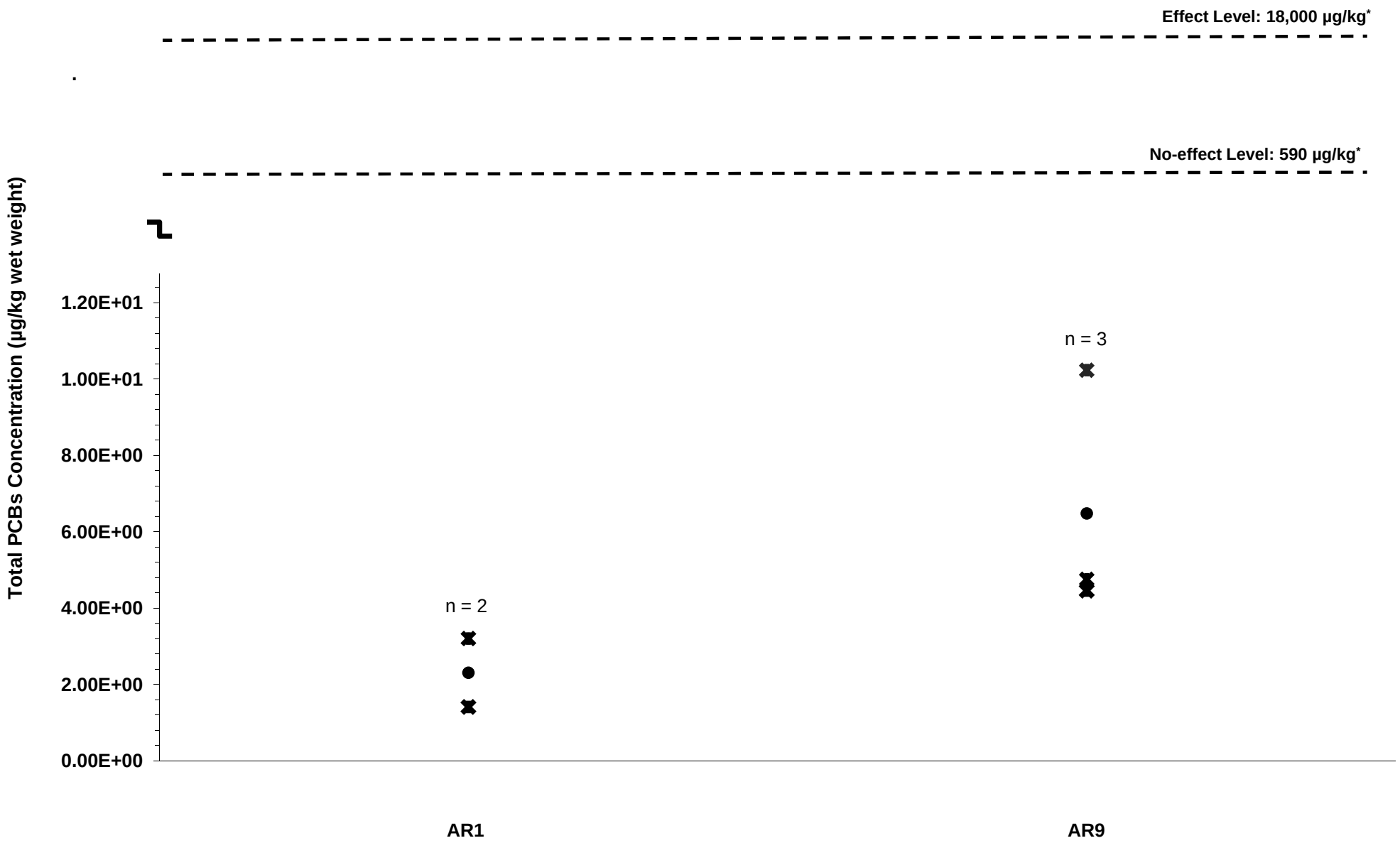
Legend: ● - Mean Concentration

Maximum concentration
75th Percentile concentration
50th Percentile concentration
25th Percentile concentration
Minimum concentration

[a]Critical body residues (CBRs) based on reproductive effects in tree swallows (Nocera and Taylor, 1998). No-effect CBR was calculated as approximately ½ the effect CBR.

[b]CBRs based on reproductive effects in mallards (effect) or on reproductive effects in tree swallows (no-effect).

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-22
Total Mercury Concentrations in 2010
Songbird Blood and Feather Samples Compared with CBRs



Legend:

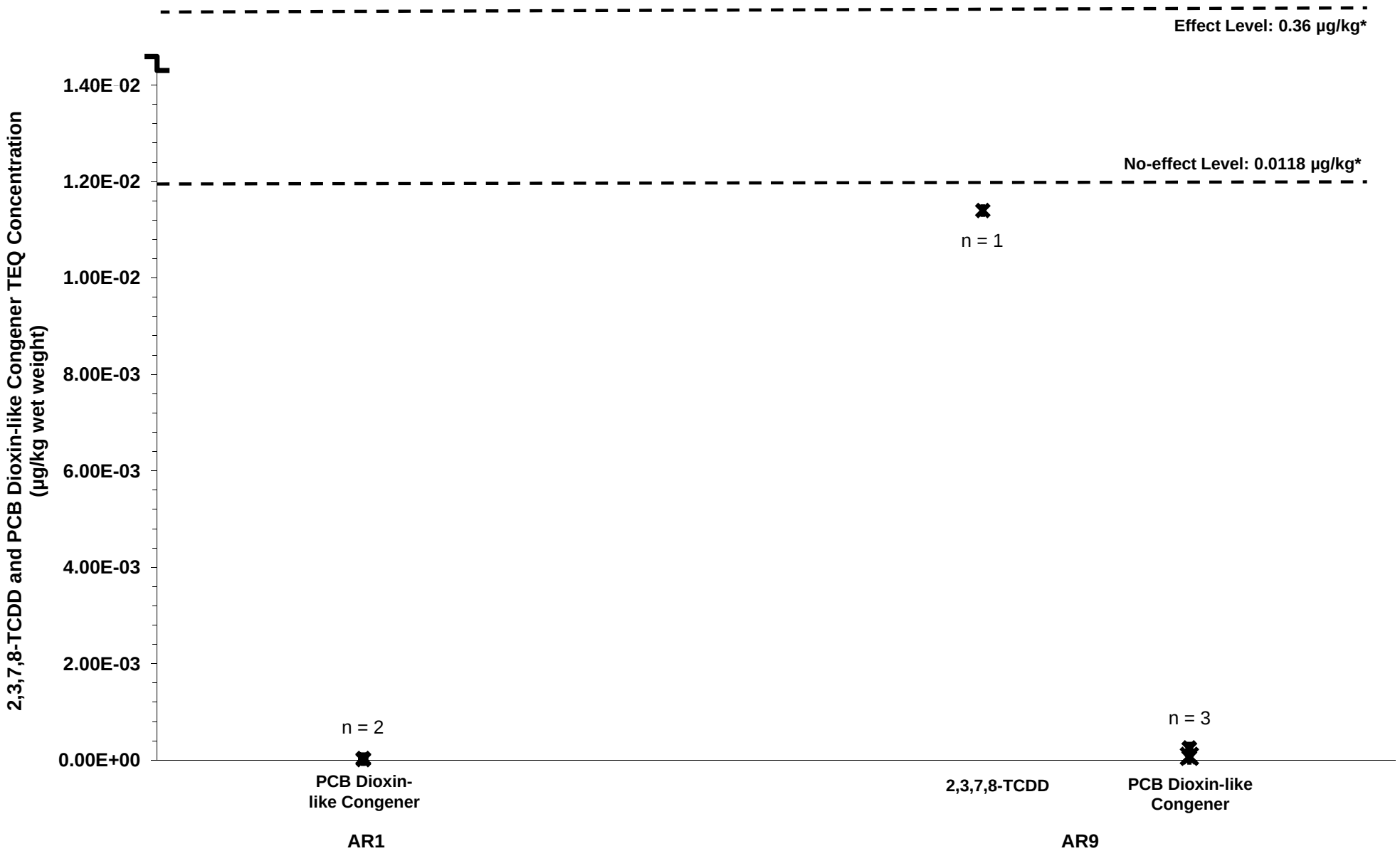
✖ - Bird Blood

● - Mean Concentration

*No-effect and effect levels of 590 µg/kg and 18,000 µg/kg based on decreased growth (Hansen et al., 1975 and Platonow and Funnell, 1972, respectively).

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Figure 4-23
Total PCBs Concentrations in 2010
Songbird Blood Compared with CBRs



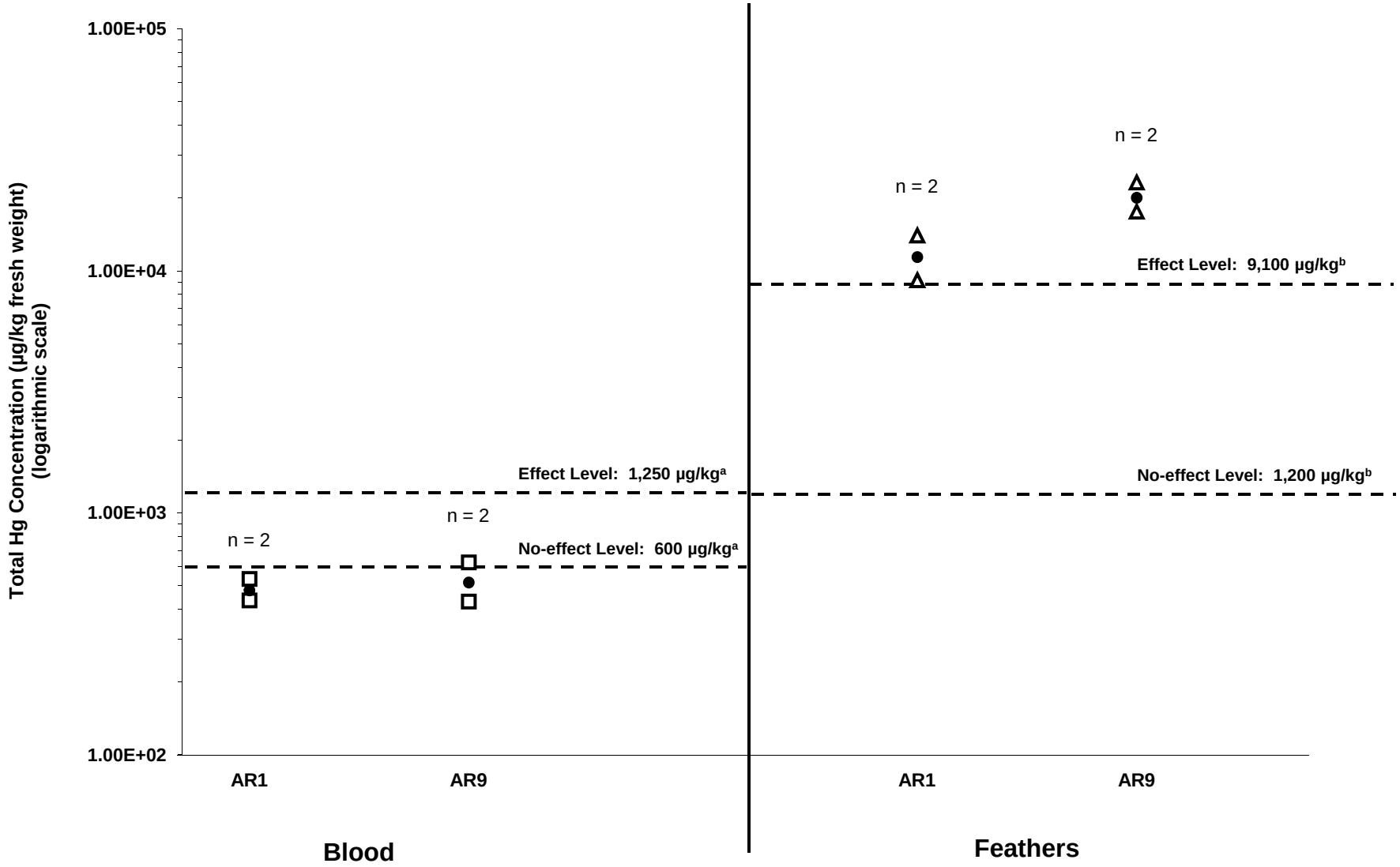
Legend:

✖ - Bird Blood

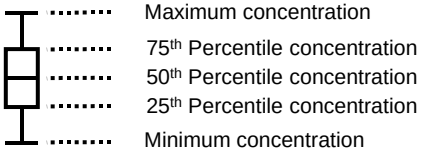
● - Mean Concentration

*No-effect and effect levels of 0.0118 µg/kg and 0.36 µg/kg based on decreased growth (Hansen et al., 1975 and Platonow and Funnell, 1972, respectively).

River Study Area
Chlor-Alkali Facility (Former)Superfund Site
Berlin, New Hampshire
Figure 4-24
2,3,7,8-TCDD and PCB Dioxin-like Congener TEQ Concentrations in 2010
Songbird Blood Samples Compared with CBRs

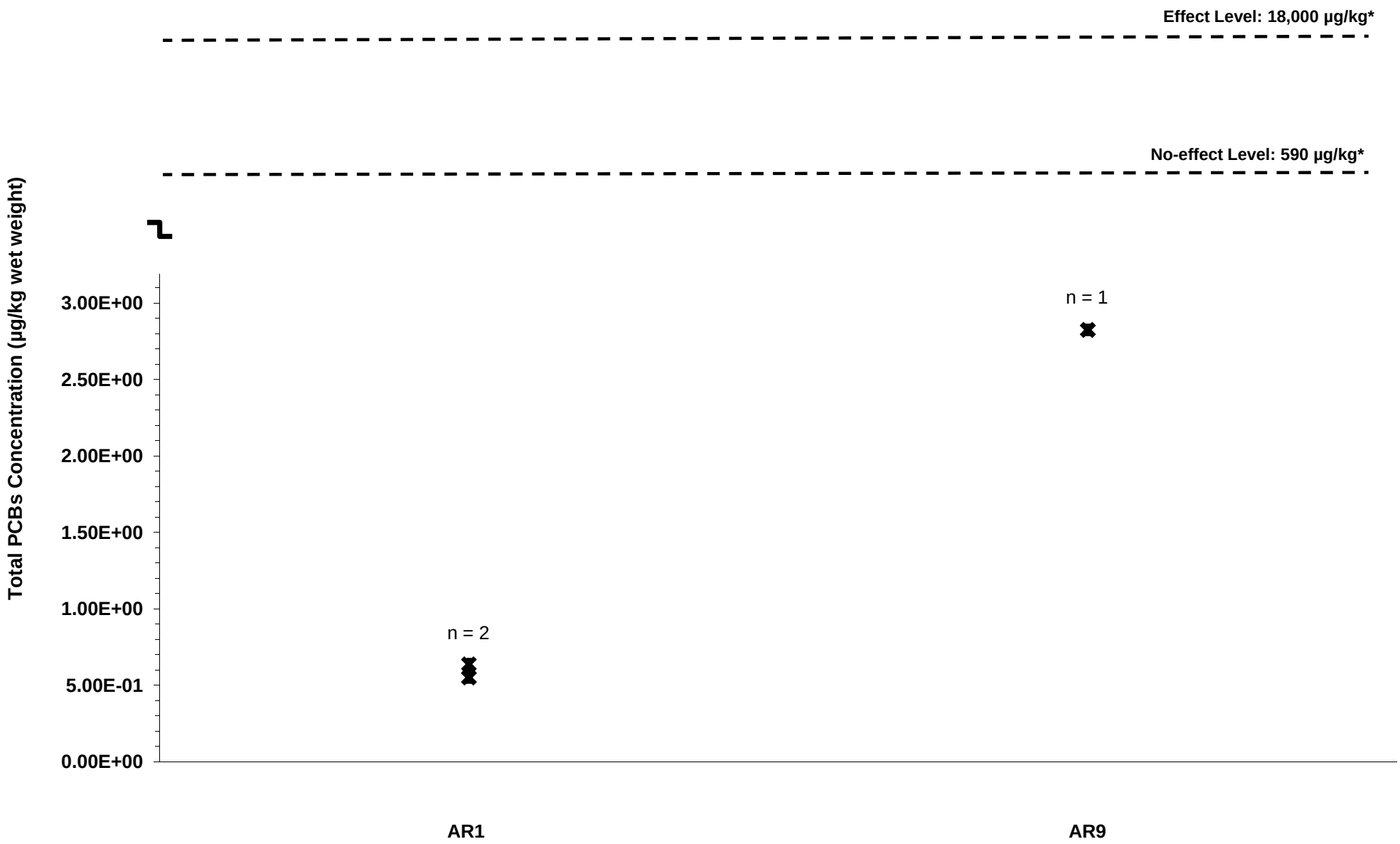


Legend: □ - Blood
△ - Feather
● - Mean Concentration



[a]Critical body residues (CBRs) based on reproductive effects in tree swallows (Nocera and Taylor, 1998). No-effect CBR was calculated as approximately ½ the effect CBR.
[b]CBRs based on reproductive effects in mallards (effect) or on reproductive effects in tree swallows (no-effect).

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-25
Total Mercury Concentrations in 2008 Bald Eagle Blood and Feather Samples Compared with CBRs



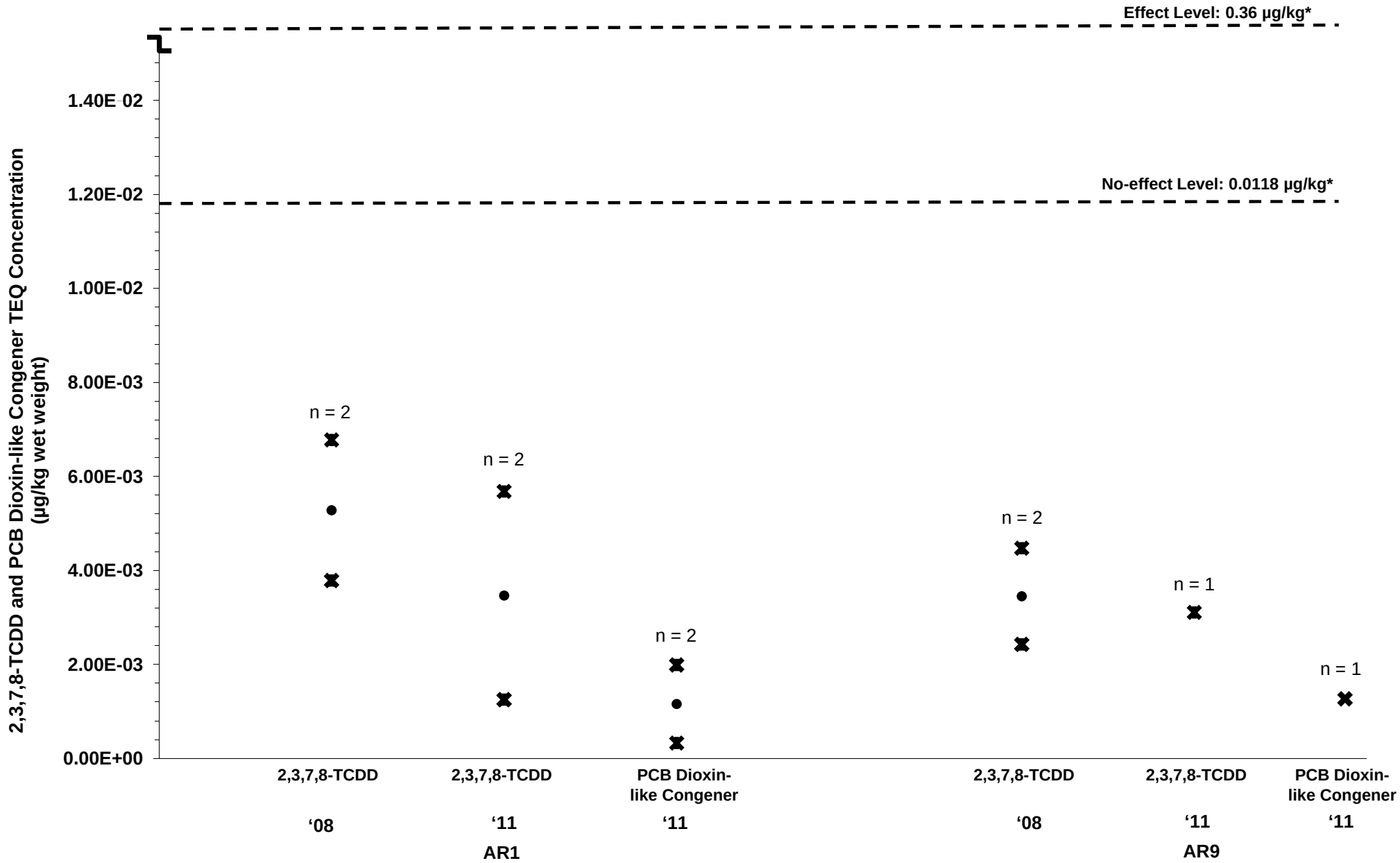
Legend:

✖ - Eagle Plasma

● - Mean Concentration

*No-effect and effect levels of 590 µg/kg and 18,000 µg/kg based on decreased growth (Hansen et al., 1975 and Platonow and Funnell, 1972, respectively).

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-26
Total PCBs Concentrations in 2011
Bald Eagle Plasma Samples Compared with CBRs



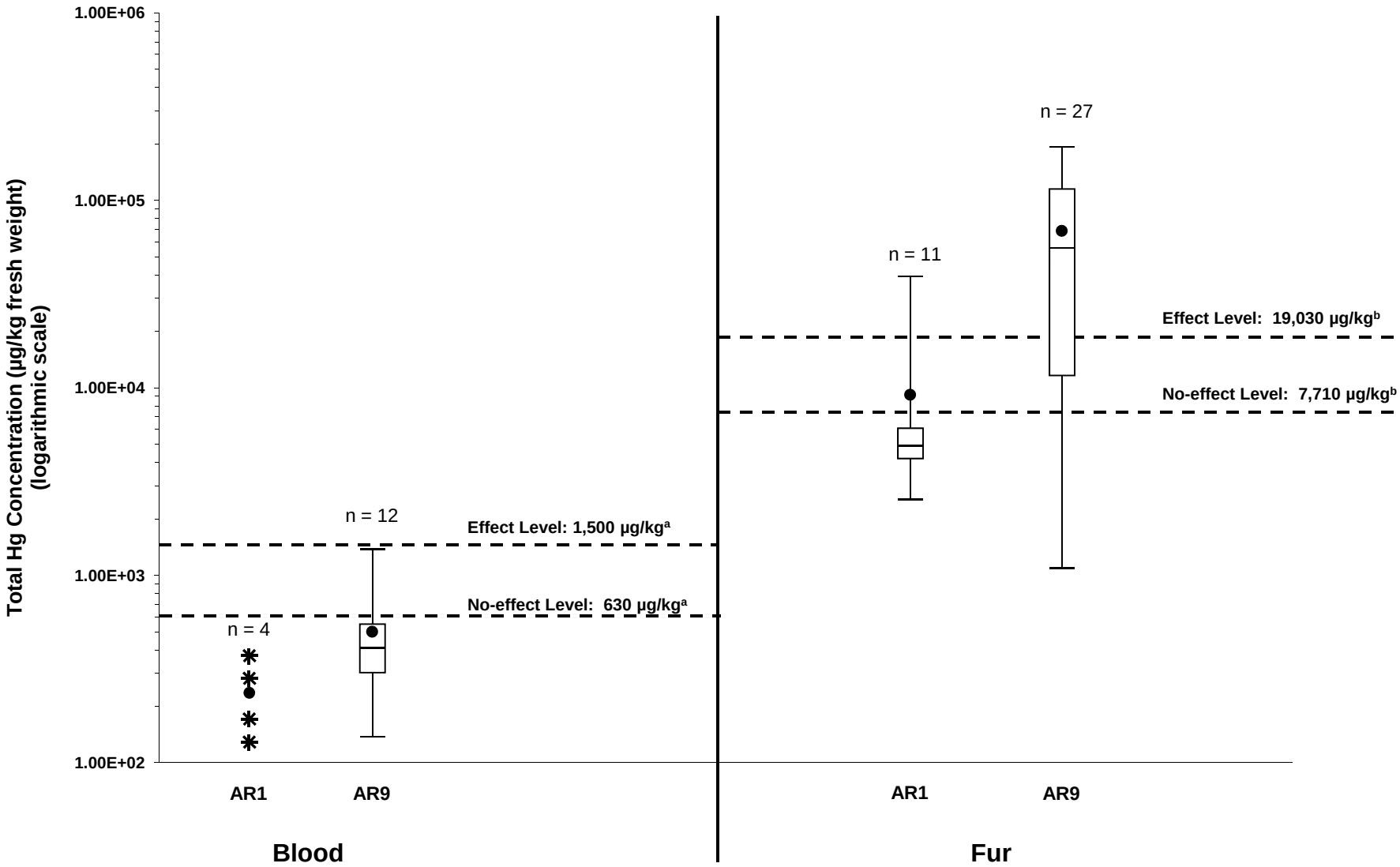
Legend:

✖ - Eagle Plasma

● - Mean Concentration

*No-effect and effect levels of 0.0118 µg/kg and 0.36 µg/kg based on decreased growth (Hansen et al., 1975 and Platonow and Funnell, 1972, respectively).

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-27
2,3,7,8-TCDD and PCB Dioxin-like Congener TEQ Concentrations in 2008 and 2011
Bald Eagle Plasma Samples Compared with CBRs



Legend:

✱ - Blood

● - Mean Concentration

Maximum concentration

75th Percentile concentration

50th Percentile concentration

25th Percentile concentration

Minimum concentration

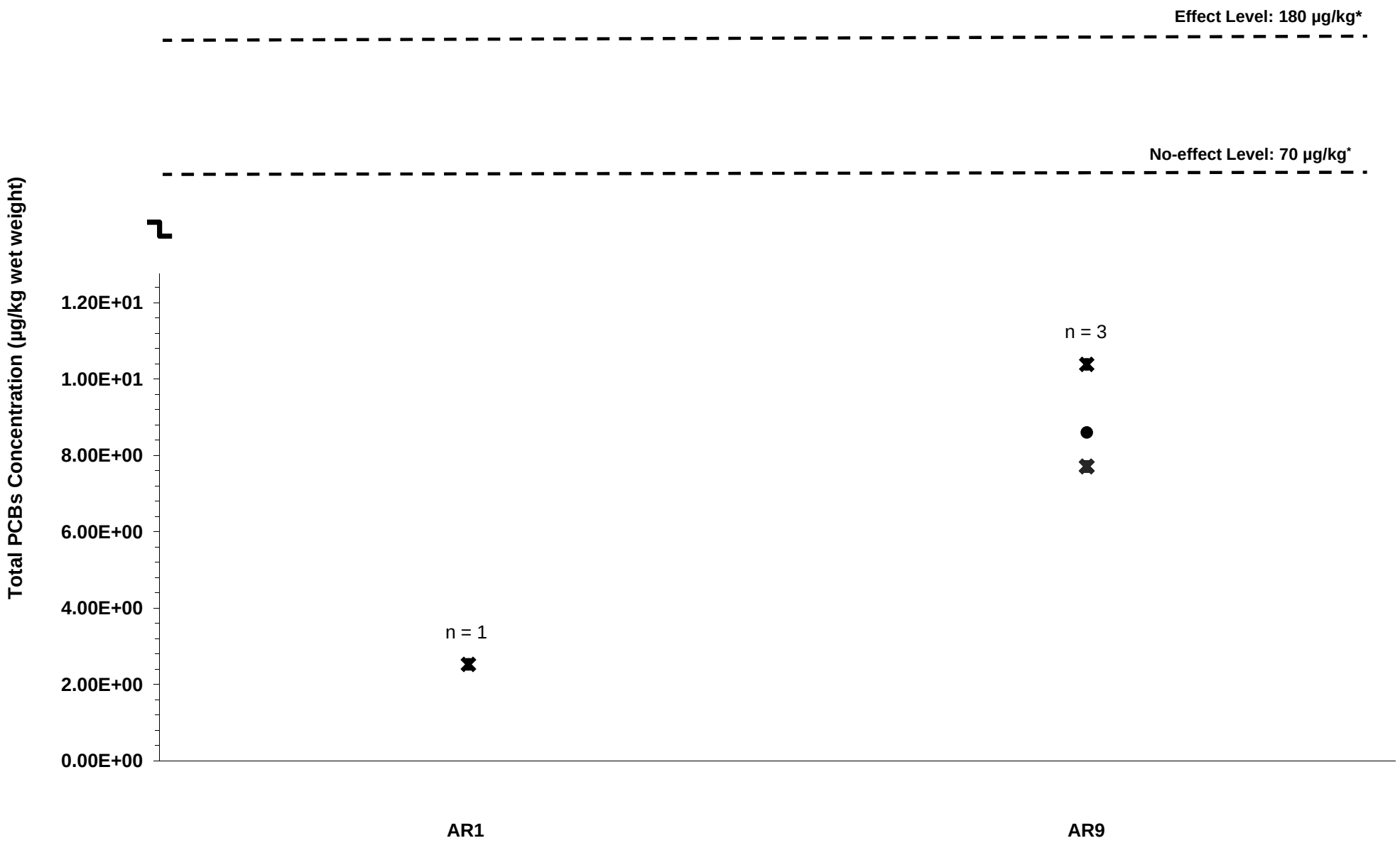
[a]Effect level CBR based on % viable deliveries in the macaque (Burbacher et al., 1988). No-effect level CBR based on neurotoxicity in mink.

[b]CBRs based on changes in litter size (Halbrook et al., 1997).

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Figure 4-28

Total Mercury Concentrations in 2010
Bat Blood and Fur Samples Compared with CBRs



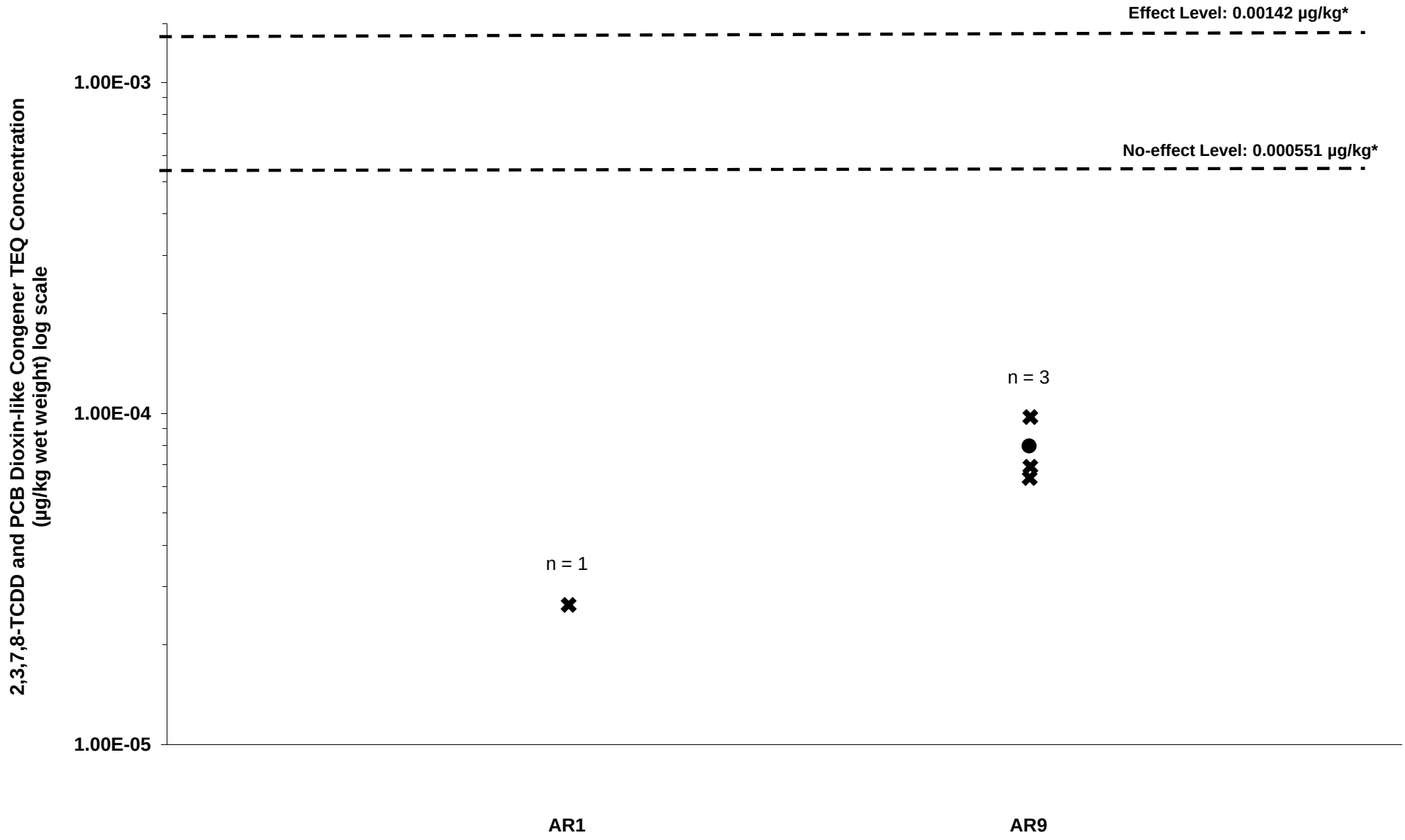
Legend:

✖ - Bat Blood

● - Mean Concentration

*No-effect and effect level of 70 µg/kg and 180 µg/kg (Grant et al., 1974) based on decreased body and testes weights.

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-29
Total PCBs Concentrations in 2010
Bat Blood Samples Compared with CBRs



Legend:

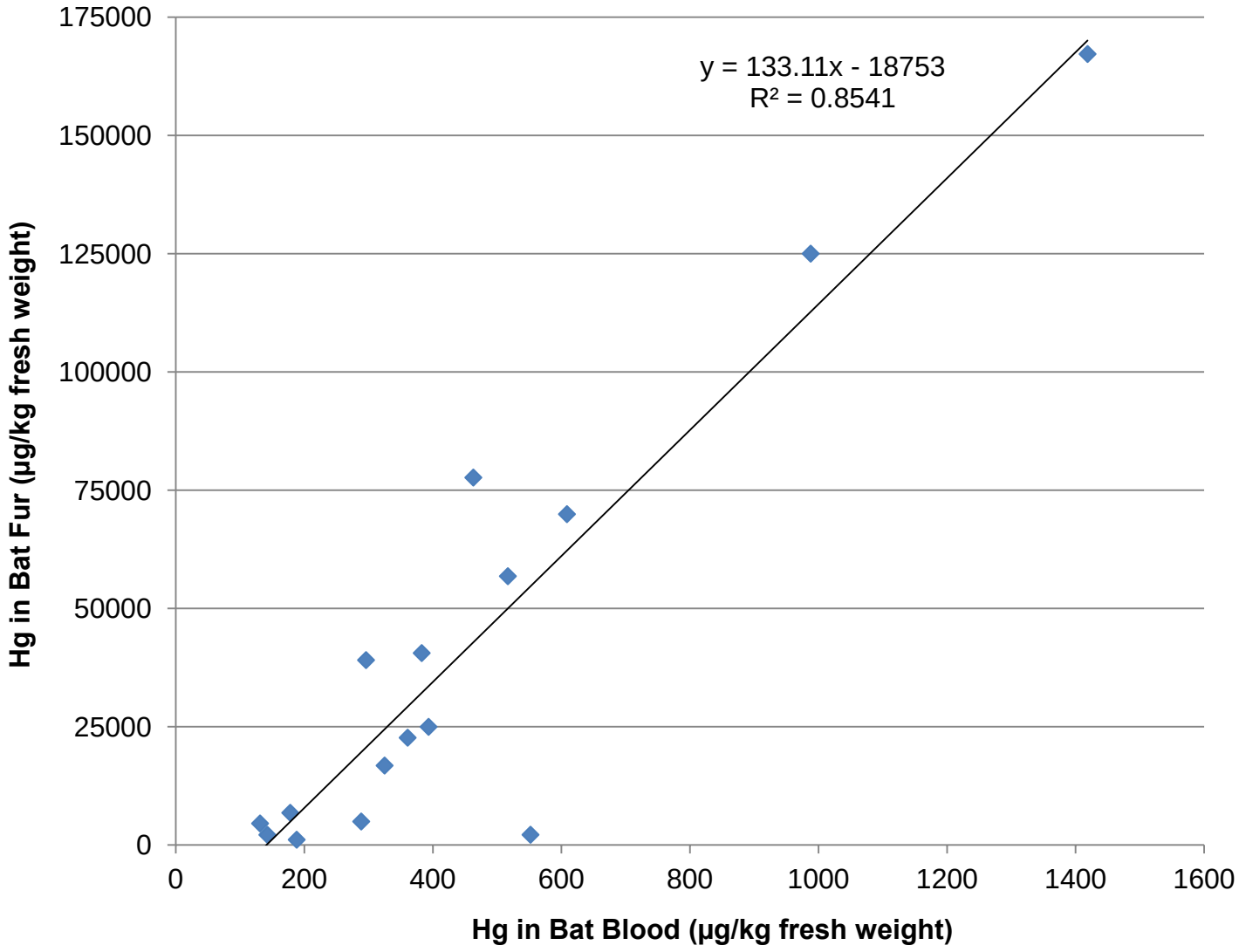
✖ - Bat Blood

● - Mean Concentration

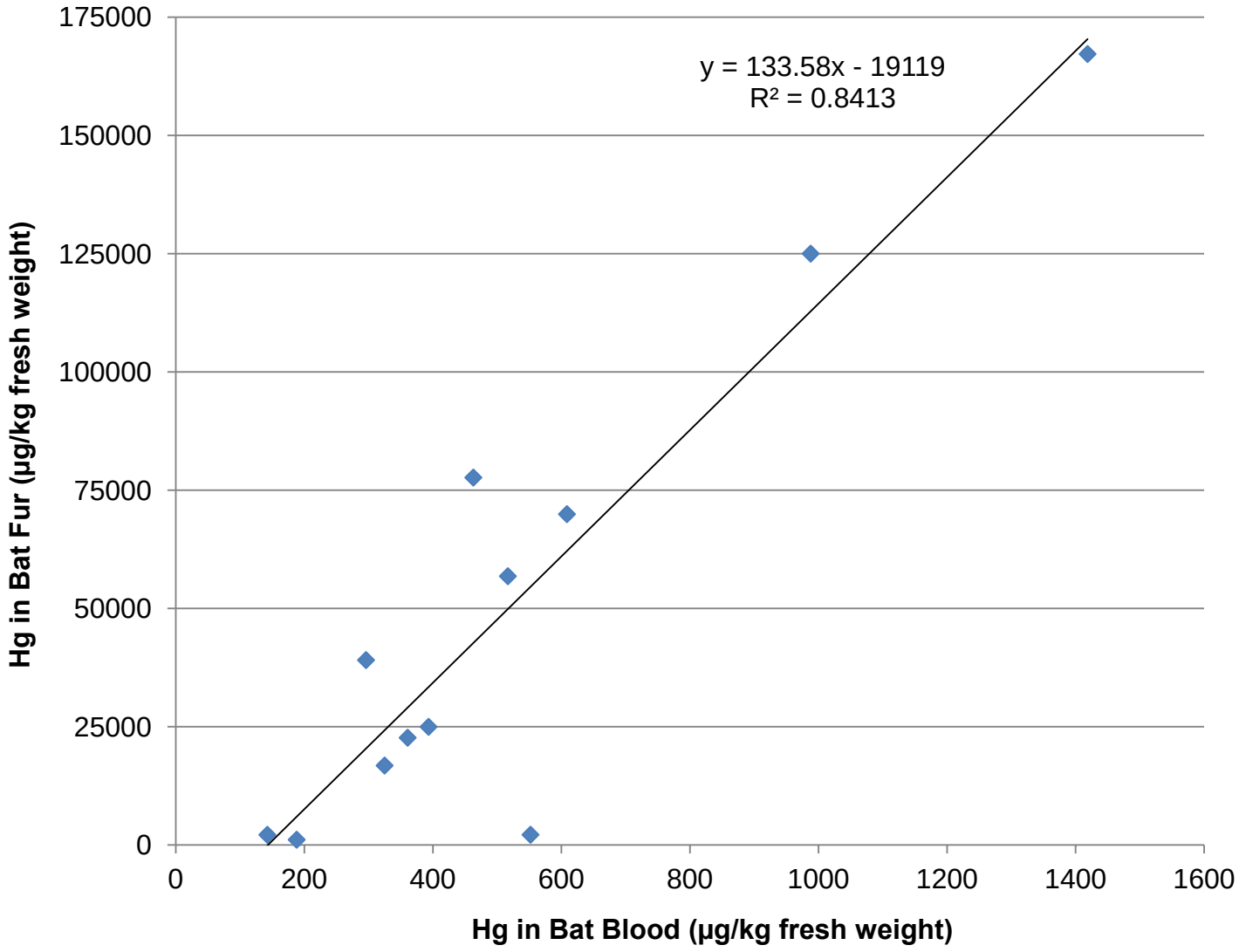
*No-effect and effect level of 0.000551 µg/kg and 0.00142 µg/kg (Grant et al., 1974) based on decreased body and testes weights.

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

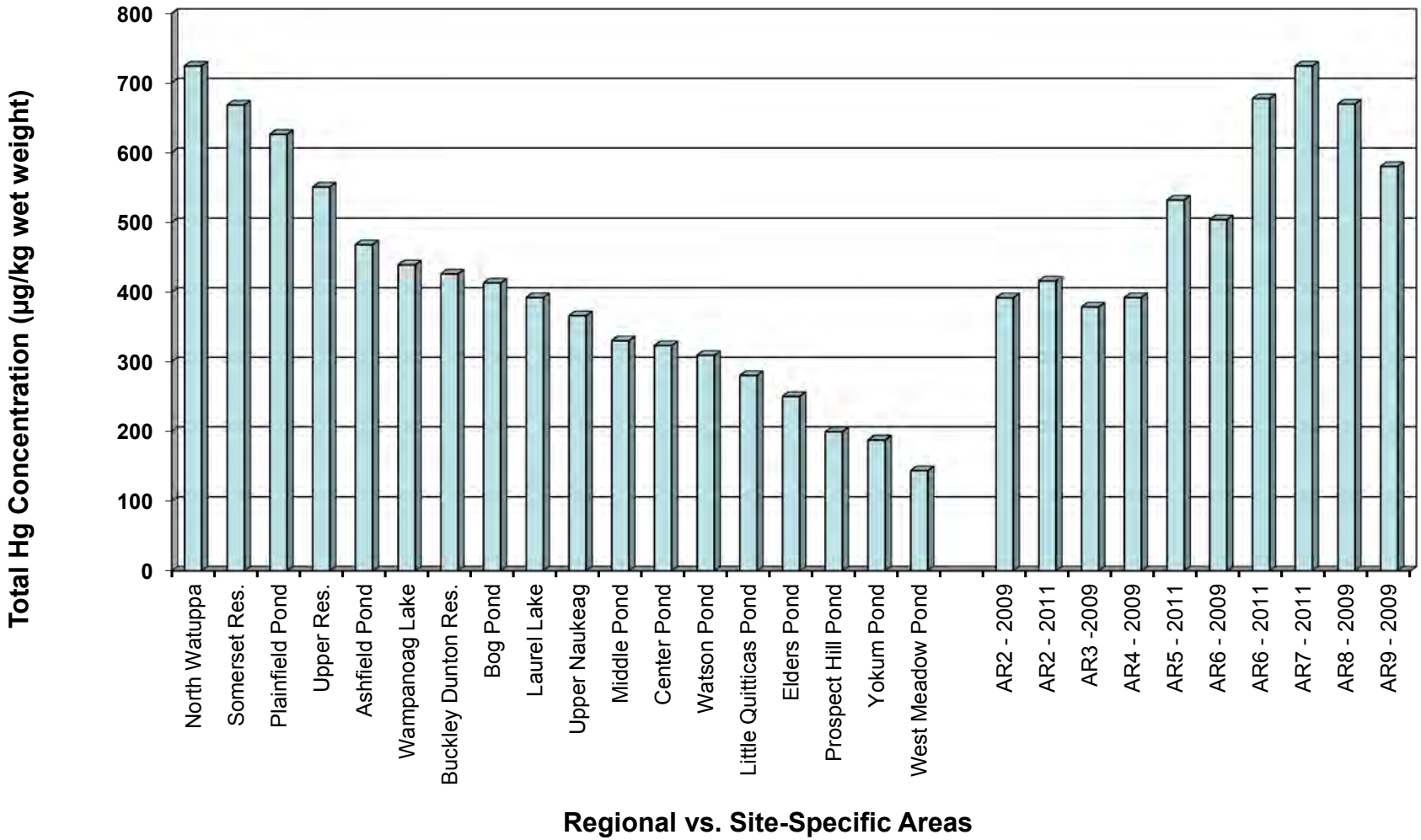
Figure 4-30
PCB Dioxin-like Congener TEQ Concentrations in 2010 Bat Blood Samples Compared with CBRs



River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-31
Total Mercury Concentrations in Bat Blood versus Bat Fur
Reaches A1 and A9



River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-32
Total Mercury Concentrations in Bat Blood versus Bat Fur
Reach A9



Note: Site bass are smallmouth bass; regional bass are largemouth bass.
Source: Rose et al., 1999

River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire
Figure 4-33
Average Mercury Concentrations in Bass Axial Muscle from the Androscoggin River and Regional Waters

APPENDIX A

APPENDIX A

NH NATURAL HERITAGE SEARCH RESULTS

Memo

NH Natural Heritage Bureau
NHB Datacheck Results Letter

To: Tara Speck, Avatar Environmental
107 South Church Street
West Chester, PA 19382

From: Melissa Coppola, NH Natural Heritage Bureau
Date: 8/28/2012 3:42:15 PM (valid for one year from this date)
Re: Review by NH Natural Heritage Bureau
NHB File ID: NHB12-2305 Town: Berlin Location: Androscoggin River and adjacent land from Pontook reservoir to the Maine Line

Description: Previoius NHB File ID: NHB11-2135; Need an update to this previous request.
Avatar Environmental is conducting an ecological risk assessment of the Chlor-Alkali facility in Berlin, NH. We are looking at the Androscoggin River and adjacent land
from Pontook reservoir to the Maine Line.

Can you please send the report to: cdobroski@avatarenviro.com

cc: Kim Tuttle

As requested, I have searched our database for records of rare species and exemplary natural communities, with the following results.

Comments:

Invertebrate Species	**State[1]**	**Federal**	**Notes**
Taiga Bluet (*Coenagrion resolutum*)	--	--	Contact the NH Fish & Game Dept (see below).

Natural Community	**State[1]**	**Federal**	**Notes**
montane - subalpine circumneutral cliff*	--	--	The primary threat is from rock-climbing that disturbs or removes the vegetation on the cliff face.
Sugar maple - silver maple - white ash floodplain forest	--	--	Threats are primarily changes to the hydrology of the river, land conversion and fragmentation, introduction of invasive species, and increased input of nutrients and pollutants.

Plant species	**State[1]**	**Federal**	**Notes**
fragrant wood fern (*Dryopteris fragrans*)*	T	--	This species occurs on cliffs and ledges. Threats would primarily be recreational activities that could trample the plants or disturb their habitat.

pink shinleaf (*Pyrola asarifolia*)	E	--	Threats are primarily damage to its floodplain or riverbank habitat, including changes to local hydrology, land conversion and fragmentation, introduction of invasive species, and increased input of nutrients and pollutants.
purple virgin's-bower (*Clematis occidentalis*)*	E	--	The largest threat to this species is habitat loss.
smooth cliff fern (*Woodsia glabella*)*	E	--	This species occurs cliffs and ledges. Threats would primarily be recreational activities that could trample the plants or disturb their habitat.

Vertebrate species	**State[1]**	**Federal**	**Notes**
Bald Eagle (*Haliaeetus leucocephalus*)	T	--	Contact the NH Fish & Game Dept (see below).
Common Nighthawk (*Chordeiles minor*)*	E	--	Contact the NH Fish & Game Dept (see below).
Northern Harrier (*Circus cyaneus*)	E	--	Contact the NH Fish & Game Dept (see below).
Osprey (*Pandion haliaetus*)	SC	--	Contact the NH Fish & Game Dept (see below).

[1]Codes: "E" = Endangered, "T" = Threatened, "--" = an exemplary natural community, or a rare species tracked by NH Natural Heritage that has not yet been added to the official state list. An asterisk (*) indicates that the most recent report for that occurrence was more than 20 years ago.

Contact for all animal reviews: Kim Tuttle, NH F&G, (603) 271-6544.

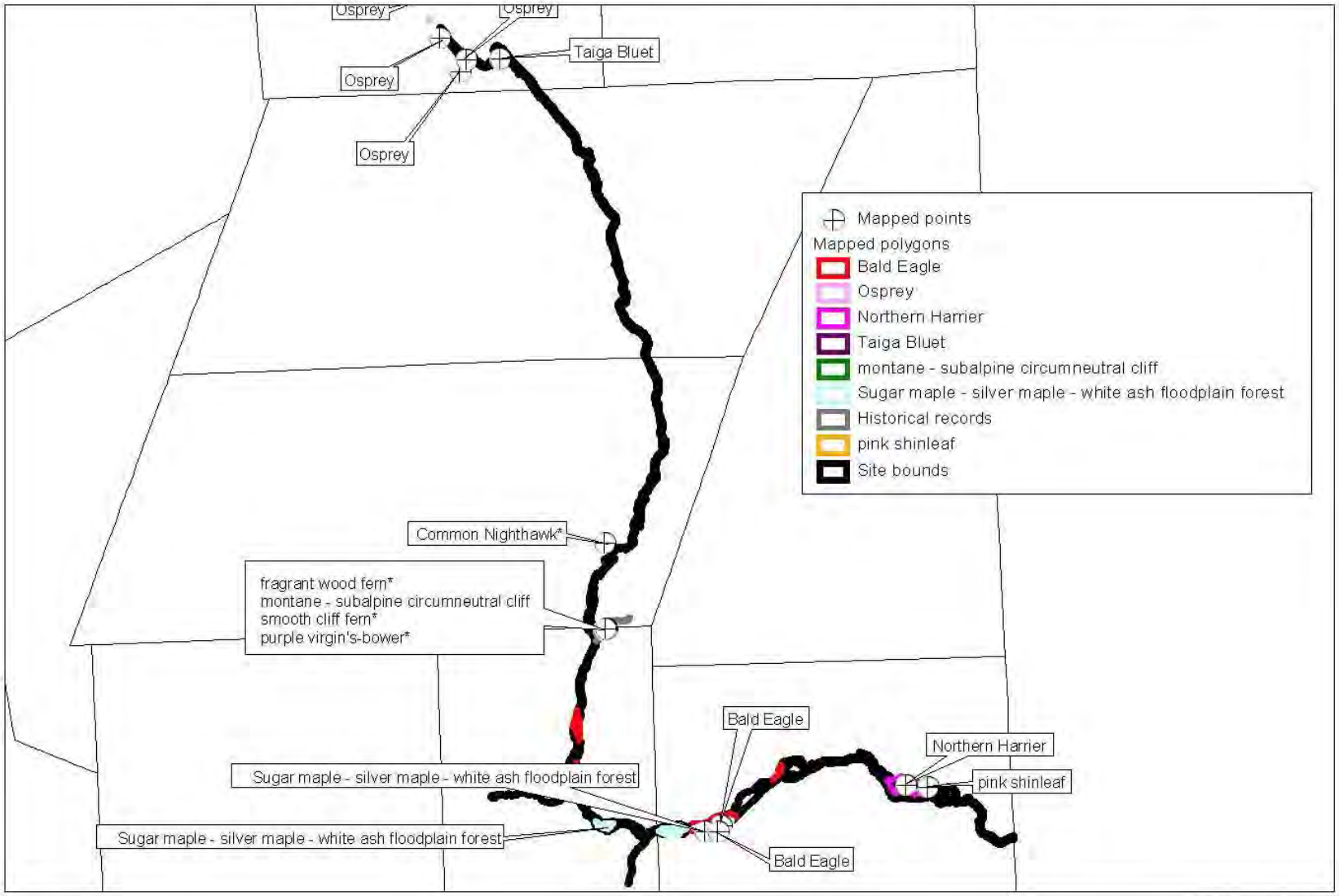
A negative result (no record in our database) does not mean that a sensitive species is not present. Our data can only tell you of known occurrences, based on information gathered by qualified biologists and reported to our office. However, many areas have never been surveyed, or have only been surveyed for certain species. An on-site survey would provide better information on what species and communities are indeed present.

NHB12-2305

NH NATURAL HERITAGE BUREAU

Known locations of rare species and exemplary natural communities

Note: Mapped locations are not always exact. Occurrences that are not in the vicinity of the project are not shown.



*Historical record

1:180000

Valid for one year from this date: 04 Sep 2012

New Hampshire Natural Heritage Bureau - Animal Record

Taiga Bluet (*Coenagrion resolutum*)

Legal Status

Federal: Not listed
State: Not listed

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2010: Uncommon (<5) on 6/19.
General Area: 2010: Large River.
General Comments:
Management Comments:

Location

Survey Site Name: Androscoggin River, south of Robbins Brook
Managed By: Bofinger Conservation Area and BAA

County: Coos
Town(s): Dummer
Size: 1.9 acres

USGS quad(s): Milan (4407152)
Lat, Long: 443654N, 0711320W
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions:

Dates documented

First reported: 2010-06-19
Last reported: 2010-06-19

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Community Record

montane - subalpine circumneutral cliff

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Not ranked (need more information)
State:	Not listed	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.

Comments on Rank: Habitat is pristine, rich in characteristic species.

Detailed Description: 1983: Dominated by *Thuja occidentalis*. Open cliffs sparsely vegetated but support *D. fragrans*, *W. glabella*. Open cascades more acidic. 1982: *Dryopteris fragrans*, *Woodsia glabella*, *Trisetum spicatum*, *Thuja*, *Drosera rotundifolia*. 1964: Pease.

General Area: Deep gorge in hillside with large exposure of wet, dark, calcareous cliffs. Habitat ranges from moist crumbly ledge to sheer and dry rock.

General Comments: *Woodsia* in moist shaded crevices of crumbly rock. *Dryopteris* on sunny dry sheer cliff. The gorge may attract visitors.

Management Comments:

Location

Survey Site Name: Alpine Cascade

Managed By:

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Gorham	Lat, Long:	442657N, 0711051W
Size:	1.5 acres	Elevation:	1100 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Alpine Cascade. East (upstream) of the powerline to the first dam on Cascade Alpine Brook.

Dates documented

First reported:	1964	Last reported:	1983-07-17

Korpi, John. 1983. Field survey to Alpine Cascade of July 7.

New Hampshire Natural Heritage Bureau - Community Record

Sugar maple - silver maple - white ash floodplain forest

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Not ranked (need more information)
State:	Not listed	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Good quality, condition and landscape context ('B' on a scale of A-D).

Comments on Rank:

Detailed Description: 1997: Two floodplain forest complexes were observed, one at the east edge of the golf course and one further west. The western complex was a stretch of scrappy broken canopy of *Acer saccharinum*, *Populus balsamifera*, *Fraxinus americana*, and *Acer rubrum*. A thick, species rich shrub and subcanopy layer included *Berberis thunbergii*, *Polygonum cuspidatum*, *Solanum dulcamara*, *Lonicera morrowii*, *Parthenocissus quinquefolius*, and *Toxicodendron radicans*. A sparse herb layer included *Onoclea sensibilis*, *Glyceria melicaria*, *Carex gracillima*, *Solidago gigantea*, *S. rugosa*, *Cacalia atriplicifiolia*, *Oxalis stricta*, and *Galeopsis tetrahit*. This area is characterized by edgy, patchy distribution of invasive, shrubs and vines, patches of bare sandy soils in the high terraces, occasional patches of pole size trees (especially near islands and low slough channels). The eastern complex was a typical, non-disturbed patch of high terrace floodplain forest. Other edgy, disturbed patches of this type of floodplain occurred t hroughout. Forest trees were variable in age and size, with an occasional super-canopy silver maple and red oak; 30"dbh individual cored; largest individual = 34" dbh. Dominant trees included *Acer saccharinum*, *Prunus serotina*, *Fraxinus nigra*, *Quercus rubra*, and *Tilia americana*. Shrubs and sub-canopy tree species included *Ostrya virginiana*, *Prunus virginiana*, *Acer saccharum*, and *Parthenocissus quinquefolius*. Herb species richness was low , with a mix of low and high floodplain species, including *Onoclea sensibilis*, *Matteuccia struthiopteris*, *Glyceria melicaria*, *Rubus hispidus*, and *Solidago rugosa*.

General Area: 1997: Wildlife sign was abundant, and wood-duck boxes were scattered on trees near the river bank. The islands in this area appeared to have silver maples in the canopy, especially overhanging the river's edge. Trees were large and overhanging along the golf course, and in various stages of recovery (pole size, blowdowns) along the river. Topography along riverside observation points was a maze of cobbly, sandy slough channels with organic debris piles from recent flooding. Higher terrace soils varied from sandy soils that harbored sandy species, to fine sandy loams, with little to no mottling, in lower landscape positions. The entire western complex is edgy and highly disturbed, either by the golf course or by flood action along the river. Edge and invasive woody, vine species are common. The eastern portion, framed by the railroad, and high gradient Pea and Kidder Brook, had more of a forest buffer, however a gravel pit for the railroad lies upslope, and along Pea Brook. The upland forest s appeared slightly disturbed from a logging history(?) and high gradient, flash flooding from Pea Brook seemed to have devastating effects on trees along the stream bank. The dry stream-bed cuts a wide swath, with a floor of large, rounded cobbles.

General Comments: 1997: These broken, edgey floodplain forest patches appear common on islands in this stretch of the Androscoggin. As much as possible of the forest should be protected, despite the edgy character of the patches.

Management Comments:

Location

Survey Site Name: PSNH / Golf Course

Managed By:

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Shelburne	Lat, Long:	442325N, 0710828W

Size: 84.6 acres Elevation: 740 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Route 2 West from Gorham. Look for Gorham / Androscoggin River Golf Course on left (north). Park in golf course parking lot, check with golf course staff. Hike along river. Also, access to releve at Observation Point 4 (to the east) is from railroad tracks that cut through golf course.

Dates documented

First reported: 1997-09-17 Last reported: 1997-09-17

Bechtel, Doug. 1997. Field survey to Country Club, Androscoggin on September 17.

Bechtel, Doug and Dan Sperduto. 1998. Floodplain Forest Natural Communities Along Major Rivers in New Hampshire. Prepared by The New Hampshire Natural Heritage Inventory Program (Concord NH) for the Environmental Protection Agency 58 pp. + Appendices.

New Hampshire Natural Heritage Bureau - Plant Record

fragrant wood fern (*Dryopteris fragrans*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1982: Very few plants. 1901: Eggleston specimen #2375 (NYBG 2535) at NY. 1899: Eggleston specimen #1770 at NY. 1872: Gillman Specimen #7 at NY. 1964: Listed in Pease, A Flora of Northern New Hampshire.
General Area: Cliffs of waterfall gorge.
General Comments:
Management Comments:

Location

Survey Site Name: Alpine Cascade
Managed By:

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Gorham	Lat, Long:	442657N, 0711049W
Size:	.2 acres	Elevation:	1050 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Gorham/Berlin. Alpine Cascade (see AMC White Mtns. Guide for directions).

Dates documented

First reported: 1867 Last reported: 1982-09

Brackley, F. 1982. Field visit to Cottrell Property in August.

New Hampshire Natural Heritage Bureau - Plant Record

pink shinleaf (*Pyrola asarifolia*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Good quality, condition and landscape context ('B' on a scale of A-D).

Comments on Rank: Small population but demonstrated long-term survival.

Detailed Description: 2009: 82 stems, no evidence of bloom.2007: About 30 vegetative sprigs scattered in a 5-m wide zone extending for about 40 m along the base of the slope.2000: Searched for but not found. 1922: Specimen collected.

General Area: 2009: Plant community similar to 2007. 2007: Growing in full shade of dense *Populus tremuloides* (quaking aspen) sapliing thickets with trunks ca. 0.75 - 2.75-in. dbh. *Quercus rubra* (red oak), *Acer rubrum* (red maple), and *Betula papyrifera* (paper birch) saplings also present. Common associated species include: *Rubus pubescens* (dwarf raspberry), *Pyrola elliptica* (common shinleaf), *Maianthemum canadense* (Canada mayflower), *Aralia nudicaulis* (wild sarsaparilla), *Cornus canadensis* (bunchberry), and *Berberis thunbergii* (Japanese barberry). Occasional species include *Onoclea sensibilis* (sensitive fern), *Parthenocissus quinquefolia* (Virginia creeper), *Galium triflorum* (sweet-scented bedstraw), *Smilax herbacea* (glaucous carrion-flower), *Symphyotrichum cordifolium* (heart-leaved aster), *Diervilla lonicera* (bush honeysuckle), *Carex communis* (colonial sedge), *Viola* sp. (viola), *Bromus ciliatus* (fringed brome grass), and *Carex debilis* var. *rudgei* (Rudge's sedge). *Carex intumescens* (inflated sedge) is uncommon and *Actaea rubra* (red baneberry) is rare.1922: Damp mossy ground.

General Comments: 2007: Do not believe the plants are in a floodplain, but might be - if so, very high in floodplain.

Management Comments:

Location

Survey Site Name: The Knubble

Managed By: Philbrook Farm Inn

County:	Coos	USGS quad(s):	Shelburne (4407141)
Town(s):	Shelburne	Lat, Long:	442409N, 0710302W
Size:	.4 acres	Elevation:	1400 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 2009: **Ask for permission from the owners of the Philbrook Farm Inn. They will direct you to a gate where you may park your vehicle. From the end of that road it is best to enter the GPS coordinates and follow them to the site. A: 44 4021853N 71 0504350W B: 44 4021937N 71 0508249W**2007: The Knubble is a local name for a small hill on the north bank of the Androscoggin River, just west of Evans Island. Best access is to park along North Rd. just north of the Knubble. There is a trail/woods road that leads back to a stump dump, which gets you close to the Knubble. But you have to bushwack through blackberry and sapling thickets the last part to get to the Knubble. No easy path. Plants are on a very gradual slope immediately below a steep slope on the north-NE side of the Knubble. Population starts at a distinctive ca. 22-in. dbh red maple with large limbs leaning away from the slope, and continues for ca. 130 ft. west to where a 12- and 8-in. dbh white pine stands on a slope break (UTM NAD 83, zone 19, 336696 E, 4918609 N). An old skidder trail to the summit occurs ca. 300 ft. east of the waypoint.1922: Woods on the Knubble, north edge.

Dates documented

First reported: 1883 Last reported: 2009-07-14

Baird, I., T. Tellman, D. Tellman, and H. Danforth. 2009. Field survey to The Knubble on July 14.

New Hampshire Natural Heritage Bureau - Plant Record

purple virgin's-bower (*Clematis occidentalis*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1910: Specimen collected. Fruiting.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Alpine Cascade
Managed By: Easement A

County: Coos
Town(s): Berlin
Size: 19.5 acres

USGS quad(s): Berlin (4407142)
Lat, Long: 442656N, 0711050W
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 1910: Rocks by Alpine Cascade.

Dates documented

First reported: 1910-07-28
Last reported: 1910-07-28

New Hampshire Natural Heritage Bureau - Plant Record

smooth cliff fern (*Woodsia glabella*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Endangered	State:	Critically imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1982: Rawinski visit. Very small, scattered population. 1882: Specimen of unknown collector at MO. 1899: Specimen of E.F. Williams at GH. 1872: Specimen of Faxon at VT and of E.W. Whorf at GH.
General Area: 1982: On calcareous rocks on south facing ravine of the falls.
General Comments: First collection here since 1908. Only site in state, a few botanists could wipe it out.
Management Comments:

Location

Survey Site Name: Alpine Cascade
Managed By:

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Gorham	Lat, Long:	442656N, 0711052W
Size:	1.2 acres	Elevation:	1050 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Gorham. Berlin. Alpine Cascade. Climb up Falls Ravine, plants are on south facing rocks. AMC book gives good directions to get to area.

Dates documented

First reported: 1870 Last reported: 1982

Rawinski, T., F. Brackley, and C. Caljouw. 1982. Field survey to Alpine Cascade of September.

New Hampshire Natural Heritage Bureau - Animal Record

Bald Eagle (*Haliaeetus leucocephalus*)

Legal Status

Federal: Not listed
State: Listed Threatened

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 1993: Occasional observations from Rte. 16 between Berlin and Gorham.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Androscoggin River
Managed By:

County: Coos
Town(s): Shelburne
Size: 151.1 acres

USGS quad(s): Berlin (4407142)
Lat, Long: 442330N, 0710804W
Elevation: 800 feet

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: All along the Androscoggin River.

Dates documented

First reported: 1993
Last reported: 1993

Martin, Chris. 2011. Identification of bald eagle wintering habitat based on decades of personal experience.

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Bald Eagle (*Haliaeetus leucocephalus*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	Listed Threatened	State:	Imperiled due to rarity or vulnerability

Description at this Location

Conservation Rank:	Fair quality, condition and/or landscape context ('C' on a scale of A-D).
Comments on Rank:	
Detailed Description:	2011: Nest 2: 1 chick fledged.2010: Nest 2: Nest active, no chicks fledged.2009: 2 chicks fledged.2008: 2 chicks fledged.2007: Pair failed to hatch or failed post hatch. 2006: 1 chick fledged.
General Area:	
General Comments:	2008: Banded and obtained blood/feather samples from 2 chicks; banding status of both adults uncertain.2007: Banded status of both adults unknown.2006: New nesting pair. One member of breeding pair had sub-adult plumage. Banded status of pair unknown.
Management Comments:	2008-2006: No closure signs installed.

Location

Survey Site Name: Androscoggin River, south of Reflection Pond
Managed By:

County:	Coos	USGS quad(s):	Berlin (4407142)
Town(s):	Shelburne	Lat, Long:	442324N, 0710809W
Size:	1.9 acres	Elevation:	

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: [From Gorham go east on Gorham Hill Rd for ca. 2 miles. Nest is on southern bank of Androscoggin River north of railroad tracks.]

Dates documented

First reported:	2006	Last reported:	2011

Martin, Chris. 2007. Email from Chris Martin to Jeff Tash regarding 2007 bald eagle nesting information.

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Common Nighthawk (*Chordeiles minor*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Not ranked (need more information)

Description at this Location

Conservation Rank: Historical records only - current condition unknown.
Comments on Rank:

Detailed Description: 1990: 26 adults, sex unknowns (Obs_id 939).
General Area: 1990: Terrestrial - Urban / suburban (Obs_id 939).
General Comments: 1990: Number above represents the high count for the period 1982-1992. Young were documented in 1985, and perhaps other years during this period (Obs_id 939).
Management Comments:

Location

Survey Site Name: Berlin
Managed By:

County: Coos
Town(s): Berlin
Size: 30.8 acres

USGS quad(s): Berlin (4407142)
Lat, Long: 442827N, 0711050W
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: 1990: Downtown [Berlin] (Obs_id 939).

Dates documented

First reported: 1990-07-22
Last reported: 1990-07-29

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Northern Harrier (*Circus cyaneus*)

Legal Status

Federal: Not listed
State: Listed Endangered

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 1997: Area 4408: adult male, 1 young.1995: Area 4408: adult female.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Shelburne, Clement Brook
Managed By: Philbrook Farm Inn

County: Coos
Town(s): Shelburne
Size: 121.5 acres

USGS quad(s): Shelburne (4407141)
Lat, Long: 442411N, 0710334W
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Farmlands along Androscoggin River. Philbrick and Tasser Farms, east of bridge over Ammonosuc [Androscoggin].

Dates documented

First reported: 1997-08-10
Last reported: 1997-08-10

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Osprey (*Pandion haliaetus*)

Legal Status		**Conservation Status**	
Federal:	Not listed	Global:	Demonstrably widespread, abundant, and secure
State:	SC	State:	Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2010: Nest 2: Nest active, no chicks fledged.2007: Nest 2: 2 fledged.2006: Nest 2: 2 fledged.2005: Nest 2: 2 fledged.2004: Nest 2: nest active, unsuccessful.2003: Nest 2: 3 fledged.2002: Nest 1: nest active, unsuccessful.2001: Nest 1: 3 fledged.2000: Nest 1: nest active, unsuccessful.1998-1999: Nest 1: 3 fledged.1997: Nest 1: 2 fledged.1996: Nest 1: 3 fledged.1994-1995: Nest 1: 2 fledged.1993: Nest 1: adults present.
General Area: Nest 1: nest 18m up dead *Betula lutea* (yellow birch), dbh 46.5cm.Nest 2: nest on pole.
General Comments: 1994: Nest 1: predator guard installed.
Management Comments:

Location

Survey Site Name: Pontook West
Managed By:

County:	Coos	USGS quad(s):	Dummer Ponds (4407163)
Town(s):	Dummer	Lat, Long:	443753N, 0711524W
Size:	.9 acres	Elevation:	

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Area 8177: Powerline ROW adjacent to Rte. 16 ca. 1.15 miles north of the junction of Rte.16 and Rte.110A.

Dates documented

First reported:	1994	Last reported:	2010

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Osprey (*Pandion haliaetus*)

Legal Status

Federal: Not listed
State: SC

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2010: Nest 2: 2 fledged.2008: Nest 2: 3 fledged.2007: Nest 2: 3 fledged.2006: Nest 2: 2 fledged.2005: Nest 1: Territory occupied by nest, not active.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Robbins Brook
Managed By:

County: Coos
Town(s): Dummer
Size: .9 acres

USGS quad(s): Milan (4407152)
Lat, Long: 443641N, 0711419W
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions: Robbins Brook substation off of Rte.110A.

Dates documented

First reported: 2005
Last reported: 2010

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Osprey (*Pandion haliaetus*)

Legal Status

Federal: Not listed
State: SC

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2010: Nest 1: 1 fledged.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Pontook Powerline
Managed By:

County: Coos
Town(s): Dummer
Size: .4 acres

USGS quad(s): Milan (4407152)
Lat, Long: 443716N, 0711447W
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions:

Dates documented

First reported: 2010
Last reported: 2010

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

New Hampshire Natural Heritage Bureau - Animal Record

Osprey (*Pandion haliaetus*)

Legal Status

Federal: Not listed
State: SC

Conservation Status

Global: Demonstrably widespread, abundant, and secure
State: Not ranked (need more information)

Description at this Location

Conservation Rank: Not ranked
Comments on Rank:

Detailed Description: 2010: Nest 1: 2 fledged.
General Area:
General Comments:
Management Comments:

Location

Survey Site Name: Rte 16/110A Junction
Managed By: Pontook - Lease Area

County: Coos
Town(s): Dummer
Size: .4 acres

USGS quad(s): Milan (4407152)
Lat, Long: 443653N, 0711408W
Elevation:

Precision: Within (but not necessarily restricted to) the area indicated on the map.

Directions:

Dates documented

First reported: 2010
Last reported: 2010

The New Hampshire Fish & Game Department has jurisdiction over rare wildlife in New Hampshire. Please contact them at 11 Hazen Drive, Concord, NH 03301 or at (603) 271-2461.

APPENDIX B

APPENDIX B

TWO SPECIES, 96-HOUR, ACUTE TOXICITY TESTING RESULTS

USING PORE WATER SAMPLES

TechLaw
Quality & Integrity

175 Cabot Street, Suite 415
Lowell, MA 01854-3650
978-275-9730
978-275-9489 FAX

Office of Environmental Measurement and Evaluation
US EPA - Region I
11 Technology Drive
North Chelmsford, MA 01863-2431

October 15, 2010

To: Mr. Bart Hoskins, EPA TOPO
Via: Mr. Louis Macri, Program Manager

TDF No. 1988A
Task Order No. 46
Task No. 04

Subject: Two Species, 96-hour, Acute Toxicity Testing Results Using Pore Water Samples Collected from the Androscoggin River in Areas Associated with Former Chlor-Alkali Facility (Berlin, NH).

Dear Mr. Hoskins:

The Environmental Services Assistance Team (ESAT) has completed four sets of two-species acute pore water toxicity tests using the midge-fly larvae, *Chironomus tentans* and the amphipod, *Hyalella azteca*. This task consisted of testing fifteen pore water samples (including two reference samples) collected by the United States Geological Survey (USGS) from the Androscoggin River and associated reservoirs.

The tests were performed according to the methods described in *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, Second Edition, EPA/600/R-99/064, March 2000.* Concurrent reference toxicity tests were performed according to the EPA the EPA Office of Environmental Measurement and Evaluation (OEME) Standard Operating Procedure (SOP) for Acute (96-hour) Reference Toxicity Test Methods for *Hyalella azteca* and *Chironomus tentans*. All initial and final chemistry were done according to the EPA OEME Biology Section SOP.

The task was requested by Mr. Hoskins, the task order project officer, and was authorized under task directional form number 1988A. The final completion date for this task is October 15, 2010.

Should you have any questions or comments, please contact Bethany Kelley of ESAT-TechLaw, Inc. at (617) 918-8681, at the EPA/OEME Biology Section, North Chelmsford, MA.

Sincerely,

Bethany Kelley

Bethany Kelley
Junior Biologist
TechLaw, Inc.

TWO SPECIES, 96-HOUR, ACUTE TOXICITY TESTING RESULTS USING PORE WATER SAMPLES COLLECTED FROM THE ANDROSCOGGIN RIVER IN AREAS ASSOCIATED WITH FORMER CHLOR-ALKALI FACILITY BERLIN, NH

Submitted to the:

Office of Environmental Measurement and Evaluation
United States Environmental Protection Agency - Region I
11 Technology Drive
North Chelmsford, Massachusetts 01863-2431

ESAT - Region I
TechLaw, Inc.
The Wannalancit Mills, 175 Cabot Street, Suite 415
Lowell, Massachusetts 01854-3650

TDF No. 1988A
Task Order No. 46
Task No. 04

October 15, 2010

Project No. 100010

TABLE OF CONTENTS

1.0 INTRODUCTION 3
2.0 STUDY OBJECTIVES 3
3.0 MATERIALS & METHODS 3
3.1 Sample Locations 3
3.2 Sample Collection 4
3.3 Toxicity Testing Methods 4
3.3.1 *C. tentans* Test Methods 4
3.3.2 *H. azteca* Test Methods 5
3.4 Statistical Analysis 5
4.0 RESULTS 6
4.1 *C. tentans* Survival 6
4.2 *H. azteca* Survival 7
5.0 DISCUSSION & CONCLUSION 9
5.1 C. tentans 9
5.2 H. azteca 9
6.0 REFERENCES 10

APPENDICES

Appendix A.....Pore Water Sampling Stations
Appendix B.....Chain-of-Custody Records
Appendix C.....Reference Toxicity Test Control Charts
Appendix D.....Bench Sheets
Appendix E.....Summary of Toxicity Test Chemistry
Appendix F.....CETIS Statistical Test Print-Outs
Appendix G.....Pore Water Toxicity Test Pictures

1.0 INTRODUCTION

The former Chlor-Alkali facility (the Site) is located on the east bank of the Androscoggin River in Berlin, NH. Chlorine and other chemicals were produced using electrolytic cells in "cell houses" on the property from the late 1800s up to the 1960s. The chlorine was used in paper making at the adjacent pulp mill. Most of the former buildings were torn down and buried on-site in the 1960's, even though the last cell house was not demolished until 1999. The Site is currently covered by a two-foot thick layer of bark and wood chips overlaying a PVC liner. The demolition debris lies beneath the liner and rests on glacial till and bedrock.

The area around the Site was also used as a wood storage lot when the paper mill was active. Large stacks of wood were present on the lot until 2006. The area is now bare with grasses, shrubs and young trees reclaiming barren ground. The remnants of the paper mill, which was demolished in 2007-2008, lies further south of the Site.

Mercury (Hg) is the primary contaminant associated with the former Chlor-Alkali facility. Hg droplets have been found on the east bank of the river next to the Site. The Hg is presumed to originate underneath the cap from where it is transmitted to the river bank via bedrock fractures. Other contaminants of concern include lead, PCBs, dioxin, polychlorinated naphthalenes, and high-pH (caustic) ground water. Site contamination has spread to other locations in soils, ground water, and through the air. It is suspected that Hg exists in elemental form on the river bottom at least through Riverside Dam. Additional disposal or mismanagement of wastes may have created unknown pockets of contamination further downstream in the Androscoggin River.

This pore water test is a continuation of testing started in September 2009 under Task Directional Form (TDF) number 1501.

2.0 STUDY OBJECTIVES

The objective of this study was to determine if responses by two benthic invertebrate test species exposed to pore water collected from the substrate of the Androscoggin River downstream of the Site differed significantly from samples collected at reference locations upstream of the Site. Laboratory control samples were used to verify that the organisms were healthy, and that the test passed the Test Acceptability Criterion (TAC) specified by EPA (2000).

The measured endpoint for both species was survival after 96 hours of exposure, which was determined by counting the number of live organisms at the end of the test period. The results from this test will help determine if Site-related contamination affect benthic organisms exposed to pore water in the Androscoggin River downstream from the Site. The results will also be used in support of a future Baseline Ecological Risk Assessment (BERA).

3.0 MATERIALS & METHODS

3.1 Sample Locations

The United States Geological Survey (USGS) obtained 15 pore water samples from the Androscoggin River between August 23 and 27, 2010 upstream and downstream of the Site. Two upstream reference samples came from Wheeler Bay (AR2-4 and AR2-5). Thirteen more samples were collected downstream of the Site as follows:

- Two samples (AR4-1 and AR4-2) upgradient from Smith Hydro Dam,
- Two samples (AR5-1 and AR5-2) upgradient from Cross Power Dam,
- Two samples (AR6-2 and AR6-3) upgradient from Cascade Dam,
- Two samples (AR7-1 and AR7-2) upgradient from Brown Dam,
- Two samples (AR8-4 and AR8-5) upgradient from Gorham Dam, and

- Three samples (AR 9-5, AR9-6, and AR9-7) from Shelburne Reservoir upgradient from Shelburne Dam.

Attachment 1 in **Appendix A** lists the pore water sample identification numbers, collection dates, GPS coordinates, and general sample locations. **Attachment 2A** and **2B** in **Appendix A** show maps of the actual pore water sample locations in the Androscoggin River.

3.2 Sample Collection and delivery

The USGS collected the pore water samples using a two-part push point sampler which was driven into the sediment to a set depth at each sampling location. The inner portion of the sampler was then removed while the outer portion remained in the substrate. A screened mini-well connected to a plastic hose was then inserted and gently pushed down to the bottom of the point sampler. Water was withdrawn at about 100 mL per minute while conductivity was continuously monitored. A pore water sample was collected for toxicity testing once the conductivity readings stabilized.

At least 1 L of pore water was collected in a labeled container at each sampling location. The samples were collected in batches, placed on ice in coolers, picked up by Environmental Services Assistant Team (ESAT) personnel and delivered to the EPA Office of Environmental Measurement and Evaluation (OEME) facility in North Chelmsford, Massachusetts on August 24, 2010, August 26, 2010, and August 27, 2010. **Appendix B** provides the chain-of-custody records.

All the pore water samples were kept at 4°C in the dark until test initiation at the OEME Biology Laboratory. The first toxicity test began on August 24, 2010 and ended on August 28, 2010. The second toxicity test began on August 26, 2010 and ended on August 30, 2010. The third toxicity test began on August 27, 2010 and ended on August 31, 2010. The final toxicity test began on August 28, 2010 and ended on September 1, 2010.

3.3 Toxicity Testing Methods

The 96-hour acute toxicity tests followed procedures in EPA (2001) and were performed using second-to-third instar-larval stage (age 11 to 12 days) *Chironomus tentans* and 14- to 21-day old *Hyalella azteca* exposed to full-strength pore water (100% undiluted). Both the *C. tentans* and *H. azteca* organisms are cultured in-house and routinely used for toxicity testing at the OEME Biology Laboratory. Their general health is monitored through an on-going reference toxicity testing program. **Appendix C** provides control charts.

3.3.1 *C. tentans* Test Methods

The midge fly (*C. tentans)* test used 90 mg/L $CaCO_3$ Hardness Process Water (HPW) as the laboratory control water, which consisted of a mixture of well water from the OEME facility and distilled deionized water amended with sodium bicarbonate. This water is also used to maintain the in-house *C. tentans* culture. The initial hardness of the pore water sample ranged from 20 to 96 mg $CaCO_3$/L, whereas the initial alkalinities ranged from 24 to 120 mg $CaCO_3$/L.

Ten replicates of each pore water sample (Site-impacted and reference) and the laboratory control were prepared to start the test. Each replicate consisted of about 20 mL of sample added to a 30 mL plastic cup. A thin layer of fine sand was added to each test chamber to provide a suitable substrate for the test organisms. One organism was introduced in each of the ten replicates per sample. A quality control check ensured that only one organism was introduced to each replicate. The cups were covered to minimize evaporation and to prevent contamination from airborne particles. The test was static, non-renewal. Each replicate was fed 0.25 mL of a 4.0 g TetraMin flakes/L distilled deionized water solution at 0 and 48 hours. Feedings were recorded, initialed, and dated in a laboratory notebook as well as on the laboratory bench sheets. The test was maintained at 25 ± 1°C in an environmental control chamber with

a 16:8 hour light/dark cycle using cool-white fluorescent lights. Mortalities were recorded at 0 and 96 hours, initialed, and dated on laboratory bench sheets. **Appendix D** provides copies of the laboratory bench sheets.

3.3.2 *H. azteca* Test Methods

The amphipod (*H. azteca*) test used 90 mg/L $CaCO_3$ HPW as the laboratory control water. The organisms used in the test were obtained from the in-house OEME cultures. The organisms were acclimated for three to five days in a crystallizing dish. They were fed 1.5 mL of a yeast-alfalfa-Trout Chow (YAT) mixture and 1.5 mL of a *Chlorella/Spirulina* mixture on the first day, followed by 1.5 mL of YAT each subsequent day of acclimation.

Ten replicates of each pore water sample (on-site and reference) and the laboratory control were prepared to start the test. Each replicate consisted of about 25 mL of sample added to a 35 mL glass culture tube. About 1 cm^2 of Nitex screen was added to each test chamber to serve as a substrate for the organisms. Two organisms were introduced into each test replicate. Only organisms that were swimming normally and appeared healthy were chosen for the test. Care was taken to ensure that all organisms were introduced in the chamber without being caught in surface water tension. A quality control check ensured the proper number of organisms was introduced in each replicate. The test tubes were covered to minimize evaporation and contamination from airborne particles.

The test was static, non-renewal. Each replicate was fed 0.1 mL of YAT and 0.1 mL of *Selenastrum capricornutum* at 0 and 48 hours. Feedings were recorded, initialed, and dated in a laboratory notebook as well as on the laboratory bench sheets. The test was maintained at 25 ± 1°C in an environmental control chamber with a 16:8 hour light/dark cycle using cool-white fluorescent lights. Mortality observations were recorded at 0 and 96 hours, initialed, and dated on laboratory bench sheets. **Appendix E** provides copies of the laboratory bench sheets.

3.3.3 Chemistry

Initial chemistry, consisting of pH, conductivity, dissolved oxygen (DO), temperature, ammonia, alkalinity, and hardness, were performed on each pore water sample at the start of the *C. tentans* and the *H. azteca* tests. The final chemistry for each species consisted of pH, conductivity, DO, and temperature measured in a composite sample of the waste water from each sample. The chemistry analyses help identifies changes which could have affected the test outcome. **Appendix E** summarizes the water chemistry data for both species.

3.4 Statistical Analysis

CETIS® was used to statistically analyze the *C. tentans* and *H. azteca* survival data according to the EPA decision tree (EPA, 2000). Survival data were analyzed separately for each species.

The *C. tentans* survival data were analyzed using the Fisher Exact/Bonferroni-Holm method to determine if a significant difference existed between the references and pore water samples collected downstream from the former Chlor-Alkali facility. References were also compared to each other using the Fisher Exact method. The reference samples (AR2-4 and AR2-5) were tested once for toxicity in the first test. The survival data from these two reference samples were then used for the second, third and fourth tests to compare them to samples collected downstream from Chlor-Alkali.

The *H. azteca* reference survival data were analyzed using the Modified Levene test method to check for homogeneity of variance, and Shapiro-Wilk W test to check for normal distribution. The Wilcoxon Rank Sum Two-Sample Test was used to determine if a significant difference existed between each of the reference samples by plotting them against each other. The reference sample data set had unequal variances and was not normally distributed. Reference sample AR2-4 was not used in the

statistical comparisons because it experienced complete mortality. The Steel Many-One Rank test was used to determine if a significant difference in survival existed between the remaining reference (AR2-5) and the pore water samples collected downstream of the Site. Survival data were analyzed using the Bartlett test method to check for homogeneity of variance, and the Shapiro-Wilk W test to check for normal distribution. This survival data was not normally distributed and had unequal variances. **Appendix F** provides the CETIS® statistical print-outs.

4.0 RESULTS

4.1 *C. tentans* Survival

Survival was the single endpoint measured after 96 hours of exposure to either the laboratory control or pore water from the reference locations upstream (AR2-4 or AR2-5) and sample locations downstream of the former Chlor-Alkali facility (AR8-4, AR8-5, AR9-5, AR9-6, AR9-7, AR6-2, AR6-3, AR7-1, AR7-2, AR4-1, AR4-2, AR5-1 or AR5-2). **Tables 1A, 1B, 1C** and **1D** present the *C. tentans* survival data. The reference locations are labeled with the superscript "A" for clarity.

Table 1A: Percent Survival for the *C. tentans* 96-hour Chlor-Alkali Pore Water Toxicity Test #1
August 24, 2010 – August 28, 2010

Sample Location	Lab Control #1	AR2-4[A]	AR2-5[A]	AR8-4	AR8-5
Percent Survival	100	80	100	100	100

A = Reference location

Table 1B: Percent Survival for the *C. tentans* 96-hour Chlor-Alkali Pore Water Toxicity Test #2
August 26, 2010 – August 30, 2010

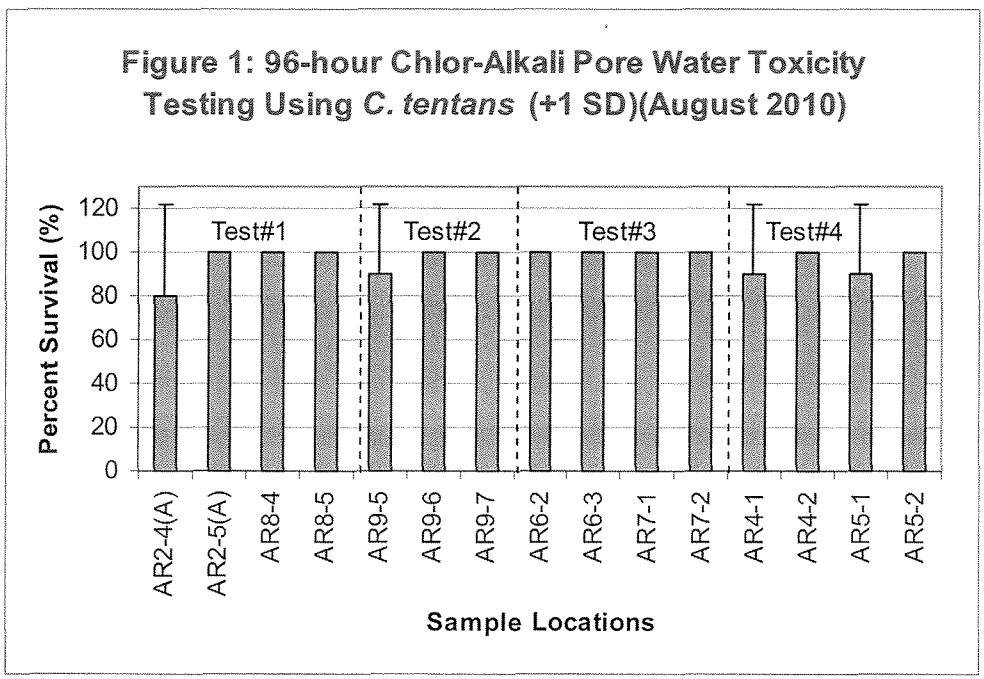
Sample Location	Lab Control #2	AR9-5	AR9-6	AR9-7
Percent Survival	100	90	100	100

Table 1C: Percent Survival for the *C. tentans* 96-hour Chlor-Alkali Pore Water Toxicity Test #3
August 27, 2010 – August 31, 2010

Sample Location	Lab Control #3	AR6-2	AR6-3	AR7-1	AR7-2
Percent Survival	100	100	100	100	100

Table 1D: Percent Survival for the *C. tentans* 96-hour Chlor-Alkali Pore Water Toxicity Test #4 August 28, 2010 – September 1, 2010					
Sample Location	**Lab Control #4**	**AR4-1**	**AR4-2**	**AR5-1**	**AR5-2**
Percent Survival	100	90	100	90	100

All four *C. tentans* laboratory controls met the minimum Test Acceptability Criterion (TAC) of 90% survival (EPA, 2000). The 96-hr survival data were evaluated using the Fisher Exact/Bonferroni-Holm method to determine if a significant ($p \leq 0.05$) difference existed in survival between the Site and the reference samples. The results of the comparisons done by CETIS (v1.1.1 rev C) statistical software are summarized in **Figure 1** with a + one Standard Deviation (SD), separated by a dashed line to indicate each test.



A = Reference location
Dashed lines separate tests started on a different day.
Note: No sample locations showed a significant difference from the reference locations.

4.2 *H. azteca* Survival

Survival was the single endpoint measured after 96 hours of exposure to either the laboratory control or pore water from the reference locations upstream (AR2-4 or AR2-5) and sample locations downstream of the former Chlor-Alkali facility (AR8-4, AR8-5, AR9-5, AR9-6, AR9-7, AR6-2, AR6-3, AR7-1, AR7-2, AR4-1, AR4-2, AR5-1 or AR5-2). **Tables 2A, 2B, 2C** and **2D** present the *H. azteca* survival data. The reference location is labeled with the superscript "A" for clarity. Sample AR2-4 was initially assigned as a reference sample but was not retained due to 100% mortality.

Table 2A: Percent Survival for the *H. azteca* 96-hour Chlor-Alkali Pore Water Toxicity Test #1 (August 24, 2010 – August 28, 2010)					
Sample Location	**Lab Control #1**	**AR2-4[B]**	**AR2-5[A]**	**AR8-4**	**AR8-5**
Percent Survival	100	0*	90	100	95

A = Reference location
B = Originally assigned as a reference sample but discarded due to complete mortality
*Indicates significantly different survival from that measured in the upstream reference sample

Table 2B: Percent Survival for the *H. azteca* 96-hour Chlor-Alkali Pore Water Toxicity Test #2 (August 26, 2010 – August 30, 2010)				
Sample Location	**Lab Control #2**	**AR9-5**	**AR9-6**	**AR9-7**
Percent Survival	100	95	100	100

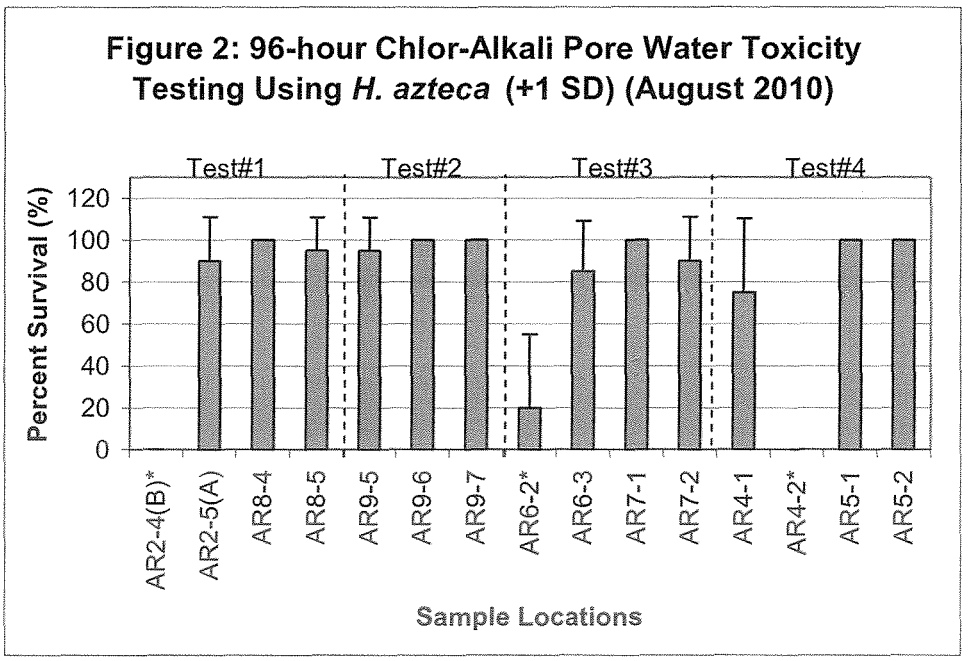
Table 2C: Percent Survival for the *H. azteca* 96-hour Chlor-Alkali Pore Water Toxicity Test #3 (August 27, 2010 – August 31, 2010)					
Sample Location	**Lab Control #3**	**AR6-2**	**AR6-3**	**AR7-1**	**AR7-2**
Percent Survival	100	20*	85	100	90

*Indicates significantly different survival from that measured in the upstream reference sample

Table 2D: Percent Survival for the *H. azteca* 96-hour Chlor-Alkali Pore Water Toxicity Test #4 (August 28, 2010 – September 1, 2010)					
Sample Location	**Lab Control #4**	**AR4-1**	**AR4-2**	**AR5-1**	**AR5-2**
Percent Survival	100	75	0*	100	100

*Indicates significantly different survival from that measured in the upstream reference sample

All four *H. azteca* laboratory controls met the minimum TAC of 90% survival (EPA, 2000). The 96-hr survival data were evaluated using the Steel Many-One Rank test to find significant ($p \leq 0.05$) differences in survival between the Site samples and the reference samples. The results of the comparisons done by CETIS (v1.1.1 rev C) statistical software are summarized in **Figure 2** with a + one Standard Deviation (SD), separated by a dashed line to indicate each test.



A = Reference locations
B = Originally assigned as a reference sample but discarded due to complete mortality
* = Indicates significantly different survival from that measured in the upstream reference sample
Dashed line indicates a test started on a different day.

5.0 DISCUSSION & CONCLUSION

5.1 *C. tentans*

All four *C. tentans* laboratory control samples met the minimum TAC of 90% survival, indicating that the test organisms were healthy. The reference samples had survival rates between 80 and 100%. The response data were evaluated to determine if a significant ($p \leq 0.05$) difference in survival existed between the Site-impacted pore water samples and the reference samples along with the reference samples against each other. No significant effects were found.

Based on these data, it was concluded that none of the pore water samples collected downstream of the former Chlor-Alkali facility were acutely toxic to a sensitive life stage of *C. tentans*.

5.2 *H. azteca*

All four *H. azteca* laboratory control samples met the minimum TAC of 90% survival, indicating that the test organisms were healthy. The 96-hour survival data were evaluated to determine if a significant ($p \leq 0.05$) difference existed in survival between the Site-impacted pore water samples and the reference sample. Only one of the two reference samples (AR2-5) was retained for comparison in the *H. azteca* statistics because the second reference sample (AR2-4) showed 100% mortality after 96 hrs. The reason for that mortality is unclear.

No significant differences were found between reference sample AR2-5 and Site-impacted samples AR8-4, AR8-5, AR9-5, AR9-6, AR9-7, AR6-3, AR7-1, AR7-2, AR4-1, AR5-1 or AR5-2. A significant effect was seen when survival in the reference sample was compared to survival in site-impacted samples AR6-2 (20%) and AR4-2 (0%).

It was concluded that pore water samples AR6-2 and AR4-2, and one of the two upstream reference samples, were acutely toxic to a sensitive life stage of *H. azteca*. *C. tentans* showed 100% survival at these same two locations (AR6-2, AR4-2).

Appendix G provides pictures of the three pore water samples that resulted in significant mortality. Reference sample AR2-4 showed a fine, dark-orange, fluffy suspended substance that settled out over time. AR6-2 initially had a dark orange/tea color but turned clear after 96 hrs, even though an orange fluffy substance accumulated on the bottom. Sample AR4-2 had a dark brown/tea color. None of the other pore water samples showed this high level of discoloration.

It appears that the reference location in Wheeler Bay may be affected by an unknown cause because reference sample AR2-4 experienced complete mortality in the *H. azteca* test. The ammonia level in this sample (9.01 mg/l at pH of 6.58) was three- to nine-times higher than that measured in any of the other pore water samples collected for this study (see **Appendix E**). According to Ankley et al (1995), however, the 96-hr LC_{50} of ammonia to *H. azteca* in soft water with a pH between 6.5 and 8.5 is about 20 mg/L and is not pH dependent. AR2-4 had a hardness of 32 mg/L $CaCO_3$, matching that of soft water, and the ammonia concentration was half of the predicted LC_{50} so this was not likely to be the primary cause of mortality. Besser et al. (1998) also reported a 96-hr LC_{50} of ammonia to *H. azteca* ranging between 117 and 126 mg/L, again suggesting that the ammonia level measured in pore water sample AR2-4 was unlikely to be responsible for the acute toxicity. Note that some mortality was observed in *H. azteca* exposed to pore water from this area (Wheeler Bay) during a previous toxicity test in September 2009 (TDF No. 1501).

6.0 REFERENCES

Ankley, G.T., Schubauer-Berigan, M.K., and Monson, P.D. 1995. Influence of pH and hardness on the toxicity of ammonia to the amphipod *Hyalella azteca*. *Can. J. Fish. Aquat. Sci.* 52:2078-2083.

Besser, J.M., C.G. Ingersoll, E.N. Leonard, and D.R. Mount. 1998. Effect of Zeolite on Toxicity of Ammonia in Freshwater Sediments: Implications for Toxicity Identification Evaluation Procedures. Environ.Toxicol. Chem. 17(11):2310-2317.

CETIS v1.1.1 rev C. Tidepool Scientific Software. Copyright 2000-2005. Michael A. Ives.

U. S. Environmental Protection Agency. 2000. *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, Second Edition*, EPA/600/R-99/064, March, 2000.

U. S. Environmental Protection Agency. 2001. Biology Section Standard Operating Procedure, Acute (96-hour) Reference Toxicity Test Methods for *Hyalella azteca* and *Chironomus tentans*, Office of Environmental Measurement and Evaluation, U.S. Environmental Protection Agency, Region 1.

Appendix A

Pore Water Sampling Stations

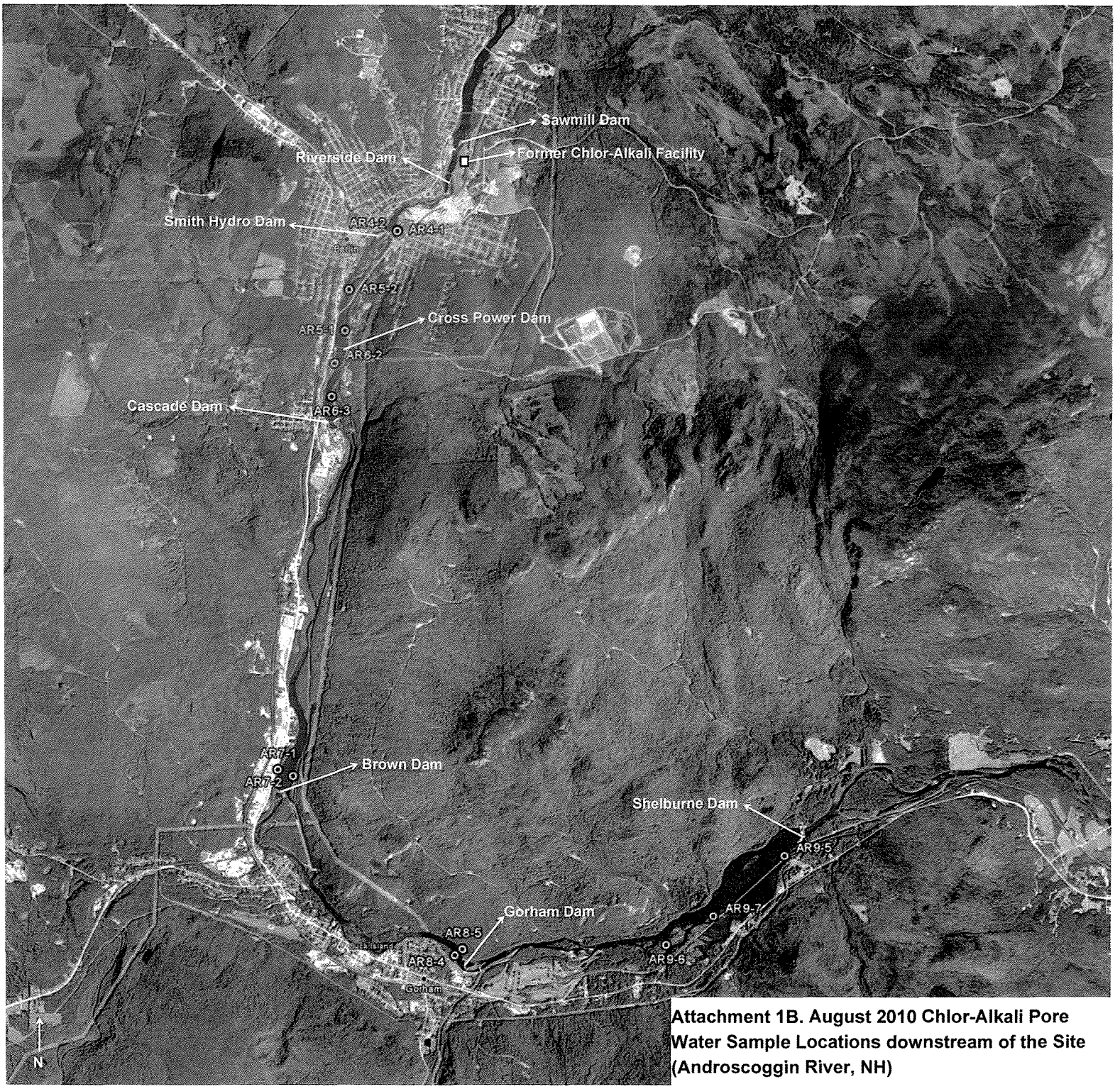
Attachment 1: Chlor-Alkali Pore Water Sampling Locations

Collected by USGS

Lab Sample ID	Field Sample ID	Collection Date	GPS Coordinates (Degrees)		Sample Location
AR2-4	S-1	8/23/2010	44.61665	-71.22092	Wheeler Bay
AR2-5	S-2		44.61799	-71.22301	Wheeler Bay
AR8-4	S-3	8/24/2010	44.39046	-71.16827	Gorham Dam[A]
AR8-5	S-4		44.39113	-71.16704	Gorham Dam[A]
AR9-5	S-5	8/24/2010	44.40137	-71.11760	Shelburne Reservoir
AR9-6	S-6	8/25/2010	44.39164	-71.13568	Shelburne Reservoir
AR9-7	S-7		44.39474	-71.12846	Shelburne Reservoir
AR6-2	S-10	8/26/2010	44.45519	-71.18681	Cascade Dam[A]
AR6-3	S-11		44.45156	-71.18729	Cascade Dam[A]
AR7-1	S-8		44.41076	-71.19547	Brown Dam[A]
AR7-2	S-9		44.41006	-71.19313	Brown Dam[A]
AR4-1	S-14	8/27/2010	44.46975	-71.17725	Smith Hydro Dam[A]
AR4-2	S-15		44.46965	-71.17726	Smith Hydro Dam[A]
AR5-1	S-12		44.45875	-71.18523	Cross Power Dam[A]
AR5-2	S-13		44.46325	-71.18462	Cross Power Dam[A]

A. The pore water samples were collected upgradient of the dam.

Attachment 1A. August 2010 Chlor-Alkali Pore Water Sample Locations Upstream of Site (Androscoggin River, NH)



Attachment 1B. August 2010 Chlor-Alkali Pore Water Sample Locations downstream of the Site (Androscoggin River, NH)

Appendix B

Chain-of-Custody Records

ENVIRONMENTAL PROTECTION AGENCY

REGION 1

Page 1 of 4

CHAIN OF CUSTODY RECORD

PROJ. NO.: 10100010

PROJECT NAME: Chlor-Alkali (Test #1)

SAMPLERS: (Signature) [signature]

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	Toxicity Testing (1 hr.) BGK 8-24-10	TOXPWCT	TOXPWHA				REMARKS
AR2-4	8/23/10	13:30		✓	Wheeler Bay	1	✓	✓	✓				Labeled as S-1
AR2-5	8/23/10	16:30		✓	Wheeler Bay	1	✓	✓	✓				" " S-2
AR8-4	8/24/10	10:30		✓	Gorham Dam	1	✓	✓	✓				" " S-3
AR8-5	8/24/10	12:00		✓	Gorham Dam	1	✓	✓	✓				" " S-4

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Erica Cyngel	8-~~22~~ 24-10 EC 6:00	Bethany Kelley			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Bethany Kelley	8-24-10 ~~8-22-10~~ BGK 6:00 PM		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

Project No. 10010 Page 16 of 73

1- 18597

ENVIRONMENTAL PROTECTION AGENCY

REGION 1

Page 2 of 4

CHAIN OF CUSTODY RECORD

PROJ. NO.: 10100010

PROJECT NAME: Chlor-Alkali Pore Water (Test # 2)

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	96Hr Tox Test (BGK 8.27.10)	TOXPWCT	TOXPWHA				REMARKS
AR9-5	8/24/10	17:30		✓	Shelburne Reservoir	1	✓						Pore Water Samples
AR9-6	8/25/10	10:00		✓	"	1	✓						"
AR9-7	8/25/10	12:30		✓	"	1	✓						"

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8/25/10 18:30	Emily Berthe			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Bethany Kelley	8.26.10 0830		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

Project No. 10010 Page 17 of 73

1- 18607

ENVIRONMENTAL PROTECTION AGENCY

REGION 1

CHAIN OF CUSTODY RECORD

PROJ. NO.: 10100010

PROJECT NAME: Chlor-Alkali Pore Water (Test #3)

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	96 Hour Tox Test	TOXPUCT + TOXPUHA (BGK 8/27/10)					REMARKS
AR6-2	8/26/10	15:30		✓	Cascade Dam	1	✓						Pore Water
AR6-3	8/26/10	17:00		✓	Cascade Dam	1	✓						Pore Water
AR7-1	8/26/10	10:00		✓	Gorham Brown Dam	1	✓						Pore Water
AR7-2	8/26/10	12:00		✓	Gorham Brown Dam	1	✓						Pore Water

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
[signature]	8/26/10 21:40	Bethany Kelley			
Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks	
		Bethany Kelley	8-27-10 0830		

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

Project No. 10010 Page 18 of 73

1- 18617

ENVIRONMENTAL PROTECTION AGENCY

REGION 1

CHAIN OF CUSTODY RECORD

PROJ. NO.: 10100010

PROJECT NAME: Chlor-Alkali Pore Water (Test #4)

SAMPLERS: (Signature)

STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION	NO. OF CONTAINERS	TOXPWCT	TOXPWHIA					REMARKS
AR5-1	8/27/10	9:00		✓	Cross Power Dam	1	✓	✓					
AR5-2	8/27/10	10:45		✓	"	1	✓	✓					
AR4-1	8/27/10	14:00		✓	Smith Hydro Dam	1	✓	✓					
AR4-2	8/27/10	16:30		✓	"	1	✓	✓					

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)
	8/27/10 22:00				

Relinquished by: (Signature)	Date / Time	Received by: (Signature)	Relinquished by: (Signature)	Date / Time	Received by: (Signature)

Relinquished by: (Signature)	Date / Time	Received for Laboratory by: (Signature)	Date / Time	Remarks
			8/27/10 22:00	

Distribution: Original Accompanies Shipment; Copy to Coordinator Field Files

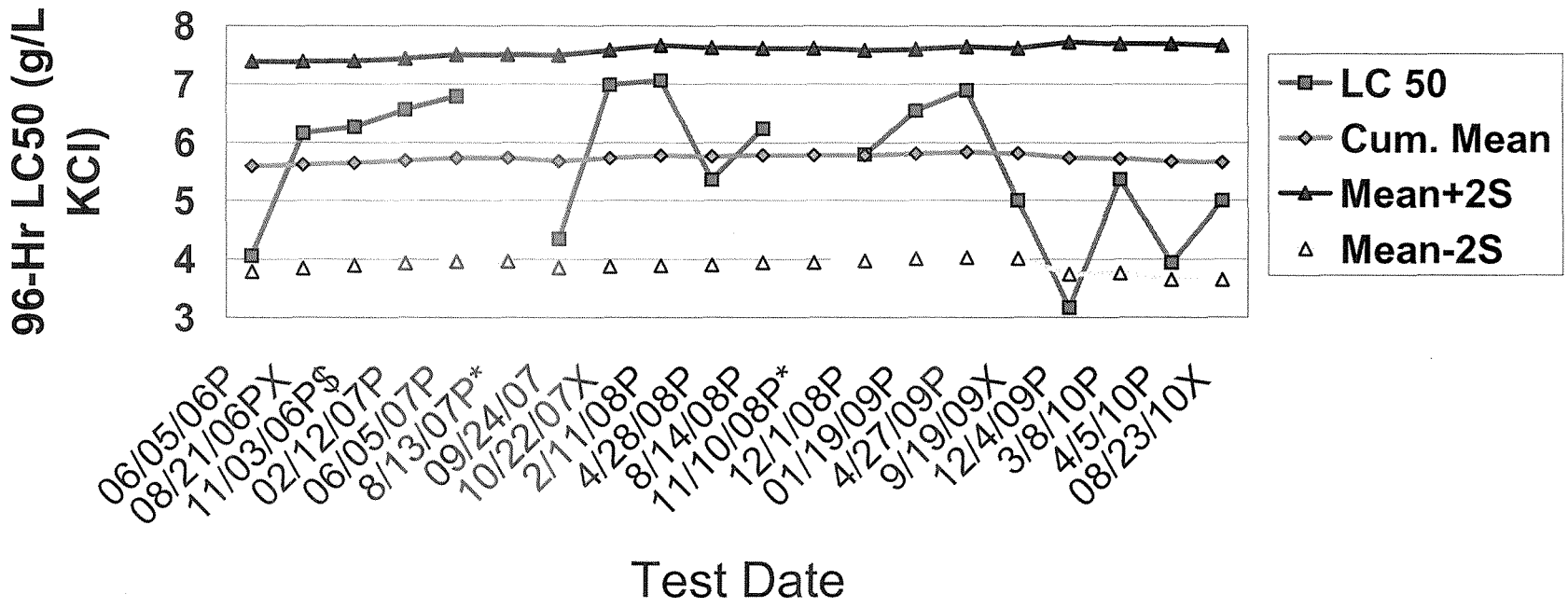
Project No. 100010 Page 19 of 73

1- 18608

Appendix C

Reference Toxicity Test Control Charts

C. tentans 96-Hour LC50 Ref. Tox. Control Chart



NOTES:

Historical data are available for tests performed prior to 6/5/06

P=tests were performed at the Chelmsford facility using laboratory process water.

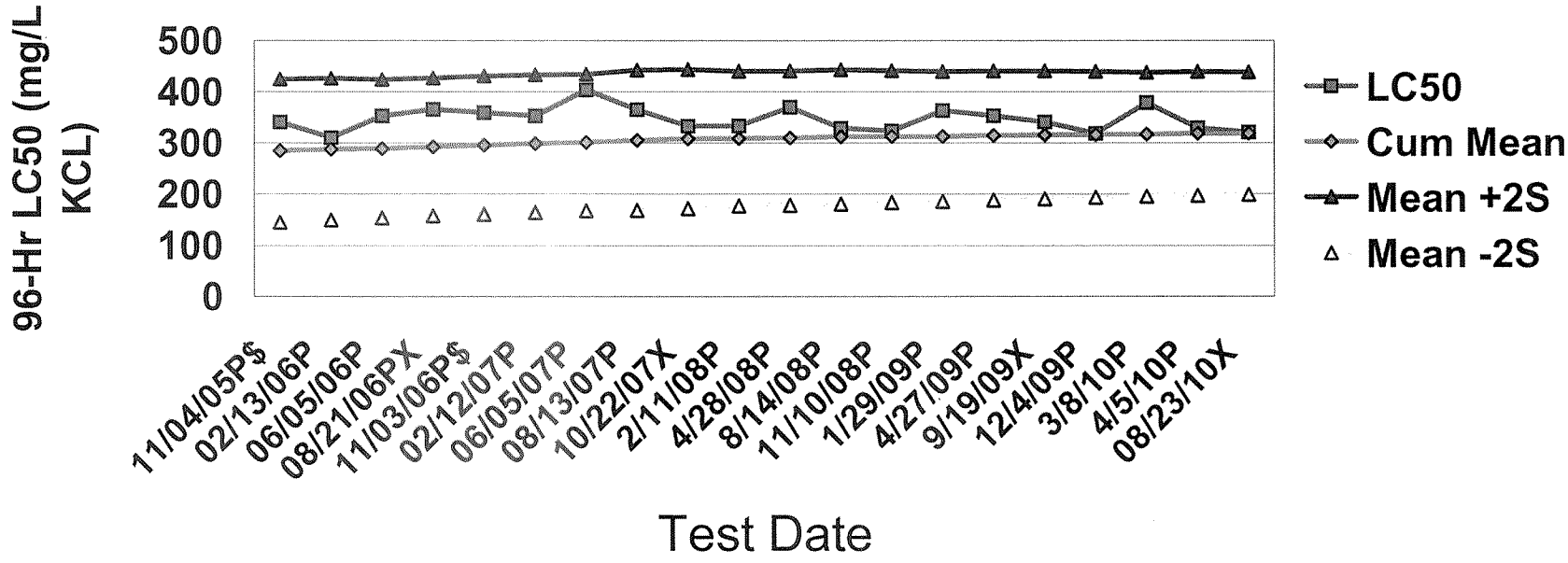
*=test failed because it did not meet the test acceptability criteria (TAC).

$ indicates that the test was performed concurrently with a site-specific sediment toxicity test.

X indicates that the test was performed concurrently with a site-specific acute pore water toxicity test.

REVISION DATE: 10/8/10

H. azteca 96-Hour LC50 Ref. Tox. Control Chart



NOTES:

Historical data are available for tests performed prior to11/4/05

P=tests were performed at the Chelmsford facility using laboratory process water.

*=test failed because it did not meet the test acceptability criteria (TAC).

$ indicates that the test was performed concurrently with a site-specific sediment toxicity test.

X indicates that the test was performed concurrently with a site-specific acute pore water toxicity test.

REVISION DATE: 10/8/10

Appendix D

Pore Water Test Bench Sheets

Chlor-Alkali Pore Water Toxicity Test #1 Using *C. tentans*

Started: 8·24·10 @ 7:00 PM - BGK, EC, MM
Fed Day 0?: ✓BGK Fed Day 2?: ✓BGK

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
Control1	1	5	1	1	
Control1	2	37	1	1	
Control1	3	6	1	1	
Control1	4	11	1	1	
Control1	5	50	1	1	
Control1	6	28	1	1	
Control1	7	47	1	1	
Control1	8	43	1	1	
Control1	9	4	1	1	
Control1	10	3	1	1	
AR2-4	1	48	1	~~1~~ 0	BGK 8·28·10
AR2-4	2	23	1	1	
AR2-4	3	29	1	~~0~~ 1	BGK 8·28·10
AR2-4	4	9	1	1	
AR2-4	5	39	1	1	
AR2-4	6	10	1	1	
AR2-4	7	33	1	1	
AR2-4	8	20	1	0	
AR2-4	9	38	1	1	
AR2-4	10	8	1	1	
AR2-5	1	18	1	1	Slight sheen on samples (breaks apart)
AR2-5	2	36	1	1	
AR2-5	3	49	1	1	
AR2-5	4	46	1	1	
AR2-5	5	40	1	1	
AR2-5	6	22	1	1	
AR2-5	7	44	1	1	
AR2-5	8	27	1	1	
AR2-5	9	35	1	1	
AR2-5	10	32	1	1	
AR8-4	1	12	1	1	
AR8-4	2	30	1	1	
AR8-4	3	14	1	1	
AR8-4	4	16	1	1	
AR8-4	5	34	1	1	
AR8-4	6	13	1	1	
AR8-4	7	19	1	1	
AR8-4	8	26	1	1	
AR8-4	9	7	1	1	
AR8-4	10	2	1	1	
Date & Initials:			BGK 8·24·10	BGK 8·28·10	

QC Check EC 8·24·10

Project No. 100010
Page 24 of 73

Chlor-Alkali Pore Water Toxicity Test #1 Using *C. tentans*

Started: 8·24·10 @7:00PM - BGK, EC, MM
Fed Day 0?: ✓ BGK Fed Day 2?:

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
AR8-5	1	15	1	1	very fine light sheen (breaks apart)
AR8-5	2	41	1	1	
AR8-5	3	24	1	1	
AR8-5	4	25	1	1	
AR8-5	5	1	1	1	
AR8-5	6	31	1	1	
AR8-5	7	42	1	1	
AR8-5	8	45	1	1	
AR8-5	9	17	1	1	
AR8-5	10	21	1	1	
Date & Initials:			BGK 8·24·10	BGK 8·28·10	

QC Check EC 8·24·10

Project No. 100010
Page 25 of 73

Chlor-Alkali Pore Water Toxicity Test #2 Using *C. tentans*

Started: 8.26.10 @10:00AM - BGK
Fed Day 0?: BGK Fed Day 2?: EC

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
Control2	1	4	1	1	
Control2	2	19	1	1	
Control2	3	31	1	1	
Control2	4	27	1	1	
Control2	5	17	1	1	
Control2	6	8	1	1	
Control2	7	9	1	1	
Control2	8	35	1	1	
Control2	9	21	1	1	
Control2	10	7	1	1	
AR9-5	1	26	1	1	
AR9-5	2	12	1	0	
AR9-5	3	5	1	1	
AR9-5	4	6	1	1	
AR9-5	5	37	1	1	
AR9-5	6	29	1	1	
AR9-5	7	24	1	1	
AR9-5	8	36	1	1	
AR9-5	9	16	1	1	
AR9-5	10	22	1	1	
AR9-6	1	40	1	1	
AR9-6	2	13	1	1	
AR9-6	3	10	1	1	
AR9-6	4	15	1	1	
AR9-6	5	34	1	1	
AR9-6	6	30	1	1	
AR9-6	7	18	1	1	
AR9-6	8	28	1	1	
AR9-6	9	1	1	1	
AR9-6	10	23	1	1	
AR9-7	1	14	1	1	
AR9-7	2	3	1	1	
AR9-7	3	2	1	1	
AR9-7	4	33	1	1	
AR9-7	5	25	1	1	
AR9-7	6	38	1	1	
AR9-7	7	20	1	1	
AR9-7	8	32	1	1	
AR9-7	9	39	1	1	
AR9-7	10	11	1	1	
Date & Initials:			8.26.10 BGK	8.30.10 EC	

QCed: EC 8.26.10

Project No. 100010
Page 26 of 73

Chlor-Alkali Pore Water Toxicity Test #3 Using *C. tentans*

Started: 8·27·10 - BGK (@ 11:50)
Fed Day 0?: BGK Fed Day 2?: CW

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
Control3	1	12	1	1	
Control3	2	37	1	1	
Control3	3	4	1	1	
Control3	4	40	1	1	
Control3	5	13	1	1	
Control3	6	29	1	1	
Control3	7	20	1	1	
Control3	8	10	1	1	
Control3	9	31	1	1	
Control3	10	22	1	1	
AR6-2	1	21	1	1	
AR6-2	2	16	1	1	
AR6-2	3	7	1	1	
AR6-2	4	42	1	1	
AR6-2	5	39	1	1	
AR6-2	6	36	1	1	
AR6-2	7	25	1	1	
AR6-2	8	27	1	1	
AR6-2	9	43	1	1	
AR6-2	10	35	1	1	
AR6-3	1	44	1	1	
AR6-3	2	14	1	1	
AR6-3	3	45	1	1	
AR6-3	4	15	1	1	
AR6-3	5	47	1	1	
AR6-3	6	33	1	1	
AR6-3	7	1	1	1	
AR6-3	8	30	1	1	
AR6-3	9	2	1	1	
AR6-3	10	48	1	1	
AR7-1	1	17	1	1	
AR7-1	2	23	1	1	
AR7-1	3	11	1	1	
AR7-1	4	8	1	1	
AR7-1	5	5	1	1	
AR7-1	6	19	1	1	
AR7-1	7	50	1	1	
AR7-1	8	41	1	1	
AR7-1	9	32	1	1	
AR7-1	10	18	1	1	
Date & Initials:			8·27·10 BGK	~~8·2~~ BGK 8·31·10	

QC: mm 8-27-10

Project No. 100010
Page 27 of 73

Chlor-Alkali Pore Water Toxicity Test #3 Using *C. tentans*

Started: 8·27·10 BGK (@11:50)
Fed Day 0?: BGK Fed Day 2?: EW

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
AR7-2	1	34	1	1	
AR7-2	2	28	1	1	
AR7-2	3	3	1	1	
AR7-2	4	24	1	1	
AR7-2	5	49	1	1	
AR7-2	6	46	1	1	
AR7-2	7	38	1	1	
AR7-2	8	26	1	1	
AR7-2	9	6	1	1	
AR7-2	10	9	1	1	
Date & Initials:			8·27·10 BGK	8·31·10 BGK	

QC: mm 8-27-10

Project No. 100010
Page 28 of 73

Chlor-Alkali Pore Water Toxicity Test #4 Using *C. tentans*

Started: 8·28·10 @ 1615
Fed Day 0?: BGK Fed Day 2?: EC

BGK 8.28.10

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
Control 5 4	1	1	1	1	
Control 5 4	2	30	1	1	
Control 5 4	3	43	1	1	
Control 5 4	4	37	1	1	
Control 5 4	5	50	1	1	
Control 5 4	6	26	1	1	
Control 5 4	7	32	1	1	
Control 5 4	8	31	1	1	
Control 5 4	9	17	1	1	
Control 5 4	10	46	1	1	
AR4-1	1	24	1	0	
AR4-1	2	49	1	1	
AR4-1	3	21	1	1	
AR4-1	4	40	1	1	
AR4-1	5	35	1	1	
AR4-1	6	18	1	1	
AR4-1	7	34	1	1	
AR4-1	8	29	1	1	
AR4-1	9	33	1	1	
AR4-1	10	41	1	1	
AR4-2	1	6	1	1	
AR4-2	2	8	1	1	
AR4-2	3	4	1	1	
AR4-2	4	7	1	1	
AR4-2	5	11	1	1	
AR4-2	6	22	1	1	
AR4-2	7	36	1	1	
AR4-2	8	25	1	1	
AR4-2	9	20	1	1	
AR4-2	10	48	1	1	
AR5-1	1	15	1	1	
AR5-1	2	12	1	1	
AR5-1	3	16	1	1	
AR5-1	4	9	1	1	
AR5-1	5	44	1	1	
AR5-1	6	19	1	1	
AR5-1	7	47	1	0	
AR5-1	8	39	1	1	
AR5-1	9	23	1	1	
AR5-1	10	13	1	1	
Date & Initials:			BGK 8·28·10	9/01/2010 MT	

Qc'd EC 8·28·10

Project No. 100010
Page 29 of 73

Chlor-Alkali Pore Water Toxicity Test #4 Using *C. tentans*

Started: 8·28·10 @ 1615
Fed Day 0?: BGK Fed Day 2?: EC

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
AR5-2	1	3	1	1	
AR5-2	2	10	1	1	
AR5-2	3	2	1	1	
AR5-2	4	45	1	1	
AR5-2	5	38	1	1	
AR5-2	6	5	1	1	
AR5-2	7	27	1	1	
AR5-2	8	28	1	1	
AR5-2	9	42	1	1	
AR5-2	10	14	1	1	
Date & Initials:			BGK 8·28·10	9/01/2010 MF	

Project No. 100010
Page 30 of 73

Chlor-Alkali Pore Water Toxicity Test #1 Using *H. azteca*

Started: 8.24.10 @7:00pm
Fed Day 0?: ✓BGK Fed Day 2?: ✓BGK

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
Control1	1	30	2	2	
Control1	2	23	2	2	
Control1	3	44	2	2	
Control1	4	45	2	2	
Control1	5	15	2	2	
Control1	6	28	2	2	
Control1	7	34	2	2	
Control1	8	4	2	2	
Control1	9	11	2	2	
Control1	10	13	2	2	
AR2-4	1	29	2	0	
AR2-4	2	41	2	0	
AR2-4	3	26	2	0	
AR2-4	4	14	2	0	
AR2-4	5	21	2	0	
AR2-4	6	49	2	0	
AR2-4	7	42	2	0	
AR2-4	8	32	2	0	
AR2-4	9	40	2	0	
AR2-4	10	48	2	0	
AR2-5	1	27	2	2	
AR2-5	2	25	2	2	
AR2-5	3	20	2	2	
AR2-5	4	18	2	1	
AR2-5	5	50	2	2	
AR2-5	6	47	2	2	
AR2-5	7	2	2	2	
AR2-5	8	22	2	2	
AR2-5	9	9	2	1	
AR2-5	10	3	2	2	
AR8-4	1	36	2	2	
AR8-4	2	31	2	2	
AR8-4	3	37	2	2	
AR8-4	4	35	2	2	
AR8-4	5	33	2	2	
AR8-4	6	10	2	2	
AR8-4	7	24	2	2	
AR8-4	8	19	2	2	
AR8-4	9	17	2	2	
AR8-4	10	7	2	2	
AR8-5	1	39	2	2	
Date & Initials:			8.24.10 EC	8.28.10 BGK+EC	

QCed: BGK 8.24.10 Project No. L00016
Page 31 of 73

Chlor-Alkali Pore Water Toxicity Test #1 Using *H. azteca*

Started: 8·24·10 @ 7:00 PM
Fed Day 0?: ✓BGK Fed Day 2?: ✓BGK

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
AR8-5	2	6	2	2	
AR8-5	3	43	2	2	
AR8-5	4	16	2	2	
AR8-5	5	12	2	2	
AR8-5	6	46	2	2	
AR8-5	7	38	2	2	
AR8-5	8	8	2	2	
AR8-5	9	1	2	~~2~~ 1	BGK 8·28·10
AR8-5	10	5	2	2	
Date & Initials:			8·24·10 EC	8·28·10 BGK	

QCed: BGK 8·24·10

Project No. 100010
Page 32 of 73

Chlor-Alkali Pore Water Toxicity Test #2 Using *H. azteca*

Started: 8·26·10 @ 10:00 AM - BGK
Fed Day 0?: BGK Fed Day 2?: EC

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
Control2	1	15	2	2	
Control2	2	32	2	2	
Control2	3	4	2	2	
Control2	4	38	2	2	
Control2	5	20	2	2	
Control2	6	19	2	2	
Control2	7	16	2	2	
Control2	8	3	2	2	
Control2	9	26	2	2	
Control2	10	1	2	2	
AR9-5	1	34	2	2	
AR9-5	2	30	2	1	
AR9-5	3	36	2	2	
AR9-5	4	7	2	2	
AR9-5	5	11	2	2	
AR9-5	6	12	2	2	
AR9-5	7	22	2	2	
AR9-5	8	14	2	2	
AR9-5	9	28	2	2	
AR9-5	10	9	2	2	
AR9-6	1	2	2	2	
AR9-6	2	33	2	2	
AR9-6	3	37	2	2	
AR9-6	4	40	2	2	
AR9-6	5	24	2	2	
AR9-6	6	23	2	2	
AR9-6	7	5	2	2	
AR9-6	8	31	2	2	
AR9-6	9	29	2	2	
AR9-6	10	27	2	2	
AR9-7	1	18	2	2	
AR9-7	2	8	2	2	
AR9-7	3	10	2	2	
AR9-7	4	17	2	2	
AR9-7	5	39	2	2	
AR9-7	6	21	2	2	
AR9-7	7	35	2	2	
AR9-7	8	13	2	2	
AR9-7	9	6	2	2	
AR9-7	10	25	2	2	
Date & Initials:			8·26·10 BGK	8·30·10 EC	

QCed: 8·26·10 EC

Project No. 100010
Page 33 of 73

Chlor-Alkali Pore Water Toxicity Test #3 Using *H. azteca*

Started: 8·27·10 BGK (@ 11:30)
Fed Day 0?: BGK Fed Day 2?: EN

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
Control 3	1	46	2	2	
Control 3	2	16	2	2	
Control 3	3	20	2	2	
Control 3	4	12	2	2	
Control 3	5	6	2	2	
Control 3	6	4	2	2	
Control 3	7	1	2	2	
Control 3	8	48	2	2	
Control 3	9	8	2	2	
Control 3	10	44	2	2	
AR6-2	1	15	2	~~2~~ 1	BGK 8.31.10
AR6-2	2	11	2	0	6-2: rusty color w/sheen. (breaks apart)
AR6-2	3	5	2	0	orange fluff has settled out.
AR6-2	4	36	2	0	was originally tea colored
AR6-2	5	19	2	2	
AR6-2	6	35	2	1	
AR6-2	7	13	2	0	
AR6-2	8	32	2	0	
AR6-2	9	7	2	0	
AR6-2	10	9	2	0	
AR6-3	1	47	2	2	6-3: yellow/beige tint w/slight sheen. (breaks apart)
AR6-3	2	50	2	1	
AR6-3	3	2	2	2	
AR6-3	4	31	2	1	
AR6-3	5	43	2	2	
AR6-3	6	18	2	2	
AR6-3	7	3	2	2	
AR6-3	8	45	2	1	
AR6-3	9	23	2	2	
AR6-3	10	29	2	2	
AR7-1	1	28	2	2	
AR7-1	2	37	2	2	
AR7-1	3	10	2	2	
AR7-1	4	38	2	2	
AR7-1	5	21	2	2	
AR7-1	6	14	2	2	
AR7-1	7	27	2	2	
AR7-1	8	34	2	2	
AR7-1	9	26	2	2	
AR7-1	10	22	2	2	
Date & Initials:			8.27.10 BGK	8.31.10 BGK	

QC: mm 8-27-10

Project No. 100010
Page 34 of 73

Chlor-Alkali Pore Water Toxicity Test #3 Using *H. azteca*

Started: 8·27·10 BGK (@11:30)
Fed Day 0?: BGK Fed Day 2?: GW

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
AR7-2	1	33	2	2	7-2: some fine precipitate has settled out
AR7-2	2	42	2	2	
AR7-2	3	39	2	2	
AR7-2	4	41	2	1	moving slow.
AR7-2	5	24	2	2	
AR7-2	6	49	2	2	
AR7-2	7	17	2	1	seems slightly disoriented.
AR7-2	8	40	2	2	
AR7-2	9	30	2	2	
AR7-2	10	25	2	2	
Date & Initials:			8·27·10 BGK	8·31·10 BGK	

QC: mm 8-27-10

Project No. 100010
Page 35 of 73

Chlor-Alkali Pore Water Toxicity Test #4 Using *H. azteca*

Started: 8-28-10 @ 1615
Fed Day 0?: BGK Fed Day 2?: EC

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
Control4	1	44	2	2	
Control4	2	48	2	2	
Control4	3	15	2	2	
Control4	4	13	2	2	
Control4	5	11	2	2	
Control4	6	34	2	2	
Control4	7	19	2	2	
Control4	8	6	2	2	
Control4	9	14	2	2	
Control4	10	49	2	2	
AR4-1	1	40	2	2	
AR4-1	2	31	2	1	
AR4-1	3	9	2	1	
AR4-1	4	23	2	1	
AR4-1	5	37	2	0	
AR4-1	6	43	2	2	
AR4-1	7	27	2	2	
AR4-1	8	29	2	2	
AR4-1	9	18	2	2	
AR4-1	10	21	2	2	
AR4-2	1	25	2	0	
AR4-2	2	22	2	0	
AR4-2	3	50	2	0	
AR4-2	4	38	2	0	
AR4-2	5	4	2	0	
AR4-2	6	17	2	0	
AR4-2	7	3	2	0	
AR4-2	8	26	2	0	
AR4-2	9	39	2	0	
AR4-2	10	32	2	0	
AR5-1	1	46	2	2	
AR5-1	2	47	2	2	
AR5-1	3	12	2	2	
AR5-1	4	1	2	2	
AR5-1	5	28	2	2	
AR5-1	6	42	2	2	
AR5-1	7	7	2	2	
AR5-1	8	2	2	2	
AR5-1	9	45	2	2	
AR5-1	10	35	2	2	
Date & Initials:			BGK 8-28-10	9/01/2010 MF	

Qc'd EC 8-28-10

Project No. 100010
Page 36 of 73

Chlor-Alkali Pore Water Toxicity Test #4 Using *H. azteca*

Started: 8·28·10 @ 1615
Fed Day 0?: BGK Fed Day 2?: EC

Sample ID	Rep	Pos	# Exposed	# Survived	Notes & Observations
AR5-2	1	30	2	2	
AR5-2	2	36	2	2	
AR5-2	3	5	2	2	
AR5-2	4	41	2	2	
AR5-2	5	33	2	2	
AR5-2	6	24	2	2	
AR5-2	7	20	2	2	
AR5-2	8	8	2	2	
AR5-2	9	10	2	2	
AR5-2	10	16	2	2	
Date & Initials:			BGK 8·28·10	9/01/2010 MF	

Qc'd 8·28·10

Project No. 100010
Page 37 of 73

Appendix E

Summary of Toxicity Test Chemistry for

H. azteca and *C. tentans*

Chironomus tentans 96-hr Acute Pore Water Toxicity Test#1: Chlor-Alkali

C. tentans Acute Exposure Test Initial Chemistry (8/24/10)							
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**	**Hardness (mg/L $CaCO_3$)**	**Alkalinity (mg/L $CaCO_3$)**	**Ammonia (mg/L)**
Lab Control 1[1]	318	8.20	7.59	24.22	82	56.5	ND[2]
AR2-4	155.5	6.58	6.16	24.56	32	77.2	9.01
AR2-5	80.5	6.33	8.01	24.05	24	36.0	ND
AR8-4	54.3	6.58	7.24	24.09	14	20.5	ND
AR8-5	106.5	6.39	6.41	24.31	28	48.0	2.84

1. Control= 90 HPW + $NaHCO_3$
2. ND = Not Detected (<1mg/L)

C. tentans Acute Exposure Test Final Chemistry (8/28/10)				
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control 1[1]	392	7.81	9.76	24.05
AR2-4	174.1	7.89	9.14	24.00
AR2-5	114.1	7.60	8.90	24.37
AR8-4	107.6	7.52	9.07	24.18
AR8-5	133.9	7.66	9.16	24.07

1. Control= 90 HPW + $NaHCO_3$

Chironomus tentans 96-hr Acute Pore Water Toxicity Test#2: Chlor-Alkali

C. tentans Acute Exposure Test Initial Chemistry (8/26/10)							
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**	**Hardness (mg/L $CaCO_3$)**	**Alkalinity (mg/L $CaCO_3$)**	**Ammonia (mg/L)**
Lab Control 2[1]	323	7.70	7.83	24.29	82	53.6	ND[2]
AR9-5	36.6	6.20	7.40	24.17	8	10.0	ND
AR9-6	55.0	6.16	7.29	24.16	16	17.9	ND
AR9-7	42.2	6.06	7.05	24.13	12	11.6	ND

1. Control= 90 HPW + $NaHCO_3$
2. ND = Not Detected (<1mg/L)

C. tentans Acute Exposure Test Final Chemistry (8/30/09)				
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control 2[1]	383	7.61	6.93	24.05
AR9-5	85.7	7.09	6.84	24.07
AR9-6	98.7	7.20	6.75	24.28
AR9-7	85.1	7.04	6.79	24.03

1. Control= 90 HPW + $NaHCO_3$

Chironomus tentans 96-hr Acute Pore Water Toxicity Test#3: Chlor-Alkali

C. tentans Acute Exposure Test Initial Chemistry (8/27/10)							
Sample ID	Conductivity (µs/cm)	pH	DO (mg/L)	Temperature (˚C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Lab Control 3[1]	328	7.93	7.78	24.01	80.4	54	ND[2]
AR6-2	268	6.28	4.33	24.14	41.6	107	2.66
AR6-3	119.1	6.37	6.84	24.00	37.6	63	2.47
AR7-1	63.5	7.40	8.03	23.87	16.4	19	ND
AR7-2	78.0	6.63	7.40	24.41	30.0	37	1.15

1. Control= 90 HPW + $NaHCO_3$
2. ND = Not Detected (<1mg/L)

C. tentans Acute Exposure Test Final Chemistry (8/31/10)				
Sample ID	Conductivity (µs/cm)	pH	DO (mg/L)	Temperature (˚C)
Lab Control 3[1]*	381	7.86	7.58	25.12
AR6-2	280	7.58	6.96	24.29
AR6-3	140.6	7.58	7.45	24.19
AR7-1	98.5	7.42	7.53	24.16
AR7-2	117.2	7.71	7.65	24.13

1. Control= 90 HPW + $NaHCO_3$

Chironomus tentans 96-hr Acute Pore Water Toxicity Test#4: Chlor-Alkali

C. tentans Acute Exposure Test Initial Chemistry (8/28/10)							
Sample ID	Conductivity (µs/cm)	pH	DO (mg/L)	Temperature (˚C)	Hardness (mg/L $CaCO_3$)	Alkalinity (mg/L $CaCO_3$)	Ammonia (mg/L)
Lab Control 3[1]	328	7.82	9.85	24.15	80.8	55	ND[2]
AR6-2	2330	6.87	4.48	24.41	231.2	488	2.08
AR6-3	3140	6.76	5.27	24.41	24.0	1020	1.00
AR7-1	282	6.29	10.06	24.13	22.0	35	1.49
AR7-2	139.5	6.64	9.52	24.25	46.0	59	ND

1. Control= 90 HPW + $NaHCO_3$
2. ND = Not Detected (<1mg/L)

C. tentans Acute Exposure Test Final Chemistry (9/1/10)				
Sample ID	Conductivity (µs/cm)	pH	DO (mg/L)	Temperature (˚C)
Lab Control 3[1]	409	8.02	7.35	24.25
AR6-2	2,420	8.90	7.25	24.02
AR6-3	3,270	9.33	7.02	24.08
AR7-1	125.5	7.76	7.17	24.01
AR7-2	188.9	7.99	7.45	24.06

1. Control= 90 HPW + $NaHCO_3$

Hyalella azteca 96-hr Acute Pore Water Toxicity Test#1: Chlor-Alkali

H. azteca Acute Exposure Test Initial Chemistry (8/24/10)							
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**	**Hardness (mg/L $CaCO_3$)**	**Alkalinity (mg/L $CaCO_3$)**	**Ammonia (mg/L)**
Lab Control 1[1]	318	8.20	7.59	24.22	82	56.5	ND[2]
AR2-4	155.5	6.58	6.16	24.56	32	77.2	9.01
AR2-5	80.5	6.33	8.01	24.05	24	36.0	ND
AR8-4	54.3	6.58	7.24	24.09	14	20.5	ND
AR8-5	106.5	6.39	6.41	24.31	28	48.0	2.84

1. Control= 90 HPW + $NaHCO_3$
2. ND = Not Detected (<1mg/L)

H. azteca Acute Exposure Test Final Chemistry (8/28/10)				
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**
Lab Control 1[1]	330	8.29	10.46	24.05
AR2-4	154.9	7.49	9.50	24.00
AR2-5	71.4	7.62	10.21	24.29
AR8-4	61.6	7.56	9.65	24.34
AR8-5	93.9	7.67	9.76	24.09

1. Control= 90 HPW + $NaHCO_3$

Hyalella azteca 96-hr Acute Pore Water Toxicity Test#2: Chlor-Alkali

H. azteca Acute Exposure Test Initial Chemistry (8/26/10)							
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**	**Hardness (mg/L $CaCO_3$)**	**Alkalinity (mg/L $CaCO_3$)**	**Ammonia (mg/L)**
Lab Control 2[1]	323	7.70	7.83	24.29	82	53.6	ND[2]
AR9-5	36.6	6.20	7.40	24.17	8	10.0	ND
AR9-6	55.0	6.16	7.29	24.16	16	17.9	ND
AR9-7	42.2	6.06	7.05	24.13	12	11.6	ND

1. Control= 90 HPW + $NaHCO_3$
2. ND = Not Detected (<1mg/L)

H. azteca Acute Exposure Test Final Chemistry (8/30/10)				
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**
Lab Control 2[1]	332	8.28	8.53	24.09
AR9-5	41.5	7.64	8.45	24.07
AR9-6	56.2	7.63	8.25	24.08
AR9-7	45.4	7.41	8.20	24.11

1. Control= 90 HPW + $NaHCO_3$

Hyalella azteca 96-hr Acute Pore Water Toxicity Test#3: Chlor-Alkali

H. azteca Acute Exposure Test Initial Chemistry (8/27/10)							
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**	**Hardness (mg/L $CaCO_3$)**	**Alkalinity (mg/L $CaCO_3$))**	**Ammonia (mg/L)**
Lab Control 3[1]	328	7.93	7.78	24.01	80.4	54	ND[2]
AR6-2	268	6.28	4.33	24.14	41.6	107	2.66
AR6-3	119.1	6.37	6.84	24.00	37.6	63	2.47
AR7-1	63.5	7.40	8.03	23.87	16.4	19	ND
AR7-2	78.0	6.63	7.40	24.41	30.0	37	1.15

1. Control= 90 HPW + $NaHCO_3$
2. ND = Not Detected (<1mg/L)

H. azteca Acute Exposure Test Final Chemistry (8/31/10)				
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control 3[1]	332	8.46	8.95	24.15
AR6-2	248	6.96	6.11	24.19
AR6-3	110.6	7.61	7.91	24.17
AR7-1	54.5	7.86	8.50	24.13
AR7-2	81.8	7.87	8.57	24.10

1. Control= 90 HPW + $NaHCO_3$

Hyalella azteca 96-hr Acute Pore Water Toxicity Test#4: Chlor-Alkali

H. azteca Acute Exposure Test Initial Chemistry (8/28/10)							
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**	**Hardness (mg/L $CaCO_3$)**	**Alkalinity (mg/L $CaCO_3$))**	**Ammonia (mg/L)**
Lab Control 4[1]	328	7.82	9.85	24.15	80.8	55	ND[2]
AR4-1	2,330	6.87	4.48	24.41	231.2	488	2.08
AR4-2	3,140	6.76	5.27	24.41	24.0	1,020	1.00
AR5-1	282	6.29	10.06	24.13	22.0	35	1.49
AR5-2	139.5	6.64	9.52	24.25	46.0	59	ND

1. Control= 90 HPW + $NaHCO_3$
2. ND = Not Detected (<1mg/L)

H. azteca Acute Exposure Test Final Chemistry (9/01/10)				
Sample ID	**Conductivity (µs/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control 4[1]	337	8.57	8.84	24.08
AR4-1	2,330	8.69	8.38	24.13
AR4-2	3,150	7.89	4.61	24.17
AR5-1	85.0	7.99	8.67	24.20
AR5-2	147.7	8.51	9.15	24.15

1. Control= 90 HPW + $NaHCO_3$

Appendix F

CETIS Statistical Reports

CETIS Data Worksheet

Report Date: 06 Oct-10 10:48 AM
Link: 13-6879-2001

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Start Date:	24 Aug-10 07:00 PM	**Species:**	Chironomus tentans	**Sample Code:**	Control1
Ending Date:	28 Aug-10 07:00 PM	**Protocol:**	EPA/600/R-99/064 (2000)	**Sample Source:**	Chlor-Alkali
Sample Date:	24 Aug-10	**Material:**	Lab Control	**Sample Station:**	Control

Sample Code	Rep	Pos	# Exposed	# Survived	Notes
Control1	1	5	1	1	
Control1	2	37	1	1	
Control1	3	6	1	1	
Control1	4	11	1	1	
Control1	5	50	1	1	
Control1	6	28	1	1	
Control1	7	47	1	1	
Control1	8	43	1	1	
Control1	9	4	1	1	
Control1	10	3	1	1	
AR2-4	1	48	1	0	
AR2-4	2	23	1	1	
AR2-4	3	29	1	1	
AR2-4	4	9	1	1	
AR2-4	5	39	1	1	
AR2-4	6	10	1	1	
AR2-4	7	33	1	1	
AR2-4	8	20	1	0	
AR2-4	9	38	1	1	
AR2-4	10	8	1	1	
AR2-5	1	18	1	1	
AR2-5	2	36	1	1	
AR2-5	3	49	1	1	
AR2-5	4	46	1	1	
AR2-5	5	40	1	1	
AR2-5	6	22	1	1	
AR2-5	7	44	1	1	
AR2-5	8	27	1	1	
AR2-5	9	35	1	1	
AR2-5	10	32	1	1	
AR8-4	1	12	1	1	
AR8-4	2	30	1	1	
AR8-4	3	14	1	1	
AR8-4	4	16	1	1	
AR8-4	5	34	1	1	
AR8-4	6	13	1	1	
AR8-4	7	19	1	1	
AR8-4	8	26	1	1	
AR8-4	9	7	1	1	
AR8-4	10	2	1	1	
AR8-5	1	15	1	1	
AR8-5	2	41	1	1	
AR8-5	3	24	1	1	
AR8-5	4	25	1	1	
AR8-5	5	1	1	1	
AR8-5	6	31	1	1	
AR8-5	7	42	1	1	
AR8-5	8	45	1	1	
AR8-5	9	17	1	1	
AR8-5	10	21	1	1	

Project No. 100010
Page 44 of 73

CETIS Analysis Detail

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	05-8548-0104	05-8548-0104	08 Oct-10 10:24 AM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Fisher Exact	C > T	Untransformed				N/A		

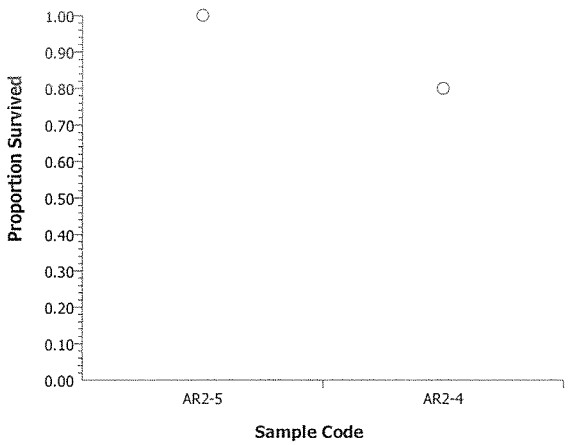
Group Comparisons

Sample	vs	Sample	Statistic	P-Value	Decision(0.05)
AR2-5		AR2-4	0.23684	0.23684	Non-Significant Effect

Data Summary

Sample Code	Non-Responders	Responders	Total Observed
AR2-5	10	0	10
AR2-4	8	2	10

Graphics



Project No. 100010
Page 45 of 73

CETIS Analysis Detail

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	13-6879-2001	13-6879-2001	06 Oct-10 4:29 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Fisher Exact/Bonferroni-Holm	C > T	Untransformed				N/A		

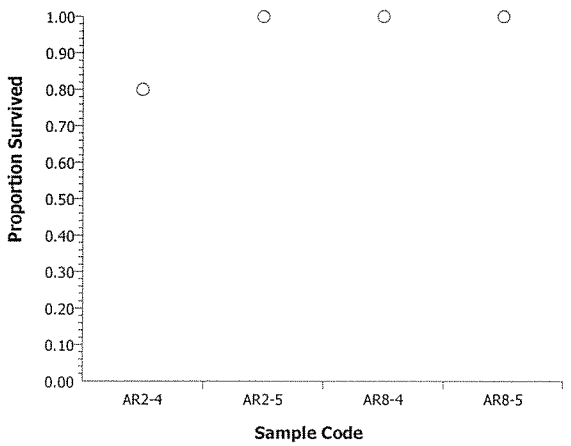
Group Comparisons

Sample	vs	Sample	Statistic	P-Value	Decision(0.05)
AR2-4		AR2-5	1.00000	1.00000	Non-Significant Effect
AR2-4		AR8-4	1.00000	1.00000	Non-Significant Effect
AR2-4		AR8-5	1.00000	1.00000	Non-Significant Effect

Data Summary

Sample Code	Non-Responders	Responders	Total Observed
AR2-4	8	2	10
AR2-5	10	0	10
AR8-4	10	0	10
AR8-5	10	0	10

Graphics



Project No. 100010
Page 46 of 73

CETIS Analysis Detail

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	13-6879-2001	13-6879-2001	06 Oct-10 4:29 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Fisher Exact/Bonferroni-Holm	C > T	Untransformed				N/A		

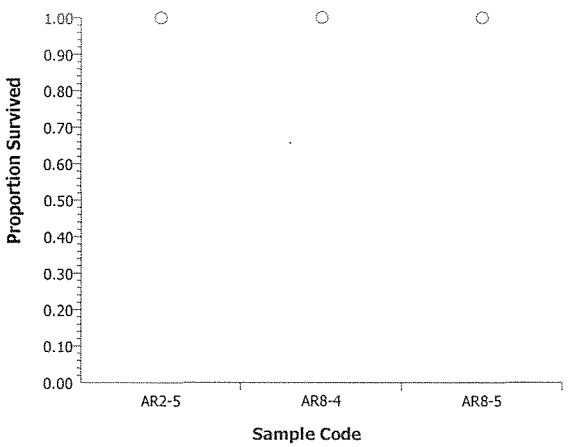
Group Comparisons

Sample	vs	Sample	Statistic	P-Value	Decision(0.05)
AR2-5		AR8-4	1.00000	1.00000	Non-Significant Effect
AR2-5		AR8-5	1.00000	1.00000	Non-Significant Effect

Data Summary

Sample Code	Non-Responders	Responders	Total Observed
AR2-5	10	0	10
AR8-4	10	0	10
AR8-5	10	0	10

Graphics



Project No. 100010
Page 47 of 73

CETIS Data Worksheet

Report Date: 06 Oct-10 12:04 PM
Link: 07-6970-7162

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Start Date:	26 Aug-10	**Species:**	Chironomus tentans	**Sample Code:**	Control2
Ending Date:	30 Aug-10 10:00 AM	**Protocol:**	EPA/600/R-99/064 (2000)	**Sample Source:**	In house
Sample Date:	26 Aug-10	**Material:**	Lab Control	**Sample Station:**	test control

Sample Code	Rep	Pos	# Exposed	# Survived	Notes
Control2	1	18	1	1	
Control2	2	50	1	1	
Control2	3	47	1	1	
Control2	4	9	1	1	
Control2	5	51	1	1	
Control2	6	13	1	1	
Control2	7	15	1	1	
Control2	8	12	1	1	
Control2	9	26	1	1	
Control2	10	49	1	1	
AR2-4	1	33	1	0	
AR2-4	2	29	1	1	
AR2-4	3	20	1	1	
AR2-4	4	23	1	1	
AR2-4	5	22	1	1	
AR2-4	6	8	1	1	
AR2-4	7	48	1	1	
AR2-4	8	5	1	0	
AR2-4	9	34	1	1	
AR2-4	10	54	1	1	
AR2-5	1	10	1	1	
AR2-5	2	17	1	1	
AR2-5	3	27	1	1	
AR2-5	4	7	1	1	
AR2-5	5	53	1	1	
AR2-5	6	24	1	1	
AR2-5	7	42	1	1	
AR2-5	8	11	1	1	
AR2-5	9	28	1	1	
AR2-5	10	30	1	1	
AR9-5	1	56	1	1	
AR9-5	2	55	1	0	
AR9-5	3	31	1	1	
AR9-5	4	19	1	1	
AR9-5	5	40	1	1	
AR9-5	6	16	1	1	
AR9-5	7	38	1	1	
AR9-5	8	43	1	1	
AR9-5	9	32	1	1	
AR9-5	10	6	1	1	
AR9-6	1	1	1	1	
AR9-6	2	36	1	1	
AR9-6	3	46	1	1	
AR9-6	4	3	1	1	
AR9-6	5	37	1	1	
AR9-6	6	4	1	1	
AR9-6	7	44	1	1	
AR9-6	8	60	1	1	
AR9-6	9	21	1	1	
AR9-6	10	57	1	1	
AR9-7	1	2	1	1	
AR9-7	2	52	1	1	
AR9-7	3	14	1	1	

CETIS Data Worksheet

Report Date: 06 Oct-10 12:04 PM
Link: 07-6970-7162

Sample Code	Rep	Pos	# Exposed	# Survived	Notes
AR9-7	4	25	1	1	
AR9-7	5	58	1	1	
AR9-7	6	45	1	1	
AR9-7	7	41	1	1	
AR9-7	8	39	1	1	
AR9-7	9	59	1	1	
AR9-7	10	35	1	1	

CETIS Analysis Detail

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	07-6970-7162	07-6970-7162	06 Oct-10 4:27 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Fisher Exact/Bonferroni-Holm	C > T	Untransformed				N/A		

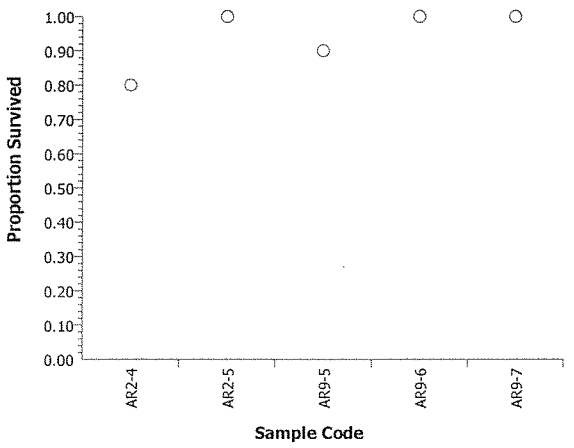
Group Comparisons

Sample	vs	Sample	Statistic	P-Value	Decision(0.05)
AR2-4		AR2-5	1.00000	1.00000	Non-Significant Effect
AR2-4		AR9-5	1.00000	1.00000	Non-Significant Effect
AR2-4		AR9-6	1.00000	1.00000	Non-Significant Effect
AR2-4		AR9-7	1.00000	1.00000	Non-Significant Effect

Data Summary

Sample Code	Non-Responders	Responders	Total Observed
AR2-4	8	2	10
AR2-5	10	0	10
AR9-5	9	1	10
AR9-6	10	0	10
AR9-7	10	0	10

Graphics



Project No. 100010
Page 50 of 73

CETIS Analysis Detail

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	07-6970-7162	07-6970-7162	06 Oct-10 4:27 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Fisher Exact/Bonferroni-Holm	C > T	Untransformed				N/A		

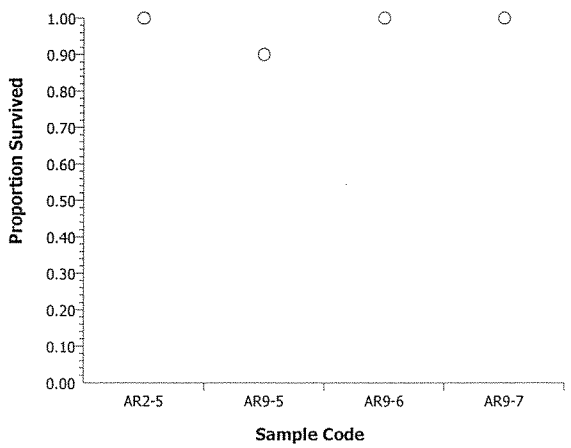
Group Comparisons

Sample	vs	Sample	Statistic	P-Value	Decision(0.05)
AR2-5		AR9-5	0.50000	1.00000	Non-Significant Effect
AR2-5		AR9-6	1.00000	1.00000	Non-Significant Effect
AR2-5		AR9-7	1.00000	1.00000	Non-Significant Effect

Data Summary

Sample Code	Non-Responders	Responders	Total Observed
AR2-5	10	0	10
AR9-5	9	1	10
AR9-6	10	0	10
AR9-7	10	0	10

Graphics



Project No. 100010
Page 51 of 73

CETIS Data Worksheet

Report Date: 06 Oct-10 1:28 PM
Link: 10-1168-4864

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Start Date:	27 Aug-10 11:30 AM	**Species:**	Chironomus tentans	**Sample Code:**	Control3
Ending Date:	31 Aug-10 11:30 AM	**Protocol:**	EPA/600/R-99/064 (2000)	**Sample Source:**	In house
Sample Date:	27 Aug-10 10:11 AM	**Material:**	Lab Control	**Sample Station:**	test control

Conc-µg/L	Rep	Pos	# Exposed	# Survived	Notes
Control3	1	62	1	1	
Control3	2	3	1	1	
Control3	3	30	1	1	
Control3	4	46	1	1	
Control3	5	13	1	1	
Control3	6	33	1	1	
Control3	7	48	1	1	
Control3	8	7	1	1	
Control3	9	24	1	1	
Control3	10	55	1	1	
AR2-4	1	63	1	0	
AR2-4	2	42	1	1	
AR2-4	3	53	1	1	
AR2-4	4	8	1	1	
AR2-4	5	44	1	1	
AR2-4	6	32	1	1	
AR2-4	7	23	1	1	
AR2-4	8	10	1	0	
AR2-4	9	15	1	1	
AR2-4	10	47	1	1	
AR2-5	1	66	1	1	
AR2-5	2	12	1	1	
AR2-5	3	14	1	1	
AR2-5	4	56	1	1	
AR2-5	5	35	1	1	
AR2-5	6	36	1	1	
AR2-5	7	60	1	1	
AR2-5	8	6	1	1	
AR2-5	9	19	1	1	
AR2-5	10	22	1	1	
AR6-2	1	5	1	1	
AR6-2	2	52	1	1	
AR6-2	3	38	1	1	
AR6-2	4	28	1	1	
AR6-2	5	50	1	1	
AR6-2	6	31	1	1	
AR6-2	7	58	1	1	
AR6-2	8	39	1	1	
AR6-2	9	49	1	1	
AR6-2	10	26	1	1	
AR6-3	1	40	1	1	
AR6-3	2	70	1	1	
AR6-3	3	64	1	1	
AR6-3	4	4	1	1	
AR6-3	5	67	1	1	
AR6-3	6	57	1	1	
AR6-3	7	61	1	1	
AR6-3	8	65	1	1	
AR6-3	9	45	1	1	
AR6-3	10	29	1	1	
AR7-1	1	1	1	1	
AR7-1	2	37	1	1	
AR7-1	3	25	1	1	

CETIS Data Worksheet

Report Date: 06 Oct-10 1:28 PM
Link: 10-1168-4864

Conc-µg/L	Rep	Pos	# Exposed	# Survived	Notes
AR7-1	4	20	1	1	
AR7-1	5	9	1	1	
AR7-1	6	68	1	1	
AR7-1	7	17	1	1	
AR7-1	8	54	1	1	
AR7-1	9	59	1	1	
AR7-1	10	16	1	1	
AR7-2	1	43	1	1	
AR7-2	2	21	1	1	
AR7-2	3	34	1	1	
AR7-2	4	11	1	1	
AR7-2	5	69	1	1	
AR7-2	6	2	1	1	
AR7-2	7	41	1	1	
AR7-2	8	51	1	1	
AR7-2	9	18	1	1	
AR7-2	10	27	1	1	

CETIS Analysis Detail

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	10-1168-4864	10-1168-4864	06 Oct-10 4:25 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Fisher Exact/Bonferroni-Holm	C > T	Untransformed				N/A		

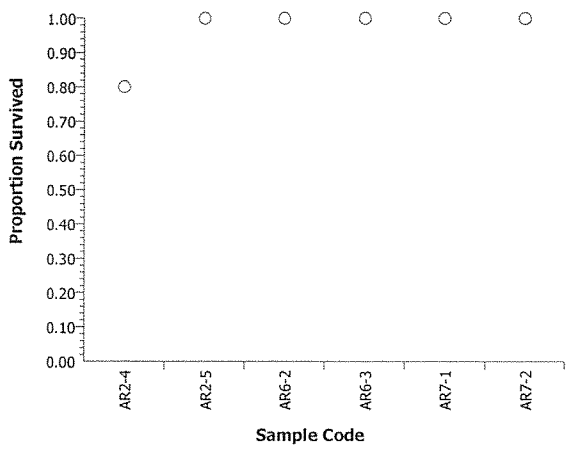
Group Comparisons

Sample	vs	Sample	Statistic	P-Value	Decision(0.05)
AR2-4		AR2-5	1.00000	1.00000	Non-Significant Effect
AR2-4		AR6-2	1.00000	1.00000	Non-Significant Effect
AR2-4		AR6-3	1.00000	1.00000	Non-Significant Effect
AR2-4		AR7-1	1.00000	1.00000	Non-Significant Effect
AR2-4		AR7-2	1.00000	1.00000	Non-Significant Effect

Data Summary

Sample Code	Non-Responders	Responders	Total Observed
AR2-4	8	2	10
AR2-5	10	0	10
AR6-2	10	0	10
AR6-3	10	0	10
AR7-1	10	0	10
AR7-2	10	0	10

Graphics



Project No. 100010
Page 54 of 73

CETIS Analysis Detail

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	10-1168-4864	10-1168-4864	06 Oct-10 4:25 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Fisher Exact/Bonferroni-Holm	C > T	Untransformed				N/A		

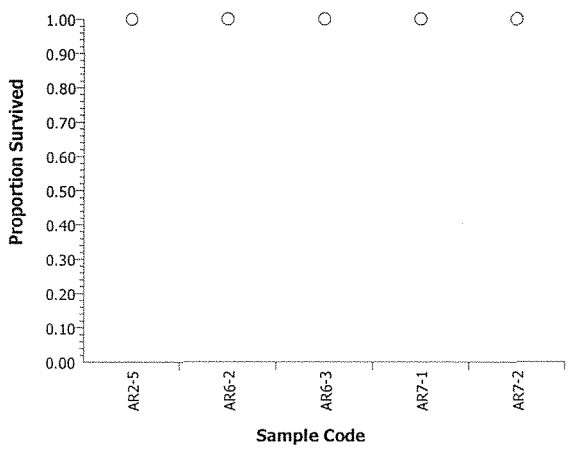
Group Comparisons

Sample	vs	Sample	Statistic	P-Value	Decision(0.05)
AR2-5		AR6-2	1.00000	1.00000	Non-Significant Effect
AR2-5		AR6-3	1.00000	1.00000	Non-Significant Effect
AR2-5		AR7-1	1.00000	1.00000	Non-Significant Effect
AR2-5		AR7-2	1.00000	1.00000	Non-Significant Effect

Data Summary

Sample Code	Non-Responders	Responders	Total Observed
AR2-5	10	0	10
AR6-2	10	0	10
AR6-3	10	0	10
AR7-1	10	0	10
AR7-2	10	0	10

Graphics



Project No. 100010
Page 55 of 73

CETIS Data Worksheet

Report Date: 06 Oct-10 1:58 PM
Link: 08-0350-9880

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Start Date: 28 Aug-10 04:15 PM **Species:** Chironomus tentans **Sample Code:** Control 4
Ending Date: 01 Sep-10 04:15 PM **Protocol:** EPA/600/R-99/064 (2000) **Sample Source:** In house
Sample Date: 28 Aug-10 03:07 PM **Material:** Lab Control **Sample Station:** test control

Conc-µg/L	Rep	Pos	# Exposed	# Survived	Notes
Control 4	1	1	1	1	
Control 4	2	29	1	1	
Control 4	3	31	1	1	
Control 4	4	65	1	1	
Control 4	5	63	1	1	
Control 4	6	3	1	1	
Control 4	7	61	1	1	
Control 4	8	28	1	1	
Control 4	9	38	1	1	
Control 4	10	17	1	1	
AR2-4	1	30	1	0	
AR2-4	2	64	1	1	
AR2-4	3	41	1	1	
AR2-4	4	54	1	1	
AR2-4	5	24	1	1	
AR2-4	6	25	1	1	
AR2-4	7	22	1	1	
AR2-4	8	46	1	0	
AR2-4	9	62	1	1	
AR2-4	10	67	1	1	
AR2-5	1	6	1	1	
AR2-5	2	47	1	1	
AR2-5	3	39	1	1	
AR2-5	4	7	1	1	
AR2-5	5	18	1	1	
AR2-5	6	4	1	1	
AR2-5	7	19	1	1	
AR2-5	8	53	1	1	
AR2-5	9	66	1	1	
AR2-5	10	9	1	1	
AR4-1	1	27	1	0	
AR4-1	2	50	1	1	
AR4-1	3	34	1	1	
AR4-1	4	40	1	1	
AR4-1	5	44	1	1	
AR4-1	6	21	1	1	
AR4-1	7	13	1	1	
AR4-1	8	16	1	1	
AR4-1	9	48	1	1	
AR4-1	10	59	1	1	
AR4-2	1	8	1	1	
AR4-2	2	51	1	1	
AR4-2	3	12	1	1	
AR4-2	4	58	1	1	
AR4-2	5	35	1	1	
AR4-2	6	69	1	1	
AR4-2	7	52	1	1	
AR4-2	8	33	1	1	
AR4-2	9	10	1	1	
AR4-2	10	37	1	1	
AR5-1	1	56	1	1	
AR5-1	2	42	1	1	
AR5-1	3	2	1	1	

CETIS Data Worksheet

Report Date: 06 Oct-10 1:58 PM
Link: 08-0350-9880

Conc-µg/L	Rep	Pos	# Exposed	# Survived	Notes
AR5-1	4	55	1	1	
AR5-1	5	49	1	1	
AR5-1	6	5	1	1	
AR5-1	7	32	1	0	
AR5-1	8	43	1	1	
AR5-1	9	60	1	1	
AR5-1	10	57	1	1	
AR5-2	1	36	1	1	
AR5-2	2	11	1	1	
AR5-2	3	26	1	1	
AR5-2	4	20	1	1	
AR5-2	5	45	1	1	
AR5-2	6	68	1	1	
AR5-2	7	70	1	1	
AR5-2	8	15	1	1	
AR5-2	9	23	1	1	
AR5-2	10	14	1	1	

CETIS Analysis Detail

Chironomus Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	08-0350-9880	08-0350-9880	06 Oct-10 4:26 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Fisher Exact/Bonferroni-Holm	C > T	Untransformed				N/A		

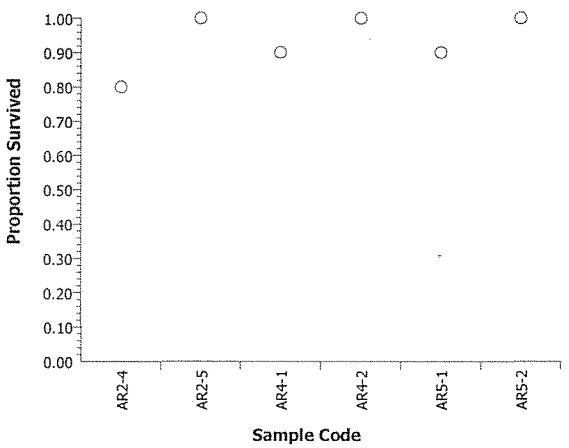
Group Comparisons

Sample	vs	Sample	Statistic	P-Value	Decision(0.05)
AR2-4		AR2-5	1.00000	1.00000	Non-Significant Effect
AR2-4		AR4-1	1.00000	1.00000	Non-Significant Effect
AR2-4		AR4-2	1.00000	1.00000	Non-Significant Effect
AR2-4		AR5-1	1.00000	1.00000	Non-Significant Effect
AR2-4		AR5-2	1.00000	1.00000	Non-Significant Effect

Data Summary

Sample Code	Non-Responders	Responders	Total Observed
AR2-4	8	2	10
AR2-5	10	0	10
AR4-1	9	1	10
AR4-2	10	0	10
AR5-1	9	1	10
AR5-2	10	0	10

Graphics



Project No. 100010
Page 58 of 73

CETIS Data Worksheet

Report Date: 06 Oct-10 10:53 AM
Link: 08-2296-5087

Hyalella Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Start Date:	24 Aug-10 07:00 PM	**Species:**	Hyalella azteca	**Sample Code:**	Control1
Ending Date:	28 Aug-10 07:00 PM	**Protocol:**	EPA/600/R-99/064 (2000)	**Sample Source:**	In house
Sample Date:	24 Aug-10	**Material:**	Lab Control	**Sample Station:**	test control

Sample Code	Rep	Pos	# Exposed	# Survived	Notes
Control1	1	30	2	2	
Control1	2	23	2	2	
Control1	3	44	2	2	
Control1	4	45	2	2	
Control1	5	15	2	2	
Control1	6	28	2	2	
Control1	7	34	2	2	
Control1	8	4	2	2	
Control1	9	11	2	2	
Control1	10	13	2	2	
AR2-4	1	29	2	0	
AR2-4	2	41	2	0	
AR2-4	3	26	2	0	
AR2-4	4	14	2	0	
AR2-4	5	21	2	0	
AR2-4	6	49	2	0	
AR2-4	7	42	2	0	
AR2-4	8	32	2	0	
AR2-4	9	40	2	0	
AR2-4	10	48	2	0	
AR2-5	1	27	2	2	
AR2-5	2	25	2	2	
AR2-5	3	20	2	2	
AR2-5	4	18	2	1	
AR2-5	5	50	2	2	
AR2-5	6	47	2	2	
AR2-5	7	2	2	2	
AR2-5	8	22	2	2	
AR2-5	9	9	2	1	
AR2-5	10	3	2	2	
AR8-4	1	36	2	2	
AR8-4	2	31	2	2	
AR8-4	3	37	2	2	
AR8-4	4	35	2	2	
AR8-4	5	33	2	2	
AR8-4	6	10	2	2	
AR8-4	7	24	2	2	
AR8-4	8	19	2	2	
AR8-4	9	17	2	2	
AR8-4	10	7	2	2	
AR8-5	1	39	2	2	
AR8-5	2	6	2	2	
AR8-5	3	43	2	2	
AR8-5	4	16	2	2	
AR8-5	5	12	2	2	
AR8-5	6	46	2	2	
AR8-5	7	38	2	2	
AR8-5	8	8	2	2	
AR8-5	9	1	2	1	
AR8-5	10	5	2	2	

Project No. 100010
Page 59 of 73

Analyst: BCK Reviewed By: EC

CETIS Analysis Detail

Hyalella Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	06-2763-6259	06-2763-6259	08 Oct-10 1:10 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Wilcoxon Rank Sum Two-Sample	C > T	Rank				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Modified Levene	65535.00000	8.28542	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.64112		0.00001	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3.596046	3.596046	1	364391	0.00000	Significant Effect
Error	1.776E-15	9.869E-17	18			
Total	3.59604645	3.5960464	19			

Group Comparisons

Sample	vs	Sample	Statistic	Critical	P-Value	Ties	Decision(0.05)
AR2-5		AR2-4	55		0.0000	0	Significant Effect

Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
AR2-5	10	1.00000	1.00000	1.00000	0.00000	15.5	15.5	15.5	0
AR2-4	10	0.00000	0.00000	0.00000	0.00000	5.5	5.5	5.5	0

Project No. 100010
Page 60 of 73

CETIS Analysis Detail

Hyalella Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	08-2296-5087	08-2296-5087	06 Oct-10 4:28 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Steel Many-One Rank	C > T	Rank				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Bartlett	261.25030	9.21034	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.58729		0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0359605	0.0179802	2	1.08	0.35382	Non-Significant Effect
Error	0.4495058	0.0166484	27			
Total	0.48546627	0.0346286	29			

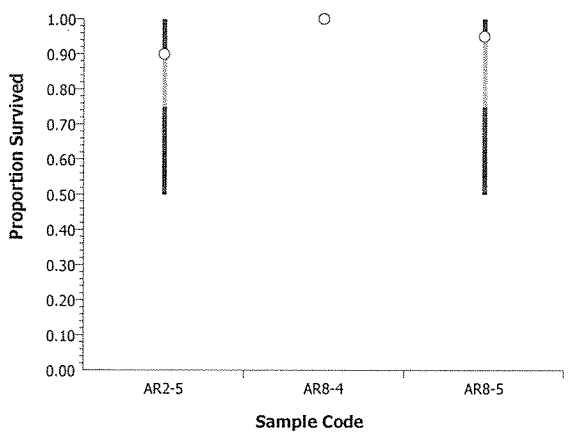
Group Comparisons

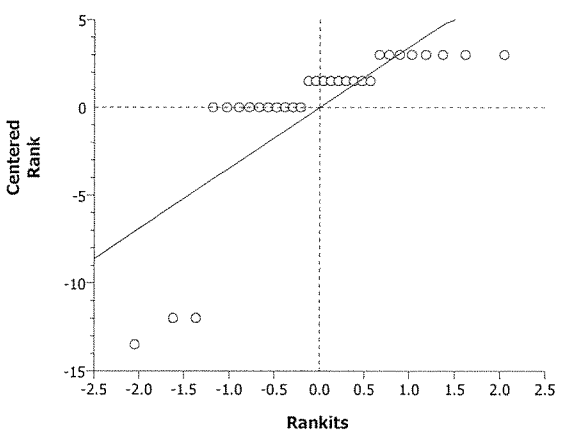
Sample	vs	Sample	Statistic	Critical	P-Value	Ties	Decision(0.05)
AR2-5		AR8-4	115	79	0.8968	8	Non-Significant Effect
		AR8-5	110	79	0.8013	8	Non-Significant Effect

Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
AR2-5	10	0.90000	0.50000	1.00000	0.21082	14	2	17	6.3246
AR8-4	10	1.00000	1.00000	1.00000	0.00000	17	17	17	0
AR8-5	10	0.95000	0.50000	1.00000	0.15811	15.5	2	17	4.7434

Graphics





Project No. 100010
Page 61 of 73

CETIS Analysis Detail

Hyalella Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	08-2296-5087	08-2296-5087	06 Oct-10 4:28 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Steel Many-One Rank	C > T	Rank				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Modified Levene	1.32000	4.37710	0.28295	Equal Variances
Distribution	Shapiro-Wilk W	0.56056		0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	4.904109	1.634703	3	130.92	0.00000	Significant Effect
Error	0.4495058	0.0124863	36			
Total	5.35361433	1.6471891	39			

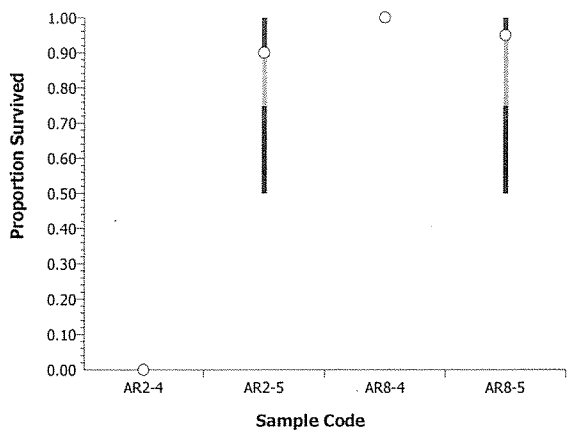
Group Comparisons

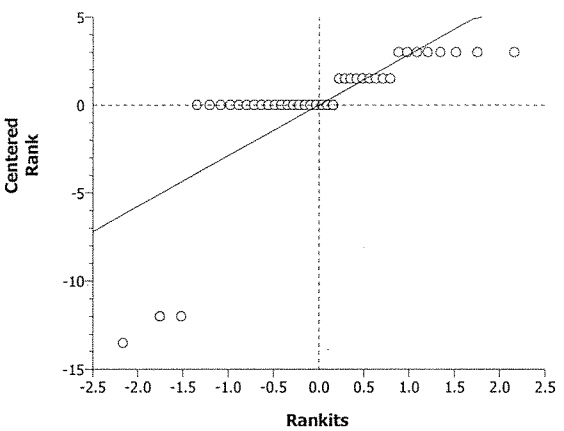
Sample	vs	Sample	Statistic	Critical	P-Value	Ties	Decision(0.05)
AR2-4		AR2-5	155	77	1.0000	0	Non-Significant Effect
		AR8-4	155	77	1.0000	0	Non-Significant Effect
		AR8-5	155	77	1.0000	0	Non-Significant Effect

Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
AR2-4	10	0.00000	0.00000	0.00000	0.00000	5.50000	5.50000	5.50000	0.00000
AR2-5	10	0.90000	0.50000	1.00000	0.21082	24.0000	12.0000	27.0000	6.32456
AR8-4	10	1.00000	1.00000	1.00000	0.00000	27.0000	27.0000	27.0000	0.00000
AR8-5	10	0.95000	0.50000	1.00000	0.15811	25.5000	12.0000	27.0000	4.74342

Graphics





Project No. 100010
Page 62 of 73

CETIS Data Worksheet

Report Date: 07 Oct-10 10:15 AM
Link: 17-8173-7707

Hyalella Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Start Date:	26 Aug-10 10:30 AM	**Species:**	Hyalella azteca	**Sample Code:**	Control2
Ending Date:	30 Aug-10 10:30 AM	**Protocol:**	EPA/600/R-99/064 (2000)	**Sample Source:**	In house
Sample Date:	06 Oct-10 11:30 AM	**Material:**	Lab Control	**Sample Station:**	test control

Sample Code	Rep	Pos	# Exposed	# Survived	Notes
Control2	1	1	2	2	
Control2	2	39	2	2	
Control2	3	28	2	2	
Control2	4	6	2	2	
Control2	5	3	2	2	
Control2	6	16	2	2	
Control2	7	38	2	2	
Control2	8	37	2	2	
Control2	9	27	2	2	
Control2	10	8	2	2	
AR2-5	1	26	2	2	
AR2-5	2	10	2	2	
AR2-5	3	46	2	2	
AR2-5	4	17	2	1	
AR2-5	5	47	2	2	
AR2-5	6	45	2	2	
AR2-5	7	4	2	2	
AR2-5	8	25	2	2	
AR2-5	9	22	2	1	
AR2-5	10	13	2	2	
AR9-5	1	24	2	2	
AR9-5	2	44	2	1	
AR9-5	3	34	2	2	
AR9-5	4	50	2	2	
AR9-5	5	42	2	2	
AR9-5	6	31	2	2	
AR9-5	7	7	2	2	
AR9-5	8	32	2	2	
AR9-5	9	36	2	2	
AR9-5	10	23	2	2	
AR9-6	1	20	2	2	
AR9-6	2	30	2	2	
AR9-6	3	40	2	2	
AR9-6	4	15	2	2	
AR9-6	5	21	2	2	
AR9-6	6	14	2	2	
AR9-6	7	9	2	2	
AR9-6	8	48	2	2	
AR9-6	9	11	2	2	
AR9-6	10	18	2	2	
AR9-7	1	49	2	2	
AR9-7	2	12	2	2	
AR9-7	3	19	2	2	
AR9-7	4	33	2	2	
AR9-7	5	29	2	2	
AR9-7	6	2	2	2	
AR9-7	7	35	2	2	
AR9-7	8	5	2	2	
AR9-7	9	41	2	2	
AR9-7	10	43	2	2	

Project No. 100010
Page 63 of 73

CETIS Analysis Detail

Hyalella Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	17-8173-7707	17-8173-7707	07 Oct-10 8:55 AM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Steel Many-One Rank	C > T	Rank				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Bartlett	520.41670	11.34487	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.56056		0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0494456	0.0164819	3	1.32	0.28295	Non-Significant Effect
Error	0.4495058	0.0124863	36			
Total	0.49895145	0.0289682	39			

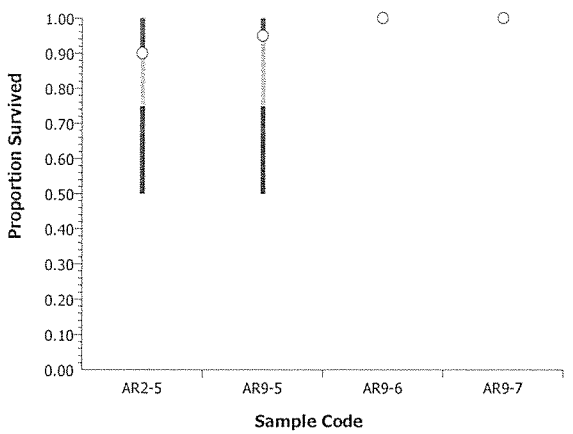
Group Comparisons

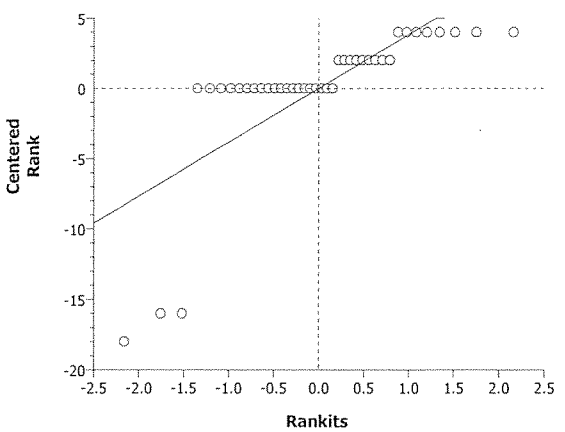
Sample	vs	Sample	Statistic	Critical	P-Value	Ties	Decision(0.05)
AR2-5		AR9-5	110	77	0.8662	8	Non-Significant Effect
		AR9-6	115	77	0.9388	8	Non-Significant Effect
		AR9-7	115	77	0.9388	8	Non-Significant Effect

Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
AR2-5	10	0.90000	0.50000	1.00000	0.21082	18	2	22	8.4327
AR9-5	10	0.95000	0.50000	1.00000	0.15811	20	2	22	6.3246
AR9-6	10	1.00000	1.00000	1.00000	0.00000	22	22	22	0
AR9-7	10	1.00000	1.00000	1.00000	0.00000	22	22	22	0

Graphics





Project No. 100010
Page 64 of 73

CETIS Data Worksheet

Report Date: 06 Oct-10 1:18 PM
Link: 06-2978-3976

Hyalella Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Start Date:	27 Aug-10 11:30 AM	**Species:**	Hyalella azteca	**Sample Code:**	Control 3
Ending Date:	30 Aug-10 11:30 AM	**Protocol:**	EPA/600/R-99/064 (2000)	**Sample Source:**	In house
Sample Date:	27 Aug-10 10:21 AM	**Material:**	Lab Control	**Sample Station:**	test control

Conc-gm/L	Rep	Pos	# Exposed	# Survived	Notes
Control 3	1	4	2	2	
Control 3	2	2	2	2	
Control 3	3	47	2	2	
Control 3	4	7	2	2	
Control 3	5	41	2	2	
Control 3	6	56	2	2	
Control 3	7	33	2	2	
Control 3	8	10	2	2	
Control 3	9	6	2	2	
Control 3	10	29	2	2	
AR2-5	1	45	2	2	
AR2-5	2	36	2	2	
AR2-5	3	5	2	2	
AR2-5	4	23	2	1	
AR2-5	5	52	2	2	
AR2-5	6	26	2	2	
AR2-5	7	28	2	2	
AR2-5	8	14	2	2	
AR2-5	9	31	2	1	
AR2-5	10	15	2	2	
AR6-2	1	11	2	1	
AR6-2	2	22	2	0	
AR6-2	3	20	2	0	
AR6-2	4	38	2	0	
AR6-2	5	44	2	2	
AR6-2	6	48	2	1	
AR6-2	7	12	2	0	
AR6-2	8	43	2	0	
AR6-2	9	27	2	0	
AR6-2	10	1	2	0	
AR6-3	1	24	2	2	
AR6-3	2	50	2	1	
AR6-3	3	60	2	2	
AR6-3	4	55	2	1	
AR6-3	5	30	2	2	
AR6-3	6	32	2	2	
AR6-3	7	37	2	2	
AR6-3	8	49	2	1	
AR6-3	9	19	2	2	
AR6-3	10	13	2	2	
AR7-1	1	42	2	2	
AR7-1	2	9	2	2	
AR7-1	3	8	2	2	
AR7-1	4	59	2	2	
AR7-1	5	58	2	2	
AR7-1	6	39	2	2	
AR7-1	7	17	2	2	
AR7-1	8	54	2	2	
AR7-1	9	34	2	2	
AR7-1	10	40	2	2	
AR7-2	1	21	2	2	
AR7-2	2	51	2	2	
AR7-2	3	35	2	2	

CETIS Data Worksheet

Report Date: 06 Oct-10 1:18 PM
Link: 06-2978-3976

Conc-gm/L	Rep	Pos	# Exposed	# Survived	Notes
AR7-2	4	3	2	1	
AR7-2	5	53	2	2	
AR7-2	6	57	2	2	-
AR7-2	7	25	2	1	
AR7-2	8	16	2	2	
AR7-2	9	18	2	2	
AR7-2	10	46	2	2	

CETIS Analysis Detail

Hyalella Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	06-2978-3976	06-2978-3976	06 Oct-10 4:27 PM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Steel Many-One Rank	C > T	Rank				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Bartlett	271.63250	13.27670	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.86527		0.00004	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	3.006295	0.7515737	4	19.39	0.00000	Significant Effect
Error	1.744083	0.0387574	45			
Total	4.7503773	0.7903311	49			

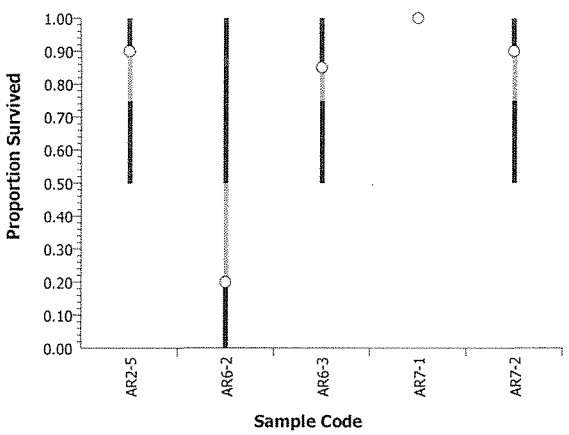
Group Comparisons

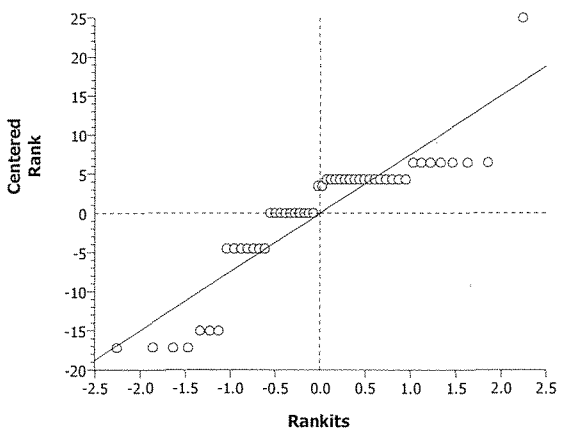
Sample	vs	Sample	Statistic	Critical	P-Value	Ties	Decision(0.05)
AR2-5		AR6-2	63	76	0.0028	2	Significant Effect
		AR6-3	100	76	0.6550	10	Non-Significant Effect
		AR7-1	115	76	0.9586	8	Non-Significant Effect
		AR7-2	105	76	0.8000	10	Non-Significant Effect

Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
AR2-5	10	0.90000	0.50000	1.00000	0.21082	29.2	12	33.5	9.0652
AR6-2	10	0.20000	0.00000	1.00000	0.34960	8.55	4	33.5	9.3762
AR6-3	10	0.85000	0.50000	1.00000	0.24152	27.05	12	33.5	10.385
AR7-1	10	1.00000	1.00000	1.00000	0.00000	33.5	33.5	33.5	0
AR7-2	10	0.90000	0.50000	1.00000	0.21082	29.2	12	33.5	9.0652

Graphics





Project No. 100010
Page 67 of 73

CETIS Data Worksheet

Report Date: 06 Oct-10 1:44 PM
Link: 05-5206-8670

Hyalella Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Start Date:	28 Aug-10 04:15 PM	**Species:**	Hyalella azteca	**Sample Code:**	Control4
Ending Date:	01 Sep-10 04:15 PM	**Protocol:**	EPA/600/R-99/064 (2000)	**Sample Source:**	In house
Sample Date:	28 Aug-10 03:02 PM	**Material:**	Lab Control	**Sample Station:**	test control

Conc-gm/L	Rep	Pos	# Exposed	# Survived	Notes
Control4	1	55	2	2	
Control4	2	3	2	2	
Control4	3	52	2	2	
Control4	4	29	2	2	
Control4	5	14	2	2	
Control4	6	5	2	2	
Control4	7	12	2	2	
Control4	8	40	2	2	
Control4	9	10	2	2	
Control4	10	38	2	2	
AR2-5	1	25	2	2	
AR2-5	2	53	2	2	
AR2-5	3	30	2	2	
AR2-5	4	7	2	1	
AR2-5	5	48	2	2	
AR2-5	6	23	2	2	
AR2-5	7	24	2	2	
AR2-5	8	37	2	2	
AR2-5	9	4	2	1	
AR2-5	10	15	2	2	
AR4-1	1	35	2	2	
AR4-1	2	13	2	1	
AR4-1	3	20	2	1	
AR4-1	4	54	2	1	
AR4-1	5	47	2	0	
AR4-1	6	56	2	2	
AR4-1	7	58	2	2	
AR4-1	8	11	2	2	
AR4-1	9	41	2	2	
AR4-1	10	60	2	2	
AR4-2	1	26	2	0	
AR4-2	2	6	2	0	
AR4-2	3	17	2	0	
AR4-2	4	18	2	0	
AR4-2	5	46	2	0	
AR4-2	6	49	2	0	
AR4-2	7	22	2	0	
AR4-2	8	2	2	0	
AR4-2	9	42	2	0	
AR4-2	10	33	2	0	
AR5-1	1	8	2	2	
AR5-1	2	21	2	2	
AR5-1	3	43	2	2	
AR5-1	4	59	2	2	
AR5-1	5	16	2	2	
AR5-1	6	31	2	2	
AR5-1	7	36	2	2	
AR5-1	8	28	2	2	
AR5-1	9	34	2	2	
AR5-1	10	39	2	2	
AR5-2	1	51	2	2	
AR5-2	2	57	2	2	
AR5-2	3	19	2	2	

CETIS Data Worksheet

Report Date: 06 Oct-10 1:44 PM
Link: 05-5206-8670

Conc-gm/L	Rep	Pos	# Exposed	# Survived	Notes
AR5-2	4	9	2	2	
AR5-2	5	27	2	2	
AR5-2	6	1	2	2	
AR5-2	7	32	2	2	
AR5-2	8	45	2	2	
AR5-2	9	50	2	2	
AR5-2	10	44	2	2	

CETIS Analysis Detail

Hyalella Toxicant 96-h Acute Survival Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Proportion Survived	Comparison	05-5206-8670	05-5206-8670	07 Oct-10 9:26 AM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Steel Many-One Rank	C > T	Rank				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Bartlett	537.26370	11.34487	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.78333		0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.3011689	0.1003896	3	3.30	0.03133	Significant Effect
Error	1.096794	0.0304665	36			
Total	1.39796302	0.1308561	39			

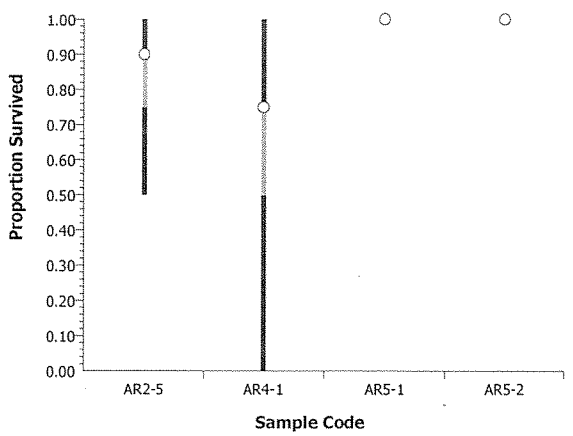
Group Comparisons

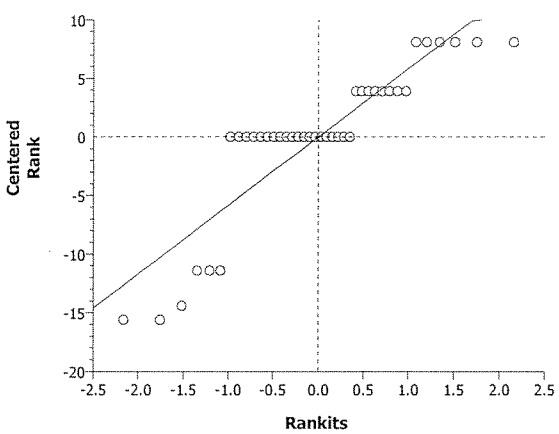
Sample	vs	Sample	Statistic	Critical	P-Value	Ties	Decision(0.05)
AR2-5		AR4-1	94	77	0.3930	10	Non-Significant Effect
		AR5-1	115	77	0.9388	8	Non-Significant Effect
		AR5-2	115	77	0.9388	8	Non-Significant Effect

Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
AR2-5	10	0.90000	0.50000	1.00000	0.21082	19.6	4	23.5	8.2219
AR4-1	10	0.75000	0.00000	1.00000	0.35355	15.4	1	23.5	10.493
AR5-1	10	1.00000	1.00000	1.00000	0.00000	23.5	23.5	23.5	0
AR5-2	10	1.00000	1.00000	1.00000	0.00000	23.5	23.5	23.5	0

Graphics



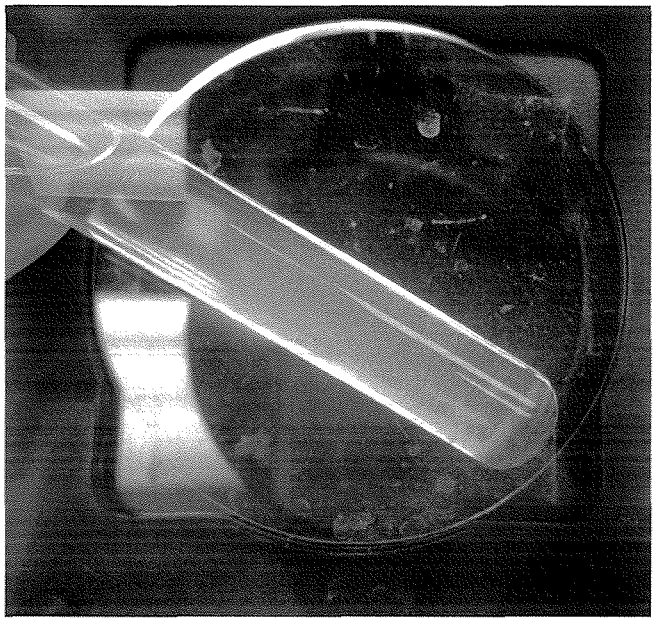


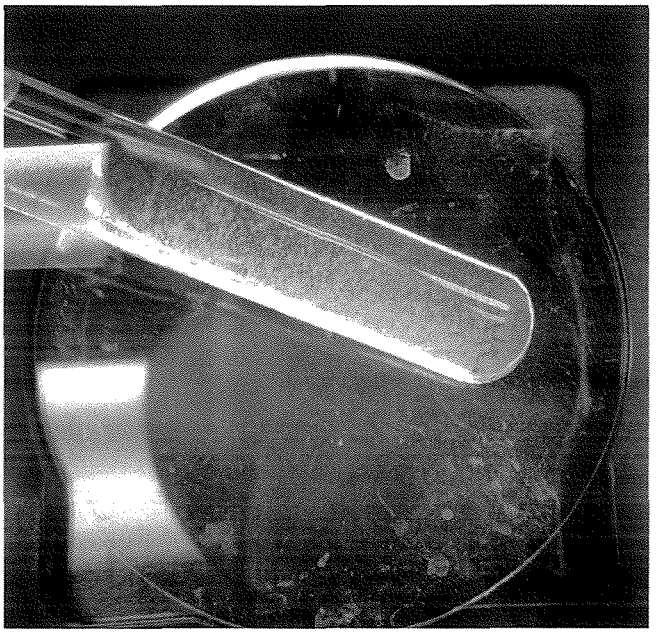
Project No. 100010
Page 70 of 73

Appendix G

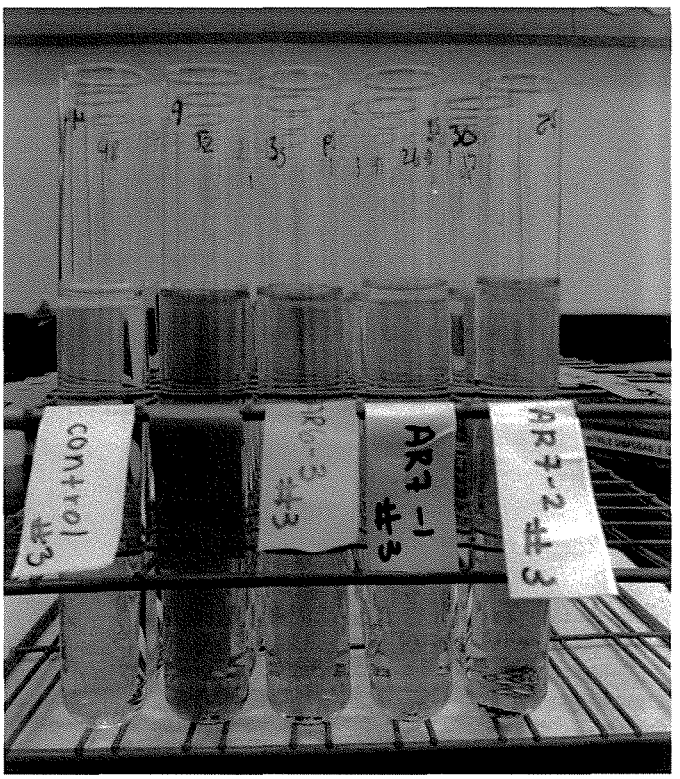
Pore Water Toxicity Test Pictures

Attachment 3: Sample location AR2-4 that could not be used as a reference because of complete mortality. The second image is the sample after being stirred up.





Attachment 4: *H. azteca* pore water test #3. Sample AR6-2 (second from left) was significantly affected.



Attachment 5: *H. azteca* pore water test #4. Sample AR4-2 (third from left) was significantly affected.

APPENDIX C

APPENDIX C

TWO SPECIES, CHRONIC TOXICITY TESTING RESULTS

USING SURFACE WATER SAMPLES

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Quality & Integrity

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Office of Environmental Measurement and Evaluation
US EPA - Region I
11 Technology Drive
North Chelmsford, MA 01863-2431

November 20, 2009

To: Mr. Bart Hoskins, EPA TOPO
Via: Mr. Louis Macri, Program Manager

TDF No. 1499
Task Order No. 26
Task No. 04

Subject: Two Species, Chronic Toxicity Testing Results Using Surface Water Samples Collected From the Androscoggin River in Areas Associated with Former Chlor-Alkali Facility in Berlin, NH.

Dear Mr. Hoskins:

The Environmental Services Assistance Team (ESAT) has completed two sets of two-species chronic surface water toxicity tests using the cladoceran, *Ceriodaphnia dubia* and fathead minnow, *Pimephales promelas*. This task included testing five surface water samples (including one reference) collected by the United States Geological Survey (USGS) from the Androscoggin River and associated reservoirs. The tests were performed according to the methods described in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, 4th edition, EPA/821/R-02/013, Chronic Toxicity Test Method for *C. dubia* (EPA, 2008) and Chronic Toxicity Test Methods for *P. promelas* (EPA, 2008). All initial and final chemistry was done according to the EPA OEME Biology Section Standard Operating Procedure (SOP).

The task was requested by Mr. Hoskins, the Task Order Project Officer (TOPO), and was authorized under TDF No. 1499. The final completion date for this task is November 20, 2009.

Should you have any questions or comments, please contact Bethany Kelley of ESAT-TechLaw, Inc. at (617) 918-8681, at the EPA/OEME Biology Section, North Chelmsford, MA.

Sincerely,

Bethany Kelley

Bethany Kelley
Junior Biologist
TechLaw, Inc.

TWO SPECIES, CHRONIC TOXICITY TESTING RESULTS USING SURFACE WATER SAMPLES COLLECTED FROM THE ANDROSCOGGIN RIVER IN AREAS ASSOCIATED WITH FORMER CHLOR-ALKALI FACILITY IN BERLIN, NH

Submitted to the:

Office of Environmental Measurement and Evaluation
United States Environmental Protection Agency - Region I
11 Technology Drive
North Chelmsford, Massachusetts 01863-2431

ESAT - Region I
TechLaw, Inc.
The Wannalancit Mills, 175 Cabot Street, Suite 415
Lowell, Massachusetts 01854-3650

TDF No. 1499
Task Order No. 26
Task No. 04

November 20, 2009

Project Number 09090023

Table of Contents

1.0 INTRODUCTION 3
2.0 STUDY OBJECTIVES 3
3.0 MATERIALS & METHODS 3
3.1 Sampling Locations 3
3.2 Sample Collection 4
3.3 Toxicity Testing Methods 4
3.3.1 *C. dubia* Test Method 4
3.3.2 *P. promelas* Test Method 5
3.4 Statistical Analysis 5
4.0 RESULTS 6
4.1 *C. dubia* Survival and Reproduction 6
4.2 *P. promelas* Survival and Growth 8
5.0 DISCUSSION & CONCLUSION 10
6.0 REFERENCES 11

Appendices

Appendix A.....Surface Water Sampling Stations
Appendix B.....Chain-of-Custody Records
Appendix C.....Control Charts for *C. dubia* and *P. promelas*
Appendix D.....Summary of Overlying Water Toxicity Test Chemistry
Appendix E.....Bench Sheets and Statistical Test Print-outs

1.0 INTRODUCTION

The former Chlor-Alkali facility is located on the east bank of the Androscoggin River in Berlin, NH. From the late 1800s up to the 1960s, chlorine and other chemicals were produced using electrolytic cells in "cell houses" on the property. The chlorine was used in paper making at the adjacent pulp mill. Most of the former buildings were torn down and buried on-site in the 1960's, even though the last cell house was not demolished until 1999. The Site is currently covered by a two-foot thick layer of bark and wood chips overlaying a PVC liner. Beneath the liner lies the demolition debris which rests on glacial till and bedrock.

The area around the Site was a wood storage lot when the paper mill was active. Large stacks of wood were present on the lot until 2006. The area is now bare with shrubs and poplar trees reclaiming barren ground. Further to the south are the remnants of the paper mill, which was demolished in 2007-2008.

Mercury (Hg) is the primary contaminant associated with the former Chlor-Alkali facility. Hg can be found as droplets on the east bank of the river next to the Site. It is presumed to originate from underneath the cap from where it is transmitted to the river bank via bedrock fractures. Other contaminants of concern include lead, PCBs, dioxin, polychlorinated naphthalenes, and high pH ground water. Contamination from the Site has spread to other locations in soils, ground water, and through the air. It is suspected that Hg exists in elemental form on the river bottom at least through Riverside Dam. Additional disposal or mismanagement of wastes may have created unknown locations of contamination further downstream in the Androscoggin River.

2.0 STUDY OBJECTIVES

The objective of this study was to determine if responses by the fathead minnow *Pimephales promelas* and the cladoceran *Ceriodaphnia dubia* test species exposed to surface water collected from the Androscoggin River downstream of the former Chlor-Alkali facility differed significantly from samples collected at reference locations upstream of the former Chlor-Alkali facility. Laboratory control samples were used only to verify that the organisms were healthy, and that the test passed the Test Acceptability Criteria (TAC) specified by EPA (2002).

The measured endpoints for *P promelas* were survival and growth and the measurement endpoints for *C. dubia* were survival and reproduction after 7 days of exposure. Survival was determined by counting the number of live organisms at the end of the test period. *P. promelas* growth was determined by drying all remaining live fish at the end of the tests and obtaining a dry weight. *C.dubia* survival was determined by counting the number of live organisms and reproduction was determined by counting the number of neonates produced each day. The results from this test will help determine if site-related contamination could be adversely affecting benthic organisms in the streams draining from the Site. The results will also be used in support of a Baseline Ecological Risk Assessment (BERA).

3.0 MATERIALS & METHODS

3.1 Sampling Locations

The United States Geological Survey (USGS) collected 5 surface water samples from the Androscoggin River upstream and downstream of the former Chlor-Alkali facility. One sample was collected at the reference site above Wheeler Bay (AR2) and 4 samples were collected downstream of the Site by the former facility (AR3), upstream of Smith-Hydro Dam by Mason Street Bridge (AR4), upstream of Gorham Dam by an old ford (AR8) and below Gorham Dam in the Shelburne Reservoir (AR9). **Figure 1** in **Appendix A** provides a map of where the surface water samples were collected by the United States Geological Survey (USGS). **Table 1** in

Appendix A will list the sample locations, dates they were collected, Sample IDs and GPS coordinates.

3.2 Sample Collection

The USGS collected surface water samples from the Androscoggin River on September 14, 2009 at AR2, AR8, AR9 and September 15, 2009 at AR3, AR4. One 20 liter cubitainer was filled with surface water at each sample location. All five sample containers (AR2, AR3, AR4, AR8 and AR9) were placed on ice, kept in coolers and shipped via FedEx on September 15, 2009 to arrive at the EPA Office of Environmental Measurement and Evaluation (OEME) facility in North Chelmsford, Massachusetts on September 16, 2009. Samples were kept between 3 and 6°C, in the dark until test initiation. The two-species surface water toxicity test was started on September 16, 2009 and ended on September 23, 2009. Chain-of-custody records are included in **Appendix B**.

3.3 Toxicity Testing Methods

The toxicity tests were performed according to procedures detailed in two EPA OEME Biology Section Standard Operating Procedures (SOPs), Chronic Toxicity Test Methods for *P. promelas* (EPA, 2008) and Chronic Toxicity Test Method for *C. dubia* (EPA, 2008). Both of these SOPs describe aquatic toxicity test methods used by the EPA OEME according to EPA (2002). All surface water samples were tested at full strength (100% undiluted). An applicable *C. dubia* reference toxicity test was run September 16, 2009 and an applicable *P. promelas* reference toxicity test was run August 27, 2009. These successfully passed minimum Test Acceptability Criteria (TAC) as outlined in *Short-Term Methods For Estimating The Chronic Toxicity Of Effluents and Receiving Waters To Freshwater Organisms*, 4th edition, EPA/821/R-02/013, October 2002. Control charts can be found in **Appendix C**.

The toxicity test was performed using *P. promelas* obtained from the EPA laboratory in Cincinnati, OH, which were less than 24 hours old and *C. dubia* neonates which were less than 24 hours old and produced within an 8-hour time period from the Region 1 EPA OEME Biology Section Laboratory. These organisms are routinely used for toxicity testing and are monitored for quality through an on-going reference toxicity testing program at the Region 1 OEME Laboratory.

Initial chemistry consisted of pH, conductivity, dissolved oxygen (DO), temperature, alkalinity, and hardness and was performed on each sample at the start of the test. On a daily basis throughout the 7-day exposure period, pH, temperature, conductivity, and DO were measured in a composite sample of renewal waste water from each sampling location in order to identify changes which could have affected the test outcome. Daily initial chemistry was also performed on fresh cubitainer to make sure the water chemistry was consistent. Water chemistry data for both species is summarized in **Appendix D**.

3.3.1 *C. dubia* Test Method

Synthetic 60 mg/L $CaCO_3$ hardness water was used as the laboratory control water for the *C. dubia*. The initial surface water sample hardnesses ranged from 8 to 12 mg $CaCO_3$/L and the initial alkalinities ranged from 8-9 mg $CaCO_3$/L. The laboratory control water had a hardness of 64 mg $CaCO_3$/L and alkalinity of 41 mg $CaCO_3$/L.

Test chambers consisted of test tubes containing approximately 15 mL of sample water or laboratory control water. At test initiation each of the 10 replicates from the 5 surface water samples and laboratory control randomly received one neonate from each of 10 parental brooders. Neonates were picked for each set of samples through parental blocking. Each parent used produced broods of at least 8 neonates within 8 hrs of each other. These neonates were also less than 24 hrs old at the start of the test. Only organisms that were swimming normally and appeared healthy were used for the test. The organisms were carefully pipetted, keeping them

completely submerged in water, from culture tube to test chamber. A quality control check was performed on each replicate to ensure that only one organism was introduced into each test chamber. All replicates were kept randomized throughout the test. The test tubes were covered to minimize evaporation and prevent contamination from airborne particles. The test was maintained at 25°C ± 1° in an environmental control chamber with a 16:8 hour light/dark cycle using cool-white fluorescent lights.

Daily test maintenance consisted of filling and randomizing a new rack of culture tubes with the ten replicates of each surface water sample and control sample and allowing the water to warm to 25 ± 1°C before carefully pipetting and transferring the organisms to the new tubes. Each replicate was fed 100 µL each of fixed Yeast Alfalfa Trout chow (YAT) and *Selanastrum capricornutum* daily.

The test was run in an environmental chamber at 25 ± 1°C with a 16:8 hour light : dark cycle using cool-white fluorescent lights. Every 24 hours, observations on brooder mortality and reproduction were recorded, initialed, and dated on laboratory bench sheets. Feedings were also recorded and initialed in a laboratory notebook. All of the test renewals were performed using surface water collected either on September 14, 2009 or September 15, 2009. No additional surface water samples were provided for renewal due to logistical restraints. Copies of the laboratory bench sheets are provided in **Appendix E**.

3.3.2 *P. promelas* Test Method

Sixty mg/L $CaCO_3$ Hardness Process Water (HPW) was used as the laboratory control water for the *P. promelas* test. This water consisted of a mixture of well water from the OEME facility and distilled deionized water, amended with sodium bicarbonate. The initial surface water sample hardnesses ranged from 8 to 12 mg $CaCO_3$/L and the initial alkalinities ranged from 8 to 9 mg $CaCO_3$/L. The laboratory control water hardness was 60 mg $CaCO_3$/L and the alkalinity was 44 mg $CaCO_3$/L.

Test chambers consisted of 300 mL beakers containing approximately 250 mL of test solution. Ten organisms were introduced into each of four replicates per test concentration through random introduction. The organisms were carefully pipetted, keeping them completely submerged in water, from holding beaker to test chamber. A quality control check was made of each replicate to ensure the proper number of organisms was introduced. Only organisms that were swimming normally and appeared healthy were used for the test. The beakers were covered to minimize evaporation and prevent contamination from airborne particles. The test was maintained at 25 ± 1°C in an environmental control chamber with a 16:8 hour light/dark cycle using cool-white fluorescent lights. All replicates were monitored every 24 hours and mortality was recorded on a standard laboratory data sheet. Each replicate was fed 100 µL of concentrated *Artemia* twice a day (before and after each daily renewal) during the exposure period. Dead and unhatched *Artemia*, as well as dead fish, were removed from each replicate on days 1 through 6 of the test. Each day (days 1 through 6), approximately 200 mL of water were removed from each replicate and replaced with fresh sample water. The surviving organisms from each replicate were placed into previously-weighed aluminum pans on day seven, dried in a drying oven at about 98°C for approximately 24 hours, and weighed again to measure growth.

3.4 Statistical Analysis

Statistical analyses for the *P. promelas and C. dubia* tests were conducted using CETIS® (Comprehensive Environmental Toxicity Information) according to the EPA decision tree (EPA, 2000). Survival, growth and reproduction data were analyzed separately for each species.

Data were analyzed using Bartlett's test to check for homogeneity of variance, and Shapiro-Wilk W test to check for normality. All data for *C. dubia* and *P. promelas* had normal distribution and homogeneous variance so were therefore analyzed using Dunnett's Multiple

Comparison Test. Dunnett's Multiple Comparison Test was also used to determine if a significant difference existed between the reference location and samples collected downstream of the former Chlor-Alkali facility.

C. dubia survival data was analyzed using the Fisher Exact/Bonferonni-Holm test. Reproduction data was analyzed using Dunnett's Multiple Comparison Test. Bartlett's test was used to check for homogeneity of variance, and Shapiro-Wilk W test was used to check for normality. Reproduction data had normal distribution and homogeneous variances.

P. promelas survival data was analyzed using Dunnett's Multiple Comparison test. Bartlett's test was used to check for homogeneity of variance, and Shapiro-Wilk W test was used to check for normality. The survival data was normally distributed and had homogenous variability. The CETIS® statistical print-outs are provided in **Appendix E**.

4.0 RESULTS

4.1 *C. dubia* Survival and Reproduction

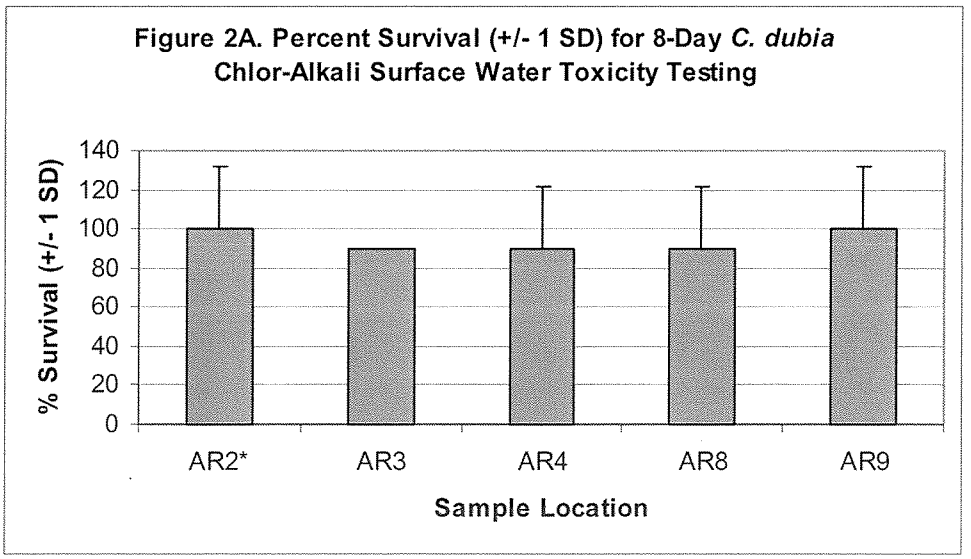
The endpoints measured for *C.dubia* were survival and reproduction after 8 days of exposure to either the laboratory control or surface water from the reference location upstream (AR2) and sample locations downstream of the former Chlor-Alkali facility (AR3, AR4, AR8, AR9). The *C. dubia* survival data are provided in **Table 2A**. The reference location is denoted with a star.

Table 2A. Percent Survival for 8-Day Chlor-Alkali Surface Water Test Using *C. dubia* September 16, 2009 – September 24, 2009

Samples	Lab Control	AR2*	AR3	AR4	AR8	AR9
% Survival	90%	100%	90%	90%	90%	100%

*Reference location

The *C. dubia* toxicity test met the minimum TAC laboratory control survival of 80% as 90% of the lab control survived (EPA 2002). The 8-day survival data were evaluated using the Fisher Exact/Bonferroni-Holm test to determine if there was a significant ($p < 0.05$) difference in survival between the reference sample (AR2) and samples downstream of the former Chlor-Alkali facility (AR3, AR4, AR8 and AR9). The results of the comparisons done by CETIS are summarized in **Figure 1A** with $\pm$ one Standard Deviation (SD).



*Reference location

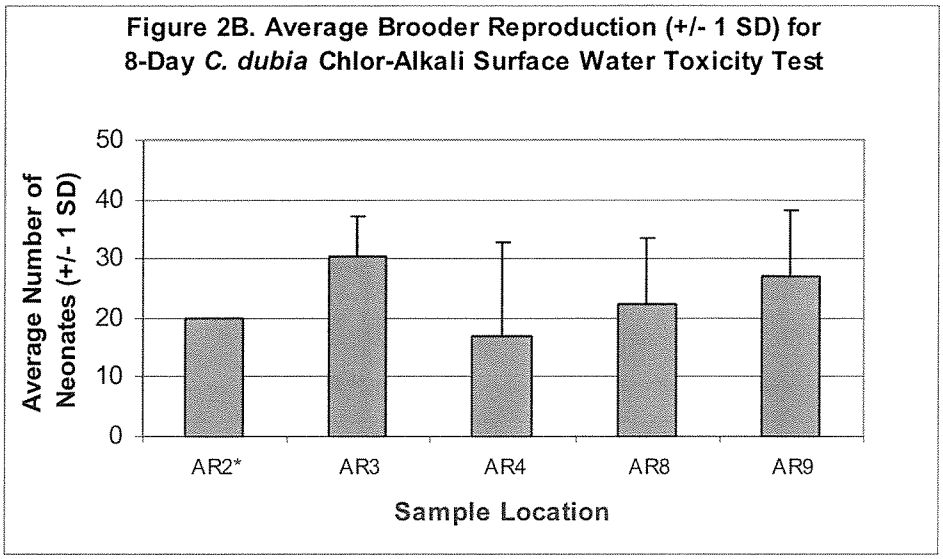
The *C. dubia* reproduction data is provided in **Table 2B**. Again, the reference location is denoted with a star.

Table 2B: Neonate Production for 8-day Chlor-Alkali Surface Water Test Using *C. dubia* September 16, 2009 – September 24, 2009

Samples	Lab Control	AR2*	AR3	AR4	AR8	AR9
Average # of neonates per surviving brooder	17	20	34	19	25	27
% of surviving brooders with 3+ broods, and an average total number of 15 or more neonates	66.7%	80%	100%	77.8%	77.8%	100%

*Reference location

The C. dubia lab control met the minimum TAC of 60% surviving brooders producing 3 or more broods with an average total number of at least 15 neonates (EPA 2002) as the test average was 66.7%. The 8-day reproduction data were evaluated using Dunnett's Multiple Comparison Test to determine if there was a significant ($p < 0.05$) difference in survival between the reference sample (AR2) and samples downstream of the former Chlor-Alkali facility (AR3, AR4, AR8 and AR9). The results of the statistical comparisons done by CETIS for reproduction are summarized in **Figure 2B** with ± one Standard Deviation.



*Reference location

4.2 *P. promelas* Survival and Growth

The endpoints for the *P. promelas* test were survival and growth. The test data were evaluated to determine if percent survival and mean dry biomass differed significantly at the end of the test between the reference sample upstream of the former facility (AR2) when compared to samples collected downstream of former Chlor-Alkali facility (AR3, AR4, AR8, AR9).

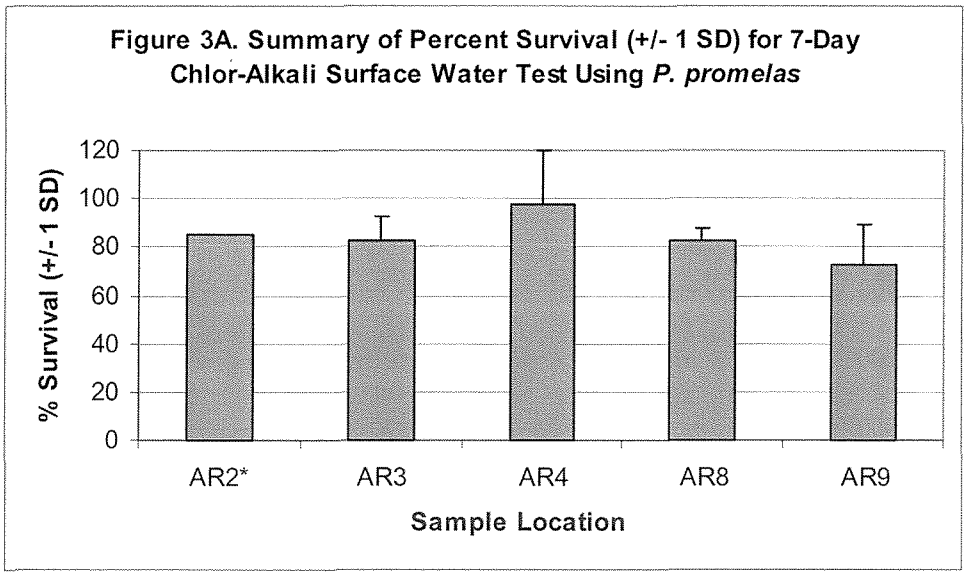
Table 3A presents the survival data for the 7-day *P. promelas* Chlor-Alkali surface water test.

Table 3A: Percent Survival for 7-Day Chlor-Alkali Surface Water Test Using *P. promelas* September 16, 2009 – September 23, 2009

Sample Location	Lab Control	AR2*	AR3	AR4	AR8	AR9
Percent Survival	100%	85%	82.5%	97.5%	82.5%	72.5%

*Reference location

The test met the TAC for survival of 80% (EPA 2002), as 100% survived in the laboratory control. The results of the comparisons are summarized in **Figure 3A** with ± one SD.



*Reference location

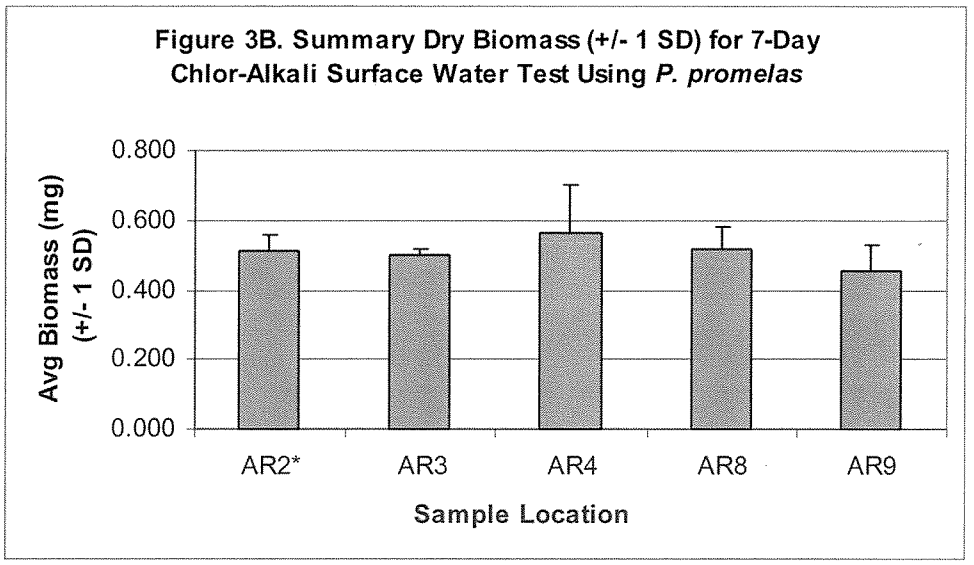
As a minimum TAC, the EPA (2002) specifies the average dry weight per surviving control fish must equal or exceed 0.25 mg. This criterion was met by the laboratory control as seen in **Table 2B**.

Table 3B: Average Dry Biomass and Dry Weight for 7-Day Chlor-Alkali Surface Water Test Using *P. promelas* September 16, 2009 – September 23, 2009

Sample Location	Lab Control	AR2*	AR3	AR4	AR8	AR9
Average Dry Biomass (mg) [A]	0.642	0.511	0.503	0.565	0.517	0.454
Average Dry Weight (mg) [B]	0.642	0.608	0.609	0.580	0.634	0.631

*Reference location
A. Average dry biomass = measured dry weight ÷ number of exposed organisms. This calculation is used in statistical analysis.
B. Average dry weight = measured dry weight ÷ number of surviving organisms. This is provided strictly for comparing the lab control against the minimum TAC per surviving organism of 0.25 mg.

The biomass data were evaluated using Dunnett's Multiple Comparison Test to determine if there was a significant ($p \leq 0.05$) difference between the reference sample (AR2) and samples downstream of the former Chlor-Alkali facility (AR3, AR4, AR8, AR9). No significant effects were seen between the reference location and samples downstream of the Site. The results of the statistical comparisons done by CETIS are summarized in **Figure 2B** with $\pm$ one SD.



*Reference location

5.0 DISCUSSION & CONCLUSION

5.1 *C. dubia*

The *C. dubia* toxicity test for former Chlor-Alkali facility successfully met the TAC for both survival and reproduction. The laboratory control had a survival of 90% which is over the minimum TAC of 80% and had 66.7% of surviving laboratory control brooders having at least 3 broods and a total average reproduction of 15 neonates. The 8-day survival data were evaluated to determine if there was a significant ($p \leq 0.05$) difference in survival between the reference sample and samples downstream of the former Site. No significant effects were found with survival or reproduction.

Based on these data, it was concluded that none of the surface water samples collected downstream of former Chlor-Alkali facility were chronically toxic to a sensitive life stage of *C. dubia.*

5.2 *P. promelas*

The *P. promelas* toxicity test for former Chlor-Alkali facility met the TAC for both survival and growth. The 7-day survival data were evaluated to determine if there was a significant ($p \leq 0.05$) difference in survival between the reference sample and samples downstream of the former Site. No significant effects were found with survival or growth.

The biomass data were evaluated to determine whether growth differed significantly when comparing the reference sample to samples downstream of the Site. No significant effects were seen.

Based on these data, it was concluded that none of the surface water samples collected downstream of former Chlor-Alkali facility were chronically toxic to a sensitive life stage of *P. promelas.*

6.0 REFERENCES

CETIS v1.1.1 rev C. Tidepool Scientific Software. Copyright 2000-2005. Michael A. Ives.

U. S. Environmental Protection Agency. October 2002. *Short-Term Methods For Estimating The Chronic Toxicity Of Effluents and Receiving Waters To Freshwater Organisms*, 4th edition, EPA/821/R-02/013.

U. S. Environmental Protection Agency. 2008. Biology Section Standard Operating Procedure, Chronic Toxicity Method for *Pimephales promelas*, Rev# 6.0. Office of Environmental Measurement and Evaluation, U.S. Environmental Protection Agency, Region 1.

U. S. Environmental Protection Agency. 2008. Biology Section Standard Operating Procedure, Chronic Toxicity Method for *Ceriodaphnia dubia*, Rev# 5.0. Office of Environmental Measurement and Evaluation, U.S. Environmental Protection Agency, Region 1.

U. S. Environmental Protection Agency. 2008. Biology Section Standard Operating Procedure, Biology Test Chemistry Protocols, Rev# 8.0. Office of Environmental Measurement and Evaluation, U.S. Environmental Protection Agency, Region 1.

Appendix A

Surface Water Sampling Stations

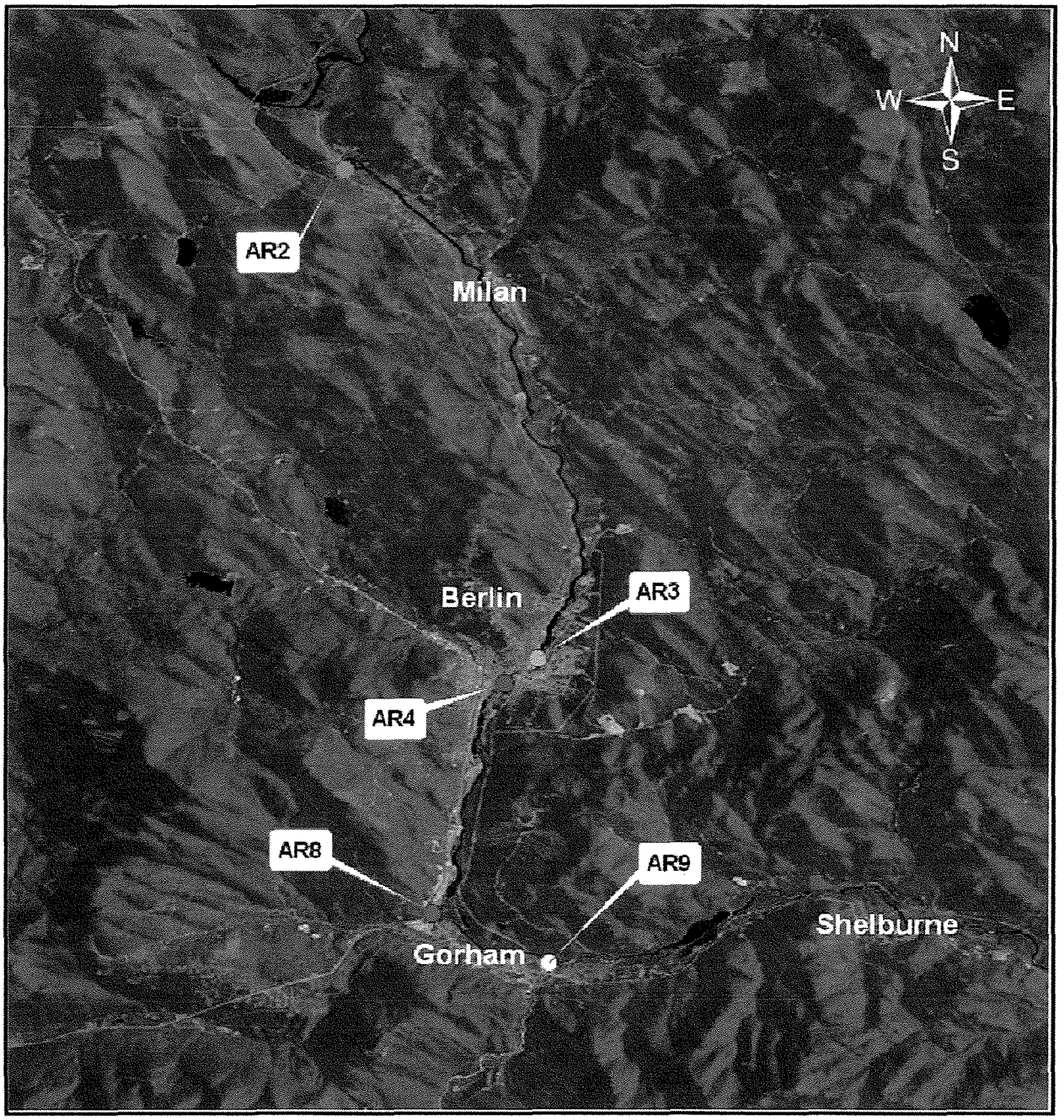
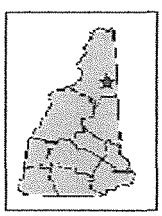


Figure 1
Chlor - Alkali Surface Water Sample Locations



Source: USDA 2007 orthoimagery
Projection: WGS84
Created by GHD
Date: 11/18/2009

TechLaw

Table 1: Chlor-Alkali Surface Water Sampling Stations
Collected by USGS

Lab Sample ID	Field Sample ID	Collection Date	GPS Coordinates*	Sample Location
AR2	AR2-00-SWBIUF01-0-090914	9/14/2009	44°36'53.58"N 71°13'26.36"W	Above Wheeler Bay
AR3	AR3-00-SWBIUF01-0-090915	9/15/2009	44°28'33.20"N 71°10'9.54"W	Railroad bridge between Sawmill and Riverside Dams
AR4	AR4-00-SWBIUF01-0-090915	9/15/2009	44°28'8.58"N 71°10'42.91"W	Mason St Bridge
AR8	AR8-00-SWBIUF01-0-090914	9/14/2009	44°24'13.27"N 71°11'56.52"W	Old ford
AR9	AR9-00-SWBIUF01-090914	9/14/2009	44°23'22.08"N 71° 9'57.59"W	Below Gorham Dam

*Datum WGS84

Appendix B

Chain-of-Custody Records

USEPA Contract Laboratory Program
Generic Chain of Custody

PN: 090900023 TXCCD + TXCFH

Reference Case ~~38974~~ E0015	
Client No:	0036S (DC)
SDG No:	

L

Date Shipped:	9/15/2009
Carrier Name:	FedEx
Airbill:	8703 1695 9907
Shipped to:	Environmental Services Assistance Team 11 Technology Drive North Chelmsford MA 01863 (617) 918-8340

Chain of Custody Record		Sampler Signature:	
Relinquished By	(Date / Time)	Received By (at Lab)	(Date / Time)
1 [signature]	9/15/09 15:00	Bethany Kelley	9/16/09 @ 1000
2			
3			
4			

For Lab Use Only

Lab Contract No:

Unit Price:

Transfer To:

Lab Contract No:

Unit Price:

SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		FOR LAB USE ONLY Sample Condition On Receipt
EP0001	Surface Water/ Thor Smith	L/G	Tox (21)	1035 (Ice Only) (1)	AR8-00-SWBIUF01-0-090914	S: 9/14/2009	16:00	Correct Sample Collection Date/Time per Chuck Debrowski
EP0002	Surface Water/ Thor Smith	L/G	Tox (21)	1081 (Ice Only) (1)	AR2-00-SWBIUF01-0-090914	S: ~~9/15/2009~~	8:30	9/14/09 @ 830 for EP0002
EP0003	Surface Water/ Thor Smith	L/G	Tox (21)	1082 (Ice Only) (1)	AR3-00-SWBIUF01-0-090915	S: ~~9/8/2009~~	8:30	9/15/09 @ 830 for EP0003
EP0004	Surface Water/ Thor Smith	L/G	Tox (21)	1095 (Ice Only) (1)	AR9-00-SWBIUF01-09 0914	S: 9/14/2009	12:05	
EP0005	Surface Water/ Thor Smith	L/G	Tox (21)	1109 (Ice Only) (1)	AR4-00-SWBIUF01-0-090915	S: 9/15/2009	12:00	

Project Number 09090023
Page 16 of 46

Note: Chuck Debrowski was notified of conflicting COC sample collection date/times via Micheal Ferrier & Beth Kelley on 9/16/09 upon sample receipt @ 10:00 AM. Corrections are noted in right-hand column according to Chuck Debrowski (Avatar) - BGK 9/16/09. (BGK 9/16/09)

Shipment for Case Complete? Y/N (DC)	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Cooler Temperature Upon Receipt: 3-6°C see sample receipt check lists	Chain of Custody Seal Number:
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Custody Seal Intact? ✓	Shipment Iced? ✓
Tox = Tox C.dubiu&P.promelas				

TR Number: 1-565205597-091509-0005

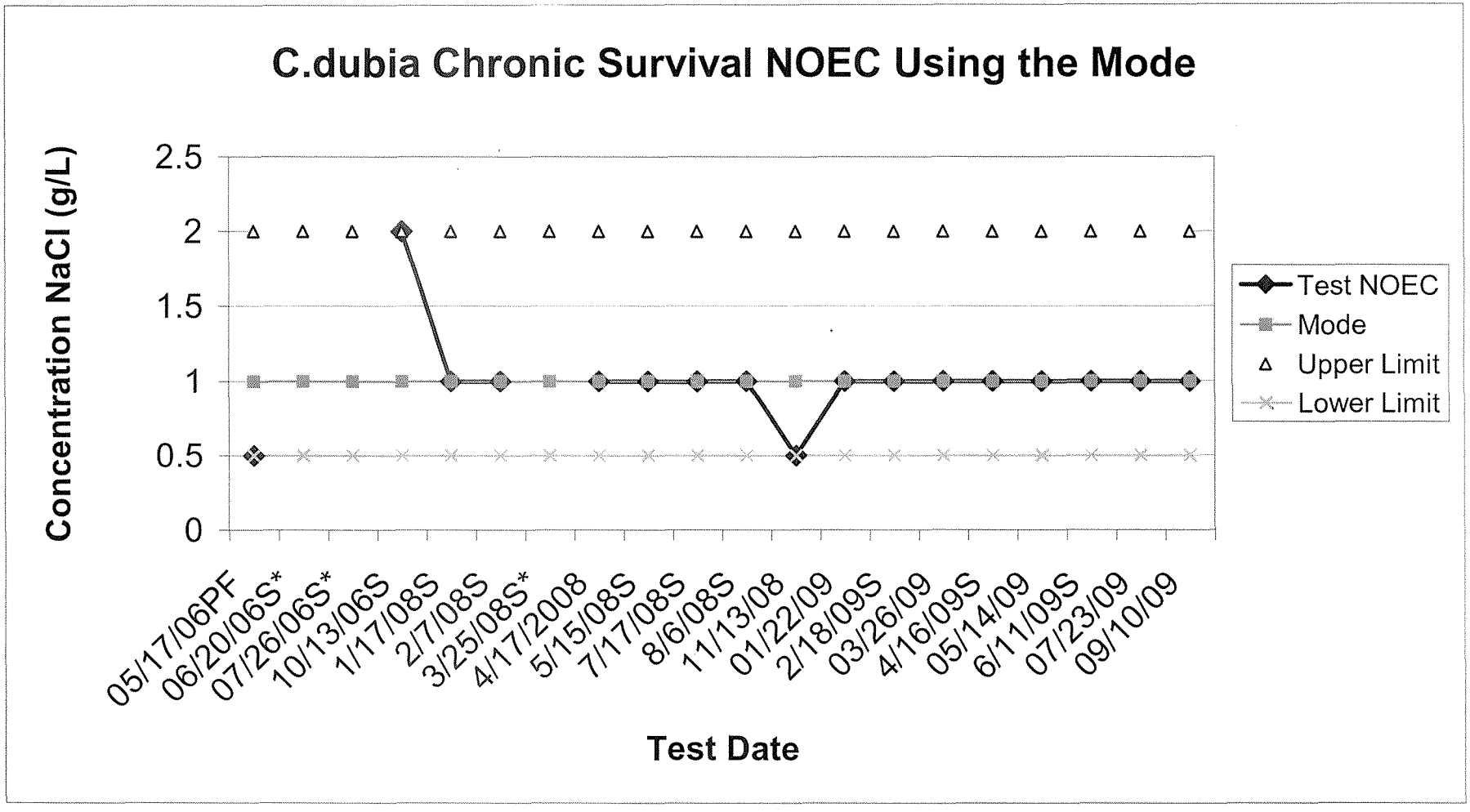
LABORATORY COPY

PR provides preliminary results. Requests for preliminary results will increase analytical costs.
Send Copy to: Sample Management Office, 15000 Conference Center Dr., Chantilly, VA. 20151-3819 Phone 703/818-4200; Fax 703/818-4602

F2V5.1.047 Page 1 of 1

Appendix C

Control Charts for *C. dubia* and *P. promelas*



Project Number 09090023

Page 18 of 46

NOTES:

Note: Historical data are available for tests performed prior to April 2006

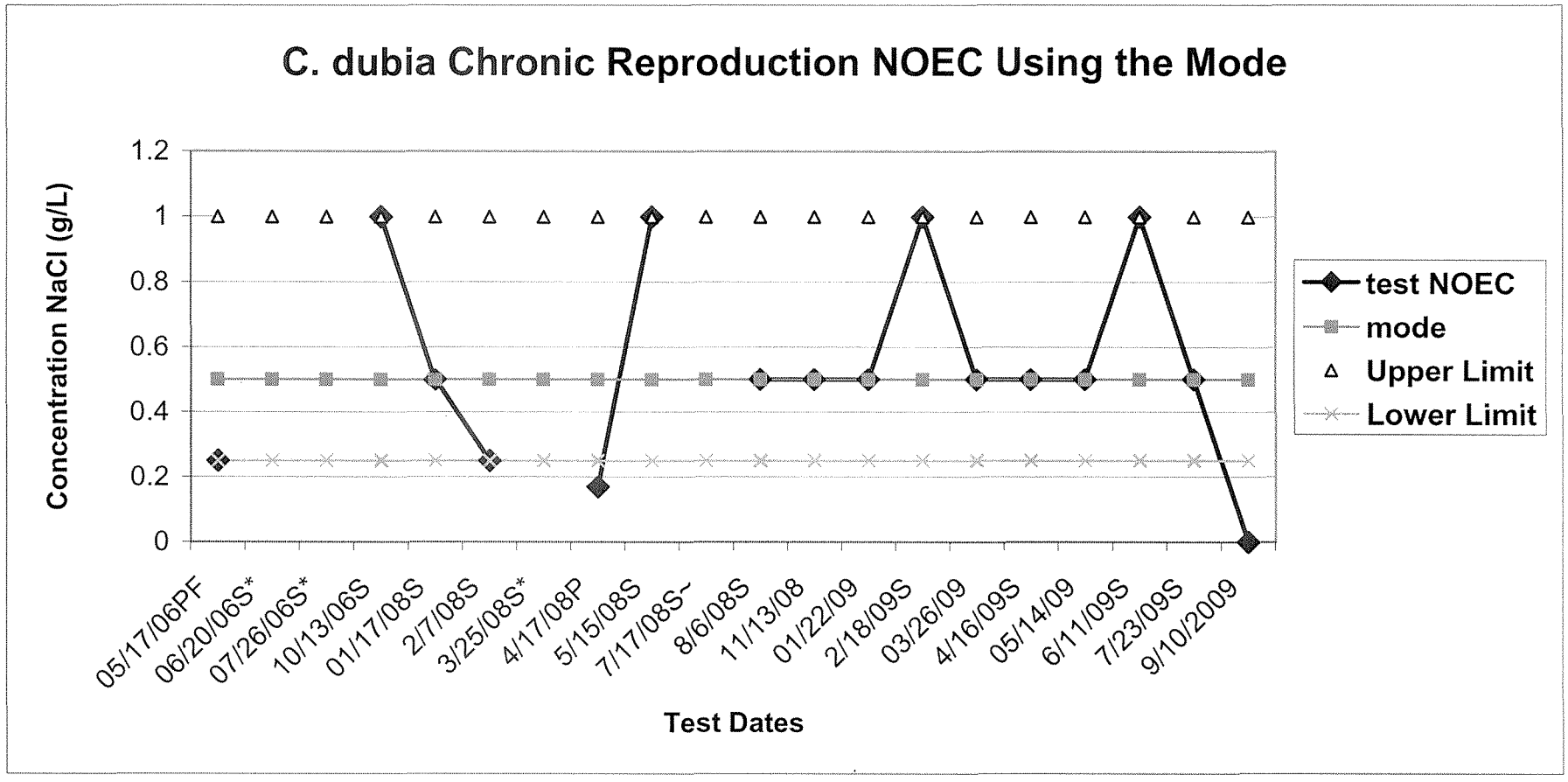
S=tests were performed using synthetic 60 hardness water.

*=test failed because it did not meet the test accpetability criteria (TAC).

PF=test was performed using filtered process water.

No test was performed in August 2006 due to a lack of organisms.

REVISION DATE: 9/25/09



NOTES:

Note: Historical data are available for tests performed prior to April 2006.

S=tests were performed using synthetic 60 hardness water.

*=test failed because it did not meet the test acceptability criteria (TAC).

PF=test was performed using filtered process water.

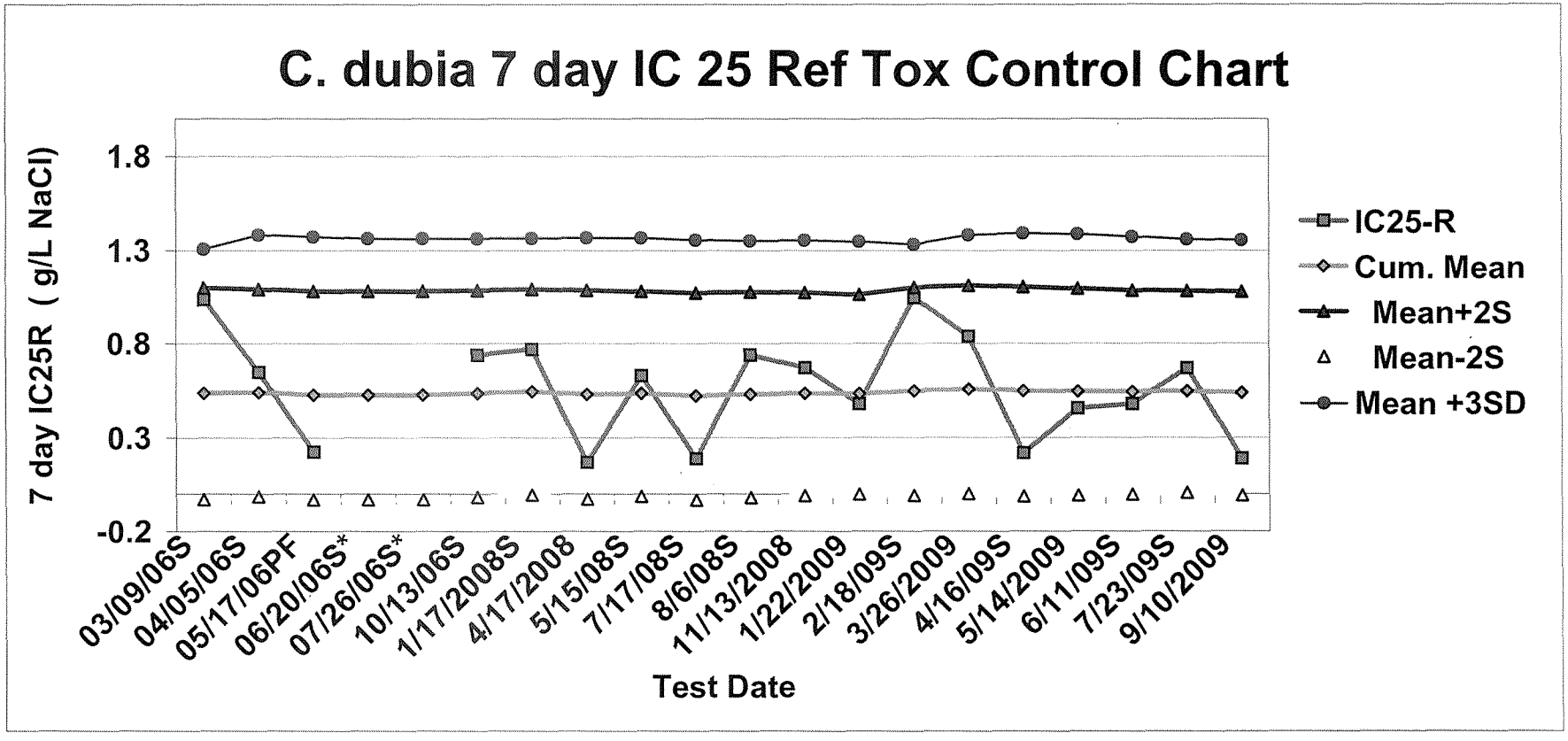
~The NOEC value was <0.25 g/L NaCl, so this data point could not be graphed.

^This test met test acceptability requirements but the LC50 did not fall within acceptable limits.

No test was performed in August 2006 due to a lack of organisms.

REVISION DATE: 9/25/09

Project Number 09090023



NOTES:

Note: Historical data are available for tests performed prior to February 2006.

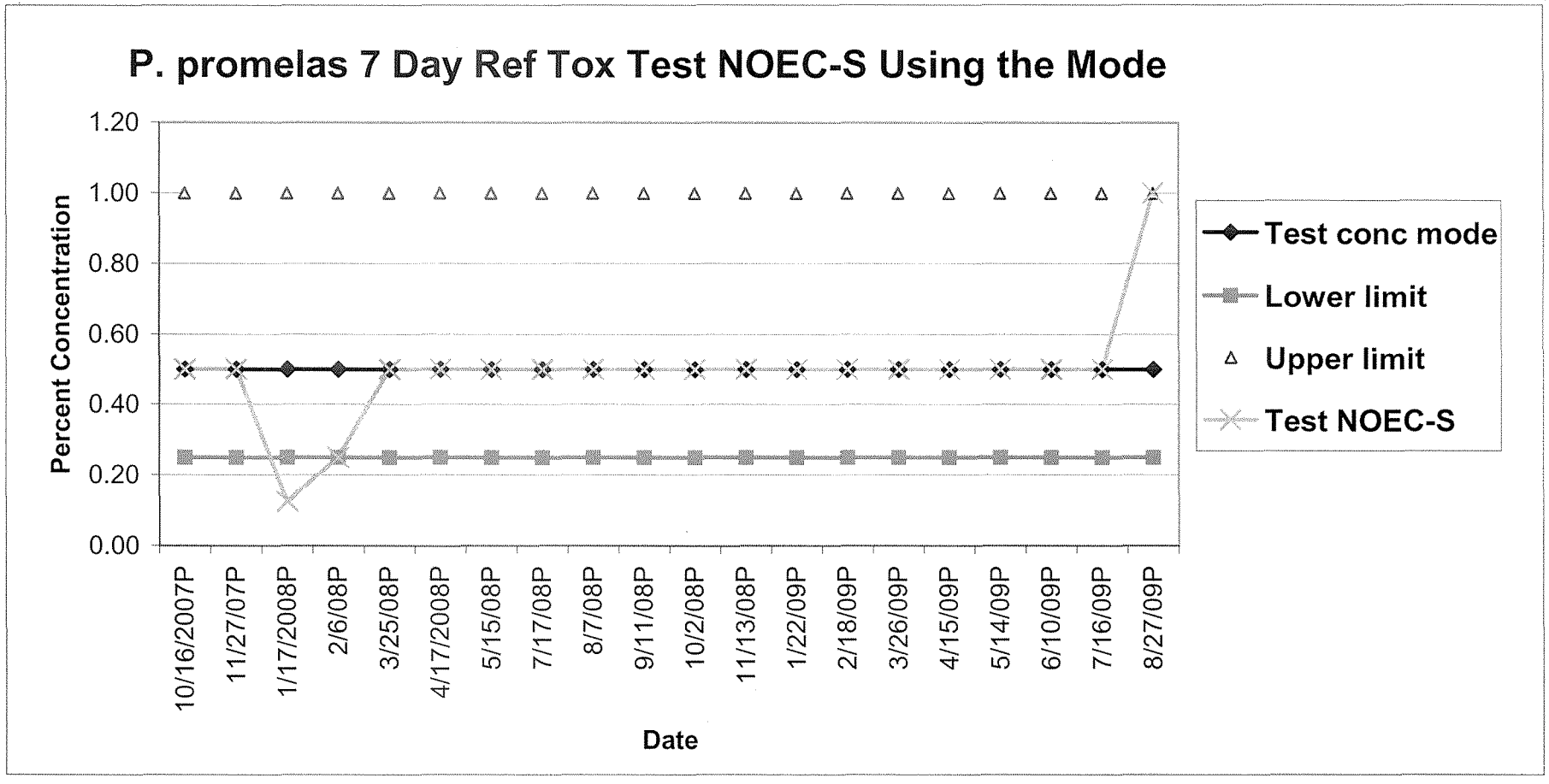
S=tests were performed using synthetic 60 hardness water.

*=test failed because it did not meet the test accpetability criteria (TAC).

No test was performed in August 2006 due to a lack of organisms.

REVISION DATE: 9/25/09

Project Number 09090023



NOTES:

Historical data are available for tests performed prior to September 2007.

P=tests were peformed using laboratory process water.

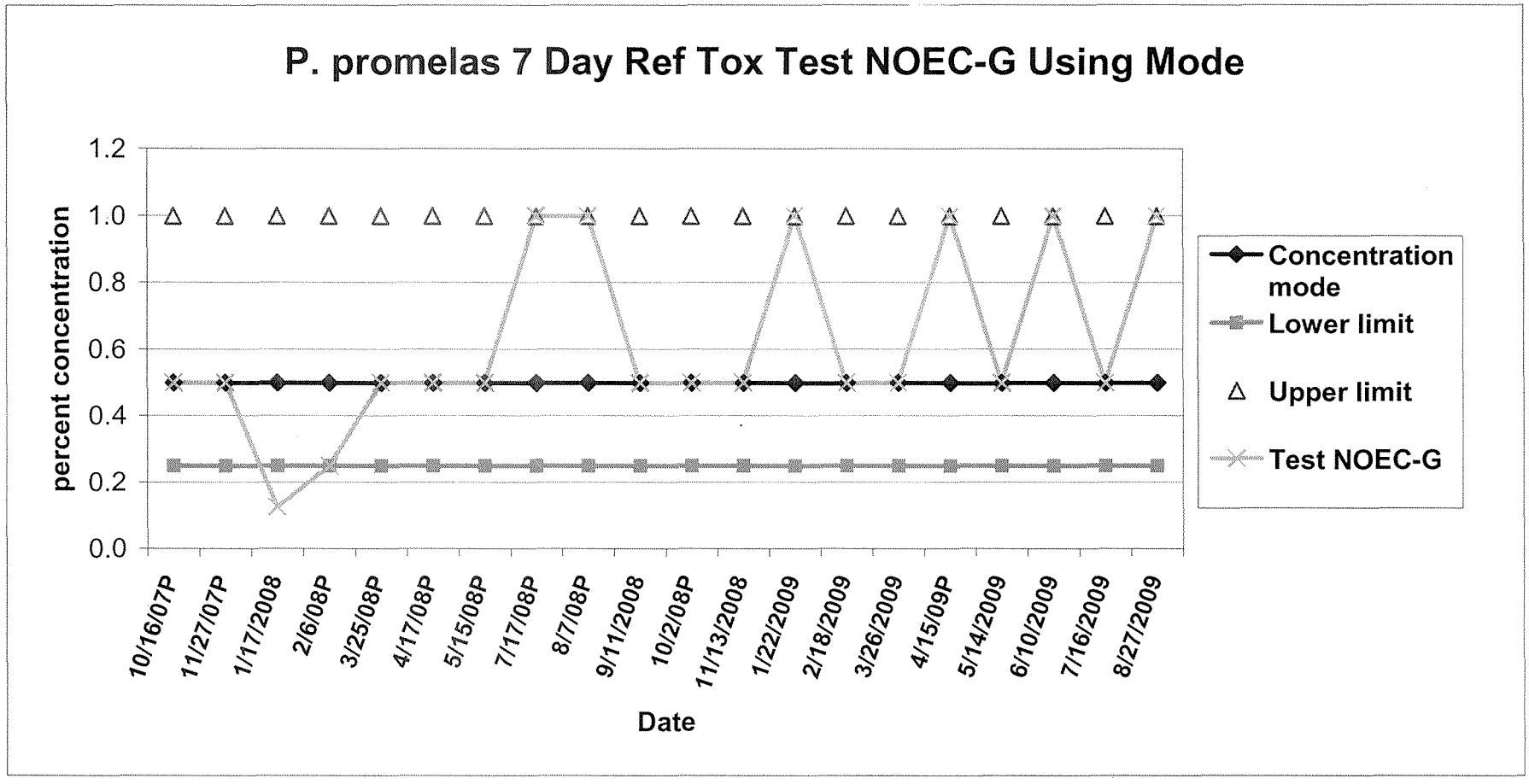
^These tests met test acceptability requirements but the survival NOEC did not fall within acceptable limits

*= did not meet TAC

REVISION DATE: 9/25/09

Project Number 09090023

Page 21 of 46



Project Number 09090023
Page 22 of 46

NOTES:

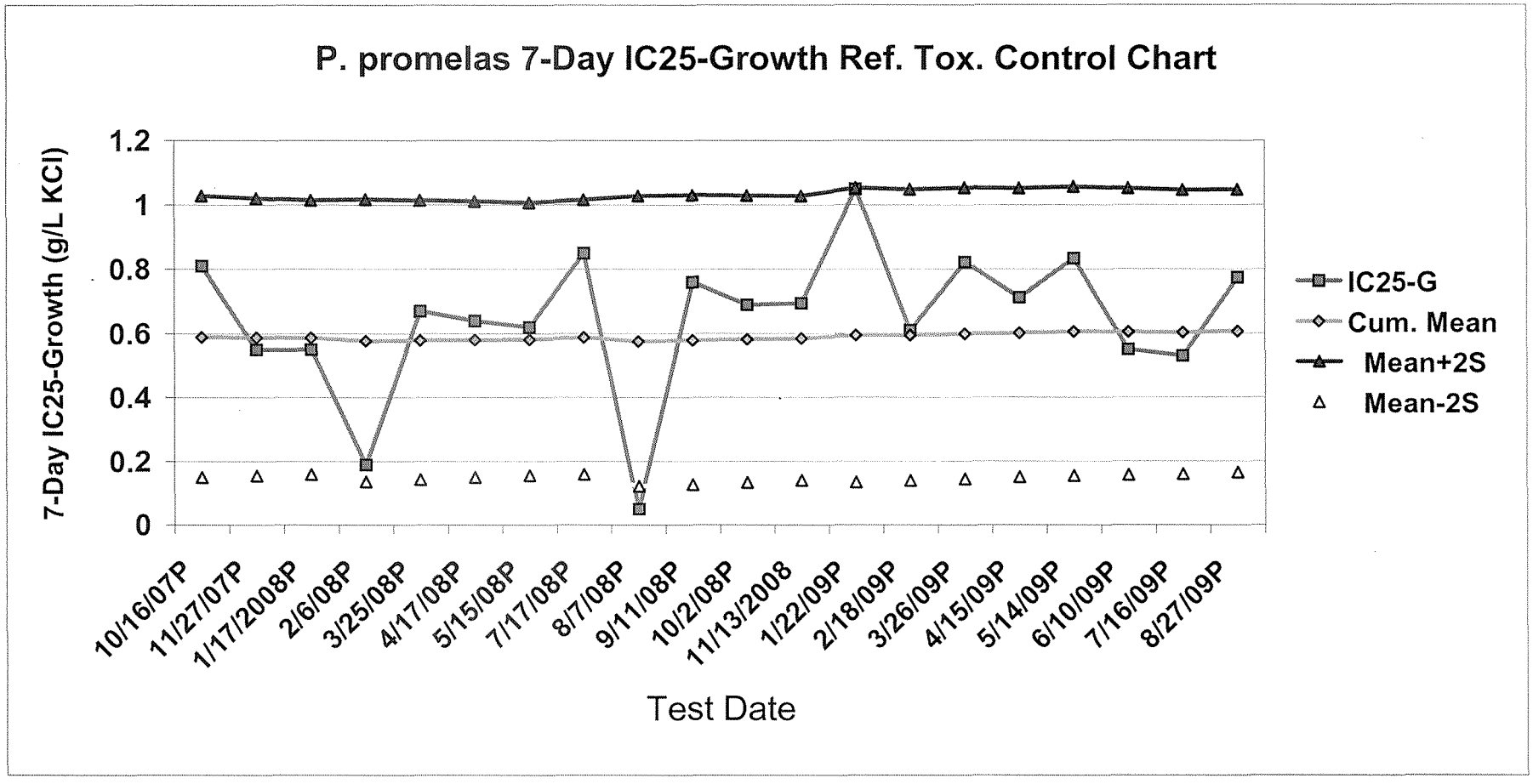
Historical data are available for tests performed prior to September 2007.

P=tests were peformed using laboratory process water.

^This test met test acceptability requirements but the growth NOEC did not fall within acceptable limits.

*=did not meet TAC

REVISION DATE: 9/25/09



NOTES:

Historical data are available for tests performed prior to September 2007.

P= tests were performed using laboratory process water.

* = did not meet TAC

^This test met test acceptability requirements but the IC25 growth did not fall within +/- 2 standard deviations of the cumulative mean.

REVISION DATE: 9/25/09

Project Number 09090023

Appendix D

Summary of Overlying Water Toxicity Test Chemistry for

Ceriodaphnia dubia and *Pimephales Promelas*

Chlor-Alkali: *C. dubia* 8-Day Exposure Surface Water Toxicity Test

C. dubia 8 -Day Exposure Test Initial Chemistry						
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**	**Hardness (mg/L $CaCO_3$)**	**Alkalinity (mg/L $CaCO_3$)**
Lab Control*	239	7.74	7.02	25.53	64	41
AR2	40.4	7.11	7.81	25.60	8	8
AR3	39.8	6.96	7.70	25.61	12	8
AR4	41.4	7.03	7.47	25.59	12	8
AR8	46.3	7.08	7.70	25.59	12	9
AR9	45.4	7.06	7.50	25.61	12	9

*Lab Control: Synthetic 60 Hardness Water + Na_2O_3Se

C. dubia 8 -Day Exposure Test Waste Chemistry-Day 1 (9/17/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**
Lab Control	238	7.80	7.41	25.59
AR2	40.4	7.11	7.81	25.60
AR3	39.8	6.96	7.70	25.61
AR4	41.4	7.03	7.47	25.59
AR8	46.3	7.08	7.70	25.59
AR9	45.4	7.06	7.50	25.61
C. dubia 8 -Day Exposure Test Waste Chemistry-Day 2 (9/18/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**
Lab Control	251	7.75	7.63	25.40
AR2	38.0	7.01	7.42	25.50
AR3	39.0	6.87	7.71	25.51
AR4	39.8	6.97	7.64	25.52
AR8	45.1	7.10	7.77	25.52
AR9	43.5	7.19	7.67	25.50
C. dubia 8 -Day Exposure Test Waste Chemistry-Day 3 (9/19/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**
Lab Control	244	7.96	7.23	25.07
AR2	40.0	7.21	7.86	25.05
AR3	40.1	7.11	7.76	25.10
AR4	40.4	7.16	7.69	25.10
AR8	46.1	7.25	7.89	25.13
AR9	44.5	7.24	7.63	25.15
C. dubia 8 -Day Exposure Test Waste Chemistry-Day 4 (9/20/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**
Lab Control	245	7.71	8.17	25.05
AR2	38.7	7.06	8.14	25.12
AR3	39.4	6.94	8.57	25.14
AR4	40.4	7.02	8.20	25.18
AR8	46.7	7.03	7.60	25.15
AR9	44.8	7.03	8.30	25.11

***C. dubia* 8 -Day Exposure Test Waste Chemistry-Day 5 (9/21/09)**				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	245	7.77	7.47	25.21
AR2	38.0	7.08	7.75	25.20
AR3	39.2	6.92	7.61	25.20
AR4	39.4	6.93	7.60	25.26
AR8	45.1	7.00	7.53	25.31
AR9	43.4	6.98	7.63	25.30
***C. dubia* 8 -Day Exposure Test Waste Chemistry-Day 6 (9/22/09)**				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	235	7.92	9.13	25.47
AR2	39.8	7.26	8.83	25.27
AR3	42.0	7.14	9.18	25.40
AR4	41.9	7.23	8.79	25.36
AR8	48.0	7.26	9.16	25.43
AR9	46.6	7.26	9.07	25.38
***C. dubia* 8 -Day Exposure Test Waste Chemistry-Day 7 (9/23/2009)**				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	251	8.01	8.35	25.07
AR2	39.6	7.31	9.09	25.08
AR3	41.0	7.21	9.01	24.98
AR4	40.9	7.29	9.34	25.06
AR8	47.0	7.30	8.57	25.14
AR9	44.5	7.30	8.40	25.14
***C. dubia* 8 -Day Exposure Test Waste Chemistry-Day 8 (9/24/09)**				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	252	7.88	7.41	25.72
AR2	38.4	7.19	7.87	25.68
AR3	39.5	7.10	7.88	25.68
AR4	40.5	7.15	7.97	25.71
AR8	45.7	7.20	7.83	25.69
AR9	44.7	7.16	7.80	25.67

Chlor-Alkali: *P. promelas* 7-Day Exposure Surface Water Toxicity Test

P. promelas 7 day Exposure Test Initial Chemistry						
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**	**Hardness (mg/L $CaCO_3$)**	**Alkalinity (mg/L $CaCO_3$)**
Lab Control*	210	7.53	7.24	25.82	60	44
AR2	32.3	6.55	7.16	25.72	8	8
AR3	32.6	6.48	7.80	25.69	12	8
AR4	33.5	6.67	7.81	25.70	12	8
AR8	38.6	6.78	8.10	25.70	12	9
AR9	37.6	6.78	8.08	25.66	12	9

*Lab Control: 60 Hardness Process Water

P. promelas 7 -Day Exposure Test Waste Chemistry-Day 1 (9/17/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	214	7.14	5.10	25.30
AR2	35.5	6.45	5.52	24.72
AR3	35.4	6.44	5.77	24.72
AR4	35.7	6.45	5.74	24.82
AR8	42.9	6.54	5.77	24.76
AR9	40.5	6.50	5.45	24.71
P. promelas 7 -Day Exposure Test Waste Chemistry-Day 2 (9/18/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	222	7.32	5.84	25.26
AR2	38.7	6.56	5.25	25.41
AR3	40.5	6.46	5.14	25.36
AR4	39.1	6.48	5.43	25.41
AR8	44.7	6.56	5.23	25.41
AR9	44.5	6.54	5.15	25.41
P. promelas 7 -Day Exposure Test Waste Chemistry-Day 3 (9/19/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	218	7.34	5.52	25.32
AR2	39.5	6.62	5.41	25.27
AR3	41.1	6.62	5.82	25.24
AR4	40.7	6.61	5.21	25.30
AR8	46.4	6.73	5.73	25.32
AR9	45.2	6.72	5.58	25.35
P. promelas 7 -Day Exposure Test Waste Chemistry-Day 4 (9/20/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	219	7.43	6.51	25.35
AR2	37.0	6.80	6.97	25.41
AR3	38.4	6.74	7.09	25.34
AR4	38.9	6.72	6.91	25.37
AR8	45.0	6.93	6.91	25.38
AR9	43.8	6.88	7.28	25.35

***P. promelas* 7 -Day Exposure Test Waste Chemistry-Day 5 (9/21/09)**				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	223	7.14	4.63	25.22
AR2	39.3	6.40	4.68	25.26
AR3	40.0	6.36	4.49	25.36
AR4	40.1	6.40	4.68	25.42
AR8	48.3	6.45	4.92	24.28
AR9	46.4	6.46	4.74	25.25
***P. promelas* 7 -Day Exposure Test Waste Chemistry-Day 6 (9/22/09)**				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	231	7.36	5.91	25.64
AR2	41.8	6.68	5.86	25.62
AR3	43.3	6.67	5.77	25.61
AR4	44.1	6.63	5.19	25.67
AR8	51.5	6.71	5.20	25.67
AR9	47.6	6.68	5.54	25.67
***P. promelas* 7 -Day Exposure Test Waste Chemistry-Day 7 (9/23/09)**				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control	228	7.27	5.58	25.72
AR2	41.8	6.69	6.27	25.67
AR3	42.6	6.71	6.11	25.59
AR4	43.7	6.64	6.12	25.64
AR8	49.1	6.67	6.01	25.66
AR9	48.1	6.71	6.48	25.68

Chlor-Alkali: Daily Initial Surface Water Sample Chemistry for 8-Day Exposure Toxicity Test (*C. dubia*) and 7-Day Exposure Toxicity Test (*P. promelas*)

Daily Initial Chemistry Non-Waste: Day 1 (9/17/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**
Lab Control[1] (P.p.)	210	7.53	7.24	25.82
Lab Control [2](C.d.)	239	7.74	7.02	25.53
AR2	32.3	6.55	7.16	25.72
AR3	32.6	6.48	7.80	25.69
AR4	33.5	6.67	7.81	25.70
AR8	38.6	6.78	8.10	25.70
AR9	37.6	6.78	8.08	25.66
Daily Initial Chemistry Non-Waste: Day 2 (9/18/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**
Lab Control[1] (P.p.)	209	7.81	7.47	25.46
Lab Control [2](C.d.)	239	7.94	7.38	25.52
AR2	39.1	6.89	8.20	25.24
AR3	34.0	6.62	8.33	25.45
AR4	34.3	6.84	7.91	25.56
AR8	41.8	6.92	8.45	25.56
AR9	39.5	6.95	8.12	25.59
Daily Initial Chemistry Non-Waste: Day 3 (9/19/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**
Lab Control[1] (P.p.)	211	7.80	7.38	25.44
Lab Control [2](C.d.)	240	7.80	7.07	25.45
AR2	33.3	7.03	8.07	25.39
AR3	34.3	6.67	8.16	25.36
AR4	34.7	6.85	8.08	25.32
AR8	39.7	6.92	8.47	25.35
AR9	40.6	7.00	8.29	25.34
Daily Initial Chemistry Non-Waste: Day 4 (9/20/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (˚C)**
Lab Control[1] (P.p.)	215	7.48	8.16	25.11
Lab Control [2](C.d.)	246	7.83	8.63	25.28
AR2	34.6	6.78	9.18	25.08
AR3	38.3	6.61	9.64	25.24
AR4	35.8	6.78	9.84	25.24
AR8	42.2	6.89	9.62	25.22
AR9	38.6	6.92	9.59	25.21

Daily Initial Chemistry Non-Waste: Day 5 (9/21/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control[1] (P.p.)	213	7.84	7.84	25.12
Lab Control [2](C.d.)	244	7.84	7.84	24.88
AR2	31.8	6.99	8.75	25.25
AR3	33.8	6.77	8.48	25.88
AR4	33.2	6.89	8.50	25.70
AR8	39.2	6.95	8.97	24.21
AR9	38.5	6.95	8.21	25.64
Daily Initial Chemistry Non-Waste: Day 6 (9/22/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control[1] (P.p.)	213	8.04	8.52	24.39
Lab Control [2](C.d.)	246	8.05	8.22	25.37
AR2	31.5	7.29	8.73	25.36
AR3	33.4	7.07	8.98	25.44
AR4	33.8	7.15	9.02	25.46
AR8	39.7	7.24	8.67	25.46
AR9	39.3	7.26	8.51	25.37
Daily Initial Chemistry Non-Waste: Day 7 (9/23/09)				
Sample ID	**Conductivity (µohms/cm)**	**pH**	**DO (mg/L)**	**Temperature (°C)**
Lab Control[1] (P.p.)	--	--	--	--
Lab Control [2](C.d.)	252	8.18	8.94	25.62
AR2	33.8	7.35	10.04	25.62
AR3	34.7	7.09	10.06	25.57
AR4	34.8	7.20	9.97	25.51
AR8	41.3	7.25	10.54	25.54
AR9	40.2	7.28	10.15	25.62

Note: Chemistry was not recorded for the Lab Control (P.p.) on day 7 because the *P. promelas* test was ended on day 7 and there was no renewal so it was unnecessary to test the water. Sample water and the *C. dubia* lab control water was tested because the *C. dubia* test was renewed on day 7 and ended on day 8.

1. Lab Control (P.p) = 60 Hardness Process Water
2. Lab Control (C.d.) = Synthetic 60 Hardness Water + Na_2O_3Se

Appendix E

Bench Sheets and Statistical Test Print-Outs

ESAT

U.S. EPA REGION I LABORATORY
Ceriodaphnia dubia SURVIVAL AND REPRODUCTION TEST

TEST: Chlor alkali

PAGE 1 OF 3

START DATE: 9/16/09

START TIME: 1200

DAY	1	2	3	4	5	6	7	8	9	10	INIT/DATE	
EXPOSURE	AR9 / 10	AR4 / 7	AR3 / 3	AR2 / 8	AR3 / 2	0 / 7	AR3 / 4	AR3 / 6	AR2 / 4	AR9 / 3		
1	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / — *	✓ / —	✓ / —	✓ / —	BGK 9/17/09	
2	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	D *	✓ / —	✓ / —	✓ / —	BGK 9/18/09	1145
3	✓ / —	✓ / 1	✓ / —	✓ / —	✓ / —	✓ / —		✓ / 4	✓ / —	✓ / —	MF 9/19/09	11:30
4	✓ / 2	✓ / 0	✓ / 9	✓ / 4	✓ / —	✓ / 3		✓ / —	✓ / 2	✓ / —	EC 9/20/09	8:30
5	✓ / —	✓ / 13	✓ / —	✓ / 7	✓ / 14	✓ / 4		✓ / 4	✓ / 8	✓ / 5	MF 9/21/09	12:05
6	✓ / 14	✓ / 4	✓ / 18	✓ / —	✓ / 12	✓ / —		✓ / —	✓ / 4	✓ / 6	MF 9/22/09	
7	✓ / 15	✓ / —	✓ / 17	✓ / —	✓ / 20	✓ / 6		✓ / —	✓ / —	✓ / —	BGK 9/23/09	
8	✓ / 13	✓ / 1	✓ / 3	✓ / 6	✓ / —	✓ / 10		✓ / 12	✓ / 12	✓ / 4	BGK 9/24/09	1425
TOTAL NUMBER NEONATES *	31	18	44	17	46	13		20	14	15		
EXPOSURE	0 / 2	AR2 / 7	AR8 / 5	AR4 / 2	AR9 / 5	AR8 / 4	AR9 / 4	AR9 / 6	AR9 / 9	AR4 / 8	INIT/DATE	
1	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	BGK 9/17/09	
2	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	BGK 9/18/09	
3	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / 2	✓ / 4	✓ / 3	✓ / —	MF 9/19/09	
4	✓ / 2	✓ / 3	✓ / 7	✓ / —	✓ / 7	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	EC 9/20/09	
5	✓ / 10	✓ / 5	✓ / 8	✓ / 14	✓ / 13	✓ / 9	✓ / 9	✓ / 7	✓ / 8	✓ / 8	MF 9/21/09	
6	✓ / 8	✓ / 9	✓ / —	✓ / 12	✓ / —	✓ / 5	✓ / 13	✓ / 14	✓ / 17	✓ / —	MF 9/22/09	
7	✓ / —	✓ / —	✓ / 13	✓ / —	✓ / 6 by white	✓ / 5	✓ / —	✓ / —	✓ / 13	✓ / 6	BGK 9/23/09	
8	✓ / 10	✓ / 11	✓ / 8	✓ / 12	✓ / —	✓ / —	✓ / 18	✓ / 11	✓ / —	✓ / 3	BGK 9/24/09	
TOTAL NUMBER NEONATES *	20	17	28	38	26	19	24	25	28	17		

* Accidentally injured on 9/17/09 - BGK

COMMENTS:
Note: only original sample for renewal

Innoculated by BGK 9/16/09

Legend:
✓ = alive
D = dead
/ = alive or dead/ number of neonates

QC check
2nd analyst count review Initials [illegible] date 9/16/09

* Total # neonates only including 1st three broods.

ESAT

U.S. EPA REGION I LABORATORY
Ceriodaphnia dubia SURVIVAL AND REPRODUCTION TEST

STUDY: Chlor Alkali

START DATE: 9/16/09 ✓ ✓ START TIME: 1200

	DAY	1	2	3	4	5	6	7	8	9	10	INIT/DATE
EXPOSURE		AR8 / 10	AR2 / 3	AR3 / 8	0 / 10	AR3 / 7	0 / 6	AR3 / 1	AR8 / 2	AR2 / 10	0 / 9	
	1	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	BGK 9/17/09
	2	small / —	small / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	BGK 9/18/09
	3	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / 6	✓ / —	✓ / —	✓ / —	AF 9/19/09
	4	D	✓ small / —	✓ / 6	✓ / 1	✓ / 11	✓ / 9	✓ / —	✓ / —	✓ / 2	✓ / 6	EC 9/20/09
	5		✓ / 1	✓ / 3	✓ / 3	✓ / —	✓ / —	✓ / 17	✓ / 9	✓ / 10	✓ / —	AF 9/21/09
	6		✓ / —	✓ / 3	✓ / 5	✓ / 12	✓ / 2	✓ / 12	✓ / 12	✓ / 11	✓ / 1	AF 9/22/09
	7		✓ / 2	✓ / -	✓ / —	✓ / 21	✓ / 5	✓ / 15	✓ / 18	✓ / —	✓ / 3	BGK 9/23/09
	8		pale / 2	✓ / 8	~~BGK 9/24/09~~ / B	✓ / 12	✓ / —	✓ / —	✓ / —	✓ / 6	✓ / —	BGK 9/24/09
TOTAL NUMBER NEONATES *			5	12	17	44	16	35	39	23	10	

	DAY	1	2	3	4	5	6	7	8	9	10	INIT/DATE
EXPOSURE		AR4 / 9	0 / 8	AR9 / 7	AR4 / 10	AR4 / 5	AR2 / 5	AR9 / 2	AR4 / 1	AR3 / 10	AR9 / 1	INIT/DATE
	1	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	BGK 9/17/09
	2	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	BGK 9/18/09
	3	✓ / —	✓ / —	✓ / —	D / —	✓ / —	✓ / —	✓ / —	✓ / 4	✓ / —	✓ / 7	AF 9/19/09
	4	✓ / 1	✓ / 1	✓ / 11		✓ / 6	✓ / 2	✓ / 6	✓ / —	✓ / 12	✓ / —	EC 9/20/09
	5	✓ / —	✓ / 7	✓ / —		✓ / —	✓ / 14	✓ / 14	✓ / 11	✓ / —	✓ / 9	AF 9/21/09
	6	✓ / —	✓ / —	✓ / 14		✓ / 11	✓ / —	✓ / 15	✓ / 7	✓ / 15	✓ / 10	AF 9/22/09
	7	✓ / —	✓ / —	✓ / 12		✓ / 4	✓ / 8	✓ / —	✓ / —	✓ / 20	✓ / 2	BGK 9/23/09
	8	✓ / —	✓ / 6	✓ / —		✓ / 10	✓ / 2	✓ / 14	✓ / —	✓ / —	✓ / —	BGK 9/24/09
TOTAL NUMBER NEONATES *		1	14	37		21	24	35	22	47	26	

COMMENTS:

Note: only original sample for renewal

Innoculated by BGK 9/16/09

Legend:

✓ = alive
D = dead/ = alive or dead/ number of neonates

QC check

2nd analyst count review Initials ✓ date 9/14/09

* Total # neonates only including 1st 3 broods.

ESAT

U.S. EPA REGION I LABORATORY
Ceriodaphnia dubia SURVIVAL AND REPRODUCTION TEST

STUDY: Chlor alkali

START DATE: 9/16/09

START TIME: 1200

	DAY	1	2	3	4	5	6	7	8	9	10	INIT/DATE
EXPOSURE CONC/REP		AR8 / 9	0 / 3	AR2 / 1	AR8 / 8	AR4 / 6	AR8 / 7	AR2 / 6	AR4 / 3	AR9 / 8	AR8 / 3	
	1	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	BGK 9/17/09
	2	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	BGK 9/18/09
	3	✓ / 5	✓ / 4	✓ / 1	✓ / 3	✓ / —	✓ / —	✓ / —	✓ / —	✓ / 1	✓ / 5	MF 9/19/09
	4	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / 5	✓ / 9	✓ / —	✓ / —	✓ / —	EC 9/20/09
	5	✓ / 11	✓ / 8	✓ / 9	✓ / 8	✓ / —	✓ / 11	✓ / —	✓ / 6	✓ / 10	✓ / 11	MF 9/21/09
	6	✓ / 13	✓ / 8	✓ / 11	✓ / 3	✓ / 12	✓ / 16	✓ / 7	✓ / 8	✓ / 12	✓ / 10	MF 9/22/09
	7	✓ / 13	✓ / 3	✓ / 16	✓ / —	✓ / —	✓ / —	✓ / 10	✓ / 10	✓ / —	✓ / 5	BGK 9/23/09
	8	✓ / —	✓ / —	✓ / —	✓ / 6	✓ / —	✓ / 16	✓ / —	✓ / —	✓ / 13	✓ / —	BGK 9/24/09
TOTAL NUMBER NEONATES *		29	20	21	14	12	32	26	24	23	26	
EXPOSURE CONC/REP		0 / 4	AR3 / 5	0 / 5	AR2 / 9	AR8 / 1	AR2 / 2	AR4 / 4	AR3 / 9	0 / 1	AR8 / 6	INIT/DATE
	1	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	BGK 9/17/09
	2	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	BGK 9/18/09
	3	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	✓ / 3	✓ / 3	✓ / 5	✓ / 5	MF 9/19/09
	4	✓ / 4	✓ / 12	✓ / 9	✓ / 9	✓ / 5	✓ / —	✓ / —	✓ / —	✓ / —	✓ / —	EC 9/20/09
	5	✓ / 4	✓ / 10	✓ / —	✓ / —	✓ / —	✓ / 4	✓ / 7	✓ / 14	✓ / 12	✓ / 7	MF 9/21/09
	6	✓ / —	✓ / 1	✓ / 12	✓ / 10	✓ / 7	✓ / 8	✓ / 6	✓ / 10	✓ / 11	✓ / 11	MF 9/22/09
	7	✓ / —	✓ / 5	D / —	✓ / 8	✓ / 2	✓ / 14	✓ / —	✓ / 9	✓ / —	✓ / —	BGK 9/23/09
	8	✓ / 10	✓ / 11	↓	✓ / 9	✓ / —	✓ / —	✓ / 18	✓ / —	✓ / 14	✓ / 8	BGK 9/24/09
TOTAL NUMBER NEONATES *		18	28	21	27	14	26	16	27	28	23	

COMMENTS:

Note: only original sample for renewal

Innoculated by BGK 9/16/09

Legend:

✓ = alive
D = dead
/ = alive or dead/ number of neonates

QC check

2nd analyst count review Initials [illegible] date 9/16/09

* Total number neonates only including 1st 3 broods.

Project Number 09090023

CETIS Data Worksheet

Report Date: 09 Nov-09 11:40 AM
Link: 04-2703-5674

Ceriodaphnia 7-d Survival and Reproduction Test — **U.S. EPA Region I Lab**

Start Date: 16 Sep-09 12:00 PM **Species:** Ceriodaphnia dubia **Sample Code:** CDControl
Ending Date: 24 Sep-09 12:00 PM **Protocol:** EPA/821/R-02-013 (2002) **Sample Source:** Chlor-Alkali
Sample Date: 16 Sep-09 12:00 PM **Material:** Lab Control **Sample Station:** Control

Sample Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Neonates	Male
CDControl	1	32	1	1	1	1	1	1	1	1	28	0
CDControl	2	42	1	1	1	1	1	1	1	1	20	0
CDControl	3	34	1	1	1	1	1	1	1	1	20	0
CDControl	4	59	1	1	1	1	1	1	1	1	18	0
CDControl	5	26	1	1	1	1	1	1	1	0	21	0
CDControl	6	21	1	1	1	1	1	1	1	1	16	0
CDControl	7	58	1	1	1	1	1	1	1	1	13	0
CDControl	8	52	1	1	1	1	1	1	1	1	14	0
CDControl	9	16	1	1	1	1	1	1	1	1	10	0
CDControl	10	55	1	1	1	1	1	1	1	1	17	0
CDAR2	1	15	1	1	1	1	1	1	1	1	21	0
CDAR2	2	24	1	1	1	1	1	1	1	1	26	0
CDAR2	3	53	1	1	1	1	1	1	1	1	5	0
CDAR2	4	6	1	1	1	1	1	1	1	1	14	0
CDAR2	5	41	1	1	1	1	1	1	1	1	24	0
CDAR2	6	40	1	1	1	1	1	1	1	1	26	0
CDAR2	7	25	1	1	1	1	1	1	1	1	17	0
CDAR2	8	13	1	1	1	1	1	1	1	1	17	0
CDAR2	9	31	1	1	1	1	1	1	1	1	27	0
CDAR2	10	12	1	1	1	1	1	1	1	1	23	0
CDAR3	1	29	1	1	1	1	1	1	1	1	35	0
CDAR3	2	4	1	1	1	1	1	1	1	1	46	0
CDAR3	3	30	1	1	1	1	1	1	1	1	44	0
CDAR3	4	48	1	1	0	0	0	0	0	0	0	0
CDAR3	5	18	1	1	1	1	1	1	1	1	28	0
CDAR3	6	10	1	1	1	1	1	1	1	1	20	0
CDAR3	7	50	1	1	1	1	1	1	1	1	44	0
CDAR3	8	27	1	1	1	1	1	1	1	1	12	0
CDAR3	9	56	1	1	1	1	1	1	1	1	27	0
CDAR3	10	36	1	1	1	1	1	1	1	1	47	0
CDAR4	1	35	1	1	1	1	1	1	1	1	22	0
CDAR4	2	47	1	1	1	1	1	1	1	1	38	0
CDAR4	3	3	1	1	1	1	1	1	1	1	24	0
CDAR4	4	20	1	1	1	1	1	1	1	1	16	0
CDAR4	5	46	1	1	1	1	1	1	1	1	21	0
CDAR4	6	37	1	1	1	1	1	1	1	1	12	0
CDAR4	7	44	1	1	1	1	1	1	1	1	18	0
CDAR4	8	38	1	1	1	1	1	1	1	1	17	0
CDAR4	9	57	1	1	1	1	1	1	1	1	1	0
CDAR4	10	28	1	1	1	0	0	0	0	0	0	0
CDAR8	1	43	1	1	1	1	1	1	1	1	14	0
CDAR8	2	2	1	1	1	1	1	1	1	1	39	0
CDAR8	3	8	1	1	1	1	1	1	1	1	26	0
CDAR8	4	5	1	1	1	1	1	1	1	1	19	0
CDAR8	5	7	1	1	1	1	1	1	1	1	28	0
CDAR8	6	60	1	1	1	1	1	1	1	1	23	0
CDAR8	7	22	1	1	1	1	1	1	1	1	32	0
CDAR8	8	23	1	1	1	1	1	1	1	1	14	0
CDAR8	9	45	1	1	1	1	1	1	1	1	29	0
CDAR8	10	33	1	1	1	1	0	0	0	0	0	0
CDAR9	1	1	1	1	1	1	1	1	1	1	26	0
CDAR9	2	14	1	1	1	1	1	1	1	1	35	0
CDAR9	3	17	1	1	1	1	1	1	1	1	15	0

CETIS Data Worksheet

Report Date: 09 Nov-09 11:40 AM
Link: 04-2703-5674

Sample Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Neonates	Male
CDAR9	4	51	1	1	1	1	1	1	1	1	24	0
CDAR9	5	39	1	1	1	1	1	1	1	1	26	0
CDAR9	6	54	1	1	1	1	1	1	1	1	25	0
CDAR9	7	11	1	1	1	1	1	1	1	1	37	0
CDAR9	8	19	1	1	1	1	1	1	1	1	23	0
CDAR9	9	9	1	1	1	1	1	1	1	1	28	0
CDAR9	10	49	1	1	1	1	1	1	1	1	31	0

Note: The 7 days included in this data set are the 1st 7 days of the test. The 8th day can be seen on the original benchsheet. None of the breeders died on the 8th day & CETIS only allows 7 days worth of survival to be included. An 8-day test is acceptable (EPA, 2002).

CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	04-2703-5674	04-2703-5674	09 Nov-09 11:38 AM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Fisher Exact/Bonferroni-Holm	C > T	Untransformed				N/A		

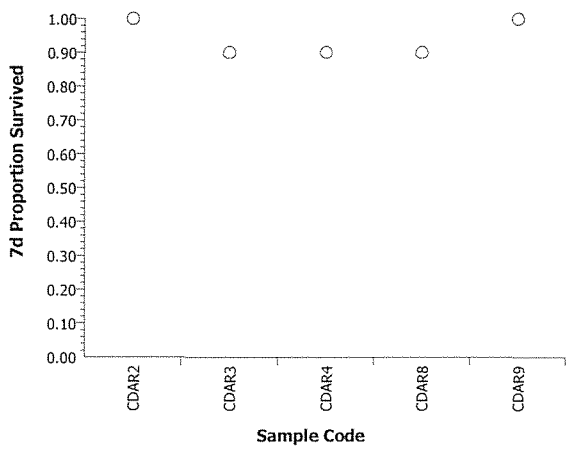
Group Comparisons

Sample	vs	Sample	Statistic	P-Value	Decision(0.05)
CDAR2		CDAR3	0.50000	1.00000	Non-Significant Effect
CDAR2		CDAR4	0.50000	1.00000	Non-Significant Effect
CDAR2		CDAR8	0.50000	1.00000	Non-Significant Effect
CDAR2		CDAR9	1.00000	1.00000	Non-Significant Effect

Data Summary

Sample Code	Non-Responders	Responders	Total Observed
CDAR2	10	0	10
CDAR3	9	1	10
CDAR4	9	1	10
CDAR8	9	1	10
CDAR9	10	0	10

Graphics



Project Number 09090023

CETIS Analysis Detail

Ceriodaphnia 7-d Survival and Reproduction Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Reproduction	Comparison	04-2703-5674	04-2703-5674	09 Nov-09 11:38 AM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Dunnett's Multiple Comparison	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Bartlett	9.79332	13.27670	0.04406	Equal Variances
Distribution	Shapiro-Wilk W	0.97233		0.28723	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	1153.48	288.37	4	2.45	0.05955	Non-Significant Effect
Error	5293.4	117.6311	45			
Total	6446.87988	406.00111	49			

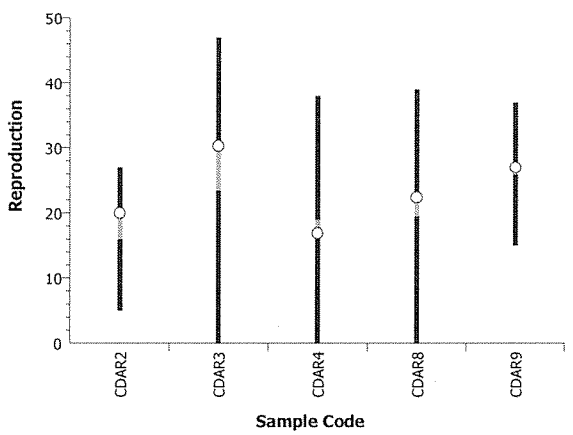
Group Comparisons

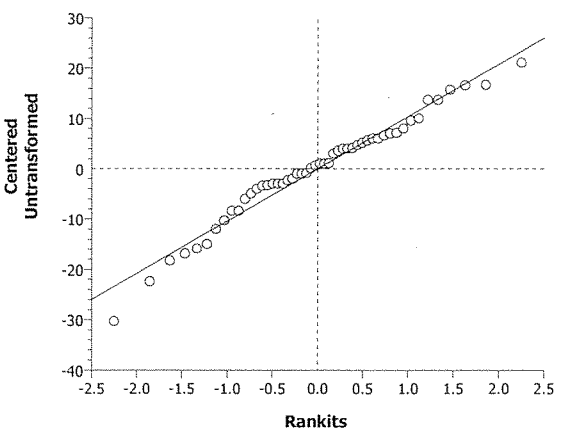
Sample	vs	Sample	Statistic	Critical	P-Value	MSD	Decision(0.05)
CDAR2		CDAR3	-2.1235	2.22241	0.9994	10.7796	Non-Significant Effect
		CDAR4	0.63912	2.22241	0.5393	10.7796	Non-Significant Effect
		CDAR8	-0.4948	2.22241	0.9221	10.7796	Non-Significant Effect
		CDAR9	-1.4432	2.22241	0.9939	10.7796	Non-Significant Effect

Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
CDAR2	10	20	5	27	6.8799				
CDAR3	10	30.3	0	47	15.98				
CDAR4	10	16.9	0	38	11.07				
CDAR8	10	22.4	0	39	11.108				
CDAR9	10	27	15	37	6.2893				

Graphics





Project Number 09090023

CETIS Test Summary

Report Date: 09 Nov-09 11:38 AM
Test Link: 04-2703-5674

Ceriodaphnia 7-d Survival and Reproduction Test — **U.S. EPA Region I Lab**

Test No:	02-9881-4292	**Test Type:**	Reproduction-Survival (7d)	**Duration:**	8d 0h
Start Date:	16 Sep-09 12:00 PM	**Protocol:**	EPA/821/R-02-013 (2002)	**Species:**	Ceriodaphnia dubia
Ending Date:	24 Sep-09 12:00 PM	**Dil Water:**		**Source:**	In-House Culture
Setup Date:	16 Sep-09 12:00 PM	**Brine:**			

Comments: ESAT: Chlor-Alkali Chronic C. dubia Surface Water Test Sept. 09

Sample No:	13-4275-4365	**Material:**	Site Surface Water	**Client:**	USGS
Sample Date:	14 Sep-09 08:30 AM	**Code:**	CDAR2	**Project:**	Special Studies
Receive Date:	16 Sep-09 10:00 AM	**Source:**	Chlor-Alkali		
Sample Age:	52h	**Station:**	AR2		

Comments: ESAT: Chlor-Alkali Chronic C. dubia Surface Water Test Sept. 09

Sample No:	15-1927-6766	**Material:**	Site Surface Water	**Client:**	USGS
Sample Date:	15 Sep-09 08:30 AM	**Code:**	CDAR3	**Project:**	Special Studies
Receive Date:	16 Sep-09 10:00 AM	**Source:**	Chlor-Alkali		
Sample Age:	28h	**Station:**	AR3		

Comments: ESAT: Chlor-Alkali Chronic C. dubia Surface Water Test Sept. 09

Sample No:	10-6907-6678	**Material:**	Site Surface Water	**Client:**	USGS
Sample Date:	15 Sep-09 12:00 PM	**Code:**	CDAR4	**Project:**	Special Studies
Receive Date:	16 Sep-09 10:00 AM	**Source:**	Chlor-Alkali		
Sample Age:	24h	**Station:**	AR4		

Comments: ESAT: Chlor-Alkali Chronic C. dubia Surface Water Test Sept. 09

Sample No:	09-7440-1981	**Material:**	Site Surface Water	**Client:**	USGS
Sample Date:	14 Sep-09 04:00 PM	**Code:**	CDAR8	**Project:**	Special Studies
Receive Date:	16 Sep-09 10:00 AM	**Source:**	Chlor-Alkali		
Sample Age:	44h	**Station:**	AR8		

Comments: ESAT: Chlor-Alkali Chronic C. dubia Surface Water Test Sept. 09

Sample No:	05-5312-5380	**Material:**	Site Surface Water	**Client:**	USGS
Sample Date:	14 Sep-09 12:05 PM	**Code:**	CDAR9	**Project:**	Special Studies
Receive Date:	16 Sep-09 10:00 AM	**Source:**	Chlor-Alkali		
Sample Age:	48h	**Station:**	AR9		

Comments: ESAT: Chlor-Alkali Chronic C. dubia Surface Water Test Sept. 09

Sample No:	07-5205-2877	**Material:**	Lab Control	**Client:**	USGS
Sample Date:	16 Sep-09 12:00 PM	**Code:**	CDControl	**Project:**	Special Studies
Receive Date:		**Source:**	Chlor-Alkali		
Sample Age:	N/A	**Station:**	Control		

Comments: ESAT: Chlor-Alkali Chronic C. dubia Surface Water Test Sept. 09

Project Number 09090023

CETIS Test Summary

Report Date: 09 Nov-09 11:38 AM
Test Link: 04-2703-5674

7d Proportion Survived Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
CDControl	10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%
CDAR2	10	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
CDAR3	10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%
CDAR4	10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%
CDAR8	10	0.90000	0.00000	1.00000	0.10000	0.31623	35.14%
CDAR9	10	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%

Reproduction Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
CDControl	10	17.7	10	28	1.585	5.0122	28.32%
CDAR2	10	20	5	27	2.1756	6.8799	34.40%
CDAR3	10	30.3	0	47	5.0532	15.98	52.74%
CDAR4	10	16.9	0	38	3.5006	11.07	65.50%
CDAR8	10	22.4	0	39	3.5125	11.108	49.59%
CDAR9	10	27	15	37	1.9889	6.2893	23.29%

7d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
CDControl	1.00000	1.00000	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000	1.00000	1.00000
CDAR2	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
CDAR3	1.00000	1.00000	1.00000	0.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
CDAR4	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.00000
CDAR8	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	0.00000
CDAR9	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

Reproduction Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
CDControl	28	20	20	18	21	16	13	14	10	17
CDAR2	21	26	5	14	24	26	17	17	27	23
CDAR3	35	46	44	0	28	20	44	12	27	47
CDAR4	22	38	24	16	21	12	18	17	1	0
CDAR8	14	39	26	19	28	23	32	14	29	0
CDAR9	26	35	15	24	26	25	37	23	28	31

Project Number 09090023

U.S. EPA REGION I LABORATORY - NORTH CHELMSFORD, MA
Pimephales promelas CHRONIC TOXICITY TEST

Study name: Chlor alkali START DATE: 9/16/09 Page 1 of 1

Project # 09090023

EXPOSURE	REP	ORIGINAL NUMBER	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Notes Pan#
ϕ	N	10	10	10	10	10	10	10	10	1
	B	10	10	10	10	10	10	10	10	2
	D	10	10	10	10	10	10	10	10	3
	M	10	10	10	10	10	10	10	10	4
AR2	J	10	10	10	9	9	9	9	9	5
	K	10	10	8	8	8	7	7	7	6
	W	10	10	10	10	10	9	9	9	7
	Q	10	10	9	9	9	9	9	9	8
AR3	U	10	10	10	10	10	10	10	10	9
	H	10	10	10	10	9	6	RAR 9/20/09 5	5	10
	L	10	10	10	10	9	9	9	9	11
	Y	10	10	10	10	9	9	9	9	12
AR4	A	10	10	10	10	10	10	10	10	13
	Z	10	10	10	10	10	10	10	10	14
	R	10	10	10	10	10	10	10	10	15
	X	10	10	10	10	10	10	10	9	16
AR8	I	10	10	10	10	9	9	9	9	17
	E	10	10	10	9	9	7	6	6	18
	V	10	10	10	10	10	10	10	10	19
	C	10	10	10	10	10	9	9	~~9~~ 8 EC 9/23	20
BGK 9/16/09 ~~AR9~~	O	10	10	9	9	9	9	9	8	21
AR9	S	10	10	9	9	9	8	8	8	22
	G	10	10	8	8	6	6	6	6	23
	T	10	10	9	8	8	8	8	7	24
INITIALS/ DATE		BGK+EB 9/16/09	RAR 9/17/09	EB 9/18/09	EW 9/19/09	EW 9/20/09	ME EW EB 9/21/09	RAR 9/22/09	EC/EB 9/23/09	

NOTE 1: The number recorded in each space is a **running** total of the number of organisms ~~dead~~ Alive (ME) in the replicate (out of a total of ten organisms per replicate).

NOTE 2: Each replicate is 100ul of *Artemia* twice a day, in the morning (pre-renewal) and again in the afternoon (post renewal). Individuals who perform the feedings record their initials in the Organism Test Feeding logbook.

QC Check

2nd analyst count review Initials BGK date 9/16/09

Renewal:

Sample ID original sample

Use Date 9/16-23/09

CETIS Data Worksheet

Report Date: 01 Oct-09 9:12 AM
Link: 17-3581-2837

Fathead Minnow 7-d Larval Survival and Growth Test — **U.S. EPA Region I Lab**

Start Date: 16 Sep-09 12:00 PM
Ending Date: 23 Sep-09 12:00 PM
Sample Date: 14 Sep-09 12:05 PM
Species: Pimephales promelas
Protocol: EPA/821/R-02-013 (2002)
Material: Site Surface Water
Sample Code: PPAR9
Sample Source: Chlor-Alkali
Sample Station: AR9

Sample Code	Rep	Pos	# Exposed	1d Survival	2d Survival	3d Survival	4d Survival	5d Survival	6d Survival	7d Survival	Total Weight-mg	Tare Weight-mg	Pan Count
Ppcontrol	1	6	10	10	10	10	10	10	10	10	999	993.09	10
Ppcontrol	2	23	10	10	10	10	10	10	10	10	992.95	986.02	10
Ppcontrol	3	18	10	10	10	10	10	10	10	10	986.56	980.44	10
Ppcontrol	4	7	10	10	10	10	10	10	10	10	988.89	982.18	10
PPAR2	1	15	10	10	10	9	9	9	9	9	988.14	983.05	9
PPAR2	2	14	10	10	8	8	8	7	7	7	991.53	986.53	7
PPAR2	3	5	10	10	10	10	10	9	9	9	998.14	993.12	9
PPAR2	4	24	10	10	9	9	9	9	9	9	958.6	953.26	9
PPAR3	1	8	10	10	10	10	10	10	10	10	981.58	975.6	10
PPAR3	2	3	10	10	10	10	9	6	5	5	996.73	993.7	5
PPAR3	3	17	10	10	10	10	9	9	9	9	974.11	968.17	9
PPAR3	4	22	10	10	10	10	9	9	9	9	973.2	968.05	9
PPAR4	1	10	10	10	10	10	10	10	10	10	978.52	972.46	10
PPAR4	2	11	10	10	10	10	10	10	10	10	992.25	985.95	10
PPAR4	3	1	10	10	10	10	10	10	10	10	997.6	992.68	10
PPAR4	4	12	10	10	10	10	10	10	10	9	988.7	983.37	9
PPAR8	1	21	10	10	10	10	9	9	9	9	1009.56	1004.37	9
PPAR8	2	9	10	10	10	9	9	7	6	6	966.89	962.67	6
PPAR8	3	2	10	10	10	10	10	10	10	10	975.57	969.46	10
PPAR8	4	4	10	10	10	10	10	9	9	8	991.59	986.42	8
PPAR9	1	13	10	10	9	9	9	8	8	8	978.46	973.94	8
PPAR9	2	16	10	10	9	9	9	8	8	8	976.6	971.6	8
PPAR9	3	19	10	10	8	8	6	6	6	6	979.8	975.48	6
PPAR9	4	20	10	10	9	8	8	8	8	7	978.2	973.9	7

Project Number 09090023

Analyst: BGK Reviewed By: EC

CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
7d Proportion Survived	Comparison	17-3581-2837	17-3581-2837	01 Oct-09 9:12 AM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Dunnett's Multiple Comparison	C > T	Angular (Corrected)				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Bartlett	5.07367	13.27670	0.27982	Equal Variances
Distribution	Shapiro-Wilk W	0.89822		0.03819	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.2461893	0.0615473	4	1.96	0.15321	Non-Significant Effect
Error	0.4718674	0.0314578	15			
Total	0.71805674	0.0930052	19			

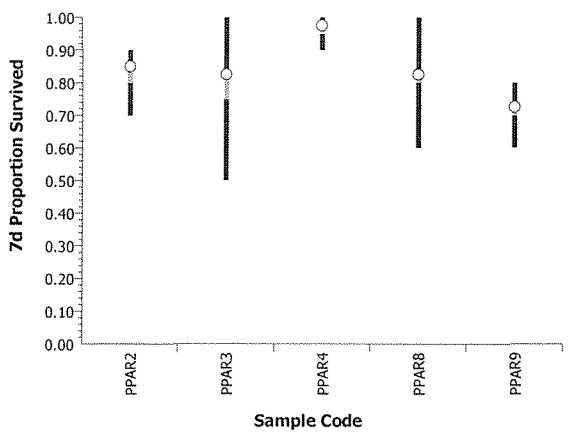
Group Comparisons

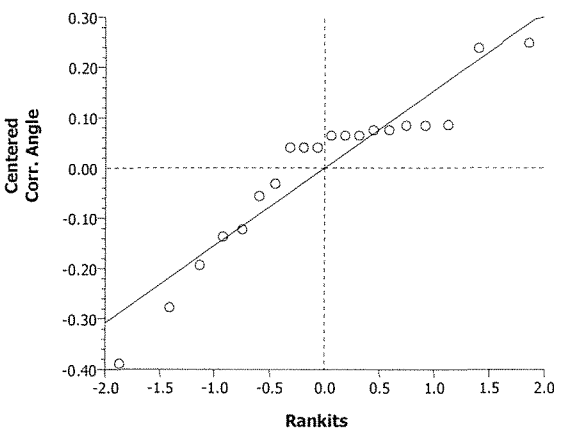
Sample	vs	Sample	Statistic	Critical	P-Value	MSD	Decision(0.05)
PPAR2		PPAR3	0.08529	2.35615	0.7713	0.2955	Non-Significant Effect
		PPAR4	-1.4887	2.35615	0.9931	0.2955	Non-Significant Effect
		PPAR8	0.16746	2.35615	0.7415	0.2955	Non-Significant Effect
		PPAR9	1.28925	2.35615	0.2713	0.2955	Non-Significant Effect

Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
PPAR2	4	0.85000	0.70000	0.90000	0.10000	1.18457	0.99116	1.24905	0.12894
PPAR3	4	0.82500	0.50000	1.00000	0.22174	1.17388	0.78540	1.41202	0.27014
PPAR4	4	0.97500	0.90000	1.00000	0.05000	1.37127	1.24905	1.41202	0.08149
PPAR8	4	0.82500	0.60000	1.00000	0.17078	1.16357	0.88608	1.41202	0.22302
PPAR9	4	0.72500	0.60000	0.80000	0.09574	1.02288	0.88608	1.10715	0.10634

Graphics





CETIS Analysis Detail

Fathead Minnow 7-d Larval Survival and Growth Test — **U.S. EPA Region I Lab**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
Mean Dry Biomass-mg	Comparison	17-3581-2837	17-3581-2837	01 Oct-09 9:12 AM	CETISv1.1.1

Method	Alt H	Data Transform	Zeta	NOEL	LOEL	Toxic Units	ChV	PMSD
Dunnett's Multiple Comparison	C > T	Untransformed				N/A		

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P-Value	Decision(0.01)
Variances	Bartlett	11.23885	13.27670	0.02401	Equal Variances
Distribution	Shapiro-Wilk W	0.90717		0.05631	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P-Value	Decision(0.05)
Between	0.0254204	0.0063551	4	1.04	0.41828	Non-Significant Effect
Error	0.0914873	0.0060992	15			
Total	0.11690773	0.0124543	19			

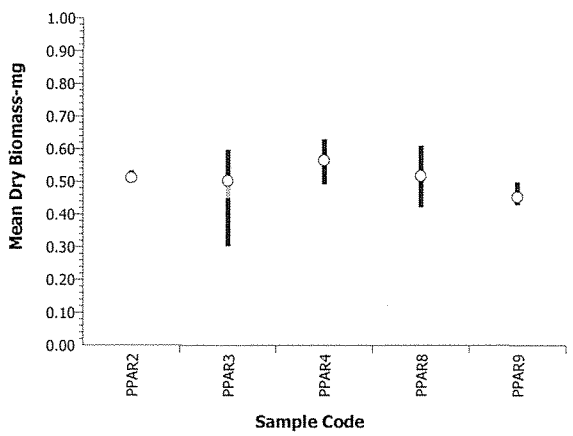
Group Comparisons

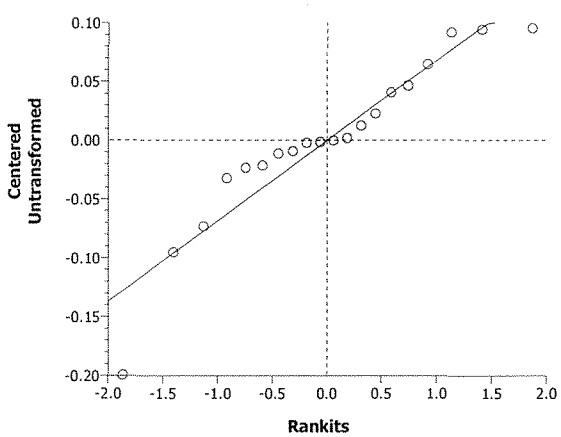
Sample	vs	Sample	Statistic	Critical	P-Value	MSD	Decision(0.05)
PPAR2		PPAR3	0.15844	2.35615	0.7449	0.13011	Non-Significant Effect
		PPAR4	-0.9778	2.35615	0.9737	0.13011	Non-Significant Effect
		PPAR8	-0.1087	2.35615	0.8332	0.13011	Non-Significant Effect
		PPAR9	1.04576	2.35615	0.3642	0.13011	Non-Significant Effect

Data Summary

		Original Data				Transformed Data			
Sample Code	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
PPAR2	4	0.51125	0.50000	0.53400	0.01565				
PPAR3	4	0.50250	0.30300	0.59800	0.13838				
PPAR4	4	0.56525	0.49200	0.63000	0.06392				
PPAR8	4	0.51725	0.42200	0.61100	0.07717				
PPAR9	4	0.45350	0.43000	0.50000	0.03255				

Graphics





Project Number 09090023

CETIS Test Summary

Report Date: 29 Sep-09 10:16 AM
Test Link: 17-3581-2837

Fathead Minnow 7-d Larval Survival and Growth Test — **U.S. EPA Region I Lab**

Test No:	14-9615-5221	**Test Type:**	Growth-Survival (7d)	**Duration:**	7d 0h
Start Date:	16 Sep-09 12:00 PM	**Protocol:**	EPA/821/R-02-013 (2002)	**Species:**	Pimephales promelas
Ending Date:	23 Sep-09 12:00 PM	**Dil Water:**		**Source:**	EPA Cincinnati
Setup Date:	16 Sep-09 12:00 PM	**Brine:**			
Comments:	ESAT: Chlor-Alkali Chronic P. promelas Surface Water Test Sept. 09				

Sample No:	09-2439-3414	**Material:**	Site Surface Water	**Client:**	USGS
Sample Date:	14 Sep-09 08:30 AM	**Code:**	PPAR2	**Project:**	Special Studies
Receive Date:	16 Sep-09 10:00 AM	**Source:**	Chlor-Alkali		
Sample Age:	52h	**Station:**	AR2		
Comments:	ESAT: Chlor-Alkali Chronic P. promelas Surface Water Test Sept. 09				

Sample No:	12-0410-6082	**Material:**	Site Surface Water	**Client:**	USGS
Sample Date:	15 Sep-09 08:30 AM	**Code:**	PPAR3	**Project:**	Special Studies
Receive Date:	16 Sep-09 10:00 AM	**Source:**	Chlor-Alkali		
Sample Age:	28h	**Station:**	AR3		
Comments:	ESAT: Chlor-Alkali Chronic P. promelas Surface Water Test Sept. 09				

Sample No:	15-0081-8567	**Material:**	Site Surface Water	**Client:**	USGS
Sample Date:	15 Sep-09 12:00 PM	**Code:**	PPAR4	**Project:**	Special Studies
Receive Date:	16 Sep-09 10:00 AM	**Source:**	Chlor-Alkali		
Sample Age:	24h	**Station:**	AR4		
Comments:	ESAT: Chlor-Alkali Chronic P. promelas Surface Water Test Sept. 09				

Sample No:	09-3185-9326	**Material:**	Site Surface Water	**Client:**	USGS
Sample Date:	14 Sep-09 04:00 PM	**Code:**	PPAR8	**Project:**	Special Studies
Receive Date:	16 Sep-09 10:00 AM	**Source:**	Chlor-Alkali		
Sample Age:	44h	**Station:**	AR8		
Comments:	ESAT: Chlor-Alkali Chronic P. promelas Surface Water Test Sept. 09				

Sample No:	18-2087-9900	**Material:**	Site Surface Water	**Client:**	USGS
Sample Date:	14 Sep-09 12:05 PM	**Code:**	PPAR9	**Project:**	Special Studies
Receive Date:	16 Sep-09 10:00 AM	**Source:**	Chlor-Alkali		
Sample Age:	48h	**Station:**	AR9		
Comments:	ESAT: Chlor-Alkali Chronic P. promelas Surface Water Test Sept. 09				

Sample No:	11-4018-0106	**Material:**	Lab Control	**Client:**	USGS
Sample Date:	16 Sep-09 12:00 PM	**Code:**	Ppcontrol	**Project:**	Special Studies
Receive Date:		**Source:**	Chlor-Alkali		
Sample Age:	N/A	**Station:**	Control		
Comments:	ESAT: Chlor-Alkali Chronic P. promelas Surface Water Test Sept. 09				

Project Number 09090023

CETIS Test Summary

Report Date: 29 Sep-09 10:16 AM
Test Link: 17-3581-2837

7d Proportion Survived Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
Ppcontrol	4	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
PPAR2	4	0.85000	0.70000	0.90000	0.05000	0.10000	11.76%
PPAR3	4	0.82500	0.50000	1.00000	0.11087	0.22174	26.88%
PPAR4	4	0.97500	0.90000	1.00000	0.02500	0.05000	5.13%
PPAR8	4	0.82500	0.60000	1.00000	0.08539	0.17078	20.70%
PPAR9	4	0.72500	0.60000	0.80000	0.04787	0.09574	13.21%

Mean Dry Biomass-mg Summary

Sample Code	Reps	Mean	Minimum	Maximum	SE	SD	CV
Ppcontrol	4	0.6417	0.591	0.693	0.0241	0.0481	7.50%
PPAR2	4	0.5113	0.5	0.534	0.0078	0.0156	3.06%
PPAR3	4	0.5025	0.303	0.5980	0.0692	0.1384	27.54%
PPAR4	4	0.5652	0.492	0.63	0.032	0.0639	11.31%
PPAR8	4	7.3423	0.4220	27.911	6.8563	13.713	186.76
PPAR9	4	0.4535	0.43	0.5	0.0163	0.0326	7.18%

7d Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Ppcontrol	1.00000	1.00000	1.00000	1.00000
PPAR2	0.90000	0.70000	0.90000	0.90000
PPAR3	1.00000	0.90000	0.90000	0.50000
PPAR4	0.90000	1.00000	1.00000	1.00000
PPAR8	0.90000	0.60000	0.80000	1.00000
PPAR9	0.80000	0.70000	0.60000	0.80000

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Ppcontrol	0.693	0.612	0.6710	0.591
PPAR2	0.5090	0.5	0.5020	0.534
PPAR3	0.5980	0.5150	0.5940	0.303
PPAR4	0.5330	0.492	0.63	0.606
PPAR8	0.5190	0.4220	0.5170	27.911
PPAR9	0.4520	0.43	0.4320	0.5

Project Number 09090023

APPENDIX D

APPENDIX D

HYALELLA AZTECA SURVIVAL AND GROWTH SEDIMENT TOXICITY TEST

TOXICOLOGICAL EVALUATION
OF FRESHWATER SEDIMENT SAMPLES

Nobis Engineering, Inc. Project 80013
DAS-RAC2-030
Task Order Number: 10-NH-80013-045-TO-01

28 Day *Hyalella azteca*
Survival and Growth Sediment Toxicity Test

Prepared For:

Nobis Engineering, Incorporated
585 Middlesex Street
Lowell, Massachusetts 01851

Prepared By:

EnviroSystems, Incorporated
1 Lafayette Road
Hampton, New Hampshire 03842

September 2010
Reference Number 20108Ha

As per the Statement of Work provided by Nobis Engineering, Incorporated for services regarding Specification DAS-RAC2-030:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. In addition, I certify, that to the best of my knowledge and belief, the data as reported are true and accurate. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature:

October 8, 2010

Kenneth A. Simon, Technical Director

Date

TABLE OF CONTENTS

1.0 INTRODUCTION 4

2.0 MATERIALS AND METHODS 4

2.1 General Methods, Biological Evaluations 4
2.2 Test Species 4
2.3 Test Samples and Laboratory Control Sediment 4
2.4 *Hyalella azteca* Survival and Growth Toxicity Tests 4
2.5 Statistical Analysis 5
2.6 Quality Control 5
2.7 Protocol Deviations 5

3.0 RESULTS AND DISCUSSION 6
3.1 Laboratory Control and Project Reference Site Performance 6
3.2 Summary 7

4.0 REFERENCES 8

LIST OF TABLES

Table 1. Summary of Sample Collection Information 6
Table 2. Reference Toxicant Evaluation 6
Table 3. Summary of Acceptable Endpoints and Measurements 7
Table 4. Summary of Project Reference Site Performance 7
Table 5. Summary of Significant Endpoints 8
Table 6. Day 28 *Hyalella azteca* Survival Summary and Statistical Analysis 9
Table 7. Day 28 *Hyalella azteca* Dry Weight Summary and Statistical Analysis 10
Table 8. Day 28 *Hyalella azteca* Dry Biomass Summary and Statistical Analysis 11
Table 9. Summary of Overlying Water Qualities 12

APPENDIX A: RAW DATA & STATISTICAL SUPPORT 14

TOXICOLOGICAL EVALUATION
OF FRESHWATER SEDIMENT SAMPLES

Nobis Engineering, Inc. Project 80013
DAS-RAC2-030

28 Day *Hyalella azteca*
Survival and Growth Sediment Toxicity Test

1.0 INTRODUCTION

This report presents the results of toxicity tests completed on sediment samples collected for Nobis Engineering, Inc. Project Number 80013, Task Order Number: 10-NH-80013-045-TO-01. Samples were collected by the US Geological Survey. Testing was based on programs and protocols developed by the ASTM (2009) and US EPA (2000). The toxicity of the samples was assessed by conducting survival and growth tests using the freshwater amphipod, *Hyalella azteca*. Toxicity tests and supporting analyses were performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire.

Toxicity tests expose groups of organisms to environmental samples, a laboratory control and field reference sites for a specified period to assess potential impacts on a variety of endpoints, such as survival, growth or reproduction. Analysis of variance techniques are used to determine the relative toxicity of the samples as compared to the laboratory control and/or field reference sites. Endpoints for this study included survival and growth (measured as dry weight and dry biomass).

2.0 MATERIALS AND METHODS

2.1 General Methods, Biological Evaluations

Toxicological and analytical protocols used in this program follow procedures outlined in *Test Methods for Measuring the Toxicity of Sediment-Associated Contaminants with Freshwater Invertebrates* (ASTM Method E 1706-05, 2009), *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates* (US EPA 2000) and *Standard Methods for the Examination of Water and Wastewater*, 20th Edition (APHA 1998). These protocols provide standard approaches for physical and chemical analysis and for the evaluation of toxicological effects of sediments on aquatic invertebrates.

2.2 Test Species

H. azteca were obtained from Aquatic Research Organisms, Hampton, New Hampshire. Organisms used in the 28 day exposure assay were approximately 7 days old at the start of the assay.

2.3 Test Samples and Laboratory Control Sediment

Sediment samples collected for Project 80013 were received at ESI under chain of custody. Once received, samples were inspected to determine integrity, given unique sample numbers and logged into the laboratory sample management database. Once logged in the samples were placed in a secure refrigerated, 2 - 4 °C, storage area. A listing of sample sites, sample collection, and receipt information is summarized in Table 1.

The control substrate was an artificial sediment prepared according to guidance presented in the EPA/ASTM method. Organic detritus from Chironomid cultures plus disintegrated paper pulp was used to provide organic content. Overlying water for the sediment toxicity tests was a mixture of natural surface water, collected from the upper portion of the Taylor River watershed in Hampton Falls, New Hampshire, and moderately hard reconstituted water. Use of natural surface water mixed with artificial reconstituted water is recommended by the protocol (US EPA 2000, ASTM 2009).

2.4 *Hyalella azteca* Survival and Growth Toxicity Tests

Prior to test initiation test sediments were sieved using a ≥2 mm sieve to remove large stones, sticks, roots, man-made material and any indigenous organisms. Once sieved, the sediment was homogenized and placed in test chambers. Overlying water was added immediately and then the chambers were allowed to stabilize. The chambers received one volume addition daily until organisms were added.

Test vessels were 400 mL glass beakers containing 100 mL of sediment and approximately 250 mL of overlying water. Test vessels were drilled at a consistent height above their bases and the hole covered with Nytex® screen. The screened hole facilitates water exchange while retaining test organisms. Vessels were maintained in a water bath during the test. Depth of the water in the bath was set below the drain hole in the test vessel to eliminate flow of water from the bath into the test vessel. Test chambers were randomly placed in the water bath after addition of test sediments. Placement locations were generated by the CETIS® software program. The randomization work sheets are included in the data appendix. The water bath was maintained in a limited access, temperature controlled room. Temperatures in the room and water bath were independently set at a temperature of 23°C. Temperature was recorded on an hourly frequency using a temperature logger placed in a surrogate vessel. The photoperiod in the test chamber was set at 16:8 hour light:dark. Lighting was supplied by cool white florescent bulbs.

On day 0, amphipods were randomly selected from the pool of organisms and added to test vessels. Each treatment group included 8 replicates with 10 organisms per replicate and a surrogate test chamber that was used to obtain water qualities during the assay without disturbing the test animals. The surrogate chamber was treated the same as actual test chambers with the addition of animals and food, but was not used to determine endpoint data.

Prior to the daily overlying water renewal, dissolved oxygen, pH, specific conductance and temperature were measured in the surrogate chamber for each treatment. Overlying water in each replicate was then renewed. The volume of water added to each test chamber was approximately two volumes. Water exchanges were facilitated by use of a distribution system designed to provide equal, regulated flow to each chamber. The system was activated manually by the addition of water during the assay. After overlying water renewal each replicate was fed 1.0 mL of a yeast/trout chow/alfalfa suspension. Alkalinity, ammonia and hardness of the overlying water were measured on days 0, 7, 14, 21 and 28. The total organic carbon of the overlying water was measured on days 0 and 28. Overlying water quality records are available in Appendix A.

After 28 days exposure, replicates of each test treatment were terminated to collect data for the survival and growth endpoints. Each test chamber was gently swirled to loosen the sediments and the test material was emptied into a stainless steel sieve. The sediments were washed through the sieve using fresh water and material left on the screen was sorted to recover the organisms. This process was continued until the entire sample was evaluated. Surviving amphipods were placed on tared weighing pans. Pans were dried overnight at 104°C to obtain dry weight to the nearest 0.01 mg. The mean dry weight of surviving organisms was determined to assess growth.

2.5 Statistical Analysis

Survival and growth were analyzed using CETIS® software to determine significant differences between the test sediments and both the laboratory control and reference site sediments. Data sets were evaluated to determine normality of distribution and homogeneity of sample variance. Data sets were subsequently evaluated using the appropriate parametric or non-parametric Analysis of Variance (ANOVA) statistic. Statistical comparisons were made for the following endpoints; day 28 survival, dry weight and dry biomass. Pair-wise comparisons were made using the appropriate statistical evaluation. Statistical difference was evaluated at α=0.05.

2.6 Quality Control

As part of the laboratory quality control program, reference toxicant evaluations are conducted by ESI on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. Results are summarized in Table 2.

2.7 Protocol Deviations

Review of data generated during the 28 day exposure period documented the following protocol deviations.

There were a few replicates that had more than 10 animals added to test vessels at the assay start.

The second protocol deviation relates to the temperature maintained for the assay. The method protocol specifies that the target temperature for this assay is 23°C and excursions of up to 3°C are allowed. Review of the data document that the lower bound of 20°C was exceeded. Temperature data collected as part of the daily water quality documented a temperature of 19.67 to 25.84°C during the 28 day exposure period with a computed mean value of 22.83°C. The temperature logger recorded hourly values ranging from 19.8 to 25.8°C with a calculated mean value of 23.0°C. On Day 21 (09/21/10) the temperature reading in the test chambers were below the lower limit due to a mechanical failure. According to the hourly logger the temperature was out of bounds for only one hour. As this was only a temporary excursion and the observed temperatures are within the natural limits for this species, this deviation should not have impacted the outcome of the assay.

It is the opinion of ESI's study director that these deviations did not adversely affect the outcome of the assay.

TABLE 1. Summary of Sample Collection Information. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Field ID	Station Location	ESI Code	Sample Number	Sample Collected Date	Sample Collected Time	Sample Received Date	Sample Received Time
D02331	AR-02-SDBI0004-0-082310	20108-001	001	08/23/10	1430	08/25/10	0940
D02332	AR-02-SDBI0005-0-082310	20108-002	002	08/23/10	1630	08/25/10	0940
D02333	AR-08-SDBI0004-0-082410	20108-003	003	08/24/10	1030	08/25/10	0940
D02334	AR-08-SDBI0005-0-082410	20108-004	004	08/24/10	1200	08/25/10	0940
D02335	AR-09-SDBI0005-0-082510	20108-005	005	08/25/10	1730	08/26/10	0945
D02336	AR-09-SDBI0006-0-082510	20108-006	006	08/25/10	1000	08/26/10	0945
D02337	AR-09-SDBI0007-0-082510	20108-007	007	08/25/10	1230	08/26/10	0945
D02338	AR-04-SDBI0001-0-082710	20108-008	008	08/27/10	1400	08/30/10	1010
D02339	AR-04-SDBI0002-0-082710	20108-009	009	08/27/10	1630	08/30/10	1010
D02340	AR-05-SDBI0001-0-082710	20108-010	010	08/27/10	0900	08/30/10	1010
D02341	AR-05-SDBI0002-0-082710	20108-011	011	08/27/10	1045	08/30/10	1010
D02342	AR-06-SDBI0003-0-082610	20108-012	012	08/26/10	1700	08/30/10	1010
D02343	AR-06-SDBI0002-0-082610	20108-013	013	08/26/10	1530	08/30/10	1010
D02344	AR-07-SDBI0002-0-082610	20108-014	014	08/26/10	1200	08/30/10	1010
D02345	AR-07-SDBI0001-0-082610	20108-015	015	08/26/10	1000	08/30/10	1010

TABLE 2. Reference Toxicant Evaluation. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Date	Endpoint		Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
Hyalella azteca						
08/26/10	Survival	LC-50	0.0265	0.0100	0.000 - 0.051	Cadmium (mg/L)

3.0 RESULTS AND DISCUSSION

3.1 Laboratory Control and Project Reference Site Performance

At the end of the 28 day exposure period, mean survival in laboratory control sediment was 81.25% with a coefficient of variation (CV) of 12.20%. Amphipods recovered from laboratory control sediment had a

mean dry weight of 0.724 mg/amphipod, with a CV of 14.19%. The dry weight of a representative group of amphipods at the start of the assay was 0.011 mg/individual. The minimum test acceptability criteria for survival in the laboratory control is ≥80%. The minimum acceptable criteria for growth is a demonstration of increased dry weight after 28 days exposure. These criteria were met indicating that the organisms were healthy and not stressed by handling and that the overlying water did not adversely impact the results of the assay. Table 3 provides a summary of assay acceptability criteria and laboratory control achievement. Table 4 summarizes the reference site performance.

During daily water quality observations the temperature recorded for the assay had a mean value of 22.83°C with a range of 19.67 to 25.84°C. Confirmation temperature data collected in a surrogate replicate documented a mean temperature of 23.0°C with a range of 19.8 to 25.8°C. Test acceptability criteria requires a mean temperature of 23±1°C, with maximum temporary fluctuations of 23±3°C.

Table 3. Summary of Acceptable Endpoints and Measurements. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Endpoint / Measurement	Protocol Criteria		Study 20116
Survival	lab mean ≥ 80%	Mean Survival %	81.25%
		Protocol Met	Yes
Growth	Measured Growth	start dry wt. (mg)	0.011
		end dry wt. (mg)	0.724
		Protocol Met	Yes
Temperature	Mean: 23°±1°C	daily / hourly	22.83 / 23.0
	Minimum: 20°C	daily / hourly	19.67 / 19.8
	Maximum: 26°C	daily / hourly	25.84 / 25.8
		Protocol Met	*No

*For a discussion of the temperature deviation please see Section 2.7 Protocol Deviations.

Table 4. Summary of Project Reference Site Performance. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

		Survival (%)		Growth - Weight (mg)		Growth - Biomass (mg)	
Field ID	ESI Code	Mean	CV	Mean	CV	Mean	CV
D02331	20108-001	77.50%	26.49%	0.602	34.92%	0.440	25.56%
D02332	20108-002	80.00%	20.04%	0.505	21.44%	0.400	26.70%

3.2 Summary

This program utilized protocols developed by the US EPA and ASTM to assess the potential toxicological impacts that exposure to Project 80013 sediments would have on freshwater invertebrates. Table 5 provides a summary of samples that demonstrated a negative effect, based on the finding of a statistically significant reduction in an endpoint as compared to the laboratory control or reference site. Tables 6 through 8 provide summaries of assay endpoints and detailed statistical results for each sample location. Table 9 summarizes overlying water qualities measured during the test. Laboratory bench sheets, detailed summaries of survival, dry weights and associated statistical support data are included in Appendix A.

Table 5. Summary of Significant Endpoints. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

		Finding of Significant Difference(s) between Project Sites and								
		Lab Control (20108-000)			D02331 (20108-001)			D02332 (20108-002)		
Field ID	ESI Code	survival	dry wt	dry biomass	survival	dry wt	dry biomass	survival	dry wt	dry biomass
D02331	20108-001			X						
D02332	20108-002		X	X						
D02333	20108-003									
D02334	20108-004									
D02335	20108-005									
D02336	20108-006		X							
D02337	20108-007									
D02338	20108-008									
D02339	20108-009									
D02340	20108-010		X	X						
D02341	20108-011		X	X						
D02342	20108-012		X	X						
D02343	20108-013		X	X						
D02344	20108-014		X	X						
D02345	20108-015		X	X						

4.0 REFERENCES

APHA. 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th Edition. Washington D.C.

ASTM. 2009. Annual Book of ASTM Standards. Volume 11.06. *Test Methods for Measuring the Toxicity of Sediment-Associated Contaminants with Freshwater Invertebrates*. E 1706-05. ASTM, Philadelphia.

US EPA. 2000. *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates.* Second Edition. EPA/600-R-99/064.

TABLE 6. Day 28 *Hyalella azteca* Survival Summary and Statistical Analysis. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Day 28 Survival Summary

Field ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Lab Control	20108-000	8	81.25%	70.0%	100.0%	12.20%
D02331	20108-001	8	77.50%	40.0%	100.0%	26.49%
D02332	20108-002	8	80.00%	60.0%	100.0%	20.04%
D02333	20108-003	8	82.50%	60.0%	100.0%	21.24%
D02334	20108-004	8	83.75%	50.0%	100.0%	19.08%
D02335	20108-005	8	71.25%	30.0%	100.0%	32.21%
D02336	20108-006	8	86.25%	60.0%	100.0%	15.10%
D02337	20108-007	8	76.25%	40.0%	100.0%	25.21%
D02338	20108-008	8	87.50%	80.0%	100.0%	10.13%
D02339	20108-009	8	73.75%	40.0%	90.0%	26.07%
D02340	20108-010	8	78.75%	50.0%	100.0%	24.88%
D02341	20108-011	8	85.00%	70.0%	100.0%	14.06%
D02342	20108-012	8	86.25%	70.0%	100.0%	12.30%
D02343	20108-013	8	78.75%	60.0%	90.0%	10.60%
D02344	20108-014	8	78.75%	70.0%	90.0%	10.60%
D02345	20108-015	8	81.25%	50.0%	100.0%	19.11%

Day 28 Survival Statistical Analysis

			Statistically Significant Difference as Compared to					
			Lab Control (20108-000)		D02331 (20108-001)		D02332 (20108-002)	
Field ID	ESI Code	Mean	p Value		p Value		p Value	
Lab Control	20108-000	81.25%	-	-	-	-	-	-
D02331	20108-001	77.50%	0.3982	No	-	-	-	-
D02332	20108-002	80.00%	0.4883	No	0.5807	No	-	-
D02333	20108-003	82.50%	0.6416	No	0.6917	No	0.6316	No
D02334	20108-004	83.75%	0.6922	No	0.7281	No	0.6724	No
D02335	20108-005	71.25%	0.1698	No	0.2793	No	0.2047	No
D02336	20108-006	86.25%	0.8216	No	0.8173	No	0.7819	No
D02337	20108-007	76.25%	0.3097	No	0.4315	No	0.3431	No
D02338	20108-008	87.50%	0.8842	No	0.8564	No	0.8318	No
D02339	20108-009	73.75%	0.1944	No	0.3268	No	0.2383	No
D02340	20108-010	78.75%	0.4473	No	0.5427	No	0.4633	No
D02341	20108-011	85.00%	0.7597	No	0.7724	No	0.7250	No
D02342	20108-012	86.25%	0.8243	No	0.8153	No	0.7790	No
D02343	20108-013	78.75%	0.2755	No	0.4600	No	0.3428	No
D02344	20108-014	78.75%	0.2910	No	0.4680	No	0.3531	No
D02345	20108-015	81.25%	0.5455	No	0.6251	No	0.5480	No

TABLE 7. Day 28 *Hyalella azteca* Dry Weight Summary and Statistical Analysis. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Dry Weight Summary

Field ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Lab Control	20108-000	8	0.724	0.574	0.870	14.19%
D02331	20108-001	8	0.602	0.347	1.000	34.92%
D02332	20108-002	8	0.505	0.315	0.647	21.44%
D02333	20108-003	8	0.686	0.461	0.868	21.87%
D02334	20108-004	8	0.681	0.446	1.016	26.24%
D02335	20108-005	8	0.760	0.457	1.224	34.15%
D02336	20108-006	8	0.561	0.365	0.820	29.09%
D02337	20108-007	8	0.697	0.503	0.881	18.48%
D02338	20108-008	8	0.678	0.508	0.833	16.70%
D02339	20108-009	8	0.735	0.540	1.196	30.23%
D02340	20108-010	8	0.556	0.434	0.716	22.14%
D02341	20108-011	8	0.505	0.351	0.668	19.84%
D02342	20108-012	8	0.493	0.313	0.682	28.73%
D02343	20108-013	8	0.576	0.437	0.790	22.36%
D02344	20108-014	8	0.617	0.447	0.901	21.97%
D02345	20108-015	8	0.533	0.433	0.700	18.22%

Dry Weight Statistical Analysis

			Statistically Significant Difference as Compared to					
			Lab Control (20108-000)		D02331 (20108-001)		D02332 (20108-002)	
Field ID	ESI Code	Mean	p Value		p Value		p Value	
Lab Control	20108-000	0.724	-	-	-	-	-	-
D02331	20108-001	0.602	0.0819	No	-	-	-	-
D02332	20108-002	0.505	0.0005	Yes	0.1314	No	-	-
D02333	20108-003	0.686	0.2835	No	0.8131	No	0.9925	No
D02334	20108-004	0.681	0.2811	No	0.7824	No	0.9841	No
D02335	20108-005	0.760	0.6398	No	0.8984	No	0.9888	No
D02336	20108-006	0.561	0.0159	Yes	0.3350	No	0.7862	No
D02337	20108-007	0.697	0.3248	No	0.8518	No	0.9970	No
D02338	20108-008	0.678	0.2049	No	0.8074	No	0.9963	No
D02339	20108-009	0.735	*0.5521	No	0.8806	No	*0.9903	No
D02340	20108-010	0.556	0.0051	Yes	0.2989	No	0.8036	No
D02341	20108-011	0.505	0.0003	Yes	0.1275	No	0.4988	No
D02342	20108-012	0.493	0.0011	Yes	0.1211	No	0.4265	No
D02343	20108-013	0.576	0.0118	Yes	0.3833	No	0.8744	No
D02344	20108-014	0.617	0.0485	Yes	0.5646	No	0.9557	No
D02345	20108-015	0.533	0.0009	Yes	0.2051	No	0.7030	No

Note: "*" Indicates the presence of an outlier. The p Value reported was calculated with the outlier included in the analysis. In these cases the exclusion of the outlier did not change the significance of the analysis.

TABLE 8. Day 28 *Hyalella azteca* Dry Biomass Summary and Statistical Analysis. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Dry Biomass Summary

Field ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Lab Control	20108-000	8	0.588	0.402	0.713	17.90%
D02331	20108-001	8	0.440	0.243	0.584	25.56%
D02332	20108-002	8	0.400	0.252	0.600	26.70%
D02333	20108-003	8	0.557	0.382	0.842	25.49%
D02334	20108-004	8	0.551	0.401	0.765	18.92%
D02335	20108-005	8	0.501	0.324	0.651	24.21%
D02336	20108-006	8	0.494	0.249	0.774	38.20%
D02337	20108-007	8	0.521	0.308	0.677	25.47%
D02338	20108-008	8	0.590	0.508	0.750	16.55%
D02339	20108-009	8	0.530	0.246	0.737	29.47%
D02340	20108-010	8	0.434	0.240	0.682	31.55%
D02341	20108-011	8	0.432	0.246	0.601	26.28%
D02342	20108-012	8	0.434	0.250	0.682	37.65%
D02343	20108-013	8	0.458	0.262	0.632	27.53%
D02344	20108-014	8	0.479	0.402	0.631	15.15%
D02345	20108-015	8	0.430	0.328	0.630	25.16%

Dry Biomass Statistical Analysis

			Statistically Significant Difference as Compared to					
			Lab Control (20108-000)		D02331 (20108-001)		D02332 (20108-002)	
Field ID	ESI Code	Mean	p Value		p Value		p Value	
Lab Control	20108-000	0.588	-	-	-	-	-	-
D02331	20108-001	0.440	0.0084	Yes	-	-	-	-
D02332	20108-002	0.400	0.0016	Yes	0.2360	No	-	-
D02333	20108-003	0.557	0.3103	No	0.9543	No	0.9871	No
D02334	20108-004	0.551	0.2435	No	0.9694	No	0.9937	No
D02335	20108-005	0.501	0.0727	No	0.8397	No	0.9503	No
D02336	20108-006	0.494	0.1191	No	0.7492	No	0.8801	No
D02337	20108-007	0.521	0.1415	No	0.8950	No	0.9683	No
D02338	20108-008	0.590	0.5118	No	0.9934	No	0.9988	No
D02339	20108-009	0.530	0.1976	No	0.8949	No	0.9638	No
D02340	20108-010	0.434	0.0121	Yes	0.4592	No	0.7059	No
D02341	20108-011	0.432	0.0064	Yes	0.4411	No	0.7147	No
D02342	20108-012	0.434	0.0208	Yes	0.4643	No	0.6857	No
D02343	20108-013	0.458	0.0206	Yes	0.6113	No	0.8303	No
D02344	20108-014	0.479	0.0147	Yes	0.7828	No	0.9466	No
D02345	20108-015	0.430	0.0051	Yes	0.4239	No	0.7058	No

TABLE 9. Summary of Overlying Water Qualities. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Field ID	ESI Code	Sample Number	Day	Conductivity (uS/cm)	Alkalinity (mg/L)	Hardness (mg/L)	Ammonia (mg/L)
Lab Control	20108-000	000	0	382	72	100	<0.1
D02331	20108-001	001	0	328	60	81	0.59
D02332	20108-002	002	0	317	47	78	0.35
D02333	20108-003	003	0	328	52	81	0.17
D02334	20108-004	004	0	318	47	75	0.39
D02335	20108-005	005	0	334	55	84	0.12
D02336	20108-006	006	0	324	50	78	0.19
D02337	20108-007	007	0	327	49	80	0.22
D02338	20108-008	008	0	487	89	90	0.2
D02339	20108-009	009	0	411	72	92	0.13
D02340	20108-010	010	0	319	47	77	0.19
D02341	20108-011	011	0	324	51	78	0.38
D02342	20108-012	012	0	305	41	73	0.27
D02343	20108-013	013	0	337	50	82	0.12
D02344	20108-014	014	0	335	55	83	0.31
D02345	20108-015	015	0	320	47	79	0.17
Lab Control	20108-000	000	7	376	79	110	<0.1
D02331	20108-001	001	7	338	60	90	<0.1
D02332	20108-002	002	7	331	56	86	0.16
D02333	20108-003	003	7	339	61	90	<0.1
D02334	20108-004	004	7	334	54	87	<0.1
D02335	20108-005	005	7	346	64	94	<0.1
D02336	20108-006	006	7	319	59	85	<0.1
D02337	20108-007	007	7	337	60	89	<0.1
D02338	20108-008	008	7	373	62	88	0.3
D02339	20108-009	009	7	357	51	90	<0.1
D02340	20108-010	010	7	335	51	86	<0.1
D02341	20108-011	011	7	334	62	86	<0.1
D02342	20108-012	012	7	330	58	85	<0.1
D02343	20108-013	013	7	337	53	86	<0.1
D02344	20108-014	014	7	333	59	85	<0.1
D02345	20108-015	015	7	334	57	85	<0.1
Lab Control	20108-000	000	14	372	82	100	<0.1
D02331	20108-001	001	14	340	68	90	<0.1
D02332	20108-002	002	14	346	68	92	0.1
D02333	20108-003	003	14	349	70	94	<0.1
D02334	20108-004	004	14	330	67	88	<0.1
D02335	20108-005	005	14	332	66	89	<0.1
D02336	20108-006	006	14	334	63	89	<0.1
D02337	20108-007	007	14	330	62	88	<0.1
D02338	20108-008	008	14	349	66	89	<0.1
D02339	20108-009	009	14	341	68	90	<0.1
D02340	20108-010	010	14	330	68	89	<0.1
D02341	20108-011	011	14	330	68	90	<0.1
D02342	20108-012	012	14	323	64	85	<0.1
D02343	20108-013	013	14	330	67	89	<0.1
D02344	20108-014	014	14	330	68	89	<0.1
D02345	20108-015	015	14	328	65	87	<0.1

Field ID	ESI Code	Sample Number	Day	Conductivity (uS/cm)	Alkalinity (mg/L)	Hardness (mg/L)	Ammonia (mg/L)
Lab Control	20108-000	000	21	375	71	87	<0.1
D02331	20108-001	001	21	327	64	80	<0.1
D02332	20108-002	002	21	330	64	78	<0.1
D02333	20108-003	003	21	328	66	82	<0.1
D02334	20108-004	004	21	325	61	78	<0.1
D02335	20108-005	005	21	332	61	79	<0.1
D02336	20108-006	006	21	326	60	81	<0.1
D02337	20108-007	007	21	325	60	79	<0.1
D02338	20108-008	008	21	347	63	87	<0.1
D02339	20108-009	009	21	346	57	85	<0.1
D02340	20108-010	010	21	322	58	76	<0.1
D02341	20108-011	011	21	324	62	79	<0.1
D02342	20108-012	012	21	323	61	82	<0.1
D02343	20108-013	013	21	323	62	83	<0.1
D02344	20108-014	014	21	324	63	80	<0.1
D02345	20108-015	015	21	325	58	79	<0.1
Lab Control	20108-000	000	28	378	73	90	<0.1
D02331	20108-001	001	28	342	60	79	<0.1
D02332	20108-002	002	28	339	61	85	0.1
D02333	20108-003	003	28	337	67	86	0.11
D02334	20108-004	004	28	328	66	85	<0.1
D02335	20108-005	005	28	337	64	80	<0.1
D02336	20108-006	006	28	332	65	83	<0.1
D02337	20108-007	007	28	324	61	84	<0.1
D02338	20108-008	008	28	338	64	89	<0.1
D02339	20108-009	009	28	335	66	93	<0.1
D02340	20108-010	010	28	321	61	77	<0.1
D02341	20108-011	011	28	319	64	84	<0.1
D02342	20108-012	012	28	317	62	83	<0.1
D02343	20108-013	013	28	318	62	83	<0.1
D02344	20108-014	014	28	320	66	84	<0.1
D02345	20108-015	015	28	321	60	85	<0.1

Additional water quality data are provided in Appendix A**.**

APPENDIX A: RAW DATA AND STATISTICAL SUPPORT

Contents	Number of Pages
H. azteca Survival and Growth Sediment Toxicity Tests	
Day 0 - 28 Daily Observation Record	1
CETIS Worksheets	4
Sample Key	1
YSI 556 MPS Sample Reading Order	1
Daily Water Quality Data Logger Output Summary	10
Day 28 Organism Recovery Bench Sheets	4
Start Dry Weight Record	1
Day 28 Dry Weight Data Sheets	3
CETIS Summary Report	4
Day 28 Survival Statistical Analysis Reports	42
Day 28 Dry Weight Statistical Analysis Reports	44
Day 28 Dry Biomass Statistical Analysis Reports	42
Analytical Chemistry Data Summaries	
Overlying Water Alkalinity	2
Overlying Water Hardness	2
Overlying Water Ammonia	2
Overlying Water Total Organic Carbon	1
Temperature Profile - Data Logger	1
Sediment Preparation Notes	1
Organism History Record	1
YSI Model 556 Sample Codes and Water Quality Instrument Calibration Records	29
Balance Calibration Log	2
Project E-Mail Communications	2
Sample Receipt Logs and Chain of Custody Records	8
Total Appendix Pages	208

Hyalella azteca 28 Day Sediment Assay

Study Number: 20116	Client: Nobis Engineering, Inc.	Project: DAS-RAC2-030

Day	Date	Renew/Feed	Initial	Notes
0	9/2/10	✓/✓	JTP	
1	9/3/10	✓/✓	JTP	
2	9/4/10	✓/✓	KC	
3	9/5/10	✓/✓	JTP	
4	9/6/10	✓/✓	AM	
5	9/7/10	✓/✓	JTP	
6	9/8/10	✓/✓	JTP	
7	9/9/10	✓/✓	AM	
8	9/10/10	✓/✓	JTP	
9	9/11/10	✓/✓	KC	
10	9.12	✓/✓	DM	
11	9/13/10	✓/✓	JTP	
12	9/14/10	✓/✓	JL	
13	9/15/10	✓/✓	JTP	
14	9/16/10	✓/✓	JTP	
15	9/17/10	✓/✓	JTP/AM	
16	9/18/10	✓/✓	JTP	
17	9/19/10	✓/✓	AM	
18	9/20/10	✓/✓	AM/JEB	
19	9/21/10	✓/✓	JTP	
20	9/22/10	✓/✓	AM/JTP	
21	9/23/10	✓/✓	JTP	
22	9/24/10	✓/✓	AM	
23	9/25/10	✓/✓	KC	
24	9.26	✓/✓	DM	
25	9/27	✓/✓	AM	
26	9/28/10	✓/✓	JTP	
27	9/29/10	✓/✓	JTP	
28	9/30/10	–/–	JTP	

Alkalinity, Hardness & Ammonia on Days 0, 7, 14, 21, 28 TOC on Days 0 and 28	Day 0	Initial: AM
	Day 7	Initial: AM
	Day 14	Initial: JTP
	Day 21	Initial: JTP
	Day 28	Initial: JTP

Notes: 23 °C	Feed 1 mL of YCT food mixture	Aerate if DO is below 2.5 mg/L	Two Volume Additions Daily

Hyalella 28-d Survival and Growth Sediment Test **EnviroSystems, Inc.**

Start Date: 02 Sep-10 12:00 **Species:** Hyalella azteca **Sample Code:** 20108-000
End Date: 30 Sep-10 12:00 **Protocol:** EPA/600/R-99/064 (2000) **Sample Source:** DAS-RAC2-030
Sample Date: 31 Aug-10 12:00 **Material:** Freshwater Sediment **Sample Station:** Laboratory Control Sample; 20108-0

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	Notes
20108-010	1	1				0			
20108-008	1	2				0			
20108-012	1	3				0			
20108-004	1	4				0			
20108-013	1	5				0			
20108-014	1	6				0			
20108-011	1	7				0			
20108-000	1	8				0			
20108-007	1	9				0			
20108-003	1	10				0			
20108-002	1	11				0			
20108-009	1	12				0			
20108-006	1	13				0			
20108-015	1	14				0			
20108-001	1	15				0			
20108-005	1	16				0			
20108-002	2	17				0			
20108-003	2	18				0			
20108-013	2	19				0			
20108-008	2	20				0			
20108-014	2	21				0			
20108-007	2	22				0			
20108-012	2	23				0			
20108-000	2	24				0			
20108-011	2	25				0			
20108-005	2	26				0			
20108-004	2	27				0			
20108-006	2	28				0			
20108-015	2	29				0			
20108-009	2	30				0			
20108-010	2	31				0			
20108-001	2	32				0			
20108-004	3	33				0			

CETIS Test Data Worksheet

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	Notes
20108-011	3	34				0			
20108-014	3	35				0			
20108-007	3	36				0			
20108-013	3	37				0			
20108-005	3	38				0			
20108-000	3	39				0			
20108-010	3	40				0			
20108-012	3	41				0			
20108-008	3	42				0			
20108-006	3	43				0			
20108-015	3	44				0			
20108-002	3	45				0			
20108-001	3	46				0			
20108-003	3	47				0			
20108-009	3	48				0			
20108-015	4	49				0			
20108-004	4	50				0			
20108-001	4	51				0			
20108-002	4	52				0			
20108-006	4	53				0			
20108-008	4	54				0			
20108-010	4	55				0			
20108-009	4	56				0			
20108-014	4	57				0			
20108-005	4	58				0			
20108-012	4	59				0			
20108-000	4	60				0			
20108-013	4	61				0			
20108-011	4	62				0			
20108-003	4	63				0			
20108-007	4	64				0			
20108-008	5	65				0			
20108-005	5	66				0			
20108-002	5	67				0			
20108-015	5	68				0			
20108-007	5	69				0			
20108-011	5	70				0			
20108-003	5	71				0			

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	Notes
20108-012	5	72				0			
20108-013	5	73				0			
20108-001	5	74				0			
20108-009	5	75				0			
20108-010	5	76				0			
20108-014	5	77				0			
20108-006	5	78				0			
20108-004	5	79				0			
20108-000	5	80				0			
20108-008	6	81				0			
20108-001	6	82				0			
20108-014	6	83				0			
20108-011	6	84				0			
20108-015	6	85				0			
20108-005	6	86				0			
20108-007	6	87				0			
20108-013	6	88				0			
20108-000	6	89				0			
20108-003	6	90				0			
20108-002	6	91				0			
20108-012	6	92				0			
20108-010	6	93				0			
20108-009	6	94				0			
20108-004	6	95				0			
20108-006	6	96				0			
20108-002	7	97				0			
20108-008	7	98				0			
20108-005	7	99				0			
20108-013	7	100				0			
20108-003	7	101				0			
20108-011	7	102				0			
20108-014	7	103				0			
20108-001	7	104				0			
20108-007	7	105				0			
20108-015	7	106				0			
20108-010	7	107				0			
20108-009	7	108				0			
20108-012	7	109				0			

CETIS Test Data Worksheet

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	Notes
20108-004	7	110				0			
20108-000	7	111				0			
20108-006	7	112				0			
20108-011	8	113				0			
20108-001	8	114				0			
20108-000	8	115				0			
20108-005	8	116				0			
20108-006	8	117				0			
20108-007	8	118				0			
20108-013	8	119				0			
20108-003	8	120				0			
20108-009	8	121				0			
20108-012	8	122				0			
20108-004	8	123				0			
20108-015	8	124				0			
20108-002	8	125				0			
20108-010	8	126				0			
20108-008	8	127				0			
20108-014	8	128				0			

Sample Key for:

Client: Nobis Engineering, Inc.
Project: DAS-RAC2-030

Sample Number	LabID	Field ID	Matrix	SAMPLED		RECEIVED		Station Location
000	Laboratory Control Sample							
001	20108-001	D02331	Solid	8/23/2010	1430	8/25/2010	940	AR-02-SDBI0004-0-082310
002	20108-002	D02332	Solid	8/23/2010	1630	8/25/2010	940	AR-02-SDBI0005-0-082310
003	20108-003	D02333	Solid	8/24/2010	1030	8/25/2010	940	AR-08-SDBI0004-0-082410
004	20108-004	D02334	Solid	8/24/2010	1200	8/25/2010	940	AR-08-SDBI0005-0-082410
005	20108-005	D02335	Solid	8/25/2010	1730	8/26/2010	945	AR-09-SDBI0005-0-082510
006	20108-006	D02336	Solid	8/25/2010	1000	8/26/2010	945	AR-09-SDBI0006-0-082510
007	20108-007	D02337	Solid	8/25/2010	1230	8/26/2010	945	AR-09-SDBI0007-0-082510
008	20108-008	D02338	Solid	8/27/2010	1400	8/30/2010	1010	AR-04-SDBI0001-0-082710
009	20108-009	D02339	Solid	8/27/2010	1630	8/30/2010	1010	AR-04-SDBI0002-0-082710
010	20108-010	D02340	Solid	8/27/2010	900	8/30/2010	1010	AR-05-SDBI0001-0-082710
011	20108-011	D02341	Solid	8/27/2010	1045	8/30/2010	1010	AR-05-SDBI0002-0-082710
012	20108-012	D02342	Solid	8/26/2010	1700	8/30/2010	1010	AR-06-SDBI0003-0-082610
013	20108-013	D02343	Solid	8/26/2010	1530	8/30/2010	1010	AR-06-SDBI0002-0-082610
014	20108-014	D02344	Solid	8/26/2010	1200	8/30/2010	1010	AR-07-SDBI0002-0-082610
015	20108-015	D02345	Solid	8/26/2010	1000	8/30/2010	1010	AR-07-SDBI0001-0-082610

YSI 556 MPS Sample Reading Order

Study Number: 20116

Client: Nobis Engineering, Inc.

Project: DAS-RAC2-030

Reading Number	Field ID	Receipt Number	Sample Number
0	Laboratory Control	20108-000	000
1	D02331	20108-001	001
2	D02332	20108-002	002
3	D02333	20108-003	003
4	D02334	20108-004	004
5	D02335	20108-005	005
6	D02336	20108-006	006
7	D02337	20108-007	007
8	D02338	20108-008	008
9	D02339	20108-009	009
10	D02340	20108-010	010
11	D02341	20108-011	011
12	D02342	20108-012	012
13	D02343	20108-013	013
14	D02344	20108-014	014
15	D02345	20108-015	015

STUDY: 20116
CLIENT: Nobis Engineering, Inc.
PROJECT: Project 80013, DAS-RAC2-030
ASSAY: Hyalella azteca 28 Day Assay
TASK: Daily Overlying Water Qualities

	Temp	DO Conc	pH	SpCond
Minimum:	19.67	2.69	6.64	305
Mean:	22.83	6.29		347
Maximum:	25.84	8.86	7.92	819

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm
Lab Control	000	0	09/02/10 08:58:37	23.77	7.68	7.92	382
D02331	001	0	09/02/10 08:59:30	23.76	6.39	7.51	328
D02332	002	0	09/02/10 09:00:05	23.75	6.56	7.37	317
D02333	003	0	09/02/10 09:00:29	23.73	6.49	7.32	328
D02334	004	0	09/02/10 09:00:40	23.71	6.43	7.29	318
D02335	005	0	09/02/10 09:00:49	23.69	6.52	7.28	334
D02336	006	0	09/02/10 09:00:58	23.69	6.63	7.28	324
D02337	007	0	09/02/10 09:01:10	23.71	6.63	7.24	327
D02338	008	0	09/02/10 09:01:22	23.71	6.61	7.26	487
D02339	009	0	09/02/10 09:01:42	23.67	5.62	7.29	411
D02340	010	0	09/02/10 09:01:53	23.66	5.60	7.29	319
D02341	011	0	09/02/10 09:02:07	23.67	5.99	7.25	324
D02342	012	0	09/02/10 09:02:21	23.67	6.19	7.22	305
D02343	013	0	09/02/10 09:02:32	23.67	6.12	7.16	337
D02344	014	0	09/02/10 09:02:41	23.66	6.22	7.15	335
D02345	015	0	09/02/10 09:02:51	23.64	6.35	7.14	320
Lab Control	000	1	09/03/10 07:47:32	23.69	6.44	7.82	388
D02331	001	1	09/03/10 07:48:38	23.71	5.64	7.49	355
D02332	002	1	09/03/10 07:48:59	23.68	5.95	7.41	350
D02333	003	1	09/03/10 07:49:54	23.63	5.80	7.30	355
D02334	004	1	09/03/10 07:50:14	23.62	6.00	7.30	352
D02335	005	1	09/03/10 07:50:28	23.63	6.14	7.30	358
D02336	006	1	09/03/10 07:50:57	23.65	5.80	7.27	353
D02337	007	1	09/03/10 07:51:14	23.65	5.88	7.24	351
D02338	008	1	09/03/10 07:51:53	23.64	4.87	7.30	429
D02339	009	1	09/03/10 07:52:19	23.61	5.13	7.31	387
D02340	010	1	09/03/10 07:52:38	23.60	5.48	7.29	364
D02341	011	1	09/03/10 07:53:13	23.59	5.95	7.26	353
D02342	012	1	09/03/10 07:53:39	23.60	5.77	7.22	342
D02343	013	1	09/03/10 07:54:16	23.63	5.62	7.20	357
D02344	014	1	09/03/10 07:54:54	23.57	5.93	7.20	354
D02345	015	1	09/03/10 07:55:15	23.53	6.16	7.20	352
Lab Control	000	2	09/04/10 10:32:58	23.82	4.38	7.73	395
D02331	001	2	09/04/10 10:33:39	23.85	5.39	7.54	350
D02332	002	2	09/04/10 10:34:02	23.86	5.67	7.48	344
D02333	003	2	09/04/10 10:34:34	23.83	5.74	7.43	353
D02334	004	2	09/04/10 10:34:54	23.81	5.95	7.42	349
D02335	005	2	09/04/10 10:35:13	23.82	6.14	7.41	353
D02336	006	2	09/04/10 10:35:49	23.78	5.88	7.37	346
D02337	007	2	09/04/10 10:36:09	23.82	5.88	7.35	343

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm
D02338	008	2	09/04/10 10:36:57	23.82	4.55	7.40	423
D02339	009	2	09/04/10 10:37:33	23.78	5.18	7.41	383
D02340	010	2	09/04/10 10:38:12	23.75	5.76	7.36	352
D02341	011	2	09/04/10 10:38:37	23.76	5.83	7.35	353
D02342	012	2	09/04/10 10:39:27	23.77	5.58	7.29	339
D02343	013	2	09/04/10 10:40:13	23.81	5.72	7.30	353
D02344	014	2	09/04/10 10:40:33	23.77	6.03	7.30	349
D02345	015	2	09/04/10 10:41:01	23.73	5.81	7.29	348
Lab Control	000	3	09/05/10 10:20:17	22.03	4.49	7.70	408
D02331	001	3	09/05/10 10:20:51	22.08	5.61	7.59	349
D02332	002	3	09/05/10 10:21:11	22.08	6.78	7.54	340
D02333	003	3	09/05/10 10:21:26	22.10	7.08	7.51	345
D02334	004	3	09/05/10 10:21:40	22.08	7.07	7.49	352
D02335	005	3	09/05/10 10:21:56	22.09	7.25	7.44	358
D02336	006	3	09/05/10 10:22:19	22.13	7.01	7.43	350
D02337	007	3	09/05/10 10:22:31	22.15	6.90	7.42	346
D02338	008	3	09/05/10 10:23:05	22.20	5.79	7.40	416
D02339	009	3	09/05/10 10:23:32	22.18	6.07	7.38	372
D02340	010	3	09/05/10 10:23:58	22.17	6.73	7.38	349
D02341	011	3	09/05/10 10:24:12	22.19	6.87	7.35	354
D02342	012	3	09/05/10 10:24:33	22.20	6.73	7.33	344
D02343	013	3	09/05/10 10:24:49	22.21	6.71	7.32	356
D02344	014	3	09/05/10 10:25:04	22.19	6.78	7.34	352
D02345	015	3	09/05/10 10:25:19	22.15	6.79	7.34	351
Lab Control	000	4	09/06/10 08:47:59	20.38	4.35	7.13	427
D02331	001	4	09/06/10 08:49:01	20.54	6.18	7.22	349
D02332	002	4	09/06/10 08:49:17	20.53	6.56	7.22	342
D02333	003	4	09/06/10 08:49:31	20.56	6.84	7.21	346
D02334	004	4	09/06/10 08:49:44	20.55	6.85	7.22	348
D02335	005	4	09/06/10 08:49:59	20.54	7.02	7.24	351
D02336	006	4	09/06/10 08:50:13	20.56	7.10	7.24	345
D02337	007	4	09/06/10 08:50:29	20.61	6.99	7.22	343
D02338	008	4	09/06/10 08:50:43	20.59	6.75	7.24	399
D02339	009	4	09/06/10 08:51:19	20.59	5.80	7.26	372
D02340	010	4	09/06/10 08:51:36	20.57	6.22	7.26	346
D02341	011	4	09/06/10 08:51:49	20.58	6.58	7.25	346
D02342	012	4	09/06/10 08:51:57	20.59	6.67	7.25	339
D02343	013	4	09/06/10 08:52:11	20.63	6.63	7.24	352
D02344	014	4	09/06/10 08:52:35	20.62	6.73	7.25	345
D02345	015	4	09/06/10 08:52:52	20.60	6.63	7.23	347
Lab Control	000	5	09/07/10 08:19:11	23.28	3.56	7.51	401
D02331	001	5	09/07/10 08:20:17	23.46	5.48	7.45	341
D02332	002	5	09/07/10 08:20:38	23.47	6.04	7.42	334
D02333	003	5	09/07/10 08:20:52	23.51	6.16	7.40	338
D02334	004	5	09/07/10 08:21:06	23.50	6.10	7.39	339
D02335	005	5	09/07/10 08:21:34	23.54	6.60	7.41	342
D02336	006	5	09/07/10 08:22:01	23.56	6.26	7.38	336
D02337	007	5	09/07/10 08:22:16	23.57	6.24	7.36	334
D02338	008	5	09/07/10 08:22:51	23.57	5.15	7.35	385
D02339	009	5	09/07/10 08:23:17	23.55	5.37	7.35	360

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm
D02340	010	5	09/07/10 08:23:45	23.52	6.04	7.34	336
D02341	011	5	09/07/10 08:24:12	23.55	6.13	7.33	338
D02342	012	5	09/07/10 08:24:25	23.56	6.13	7.32	333
D02343	013	5	09/07/10 08:24:37	23.57	6.08	7.31	342
D02344	014	5	09/07/10 08:24:57	23.55	6.17	7.30	337
D02345	015	5	09/07/10 08:25:18	23.51	6.28	7.30	337
Lab Control	000	6	09/08/10 10:31:32	23.84	4.18	7.54	382
D02331	001	6	09/08/10 10:32:29	23.92	5.26	7.45	338
D02332	002	6	09/08/10 10:32:52	23.92	5.58	7.40	331
D02333	003	6	09/08/10 10:33:07	23.91	5.71	7.36	336
D02334	004	6	09/08/10 10:33:26	23.88	5.90	7.35	339
D02335	005	6	09/08/10 10:33:42	23.89	6.27	7.35	347
D02336	006	6	09/08/10 10:33:57	23.91	6.39	7.36	337
D02337	007	6	09/08/10 10:34:24	23.97	5.80	7.31	338
D02338	008	6	09/08/10 10:35:00	24.05	4.81	7.30	386
D02339	009	6	09/08/10 10:35:20	24.10	5.13	7.30	368
D02340	010	6	09/08/10 10:35:45	24.15	5.75	7.30	338
D02341	011	6	09/08/10 10:36:00	24.20	6.01	7.29	341
D02342	012	6	09/08/10 10:36:13	24.21	6.07	7.29	336
D02343	013	6	09/08/10 10:36:26	24.23	5.92	7.28	343
D02344	014	6	09/08/10 10:36:39	24.20	5.87	7.27	339
D02345	015	6	09/08/10 10:36:52	24.14	5.93	7.26	339
Lab Control	000	7	09/09/10 08:01:16	20.06	4.03	7.49	376
D02331	001	7	09/09/10 08:02:08	20.23	4.95	7.37	338
D02332	002	7	09/09/10 08:02:44	20.22	5.65	7.33	331
D02333	003	7	09/09/10 08:03:20	20.29	5.24	7.28	339
D02334	004	7	09/09/10 08:03:43	20.32	5.46	7.26	334
D02335	005	7	09/09/10 08:04:06	20.32	5.76	7.25	346
D02336	006	7	09/09/10 08:05:05	20.40	6.04	7.22	319
D02337	007	7	09/09/10 08:06:10	20.38	5.34	7.20	337
D02338	008	7	09/09/10 08:06:54	20.33	4.69	7.19	373
D02339	009	7	09/09/10 08:07:28	20.35	4.74	7.17	357
D02340	010	7	09/09/10 08:08:07	20.35	5.47	7.16	335
D02341	011	7	09/09/10 08:08:28	20.37	5.75	7.16	334
D02342	012	7	09/09/10 08:08:59	20.40	5.51	7.14	330
D02343	013	7	09/09/10 08:09:51	20.42	5.46	7.15	337
D02344	014	7	09/09/10 08:10:12	20.38	5.60	7.16	333
D02345	015	7	09/09/10 08:10:52	20.38	5.93	7.16	334
Lab Control	000	8	09/10/10 08:11:54	22.69	3.73	7.45	367
D02331	001	8	09/10/10 08:13:18	22.87	5.24	7.41	340
D02332	002	8	09/10/10 08:13:39	22.86	5.69	7.39	336
D02333	003	8	09/10/10 08:14:04	22.93	5.65	7.38	346
D02334	004	8	09/10/10 08:22:14	22.96	6.81	7.35	339
D02335	005	8	09/10/10 08:22:50	22.96	6.64	7.45	350
D02336	006	8	09/10/10 08:23:28	23.03	5.86	7.42	333
D02337	007	8	09/10/10 08:23:53	23.05	5.76	7.40	341
D02338	008	8	09/10/10 08:24:24	23.09	5.42	7.38	368
D02339	009	8	09/10/10 08:24:45	23.08	5.34	7.36	354
D02340	010	8	09/10/10 08:25:13	23.05	5.83	7.34	336
D02341	011	8	09/10/10 08:25:45	23.09	5.95	7.38	336

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm
D02342	012	8	09/10/10 08:26:18	23.13	5.41	7.31	333
D02343	013	8	09/10/10 08:26:43	23.15	5.50	7.32	337
D02344	014	8	09/10/10 08:27:02	23.11	5.80	7.33	335
D02345	015	8	09/10/10 08:27:22	23.07	6.09	7.32	336
Lab Control	000	9	09/11/10 09:32:22	22.36	3.64	7.54	373
D02331	001	9	09/11/10 09:33:16	22.53	5.39	7.51	344
D02332	002	9	09/11/10 09:33:51	22.51	5.79	7.48	339
D02333	003	9	09/11/10 09:34:08	22.55	5.86	7.45	349
D02334	004	9	09/11/10 09:34:48	22.59	6.25	7.45	335
D02335	005	9	09/11/10 09:35:13	22.60	6.28	7.47	351
D02336	006	9	09/11/10 09:35:33	22.60	6.02	7.47	342
D02337	007	9	09/11/10 09:36:03	22.60	5.77	7.47	345
D02338	008	9	09/11/10 09:36:20	22.65	5.72	7.46	372
D02339	009	9	09/11/10 09:36:49	22.65	5.33	7.42	355
D02340	010	9	09/11/10 09:37:37	22.65	6.30	7.45	340
D02341	011	9	09/11/10 09:38:16	22.67	6.03	7.46	339
D02342	012	9	09/11/10 09:38:53	22.69	5.25	7.38	332
D02343	013	9	09/11/10 09:39:25	22.70	5.28	7.37	340
D02344	014	9	09/11/10 09:39:55	22.64	5.87	7.41	340
D02345	015	9	09/11/10 09:40:18	22.58	6.16	7.38	337
Lab Control	000	10	09/12/10 09:37:15	22.50	4.84	7.59	362
D02331	001	10	09/12/10 09:38:14	22.65	6.20	7.54	341
D02332	002	10	09/12/10 09:38:41	22.63	6.28	7.54	337
D02333	003	10	09/12/10 09:39:19	22.68	5.91	7.51	350
D02334	004	10	09/12/10 09:39:40	22.73	6.25	7.47	333
D02335	005	10	09/12/10 09:39:58	22.75	6.79	7.48	348
D02336	006	10	09/12/10 09:40:31	22.74	5.99	7.48	343
D02337	007	10	09/12/10 09:41:08	22.75	6.12	7.50	337
D02338	008	10	09/12/10 09:41:26	22.78	6.13	7.46	359
D02339	009	10	09/12/10 09:41:40	22.77	6.25	7.46	350
D02340	010	10	09/12/10 09:42:04	22.79	6.51	7.47	337
D02341	011	10	09/12/10 09:42:31	22.80	6.66	7.49	335
D02342	012	10	09/12/10 09:42:50	22.83	6.26	7.44	325
D02343	013	10	09/12/10 09:43:08	22.84	6.11	7.42	335
D02344	014	10	09/12/10 09:43:22	22.80	6.23	7.45	339
D02345	015	10	09/12/10 09:43:41	22.77	6.85	7.47	335
Lab Control	000	11	09/13/10 07:18:29	21.96	4.30	7.50	346
D02331	001	11	09/13/10 07:19:28	22.05	5.91	7.38	325
D02332	002	11	09/13/10 07:20:23	22.08	6.28	7.35	323
D02333	003	11	09/13/10 07:21:09	22.13	5.86	7.38	331
D02334	004	11	09/13/10 07:21:38	22.19	6.10	7.35	319
D02335	005	11	09/13/10 07:22:11	22.21	6.70	7.33	330
D02336	006	11	09/13/10 07:22:52	22.20	5.94	7.32	331
D02337	007	11	09/13/10 07:23:13	22.22	6.01	7.33	328
D02338	008	11	09/13/10 07:23:43	22.24	5.92	7.33	345
D02339	009	11	09/13/10 07:24:08	22.22	5.98	7.33	337
D02340	010	11	09/13/10 07:24:39	22.19	6.45	7.34	325
D02341	011	11	09/13/10 07:25:02	22.20	6.40	7.35	321
D02342	012	11	09/13/10 07:25:28	22.23	6.09	7.28	312
D02343	013	11	09/13/10 07:25:51	22.26	5.92	7.24	324

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm
D02344	014	11	09/13/10 07:26:39	22.22	6.60	7.35	326
D02345	015	11	09/13/10 07:27:09	22.17	6.65	7.34	320
Lab Control	000	12	09/14/10 06:39:47	22.11	3.87	7.49	363
D02331	001	12	09/14/10 06:40:31	22.26	5.41	7.39	332
D02332	002	12	09/14/10 06:40:44	22.28	5.74	7.37	334
D02333	003	12	09/14/10 06:40:57	22.32	5.91	7.36	341
D02334	004	12	09/14/10 06:41:10	22.39	5.88	7.36	328
D02335	005	12	09/14/10 06:41:22	22.42	5.93	7.34	334
D02336	006	12	09/14/10 06:41:34	22.40	6.09	7.32	339
D02337	007	12	09/14/10 06:41:46	22.45	5.83	7.31	335
D02338	008	12	09/14/10 06:41:59	22.46	5.81	7.32	355
D02339	009	12	09/14/10 06:42:11	22.48	5.73	7.32	344
D02340	010	12	09/14/10 06:42:28	22.46	5.84	7.31	334
D02341	011	12	09/14/10 06:42:41	22.46	6.02	7.31	332
D02342	012	12	09/14/10 06:42:52	22.50	5.98	7.32	321
D02343	013	12	09/14/10 06:43:05	22.54	5.83	7.29	333
D02344	014	12	09/14/10 06:43:20	22.49	5.96	7.29	333
D02345	015	12	09/14/10 06:43:33	22.47	6.18	7.31	328
Lab Control	000	13	09/15/10 13:38:48	22.85	4.21	7.62	362
D02331	001	13	09/15/10 13:40:02	22.94	7.52	7.56	329
D02332	002	13	09/15/10 13:40:45	22.95	6.34	7.52	337
D02333	003	13	09/15/10 13:41:20	22.98	6.63	7.51	341
D02334	004	13	09/15/10 13:41:50	23.02	6.90	7.51	326
D02335	005	13	09/15/10 13:42:24	23.05	7.82	7.53	331
D02336	006	13	09/15/10 13:43:12	23.06	5.77	7.43	336
D02337	007	13	09/15/10 13:43:37	23.08	6.03	7.39	331
D02338	008	13	09/15/10 13:44:11	23.14	6.85	7.48	354
D02339	009	13	09/15/10 13:44:48	23.13	6.13	7.47	344
D02340	010	13	09/15/10 13:45:28	23.12	7.63	7.51	332
D02341	011	13	09/15/10 13:46:04	23.15	6.73	7.49	331
D02342	012	13	09/15/10 13:46:46	23.16	5.69	7.39	319
D02343	013	13	09/15/10 13:47:08	23.16	5.95	7.39	333
D02344	014	13	09/15/10 13:47:49	23.10	7.94	7.53	331
D02345	015	13	09/15/10 13:48:24	23.02	7.15	7.50	328
Lab Control	000	14	09/16/10 11:08:29	21.71	4.48	7.55	372
D02331	001	14	09/16/10 11:10:19	21.85	7.58	7.41	340
D02332	002	14	09/16/10 11:10:49	21.83	7.09	7.39	346
D02333	003	14	09/16/10 11:11:03	21.85	7.10	7.35	349
D02334	004	14	09/16/10 11:11:17	21.89	7.21	7.36	330
D02335	005	14	09/16/10 11:11:30	21.92	7.47	7.35	332
D02336	006	14	09/16/10 11:11:40	21.93	7.69	7.35	334
D02337	007	14	09/16/10 11:12:04	21.99	6.79	7.31	330
D02338	008	14	09/16/10 11:12:27	22.01	7.10	7.34	349
D02339	009	14	09/16/10 11:12:36	22.01	7.38	7.35	341
D02340	010	14	09/16/10 11:12:49	21.98	7.26	7.35	330
D02341	011	14	09/16/10 11:13:04	21.98	7.41	7.34	330
D02342	012	14	09/16/10 11:13:15	21.99	7.15	7.32	323
D02343	013	14	09/16/10 11:13:37	22.04	6.65	7.30	330
D02344	014	14	09/16/10 11:14:11	21.98	7.77	7.36	330
D02345	015	14	09/16/10 11:14:44	22.01	7.16	7.31	328

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm
Lab Control	000	15	09/17/10 08:09:51	22.89	3.23	6.79	389
D02331	001	15	09/17/10 08:11:05	23.08	5.45	7.05	328
D02332	002	15	09/17/10 08:11:24	23.08	5.51	7.09	332
D02333	003	15	09/17/10 08:11:42	23.10	5.63	7.13	333
D02334	004	15	09/17/10 08:12:14	23.19	5.17	7.15	321
D02335	005	15	09/17/10 08:12:47	23.20	5.45	7.17	323
D02336	006	15	09/17/10 08:13:22	23.14	5.16	7.17	324
D02337	007	15	09/17/10 08:13:43	23.17	5.28	7.17	323
D02338	008	15	09/17/10 08:14:01	23.17	5.28	7.20	340
D02339	009	15	09/17/10 08:14:30	23.17	5.02	7.23	335
D02340	010	15	09/17/10 08:15:01	23.16	5.40	7.24	322
D02341	011	15	09/17/10 08:15:15	23.14	5.49	7.24	323
D02342	012	15	09/17/10 08:15:32	23.14	5.29	7.23	320
D02343	013	15	09/17/10 08:15:48	23.17	5.33	7.23	324
D02344	014	15	09/17/10 08:16:30	23.14	6.05	7.27	323
D02345	015	15	09/17/10 08:17:10	23.13	5.59	7.27	324
Lab Control	000	16	09/18/10 09:19:40	21.98	4.45	7.51	382
D02331	001	16	09/18/10 09:20:38	22.04	7.07	7.42	332
D02332	002	16	09/18/10 09:20:50	22.00	7.09	7.46	338
D02333	003	16	09/18/10 09:21:14	21.99	6.99	7.43	336
D02334	004	16	09/18/10 09:21:46	22.10	6.63	7.40	326
D02335	005	16	09/18/10 09:22:16	22.14	7.04	7.39	326
D02336	006	16	09/18/10 09:22:52	22.10	6.34	7.33	324
D02337	007	16	09/18/10 09:23:18	22.12	6.54	7.32	326
D02338	008	16	09/18/10 09:23:54	22.14	7.11	7.40	344
D02339	009	16	09/18/10 09:24:30	22.16	6.28	7.39	340
D02340	010	16	09/18/10 09:24:57	22.17	7.00	7.38	322
D02341	011	16	09/18/10 09:25:26	22.16	6.54	7.35	324
D02342	012	16	09/18/10 09:25:54	22.16	6.16	7.32	320
D02343	013	16	09/18/10 09:26:21	22.19	6.37	7.28	323
D02344	014	16	09/18/10 09:26:55	22.17	7.55	7.37	323
D02345	015	16	09/18/10 09:27:31	22.14	6.80	7.35	324
Lab Control	000	17	09/19/10 09:24:36	21.95	4.77	7.12	359
D02331	001	17	09/19/10 09:25:27	22.04	6.49	7.18	328
D02332	002	17	09/19/10 09:25:42	21.99	6.84	7.23	337
D02333	003	17	09/19/10 09:25:53	21.97	6.76	7.27	337
D02334	004	17	09/19/10 09:26:16	22.06	6.75	7.23	332
D02335	005	17	09/19/10 09:26:28	22.07	6.71	7.25	327
D02336	006	17	09/19/10 09:26:41	22.05	6.95	7.27	326
D02337	007	17	09/19/10 09:26:53	22.08	6.66	7.27	326
D02338	008	17	09/19/10 09:27:11	22.09	6.90	7.30	347
D02339	009	17	09/19/10 09:27:24	22.09	6.96	7.32	336
D02340	010	17	09/19/10 09:27:35	22.10	6.65	7.34	321
D02341	011	17	09/19/10 09:27:48	22.09	6.94	7.34	326
D02342	012	17	09/19/10 09:28:01	22.09	6.63	7.31	323
D02343	013	17	09/19/10 09:28:12	22.10	6.44	7.31	327
D02344	014	17	09/19/10 09:28:35	22.09	7.32	7.35	326
D02345	015	17	09/19/10 09:28:46	22.07	7.58	7.39	327
Lab Control	000	18	09/20/10 08:13:32	21.18	4.99	6.95	361

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm
D02331	001	18	09/20/10 08:14:21	21.31	5.97	7.06	334
D02332	002	18	09/20/10 08:14:48	21.33	6.16	7.08	342
D02333	003	18	09/20/10 08:15:15	21.37	6.44	7.12	341
D02334	004	18	09/20/10 08:15:49	21.44	5.86	7.12	339
D02335	005	18	09/20/10 08:16:10	21.45	6.09	7.16	339
D02336	006	18	09/20/10 08:16:29	21.39	6.24	7.17	336
D02337	007	18	09/20/10 08:16:53	21.47	6.36	7.18	336
D02338	008	18	09/20/10 08:17:07	21.45	6.43	7.19	355
D02339	009	18	09/20/10 08:17:29	21.45	6.00	7.20	349
D02340	010	18	09/20/10 08:17:47	21.47	5.67	7.23	330
D02341	011	18	09/20/10 08:18:03	21.44	6.02	7.22	332
D02342	012	18	09/20/10 08:18:17	21.45	5.98	7.21	328
D02343	013	18	09/20/10 08:18:29	21.48	6.01	7.20	332
D02344	014	18	09/20/10 08:18:43	21.46	6.15	7.22	331
D02345	015	18	09/20/10 08:19:04	21.45	6.58	7.24	331
Lab Control	000	19	09/21/10 07:25:33	19.67	5.46	7.42	356
D02331	001	19	09/21/10 07:26:41	19.77	6.48	7.37	331
D02332	002	19	09/21/10 07:27:01	19.69	6.68	7.37	338
D02333	003	19	09/21/10 07:27:18	19.70	6.77	7.37	337
D02334	004	19	09/21/10 07:27:50	19.74	6.43	7.35	334
D02335	005	19	09/21/10 07:28:08	19.77	6.54	7.33	336
D02336	006	19	09/21/10 07:28:35	19.71	6.53	7.32	332
D02337	007	19	09/21/10 07:28:55	19.81	6.57	7.31	325
D02338	008	19	09/21/10 07:29:20	19.78	6.63	7.34	345
D02339	009	19	09/21/10 07:29:35	19.79	6.55	7.36	344
D02340	010	19	09/21/10 07:29:48	19.80	6.36	7.36	326
D02341	011	19	09/21/10 07:30:03	19.80	6.46	7.34	329
D02342	012	19	09/21/10 07:30:15	19.79	6.33	7.33	327
D02343	013	19	09/21/10 07:30:32	19.88	6.38	7.33	329
D02344	014	19	09/21/10 07:30:55	19.82	6.77	7.35	327
D02345	015	19	09/21/10 07:31:13	19.82	7.24	7.36	328
Lab Control	000	20	09/22/10 06:47:27	21.92	4.90	6.75	376
D02331	001	20	09/22/10 06:48:35	22.03	5.91	7.02	324
D02332	002	20	09/22/10 06:48:56	22.02	6.11	7.08	328
D02333	003	20	09/22/10 06:49:27	22.04	6.35	7.14	325
D02334	004	20	09/22/10 06:50:07	22.10	5.84	7.18	324
D02335	005	20	09/22/10 06:50:35	22.09	6.07	7.21	327
D02336	006	20	09/22/10 06:51:02	22.05	6.10	7.22	323
D02337	007	20	09/22/10 06:51:34	22.12	6.69	7.25	317
D02338	008	20	09/22/10 06:52:14	22.07	5.90	7.31	340
D02339	009	20	09/22/10 06:52:28	22.06	5.81	7.32	341
D02340	010	20	09/22/10 06:52:42	22.07	5.77	7.34	319
D02341	011	20	09/22/10 06:53:09	22.07	6.04	7.31	321
D02342	012	20	09/22/10 06:53:38	22.13	5.81	7.28	319
D02343	013	20	09/22/10 06:54:01	22.14	5.86	7.29	322
D02344	014	20	09/22/10 06:54:29	22.12	6.31	7.31	319
D02345	015	20	09/22/10 06:54:48	22.12	6.53	7.34	321
Lab Control	000	21	09/23/10 08:21:17	23.89	4.43	6.83	375
D02331	001	21	09/23/10 08:22:19	24.00	6.07	7.10	327
D02332	002	21	09/23/10 08:22:35	23.99	6.09	7.15	330

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm
D02333	003	21	09/23/10 08:23:06	23.98	6.56	7.23	328
D02334	004	21	09/23/10 08:23:43	23.96	6.04	7.27	325
D02335	005	21	09/23/10 08:24:19	23.93	6.60	7.32	332
D02336	006	21	09/23/10 08:24:43	23.91	6.44	7.34	326
D02337	007	21	09/23/10 08:25:15	23.92	6.97	7.38	325
D02338	008	21	09/23/10 08:25:48	23.89	6.48	7.43	347
D02339	009	21	09/23/10 08:26:25	23.85	6.04	7.48	346
D02340	010	21	09/23/10 08:26:51	23.87	6.26	7.46	322
D02341	011	21	09/23/10 08:27:24	23.83	6.55	7.44	324
D02342	012	21	09/23/10 08:27:58	23.81	6.35	7.41	323
D02343	013	21	09/23/10 08:28:25	23.88	6.22	7.41	323
D02344	014	21	09/23/10 08:28:54	23.79	6.65	7.43	324
D02345	015	21	09/23/10 08:29:21	23.73	6.76	7.45	325
Lab Control	000	22	09/24/10 09:10:03	23.82	4.92	6.82	363
D02331	001	22	09/24/10 09:11:07	23.87	6.71	7.06	324
D02332	002	22	09/24/10 09:11:22	23.90	6.89	7.10	325
D02333	003	22	09/24/10 09:11:46	23.87	7.30	7.17	324
D02334	004	22	09/24/10 09:12:01	23.86	7.36	7.20	320
D02335	005	22	09/24/10 09:12:14	23.84	7.25	7.22	325
D02336	006	22	09/24/10 09:12:28	23.82	7.27	7.23	320
D02337	007	22	09/24/10 09:12:49	23.80	7.51	7.27	321
D02338	008	22	09/24/10 09:13:21	23.83	6.82	7.31	335
D02339	009	22	09/24/10 09:13:31	23.81	6.79	7.32	337
D02340	010	22	09/24/10 09:13:50	23.77	7.20	7.34	318
D02341	011	22	09/24/10 09:14:13	23.78	6.92	7.32	322
D02342	012	22	09/24/10 09:14:26	23.77	6.76	7.31	320
D02343	013	22	09/24/10 09:14:37	23.77	6.61	7.29	322
D02344	014	22	09/24/10 09:14:47	23.73	6.69	7.30	320
D02345	015	22	09/24/10 09:14:57	23.69	7.25	7.32	323
Lab Control	000	23	09/25/10 11:48:41	24.70	5.07	6.84	364
D02331	001	23	09/25/10 11:49:23	24.87	7.50	7.10	307
D02332	002	23	09/25/10 11:49:42	24.85	7.73	7.19	309
D02333	003	23	09/25/10 11:50:00	24.81	7.87	7.26	311
D02334	004	23	09/25/10 11:50:19	24.81	7.78	7.30	307
D02335	005	23	09/25/10 11:50:43	24.78	8.04	7.37	311
D02336	006	23	09/25/10 11:57:58	24.72	7.34	7.46	308
D02337	007	23	09/25/10 11:58:31	24.76	8.53	7.57	308
D02338	008	23	09/25/10 11:58:54	24.79	8.06	7.61	323
D02339	009	23	09/25/10 11:59:10	24.78	7.60	7.61	325
D02340	010	23	09/25/10 11:59:52	24.76	8.28	7.59	305
D02341	011	23	09/25/10 12:00:22	24.79	8.10	7.58	310
D02342	012	23	09/25/10 12:00:43	24.78	7.75	7.56	305
D02343	013	23	09/25/10 12:01:07	24.79	7.90	7.54	307
D02344	014	23	09/25/10 12:01:31	24.71	8.67	7.63	309
D02345	015	23	09/25/10 12:01:49	24.68	8.86	7.68	311
Lab Control	000	24	09/26/10 09:09:03	23.55	4.91	7.16	819
D02331	001	24	09/26/10 09:10:10	23.63	6.60	7.29	629
D02332	002	24	09/26/10 09:10:42	23.61	7.33	7.38	708
D02333	003	24	09/26/10 09:10:59	23.56	7.50	7.41	672
D02334	004	24	09/26/10 09:11:18	23.57	7.13	7.41	703

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm
D02335	005	24	09/26/10 09:11:32	23.56	7.05	7.42	667
D02336	006	24	09/26/10 09:11:48	23.55	7.23	7.43	715
D02337	007	24	09/26/10 09:12:09	23.57	7.64	7.52	340
D02338	008	24	09/26/10 09:12:32	23.60	7.32	7.55	349
D02339	009	24	09/26/10 09:12:48	23.59	7.02	7.58	349
D02340	010	24	09/26/10 09:13:05	23.60	7.18	7.59	327
D02341	011	24	09/26/10 09:13:21	23.62	7.43	7.58	324
D02342	012	24	09/26/10 09:13:44	23.64	7.34	7.58	324
D02343	013	24	09/26/10 09:14:04	23.65	7.53	7.59	325
D02344	014	24	09/26/10 09:14:28	23.58	7.77	7.65	325
D02345	015	24	09/26/10 09:14:43	23.60	7.79	7.66	326
Lab Control	000	25	09/27/10 08:52:36	23.24	5.78	7.52	468
D02331	001	25	09/27/10 08:53:48	23.29	7.46	7.54	481
D02332	002	25	09/27/10 08:54:03	23.33	7.73	7.60	478
D02333	003	25	09/27/10 08:54:24	23.32	7.89	7.63	462
D02334	004	25	09/27/10 08:54:34	23.36	7.76	7.62	465
D02335	005	25	09/27/10 08:54:51	23.37	7.48	7.59	461
D02336	006	25	09/27/10 08:55:08	23.25	7.63	7.57	469
D02337	007	25	09/27/10 08:55:18	23.30	7.63	7.61	315
D02338	008	25	09/27/10 08:55:31	23.31	7.81	7.63	332
D02339	009	25	09/27/10 08:55:45	23.30	7.54	7.65	321
D02340	010	25	09/27/10 08:55:58	23.30	7.52	7.67	310
D02341	011	25	09/27/10 08:56:13	23.33	7.63	7.66	309
D02342	012	25	09/27/10 08:56:24	23.34	7.66	7.65	308
D02343	013	25	09/27/10 08:56:41	23.39	7.82	7.67	309
D02344	014	25	09/27/10 08:56:55	23.36	8.08	7.71	313
D02345	015	25	09/27/10 08:57:11	23.41	8.05	7.72	315
Lab Control	000	26	09/28/10 08:14:11	23.71	4.28	6.77	467
D02331	001	26	09/28/10 08:15:32	23.84	6.57	7.07	421
D02332	002	26	09/28/10 08:16:11	23.90	7.84	7.25	417
D02333	003	26	09/28/10 08:16:41	23.88	7.13	7.28	406
D02334	004	26	09/28/10 08:17:10	23.92	6.72	7.27	387
D02335	005	26	09/28/10 08:17:44	23.89	6.88	7.29	412
D02336	006	26	09/28/10 08:18:14	23.87	7.42	7.33	400
D02337	007	26	09/28/10 08:18:46	23.87	7.85	7.33	350
D02338	008	26	09/28/10 08:19:20	23.88	7.19	7.39	365
D02339	009	26	09/28/10 08:20:03	23.85	7.42	7.50	358
D02340	010	26	09/28/10 08:20:42	23.82	7.70	7.48	346
D02341	011	26	09/28/10 08:21:07	23.84	7.64	7.47	335
D02342	012	26	09/28/10 08:21:52	23.80	7.71	7.45	328
D02343	013	26	09/28/10 08:22:25	23.88	8.06	7.52	330
D02344	014	26	09/28/10 08:22:54	23.80	7.96	7.53	330
D02345	015	26	09/28/10 08:23:21	23.85	7.74	7.52	331
Lab Control	000	27	09/29/10 08:16:57	25.63	2.69	6.64	424
D02331	001	27	09/29/10 08:18:23	25.78	4.97	6.97	370
D02332	002	27	09/29/10 08:18:51	25.84	6.15	7.08	364
D02333	003	27	09/29/10 08:19:22	25.80	5.59	7.12	357
D02334	004	27	09/29/10 08:19:39	25.80	5.61	7.14	349
D02335	005	27	09/29/10 08:19:54	25.78	5.77	7.15	361
D02336	006	27	09/29/10 08:20:08	25.77	5.95	7.18	357

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm
D02337	007	27	09/29/10 08:20:23	25.76	6.44	7.21	336
D02338	008	27	09/29/10 08:20:35	25.77	6.60	7.23	353
D02339	009	27	09/29/10 08:21:02	25.74	5.88	7.27	348
D02340	010	27	09/29/10 08:21:19	25.72	6.05	7.28	334
D02341	011	27	09/29/10 08:21:46	25.74	6.37	7.29	329
D02342	012	27	09/29/10 08:22:06	25.68	6.38	7.30	325
D02343	013	27	09/29/10 08:22:20	25.75	6.45	7.31	328
D02344	014	27	09/29/10 08:22:36	25.69	6.61	7.33	329
D02345	015	27	09/29/10 08:22:57	25.71	6.16	7.32	329
Lab Control	000	28	09/30/10 07:26:19	22.83	2.70	7.34	378
D02331	001	28	09/30/10 07:27:25	22.79	4.87	7.27	342
D02332	002	28	09/30/10 07:28:16	22.86	6.21	7.31	339
D02333	003	28	09/30/10 07:28:54	22.84	5.70	7.29	337
D02334	004	28	09/30/10 07:29:30	22.87	5.44	7.27	328
D02335	005	28	09/30/10 07:30:04	22.89	5.09	7.24	337
D02336	006	28	09/30/10 07:30:46	22.94	6.16	7.26	332
D02337	007	28	09/30/10 07:31:13	22.87	6.33	7.26	324
D02338	008	28	09/30/10 07:31:48	22.96	5.70	7.29	338
D02339	009	28	09/30/10 07:32:24	22.93	5.78	7.31	335
D02340	010	28	09/30/10 07:33:11	22.96	5.73	7.27	321
D02341	011	28	09/30/10 07:33:37	22.98	6.31	7.28	319
D02342	012	28	09/30/10 07:34:12	22.98	6.13	7.27	317
D02343	013	28	09/30/10 07:34:57	22.99	6.69	7.30	318
D02344	014	28	09/30/10 07:35:44	22.99	5.98	7.28	320
D02345	015	28	09/30/10 07:36:45	23.12	5.72	7.25	321

Hyalella azteca 28 Day Assay

STUDY NUMBER: 20116 **PROJECT: DAS-RAC2-030**

DATE: 09/30/10 **CLIENT: Nobis Engineering, Inc.**

Sample Code	Rep	Pos	Survived	Initials	Count Checked by
20108-010	1	1	8	JTP	AM 10/01/10
20108-008	1	2	11		
20108-012	1	3	8		
20108-004	1	4	9		
20108-013	1	5	8		
20108-014	1	6	9		
20108-011	1	7	10		
20108-000	1	8	10	RAM	
20108-007	1	9	8	JTP	
20108-003	1	10	10		
20108-002	1	11	8		
20108-009	1	12	4		
20108-006	1	13	10		
20108-015	1	14	9	AM	
20108-001	1	15	11		
20108-005	1	16	6		
20108-002	2	17	9		
20108-003	2	18	6		
20108-013	2	19	6		
20108-008	2	20	8		
20108-014	2	21	8		
20108-007	2	22	6		
20108-012	2	23	8		
20108-000	2	24	8	RAM	
20108-011	2	25	8	AM	
20108-005	2	26	10		
20108-004	2	27	8		
20108-006	2	28	8		
20108-015	2	29	10		
20108-009	2	30	9		
20108-010	2	31	5		
20108-001	2	32	4		
20108-004	3	33	10		
20108-011	3	34	7		
20108-014	3	35	7		
20108-007	3	36	4		
20108-013	3	37	8		
20108-005	3	38	3		
20108-000	3	39	7	RAM	
20108-010	3	40	9	JTP	

Hyalella azteca 28 Day Assay

STUDY NUMBER: 20116 **PROJECT: DAS-RAC2-030**

DATE: 09/30/10 **CLIENT: Nobis Engineering, Inc.**

Sample Code	Rep	Pos	Survived	Initials	Count Checked by
20108-012	3	41	10	JTP	AM 10/01/10
20108-008	3	42	9		
20108-006	3	43	9		
20108-015	3	44	8		
20108-002	3	45	6		
20108-001	3	46	7		
20108-003	3	47	10		
20108-009	3	48	7		
20108-015	4	49	5		
20108-004	4	50	5		
20108-001	4	51	10		
20108-002	4	52	8		
20108-006	4	53	9		
20108-008	4	54	8		
20108-010	4	55	8		
20108-009	4	56	5		
20108-014	4	57	8		
20108-005	4	58	5		
20108-012	4	59	8		
20108-000	4	60	9	RAM	
20108-013	4	61	8	AM	
20108-011	4	62	7	JTP	
20108-003	4	63	6	JTP	
20108-007	4	64	10	AM	
20108-008	5	65	8		
20108-005	5	66	8		
20108-002	5	67	10		
20108-015	5	68	7		
20108-007	5	69	8		
20108-011	5	70	9	KC	
20108-003	5	71	7		
20108-012	5	72	9		
20108-013	5	73	8		
20108-001	5	74	6		
20108-009	5	75	9		
20108-010	5	76	10		
20108-014	5	77	9		
20108-006	5	78	6		
20108-004	5	79	10		
20108-000	5	80	8	RAM	

Hyalella azteca 28 Day Assay

STUDY NUMBER: 20116 **PROJECT: DAS-RAC2-030**

DATE: 09/30/10 **CLIENT: Nobis Engineering, Inc.**

Sample Code	Rep	Pos	Survived	Initials	Count Checked by
20108-008	6	81	8	KC	AM 10/10/10
20108-001	6	82	9		
20108-014	6	83	8		
20108-011	6	84	8		
20108-015	6	85	9		
20108-005	6	86	9	JEB	
20108-007	6	87	9		
20108-013	6	88	9 ~~8~~ EBAM 10/4		
20108-000	6	89	EBAM 10/4 ~~9~~ 8	RAM	
20108-003	6	90	9	JEB	
20108-002	6	91	7		
20108-012	6	92	7		
20108-010	6	93	8		
20108-009	6	94	8		
20108-004	6	95	9		
20108-006	6	96	9		
20108-002	7	97	6		
20108-008	7	98	10		
20108-005	7	99	8	JTP	
20108-013	7	100	8		
20108-003	7	101	8		
20108-011	7	102	10		
20108-014	7	103	7		
20108-001	7	104	8		
20108-007	7	105	9		
20108-015	7	106	8		
20108-010	7	107	5		
20108-009	7	108	9		
20108-012	7	109	9		
20108-004	7	110	8		
20108-000	7	111	7	RAM	
20108-006	7	112	10	JTP	
20108-011	8	113	9		
20108-001	8	114	8		
20108-000	8	115	8	RAM	
20108-005	8	116	8	JTP	
20108-006	8	117	8		
20108-007	8	118	7		
20108-013	8	119	8		
20108-003	8	120	10	KC	

Hyalella azteca 28 Day Assay

STUDY NUMBER: 20116 **PROJECT: DAS-RAC2-030**

DATE: 09/30/10 **CLIENT: Nobis Engineering, Inc.**

Sample Code	Rep	Pos	Survived	Initials	Count Checked by
20108-009	8	121	8	KC	AM 10/01/10
20108-012	8	122	10	JEB	
20108-004	8	123	8	KC	
20108-015	8	124	9	JEB	
20108-002	8	125	10	JEB	
20108-010	8	126	10	JEB	
20108-008	8	127	9	KC	
20108-014	8	128	7	↓	↓

Hyalella azteca Sediment Evaluation

STUDY NUMBER: 20116 **CLIENT:** Nobis Engineering, Inc.

PROJECT: DAS-RAC2-030 **START DATE:**

	REP	TARE WEIGHT (mg)	*H. azteca*+ FOIL (mg)	NET WEIGHT (mg)	# *H. azteca*	MEAN DRY WEIGHT PER Individual (mg)
START ORGANISMS	A	206.86	206.96	0.10	10	0.010
	B	206.92	207.02	0.10	10	0.010
	C	205.78	205.89	0.11	10	0.011
	D	204.41	204.54	0.13	10	0.013
RECORDED BY:		AM	AM	Overall Mean Dry Weight Per Individual:		
DATE:		9/2/10	9/3/10	0.011 mg		

NOTES:

STUDY: 20116
CLIENT: Nobis Engineering, Inc.
PROJECT: DAS-RAC2-030
ASSAY: Hyalella azteca 28 Day
TASK: Dry Weight Data - AccuSeries Balance Output File
BALANCE: AccuSeries Model 225D
SERIAL #: 17008376

			10/04/10 JEB	09/30/10 AM	Duplicates	
Sample	Rep.	Pos.	Total (mg)	Tare (mg)	Total (mg)	Tare (mg)
20108-010	1	1	207.69	203.91		
20108-008	1	2	215.48	209.89		
20108-012	1	3	212.81	209.76		
20108-004	1	4	213.64	208.59		
20108-013	1	5	212.68	209.03		
20108-014	1	6	212.52	208.50		
20108-011	1	7	212.22	207.73		
20108-000	1	8	215.28	208.15		
20108-007	1	9	212.34	208.17		
20108-003	1	10	213.15	207.87		
20108-002	1	11	212.04	209.52		
20108-009	1	12	212.75	210.29		
20108-006	1	13	211.64	206.98		
20108-015	1	14	208.81	204.51		
20108-001	1	15	211.42	207.49		
20108-005	1	16	213.07	209.28		
20108-002	2	17	213.33	209.16		
20108-003	2	18	210.35	206.53		
20108-013	2	19	211.51	208.89		
20108-008	2	20	213.86	208.69	213.83	208.68
20108-014	2	21	210.91	206.49		
20108-007	2	22	214.17	209.56		
20108-012	2	23	211.55	209.05		
20108-000	2	24	215.06	209.86		
20108-011	2	25	208.95	205.69		
20108-005	2	26	214.65	208.14		
20108-004	2	27	213.33	207.48		
20108-006	2	28	212.32	208.18		
20108-015	2	29	212.37	206.82		
20108-009	2	30	214.78	209.59		
20108-010	2	31	210.60	208.20		
20108-001	2	32	211.33	207.33		
20108-004	3	33	213.62	205.97		
20108-011	3	34	210.45	207.99		
20108-014	3	35	212.60	208.00		
20108-007	3	36	211.88	208.80		
20108-013	3	37	211.67	207.33		
20108-005	3	38	211.07	207.83		
20108-000	3	39	215.60	209.86		
20108-010	3	40	210.60	206.08	210.58	206.10
20108-012	3	41	214.85	208.99		
20108-008	3	42	217.29	209.91		
20108-006	3	43	214.23	209.51		
20108-015	3	44	213.58	209.88		
20108-002	3	45	213.34	209.72		

Sample	Rep.	Pos.	10/04/10 JEB Total (mg)	09/30/10 AM Tare (mg)	Duplicates Total (mg)	Duplicates Tare (mg)
20108-001	3	46	210.70	208.27		
20108-003	3	47	209.64	205.03		
20108-009	3	48	212.20	208.42		
20108-015	4	49	212.42	209.14		
20108-004	4	50	215.19	210.11		
20108-001	4	51	214.27	208.70		
20108-002	4	52	209.33	205.43		
20108-006	4	53	214.97	209.50		
20108-008	4	54	215.36	209.67		
20108-010	4	55	213.59	209.98		
20108-009	4	56	215.56	209.58		
20108-014	4	57	215.96	211.56		
20108-005	4	58	215.31	209.19		
20108-012	4	59	213.94	209.01		
20108-000	4	60	213.70	207.42	213.69	207.42
20108-013	4	61	207.46	203.55		
20108-011	4	62	209.07	205.41		
20108-003	4	63	213.37	208.16		
20108-007	4	64	217.38	210.61		
20108-008	5	65	215.33	209.83		
20108-005	5	66	210.67	205.39		
20108-002	5	67	217.90	213.06		
20108-015	5	68	211.10	207.79		
20108-007	5	69	215.93	210.31		
20108-011	5	70	211.81	206.85		
20108-003	5	71	211.19	206.41		
20108-012	5	72	210.34	204.98		
20108-013	5	73	211.43	207.17		
20108-001	5	74	214.01	210.02		
20108-009	5	75	215.31	208.66		
20108-010	5	76	215.45	211.11		
20108-014	5	77	214.81	209.96		
20108-006	5	78	212.70	210.21		
20108-004	5	79	214.35	209.26		
20108-000	5	80	214.93	208.39	214.93	208.41
20108-008	6	81	212.78	207.53		
20108-001	6	82	216.58	211.70		
20108-014	6	83	212.79	207.48		
20108-011	6	84	216.28	211.68		
20108-015	6	85	215.81	211.91		
20108-005	6	86	210.64	206.53		
20108-007	6	87	212.57	208.04		
20108-013	6	88	211.38	205.68		
20108-000	6	89	213.47	208.29		
20108-003	6	90	214.40	208.62		
20108-002	6	91	210.49	207.43		
20108-012	6	92	209.03	206.53		
20108-010	6	93	213.99	208.33		
20108-009	6	94	213.78	208.17		
20108-004	6	95	210.90	206.89		
20108-006	6	96	215.58	208.20		
20108-002	7	97	212.74	208.86		
20108-008	7	98	214.20	208.60		

			10/04/10 JEB	09/30/10 AM	Duplicates	
Sample	Rep.	Pos.	Total (mg)	Tare (mg)	Total (mg)	Tare (mg)
20108-005	7	99	212.50	206.36		
20108-013	7	100	214.58	208.26	214.57	208.24
20108-003	7	101	214.75	208.13		
20108-011	7	102	211.80	206.69		
20108-014	7	103	213.15	208.78		
20108-001	7	104	213.60	207.76		
20108-007	7	105	214.32	207.57		
20108-015	7	106	212.60	208.57		
20108-010	7	107	210.42	206.84		
20108-009	7	108	213.80	208.46		
20108-012	7	109	209.63	205.93		
20108-004	7	110	212.73	206.94		
20108-000	7	111	211.23	207.21		
20108-006	7	112	215.40	207.66		
20108-011	8	113	213.82	207.81		
20108-001	8	114	212.56	207.61		
20108-000	8	115	215.23	208.27		
20108-005	8	116	210.53	205.67		
20108-006	8	117	211.28	208.36		
20108-007	8	118	213.74	207.57		
20108-013	8	119	212.34	206.53		
20108-003	8	120	216.22	207.80	216.21	207.81
20108-009	8	121	216.14	208.77		
20108-012	8	122	215.15	208.33		
20108-004	8	123	212.86	207.32		
20108-015	8	124	212.94	206.64		
20108-002	8	125	215.46	209.46		
20108-010	8	126	213.05	206.23		
20108-008	8	127	214.76	207.26		
20108-014	8	128	215.14	208.83	215.12	208.84

CETIS Summary Report

Report Date: 04 Oct-10 12:43 (p 1 of 4)
Test Code: 18-3577-7325/20116Ha

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
20108-000	11-3147-0529	31 Aug-10 12:00	31 Aug-10 12:00	48h	Nobis Engineering, Inc.	Ecological Risk Assessme
20108-001	12-7681-9937	23 Aug-10 14:30	25 Aug-10 09:40	9d 22h		
20108-002	08-0875-5915	23 Aug-10 16:30	25 Aug-10 09:40	9d 20h		
20108-003	20-7911-9243	24 Aug-10 10:30	25 Aug-10 09:40	9d 2h		
20108-004	03-1060-8043	24 Aug-10 12:00	25 Aug-10 09:40	9d 0h		
20108-005	06-2472-6864	25 Aug-10 17:30	26 Aug-10 09:45	7d 19h		
20108-006	21-0612-3779	25 Aug-10 10:00	26 Aug-10 09:45	8d 2h		
20108-007	03-0112-8262	25 Aug-10 12:30	26 Aug-10 09:45	7d 23h		
20108-008	19-8536-5911	27 Aug-10 14:00	30 Aug-10 10:10	5d 22h		
20108-009	09-4502-3703	27 Aug-10 16:30	30 Aug-10 10:10	5d 20h		
20108-010	08-3176-6542	27 Aug-10 09:00	30 Aug-10 10:10	6d 3h		
20108-011	16-2942-8773	27 Aug-10 10:45	30 Aug-10 10:10	6d 1h		
20108-012	10-9672-7849	26 Aug-10 17:00	30 Aug-10 10:10	6d 19h		
20108-013	04-2922-4416	26 Aug-10 15:30	30 Aug-10 10:10	6d 20h		
20108-014	09-2631-1057	26 Aug-10 12:00	30 Aug-10 10:10	7d 0h		
20108-015	10-3919-9014	26 Aug-10 10:00	30 Aug-10 10:10	7d 2h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
20108-000	Freshwater Sediment	DAS-RAC2-030	Laboratory Control Sample; 2010		
20108-001	Freshwater Sediment	DAS-RAC2-030	D02331; 20108-001		
20108-002	Freshwater Sediment	DAS-RAC2-030	D02332; 20108-002		
20108-003	Freshwater Sediment	DAS-RAC2-030	D02333; 20108-003		
20108-004	Freshwater Sediment	DAS-RAC2-030	D02334; 20108-004		
20108-005	Freshwater Sediment	DAS-RAC2-030	D02335; 20108-005		
20108-006	Freshwater Sediment	DAS-RAC2-030	D02336; 20108-006		
20108-007	Freshwater Sediment	DAS-RAC2-030	D02337; 20108-007		
20108-008	Freshwater Sediment	DAS-RAC2-030	D02338; 20108-008		
20108-009	Freshwater Sediment	DAS-RAC2-030	D02339; 20108-009		
20108-010	Freshwater Sediment	DAS-RAC2-030	D02340; 20108-010		
20108-011	Freshwater Sediment	DAS-RAC2-030	D02341; 20108-011		
20108-012	Freshwater Sediment	DAS-RAC2-030	D02342; 20108-012		
20108-013	Freshwater Sediment	DAS-RAC2-030	D02343; 20108-013		
20108-014	Freshwater Sediment	DAS-RAC2-030	D02344; 20108-014		
20108-015	Freshwater Sediment	DAS-RAC2-030	D02345; 20108-015		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
02-9992-2740	Proportion Survived	Control Resp	0.8125	0.8 - NL	Yes	Result Within Limits

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5488	0.6274	0.402	0.713	0.01922	0.1053	17.9%	0.0%
20108-001	8	0.4404	0.3984	0.4824	0.243	0.584	0.02055	0.1126	25.56%	25.12%
20108-002	8	0.3999	0.36	0.4397	0.252	0.6	0.01949	0.1068	26.7%	32.01%
20108-003	8	0.5565	0.5035	0.6095	0.382	0.842	0.0259	0.1419	25.49%	5.38%
20108-004	8	0.5507	0.5118	0.5897	0.401	0.765	0.01902	0.1042	18.92%	6.36%
20108-005	8	0.5006	0.4554	0.5459	0.324	0.651	0.02213	0.1212	24.21%	14.88%
20108-006	8	0.494	0.4235	0.5645	0.249	0.774	0.03445	0.1887	38.2%	16.0%
20108-007	8	0.5213	0.4717	0.5708	0.308	0.677	0.02424	0.1327	25.47%	11.37%
20108-008	8	0.5896	0.5532	0.6261	0.5082	0.75	0.01782	0.09761	16.55%	-0.26%
20108-009	8	0.5297	0.4715	0.588	0.246	0.737	0.0285	0.1561	29.47%	9.93%

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-010	8	0.4339	0.3828	0.485	0.24	0.682	0.02499	0.1369	31.55%	26.23%
20108-011	8	0.4319	0.3895	0.4743	0.246	0.601	0.02072	0.1135	26.28%	26.57%
20108-012	8	0.434	0.373	0.495	0.25	0.682	0.02984	0.1634	37.65%	26.21%
20108-013	8	0.4576	0.4106	0.5047	0.262	0.632	0.023	0.126	27.53%	22.19%
20108-014	8	0.4785	0.4514	0.5056	0.402	0.631	0.01324	0.07249	15.15%	18.64%
20108-015	8	0.4296	0.3893	0.47	0.328	0.63	0.01973	0.1081	25.16%	26.95%

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6854	0.7621	0.5743	0.87	0.01875	0.1027	14.19%	0.0%
20108-001	8	0.6022	0.5237	0.6807	0.3471	1	0.03839	0.2103	34.92%	16.8%
20108-002	8	0.5046	0.4642	0.545	0.315	0.6467	0.01975	0.1082	21.44%	30.28%
20108-003	8	0.6861	0.6301	0.7421	0.461	0.8683	0.02739	0.15	21.87%	5.21%
20108-004	8	0.6805	0.6138	0.7472	0.4456	1.016	0.0326	0.1785	26.24%	5.97%
20108-005	8	0.7598	0.6629	0.8567	0.4567	1.224	0.04738	0.2595	34.15%	-4.98%
20108-006	8	0.5612	0.5002	0.6222	0.365	0.82	0.02981	0.1633	29.09%	22.46%
20108-007	8	0.6967	0.6486	0.7448	0.5033	0.8814	0.02351	0.1288	18.48%	3.73%
20108-008	8	0.6778	0.6356	0.7201	0.5082	0.8333	0.02067	0.1132	16.7%	6.34%
20108-009	8	0.7353	0.6523	0.8183	0.54	1.196	0.04059	0.2223	30.23%	-1.6%
20108-010	8	0.5557	0.5098	0.6016	0.434	0.716	0.02246	0.123	22.14%	23.22%
20108-011	8	0.5045	0.4671	0.5418	0.3514	0.6678	0.01827	0.1001	19.84%	30.3%
20108-012	8	0.4927	0.4399	0.5456	0.3125	0.682	0.02585	0.1416	28.73%	31.92%
20108-013	8	0.5758	0.5277	0.6239	0.4367	0.79	0.02351	0.1288	22.36%	20.45%
20108-014	8	0.6168	0.5662	0.6674	0.4467	0.9014	0.02474	0.1355	21.97%	14.77%
20108-015	8	0.5327	0.4964	0.5689	0.4333	0.7	0.01772	0.09705	18.22%	26.4%

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7755	0.8495	0.7	1	0.01809	0.0991	12.2%	0.0%
20108-001	8	0.775	0.6983	0.8517	0.4	1	0.03748	0.2053	26.49%	4.62%
20108-002	8	0.8	0.7401	0.8599	0.6	1	0.02928	0.1604	20.04%	1.54%
20108-003	8	0.825	0.7596	0.8904	0.6	1	0.032	0.1753	21.24%	-1.54%
20108-004	8	0.8375	0.7778	0.8972	0.5	1	0.02918	0.1598	19.08%	-3.08%
20108-005	8	0.7125	0.6268	0.7982	0.3	1	0.0419	0.2295	32.21%	12.31%
20108-006	8	0.8625	0.8139	0.9111	0.6	1	0.02378	0.1302	15.1%	-6.15%
20108-007	8	0.7625	0.6907	0.8343	0.4	1	0.0351	0.1923	25.21%	6.15%
20108-008	8	0.875	0.8419	0.9081	0.8	1	0.01618	0.08864	10.13%	-7.69%
20108-009	8	0.7375	0.6657	0.8093	0.4	0.9	0.0351	0.1923	26.07%	9.23%
20108-010	8	0.7875	0.7143	0.8607	0.5	1	0.03577	0.1959	24.88%	3.08%
20108-011	8	0.85	0.8054	0.8946	0.7	1	0.02182	0.1195	14.06%	-4.62%
20108-012	8	0.8625	0.8229	0.9021	0.7	1	0.01936	0.1061	12.3%	-6.15%
20108-013	8	0.7875	0.7563	0.8187	0.6	0.9	0.01524	0.08345	10.6%	3.08%
20108-014	8	0.7875	0.7563	0.8187	0.7	0.9	0.01524	0.08345	10.6%	3.08%
20108-015	8	0.8125	0.7545	0.8705	0.5	1	0.02835	0.1553	19.11%	0.0%

Hyalella 28-d Survival and Growth Sediment Test **EnviroSystems, Inc.**

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-003	0.528	0.382	0.461	0.521	0.478	0.578	0.662	0.842
20108-004	0.505	0.585	0.765	0.508	0.509	0.401	0.579	0.554
20108-005	0.379	0.651	0.324	0.612	0.528	0.411	0.614	0.486
20108-006	0.466	0.414	0.472	0.547	0.249	0.738	0.774	0.292
20108-007	0.417	0.461	0.308	0.677	0.562	0.453	0.675	0.617
20108-008	0.5082	0.517	0.738	0.569	0.55	0.525	0.56	0.75
20108-009	0.246	0.519	0.378	0.598	0.665	0.561	0.534	0.737
20108-010	0.378	0.24	0.452	0.361	0.434	0.566	0.358	0.682
20108-011	0.449	0.326	0.246	0.366	0.496	0.46	0.511	0.601
20108-012	0.305	0.25	0.586	0.493	0.536	0.25	0.37	0.682
20108-013	0.365	0.262	0.434	0.391	0.426	0.57	0.632	0.581
20108-014	0.402	0.442	0.46	0.44	0.485	0.531	0.437	0.631
20108-015	0.43	0.555	0.37	0.328	0.331	0.39	0.403	0.63

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-003	0.528	0.6367	0.461	0.8683	0.6829	0.6422	0.8275	0.842
20108-004	0.5611	0.7313	0.765	1.016	0.509	0.4456	0.7237	0.6925
20108-005	0.6317	0.651	1.08	1.224	0.66	0.4567	0.7675	0.6075
20108-006	0.466	0.5175	0.5244	0.6078	0.415	0.82	0.774	0.365
20108-007	0.5212	0.7683	0.77	0.677	0.7025	0.5033	0.75	0.8814
20108-008	0.5082	0.6462	0.82	0.7113	0.6875	0.6563	0.56	0.8333
20108-009	0.615	0.5767	0.54	1.196	0.7389	0.7013	0.5933	0.9212
20108-010	0.4725	0.48	0.5022	0.4513	0.434	0.7075	0.716	0.682
20108-011	0.449	0.4075	0.3514	0.5229	0.5511	0.575	0.511	0.6678
20108-012	0.3813	0.3125	0.586	0.6163	0.5956	0.3571	0.4111	0.682
20108-013	0.4562	0.4367	0.5425	0.4888	0.5325	0.6333	0.79	0.7262
20108-014	0.4467	0.5525	0.6571	0.55	0.5389	0.6637	0.6243	0.9014
20108-015	0.4778	0.555	0.4625	0.656	0.4729	0.4333	0.5037	0.7

Hyalella 28-d Survival and Growth Sediment Test **EnviroSystems, Inc.**

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-003	1	0.6	1	0.6	0.7	0.9	0.8	1
20108-004	0.9	0.8	1	0.5	1	0.9	0.8	0.8
20108-005	0.6	1	0.3	0.5	0.8	0.9	0.8	0.8
20108-006	1	0.8	0.9	0.9	0.6	0.9	1	0.8
20108-007	0.8	0.6	0.4	1	0.8	0.9	0.9	0.7
20108-008	1	0.8	0.9	0.8	0.8	0.8	1	0.9
20108-009	0.4	0.9	0.7	0.5	0.9	0.8	0.9	0.8
20108-010	0.8	0.5	0.9	0.8	1	0.8	0.5	1
20108-011	1	0.8	0.7	0.7	0.9	0.8	1	0.9
20108-012	0.8	0.8	1	0.8	0.9	0.7	0.9	1
20108-013	0.8	0.6	0.8	0.8	0.8	0.9	0.8	0.8
20108-014	0.9	0.8	0.7	0.8	0.9	0.8	0.7	0.7
20108-015	0.9	1	0.8	0.5	0.7	0.9	0.8	0.9

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-5564-4485	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					16.9%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-015	-0.1228	1.761	0.178	0.5480	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.835	2.586	0.8706	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0006165208	0.0006165208	1	0.01509	0.9040	Non-Significant Effect
Error	0.5721508	0.04086791	14			
Total	0.5727673	0.04148443	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.204	8.885	0.8129	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9472		0.4464	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-015	8	0.8125	0.7534	0.8716	0.5	1	0.02883	0.1553	19.11%	-1.56%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-015	8	1.144	1.07	1.217	0.7854	1.412	0.03576	0.1926	16.84%	-1.1%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-015	0.9	1	0.8	0.5	0.7	0.9	0.8	0.9

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-5166-9961	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					13.34%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-014	0.3847	1.761	0.1475	0.3531	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.735	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.004149898	0.004149898	1	0.148	0.7063	Non-Significant Effect
Error	0.3926595	0.02804711	14			
Total	0.3968094	0.03219701	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.901	8.885	0.0931	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9446		0.4098	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-014	8	0.7875	0.7558	0.8192	0.7	0.9	0.0155	0.08345	10.6%	1.56%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-014	8	1.099	1.058	1.14	0.9912	1.249	0.01987	0.107	9.73%	2.85%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-014	0.9	0.8	0.7	0.8	0.9	0.8	0.7	0.7

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-1406-2162	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					13.08%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-013	0.4133	1.761	0.1452	0.3428	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.762	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.004646844	0.004646844	1	0.1709	0.6856	Non-Significant Effect
Error	0.3807662	0.02719759	14			
Total	0.3854131	0.03184443	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.581	8.885	0.0625	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9105		0.1187	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-013	8	0.7875	0.7558	0.8192	0.6	0.9	0.0155	0.08345	10.6%	1.56%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-013	8	1.097	1.06	1.135	0.8861	1.249	0.01833	0.09872	9.0%	3.01%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-013	0.8	0.6	0.8	0.8	0.8	0.9	0.8	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-5073-5692	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					15.08%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-012	-0.7914	1.761	0.1625	0.7790	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.575	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02131894	0.02131894	1	0.6263	0.4419	Non-Significant Effect
Error	0.4765839	0.03404171	14			
Total	0.4979029	0.05536065	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.905	8.885	0.4144	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9315		0.2575	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-012	8	0.8625	0.8222	0.9028	0.7	1	0.0197	0.1061	12.3%	-7.81%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-012	8	1.204	1.146	1.263	0.9912	1.412	0.02843	0.1531	12.71%	-6.45%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-012	0.8	0.8	1	0.8	0.9	0.7	0.9	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	01-6014-3781	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					15.75%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-011	-0.6125	1.761	0.1682	0.7250	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.521	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01369181	0.01369181	1	0.3752	0.5500	Non-Significant Effect
Error	0.5109034	0.0364931	14			
Total	0.5245952	0.05018491	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.576	8.885	0.5632	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9229		0.1878	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-011	8	0.85	0.8045	0.8955	0.7	1	0.02219	0.1195	14.06%	-6.25%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-011	8	1.19	1.126	1.254	0.9912	1.412	0.03126	0.1683	14.15%	-5.17%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-011	1	0.8	0.7	0.7	0.9	0.8	1	0.9

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-8436-2514	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					19.55%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-010	0.09384	1.761	0.2003	0.4633	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.526	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0004554574	0.0004554574	1	0.008805	0.9266	Non-Significant Effect
Error	0.7241507	0.05172505	14			
Total	0.7246062	0.05218051	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.317	8.885	0.7256	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9089		0.1117	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-010	8	0.7875	0.713	0.862	0.5	1	0.03639	0.1959	24.88%	1.56%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-010	8	1.121	1.028	1.213	0.7854	1.412	0.04503	0.2425	21.64%	0.94%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-010	0.8	0.5	0.9	0.8	1	0.8	0.5	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-7093-0613	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					18.2%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-009	0.7316	1.761	0.189	0.2383	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.776	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02464724	0.02464724	1	0.5352	0.4765	Non-Significant Effect
Error	0.6447743	0.04605531	14			
Total	0.6694215	0.07070255	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.063	8.885	0.9378	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9392		0.3394	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-009	8	0.7375	0.6644	0.8106	0.4	0.9	0.0357	0.1923	26.07%	7.81%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-009	8	1.053	0.97	1.136	0.6847	1.249	0.04046	0.2179	20.69%	6.94%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-009	0.4	0.9	0.7	0.5	0.9	0.8	0.9	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-4235-5500	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					14.38%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-008	-0.9956	1.761	0.1564	0.8318	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.635	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03128299	0.03128299	1	0.9913	0.3363	Non-Significant Effect
Error	0.4418269	0.03155906	14			
Total	0.4731099	0.06284206	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.417	8.885	0.2670	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9265		0.2148	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-008	8	0.875	0.8413	0.9087	0.8	1	0.01646	0.08864	10.13%	-9.38%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-008	8	1.22	1.168	1.271	1.107	1.419	0.02524	0.1359	11.14%	-7.82%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-008	1	0.8	0.9	0.8	0.8	0.8	1	0.9

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-7505-9879	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					18.86%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-007	0.4124	1.761	0.1945	0.3431	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.88	2.586	0.7668	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.008295943	0.008295943	1	0.1701	0.6863	Non-Significant Effect
Error	0.6828817	0.04877726	14			
Total	0.6911776	0.0570732	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.185	8.885	0.8286	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9668		0.7843	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-007	8	0.7625	0.6894	0.8356	0.4	1	0.0357	0.1923	25.21%	4.69%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-007	8	1.086	0.9983	1.173	0.6847	1.412	0.04271	0.23	21.18%	4.03%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-007	0.8	0.6	0.4	1	0.8	0.9	0.9	0.7

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-1361-1848	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					16.02%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-006	-0.8017	1.761	0.1705	0.7819	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.726	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02409153	0.02409153	1	0.6427	0.4361	Non-Significant Effect
Error	0.524811	0.0374865	14			
Total	0.5489025	0.06157803	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.472	8.885	0.6224	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9574		0.6158	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-006	8	0.8625	0.813	0.912	0.6	1	0.02419	0.1302	15.1%	-7.81%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-006	8	1.209	1.143	1.275	0.8861	1.412	0.03234	0.1741	14.4%	-6.86%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-006	1	0.8	0.9	0.9	0.6	0.9	1	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-7031-4423	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					20.9%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-005	0.8504	1.761	0.2115	0.2047	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.937	2.586	0.6474	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04172452	0.04172452	1	0.7232	0.4094	Non-Significant Effect
Error	0.8076786	0.05769133	14			
Total	0.8494031	0.09941585	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.584	8.885	0.5586	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9677		0.7994	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-005	8	0.7125	0.6252	0.7998	0.3	1	0.04262	0.2295	32.21%	10.94%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-005	8	1.029	0.928	1.13	0.5796	1.412	0.04939	0.266	25.84%	9.03%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-005	0.6	1	0.3	0.5	0.8	0.9	0.8	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-8312-3723	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					17.43%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-004	-0.4563	1.761	0.1825	0.6724	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.964	2.586	0.5974	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.008943571	0.008943571	1	0.2082	0.6552	Non-Significant Effect
Error	0.6013573	0.04295409	14			
Total	0.6103008	0.05189767	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.082	8.885	0.9197	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9526		0.5327	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-004	8	0.8375	0.7767	0.8983	0.5	1	0.02967	0.1598	19.08%	-4.69%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-004	8	1.179	1.101	1.256	0.7854	1.412	0.03772	0.2031	17.23%	-4.18%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-004	0.9	0.8	1	0.5	1	0.9	0.8	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-9840-7800	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:07	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					19.01%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-003	-0.3429	1.761	0.1957	0.6316	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.32	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005809008	0.005809008	1	0.1176	0.7368	Non-Significant Effect
Error	0.6916632	0.04940451	14			
Total	0.6974722	0.05521352	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.213	8.885	0.8054	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8877		0.0513	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	0.0%
20108-003	8	0.825	0.7583	0.8917	0.6	1	0.03254	0.1753	21.24%	-3.13%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.0%
20108-003	8	1.169	1.081	1.258	0.8861	1.412	0.04322	0.2327	19.9%	-3.37%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1
20108-003	1	0.6	1	0.6	0.7	0.9	0.8	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-1417-6597	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					19.74%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-015	-0.3253	1.761	0.1985	0.6251	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.94	2.586	0.6422	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005373978	0.005373978	1	0.1058	0.7498	Non-Significant Effect
Error	0.7110015	0.05078582	14			
Total	0.7163754	0.05615979	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.739	8.885	0.4827	Equal Variances
Distribution	Shapiro-Wilk Normality	0.957		0.6082	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-015	8	0.8125	0.7534	0.8716	0.5	1	0.02883	0.1553	19.11%	-4.84%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-015	8	1.144	1.07	1.217	0.7854	1.412	0.03576	0.1926	16.84%	-3.31%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-015	0.9	1	0.8	0.5	0.7	0.9	0.8	0.9

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-0650-5335	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					16.4%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-014	0.08182	1.761	0.1716	0.4680	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.244	2.586	0.2295	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0002541511	0.0002541511	1	0.006694	0.9359	Non-Significant Effect
Error	0.5315102	0.03796501	14			
Total	0.5317643	0.03821917	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	5.634	8.885	0.0363	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9487		0.4694	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-014	8	0.7875	0.7558	0.8192	0.7	0.9	0.0155	0.08345	10.6%	-1.61%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-014	8	1.099	1.058	1.14	0.9912	1.249	0.01987	0.107	9.73%	0.72%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-014	0.9	0.8	0.7	0.8	0.9	0.8	0.7	0.7

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-9833-8637	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					16.17%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-013	0.1022	1.761	0.1697	0.4600	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.269	2.586	0.2079	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0003877032	0.0003877032	1	0.01045	0.9200	Non-Significant Effect
Error	0.5196169	0.03711549	14			
Total	0.5200046	0.03750319	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	6.616	8.885	0.0234	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9121		0.1258	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-013	8	0.7875	0.7558	0.8192	0.6	0.9	0.0155	0.08345	10.6%	-1.61%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-013	8	1.097	1.06	1.135	0.8861	1.249	0.01833	0.09872	9.0%	0.89%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-013	0.8	0.6	0.8	0.8	0.8	0.9	0.8	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-7228-0857	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					18.02%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-012	-0.9276	1.761	0.1846	0.8153	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.085	2.586	0.4049	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03782544	0.03782544	1	0.8605	0.3693	Non-Significant Effect
Error	0.6154346	0.04395961	14			
Total	0.6532601	0.08178505	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.752	8.885	0.2051	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9651		0.7535	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-012	8	0.8625	0.8222	0.9028	0.7	1	0.0197	0.1061	12.3%	-11.29%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-012	8	1.204	1.146	1.263	0.9912	1.412	0.02843	0.1531	12.71%	-8.78%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-012	0.8	0.8	1	0.8	0.9	0.7	0.9	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-8019-5487	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					18.65%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-011	-0.7682	1.761	0.1897	0.7724	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.029	2.586	0.4864	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02738681	0.02738681	1	0.5901	0.4551	Non-Significant Effect
Error	0.649754	0.046411	14			
Total	0.6771408	0.07379781	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.276	8.885	0.3002	Equal Variances
Distribution	Shapiro-Wilk Normality	0.966		0.7696	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-011	8	0.85	0.8045	0.8955	0.7	1	0.02219	0.1195	14.06%	-9.68%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-011	8	1.19	1.126	1.254	0.9912	1.412	0.03126	0.1683	14.15%	-7.47%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-011	1	0.8	0.7	0.7	0.9	0.8	1	0.9

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-9137-0801	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					22.28%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-010	-0.1093	1.761	0.2186	0.5427	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.761	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.00073637	0.00073637	1	0.01195	0.9145	Non-Significant Effect
Error	0.8630014	0.06164296	14			
Total	0.8637378	0.06237933	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.097	8.885	0.9063	Equal Variances
Distribution	Shapiro-Wilk Normality	0.922		0.1814	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-010	8	0.7875	0.713	0.862	0.5	1	0.03639	0.1959	24.88%	-1.61%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-010	8	1.121	1.028	1.213	0.7854	1.412	0.04503	0.2425	21.64%	-1.23%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-010	0.8	0.5	0.9	0.8	1	0.8	0.5	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-1037-5933	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					20.98%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-009	0.4587	1.761	0.2084	0.3268	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.848	2.586	0.8393	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0117759	0.0117759	1	0.2104	0.6535	Non-Significant Effect
Error	0.7836249	0.05597321	14			
Total	0.7954009	0.06774911	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.359	8.885	0.6961	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9453		0.4194	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-009	8	0.7375	0.6644	0.8106	0.4	0.9	0.0357	0.1923	26.07%	4.84%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-009	8	1.053	0.97	1.136	0.6847	1.249	0.04046	0.2179	20.69%	4.9%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-009	0.4	0.9	0.7	0.5	0.9	0.8	0.9	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-6825-7928	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					17.36%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-008	-1.106	1.761	0.1794	0.8564	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.147	2.586	0.3276	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.05078153	0.05078153	1	1.224	0.2872	Non-Significant Effect
Error	0.5806775	0.04147696	14			
Total	0.6314591	0.0922585	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.491	8.885	0.1211	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9502		0.4930	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-008	8	0.875	0.8413	0.9087	0.8	1	0.01646	0.08864	10.13%	-12.9%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-008	8	1.22	1.168	1.271	1.107	1.419	0.02524	0.1359	11.14%	-10.18%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-008	1	0.8	0.9	0.8	0.8	0.8	1	0.9

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-4618-4890	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					21.61%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-007	0.1759	1.761	0.2134	0.4315	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.805	2.586	0.9462	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.001815142	0.001815142	1	0.03092	0.8629	Non-Significant Effect
Error	0.8217323	0.05869516	14			
Total	0.8235474	0.0605103	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.219	8.885	0.8007	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9469		0.4418	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-007	8	0.7625	0.6894	0.8356	0.4	1	0.0357	0.1923	25.21%	1.61%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-007	8	1.086	0.9983	1.173	0.6847	1.412	0.04271	0.23	21.18%	1.92%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-007	0.8	0.6	0.4	1	0.8	0.9	0.9	0.7

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-8125-3181	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					18.9%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-006	-0.9355	1.761	0.1917	0.8173	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.008	2.586	0.5207	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04149045	0.04149045	1	0.8752	0.3654	Non-Significant Effect
Error	0.6636617	0.0474044	14			
Total	0.7051521	0.08889486	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.127	8.885	0.3408	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9632		0.7209	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-006	8	0.8625	0.813	0.912	0.6	1	0.02419	0.1302	15.1%	-11.29%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-006	8	1.209	1.143	1.275	0.8861	1.412	0.03234	0.1741	14.4%	-9.2%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-006	1	0.8	0.9	0.9	0.6	0.9	1	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-4222-1243	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					23.59%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-005	0.5991	1.761	0.229	0.2793	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.79	2.586	0.9853	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02426997	0.02426997	1	0.359	0.5586	Non-Significant Effect
Error	0.9465293	0.06760924	14			
Total	0.9707993	0.0918792	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.097	8.885	0.9060	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9602		0.6646	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-005	8	0.7125	0.6252	0.7998	0.3	1	0.04262	0.2295	32.21%	8.07%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-005	8	1.029	0.928	1.13	0.5796	1.412	0.04939	0.266	25.84%	7.04%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-005	0.6	1	0.3	0.5	0.8	0.9	0.8	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-8592-3738	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					20.25%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-004	-0.6221	1.761	0.2025	0.7281	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.901	2.586	0.7202	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02046274	0.02046274	1	0.387	0.5439	Non-Significant Effect
Error	0.740208	0.052872	14			
Total	0.7606707	0.07333474	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.563	8.885	0.5702	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9467		0.4389	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-004	8	0.8375	0.7767	0.8983	0.5	1	0.02967	0.1598	19.08%	-8.07%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-004	8	1.179	1.101	1.256	0.7854	1.412	0.03772	0.2031	17.23%	-6.46%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-004	0.9	0.8	1	0.5	1	0.9	0.8	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-1561-1118	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					21.76%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-003	-0.512	1.761	0.2145	0.6917	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.795	2.586	0.9710	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0155487	0.0155487	1	0.2621	0.6167	Non-Significant Effect
Error	0.8305138	0.05932242	14			
Total	0.8460625	0.07487112	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.191	8.885	0.8238	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9383		0.3288	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-003	8	0.825	0.7583	0.8917	0.6	1	0.03254	0.1753	21.24%	-6.45%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-003	8	1.169	1.081	1.258	0.8861	1.412	0.04322	0.2327	19.9%	-5.63%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-003	1	0.6	1	0.6	0.7	0.9	0.8	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-4368-9791	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					20.65%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-002	-0.2075	1.761	0.2057	0.5807	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.872	2.586	0.7848	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.002350076	0.002350076	1	0.04307	0.8386	Non-Significant Effect
Error	0.7639354	0.05456682	14			
Total	0.7662855	0.05691689	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.444	8.885	0.6398	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9425		0.3812	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	0.0%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	-3.23%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	0.0%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	-2.19%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-0018-3143	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:06	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					14.4%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-015	-0.1163	1.761	0.1477	0.5455	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.212	2.586	0.2591	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.000380598	0.000380598	1	0.01353	0.9091	Non-Significant Effect
Error	0.3938293	0.02813067	14			
Total	0.39421	0.02851127	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.934	8.885	0.4037	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9392		0.3395	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-015	8	0.8125	0.7534	0.8716	0.5	1	0.02883	0.1553	19.11%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-015	8	1.144	1.07	1.217	0.7854	1.412	0.03576	0.1926	16.84%	-0.86%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-015	0.9	1	0.8	0.5	0.7	0.9	0.8	0.9

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-6408-9816	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					10.08%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-014	0.5636	1.761	0.109	0.2910	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.326	2.586	0.1660	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.004863754	0.004863754	1	0.3177	0.5819	Non-Significant Effect
Error	0.2143381	0.01530986	14			
Total	0.2192018	0.02017362	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.675	8.885	0.5123	Equal Variances
Distribution	Shapiro-Wilk Normality	0.902		0.0865	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-014	8	0.7875	0.7558	0.8192	0.7	0.9	0.0155	0.08345	10.6%	3.08%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-014	8	1.099	1.058	1.14	0.9912	1.249	0.01987	0.107	9.73%	3.08%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-014	0.9	0.8	0.7	0.8	0.9	0.8	0.7	0.7

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-5018-9086	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					9.75%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-013	0.6111	1.761	0.1059	0.2755	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.393	2.586	0.1249	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005400586	0.005400586	1	0.3735	0.5509	Non-Significant Effect
Error	0.2024448	0.01446034	14			
Total	0.2078454	0.01986093	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.967	8.885	0.3919	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9031		0.0900	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-013	8	0.7875	0.7558	0.8192	0.6	0.9	0.0155	0.08345	10.6%	3.08%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-013	8	1.097	1.06	1.135	0.8861	1.249	0.01833	0.09872	9.0%	3.24%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-013	0.8	0.6	0.8	0.8	0.8	0.9	0.8	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-0264-7946	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					12.24%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-012	-0.9639	1.761	0.1285	0.8243	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.972	2.586	0.5834	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01979344	0.01979344	1	0.9291	0.3515	Non-Significant Effect
Error	0.2982625	0.02130446	14			
Total	0.3180559	0.0410979	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.222	8.885	0.7980	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9345		0.2871	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-012	8	0.8625	0.8222	0.9028	0.7	1	0.0197	0.1061	12.3%	-6.15%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-012	8	1.204	1.146	1.263	0.9912	1.412	0.02843	0.1531	12.71%	-6.2%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-012	0.8	0.8	1	0.8	0.9	0.7	0.9	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-4097-3086	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					13.05%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-011	-0.7247	1.761	0.1357	0.7597	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.867	2.586	0.7950	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0124749	0.0124749	1	0.5251	0.4806	Non-Significant Effect
Error	0.3325819	0.02375585	14			
Total	0.3450568	0.03623076	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.478	8.885	0.6191	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9305		0.2480	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-011	8	0.85	0.8045	0.8955	0.7	1	0.02219	0.1195	14.06%	-4.62%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-011	8	1.19	1.126	1.254	0.9912	1.412	0.03126	0.1683	14.15%	-4.93%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-011	1	0.8	0.7	0.7	0.9	0.8	1	0.9

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-1706-2671	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					17.39%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-010	0.135	1.761	0.1739	0.4473	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.758	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0007108816	0.0007108816	1	0.01823	0.8945	Non-Significant Effect
Error	0.5458293	0.0389878	14			
Total	0.5465402	0.03969869	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.067	8.885	0.1624	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9096		0.1145	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-010	8	0.7875	0.713	0.862	0.5	1	0.03639	0.1959	24.88%	3.08%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-010	8	1.121	1.028	1.213	0.7854	1.412	0.04503	0.2425	21.64%	1.18%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-010	0.8	0.5	0.9	0.8	1	0.8	0.5	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-7618-1169	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					15.88%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-009	0.8892	1.761	0.1607	0.1944	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.088	2.586	0.4018	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02634626	0.02634626	1	0.7908	0.3889	Non-Significant Effect
Error	0.4664528	0.03331806	14			
Total	0.4927991	0.05966432	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.475	8.885	0.2548	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9595		0.6528	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-009	8	0.7375	0.6644	0.8106	0.4	0.9	0.0357	0.1923	26.07%	9.23%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-009	8	1.053	0.97	1.136	0.6847	1.249	0.04046	0.2179	20.69%	7.16%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-009	0.4	0.9	0.7	0.5	0.9	0.8	0.9	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-0705-0572	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					11.39%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-008	-1.25	1.761	0.1208	0.8842	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.098	2.586	0.3883	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02942908	0.02942908	1	1.564	0.2316	Non-Significant Effect
Error	0.2635054	0.01882182	14			
Total	0.2929345	0.0482509	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.038	8.885	0.9618	Equal Variances
Distribution	Shapiro-Wilk Normality	0.879		0.0374	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-008	8	0.875	0.8413	0.9087	0.8	1	0.01646	0.08864	10.13%	-7.69%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-008	8	1.22	1.168	1.271	1.107	1.419	0.02524	0.1359	11.14%	-7.56%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-008	1	0.8	0.9	0.8	0.8	0.8	1	0.9

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-5631-6020	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					16.62%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-007	0.5078	1.761	0.1672	0.3097	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.187	2.586	0.2838	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.009293535	0.009293535	1	0.2579	0.6195	Non-Significant Effect
Error	0.5045602	0.03604002	14			
Total	0.5138537	0.04533355	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.759	8.885	0.2040	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9697		0.8345	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-007	8	0.7625	0.6894	0.8356	0.4	1	0.0357	0.1923	25.21%	6.15%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-007	8	1.086	0.9983	1.173	0.6847	1.412	0.04271	0.23	21.18%	4.25%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-007	0.8	0.6	0.4	1	0.8	0.9	0.9	0.7

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-2918-2865	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					13.36%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-006	-0.9528	1.761	0.1385	0.8216	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.124	2.586	0.3543	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02246808	0.02246808	1	0.9078	0.3569	Non-Significant Effect
Error	0.3464895	0.02474925	14			
Total	0.3689576	0.04721733	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.581	8.885	0.5601	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9644		0.7411	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-006	8	0.8625	0.813	0.912	0.6	1	0.02419	0.1302	15.1%	-6.15%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-006	8	1.209	1.143	1.275	0.8861	1.412	0.03234	0.1741	14.4%	-6.61%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-006	1	0.8	0.9	0.9	0.6	0.9	1	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-1291-8030	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					18.88%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-005	0.9885	1.761	0.1867	0.1698	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.195	2.586	0.2757	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04392659	0.04392659	1	0.9771	0.3397	Non-Significant Effect
Error	0.6293572	0.04495409	14			
Total	0.6732838	0.08888068	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.689	8.885	0.1064	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9736		0.8929	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-005	8	0.7125	0.6252	0.7998	0.3	1	0.04262	0.2295	32.21%	12.31%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-005	8	1.029	0.928	1.13	0.5796	1.412	0.04939	0.266	25.84%	9.24%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-005	0.6	1	0.3	0.5	0.8	0.9	0.8	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-5580-2839	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					15.01%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-004	-0.5134	1.761	0.1531	0.6922	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.342	2.586	0.1556	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.00796548	0.00796548	1	0.2636	0.6157	Non-Significant Effect
Error	0.4230359	0.03021685	14			
Total	0.4310013	0.03818233	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.152	8.885	0.3335	Equal Variances
Distribution	Shapiro-Wilk Normality	0.935		0.2925	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-004	8	0.8375	0.7767	0.8983	0.5	1	0.02967	0.1598	19.08%	-3.08%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-004	8	1.179	1.101	1.256	0.7854	1.412	0.03772	0.2031	17.23%	-3.94%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-004	0.9	0.8	1	0.5	1	0.9	0.8	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-2168-7642	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					16.79%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-003	-0.3702	1.761	0.1686	0.6416	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.532	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005026233	0.005026233	1	0.1371	0.7167	Non-Significant Effect
Error	0.5133417	0.03666727	14			
Total	0.5183679	0.0416935	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.825	8.885	0.1941	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9255		0.2069	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-003	8	0.825	0.7583	0.8917	0.6	1	0.03254	0.1753	21.24%	-1.54%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-003	8	1.169	1.081	1.258	0.8861	1.412	0.04322	0.2327	19.9%	-3.13%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-003	1	0.6	1	0.6	0.7	0.9	0.8	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-7043-3028	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					15.49%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-002	0.02979	1.761	0.1573	0.4883	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.626	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	2.831214E-05	2.831214E-05	1	0.0008872	0.9767	Non-Significant Effect
Error	0.4467633	0.03191167	14			
Total	0.4467916	0.03193998	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.329	8.885	0.2872	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8966		0.0710	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-002	8	0.8	0.739	0.861	0.6	1	0.02978	0.1604	20.04%	1.54%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-002	8	1.131	1.051	1.212	0.8861	1.412	0.03924	0.2113	18.68%	0.23%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-002	0.8	0.9	0.6	0.8	1	0.7	0.6	1

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-9992-2740	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:05	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					18.12%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-001	0.263	1.761	0.1801	0.3982	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.138	2.586	0.3383	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.002894279	0.002894279	1	0.06919	0.7963	Non-Significant Effect
Error	0.585614	0.04182957	14			
Total	0.5885082	0.04472385	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.363	8.885	0.1320	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9441		0.4019	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.8125	0.7748	0.8502	0.7	1	0.0184	0.0991	12.2%	0.0%
20108-001	8	0.775	0.6969	0.8531	0.4	1	0.03812	0.2053	26.49%	4.62%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.134	1.081	1.187	0.9912	1.412	0.02571	0.1385	12.21%	0.0%
20108-001	8	1.107	1.011	1.204	0.6847	1.419	0.04716	0.2539	22.94%	2.37%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	1	0.8	0.7	0.9	0.8	0.8	0.7	0.8
20108-001	1	0.4	0.7	1	0.6	0.9	0.8	0.8

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-2457-0397	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.94%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-015	-0.5455	1.761	0.09051	0.7030	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.91	2.586	0.7026	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.003142746	0.003142746	1	0.2975	0.5940	Non-Significant Effect
Error	0.1478779	0.01056271	14			
Total	0.1510207	0.01370546	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.243	8.885	0.7814	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9394		0.3421	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-015	8	0.5327	0.4957	0.5696	0.4333	0.7	0.01802	0.09705	18.22%	-5.56%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-015	0.4778	0.555	0.4625	0.656	0.4729	0.4333	0.5037	0.7

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-6772-8560	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					21.4%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-014	-1.83	1.761	0.108	0.9557	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.403	2.586	0.1199	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.05036493	0.05036493	1	3.35	0.0886	Non-Significant Effect
Error	0.2104643	0.01503316	14			
Total	0.2608292	0.0653981	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.568	8.885	0.5673	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9561		0.5923	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-014	8	0.6168	0.5653	0.6684	0.4467	0.9014	0.02516	0.1355	21.97%	-22.24%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-014	0.4467	0.5525	0.6571	0.55	0.5389	0.6637	0.6243	0.9014

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-2866-3749	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					20.75%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-013	-1.197	1.761	0.1047	0.8744	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.865	2.586	0.8007	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02025445	0.02025445	1	1.432	0.2513	Non-Significant Effect
Error	0.1979906	0.01414219	14			
Total	0.2182451	0.03439663	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.416	8.885	0.6578	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9636		0.7274	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-013	8	0.5758	0.5268	0.6248	0.4367	0.79	0.02391	0.1288	22.36%	-14.1%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-013	0.4562	0.4367	0.5425	0.4888	0.5325	0.6333	0.79	0.7262

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-1866-9594	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					21.99%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-012	0.1888	1.761	0.111	0.4265	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.558	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0005660316	0.0005660316	1	0.03565	0.8529	Non-Significant Effect
Error	0.2222596	0.01587568	14			
Total	0.2228256	0.01644172	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.712	8.885	0.4949	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9315		0.2577	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-012	8	0.4927	0.4389	0.5466	0.3125	0.682	0.02629	0.1416	28.73%	2.36%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-012	0.3813	0.3125	0.586	0.6163	0.5956	0.3571	0.4111	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-5968-5270	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					18.19%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-011	0.003125	1.761	0.09178	0.4988	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.883	2.586	0.7588	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.060479E-07	1.060479E-07	1	9.764E-06	0.9976	Non-Significant Effect
Error	0.1520537	0.01086098	14			
Total	0.1520538	0.01086108	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.169	8.885	0.8421	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9815		0.9744	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-011	8	0.5045	0.4664	0.5425	0.3514	0.6678	0.01858	0.1001	19.84%	0.03%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-011	0.449	0.4075	0.3514	0.5229	0.5511	0.575	0.511	0.6678

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-8874-5447	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					20.22%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-010	-0.8816	1.761	0.102	0.8036	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.694	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01042944	0.01042944	1	0.7772	0.3929	Non-Significant Effect
Error	0.1878756	0.01341968	14			
Total	0.198305	0.02384912	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.293	8.885	0.7436	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9116		0.1235	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-010	8	0.5557	0.5089	0.6025	0.434	0.716	0.02284	0.123	22.14%	-10.12%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-010	0.4725	0.48	0.5022	0.4513	0.434	0.7075	0.716	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	01-2941-1336	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					30.51%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-009	-2.639	1.761	0.154	0.9903	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.728	2.586	0.0225	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2128464	0.2128464	1	6.964	0.0194	Significant Effect
Error	0.4278771	0.03056265	14			
Total	0.6407235	0.243409	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.221	8.885	0.0768	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8919		0.0597	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-009	8	0.7353	0.6507	0.8199	0.54	1.196	0.04128	0.2223	30.23%	-45.71%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-009	0.615	0.5767	0.54	1.196	0.7389	0.7013	0.5933	0.9212

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-0024-4775	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					21.69%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-009	-2.668	1.771	0.1094	0.9903	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1014701	0.1014701	1	7.118	0.0193	Significant Effect
Error	0.1853113	0.01425472	13			
Total	0.2867814	0.1157248	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.471	9.155	0.6214	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9714		0.8776	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-009	7	0.6695	0.6196	0.7194	0.54	0.9212	0.02437	0.1313	19.6%	-32.67%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-009	0.615	0.5767	0.54	Outlier	0.7389	0.7013	0.5933	0.9212

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-8632-0153	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					19.33%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-008	-3.129	1.761	0.09752	0.9963	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.772	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1200251	0.1200251	1	9.788	0.0074	Significant Effect
Error	0.1716825	0.01226303	14			
Total	0.2917076	0.1322881	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.095	8.885	0.9078	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9462		0.4320	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-008	8	0.6778	0.6348	0.7209	0.5082	0.8333	0.02102	0.1132	16.7%	-34.33%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-008	0.5082	0.6462	0.82	0.7113	0.6875	0.6563	0.56	0.8333

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	01-5312-1135	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					20.76%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-007	-3.231	1.761	0.1047	0.9970	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.683	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.147623	0.147623	1	10.44	0.0060	Significant Effect
Error	0.1980153	0.01414395	14			
Total	0.3456383	0.1617669	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.416	8.885	0.6576	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9408		0.3587	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-007	8	0.6967	0.6478	0.7457	0.5033	0.8814	0.02391	0.1288	18.48%	-38.07%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-007	0.5212	0.7683	0.77	0.677	0.7025	0.5033	0.75	0.8814

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-3456-7475	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					24.17%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-006	-0.8172	1.761	0.122	0.7862	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.934	2.586	0.6540	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01281114	0.01281114	1	0.6678	0.4275	Non-Significant Effect
Error	0.2685746	0.0191839	14			
Total	0.2813857	0.03199504	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.277	8.885	0.2998	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9576		0.6179	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-006	8	0.5612	0.4991	0.6233	0.365	0.82	0.03032	0.1633	29.09%	-11.21%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-006	0.466	0.5175	0.5244	0.6078	0.415	0.82	0.774	0.365

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-1251-1661	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					34.69%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-005	-2.567	1.761	0.1751	0.9888	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.417	2.586	0.1125	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2604463	0.2604463	1	6.59	0.0224	Significant Effect
Error	0.5533208	0.03952291	14			
Total	0.8137671	0.2999693	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	5.752	8.885	0.0344	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9309		0.2520	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-005	8	0.7598	0.6611	0.8585	0.4567	1.224	0.04819	0.2595	34.15%	-50.57%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-005	0.6317	0.651	1.08	1.224	0.66	0.4567	0.7675	0.6075

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-5112-4152	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:04	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					25.76%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-004	-2.383	1.761	0.13	0.9841	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.352	2.586	0.1487	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1237613	0.1237613	1	5.679	0.0319	Significant Effect
Error	0.3051065	0.02179332	14			
Total	0.4288678	0.1455546	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.723	8.885	0.2097	Equal Variances
Distribution	Shapiro-Wilk Normality	0.966		0.7713	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-004	8	0.6805	0.6126	0.7484	0.4456	1.016	0.03316	0.1785	26.24%	-34.86%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-004	0.5611	0.7313	0.765	1.016	0.509	0.4456	0.7237	0.6925

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-0409-0461	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					22.83%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-003	-2.775	1.761	0.1152	0.9925	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.781	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1316966	0.1316966	1	7.698	0.0149	Significant Effect
Error	0.239503	0.01710736	14			
Total	0.3711995	0.1488039	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.923	8.885	0.4080	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9363		0.3063	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	0.0%
20108-003	8	0.6861	0.629	0.7431	0.461	0.8683	0.02786	0.15	21.87%	-35.96%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6
20108-003	0.528	0.6367	0.461	0.8683	0.6829	0.6422	0.8275	0.842

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-3044-6584	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					23.95%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-015	0.8491	1.761	0.1442	0.2051	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.515	2.586	0.0715	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01933273	0.01933273	1	0.721	0.4101	Non-Significant Effect
Error	0.3754071	0.02681479	14			
Total	0.3947398	0.04614752	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.694	8.885	0.0587	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9308		0.2514	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-015	8	0.5327	0.4957	0.5696	0.4333	0.7	0.01802	0.09705	18.22%	11.55%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-015	0.4778	0.555	0.4625	0.656	0.4729	0.4333	0.5037	0.7

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-6232-6688	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					25.87%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-014	-0.1658	1.761	0.1558	0.5646	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.328	2.586	0.1644	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0008596009	0.0008596009	1	0.02748	0.8707	Non-Significant Effect
Error	0.4379934	0.03128524	14			
Total	0.438853	0.03214484	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.408	8.885	0.2690	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9332		0.2742	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-014	8	0.6168	0.5653	0.6684	0.4467	0.9014	0.02516	0.1355	21.97%	-2.43%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-014	0.4467	0.5525	0.6571	0.55	0.5389	0.6637	0.6243	0.9014

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-0624-6032	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					25.5%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-013	0.3028	1.761	0.1535	0.3833	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.362	2.586	0.1428	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.002786179	0.002786179	1	0.09167	0.7665	Non-Significant Effect
Error	0.4255198	0.03039427	14			
Total	0.428306	0.03318045	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.667	8.885	0.2189	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9611		0.6819	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-013	8	0.5758	0.5268	0.6248	0.4367	0.79	0.02391	0.1288	22.36%	4.38%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-013	0.4562	0.4367	0.5425	0.4888	0.5325	0.6333	0.79	0.7262

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-1894-9805	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					26.21%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-012	1.221	1.761	0.1579	0.1211	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.297	2.586	0.1862	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04791449	0.04791449	1	1.491	0.2422	Non-Significant Effect
Error	0.4497887	0.03212777	14			
Total	0.4977032	0.08004226	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.206	8.885	0.3185	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9625		0.7072	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-012	8	0.4927	0.4389	0.5466	0.3125	0.682	0.02629	0.1416	28.73%	18.18%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-012	0.3813	0.3125	0.586	0.6163	0.5956	0.3571	0.4111	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-9624-6873	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					24.08%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-011	1.187	1.761	0.145	0.1275	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.501	2.586	0.0764	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03819212	0.03819212	1	1.409	0.2550	Non-Significant Effect
Error	0.3795829	0.02711306	14			
Total	0.417775	0.06530517	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.415	8.885	0.0686	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9475		0.4505	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-011	8	0.5045	0.4664	0.5425	0.3514	0.6678	0.01858	0.1001	19.84%	16.23%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-011	0.449	0.4075	0.3514	0.5229	0.5511	0.575	0.511	0.6678

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	18-1509-5779	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					25.19%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-010	0.5398	1.761	0.1517	0.2989	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.391	2.586	0.1263	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.008644866	0.008644866	1	0.2913	0.5978	Non-Significant Effect
Error	0.4154047	0.02967177	14			
Total	0.4240496	0.03831663	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.922	8.885	0.1805	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9445		0.4077	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-010	8	0.5557	0.5089	0.6025	0.434	0.716	0.02284	0.123	22.14%	7.72%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-010	0.4725	0.48	0.5022	0.4513	0.434	0.7075	0.716	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-5580-6516	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					31.64%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-009	-1.231	1.761	0.1905	0.8806	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.204	2.586	0.2665	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.07088926	0.07088926	1	1.514	0.2388	Non-Significant Effect
Error	0.6554063	0.04681473	14			
Total	0.7262955	0.117704	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.118	8.885	0.8870	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9104		0.1181	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-009	8	0.7353	0.6507	0.8199	0.54	1.196	0.04128	0.2223	30.23%	-22.11%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-009	0.615	0.5767	0.54	1.196	0.7389	0.7013	0.5933	0.9212

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-5238-4514	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					24.7%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-008	-0.8962	1.761	0.1487	0.8074	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.439	2.586	0.1021	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02290501	0.02290501	1	0.8033	0.3853	Non-Significant Effect
Error	0.3992116	0.02851512	14			
Total	0.4221166	0.05142013	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.449	8.885	0.1246	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9542		0.5588	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-008	8	0.6778	0.6348	0.7209	0.5082	0.8333	0.02102	0.1132	16.7%	-12.57%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-008	0.5082	0.6462	0.82	0.7113	0.6875	0.6563	0.56	0.8333

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-6721-8868	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					25.5%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-007	-1.085	1.761	0.1535	0.8518	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.362	2.586	0.1428	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03576447	0.03576447	1	1.177	0.2964	Non-Significant Effect
Error	0.4255445	0.03039603	14			
Total	0.461309	0.06616051	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.666	8.885	0.2190	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9478		0.4556	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-007	8	0.6967	0.6478	0.7457	0.5033	0.8814	0.02391	0.1288	18.48%	-15.7%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-007	0.5212	0.7683	0.77	0.677	0.7025	0.5033	0.75	0.8814

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-6051-2074	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					27.53%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-006	0.4352	1.761	0.1658	0.3350	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.188	2.586	0.2831	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.006710246	0.006710246	1	0.1894	0.6701	Non-Significant Effect
Error	0.4961037	0.03543598	14			
Total	0.502814	0.04214623	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.658	8.885	0.5206	Equal Variances
Distribution	Shapiro-Wilk Normality	0.958		0.6263	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-006	8	0.5612	0.4991	0.6233	0.365	0.82	0.03032	0.1633	29.09%	6.8%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-006	0.466	0.5175	0.5244	0.6078	0.415	0.82	0.774	0.365

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-6752-2024	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					34.54%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-005	-1.335	1.761	0.208	0.8984	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.035	2.586	0.4784	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.09937439	0.09937439	1	1.782	0.2032	Non-Significant Effect
Error	0.7808499	0.05577499	14			
Total	0.8802243	0.1551494	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.523	8.885	0.5925	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9175		0.1535	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-005	8	0.7598	0.6611	0.8585	0.4567	1.224	0.04819	0.2595	34.15%	-26.17%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-005	0.6317	0.651	1.08	1.224	0.66	0.4567	0.7675	0.6075

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-0358-0131	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					28.53%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-004	-0.8033	1.761	0.1718	0.7824	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.111	2.586	0.3708	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02455329	0.02455329	1	0.6454	0.4352	Non-Significant Effect
Error	0.5326356	0.0380454	14			
Total	0.5571889	0.0625987	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.387	8.885	0.6770	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9332		0.2738	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-004	8	0.6805	0.6126	0.7484	0.4456	1.016	0.03316	0.1785	26.24%	-13.01%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-004	0.5611	0.7313	0.765	1.016	0.509	0.4456	0.7237	0.6925

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-8235-1932	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:03	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					26.71%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-003	-0.9187	1.761	0.1608	0.8131	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.255	2.586	0.2202	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02815611	0.02815611	1	0.844	0.3738	Non-Significant Effect
Error	0.4670322	0.03335944	14			
Total	0.4951883	0.06151555	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.964	8.885	0.3930	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9544		0.5625	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-003	8	0.6861	0.629	0.7431	0.461	0.8683	0.02786	0.15	21.87%	-13.93%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-003	0.528	0.6367	0.461	0.8683	0.6829	0.6422	0.8275	0.842

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-5719-1864	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					24.45%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-002	1.167	1.761	0.1473	0.1314	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.463	2.586	0.0915	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03806494	0.03806494	1	1.361	0.2628	Non-Significant Effect
Error	0.3914312	0.02795937	14			
Total	0.4294962	0.06602431	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.776	8.885	0.1007	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9397		0.3449	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	0.0%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	16.2%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	01-8541-5467	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					12.16%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-015	3.826	1.761	0.08799	0.0009	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.734	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1460852	0.1460852	1	14.63	0.0019	Significant Effect
Error	0.139752	0.009982282	14			
Total	0.2858371	0.1560675	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.12	8.885	0.8852	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9218		0.1802	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-015	8	0.5327	0.4957	0.5696	0.4333	0.7	0.01802	0.09705	18.22%	26.4%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-015	0.4778	0.555	0.4625	0.656	0.4729	0.4333	0.5037	0.7

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-6398-2115	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					14.63%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-014	1.779	1.761	0.1059	0.0485	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.45	2.586	0.0968	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04573173	0.04573173	1	3.164	0.0970	Non-Significant Effect
Error	0.2023383	0.01445273	14			
Total	0.24807	0.06018446	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.741	8.885	0.4818	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9435		0.3944	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-014	8	0.6168	0.5653	0.6684	0.4467	0.9014	0.02516	0.1355	21.97%	14.77%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-014	0.4467	0.5525	0.6571	0.55	0.5389	0.6637	0.6243	0.9014

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-2765-0750	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					14.17%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-013	2.541	1.761	0.1026	0.0118	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.904	2.586	0.7145	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.08758818	0.08758818	1	6.458	0.0235	Significant Effect
Error	0.1898646	0.01356176	14			
Total	0.2774528	0.1011499	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.572	8.885	0.5653	Equal Variances
Distribution	Shapiro-Wilk Normality	0.936		0.3029	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-013	8	0.5758	0.5268	0.6248	0.4367	0.79	0.02391	0.1288	22.36%	20.45%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-013	0.4562	0.4367	0.5425	0.4888	0.5325	0.6333	0.79	0.7262

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-2295-5068	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					15.05%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-012	3.736	1.761	0.1089	0.0011	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.584	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2135018	0.2135018	1	13.96	0.0022	Significant Effect
Error	0.2141336	0.01529526	14			
Total	0.4276354	0.228797	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.901	8.885	0.4161	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9208		0.1736	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-012	8	0.4927	0.4389	0.5466	0.3125	0.682	0.02629	0.1416	28.73%	31.92%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-012	0.3813	0.3125	0.586	0.6163	0.5956	0.3571	0.4111	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-0268-6093	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					12.34%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-011	4.326	1.761	0.08929	0.0003	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.667	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1923671	0.1923671	1	18.71	0.0007	Significant Effect
Error	0.1439277	0.01028055	14			
Total	0.3362948	0.2026477	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.053	8.885	0.9473	Equal Variances
Distribution	Shapiro-Wilk Normality	0.967		0.7878	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-011	8	0.5045	0.4664	0.5425	0.3514	0.6678	0.01858	0.1001	19.84%	30.3%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-011	0.449	0.4075	0.3514	0.5229	0.5511	0.575	0.511	0.6678

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-2735-7808	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					13.79%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-010	2.967	1.761	0.09979	0.0051	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.464	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1129945	0.1129945	1	8.801	0.0102	Significant Effect
Error	0.1797496	0.01283926	14			
Total	0.2927441	0.1258337	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.435	8.885	0.6457	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8755		0.0331	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-010	8	0.5557	0.5089	0.6025	0.434	0.716	0.02284	0.123	22.14%	23.22%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-010	0.4725	0.48	0.5022	0.4513	0.434	0.7075	0.716	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-7776-2363	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					21.07%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-009	-0.1333	1.761	0.1525	0.5521	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.754	2.586	0.0191	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0005327617	0.0005327617	1	0.01777	0.8959	Non-Significant Effect
Error	0.4197511	0.02998222	14			
Total	0.4202839	0.03051499	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.686	8.885	0.0590	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8826		0.0426	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-009	8	0.7353	0.6507	0.8199	0.54	1.196	0.04128	0.2223	30.23%	-1.6%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-009	0.615	0.5767	0.54	1.196	0.7389	0.7013	0.5933	0.9212

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-5127-2092	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					14.78%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-009	0.8982	1.771	0.107	0.1927	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01099698	0.01099698	1	0.8068	0.3854	Non-Significant Effect
Error	0.1771854	0.01362964	13			
Total	0.1881823	0.02462662	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.633	9.155	0.5343	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9386		0.3649	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-009	7	0.6695	0.6196	0.7194	0.54	0.9212	0.02437	0.1313	19.6%	7.5%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-009	0.615	0.5767	0.54	Outlier	0.7389	0.7013	0.5933	0.9212

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-8604-2336	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					13.15%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-008	0.8496	1.761	0.09519	0.2049	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.625	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.008431777	0.008431777	1	0.7217	0.4099	Non-Significant Effect
Error	0.1635565	0.01168261	14			
Total	0.1719883	0.02011438	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.215	8.885	0.8034	Equal Variances
Distribution	Shapiro-Wilk Normality	0.948		0.4590	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-008	8	0.6778	0.6348	0.7209	0.5082	0.8333	0.02102	0.1132	16.7%	6.34%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-008	0.5082	0.6462	0.82	0.7113	0.6875	0.6563	0.56	0.8333

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-6506-1104	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					14.17%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-007	0.4641	1.761	0.1026	0.3248	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.719	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.00292181	0.00292181	1	0.2154	0.6497	Non-Significant Effect
Error	0.1898894	0.01356352	14			
Total	0.1928112	0.01648534	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.572	8.885	0.5651	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9632		0.7206	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-007	8	0.6967	0.6478	0.7457	0.5033	0.8814	0.02391	0.1288	18.48%	3.73%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-007	0.5212	0.7683	0.77	0.677	0.7025	0.5033	0.75	0.8814

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-8188-4363	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					16.6%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-006	2.383	1.761	0.1201	0.0159	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.964	2.586	0.5973	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1056801	0.1056801	1	5.681	0.0319	Significant Effect
Error	0.2604486	0.01860347	14			
Total	0.3661287	0.1242836	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.528	8.885	0.2442	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9559		0.5878	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-006	8	0.5612	0.4991	0.6233	0.365	0.82	0.03032	0.1633	29.09%	22.46%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-006	0.466	0.5175	0.5244	0.6078	0.415	0.82	0.774	0.365

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-7170-4151	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					24.01%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-005	-0.3652	1.761	0.1738	0.6398	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.435	2.586	0.1039	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005193842	0.005193842	1	0.1334	0.7204	Non-Significant Effect
Error	0.5451947	0.03894248	14			
Total	0.5503886	0.04413632	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	6.385	8.885	0.0258	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9154		0.1424	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-005	8	0.7598	0.6611	0.8585	0.4567	1.224	0.04819	0.2595	34.15%	-4.98%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-005	0.6317	0.651	1.08	1.224	0.66	0.4567	0.7675	0.6075

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-0043-0526	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.72%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-004	0.5937	1.761	0.1283	0.2811	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.384	2.586	0.1299	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.007477723	0.007477723	1	0.3525	0.5622	Non-Significant Effect
Error	0.2969805	0.02121289	14			
Total	0.3044582	0.02869062	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.023	8.885	0.1677	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9695		0.8301	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-004	8	0.6805	0.6126	0.7484	0.4456	1.016	0.03316	0.1785	26.24%	5.97%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-004	0.5611	0.7313	0.765	1.016	0.509	0.4456	0.7237	0.6925

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-6449-4230	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:02	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					15.64%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-003	0.5863	1.761	0.1132	0.2835	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.812	2.586	0.9267	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005680775	0.005680775	1	0.3437	0.5670	Non-Significant Effect
Error	0.231377	0.01652693	14			
Total	0.2370578	0.02220771	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.134	8.885	0.3386	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9454		0.4203	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-003	8	0.6861	0.629	0.7431	0.461	0.8683	0.02786	0.15	21.87%	5.21%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-003	0.528	0.6367	0.461	0.8683	0.6829	0.6422	0.8275	0.842

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-5724-0730	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:01	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					12.84%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-002	4.155	1.761	0.09289	0.0005	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.861	2.586	0.8095	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1920816	0.1920816	1	17.26	0.0010	Significant Effect
Error	0.1557761	0.01112686	14			
Total	0.3478577	0.2032084	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.11	8.885	0.8940	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9317		0.2590	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-002	8	0.5046	0.4635	0.5458	0.315	0.6467	0.02009	0.1082	21.44%	30.28%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-002	0.315	0.4633	0.6033	0.4875	0.484	0.4371	0.6467	0.6

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-4648-0487	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:01	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					20.13%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-001	1.47	1.761	0.1457	0.0819	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.489	2.586	0.0810	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.05913103	0.05913103	1	2.16	0.1638	Non-Significant Effect
Error	0.3833053	0.02737895	14			
Total	0.4424363	0.08650998	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.192	8.885	0.0781	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9477		0.4537	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.7238	0.6847	0.7628	0.5743	0.87	0.01907	0.1027	14.19%	0.0%
20108-001	8	0.6022	0.5222	0.6822	0.3471	1	0.03905	0.2103	34.92%	16.8%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.65	0.82	0.6978	0.8175	0.6475	0.5743	0.87
20108-001	0.3573	1	0.3471	0.557	0.665	0.5422	0.73	0.6187

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-2003-8050	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:01	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					23.66%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-015	-0.5539	1.761	0.0946	0.7058	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.931	2.586	0.6600	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.003540218	0.003540218	1	0.3068	0.5884	Non-Significant Effect
Error	0.1615304	0.01153789	14			
Total	0.1650707	0.01507811	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.025	8.885	0.9750	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9101		0.1167	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-015	8	0.4296	0.3885	0.4707	0.328	0.63	0.02007	0.1081	25.16%	-7.44%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-015	0.43	0.555	0.37	0.328	0.331	0.39	0.403	0.63

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-6502-4291	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:01	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					20.1%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-014	-1.723	1.761	0.08036	0.9466	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.27	2.586	0.2072	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02472751	0.02472751	1	2.97	0.1068	Non-Significant Effect
Error	0.1165587	0.008325621	14			
Total	0.1412862	0.03305313	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.169	8.885	0.3287	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9341		0.2827	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-014	8	0.4785	0.4509	0.5061	0.402	0.631	0.01346	0.07249	15.15%	-19.66%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-014	0.402	0.442	0.46	0.44	0.485	0.531	0.437	0.631

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-6139-1638	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:01	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					25.72%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-013	-0.9892	1.761	0.1028	0.8303	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.774	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01334022	0.01334022	1	0.9785	0.3394	Non-Significant Effect
Error	0.1908756	0.01363397	14			
Total	0.2042158	0.02697419	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.393	8.885	0.6730	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9665		0.7796	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-013	8	0.4576	0.4097	0.5055	0.262	0.632	0.02339	0.126	27.53%	-14.44%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-013	0.365	0.262	0.434	0.391	0.426	0.57	0.632	0.581

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-1690-5226	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:01	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					30.4%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-012	-0.4945	1.761	0.1216	0.6857	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.86	2.586	0.8116	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.004658101	0.004658101	1	0.2445	0.6286	Non-Significant Effect
Error	0.2667144	0.01905103	14			
Total	0.2713725	0.02370913	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.343	8.885	0.2837	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9623		0.7043	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-012	8	0.434	0.3718	0.4962	0.25	0.682	0.03035	0.1634	37.65%	-8.53%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-012	0.305	0.25	0.586	0.493	0.536	0.25	0.37	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-3363-4044	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:01	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					24.26%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-011	-0.5809	1.761	0.09702	0.7147	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.88	2.586	0.7657	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.004095989	0.004095989	1	0.3375	0.5705	Non-Significant Effect
Error	0.1699325	0.01213803	14			
Total	0.1740284	0.01623402	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.13	8.885	0.8759	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9826		0.9811	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-011	8	0.4319	0.3887	0.475	0.246	0.601	0.02107	0.1135	26.28%	-8.0%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-011	0.449	0.326	0.246	0.366	0.496	0.46	0.511	0.601

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-0892-9450	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:01	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					27.03%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-010	-0.554	1.761	0.1081	0.7059	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.093	2.586	0.3950	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.004624056	0.004624056	1	0.307	0.5883	Non-Significant Effect
Error	0.2109019	0.01506442	14			
Total	0.2155259	0.01968848	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.644	8.885	0.5278	Equal Variances
Distribution	Shapiro-Wilk Normality	0.955		0.5731	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-010	8	0.4339	0.3818	0.4859	0.24	0.682	0.02542	0.1369	31.55%	-8.5%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-010	0.378	0.24	0.452	0.361	0.434	0.566	0.358	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-3647-7505	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:01	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					29.45%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-009	-1.943	1.761	0.1178	0.9638	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.196	2.586	0.2740	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.06746984	0.06746984	1	3.773	0.0725	Non-Significant Effect
Error	0.2503276	0.01788054	14			
Total	0.3177975	0.08535039	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.138	8.885	0.3375	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9651		0.7540	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-009	8	0.5297	0.4704	0.5891	0.246	0.737	0.02899	0.1561	29.47%	-32.48%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-009	0.246	0.519	0.378	0.598	0.665	0.561	0.534	0.737

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-8087-4456	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					22.53%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-008	-3.711	1.761	0.09008	0.9988	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.025	2.586	0.4929	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1440542	0.1440542	1	13.77	0.0023	Significant Effect
Error	0.1464649	0.01046178	14			
Total	0.2905192	0.154516	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.196	8.885	0.8193	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9068		0.1035	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-008	8	0.5896	0.5525	0.6268	0.5082	0.75	0.01813	0.09761	16.55%	-47.46%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-008	0.5082	0.517	0.738	0.569	0.55	0.525	0.56	0.75

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-6945-8249	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					26.53%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-007	-2.015	1.761	0.1061	0.9683	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.833	2.586	0.8763	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.05892764	0.05892764	1	4.061	0.0635	Non-Significant Effect
Error	0.2031302	0.0145093	14			
Total	0.2620579	0.07343694	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.546	8.885	0.5793	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9802		0.9649	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-007	8	0.5213	0.4708	0.5717	0.308	0.677	0.02465	0.1327	25.47%	-30.35%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-007	0.417	0.461	0.308	0.677	0.562	0.453	0.675	0.617

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-0974-8162	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					33.76%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-006	-1.228	1.761	0.135	0.8801	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.891	2.586	0.7432	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03543805	0.03543805	1	1.508	0.2397	Non-Significant Effect
Error	0.3290149	0.02350107	14			
Total	0.364453	0.05893912	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.124	8.885	0.1559	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9547		0.5678	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-006	8	0.494	0.4222	0.5658	0.249	0.774	0.03504	0.1887	38.2%	-23.54%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-006	0.466	0.414	0.472	0.547	0.249	0.738	0.774	0.292

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-7065-5378	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					25.15%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-005	-1.764	1.761	0.1006	0.9503	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.814	2.586	0.9230	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04060222	0.04060222	1	3.113	0.0995	Non-Significant Effect
Error	0.1826281	0.01304486	14			
Total	0.2232303	0.05364709	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.289	8.885	0.7459	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9718		0.8668	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-005	8	0.5006	0.4545	0.5467	0.324	0.651	0.02251	0.1212	24.21%	-25.2%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-005	0.379	0.651	0.324	0.612	0.528	0.411	0.614	0.486

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-6485-0829	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					23.23%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-004	-2.861	1.761	0.09289	0.9937	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.103	2.586	0.3818	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.09105294	0.09105294	1	8.185	0.0126	Significant Effect
Error	0.1557462	0.01112473	14			
Total	0.2467991	0.1021777	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.05	8.885	0.9503	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9157		0.1438	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-004	8	0.5507	0.5111	0.5904	0.401	0.765	0.01935	0.1042	18.92%	-37.73%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-004	0.505	0.585	0.765	0.508	0.509	0.401	0.579	0.554

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-0387-2762	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					27.65%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-003	-2.495	1.761	0.1106	0.9871	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.354	2.586	0.1478	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0981253	0.0981253	1	6.225	0.0257	Significant Effect
Error	0.2206805	0.0157629	14			
Total	0.3188058	0.1138882	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.766	8.885	0.4705	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9346		0.2878	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	0.0%
20108-003	8	0.5565	0.5025	0.6105	0.382	0.842	0.02635	0.1419	25.49%	-39.17%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6
20108-003	0.528	0.382	0.461	0.521	0.478	0.578	0.662	0.842

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-2372-0502	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					22.06%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-015	0.1955	1.761	0.09717	0.4239	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.88	2.586	0.7668	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0004651894	0.0004651894	1	0.03821	0.8478	Non-Significant Effect
Error	0.170445	0.01217464	14			
Total	0.1709102	0.01263983	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.085	8.885	0.9173	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9629		0.7155	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-015	8	0.4296	0.3885	0.4707	0.328	0.63	0.02007	0.1081	25.16%	2.45%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-015	0.43	0.555	0.37	0.328	0.331	0.39	0.403	0.63

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	01-1502-8920	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					18.93%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-014	-0.8047	1.761	0.08337	0.7828	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.158	2.586	0.3144	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005803674	0.005803674	1	0.6476	0.4344	Non-Significant Effect
Error	0.1254733	0.008962375	14			
Total	0.1312769	0.01476605	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.411	8.885	0.2684	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9446		0.4098	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-014	8	0.4785	0.4509	0.5061	0.402	0.631	0.01346	0.07249	15.15%	-8.65%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-014	0.402	0.442	0.46	0.44	0.485	0.531	0.437	0.631

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-8923-4643	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					23.89%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-013	-0.2882	1.761	0.1052	0.6113	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.711	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.001185555	0.001185555	1	0.08308	0.7774	Non-Significant Effect
Error	0.1997901	0.01427072	14			
Total	0.2009757	0.01545628	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.253	8.885	0.7738	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9416		0.3695	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-013	8	0.4576	0.4097	0.5055	0.262	0.632	0.02339	0.126	27.53%	-3.91%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-013	0.365	0.262	0.434	0.391	0.426	0.57	0.632	0.581

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-8572-6521	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					28.06%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-012	0.09135	1.761	0.1236	0.4643	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.83	2.586	0.8836	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0001642934	0.0001642934	1	0.008345	0.9285	Non-Significant Effect
Error	0.275629	0.01968778	14			
Total	0.2757933	0.01985208	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.108	8.885	0.3464	Equal Variances
Distribution	Shapiro-Wilk Normality	0.953		0.5379	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-012	8	0.434	0.3718	0.4962	0.25	0.682	0.03035	0.1634	37.65%	1.46%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-012	0.305	0.25	0.586	0.493	0.536	0.25	0.37	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-2875-3515	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					22.6%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-011	0.151	1.761	0.09954	0.4411	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.808	2.586	0.9377	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0002913189	0.0002913189	1	0.0228	0.8821	Non-Significant Effect
Error	0.178847	0.01277479	14			
Total	0.1791383	0.01306611	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.017	8.885	0.9832	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9639		0.7325	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-011	8	0.4319	0.3887	0.475	0.246	0.601	0.02107	0.1135	26.28%	1.94%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-011	0.449	0.326	0.246	0.366	0.496	0.46	0.511	0.601

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-4017-8180	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					25.06%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-010	0.1043	1.761	0.1103	0.4592	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.05	2.586	0.4555	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0001707615	0.0001707615	1	0.01088	0.9184	Non-Significant Effect
Error	0.2198164	0.01570117	14			
Total	0.2199872	0.01587194	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.479	8.885	0.6187	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9672		0.7913	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-010	8	0.4339	0.3818	0.4859	0.24	0.682	0.02542	0.1369	31.55%	1.48%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-010	0.378	0.24	0.452	0.361	0.434	0.566	0.358	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-2180-3030	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					27.21%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-009	-1.313	1.761	0.1198	0.8949	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.158	2.586	0.3144	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03192712	0.03192712	1	1.724	0.2103	Non-Significant Effect
Error	0.2592422	0.0185173	14			
Total	0.2911693	0.05044442	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.923	8.885	0.4078	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9679		0.8034	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-009	8	0.5297	0.4704	0.5891	0.246	0.737	0.02899	0.1561	29.47%	-20.29%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-009	0.246	0.519	0.378	0.598	0.665	0.561	0.534	0.737

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-1980-5059	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					21.07%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-008	-2.833	1.761	0.09278	0.9934	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.94	2.586	0.6430	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0890884	0.0890884	1	8.027	0.0133	Significant Effect
Error	0.1553795	0.01109854	14			
Total	0.2444679	0.1001869	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.33	8.885	0.7164	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9197		0.1668	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-008	8	0.5896	0.5525	0.6268	0.5082	0.75	0.01813	0.09761	16.55%	-33.89%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-008	0.5082	0.517	0.738	0.569	0.55	0.525	0.56	0.75

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-6489-7756	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 12:00	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					24.61%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-007	-1.314	1.761	0.1084	0.8950	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.794	2.586	0.9749	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02614112	0.02614112	1	1.726	0.2101	Non-Significant Effect
Error	0.2120448	0.01514606	14			
Total	0.2381859	0.04128718	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.391	8.885	0.6742	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9359		0.3023	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-007	8	0.5213	0.4708	0.5717	0.308	0.677	0.02465	0.1327	25.47%	-18.36%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-007	0.417	0.461	0.308	0.677	0.562	0.453	0.675	0.617

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-8694-0920	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					31.07%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-006	-0.6899	1.761	0.1368	0.7492	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.865	2.586	0.7987	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01148798	0.01148798	1	0.4759	0.5015	Non-Significant Effect
Error	0.3379295	0.02413782	14			
Total	0.3494175	0.0356258	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.81	8.885	0.1962	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9654		0.7603	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-006	8	0.494	0.4222	0.5658	0.249	0.774	0.03504	0.1887	38.2%	-12.17%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-006	0.466	0.414	0.472	0.547	0.249	0.738	0.774	0.292

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-7406-7577	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					23.39%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-005	-1.03	1.761	0.103	0.8397	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.747	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01450385	0.01450385	1	1.06	0.3207	Non-Significant Effect
Error	0.1915426	0.01368162	14			
Total	0.2060465	0.02818547	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.16	8.885	0.8500	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9407		0.3575	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-005	8	0.5006	0.4545	0.5467	0.324	0.651	0.02251	0.1212	24.21%	-13.67%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-005	0.379	0.651	0.324	0.612	0.528	0.411	0.614	0.486

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-1586-4524	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					21.69%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-004	-2.035	1.761	0.09551	0.9694	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.045	2.586	0.4626	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04870046	0.04870046	1	4.141	0.0613	Non-Significant Effect
Error	0.1646607	0.01176148	14			
Total	0.2133612	0.06046195	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.167	8.885	0.8435	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9726		0.8783	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-004	8	0.5507	0.5111	0.5904	0.401	0.765	0.01935	0.1042	18.92%	-25.05%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-004	0.505	0.585	0.765	0.508	0.509	0.401	0.579	0.554

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-1166-9993	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					25.61%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-003	-1.813	1.761	0.1128	0.9543	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.308	2.586	0.1787	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0539083	0.0539083	1	3.287	0.0913	Non-Significant Effect
Error	0.2295951	0.01639965	14			
Total	0.2835034	0.07030795	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.589	8.885	0.5562	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9658		0.7674	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-003	8	0.5565	0.5025	0.6105	0.382	0.842	0.02635	0.1419	25.49%	-26.36%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-003	0.528	0.382	0.461	0.521	0.478	0.578	0.662	0.842

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-8229-5210	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					21.93%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-002	0.739	1.761	0.0966	0.2360	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.888	2.586	0.7478	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.006572018	0.006572018	1	0.5462	0.4721	Non-Significant Effect
Error	0.1684604	0.01203288	14			
Total	0.1750324	0.0186049	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.112	8.885	0.8924	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9903		0.9994	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	0.0%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	9.2%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-6400-2901	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					15.97%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-015	2.972	1.761	0.09395	0.0051	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.944	2.586	0.6341	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1004889	0.1004889	1	8.83	0.0101	Significant Effect
Error	0.1593186	0.0113799	14			
Total	0.2598075	0.1118688	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.054	8.885	0.9464	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9692		0.8253	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-015	8	0.4296	0.3885	0.4707	0.328	0.63	0.02007	0.1081	25.16%	26.95%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-015	0.43	0.555	0.37	0.328	0.331	0.39	0.403	0.63

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-6645-7295	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					13.53%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-014	2.426	1.761	0.07959	0.0147	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.132	2.586	0.3453	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04807044	0.04807044	1	5.885	0.0294	Significant Effect
Error	0.1143468	0.00816763	14			
Total	0.1624173	0.05623807	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.108	8.885	0.3462	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9664		0.7783	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-014	8	0.4785	0.4509	0.5061	0.402	0.631	0.01346	0.07249	15.15%	18.64%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-014	0.402	0.442	0.46	0.44	0.485	0.531	0.437	0.631

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-1362-4367	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.38%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-013	2.248	1.761	0.1022	0.0206	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.744	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.06812083	0.06812083	1	5.055	0.0412	Significant Effect
Error	0.1886637	0.01347598	14			
Total	0.2567845	0.08159681	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.432	8.885	0.6472	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9461		0.4307	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-013	8	0.4576	0.4097	0.5055	0.262	0.632	0.02339	0.126	27.53%	22.19%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-013	0.365	0.262	0.434	0.391	0.426	0.57	0.632	0.581

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-9216-7107	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					20.58%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-012	2.243	1.761	0.121	0.0208	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.868	2.586	0.7939	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.09501761	0.09501761	1	5.029	0.0416	Significant Effect
Error	0.2645026	0.01889304	14			
Total	0.3595202	0.1139107	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.41	8.885	0.2686	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9473		0.4482	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-012	8	0.434	0.3718	0.4962	0.25	0.682	0.03035	0.1634	37.65%	26.21%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-012	0.305	0.25	0.586	0.493	0.536	0.25	0.37	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-9880-0937	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					16.39%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-011	2.855	1.761	0.09639	0.0064	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.76	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.09765602	0.09765602	1	8.152	0.0127	Significant Effect
Error	0.1677206	0.01198004	14			
Total	0.2653766	0.1096361	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.162	8.885	0.8477	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9568		0.6043	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-011	8	0.4319	0.3887	0.475	0.246	0.601	0.02107	0.1135	26.28%	26.57%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-011	0.449	0.326	0.246	0.366	0.496	0.46	0.511	0.601

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-0074-3072	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					18.28%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-010	2.527	1.761	0.1075	0.0121	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.104	2.586	0.3805	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.09517172	0.09517172	1	6.385	0.0242	Significant Effect
Error	0.20869	0.01490643	14			
Total	0.3038617	0.1100781	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.691	8.885	0.5049	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9664		0.7775	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-010	8	0.4339	0.3818	0.4859	0.24	0.682	0.02542	0.1369	31.55%	26.23%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-010	0.378	0.24	0.452	0.361	0.434	0.566	0.358	0.682

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-4860-1504	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					19.93%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-009	0.877	1.761	0.1172	0.1976	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.206	2.586	0.2643	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01363055	0.01363055	1	0.7691	0.3953	Non-Significant Effect
Error	0.2481157	0.01772255	14			
Total	0.2617463	0.03135311	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.199	8.885	0.3203	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9658		0.7676	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-009	8	0.5297	0.4704	0.5891	0.246	0.737	0.02899	0.1561	29.47%	9.93%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-009	0.246	0.519	0.378	0.598	0.665	0.561	0.534	0.737

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-6536-1830	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					15.2%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-008	-0.03	1.761	0.08939	0.5118	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.898	2.586	0.7274	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	9.273387E-06	9.273387E-06	1	0.0009	0.9765	Non-Significant Effect
Error	0.1442531	0.01030379	14			
Total	0.1442623	0.01031306	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.163	8.885	0.8472	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9321		0.2633	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-008	8	0.5896	0.5525	0.6268	0.5082	0.75	0.01813	0.09761	16.55%	-0.26%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-008	0.5082	0.517	0.738	0.569	0.55	0.525	0.56	0.75

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-6428-9302	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.94%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-007	1.116	1.761	0.1055	0.1415	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.843	2.586	0.8520	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0178889	0.0178889	1	1.246	0.2830	Non-Significant Effect
Error	0.2009183	0.01435131	14			
Total	0.2188073	0.03224021	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.59	8.885	0.5553	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9416		0.3697	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-007	8	0.5213	0.4708	0.5717	0.308	0.677	0.02465	0.1327	25.47%	11.37%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-007	0.417	0.461	0.308	0.677	0.562	0.453	0.675	0.617

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	21-3191-5724	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					22.88%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-006	1.232	1.761	0.1346	0.1191	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.897	2.586	0.7295	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0354379	0.0354379	1	1.518	0.2382	Non-Significant Effect
Error	0.3268031	0.02334308	14			
Total	0.362241	0.05878098	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.213	8.885	0.1464	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9702		0.8413	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-006	8	0.494	0.4222	0.5658	0.249	0.774	0.03504	0.1887	38.2%	16.0%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-006	0.466	0.414	0.472	0.547	0.249	0.738	0.774	0.292

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-0459-5221	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.0%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-005	1.542	1.761	0.09997	0.0727	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.697	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03062487	0.03062487	1	2.376	0.1455	Non-Significant Effect
Error	0.1804162	0.01288687	14			
Total	0.2110411	0.04351174	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.326	8.885	0.7190	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9356		0.2983	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-005	8	0.5006	0.4545	0.5467	0.324	0.651	0.02251	0.1212	24.21%	14.88%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-005	0.379	0.651	0.324	0.612	0.528	0.411	0.614	0.486

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-3702-0229	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					15.68%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-004	0.7138	1.761	0.09222	0.2435	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.118	2.586	0.3626	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005587526	0.005587526	1	0.5095	0.4871	Non-Significant Effect
Error	0.1535343	0.01096674	14			
Total	0.1591218	0.01655426	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.021	8.885	0.9789	Equal Variances
Distribution	Shapiro-Wilk Normality	0.982		0.9774	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-004	8	0.5507	0.5111	0.5904	0.401	0.765	0.01935	0.1042	18.92%	6.36%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-004	0.505	0.585	0.765	0.508	0.509	0.401	0.579	0.554

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-4627-6208	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					18.71%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-003	0.5063	1.761	0.11	0.3103	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.366	2.586	0.1406	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.004000558	0.004000558	1	0.2564	0.6205	Non-Significant Effect
Error	0.2184687	0.0156049	14			
Total	0.2224692	0.01960546	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.817	8.885	0.4491	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9607		0.6744	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-003	8	0.5565	0.5025	0.6105	0.382	0.842	0.02635	0.1419	25.49%	5.38%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-003	0.528	0.382	0.461	0.521	0.478	0.578	0.662	0.842

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-8857-1074	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					15.87%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-002	3.552	1.761	0.09336	0.0016	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.954	2.586	0.6156	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1417519	0.1417519	1	12.61	0.0032	Significant Effect
Error	0.157334	0.01123814	14			
Total	0.2990859	0.1529901	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.029	8.885	0.9714	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9912		0.9997	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-002	8	0.3999	0.3593	0.4405	0.252	0.6	0.01982	0.1068	26.7%	32.01%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-002	0.252	0.417	0.362	0.39	0.484	0.306	0.388	0.6

Hyalella 28-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-4704-5998	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	04 Oct-10 11:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	01-5389-2607	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	02 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	30 Sep-10 12:00	**Species:**	Hyalella azteca	**Brine:**	Not Applicable
Duration:	28d 0h	**Source:**	ARO - Aquatic Research Organisms, NH	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					16.32%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-001	2.711	1.761	0.09597	0.0084	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.875	2.586	0.7770	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.08727981	0.08727981	1	7.35	0.0169	Significant Effect
Error	0.1662485	0.01187489	14			
Total	0.2535283	0.0991547	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.143	8.885	0.8642	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9383		0.3289	Normal Distribution

Mean Dry Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.5881	0.5481	0.6282	0.402	0.713	0.01955	0.1053	17.9%	0.0%
20108-001	8	0.4404	0.3976	0.4832	0.243	0.584	0.0209	0.1126	25.56%	25.12%

Mean Dry Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.713	0.52	0.574	0.628	0.654	0.518	0.402	0.696
20108-001	0.3573	0.4	0.243	0.557	0.399	0.488	0.584	0.495

CLIENT: Nobis Engineering, Inc.
PROJECT: Project 80013, DAS-RAC2-030
ASSAY: Hyalella azteca Sediment Assay
TASK: Overlying Water Alkalinity Summary
METHOD: EPA 310.2

Field ID	Sample Number	Day	LAB ID	MATRIX	RESULT	QLIMIT	UNITS	SAMPLED	ANALYZED
Lab Control	000	0	20116-100	Water	72	2	mg/L	09/02/10 0930	09/09/10
D02331	001	0	20116-101	Water	60	2	mg/L	09/02/10 0930	09/09/10
D02332	002	0	20116-102	Water	47	2	mg/L	09/02/10 0930	09/09/10
D02333	003	0	20116-103	Water	52	2	mg/L	09/02/10 0930	09/09/10
D02334	004	0	20116-104	Water	47	2	mg/L	09/02/10 0930	09/09/10
D02335	005	0	20116-105	Water	55	2	mg/L	09/02/10 0930	09/09/10
D02336	006	0	20116-106	Water	50	2	mg/L	09/02/10 0930	09/09/10
D02337	007	0	20116-107	Water	49	2	mg/L	09/02/10 0930	09/09/10
D02338	008	0	20116-108	Water	89	2	mg/L	09/02/10 0930	09/09/10
D02339	009	0	20116-109	Water	72	2	mg/L	09/02/10 0930	09/09/10
D02340	010	0	20116-110	Water	47	2	mg/L	09/02/10 0930	09/09/10
D02341	011	0	20116-111	Water	51	2	mg/L	09/02/10 0930	09/09/10
D02342	012	0	20116-112	Water	41	2	mg/L	09/02/10 0930	09/09/10
D02343	013	0	20116-113	Water	50	2	mg/L	09/02/10 0930	09/09/10
D02344	014	0	20116-114	Water	55	2	mg/L	09/02/10 0930	09/09/10
D02345	015	0	20116-115	Water	47	2	mg/L	09/02/10 0930	09/09/10
Lab Control	000	7	20116-200	Water	79	2	mg/L	09/09/10 0915	09/09/10
D02331	001	7	20116-201	Water	60	2	mg/L	09/09/10 0915	09/09/10
D02332	002	7	20116-202	Water	56	2	mg/L	09/09/10 0915	09/09/10
D02333	003	7	20116-203	Water	61	2	mg/L	09/09/10 0915	09/09/10
D02334	004	7	20116-204	Water	54	2	mg/L	09/09/10 0915	09/09/10
D02335	005	7	20116-205	Water	64	2	mg/L	09/09/10 0915	09/09/10
D02336	006	7	20116-206	Water	59	2	mg/L	09/09/10 0915	09/09/10
D02337	007	7	20116-207	Water	60	2	mg/L	09/09/10 0915	09/09/10
D02338	008	7	20116-208	Water	62	2	mg/L	09/09/10 0915	09/09/10
D02339	009	7	20116-209	Water	51	2	mg/L	09/09/10 0915	09/09/10
D02340	010	7	20116-210	Water	51	2	mg/L	09/09/10 0915	09/09/10
D02341	011	7	20116-211	Water	62	2	mg/L	09/09/10 0915	09/09/10
D02342	012	7	20116-212	Water	58	2	mg/L	09/09/10 0915	09/09/10
D02343	013	7	20116-213	Water	53	2	mg/L	09/09/10 0915	09/09/10
D02344	014	7	20116-214	Water	59	2	mg/L	09/09/10 0915	09/09/10
D02345	015	7	20116-215	Water	57	2	mg/L	09/09/10 0915	09/09/10
Lab Control	000	14	20116-300	Water	82	2	mg/L	09/16/10 1445	09/21/10
D02331	001	14	20116-301	Water	68	2	mg/L	09/16/10 1445	09/21/10
D02332	002	14	20116-302	Water	68	2	mg/L	09/16/10 1445	09/21/10
D02333	003	14	20116-303	Water	70	2	mg/L	09/16/10 1445	09/21/10
D02334	004	14	20116-304	Water	67	2	mg/L	09/16/10 1445	09/21/10
D02335	005	14	20116-305	Water	66	2	mg/L	09/16/10 1445	09/21/10
D02336	006	14	20116-306	Water	63	2	mg/L	09/16/10 1445	09/21/10
D02337	007	14	20116-307	Water	62	2	mg/L	09/16/10 1445	09/21/10
D02338	008	14	20116-308	Water	66	2	mg/L	09/16/10 1445	09/21/10
D02339	009	14	20116-309	Water	68	2	mg/L	09/16/10 1445	09/21/10
D02340	010	14	20116-310	Water	68	2	mg/L	09/16/10 1445	09/21/10
D02341	011	14	20116-311	Water	68	2	mg/L	09/16/10 1445	09/21/10
D02342	012	14	20116-312	Water	64	2	mg/L	09/16/10 1445	09/21/10

TASK: Overlying Water Alkalinity Summary
METHOD: EPA 310.2

Field ID	Sample Number	Day	LAB ID	MATRIX	RESULT	QLIMIT	UNITS	SAMPLED	ANALYZED
D02343	013	14	20116-313	Water	67	2	mg/L	09/16/10 1445	09/21/10
D02344	014	14	20116-314	Water	68	2	mg/L	09/16/10 1445	09/21/10
D02345	015	14	20116-315	Water	65	2	mg/L	09/16/10 1445	09/21/10
Lab Control	000	21	20116-400	Water	71	2	mg/L	09/23/10 0900	09/27/10 1259
D02331	001	21	20116-401	Water	64	2	mg/L	09/23/10 0900	09/27/10 1300
D02332	002	21	20116-402	Water	64	2	mg/L	09/23/10 0900	09/27/10 1301
D02333	003	21	20116-403	Water	66	2	mg/L	09/23/10 0900	09/27/10 1302
D02334	004	21	20116-404	Water	61	2	mg/L	09/23/10 0900	09/27/10 1310
D02335	005	21	20116-405	Water	61	2	mg/L	09/23/10 0900	09/27/10 1313
D02336	006	21	20116-406	Water	60	2	mg/L	09/23/10 0900	09/27/10 1314
D02337	007	21	20116-407	Water	60	2	mg/L	09/23/10 0900	09/27/10 1316
D02338	008	21	20116-408	Water	63	2	mg/L	09/23/10 0900	09/27/10 1317
D02339	009	21	20116-409	Water	57	2	mg/L	09/23/10 0900	09/27/10 1400
D02340	010	21	20116-410	Water	58	2	mg/L	09/23/10 0900	09/27/10 1319
D02341	011	21	20116-411	Water	62	2	mg/L	09/23/10 0900	09/27/10 1320
D02342	012	21	20116-412	Water	61	2	mg/L	09/23/10 0900	09/27/10 1324
D02343	013	21	20116-413	Water	62	2	mg/L	09/23/10 0900	09/27/10 1325
D02344	014	21	20116-414	Water	63	2	mg/L	09/23/10 0900	09/27/10 1326
D02345	015	21	20116-415	Water	58	2	mg/L	09/23/10 0900	09/27/10 1328
Lab Control	000	28	20116-500	Water	73	2	mg/L	09/30/10 0900	10/05/10
D02331	001	28	20116-501	Water	60	2	mg/L	09/30/10 0900	10/05/10
D02332	002	28	20116-502	Water	61	2	mg/L	09/30/10 0900	10/05/10
D02333	003	28	20116-503	Water	67	2	mg/L	09/30/10 0900	10/05/10
D02334	004	28	20116-504	Water	66	2	mg/L	09/30/10 0900	10/05/10
D02335	005	28	20116-505	Water	64	2	mg/L	09/30/10 0900	10/05/10
D02336	006	28	20116-506	Water	65	2	mg/L	09/30/10 0900	10/05/10
D02337	007	28	20116-507	Water	61	2	mg/L	09/30/10 0900	10/05/10
D02338	008	28	20116-508	Water	64	2	mg/L	09/30/10 0900	10/05/10
D02339	009	28	20116-509	Water	66	2	mg/L	09/30/10 0900	10/05/10
D02340	010	28	20116-510	Water	61	2	mg/L	09/30/10 0900	10/05/10
D02341	011	28	20116-511	Water	64	2	mg/L	09/30/10 0900	10/05/10
D02342	012	28	20116-512	Water	62	2	mg/L	09/30/10 0900	10/05/10
D02343	013	28	20116-513	Water	62	2	mg/L	09/30/10 0900	10/05/10
D02344	014	28	20116-514	Water	66	2	mg/L	09/30/10 0900	10/05/10
D02345	015	28	20116-515	Water	60	2	mg/L	09/30/10 0900	10/05/10

CLIENT: Nobis Engineering, Inc.
PROJECT: Project 80013, DAS-RAC2-030
ASSAY: Hyalella azteca Sediment Assay
TASK: Overlying Water Hardness Summary
METHOD: SW846 3rd Ed. 6020

Field ID	Sample Number	Day	LAB ID	MATRIX	RESULT	QLIMIT	UNITS	SAMPLED	ANALYZED
Lab Control	000	0	20116-116	Water	100	0.4	mg/L	09/02/10 0930	09/13/10
D02331	001	0	20116-117	Water	81	0.4	mg/L	09/02/10 0930	09/13/10
D02332	002	0	20116-118	Water	78	0.4	mg/L	09/02/10 0930	09/13/10
D02333	003	0	20116-119	Water	81	0.4	mg/L	09/02/10 0930	09/13/10
D02334	004	0	20116-120	Water	75	0.4	mg/L	09/02/10 0930	09/13/10
D02335	005	0	20116-121	Water	84	0.4	mg/L	09/02/10 0930	09/13/10
D02336	006	0	20116-122	Water	78	0.4	mg/L	09/02/10 0930	09/13/10
D02337	007	0	20116-123	Water	80	0.4	mg/L	09/02/10 0930	09/13/10
D02338	008	0	20116-124	Water	90	0.4	mg/L	09/02/10 0930	09/13/10
D02339	009	0	20116-125	Water	92	0.4	mg/L	09/02/10 0930	09/13/10
D02340	010	0	20116-126	Water	77	0.4	mg/L	09/02/10 0930	09/13/10
D02341	011	0	20116-127	Water	78	0.4	mg/L	09/02/10 0930	09/13/10
D02342	012	0	20116-128	Water	73	0.4	mg/L	09/02/10 0930	09/13/10
D02343	013	0	20116-129	Water	82	0.4	mg/L	09/02/10 0930	09/13/10
D02344	014	0	20116-130	Water	83	0.4	mg/L	09/02/10 0930	09/13/10
D02345	015	0	20116-131	Water	79	0.4	mg/L	09/02/10 0930	09/13/10
Lab Control	000	7	20116-216	Water	110	0.4	mg/L	09/09/10 0915	09/13/10
D02331	001	7	20116-217	Water	90	0.4	mg/L	09/09/10 0915	09/13/10
D02332	002	7	20116-218	Water	86	0.4	mg/L	09/09/10 0915	09/13/10
D02333	003	7	20116-219	Water	90	0.4	mg/L	09/09/10 0915	09/13/10
D02334	004	7	20116-220	Water	87	0.4	mg/L	09/09/10 0915	09/13/10
D02335	005	7	20116-221	Water	94	0.4	mg/L	09/09/10 0915	09/13/10
D02336	006	7	20116-222	Water	85	0.4	mg/L	09/09/10 0915	09/13/10
D02337	007	7	20116-223	Water	89	0.4	mg/L	09/09/10 0915	09/13/10
D02338	008	7	20116-224	Water	88	0.4	mg/L	09/09/10 0915	09/13/10
D02339	009	7	20116-225	Water	90	0.4	mg/L	09/09/10 0915	09/13/10
D02340	010	7	20116-226	Water	86	0.4	mg/L	09/09/10 0915	09/13/10
D02341	011	7	20116-227	Water	86	0.4	mg/L	09/09/10 0915	09/13/10
D02342	012	7	20116-228	Water	85	0.4	mg/L	09/09/10 0915	09/13/10
D02343	013	7	20116-229	Water	86	0.4	mg/L	09/09/10 0915	09/13/10
D02344	014	7	20116-230	Water	85	0.4	mg/L	09/09/10 0915	09/13/10
D02345	015	7	20116-231	Water	85	0.4	mg/L	09/09/10 0915	09/13/10
Lab Control	000	14	20116-316	Water	100	0.4	mg/L	09/16/10 1445	09/21/10
D02331	001	14	20116-317	Water	90	0.4	mg/L	09/16/10 1445	09/21/10
D02332	002	14	20116-318	Water	92	0.4	mg/L	09/16/10 1445	09/21/10
D02333	003	14	20116-319	Water	94	0.4	mg/L	09/16/10 1445	09/21/10
D02334	004	14	20116-320	Water	88	0.4	mg/L	09/16/10 1445	09/21/10
D02335	005	14	20116-321	Water	89	0.4	mg/L	09/16/10 1445	09/21/10
D02336	006	14	20116-322	Water	89	0.4	mg/L	09/16/10 1445	09/21/10
D02337	007	14	20116-323	Water	88	0.4	mg/L	09/16/10 1445	09/21/10
D02338	008	14	20116-324	Water	89	0.4	mg/L	09/16/10 1445	09/21/10
D02339	009	14	20116-325	Water	90	0.4	mg/L	09/16/10 1445	09/21/10
D02340	010	14	20116-326	Water	89	0.4	mg/L	09/16/10 1445	09/21/10
D02341	011	14	20116-327	Water	90	0.4	mg/L	09/16/10 1445	09/21/10
D02342	012	14	20116-328	Water	85	0.4	mg/L	09/16/10 1445	09/21/10

TASK: Overlying Water Hardness Summary
METHOD: SW846 3rd Ed. 6020

Field ID	Sample Number	Day	LAB ID	MATRIX	RESULT	QLIMIT	UNITS	SAMPLED	ANALYZED
D02343	013	14	20116-329	Water	89	0.4	mg/L	09/16/10 1445	09/21/10
D02344	014	14	20116-330	Water	89	0.4	mg/L	09/16/10 1445	09/21/10
D02345	015	14	20116-331	Water	87	0.4	mg/L	09/16/10 1445	09/21/10
Lab Control	000	21	20116-416	Water	87	0.4	mg/L	09/23/10 0900	09/24/10
D02331	001	21	20116-417	Water	80	0.4	mg/L	09/23/10 0900	09/24/10
D02332	002	21	20116-418	Water	78	0.4	mg/L	09/23/10 0900	09/24/10
D02333	003	21	20116-419	Water	82	0.4	mg/L	09/23/10 0900	09/24/10
D02334	004	21	20116-420	Water	78	0.4	mg/L	09/23/10 0900	09/24/10
D02335	005	21	20116-421	Water	79	0.4	mg/L	09/23/10 0900	09/24/10
D02336	006	21	20116-422	Water	81	0.4	mg/L	09/23/10 0900	09/24/10
D02337	007	21	20116-423	Water	79	0.4	mg/L	09/23/10 0900	09/24/10
D02338	008	21	20116-424	Water	87	0.4	mg/L	09/23/10 0900	09/24/10
D02339	009	21	20116-425	Water	85	0.4	mg/L	09/23/10 0900	09/24/10
D02340	010	21	20116-426	Water	76	0.4	mg/L	09/23/10 0900	09/24/10
D02341	011	21	20116-427	Water	79	0.4	mg/L	09/23/10 0900	09/24/10
D02342	012	21	20116-428	Water	82	0.4	mg/L	09/23/10 0900	09/24/10
D02343	013	21	20116-429	Water	83	0.4	mg/L	09/23/10 0900	09/24/10
D02344	014	21	20116-430	Water	80	0.4	mg/L	09/23/10 0900	09/24/10
D02345	015	21	20116-431	Water	79	0.4	mg/L	09/23/10 0900	09/24/10
Lab Control	000	28	20116-516	Water	90	0.4	mg/L	09/30/10 0900	10/01/10
D02331	001	28	20116-517	Water	79	0.4	mg/L	09/30/10 0900	10/01/10
D02332	002	28	20116-518	Water	85	0.4	mg/L	09/30/10 0900	10/01/10
D02333	003	28	20116-519	Water	86	0.4	mg/L	09/30/10 0900	10/01/10
D02334	004	28	20116-520	Water	85	0.4	mg/L	09/30/10 0900	10/01/10
D02335	005	28	20116-521	Water	80	0.4	mg/L	09/30/10 0900	10/01/10
D02336	006	28	20116-522	Water	83	0.4	mg/L	09/30/10 0900	10/01/10
D02337	007	28	20116-523	Water	84	0.4	mg/L	09/30/10 0900	10/01/10
D02338	008	28	20116-524	Water	89	0.4	mg/L	09/30/10 0900	10/01/10
D02339	009	28	20116-525	Water	93	0.4	mg/L	09/30/10 0900	10/01/10
D02340	010	28	20116-526	Water	77	0.4	mg/L	09/30/10 0900	10/01/10
D02341	011	28	20116-527	Water	84	0.4	mg/L	09/30/10 0900	10/01/10
D02342	012	28	20116-528	Water	83	0.4	mg/L	09/30/10 0900	10/01/10
D02343	013	28	20116-529	Water	83	0.4	mg/L	09/30/10 0900	10/01/10
D02344	014	28	20116-530	Water	84	0.4	mg/L	09/30/10 0900	10/01/10
D02345	015	28	20116-531	Water	85	0.4	mg/L	09/30/10 0900	10/01/10

CLIENT: Nobis Engineering, Inc.
PROJECT: Project 80013, DAS-RAC2-030
ASSAY: Hyalella azteca Sediment Assay
TASK: Overlying Water Ammonia Summary
METHOD: SM 4500-NH3 G

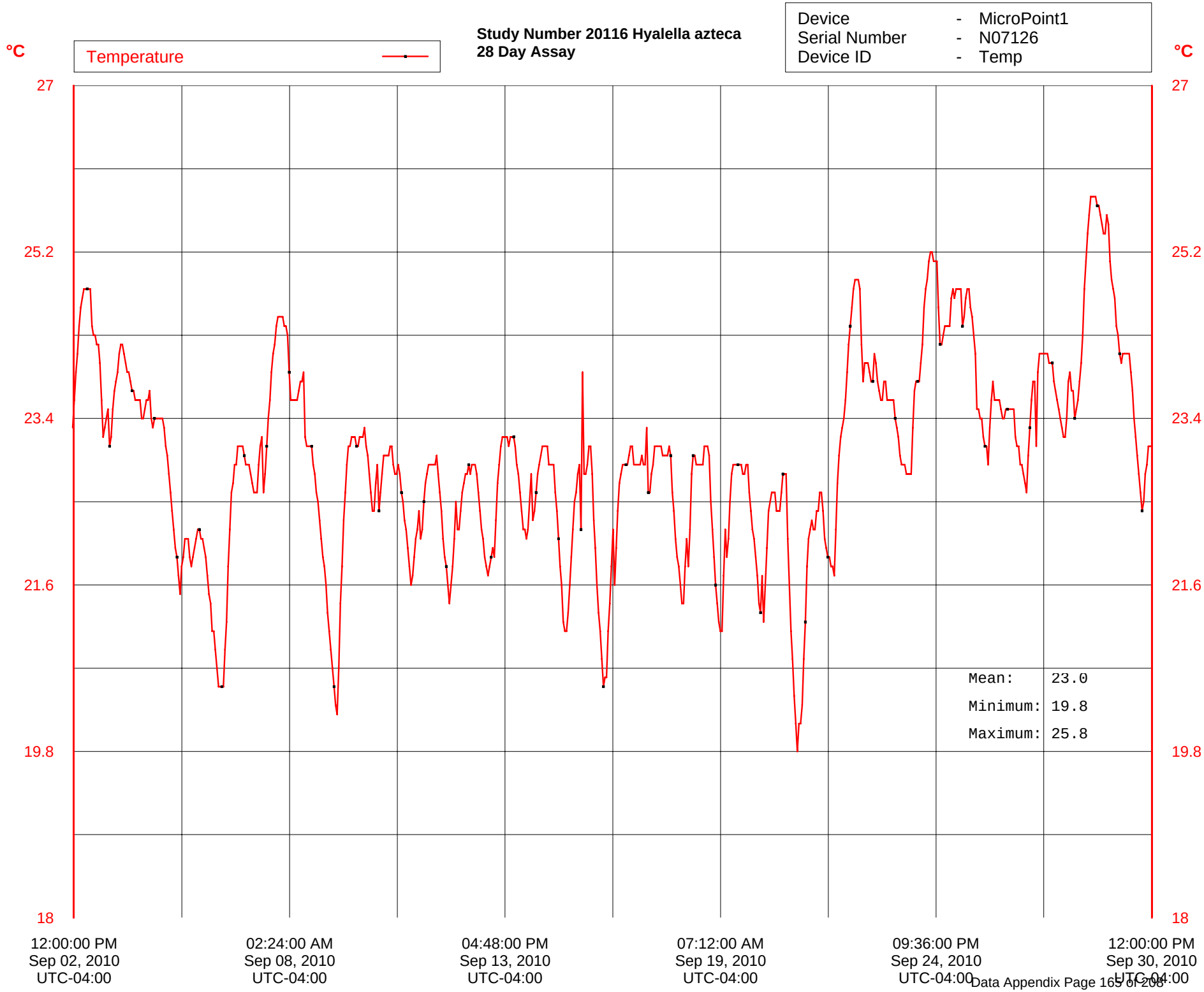
Field ID	Sample Number	Day	LAB ID	MATRIX	RESULT	QLIMIT	UNITS	SAMPLED	ANALYZED
Lab Control	000	0	20116-132	Water	ND	0.1	mg/L as N	09/02/10 0930	09/07/10
D02331	001	0	20116-133	Water	0.59	0.1	mg/L as N	09/02/10 0930	09/07/10
D02332	002	0	20116-134	Water	0.35	0.1	mg/L as N	09/02/10 0930	09/07/10
D02333	003	0	20116-135	Water	0.17	0.1	mg/L as N	09/02/10 0930	09/07/10
D02334	004	0	20116-136	Water	0.39	0.1	mg/L as N	09/02/10 0930	09/07/10
D02335	005	0	20116-137	Water	0.12	0.1	mg/L as N	09/02/10 0930	09/07/10
D02336	006	0	20116-138	Water	0.19	0.1	mg/L as N	09/02/10 0930	09/07/10
D02337	007	0	20116-139	Water	0.22	0.1	mg/L as N	09/02/10 0930	09/07/10
D02338	008	0	20116-140	Water	0.2	0.1	mg/L as N	09/02/10 0930	09/07/10
D02339	009	0	20116-141	Water	0.13	0.1	mg/L as N	09/02/10 0930	09/07/10
D02340	010	0	20116-142	Water	0.19	0.1	mg/L as N	09/02/10 0930	09/07/10
D02341	011	0	20116-143	Water	0.38	0.1	mg/L as N	09/02/10 0930	09/07/10
D02342	012	0	20116-144	Water	0.27	0.1	mg/L as N	09/02/10 0930	09/07/10
D02343	013	0	20116-145	Water	0.12	0.1	mg/L as N	09/02/10 0930	09/07/10
D02344	014	0	20116-146	Water	0.31	0.1	mg/L as N	09/02/10 0930	09/07/10
D02345	015	0	20116-147	Water	0.17	0.1	mg/L as N	09/02/10 0930	09/07/10
Lab Control	000	7	20116-232	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02331	001	7	20116-233	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02332	002	7	20116-234	Water	0.16	0.1	mg/L as N	09/09/10 0915	09/10/10
D02333	003	7	20116-235	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02334	004	7	20116-236	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02335	005	7	20116-237	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02336	006	7	20116-238	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02337	007	7	20116-239	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02338	008	7	20116-240	Water	0.3	0.1	mg/L as N	09/09/10 0915	09/10/10
D02339	009	7	20116-241	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02340	010	7	20116-242	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02341	011	7	20116-243	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02342	012	7	20116-244	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02343	013	7	20116-245	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02344	014	7	20116-246	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
D02345	015	7	20116-247	Water	ND	0.1	mg/L as N	09/09/10 0915	09/10/10
Lab Control	000	14	20116-332	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02331	001	14	20116-333	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02332	002	14	20116-334	Water	0.1	0.1	mg/L as N	09/16/10 1445	09/17/10
D02333	003	14	20116-335	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02334	004	14	20116-336	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02335	005	14	20116-337	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02336	006	14	20116-338	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02337	007	14	20116-339	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02338	008	14	20116-340	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02339	009	14	20116-341	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02340	010	14	20116-342	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02341	011	14	20116-343	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02342	012	14	20116-344	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10

TASK: Overlying Water Ammonia Summary
METHOD: SM 4500-NH3 G

Field ID	Sample Number	Day	LAB ID	MATRIX	RESULT	QLIMIT	UNITS	SAMPLED	ANALYZED
D02343	013	14	20116-345	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02344	014	14	20116-346	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
D02345	015	14	20116-347	Water	ND	0.1	mg/L as N	09/16/10 1445	09/17/10
Lab Control	000	21	20116-432	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02331	001	21	20116-433	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02332	002	21	20116-434	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02333	003	21	20116-435	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02334	004	21	20116-436	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02335	005	21	20116-437	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02336	006	21	20116-438	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02337	007	21	20116-439	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02338	008	21	20116-440	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02339	009	21	20116-441	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02340	010	21	20116-442	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02341	011	21	20116-443	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02342	012	21	20116-444	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02343	013	21	20116-445	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02344	014	21	20116-446	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
D02345	015	21	20116-447	Water	ND	0.1	mg/L as N	09/23/10 0900	09/23/10
Lab Control	000	28	20116-532	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02331	001	28	20116-533	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02332	002	28	20116-534	Water	0.1	0.1	mg/L as N	09/30/10 0900	09/30/10
D02333	003	28	20116-535	Water	0.11	0.1	mg/L as N	09/30/10 0900	09/30/10
D02334	004	28	20116-536	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02335	005	28	20116-537	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02336	006	28	20116-538	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02337	007	28	20116-539	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02338	008	28	20116-540	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02339	009	28	20116-541	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02340	010	28	20116-542	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02341	011	28	20116-543	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02342	012	28	20116-544	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02343	013	28	20116-545	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02344	014	28	20116-546	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10
D02345	015	28	20116-547	Water	ND	0.1	mg/L as N	09/30/10 0900	09/30/10

CLIENT: Nobis Engineering, Inc.
PROJECT: Project 80013, DAS-RAC2-030
ASSAY: Hyalella azteca Sediment Assay
TASK: Overlying Water Total Organic Carbon Summary
METHOD: SM 5310 C

Field ID	Sample Number	Day	LAB ID	MATRIX	RESULT	QLIMIT	UNITS	SAMPLED	ANALYZED
Lab Control	000	0	20116-148	Water	5.3	2	mg/L	09/02/10 0930	09/11/10
D02331	001	0	20116-149	Water	5.3	2	mg/L	09/02/10 0930	09/11/10
D02332	002	0	20116-150	Water	5.3	2	mg/L	09/02/10 0930	09/11/10
D02333	003	0	20116-151	Water	5	2	mg/L	09/02/10 0930	09/11/10
D02334	004	0	20116-152	Water	4.5	2	mg/L	09/02/10 0930	09/11/10
D02335	005	0	20116-153	Water	4.5	2	mg/L	09/02/10 0930	09/11/10
D02336	006	0	20116-154	Water	4.3	2	mg/L	09/02/10 0930	09/11/10
D02337	007	0	20116-155	Water	5	2	mg/L	09/02/10 0930	09/11/10
D02338	008	0	20116-156	Water	5.6	2	mg/L	09/02/10 0930	09/11/10
D02339	009	0	20116-157	Water	4.6	2	mg/L	09/02/10 0930	09/11/10
D02340	010	0	20116-158	Water	4.3	2	mg/L	09/02/10 0930	09/11/10
D02341	011	0	20116-159	Water	4.6	2	mg/L	09/02/10 0930	09/11/10
D02342	012	0	20116-160	Water	4.4	2	mg/L	09/02/10 0930	09/11/10
D02343	013	0	20116-161	Water	4.9	2	mg/L	09/02/10 0930	09/11/10
D02344	014	0	20116-162	Water	ND	2	mg/L	09/02/10 0930	09/11/10
D02345	015	0	20116-163	Water	4.7	2	mg/L	09/02/10 0930	09/11/10
Lab Control	000	28	20116-548	Water	5	2	mg/L	09/30/10 0900	09/30/10
D02331	001	28	20116-549	Water	4.3	0.8	mg/L	09/30/10 0900	09/30/10
D02332	002	28	20116-550	Water	4	0.8	mg/L	09/30/10 0900	09/30/10
D02333	003	28	20116-551	Water	4.1	0.8	mg/L	09/30/10 0900	09/30/10
D02334	004	28	20116-552	Water	4	0.8	mg/L	09/30/10 0900	09/30/10
D02335	005	28	20116-553	Water	4	0.8	mg/L	09/30/10 0900	09/30/10
D02336	006	28	20116-554	Water	3.7	0.8	mg/L	09/30/10 0900	09/30/10
D02337	007	28	20116-555	Water	3.8	0.8	mg/L	09/30/10 0900	09/30/10
D02338	008	28	20116-556	Water	4	0.8	mg/L	09/30/10 0900	09/30/10
D02339	009	28	20116-557	Water	3.8	0.8	mg/L	09/30/10 0900	09/30/10
D02340	010	28	20116-558	Water	3.7	0.8	mg/L	09/30/10 0900	09/30/10
D02341	011	28	20116-559	Water	3.7	0.8	mg/L	09/30/10 0900	09/30/10
D02342	012	28	20116-560	Water	3.7	0.8	mg/L	09/30/10 0900	09/30/10
D02343	013	28	20116-561	Water	3.7	0.8	mg/L	09/30/10 0900	09/30/10
D02344	014	28	20116-562	Water	3.6	0.8	mg/L	09/30/10 0900	09/30/10
D02345	015	28	20116-563	Water	3.5	0.8	mg/L	09/30/10 0900	09/30/10


Study Number 20116 Hyalella azteca
28 Day Assay
Device - MicroPoint1
Serial Number - N07126
Device ID - Temp
°C
Temperature
27
25.2
23.4
21.6
19.8
18
Mean: 23.0
Minimum: 19.8
Maximum: 25.8
12:00:00 PM Sep 02, 2010 UTC-04:00
02:24:00 AM Sep 08, 2010 UTC-04:00
04:48:00 PM Sep 13, 2010 UTC-04:00
07:12:00 AM Sep 19, 2010 UTC-04:00
09:36:00 PM Sep 24, 2010 UTC-04:00
12:00:00 PM Sep 30, 2010 UTC-04:00

Test Sediment Preparation Notes (3) AM 8/31

Study Number: ~~20016 + 200~~ 20116 + 20117

Client: Nobis Engineering, Inc

Project: DAS-RAC2-030

Field ID	ESI Code (3) AM 9/1/10	Sample Number	Notes
WB-1	~~20116~~ 20108 ~~20117~~	001	≤ 1 gallons left after addition Seived to 2mm
WB-2		002	≈ 1 1/2 gallons left after additions Seived to 2mm
AR-8-4		003	= 1 gallon left after addition Seived to 2mm
AR-8-5		004	> 1 1/2 gallons left after addition Seived to 2mm
AR-9-5		005	= 1 1/2 gallons left after addition Seived to 2mm
AR-9-6		006	< 1 1/2 gallons left after addition Seived to 2mm
AR-9-7		007	≈ 1 1/2 gallons left after addition Seived to 2mm
AR-4-1		008	≈ 1 1/2 gallons left after addition Seived to 2mm
AR-4-2		009	≈ 1 gallon left after addition Seived to 2mm
AR-5-1		010	≈ 1 1/2 gallons left after addition Seived to 2mm
AR-5-2		011	> 1 1/2 gallons left after adding Seived to 2mm
AR-6-3		012	> 1 1/2 gallons left after adding Seived to 2mm
AR-~~7~~6-2 (3) AM 8/31		013	> 1 1/2 gallons left after adding Seived to 2mm
AR-7-2		014	= 1 1/2 gallons left after adding Seived to 2mm
AR-7-1		015	> 1 gallon left after adding Seived to 2mm

Date: 8/31/10 9/1/10

Initial: AM

Aquatic Research Organisms

DATA SHEET

Rec 9.2.10 1200

I. Organism History

Species Hyalella azteca

Source: Lab reared x Hatchery reared ____ Field collected ____

Hatch date 8/27/10 Receipt date ____

Lot number 08 27 10 HA Strain ARO

Brood origination US Fish Mo

II. Water Quality

Temperature 24 °C Salinity – ppt D.O. SAT ppm

pH 7.4 su Hardness ≈120 ppm Alkalinity ≈140 ppm

III. Culture Conditions

Freshwater X Saltwater ____ Other ____

Recirculating ____ Flow through ____ Static x

DIET: Flake food x Phytoplankton ____ Trout chow x

Artemia ____ Rotifers ____ YCT ____ Other ____

Prophylactic treatments: ____

Comments: ____

IV. Shipping Information

Client: ESI # of Organisms 1700+

Carrier: Pick-up Date shipped 9/2/10

Biologist: [illegible]

PO BOX 1271 HAMPTON NH 03843-1271 (603) 926-1650 AROFISH@AOL.COM

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/2/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
715	AM	4.02	4.00	6.98	7.00	10.09	10.01	6.98	1311	1277	9.23	9.50	18.34	18.30	37.23	35.01

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5105	N/A
S/C check	C-5073	9/6/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/3/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
730	AM	4.05	4.00	6.94	7.00	10.10	10.01	6.95	1172	1277	9.42	9.31	18.60	18.50	37.52	34.98

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5105	N/A
S/C check	C-5073	9/6/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/4/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0935	nc	4.00	4.00	6.95	7.00	10.07	10.01	6.97	1305	1412	9.02	9.10	19.5	19.57		

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5105	N/A
S/C check	C-5073	9/6/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/5/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
10:00	JTP	4.05	4.00	6.91	7.00	10.04	10.00	7.01	1.175	1.304	9.08	9.30	18.97	18.90	37.51	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5105	N/A
S/C check	C-5073	9/6/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/6/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
830	AM	4.05	4.00	7.01	7.00	10.02	10.00	6.98	1325	1251	10.23	9.71	17.41	17.30	33.35	34.98

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	~~9/10/10~~ 3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5105	N/A
S/C check	C-5107	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/7/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
8:00	JTP	4.01	4.00	7.00	7.00	9.95	10.00	7.00	1.397	1.331	8.93	9.10	20.30	20.20	34.47	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-~~5105~~ 5118 JTP 9/7/10	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/8/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
1030	AM	4.01	4.00	6.98	7.00	9.99	10.00	6.98	1314	1304	8.90	9.10	20.48	20.40		

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/9/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
730	AM	4.02	4.00	7.02	7.00	10.07	10.01	6.96	1336	1227	9.91	9.32	18.83	18.70	33.21	35.01

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/9/10
Salinity Std.	C-5110	N/A
S/C check	C-5107	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/10/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
7:55	JTP	3.98	4.00	6.93	7.00	10.03	10.00	7.01	1.339	1.304	9.18	9.30	18.76	18.60	34.14	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5114	9/30/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/11/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0850	ML	4.07	4.00	6.94	7.00	10.09	10.01	7.02	1464	1415	9.61	9.30	18.6	18.67	33.46	35.00
				6.92	7.00											

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	3/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5114	9/30/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9-12-10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0940	DM	4.08	4.00	7.08	7.00	9.96	10.00	6.99	1321	1277	9.47	9.30	18.71	18.70	33.56	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A2829	3-12
pH 7 buffer	A2828	3-12
pH 10 buffer	A2830	3-12
pH 7 check	C5114	9-30-10
Salinity Std.	C5110	N/A
S/C check	C5109	9-27-10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/13/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
710	AM	4.01	4.00	6.98	7.06	10.08	10.01	6.95	1324	1277	8.72	9.29	18.81	18.70	36.22	35.02

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2827	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5114	9/30/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/14/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
600	AM	4.02	4.00	6.99	7.00	10.03	10.00	6.95	1324	1304	9.29	9.30	19.41	19.30	33.85	34.98

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2827	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5114	9/30/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/29/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/15/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
1245	JTP	4.02	4.00	6.93	7.00	9.96	10.00	7.01	1.355	1.304	9.51	9.10	20.60	20.0	33.40	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5114	9/30/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/16/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0810	AM	4.07	4.00	6.96	7.00	10.12	10.02	6.95	1294	1251	9.22	9.76	16.74	16.80		

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. value	Duplicates duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/17/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0800	JTP	4.06	4.00	6.92	7.00	9.89	10.00	7.05	1.398	1.331	9.48	9.10	20.35	20.30	33.29	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-~~5110~~ 5133	(F3) JTP 9/17 N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/18/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0900	JTP	4.08	4.00	6.92	7.00	10.10	10.00	7.01	1.347	1.251	9.16	9.50	18.02	17.90	32.07	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. value	Duplicates duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/19/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
915	AM	4.04	4.00	6.94	7.00	10.10	10.01	6.95	1310	1251	9.78	9.51	17.52	17.40	33.21	34.98

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5133	N/A
S/C check	C-5107	9/29/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/20/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
800	AM	4.00	4.00	7.02	7.00	10.02	10.00	6.96	1372	1277	9.52	9.50	18.42	18.30	3241	34.99

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2827	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/21/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0705	JTP	4.02	4.00	6.93	7.00	10.02	10.00	7.00	1.321	1.224	10.22	9.90	16.01	15.90	31.58	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/22/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0630	JTP	4.06	4.00	6.93	7.00	9.95	10.00	6.99	1.419	1.277	9.25	9.30	18.81	18.70		35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/23/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0800	JTP	4.06	4.00	6.95	7.00	10.04	10.00	7.02	1.383	1.277	9.36	9.30	18.77	18.70	31.83	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	~~A-2826~~ CF5111 JTP	9/28/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/24/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
730	AM	4.03	4.00	6.96	7.00	10.12	10.02	6.95	1367	1277	9.21	9.51	18.38	18.30	32.33	34.98

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5140	10/14/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/25/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
1120	WL	4.07	4.00	6.91	7.00	10.08	10.01	6.97	1510	1408	8.51	8.70	21.6	21.67	34.29	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5140	10/14/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9·26·10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0900	DM	4.06	4.00	6.98	7.00	10.04	10.00	6.99	1330	1304	9.96	9.3	19.20	19.10	32.41	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A·2829	3·12
pH 7 buffer	A·2828	2·12
pH 10 buffer	A·2830	3·12
pH 7 check	C-5140	10·14·10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9·27·10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9-27-10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0800	JTP	4.01	4.00	6.96	7.00	9.99	10.00	7.00	1.376	1.277	9.07	9.30	18.76	18.70	32.43	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3-12
pH 7 buffer	A-2828	2-12
pH 10 buffer	A-2830	3-12
pH 7 check	C-5140	10-14-10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9-27-10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/28/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0800	JTP	4.06	4.00	6.94	7.00	10.08	10.00	6.99	1.360	1.304	8.45	9.10	19.97	19.90	33.39	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5140	10/14/1
Salinity Std.	C-5144	N/A
S/C check	C-5145	10/18/1

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/29/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
815	AM	4.02	4.00	6.95	7.00	10.05	10.01	6.96	1432	1386	8.71	8.61	22.57	22.50	33.32	34.98

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5140	10/14/10
Salinity Std.	C-5144	N/A
S/C check	C-5145	10/18/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/30/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0700	JTP	4.04	4.00	6.93	7.00	10.03	10.00	7.01	1.300	1.277	9.60	9.30	18.96	18.90	34.21	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5140	10/14/10
Salinity Std.	C-5144	N/A
S/C check	C-5145	10/18/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

CALIBRATION LOG FOR METTLER SCALE MODEL AE100 - ESI DESIGNATION PRL-1202

September 2010		ANALYTICAL RANGE (0-180g) (Acceptable Range = ± 0.0005 g)								SEMI-MICRO RANGE (0-32 g) (Acceptable Range = ± 0.00005 g)							
DATE	INIT	100.0000 g	✓	10.0000 g	✓	1.0000 g	✓	0.1000 g	✓	0.10000 g	✓	0.05000 g	✓	0.01000 g	✓	0.00500 g	✓
1																	
2	LB	100.0002	✓	10.0000	✓	1.0000	✓	0.0999	✓	0.10000	✓	0.05000	✓	0.00998	✓		
3	Am	100.0002	✓	10.0000	✓	1.0001	✓	0.1000	✓	0.10001	✓	0.05001	✓	0.01002	✓		
4																	
5																	
6	Am	100.0001	✓	10.0000	✓	1.0001	✓	0.1000	✓	0.10000	✓	0.05001	✓	0.01003	✓		
7																	
8	SJ	100.0001	✓	10.0000	✓	0.9999	✓	0.1000	✓	0.10000	✓	0.05000	✓	0.01001	✓		
9	ne	100.0001	✓	9.9999	✓	0.9999	✓	0.1000	✓	0.09998	✓	0.04996	✓	0.0997	✓		
10	SJ	100.0001	✓	9.9999	✓	0.9999	✓	0.1000	✓	0.10001	✓	0.05001	✓	0.01004	✓		
11	EAL	100.0001	✓	9.9999	✓	0.9999	✓	0.1000	✓	0.09999	✓	0.05000	✓	0.00999	✓		
12	EAL	100.0001	✓	10.0000	✓	0.9999	✓	0.1000	✓	0.09999	✓	0.05000	✓	0.00999	✓		
13	EAL	100.0001	✓	9.9998	✓	0.9999	✓	0.1000	✓	0.10001	✓	0.04999	✓	0.00996	✓		
14	JTP	100.0001	✓	9.9999	✓	0.9999	✓	0.0999	✓	0.09999	✓	0.04998	✓	0.00999	✓		
15	Am	100.0001	✓	9.9998	✓	1.0001	✓	0.0999	✓	0.09998	✓	0.05002	✓	0.00997	✓		
16	Am	99.9999	✓	9.9998	✓	0.9998	✓	0.0996	✓	0.09999	✓	0.04999	✓	0.00997	✓		
17	EAL	100.0003	✓	10.0001	✓	0.9998	✓	0.1000	✓	0.09999	✓	0.05001	✓	0.00998	✓		
18																	
19																	
20	NLF	99.9998	✓	10.0002	✓	0.9998	✓	0.0999	✓	0.09999	✓	0.04999	✓	0.00999	✓		
21	EAL	100.0001	✓	10.0000	✓	0.9999	✓	0.0999	✓	0.10001	✓	0.05002	✓	0.01001	✓		
22	JTP	100.0002	✓	10.0001	✓	1.0000	✓	0.1000	✓	0.09997	✓	0.04999	✓	0.01002	✓		
23	EAL	99.9997	✓	10.0000	✓	0.9999	✓	0.1000	✓	0.09997	✓	0.05000	✓	0.00996	✓		
24	JTP	100.0001	✓	10.0000	✓	0.9999	✓	0.1000	✓	0.10001	✓	0.05002	✓	0.01002	✓		
25																	
26																	
27	Am	100.0002	✓	9.9999	✓	0.9999	✓	0.0999	✓	0.09999	✓	0.04999	✓	0.00997	✓		
28																	
29																	
30																	

CALIBRATE USING CERTIFIED CLASS "S" WEIGHTS ONLY.
INDICATE "NOT USED" ON DAYS WHERE THE BALANCE IS NOT USED.

CALIBRATION LOG FOR Fischer SCALE MODEL 225D - ESI DESIGNATION -

October 2010		ANALYTICAL RANGE (0-180g) (Acceptable Range = ± 0.0005 g)								SEMI-MICRO RANGE (0-32 g) (Acceptable Range = ± 0.00005 g)							
DATE	INIT	100.0000 g	✓	10.0000 g	✓	1.0000 g	✓	0.1000 g	✓	0.10000 g	✓	0.05000 g	✓	0.01000 g	✓	0.00500 g	✓
1	ne	100.0001	✓	10.0000	✓	0.9999	✓	0.0999	✓	0.10002	✓	0.04999	✓	0.00998	✓		
2																	
3																	
4	SJ	100.0001	✓	10.0000	✓	0.9999	✓	0.0999	✓	0.09997	✓	0.04996	✓	0.00996	✓		
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
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29																	
30																	
31																	

CALIBRATE USING CERTIFIED CLASS "S" WEIGHTS ONLY.
INDICATE "NOT USED" ON DAYS WHERE THE BALANCE IS NOT USED.

Subject: RE: Reference samples for sed tox samples?
From: Ann T Chalmers <chalmers@usgs.gov>
Date: Fri, 3 Sep 2010 18:12:13 -0400
To: "Gail Deruzzo" <GDeruzzo@nobisengineering.com>, r.mcisaac@envirosystems.com
CC: "Jeffrey R Deacon" <jrdeacon@usgs.gov>, "Liyang Chu" <LChu@nobisengineering.com>

Hi Gail/Renee,
The reference sites are
AR2 -4 (S-1)
AR2 - 5 (S-2)
both samples collected on 8/23.
Thanks,
Ann

Ann Chalmers
US Geological Survey
Rm 324, 87 State St
P.O. Box 628
Montpelier, Vermont 05602
(802) 828-4511 (voice)
(802) 828-4465 (fax)

From:	"Gail Deruzzo" <GDeruzzo@nobisengineering.com>
To:	"Jeffrey R Deacon" <jrdeacon@usgs.gov>, "Liyang Chu" <LChu@nobisengineering.com>
Cc:	"Ann T Chalmers" <chalmers@usgs.gov>
Date:	08/31/2010 08:35 AM
Subject:	RE: Reference samples for sed tox samples?

I do not think we need the information until they are reporting the data. Perhaps you can have Ann get back to us next week, then.
Thank you,
Gail

From: Jeffrey R Deacon [mailto:jrdeacon@usgs.gov]
Sent: Tuesday, August 31, 2010 8:32 AM
To: Liyang Chu
Cc: Ann T Chalmers; Gail Deruzzo
Subject: Re: Reference samples for sed tox samples?

Hi Liyang:

Ann is in the field this week and will likely not see this question until she returns. I was not involved iwth the sampling, so I'm not sure.

Jeff

Subject: RE: Samples Received 08-26-10 for DAS-RAC2-030
From: "Gail Deruzzo" <GDeruzzo@nobisengineering.com>
Date: Thu, 26 Aug 2010 16:03:15 -0400
To: "Renee McIsaac" <r.mcisaac@envirosystems.com>
CC: "Kenneth Simon" <ksimon@envirosystems.com>

Hi, Renee!
Our sampler had some trouble with the IDs.
Please make your sample 005 = D02335 and 006=D02336 in your data system.
Thanks,
Gail

From: Renee McIsaac [mailto:r.mcisaac@envirosystems.com]
Sent: Thursday, August 26, 2010 3:22 PM
To: Gail Deruzzo
Cc: Kenneth Simon
Subject: Samples Received 08-26-10 for DAS-RAC2-030

Hello Gail,

We received 3 samples on 08/26/10 for the project associated with DAS-RAC2-030 and all samples were received in good condition.
I have attached documentation of their receipt.
Please let me know if you have any questions.

Thanks,
Renee McIsaac
ERA Project Manager

EnviroSystems, Inc.
Specialists in Environmental Toxicology and Chemistry
PO Box 778 / 1 Lafayette Road
Hampton, NH 03843-0778
Voice: 603-926-3345 ext. 212 / Fax: 603-926-3521

http://www.envirosystems.com

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USEPA Contract Laboratory Program
Generic Chain of Custody

Reference Case
Client No: 0066S
SDG No:
L

Date Shipped: 8/25/2010	**Chain of Custody Record**	**Sampler Signature:** USGS	**For Lab Use Only**
Carrier Name: Courier	**Relinquished By** (Date / Time)	**Received By** (Date / Time)	**Lab Contract No:** 20108
Airbill:	1 [illegible] 8/25/10 0940	J. White 8/25/10 0940	**Unit Price:**
Shipped to: EnviroSystems, Inc. NH 1 Lafayette Road Hampton NH 03842 (603) 926-3345	2		**Transfer To:**
	3		**Lab Contract No:**
	4		**Unit Price:**

	SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	FOR LAB USE ONLY Sample Condition On Receipt
001	D02331	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	1 (Ice Only) (2)	AR-02-SDBI0004-0-08 2310	S: 8/23/2010 14:30	
002	D02332	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	2 (Ice Only) (2)	AR-02-SDBI0005-0-08 2310	S: 8/23/2010 16:30	
003	D02333	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	3 (Ice Only) (2)	AR-08-SDBI0004-0-08 2410	S: 8/24/2010 10:30	
004	D02334	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	4 (Ice Only) (2)	AR-08-SDBI0005-0-08 2410	S: 8/24/2010 12:00	

Shipment for Case Complete? N	**Sample(s) to be used for laboratory QC:**	**Additional Sampler Signature(s):**	**Cooler Temperature Upon Receipt:** 3°C	**Chain of Custody Seal Number:**
Analysis Key:	**Concentration:** L = Low, M = Low/Medium, H = High	**Type/Designate:** Composite = C, Grab = G		**Custody Seal Intact?** NA **Shipment Iced?** ✓

Azteca = 28-day Hyalella azteca, Tentans = 20-day Chironomus tentans

TR Number: 1-565205597-082510-0001

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SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	20108		
SDG No:			
Project:	DAS-RAC2-030		
Delivered via:	**ESI**		
Date and Time Received:	08/25/10 0940	Date and TIme Logged into Lab:	08/25/10 1630
Recieved By:	DW	Logged into Lab by:	AM
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	2C, 3C	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	No		
COC Complete:		Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	No
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required		

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
D02331	20108-001	S	HA28T, CD20T, TVS;	1x2G P	4 C	AM
D02332	20108-002	S	HA28T, CD20T, TVS;	1x2G P	4 C	AM
D02333	20108-003	S	HA28T, CD20T, TVS;	1x2G P	4 C	AM
D02334	20108-004	S	HA28T, CD20T, TVS;	1x2G P	4 C	AM

Notes and qualifications:

Samples containers were identified by their station location, the sample number was not on the container.
AM 08/25/10

Field Data Sheet

Station ID: AR2-4

Date (MM/DD/YYYY): 8/23/2010

Time : 1430

Medium: Sediment

Analysis: Sediment toxicity
28-day *Hyalella azteca*
20-day *Chironomus tentans*

containers: 2

Field Data Sheet

Station ID: AR2-5

Date (MM/DD/YYYY): 8/23/2010

Time : 1630

3°C
upon receipt

Medium: Sediment

Analysis: Sediment toxicity
28-day *Hyalella azteca*
20-day *Chironomus tentans*

containers: 1

Field Data Sheet

Station ID: AR8-4

Date (MM/DD/YYYY): 9/24/2010

Time : ~~1200~~ 1030

Medium: Sediment

Analysis: Sediment toxicity
28-day *Hyalella azteca*
20-day *Chironomus tentans*

containers: 1

Field Data Sheet

Station ID: AR8-5

Date (MM/DD/YYYY): 9/24/2010

Time : 1200

Medium: Sediment

Analysis: Sediment toxicity
28-day *Hyalella azteca*
20-day *Chironomus tentans*

containers: 1

2°C
Upon receipt

USEPA Contract Laboratory Program
Generic Chain of Custody

Reference Case
Client No: 0066S
SDG No:
L

Date Shipped: 8/26/2010	**Chain of Custody Record**	Sampler Signature:	**For Lab Use Only**
Carrier Name: Courier	Relinquished By (Date / Time)	Received By (Date / Time)	Lab Contract No: 20108
Airbill:	1 [illegible] 8/26/10 0945	[illegible] White 8/26/10 9:45	Unit Price:
Shipped to: EnviroSystems, Inc. NH 1 Lafayette Road Hampton NH 03842 (603) 926-3345	2		Transfer To:
	3		Lab Contract No:
	4		Unit Price:

	SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		FOR LAB USE ONLY Sample Condition On Receipt
005	D002335	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	40 (Ice Only) (2)	AR-09-SDBI0005-0-08 2510	S: 8/25/2010	17:30	
006	D022336	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	41 (Ice Only) (2)	AR-09-SDBI0006-0-08 2510	S: 8/25/2010	10:00	
007	D02337	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	42 (Ice Only) (2)	AR-09-SDBI0007-0-08 2510	S: 8/25/2010	12:30	

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Cooler Temperature Upon Receipt: 3-4°C	Chain of Custody Seal Number:
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G		Custody Seal Intact? NA / Shipment Iced? Y

Azteca = 28-day Hyalella azteca, Tentans = 20-day Chironomus tentans

TR Number: 1-565205597-082510-0002

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ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	20108		
SDG No:			
Project:	DAS-RAC2-030		
Delivered via:	**ESI**		
Date and Time Received:	08/26/10 0945	Date and TIme Logged into Lab:	08/26/10 1455
Recieved By:	DW	Logged into Lab by:	AM
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	3-4C	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required		

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
D02335	20108-005	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02336	20108-006	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02337	20108-007	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes

Notes and qualifications:

Sample Numbers have been updated with the correct ID's as identified by Gail DeRuzzo in an e-mail dated 08/26/2010.

USEPA Contract Laboratory Program
Generic Chain of Custody

Reference Case
Client No: 0066S
SDG No:
L

Date Shipped:	8/30/2010
Carrier Name:	Courier
Airbill:	
Shipped to:	EnviroSystems, Inc. NH 1 Lafayette Road Hampton NH 03842 (603) 926-3345

Chain of Custody Record

Relinquished By	(Date / Time)	Received By	(Date / Time)
1 [illegible] Rawson	8/30/10 1010	[illegible]	8/30/10 1010
2			
3			
4			

Sampler Signature:

For Lab Use Only
Lab Contract No:
Unit Price:
Transfer To:
Lab Contract No:
Unit Price:

	SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	FOR LAB USE ONLY Sample Condition On Receipt
008	D02338	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	49 (Ice Only) (2)	AR-04-SDBI0001-0-08 2710	S: 8/27/2010 14:00	
009	D02339	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	50 (Ice Only) (2)	AR-04-SDBI0002-0-08 2710	S: 8/27/2010 16:30	
010	D02340	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	51 (Ice Only) (2)	AR-05-SDBI0001-0-08 2710	S: 8/27/2010 9:00	
011	D02341	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	52 (Ice Only) (2)	AR-05-SDBI0002-0-08 2710	S: 8/27/2010 10:45	
012	D02342	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	54 (Ice Only) (2)	AR-06-SDBI0003-0-08 2610	S: 8/26/2010 17:00	
013	D02343	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	55 (Ice Only) (2)	AR-06-SDBI0002-0-08 2610	S: 8/26/2010 15:30	
014	D02344	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	56 (Ice Only) (2)	AR-07-SDBI0002-0-08 2610	S: 8/26/2010 12:00	
015	D02345	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	57 (Ice Only) (2)	AR-07-SDBI0001-0-08 2610	S: 8/26/2010 10:00	

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Cooler Temperature Upon Receipt: 2°C	Chain of Custody Seal Number:
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Custody Seal Intact? ___	Shipment Iced? Yes

Azteca = 28-day Hyalella azteca, Tentans = 20-day Chironomus tentans

TR Number: 1-565205597-083010-0001

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ESI

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	20108		
SDG No:			
Project:	DAS-RAC2-030		
Delivered via:	**ESI**		
Date and Time Received:	08/30/10 1010	Date and TIme Logged into Lab:	08/30/10 1200
Recieved By:	DW JTP	Logged into Lab by:	JTP
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	2C	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):			
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required		

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
D02338	20108-008	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02339	20108-009	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02340	20108-010	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02341	20108-011	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02342	20108-012	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02343	20108-013	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02344	20108-014	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02345	20108-015	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes

Notes and qualifications:

APPENDIX E

APPENDIX E

CHIRONOMUS DILUTUS, SURVIVAL AND GROWTH SEDIMENT TOXICITY TEST

TOXICOLOGICAL EVALUATION
OF FRESHWATER SEDIMENT SAMPLES

Nobis Engineering, Inc. Project 80013
DAS-RAC2-030
Task Order Number: 10-NH-80013-045-TO-01

20 Day *Chironomus dilutus*
Survival and Growth Sediment Toxicity Test

Prepared For:

Nobis Engineering, Incorporated
585 Middlesex Street
Lowell, Massachusetts 01851

Prepared By:

EnviroSystems, Incorporated
1 Lafayette Road
Hampton, New Hampshire 03842

September 2010
Reference Number 20108Cd

As per the Statement of Work provided by Nobis Engineering, Incorporated for services regarding Specification DAS-RAC2-030:

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. In addition, I certify, that to the best of my knowledge and belief, the data as reported are true and accurate. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature:

Kenneth A. Simon, Technical Director — September 29, 2010 Date

TABLE OF CONTENTS

1.0 INTRODUCTION 3

2.0 MATERIALS AND METHODS 3
- 2.1 General Methods, Biological Evaluations 3
- 2.2 Test Species 3
- 2.3 Test Samples and Laboratory Control Sediment 3
- 2.4 *Chironomus dilutus* Survival and Growth Toxicity Tests 3
- 2.5 Statistical Analysis 4
- 2.6 Quality Control 4
- 2.7 Protocol Deviations 4

3.0 RESULTS AND DISCUSSION 5
- 3.1 *Chironomus dilutus* 20 Day Survival and Growth Evaluation 5
- 3.2 Summary 6

4.0 REFERENCES 7

LIST OF TABLES

Table 1. Sample Collection and Receipt Summary. 5
Table 2. Reference Toxicant Evaluation. 5
Table 3. Summary of Acceptable Endpoints and Measurements. 6
Table 4. Summary of Project Reference Site Performance. 6
Table 5. Summary of Significant Endpoints. 7
Table 6. Day 20 *C. dilutus* Survival Summary and Statistical Analysis 8
Table 7. Day 20 *C. dilutus* Ash Free Dry Weight Summary and Statistical Analysis 9
Table 8. Day 20 *C. dilutus* Ash Free Dry Biomass Summary and Statistical Analysis 10
Table 9. Summary of Overlying Water Qualities 11

APPENDIX A: RAW DATA AND STATISTICAL SUPPORT 13

TOXICOLOGICAL EVALUATION
OF FRESHWATER SEDIMENT SAMPLES

Nobis Engineering, Inc. Project 80013
DAS-RAC2-030

20 Day *Chironomus dilutus*
Survival and Growth Sediment Toxicity Test

1.0 INTRODUCTION

This report presents the results of toxicity tests completed on sediment samples collected for Nobis Engineering, Inc. Project Number 80013, Task Order Number: 10-NH-80013-045-TO-01. Samples were collected by the US Geological Survey. Testing was based on programs and protocols developed by the ASTM (2009) and US EPA (2000). The toxicity of samples was assessed by conducting 20 day survival and growth tests using the freshwater midge, *Chironomus dilutus*. Assays and supporting analyses were performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire.

Toxicity tests expose groups of organisms to environmental samples, a laboratory control and field reference sites for a specified period to assess potential impacts on a variety of endpoints, such as survival, growth or reproduction. Analysis of variance techniques are used to determine the relative toxicity of the samples as compared to the laboratory control and/or field reference sites. Endpoints for this study included survival and growth (measured as ash free dry weight and ash free dry biomass).

2.0 MATERIALS AND METHODS

2.1 General Methods, Biological Evaluations

Toxicological and analytical protocols used in this program follow procedures outlined in *Test Methods for Measuring the Toxicity of Sediment-Associated Contaminants with Freshwater Invertebrates* (ASTM 2009), *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates* (US EPA 2000) and *Standard Methods for the Examination of Water and Wastewater*, 20th Edition (APHA 1998). These protocols provide standard approaches for physical and chemical analysis and for the evaluation of toxicological effects of sediments on aquatic invertebrates.

2.2 Test Species

C. dilutus were obtained from Aquatic BioSystems, Inc., Fort Collins, Colorado. Egg cases were shipped overnight to ESI. At ESI, egg cases were transferred to fresh water and placed in an incubator. Observations were made daily until hatch. Once larvae hatched and left the egg casing, they were collected and added to the test vessels.

2.3 Test Samples and Laboratory Control Sediment

Sediment samples collected for Project 80013 were received at ESI under chain of custody. Once received, samples were inspected to determine integrity, given unique sample numbers and logged into the laboratory sample management database. Once logged in the samples were placed in a secure refrigerated, 2 - 4 °C, storage area. A listing of sample sites, sample collection, and receipt information is summarized in Table 1.

The control substrate was an artificial sediment prepared according to guidance presented in the EPA/ASTM method. Organic detritus from Chironomid cultures plus disintegrated paper pulp was used to provide organic content. Overlying water for the sediment toxicity tests was natural surface water, collected from the upper portion of the Taylor River watershed in Hampton Falls, New Hampshire. Use of natural surface water is recommended by the protocol (EPA 2000, ASTM 2009).

2.4 *Chironomus dilutus* Survival and Growth Toxicity Tests

Prior to test initiation test sediments were sieved using a ≥2 mm sieve to remove large stones, sticks, roots, man-made material and any indigenous organisms. Once sieved, the sediment was homogenized and placed in test chambers. Overlying water was added immediately and then the chambers were allowed to stabilize. The chambers received one volume addition daily until organisms were added.

Test vessels were 400 mL glass beakers containing 100 mL of sediment and approximately 250 mL of overlying water. Test vessels were drilled at a consistent height above their bases and the hole covered with Nytex® screen. The screened hole facilitates water exchange while retaining test organisms. Vessels were maintained in a water bath during the test. Depth of the water in the bath was set below the drain hole in the test vessel to eliminate flow of water from the bath into the test vessel. Test chambers were randomly placed in the water bath after addition of test sediments. Placement locations were generated by the CETIS® software program. The randomization work sheets are included in the data appendix. The water bath was maintained in a limited access, temperature controlled room. Temperatures in the room and water bath were independently set at a temperature of 23°C. Temperature was recorded on an hourly frequency using a temperature logger placed in a surrogate vessel. The photoperiod in the test chamber was set at 16:8 hour light:dark. Lighting was supplied by cool white florescent bulbs.

On day 0, a total of 10 larvae were randomly selected from the pool of organisms and added to test vessels below the water surface using a glass transfer pipet with the assistance of a dissecting microscope. Each treatment group included 8 replicates and a surrogate test chamber that was used to obtain water qualities during the assay without disturbing the test animals. The surrogate chamber was treated the same as actual test chambers with the addition of animals and food, but was not used to determine endpoint data.

Prior to the daily overlying water renewal, dissolved oxygen, pH, specific conductance and temperature were measured in the surrogate chamber for each treatment. Overlying water in each replicate was then renewed. The volume of water added to each test chamber was approximately two volumes. Water exchanges were facilitated by use of a distribution system designed to provide equal, regulated flow to each chamber. The system was activated manually by the addition of water during the assay. After overlying water renewal each replicate was fed 1 mL of 6 g/L Tetramin® flake fish food suspension. Alkalinity, ammonia and hardness of the overlying water were measured on days 0, 10 and 20. Overlying water quality records are available in Appendix A.

After 20 days exposure, replicates of each test treatment were terminated to collect data for the survival and growth endpoints. Each test chamber was gently swirled to loosen the sediments and the test material was emptied into a stainless steel sieve. The sediments were washed through the sieve using fresh water and material left on the screen was sorted to recover the organisms. This process was continued until the entire sample was evaluated. Surviving larvae were placed on tared weighing pans; partially and fully emerged organisms were recorded in survival counts but excluded in weight measurements. Pans were dried overnight at 104°C to obtain dry weight to the nearest 0.01 mg. The organisms were then fired in a muffle furnace for two hours at 550 °C to obtain the ash free dry weight to the nearest 0.01 mg. The mean weight of surviving organisms was determined to assess growth.

2.5 Statistical Analysis

Survival and growth were analyzed using CETIS® software to determine significant differences between the test sediments and both the associated laboratory control and reference sediments. Data sets were evaluated to determine normality of distribution and homogeneity of sample variance. Data sets were subsequently evaluated using the appropriate parametric or non-parametric Analysis of Variance (ANOVA) statistic. Statistical comparisons were made for the following endpoints; day 20 survival, ash free dry weight and dry biomass. Pair-wise comparisons were made using the appropriate statistical evaluation. Statistical difference was evaluated at $\alpha=0.05$.

2.6 Quality Control

As part of the laboratory quality control program, reference toxicant evaluations are conducted on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. Results are summarized in Table 2.

2.7 Protocol Deviations

Review of data generated during the 20 day exposure period documented the following protocol deviations.

In a limited number of instances more than 10 animals were added to test chambers at the start of the assay. Review of the data documented 2 instances where 11 organisms were added to a replicate. In 1 replicate a total of 20 organisms were added to the test chamber.

The second protocol deviation relates to the temperature maintained for the assay. The method protocol specifies that the target temperature for this assay is 23°C and excursions of up to 3°C are allowed. Review of the data document that the lower bound of 20°C was exceeded. Temperature data collected as part of the daily water quality documented a temperature of 19.87 to 24.01°C during the 20 day exposure period with a computed mean value of 22.34°C. On Day 19 (09/21/10) temperature readings from 13 test chambers were below the lower limit. The temperature logger documented hourly values ranging from 20.2 to 24.8°C with a calculated mean value of 22.6°C. As all hourly temperature values were within protocol limits and the observed temperatures are within the natural limits for this species and this deviation should not have impacted the outcome of the assay.

It is the opinion of ESI's study director that these deviations did not adversely affect the outcome of the assay.

TABLE 1. Summary of Sample Collection Information. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

			Sample	Sample Collected		Sample Received	
Field ID	Station Location	ESI Code	Number	Date	Time	Date	Time
D02331	AR-02-SDBI0004-0-082310	20108-001	001	08/23/10	1430	08/25/10	0940
D02332	AR-02-SDBI0005-0-082310	20108-002	002	08/23/10	1630	08/25/10	0940
D02333	AR-08-SDBI0004-0-082410	20108-003	003	08/24/10	1030	08/25/10	0940
D02334	AR-08-SDBI0005-0-082410	20108-004	004	08/24/10	1200	08/25/10	0940
D02335	AR-09-SDBI0005-0-082510	20108-005	005	08/25/10	1730	08/26/10	0945
D02336	AR-09-SDBI0006-0-082510	20108-006	006	08/25/10	1000	08/26/10	0945
D02337	AR-09-SDBI0007-0-082510	20108-007	007	08/25/10	1230	08/26/10	0945
D02338	AR-04-SDBI0001-0-082710	20108-008	008	08/27/10	1400	08/30/10	1010
D02339	AR-04-SDBI0002-0-082710	20108-009	009	08/27/10	1630	08/30/10	1010
D02340	AR-05-SDBI0001-0-082710	20108-010	010	08/27/10	0900	08/30/10	1010
D02341	AR-05-SDBI0002-0-082710	20108-011	011	08/27/10	1045	08/30/10	1010
D02342	AR-06-SDBI0003-0-082610	20108-012	012	08/26/10	1700	08/30/10	1010
D02343	AR-06-SDBI0002-0-082610	20108-013	013	08/26/10	1530	08/30/10	1010
D02344	AR-07-SDBI0002-0-082610	20108-014	014	08/26/10	1200	08/30/10	1010
D02345	AR-07-SDBI0001-0-082610	20108-015	015	08/26/10	1000	08/30/10	1010

TABLE 2. Reference Toxicant Evaluation. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Date	Endpoint		Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
Chironomus dilutus						
08/19/09	Survival	LC-50	6.31	2.90	0.0 - 8.6	Cadmium (mg/L)

3.0 RESULTS AND DISCUSSION

3.1 *Chironomus dilutus* 20 Day Survival and Growth Evaluation

At the end of the 20 day exposure period survival in the laboratory control treatment was 87.50% with a coefficient of variation (CV) of 11.83%. The minimum test acceptability criteria for survival in the laboratory control is ≥70%. The ash free dry weight was 2.845 mg with a CV of 23.25%. The minimum acceptable criteria for growth is a mean ash free dry weight (AFDW) of ≥0.48 mg/larvae after 20 days exposure. These criteria were met indicating that the organisms were healthy and not stressed by handling. Table 4 provides a summary of assay acceptability criteria and laboratory control achievement. Table 5 summarizes the reference site performance.

During daily water quality observations the temperature recorded for the assay had a mean value of 22.34°C with a range of 19.87 to 24.01°C. Confirmation temperature data collected in a surrogate replicate documented a mean temperature of 22.7°C with a range of 20.2 to 24.8°C. Test acceptability criteria requires a mean temperature of 23±1°C, with maximum temporary fluctuations of 23±3°C.

Table 3. Summary of Acceptable Endpoints and Measurements. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Endpoint / Measurement	Protocol Limit	Value		Protocol Met
Mean Survival	lab ≥ 70%	87.50	%	Yes
Ash Free Dry Weight	lab ≥ 0.48 mg	2.845	mg/individual	Yes
Temperature	Mean: 23°±1°C	22.34 / 22.6	daily / hourly	Yes / Yes
	Minimum: 20°C	19.87 / 20.2	daily / hourly	*No / Yes
	Maximum: 26°C	24.01 / 24.8	daily / hourly	Yes / Yes

* For a discussion of the temperature deviation, please see section 2.7 Protocol Deviations.

Table 4. Summary of Project Reference Site Performance. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

		Survival (%)		Growth - Weight (mg)		Growth - Biomass (mg)	
Field ID	ESI Code	Mean	CV	Mean	CV	Mean	CV
D02331	20108-001	82.50%	16.83%	2.421	16.33%	1.361	24.29%
D02332	20108-002	76.25%	28.85%	2.328	22.52%	1.253	38.22%

3.2 Summary

This program utilized protocols developed by the U.S. EPA and ASTM to assess the potential toxicological impacts that exposure to Project 80013 sediments would have on invertebrates. Table 5 provides a summary of sample that demonstrated a negative effect, based on the finding of a statistically significant reduction in an endpoint as compared to the laboratory control or reference site. Tables 6 through 8 provide summaries of assay endpoints and detailed statistical results for each sample location. Table 9 summarizes water qualities measured during the test. Laboratory bench sheets, detailed summaries of survival, dry weights and associated statistical support data are included in Appendix A.

Table 5. Summary of Significant Endpoints. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

		Finding of Significant Difference(s) between Project Sites and								
		Lab Control (20108-000)			D02331 (20108-001)			D02332 (20108-002)		
Field ID	ESI Code	survival	ash free dry wt	ash free dry biomass	survival	ash free dry wt	ash free dry biomass	survival	ash free dry wt	ash free dry biomass
D02331	20108-001									
D02332	20108-002									
D02333	20108-003									
D02334	20108-004		Yes							
D02335	20108-005	Yes			Yes			Yes		
D02336	20108-006	Yes	Yes		Yes	Yes				
D02337	20108-007									
D02338	20108-008	Yes			Yes					
D02339	20108-009									
D02340	20108-010		Yes							
D02341	20108-011									
D02342	20108-012		Yes							
D02343	20108-013		Yes			Yes				
D02344	20108-014		Yes							
D02345	20108-015	Yes	Yes							

4.0 REFERENCES

APHA. 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th Edition. Washington D.C.

ASTM. 2009. Annual Book of ASTM Standards. Volume 11.06. *Test Methods for Measuring the Toxicity of Sediment-Associated Contaminants with Freshwater Invertebrates*. E 1706-05. ASTM, Philadelphia.

US EPA. 2000. *Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates.* Second Edition. EPA/600-R-99/064. Method 100.5.

TABLE 6. Day 20 *C. dilutus* Survival Summary and Statistical Analysis. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Day 20 Survival Summary

Field ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Lab Control	20108-000	8	87.50%	70.0%	100.0%	11.83%
D02331	20108-001	8	82.50%	50.0%	90.0%	16.83%
D02332	20108-002	8	76.25%	30.0%	100.0%	28.85%
D02333	20108-003	8	85.00%	70.0%	100.0%	16.64%
D02334	20108-004	8	86.25%	60.0%	100.0%	15.10%
D02335	20108-005	8	40.00%	0.0%	90.0%	71.96%
D02336	20108-006	8	61.25%	0.0%	90.0%	50.46%
D02337	20108-007	8	76.25%	40.0%	100.0%	25.21%
D02338	20108-008	8	63.75%	0.0%	90.0%	46.64%
D02339	20108-009	8	85.00%	70.0%	100.0%	10.89%
D02340	20108-010	8	80.00%	40.0%	100.0%	23.15%
D02341	20108-011	8	67.50%	10.0%	100.0%	56.97%
D02342	20108-012	8	96.25%	90.0%	100.0%	5.38%
D02343	20108-013	8	90.63%	70.0%	100.0%	12.66%
D02344	20108-014	8	75.00%	30.0%	100.0%	39.68%
D02345	20108-015	8	70.00%	40.0%	100.0%	25.33%

Day 20 Survival Statistical Analysis

			Statistically Significant Difference as Compared to					
			Lab Control (20108-000)		D02154 (20108-001)		D02155 (20108-002)	
Field ID	ESI Code	Mean	p Value		p Value		p Value	
Lab Control	20108-000	87.50%						
D02331	20108-001	82.50%	0.1997	No				
D02332	20108-002	76.25%	0.1069	No	0.2665	No		
D02333	20108-003	85.00%	0.3818	No	0.6702	No	0.8220	No
D02334	20108-004	86.25%	0.4335	No	0.7342	No	0.8592	No
D02335	20108-005	40.00%	0.0004	Yes	0.0013	Yes	0.0073	Yes
D02336	20108-006	61.25%	0.0191*	Yes	0.0852[a]	No	0.1320	No
					0.0484	Yes		
D02337	20108-007	76.25%	0.0889	No	0.2474	No	0.4956	No
D02338	20108-008	63.75%	0.0141*	Yes	0.0249*	Yes	0.1533*	No
D02339	20108-009	85.00%	0.2907	No	0.6467*	No	0.8219*	No
D02340	20108-010	80.00%	0.1718	No	0.3992	No	0.6411	No
D02341	20108-011	67.50%	0.1158	No	0.1938	No	0.3257	No
D02342	20108-012	96.25%	0.9717	No	0.9948*	No	0.9879*	No
D02343	20108-013	90.63%	0.7190	No	0.8607	No	0.9448	No
D02344	20108-014	75.00%	0.1771	No	0.3298	No	0.5168	No
D02345	20108-015	70.00%	0.0174	Yes	0.0711	No	0.2565	No

Note: "*" Indicates the presence of an outlier. The p Value reported was calculated with the outlier included in the analysis. In these cases the exclusion of the outlier did not change the significance of the analysis.
"a" Indicates that an outlier has been excluded in the statistical analysis.

TABLE 7. Day 20 *Chironomus dilutus* Ash Free Dry Weight Summary and Statistical Analysis. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Ash Free Dry Weight Summary

Field ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Lab Control	20108-000	8	2.845	2.177	4.000	23.25%
D02331	20108-001	8	2.421	1.797	2.820	16.33%
D02332	20108-002	8	2.328	1.880	3.520	22.52%
D02333	20108-003	8	2.411	1.797	3.470	22.71%
D02334	20108-004	8	2.198	1.522	2.832	19.41%
D02335	20108-005	8	2.966	0.613	4.930	48.11%
D02336	20108-006	8	2.025	1.256	2.486	18.81%
D02337	20108-007	8	2.407	1.420	4.225	36.22%
D02338	20108-008	8	2.855	2.295	3.810	17.61%
D02339	20108-009	8	2.554	2.122	3.108	14.17%
D02340	20108-010	8	2.104	1.190	2.652	19.98%
D02341	20108-011	8	2.401	1.527	3.154	24.77%
D02342	20108-012	8	2.121	1.592	2.504	15.96%
D02343	20108-013	8	2.016	1.311	2.568	23.98%
D02344	20108-014	8	2.283	1.408	3.185	24.74%
D02345	20108-015	8	2.220	1.927	2.590	10.94%

Ash Free Dry Weight Statistical Analysis			Statistically Significant Difference as Compared to					
			Lab Control (20108-000)		D02154 (20108-001)		D02155 (20108-002)	
Field ID	ESI Code	Mean	p Value		p Value		p Value	
Lab Control	20108-000	2.845	-	-	-	-	-	-
D02331	20108-001	2.421	0.0707	No	-	-	-	-
D02332	20108-002	2.328	0.0524	No	0.3475*	No	-	-
D02333	20108-003	2.411	0.0870	No	0.4834	No	0.6191	No
D02334	20108-004	2.198	0.0178	Yes	0.1489	No	0.2983	No
D02335	20108-005	2.966	0.5820	No	0.7976*	No	0.8688	No
D02336	20108-006	2.025	0.0064	Yes	0.0354	Yes	0.1143*	No
D02337	20108-007	2.407	0.1381	No	0.4841*	No	0.5855*	No
D02338	20108-008	2.855	0.5121	No	0.9581	No	0.9654	No
D02339	20108-009	2.554	0.1465	No	0.7534	No	0.8339*	No
D02340	20108-010	2.104	0.0091	Yes	0.0717	No	0.1815*	No
D02341	20108-011	2.401	0.1093	No	0.4700	No	0.5938	No
D02342	20108-012	2.121	0.0077	Yes	0.0630	No	0.1826*	No
D02343	20108-013	2.016	0.0063	Yes	0.0442	Yes	0.1185	No
D02344	20108-014	2.283	0.0443	Yes	0.2899	No	0.4353	No
D02345	20108-015	2.220	0.0125	Yes	0.1202	No	0.5204*	No

Note: "*" Indicates the presence of an outlier. The p Value reported was calculated with the outlier included in the analysis. In these cases the exclusion of the outlier did not change the significance of the analysis.

TABLE 8. Day 20 *Chironomus dilutus* Dry Biomass Summary and Statistical Analysis. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Ash Free Dry Biomass Summary

Field ID	ESI Code	Reps	Mean	Minimum	Maximum	CV
Lab Control	20108-000	8	0.969	0.225	1.771	52.75%
D02331	20108-001	8	1.361	0.846	1.663	24.29%
D02332	20108-002	8	1.253	0.352	1.742	38.22%
D02333	20108-003	8	1.277	0.610	1.698	28.23%
D02334	20108-004	8	1.537	0.913	2.142	27.19%
D02335	20108-005	8	0.986	0.184	1.684	58.24%
D02336	20108-006	8	1.145	0.628	1.740	35.75%
D02337	20108-007	8	1.208	0.426	1.773	39.30%
D02338	20108-008	8	1.233	0.794	1.525	19.17%
D02339	20108-009	8	1.292	0.849	1.690	20.67%
D02340	20108-010	8	1.275	0.840	1.984	36.92%
D02341	20108-011	8	1.611	1.289	2.138	18.01%
D02342	20108-012	8	1.773	0.955	2.504	27.11%
D02343	20108-013	8	1.347	0.565	1.861	37.76%
D02344	20108-014	8	1.135	0.176	1.832	57.36%
D02345	20108-015	8	1.445	1.036	1.970	19.38%

Ash Free Dry Biomass Statistical Analysis			Statistically Significant Difference as Compared to					
			Lab Control (20108-000)		D02154 (20108-001)		D02155 (20108-002)	
Field ID	ESI Code	Mean	p Value		p Value		p Value	
Lab Control	20108-000	0.969	-	-	-	-	-	-
D02331	20108-001	1.361	0.9549	No	-	-	-	-
D02332	20108-002	1.253	0.8650	No	0.3052	No	-	-
D02333	20108-003	1.277	0.9071	No	0.3173	No	0.5429	No
D02334	20108-004	1.537	0.9855	No	0.8176	No	0.8863	No
D02335	20108-005	0.986	0.5226	No	0.0738	No	0.1800	No
D02336	20108-006	1.145	0.7606	No	0.1398	No	0.3243	No
D02337	20108-007	1.208	0.8253	No	0.2334	No	0.4253	No
D02338	20108-008	1.233	0.8836	No	0.2063	No	0.4605	No
D02339	20108-009	1.292	0.9323	No	0.3271	No	0.5773	No
D02340	20108-010	1.275	0.8833	No	0.3398	No	0.5354	No
D02341	20108-011	1.611	0.9911	No	0.9169	No	0.9333	No
D02342	20108-012	1.773	0.9970	No	0.9672	No	0.9759	No
D02343	20108-013	1.347	0.9196	No	0.4741	No	0.6440	No
D02344	20108-014	1.135	0.7098	No	0.1978	No	0.3418	No
D02345	20108-015	1.445	0.9817	No	0.7056	No	0.8278	No

TABLE 9. Summary of Overlying Water Qualities. Project 80013, DAS-RAC2-030 Sediment Evaluation. September 2010.

Field ID	ESI Code	Sample Number	Day	Conductivity (uS/cm)	Alkalinity (mg/L)	Hardness (mg/L)	Ammonia (mg/L)
Lab Control	20108-000	000	0	401	84	100	<0.1
D02331	20108-001	001	0	342	65	77	0.99
D02332	20108-002	002	0	332	54	75	0.45
D02333	20108-003	003	0	346	62	80	0.2
D02334	20108-004	004	0	345	65	80	0.24
D02335	20108-005	005	0	358	70	86	0.17
D02336	20108-006	006	0	336	53	76	0.26
D02337	20108-007	007	0	359	60	83	0.25
D02338	20108-008	008	0	460	92	91	0.18
D02339	20108-009	009	0	432	89	92	0.11
D02340	20108-010	010	0	344	62	78	0.22
D02341	20108-011	011	0	348	66	79	0.25
D02342	20108-012	012	0	328	50	73	0.18
D02343	20108-013	013	0	360	67	84	0.34
D02344	20108-014	014	0	349	64	82	0.37
D02345	20108-015	015	0	341	59	81	0.18
Lab Control	20108-000	000	10	339	78	89	0.72
D02331	20108-001	001	10	302	56	74	<0.1
D02332	20108-002	002	10	289	53	70	<0.1
D02333	20108-003	003	10	299	60	75	<0.1
D02334	20108-004	004	10	294	51	70	<0.1
D02335	20108-005	005	10	308	64	79	<0.1
D02336	20108-006	006	10	301	55	72	<0.1
D02337	20108-007	007	10	310	57	78	0.14
D02338	20108-008	008	10	323	54	78	0.17
D02339	20108-009	009	10	316	56	78	<0.1
D02340	20108-010	010	10	298	55	73	0.23
D02341	20108-011	011	10	299	57	75	<0.1
D02342	20108-012	012	10	301	60	77	<0.1
D02343	20108-013	013	10	299	57	75	0.12
D02344	20108-014	014	10	296	53	72	0.1
D02345	20108-015	015	10	302	56	75	<0.1
Lab Control	20108-000	000	20	299	72	73	<0.1
D02331	20108-001	001	20	268	48	60	<0.1
D02332	20108-002	002	20	279	48	64	<0.1
D02333	20108-003	003	20	282	51	64	<0.1
D02334	20108-004	004	20	279	55	66	<0.1
D02335	20108-005	005	20	281	59	65	<0.1
D02336	20108-006	006	20	276	52	63	<0.1
D02337	20108-007	007	20	280	56	68	<0.1
D02338	20108-008	008	20	297	50	72	<0.1
D02339	20108-009	009	20	290	54	67	<0.1
D02340	20108-010	010	20	278	53	64	<0.1
D02341	20108-011	011	20	281	68	67	<0.1
D02342	20108-012	012	20	266	45	59	<0.1
D02343	20108-013	013	20	284	59	68	<0.1
D02344	20108-014	014	20	274	52	63	<0.1
D02345	20108-015	015	20	286	60	71	<0.1

Additional water quality data are provided in Appendix A**.**

APPENDIX A: RAW DATA AND STATISTICAL SUPPORT

Contents	Number of Pages
C. dilutus 20-Day Sediment Toxicity Tests	
Day 0 - 20 Daily Observation Record	2
CETIS Worksheets	4
Sample Key	1
YSI 556 MPS Sample Reading Order	1
Daily Water Quality Data Logger Output Summary	7
Day 20 Organism Recovery Bench Sheets	4
Day 20 Ash Free Dry Weight Data Sheets	3
Day 20 Survival and Growth Data Statistical Analysis Reports	55
Ash Free Dry Weight Statistical Analysis Reports	51
Ash Free Dry Biomass Statistical Analysis Reports	42
Analytical Chemistry Data Summaries	
Overlying Water Alkalinity	1
Overlying Water Hardness	1
Overlying Water Ammonia	1
Temperature Profile - Data Logger	1
Sediment Preparation Notes	1
Organism History Record	1
YSI Model 556 Sample Codes and Water Quality Instrument Calibration Records	21
Balance Calibration Log	1
Project E-Mail Communications	2
Sample Receipt Logs and Chain of Custody Records	8
Total Appendix Pages	208

Chironomus dilutus 20 Day Sediment Assay

Study Number:	20117	Client:	Nobis Engineering, Inc.	Project:	DAS-RAC2-030

Day	Date	Renew/Feed	Initial	Notes
0	9/2/10	✓/✓	DM	
1	9/3/10	✓/✓	JTP	
2	9/4/10	✓/✓	KC	
3	9/5/10	✓/✓	JTP	
4	9/6/10	✓/✓	AM	
5	9/7/10	✓/✓	JTP	
6	9/8/10	✓/✓	JTP	
7	9/9/10	✓/✓	AM	
8	9/10/10	✓/✓	JTP	
9	9/11/10	✓/✓	KC	
10	9.12.10	✓/✓	DM	
11	9/13/10	✓/✓	JTP	
12	9/14/10	✓/✓	JL	
13	9/15/10	✓/✓	JTP	
14	9/16/10	✓/✓	JTP	
15	9/17/10	✓/✓	JTP/AM	
16	9/18/10	✓/✓	JTP	
17	9/19/10	✓/✓	AM	
18	9/20/10	✓/✓	AM/JGB	
19	9/21/10	✓/✓	JTP	
20	9/22/10	–/–	JTP/AM	

Alkalinity, Hardness & Ammonia collected		Day 0	Initial: AM
		Day 10	Initial: DM
		Day 20	Initial: AM
Notes: 23 °C	Feed 1 mL of 6g/L flake food mixture	Aerate if DO is below 2.5 mg/L	Two Volume Additions Daily

Miscellaneous Project Notes for Nobis Engineering, Inc.

DAS-RAC2-030

Chironomus dilutus
~~28~~ 20 Day Sediment Assay 20117

9/7/10 AM D.O. in Lab Blank dropped below 2.5mg/L
Aeration was added to all test vessels

9/22/10: Emergence observed ~~(flys~~ (Adults ~~(pupae~~ (casings/pupal recovered) in following
replicates: 001 A=2, Lab A=3, 014 A=1, 013 A=2, 002 B=1, 016 A=1
001 B=1, 013 C=2, 002 C=1, 005 C=1, Lab C=1, 009 C=2, 013 D=2,
015 D=1, 013 E=1, 008 E=1, 012 E=1, 003 E=2, Lab E=1, 004 E=2,
Lab F=2, 013 F=1, 009 F=2, 007 F=3, 007 G=1, 006 G=2,
013 H=2, 001 H=2, 011 H=1, - MC 9/22/10
Lab B=4, 003 B-1, 011 B=2, 013 B-1, 008 C-1, 004 C-1
003 D=1, 008 F-3, 003 E-1, Lab F-1, 014 F-1, 009 G-1
001 G-1, Lab G-1, 014 G-1, 005 G-1, 003 H-2 AM 9/22/10

CETIS Test Data Worksheet

Chironomus 20-d Survival and Growth Sediment Test **EnviroSystems, Inc.**

Start Date: 03 Sep-10 12:00 **Species:** Chironomus dilutus **Sample Code:** 20108-000
End Date: 23 Sep-10 12:00 **Protocol:** EPA/600/R-99/064 (2000) **Sample Source:** DAS-RAC2-030
Sample Date: 31 Aug-10 12:00 **Material:** Freshwater Sediment **Sample Station:** Laboratory Control Sample; 20108-0

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Ashed Weight-mg	Pan Count	Mean Length-mm	Notes
20108-008	1	1							
20108-010	1	2							
20108-004	1	3							
20108-012	1	4							
20108-015	1	5							
20108-003	1	6							
20108-001	1	7							
20108-014	1	8							
20108-005	1	9							
20108-013	1	10							
20108-009	1	11							
20108-006	1	12							
20108-002	1	13							
20108-011	1	14							
20108-000	1	15							
20108-007	1	16							
20108-014	2	17							
20108-003	2	18							
20108-000	2	19							
20108-002	2	20							
20108-008	2	21							
20108-004	2	22							
20108-015	2	23							
20108-011	2	24							
20108-009	2	25							
20108-005	2	26							
20108-012	2	27							
20108-013	2	28							
20108-007	2	29							
20108-010	2	30							
20108-006	2	31							
20108-001	2	32							
20108-014	3	33							

CETIS Test Data Worksheet

Test Code: 01-1209-0423/20117Cd

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Ashed Weight-mg	Pan Count	Mean Length-mm	Notes
20108-008	3	34							
20108-010	3	35							
20108-013	3	36							
20108-003	3	37							
20108-002	3	38							
20108-004	3	39							
20108-005	3	40							
20108-011	3	41							
20108-012	3	42							
20108-015	3	43							
20108-001	3	44							
20108-009	3	45							
20108-000	3	46							
20108-006	3	47							
20108-007	3	48							
20108-004	4	49							
20108-009	4	50							
20108-003	4	51							
20108-012	4	52							
20108-001	4	53							
20108-008	4	54							
20108-014	4	55							
20108-005	4	56							
20108-013	4	57							
20108-002	4	58							
20108-010	4	59							
20108-007	4	60							
20108-011	4	61							
20108-006	4	62							
20108-015	4	63							
20108-000	4	64							
20108-010	5	65							
20108-009	5	66							
20108-007	5	67							
20108-015	5	68							
20108-008	5	69							
20108-011	5	70							
20108-014	5	71							

CETIS Test Data Worksheet

Report Date: 31 Aug-10 10:45 (p 3 of 4)
Test Code: 01-1209-0423/20117Cd

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Ashed Weight-mg	Pan Count	Mean Length-mm	Notes
20108-012	5	72							
20108-006	5	73							
20108-013	5	74							
20108-001	5	75							
20108-004	5	76							
20108-002	5	77							
20108-000	5	78							
20108-003	5	79							
20108-005	5	80							
20108-001	6	81							
20108-008	6	82							
20108-015	6	83							
20108-004	6	84							
20108-011	6	85							
20108-005	6	86							
20108-013	6	87							
20108-010	6	88							
20108-012	6	89							
20108-000	6	90							
20108-002	6	91							
20108-006	6	92							
20108-003	6	93							
20108-007	6	94							
20108-009	6	95							
20108-014	6	96							
20108-015	7	97							
20108-001	7	98							
20108-009	7	99							
20108-002	7	100							
20108-010	7	101							
20108-003	7	102							
20108-008	7	103							
20108-007	7	104							
20108-012	7	105							
20108-000	7	106							
20108-014	7	107							
20108-005	7	108							
20108-006	7	109							

CETIS Test Data Worksheet

Report Date: 31 Aug-10 10:45 (p 4 of 4)
Test Code: 01-1209-0423/20117Cd

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Ashed Weight-mg	Pan Count	Mean Length-mm	Notes
20108-011	7	110							
20108-013	7	111							
20108-004	7	112							
20108-002	8	113							
20108-011	8	114							
20108-001	8	115							
20108-003	8	116							
20108-004	8	117							
20108-013	8	118							
20108-009	8	119							
20108-005	8	120							
20108-000	8	121							
20108-015	8	122							
20108-010	8	123							
20108-012	8	124							
20108-006	8	125							
20108-007	8	126							
20108-014	8	127							
20108-008	8	128							

Client: Nobis Engineering, Inc.
Project: DAS-RAC2-030

Sample Number	LabID	Field ID	Matrix	SAMPLED		RECEIVED		Station Location
000	Laboratory Control Sample							
001	20108-001	D02331	Solid	8/23/2010	1430	8/25/2010	940	AR-02-SDBI0004-0-082310
002	20108-002	D02332	Solid	8/23/2010	1630	8/25/2010	940	AR-02-SDBI0005-0-082310
003	20108-003	D02333	Solid	8/24/2010	1030	8/25/2010	940	AR-08-SDBI0004-0-082410
004	20108-004	D02334	Solid	8/24/2010	1200	8/25/2010	940	AR-08-SDBI0005-0-082410
005	20108-005	D02335	Solid	8/25/2010	1730	8/26/2010	945	AR-09-SDBI0005-0-082510
006	20108-006	D02336	Solid	8/25/2010	1000	8/26/2010	945	AR-09-SDBI0006-0-082510
007	20108-007	D02337	Solid	8/25/2010	1230	8/26/2010	945	AR-09-SDBI0007-0-082510
008	20108-008	D02338	Solid	8/27/2010	1400	8/30/2010	1010	AR-04-SDBI0001-0-082710
009	20108-009	D02339	Solid	8/27/2010	1630	8/30/2010	1010	AR-04-SDBI0002-0-082710
010	20108-010	D02340	Solid	8/27/2010	900	8/30/2010	1010	AR-05-SDBI0001-0-082710
011	20108-011	D02341	Solid	8/27/2010	1045	8/30/2010	1010	AR-05-SDBI0002-0-082710
012	20108-012	D02342	Solid	8/26/2010	1700	8/30/2010	1010	AR-06-SDBI0003-0-082610
013	20108-013	D02343	Solid	8/26/2010	1530	8/30/2010	1010	AR-06-SDBI0002-0-082610
014	20108-014	D02344	Solid	8/26/2010	1200	8/30/2010	1010	AR-07-SDBI0002-0-082610
015	20108-015	D02345	Solid	8/26/2010	1000	8/30/2010	1010	AR-07-SDBI0001-0-082610

YSI 556 MPS Sample Reading Order

Study Number: 20117

Client: Nobis Engineering, Inc.

Project: DAS-RAC2-030

Reading Number	Field ID	Receipt Number	Sample Number
0	Laboratory Control	20108-000	000
1	D02331	20108-001	001
2	D02332	20108-002	002
3	D02333	20108-003	003
4	D02334	20108-004	004
5	D02335	20108-005	005
6	D02336	20108-006	006
7	D02337	20108-007	007
8	D02338	20108-008	008
9	D02339	20108-009	009
10	D02340	20108-010	010
11	D02341	20108-011	011
12	D02342	20108-012	012
13	D02343	20108-013	013
14	D02344	20108-014	014
15	D02345	20108-015	015

STUDY: 20117
CLIENT: Nobis Engineering, Inc.
PROJECT: Project 80013, DAS-RAC2-030
ASSAY: Chironomus dilutus 20 Day Assay
TASK: Daily Overlying Water Qualities

	Temp	DO Conc	pH	SpCond	Salinity
Minimum:	19.87	2.07	7.18	266	0.13
Mean:	22.34	7.43		317	0.15
Maximum:	24.01	8.82	8.11	460	0.22

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm	Salinity ppt
Lab Control	000	0	09/02/10 07:44:05	23.40	7.34	7.99	401	0.19
D02331	001	0	09/02/10 07:45:26	23.32	6.07	7.44	342	0.16
D02332	002	0	09/02/10 07:45:51	23.29	6.23	7.40	332	0.16
D02333	003	0	09/02/10 07:46:13	23.29	6.20	7.34	346	0.16
D02334	004	0	09/02/10 07:46:30	23.28	6.27	7.31	345	0.16
D02335	005	0	09/02/10 07:46:46	23.26	6.45	7.30	358	0.17
D02336	006	0	09/02/10 07:47:01	23.22	6.57	7.31	336	0.16
D02337	007	0	09/02/10 07:47:11	23.25	6.69	7.30	359	0.17
D02338	008	0	09/02/10 07:47:22	23.32	6.77	7.31	460	0.22
D02339	009	0	09/02/10 07:47:56	23.28	5.68	7.39	432	0.21
D02340	010	0	09/02/10 07:48:19	23.27	6.06	7.33	344	0.16
D02341	011	0	09/02/10 07:48:40	23.31	6.45	7.30	348	0.17
D02342	012	0	09/02/10 07:48:57	23.26	6.52	7.28	328	0.16
D02343	013	0	09/02/10 07:49:11	23.35	6.51	7.24	360	0.17
D02344	014	0	09/02/10 07:49:21	23.37	6.51	7.23	349	0.17
D02345	015	0	09/02/10 07:49:38	23.34	6.52	7.22	341	0.16
Lab Control	000	1	09/03/10 08:00:10	23.55	5.10	7.62	413	0.20
D02331	001	1	09/03/10 08:01:18	23.47	5.01	7.36	372	0.18
D02332	002	1	09/03/10 08:01:46	23.47	5.26	7.32	363	0.17
D02333	003	1	09/03/10 08:02:07	23.46	5.26	7.27	376	0.18
D02334	004	1	09/03/10 08:02:23	23.45	5.26	7.26	376	0.18
D02335	005	1	09/03/10 08:02:52	23.48	5.12	7.24	384	0.18
D02336	006	1	09/03/10 08:03:16	23.47	5.26	7.22	377	0.18
D02337	007	1	09/03/10 08:03:37	23.50	5.26	7.18	372	0.18
D02338	008	1	09/03/10 08:03:57	23.50	5.32	7.25	444	0.21
D02339	009	1	09/03/10 08:04:14	23.49	5.21	7.28	415	0.20
D02340	010	1	09/03/10 08:04:33	23.50	5.24	7.25	372	0.18
D02341	011	1	09/03/10 08:04:49	23.46	5.50	7.26	379	0.18
D02342	012	1	09/03/10 08:05:04	23.46	5.59	7.27	370	0.18
D02343	013	1	09/03/10 08:05:20	23.49	5.50	7.23	380	0.18
D02344	014	1	09/03/10 08:05:29	23.48	5.45	7.21	374	0.18
D02345	015	1	09/03/10 08:05:41	23.45	5.17	7.22	364	0.17
Lab Control	000	2	09/04/10 10:45:26	23.63	3.23	7.58	422	0.20
D02331	001	2	09/04/10 10:46:03	23.68	4.37	7.43	373	0.18
D02332	002	2	09/04/10 10:46:36	23.69	4.54	7.36	366	0.17
D02333	003	2	09/04/10 10:46:57	23.68	4.68	7.34	377	0.18
D02334	004	2	09/04/10 10:47:28	23.68	4.74	7.32	374	0.18
D02335	005	2	09/04/10 10:48:08	23.74	4.57	7.33	382	0.18
D02336	006	2	09/04/10 10:48:27	23.70	4.88	7.32	374	0.18
D02337	007	2	09/04/10 10:48:56	23.70	4.98	7.31	373	0.18

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm	Salinity ppt
D02338	008	2	09/04/10 10:49:13	23.74	5.12	7.34	425	0.20
D02339	009	2	09/04/10 10:49:37	23.69	4.73	7.38	409	0.20
D02340	010	2	09/04/10 10:50:11	23.72	4.84	7.34	376	0.18
D02341	011	2	09/04/10 10:50:32	23.71	5.04	7.34	381	0.18
D02342	012	2	09/04/10 10:50:52	23.69	5.12	7.35	374	0.18
D02343	013	2	09/04/10 10:51:39	23.71	4.84	7.34	379	0.18
D02344	014	2	09/04/10 10:52:00	23.71	4.91	7.31	377	0.18
D02345	015	2	09/04/10 10:52:23	23.67	5.07	7.30	368	0.18
Lab Control	000	3	09/05/10 10:28:07	22.02	4.30	7.56	387	0.18
D02331	001	3	09/05/10 10:29:02	22.06	5.27	7.37	348	0.17
D02332	002	3	09/05/10 10:29:15	22.05	5.39	7.35	350	0.17
D02333	003	3	09/05/10 10:29:34	22.05	5.24	7.31	362	0.17
D02334	004	3	09/05/10 10:29:46	22.05	5.26	7.31	361	0.17
D02335	005	3	09/05/10 10:30:01	22.08	5.50	7.31	364	0.17
D02336	006	3	09/05/10 10:30:29	22.03	5.92	7.27	353	0.17
D02337	007	3	09/05/10 10:30:48	22.08	5.90	7.26	341	0.16
D02338	008	3	09/05/10 10:31:12	22.08	5.53	7.30	382	0.18
D02339	009	3	09/05/10 10:31:23	22.07	5.49	7.31	380	0.18
D02340	010	3	09/05/10 10:31:36	22.06	5.57	7.30	355	0.17
D02341	011	3	09/05/10 10:31:49	22.06	5.76	7.26	358	0.17
D02342	012	3	09/05/10 10:32:04	22.07	5.87	7.27	337	0.16
D02343	013	3	09/05/10 10:32:16	22.10	5.94	7.26	339	0.16
D02344	014	3	09/05/10 10:32:47	22.15	5.48	7.23	353	0.17
D02345	015	3	09/05/10 10:33:21	22.12	6.21	7.25	353	0.17
Lab Control	000	4	09/06/10 09:17:57	20.71	4.03	7.37	378	0.18
D02331	001	4	09/06/10 09:18:54	20.78	4.97	7.29	336	0.16
D02332	002	4	09/06/10 09:19:12	20.77	5.30	7.26	338	0.16
D02333	003	4	09/06/10 09:19:33	20.75	5.25	7.22	347	0.17
D02334	004	4	09/06/10 09:19:56	20.67	5.85	7.21	344	0.16
D02335	005	4	09/06/10 09:20:10	20.68	5.52	7.22	345	0.17
D02336	006	4	09/06/10 09:20:25	20.67	5.48	7.21	336	0.16
D02337	007	4	09/06/10 09:20:43	20.69	5.78	7.21	327	0.16
D02338	008	4	09/06/10 09:20:57	20.70	5.78	7.22	358	0.17
D02339	009	4	09/06/10 09:21:11	20.70	5.76	7.23	358	0.17
D02340	010	4	09/06/10 09:21:25	20.69	5.62	7.24	339	0.16
D02341	011	4	09/06/10 09:21:41	20.70	5.94	7.23	344	0.16
D02342	012	4	09/06/10 09:21:53	20.70	6.00	7.24	330	0.16
D02343	013	4	09/06/10 09:22:05	20.74	6.12	7.23	330	0.16
D02344	014	4	09/06/10 09:22:18	20.76	6.13	7.23	338	0.16
D02345	015	4	09/06/10 09:22:31	20.77	5.98	7.20	341	0.16
Lab Control	000	5	09/07/10 08:30:53	23.24	2.07	7.33	372	0.18
D02331	001	5	09/07/10 08:32:00	23.24	4.25	7.24	326	0.15
D02332	002	5	09/07/10 08:32:15	23.24	4.45	7.23	324	0.15
D02333	003	5	09/07/10 08:32:30	23.26	4.54	7.20	330	0.16
D02334	004	5	09/07/10 08:32:51	23.23	4.58	7.19	328	0.16
D02335	005	5	09/07/10 08:33:21	23.22	4.77	7.19	330	0.16
D02336	006	5	09/07/10 08:33:40	23.16	4.91	7.19	328	0.16
D02337	007	5	09/07/10 08:33:54	23.19	5.04	7.19	323	0.15
D02338	008	5	09/07/10 08:34:11	23.22	5.21	7.21	351	0.17
D02339	009	5	09/07/10 08:34:22	23.20	5.24	7.23	354	0.17
D02340	010	5	09/07/10 08:34:33	23.20	5.08	7.23	334	0.16

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm	Salinity ppt
D02341	011	5	09/07/10 08:34:46	23.20	5.24	7.23	335	0.16
D02342	012	5	09/07/10 08:34:59	23.22	5.38	7.22	329	0.16
D02343	013	5	09/07/10 08:35:14	23.30	5.39	7.21	329	0.16
D02344	014	5	09/07/10 08:35:30	23.30	5.19	7.20	329	0.16
D02345	015	5	09/07/10 08:35:46	23.29	5.07	7.20	333	0.16
Lab Control	000	6	09/08/10 10:42:42	23.98	8.54	8.11	379	0.18
D02331	001	6	09/08/10 10:43:30	23.97	8.60	8.08	317	0.15
D02332	002	6	09/08/10 10:43:42	23.97	8.62	8.02	318	0.15
D02333	003	6	09/08/10 10:43:54	23.97	8.65	7.99	325	0.15
D02334	004	6	09/08/10 10:44:06	23.98	8.70	7.97	319	0.15
D02335	005	6	09/08/10 10:44:26	23.98	8.67	7.96	327	0.16
D02336	006	6	09/08/10 10:44:39	23.97	8.60	7.96	319	0.15
D02337	007	6	09/08/10 10:44:57	24.01	8.65	7.94	316	0.15
D02338	008	6	09/08/10 10:45:09	23.99	8.70	7.94	356	0.17
D02339	009	6	09/08/10 10:45:24	23.97	8.73	7.95	361	0.17
D02340	010	6	09/08/10 10:45:39	23.97	8.71	7.96	322	0.15
D02341	011	6	09/08/10 10:45:57	23.98	8.70	7.96	324	0.15
D02342	012	6	09/08/10 10:46:14	23.96	8.74	7.94	316	0.15
D02343	013	6	09/08/10 10:46:27	23.99	8.72	7.92	321	0.15
D02344	014	6	09/08/10 10:46:40	24.01	8.71	7.92	313	0.15
D02345	015	6	09/08/10 10:46:55	24.01	8.71	7.85	322	0.15
Lab Control	000	7	09/09/10 08:15:10	20.44	8.44	7.83	360	0.17
D02331	001	7	09/09/10 08:16:00	20.47	8.55	7.77	317	0.15
D02332	002	7	09/09/10 08:16:18	20.47	8.61	7.73	315	0.15
D02333	003	7	09/09/10 08:16:37	20.48	8.64	7.69	326	0.16
D02334	004	7	09/09/10 08:17:03	20.50	8.67	7.67	315	0.15
D02335	005	7	09/09/10 08:17:25	20.51	8.65	7.70	324	0.15
D02336	006	7	09/09/10 08:17:47	20.51	8.69	7.71	318	0.15
D02337	007	7	09/09/10 08:18:08	20.47	8.67	7.70	316	0.15
D02338	008	7	09/09/10 08:18:42	20.49	8.79	7.72	351	0.17
D02339	009	7	09/09/10 08:19:02	20.47	8.75	7.72	352	0.17
D02340	010	7	09/09/10 08:19:26	20.47	8.73	7.73	321	0.15
D02341	011	7	09/09/10 08:19:52	20.48	8.54	7.68	321	0.15
D02342	012	7	09/09/10 08:20:10	20.47	8.64	7.66	317	0.15
D02343	013	7	09/09/10 08:20:35	20.49	8.77	7.66	317	0.15
D02344	014	7	09/09/10 08:20:50	20.49	8.71	7.68	313	0.15
D02345	015	7	09/09/10 08:21:13	20.51	8.70	7.69	316	0.15
Lab Control	000	8	09/10/10 08:32:30	22.98	7.87	7.89	354	0.17
D02331	001	8	09/10/10 08:33:30	22.94	7.87	7.83	320	0.15
D02332	002	8	09/10/10 08:34:07	22.93	8.10	7.79	317	0.15
D02333	003	8	09/10/10 08:34:25	22.94	8.11	7.78	328	0.16
D02334	004	8	09/10/10 08:34:44	22.91	8.09	7.79	313	0.15
D02335	005	8	09/10/10 08:35:10	22.93	8.08	7.81	325	0.15
D02336	006	8	09/10/10 08:35:29	22.92	8.11	7.82	317	0.15
D02337	007	8	09/10/10 08:35:43	22.91	8.09	7.79	315	0.15
D02338	008	8	09/10/10 08:36:03	22.95	8.10	7.79	347	0.17
D02339	009	8	09/10/10 08:36:18	22.88	8.15	7.79	354	0.17
D02340	010	8	09/10/10 08:36:30	22.88	8.09	7.81	320	0.15
D02341	011	8	09/10/10 08:36:50	22.94	8.09	7.76	319	0.15
D02342	012	8	09/10/10 08:37:11	22.90	7.96	7.77	319	0.15
D02343	013	8	09/10/10 08:37:35	22.97	8.06	7.79	318	0.15

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm	Salinity ppt
D02344	014	8	09/10/10 08:37:48	22.98	8.12	7.78	313	0.15
D02345	015	8	09/10/10 08:38:02	22.97	8.14	7.80	321	0.15
Lab Control	000	9	09/11/10 09:44:26	22.30	7.85	7.97	352	0.17
D02331	001	9	09/11/10 09:44:53	22.32	7.98	7.93	313	0.15
D02332	002	9	09/11/10 09:45:19	22.35	8.09	7.90	305	0.15
D02333	003	9	09/11/10 09:45:55	22.40	7.87	7.86	325	0.15
D02334	004	9	09/11/10 09:46:23	22.38	7.90	7.85	304	0.14
D02335	005	9	09/11/10 09:46:42	22.41	7.94	7.85	310	0.15
D02336	006	9	09/11/10 09:47:03	22.41	8.05	7.87	305	0.15
D02337	007	9	09/11/10 09:47:34	22.39	7.87	7.83	309	0.15
D02338	008	9	09/11/10 09:47:57	22.43	7.98	7.83	337	0.16
D02339	009	9	09/11/10 09:48:29	22.36	8.04	7.85	338	0.16
D02340	010	9	09/11/10 09:48:54	22.43	8.07	7.85	309	0.15
D02341	011	9	09/11/10 09:49:44	22.43	7.74	7.83	305	0.14
D02342	012	9	09/11/10 09:50:12	22.42	8.06	7.84	304	0.14
D02343	013	9	09/11/10 09:50:31	22.46	8.08	7.86	306	0.15
D02344	014	9	09/11/10 09:50:47	22.43	8.07	7.85	302	0.14
D02345	015	9	09/11/10 09:51:09	22.41	8.17	7.84	314	0.15
Lab Control	000	10	09/12/10 09:48:26	22.57	7.74	7.92	339	0.16
D02331	001	10	09/12/10 09:49:38	22.52	7.81	7.92	302	0.14
D02332	002	10	09/12/10 09:50:01	22.51	8.16	7.90	289	0.14
D02333	003	10	09/12/10 09:50:24	22.56	8.01	7.89	299	0.14
D02334	004	10	09/12/10 09:50:45	22.53	7.84	7.80	294	0.14
D02335	005	10	09/12/10 09:51:16	22.59	8.36	7.82	308	0.15
D02336	006	10	09/12/10 09:51:45	22.59	8.05	7.85	301	0.14
D02337	007	10	09/12/10 09:52:37	22.56	4.92	7.47	310	0.15
D02338	008	10	09/12/10 09:53:30	22.61	8.03	7.69	323	0.15
D02339	009	10	09/12/10 09:54:04	22.54	8.11	7.77	316	0.15
D02340	010	10	09/12/10 09:54:24	22.58	8.10	7.81	298	0.14
D02341	011	10	09/12/10 09:54:45	22.62	7.99	7.82	299	0.14
D02342	012	10	09/12/10 09:55:03	22.62	7.83	7.82	301	0.14
D02343	013	10	09/12/10 09:55:26	22.66	7.99	7.82	299	0.14
D02344	014	10	09/12/10 09:55:41	22.67	8.04	7.82	296	0.14
D02345	015	10	09/12/10 09:56:04	22.64	8.13	7.84	302	0.14
Lab Control	000	11	09/13/10 07:30:29	22.02	8.09	7.81	317	0.15
D02331	001	11	09/13/10 07:31:20	22.03	8.50	7.81	293	0.14
D02332	002	11	09/13/10 07:31:36	22.04	8.51	7.80	281	0.13
D02333	003	11	09/13/10 07:31:49	22.03	8.48	7.78	296	0.14
D02334	004	11	09/13/10 07:32:06	22.01	8.44	7.77	285	0.14
D02335	005	11	09/13/10 07:32:23	22.06	8.45	7.75	296	0.14
D02336	006	11	09/13/10 07:32:44	22.06	8.34	7.75	290	0.14
D02337	007	11	09/13/10 07:33:03	22.07	8.29	7.74	289	0.14
D02338	008	11	09/13/10 07:33:40	22.08	8.59	7.75	305	0.15
D02339	009	11	09/13/10 07:34:02	22.01	8.53	7.75	301	0.14
D02340	010	11	09/13/10 07:34:18	22.04	8.56	7.72	285	0.14
D02341	011	11	09/13/10 07:34:33	22.05	8.56	7.71	286	0.14
D02342	012	11	09/13/10 07:34:51	22.00	8.59	7.72	289	0.14
D02343	013	11	09/13/10 07:35:10	21.97	8.61	7.72	290	0.14
D02344	014	11	09/13/10 07:35:30	22.04	8.59	7.72	284	0.14
D02345	015	11	09/13/10 07:35:48	22.04	8.61	7.75	292	0.14

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm	Salinity ppt
Lab Control	000	12	09/14/10 06:46:51	22.31	7.88	7.81	318	0.15
D02331	001	12	09/14/10 06:47:54	22.39	8.18	7.77	298	0.14
D02332	002	12	09/14/10 06:48:11	22.39	8.24	7.77	284	0.13
D02333	003	12	09/14/10 06:48:23	22.38	8.34	7.75	293	0.14
D02334	004	12	09/14/10 06:48:35	22.35	8.37	7.73	286	0.14
D02335	005	12	09/14/10 06:48:51	22.39	8.19	7.71	297	0.14
D02336	006	12	09/14/10 06:49:06	22.38	8.23	7.69	293	0.14
D02337	007	12	09/14/10 06:49:29	22.40	8.19	7.69	292	0.14
D02338	008	12	09/14/10 06:49:42	22.41	8.25	7.70	310	0.15
D02339	009	12	09/14/10 06:49:52	22.37	8.33	7.69	307	0.15
D02340	010	12	09/14/10 06:50:04	22.36	8.33	7.68	289	0.14
D02341	011	12	09/14/10 06:50:18	22.39	8.39	7.70	292	0.14
D02342	012	12	09/14/10 06:50:29	22.37	8.43	7.68	295	0.14
D02343	013	12	09/14/10 06:50:39	22.38	8.44	7.60	299	0.14
D02344	014	12	09/14/10 06:50:49	22.42	8.43	7.62	290	0.14
D02345	015	12	09/14/10 06:51:00	22.44	8.39	7.65	301	0.14
Lab Control	000	13	09/15/10 13:52:31	22.79	7.46	7.96	322	0.15
D02331	001	13	09/15/10 13:53:23	22.82	7.93	7.92	299	0.14
D02332	002	13	09/15/10 13:53:38	22.85	7.89	7.91	283	0.13
D02333	003	13	09/15/10 13:53:50	22.84	8.00	7.91	301	0.14
D02334	004	13	09/15/10 13:54:03	22.84	8.06	7.89	285	0.14
D02335	005	13	09/15/10 13:54:21	22.89	7.93	7.86	298	0.14
D02336	006	13	09/15/10 13:54:35	22.88	7.90	7.86	291	0.14
D02337	007	13	09/15/10 13:54:49	22.89	7.87	7.84	294	0.14
D02338	008	13	09/15/10 13:55:04	22.91	8.06	7.83	314	0.15
D02339	009	13	09/15/10 13:55:19	22.88	8.03	7.84	312	0.15
D02340	010	13	09/15/10 13:55:39	22.88	7.89	7.87	286	0.14
D02341	011	13	09/15/10 13:55:59	22.91	7.80	7.86	291	0.14
D02342	012	13	09/15/10 13:56:21	22.85	7.96	7.84	280	0.13
D02343	013	13	09/15/10 13:56:38	22.91	7.97	7.85	295	0.14
D02344	014	13	09/15/10 13:57:00	22.94	8.01	7.86	283	0.13
D02345	015	13	09/15/10 13:57:24	22.89	8.03	7.90	298	0.14
Lab Control	000	14	09/16/10 11:19:07	21.97	8.06	7.74	311	0.15
D02331	001	14	09/16/10 11:19:56	21.93	8.19	7.75	291	0.14
D02332	002	14	09/16/10 11:20:28	21.89	8.46	7.78	281	0.13
D02333	003	14	09/16/10 11:20:41	21.88	8.51	7.79	296	0.14
D02334	004	14	09/16/10 11:21:32	21.84	8.40	7.73	284	0.13
D02335	005	14	09/16/10 11:21:53	21.90	8.46	7.73	291	0.14
D02336	006	14	09/16/10 11:22:21	21.89	8.47	7.71	285	0.14
D02337	007	14	09/16/10 11:22:30	21.90	8.40	7.71	289	0.14
D02338	008	14	09/16/10 11:22:39	21.90	8.41	7.72	306	0.15
D02339	009	14	09/16/10 11:22:50	21.90	8.51	7.74	303	0.14
D02340	010	14	09/16/10 11:23:17	21.90	8.56	7.71	285	0.14
D02341	011	14	09/16/10 11:23:27	21.90	8.54	7.69	288	0.14
D02342	012	14	09/16/10 11:23:42	21.89	8.57	7.71	278	0.13
D02343	013	14	09/16/10 11:23:50	21.91	8.56	7.72	289	0.14
D02344	014	14	09/16/10 11:24:01	21.95	8.58	7.74	276	0.13
D02345	015	14	09/16/10 11:24:13	21.97	8.60	7.76	291	0.14
Lab Control	000	15	09/17/10 08:20:34	23.28	7.60	7.84	301	0.14
D02331	001	15	09/17/10 08:21:14	23.26	7.95	7.83	282	0.13
D02332	002	15	09/17/10 08:21:28	23.25	8.02	7.84	277	0.13

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm	Salinity ppt
D02333	003	15	09/17/10 08:21:48	23.26	7.94	7.83	292	0.14
D02334	004	15	09/17/10 08:22:13	23.21	7.82	7.80	279	0.13
D02335	005	15	09/17/10 08:22:37	23.25	7.96	7.81	286	0.14
D02336	006	15	09/17/10 08:23:01	23.24	7.87	7.80	281	0.13
D02337	007	15	09/17/10 08:23:14	23.24	7.78	7.80	285	0.14
D02338	008	15	09/17/10 08:23:50	23.26	7.80	7.82	300	0.14
D02339	009	15	09/17/10 08:24:36	23.25	8.04	7.82	295	0.14
D02340	010	15	09/17/10 08:25:16	23.25	7.81	7.81	279	0.13
D02341	011	15	09/17/10 08:25:52	23.24	7.85	7.83	284	0.13
D02342	012	15	09/17/10 08:26:24	23.21	8.00	7.80	274	0.13
D02343	013	15	09/17/10 08:26:43	23.24	7.92	7.83	286	0.14
D02344	014	15	09/17/10 08:27:15	23.28	7.93	7.84	277	0.13
D02345	015	15	09/17/10 08:27:30	23.26	7.94	7.85	286	0.14
Lab Control	000	16	09/18/10 09:32:19	22.10	8.40	7.88	303	0.14
D02331	001	16	09/18/10 09:32:45	22.08	8.20	7.85	282	0.13
D02332	002	16	09/18/10 09:32:56	22.06	8.38	7.83	279	0.13
D02333	003	16	09/18/10 09:33:11	22.07	8.60	7.82	292	0.14
D02334	004	16	09/18/10 09:33:25	22.03	8.61	7.80	282	0.13
D02335	005	16	09/18/10 09:33:41	22.04	8.57	7.79	287	0.14
D02336	006	16	09/18/10 09:33:54	22.05	8.71	7.79	280	0.13
D02337	007	16	09/18/10 09:34:08	22.05	8.64	7.76	286	0.14
D02338	008	16	09/18/10 09:34:22	22.05	8.61	7.77	303	0.14
D02339	009	16	09/18/10 09:34:38	22.03	8.68	7.78	296	0.14
D02340	010	16	09/18/10 09:34:53	22.03	8.66	7.79	280	0.13
D02341	011	16	09/18/10 09:35:10	22.01	8.65	7.78	284	0.13
D02342	012	16	09/18/10 09:35:24	21.96	8.68	7.76	272	0.13
D02343	013	16	09/18/10 09:35:39	21.99	8.82	7.79	290	0.14
D02344	014	16	09/18/10 09:35:55	22.02	8.81	7.82	278	0.13
D02345	015	16	09/18/10 09:36:11	22.00	8.74	7.80	288	0.14
Lab Control	000	17	09/19/10 09:32:04	22.04	7.87	7.74	304	0.14
D02331	001	17	09/19/10 09:32:32	22.09	7.75	7.75	281	0.13
D02332	002	17	09/19/10 09:32:53	22.08	8.22	7.77	283	0.13
D02333	003	17	09/19/10 09:33:08	22.10	8.38	7.79	295	0.14
D02334	004	17	09/19/10 09:33:20	22.07	8.37	7.75	284	0.13
D02335	005	17	09/19/10 09:33:33	22.09	8.24	7.77	288	0.14
D02336	006	17	09/19/10 09:33:44	22.07	8.35	7.75	284	0.13
D02337	007	17	09/19/10 09:33:55	22.09	8.32	7.74	288	0.14
D02338	008	17	09/19/10 09:34:04	22.09	8.23	7.76	305	0.15
D02339	009	17	09/19/10 09:34:13	22.09	8.33	7.74	298	0.14
D02340	010	17	09/19/10 09:34:24	22.07	8.45	7.77	282	0.13
D02341	011	17	09/19/10 09:34:33	22.08	8.50	7.75	286	0.14
D02342	012	17	09/19/10 09:34:43	22.05	8.49	7.75	278	0.13
D02343	013	17	09/19/10 09:34:52	22.04	8.45	7.77	294	0.14
D02344	014	17	09/19/10 09:35:01	22.09	8.44	7.78	279	0.13
D02345	015	17	09/19/10 09:35:10	22.12	8.43	7.75	291	0.14
Lab Control	000	18	09/20/10 08:25:47	21.61	7.69	7.57	303	0.14
D02331	001	18	09/20/10 08:26:42	21.59	8.26	7.63	277	0.13
D02332	002	18	09/20/10 08:27:03	21.59	8.38	7.68	281	0.13
D02333	003	18	09/20/10 08:27:15	21.60	8.31	7.68	290	0.14
D02334	004	18	09/20/10 08:27:35	21.58	8.09	7.64	282	0.13
D02335	005	18	09/20/10 08:28:04	21.61	8.11	7.66	282	0.13

Field ID	Sample Number	Day	DateTime M/D/Y	Temp C	DO Conc mg/L	pH SU	SpCond uS/cm	Salinity ppt
D02336	006	18	09/20/10 08:28:20	21.59	8.26	7.67	277	0.13
D02337	007	18	09/20/10 08:28:40	21.61	8.20	7.64	282	0.13
D02338	008	18	09/20/10 08:29:00	21.62	8.17	7.64	299	0.14
D02339	009	18	09/20/10 08:29:15	21.60	8.29	7.68	293	0.14
D02340	010	18	09/20/10 08:29:53	21.54	8.16	7.62	281	0.13
D02341	011	18	09/20/10 08:30:17	21.56	8.14	7.63	283	0.13
D02342	012	18	09/20/10 08:30:30	21.54	8.20	7.65	272	0.13
D02343	013	18	09/20/10 08:30:49	21.55	8.30	7.66	289	0.14
D02344	014	18	09/20/10 08:31:00	21.59	8.33	7.70	276	0.13
D02345	015	18	09/20/10 08:31:10	21.60	8.35	7.71	287	0.14
Lab Control	000	19	09/21/10 07:32:19	19.87	7.87	7.39	309	0.15
D02331	001	19	09/21/10 07:33:01	20.03	7.97	7.54	277	0.13
D02332	002	19	09/21/10 07:33:16	20.02	8.40	7.58	285	0.14
D02333	003	19	09/21/10 07:33:27	20.02	8.51	7.61	291	0.14
D02334	004	19	09/21/10 07:33:45	19.94	8.38	7.61	286	0.14
D02335	005	19	09/21/10 07:34:01	19.97	8.23	7.63	285	0.14
D02336	006	19	09/21/10 07:34:14	19.95	8.53	7.66	283	0.13
D02337	007	19	09/21/10 07:34:35	19.99	7.44	7.53	288	0.14
D02338	008	19	09/21/10 07:34:59	19.98	7.70	7.56	302	0.14
D02339	009	19	09/21/10 07:35:11	19.96	8.34	7.62	297	0.14
D02340	010	19	09/21/10 07:35:23	19.94	8.55	7.63	285	0.14
D02341	011	19	09/21/10 07:35:42	19.93	8.10	7.59	287	0.14
D02342	012	19	09/21/10 07:35:59	19.90	8.31	7.56	273	0.13
D02343	013	19	09/21/10 07:36:17	19.93	8.53	7.54	293	0.14
D02344	014	19	09/21/10 07:36:30	19.93	8.62	7.62	279	0.13
D02345	015	19	09/21/10 07:36:42	19.93	8.66	7.65	295	0.14
Lab Control	000	20	09/22/10 06:55:28	22.22	7.62	7.50	299	0.14
D02331	001	20	09/22/10 06:56:26	22.24	8.15	7.67	268	0.13
D02332	002	20	09/22/10 06:56:42	22.21	8.14	7.71	279	0.13
D02333	003	20	09/22/10 06:56:57	22.23	8.19	7.74	282	0.13
D02334	004	20	09/22/10 06:57:31	22.15	7.74	7.67	279	0.13
D02335	005	20	09/22/10 06:58:11	22.25	8.25	7.77	281	0.13
D02336	006	20	09/22/10 06:58:35	22.21	8.09	7.78	276	0.13
D02337	007	20	09/22/10 06:58:56	22.23	7.94	7.75	280	0.13
D02338	008	20	09/22/10 06:59:34	22.28	8.15	7.78	297	0.14
D02339	009	20	09/22/10 06:59:48	22.26	8.16	7.81	290	0.14
D02340	010	20	09/22/10 07:00:08	22.23	8.13	7.77	278	0.13
D02341	011	20	09/22/10 07:00:30	22.20	7.97	7.73	281	0.13
D02342	012	20	09/22/10 07:01:02	22.26	8.05	7.72	266	0.13
D02343	013	20	09/22/10 07:01:22	22.25	8.23	7.76	284	0.13
D02344	014	20	09/22/10 07:01:38	22.22	8.10	7.81	274	0.13
D02345	015	20	09/22/10 07:01:52	22.22	8.16	7.83	286	0.14

Chironomus dilutus 20 Day Assay

STUDY NUMBER: 20117 **PROJECT: DAS-RAC2-030**

DATE: 09/22/10 **CLIENT: Nobis Engineering, Inc.**

Sample Code	Rep	Pos	Larvae Survived	Pupae	Emerged	Initials
20108-008	1	1	3	1	0	
20108-010	1	2	4	4	1	
20108-004	1	3	7	1	1	
20108-012	1	4	9	1	0	
20108-015	1	5	7	0	0	
20108-003	1	6	7	3	0	
20108-001	1	7	4	2	2	
20108-014	1	8	2	0	1 ~~0~~	
20108-005	1	9	0	2	0	
20108-013	1	10	8	0	2	
20108-009	1	11	4	3	0	
20108-006	1	12	4	4	0	
20108-002	1	13	5	2	1	
20108-011	1	14	0	1	0	
20108-000	1	15	2	3	3	
20108-007	1	16	2	1	1	
20108-014	2	17	7	3	1	
20108-003	2	18	6	2	1	
20108-000	2	19	1	2	~~3~~ 4	
20108-002	2	20	1	1	1	
20108-008	2	21	4	3	0	
20108-004	2	22	9	0	0	
20108-015	2	23	6	0	0	
20108-011	2	24	5	3	~~1~~ 2	
20108-009	2	25	5	4	1	
20108-005	2	26	3	1	0	
20108-012	2	27	10	0	0	
20108-013	2	28	4	3	~~1~~ 1	
20108-007	2	29	7	0	1	
20108-010	2	30	10	0	0	
20108-006	2	31	7	2	0	
20108-001	2	32	6	1	1	
20108-014	3	33	2	6	0	
20108-008	3	34	5	1	1	
20108-010	3	35	8	0	1	
20108-013	3	36	4	1	2	
20108-003	3	37	3	4	0	
20108-002	3	38	5	1	1+ 1	
20108-004	3	39	5	2	1	
20108-005	3	40	3	0	1	

Chironomus dilutus 20 Day Assay

STUDY NUMBER: 20117 **PROJECT: DAS-RAC2-030**

DATE: 09/22/10 **CLIENT: Nobis Engineering, Inc.**

Sample Code	Rep	Pos	Larvae Survived	Pupae	Emerged	Initials
20108-011	3	41	10	0	0	
20108-012	3	42	8	2	0	
20108-015	3	43	7	1	0	
20108-001	3	44	3	2	0	
20108-009	3	45	4	2	2	
20108-000	3	46	5	3	1	
20108-006	3	47	0	0	0	
20108-007	3	48	5	2	0	
20108-004	4	49	8	1	0	
20108-009	4	50	7	2	0	
20108-003	4	51	9	1	1	
20108-012	4	52	9	1	0	
20108-001	4	53	9	0	0	
20108-008	4	54	3	5	0	
20108-014	4	55	8	2	0	
20108-005	4	56	0	0	0	
20108-013	4	57	~~8~~ 6	~~0~~ 2	2	
20108-002	4	58	~~6~~ 9	~~8~~ 1	0	
20108-010	4	59	~~8~~ 6	1	0	
20108-007	4	60	3	3	0	
20108-011	4	61	5	2	0	
20108-006	4	62	4	0	0	
20108-015	4	63	6	0	1	
20108-000	4	64	3	9	0	
20108-010	5	65	4	0	0	
20108-009	5	66	5	3	0	
20108-007	5	67	6	2	0	
20108-015	5	68	4	0	0	
20108-008	5	69	5	2	1	
20108-011	5	70	8	1	0	
20108-014	5	71	6	1	0	
20108-012	5	72	6	2	1	
20108-006	5	73	6	0		
20108-013	5	74	14	2	1	
20108-001	5	75	8	1	0	
20108-004	5	76	8	1	2	
20108-002	5	77	5	4	0	
20108-000	5	78	2	4	2+1	
20108-003	5	79	6	1	~~1~~ 2+1	
20108-005	5	80	1	1	0	

Chironomus dilutus 20 Day Assay

STUDY NUMBER: 20117 **PROJECT: DAS-RAC2-030**

DATE: 09/22/10 **CLIENT: Nobis Engineering, Inc.**

Sample Code	Rep	Pos	Larvae Survived	Pupae	Emerged	Initials
20108-001	6	81	7	2	0	
20108-008	6	82	5	1	~~4~~ 3	
20108-015	6	83	10	0	0	
20108-004	6	84	5	2	1	
20108-011	6	85	5	1	0	
20108-005	6	86	7	2	0	
20108-013	6	87	8	1	1	
20108-010	6	88	5	2	~~0~~ 1	
20108-012	6	89	7	1	~~0~~ 1	
20108-000	6	90	5	1	1+2	
20108-002	6	91	7	2	0	
20108-006	6	92	7	2	0	
20108-003	6	93	4	4	0	
20108-007	6	94	3	2	1+3	
20108-009	6	95	4	2	2	
20108-014	6	96	1	1	1	
20108-015	7	97	7	1	0	
20108-001	7	98	6	2	1	
20108-009	7	99	5	3	1	
20108-002	7	100	6	0	0	
20108-010	7	101	9	0	0	
20108-003	7	102	7	0	0	
20108-008	7	103	0	0	0	
20108-007	7	104	8	0	1	
20108-012	7	105	9	0	0	
20108-000	7	106	4	3	1	
20108-014	7	107	8	1	1	
20108-005	7	108	5	0	2 ~~1~~	
20108-006	7	109	6	0	2	
20108-011	7	110	10	0	0	
20108-013	7	111	9	0	0	
20108-004	7	112	6	0	0	
20108-002	8	113	8	0	0	
20108-011	8	114	0	0	1	
20108-001	8	115	4	3	2	
20108-003	8	116	3	2	2	
20108-004	8	117	9	1	0	
20108-013	8	118	7	0	1+2	
20108-009	8	119	7	2	0	
20108-005	8	120	3	1	0	

Chironomus dilutus 20 Day Assay

STUDY NUMBER: 20117 **PROJECT: DAS-RAC2-030**

DATE: 09/22/10 **CLIENT: Nobis Engineering, Inc.**

Sample Code	Rep	Pos	Larvae Survived	Pupae	Emerged	Initials
20108-000	8	121	6	4	0	
20108-015	8	122	6	0	0	
20108-010	8	123	4	4	0	
20108-012	8	124	8	2	0	
20108-006	8	125	5	0	0	
20108-007	8	126	10	0	0	
20108-014	8	127	8	1	0	
20108-008	8	128	6	2	0	

STUDY: 20117
CLIENT: Nobis Engineering, Inc.
PROJECT: DAS-RAC2-030
ASSAY: Chironomus dilutus 20 Day Assay
TASK: Dry Weight Data - AccuSeries Balance Output File
BALANCE: AccuSeries Model 225D
Serial #: 17008376

Date/Init:			09/22/10 JTP	09/24/10 JTP	09/24/10 AM	Duplicates		
Sample	Rep.	Pos.	Total (mg)	Tare (mg)	Ash (mg)	Total (mg)	Tare (mg)	Ash (mg)
20108-008	1	1	221.20	208.13	209.77			
20108-010	1	2	219.03	208.44	210.46			
20108-004	1	3	230.23	208.76	211.63			
20108-012	1	4	230.36	209.43	213.84			
20108-015	1	5	229.10	209.34	212.59			
20108-003	1	6	225.42	206.27	208.44			
20108-001	1	7	221.11	207.78	209.94			
20108-014	1	8	215.72	208.82	209.35			
20108-005	1	9		210.34				
20108-013	1	10	234.52	209.62	216.16			
20108-009	1	11	220.83	208.04	209.89			
20108-006	1	12	219.49	209.13	211.40			
20108-002	1	13	223.95	210.15	212.62			
20108-011	1	14		206.75				
20108-000	1	15	212.70	204.25	204.70			
20108-007	1	16	216.58	207.21	208.13			
20108-014	2	17	229.83	209.18	213.21			
20108-003	2	18	220.91	207.19	209.23			
20108-000	2	19	210.75	208.36	208.50			
20108-002	2	20	207.95	204.10	204.43	207.96	204.11	204.44
20108-008	2	21	220.68	207.87	208.78			
20108-004	2	22	232.63	205.18	211.21			
20108-015	2	23	222.93	207.98	210.76			
20108-011	2	24	223.33	207.87	210.44			
20108-009	2	25	221.23	207.67	209.55			
20108-005	2	26	210.95	209.07	209.11			
20108-012	2	27	241.80	209.93	216.76			
20108-013	2	28	218.05	205.08	207.78			
20108-007	2	29	229.49	210.38	213.02			
20108-010	2	30	233.40	209.13	213.56			
20108-006	2	31	229.64	208.07	213.91			
20108-001	2	32	229.18	208.32	212.55			
20108-014	3	33	216.00	208.66	210.27			
20108-008	3	34	227.37	208.57	212.12			
20108-010	3	35	222.33	208.88	212.81			
20108-013	3	36	216.67	210.45	211.02			
20108-003	3	37	218.78	207.55	208.37			
20108-002	3	38	219.31	208.00	209.91			
20108-004	3	39	223.32	209.20	212.34			
20108-005	3	40	218.19	205.89	207.42	218.22	205.90	207.41
20108-011	3	41	235.95	208.51	214.57			
20108-012	3	42	233.40	209.10	214.97			
20108-015	3	43	224.93	206.96	210.15			
20108-001	3	44	219.00	208.54	210.54			
20108-009	3	45	219.40	208.87	210.91			

Date/Init:			09/22/10 JTP	09/24/10 JTP	09/24/10 AM	Duplicates		
Sample	Rep.	Pos.	Total (mg)	Tare (mg)	Ash (mg)	Total (mg)	Tare (mg)	Ash (mg)
20108-000	3	46	221.65	208.32	209.17			
20108-006	3	47		208.36				
20108-007	3	48	222.34	207.53	210.20			
20108-004	4	49	229.82	205.10	212.58			
20108-009	4	50	225.62	208.31	210.46			
20108-003	4	51	226.71	207.60	210.54			
20108-012	4	52	236.20	209.72	216.61			
20108-001	4	53	229.54	209.18	213.37			
20108-008	4	54	218.59	209.95	210.65			
20108-014	4	55	233.14	209.78	214.82			
20108-005	4	56		209.07				
20108-013	4	57	225.25	207.65	214.62			
20108-002	4	58	232.44	209.13	215.02			
20108-010	4	59	226.34	208.24	212.88			
20108-007	4	60	213.11	208.45	208.85	213.12	208.44	208.84
20108-011	4	61	228.58	208.77	212.81			
20108-006	4	62	221.31	210.16	212.71			
20108-015	4	63	226.94	209.31	212.91			
20108-000	4	64	214.54	207.53	208.01			
20108-010	5	65	221.67	210.11	212.26			
20108-009	5	66	220.24	207.05	207.33			
20108-007	5	67	222.15	207.84	210.38			
20108-015	5	68	222.74	209.61	212.38			
20108-008	5	69	218.83	204.84	206.74			
20108-011	5	70	233.64	209.42	216.79			
20108-014	5	71	219.14	207.37	210.69			
20108-012	5	72	218.69	207.64	209.14			
20108-006	5	73	225.04	208.85	212.86			
20108-013	5	74	235.65	207.74	217.30			
20108-001	5	75	232.75	210.38	216.13			
20108-004	5	76	229.26	208.07	214.64			
20108-002	5	77	225.01	211.52	214.65			
20108-000	5	78	214.29	207.11	207.95			
20108-003	5	79	224.56	206.68	210.55			
20108-005	5	80	215.67	209.60	210.74	215.69	209.62	210.75
20108-001	6	81	227.11	208.53	212.71			
20108-008	6	82	229.16	210.90	215.21			
20108-015	6	83	235.57	209.69	215.87			
20108-004	6	84	229.17	209.80	215.01			
20108-011	6	85	227.26	207.48	212.76			
20108-005	6	86	228.07	206.12	211.23			
20108-013	6	87	237.87	210.25	219.26			
20108-010	6	88	226.49	207.51	213.23			
20108-012	6	89	229.38	209.26	213.49			
20108-000	6	90	227.08	208.02	209.37			
20108-002	6	91	227.17	205.08	210.90			
20108-006	6	92	227.02	204.83	209.62			
20108-003	6	93	225.59	210.80	214.01			
20108-007	6	94	218.29	207.93	209.31			
20108-009	6	95	223.52	208.49	211.09			
20108-014	6	96	211.40	208.45	209.64			
20108-015	7	97	222.70	206.41	209.21			
20108-001	7	98	228.11	208.35	212.49			

Date/Init:			09/22/10 JTP	09/24/10 JTP	09/24/10 AM	Duplicates		
Sample	Rep.	Pos.	Total (mg)	Tare (mg)	Ash (mg)	Total (mg)	Tare (mg)	Ash (mg)
20108-009	7	99	228.44	209.24	213.59			
20108-002	7	100	228.61	209.08	213.55	228.62	209.09	213.55
20108-010	7	101	233.17	207.34	213.63			
20108-003	7	102	229.85	208.66	213.17			
20108-008	7	103		209.98				
20108-007	7	104	227.09	206.69	210.27			
20108-012	7	105	233.49	206.06	211.11			
20108-000	7	106	220.34	208.58	209.39			
20108-014	7	107	227.64	204.42	209.42			
20108-005	7	108	227.95	209.12	212.93			
20108-006	7	109	224.34	210.01	212.45			
20108-011	7	110	232.46	211.85	217.19			
20108-013	7	111	229.81	206.38	212.27			
20108-004	7	112	221.46	208.35	212.33			
20108-002	8	113	227.38	206.19	210.46			
20108-011	8	114		211.44				
20108-001	8	115	221.13	209.18	211.34			
20108-003	8	116	215.49	208.95	209.39			
20108-004	8	117	233.09	207.41	214.93			
20108-013	8	118	229.36	205.98	211.87			
20108-009	8	119	228.96	208.42	212.06			
20108-005	8	120	219.77	207.08	210.02	219.78	207.06	210.01
20108-000	8	121	221.57	206.03	207.22			
20108-015	8	122	227.43	209.26	212.83			
20108-010	8	123	220.74	209.13	212.34			
20108-012	8	124	227.27	208.65	212.85			
20108-006	8	125	214.43	206.49	208.15			
20108-007	8	126	232.53	206.30	214.80			
20108-014	8	127	231.02	209.63	214.21			
20108-008	8	128	225.56	208.64	211.79	225.56	208.63	211.82

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
20108-000	11-3147-0529	31 Aug-10 12:00	31 Aug-10 12:00	72h	Nobis Engineering, Inc.	Ecological Risk Assessme
20108-001	12-7681-9937	23 Aug-10 14:30	25 Aug-10 09:40	10d 22h		
20108-002	08-0875-5915	23 Aug-10 16:30	25 Aug-10 09:40	10d 20h		
20108-003	20-7911-9243	24 Aug-10 10:30	25 Aug-10 09:40	10d 2h		
20108-004	03-1060-8043	24 Aug-10 12:00	25 Aug-10 09:40	10d 0h		
20108-005	06-2472-6864	25 Aug-10 17:30	26 Aug-10 09:45	8d 19h		
20108-006	21-0612-3779	25 Aug-10 10:00	26 Aug-10 09:45	9d 2h		
20108-007	03-0112-8262	25 Aug-10 12:30	26 Aug-10 09:45	8d 23h		
20108-008	19-8536-5911	27 Aug-10 14:00	30 Aug-10 10:10	6d 22h		
20108-009	09-4502-3703	27 Aug-10 16:30	30 Aug-10 10:10	6d 20h		
20108-010	08-3176-6542	27 Aug-10 09:00	30 Aug-10 10:10	7d 3h		
20108-011	16-2942-8773	27 Aug-10 10:45	30 Aug-10 10:10	7d 1h		
20108-012	10-9672-7849	26 Aug-10 17:00	30 Aug-10 10:10	7d 19h		
20108-013	04-2922-4416	26 Aug-10 15:30	30 Aug-10 10:10	7d 20h		
20108-014	09-2631-1057	26 Aug-10 12:00	30 Aug-10 10:10	8d 0h		
20108-015	10-3919-9014	26 Aug-10 10:00	30 Aug-10 10:10	8d 2h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
20108-000	Freshwater Sediment	DAS-RAC2-030	Laboratory Control Sample; 2010		
20108-001	Freshwater Sediment	DAS-RAC2-030	D02331; 20108-001		
20108-002	Freshwater Sediment	DAS-RAC2-030	D02332; 20108-002		
20108-003	Freshwater Sediment	DAS-RAC2-030	D02333; 20108-003		
20108-004	Freshwater Sediment	DAS-RAC2-030	D02334; 20108-004		
20108-005	Freshwater Sediment	DAS-RAC2-030	D02335; 20108-005		
20108-006	Freshwater Sediment	DAS-RAC2-030	D02336; 20108-006		
20108-007	Freshwater Sediment	DAS-RAC2-030	D02337; 20108-007		
20108-008	Freshwater Sediment	DAS-RAC2-030	D02338; 20108-008		
20108-009	Freshwater Sediment	DAS-RAC2-030	D02339; 20108-009		
20108-010	Freshwater Sediment	DAS-RAC2-030	D02340; 20108-010		
20108-011	Freshwater Sediment	DAS-RAC2-030	D02341; 20108-011		
20108-012	Freshwater Sediment	DAS-RAC2-030	D02342; 20108-012		
20108-013	Freshwater Sediment	DAS-RAC2-030	D02343; 20108-013		
20108-014	Freshwater Sediment	DAS-RAC2-030	D02344; 20108-014		
20108-015	Freshwater Sediment	DAS-RAC2-030	D02345; 20108-015		

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
13-8177-8951	Proportion Survived	Control Resp	0.875	0.7 - NL	Yes	Result Within Limits

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7782	1.16	0.225	1.771	0.09332	0.5111	52.75%	0.0%
20108-001	8	1.361	1.237	1.484	0.846	1.663	0.06034	0.3305	24.29%	-40.43%
20108-002	8	1.253	1.075	1.432	0.352	1.742	0.08748	0.4791	38.22%	-29.36%
20108-003	8	1.277	1.142	1.411	0.61	1.698	0.06581	0.3604	28.23%	-31.76%
20108-004	8	1.537	1.381	1.693	0.913	2.142	0.07632	0.418	27.19%	-58.64%
20108-005	6	0.9858	0.7715	1.2	0.184	1.684	0.1048	0.5741	58.24%	-1.74%
20108-006	7	1.145	0.9924	1.298	0.628	1.74	0.07475	0.4094	35.75%	-18.19%
20108-007	8	1.208	1.031	1.385	0.426	1.773	0.08666	0.4746	39.3%	-24.64%
20108-008	7	1.233	1.145	1.322	0.794	1.525	0.04317	0.2365	19.17%	-27.27%
20108-009	8	1.292	1.192	1.392	0.849	1.69	0.04875	0.267	20.67%	-33.33%

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-010	8	1.275	1.099	1.451	0.84	1.984	0.08595	0.4707	36.92%	-31.58%
20108-011	6	1.611	1.503	1.719	1.289	2.138	0.05298	0.2902	18.01%	-66.25%
20108-012	8	1.773	1.593	1.952	0.955	2.504	0.08776	0.4807	27.11%	-82.94%
20108-013	8	1.347	1.157	1.536	0.565	1.861	0.09283	0.5084	37.76%	-38.96%
20108-014	8	1.135	0.8916	1.378	0.176	1.832	0.1188	0.6508	57.36%	-17.09%
20108-015	8	1.445	1.341	1.55	1.036	1.97	0.05116	0.2802	19.38%	-49.17%

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.598	3.093	2.177	4	0.1208	0.6617	23.25%	0.0%
20108-001	8	2.421	2.273	2.568	1.797	2.82	0.07219	0.3954	16.33%	14.93%
20108-002	8	2.328	2.132	2.524	1.88	3.52	0.0957	0.5242	22.52%	18.19%
20108-003	8	2.411	2.206	2.615	1.797	3.47	0.09996	0.5475	22.71%	15.28%
20108-004	8	2.198	2.039	2.358	1.522	2.832	0.07792	0.4268	19.41%	22.74%
20108-005	6	2.966	2.433	3.498	0.6133	4.93	0.2605	1.427	48.11%	-4.22%
20108-006	7	2.025	1.882	2.167	1.256	2.486	0.06954	0.3809	18.81%	28.84%
20108-007	8	2.407	2.082	2.733	1.42	4.225	0.1592	0.8717	36.22%	15.41%
20108-008	7	2.855	2.667	3.043	2.295	3.81	0.09179	0.5028	17.61%	-0.33%
20108-009	8	2.554	2.419	2.689	2.122	3.108	0.06608	0.3619	14.17%	10.24%
20108-010	8	2.104	1.947	2.261	1.19	2.652	0.07676	0.4204	19.98%	26.04%
20108-011	6	2.401	2.179	2.623	1.527	3.154	0.1085	0.5945	24.77%	15.64%
20108-012	8	2.121	1.995	2.248	1.592	2.504	0.06181	0.3385	15.96%	25.45%
20108-013	8	2.016	1.836	2.197	1.311	2.568	0.08829	0.4836	23.98%	29.14%
20108-014	8	2.283	2.072	2.494	1.408	3.185	0.1031	0.5647	24.74%	19.78%
20108-015	8	2.22	2.129	2.31	1.927	2.59	0.04432	0.2427	10.94%	21.99%

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8363	0.9137	0.7	1	0.0189	0.1035	11.83%	0.0%
20108-001	8	0.825	0.7731	0.8769	0.5	0.9	0.02535	0.1389	16.83%	5.71%
20108-002	8	0.7625	0.6804	0.8446	0.3	1	0.04016	0.22	28.85%	12.86%
20108-003	8	0.85	0.7972	0.9028	0.7	1	0.02582	0.1414	16.64%	2.86%
20108-004	8	0.8625	0.8139	0.9111	0.6	1	0.02378	0.1302	15.1%	1.43%
20108-005	8	0.4	0.2925	0.5075	0	0.9	0.05255	0.2878	71.96%	54.29%
20108-006	8	0.6125	0.4971	0.7279	0	0.9	0.05643	0.3091	50.46%	30.0%
20108-007	8	0.7625	0.6907	0.8343	0.4	1	0.0351	0.1923	25.21%	12.86%
20108-008	8	0.6375	0.5265	0.7485	0	0.9	0.05428	0.2973	46.64%	27.14%
20108-009	8	0.85	0.8154	0.8846	0.7	1	0.0169	0.09258	10.89%	2.86%
20108-010	8	0.8	0.7309	0.8691	0.4	1	0.03381	0.1852	23.15%	8.57%
20108-011	8	0.675	0.5314	0.8186	0.1	1	0.0702	0.3845	56.97%	22.86%
20108-012	8	0.9625	0.9432	0.9818	0.9	1	0.009449	0.05175	5.38%	-10.0%
20108-013	8	0.9063	0.8634	0.9491	0.7	1	0.02095	0.1148	12.66%	-3.57%
20108-014	8	0.75	0.6389	0.8611	0.3	1	0.05434	0.2976	39.68%	14.29%
20108-015	8	0.7	0.6338	0.7662	0.4	1	0.03237	0.1773	25.33%	20.0%

Chironomus 20-d Survival and Growth Sediment Test **EnviroSystems, Inc.**

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-003	1.698	1.168	1.041	1.47	1.401	1.158	1.668	0.61
20108-004	1.86	2.142	1.098	1.724	1.329	1.416	0.913	1.816
20108-005		0.184	1.077		0.493	1.684	1.502	0.975
20108-006	0.809	1.573		0.86	1.218	1.74	1.189	0.628
20108-007	0.845	1.647	1.214	0.426	1.177	0.898	1.682	1.773
20108-008	1.143	1.19	1.525	0.794	1.209	1.395		1.377
20108-009	1.094	1.168	0.849	1.516	1.291	1.243	1.485	1.69
20108-010	0.857	1.984	0.952	1.346	0.941	1.326	1.954	0.84
20108-011		1.289	2.138	1.577	1.685	1.45	1.527	
20108-012	1.652	2.504	1.843	1.959	0.955	1.589	2.238	1.442
20108-013	1.836	1.027	0.565	1.063	0.9175	1.861	1.754	1.749
20108-014	0.637	1.511	0.573	1.832	0.845	0.176	1.822	1.681
20108-015	1.651	1.217	1.478	1.403	1.036	1.97	1.349	1.46

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-001	2.792	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-003	2.426	1.947	3.47	1.797	2.335	2.895	2.383	2.033
20108-004	2.657	2.38	2.196	2.155	1.827	2.832	1.522	2.018
20108-005		0.6133	3.59		4.93	2.406	3.004	3.25
20108-006	2.023	2.247		2.15	2.03	2.486	1.982	1.256
20108-007	4.225	2.353	2.428	1.42	1.962	2.993	2.102	1.773
20108-008	3.81	2.975	3.05	2.647	2.418	2.79		2.295
20108-009	2.735	2.336	2.122	2.166	2.582	3.108	2.97	2.414
20108-010	2.142	1.984	1.19	2.243	2.353	2.652	2.171	2.1
20108-011		2.578	2.138	3.154	2.106	2.9	1.527	
20108-012	1.836	2.504	2.304	2.177	1.592	2.27	2.487	1.802
20108-013	2.295	2.568	1.412	1.772	1.311	2.326	1.949	2.499
20108-014	3.185	2.374	2.865	2.29	1.408	1.76	2.278	2.101
20108-015	2.359	2.028	2.111	2.338	2.59	1.97	1.927	2.433

Chironomus 20-d Survival and Growth Sediment Test **EnviroSystems, Inc.**

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.7	0.9	1	0.9	0.9	0.8	1
20108-001	0.8	0.8	0.5	0.9	0.9	0.9	0.9	0.9
20108-002	0.8	0.3	0.8	1	0.9	0.9	0.6	0.8
20108-003	1	0.9	0.7	1	1	0.8	0.7	0.7
20108-004	0.9	0.9	0.8	0.9	1	0.8	0.6	1
20108-005	0.2	0.4	0.4	0	0.2	0.9	0.7	0.4
20108-006	0.8	0.9	0	0.4	0.6	0.9	0.8	0.5
20108-007	0.4	0.8	0.7	0.6	0.8	0.9	0.9	1
20108-008	0.4	0.7	0.7	0.8	0.8	0.9	0	0.8
20108-009	0.7	1	0.8	0.9	0.8	0.8	0.9	0.9
20108-010	0.9	1	0.9	0.7	0.4	0.8	0.9	0.8
20108-011	0.1	1	1	0.7	0.9	0.6	1	0.1
20108-012	1	1	1	1	0.9	0.9	0.9	1
20108-013	1	0.8	0.7	1	0.85	1	0.9	1
20108-014	0.3	1	0.8	1	0.7	0.3	1	0.9
20108-015	0.7	0.6	0.8	0.7	0.4	1	0.8	0.6

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-8340-9171	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					22.1%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-015	0.6714	1.761	0.2072	0.2565	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.233	2.586	0.2391	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02494587	0.02494587	1	0.4507	0.5129	Non-Significant Effect
Error	0.7748532	0.05534666	14			
Total	0.7997991	0.08029253	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.439	8.885	0.6431	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9692		0.8250	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-015	8	0.7	0.6326	0.7674	0.4	1	0.03292	0.1773	25.33%	8.2%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-015	8	1.008	0.9272	1.089	0.6847	1.412	0.03956	0.213	21.13%	7.26%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-015								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-8365-0427	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					30.44%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-014	-0.04288	1.761	0.2714	0.5168	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.727	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0001746085	0.0001746085	1	0.001839	0.9664	Non-Significant Effect
Error	1.329272	0.09494798	14			
Total	1.329446	0.09512259	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.908	8.885	0.4135	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8623		0.0208	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-014	8	0.75	0.6368	0.8632	0.3	1	0.05526	0.2976	39.68%	1.64%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-014	8	1.094	0.9595	1.228	0.5796	1.419	0.06554	0.353	32.27%	-0.61%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-014								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-1142-5329	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					19.9%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-013	-1.704	1.761	0.19	0.9448	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.434	2.586	0.1041	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1352845	0.1352845	1	2.905	0.1104	Non-Significant Effect
Error	0.651924	0.046566	14			
Total	0.7872086	0.1818505	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.347	8.885	0.2828	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9212		0.1765	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-013	8	0.9063	0.8626	0.9499	0.7	1	0.02131	0.1148	12.66%	-18.85%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-013	8	1.271	1.208	1.335	0.9912	1.412	0.03098	0.1668	13.12%	-16.92%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-013								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-4346-5245	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					18.22%

Unequal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-012	-2.772	1.86	0.1769	0.9879	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.761	2.586	0.0184	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2782423	0.2782423	1	7.684	0.0150	Significant Effect
Error	0.506954	0.036211	14			
Total	0.7851963	0.3144533	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	9.18	8.885	0.0091	Unequal Variances
Distribution	Shapiro-Wilk Normality	0.8837		0.0443	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-012	8	0.9625	0.9428	0.9822	0.9	1	0.009611	0.05175	5.38%	-26.23%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-012	8	1.351	1.319	1.383	1.249	1.412	0.01566	0.08435	6.24%	-24.26%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-012								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	01-9427-4175	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					9.98%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-012	-2.89	1.771	0.1172	0.9937	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1365392	0.1365392	1	8.35	0.0127	Significant Effect
Error	0.2125819	0.01635245	13			
Total	0.3491211	0.1528916	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.814	9.155	0.1033	Equal Variances
Distribution	Shapiro-Wilk Normality	0.922		0.2063	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	7	0.8286	0.7809	0.8763	0.6	1	0.02328	0.1254	15.13%	0.0%
20108-012	8	0.9625	0.9428	0.9822	0.9	1	0.009611	0.05175	5.38%	-16.16%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	7	1.16	1.097	1.222	0.8861	1.412	0.03059	0.1647	14.2%	0.0%
20108-012	8	1.351	1.319	1.383	1.249	1.412	0.01566	0.08435	6.24%	-16.49%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-012								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-0610-0141	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					38.08%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-011	0.4618	1.761	0.3296	0.3257	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.878	2.586	0.7715	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02988073	0.02988073	1	0.2133	0.6513	Non-Significant Effect
Error	1.961548	0.1401106	14			
Total	1.991429	0.1699913	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.291	8.885	0.1387	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8905		0.0568	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-011	8	0.675	0.5287	0.8213	0.1	1	0.0714	0.3845	56.97%	11.48%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-011	8	1.001	0.8244	1.177	0.3218	1.412	0.08609	0.4636	46.32%	7.95%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-011								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-5968-8830	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:36	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					22.49%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-010	-0.3687	1.761	0.2102	0.6411	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.201	2.586	0.2698	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.007746463	0.007746463	1	0.1359	0.7179	Non-Significant Effect
Error	0.7977901	0.056985	14			
Total	0.8055365	0.06473146	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.342	8.885	0.7077	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9075		0.1063	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-010	8	0.8	0.7296	0.8704	0.4	1	0.03438	0.1852	23.15%	-4.92%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-010	8	1.131	1.047	1.215	0.6847	1.412	0.04096	0.2206	19.5%	-4.05%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-010								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-2433-7097	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					18.46%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-009	-0.9539	1.761	0.1787	0.8219	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.588	2.586	0.0493	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03748924	0.03748924	1	0.91	0.3563	Non-Significant Effect
Error	0.5767464	0.04119617	14			
Total	0.6142356	0.0786854	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.823	8.885	0.0978	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9372		0.3160	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-009	8	0.85	0.8148	0.8852	0.7	1	0.01719	0.09258	10.89%	-11.48%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-009	8	1.184	1.134	1.234	0.9912	1.412	0.02427	0.1307	11.04%	-8.91%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-009								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-0946-2846	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					11.88%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-009	-0.3187	1.771	0.1351	0.6225	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.00220594	0.00220594	1	0.1016	0.7550	Non-Significant Effect
Error	0.2823743	0.0217211	13			
Total	0.2845802	0.02392704	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.588	9.155	0.5571	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9481		0.4955	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	7	0.8286	0.7809	0.8763	0.6	1	0.02328	0.1254	15.13%	0.0%
20108-009	8	0.85	0.8148	0.8852	0.7	1	0.01719	0.09258	10.89%	-2.59%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	7	1.16	1.097	1.222	0.8861	1.412	0.03059	0.1647	14.2%	0.0%
20108-009	8	1.184	1.134	1.234	0.9912	1.412	0.02427	0.1307	11.04%	-2.1%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-009								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-8308-6212	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					30.25%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-008	1.061	1.761	0.2699	0.1533	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.586	2.586	0.0499	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1057821	0.1057821	1	1.126	0.3066	Non-Significant Effect
Error	1.315275	0.09394819	14			
Total	1.421057	0.1997302	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.877	8.885	0.4251	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8421		0.0104	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-008	8	0.6375	0.5244	0.7506	0	0.9	0.05521	0.2973	46.64%	16.39%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-008	8	0.9245	0.7914	1.058	0.1588	1.249	0.06502	0.3501	37.87%	14.96%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-008								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-1465-5917	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					21.71%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-008	0.4617	1.771	0.2042	0.3260	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01057687	0.01057687	1	0.2131	0.6519	Non-Significant Effect
Error	0.6451203	0.04962464	13			
Total	0.6556972	0.06020151	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.085	10.79	0.3894	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9117		0.1440	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-008	7	0.7286	0.6676	0.7896	0.4	0.9	0.02978	0.1604	22.01%	4.45%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-008	7	1.034	0.9666	1.101	0.6847	1.249	0.03287	0.177	17.12%	4.9%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-008								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-4059-0278	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					22.99%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-007	0.01122	1.761	0.2141	0.4956	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.161	2.586	0.3117	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	7.442896E-06	7.442896E-06	1	0.0001259	0.9912	Non-Significant Effect
Error	0.8274946	0.05910675	14			
Total	0.827502	0.0591142	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.234	8.885	0.7882	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9236		0.1926	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-007	8	0.7625	0.6894	0.8356	0.4	1	0.0357	0.1923	25.21%	0.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-007	8	1.086	0.9983	1.173	0.6847	1.412	0.04271	0.23	21.18%	0.13%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-007								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-4665-0962	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					31.32%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-006	1.164	1.761	0.2781	0.1320	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.441	2.586	0.1009	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1350392	0.1350392	1	1.355	0.2639	Non-Significant Effect
Error	1.395629	0.09968777	14			
Total	1.530668	0.2347269	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.053	8.885	0.3634	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8997		0.0794	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-006	8	0.6125	0.4949	0.7301	0	0.9	0.0574	0.3091	50.46%	19.67%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-006	8	0.9034	0.7641	1.043	0.1588	1.249	0.06799	0.3662	40.53%	16.9%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-006								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-0362-9478	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					29.27%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-005	2.783	1.761	0.2624	0.0073	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.003	2.586	0.5293	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.6875873	0.6875873	1	7.746	0.0147	Significant Effect
Error	1.242697	0.08876406	14			
Total	1.930284	0.7763513	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.718	8.885	0.4920	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9455		0.4218	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-005	8	0.4	0.2905	0.5095	0	0.9	0.05345	0.2878	71.96%	47.54%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-005	8	0.6726	0.5451	0.8	0.1588	1.249	0.06221	0.335	49.81%	38.14%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-005								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-3022-3731	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					20.28%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-004	-1.12	1.761	0.193	0.8592	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.397	2.586	0.1229	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.06023601	0.06023601	1	1.254	0.2816	Non-Significant Effect
Error	0.6724972	0.04803552	14			
Total	0.7327332	0.1082715	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.123	8.885	0.3419	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9304		0.2478	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-004	8	0.8625	0.813	0.912	0.6	1	0.02419	0.1302	15.1%	-13.11%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-004	8	1.21	1.143	1.277	0.8861	1.419	0.03257	0.1754	14.5%	-11.29%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-004								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-8905-5941	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					21.44%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-003	-0.9544	1.761	0.2021	0.8220	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.29	2.586	0.1920	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0479489	0.0479489	1	0.9108	0.3561	Non-Significant Effect
Error	0.7370048	0.0526432	14			
Total	0.7849537	0.1005921	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.634	8.885	0.5329	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9329		0.2705	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	0.0%
20108-003	8	0.85	0.7962	0.9038	0.7	1	0.02626	0.1414	16.64%	-11.48%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	0.0%
20108-003	8	1.197	1.121	1.273	0.9912	1.419	0.03713	0.1999	16.71%	-10.07%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002								
20108-003								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	21-2329-3963	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					15.43%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-015	1.555	1.761	0.1669	0.0711	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.205	2.586	0.2655	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0869401	0.0869401	1	2.419	0.1422	Non-Significant Effect
Error	0.503103	0.03593592	14			
Total	0.5900431	0.122876	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.714	8.885	0.4942	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8962		0.0698	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-015	8	0.7	0.6326	0.7674	0.4	1	0.03292	0.1773	25.33%	15.15%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-015	8	1.008	0.9272	1.089	0.6847	1.412	0.03956	0.213	21.13%	12.76%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-015								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-7310-3040	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					24.03%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-014	0.4501	1.761	0.242	0.3298	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.936	2.586	0.6495	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01530157	0.01530157	1	0.2026	0.6595	Non-Significant Effect
Error	1.057521	0.07553725	14			
Total	1.072823	0.09083881	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.704	8.885	0.0584	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8743		0.0316	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-014	8	0.75	0.6368	0.8632	0.3	1	0.05526	0.2976	39.68%	9.09%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-014	8	1.094	0.9595	1.228	0.5796	1.419	0.06554	0.353	32.27%	5.35%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-014								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-0257-9526	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					13.02%

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	P-Value	Decision(5%)
20108-001		20108-013	79.5		2	0.8607	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.325	2.586	0.1662	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.05331342	0.05331342	1	1.963	0.1829	Non-Significant Effect
Error	0.3801737	0.02715527	14			
Total	0.4334872	0.08046869	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.051	8.885	0.9498	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8301		0.0070	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-013	8	0.9063	0.8626	0.9499	0.7	1	0.02131	0.1148	12.66%	-9.85%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-013	8	1.271	1.208	1.335	0.9912	1.412	0.03098	0.1668	13.12%	-9.99%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-013								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-5505-7180	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					9.69%

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	P-Value	Decision(5%)
20108-001		20108-012	92.5		1	0.9948	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.957	2.586	0.0046	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1525475	0.1525475	1	9.08	0.0093	Significant Effect
Error	0.2352038	0.01680027	14			
Total	0.3877513	0.1693478	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.723	8.885	0.1041	Equal Variances
Distribution	Shapiro-Wilk Normality	0.7404		0.0005	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-012	8	0.9625	0.9428	0.9822	0.9	1	0.009611	0.05175	5.38%	-16.67%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-012	8	1.351	1.319	1.383	1.249	1.412	0.01566	0.08435	6.24%	-16.9%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-012								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-8567-7603	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:35	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					5.5%

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	P-Value	Decision(5%)
20108-001		20108-012	84.5		1	0.9897	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.07570202	0.07570202	1	12.53	0.0036	Significant Effect
Error	0.07856271	0.006043286	13			
Total	0.1542647	0.0817453	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.484	10.79	0.6467	Equal Variances
Distribution	Shapiro-Wilk Normality	0.679		0.0001	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	7	0.8714	0.8529	0.89	0.8	0.9	0.009061	0.04879	5.6%	0.0%
20108-012	8	0.9625	0.9428	0.9822	0.9	1	0.009611	0.05175	5.38%	-10.45%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	7	1.209	1.182	1.235	1.107	1.249	0.01286	0.06924	5.73%	0.0%
20108-012	8	1.351	1.319	1.383	1.249	1.412	0.01566	0.08435	6.24%	-11.78%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-012								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-0681-6827	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					31.63%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-011	0.8916	1.761	0.306	0.1938	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.023	2.586	0.4966	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.09595986	0.09595986	1	0.795	0.3877	Non-Significant Effect
Error	1.689798	0.1206998	14			
Total	1.785758	0.2166597	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	8.114	8.885	0.0131	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8783		0.0365	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-011	8	0.675	0.5287	0.8213	0.1	1	0.0714	0.3845	56.97%	18.18%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-011	8	1.001	0.8244	1.177	0.3218	1.412	0.08609	0.4636	46.32%	13.4%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-011								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-1064-8669	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					15.85%

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	P-Value	Decision(5%)
20108-001		20108-010	65.5		2	0.3992	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.384	2.586	0.1300	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.002391156	0.002391156	1	0.06364	0.8045	Non-Significant Effect
Error	0.5260398	0.03757427	14			
Total	0.5284309	0.03996542	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.837	8.885	0.4408	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8406		0.0099	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-010	8	0.8	0.7296	0.8704	0.4	1	0.03438	0.1852	23.15%	3.03%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-010	8	1.131	1.047	1.215	0.6847	1.412	0.04096	0.2206	19.5%	2.12%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-010								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-8963-1433	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					11.38%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-009	-0.3842	1.761	0.13	0.6467	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.596	2.586	0.0473	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.003215789	0.003215789	1	0.1476	0.7066	Non-Significant Effect
Error	0.3049962	0.02178544	14			
Total	0.308212	0.02500123	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.55	8.885	0.5771	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8807		0.0398	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-009	8	0.85	0.8148	0.8852	0.7	1	0.01719	0.09258	10.89%	-3.03%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-009	8	1.184	1.134	1.234	0.9912	1.412	0.02427	0.1307	11.04%	-2.45%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-009								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-5082-7899	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					7.88%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-009	0.4438	1.771	0.09791	0.3323	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.002247201	0.002247201	1	0.1969	0.6645	Non-Significant Effect
Error	0.1483551	0.01141193	13			
Total	0.1506023	0.01365913	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.564	10.79	0.1426	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9037		0.1083	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	7	0.8714	0.8529	0.89	0.8	0.9	0.009061	0.04879	5.6%	0.0%
20108-009	8	0.85	0.8148	0.8852	0.7	1	0.01719	0.09258	10.89%	2.46%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	7	1.209	1.182	1.235	1.107	1.249	0.01286	0.06924	5.73%	0.0%
20108-009	8	1.184	1.134	1.234	0.9912	1.412	0.02427	0.1307	11.04%	2.03%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-009								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-6480-6242	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					23.84%

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	P-Value	Decision(5%)
20108-001		20108-008	49.5		2	0.0249	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.903	2.586	0.0069	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2135872	0.2135872	1	2.866	0.1126	Non-Significant Effect
Error	1.043524	0.07453746	14			
Total	1.257112	0.2881247	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.628	8.885	0.0609	Equal Variances
Distribution	Shapiro-Wilk Normality	0.7922		0.0021	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-008	8	0.6375	0.5244	0.7506	0	0.9	0.05521	0.2973	46.64%	22.73%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-008	8	0.9245	0.7914	1.058	0.1588	1.249	0.06502	0.3501	37.87%	20.0%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-008								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-9727-0599	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					14.14%

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	P-Value	Decision(5%)
20108-001		20108-008	41.5		2	0.0469	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.05527901	0.05527901	1	1.925	0.1887	Non-Significant Effect
Error	0.3733701	0.02872077	13			
Total	0.4286491	0.08399978	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.183	9.155	0.8211	Equal Variances
Distribution	Shapiro-Wilk Normality	0.782		0.0022	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-008	7	0.7286	0.6676	0.7896	0.4	0.9	0.02978	0.1604	22.01%	11.69%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-008	7	1.034	0.9666	1.101	0.6847	1.249	0.03287	0.177	17.12%	10.53%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-008								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-8627-9608	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					16.38%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-007	0.7009	1.761	0.1755	0.2474	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.084	2.586	0.4070	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01949978	0.01949978	1	0.4912	0.4949	Non-Significant Effect
Error	0.5557443	0.03969602	14			
Total	0.5752441	0.0591958	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.997	8.885	0.3816	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9115		0.1230	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-007	8	0.7625	0.6894	0.8356	0.4	1	0.0357	0.1923	25.21%	7.58%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-007	8	1.086	0.9983	1.173	0.6847	1.412	0.04271	0.23	21.18%	6.04%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-007								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-1355-8846	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					24.91%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-006	1.78	1.761	0.2495	0.0484	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.72	2.586	0.0235	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2544095	0.2544095	1	3.169	0.0967	Non-Significant Effect
Error	1.123878	0.08027704	14			
Total	1.378288	0.3346865	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	5.062	8.885	0.0483	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8846		0.0458	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-006	8	0.6125	0.4949	0.7301	0	0.9	0.0574	0.3091	50.46%	25.76%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-006	8	0.9034	0.7641	1.043	0.1588	1.249	0.06799	0.3662	40.53%	21.82%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-006								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-8523-7412	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					16.66%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-006	1.451	1.771	0.178	0.0852	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.07938136	0.07938136	1	2.105	0.1705	Non-Significant Effect
Error	0.4901767	0.0377059	13			
Total	0.5695581	0.1170873	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.918	9.155	0.4140	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8725		0.0367	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-006	7	0.7	0.6239	0.7761	0.4	0.9	0.03714	0.2	28.57%	15.15%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-006	7	1.01	0.9241	1.096	0.6847	1.249	0.04185	0.2254	22.32%	12.62%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-006								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-4883-1447	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					22.84%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-005	3.669	1.761	0.2319	0.0013	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.266	2.586	0.2108	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.9333922	0.9333922	1	13.46	0.0025	Significant Effect
Error	0.9709466	0.06935333	14			
Total	1.904339	1.002746	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.237	8.885	0.0761	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9343		0.2852	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-005	8	0.4	0.2905	0.5095	0	0.9	0.05345	0.2878	71.96%	51.52%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-005	8	0.6726	0.5451	0.8	0.1588	1.249	0.06221	0.335	49.81%	41.8%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-005								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-3272-0943	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					13.45%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-004	-0.6414	1.761	0.149	0.7342	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.265	2.586	0.2115	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0117759	0.0117759	1	0.4114	0.5316	Non-Significant Effect
Error	0.4007469	0.02862478	14			
Total	0.4125229	0.04040068	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.161	8.885	0.8485	Equal Variances
Distribution	Shapiro-Wilk Normality	0.874		0.0314	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-004	8	0.8625	0.813	0.912	0.6	1	0.02419	0.1302	15.1%	-4.55%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-004	8	1.21	1.143	1.277	0.8861	1.419	0.03257	0.1754	14.5%	-4.7%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-004								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-1709-1304	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					14.72%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-003	-0.4501	1.761	0.1605	0.6702	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.102	2.586	0.3824	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.006733667	0.006733667	1	0.2026	0.6595	Non-Significant Effect
Error	0.4652545	0.03323247	14			
Total	0.4719882	0.03996613	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.509	8.885	0.6004	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9145		0.1374	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-003	8	0.85	0.7962	0.9038	0.7	1	0.02626	0.1414	16.64%	-3.03%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-003	8	1.197	1.121	1.273	0.9912	1.419	0.03713	0.1999	16.71%	-3.55%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-003								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-5140-7225	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					17.87%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-002	0.6391	1.761	0.1887	0.2665	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.452	2.586	0.0960	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01874529	0.01874529	1	0.4084	0.5331	Non-Significant Effect
Error	0.6425603	0.04589716	14			
Total	0.6613056	0.06464246	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.466	8.885	0.2567	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8723		0.0295	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	0.0%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	7.58%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	0.0%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	5.92%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001								
20108-002								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-2251-2832	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:34	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					12.91%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-015	2.336	1.761	0.1626	0.0174	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.264	2.586	0.2123	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1859895	0.1859895	1	5.456	0.0349	Significant Effect
Error	0.477239	0.0340885	14			
Total	0.6632286	0.220078	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.991	8.885	0.3837	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9709		0.8531	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-015	8	0.7	0.6326	0.7674	0.4	1	0.03292	0.1773	25.33%	20.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-015	8	1.008	0.9272	1.089	0.6847	1.412	0.03956	0.213	21.13%	17.62%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-015								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-1394-6245	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					20.67%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-014	0.9582	1.761	0.2391	0.1771	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.96	2.586	0.6038	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.06765641	0.06765641	1	0.9181	0.3542	Non-Significant Effect
Error	1.031658	0.07368983	14			
Total	1.099314	0.1413462	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	5.466	8.885	0.0394	Equal Variances
Distribution	Shapiro-Wilk Normality	0.912		0.1254	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-014	8	0.75	0.6368	0.8632	0.3	1	0.05526	0.2976	39.68%	14.29%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-014	8	1.094	0.9595	1.228	0.5796	1.419	0.06554	0.353	32.27%	10.63%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-014								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-2491-1225	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					10.75%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-013	-0.5939	1.761	0.1401	0.7190	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.821	2.586	0.9040	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.00892799	0.00892799	1	0.3528	0.5620	Non-Significant Effect
Error	0.3543098	0.02530785	14			
Total	0.3632378	0.03423584	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.221	8.885	0.7991	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9272		0.2196	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-013	8	0.9063	0.8626	0.9499	0.7	1	0.02131	0.1148	12.66%	-3.57%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-013	8	1.271	1.208	1.335	0.9912	1.412	0.03098	0.1668	13.12%	-3.86%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-013								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-9888-1331	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					7.76%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-012	-2.079	1.761	0.1077	0.9717	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.969	2.586	0.5873	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.06459954	0.06459954	1	4.32	0.0565	Non-Significant Effect
Error	0.2093399	0.01495285	14			
Total	0.2739394	0.07955239	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.204	8.885	0.1474	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9194		0.1650	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-012	8	0.9625	0.9428	0.9822	0.9	1	0.009611	0.05175	5.38%	-10.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-012	8	1.351	1.319	1.383	1.249	1.412	0.01566	0.08435	6.24%	-10.38%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-012								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-7943-5413	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					29.51%

Unequal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-011	1.294	1.86	0.3205	0.1158	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.039	2.586	0.4722	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1990791	0.1990791	1	1.675	0.2165	Non-Significant Effect
Error	1.663934	0.1188524	14			
Total	1.863013	0.3179315	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	9.429	8.885	0.0084	Unequal Variances
Distribution	Shapiro-Wilk Normality	0.8972		0.0725	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-011	8	0.675	0.5287	0.8213	0.1	1	0.0714	0.3845	56.97%	22.86%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-011	8	1.001	0.8244	1.177	0.3218	1.412	0.08609	0.4636	46.32%	18.23%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-011								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	21-1655-7836	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					13.29%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-010	0.9804	1.761	0.1665	0.1718	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.445	2.586	0.0993	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0343392	0.0343392	1	0.9612	0.3435	Non-Significant Effect
Error	0.5001758	0.03572685	14			
Total	0.534515	0.07006605	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.135	8.885	0.3383	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9523		0.5262	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-010	8	0.8	0.7296	0.8704	0.4	1	0.03438	0.1852	23.15%	8.57%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-010	8	1.131	1.047	1.215	0.6847	1.412	0.04096	0.2206	19.5%	7.57%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-010								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-1694-2197	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					9.28%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-009	0.5644	1.761	0.1244	0.2907	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.706	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.006352254	0.006352254	1	0.3186	0.5814	Non-Significant Effect
Error	0.2791322	0.01993802	14			
Total	0.2854845	0.02629027	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.334	8.885	0.7134	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9533		0.5435	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-009	8	0.85	0.8148	0.8852	0.7	1	0.01719	0.09258	10.89%	2.86%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-009	8	1.184	1.134	1.234	0.9912	1.412	0.02427	0.1307	11.04%	3.26%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-009								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-7828-3341	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					20.5%

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	P-Value	Decision(5%)
20108-000		20108-008	47.5		3	0.0141	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.94	2.586	0.0052	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.3582788	0.3582788	1	4.929	0.0434	Significant Effect
Error	1.01766	0.07269004	14			
Total	1.375939	0.4309688	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	5.379	8.885	0.0411	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8374		0.0089	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-008	8	0.6375	0.5244	0.7506	0	0.9	0.05521	0.2973	46.64%	27.14%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-008	8	0.9245	0.7914	1.058	0.1588	1.249	0.06502	0.3501	37.87%	24.45%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-008								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-2037-4439	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					11.68%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-008	2.244	1.771	0.1499	0.0214	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1346145	0.1346145	1	5.036	0.0429	Significant Effect
Error	0.3475062	0.02673124	13			
Total	0.4821206	0.1613457	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.375	9.155	0.6815	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9416		0.4023	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-008	7	0.7286	0.6676	0.7896	0.4	0.9	0.02978	0.1604	22.01%	16.73%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-008	7	1.034	0.9666	1.101	0.6847	1.249	0.03287	0.177	17.12%	15.52%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-008								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-8398-2547	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					13.76%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-007	1.419	1.761	0.1713	0.0889	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.134	2.586	0.3427	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.07620392	0.07620392	1	2.013	0.1778	Non-Significant Effect
Error	0.5298804	0.0378486	14			
Total	0.6060843	0.1140525	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.321	8.885	0.2890	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9666		0.7816	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-007	8	0.7625	0.6894	0.8356	0.4	1	0.0357	0.1923	25.21%	12.86%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-007	8	1.086	0.9983	1.173	0.6847	1.412	0.04271	0.23	21.18%	11.28%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-007								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-0031-5565	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					21.47%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-006	2.288	1.761	0.2466	0.0191	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.752	2.586	0.0194	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.4106236	0.4106236	1	5.236	0.0382	Significant Effect
Error	1.098015	0.07842962	14			
Total	1.508638	0.4890532	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	5.882	8.885	0.0323	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8921		0.0602	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-006	8	0.6125	0.4949	0.7301	0	0.9	0.0574	0.3091	50.46%	30.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-006	8	0.9034	0.7641	1.043	0.1588	1.249	0.06799	0.3662	40.53%	26.18%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-006								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-3814-3894	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					13.95%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-006	2.188	1.771	0.1732	0.0238	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1710075	0.1710075	1	4.788	0.0475	Significant Effect
Error	0.4643128	0.03571637	13			
Total	0.6353203	0.2067239	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.229	9.155	0.3182	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9365		0.3409	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-006	7	0.7	0.6239	0.7761	0.4	0.9	0.03714	0.2	28.57%	20.0%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-006	7	1.01	0.9241	1.096	0.6847	1.249	0.04185	0.2254	22.32%	17.49%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-006								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-4605-6028	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					19.6%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-005	4.243	1.761	0.2288	0.0004	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.297	2.586	0.1867	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.215575	1.215575	1	18.01	0.0008	Significant Effect
Error	0.9450827	0.06750591	14			
Total	2.160658	1.283081	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.924	8.885	0.0519	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9525		0.5306	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-005	8	0.4	0.2905	0.5095	0	0.9	0.05345	0.2878	71.96%	54.29%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-005	8	0.6726	0.5451	0.8	0.1588	1.249	0.06221	0.335	49.81%	45.04%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-005								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-6387-6040	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					11.13%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-004	0.1705	1.761	0.1441	0.4335	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.048	2.586	0.4577	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.000777972	0.000777972	1	0.02905	0.8671	Non-Significant Effect
Error	0.3748831	0.02677736	14			
Total	0.375661	0.02755533	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.35	8.885	0.7023	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9218		0.1804	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-004	8	0.8625	0.813	0.912	0.6	1	0.02419	0.1302	15.1%	1.43%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-004	8	1.21	1.143	1.277	0.8861	1.419	0.03257	0.1754	14.5%	1.14%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-004								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-3435-3767	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					12.27%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-003	0.3068	1.761	0.156	0.3818	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.359	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.002953926	0.002953926	1	0.09412	0.7635	Non-Significant Effect
Error	0.4393906	0.03138504	14			
Total	0.4423445	0.03433897	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.754	8.885	0.4759	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8799		0.0387	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-003	8	0.85	0.7962	0.9038	0.7	1	0.02626	0.1414	16.64%	2.86%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-003	8	1.197	1.121	1.273	0.9912	1.419	0.03713	0.1999	16.71%	2.22%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-003								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-7583-2617	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					15.1%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-002	1.302	1.761	0.1848	0.1069	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.503	2.586	0.0756	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.07470514	0.07470514	1	1.696	0.2138	Non-Significant Effect
Error	0.6166964	0.04404974	14			
Total	0.6914015	0.1187549	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.865	8.885	0.1882	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9298		0.2425	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-002	8	0.7625	0.6788	0.8462	0.3	1	0.04085	0.22	28.85%	12.86%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-002	8	1.087	0.99	1.184	0.5796	1.412	0.04746	0.2556	23.51%	11.17%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-002								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-8177-8951	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:32	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Angular (Corrected)	0	C > T	Not Run					10.57%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-001	0.869	1.761	0.1382	0.1997	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.441	2.586	0.1009	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0186074	0.0186074	1	0.7552	0.3995	Non-Significant Effect
Error	0.3449461	0.02463901	14			
Total	0.3635535	0.04324641	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.162	8.885	0.8480	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9107		0.1194	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.875	0.8356	0.9144	0.7	1	0.01922	0.1035	11.83%	0.0%
20108-001	8	0.825	0.7722	0.8778	0.5	0.9	0.02579	0.1389	16.83%	5.71%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	1.224	1.166	1.281	0.9912	1.426	0.02803	0.151	12.34%	0.0%
20108-001	8	1.156	1.094	1.218	0.7854	1.249	0.03022	0.1627	14.08%	5.57%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000								
20108-001								

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-5290-9984	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					15.45%

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	P-Value	Decision(5%)
20108-002		20108-015	69		0	0.5204	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	3.021	2.586	0.0026	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04684004	0.04684004	1	0.2807	0.6045	Non-Significant Effect
Error	2.335883	0.1668488	14			
Total	2.382723	0.2136888	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.664	8.885	0.0597	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8323		0.0076	Non-normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-015	8	2.22	2.127	2.312	1.927	2.59	0.04507	0.2427	10.94%	4.65%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-015	2.359	2.028	2.111	2.338	2.59	1.97	1.927	2.433

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-5054-7709	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					9.94%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-015	-0.5128	1.771	0.2144	0.6917	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01439456	0.01439456	1	0.263	0.6167	Non-Significant Effect
Error	0.7116329	0.054741	13			
Total	0.7260275	0.06913555	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.181	10.79	0.8550	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9252		0.2307	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	7	2.158	2.073	2.242	1.88	2.51	0.04147	0.2233	10.35%	0.0%
20108-015	8	2.22	2.127	2.312	1.927	2.59	0.04507	0.2427	10.94%	-2.88%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	Outlier	1.88	1.936	2.072	2.324	2.51	2.115
20108-015	2.359	2.028	2.111	2.338	2.59	1.97	1.927	2.433

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-2802-7049	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					20.61%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-014	0.1659	1.761	0.4798	0.4353	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.265	2.586	0.2116	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.008167082	0.008167082	1	0.02751	0.8706	Non-Significant Effect
Error	4.155822	0.2968444	14			
Total	4.163989	0.3050115	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.161	8.885	0.8493	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9327		0.2694	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-014	8	2.283	2.068	2.497	1.408	3.185	0.1049	0.5647	24.74%	1.94%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-014	3.185	2.374	2.865	2.29	1.408	1.76	2.278	2.101

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-8465-9974	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					19.08%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-013	1.235	1.761	0.4441	0.1185	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.447	2.586	0.0983	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.3880521	0.3880521	1	1.526	0.2371	Non-Significant Effect
Error	3.560448	0.2543177	14			
Total	3.9485	0.6423699	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.175	8.885	0.8370	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9539		0.5547	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-013	8	2.016	1.832	2.2	1.311	2.568	0.0898	0.4836	23.98%	13.38%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-013	2.295	2.568	1.412	1.772	1.311	2.326	1.949	2.499

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-9844-3329	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					16.69%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-012	0.936	1.761	0.3886	0.1826	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.797	2.586	0.0146	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1705768	0.1705768	1	0.8761	0.3651	Non-Significant Effect
Error	2.725691	0.1946922	14			
Total	2.896267	0.365269	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.398	8.885	0.2713	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8899		0.0554	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-012	8	2.121	1.993	2.25	1.592	2.504	0.06286	0.3385	15.96%	8.87%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-012	1.836	2.504	2.304	2.177	1.592	2.27	2.487	1.803

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	08-6197-2273	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					12.37%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-012	0.2403	1.771	0.2668	0.4069	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.004891706	0.004891706	1	0.05774	0.8139	Non-Significant Effect
Error	1.101441	0.08472621	13			
Total	1.106333	0.08961792	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.298	10.79	0.3302	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9472		0.4817	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	7	2.158	2.073	2.242	1.88	2.51	0.04147	0.2233	10.35%	0.0%
20108-012	8	2.121	1.993	2.25	1.592	2.504	0.06286	0.3385	15.96%	1.68%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	Outlier	1.88	1.936	2.072	2.324	2.51	2.115
20108-012	1.836	2.504	2.304	2.177	1.592	2.27	2.487	1.803

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-6034-7578	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					22.93%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-011	-0.2427	1.782	0.5338	0.5938	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.237	2.507	0.1812	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01811416	0.01811416	1	0.0589	0.8123	Non-Significant Effect
Error	3.690739	0.3075616	12			
Total	3.708853	0.3256758	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.286	9.522	0.7338	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9423		0.4490	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-011	6	2.401	2.174	2.627	1.527	3.154	0.1104	0.5945	24.77%	-3.12%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-011	2.578	2.138	3.154	2.106	2.9	1.527		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	01-4778-7525	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.98%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-010	0.9404	1.761	0.4184	0.1815	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.597	2.586	0.0471	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1996746	0.1996746	1	0.8844	0.3629	Non-Significant Effect
Error	3.160746	0.2257676	14			
Total	3.360421	0.4254422	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.555	8.885	0.5747	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9302		0.2456	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-010	8	2.104	1.945	2.264	1.19	2.652	0.07807	0.4204	19.98%	9.6%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-010	2.142	1.984	1.19	2.243	2.353	2.652	2.171	2.1

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-7211-9049	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					14.6%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-010	0.2985	1.771	0.3151	0.3850	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01053363	0.01053363	1	0.08912	0.7700	Non-Significant Effect
Error	1.536496	0.118192	13			
Total	1.54703	0.1287257	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.544	10.79	0.1442	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9049		0.1132	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	7	2.158	2.073	2.242	1.88	2.51	0.04147	0.2233	10.35%	0.0%
20108-010	8	2.104	1.945	2.264	1.19	2.652	0.07807	0.4204	19.98%	2.46%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	Outlier	1.88	1.936	2.072	2.324	2.51	2.115
20108-010	2.142	1.984	1.19	2.243	2.353	2.652	2.171	2.1

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-9878-5161	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.04%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-009	-1.005	1.761	0.3967	0.8339	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.74	2.586	0.0209	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2047916	0.2047916	1	1.009	0.3321	Non-Significant Effect
Error	2.840451	0.2028894	14			
Total	3.045243	0.4076809	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.098	8.885	0.3495	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8672		0.0247	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-009	8	2.554	2.416	2.692	2.122	3.108	0.06721	0.3619	14.17%	-9.72%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-009	2.735	2.336	2.122	2.166	2.582	3.108	2.97	2.414

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-8705-0555	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					12.99%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-009	-2.505	1.771	0.2803	0.9868	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.5871522	0.5871522	1	6.276	0.0263	Significant Effect
Error	1.216201	0.09355393	13			
Total	1.803353	0.6807061	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.627	10.79	0.2599	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9678		0.8240	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	7	2.158	2.073	2.242	1.88	2.51	0.04147	0.2233	10.35%	0.0%
20108-009	8	2.554	2.416	2.692	2.122	3.108	0.06721	0.3619	14.17%	-18.38%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	Outlier	1.88	1.936	2.072	2.324	2.51	2.115
20108-009	2.735	2.336	2.122	2.166	2.582	3.108	2.97	2.414

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-3233-6972	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					20.25%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-008	-1.98	1.771	0.4715	0.9654	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.405	2.548	0.1019	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.037234	1.037234	1	3.92	0.0693	Non-Significant Effect
Error	3.44012	0.2646246	13			
Total	4.477354	1.301859	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.087	10.79	0.9351	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8476		0.0160	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-008	7	2.855	2.664	3.046	2.295	3.81	0.09336	0.5028	17.61%	-22.64%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-008	3.81	2.975	3.05	2.647	2.418	2.79	2.295	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-0425-5310	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					27.21%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-007	-0.2202	1.761	0.6334	0.5855	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.616	2.586	0.0425	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02508304	0.02508304	1	0.04848	0.8289	Non-Significant Effect
Error	7.242928	0.517352	14			
Total	7.268011	0.5424351	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.766	8.885	0.2030	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8675		0.0249	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-007	8	2.407	2.075	2.739	1.42	4.225	0.1619	0.8717	36.22%	-3.4%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-007	4.225	2.353	2.428	1.42	1.962	2.993	2.102	1.773

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-6079-0322	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					20.33%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-007	0.6755	1.771	0.4732	0.2556	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1216595	0.1216595	1	0.4563	0.5112	Non-Significant Effect
Error	3.465831	0.2666024	13			
Total	3.587491	0.3882619	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.069	10.79	0.9514	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9111		0.1410	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-007	7	2.147	1.954	2.34	1.42	2.993	0.09415	0.507	23.61%	7.76%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-007	Outlier	2.353	2.428	1.42	1.962	2.993	2.102	1.773

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-4053-7626	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					18.25%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-006	1.263	1.771	0.4249	0.1143	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.669	2.548	0.0251	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.3430656	0.3430656	1	1.596	0.2286	Non-Significant Effect
Error	2.793979	0.2149214	13			
Total	3.137044	0.557987	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.894	10.79	0.4542	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9156		0.1647	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-006	7	2.025	1.88	2.17	1.256	2.486	0.07073	0.3809	18.81%	13.02%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-006	2.023	2.247	2.15	2.03	2.486	1.982	1.256	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-4229-4220	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					13.79%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-006	0.7959	1.782	0.2974	0.2208	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.06175416	0.06175416	1	0.6335	0.4415	Non-Significant Effect
Error	1.169729	0.09747741	12			
Total	1.231483	0.1592316	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.909	11.07	0.2195	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9273		0.2798	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	7	2.158	2.073	2.242	1.88	2.51	0.04147	0.2233	10.35%	0.0%
20108-006	7	2.025	1.88	2.17	1.256	2.486	0.07073	0.3809	18.81%	6.16%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	Outlier	1.88	1.936	2.072	2.324	2.51	2.115
20108-006	2.023	2.247	2.15	2.03	2.486	1.982	1.256	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-7203-4286	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					41.52%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-005	-1.176	1.782	0.9666	0.8688	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.438	2.507	0.0722	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.394056	1.394056	1	1.382	0.2625	Non-Significant Effect
Error	12.10119	1.008432	12			
Total	13.49524	2.402488	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	7.408	9.522	0.0204	Equal Variances
Distribution	Shapiro-Wilk Normality	0.904		0.1289	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-005	6	2.966	2.423	3.508	0.6133	4.93	0.2649	1.427	48.11%	-27.39%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-005	0.6133	3.59	4.93	2.406	3.004	3.25		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	01-1875-4205	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:31	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					18.08%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-004	0.5417	1.761	0.4209	0.2983	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.582	2.586	0.0510	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.06704918	0.06704918	1	0.2935	0.5965	Non-Significant Effect
Error	3.198398	0.228457	14			
Total	3.265448	0.2955062	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.509	8.885	0.6008	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9226		0.1858	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-004	8	2.198	2.036	2.361	1.522	2.832	0.07925	0.4268	19.41%	5.56%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-004	2.657	2.38	2.196	2.155	1.827	2.832	1.522	2.018

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-5063-5143	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					20.28%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-003	-0.309	1.761	0.472	0.6191	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.302	2.586	0.1825	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02742338	0.02742338	1	0.09547	0.7619	Non-Significant Effect
Error	4.02164	0.28726	14			
Total	4.049064	0.3146834	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.091	8.885	0.9117	Equal Variances
Distribution	Shapiro-Wilk Normality	0.855		0.0161	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	0.0%
20108-003	8	2.411	2.202	2.619	1.797	3.47	0.1017	0.5475	22.71%	-3.56%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115
20108-003	2.426	1.947	3.47	1.797	2.335	2.895	2.383	2.033

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-6113-5936	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					11.93%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-015	1.226	1.761	0.2889	0.1202	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.969	2.586	0.5877	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1618387	0.1618387	1	1.504	0.2403	Non-Significant Effect
Error	1.50671	0.1076221	14			
Total	1.668548	0.2694609	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.653	8.885	0.2212	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9321		0.2630	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-015	8	2.22	2.127	2.312	1.927	2.59	0.04507	0.2427	10.94%	8.31%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-015	2.359	2.028	2.111	2.338	2.59	1.97	1.927	2.433

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-2123-7640	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.73%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-014	0.5667	1.761	0.4293	0.2899	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.916	2.586	0.6898	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.07630753	0.07630753	1	0.3211	0.5799	Non-Significant Effect
Error	3.326648	0.2376177	14			
Total	3.402956	0.3139253	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.04	8.885	0.3675	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9885		0.9981	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-014	8	2.283	2.068	2.497	1.408	3.185	0.1049	0.5647	24.74%	5.71%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-014	3.185	2.374	2.865	2.29	1.408	1.76	2.278	2.101

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	18-6863-8806	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					16.07%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-013	1.831	1.761	0.389	0.0442	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.654	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.6541648	0.6541648	1	3.353	0.0884	Non-Significant Effect
Error	2.731275	0.1950911	14			
Total	3.38544	0.8492559	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.496	8.885	0.6083	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9079		0.1075	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-013	8	2.016	1.832	2.2	1.311	2.568	0.0898	0.4836	23.98%	16.71%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-013	2.295	2.568	1.412	1.772	1.311	2.326	1.949	2.499

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-1270-1068	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					13.39%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-012	1.627	1.761	0.3241	0.0630	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.755	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.3586521	0.3586521	1	2.648	0.1260	Non-Significant Effect
Error	1.896517	0.1354655	14			
Total	2.25517	0.4941177	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.364	8.885	0.6924	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8849		0.0463	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-012	8	2.121	1.993	2.25	1.592	2.504	0.06286	0.3385	15.96%	12.37%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-012	1.836	2.504	2.304	2.177	1.592	2.27	2.487	1.803

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-9780-0785	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					19.42%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-011	0.07677	1.782	0.47	0.4700	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.862	2.507	0.6754	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.00140549	0.00140549	1	0.005894	0.9401	Non-Significant Effect
Error	2.861566	0.2384638	12			
Total	2.862972	0.2398693	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.261	9.522	0.3172	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9626		0.7657	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-011	6	2.401	2.174	2.627	1.527	3.154	0.1104	0.5945	24.77%	0.84%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-011	2.578	2.138	3.154	2.106	2.9	1.527		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-9200-9715	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					14.85%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-010	1.55	1.761	0.3594	0.0717	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.319	2.586	0.1704	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.4003295	0.4003295	1	2.404	0.1433	Non-Significant Effect
Error	2.331573	0.1665409	14			
Total	2.731903	0.5668704	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.131	8.885	0.8755	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9334		0.2757	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-010	8	2.104	1.945	2.264	1.19	2.652	0.07807	0.4204	19.98%	13.07%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-010	2.142	1.984	1.19	2.243	2.353	2.652	2.171	2.1

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-9836-3861	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					13.79%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-009	-0.7036	1.761	0.3338	0.7534	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.704	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.07111436	0.07111436	1	0.495	0.4932	Non-Significant Effect
Error	2.011278	0.1436627	14			
Total	2.082392	0.2147771	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.193	8.885	0.8215	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9402		0.3510	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-009	8	2.554	2.416	2.692	2.122	3.108	0.06721	0.3619	14.17%	-5.51%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-009	2.735	2.336	2.122	2.166	2.582	3.108	2.97	2.414

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-2754-5397	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					16.97%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-008	-1.872	1.771	0.4108	0.9581	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.212	2.548	0.2304	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.7037247	0.7037247	1	3.504	0.0839	Non-Significant Effect
Error	2.610947	0.200842	13			
Total	3.314671	0.9045667	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.617	9.155	0.5424	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9581		0.6596	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-008	7	2.855	2.664	3.046	2.295	3.81	0.09336	0.5028	17.61%	-17.93%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-008	3.81	2.975	3.05	2.647	2.418	2.79	2.295	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-2324-5184	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					24.62%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-007	0.04061	1.761	0.5961	0.4841	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.78	2.586	0.0162	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0007557012	0.0007557012	1	0.00165	0.9682	Non-Significant Effect
Error	6.413755	0.4581254	14			
Total	6.414511	0.4588811	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.861	8.885	0.0537	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9082		0.1089	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-007	8	2.407	2.075	2.739	1.42	4.225	0.1619	0.8717	36.22%	0.57%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-007	4.225	2.353	2.428	1.42	1.962	2.993	2.102	1.773

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-2017-1506	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.05%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-007	1.173	1.771	0.4128	0.1309	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2791654	0.2791654	1	1.376	0.2618	Non-Significant Effect
Error	2.636658	0.2028199	13			
Total	2.915823	0.4819853	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.644	9.155	0.5289	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9682		0.8307	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-007	7	2.147	1.954	2.34	1.42	2.993	0.09415	0.507	23.61%	11.3%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-007	Outlier	2.353	2.428	1.42	1.962	2.993	2.102	1.773

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-3599-9922	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:30	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					14.72%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-006	1.968	1.771	0.3563	0.0354	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.052	2.548	0.4094	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.5856563	0.5856563	1	3.875	0.0707	Non-Significant Effect
Error	1.964806	0.1511389	13			
Total	2.550462	0.7367952	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.078	10.79	0.9437	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9178		0.1783	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-006	7	2.025	1.88	2.17	1.256	2.486	0.07073	0.3809	18.81%	16.36%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-006	2.023	2.247	2.15	2.03	2.486	1.982	1.256	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-5461-8559	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					49.86%

Unequal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-005	-0.9094	2.015	1.207	0.7976	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.526	2.507	0.0450	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.01732	1.01732	1	1.083	0.3185	Non-Significant Effect
Error	11.27201	0.9393345	12			
Total	12.28933	1.956654	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	13.02	9.522	0.0039	Unequal Variances
Distribution	Shapiro-Wilk Normality	0.8844		0.0672	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-005	6	2.966	2.423	3.508	0.6133	4.93	0.2649	1.427	48.11%	-22.5%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-005	0.6133	3.59	4.93	2.406	3.004	3.25		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-7652-3478	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					27.45%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-005	-2.744	1.796	0.6644	0.9905	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	3.170882	3.170882	1	7.529	0.0191	Significant Effect
Error	4.63274	0.4211582	11			
Total	7.803622	3.59204	12			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	5.659	10.05	0.0471	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9383		0.4347	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-005	5	3.436	3.078	3.794	2.406	4.93	0.1747	0.9405	27.37%	-41.93%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-005	Outlier	3.59	4.93	2.406	3.004	3.25		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-3360-7404	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					14.97%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-004	1.081	1.761	0.3623	0.1489	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.703	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1978513	0.1978513	1	1.169	0.2979	Non-Significant Effect
Error	2.369225	0.1692304	14			
Total	2.567077	0.3670817	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.165	8.885	0.8454	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9579		0.6242	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-004	8	2.198	2.036	2.361	1.522	2.832	0.07925	0.4268	19.41%	9.19%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-004	2.657	2.38	2.196	2.155	1.827	2.832	1.522	2.018

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-0018-2178	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.37%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-003	0.04244	1.761	0.4205	0.4834	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.296	2.586	0.1870	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0004107191	0.0004107191	1	0.001801	0.9667	Non-Significant Effect
Error	3.192467	0.2280334	14			
Total	3.192878	0.2284441	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.917	8.885	0.4099	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9468		0.4414	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-003	8	2.411	2.202	2.619	1.797	3.47	0.1017	0.5475	22.71%	0.42%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-003	2.426	1.947	3.47	1.797	2.335	2.895	2.383	2.033

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	18-8687-4827	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					16.89%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-002	0.4003	1.761	0.4089	0.3475	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.658	2.586	0.0338	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03454627	0.03454627	1	0.1603	0.6950	Non-Significant Effect
Error	3.017784	0.215556	14			
Total	3.05233	0.2501023	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.758	8.885	0.4743	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9171		0.1515	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	3.84%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-7747-4675	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					12.4%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-002	1.554	1.771	0.3001	0.0722	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2587026	0.2587026	1	2.413	0.1443	Non-Significant Effect
Error	1.393534	0.1071949	13			
Total	1.652237	0.3658976	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.135	10.79	0.1852	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9412		0.3972	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	0.0%
20108-002	7	2.158	2.073	2.242	1.88	2.51	0.04147	0.2233	10.35%	10.87%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448
20108-002	2.266	Outlier	1.88	1.936	2.072	2.324	2.51	2.115

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-0178-6335	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					15.42%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-015	2.511	1.761	0.4389	0.0125	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.398	2.586	0.1224	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.566684	1.566684	1	6.307	0.0249	Significant Effect
Error	3.477425	0.2483875	14			
Total	5.044109	1.815071	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	7.432	8.885	0.0168	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9486		0.4686	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-015	8	2.22	2.127	2.312	1.927	2.59	0.04507	0.2427	10.94%	21.99%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-015	2.359	2.028	2.111	2.338	2.59	1.97	1.927	2.433

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-3034-0185	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					19.04%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-014	1.83	1.761	0.5417	0.0443	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.943	2.586	0.6370	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.267018	1.267018	1	3.349	0.0886	Non-Significant Effect
Error	5.297364	0.3783831	14			
Total	6.564382	1.645401	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.373	8.885	0.6863	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9581		0.6273	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-014	8	2.283	2.068	2.497	1.408	3.185	0.1049	0.5647	24.74%	19.78%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-014	3.185	2.374	2.865	2.29	1.408	1.76	2.278	2.101

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-1158-4892	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.94%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-013	2.861	1.761	0.5104	0.0063	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.062	2.586	0.4373	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	2.749578	2.749578	1	8.187	0.0126	Significant Effect
Error	4.701991	0.3358565	14			
Total	7.451569	3.085434	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.872	8.885	0.4269	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9385		0.3309	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-013	8	2.016	1.832	2.2	1.311	2.568	0.0898	0.4836	23.98%	29.14%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-013	2.295	2.568	1.412	1.772	1.311	2.326	1.949	2.499

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	21-4489-5951	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					16.27%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-012	2.756	1.761	0.4629	0.0077	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.274	2.586	0.2044	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	2.097446	2.097446	1	7.593	0.0155	Significant Effect
Error	3.867233	0.2762309	14			
Total	5.96468	2.373677	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.821	8.885	0.0979	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9461		0.4309	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-012	8	2.121	1.993	2.25	1.592	2.504	0.06286	0.3385	15.96%	25.45%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-012	1.836	2.504	2.304	2.177	1.592	2.27	2.487	1.803

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-8243-4496	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					21.47%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-011	1.298	1.782	0.6108	0.1093	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.894	2.507	0.6139	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.6787511	0.6787511	1	1.686	0.2186	Non-Significant Effect
Error	4.832282	0.4026901	12			
Total	5.511033	1.081441	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.239	14.2	0.8419	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9547		0.6364	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-011	6	2.401	2.174	2.627	1.527	3.154	0.1104	0.5945	24.77%	15.64%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-011	2.578	2.138	3.154	2.106	2.9	1.527		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-9971-4531	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.16%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-010	2.674	1.761	0.4882	0.0091	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.156	2.586	0.3174	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	2.19661	2.19661	1	7.148	0.0182	Significant Effect
Error	4.302289	0.3073063	14			
Total	6.498899	2.503917	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.477	8.885	0.2544	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9845		0.9892	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-010	8	2.104	1.945	2.264	1.19	2.652	0.07807	0.4204	19.98%	26.04%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-010	2.142	1.984	1.19	2.243	2.353	2.652	2.171	2.1

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-0424-6555	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					16.51%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-009	1.093	1.761	0.4697	0.1465	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.241	2.586	0.2322	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.3395484	0.3395484	1	1.194	0.2930	Non-Significant Effect
Error	3.981993	0.2844281	14			
Total	4.321542	0.6239765	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.343	8.885	0.1339	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9422		0.3769	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-009	8	2.554	2.416	2.692	2.122	3.108	0.06721	0.3619	14.17%	10.24%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-009	2.735	2.336	2.122	2.166	2.582	3.108	2.97	2.414

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-5817-0137	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					19.12%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-008	-0.03083	1.771	0.5441	0.5121	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.018	2.548	0.4581	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0003350143	0.0003350143	1	0.0009506	0.9759	Non-Significant Effect
Error	4.581662	0.3524356	13			
Total	4.581997	0.3527706	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.732	10.79	0.5202	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9122		0.1464	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-008	7	2.855	2.664	3.046	2.295	3.81	0.09336	0.5028	17.61%	-0.33%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-008	3.81	2.975	3.05	2.647	2.418	2.79	2.295	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-1665-9581	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					23.95%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-007	1.133	1.761	0.6815	0.1381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.432	2.586	0.1054	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.7689021	0.7689021	1	1.284	0.2762	Non-Significant Effect
Error	8.384471	0.5988907	14			
Total	9.153373	1.367793	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.736	8.885	0.4842	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9109		0.1205	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-007	8	2.407	2.075	2.739	1.42	4.225	0.1619	0.8717	36.22%	15.41%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-007	4.225	2.353	2.428	1.42	1.962	2.993	2.102	1.773

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-3985-6358	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:29	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.72%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-006	2.882	1.771	0.5043	0.0064	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.178	2.548	0.2621	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	2.514956	2.514956	1	8.308	0.0128	Significant Effect
Error	3.935521	0.3027324	13			
Total	6.450478	2.817689	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.018	10.79	0.1995	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9678		0.8245	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-006	7	2.025	1.88	2.17	1.256	2.486	0.07073	0.3809	18.81%	28.84%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-006	2.023	2.247	2.15	2.03	2.486	1.982	1.256	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-2938-3119	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					35.54%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-005	-0.2116	1.782	1.011	0.5820	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.331	2.507	0.1210	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04939464	0.04939464	1	0.04476	0.8360	Non-Significant Effect
Error	13.24273	1.103561	12			
Total	13.29212	1.152955	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.649	9.522	0.0688	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9511		0.5772	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-005	6	2.966	2.423	3.508	0.6133	4.93	0.2649	1.427	48.11%	-4.22%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-005	0.6133	3.59	4.93	2.406	3.004	3.25		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-2897-5786	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					17.23%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-004	2.324	1.761	0.4903	0.0178	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.146	2.586	0.3281	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.674916	1.674916	1	5.403	0.0357	Significant Effect
Error	4.339941	0.3099958	14			
Total	6.014857	1.984912	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.404	8.885	0.2699	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9474		0.4492	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-004	8	2.198	2.036	2.361	1.522	2.832	0.07925	0.4268	19.41%	22.74%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-004	2.657	2.38	2.196	2.155	1.827	2.832	1.522	2.018

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	09-0927-6651	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					18.8%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-003	1.432	1.761	0.5348	0.0870	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.968	2.586	0.5902	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.7562855	0.7562855	1	2.051	0.1741	Non-Significant Effect
Error	5.163183	0.3687988	14			
Total	5.919468	1.125084	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.461	8.885	0.6295	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8985		0.0760	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-003	8	2.411	2.202	2.619	1.797	3.47	0.1017	0.5475	22.71%	15.28%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-003	2.426	1.947	3.47	1.797	2.335	2.895	2.383	2.033

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-3402-5841	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					18.47%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-002	1.734	1.761	0.5257	0.0524	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.067	2.586	0.4299	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.071736	1.071736	1	3.008	0.1048	Non-Significant Effect
Error	4.9885	0.3563214	14			
Total	6.060236	1.428057	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.593	8.885	0.5537	Equal Variances
Distribution	Shapiro-Wilk Normality	0.874		0.0313	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-002	8	2.328	2.128	2.527	1.88	3.52	0.09734	0.5242	22.52%	18.19%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-002	2.266	3.52	1.88	1.936	2.072	2.324	2.51	2.115

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	18-2706-1499	**Endpoint:**	Mean AF Weight-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					16.87%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-001	1.558	1.761	0.48	0.0707	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.192	2.586	0.2780	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.7214473	0.7214473	1	2.428	0.1415	Non-Significant Effect
Error	4.159327	0.2970947	14			
Total	4.880774	1.018542	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.801	8.885	0.1976	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9353		0.2952	Normal Distribution

Mean AF Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	2.845	2.594	3.097	2.177	4	0.1229	0.6617	23.25%	0.0%
20108-001	8	2.421	2.27	2.571	1.797	2.82	0.07342	0.3954	16.33%	14.93%

Mean AF Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	4	2.25	2.496	2.177	3.17	3.542	2.737	2.392
20108-001	2.793	2.772	2.82	1.797	2.077	2.057	2.603	2.448

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-6123-3435	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					27.57%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-015	-0.9784	1.761	0.3456	0.8278	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.378	2.586	0.1337	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.147456	0.147456	1	0.9572	0.3445	Non-Significant Effect
Error	2.156604	0.1540431	14			
Total	2.30406	0.3014991	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.924	8.885	0.1803	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9513		0.5098	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-015	8	1.445	1.339	1.552	1.036	1.97	0.05203	0.2802	19.38%	-15.32%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-015	1.651	1.217	1.478	1.403	1.036	1.97	1.349	1.46

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-0778-3804	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					40.15%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-014	0.4161	1.761	0.5033	0.3418	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.736	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.05653623	0.05653623	1	0.1731	0.6837	Non-Significant Effect
Error	4.571814	0.3265581	14			
Total	4.62835	0.3830943	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.845	8.885	0.4377	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9182		0.1580	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-014	8	1.135	0.8871	1.382	0.176	1.832	0.1209	0.6508	57.36%	9.48%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-014	0.637	1.511	0.573	1.832	0.845	0.176	1.822	1.681

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-0344-6275	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					34.71%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-013	-0.3768	1.761	0.435	0.6440	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.889	2.586	0.7467	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.03464251	0.03464251	1	0.142	0.7120	Non-Significant Effect
Error	3.416603	0.2440431	14			
Total	3.451246	0.2786856	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.126	8.885	0.8795	Equal Variances
Distribution	Shapiro-Wilk Normality	0.8742		0.0315	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-013	8	1.347	1.153	1.54	0.565	1.861	0.09442	0.5084	37.76%	-7.42%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-013	1.836	1.027	0.565	1.063	0.9175	1.861	1.754	1.749

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-9800-5229	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					33.72%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-012	-2.164	1.761	0.4226	0.9759	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.944	2.586	0.6337	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.078483	1.078483	1	4.683	0.0482	Significant Effect
Error	3.224248	0.2303034	14			
Total	4.302731	1.308786	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.006	8.885	0.9935	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9534		0.5457	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-012	8	1.773	1.59	1.956	0.955	2.504	0.08926	0.4807	27.11%	-41.42%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-012	1.652	2.504	1.843	1.959	0.955	1.589	2.238	1.442

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	17-7230-5050	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					31.57%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-011	-1.61	1.782	0.3957	0.9333	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.282	2.507	0.1497	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.4381931	0.4381931	1	2.593	0.1333	Non-Significant Effect
Error	2.028005	0.1690004	12			
Total	2.466198	0.6071935	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.726	14.2	0.2871	Equal Variances
Distribution	Shapiro-Wilk Normality	0.935		0.3582	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-011	6	1.611	1.501	1.721	1.289	2.138	0.05389	0.2902	18.01%	-28.52%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-011	1.289	2.138	1.577	1.685	1.45	1.527		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-3425-4230	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:28	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					33.37%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-010	-0.09053	1.761	0.4183	0.5354	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.965	2.586	0.5960	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.001849	0.001849	1	0.008196	0.9291	Non-Significant Effect
Error	3.158179	0.2255842	14			
Total	3.160028	0.2274332	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.036	8.885	0.9640	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9557		0.5853	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-010	8	1.275	1.096	1.454	0.84	1.984	0.08741	0.4707	36.92%	-1.72%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-010	0.857	1.984	0.952	1.346	0.941	1.326	1.954	0.84

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-3838-7925	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					27.25%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-009	-0.1985	1.761	0.3416	0.5773	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.406	2.586	0.1182	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.005929003	0.005929003	1	0.03941	0.8455	Non-Significant Effect
Error	2.106045	0.1504318	14			
Total	2.111974	0.1563608	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.22	8.885	0.1457	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9393		0.3410	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-009	8	1.292	1.19	1.394	0.849	1.69	0.04958	0.267	20.67%	-3.07%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-009	1.094	1.168	0.849	1.516	1.291	1.243	1.485	1.69

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-5720-7958	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					28.26%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-008	0.101	1.771	0.3543	0.4605	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.42	2.548	0.0949	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.00152553	0.00152553	1	0.01021	0.9211	Non-Significant Effect
Error	1.942473	0.149421	13			
Total	1.943998	0.1509465	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.106	10.79	0.1055	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9436		0.4302	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-008	7	1.233	1.143	1.323	0.794	1.525	0.04391	0.2365	19.17%	1.61%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-008	1.143	1.19	1.525	0.794	1.209	1.395	1.377	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	20-3925-4297	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					33.5%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-007	0.1919	1.761	0.42	0.4253	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.957	2.586	0.6107	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.008372411	0.008372411	1	0.03681	0.8506	Non-Significant Effect
Error	3.183995	0.2274282	14			
Total	3.192368	0.2358006	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.019	8.885	0.9808	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9154		0.1422	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-007	8	1.208	1.027	1.388	0.426	1.773	0.08814	0.4746	39.3%	3.65%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-007	0.845	1.647	1.214	0.426	1.177	0.898	1.682	1.773

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	15-0435-9271	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					32.78%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-006	0.4664	1.771	0.4109	0.3243	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.087	2.548	0.3635	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04371858	0.04371858	1	0.2175	0.6487	Non-Significant Effect
Error	2.612868	0.2009898	13			
Total	2.656586	0.2447084	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.369	10.79	0.7176	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9489		0.5072	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-006	7	1.145	0.9895	1.301	0.628	1.74	0.07603	0.4094	35.75%	8.63%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-006	0.809	1.573	0.86	1.218	1.74	1.189	0.628	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-2282-3236	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					39.99%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-005	0.9516	1.782	0.5013	0.1800	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.802	2.507	0.8046	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2456412	0.2456412	1	0.9056	0.3601	Non-Significant Effect
Error	3.255102	0.2712585	12			
Total	3.500743	0.5168997	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.436	9.522	0.6392	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9484		0.5366	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-005	6	0.9858	0.7674	1.204	0.184	1.684	0.1066	0.5741	58.24%	21.35%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-005	0.184	1.077	0.493	1.684	1.502	0.975		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	18-9723-4805	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					31.59%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-004	-1.262	1.761	0.396	0.8863	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.075	2.586	0.4184	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.3220824	0.3220824	1	1.593	0.2275	Non-Significant Effect
Error	2.830109	0.2021507	14			
Total	3.152192	0.5242331	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.314	8.885	0.7279	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9475		0.4514	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-004	8	1.537	1.378	1.696	0.913	2.142	0.07762	0.418	27.19%	-22.64%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-004	1.86	2.142	1.098	1.724	1.329	1.416	0.913	1.816

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	16-7874-5004	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					29.79%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-002		20108-003	-0.1097	1.761	0.3734	0.5429	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.201	2.586	0.2694	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.002162324	0.002162324	1	0.01203	0.9142	Non-Significant Effect
Error	2.516356	0.1797397	14			
Total	2.518519	0.1819021	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.767	8.885	0.4702	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9175		0.1538	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	0.0%
20108-003	8	1.277	1.14	1.414	0.61	1.698	0.06693	0.3604	28.23%	-1.86%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692
20108-003	1.698	1.168	1.041	1.47	1.401	1.158	1.668	0.61

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	02-9236-8242	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					19.83%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-015	-0.5532	1.761	0.2698	0.7056	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.772	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02873036	0.02873036	1	0.306	0.5888	Non-Significant Effect
Error	1.314285	0.09387749	14			
Total	1.343015	0.1226078	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.391	8.885	0.6740	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9699		0.8365	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-015	8	1.445	1.339	1.552	1.036	1.97	0.05203	0.2802	19.38%	-6.23%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-015	1.651	1.217	1.478	1.403	1.036	1.97	1.349	1.46

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-1268-0779	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					33.4%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-014	0.8763	1.761	0.4545	0.1978	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.922	2.586	0.6768	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.204551	0.204551	1	0.7679	0.3957	Non-Significant Effect
Error	3.729495	0.2663925	14			
Total	3.934046	0.4709435	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.877	8.885	0.0945	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9433		0.3915	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-014	8	1.135	0.8871	1.382	0.176	1.832	0.1209	0.6508	57.36%	16.62%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-014	0.637	1.511	0.573	1.832	0.845	0.176	1.822	1.681

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-6285-2117	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					27.75%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-013	0.06617	1.761	0.3776	0.4741	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.887	2.586	0.7518	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.000805122	0.000805122	1	0.004379	0.9482	Non-Significant Effect
Error	2.574285	0.1838775	14			
Total	2.57509	0.1846826	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.367	8.885	0.2784	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9087		0.1110	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-013	8	1.347	1.153	1.54	0.565	1.861	0.09442	0.5084	37.76%	1.04%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-013	1.836	1.027	0.565	1.063	0.9175	1.861	1.754	1.749

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-6645-0304	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					26.69%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-012	-1.998	1.761	0.3633	0.9672	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.052	2.586	0.4519	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.6789768	0.6789768	1	3.991	0.0656	Non-Significant Effect
Error	2.381929	0.1701378	14			
Total	3.060906	0.8491147	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.115	8.885	0.3442	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9829		0.9826	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-012	8	1.773	1.59	1.956	0.955	2.504	0.08926	0.4807	27.11%	-30.28%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-012	1.652	2.504	1.843	1.959	0.955	1.589	2.238	1.442

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	21-0413-2506	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					22.24%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-011	-1.474	1.782	0.3026	0.9169	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.745	2.507	0.9411	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2147149	0.2147149	1	2.173	0.1662	Non-Significant Effect
Error	1.185686	0.09880716	12			
Total	1.400401	0.3135221	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.297	14.2	0.8010	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9778		0.9597	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-011	6	1.611	1.501	1.721	1.289	2.138	0.05389	0.2902	18.01%	-18.39%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-011	1.289	2.138	1.577	1.685	1.45	1.527		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	10-3857-7045	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					26.32%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-010	0.4217	1.761	0.3582	0.3398	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.804	2.586	0.9467	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02941214	0.02941214	1	0.1778	0.6797	Non-Significant Effect
Error	2.315861	0.1654186	14			
Total	2.345273	0.1948308	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.029	8.885	0.3712	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9168		0.1497	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-010	8	1.275	1.096	1.454	0.84	1.984	0.08741	0.4707	36.92%	6.3%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-010	0.857	1.984	0.952	1.346	0.941	1.326	1.954	0.84

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-0168-1634	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:27	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					19.44%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-009	0.4577	1.761	0.2646	0.3271	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.773	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.01890615	0.01890615	1	0.2094	0.6542	Non-Significant Effect
Error	1.263726	0.09026615	14			
Total	1.282632	0.1091723	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.532	8.885	0.5873	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9324		0.2661	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-009	8	1.292	1.19	1.394	0.849	1.69	0.04958	0.267	20.67%	5.05%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-009	1.094	1.168	0.849	1.516	1.291	1.243	1.485	1.69

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-1489-3867	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					19.59%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-008	0.8466	1.771	0.2666	0.2063	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.836	2.548	0.7980	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.06065601	0.06065601	1	0.7167	0.4125	Non-Significant Effect
Error	1.100154	0.08462726	13			
Total	1.16081	0.1452833	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.954	10.79	0.4326	Equal Variances
Distribution	Shapiro-Wilk Normality	0.895		0.0797	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-008	7	1.233	1.143	1.323	0.794	1.525	0.04391	0.2365	19.17%	9.37%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-008	1.143	1.19	1.525	0.794	1.209	1.395	1.377	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-9475-9015	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					26.47%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-007	0.7482	1.761	0.3602	0.2334	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.979	2.586	0.5710	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.09363633	0.09363633	1	0.5598	0.4667	Non-Significant Effect
Error	2.341676	0.1672626	14			
Total	2.435313	0.2608989	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.062	8.885	0.3604	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9561		0.5916	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-007	8	1.208	1.027	1.388	0.426	1.773	0.08814	0.4746	39.3%	11.24%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-007	0.845	1.647	1.214	0.426	1.177	0.898	1.682	1.773

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-4756-7547	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					24.86%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-006	1.128	1.771	0.3382	0.1398	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.672	2.548	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1733192	0.1733192	1	1.273	0.2797	Non-Significant Effect
Error	1.770549	0.1361961	13			
Total	1.943868	0.3095153	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.535	9.155	0.5855	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9381		0.3586	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-006	7	1.145	0.9895	1.301	0.628	1.74	0.07603	0.4094	35.75%	15.83%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-006	0.809	1.573	0.86	1.218	1.74	1.189	0.628	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-4012-3168	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					31.72%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-005	1.548	1.782	0.4316	0.0738	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.861	2.507	0.6768	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.4819277	0.4819277	1	2.397	0.1475	Non-Significant Effect
Error	2.412783	0.2010653	12			
Total	2.894711	0.682993	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.017	9.522	0.1823	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9652		0.8067	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-005	6	0.9858	0.7674	1.204	0.184	1.684	0.1066	0.5741	58.24%	27.55%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-005	0.184	1.077	0.493	1.684	1.502	0.975		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	21-1280-6497	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					24.39%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-004	-0.9369	1.761	0.3318	0.8176	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.715	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1246255	0.1246255	1	0.8777	0.3647	Non-Significant Effect
Error	1.98779	0.141985	14			
Total	2.112416	0.2666106	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.6	8.885	0.5505	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9303		0.2463	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-004	8	1.537	1.378	1.696	0.913	2.142	0.07762	0.418	27.19%	-12.97%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-004	1.86	2.142	1.098	1.724	1.329	1.416	0.913	1.816

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-1276-1193	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					22.38%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-003	0.4858	1.761	0.3045	0.3173	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.996	2.586	0.5411	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.02822362	0.02822362	1	0.236	0.6346	Non-Significant Effect
Error	1.674038	0.1195741	14			
Total	1.702261	0.1477977	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.189	8.885	0.8250	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9312		0.2543	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-003	8	1.277	1.14	1.414	0.61	1.698	0.06693	0.3604	28.23%	6.17%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-003	1.698	1.168	1.041	1.47	1.401	1.158	1.668	0.61

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-6540-0914	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					26.64%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-001		20108-002	0.5212	1.761	0.3625	0.3052	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.267	2.586	0.2097	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.04601011	0.04601011	1	0.2716	0.6104	Non-Significant Effect
Error	2.371648	0.1694035	14			
Total	2.417658	0.2154136	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.102	8.885	0.3483	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9202		0.1699	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	0.0%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	7.88%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	14-3193-6837	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					37.46%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-015	-2.312	1.761	0.363	0.9817	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.014	2.586	0.5110	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.9081295	0.9081295	1	5.345	0.0365	Significant Effect
Error	2.378504	0.1698931	14			
Total	3.286633	1.078023	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.328	8.885	0.1353	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9905		0.9995	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-015	8	1.445	1.339	1.552	1.036	1.97	0.05203	0.2802	19.38%	-49.17%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-015	1.651	1.217	1.478	1.403	1.036	1.97	1.349	1.46

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	07-7097-0947	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					53.18%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-014	-0.566	1.761	0.5153	0.7098	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.696	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.1096834	0.1096834	1	0.3203	0.5804	Non-Significant Effect
Error	4.793714	0.3424082	14			
Total	4.903398	0.4520915	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.621	8.885	0.5393	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9391		0.3376	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-014	8	1.135	0.8871	1.382	0.176	1.832	0.1209	0.6508	57.36%	-17.09%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-014	0.637	1.511	0.573	1.832	0.845	0.176	1.822	1.681

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-2149-2676	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					46.33%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-013	-1.481	1.761	0.449	0.9196	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.628	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.5701508	0.5701508	1	2.194	0.1607	Non-Significant Effect
Error	3.638504	0.2598931	14			
Total	4.208654	0.8300439	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.011	8.885	0.9892	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9288		0.2334	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-013	8	1.347	1.153	1.54	0.565	1.861	0.09442	0.5084	37.76%	-38.96%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-013	1.836	1.027	0.565	1.063	0.9175	1.861	1.754	1.749

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-0646-2131	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					45.09%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-012	-3.24	1.761	0.4369	0.9970	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.706	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	2.583923	2.583923	1	10.5	0.0059	Significant Effect
Error	3.446148	0.2461535	14			
Total	6.030071	2.830076	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.131	8.885	0.8753	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9728		0.8814	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-012	8	1.773	1.59	1.956	0.955	2.504	0.08926	0.4807	27.11%	-82.94%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-012	1.652	2.504	1.843	1.959	0.955	1.589	2.238	1.442

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	03-0261-4657	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:26	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					43.01%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-011	-2.745	1.782	0.4168	0.9911	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.928	2.507	0.5524	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.413042	1.413042	1	7.537	0.0178	Significant Effect
Error	2.249905	0.1874921	12			
Total	3.662947	1.600534	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.103	14.2	0.2309	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9837		0.9910	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-011	6	1.611	1.501	1.721	1.289	2.138	0.05389	0.2902	18.01%	-66.25%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-011	1.289	2.138	1.577	1.685	1.45	1.527		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	05-4705-0488	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					44.66%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-010	-1.245	1.761	0.4327	0.8833	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.689	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.3744929	0.3744929	1	1.551	0.2334	Non-Significant Effect
Error	3.38008	0.2414343	14			
Total	3.754573	0.6159272	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.179	8.885	0.8336	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9273		0.2211	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-010	8	1.275	1.096	1.454	0.84	1.984	0.08741	0.4707	36.92%	-31.58%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-010	0.857	1.984	0.952	1.346	0.941	1.326	1.954	0.84

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	19-0193-9310	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					37.06%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-009	-1.584	1.761	0.3591	0.9323	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.036	2.586	0.4766	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.4172621	0.4172621	1	2.509	0.1355	Non-Significant Effect
Error	2.327945	0.1662818	14			
Total	2.745207	0.583544	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	3.665	8.885	0.1081	Equal Variances
Distribution	Shapiro-Wilk Normality	0.993		0.9999	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-009	8	1.292	1.19	1.394	0.849	1.69	0.04958	0.267	20.67%	-33.33%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-009	1.094	1.168	0.849	1.516	1.291	1.243	1.485	1.69

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-3022-7865	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					38.59%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-008	-1.251	1.771	0.374	0.8836	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	2.04	2.548	0.4266	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2607204	0.2607204	1	1.566	0.2328	Non-Significant Effect
Error	2.164373	0.1664903	13			
Total	2.425094	0.4272107	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	4.673	10.79	0.0791	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9879		0.9979	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-008	7	1.233	1.143	1.323	0.794	1.525	0.04391	0.2365	19.17%	-27.27%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-008	1.143	1.19	1.525	0.794	1.209	1.395	1.377	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	06-1671-3590	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					44.83%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-007	-0.968	1.761	0.4344	0.8253	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.683	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.2279656	0.2279656	1	0.9371	0.3495	Non-Significant Effect
Error	3.405896	0.2432783	14			
Total	3.633861	0.4712439	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.16	8.885	0.8500	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9603		0.6667	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-007	8	1.208	1.027	1.388	0.426	1.773	0.08814	0.4746	39.3%	-24.64%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-007	0.845	1.647	1.214	0.426	1.177	0.898	1.682	1.773

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-4157-6510	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					44.17%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-006	-0.7293	1.771	0.428	0.7606	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.782	2.548	0.9275	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.115992	0.115992	1	0.5319	0.4787	Non-Significant Effect
Error	2.834768	0.2180591	13			
Total	2.95076	0.3340511	14			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.558	10.79	0.6051	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9714		0.8779	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-006	7	1.145	0.9895	1.301	0.628	1.74	0.07603	0.4094	35.75%	-18.19%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-006	0.809	1.573	0.86	1.218	1.74	1.189	0.628	

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	11-6823-0325	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					53.47%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-005	-0.05783	1.782	0.5181	0.5226	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.551	2.507	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.0009691379	0.0009691379	1	0.003345	0.9548	Non-Significant Effect
Error	3.477002	0.2897502	12			
Total	3.477972	0.2907193	13			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.262	9.522	0.7509	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9626		0.7655	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-005	6	0.9858	0.7674	1.204	0.184	1.684	0.1066	0.5741	58.24%	-1.74%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-005	0.184	1.077	0.493	1.684	1.502	0.975		

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	12-4700-6463	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					42.43%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-004	-2.434	1.761	0.4112	0.9855	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.778	2.586	1.0000	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	1.29159	1.29159	1	5.925	0.0289	Significant Effect
Error	3.05201	0.2180007	14			
Total	4.343599	1.509591	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.495	8.885	0.6087	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9728		0.8811	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-004	8	1.537	1.378	1.696	0.913	2.142	0.07762	0.418	27.19%	-58.64%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-004	1.86	2.142	1.098	1.724	1.329	1.416	0.913	1.816

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	13-4273-6550	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					40.19%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-003	-1.392	1.761	0.3895	0.9071	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.877	2.586	0.7728	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.3787899	0.3787899	1	1.937	0.1857	Non-Significant Effect
Error	2.738257	0.1955898	14			
Total	3.117047	0.5743797	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.011	8.885	0.3770	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9805		0.9671	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-003	8	1.277	1.14	1.414	0.61	1.698	0.06693	0.3604	28.23%	-31.76%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-003	1.698	1.168	1.041	1.47	1.401	1.158	1.668	0.61

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	00-7439-4912	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					45.02%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-002	-1.148	1.761	0.4363	0.8650	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.884	2.586	0.7583	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.3237135	0.3237135	1	1.319	0.2700	Non-Significant Effect
Error	3.435868	0.2454191	14			
Total	3.759581	0.5691326	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	1.138	8.885	0.8689	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9648		0.7482	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-002	8	1.253	1.071	1.436	0.352	1.742	0.08897	0.4791	38.22%	-29.36%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-002	1.133	0.352	0.94	1.742	1.036	1.627	1.506	1.692

Chironomus 20-d Survival and Growth Sediment Test — **EnviroSystems, Inc.**

Analysis ID:	04-5036-7317	**Endpoint:**	Mean AF Biomass-mg	**CETIS Version:**	CETISv1.7.0
Analyzed:	24 Sep-10 15:25	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	15-0170-4877	**Test Type:**	Survival-AF Growth	**Analyst:**	
Start Date:	03 Sep-10 12:00	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Not Applicable
Ending Date:	23 Sep-10 12:00	**Species:**	Chironomus dilutus	**Brine:**	Not Applicable
Duration:	20d 0h	**Source:**	ABS - Aquatic Biosystems, CO	**Age:**	

Data Transform	Zeta	Alt Hyp	Monte Carlo	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	0	C > T	Not Run					39.12%

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	P-Value	Decision(5%)
20108-000		20108-001	-1.82	1.761	0.379	0.9549	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision
Extreme Value	Grubbs Single Outlier	1.929	2.586	0.6644	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(5%)
Between	0.6138064	0.6138064	1	3.313	0.0902	Non-Significant Effect
Error	2.593549	0.1852535	14			
Total	3.207355	0.7990599	15			

ANOVA Assumptions

Attribute	Test	Test Stat	Critical	P-Value	Decision(1%)
Variances	Variance Ratio F	2.392	8.885	0.2727	Equal Variances
Distribution	Shapiro-Wilk Normality	0.9652		0.7560	Normal Distribution

Mean AF Biomass-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	Diff%
20108-000	8	0.969	0.7746	1.163	0.225	1.771	0.09492	0.5111	52.75%	0.0%
20108-001	8	1.361	1.235	1.486	0.846	1.663	0.06137	0.3305	24.29%	-40.43%

Mean AF Biomass-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
20108-000	0.8	0.225	1.248	0.5442	0.634	1.771	1.095	1.435
20108-001	1.117	1.663	0.846	1.617	1.662	1.44	1.562	0.979

CLIENT: Nobis Engineering, Inc.
PROJECT: Project 80013, DAS-RAC2-030
ASSAY: Chironomus dilutus Sediment Assay
TASK: Overlying Water Alkalinity Summary
METHOD: EPA 310.2

Field ID	Sample Number	Day	LAB ID	MATRIX	RESULT	QLIMIT	UNITS	SAMPLED	ANALYZED
Lab Control	000	0	20117-100	Water	84	2	mg/L	09/02/10 0945	09/09/10
D02331	001	0	20117-101	Water	65	2	mg/L	09/02/10 0945	09/09/10
D02332	002	0	20117-102	Water	54	2	mg/L	09/02/10 0945	09/09/10
D02333	003	0	20117-103	Water	62	2	mg/L	09/02/10 0945	09/09/10
D02334	004	0	20117-104	Water	65	2	mg/L	09/02/10 0945	09/09/10
D02335	005	0	20117-105	Water	70	2	mg/L	09/02/10 0945	09/09/10
D02336	006	0	20117-106	Water	53	2	mg/L	09/02/10 0945	09/09/10
D02337	007	0	20117-107	Water	60	2	mg/L	09/02/10 0945	09/09/10
D02338	008	0	20117-108	Water	92	2	mg/L	09/02/10 0945	09/09/10
D02339	009	0	20117-109	Water	89	2	mg/L	09/02/10 0945	09/09/10
D02340	010	0	20117-110	Water	62	2	mg/L	09/02/10 0945	09/09/10
D02341	011	0	20117-111	Water	66	2	mg/L	09/02/10 0945	09/09/10
D02342	012	0	20117-112	Water	50	2	mg/L	09/02/10 0945	09/09/10
D02343	013	0	20117-113	Water	67	2	mg/L	09/02/10 0945	09/09/10
D02344	014	0	20117-114	Water	64	2	mg/L	09/02/10 0945	09/09/10
D02345	015	0	20117-115	Water	59	2	mg/L	09/02/10 0945	09/09/10
Lab Control	000	10	20117-200	Water	78	2	mg/L	09/12/10 1000	09/21/10
D02331	001	10	20117-201	Water	56	2	mg/L	09/12/10 1000	09/21/10
D02332	002	10	20117-202	Water	53	2	mg/L	09/12/10 1000	09/21/10
D02333	003	10	20117-203	Water	60	2	mg/L	09/12/10 1000	09/21/10
D02334	004	10	20117-204	Water	51	2	mg/L	09/12/10 1000	09/21/10
D02335	005	10	20117-205	Water	64	2	mg/L	09/12/10 1000	09/21/10
D02336	006	10	20117-206	Water	55	2	mg/L	09/12/10 1000	09/21/10
D02337	007	10	20117-207	Water	57	2	mg/L	09/12/10 1000	09/21/10
D02338	008	10	20117-208	Water	54	2	mg/L	09/12/10 1000	09/21/10
D02339	009	10	20117-209	Water	56	2	mg/L	09/12/10 1000	09/21/10
D02340	010	10	20117-210	Water	55	2	mg/L	09/12/10 1000	09/21/10
D02341	011	10	20117-211	Water	57	2	mg/L	09/12/10 1000	09/21/10
D02342	012	10	20117-212	Water	60	2	mg/L	09/12/10 1000	09/21/10
D02343	013	10	20117-213	Water	57	2	mg/L	09/12/10 1000	09/21/10
D02344	014	10	20117-214	Water	53	2	mg/L	09/12/10 1000	09/21/10
D02345	015	10	20117-215	Water	56	2	mg/L	09/12/10 1000	09/21/10
Lab Control	000	20	20117-300	Water	72	2	mg/L	09/22/10 0815	09/27/10
D02331	001	20	20117-301	Water	48	2	mg/L	09/22/10 0815	09/27/10
D02332	002	20	20117-302	Water	48	2	mg/L	09/22/10 0815	09/27/10
D02333	003	20	20117-303	Water	51	2	mg/L	09/22/10 0815	09/27/10
D02334	004	20	20117-304	Water	55	2	mg/L	09/22/10 0815	09/27/10
D02335	005	20	20117-305	Water	59	2	mg/L	09/22/10 0815	09/27/10
D02336	006	20	20117-306	Water	52	2	mg/L	09/22/10 0815	09/27/10
D02337	007	20	20117-307	Water	56	2	mg/L	09/22/10 0815	09/27/10
D02338	008	20	20117-308	Water	50	2	mg/L	09/22/10 0815	09/27/10
D02339	009	20	20117-309	Water	54	2	mg/L	09/22/10 0815	09/27/10
D02340	010	20	20117-310	Water	53	2	mg/L	09/22/10 0815	09/27/10
D02341	011	20	20117-311	Water	68	2	mg/L	09/22/10 0815	09/27/10
D02342	012	20	20117-312	Water	45	2	mg/L	09/22/10 0815	09/27/10
D02343	013	20	20117-313	Water	59	2	mg/L	09/22/10 0815	09/27/10
D02344	014	20	20117-314	Water	52	2	mg/L	09/22/10 0815	09/27/10
D02345	015	20	20117-315	Water	60	2	mg/L	09/22/10 0815	09/27/10

CLIENT: Nobis Engineering, Inc.
PROJECT: Project 80013, DAS-RAC2-030
ASSAY: Chironomus dilutus Sediment Assay
TASK: Overlying Water Hardness Summary
METHOD: SW846 3rd Ed. 6020

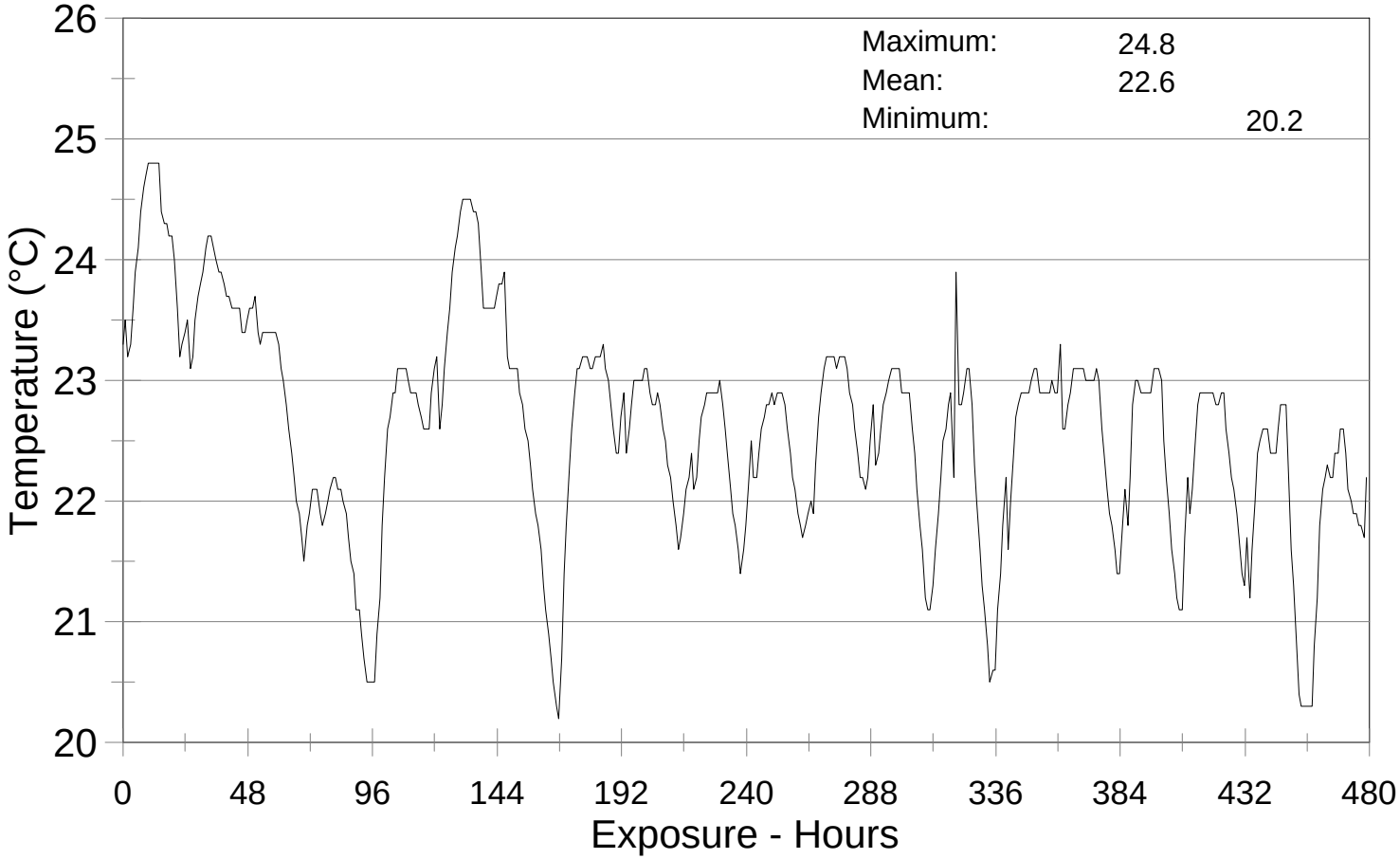
Field ID	Sample Number	Day	LAB ID	MATRIX	RESULT	QLIMIT	UNITS	SAMPLED	ANALYZED
Lab Control	000	0	20117-116	Water	100	0.4	mg/L	09/02/10 0945	09/13/10
D02331	001	0	20117-117	Water	77	0.4	mg/L	09/02/10 0945	09/13/10
D02332	002	0	20117-118	Water	75	0.4	mg/L	09/02/10 0945	09/13/10
D02333	003	0	20117-119	Water	80	0.4	mg/L	09/02/10 0945	09/13/10
D02334	004	0	20117-120	Water	80	0.4	mg/L	09/02/10 0945	09/13/10
D02335	005	0	20117-121	Water	86	0.4	mg/L	09/02/10 0945	09/13/10
D02336	006	0	20117-122	Water	76	0.4	mg/L	09/02/10 0945	09/13/10
D02337	007	0	20117-123	Water	83	0.4	mg/L	09/02/10 0945	09/13/10
D02338	008	0	20117-124	Water	91	0.4	mg/L	09/02/10 0945	09/13/10
D02339	009	0	20117-125	Water	92	0.4	mg/L	09/02/10 0945	09/13/10
D02340	010	0	20117-126	Water	78	0.4	mg/L	09/02/10 0945	09/13/10
D02341	011	0	20117-127	Water	79	0.4	mg/L	09/02/10 0945	09/13/10
D02342	012	0	20117-128	Water	73	0.4	mg/L	09/02/10 0945	09/13/10
D02343	013	0	20117-129	Water	84	0.4	mg/L	09/02/10 0945	09/13/10
D02344	014	0	20117-130	Water	82	0.4	mg/L	09/02/10 0945	09/13/10
D02345	015	0	20117-131	Water	81	0.4	mg/L	09/02/10 0945	09/13/10
Lab Control	000	10	20117-216	Water	89	0.4	mg/L	09/12/10 1000	09/13/10
D02331	001	10	20117-217	Water	74	0.4	mg/L	09/12/10 1000	09/13/10
D02332	002	10	20117-218	Water	70	0.4	mg/L	09/12/10 1000	09/13/10
D02333	003	10	20117-219	Water	75	0.4	mg/L	09/12/10 1000	09/13/10
D02334	004	10	20117-220	Water	70	0.4	mg/L	09/12/10 1000	09/13/10
D02335	005	10	20117-221	Water	79	0.4	mg/L	09/12/10 1000	09/13/10
D02336	006	10	20117-222	Water	72	0.4	mg/L	09/12/10 1000	09/13/10
D02337	007	10	20117-223	Water	78	0.4	mg/L	09/12/10 1000	09/15/10
D02338	008	10	20117-224	Water	78	0.4	mg/L	09/12/10 1000	09/15/10
D02339	009	10	20117-225	Water	78	0.4	mg/L	09/12/10 1000	09/15/10
D02340	010	10	20117-226	Water	73	0.4	mg/L	09/12/10 1000	09/15/10
D02341	011	10	20117-227	Water	75	0.4	mg/L	09/12/10 1000	09/15/10
D02342	012	10	20117-228	Water	77	0.4	mg/L	09/12/10 1000	09/15/10
D02343	013	10	20117-229	Water	75	0.4	mg/L	09/12/10 1000	09/15/10
D02344	014	10	20117-230	Water	72	0.4	mg/L	09/12/10 1000	09/15/10
D02345	015	10	20117-231	Water	75	0.4	mg/L	09/12/10 1000	09/15/10
Lab Control	000	20	20117-316	Water	73	0.4	mg/L	09/22/10 0815	09/23/10
D02331	001	20	20117-317	Water	60	0.4	mg/L	09/22/10 0815	09/23/10
D02332	002	20	20117-318	Water	64	0.4	mg/L	09/22/10 0815	09/23/10
D02333	003	20	20117-319	Water	64	0.4	mg/L	09/22/10 0815	09/23/10
D02334	004	20	20117-320	Water	66	0.4	mg/L	09/22/10 0815	09/23/10
D02335	005	20	20117-321	Water	65	0.4	mg/L	09/22/10 0815	09/23/10
D02336	006	20	20117-322	Water	63	0.4	mg/L	09/22/10 0815	09/23/10
D02337	007	20	20117-323	Water	68	0.4	mg/L	09/22/10 0815	09/23/10
D02338	008	20	20117-324	Water	72	0.4	mg/L	09/22/10 0815	09/23/10
D02339	009	20	20117-325	Water	67	0.4	mg/L	09/22/10 0815	09/23/10
D02340	010	20	20117-326	Water	64	0.4	mg/L	09/22/10 0815	09/23/10
D02341	011	20	20117-327	Water	67	0.4	mg/L	09/22/10 0815	09/23/10
D02342	012	20	20117-328	Water	59	0.4	mg/L	09/22/10 0815	09/23/10
D02343	013	20	20117-329	Water	68	0.4	mg/L	09/22/10 0815	09/23/10
D02344	014	20	20117-330	Water	63	0.4	mg/L	09/22/10 0815	09/23/10
D02345	015	20	20117-331	Water	71	0.4	mg/L	09/22/10 0815	09/23/10

CLIENT: Nobis Engineering, Inc.
PROJECT: Project 80013, DAS-RAC2-030
ASSAY: Chironomus dilutus Sediment Assay
TASK: Overlying Water Ammonia Summary
METHOD: SM 4500-NH3 G

Field ID	Sample Number	Day	LAB ID	MATRIX	RESULT	QLIMIT	UNITS	SAMPLED	ANALYZED
Lab Control	000	0	20117-132	Water	ND	0.1	mg/L as N	09/02/10 0945	09/07/10
D02331	001	0	20117-133	Water	0.99	0.1	mg/L as N	09/02/10 0945	09/07/10
D02332	002	0	20117-134	Water	0.45	0.1	mg/L as N	09/02/10 0945	09/07/10
D02333	003	0	20117-135	Water	0.2	0.1	mg/L as N	09/02/10 0945	09/07/10
D02334	004	0	20117-136	Water	0.24	0.1	mg/L as N	09/02/10 0945	09/07/10
D02335	005	0	20117-137	Water	0.17	0.1	mg/L as N	09/02/10 0945	09/07/10
D02336	006	0	20117-138	Water	0.26	0.1	mg/L as N	09/02/10 0945	09/07/10
D02337	007	0	20117-139	Water	0.25	0.1	mg/L as N	09/02/10 0945	09/07/10
D02338	008	0	20117-140	Water	0.18	0.1	mg/L as N	09/02/10 0945	09/07/10
D02339	009	0	20117-141	Water	0.11	0.1	mg/L as N	09/02/10 0945	09/07/10
D02340	010	0	20117-142	Water	0.22	0.1	mg/L as N	09/02/10 0945	09/07/10
D02341	011	0	20117-143	Water	0.25	0.1	mg/L as N	09/02/10 0945	09/07/10
D02342	012	0	20117-144	Water	0.18	0.1	mg/L as N	09/02/10 0945	09/07/10
D02343	013	0	20117-145	Water	0.34	0.1	mg/L as N	09/02/10 0945	09/07/10
D02344	014	0	20117-146	Water	0.37	0.1	mg/L as N	09/02/10 0945	09/07/10
D02345	015	0	20117-147	Water	0.18	0.1	mg/L as N	09/02/10 0945	09/07/10
Lab Control	000	10	20117-232	Water	0.72	0.1	mg/L as N	09/12/10 1000	09/15/10
D02331	001	10	20117-233	Water	ND	0.1	mg/L as N	09/12/10 1000	09/15/10
D02332	002	10	20117-234	Water	ND	0.1	mg/L as N	09/12/10 1000	09/15/10
D02333	003	10	20117-235	Water	ND	0.1	mg/L as N	09/12/10 1000	09/15/10
D02334	004	10	20117-236	Water	ND	0.1	mg/L as N	09/12/10 1000	09/15/10
D02335	005	10	20117-237	Water	ND	0.1	mg/L as N	09/12/10 1000	09/15/10
D02336	006	10	20117-238	Water	ND	0.1	mg/L as N	09/12/10 1000	09/17/10
D02337	007	10	20117-239	Water	0.14	0.1	mg/L as N	09/12/10 1000	09/17/10
D02338	008	10	20117-240	Water	0.17	0.1	mg/L as N	09/12/10 1000	09/17/10
D02339	009	10	20117-241	Water	ND	0.1	mg/L as N	09/12/10 1000	09/17/10
D02340	010	10	20117-242	Water	0.23	0.1	mg/L as N	09/12/10 1000	09/17/10
D02341	011	10	20117-243	Water	ND	0.1	mg/L as N	09/12/10 1000	09/17/10
D02342	012	10	20117-244	Water	ND	0.1	mg/L as N	09/12/10 1000	09/17/10
D02343	013	10	20117-245	Water	0.12	0.1	mg/L as N	09/12/10 1000	09/17/10
D02344	014	10	20117-246	Water	0.1	0.1	mg/L as N	09/12/10 1000	09/17/10
D02345	015	10	20117-247	Water	ND	0.1	mg/L as N	09/12/10 1000	09/17/10
Lab Control	000	20	20117-332	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02331	001	20	20117-333	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02332	002	20	20117-334	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02333	003	20	20117-335	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02334	004	20	20117-336	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02335	005	20	20117-337	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02336	006	20	20117-338	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02337	007	20	20117-339	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02338	008	20	20117-340	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02339	009	20	20117-341	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02340	010	20	20117-342	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02341	011	20	20117-343	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02342	012	20	20117-344	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02343	013	20	20117-345	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02344	014	20	20117-346	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10
D02345	015	20	20117-347	Water	ND	0.1	mg/L as N	09/22/10 0815	09/23/10

Chironomus dilutus 20-Day Assay

Temperature Profile



Test Sediment Preparation Notes (3) AM 8/31

Study Number: ~~20016 + 200~~ 20116 + 20117

Client: Nobis Engineering, Inc

Project: DAS-RAC2-030

Field ID	ESI Code (3) AM 9/1/10	Sample Number	Notes
WB-1	~~20116~~ 20108 ~~20117~~	001	≤ 1 gallons left after addition Seived to 2mm
WB-2		002	≈ 1 1/2 gallons left after additions Seived to 2mm
AR-8-4		003	= 1 gallon left after addition Seived to 2mm
AR-8-5		004	> 1 1/2 gallons left after addition Seived to 2mm
AR-9-5		005	= 1 1/2 gallons left after addition Seived to 2mm
AR-9-6		006	< 1 1/2 gallons left after addition Seived to 2mm
AR-9-7		007	≈ 1 1/2 gallons left after addition Seived to 2mm
AR-4-1		008	≈ 1 1/2 gallons left after addition Seived to 2mm
AR-4-2		009	≈ 1 gallon left after addition Seived to 2mm
AR-5-1		010	≈ 1 1/2 gallons left after addition Seived to 2mm
AR-5-2		011	> 1 1/2 gallons left after adding Seived to 2mm
AR-6-3		012	> 1 1/2 gallons left after adding Seived to 2mm
AR-~~7~~6-2 (3) AM 8/31		013	> 1 1/2 gallons left after adding Seived to 2mm
AR-7-2		014	= 1 1/2 gallons left after adding Seived to 2mm
AR-7-1		015	> 1 gallon left after adding Seived to 2mm

Date: 8/31/10 9/1/10

Initial: AM

08/31/10

1300 Blue Spruce Drive, Suite C
Fort Collins, Colorado 80524

Toll Free: 800/331-5916
Tel:970/484-5091 Fax:970/484-2514

ORGANISM HISTORY

DATE: 8/30/10

SPECIES: *Chironomus dilutus (formerly C. tentans)*

AGE: Deposited on 8/29-30/2010*

LIFE STAGE: Second Instar 9/10/2010

HATCH DATE: Emergent date 9/23/2010

BEGAN FEEDING: Immediately

FOOD: *Selenastrum* sp., Flake slurry

Water Chemistry Record:	**Current**	**Range**
TEMPERATURE:	25°C	22-26°C
SALINITY/CONDUCTIVITY:	--	--
TOTAL HARDNESS (as $CaCO_3$):	148 mg/l	100-190 mg/l
TOTAL ALKALINITY (as $CaCO_3$):	105 mg/l	50-110 mg/l
pH:	7.81	7.53-8.31

Comments:

Facility Supervisor

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/2/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
715	AM	4.02	4.00	6.98	7.00	10.09	10.01	6.98	1311	1277	9.23	9.50	18.34	18.30	37.23	35.01

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5105	N/A
S/C check	C-5073	9/6/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/3/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
730	AM	4.05	4.00	6.94	7.00	10.10	10.01	6.95	1172	1277	9.42	9.31	18.60	18.50	37.52	34.98

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5105	N/A
S/C check	C-5073	9/6/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/4/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0935	nc	4.00	4.00	6.95	7.00	10.07	10.01	6.97	1305	1412	9.02	9.10	19.5	19.57		

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5105	N/A
S/C check	C-5073	9/6/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/5/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
10:00	JTP	4.05	4.00	6.91	7.00	10.04	10.00	7.01	1.175	1.304	9.08	9.30	18.97	18.90	37.51	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5105	N/A
S/C check	C-5073	9/6/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/6/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
830	AM	4.05	4.00	7.01	7.00	10.02	10.00	6.98	1325	1251	10.23	9.71	17.41	17.30	33.35	34.98

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	~~9/10/10~~ 3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5105	N/A
S/C check	C-5107	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/7/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
8:00	JTP	4.01	4.00	7.00	7.00	9.95	10.00	7.00	1.397	1.331	8.93	9.10	20.30	20.20	34.47	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-~~5105~~ 5118 JTP 9/7/10	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/8/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
1030	AM	4.01	4.00	6.98	7.00	9.99	10.00	6.98	1314	1304	8.90	9.10	20.48	20.40		

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/10/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/9/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
730	AM	4.02	4.00	7.02	7.00	10.07	10.01	6.96	1336	1227	9.91	9.32	18.83	18.70	33.21	35.01

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5104	9/9/10
Salinity Std.	C-5110	N/A
S/C check	C-5107	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/10/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
7:55	JTP	3.98	4.00	6.93	7.00	10.03	10.00	7.01	1.339	1.304	9.18	9.30	18.76	18.60	34.14	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5114	9/30/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/11/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0850	ML	4.07	4.00	6.94	7.00	10.09	10.01	7.02	1464	1415	9.61	9.30	18.6	18.67	33.46	35.00
				6.92	7.00											

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	3/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5114	9/30/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9-12-10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0940	DM	4.08	4.00	7.08	7.00	9.96	10.00	6.99	1321	1277	9.47	9.30	18.71	18.70	33.56	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A2829	3-12
pH 7 buffer	A2828	3-12
pH 10 buffer	A2830	3-12
pH 7 check	C5114	9-30-10
Salinity Std.	C5110	N/A
S/C check	C5109	9-27-10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/13/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
710	AM	4.01	4.00	6.98	7.06	10.08	10.01	6.95	1324	1277	8.72	9.29	18.81	18.70	36.22	35.02

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2827	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5114	9/30/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/14/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
600	AM	4.02	4.00	6.99	7.00	10.03	10.00	6.95	1324	1304	9.29	9.30	19.41	19.30	33.85	34.98

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2827	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5114	9/30/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/29/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/15/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
1245	JTP	4.02	4.00	6.93	7.00	9.96	10.00	7.01	1.355	1.304	9.51	9.10	20.60	20.0	33.40	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5114	9/30/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/16/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0810	AM	4.07	4.00	6.96	7.00	10.12	10.02	6.95	1294	1251	9.22	9.76	16.74	16.80		

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. value	Duplicates duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5110	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/17/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0800	JTP	4.06	4.00	6.92	7.00	9.89	10.00	7.05	1.398	1.331	9.48	9.10	20.35	20.30	33.29	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-~~5110~~ 5133	(F3) JTP 9/17 N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/18/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0900	JTP	4.08	4.00	6.92	7.00	10.10	10.00	7.01	1.347	1.251	9.16	9.50	18.02	17.90	32.07	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. value	Duplicates duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/19/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
915	AM	4.04	4.00	6.94	7.00	10.10	10.01	6.95	1310	1251	9.78	9.51	17.52	17.40	33.21	34.98

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5133	N/A
S/C check	C-5107	9/29/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/20/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
800	AM	4.00	4.00	7.02	7.00	10.02	10.00	6.96	1372	1277	9.52	9.50	18.42	18.30	3241	34.99

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2827	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/21/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0705	JTP	4.02	4.00	6.93	7.00	10.02	10.00	7.00	1.321	1.224	10.22	9.90	16.01	15.90	31.58	35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

Start of Day Calibrations and Recalibrations for YSI 556 MPS:

Date: 9/22/10		pH (±0.05 SU)							Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)		Temperature C°		Salinity 35 ppt at 15° C	
Time	Initials	Reading 4.00	As Cal 4.00	Reading 7.00	As Cal 7.00	Reading 10.00	As Cal 10.00	pH 7 check	Reading	As Cal	Reading	As Cal	Meter	Therm	Reading	As Cal
0630	JTP	4.06	4.00	6.93	7.00	9.95	10.00	6.99	1.419	1.277	9.25	9.30	18.81	18.70		35.00

Check Calibrations Prior to Each Assay:

			pH (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)				DO_2 (mg/L) Adjust if Necessary	
Time	Initials	Job Number	7.00 (SU)	pH value	duplicate value	°C	Standard 1413 µmhos	S.C. Duplicates value	duplicate	°C	100% DO_2 Saturation (mg/L)

Standard Lot Numbers		
Item	Lot #	Exp
pH 4 buffer	A-2829	3/12
pH 7 buffer	A-2828	2/12
pH 10 buffer	A-2830	3/12
pH 7 check	C-5132	10/7/10
Salinity Std.	C-5133	N/A
S/C check	C-5109	9/27/10

End of Day Calibrations:

		pH (SU) (±0.05 SU)			Specific Conductivity (µmhos) (±10% at X°C)		DO_2 (mg/L)	
Time	Initials	4.00	7.00	10.00	°C	Standard 1413 µmhos	°C	100% O_2 (mg/L)

COMMENTS, MAINTENANCE FUNCTIONS, EQUIPMENT CHANGES: _____

CALIBRATION LOG FOR METTLER SCALE MODEL AE100 - ESI DESIGNATION PRL-1202

September 2010		ANALYTICAL RANGE (0-180g) (Acceptable Range = ± 0.0005 g)								SEMI-MICRO RANGE (0-32 g) (Acceptable Range = ± 0.00005 g)							
DATE	INIT	100.0000 g	✓	10.0000 g	✓	1.0000 g	✓	0.1000 g	✓	0.10000 g	✓	0.05000 g	✓	0.01000 g	✓	0.00500 g	✓
1																	
2	LB	100.0002	✓	10.0000	✓	1.0000	✓	0.0999	✓	0.10000	✓	0.05000	✓	0.00998	✓		
3	Am	100.0002	✓	10.0000	✓	1.0001	✓	0.1000	✓	0.10001	✓	0.05001	✓	0.01002	✓		
4																	
5																	
6	Am	100.0001	✓	10.0000	✓	1.0001	✓	0.1000	✓	0.10000	✓	0.05001	✓	0.01003	✓		
7																	
8	SJ	100.0001	✓	10.0000	✓	0.9999	✓	0.1000	✓	0.10000	✓	0.05000	✓	0.01001	✓		
9	ne	100.0001	✓	9.9999	✓	0.9999	✓	0.1000	✓	0.09998	✓	0.04996	✓	0.0997	✓		
10	SJ	100.0001	✓	9.9999	✓	0.9999	✓	0.1000	✓	0.10001	✓	0.05001	✓	0.01004	✓		
11	EAL	100.0001	✓	9.9999	✓	0.9999	✓	0.1000	✓	0.09999	✓	0.05000	✓	0.00999	✓		
12	EAL	100.0001	✓	10.0000	✓	0.9999	✓	0.1000	✓	0.09999	✓	0.05000	✓	0.00999	✓		
13	EAL	100.0001	✓	9.9998	✓	0.9999	✓	0.1000	✓	0.10001	✓	0.04999	✓	0.00996	✓		
14	JTP	100.0001	✓	9.9999	✓	0.9999	✓	0.0999	✓	0.09999	✓	0.04998	✓	0.00999	✓		
15	Am	100.0001	✓	9.9998	✓	1.0001	✓	0.0999	✓	0.09998	✓	0.05002	✓	0.00997	✓		
16	Am	99.9999	✓	9.9998	✓	0.9998	✓	0.0996	✓	0.09999	✓	0.04999	✓	0.00997	✓		
17	EAL	100.0003	✓	10.0001	✓	0.9998	✓	0.1000	✓	0.09999	✓	0.05001	✓	0.00997 0.01005	✓		
18																	
19																	
20	MF	99.9998	✓	10.0002	✓	0.9998	✓	0.0999	✓	0.09999	✓	0.04999	✓	0.00999	✓		
21	EAL	100.0001	✓	10.0000	✓	0.9999	✓	0.0999	✓	0.10001	✓	0.05002	✓	0.01001	✓		
22	JTP	100.0002	✓	10.0001	✓	1.0000	✓	0.1000	✓	0.09997	✓	0.04999	✓	0.01002	✓		
23	EAL	99.9997	✓	10.0000	✓	0.9999	✓	0.1000	✓	0.09997	✓	0.05000	✓	0.00996	✓		
24	JTP	100.0001	✓	10.0000	✓	0.9999	✓	0.1000	✓	0.10001	✓	0.05002	✓	0.01002	✓		
25																	
26																	
27	Am	100.0002	✓	9.9999	✓	0.9999	✓	0.0999	✓	0.09999	✓	0.04999	✓	0.00997	✓		
28																	
29																	
30																	

CALIBRATE USING CERTIFIED CLASS "S" WEIGHTS ONLY.
INDICATE "NOT USED" ON DAYS WHERE THE BALANCE IS NOT USED.

Subject: RE: Reference samples for sed tox samples?
From: Ann T Chalmers <chalmers@usgs.gov>
Date: Fri, 3 Sep 2010 18:12:13 -0400
To: "Gail Deruzzo" <GDeruzzo@nobisengineering.com>, r.mcisaac@envirosystems.com
CC: "Jeffrey R Deacon" <jrdeacon@usgs.gov>, "Liyang Chu" <LChu@nobisengineering.com>

Hi Gail/Renee,
The reference sites are
AR2 -4 (S-1)
AR2 - 5 (S-2)
both samples collected on 8/23.
Thanks,
Ann

Ann Chalmers
US Geological Survey
Rm 324, 87 State St
P.O. Box 628
Montpelier, Vermont 05602
(802) 828-4511 (voice)
(802) 828-4465 (fax)

From:	"Gail Deruzzo" <GDeruzzo@nobisengineering.com>
To:	"Jeffrey R Deacon" <jrdeacon@usgs.gov>, "Liyang Chu" <LChu@nobisengineering.com>
Cc:	"Ann T Chalmers" <chalmers@usgs.gov>
Date:	08/31/2010 08:35 AM
Subject:	RE: Reference samples for sed tox samples?

I do not think we need the information until they are reporting the data. Perhaps you can have Ann get back to us next week, then.
Thank you,
Gail

From: Jeffrey R Deacon [mailto:jrdeacon@usgs.gov]
Sent: Tuesday, August 31, 2010 8:32 AM
To: Liyang Chu
Cc: Ann T Chalmers; Gail Deruzzo
Subject: Re: Reference samples for sed tox samples?

Hi Liyang:

Ann is in the field this week and will likely not see this question until she returns. I was not involved iwth the sampling, so I'm not sure.

Jeff

Subject: RE: Samples Received 08-26-10 for DAS-RAC2-030
From: "Gail Deruzzo" <GDeruzzo@nobisengineering.com>
Date: Thu, 26 Aug 2010 16:03:15 -0400
To: "Renee McIsaac" <r.mcisaac@envirosystems.com>
CC: "Kenneth Simon" <ksimon@envirosystems.com>

Hi, Renee!
Our sampler had some trouble with the IDs.
Please make your sample 005 = D02335 and 006=D02336 in your data system.
Thanks,
Gail

From: Renee McIsaac [mailto:r.mcisaac@envirosystems.com]
Sent: Thursday, August 26, 2010 3:22 PM
To: Gail Deruzzo
Cc: Kenneth Simon
Subject: Samples Received 08-26-10 for DAS-RAC2-030

Hello Gail,

We received 3 samples on 08/26/10 for the project associated with DAS-RAC2-030 and all samples were received in good condition.
I have attached documentation of their receipt.
Please let me know if you have any questions.

Thanks,
Renee McIsaac
ERA Project Manager

EnviroSystems, Inc.
Specialists in Environmental Toxicology and Chemistry
PO Box 778 / 1 Lafayette Road
Hampton, NH 03843-0778
Voice: 603-926-3345 ext. 212 / Fax: 603-926-3521

http://www.envirosystems.com

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USEPA Contract Laboratory Program
Generic Chain of Custody

Reference Case
Client No: 0066S
SDG No:
L

Date Shipped: 8/25/2010	**Chain of Custody Record**	Sampler Signature: USGS	**For Lab Use Only**
Carrier Name: Courier	Relinquished By (Date / Time)	Received By (Date / Time)	Lab Contract No: 20108
Airbill:	1 [illegible] 8/25/10 0940	J. White 8/25/10 0940	Unit Price:
Shipped to: EnviroSystems, Inc. NH 1 Lafayette Road Hampton NH 03842 (603) 926-3345	2		Transfer To:
	3		Lab Contract No:
	4		Unit Price:

	SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		FOR LAB USE ONLY Sample Condition On Receipt
001	D02331	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	1 (Ice Only) (2)	AR-02-SDBI0004-0-08 2310	S: 8/23/2010	14:30	
002	D02332	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	2 (Ice Only) (2)	AR-02-SDBI0005-0-08 2310	S: 8/23/2010	16:30	
003	D02333	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	3 (Ice Only) (2)	AR-08-SDBI0004-0-08 2410	S: 8/24/2010	10:30	
004	D02334	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	4 (Ice Only) (2)	AR-08-SDBI0005-0-08 2410	S: 8/24/2010	12:00	

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Cooler Temperature Upon Receipt: 3°C	Chain of Custody Seal Number:
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G		Custody Seal Intact? NA / Shipment Iced? ✓

Azteca = 28-day Hyalella azteca, Tentans = 20-day Chironomus tentans

TR Number: 1-565205597-082510-0001

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SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	20108		
SDG No:			
Project:	DAS-RAC2-030		
Delivered via:	**ESI**		
Date and Time Received:	08/25/10 0940	Date and TIme Logged into Lab:	08/25/10 1630
Recieved By:	DW	Logged into Lab by:	AM
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	2C, 3C	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	No		
COC Complete:		Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	No
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required		

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
D02331	20108-001	S	HA28T, CD20T, TVS;	1x2G P	4 C	AM
D02332	20108-002	S	HA28T, CD20T, TVS;	1x2G P	4 C	AM
D02333	20108-003	S	HA28T, CD20T, TVS;	1x2G P	4 C	AM
D02334	20108-004	S	HA28T, CD20T, TVS;	1x2G P	4 C	AM

Notes and qualifications:

Samples containers were identified by their station location, the sample number was not on the container.
AM 08/25/10

Field Data Sheet

Station ID: AR2-4

Date (MM/DD/YYYY): 8/23/2010

Time : 1430

Medium: Sediment

Analysis: Sediment toxicity
28-day *Hyalella azteca*
20-day *Chironomus tentans*

containers: 2

Field Data Sheet

Station ID: AR2-5

Date (MM/DD/YYYY): 8/23/2010

Time : 1630

3°C
upon receipt

Medium: Sediment

Analysis: Sediment toxicity
28-day *Hyalella azteca*
20-day *Chironomus tentans*

containers: 1

Field Data Sheet

Station ID: AR8-4

Date (MM/DD/YYYY): 9/24/2010

Time : ~~1200~~ 1030

Medium: Sediment

Analysis: Sediment toxicity
28-day *Hyalella azteca*
20-day *Chironomus tentans*

containers: 1

Field Data Sheet

Station ID: AR8-5

Date (MM/DD/YYYY): 9/24/2010

Time : 1200

Medium: Sediment

Analysis: Sediment toxicity
28-day *Hyalella azteca*
20-day *Chironomus tentans*

containers: 1

2°C
Upon receipt

USEPA Contract Laboratory Program
Generic Chain of Custody

Reference Case
Client No: 0066S
SDG No:

L

Date Shipped:	8/26/2010
Carrier Name:	Courier
Airbill:	
Shipped to:	EnviroSystems, Inc. NH 1 Lafayette Road Hampton NH 03842 (603) 926-3345

Chain of Custody Record

Sampler Signature:

	Relinquished By	(Date / Time)	Received By	(Date / Time)
1	[illegible]	8/26/10 0945	[illegible]	8/26/10 9:45
2				
3				
4				

For Lab Use Only

Lab Contract No: 20108
Unit Price:
Transfer To:
Lab Contract No:
Unit Price:

	SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	FOR LAB USE ONLY Sample Condition On Receipt
005	D002335	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	40 (Ice Only) (2)	AR-09-SDBI0005-0-08 2510	S: 8/25/2010 17:30	
006	D022336	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	41 (Ice Only) (2)	AR-09-SDBI0006-0-08 2510	S: 8/25/2010 10:00	
007	D02337	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	42 (Ice Only) (2)	AR-09-SDBI0007-0-08 2510	S: 8/25/2010 12:30	

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Cooler Temperature Upon Receipt: 3-4°C	Chain of Custody Seal Number:
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G		Custody Seal Intact? NA / Shipment Iced? Y

Azteca = 28-day Hyalella azteca, Tentans = 20-day Chironomus tentans

TR Number: 1-565205597-082510-0002

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F2V5.1.047 Page 1 of 1

SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	20108		
SDG No:			
Project:	DAS-RAC2-030		
Delivered via:	**ESI**		
Date and Time Received:	08/26/10 0945	Date and TIme Logged into Lab:	08/26/10 1455
Recieved By:	DW	Logged into Lab by:	AM
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	3-4C	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):	NA		
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required		

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
D02335	20108-005	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02336	20108-006	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02337	20108-007	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes

Notes and qualifications:

Sample Numbers have been updated with the correct ID's as identified by Gail DeRuzzo in an e-mail dated 08/26/2010.

USEPA Contract Laboratory Program
Generic Chain of Custody

Reference Case
Client No: 0066S
SDG No:
L

Date Shipped:	8/30/2010
Carrier Name:	Courier
Airbill:	
Shipped to:	EnviroSystems, Inc. NH 1 Lafayette Road Hampton NH 03842 (603) 926-3345

Chain of Custody Record

	Relinquished By	(Date / Time)	Received By	(Date / Time)
1	Courtney Rawson	8/30/10 1010	[illegible]	8/30/10 1010
2				
3				
4				

Sampler Signature:

For Lab Use Only
Lab Contract No:
Unit Price:
Transfer To:
Lab Contract No:
Unit Price:

	SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME		FOR LAB USE ONLY Sample Condition On Receipt
008	D02338	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	49 (Ice Only) (2)	AR-04-SDBI0001-0-08 2710	S: 8/27/2010	14:00	
009	D02339	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	50 (Ice Only) (2)	AR-04-SDBI0002-0-08 2710	S: 8/27/2010	16:30	
010	D02340	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	51 (Ice Only) (2)	AR-05-SDBI0001-0-08 2710	S: 8/27/2010	9:00	
011	D02341	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	52 (Ice Only) (2)	AR-05-SDBI0002-0-08 2710	S: 8/27/2010	10:45	
012	D02342	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	54 (Ice Only) (2)	AR-06-SDBI0003-0-08 2610	S: 8/26/2010	17:00	
013	D02343	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	55 (Ice Only) (2)	AR-06-SDBI0002-0-08 2610	S: 8/26/2010	15:30	
014	D02344	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	56 (Ice Only) (2)	AR-07-SDBI0002-0-08 2610	S: 8/26/2010	12:00	
015	D02345	Sediment/ USGS USGS	M/G	Azteca (21), Tentans (21)	57 (Ice Only) (2)	AR-07-SDBI0001-0-08 2610	S: 8/26/2010	10:00	

Shipment for Case Complete? Y	Sample(s) to be used for laboratory QC:	Additional Sampler Signature(s):	Cooler Temperature Upon Receipt: 2°C	Chain of Custody Seal Number:
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = High	Type/Designate: Composite = C, Grab = G	Custody Seal Intact? ___	Shipment Iced? Yes

Azteca = 28-day Hyalella azteca, Tentans = 20-day Chironomus tentans

TR Number: 1-565205597-083010-0001

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SAMPLE RECEIPT AND CONDITION DOCUMENTATION

STUDY NO:	20108		
SDG No:			
Project:	DAS-RAC2-030		
Delivered via:	**ESI**		
Date and Time Received:	08/30/10 1010	Date and TIme Logged into Lab:	08/30/10 1200
Recieved By:	DW JTP	Logged into Lab by:	JTP
Air bill / Way bill:	No	Air bill included in folder if received?	NA
Cooler on ice/packs:	Yes	Custody Seals present?	NA
Cooler Blank Temp (C) at arrival:	2C	Custody Seals intact?	NA
Number of COC Pages:	1		
COC Serial Number(s):			
COC Complete:	Yes	Does the info on the COC match the samples?	Yes
Sampled Date:	Yes	Were samples received within holding time?	Yes
Field ID complete:	Yes	Were all samples properly labeled?	Yes
Sampled Time:	Yes	Were proper sample containers used?	Yes
Analysis request:	Yes	Were samples received intact? (none broken or leaking)	Yes
COC Signed and dated:	Yes	Were sample volumes sufficient for requested analysis?	Yes
Were all samples received?	Yes	Were VOC vials free of headspace?	NA
Client notification/authorization:	Not required		

Field ID	Lab ID	Mx	Analysis Requested	Bottle	Req'd Pres'n	Verified Pres'n
D02338	20108-008	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02339	20108-009	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02340	20108-010	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02341	20108-011	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02342	20108-012	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02343	20108-013	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02344	20108-014	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes
D02345	20108-015	S	HA28T, CD20T, TVS;	1x2G P	4 C	Yes

Notes and qualifications:

APPENDIX F

APPENDIX F

SAMPLE LISTS

Table F-1
Samples Used in the BERA - Surface Water
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Fraction	Sample ID	Date	Type
AR2	D	AR2-WB-SWCHFI01-0-090914	9/14/2009	N
AR2	T	AR2-WB-SWCHUF01-0-090914	9/14/2009	N
AR3	D	AR3-00-SWCHFI01-0-090915	9/15/2009	N
AR3	T	AR3-00-SWCHUF01-0-090915	9/15/2009	N
AR4	D	AR4-00-SWCHFI01-0-090915	9/15/2009	N
AR4	T	AR4-00-SWCHUF01-0-090915	9/15/2009	N
AR8	D	AR8-00-SWCHFI01-0-090914	9/14/2009	N
AR8	T	AR8-00-SWCHFI01-0-090914	9/14/2009	N
AR8	T	AR8-00-SWCHUF01-0-090914	9/14/2009	N
AR9	D	AR9-00-SWCHFI01-0-090914	9/14/2009	N
AR9	D	AR9-00-SWCHFI01-1-090914	9/14/2009	FD
AR9	T	AR9-00-SWCHUF01-0-090914	9/14/2009	N
AR9	T	AR9-00-SWCHUF01-1-090914	9/14/2009	FD

D = Dissolved
FD = Field duplicate
N = Primary
T = Total

Table F-2
Samples Used in the BERA - Pore Water
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Fraction	Sample ID	Date	Type
AR2	D	AR2-4 N	8/23/2010	N
AR2	D	AR2-5 N	8/23/2010	N
AR2	D	AR2-WB-PWCHFI01-0-090916	9/16/2009	N
AR2	D	AR2-WB-PWCHFI02-0-090916	9/16/2009	N
AR2	D	AR2-WB-PWCHFI03-0-090916	9/16/2009	N
AR2	T	AR2-WB-PWCHUF01-0-090916	9/16/2009	N
AR2	T	AR2-WB-PWCHUF02-0-090916	9/16/2009	N
AR2	T	AR2-WB-PWCHUF03-0-090916	9/16/2009	N
AR4	D	AR4-1 N	8/27/2010	N
AR4	D	AR4-2 N	8/27/2010	N
AR5	D	AR5-1 N	8/27/2010	N
AR5	D	AR5-2 N	8/27/2010	N
AR6	D	AR6-00-PWCHFI01-0-090918	9/18/2009	N
AR6	D	AR6-2 N	8/26/2010	N
AR6	D	AR6-3 N	8/26/2010	N
AR6	T	AR6-00-PWCHUF01-090918	9/18/2009	N
AR7	D	AR7-1 N	8/26/2010	N
AR7	D	AR7-2 N	8/26/2010	N
AR8	D	AR8-00-PWCHFI01-0-090918	9/18/2009	N
AR8	D	AR8-00-PWCHFI02-0-090918	9/18/2009	N
AR8	D	AR8-00-PWCHFI03-0-090918	9/18/2009	N
AR8	D	AR8-4 N	8/24/2010	N
AR8	D	AR8-5 N	8/24/2010	N
AR8	T	AR8-00-PWCHUF01-0-090918	9/18/2009	N
AR8	T	AR8-00-PWCHUF02-0-090918	9/18/2009	N
AR8	T	AR8-00-PWCHUF03-0-090918	9/18/2009	N
AR9	D	AR9-00-PWCHFI01-0-090917	9/17/2009	N
AR9	D	AR9-00-PWCHFI02-0-090917	9/17/2009	N
AR9	D	AR9-00-PWCHFI02-1-090917	9/17/2009	FD
AR9	D	AR9-00-PWCHFI03-0-090917	9/17/2009	N
AR9	D	AR9-00-PWCHFI04-0-090917	9/17/2009	N
AR9	D	AR9-5 N	8/24/2010	N
AR9	D	AR9-6 N	8/25/2010	N
AR9	D	AR9-7 N	8/25/2010	N
AR9	T	AR9-00-PWCHUF01-0-090917	9/17/2009	N
AR9	T	AR9-00-PWCHUF02-0-090917	9/17/2009	N
AR9	T	AR9-00-PWCHUF02-1-090917	9/17/2009	FD
AR9	T	AR9-00-PWCHUF02-1-090917	9/17/2009	N
AR9	T	AR9-00-PWCHUF03-0-090917	9/17/2009	N
AR9	T	AR9-00-PWCHUF04-0-090917	9/17/2009	N

D = Dissolved
FD = Field duplicate
N = Primary
T = Total

Table F-3
Samples Used in the BERA - Sediment
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample ID	Date	Type
AR2	BG01-SD-20060919	9/19/2006	N
AR2	DUP02-SD-20060919	9/19/2006	FD
AR2	BG02-SD-20060919	9/19/2006	N
AR2	BG03-SD-20060919	9/19/2006	N
AR2	AR2-WB-SDCH0001-0-090916	9/16/2009	N
AR2	AR2-WB-SDCH0002-0-090916	9/16/2009	N
AR2	AR2-WB-SDCH0003-0-090916	9/16/2009	N
AR2	AR2-4 FD1	8/23/2010	N
AR2	AR2-4 FD2	8/23/2010	N
AR2	AR2-4 FD3	8/23/2010	N
AR2	AR2-4 N	8/23/2010	N
AR2	AR2-5 FD1	8/23/2010	N
AR2	AR2-5 FD2	8/23/2010	N
AR2	AR2-5 FD3	8/23/2010	N
AR2	AR2-5 N	8/23/2010	N
AR3	BH01-SD-20060918	9/18/2006	N
AR3	BH02-SD-20060918	9/18/2006	N
AR4	SH1-0-SD-20060918	9/18/2006	N
AR4	SH2-0-SD-20060918	9/18/2006	N
AR4	AR4-00-SDCH0001-0-091008	10/8/2009	N
AR4	AR4-00-SDCH0002-0-091008	10/8/2009	N
AR4	AR4-1 FD1	8/27/2010	N
AR4	AR4-1 FD2	8/27/2010	N
AR4	AR4-1 FD3	8/27/2010	N
AR4	AR4-1 N	8/27/2010	N
AR4	AR4-2 FD1	8/27/2010	N
AR4	AR4-2 FD2	8/27/2010	N
AR4	AR4-2 FD3	8/27/2010	N
AR4	AR4-2 N	8/27/2010	N
AR5	AR5-1 FD1	8/27/2010	N
AR5	AR5-1 FD2	8/27/2010	N
AR5	AR5-1 FD3	8/27/2010	N
AR5	AR5-1 N	8/27/2010	N
AR5	AR5-2 FD1	8/27/2010	N
AR5	AR5-2 FD2	8/27/2010	N
AR5	AR5-2 FD3	8/27/2010	N
AR5	AR5-2 N	8/27/2010	N
AR6	DUP01-SD-20060919	9/19/2006	FD
AR6	MD01-SD-20060919	9/19/2006	N
AR6	AR6-00-SDCH0001-0-090918	9/18/2009	N
AR6	AR6-2 FD1	8/26/2010	N
AR6	AR6-2 FD2	8/26/2010	N
AR6	AR6-2 FD3	8/26/2010	N
AR6	AR6-2 N	8/26/2010	N
AR6	AR6-3 FD1	8/26/2010	N
AR6	AR6-3 FD2	8/26/2010	N
AR6	AR6-3 FD3	8/26/2010	N
AR6	AR6-3 N	8/26/2010	N
AR7	RHD01-SD-20060919	9/19/2006	N
AR7	AR7-1 FD1	8/26/2010	N
AR7	AR7-1 FD2	8/26/2010	N
AR7	AR7-1 FD3	8/26/2010	N
AR7	AR7-1 N	8/26/2010	N
AR7	AR7-2 FD1	8/26/2010	N
AR7	AR7-2 FD2	8/26/2010	N
AR7	AR7-2 FD3	8/26/2010	N
AR7	AR7-2 N	8/26/2010	N
AR8	DPWD01-SD-20060919	9/19/2006	N
AR8	DPWD02-SD-20060919	9/19/2006	N
AR8	AR8-00-SDCH0001-0-090918	9/18/2009	N
AR8	AR8-00-SDCH0002-0-090918	9/18/2009	N
AR8	AR8-00-SDCH0003-0-090918	9/18/2009	N
AR8	AR8-4 FD1	8/24/2010	N
AR8	AR8-4 FD2	8/24/2010	N
AR8	AR8-4 FD3	8/24/2010	N

Table F-3
Samples Used in the BERA - Sediment
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample ID	Date	Type
AR8	AR8-4 N	8/24/2010	N
AR8	AR8-5 FD1	8/24/2010	N
AR8	AR8-5 FD2	8/24/2010	N
AR8	AR8-5 FD3	8/24/2010	N
AR8	AR8-5 N	8/24/2010	N
AR9	AR9-00-SDCH0001-0-090917	9/17/2009	N
AR9	AR9-00-SDCH0002-0-090917	9/17/2009	N
AR9	AR9-00-SDCH0002-1-090917	9/17/2009	FD
AR9	AR9-00-SDCH0003-0-090917	9/17/2009	N
AR9	AR9-00-SDCH0004-0-090917	9/17/2009	N
AR9	AR9-5 FD1	8/24/2010	N
AR9	AR9-5 FD2	8/24/2010	N
AR9	AR9-5 FD3	8/24/2010	N
AR9	AR9-5 N	8/24/2010	N
AR9	AR9-6 FD1	8/25/2010	N
AR9	AR9-6 FD2	8/25/2010	N
AR9	AR9-6 FD3	8/25/2010	N
AR9	AR9-6 N	8/25/2010	N
AR9	AR9-7 FD1	8/25/2010	N
AR9	AR9-7 FD2	8/25/2010	N
AR9	AR9-7 FD3	8/25/2010	N
AR9	AR9-7 N	8/25/2010	N

FD = Field duplicate
N = Primary

Table F-4
Samples Used in the BERA - Larvae
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample ID	Date	Type	Species
AR2	AR2-IT-01A	9/16/2009	N	Burrow Mayfly
AR2	AR2-IT-01C	9/16/2009	N	Burrow Mayfly
AR3	AR3-ET-02B	9/15/2009	N	Dragonfly
AR3	AR3-ET-01C	9/15/2009	N	Mayfly
AR3	AR3-ET-02A	9/15/2009	N	Mayfly
AR3	AR3-ET-03A	9/15/2009	N	Mayfly
AR3	AR3-ET-01B	9/15/2009	N	Stonefly
AR3	AR3-ET-03B	9/15/2009	N	Stonefly
AR3	AR3-ET-01A	9/15/2009	N	Water Pennies
AR3	AR3-ET-03C	9/15/2009	N	Water Pennies

N = Primary

Table F-5
Samples Used in the BERA - Rock Basket
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample ID	Date	Type
AR2	AR2-RB	9/22/2009	N
AR2	AR2-RB- DUP	9/22/2009	FD
AR3	AR3-RB	9/22/2009	N
AR4	AR4-RB	9/22/2009	N
AR8	AR8-RB	9/21/2009	N
AR9	AR9-RB	9/21/2009	N

FD = Field duplicate

N = Primary

Table F-6
Samples Used in the BERA - Oligochaetes
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample ID	Date	Type
AR2	AR2-IT-01B	9/16/2009	N
AR2	AR2-IT-01B-DUP	9/16/2009	FD
AR2	AR2-IT-02A	9/16/2009	N
AR2	AR2-IT-03	9/16/2009	N
AR2	AR2-IT-04-100823	8/23/2010	N
AR2	AR2-IT-05-100823	8/23/2010	N
AR2	AR2-IT-05-DUP-100823	8/23/2010	FD
AR4	AR4-IT-01-100827	8/27/2010	N
AR5	AR5-IT-01-100827	8/27/2010	N
AR5	AR5-IT-02-100827	8/27/2010	N
AR6	AR6-IT-01	9/18/2009	N
AR6	AR6-IT-03-100826	8/26/2010	N
AR7	AR7-IT-01-100826	8/26/2010	N
AR7	AR7-IT-02-100826	8/26/2010	N
AR8	AR8-IT-01	9/18/2009	N
AR8	AR8-IT-02	9/18/2009	N
AR8	AR8-IT-03	9/18/2009	N
AR8	AR8-IT-04-100824	8/24/2010	N
AR8	AR8-IT-05-100824	8/24/2010	N
AR9	AR9-IT-01	9/17/2009	N
AR9	AR9-IT-03	9/17/2009	N
AR9	AR9-IT-04	9/17/2009	N
AR9	AR9-IT-05-100824	8/24/2010	N
AR9	AR9-IT-06-100825	8/25/2010	N
AR9	AR9-IT-07-100825	8/25/2010	N

FD = Field duplicate
N = Primary

Table F-7
Samples Used in the BERA - Crayfish
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample ID	Date	Type
AR2	AR2-WB-CC00WB01-0-090824	8/24/2009	N
AR2	AR2-WB-CC00WB02-0-090824	8/24/2009	N
AR2	AR2-WB-CIWB01	8/8/2011	N
AR2	AR2-WB-CIWB02	8/8/2011	N
AR2	AR2-WB-CIWB03	8/8/2011	N
AR2	AR2-WB-CIWB04	8/8/2011	N
AR2	AR2-WB-CIWB05	8/8/2011	N
AR2	AR2-WB-CIWB06	8/8/2011	N
AR2	AR2-WB-CIWB07	8/8/2011	N
AR2	AR2-WB-CIWB08	8/8/2011	N
AR2	AR2-WB-CIWB09	8/8/2011	N
AR2	AR2-WB-CIWB10	8/8/2011	N
AR3	AR3-00-CC00WB01-0-090826	8/26/2009	N
AR3	AR3-00-CC00WB02-0-090827	8/27/2009	N
AR4	AR4-00-CC00WB01-0-090826	8/26/2009	N
AR4	AR4-00-CC00WB02-0-090827	8/27/2009	N
AR5	AR5-0-CIWB01	8/9/2011	N
AR5	AR5-0-CIWB02	8/9/2011	N
AR5	AR5-0-CIWB03	8/9/2011	N
AR5	AR5-0-CIWB04	8/9/2011	N
AR5	AR5-0-CIWB05	8/9/2011	N
AR5	AR5-0-CIWB06	8/9/2011	N
AR5	AR5-0-CIWB07	8/9/2011	N
AR5	AR5-0-CIWB08	8/9/2011	N
AR5	AR5-0-CIWB09	8/9/2011	N
AR5	AR5-0-CIWB10	8/9/2011	N
AR6	AR7-00-CC00WB01-0-090828	8/28/2009	N
AR6	AR6-0-CIWB01	8/11/2011	N
AR6	AR6-0-CIWB02	8/11/2011	N
AR6	AR6-0-CIWB03	8/11/2011	N
AR6	AR6-0-CIWB04	8/11/2011	N
AR6	AR6-0-CIWB05	8/11/2011	N
AR6	AR6-0-CIWB06	8/11/2011	N
AR6	AR6-0-CIWB07	8/11/2011	N
AR6	AR6-0-CIWB08	8/11/2011	N
AR6	AR6-0-CIWB09	8/11/2011	N
AR6	AR6-0-CIWB10	8/11/2011	N
AR7	AR7-0-CIWB01	8/10/2011	N
AR7	AR7-0-CIWB02	8/10/2011	N
AR7	AR7-0-CIWB03	8/10/2011	N
AR7	AR7-0-CIWB04	8/10/2011	N
AR7	AR7-0-CIWB05	8/10/2011	N
AR7	AR7-0-CIWB06	8/10/2011	N
AR7	AR7-0-CIWB07	8/10/2011	N
AR7	AR7-0-CIWB08	8/10/2011	N
AR7	AR7-0-CIWB09	8/10/2011	N
AR7	AR7-0-CIWB10	8/10/2011	N
AR8	AR8-00-CC00WB02-0-090826	8/26/2009	N
AR8	AR8-00-CC00WB02-1-090826	8/26/2009	FD
AR8	AR8-00-CC00WB01-0-090826	8/26/2009	N
AR9	AR9-00-CC00WB01-0-090825	8/25/2009	N
AR9	AR9-00-CC00WB02-0-090825	8/25/2009	N

FD = Field duplicate

N = Primary

Table F-8
Samples Used in the BERA - Fish
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample ID	Date	Type	Species
AR2	AR2-WB-FFSBSR01-0-090824	8/24/2009	N	Smallmouth Bass
AR2	AR2-WB-FFSBSR02-0-090824	8/24/2009	N	Smallmouth Bass
AR2	AR2-WB-FFSBSO04-0-090824	8/24/2009	N	Smallmouth Bass
AR2	AR2-WB-FFSBSO05-0-090824	8/24/2009	N	Smallmouth Bass
AR2	AR2-WB-FFSBSO06-0-090824	8/24/2009	N	Smallmouth Bass
AR2	AR2-WB-FFSBSR04-0-090824	8/24/2009	N	Smallmouth Bass
AR2	AR2-WB-FFSBSR05-0-090824	8/24/2009	N	Smallmouth Bass
AR2	AR2-WB-FFSBSR06-0-090824	8/24/2009	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSO01	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSO02A	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSO02B	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSO02C	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSO03	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSO04	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSO05	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSR01	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSR02	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSR03	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSR04	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FFSMBSR05	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FOSMB01	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FOSMB02	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FOSMB03A	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FOSMB03B	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FOSMB03C	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FOSMB04	8/8/2011	N	Smallmouth Bass
AR2	AR2-WB-FOSMB05	8/8/2011	N	Smallmouth Bass
AR3	AR3-00-FFSBSO01-0-090825	8/26/2009	N	Smallmouth Bass
AR3	AR3-00-FFSBSR01-0-090825	8/26/2009	N	Smallmouth Bass
AR3	AR3-00-FFSBSO02-0-090827	8/27/2009	N	Smallmouth Bass
AR3	AR3-00-FFSBSO03-0-090827	8/27/2009	N	Smallmouth Bass
AR3	AR3-00-FFSBSR02-0-090827	8/27/2009	N	Smallmouth Bass
AR3	AR3-00-FFSBSR03-0-090827	8/27/2009	N	Smallmouth Bass
AR3	AR3-00-FFSBSR04-0-090827	8/27/2009	N	Smallmouth Bass
AR3	AR3-00-FFSBSR05-0-090827	8/27/2009	N	Smallmouth Bass
AR4	AR4-00-FFSBSO01-0-090826	8/26/2009	N	Smallmouth Bass
AR4	AR4-00-FFSBSR01-0-090826	8/26/2009	N	Smallmouth Bass
AR5	AR5-0-FFSMBSO01A	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSO01B	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSO01C	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSO02	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSO03	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSO04	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSO05	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSR01	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSR02	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSR03	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSR04	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FFSMBSR05	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FOSMB01	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FOSMB02	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FOSMB03	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FOSMB04A	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FOSMB04B	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FOSMB04C	8/9/2011	N	Smallmouth Bass
AR5	AR5-0-FOSMB05	8/9/2011	N	Smallmouth Bass
AR6	AR7-00-FFSBSO04-0-090827	8/27/2009	N	Smallmouth Bass
AR6	AR7-00-FFSBSR04-0-090827	8/27/2009	N	Smallmouth Bass
AR6	AR7-00-FFSBSO01-0-090827	8/27/2009	N	Smallmouth Bass
AR6	AR7-00-FFSBSO02-0-090827	8/27/2009	N	Smallmouth Bass
AR6	AR7-00-FFSBSR01-0-090827	8/27/2009	N	Smallmouth Bass
AR6	AR7-00-FFSBSR02-0-090827	8/27/2009	N	Smallmouth Bass
AR6	AR7-00-FFSBSO03-0-090827	8/27/2009	N	Smallmouth Bass
AR6	AR7-00-FFSBSR03-0-090827	8/27/2009	N	Smallmouth Bass
AR6	AR7-00-FFSBSO05-0-090828	8/28/2009	N	Smallmouth Bass

Table F-8
Samples Used in the BERA - Fish
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample ID	Date	Type	Species
AR6	AR7-00-FFSBSR05-0-090828	8/28/2009	N	Smallmouth Bass
AR6	AR6-0-FFSMBSO01	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSO02A	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSO02B	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSO02C	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSO03	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSO04	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSO05	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSR01	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSR02	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSR03	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSR04	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FFSMBSR05	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FOSMB01	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FOSMB02	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FOSMB03	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FOSMB04	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FOSMB05A	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FOSMB05B	8/11/2011	N	Smallmouth Bass
AR6	AR6-0-FOSMB05C	8/11/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSO01	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSO02	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSO03	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSO04	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSO05A	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSO05B	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSO05C	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSR01	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSR02	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSR03	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSR04	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FFSMBSR05	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FOSMB01A	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FOSMB01B	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FOSMB01C	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FOSMB02	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FOSMB03	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FOSMB04	8/10/2011	N	Smallmouth Bass
AR7	AR7-0-FOSMB05	8/10/2011	N	Smallmouth Bass
AR8	AR8-00-FFSBSO01-0-090826	8/26/2009	N	Smallmouth Bass
AR8	AR8-00-FFSBSO02-0-090826	8/26/2009	N	Smallmouth Bass
AR8	AR8-00-FFSBSR01-0-090826	8/26/2009	N	Smallmouth Bass
AR8	AR8-00-FFSBSR02-0-090826	8/26/2009	N	Smallmouth Bass
AR8	AR8-00-FFSBSO03-0-090826	8/26/2009	N	Smallmouth Bass
AR8	AR8-00-FFSBSO04-0-090826	8/26/2009	N	Smallmouth Bass
AR8	AR8-00-FFSBSO05-0-090826	8/26/2009	N	Smallmouth Bass
AR8	AR8-00-FFSBSR03-0-090826	8/26/2009	N	Smallmouth Bass
AR8	AR8-00-FFSBSR04-0-090826	8/26/2009	N	Smallmouth Bass
AR8	AR8-00-FFSBSR05-0-090826	8/26/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSO01-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSR01-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSO02-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSR02-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSO03-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSR03-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSO04-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSO04-1-090825	8/25/2009	FD	Smallmouth Bass
AR9	AR9-00-FFSBSR05-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSR05-1-090825	8/25/2009	FD	Smallmouth Bass
AR9	AR9-00-FFSBSO06-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSR06-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSO07-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSR07-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSO08-0-090825	8/25/2009	N	Smallmouth Bass
AR9	AR9-00-FFSBSR08-0-090825	8/25/2009	N	Smallmouth Bass

Table F-8
Samples Used in the BERA - Fish
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample ID	Date	Type	Species
AR2	AR2-WB-FCWSWB01-0-090824	8/24/2009	N	White Sucker
AR2	AR2-WB-FCWSWB02-0-090824	8/24/2009	N	White Sucker
AR2	AR2-WB-FCWSWB01	8/8/2011	N	White Sucker
AR2	AR2-WB-FCWSWB02	8/8/2011	N	White Sucker
AR2	AR2-WB-FCWSWB03	8/8/2011	N	White Sucker
AR2	AR2-WB-FCWSWB04	8/8/2011	N	White Sucker
AR2	AR2-WB-FCWSWB05	8/8/2011	N	White Sucker
AR5	AR5-0-FCWSWB01	8/9/2011	N	White Sucker
AR5	AR5-0-FCWSWB02	8/9/2011	N	White Sucker
AR5	AR5-0-FCWSWB03	8/9/2011	N	White Sucker
AR5	AR5-0-FCWSWB04	8/9/2011	N	White Sucker
AR5	AR5-0-FCWSWB05	8/9/2011	N	White Sucker
AR6	AR6-0-FCWSWB01	8/11/2011	N	White Sucker
AR6	AR6-0-FCWSWB02	8/11/2011	N	White Sucker
AR6	AR6-0-FCWSWB03	8/11/2011	N	White Sucker
AR6	AR6-0-FCWSWB04	8/11/2011	N	White Sucker
AR6	AR6-0-FCWSWB05	8/11/2011	N	White Sucker
AR7	AR7-0-FCWSWB01	8/10/2011	N	White Sucker
AR7	AR7-0-FCWSWB02	8/10/2011	N	White Sucker
AR7	AR7-0-FCWSWB03	8/10/2011	N	White Sucker
AR7	AR7-0-FCWSWB04	8/10/2011	N	White Sucker
AR7	AR7-0-FCWSWB05	8/10/2011	N	White Sucker
AR8	AR8-00-FCWSWB01-0-090826	8/26/2009	N	White Sucker
AR8	AR8-00-FCWSWB02-0-090826	8/26/2009	N	White Sucker
AR9	AR2-WB-FCWSWB01-0-090825	8/25/2009	N	White Sucker
AR9	AR2-WB-FCWSWB01-1-090825	8/25/2009	FD	White Sucker
AR9	AR2-WB-FCWSWB02-0-090825	8/25/2009	N	White Sucker

FD = Field duplicate
N = Primary

Table F-9
Samples Used in the BERA - Tree Swallow
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Tissue/Age	Sample ID	Date	Type
AR1	Blood/Adult	AR1-0-BBTS0001-100602	6/2/2010	N
AR1	Blood/Adult	AR1-0-BBTS0002-100602	6/2/2010	N
AR1	Blood/Adult	AR1-0-BBTS0003-100602	6/2/2010	N
AR1	Blood/Adult	AR1-0-BBTS0004-100602	6/2/2010	N
AR1	Blood/Adult	AR1-0-BBTS0005-100602	6/2/2010	N
AR1	Blood/Adult	AR1-0-BBTS0006-100616	6/16/2010	N
AR1	Blood/Adult	AR1-0-BBTS00013-100630	6/30/2010	N
AR2	Blood/Adult	AR2-0-BBTS0001-100603	6/3/2010	N
AR2	Blood/Adult	AR2-0-BBTS0002-100603	6/3/2010	N
AR2	Blood/Adult	AR2-0-BBTS0003-100603	6/3/2010	N
AR2	Blood/Adult	AR2-0-BBTS0004-100609	6/9/2010	N
AR3	Blood/Adult	AR3-0-BBTS0001-100609	6/9/2010	N
AR4	Blood/Adult	AR4-0-BBTS0001-100609	6/9/2010	N
AR8	Blood/Adult	AR8-0-BBTS0001-100602	6/2/2010	N
AR8	Blood/Adult	AR8-0-BBTS0002-100602	6/2/2010	N
AR8	Blood/Adult	AR8-0-BBTS0003-100609	6/9/2010	N
AR8	Blood/Adult	AR8-0-BBTS0004-100609	6/9/2010	N
AR8	Blood/Adult	AR8-0-BBTS0007-100623	6/23/2010	N
AR9	Blood/Adult	AR9-1-BBTS0001-100521	5/21/2010	N
AR9	Blood/Adult	AR9-1-BBTS0002-100601	6/1/2010	N
AR9	Blood/Adult	AR9-2-BBTS0001-100601	6/1/2010	N
AR9	Blood/Adult	AR9-2-BBTS0002-100608	6/8/2010	N
AR9	Blood/Adult	AR9-2-BBTS0003-100608	6/8/2010	N
AR9	Blood/Adult	AR9-3-BBTS0001-100608	6/8/2010	N
AR9	Blood/Adult	AR9-3-BBTS0002-100608	6/8/2010	N
AR9	Blood/Adult	AR9-2-BBTS0005-100623	6/23/2010	N
AR1	Blood/Nestling	AR1-0-BBTS0007-100622	6/22/2010	N
AR1	Blood/Nestling	AR1-0-BBTS0008-100622	6/22/2010	N
AR1	Blood/Nestling	AR1-0-BBTS0009-100622	6/22/2010	N
AR1	Blood/Nestling	AR1-0-BBTS0010-100622	6/22/2010	N
AR1	Blood/Nestling	AR1-0-BBTS0011-100622	6/22/2010	N
AR1	Blood/Nestling	AR1-0-BBTS0012-100622	6/22/2010	N
AR2	Blood/Nestling	AR2-0-BBTS0005-100623	6/23/2010	N
AR2	Blood/Nestling	AR2-0-BBTS0006-100623	6/23/2010	N
AR2	Blood/Nestling	AR2-0-BBTS0007-100623	6/23/2010	N
AR2	Blood/Nestling	AR2-0-BBTS0008-100623	6/23/2010	N
AR2	Blood/Nestling	AR2-0-BBTS0009-100623	6/23/2010	N
AR2	Blood/Nestling	AR2-0-BBTS0011-100630	6/23/2010	N
AR2	Blood/Nestling	AR2-0-BBTS0010-100630	6/30/2010	N
AR4	Blood/Nestling	AR4-0-BBTS0002-100623	6/23/2010	N
AR4	Blood/Nestling	AR4-0-BBTS0003-100623	6/23/2010	N
AR8	Blood/Nestling	AR8-0-BBTS0005-100623	6/23/2010	N
AR8	Blood/Nestling	AR8-0-BBTS0006-100623	6/23/2010	N
AR8	Blood/Nestling	AR8-0-BBTS0008-100701	7/1/2010	N
AR9	Blood/Nestling	AR9-2-BBTS0004-100617	6/17/2010	N
AR9	Blood/Nestling	AR9-1-BBTS0003-100623	6/23/2010	N
AR9	Blood/Nestling	AR9-3-BBTS0003-100623	6/23/2010	N
AR9	Blood/Nestling	AR9-3-BBTS0004-100623	6/23/2010	N
AR1	Feather/Adult	AR1-0-BFTS0001-100602	6/2/2010	N
AR1	Feather/Adult	AR1-0-BFTS0002-100602	6/2/2010	N
AR1	Feather/Adult	AR1-0-BFTS0003-100602	6/2/2010	N
AR1	Feather/Adult	AR1-0-BFTS0004-100602	6/2/2010	N
AR1	Feather/Adult	AR1-0-BFTS-0005-100609	6/9/2010	N
AR1	Feather/Adult	AR1-0-BFTS0006-100609	6/9/2010	N
AR1	Feather/Adult	AR1-0-BFTS0007-100616	6/16/2010	N
AR1	Feather/Adult	AR1-0-BFTS0014-100630	6/30/2010	N
AR2	Feather/Adult	AR2-0-BFTS0001-100603	6/3/2010	N
AR2	Feather/Adult	AR2-0-BFTS0002-100603	6/3/2010	N
AR2	Feather/Adult	AR2-0-BFTS0003-100603	6/3/2010	N
AR2	Feather/Adult	AR2-0-BFTS0004-100603	6/3/2010	N
AR2	Feather/Adult	AR2-0-BFTS0005-100609	6/9/2010	N
AR2	Feather/Adult	AR2-0-BFTS0006-100906	6/9/2010	N
AR3	Feather/Adult	AR3-0-BFTS0001-100609	6/9/2010	N
AR4	Feather/Adult	AR4-0-BFTS0001-100609	6/9/2010	N
AR8	Feather/Adult	AR8-0-BFTS0001-100602	6/2/2010	N

Table F-9
Samples Used in the BERA - Tree Swallow
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Tissue/Age	Sample ID	Date	Type
AR8	Feather/Adult	AR8-0-BFTS0002-100602	6/2/2010	N
AR8	Feather/Adult	AR8-0-BFTS0003-100602	6/2/2010	N
AR8	Feather/Adult	AR8-0-BFTS0004-100602	6/2/2010	N
AR8	Feather/Adult	AR8-0-BFTS0005-100609	6/9/2010	N
AR8	Feather/Adult	AR8-0-BFTS0006-100609	6/9/2010	N
AR8	Feather/Adult	AR8-0-BFTS0009-100623	6/23/2010	N
AR9	Feather/Adult	AR9-1-BFTS0001-100521	5/21/2010	N
AR9	Feather/Adult	AR9-1-BFTS0002-100521	5/21/2010	N
AR9	Feather/Adult	AR9-2-BFTS0001-100521	5/21/2010	N
AR9	Feather/Adult	AR9-2-BFTS0002-100521	5/21/2010	N
AR9	Feather/Adult	AR9-1-BFTS0003-100601	6/1/2010	N
AR9	Feather/Adult	AR9-2-BFTS0003-100601	6/1/2010	N
AR9	Feather/Adult	AR9-2-BFTS0004-100608	6/8/2010	N
AR9	Feather/Adult	AR9-2-BFTS0005-100608	6/8/2010	N
AR9	Feather/Adult	AR9-2-BFTS0006-100608	6/8/2010	N
AR9	Feather/Adult	AR9-3-BFTS0001-100608	6/8/2010	N
AR9	Feather/Adult	AR9-3-BFTS0002-100608	6/8/2010	N
AR9	Feather/Adult	AR9-2-BFTS0007-100617	6/17/2010	N
AR1	Feather/Nestling	AR1-0-BFTS0008-100622	6/22/2010	N
AR1	Feather/Nestling	AR1-0-BFTS0009-100622	6/22/2010	N
AR1	Feather/Nestling	AR1-0-BFTS0010-100622	6/22/2010	N
AR1	Feather/Nestling	AR1-0-BFTS0011-100622	6/22/2010	N
AR1	Feather/Nestling	AR1-0-BFTS0012-100622	6/22/2010	N
AR1	Feather/Nestling	AR1-0-BFTS0013-100622	6/22/2010	N
AR2	Feather/Nestling	AR2-0-BFTS0007-100623	6/23/2010	N
AR2	Feather/Nestling	AR2-0-BFTS0008-100623	6/23/2010	N
AR2	Feather/Nestling	AR2-0-BFTS0009-100623	6/23/2010	N
AR2	Feather/Nestling	AR2-0-BFTS0010-100623	6/23/2010	N
AR2	Feather/Nestling	AR2-0-BFTS0011-100623	6/23/2010	N
AR2	Feather/Nestling	AR2-0-BFTS0012-100630	6/30/2010	N
AR2	Feather/Nestling	AR2-0-BFTS0013-100630	6/30/2010	N
AR4	Feather/Nestling	AR4-0-BFTS0003-100623	6/23/2010	N
AR8	Feather/Nestling	AR8-0-BFTS0007-100623	6/23/2010	N
AR8	Feather/Nestling	AR8-0-BFTS0008-100623	6/23/2010	N
AR8	Feather/Nestling	AR8-0-BFTS0010-100701	7/1/2010	N
AR9	Feather/Nestling	AR9-2-BFTS0008-100617	6/17/2010	N
AR9	Feather/Nestling	AR9-2-BFTS0009-100617	6/17/2010	N
AR9	Feather/Nestling	AR9-1-BFTS0004-100623	6/23/2010	N
AR9	Feather/Nestling	AR9-3-BFTS0003-100623	6/23/2010	N
AR9	Feather/Nestling	AR9-3-BFTS0004-100623	6/23/2010	N
AR1	Egg	AR1-0-BETS0001	6/2/2010	N
AR1	Egg	AR1-0-BETS0003	6/2/2010	N
AR1	Egg	AR1-0-BETS0005	6/2/2010	N
AR1	Egg	AR1-0-BETS0007	6/2/2010	N
AR1	Egg	AR1-0-BETS0009	6/9/2010	N
AR1	Egg	AR1-0-BETS0011	6/22/2010	N
AR1	Egg	AR1-0-BETSC001-101112	11/12/2010	N
AR2	Egg	AR2-0-BETS0001	6/3/2010	N
AR2	Egg	AR2-0-BETS0003	6/3/2010	N
AR2	Egg	AR2-0-BETS0005	6/9/2010	N
AR2	Egg	AR2-0-BETS0007	6/9/2010	N
AR2	Egg	AR2-0-BETS0009	6/9/2010	N
AR2	Egg	AR2-0-BETS0011	6/9/2010	N
AR2	Egg	AR2-0-BETS0013	6/9/2010	N
AR2	Egg	AR2-0-BETSC001-101112	11/12/2010	N
AR3	Egg	AR3-0-BETS0001	6/9/2010	N
AR3	Egg	AR3-0-BETSC001-101112	11/12/2010	N
AR4	Egg	AR4-0-BETS0001	6/9/2010	N
AR8	Egg	AR8-0-BETS0001	8/12/2010	N
AR8	Egg	AR8-0-BETS0003	8/13/2010	N
AR8	Egg	AR8-0-BETS0005	8/13/2010	N
AR8	Egg	AR8-0-BETS0007	8/13/2010	N
AR8	Egg	AR8-0-BETS0009	8/13/2010	N
AR8	Egg	AR8-0-BETSC001-101112	11/12/2010	N
AR9	Egg	AR9-1-BETS0001	6/1/2010	N

Table F-9
Samples Used in the BERA - Tree Swallow
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Tissue/Age	Sample ID	Date	Type
AR9	Egg	AR9-1-BETS0002	6/1/2010	N
AR9	Egg	AR9-1-BETS0003	6/1/2010	N
AR9	Egg	AR9-2-BETS0001	6/1/2010	N
AR9	Egg	AR9-2-BETS0003	6/1/2010	N
AR9	Egg	AR9-2-BETS0005	6/1/2010	N
AR9	Egg	AR9-2-BETS0007	6/8/2010	N
AR9	Egg	AR9-2-BETS0009	6/8/2010	N
AR9	Egg	AR9-3-BETS0001	6/8/2010	N
AR9	Egg	AR9-1-BETSC001-101112	11/12/2010	N

N = Primary

Table F-10
Samples Used in the BERA - Song Bird
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Tissue	Sample ID	Date	Type	Species
AR1	Blood	AR1-01-BBRWBL01-0-100811	8/8/2010	N	Red-winged blackbird
AR1	Blood	AR1-01-BBYWAR03-0-100812	8/8/2010	N	Yellow warbler
AR1	Blood	AR1-01-BBGRCA01-0-100811	8/11/2010	N	Gray catbird
AR1	Blood	AR1-01-BBGRCA02-0-100811	8/11/2010	N	Gray catbird
AR1	Blood	AR1-01-BBSOSP01-0-100811	8/11/2010	N	Song sparrow
AR1	Blood	AR1-01-BBSWSP01-0-100811	8/11/2010	N	Swamp sparrow
AR1	Blood	AR1-01-BBSWSP02-0-100811	8/11/2010	N	Swamp sparrow
AR1	Blood	AR1-01-BBSWSP03-0-100811	8/11/2010	N	Swamp sparrow
AR1	Blood	AR1-01-BBTRFL01-0-100811	8/11/2010	N	Traill's flycatcher
AR1	Blood	AR1-01-BBYWAR01-0-100811	8/11/2010	N	Yellow warbler
AR1	Blood	AR1-01-BBSWSP06-0-100812	8/12/2010	N	Swamp sparrow
AR1	Blood	AR1-01-BBTRFL02-0-100812	8/12/2010	N	Traill's flycatcher
AR1	Blood	AR1-01-BBTRFL03-0-100812	8/12/2010	N	Traill's flycatcher
AR1	Blood	AR1-01-BBTRFL04-0-100812	8/12/2010	N	Traill's flycatcher
AR1	Blood	AR1-01-BBYWAR02-0-100812	8/12/2010	N	Yellow warbler
AR1	Blood	AR1-01-BBSOSP02-0-100813	8/13/2010	N	Song sparrow
AR1	Blood	AR1-01-BBSOSP03-0-100813	8/13/2010	N	Song sparrow
AR1	Blood	AR1-01-BBSOSP04-0-100813	8/13/2010	N	Song sparrow
AR1	Blood	AR1-01-BBTRFL05-0-100813	8/13/2010	N	Traill's flycatcher
AR1	Blood	AR1-01-BBSWSPC1-0-101102	11/2/2010	N	Swamp sparrow
AR1	Blood	AR1-01-BBSWSPC2-0-101102	11/2/2010	N	Swamp sparrow
AR9	Blood	AR9-01-BBALFL01-0-100802	8/2/2010	N	Alder flycatcher
AR9	Blood	AR9-01-BBCEDW01-0-100802	8/2/2010	N	Cedar waxing
AR9	Blood	AR9-01-BBEAKI01-0-100802	8/2/2010	N	Eastern kingbird
AR9	Blood	AR9-01-BBEAKI02-0-100802	8/2/2010	N	Eastern kingbird
AR9	Blood	AR9-01-BBSOSP01-0-100802	8/2/2010	N	Song sparrow
AR9	Blood	AR9-01-BBSOSP02-0-100802	8/2/2010	N	Song sparrow
AR9	Blood	AR9-01-BBSWSP01-0-100802	8/2/2010	N	Swamp sparrow
AR9	Blood	AR9-01-BBNAWA01-0-100803	8/3/2010	N	Nashville warbler
AR9	Blood	AR9-01-BBBCCH01-0-100804	8/4/2010	N	Black-capped chickadee
AR9	Blood	AR9-01-BBCOYE01-0-100804	8/4/2010	N	Common yellowthroat
AR9	Blood	AR9-01-BBAMRE01-0-100809	8/9/2010	N	American redstart
AR9	Blood	AR9-01-BBBCCH02-0-100809	8/9/2010	N	Black-capped chickadee
AR9	Blood	AR9-01-BBBCCH03-0-100809	8/9/2010	N	Black-capped chickadee
AR9	Blood	AR9-01-BBBCCH04-0-100809	8/9/2010	N	Black-capped chickadee
AR9	Blood	AR9-01-BBBCCH05-0-100809	8/9/2010	N	Black-capped chickadee
AR9	Blood	AR9-01-BBBTNW01-0-100809	8/9/2010	N	Black-throated green warbler
AR9	Blood	AR9-01-BBCSWA01-0-100809	8/9/2010	N	Chestnut-sided warbler
AR9	Blood	AR9-01-BBLEFL01-0-100809	8/9/2010	N	Least flycatcher
AR9	Blood	AR9-01-BBWBNU01-0-100809	8/9/2010	N	White-breasted nuthatch
AR9	Blood	AR9-01-BBWIWA01-0-100809	8/9/2010	N	Wilson's warbler
AR9	Blood	AR9-01-BBYBFL01-0-100809	8/9/2010	N	Yellow-bellied flycatcher
AR9	Blood	AR9-01-BBACFL01-0-100810	8/10/2010	N	Acadian flycatcher
AR9	Blood	AR9-01-BBACFL02-0-100810	8/10/2010	N	Acadian flycatcher
AR9	Blood	AR9-01-BBAMGO01-0-100810	8/10/2010	N	American goldfinch
AR9	Blood	AR9-01-BBBAWW01-0-100810	8/10/2010	N	Black-and-white warbler
AR9	Blood	AR9-01-BBCOYE02-0-100810	8/10/2010	N	Common yellowthroat
AR9	Blood	AR9-01-BBCSWA02-0-100810	8/10/2010	N	Chestnut-sided warbler
AR9	Blood	AR9-01-BBCSWA03-0-100810	8/10/2010	N	Chestnut-sided warbler
AR9	Blood	AR9-01-BBDOWO01-0-100810	8/10/2010	N	Downy woodpecker
AR9	Blood	AR9-01-BBDOWO02-0-100810	8/10/2010	N	Downy woodpecker
AR9	Blood	AR9-01-BBMAWA01-0-100810	8/10/2010	N	Magnolia warbler
AR9	Blood	AR9-01-BBSWSP02-0-100810	8/10/2010	N	Swamp sparrow
AR9	Blood	AR9-01-BBSWSP03-0-100810	8/10/2010	N	Swamp sparrow
AR9	Blood	AR9-01-BBSWSP04-0-100810	8/10/2010	N	Swamp sparrow
AR9	Blood	AR9-01-BBSWSP05-0-100810	8/10/2010	N	Swamp sparrow
AR9	Blood	AR9-01-BBSWSP06-0-100810	8/10/2010	N	Swamp sparrow
AR9	Blood	AR9-01-BBEAKIC1-0-101102	11/2/2010	N	Eastern kingbird
AR9	Blood	AR9-01-BBSWSPC1-0-101102	11/2/2010	N	Swamp sparrow
AR9	Blood	AR9-01-BBSWSPC2-0-101102	11/2/2010	N	Swamp sparrow
AR1	Feather - Tail	AR1-01-BFGRCA01-0-100811T	8/11/2010	N	Gray catbird
AR1	Feather - Primary	AR1-01-BFGRCA02-0-100811P	8/11/2010	N	Gray catbird
AR1	Feather - Primary	AR1-01-BFRWBL01-0-100811P	8/11/2010	N	Red-winged blackbird
AR1	Feather - Tail	AR1-01-BFRWBL01-0-100811T	8/11/2010	N	Red-winged blackbird
AR1	Feather - Primary	AR1-01-BFSOSP01-0-100811P	8/11/2010	N	Song sparrow

Table F-10
Samples Used in the BERA - Song Bird
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Tissue	Sample ID	Date	Type	Species
AR1	Feather - Tail	AR1-01-BFSOSP01-0-100811T	8/11/2010	N	Song sparrow
AR1	Feather - Primary	AR1-01-BFSWSP01-0-100811P	8/11/2010	N	Swamp sparrow
AR1	Feather - Tail	AR1-01-BFSWSP01-0-100811T	8/11/2010	N	Swamp sparrow
AR1	Feather - Primary	AR1-01-BFSWSP02-0-100811P	8/11/2010	N	Swamp sparrow
AR1	Feather - Tail	AR1-01-BFSWSP02-0-100811T	8/11/2010	N	Swamp sparrow
AR1	Feather - Primary	AR1-01-BFSWSP03-0-100811P	8/11/2010	N	Swamp sparrow
AR1	Feather - Tail	AR1-01-BFSWSP03-0-100811T	8/11/2010	N	Swamp sparrow
AR1	Feather - Primary	AR1-01-BFSWSP04-0-100811P	8/11/2010	N	Swamp sparrow
AR1	Feather - Tail	AR1-01-BFSWSP04-0-100811T	8/11/2010	N	Swamp sparrow
AR1	Feather - Primary	AR1-01-BFTRFL01-0-100811P	8/11/2010	N	Traill's flycatcher
AR1	Feather - Tail	AR1-01-BFTRFL01-0-100811T	8/11/2010	N	Traill's flycatcher
AR1	Feather - Primary	AR1-01-BFYWAR01-0-100811P	8/11/2010	N	Yellow warbler
AR1	Feather - Tail	AR1-01-BFYWAR01-0-100811T	8/11/2010	N	Yellow warbler
AR1	Feather - Primary	AR1-01-BFSWSP05-0-100812P	8/12/2010	N	Swamp sparrow
AR1	Feather - Primary	AR1-01-BFSWSP06-0-100812P	8/12/2010	N	Swamp sparrow
AR1	Feather - Tail	AR1-01-BFSWSP06-0-100812T	8/12/2010	N	Swamp sparrow
AR1	Feather - Primary	AR1-01-BFTRFL02-0-100812P	8/12/2010	N	Traill's flycatcher
AR1	Feather - Tail	AR1-01-BFTRFL02-0-100812T	8/12/2010	N	Traill's flycatcher
AR1	Feather - Primary	AR1-01-BFYWAR02-0-100812P	8/12/2010	N	Yellow warbler
AR1	Feather - Tail	AR1-01-BFYWAR02-0-100812T	8/12/2010	N	Yellow warbler
AR1	Feather - Primary	AR1-01-BFYWAR03-0-100812P	8/12/2010	N	Yellow warbler
AR1	Feather - Tail	AR1-01-BFYWAR03-0-100812T	8/12/2010	N	Yellow warbler
AR1	Feather - Primary	AR1-01-BFSOSP02-0-100813P	8/13/2010	N	Song sparrow
AR1	Feather - Tail	AR1-01-BFSOSP02-0-100813T	8/13/2010	N	Song sparrow
AR1	Feather - Primary	AR1-01-BFSOSP03-0-100813P	8/13/2010	N	Song sparrow
AR1	Feather - Tail	AR1-01-BFSOSP03-0-100813T	8/13/2010	N	Song sparrow
AR1	Feather - Primary	AR1-01-BFSOSP04-0-100813P	8/13/2010	N	Song sparrow
AR1	Feather - Tail	AR1-01-BFSOSP04-0-100813T	8/13/2010	N	Song sparrow
AR1	Feather - Primary	AR1-01-BFTRFL05-0-100813P	8/13/2010	N	Traill's flycatcher
AR1	Feather - Tail	AR1-01-BFTRFL05-0-100813T	8/13/2010	N	Traill's flycatcher
AR9	Feather - Primary	AR9-01-BFALFL01-0-100802P	8/2/2010	N	Alder flycatcher
AR9	Feather - Tail	AR9-01-BFALFL01-0-100802T	8/2/2010	N	Alder flycatcher
AR9	Feather - Primary	AR9-01-BFCEDW01-0-100802P	8/2/2010	N	Cedar waxing
AR9	Feather - Tail	AR9-01-BFCEDW01-0-100802T	8/2/2010	N	Cedar waxing
AR9	Feather - Primary	AR9-01-BFEAKI01-0-100802P	8/2/2010	N	Eastern kingbird
AR9	Feather - Tail	AR9-01-BFEAKI01-0-100802T	8/2/2010	N	Eastern kingbird
AR9	Feather - Primary	AR9-01-BFEAKI02-0-100802P	8/2/2010	N	Eastern kingbird
AR9	Feather - Tail	AR9-01-BFEAKI02-0-100802T	8/2/2010	N	Eastern kingbird
AR9	Feather - Primary	AR9-01-BFSOSP01-0-100802P	8/2/2010	N	Song sparrow
AR9	Feather - Tail	AR9-01-BFSOSP01-0-100802T	8/2/2010	N	Song sparrow
AR9	Feather - Primary	AR9-01-BFSOSP02-0-100802P	8/2/2010	N	Song sparrow
AR9	Feather - Tail	AR9-01-BFSOSP02-0-100802T	8/2/2010	N	Song sparrow
AR9	Feather - Primary	AR9-01-BFSWSP01-0-100802P	8/2/2010	N	Swamp sparrow
AR9	Feather - Tail	AR9-01-BFSWSP01-0-100802T	8/2/2010	N	Swamp sparrow
AR9	Feather - Primary	AR9-01-BFBCCH01-0-100804P	8/4/2010	N	Black-capped chickadee
AR9	Feather - Tail	AR9-01-BFBCCH01-0-100804T	8/4/2010	N	Black-capped chickadee
AR9	Feather - Primary	AR9-01-BFCOYE01-0-100804P	8/4/2010	N	Common yellowthroat
AR9	Feather - Primary	AR9-01-BFAMRE01-0-100809P	8/9/2010	N	American redstart
AR9	Feather - Primary	AR9-01-BFBCCH02-0-100809P	8/9/2010	N	Black-capped chickadee
AR9	Feather - Tail	AR9-01-BFBCCH02-0-100809T	8/9/2010	N	Black-capped chickadee
AR9	Feather - Primary	AR9-01-BFBCCH03-0-100809P	8/9/2010	N	Black-capped chickadee
AR9	Feather - Tail	AR9-01-BFBCCH03-0-100809T	8/9/2010	N	Black-capped chickadee
AR9	Feather - Primary	AR9-01-BFBCCH04-0-100809P	8/9/2010	N	Black-capped chickadee
AR9	Feather - Tail	AR9-01-BFBCCH04-0-100809T	8/9/2010	N	Black-capped chickadee
AR9	Feather - Primary	AR9-01-BFBCCH05-0-100809P	8/9/2010	N	Black-capped chickadee
AR9	Feather - Tail	AR9-01-BFBCCH05-0-100809T	8/9/2010	N	Black-capped chickadee
AR9	Feather - Primary	AR9-01-BFBTNW01-0-100809P	8/9/2010	N	Black-throated green warbler
AR9	Feather - Tail	AR9-01-BFBTNW01-0-100809T	8/9/2010	N	Black-throated green warbler
AR9	Feather - Primary	AR9-01-BFCSWA01-0-100809P	8/9/2010	N	Chestnut-sided warbler
AR9	Feather - Tail	AR9-01-BFCSWA01-0-100809T	8/9/2010	N	Chestnut-sided warbler
AR9	Feather - Primary	AR9-01-BFLEFL01-0-100809P	8/9/2010	N	Least flycatcher
AR9	Feather - Tail	AR9-01-BFLEFL01-0-100809T	8/9/2010	N	Least flycatcher
AR9	Feather - Primary	AR9-01-BFWBNU01-0-100809P	8/9/2010	N	White-breasted nuthatch
AR9	Feather - Tail	AR9-01-BFWBNU01-0-100809T	8/9/2010	N	White-breasted nuthatch
AR9	Feather - Primary	AR9-01-BFWIWA01-0-100809P	8/9/2010	N	Wilson's warbler

Table F-10
Samples Used in the BERA - Song Bird
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Tissue	Sample ID	Date	Type	Species
AR9	Feather - Tail	AR9-01-BFWIWA01-0-100809T	8/9/2010	N	Wilson's warbler
AR9	Feather - Primary	AR9-01-BFYBFL01-0-100809P	8/9/2010	N	Yellow-bellied flycatcher
AR9	Feather - Tail	AR9-01-BFYBFL01-0-100809T	8/9/2010	N	Yellow-bellied flycatcher
AR9	Feather - Primary	AR9-01-BFACFL01-0-100810P	8/10/2010	N	Acadian flycatcher
AR9	Feather - Tail	AR9-01-BFACFL01-0-100810T	8/10/2010	N	Acadian flycatcher
AR9	Feather - Primary	AR9-01-BFACFL02-0-100810P	8/10/2010	N	Acadian flycatcher
AR9	Feather - Tail	AR9-01-BFACFL02-0-100810T	8/10/2010	N	Acadian flycatcher
AR9	Feather - Primary	AR9-01-BFAMGO01-0-100810P	8/10/2010	N	American goldfinch
AR9	Feather - Tail	AR9-01-BFAMGO01-0-100810T	8/10/2010	N	American goldfinch
AR9	Feather - Primary	AR9-01-BFBAWW01-0-100810P	8/10/2010	N	Black-and-white warbler
AR9	Feather - Tail	AR9-01-BFBAWW01-0-100810T	8/10/2010	N	Black-and-white warbler
AR9	Feather - Primary	AR9-01-BFCOYE02-0-100810P	8/10/2010	N	Common yellowthroat
AR9	Feather - Tail	AR9-01-BFCOYE02-0-100810T	8/10/2010	N	Common yellowthroat
AR9	Feather - Primary	AR9-01-BFCSWA02-0-100810P	8/10/2010	N	Chestnut-sided warbler
AR9	Feather - Tail	AR9-01-BFCSWA02-0-100810T	8/10/2010	N	Chestnut-sided warbler
AR9	Feather - Primary	AR9-01-BFCSWA03-0-100810P	8/10/2010	N	Chestnut-sided warbler
AR9	Feather - Tail	AR9-01-BFCSWA03-0-100810T	8/10/2010	N	Chestnut-sided warbler
AR9	Feather - Primary	AR9-01-BFDOWO01-0-100810P	8/10/2010	N	Downy woodpecker
AR9	Feather - Tail	AR9-01-BFDOWO01-0-100810T	8/10/2010	N	Downy woodpecker
AR9	Feather - Primary	AR9-01-BFDOWO02-0-100810P	8/10/2010	N	Downy woodpecker
AR9	Feather - Tail	AR9-01-BFDOWO02-0-100810T	8/10/2010	N	Downy woodpecker
AR9	Feather - Primary	AR9-01-BFMAWA01-0-100810P	8/10/2010	N	Magnolia warbler
AR9	Feather - Tail	AR9-01-BFMAWA01-0-100810T	8/10/2010	N	Magnolia warbler
AR9	Feather - Primary	AR9-01-BFSWSP02-0-100810P	8/10/2010	N	Swamp sparrow
AR9	Feather - Tail	AR9-01-BFSWSP02-0-100810T	8/10/2010	N	Swamp sparrow
AR9	Feather - Primary	AR9-01-BFSWSP03-0-100810P	8/10/2010	N	Swamp sparrow
AR9	Feather - Tail	AR9-01-BFSWSP03-0-100810T	8/10/2010	N	Swamp sparrow
AR9	Feather - Primary	AR9-01-BFSWSP04-0-100810P	8/10/2010	N	Swamp sparrow
AR9	Feather - Primary	AR9-01-BFSWSP05-0-100810P	8/10/2010	N	Swamp sparrow
AR9	Feather - Tail	AR9-01-BFSWSP05-0-100810T	8/10/2010	N	Swamp sparrow
AR9	Feather - Primary	AR9-01-BFSWSP06-0-100810P	8/10/2010	N	Swamp sparrow
AR9	Feather - Tail	AR9-01-BFSWSP06-0-100810T	8/10/2010	N	Swamp sparrow

N = Primary

Table F-11
Samples Used in the BERA - Eagle River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Tissue	Sample ID	Date	Type
AR1	Blood	AR1-00-BBBE0001-0-080604	6/4/2008	N
AR1	Blood	AR1-00-BBBE0002-0-080604	6/4/2008	N
AR9	Blood	AR9-00-BBBE0001-0-080604	6/4/2008	N
AR9	Blood	AR9-00-BBBE0002-0-080604	6/4/2008	N
AR1	Feathers	AR1-00-BFBE0001-0-080604	6/4/2008	N
AR1	Feathers	AR1-00-BFBE0002-0-080604	6/4/2008	N
AR9	Feathers	AR9-00-BFBE0001-0-080604	6/4/2008	N
AR9	Feathers	AR9-00-BFBE0002-0-080604	6/4/2008	N
AR1	Plasma	AR1-00-BPBE0001-0-0-80604	6/4/2008	N
AR1	Plasma	AR1-00-BPBE0002-0-0-80604	6/4/2008	N
AR1	Plasma	AR1-00-BPBE0001-N-110623	6/23/2011	N
AR1	Plasma	AR1-00-BPBE0002-N-110623	6/23/2011	N
AR9	Plasma	AR9-00-BPBE0001-0-0-80604	6/4/2008	N
AR9	Plasma	AR9-00-BPBE0002-0-0-80604	6/4/2008	N
AR9	Plasma	AR9-00-BPBE0001-N-110623	6/23/2011	N
AR9	Prey - White Sucker	AR9-00-FWWSWB01-0-080604	6/4/2008	N

N = Primary

Table F-12
Samples Used in the BERA - Bat
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach	Sample ID	Date	Type
AR1	AR1-0-BTBMYLU02-0-100809	8/9/2010	N
AR1	AR1-0-BTBMYLU03-0-100809	8/9/2010	N
AR1	AR1-0-BTBMYLU10-0-100809	8/9/2010	N
AR1	AR1-0-BTBMYLU11-0-100809	8/9/2010	N
AR1	AR1-00-BTBMYLUC1-0-101102	11/2/2010	N
AR9	AR9-0-BTBEPFU01-0-100809	8/9/2010	N
AR9	AR9-0-BTBMYLU04-0-100809	8/9/2010	N
AR9	AR9-0-BTBMYLU05-0-100809	8/9/2010	N
AR9	AR9-0-BTBMYLU08-0-100809	8/9/2010	N
AR9	AR9-0-BTBMYLU12-0-100809	8/9/2010	N
AR9	AR9-0-BTBMYLU13-0-100809	8/9/2010	N
AR9	AR9-0-BTBMYLU16-0-100809	8/9/2010	N
AR9	AR9-0-BTBMYLU19-0-100810	8/10/2010	N
AR9	AR9-0-BTBMYLU20-0-100810	8/10/2010	N
AR9	AR9-0-BTBMYLU22-0-100810	8/10/2010	N
AR9	AR9-0-BTBMYLU24-0-100810	8/10/2010	N
AR9	AR9-0-BTBMYLU26-0-100810	8/10/2010	N
AR9	AR9-0-BTBMYLUC1-0-101102	11/2/2010	N
AR9	AR9-0-BTBMYLUC2-0-101102	11/2/2010	N
AR9	AR9-0-BTBMYLUC3-0-101102	11/2/2010	N
AR1	AR1-0-BTFMYLU02-0-100809	8/9/2010	N
AR1	AR1-0-BTFMYLU03-0-100809	8/9/2010	N
AR1	AR1-0-BTFMYLU04-0-100809	8/9/2010	N
AR1	AR1-0-BTFMYLU05-0-100809	8/9/2010	N
AR1	AR1-0-BTFMYLU06-0-100809	8/9/2010	N
AR1	AR1-00-BTFMYLU07-0-100812	8/12/2010	N
AR1	AR1-00-BTFMYLU08-0-100812	8/12/2010	N
AR1	AR1-00-BTFMYLU09-0-100812	8/12/2010	N
AR1	AR1-00-BTFMYLU10-0-100812	8/12/2010	N
AR1	AR1-00-BTFMYLU11-0-100812	8/12/2010	N
AR1	AR1-00-BTFMYLU12-0-100812	8/12/2010	N
AR9	AR9-0-BTFEPFU01-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU01-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU02-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU03-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU04-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU05-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU06-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU07-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU08-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU09-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU10-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU11-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU12-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU13-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU14-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU15-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU17-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU18-0-100809	8/9/2010	N
AR9	AR9-0-BTFMYLU19-0-100810	8/10/2010	N
AR9	AR9-0-BTFMYLU20-0-100810	8/10/2010	N
AR9	AR9-0-BTFMYLU21-0-100810	8/10/2010	N
AR9	AR9-0-BTFMYLU22-0-100810	8/10/2010	N
AR9	AR9-0-BTFMYLU23-0-100810	8/10/2010	N
AR9	AR9-0-BTFMYLU24-0-100810	8/10/2010	N
AR9	AR9-0-BTFMYLU25-0-100810	8/10/2010	N
AR9	AR9-0-BTFMYLU26-0-100810	8/10/2010	N
AR9	AR9-0-BTFMYLU16-0-100809	8/12/2010	N

N = Primary

APPENDIX G

APPENDIX G

RAW DATA

TABLE G-1
ANALYTICAL RESULTS - SURFACE WATER - 2009
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

		AR2	AR2	AR3	AR3	AR4	AR4	AR8	AR8	AR8	AR9
		AR2-WB-SWCHFI01-0-090914	AR2-WB-SWCHUF01-0-090914	AR3-00-SWCHFI01-0-090915	AR3-00-SWCHUF01-0-090915	AR4-00-SWCHFI01-0-090915	AR4-00-SWCHUF01-0-090915	AR8-00-SWCHFI01-0-090914	AR8-00-SWCHFI01-0-090914	AR8-00-SWCHUF01-0-090914	AR9-00-SWCHFI01-0-090914
		Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
		9/14/2009	9/14/2009	9/15/2009	9/15/2009	9/15/2009	9/15/2009	9/14/2009	9/14/2009	9/14/2009	9/14/2009
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Total	Dissolved
Analytes	**Units**										
Antimony	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
Arsenic	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U	1 U
Beryllium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U	0.5 U
Cadmium	µg/L	0.5 U		0.5 U		0.5 U		0.5 U			0.5 U
Chromium	µg/L	0.37 J	10 U	10 U	10 U	10 U	10 U	10 U		10 U	10 U
Copper	µg/L	2 U	2 U	1 U	2 U	2 U	2 U	2 U		2 U	0.59 J
Lead	µg/L	1 U		1 U		1 U		1 U			1 U
Nickel	µg/L	40 U		40 U		40 U		40 U			40 U
Selenium	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U		5 U	5 U
Strontium	µg/L	14.8 J	15.6 J	15.4 J	15.2 J	15.3 J	15.5 J	15.9 J		16.7 J	16.2 J
Sulfate	µg/L	2330	2300	2300	2340	2410	2440		2750	2750 J	2630
Vanadium	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U		5 U	5 U
Zinc	µg/L	60 U		60 U		60 U		60 U			60 U
Mercury	µg/L	0.00085 J	0.001 J	0.0007 J	0.00104	0.00087 J	0.00099 J	0.001		0.00217	0.00094 J
Mercury, divalent	µg/L	0.00005 J	0.00007 J	0.00008 U	0.00006 J	0.00008 J	0.00004 J	0.00007 J		0.00006 J	0.00004 J
Methylmercury	µg/L	0.0001 U	0.00005 J	0.0001 U	0.0001 U	0.00006 J	0.00005 J	0.00006 J		0.0001 U	0.0001 U
Dissolved organic carbon	µg/L	5030		4860		5220		5030			5410
Total organic carbon (TOC)	µg/L		5340		5340		5270			5180	

TABLE G-1
ANALYTICAL RESULTS - SURFACE WATER - 2009
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

		AR9	AR9	AR9
		AR9-00-SWCHFI01-1-090914	AR9-00-SWCHUF01-0-090914	AR9-00-SWCHUF01-1-090914
		Duplicate	Primary	Duplicate
		9/14/2009	9/14/2009	9/14/2009
		Dissolved	Total	Total
Analytes	**Units**			
Antimony	µg/L	1 U	1 U	1 U
Arsenic	µg/L	1 U	1 U	1 U
Beryllium	µg/L	0.5 U	0.5 U	0.5 U
Cadmium	µg/L	0.5 U		
Chromium	µg/L	10 U	10 U	10 U
Copper	µg/L	2 U	2 U	2 U
Lead	µg/L	1 U		
Nickel	µg/L	40 U		
Selenium	µg/L	5 U	5 U	5 U
Strontium	µg/L	16.7 J	17.1 J	16.5 J
Sulfate	µg/L	2660	2670	2680
Vanadium	µg/L	5 U	5 U	5 U
Zinc	µg/L	60 U		
Mercury	µg/L	0.00012 J	0.00044 J	0.00067 J
Mercury, divalent	µg/L	0.00006 J	0.00008 U	0.00007 J
Methylmercury	µg/L	0.0001 U	0.00006 J	0.00005 J
Dissolved organic carbon	µg/L	4760		
Total organic carbon (TOC)	µg/L		5120	5480

TABLE G-2
ANALYTICAL RESULTS - PORE WATER - 2009
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

		AR2	AR2	AR2	AR2	AR2	AR2	AR2	AR2	AR4
		AR2-4 N	AR2-5 N	AR2-WB-PWCHFI01-0-090916	AR2-WB-PWCHFI02-0-090916	AR2-WB-PWCHFI03-0-090916	AR2-WB-PWCHUF01-0-090916	AR2-WB-PWCHUF02-0-090916	AR2-WB-PWCHUF03-0-090916	AR4-1 N
		Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
		8/23/2010	8/23/2010	9/16/2009	9/16/2009	9/16/2009	9/16/2009	9/16/2009	9/16/2009	8/27/2010
		Dissolved	Dissolved	Dissolved	Dissolved	Dissolved	Total	Total	Total	Dissolved
Analyte	**Units**									
Antimony	µg/L			1 U	1 U	1 U	1 U	1 U	1 U	
Arsenic	µg/L			15.5	7.8	3.7	20.9 J	8.1 J	4.2 J	
Beryllium	µg/L			0.5 U	0.5 U	0.5 U	1.6 J	0.5 U	0.5 U	
Cadmium	µg/L			0.5 U	0.5 U	0.5 U				
Chromium	µg/L			1 J	0.52 J	0.47 J	49.5	10 U	1.5 J	
Copper	µg/L			2 U	2 U	2 U	43.8 J	2 U	2 U	
Lead	µg/L			1 U	1 U	1 U	34.5 J		1.5 J	
Nickel	µg/L			40 U	40 U	40 U	46.4 J			
Selenium	µg/L			5 U	5 U	5 U	5 U	5 U	5 U	
Strontium	µg/L			29.6 J	62.4 J	28.2 J	44.4 J	65 J	30.9 J	
Sulfate	µg/L			2050	950 U	1350 U	510	890 U	1280	
Vanadium	µg/L			1.2 J	0.41 J	0.57 J	86.8 J	0.62 J	3.4 J	
Zinc	µg/L			60 U	60 U	60 U	172 J			
Mercury	µg/L	1.34E-03	2.63E-04	0.0007 J	0.005 U	0.0102	0.0149	0.005 U	0.00482 J	8.68E-03
Mercury, divalent	µg/L			0.00013 U	0.00013 U	0.00008 U	0.00008 J	0.00013 U	0.00008 U	
Methylmercury	µg/L	2.83E-04	9.89E-05	0.00012 U	0.0001 U	0.00006 J	0.00012 U	0.0001 U	0.0001 U	1.89E-04
Dissolved organic carbon	µg/L			8010	10300	8030 U				
Total organic carbon (TOC)	µg/L						11700	11400	8720 U	

TABLE G-2
ANALYTICAL RESULTS - PORE WATER - 2009
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

		AR4	AR5	AR5	AR6	AR6	AR6	AR6	AR7	AR7
		AR4-2 N	AR5-1 N	AR5-2 N	AR6-00-PWCHFI01-0-090918	AR6-00-PWCHUF01-090918	AR6-2 N	AR6-3 N	AR7-1 N	AR7-2 N
		Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
		8/27/2010	8/27/2010	8/27/2010	9/18/2009	9/18/2009	8/26/2010	8/26/2010	8/26/2010	8/26/2010
		Dissolved	Dissolved	Dissolved	Dissolved	Total	Dissolved	Dissolved	Dissolved	Dissolved
Analyte	**Units**									
Antimony	µg/L				1 U	1 U				
Arsenic	µg/L				4.2 J	4.4 J				
Beryllium	µg/L				0.5 U	0.5 U				
Cadmium	µg/L				0.5 U	0.5 U				
Chromium	µg/L				0.96 J	10 U				
Copper	µg/L				0.2 J	2 U				
Lead	µg/L				0.084 J	1 U				
Nickel	µg/L				40 U	40 U				
Selenium	µg/L				5 U	5 U				
Strontium	µg/L				72.7 J	74.3 J				
Sulfate	µg/L				820 U	2950				
Vanadium	µg/L				1.5 J	2.1 J				
Zinc	µg/L				3.5 J	60 U				
Mercury	µg/L	1.71E-02	1.32E-03	8.47E-03	0.005 U	0.005 U	8.53E-04	1.15E-03	0.001717879	9.37E-04
Mercury, divalent	µg/L				0.00008 U	0.00008 U				
Methylmercury	µg/L	2.75E-03	5.15E-04	1.90E-03	0.0001 U	0.0001 U	3.23E-04	5.33E-04	7.63E-04	2.52E-04
Dissolved organic carbon	µg/L				14800					
Total organic carbon (TOC)	µg/L					15100				

TABLE G-2
ANALYTICAL RESULTS - PORE WATER - 2009
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

		AR8	AR8	AR8	AR8	AR8	AR8	AR8	AR8	AR9
		AR8-00-PWCHFI01-0-090918	AR8-00-PWCHFI02-0-090918	AR8-00-PWCHFI03-0-090918	AR8-00-PWCHUF01-0-090918	AR8-00-PWCHUF02-0-090918	AR8-00-PWCHUF03-0-090918	AR8-4 N	AR8-5 N	AR9-00-PWCHFI01-0-090917
		Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
		9/18/2009	9/18/2009	9/18/2009	9/18/2009	9/18/2009	9/18/2009	8/24/2010	8/24/2010	9/17/2009
		Dissolved	Dissolved	Dissolved	Total	Total	Total	Dissolved	Dissolved	Dissolved
Analyte	**Units**									
Antimony	µg/L	1 U	1 U	1 U	1 U	1 U	1 U			1 U
Arsenic	µg/L	4 J	1 U	6.5 J	4.5 J	1 U	6.7 J			2.5
Beryllium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U			0.5 U
Cadmium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U			0.5 U
Chromium	µg/L	2.8 J	0.69 J	0.71 J	2.9 J	10 U	10 U			1.2 J
Copper	µg/L	0.5 J	2 U	2 U	4.6	2 U	2 U			2 U
Lead	µg/L	1.4	1 U	0.3 J	4.4	1 U	1 U			1 U
Nickel	µg/L	11.5 J	0.55 J	2.2 J	13 J	0.61 J	2.1 J			40 U
Selenium	µg/L	5 U	5 U	5 U	5 U	5 U	5 U			5 U
Strontium	µg/L	38.9 J	79 J	33.9 J	46.6 J	82.1 J	34.8 J			32.8 J
Sulfate	µg/L	27400	820 U		32800	1620	990 U			1850 U
Vanadium	µg/L	4.9 J	5 U	1.3 J	6 J	5 U	1.6 J			1.5 J
Zinc	µg/L	34.5 J	3.4 J	3.6 J	44.1 J	60 U	60 U			60 U
Mercury	µg/L	0.0079	0.005 U		0.0282	0.00449 J	0.00529	2.30E-03	1.88E-03	0.00606
Mercury, divalent	µg/L	0.00015 U	0.00013 U		0.00013 U	0.00013 U	0.00029 U			0.00013 U
Methylmercury	µg/L	0.00063	0.0001 U		0.00235	0.0001 U	0.0001	5.51E-04	1.08E-04	0.00029
Dissolved organic carbon	µg/L	19900	11700							10800
Total organic carbon (TOC)	µg/L				23100	9180	12100			

TABLE G-2
ANALYTICAL RESULTS - PORE WATER - 2009
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

		AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9
		AR9-00-PWCHFI02-0-090917	AR9-00-PWCHFI02-1-090917	AR9-00-PWCHFI03-0-090917	AR9-00-PWCHFI04-0-090917	AR9-00-PWCHUF01-0-090917	AR9-00-PWCHUF02-0-090917	AR9-00-PWCHUF02-1-090917	AR9-00-PWCHUF02-1-090917	AR9-00-PWCHUF03-0-090917
		Primary	Duplicate	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary
		9/17/2009	9/17/2009	9/17/2009	9/17/2009	9/17/2009	9/17/2009	9/17/2009	9/17/2009	9/17/2009
		Dissolved	Dissolved	Dissolved	Dissolved	Total	Total	Total	Total	Total
Analyte	**Units**									
Antimony	µg/L	1 U	1 U	1 U	1 U	1 U	1 U	1 U		1 U
Arsenic	µg/L	2.5	2.4	1.9 J	3 J	2.8 J	2.7 J	2.6 J		1.8 U
Beryllium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U		0.5 U
Cadmium	µg/L	0.5 U	0.5 U	0.5 U	0.5 U					0.5 U
Chromium	µg/L	0.58 J	0.67 J	0.41 J	0.76 J	2 J	0.39 J	2.5 J		10 U
Copper	µg/L	2 U	2 U	2 U	0.19 J	2 U	2 U	4.1 J		2 U
Lead	µg/L	1 U	1 U	0.14 J	0.12 J	0.65 J			3.6 J	1 U
Nickel	µg/L	40 U	40 U	0.93 J	3.2 J					0.75 J
Selenium	µg/L	5 U	5 U	5 U	5 U	5 U	5 U	5 U		5 U
Strontium	µg/L	149	148	39.7 J	59.9 J	34.9 J	163	159		38.5 J
Sulfate	µg/L	13500 U	14000 U	15300	27600	1770	15300	16300		17400
Vanadium	µg/L	0.76 J	0.61 J	0.33 J	0.52 J	1.6 J	0.96 J	4.9 J		5 U
Zinc	µg/L	60 U	60 U	11.1 J	38.1 J				19.1 J	60 U
Mercury	µg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.00468 J	0.00249 J	0.005 U		0.0062
Mercury, divalent	µg/L	0.00013 U	0.00019 J	0.00008 U	0.00019 J	0.00013 U	0.00013 U	0.00013 U		0.00024 U
Methylmercury	µg/L	0.0001 U	0.00014	0.00007	0.0001 U	0.0001 U	0.0001 U	0.0001 U		0.0001
Dissolved organic carbon	µg/L	12200	11900	5770	13800					
Total organic carbon (TOC)	µg/L					11400	12000	13500		5450

TABLE G-2
ANALYTICAL RESULTS - PORE WATER - 2009
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

		AR9	AR9	AR9	AR9
		AR9-00-PWCHUF04-0-090917	AR9-5 N	AR9-6 N	AR9-7 N
		Primary	Primary	Primary	Primary
		9/17/2009	8/24/2010	8/25/2010	8/25/2010
		Total	Dissolved	Dissolved	Dissolved
Analyte	**Units**				
Antimony	µg/L	1 U			
Arsenic	µg/L	3.2 J			
Beryllium	µg/L	0.5 U			
Cadmium	µg/L	0.5 U			
Chromium	µg/L	10 U			
Copper	µg/L	2 U			
Lead	µg/L	1 U			
Nickel	µg/L	2.9 J			
Selenium	µg/L	5 U			
Strontium	µg/L	61.4 J			
Sulfate	µg/L	31000			
Vanadium	µg/L	5 U			
Zinc	µg/L	42 J			
Mercury	µg/L	0.00471 J	1.68E-03	7.33E-04	5.80E-03
Mercury, divalent	µg/L	0.00013 U			
Methylmercury	µg/L	0.00017	2.86E-04	3.14E-04	1.58E-03
Dissolved organic carbon	µg/L				
Total organic carbon (TOC)	µg/L	14100			

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR6
	Sample ID	BG01-SD-20060919	BG02-SD-20060919	BG03-SD-20060919	DUP02-SD-20060919	BH01-SD-20060918	BH02-SD-20060918	SH1-0-SD-20060918	SH2-0-SD-20060918	DUP01-SD-20060919	MD01-SD-20060919
	Type	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006
Analyte	**Units**										
1,1'-Biphenyl	mg/kg										
1,2,4-Trichlorobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
1,2-Dichlorobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
1,3-Dichlorobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
1,4-Dichlorobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2,2'-Oxybis(1-Chloropropane)	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Acetophenone	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Azobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Benzaldehyde	mg/kg										
Benzyl Alcohol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Bis(2-Chloroethyl)Ether	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Hexachlorobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Hexachloroethane	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Hexachloropropene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Pyridine	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
1,2,4,5-Tetrachlorobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
1,4-Naphthoquinone	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2,3,4,6-Tetrachlorophenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2,4,5-Trichlorophenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2,4,6-Trichlorophenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2,4-Dichlorophenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2,4-Dimethylphenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2,4-Dinitrophenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2,4-Dinitrotoluene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2,6-Dichlorophenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2,6-Dinitrotoluene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2-Chlorophenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2-Methylphenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2-Nitroaniline	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2-Nitrophenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
3 & 4 Methylphenol	mg/kg	1.5 U	1.9 U	1.3 U		1.6 U		1.9 U	2.5 U	1.6 U	2.7 U
3,3'-Dichlorobenzidine	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
3-Methylchloranthrene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
3-Nitroaniline	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
4,6-Dinitro-2-Methylphenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
4-Bromophenyl-Phenylether	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
4-Chloro-3-Methylphenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR6
	Sample ID	BG01-SD-20060919	BG02-SD-20060919	BG03-SD-20060919	DUP02-SD-20060919	BH01-SD-20060918	BH02-SD-20060918	SH1-0-SD-20060918	SH2-0-SD-20060918	DUP01-SD-20060919	MD01-SD-20060919
	Type	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006
Analyte	**Units**										
4-Chloroaniline	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
4-Chlorophenyl-Phenylether	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
4-Methylphenol	mg/kg										
4-Nitroaniline	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
4-Nitrophenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
4-Nitroquinoline-n-Oxide	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Aniline	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Aramite	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Atrazine	mg/kg										
Benzidine	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Benzoic Acid	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3	0.78 U	1.3 U
Bis(2-Chloroethoxy)Methane	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Bis(2-chloroisopropyl) ether	mg/kg										
Bis(2-Ethylhexyl)Phthalate	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Butylbenzylphthalate	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Caprolactam	mg/kg										
Chlorobenzilate	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Dibenzofuran	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Diethylphthalate	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Dimethylphthalate	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Di-n-butyl phthalate	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Di-n-octyl phthalate	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Ethyl methanesulfonate	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Hexachlorobutadiene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Hexachlorocyclopentadiene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Isophorone	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Isosafrole	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Methyl Methanesulfonate	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Nitrobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
N-Nitrosodimethylamine	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
N-Nitroso-Di-N-Propylamine	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
N-Nitrosodiphenylamine	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Pentachlorobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Pentachlorophenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Phenacetin	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Phenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
2-Chloronaphthalene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR6
	Sample ID	BG01-SD-20060919	BG02-SD-20060919	BG03-SD-20060919	DUP02-SD-20060919	BH01-SD-20060918	BH02-SD-20060918	SH1-0-SD-20060918	SH2-0-SD-20060918	DUP01-SD-20060919	MD01-SD-20060919
	Type	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006
Analyte	**Units**										
2-Methylnaphthalene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Acenaphthene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Acenaphthylene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Anthracene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Benzo(a)anthracene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		2.8	1.3 U	0.78 U	1.3 U
Benzo(a)pyrene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		2.7	1.3 U	0.8	1.3 U
Benzo(b)fluoranthene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		4.1	1.3 U	0.93	1.3 U
Benzo(g,h,i)perylene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		1.6	1.3 U	0.78 U	1.3 U
Benzo(k)fluoranthene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		1.4	1.3 U	0.78 U	1.3 U
Carbazole	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Chrysene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		3.2	1.3 U	0.78 U	1.3 U
Dibenz(a,h)anthracene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Fluoranthene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		5.9	1.5	0.86	1.3 U
Fluorene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Indeno(1,2,3-cd)pyrene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		1.7	1.3 U	0.78 U	1.3 U
Naphthalene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Naphthalene, 1-Methyl-	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Phenanthrene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		2.6	1.3 U	0.78 U	1.3 U
Pyrene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		5.4	1.6	1	1.3 U
Safrole	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	mg/kg										
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	mg/kg										
1,2,3,4,6,7,8-Heptachlorodibenzofuran	mg/kg										
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	mg/kg										
1,2,3,4,7,8,9-Heptachlorodibenzofuran	mg/kg										
1,2,3,4,7,8-Hexachlorodibenzofuran	mg/kg										
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	mg/kg										
1,2,3,6,7,8-Hexachlorodibenzofuran	mg/kg										
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	mg/kg										
1,2,3,7,8,9-Hexachlorodibenzofuran	mg/kg										
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	mg/kg										
1,2,3,7,8-Pentachlorodibenzofuran	mg/kg										
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	mg/kg										
2,3,4,6,7,8-Hexachlorodibenzofuran	mg/kg										
2,3,4,7,8-Pentachlorodibenzofuran	mg/kg										
2,3,7,8-TCDD TEQ (bird)	mg/kg										
2,3,7,8-TCDD TEQ (fish)	mg/kg										

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR6
	Sample ID	BG01-SD-20060919	BG02-SD-20060919	BG03-SD-20060919	DUP02-SD-20060919	BH01-SD-20060918	BH02-SD-20060918	SH1-0-SD-20060918	SH2-0-SD-20060918	DUP01-SD-20060919	MD01-SD-20060919
	Type	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006
Analyte	**Units**										
2,3,7,8-TCDD TEQ (mammal)	mg/kg										
2,3,7,8-Tetrachlorodibenzofuran	mg/kg										
2,3,7,8-Tetrachlorodibenzo-p-dioxin	mg/kg										
Dioxin/Furan - Toxic Equivalent	mg/kg	0.00000001	0.00000004		0.00000004	0.00000157		0.00000533		0.00002921	0.0000236
Heptachlorodibenzofuran (total)	mg/kg										
Heptachlorodibenzo-p-dioxin (total)	mg/kg										
Hexachlorodibenzofuran (total)	mg/kg										
Hexachlorodibenzo-p-dioxin (total)	mg/kg										
Pentachlorodibenzofuran (total)	mg/kg										
Pentachlorodibenzo-p-dioxin (total)	mg/kg										
Tetrachlorodibenzo(p)dioxin (total)	mg/kg										
Tetrachlorodibenzofuran (total)	mg/kg										
4,4'-DDD	mg/kg										
4,4'-DDe	mg/kg										
4,4'-DDT	mg/kg										
Aldrin	mg/kg										
Alpha-Bhc	mg/kg										
alpha-Chlordane	mg/kg										
beta-BHC	mg/kg										
beta-Chlordane	mg/kg										
Chlordane	mg/kg										
Chlorpyrifos	mg/kg										
cis-Nonachlor	mg/kg										
Delta-Bhc	mg/kg										
Dieldrin	mg/kg										
Dinitrobutyl Phenol	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Endosulfan I	mg/kg										
Endosulfan II	mg/kg										
Endosulfan Sulfate	mg/kg										
Endrin aldehyde	mg/kg										
Endrin Ketone	mg/kg										
Endrin	mg/kg										
gamma-BHC (Lindane)	mg/kg										
Heptachlor epoxide	mg/kg										
Heptachlor	mg/kg										
Isodrin	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Kepone	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR6
	Sample ID	BG01-SD-20060919	BG02-SD-20060919	BG03-SD-20060919	DUP02-SD-20060919	BH01-SD-20060918	BH02-SD-20060918	SH1-0-SD-20060918	SH2-0-SD-20060918	DUP01-SD-20060919	MD01-SD-20060919
	Type	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006
Analyte	**Units**										
Methoxychlor	mg/kg										
Mirex	mg/kg										
o,p'-DDD	mg/kg										
O,P'-Dde	mg/kg										
o,p'-DDT	mg/kg										
Oxychlordane	mg/kg										
Toxaphene	mg/kg										
trans-Nonachlor	mg/kg										
Aroclor 1016	mg/kg	0.09 U	0.09 U	0.09 U		0.09 U		0.11 U	0.15 U	0.11 U	0.1 U
Aroclor 1221	mg/kg	0.09 U	0.09 U	0.09 U		0.09 U		0.11 U	0.15 U	0.11 U	0.1 U
Aroclor 1232	mg/kg	0.09 U	0.09 U	0.09 U		0.09 U		0.11 U	0.15 U	0.11 U	0.1 U
Aroclor 1242	mg/kg	0.09 U	0.09 U	0.09 U		0.09 U		0.11 U	0.15 U	0.11 U	0.1 U
Aroclor 1248	mg/kg	0.09 U	0.09 U	0.09 U		0.09 U		0.11 U	0.15 U	0.11 U	0.1 U
Aroclor 1254	mg/kg	0.09 U	0.09 U	0.09 U		0.09 U		0.11 U	0.15 U	0.11 U	0.1 U
Aroclor 1260	mg/kg	0.09 U	0.09 U	0.09 U		0.09 U		0.11 U	0.15 U	0.11 U	0.1 U
Aroclor 1262	mg/kg	0.09 U	0.09 U	0.09 U		0.09 U		0.11 U	0.15 U	0.11 U	0.1 U
Aroclor 1268	mg/kg	0.09 U	0.09 U	0.09 U		0.09 U		0.11 U	0.15 U	0.11 U	0.1 U
Polychlorinated Biphenyls	mg/kg	0.09 U	0.09 U	0.09 U		0.09 U		0.11 U	0.15 U	0.11 U	0.1 U
Decachlorobiphenyl	mg/kg										
Total DiCB	mg/kg										
Total HpCB	mg/kg										
Total HxCB	mg/kg										
Total MoCB	mg/kg										
Total NoCB	mg/kg										
Total OcCB	mg/kg										
Total PCB homologues	mg/kg										
Total PeCB	mg/kg										
Total TeCB	mg/kg										
Total TrCB	mg/kg										
2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg										
2,3,3',4,4',5-Hexachlorobiphenyl	mg/kg										
2,3,3',4,4'-Pentachlorobiphenyl	mg/kg										
2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg										
2',3,4,4',5-Pentachlorobiphenyl	mg/kg										
2,3',4,4',5-Pentachlorobiphenyl	mg/kg										
2,3,4,4',5-Pentachlorobiphenyl	mg/kg										
3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg										

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR6
	Sample ID	BG01-SD-20060919	BG02-SD-20060919	BG03-SD-20060919	DUP02-SD-20060919	BH01-SD-20060918	BH02-SD-20060918	SH1-0-SD-20060918	SH2-0-SD-20060918	DUP01-SD-20060919	MD01-SD-20060919
	Type	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006	9/19/2006
Analyte	**Units**										
3,3',4,4',5-Pentachlorobiphenyl	mg/kg										
3,3',4,4'-Tetrachlorobiphenyl	mg/kg										
3,4,4',5-Tetrachlorobiphenyl	mg/kg										
Decachlorobiphenyl	mg/kg										
PCB Dioxin-like Congener TEQ (bird)	mg/kg										
PCB Dioxin-like Congener TEQ (fish)	mg/kg										
PCB Dioxin-like Congener TEQ (mammal)	mg/kg										
tPCBs_all	mg/kg										
tPCBs_detects	mg/kg										
m-Dinitrobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Pentachloronitrobenzene	mg/kg	0.74 U	0.93 U	0.64 U		0.79 U		0.93 U	1.3 U	0.78 U	1.3 U
Aluminum	mg/kg	4000	3700	5800		3600	3800	4800	12000	4400	3700
Antimony	mg/kg	9.3 U	9.6 U	10 U		9.3 U	9.8 U	9.8 U	9.5 U	9.5 U	9.1 U
Arsenic	mg/kg	19 U	19 U	20 U		19 U	20 U	20 U	19 U	19 U	18 U
Barium	mg/kg	17	13	19		16	13	30	59	30	22
Beryllium	mg/kg	0.93 U	0.96 U	1 U		0.93 U	0.98 U	0.98 U	0.95 U	0.95 U	0.91 U
Cadmium	mg/kg	2.8 U	2.9 U	3 U		2.8 U	2.9 U	2.9 U	2.8 U	2.8 U	2.7 U
Calcium	mg/kg	1100	820	1000		1200	900	1100	2200	1100	770
Chromium	mg/kg	6.4	7.4	14		5	5.5	11	19	5.9	6.1
Cobalt	mg/kg	4.4	3.8	5.5		3.8	3.6	4.3	11	4.6	3.9
Copper	mg/kg	3.9	3.6	5.4		5.2	3.9	13	18	8.9	11
Iron	mg/kg	8400	6900	12000		8000	7600	7900	17000	7900	8300
Lead	mg/kg	19 U	19 U	20 U		19 U	20 U	20 U	21	19 U	18 U
Magnesium	mg/kg	2200	1900	3400		1900	2000	2100	4100	2500	1700
Manganese	mg/kg	250	210	420		190	180	110	380	220	170
Nickel	mg/kg	11 U	12 U	12 U		11 U	12 U	12 U	16	11 U	11 U
Potassium	mg/kg	630	520	800		640	490 U	930	1300	930	540
Selenium	mg/kg	9.3 U	9.6 U	10 U		9.3 U	9.8 U	9.8 U	9.5 U	9.5 U	9.1 U
Silver	mg/kg	2.8 U	2.9 U	3 U		2.8 U	2.9 U	2.9 U	2.8 U	2.8 U	2.7 U
Sodium	mg/kg	470 U	480 U	500 U		470 U	490 U	490 U	480 U	480 U	460 U
Strontium	mg/kg										
Thallium	mg/kg	30 U	19 U	35 U		30 U	20 U	35 U	45 U	19 U	30 U
Vanadium	mg/kg	14	12	27		14	13	18	30	14	12
Zinc	mg/kg	24	21	28		22	22	48	75	26	28
Sulfide	mg/kg										
Total organic carbon (TOC)	%	894	1540	1170		1820		16900	26400	1310	1360

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR8	AR8	AR2	AR2	AR2	AR4
	Sample ID	RHD01-SD-20060919	DPWD01-SD-20060919	DPWD02-SD-20060919	AR2-WB-SDCH0001-0-090916	AR2-WB-SDCH0002-0-090916	AR2-WB-SDCH0003-0-090916	AR4-00-SDCH0001-0-091008
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/16/2009	9/16/2009	9/16/2009	10/8/2009
Analyte	**Units**							
1,1'-Biphenyl	mg/kg				0.018 U	0.026 U	0.022 U	0.011 U
1,2,4-Trichlorobenzene	mg/kg	0.79 U	1.2 U	0.97 U				
1,2-Dichlorobenzene	mg/kg	0.79 U	1.2 U	0.97 U				
1,3-Dichlorobenzene	mg/kg	0.79 U	1.2 U	0.97 U				
1,4-Dichlorobenzene	mg/kg	0.79 U	1.2 U	0.97 U				
2,2'-Oxybis(1-Chloropropane)	mg/kg	0.79 U	1.2 U	0.97 U				
Acetophenone	mg/kg	0.79 U	1.2 U	0.97 U	0.1	0.083	0.06	0.015 J
Azobenzene	mg/kg	0.79 U	1.2 U	0.97 U				
Benzaldehyde	mg/kg				0.028	0.028	0.016 J	0.011 U
Benzyl Alcohol	mg/kg	0.79 U	1.2 U	0.97 U				
Bis(2-Chloroethyl)Ether	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
Hexachlorobenzene	mg/kg	0.79 U	1.2 U	0.97 U	0.0045 U	0.0063 U	0.0055 U	0.0028 U
Hexachloroethane	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
Hexachloropropene	mg/kg	0.79 U	1.2 U	0.97 U				
Pyridine	mg/kg	0.79 U	1.2 U	0.97 U				
1,2,4,5-Tetrachlorobenzene	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
1,4-Naphthoquinone	mg/kg	0.79 U	1.2 U	0.97 U				
2,3,4,6-Tetrachlorophenol	mg/kg	0.79 U	1.2 U	0.97 U	0.045 U	0.063 U	0.055 U	0.028 U
2,4,5-Trichlorophenol	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
2,4,6-Trichlorophenol	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
2,4-Dichlorophenol	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
2,4-Dimethylphenol	mg/kg	0.79 U	1.2 U	0.97 U				0.028 U
2,4-Dinitrophenol	mg/kg	0.79 U	1.2 U	0.97 U	0.18 U	0.26 U	0.22 U	0.11 U
2,4-Dinitrotoluene	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
2,6-Dichlorophenol	mg/kg	0.79 U	1.2 U	0.97 U				
2,6-Dinitrotoluene	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
2-Chlorophenol	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
2-Methylphenol	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
2-Nitroaniline	mg/kg	0.79 U	1.2 U	0.97 U	0.018 U	0.026 U	0.022 U	0.011 U
2-Nitrophenol	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
3 & 4 Methylphenol	mg/kg	1.6 U	2.4 U	1.9 U				
3,3'-Dichlorobenzidine	mg/kg	0.79 U	1.2 U	0.97 U	0.089 U	0.13 U	0.11 U	0.055 U
3-Methylchloranthrene	mg/kg	0.79 U	1.2 U	0.97 U				
3-Nitroaniline	mg/kg	0.79 U	1.2 U	0.97 U	0.018 U	0.026 U	0.022 U	0.011 U
4,6-Dinitro-2-Methylphenol	mg/kg	0.79 U	1.2 U	0.97 U	0.089 U	0.13 U	0.11 U	0.055 U
4-Bromophenyl-Phenylether	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
4-Chloro-3-Methylphenol	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR8	AR8	AR2	AR2	AR2	AR4
	Sample ID	RHD01-SD-20060919	DPWD01-SD-20060919	DPWD02-SD-20060919	AR2-WB-SDCH0001-0-090916	AR2-WB-SDCH0002-0-090916	AR2-WB-SDCH0003-0-090916	AR4-00-SDCH0001-0-091008
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/16/2009	9/16/2009	9/16/2009	10/8/2009
Analyte	**Units**							
4-Chloroaniline	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
4-Chlorophenyl-Phenylether	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
4-Methylphenol	mg/kg				0.0089 U	0.013 U	0.011 U	0.0055 U
4-Nitroaniline	mg/kg	0.79 U	1.2 U	0.97 U	0.018 U	0.026 U	0.022 U	0.011 U
4-Nitrophenol	mg/kg	0.79 U	1.2 U	0.97 U	0.089 U	0.13 U	0.11 U	0.055 U
4-Nitroquinoline-n-Oxide	mg/kg	0.79 U	1.2 U	0.97 U				
Aniline	mg/kg	0.79 U	1.2 U	0.97 U				
Aramite	mg/kg	0.79 U	1.2 U	0.97 U				
Atrazine	mg/kg				0.0089 U	0.013 U	0.011 U	0.0055 U
Benzidine	mg/kg	0.79 U	1.2 U	0.97 U				
Benzoic Acid	mg/kg	0.79 U	1.2 U	0.97 U				
Bis(2-Chloroethoxy)Methane	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
Bis(2-chloroisopropyl) ether	mg/kg				0.0089 U	0.013 U	0.011 U	0.055 U
Bis(2-Ethylhexyl)Phthalate	mg/kg	0.79 U	1.2 U	0.97 U	0.0094 J	0.013 J	0.0082 J	0.0055 U
Butylbenzylphthalate	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
Caprolactam	mg/kg				0.045 U	0.063 U	0.055 U	0.028 U
Chlorobenzilate	mg/kg	0.79 U	1.2 U	0.97 U				
Dibenzofuran	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0095
Diethylphthalate	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.0016 J	0.0055 U
Dimethylphthalate	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
Di-n-butyl phthalate	mg/kg	0.79 U	1.2 U	0.97 U	0.018 U	0.026 U	0.0095 J	0.011 U
Di-n-octyl phthalate	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
Ethyl methanesulfonate	mg/kg	0.79 U	1.2 U	0.97 U				
Hexachlorobutadiene	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
Hexachlorocyclopentadiene	mg/kg	0.79 U	1.2 U	0.97 U	0.045 U	0.063 U	0.055 U	0.029 U
Isophorone	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
Isosafrole	mg/kg	0.79 U	1.2 U	0.97 U				
Methyl Methanesulfonate	mg/kg	0.79 U	1.2 U	0.97 U				
Nitrobenzene	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
N-Nitrosodimethylamine	mg/kg	0.79 U	1.2 U	0.97 U				
N-Nitroso-Di-N-Propylamine	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
N-Nitrosodiphenylamine	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U
Pentachlorobenzene	mg/kg	0.79 U	1.2 U	0.97 U				
Pentachlorophenol	mg/kg	0.79 U	1.2 U	0.97 U	0.089 U	0.13 U	0.11 U	0.055 U
Phenacetin	mg/kg	0.79 U	1.2 U	0.97 U				
Phenol	mg/kg	0.79 U	1.2 U	0.97 U	0.051 U	0.038 U	0.039 U	0.0021 J
2-Chloronaphthalene	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0055 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR8	AR8	AR2	AR2	AR2	AR4
	Sample ID	RHD01-SD-20060919	DPWD01-SD-20060919	DPWD02-SD-20060919	AR2-WB-SDCH0001-0-090916	AR2-WB-SDCH0002-0-090916	AR2-WB-SDCH0003-0-090916	AR4-00-SDCH0001-0-091008
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/16/2009	9/16/2009	9/16/2009	10/8/2009
Analyte	**Units**							
2-Methylnaphthalene	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.0031 J
Acenaphthene	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.012
Acenaphthylene	mg/kg	0.79 U	1.2 U	0.97 U	0.0061 J	0.005 J	0.0054 J	0.029
Anthracene	mg/kg	0.79 U	1.2 U	0.97 U	0.0032 J	0.0034 J	0.0042 J	0.071
Benzo(a)anthracene	mg/kg	1	1.2 U	2	0.013	0.011 J	0.012	0.46
Benzo(a)pyrene	mg/kg	0.88	1.2 U	2	0.015 J	0.012 J	0.014 J	0.64 D
Benzo(b)fluoranthene	mg/kg	1.1	1.2 U	2.7	0.02	0.02	0.018	0.8 D
Benzo(g,h,i)perylene	mg/kg	0.79 U	1.2 U	1.1	0.013	0.011 J	0.012	0.4
Benzo(k)fluoranthene	mg/kg	0.79 U	1.2 U	0.97 U	0.0077 J	0.0068 J	0.0067 J	0.24
Carbazole	mg/kg	0.79 U	1.2 U	0.97 U	0.0014 J	0.0022 J	0.0018 J	0.021
Chrysene	mg/kg	0.99	1.2 U	2	0.02	0.017	0.017	0.51
Dibenz(a,h)anthracene	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.075
Fluoranthene	mg/kg	2.1	1.2 U	2.7	0.026	0.025	0.025	0.62 D
Fluorene	mg/kg	0.79 U	1.2 U	0.97 U	0.0014 J	0.013 U	0.011 U	0.017
Indeno(1,2,3-cd)pyrene	mg/kg	0.79 U	1.2 U	1.1	0.015 J	0.014 J	0.012 J	0.47
Naphthalene	mg/kg	0.79 U	1.2 U	0.97 U	0.0089 U	0.013 U	0.011 U	0.011
Naphthalene, 1-Methyl-	mg/kg	0.79 U	1.2 U	0.97 U				
Phenanthrene	mg/kg	1.4	1.2 U	1	0.013	0.013	0.013	0.22
Pyrene	mg/kg	2.2	1.2	3	0.03	0.028	0.03	0.66 D
Safrole	mg/kg	0.79 U	1.2 U	0.97 U				
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	mg/kg				0.00000148 *	0.00000168 J	0.00000244 U	0.00000718 J
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	mg/kg				0.0000184	0.0000176	0.000019	0.000036
1,2,3,4,6,7,8-Heptachlorodibenzofuran	mg/kg				0.00000108 *	0.00000113 J	0.000000993 *	0.00000267 J
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	mg/kg				0.00000353 J	0.00000363 J	0.00000382 J	0.00000613
1,2,3,4,7,8,9-Heptachlorodibenzofuran	mg/kg				0.000000732 U	0.000000744 U	0.000000936 U	0.000000999 J
1,2,3,4,7,8-Hexachlorodibenzofuran	mg/kg				0.000000326 J	0.000000388 *	0.000000335 *	0.00000455 J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	mg/kg				0.000000442 U	0.000000496 U	0.000000626 U	0.000000163 U
1,2,3,6,7,8-Hexachlorodibenzofuran	mg/kg				0.000000328 J	0.000000419 *	0.000000362 J	0.00000103 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	mg/kg				0.000000442 U	0.000000473 U	0.000000648 U	0.000000432 J
1,2,3,7,8,9-Hexachlorodibenzofuran	mg/kg				0.000000455 U	0.000000419 U	0.000000452 U	0.000000784 *
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	mg/kg				0.000000456 U	0.000000499 U	0.000000657 U	0.000000289 *
1,2,3,7,8-Pentachlorodibenzofuran	mg/kg				0.000000292 J	0.000000305 *	0.000000337 J	0.00000269 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	mg/kg				0.000000325 U	0.00000027 U	0.000000349 U	0.000000139 *
2,3,4,6,7,8-Hexachlorodibenzofuran	mg/kg				0.000000292 U	0.00000028 *	0.0000003 U	0.000000544 J
2,3,4,7,8-Pentachlorodibenzofuran	mg/kg				0.000000196 U	0.000000291 *	0.000000307 *	0.00000222 J
2,3,7,8-TCDD TEQ (bird)	mg/kg				1.67406E-06	1.70283E-06	1.82133E-06	8.88431E-06
2,3,7,8-TCDD TEQ (fish)	mg/kg				1.12937E-06	1.13232E-06	1.295E-06	2.65215E-06

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR8	AR8	AR2	AR2	AR2	AR4
	Sample ID	RHD01-SD-20060919	DPWD01-SD-20060919	DPWD02-SD-20060919	AR2-WB-SDCH0001-0-090916	AR2-WB-SDCH0002-0-090916	AR2-WB-SDCH0003-0-090916	AR4-00-SDCH0001-0-091008
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/16/2009	9/16/2009	9/16/2009	10/8/2009
Analyte	**Units**							
2,3,7,8-TCDD TEQ (mammal)	mg/kg				1.05514E-06	1.02457E-06	1.16303E-06	2.48284E-06
2,3,7,8-Tetrachlorodibenzofuran	mg/kg				0.000000621 J	0.000000619 J	0.000000609 J	0.0000053
2,3,7,8-Tetrachlorodibenzo-p-dioxin	mg/kg				0.000000267 U	0.000000238 U	0.000000249 U	0.000000177 *
Dioxin/Furan - Toxic Equivalent	mg/kg	0.00019833	0.00002358					
Heptachlorodibenzofuran (total)	mg/kg				0.000000805 J	0.00000203 J	0.00000105 J	0.00000557 J
Heptachlorodibenzo-p-dioxin (total)	mg/kg				0.00000684 J	0.00000731 J	0.0000073 J	0.0000123 J
Hexachlorodibenzofuran (total)	mg/kg				0.00000219 J	0.000000963 J	0.00000205 J	0.00000918 J
Hexachlorodibenzo-p-dioxin (total)	mg/kg				0.00000116 J	0.00000154 J	0.000000687 J	0.00000226 J
Pentachlorodibenzofuran (total)	mg/kg				0.000000748 J	0.00000193 J	0.00000137 J	0.000011 J
Pentachlorodibenzo-p-dioxin (total)	mg/kg				0.000000325 U	0.00000027 U	0.000000349 U	0.000000232 J
Tetrachlorodibenzo(p)dioxin (total)	mg/kg				0.000000947 U	0.000000901 U	0.000000878 U	0.0000000978 U
Tetrachlorodibenzofuran (total)	mg/kg				0.00000149 J	0.00000361 J	0.00000229 J	0.0000143 J
4,4'-DDD	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
4,4'-DDe	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
4,4'-DDT	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0013 J
Aldrin	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Alpha-Bhc	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
alpha-Chlordane	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
beta-BHC	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
beta-Chlordane	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Chlordane	mg/kg				0.089 U	0.13 U	0.11 U	0.055 U
Chlorpyrifos	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
cis-Nonachlor	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Delta-Bhc	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Dieldrin	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Dinitrobutyl Phenol	mg/kg	0.79 U	1.2 U	0.97 U				
Endosulfan I	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Endosulfan II	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Endosulfan Sulfate	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Endrin aldehyde	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Endrin Ketone	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Endrin	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
gamma-BHC (Lindane)	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Heptachlor epoxide	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Heptachlor	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Isodrin	mg/kg	0.79 U	1.2 U	0.97 U				
Kepone	mg/kg	0.79 U	1.2 U	0.97 U				

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR8	AR8	AR2	AR2	AR2	AR4
	Sample ID	RHD01-SD-20060919	DPWD01-SD-20060919	DPWD02-SD-20060919	AR2-WB-SDCH0001-0-090916	AR2-WB-SDCH0002-0-090916	AR2-WB-SDCH0003-0-090916	AR4-00-SDCH0001-0-091008
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/16/2009	9/16/2009	9/16/2009	10/8/2009
Analyte	**Units**							
Methoxychlor	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Mirex	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
o,p'-DDD	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
O,P'-Dde	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
o,p'-DDT	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Oxychlordane	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Toxaphene	mg/kg				0.23 U	0.32 U	0.28 U	0.14 U
trans-Nonachlor	mg/kg				0.0045 U	0.0063 U	0.0055 U	0.0028 U
Aroclor 1016	mg/kg	0.11 U	0.1 U	0.13 U				
Aroclor 1221	mg/kg	0.11 U	0.1 U	0.13 U				
Aroclor 1232	mg/kg	0.11 U	0.1 U	0.13 U				
Aroclor 1242	mg/kg	0.11 U	0.1 U	0.13 U				
Aroclor 1248	mg/kg	0.11 U	0.1 U	0.13 U				
Aroclor 1254	mg/kg	0.11 U	0.1 U	0.13 U				
Aroclor 1260	mg/kg	0.11 U	0.1 U	0.13 U				
Aroclor 1262	mg/kg	0.11 U	0.1 U	0.13 U				
Aroclor 1268	mg/kg	0.11 U	0.1 U	0.13 U				
Polychlorinated Biphenyls	mg/kg	0.11 U	0.1 U	0.13 U				
Decachlorobiphenyl	mg/kg				0.00000403 J	0.00000664 J	0.0000108 J	0.00000652 J
Total DiCB	mg/kg				0.0000564 U	0.0000762 U	0.0000684 U	0.0000515 U
Total HpCB	mg/kg				0.0000764 J	0.0000993 J	0.000565 J	0.00427 J
Total HxCB	mg/kg				0.0000875 U	0.000119 U	0.000412 J	0.0148 J
Total MoCB	mg/kg				0.00000804 U	0.0000107 U	0.00000856 U	0.00000324 U
Total NoCB	mg/kg				0.00000437 J	0.00000824 J	0.0000322 J	0.0000362 J
Total OcCB	mg/kg				0.0000378 J	0.0000528 J	0.000237 J	0.000533 J
Total PCB homologues	mg/kg				0.000123 J	0.000167 J	0.00126 J	0.0352 J
Total PeCB	mg/kg				0.0000626 U	0.0000656 U	0.000155 U	0.0133 J
Total TeCB	mg/kg				0.0000646 U	0.0000902 U	0.000111 U	0.00222 J
Total TrCB	mg/kg				0.0000552 U	0.0000786 U	0.0000649 U	0.000163 U
2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg				0.0000029 U	0.00000223 U	0.00000205 U	0.0000192
2,3,3',4,4',5-Hexachlorobiphenyl	mg/kg				0.00000482 U	0.00000323 U	0.0000067 *	0.000473
2,3,3',4,4'-Pentachlorobiphenyl	mg/kg				0.00000385 U	0.00000765 U	0.0000113 U	0.000757 J
2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg				0.00000416 U	0.00000343 U	0.00000401 U	0.000137
2',3,4,4',5-Pentachlorobiphenyl	mg/kg				0.00000308 U	0.00000287 U	0.0000037 U	0.0000287 J
2,3',4,4',5-Pentachlorobiphenyl	mg/kg				0.0000131 U	0.0000174 U	0.0000267	0.00206
2,3,4,4',5-Pentachlorobiphenyl	mg/kg				0.00000331 U	0.00000301 U	0.00000405 U	0.0000481 J
3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg				0.00000341 U	0.00000268 U	0.00000313 U	0.00000359 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR8	AR8	AR2	AR2	AR2	AR4
	Sample ID	RHD01-SD-20060919	DPWD01-SD-20060919	DPWD02-SD-20060919	AR2-WB-SDCH0001-0-090916	AR2-WB-SDCH0002-0-090916	AR2-WB-SDCH0003-0-090916	AR4-00-SDCH0001-0-091008
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	9/19/2006	9/19/2006	9/19/2006	9/16/2009	9/16/2009	9/16/2009	10/8/2009
Analyte	**Units**							
3,3',4,4',5-Pentachlorobiphenyl	mg/kg				0.00000508 U	0.00000485 U	0.0000054 U	0.00000411 U
3,3',4,4'-Tetrachlorobiphenyl	mg/kg				0.00000329 U	0.00000203 U	0.00000208 U	0.0000126
3,4,4',5-Tetrachlorobiphenyl	mg/kg				0.00000294 U	0.00000174 U	0.00000181 U	0.00000173 U
Decachlorobiphenyl	mg/kg				0.00000403 J	0.00000664 J	0.0000108 J	0.00000652 J
PCB Dioxin-like Congener TEQ (bird)	mg/kg				0.0000001659304 U	0.0000001031483 U	1.0657E-07	7.80259E-07
PCB Dioxin-like Congener TEQ (fish)	mg/kg				0.0000000005051 U	0.0000000004021 U	5.0055E-10	1.8875E-08
PCB Dioxin-like Congener TEQ (mammal)	mg/kg				0.0000000013856 U	0.0000000013976 U	1.9633E-09	1.0695E-07
tPCBs_all	mg/kg				0.00004994	0.00005112	0.00007093	0.00354503
tPCBs_detects	mg/kg						0.0000334	0.0035356
m-Dinitrobenzene	mg/kg	0.79 U	1.2 U	0.97 U				
Pentachloronitrobenzene	mg/kg	0.79 U	1.2 U	0.97 U				
Aluminum	mg/kg	4700	5700	9000				
Antimony	mg/kg	8.6 U	9.5 U	9.1 U	1 U	1 U	1 U	1 U
Arsenic	mg/kg	17 U	19 U	18 U	2.2	2.1	2.5	0.99 J
Barium	mg/kg	28	34	48				
Beryllium	mg/kg	0.86 U	0.95 U	0.91 U	0.29 J	0.27 J	0.37 J	0.14 J
Cadmium	mg/kg	2.6 U	2.8 U	2.7 U	0.6	0.59	0.77	0.078 J
Calcium	mg/kg	1000	1300	1900				
Chromium	mg/kg	8	9.9	16	11.4	10.6	14.9	4.7
Cobalt	mg/kg	4.8	6.1	9.4				
Copper	mg/kg	11	10	19	9	8.1	11.7	5.5
Iron	mg/kg	9000	10000	15000				
Lead	mg/kg	17 U	19 U	18 U	7.4	7.1	9.4	6.1
Magnesium	mg/kg	2100	2400	3500				
Manganese	mg/kg	250	330	300				
Nickel	mg/kg	10 U	11 U	12	11.7	10.5	15.2	3.9 J
Potassium	mg/kg	730	740	1200				
Selenium	mg/kg	8.6 U	9.5 U	9.1 U	0.63 J	0.66 J	0.75 J	3.5 U
Silver	mg/kg	2.6 U	2.8 U	2.7 U	0.291 U	0.367 U	0.291 U	0.024 U
Sodium	mg/kg	430 U	480 U	460 U				
Strontium	mg/kg				5.2 J	4.6 J	6.7 J	2.2 J
Thallium	mg/kg	30 U	40 U	40 U				
Vanadium	mg/kg	15	16	25	14.4	12.7	18.2	9 J
Zinc	mg/kg	38	51	76	50.9	46.4	65.9	29.2
Sulfide	mg/kg				17.8	33.5	17.8	7.31
Total organic carbon (TOC)	%	3560 J	8300	30600	1.92 EB	3.22 EB	2.16 EB	0.333

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR4	AR6	AR8	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR4-00-SDCH0002-0-091008	AR6-00-SDCH0001-0-090918	AR8-00-SDCH0001-0-090918	AR8-00-SDCH0002-0-090918	AR8-00-SDCH0003-0-090918	AR9-00-SDCH0001-0-090917	AR9-00-SDCH0002-0-090917	AR9-00-SDCH0002-1-090917
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate
	Date	10/8/2009	9/18/2009	9/18/2009	9/18/2009	9/18/2009	9/17/2009	9/17/2009	9/17/2009
Analyte	**Units**								
1,1'-Biphenyl	mg/kg	0.012 U	0.089 U	0.0037 J	0.0022 J	0.0033 J	0.018 U	0.15 U	0.076 U
1,2,4-Trichlorobenzene	mg/kg								
1,2-Dichlorobenzene	mg/kg								
1,3-Dichlorobenzene	mg/kg								
1,4-Dichlorobenzene	mg/kg								
2,2'-Oxybis(1-Chloropropane)	mg/kg								
Acetophenone	mg/kg	0.027 J	0.23 U	0.015 J	0.016 J	0.016 J	0.038 J	0.37 U	0.19 U
Azobenzene	mg/kg								
Benzaldehyde	mg/kg	0.012 U	0.089 U	0.016 U	0.0095 J	0.0087 J	0.011 J	0.15 U	0.076 U
Benzyl Alcohol	mg/kg								
Bis(2-Chloroethyl)Ether	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
Hexachlorobenzene	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0013 J	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Hexachloroethane	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
Hexachloropropene	mg/kg								
Pyridine	mg/kg								
1,2,4,5-Tetrachlorobenzene	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
1,4-Naphthoquinone	mg/kg								
2,3,4,6-Tetrachlorophenol	mg/kg	0.028 U	0.23 U	0.039 U	0.043 U	0.045 U	0.044 U	0.37 U	0.19 U
2,4,5-Trichlorophenol	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
2,4,6-Trichlorophenol	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
2,4-Dichlorophenol	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
2,4-Dimethylphenol	mg/kg	0.028 U							
2,4-Dinitrophenol	mg/kg	0.12 U	0.89 U	0.16 U	0.18 U	0.18 U	0.18 U	1.5 U	0.76 U
2,4-Dinitrotoluene	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
2,6-Dichlorophenol	mg/kg								
2,6-Dinitrotoluene	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
2-Chlorophenol	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
2-Methylphenol	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
2-Nitroaniline	mg/kg	0.012 U	0.089 U	0.016 U	0.018 U	0.018 U	0.018 U	0.15 U	0.076 U
2-Nitrophenol	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
3 & 4 Methylphenol	mg/kg								
3,3'-Dichlorobenzidine	mg/kg	0.056 U	0.45 U	0.077 U	0.086 U	0.089 U	0.088 U	0.73 U	0.38 U
3-Methylchloranthrene	mg/kg								
3-Nitroaniline	mg/kg	0.012 U	0.089 U	0.016 U	0.018 U	0.018 U	0.018 U	0.15 U	0.076 U
4,6-Dinitro-2-Methylphenol	mg/kg	0.056 U	0.45 U	0.077 U	0.086 U	0.089 U	0.088 U	0.73 U	0.38 U
4-Bromophenyl-Phenylether	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
4-Chloro-3-Methylphenol	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR4	AR6	AR8	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR4-00-SDCH0002-0-091008	AR6-00-SDCH0001-0-090918	AR8-00-SDCH0001-0-090918	AR8-00-SDCH0002-0-090918	AR8-00-SDCH0003-0-090918	AR9-00-SDCH0001-0-090917	AR9-00-SDCH0002-0-090917	AR9-00-SDCH0002-1-090917
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate
	Date	10/8/2009	9/18/2009	9/18/2009	9/18/2009	9/18/2009	9/17/2009	9/17/2009	9/17/2009
Analyte	**Units**								
4-Chloroaniline	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
4-Chlorophenyl-Phenylether	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
4-Methylphenol	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0076 J	0.073 U	0.038 U
4-Nitroaniline	mg/kg	0.012 U	0.089 U	0.016 U	0.018 U	0.018 U	0.018 U	0.15 U	0.076 U
4-Nitrophenol	mg/kg	0.056 U	0.45 U	0.077 U	0.086 U	0.089 U	0.088 U	0.73 U	0.38 U
4-Nitroquinoline-n-Oxide	mg/kg								
Aniline	mg/kg								
Aramite	mg/kg								
Atrazine	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
Benzidine	mg/kg								
Benzoic Acid	mg/kg								
Bis(2-Chloroethoxy)Methane	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
Bis(2-chloroisopropyl) ether	mg/kg	0.0056 U	0.45 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.73 U	0.38 U
Bis(2-Ethylhexyl)Phthalate	mg/kg	0.0083 J	0.045 U	0.036 J	0.021 J	0.034 J	0.023 J	0.073 U	0.038 U
Butylbenzylphthalate	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
Caprolactam	mg/kg	0.028 U	0.23 U	0.039 U	0.043 U	0.045 U	0.044 U	0.37 U	0.19 U
Chlorobenzilate	mg/kg								
Dibenzofuran	mg/kg	0.0096	0.018 JD	0.027	0.012	0.024	0.0087 J	0.031 JD	0.041 D
Diethylphthalate	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0016 J	0.0088 U	0.073 U	0.038 U
Dimethylphthalate	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
Di-n-butyl phthalate	mg/kg	0.012 U	0.089 U	0.013 J	0.0079 J	0.012 J	0.018 U	0.15 U	0.076 U
Di-n-octyl phthalate	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
Ethyl methanesulfonate	mg/kg								
Hexachlorobutadiene	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
Hexachlorocyclopentadiene	mg/kg	0.029 U	0.23 U	0.039 U	0.043 U	0.045 U	0.044 U	0.37 U	0.19 U
Isophorone	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
Isosafrole	mg/kg								
Methyl Methanesulfonate	mg/kg								
Nitrobenzene	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
N-Nitrosodimethylamine	mg/kg								
N-Nitroso-Di-N-Propylamine	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
N-Nitrosodiphenylamine	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U
Pentachlorobenzene	mg/kg								
Pentachlorophenol	mg/kg	0.056 U	0.45 U	0.077 U	0.086 U	0.089 U	0.088 U	0.73 U	0.38 U
Phenacetin	mg/kg								
Phenol	mg/kg	0.017 U	0.14 U	0.01 J	0.0065 J	0.0093 J	0.0088 J	0.22 U	0.12 U
2-Chloronaphthalene	mg/kg	0.0056 U	0.045 U	0.0077 U	0.0086 U	0.0089 U	0.0088 U	0.073 U	0.038 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR4	AR6	AR8	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR4-00-SDCH0002-0-091008	AR6-00-SDCH0001-0-090918	AR8-00-SDCH0001-0-090918	AR8-00-SDCH0002-0-090918	AR8-00-SDCH0003-0-090918	AR9-00-SDCH0001-0-090917	AR9-00-SDCH0002-0-090917	AR9-00-SDCH0002-1-090917
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate
	Date	10/8/2009	9/18/2009	9/18/2009	9/18/2009	9/18/2009	9/17/2009	9/17/2009	9/17/2009
Analyte	**Units**								
2-Methylnaphthalene	mg/kg	0.0029 J	0.045 U	0.01	0.0052 J	0.0099	0.0045 J	0.073 U	0.019 JD
Acenaphthene	mg/kg	0.015 J	0.034 JD	0.048	0.027	0.054	0.018	0.069 JD	0.1 DJ
Acenaphthylene	mg/kg	0.026	0.028 JD	0.046	0.03	0.038	0.023	0.038 JD	0.048 D
Anthracene	mg/kg	0.07	0.15 D	0.23	0.13	0.26	0.092	0.2 D	0.28 D
Benzo(a)anthracene	mg/kg	0.38	0.9 D	1.4 D	0.79	1.3 D	0.59	0.8 DJ	2.4 DJ
Benzo(a)pyrene	mg/kg	0.44	0.88 DJ	1.3 D	0.84 J	1.3 D	0.6 J	0.78 DJ	2.9 DJ
Benzo(b)fluoranthene	mg/kg	0.67 D	1.2 D	1.8 D	1.1 D	1.7 D	0.78 D	1.1 DJ	3.8 DJ
Benzo(g,h,i)perylene	mg/kg	0.29	0.48 D	0.61 D	0.46	0.81	0.37	0.49 DJ	2.3 DJ
Benzo(k)fluoranthene	mg/kg	0.17	0.4 D	0.63	0.53	0.67	0.35	0.35 DJ	1.4 DJ
Carbazole	mg/kg	0.028	0.061 D	0.083	0.04	0.088	0.025	0.048 JD	0.092 DJ
Chrysene	mg/kg	0.43	0.92 D	1.5 D	0.82	1.5 D	0.62	0.85 DJ	2.7 DJ
Dibenz(a,h)anthracene	mg/kg	0.068	0.047 D	0.066	0.038	0.061	0.03	0.15 D	0.14 D
Fluoranthene	mg/kg	0.68 D	1.4 D	2 D	1.2 D	2.2 D	0.81 D	1.5 DJ	3.8 DJ
Fluorene	mg/kg	0.018	0.033 JD	0.055 J	0.032 J	0.06 J	0.021 J	0.088 DJ	0.098 DJ
Indeno(1,2,3-cd)pyrene	mg/kg	0.34	0.62 DJ	0.72 D	0.49 D	0.8 D	0.38 D	0.58 DJ	1.6 DJ
Naphthalene	mg/kg	0.0047 J	0.045 U	0.016	0.0098	0.017	0.01	0.073 U	0.025 JD
Naphthalene, 1-Methyl-	mg/kg								
Phenanthrene	mg/kg	0.24	0.53 D	0.8 D	0.53	0.93 D	0.31	0.93 D	1.2 D
Pyrene	mg/kg	0.65 D	1.2 D	1.9 D	1.3 D	2.1 D	0.86	1.4 D	3.2 D
Safrole	mg/kg								
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	mg/kg	0.00000848 J	0.0000214	0.0000194	0.0000372	0.0000162	0.00000956	0.00000488 J	0.000013
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	mg/kg	0.0000478	0.0000624	0.0000783	0.0000886	0.000103	0.0000523	0.00002	0.0000278
1,2,3,4,6,7,8-Heptachlorodibenzofuran	mg/kg	0.00000307 J	0.0000157	0.0000152	0.0000406	0.0000123	0.00000702	0.00000547 J	0.0000132 J
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	mg/kg	0.0000073	0.0000112	0.0000151	0.0000136	0.0000172	0.00000774	0.0000034 J	0.00000452 J
1,2,3,4,7,8,9-Heptachlorodibenzofuran	mg/kg	0.00000057 J	0.00000514	0.00000487 *	0.0000152	0.00000344 J	0.00000228 J	0.00000215 J	0.00000537
1,2,3,4,7,8-Hexachlorodibenzofuran	mg/kg	0.00000303 J	0.0000313	0.0000314	0.0000774	0.0000266	0.0000135	0.0000236	0.0000393
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	mg/kg	0.000000194 U	0.000000465 U	0.000000485 J	0.000000467 U	0.000000459 U	0.000000456 U	0.000000481 U	0.000000493 U
1,2,3,6,7,8-Hexachlorodibenzofuran	mg/kg	0.000000908 J	0.00000658	0.00000712	0.0000215	0.00000654	0.00000295 J	0.00000559	0.00000885
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	mg/kg	0.000000371 J	0.000000623 J	0.00000127 J	0.000000935 J	0.000000991 J	0.000000741 J	0.000000476 U	0.000000498 U
1,2,3,7,8,9-Hexachlorodibenzofuran	mg/kg	0.000000685 J	0.00000947	0.00000685	0.0000331	0.00000688	0.00000344 J	0.00000485 J	0.00000965 J
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	mg/kg	0.000000273 J	0.000000529 J	0.000000816 J	0.000000538 J	0.000000689 J	0.000000479 U	0.000000493 U	0.000000511 U
1,2,3,7,8-Pentachlorodibenzofuran	mg/kg	0.00000274 J	0.0000186	0.0000322	0.0000428	0.0000207	0.0000106	0.0000379	0.000039
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	mg/kg	0.000000104 U	0.000000356 U	0.000000341 J	0.000000263 U	0.000000288 U	0.000000257 U	0.000000216 U	0.000000312 U
2,3,4,6,7,8-Hexachlorodibenzofuran	mg/kg	0.000000457 *	0.00000337 J	0.00000328 J	0.0000096	0.00000322 J	0.00000168 J	0.00000228 J	0.00000436 J
2,3,4,7,8-Pentachlorodibenzofuran	mg/kg	0.00000301 J	0.000019	0.0000327	0.0000407	0.0000206	0.0000103	0.0000259 J	0.0000465 J
2,3,7,8-TCDD TEQ (bird)	mg/kg	1.0978E-05	6.72364E-05	0.000131077	0.000110592	6.41893E-05	4.2637E-05	0.000185355	
2,3,7,8-TCDD TEQ (fish)	mg/kg	3.16677E-06	0.000018588	2.85219E-05	4.05734E-05	1.84188E-05	1.02341E-05	3.78067E-05	

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR4	AR6	AR8	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR4-00-SDCH0002-0-091008	AR6-00-SDCH0001-0-090918	AR8-00-SDCH0001-0-090918	AR8-00-SDCH0002-0-090918	AR8-00-SDCH0003-0-090918	AR9-00-SDCH0001-0-090917	AR9-00-SDCH0002-0-090917	AR9-00-SDCH0002-1-090917
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate
	Date	10/8/2009	9/18/2009	9/18/2009	9/18/2009	9/18/2009	9/17/2009	9/17/2009	9/17/2009
Analyte	**Units**								
2,3,7,8-TCDD TEQ (mammal)	mg/kg	2.89528E-06	1.64712E-05	2.59471E-05	3.41807E-05	1.58511E-05	9.38656E-06	3.4125E-05	
2,3,7,8-Tetrachlorodibenzofuran	mg/kg	0.00000656	0.0000404	0.0000892	0.0000502	0.0000364	0.0000283	0.000067 J	0.000129 J
2,3,7,8-Tetrachlorodibenzo-p-dioxin	mg/kg	0.000000432 J	0.000000238 U	0.000000407 J	0.000000318 *	0.000000219 U	0.000000378 J	0.000000167 U	0.000000244 U
Dioxin/Furan - Toxic Equivalent	mg/kg								
Heptachlorodibenzofuran (total)	mg/kg	0.00000759 J	0.0000324 J	0.0000255 J	0.0000869 J	0.0000254 J	0.0000152 J	0.000011 J	0.0000256 J
Heptachlorodibenzo-p-dioxin (total)	mg/kg	0.0000129 J	0.0000218 J	0.0000356 J	0.0000286 J	0.0000328 J	0.0000163 J	0.00000699 J	0.0000105 J
Hexachlorodibenzofuran (total)	mg/kg	0.00000782 J	0.0000674 J	0.0000619 J	0.000199 J	0.0000588 J	0.0000284 J	0.0000443 J	0.0000809 J
Hexachlorodibenzo-p-dioxin (total)	mg/kg	0.00000182 J	0.00000314 J	0.00000972 J	0.00000585 J	0.00000622 J	0.00000358 J	0.00000114 J	0.000000548 J
Pentachlorodibenzofuran (total)	mg/kg	0.0000138 J	0.000101 J	0.000164 J	0.000215 J	0.000102 J	0.0000465 J	0.000119 J	0.000219 J
Pentachlorodibenzo-p-dioxin (total)	mg/kg	0.000000104 U	0.000000356 U	0.000000945 J	0.000000263 U	0.000000449 J	0.000000257 U	0.000000216 U	0.000000312 U
Tetrachlorodibenzo(p)dioxin (total)	mg/kg	0.000000691 J	0.000000809 U	0.00000101 U	0.000000786 U	0.000000625 U	0.00000103 U	0.000000408 U	0.000000244 U
Tetrachlorodibenzofuran (total)	mg/kg	0.0000224 J	0.000161 J	0.000397 J	0.000177 J	0.000134 J	0.00009 J	0.000211 J	0.000569 J
4,4'-DDD	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
4,4'-DDe	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
4,4'-DDT	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Aldrin	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Alpha-Bhc	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
alpha-Chlordane	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
beta-BHC	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
beta-Chlordane	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Chlordane	mg/kg	0.056 U	0.089 U	0.077 U	0.087 U	0.089 U	0.088 U	0.072 U	0.075 U
Chlorpyrifos	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0059 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
cis-Nonachlor	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Delta-Bhc	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Dieldrin	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Dinitrobutyl Phenol	mg/kg								
Endosulfan I	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Endosulfan II	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Endosulfan Sulfate	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Endrin aldehyde	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Endrin Ketone	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Endrin	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
gamma-BHC (Lindane)	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Heptachlor epoxide	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Heptachlor	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Isodrin	mg/kg								
Kepone	mg/kg								

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR4	AR6	AR8	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR4-00-SDCH0002-0-091008	AR6-00-SDCH0001-0-090918	AR8-00-SDCH0001-0-090918	AR8-00-SDCH0002-0-090918	AR8-00-SDCH0003-0-090918	AR9-00-SDCH0001-0-090917	AR9-00-SDCH0002-0-090917	AR9-00-SDCH0002-1-090917
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate
	Date	10/8/2009	9/18/2009	9/18/2009	9/18/2009	9/18/2009	9/17/2009	9/17/2009	9/17/2009
Analyte	**Units**								
Methoxychlor	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Mirex	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
o,p'-DDD	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
O,P'-Dde	mg/kg	0.0028 U	0.0045 U	0.0052 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
o,p'-DDT	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.00051 J	0.0044 J	0.0044 U	0.0036 U	0.0014 J
Oxychlordane	mg/kg	0.0028 U	0.0045 U	0.0051 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Toxaphene	mg/kg	0.14 U	0.26 U	0.23 U	0.22 U	0.23 U	0.22 U	0.18 U	0.25 U
trans-Nonachlor	mg/kg	0.0028 U	0.0045 U	0.0039 U	0.0044 U	0.0045 U	0.0044 U	0.0036 U	0.0038 U
Aroclor 1016	mg/kg								
Aroclor 1221	mg/kg								
Aroclor 1232	mg/kg								
Aroclor 1242	mg/kg								
Aroclor 1248	mg/kg								
Aroclor 1254	mg/kg								
Aroclor 1260	mg/kg								
Aroclor 1262	mg/kg								
Aroclor 1268	mg/kg								
Polychlorinated Biphenyls	mg/kg								
Decachlorobiphenyl	mg/kg	0.00000639 J	0.0000625 J	0.0000213 J	0.0000248 J	0.0000217 J	0.0000095 J	0.00000825 J	0.0000613 J
Total DiCB	mg/kg	0.0000678 U	0.000149 U	0.0000827 U	0.000156 U	0.0000615 U	0.0000683 U	0.0000761 U	0.000204 U
Total HpCB	mg/kg	0.00227 J	0.0762 J	0.00855 J	0.00392 J	0.00357 J	0.00525 J	0.00557 J	0.00746 J
Total HxCB	mg/kg	0.00501 J	0.0774 J	0.00909 J	0.00559 J	0.00517 J	0.00621 J	0.00775 J	0.0103 J
Total MoCB	mg/kg	0.00000845 U	0.00000379 U	0.0000277 U	0.0000456 U	0.00000992 U	0.00000978 U	0.0000119 U	0.0000607 J
Total NoCB	mg/kg	0.0000357 J	0.000799 J	0.000173 J	0.0000783 J	0.0000865 J	0.0000921 J	0.0000969 J	0.0000985 J
Total OcCB	mg/kg	0.000449 J	0.0141 J	0.00229 J	0.000876 J	0.000916 J	0.00131 J	0.00125 J	0.00143 J
Total PCB homologues	mg/kg	0.0111 J	0.202 J	0.0238 J	0.0135 J	0.0131 J	0.0157 J	0.0192 J	0.0258 J
Total PeCB	mg/kg	0.00293 J	0.026 J	0.00279 J	0.00226 J	0.00234 J	0.00222 J	0.00327 J	0.0046 J
Total TeCB	mg/kg	0.000442 J	0.00634 J	0.000848 J	0.000751 J	0.00101 J	0.000651 J	0.00123 J	0.00175 J
Total TrCB	mg/kg	0.000119 U	0.00102 J	0.000165 U	0.000312 U	0.000143 U	0.000123 U	0.00015 U	0.000278 U
2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg	0.00000406	0.00026 J	0.0000295	0.0000135	0.000012	0.0000155	0.0000169 *	0.0000187
2,3,3',4,4',5-Hexachlorobiphenyl	mg/kg	0.0000279	0.00122 J	0.000147	0.0000846	0.0000578	0.0000792	0.0000931	0.000108
2,3,3',4,4'-Pentachlorobiphenyl	mg/kg	0.0000294 J	0.00103 *	0.0000686 J	0.0000799 J	0.0000709 J	0.0000777 J	0.0000866 J	0.0000963 J
2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	0.0000129	0.000616 J	0.0000537	0.0000352	0.0000255	0.0000328	0.0000333	0.0000463
2',3,4,4',5-Pentachlorobiphenyl	mg/kg	0.00000385 U	0.0000402 U	0.00000956 U	0.00000951 U	0.00000757 U	0.00000608 U	0.00000591 U	0.000011 U
2,3',4,4',5-Pentachlorobiphenyl	mg/kg	0.000118	0.00394 J	0.000387	0.000254	0.000226	0.000236	0.000286	0.000361
2,3,4,4',5-Pentachlorobiphenyl	mg/kg	0.00000416 U	0.0000548 *	0.00000894 U	0.00000987 U	0.00000718 U	0.0000068 U	0.00000679 U	0.0000111 U
3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	0.00000331 U	0.0000616 U	0.00000982 U	0.00000955 U	0.00000677 U	0.00000566 U	0.0000067 U	0.00000639 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR4	AR6	AR8	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR4-00-SDCH0002-0-091008	AR6-00-SDCH0001-0-090918	AR8-00-SDCH0001-0-090918	AR8-00-SDCH0002-0-090918	AR8-00-SDCH0003-0-090918	AR9-00-SDCH0001-0-090917	AR9-00-SDCH0002-0-090917	AR9-00-SDCH0002-1-090917
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate
	Date	10/8/2009	9/18/2009	9/18/2009	9/18/2009	9/18/2009	9/17/2009	9/17/2009	9/17/2009
Analyte	**Units**								
3,3',4,4',5-Pentachlorobiphenyl	mg/kg	0.00000454 U	0.0000579 U	0.000016 U	0.0000133 U	0.0000119 U	0.00000806 U	0.00000823 U	0.000012 U
3,3',4,4'-Tetrachlorobiphenyl	mg/kg	0.00000268	0.000031 U	0.00000536 U	0.00000977 U	0.0000045 *	0.00000445 U	0.00000468 U	0.00000708
3,4,4',5-Tetrachlorobiphenyl	mg/kg	0.00000214 U	0.0000327 U	0.00000572 U	0.0000106 U	0.00000328 U	0.00000431 U	0.00000418 U	0.0000061 U
Decachlorobiphenyl	mg/kg	0.00000639 J	0.0000625 J	0.0000213 J	0.0000248 J	0.0000217 J	0.0000095 J	0.00000825 J	0.0000613 J
PCB Dioxin-like Congener TEQ (bird)	mg/kg	1.41534E-07	1.82904E-06	2.95252E-07	5.09059E-07	2.41299E-07	2.41774E-07	3.78016E-07	
PCB Dioxin-like Congener TEQ (fish)	mg/kg	1.26935E-09	3.8905E-08	4.0575E-09	3.4099E-09	2.48475E-09	2.7154E-09	3.67323E-09	
PCB Dioxin-like Congener TEQ (mammal)	mg/kg	6.2761E-09	2.1793E-07	2.1665E-08	1.55744E-08	1.26585E-08	1.40674E-08	1.84994E-08	
tPCBs_all	mg/kg	0.00021294	0.0073442	0.0007412	0.0005298	0.0004334	0.00047656	0.000621925	
tPCBs_detects	mg/kg	0.00019494	0.0071208	0.0006858	0.0004672	0.0003967	0.0004412	0.00058018	
m-Dinitrobenzene	mg/kg								
Pentachloronitrobenzene	mg/kg								
Aluminum	mg/kg								
Antimony	mg/kg	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Arsenic	mg/kg	1 U	1.8	1.7	3.6	1.7	1.4	1 U	7.3
Barium	mg/kg								
Beryllium	mg/kg	0.12 J	0.31 J	0.35 J	0.3 J	0.35 J	0.25 J	0.27 J	0.28 J
Cadmium	mg/kg	0.091 J	0.59	0.56	0.53	0.53	0.37 J	0.39 J	0.38 J
Calcium	mg/kg								
Chromium	mg/kg	5.1	11.6	13.4	10.3	11.2	6.9	7.9	7.4
Cobalt	mg/kg								
Copper	mg/kg	5.8	14.4	19	13.8	17.7	10.8	8.5	10.7
Iron	mg/kg								
Lead	mg/kg	5.6	11.6	15.6	11	16.6	6.9	6.6	9.4
Magnesium	mg/kg								
Manganese	mg/kg								
Nickel	mg/kg	4.1	9.9	9.5	8.7	8.7	5.2	5.5	5.7
Potassium	mg/kg								
Selenium	mg/kg	3.5 U	0.58 J	0.54 J	0.63 J	0.65 J	0.71 J	0.53 J	3.5 U
Silver	mg/kg	0.024 U	0.051 U	0.038 U	0.052 U	0.042 U	0.043 U	0.035 U	0.039 U
Sodium	mg/kg								
Strontium	mg/kg	2.8 J	5.5 J	5.8 J	5.4 J	5.7 J	4.3 J	4 J	4 J
Thallium	mg/kg								
Vanadium	mg/kg	8.8 J	17	16.3	14.9	15.9	10.7	11.7	12.2
Zinc	mg/kg	30.3	57.4	57.3	57.1	55.2	37.4	50.2	42.7
Sulfide	mg/kg	3.49	2.57	1.97	3.5	2.83	2.1	1.34	1.64
Total organic carbon (TOC)	%	0.761	1.66	1.64	1.75	2.09	1.08	1.75	3.9

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9
	Sample ID	AR9-00-SDCH0003-0-090917	AR9-00-SDCH0004-0-090917
	Type	Primary	Primary
	Date	9/17/2009	9/17/2009
Analyte	**Units**		
1,1'-Biphenyl	mg/kg	0.2 U	0.087 U
1,2,4-Trichlorobenzene	mg/kg		
1,2-Dichlorobenzene	mg/kg		
1,3-Dichlorobenzene	mg/kg		
1,4-Dichlorobenzene	mg/kg		
2,2'-Oxybis(1-Chloropropane)	mg/kg		
Acetophenone	mg/kg	0.49 U	0.22 U
Azobenzene	mg/kg		
Benzaldehyde	mg/kg	0.2 U	0.087 U
Benzyl Alcohol	mg/kg		
Bis(2-Chloroethyl)Ether	mg/kg	0.098 U	0.044 U
Hexachlorobenzene	mg/kg	0.0049 U	0.0044 U
Hexachloroethane	mg/kg	0.098 U	0.044 U
Hexachloropropene	mg/kg		
Pyridine	mg/kg		
1,2,4,5-Tetrachlorobenzene	mg/kg	0.098 U	0.044 U
1,4-Naphthoquinone	mg/kg		
2,3,4,6-Tetrachlorophenol	mg/kg	0.49 U	0.22 U
2,4,5-Trichlorophenol	mg/kg	0.098 U	0.044 U
2,4,6-Trichlorophenol	mg/kg	0.098 U	0.044 U
2,4-Dichlorophenol	mg/kg	0.098 U	0.044 U
2,4-Dimethylphenol	mg/kg		
2,4-Dinitrophenol	mg/kg	2 U	0.87 U
2,4-Dinitrotoluene	mg/kg	0.098 U	0.044 U
2,6-Dichlorophenol	mg/kg		
2,6-Dinitrotoluene	mg/kg	0.098 U	0.044 U
2-Chlorophenol	mg/kg	0.098 U	0.044 U
2-Methylphenol	mg/kg	0.098 U	0.044 U
2-Nitroaniline	mg/kg	0.2 U	0.087 U
2-Nitrophenol	mg/kg	0.098 U	0.044 U
3 & 4 Methylphenol	mg/kg		
3,3'-Dichlorobenzidine	mg/kg	0.98 U	0.44 U
3-Methylchloranthrene	mg/kg		
3-Nitroaniline	mg/kg	0.2 U	0.087 U
4,6-Dinitro-2-Methylphenol	mg/kg	0.98 U	0.44 U
4-Bromophenyl-Phenylether	mg/kg	0.098 U	0.044 U
4-Chloro-3-Methylphenol	mg/kg	0.098 U	0.044 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9
	Sample ID	AR9-00-SDCH0003-0-090917	AR9-00-SDCH0004-0-090917
	Type	Primary	Primary
	Date	9/17/2009	9/17/2009
Analyte	**Units**		
4-Chloroaniline	mg/kg	0.098 U	0.044 U
4-Chlorophenyl-Phenylether	mg/kg	0.098 U	0.044 U
4-Methylphenol	mg/kg	0.098 U	0.044 U
4-Nitroaniline	mg/kg	0.2 U	0.087 U
4-Nitrophenol	mg/kg	0.98 U	0.44 U
4-Nitroquinoline-n-Oxide	mg/kg		
Aniline	mg/kg		
Aramite	mg/kg		
Atrazine	mg/kg	0.098 U	0.044 U
Benzidine	mg/kg		
Benzoic Acid	mg/kg		
Bis(2-Chloroethoxy)Methane	mg/kg	0.098 U	0.044 U
Bis(2-chloroisopropyl) ether	mg/kg	0.98 U	0.44 U
Bis(2-Ethylhexyl)Phthalate	mg/kg	0.098 U	0.044 U
Butylbenzylphthalate	mg/kg	0.098 U	0.044 U
Caprolactam	mg/kg	0.49 U	0.22 U
Chlorobenzilate	mg/kg		
Dibenzofuran	mg/kg	0.07 JD	0.019 JD
Diethylphthalate	mg/kg	0.098 U	0.044 U
Dimethylphthalate	mg/kg	0.098 U	0.044 U
Di-n-butyl phthalate	mg/kg	0.2 U	0.087 U
Di-n-octyl phthalate	mg/kg	0.098 U	0.044 U
Ethyl methanesulfonate	mg/kg		
Hexachlorobutadiene	mg/kg	0.098 U	0.044 U
Hexachlorocyclopentadiene	mg/kg	0.49 U	0.22 U
Isophorone	mg/kg	0.098 U	0.044 U
Isosafrole	mg/kg		
Methyl Methanesulfonate	mg/kg		
Nitrobenzene	mg/kg	0.098 U	0.044 U
N-Nitrosodimethylamine	mg/kg		
N-Nitroso-Di-N-Propylamine	mg/kg	0.098 U	0.044 U
N-Nitrosodiphenylamine	mg/kg	0.098 U	0.044 U
Pentachlorobenzene	mg/kg		
Pentachlorophenol	mg/kg	0.98 U	0.44 U
Phenacetin	mg/kg		
Phenol	mg/kg	0.3 U	0.13 U
2-Chloronaphthalene	mg/kg	0.098 U	0.044 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9
	Sample ID	AR9-00-SDCH0003-0-090917	AR9-00-SDCH0004-0-090917
	Type	Primary	Primary
	Date	9/17/2009	9/17/2009
Analyte	**Units**		
2-Methylnaphthalene	mg/kg	0.033 JD	0.044 U
Acenaphthene	mg/kg	0.14 D	0.056 D
Acenaphthylene	mg/kg	0.055 JD	0.02 JD
Anthracene	mg/kg	0.43 D	0.25 D
Benzo(a)anthracene	mg/kg	2.3 D	1.2 D
Benzo(a)pyrene	mg/kg	2.1 DJ	1 DJ
Benzo(b)fluoranthene	mg/kg	3 D	1.4 D
Benzo(g,h,i)perylene	mg/kg	1.2 D	0.52 D
Benzo(k)fluoranthene	mg/kg	1 D	0.53 D
Carbazole	mg/kg	0.14 D	0.059 D
Chrysene	mg/kg	2.4 D	1.2 D
Dibenz(a,h)anthracene	mg/kg	0.35 D	0.055 D
Fluoranthene	mg/kg	3.6 D	1.8 D
Fluorene	mg/kg	0.15 DJ	0.058 DJ
Indeno(1,2,3-cd)pyrene	mg/kg	1.6 DJ	0.77 DJ
Naphthalene	mg/kg	0.05 JD	0.044 U
Naphthalene, 1-Methyl-	mg/kg		
Phenanthrene	mg/kg	1.7 D	0.72 D
Pyrene	mg/kg	3.4 D	1.6 D
Safrole	mg/kg		
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	mg/kg	0.0000429 J	0.0000878
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	mg/kg	0.000055	0.00118
1,2,3,4,6,7,8-Heptachlorodibenzofuran	mg/kg	0.000069 J	0.0000267
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	mg/kg	0.00000915	0.000089
1,2,3,4,7,8,9-Heptachlorodibenzofuran	mg/kg	0.0000257 J	0.00000746
1,2,3,4,7,8-Hexachlorodibenzofuran	mg/kg	0.000362	0.0000381
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	mg/kg	0.000000566 U	0.00000052 U
1,2,3,6,7,8-Hexachlorodibenzofuran	mg/kg	0.0000796 J	0.00000936
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	mg/kg	0.000000894 J	0.00000188 *
1,2,3,7,8,9-Hexachlorodibenzofuran	mg/kg	0.0000866 J	0.00000877 J
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	mg/kg	0.000000579 U	0.00000055 U
1,2,3,7,8-Pentachlorodibenzofuran	mg/kg	0.000434	0.0000308
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	mg/kg	0.000000277 U	0.000000353 J
2,3,4,6,7,8-Hexachlorodibenzofuran	mg/kg	0.0000426	0.00000639 *
2,3,4,7,8-Pentachlorodibenzofuran	mg/kg	0.000458	0.0000276
2,3,7,8-TCDD TEQ (bird)	mg/kg	0.00137218	0.000110039
2,3,7,8-TCDD TEQ (fish)	mg/kg	0.000350283	2.70537E-05

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9
	Sample ID	AR9-00-SDCH0003-0-090917	AR9-00-SDCH0004-0-090917
	Type	Primary	Primary
	Date	9/17/2009	9/17/2009
Analyte	**Units**		
2,3,7,8-TCDD TEQ (mammal)	mg/kg	0.000290611	2.55529E-05
2,3,7,8-Tetrachlorodibenzofuran	mg/kg	0.000812	0.0000714
2,3,7,8-Tetrachlorodibenzo-p-dioxin	mg/kg	0.000000362	0.000000687 J
Dioxin/Furan - Toxic Equivalent	mg/kg		
Heptachlorodibenzofuran (total)	mg/kg	0.000125 J	0.0000921 J
Heptachlorodibenzo-p-dioxin (total)	mg/kg	0.0000197 J	0.000707 J
Hexachlorodibenzofuran (total)	mg/kg	0.000679 J	0.0000792 J
Hexachlorodibenzo-p-dioxin (total)	mg/kg	0.00000477 J	0.0000262 J
Pentachlorodibenzofuran (total)	mg/kg	0.00192 J	0.000133 J
Pentachlorodibenzo-p-dioxin (total)	mg/kg	0.000000277 U	0.000000353 J
Tetrachlorodibenzo(p)dioxin (total)	mg/kg	0.000000364 U	0.000000687 U
Tetrachlorodibenzofuran (total)	mg/kg	0.00259 J	0.000248 J
4,4'-DDD	mg/kg	0.0049 U	0.0044 U
4,4'-DDe	mg/kg	0.0049 U	0.0044 U
4,4'-DDT	mg/kg	0.0049 U	0.0044 U
Aldrin	mg/kg	0.0049 U	0.0044 U
Alpha-Bhc	mg/kg	0.0049 U	0.0044 U
alpha-Chlordane	mg/kg	0.0049 U	0.0044 U
beta-BHC	mg/kg	0.0049 U	0.0044 U
beta-Chlordane	mg/kg	0.0049 U	0.0044 U
Chlordane	mg/kg	0.098 U	0.087 U
Chlorpyrifos	mg/kg	0.0049 U	0.0044 U
cis-Nonachlor	mg/kg	0.0049 U	0.0044 U
Delta-Bhc	mg/kg	0.0049 U	0.0044 U
Dieldrin	mg/kg	0.0049 U	0.0044 U
Dinitrobutyl Phenol	mg/kg		
Endosulfan I	mg/kg	0.0049 U	0.0044 U
Endosulfan II	mg/kg	0.0049 U	0.0044 U
Endosulfan Sulfate	mg/kg	0.0049 U	0.0044 U
Endrin aldehyde	mg/kg	0.0049 U	0.0044 U
Endrin Ketone	mg/kg	0.0049 U	0.0044 U
Endrin	mg/kg	0.0049 U	0.0044 U
gamma-BHC (Lindane)	mg/kg	0.0012 J	0.00057 J
Heptachlor epoxide	mg/kg	0.0049 U	0.0044 U
Heptachlor	mg/kg	0.0049 U	0.0044 U
Isodrin	mg/kg		
Kepone	mg/kg		

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9
	Sample ID	AR9-00-SDCH0003-0-090917	AR9-00-SDCH0004-0-090917
	Type	Primary	Primary
	Date	9/17/2009	9/17/2009
Analyte	**Units**		
Methoxychlor	mg/kg	0.0049 U	0.0044 U
Mirex	mg/kg	0.0049 U	0.0044 U
o,p'-DDD	mg/kg	0.0049 U	0.0044 U
O,P'-Dde	mg/kg	0.0049 U	0.0044 U
o,p'-DDT	mg/kg	0.0027 J	0.0031 J
Oxychlordane	mg/kg	0.0049 U	0.0044 U
Toxaphene	mg/kg	0.27 U	0.22 U
trans-Nonachlor	mg/kg	0.0049 U	0.0044 U
Aroclor 1016	mg/kg		
Aroclor 1221	mg/kg		
Aroclor 1232	mg/kg		
Aroclor 1242	mg/kg		
Aroclor 1248	mg/kg		
Aroclor 1254	mg/kg		
Aroclor 1260	mg/kg		
Aroclor 1262	mg/kg		
Aroclor 1268	mg/kg		
Polychlorinated Biphenyls	mg/kg		
Decachlorobiphenyl	mg/kg	0.0000439 J	0.0000167 J
Total DiCB	mg/kg	0.000387 J	0.000111 U
Total HpCB	mg/kg	0.0226 J	0.00523 J
Total HxCB	mg/kg	0.127 J	0.0104 J
Total MoCB	mg/kg	0.000102 J	0.0000276 U
Total NoCB	mg/kg	0.000134 J	0.0000788 J
Total OcCB	mg/kg	0.00203 J	0.00118 J
Total PCB homologues	mg/kg	0.31 J	0.024 J
Total PeCB	mg/kg	0.134 J	0.00519 J
Total TeCB	mg/kg	0.023 J	0.00189 J
Total TrCB	mg/kg	0.000719 J	0.000288 U
2,3,3',4,4',5,5'-Heptachlorobiphenyl	mg/kg	0.000188 J	0.0000197
2,3,3',4,4',5-Hexachlorobiphenyl	mg/kg	0.00538 J	0.000197
2,3,3',4,4'-Pentachlorobiphenyl	mg/kg	0.00754 J	0.000219 J
2,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	0.00176	0.0000705
2',3,4,4',5-Pentachlorobiphenyl	mg/kg	0.000382 *	0.00000972 U
2,3',4,4',5-Pentachlorobiphenyl	mg/kg	0.0232 J	0.000695
2,3,4,4',5-Pentachlorobiphenyl	mg/kg	0.000563 J	0.0000108 U
3,3',4,4',5,5'-Hexachlorobiphenyl	mg/kg	0.000018 U	0.00000698 U

TABLE G-3
ANALYTICAL RESULTS - SEDIMENT - 2006 AND 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9
	Sample ID	AR9-00-SDCH0003-0-090917	AR9-00-SDCH0004-0-090917
	Type	Primary	Primary
	Date	9/17/2009	9/17/2009
Analyte	**Units**		
3,3',4,4',5-Pentachlorobiphenyl	mg/kg	0.000036 U	0.0000126 U
3,3',4,4'-Tetrachlorobiphenyl	mg/kg	0.000036 *	0.00000688 *
3,4,4',5-Tetrachlorobiphenyl	mg/kg	0.0000113 U	0.00000502 U
Decachlorobiphenyl	mg/kg	0.0000439 J	0.0000167 J
PCB Dioxin-like Congener TEQ (bird)	mg/kg	3.4036E-06	3.94629E-07
PCB Dioxin-like Congener TEQ (fish)	mg/kg	1.98665E-07	6.7966E-09
PCB Dioxin-like Congener TEQ (mammal)	mg/kg	1.17399E-06	3.73396E-08
tPCBs_all	mg/kg	0.0391143	0.0012532
tPCBs_detects	mg/kg	0.039049	0.00120808
m-Dinitrobenzene	mg/kg		
Pentachloronitrobenzene	mg/kg		
Aluminum	mg/kg		
Antimony	mg/kg	1 U	1 U
Arsenic	mg/kg	1.6	1.3
Barium	mg/kg		
Beryllium	mg/kg	0.35 J	0.27 J
Cadmium	mg/kg	0.56	0.48 J
Calcium	mg/kg		
Chromium	mg/kg	10.7	9.4
Cobalt	mg/kg		
Copper	mg/kg	28.9	13.5
Iron	mg/kg		
Lead	mg/kg	14.7	13.7
Magnesium	mg/kg		
Manganese	mg/kg		
Nickel	mg/kg	8.1	7.1
Potassium	mg/kg		
Selenium	mg/kg	1.1 J	0.74 J
Silver	mg/kg	0.053 U	0.054 U
Sodium	mg/kg		
Strontium	mg/kg	7.1 J	8 J
Thallium	mg/kg		
Vanadium	mg/kg	15.5	13.3
Zinc	mg/kg	53.6	46
Sulfide	mg/kg	2.24	3.72
Total organic carbon (TOC)	%	3.83	1.88

TABLE G-4
ANALYTICAL RESULTS - SEDIMENT - 2006, 2009, AND 2010 - MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Reach	Sample ID	Type	Date	Mercury (mg/kg)	Mercury, divalent (mg/kg)	Methylmercury (mg/kg)	Residue, total (%)
AR2	BG01-SD-20060919	Primary	9/19/2006	0.024 U			
	BG02-SD-20060919	Primary	9/19/2006	0.024 U			
	BG03-SD-20060919	Primary	9/19/2006	0.025 U			
	DUP02-SD-20060919	Duplicate	9/19/2006				
	AR2-WB-SDCH0001-0-090916	Primary	9/16/2009	0.1 U	0.00045 U	0.0001 J	56.2
	AR2-WB-SDCH0002-0-090916	Primary	9/16/2009	0.1 U	0.00017 J	0.00021 J	39.8
	AR2-WB-SDCH0003-0-090916	Primary	9/16/2009	0.1 U	0.00033 J	0.0009 U	45.5
	AR2-4 FD1	Primary	8/23/2010	2.96E-02			
	AR2-4 FD2	Primary	8/23/2010	1.09E-02			
	AR2-4 FD3	Primary	8/23/2010	2.05E-02			
	AR2-4 N	Primary	8/23/2010	2.82E-02		4.75E-04	
	AR2-5 FD1	Primary	8/23/2010	2.33E-02			
	AR2-5 FD2	Primary	8/23/2010	3.11E-02			
	AR2-5 FD3	Primary	8/23/2010	3.79E-02			
	AR2-5 N	Primary	8/23/2010	0.02076294		2.32E-04	
AR3	BH01-SD-20060918	Primary	9/19/2006	0.15			
	BH02-SD-20060918	Primary	9/19/2006	0.22			
AR4	SH1-0-SD-20060918	Primary	9/19/2006	0.048			
	SH2-0-SD-20060918	Primary	9/19/2006	0.16			
	AR4-00-SDCH0001-0-091008	Primary	10/8/2009	0.062 J			91.8
	AR4-00-SDCH0002-0-091008	Primary	10/8/2009	0.022 J			89.6
	AR4-1 FD1	Primary	8/27/2010	7.30E-02			
	AR4-1 FD2	Primary	8/27/2010	0.10381091			
	AR4-1 FD3	Primary	8/27/2010	0.113525673			
	AR4-1 N	Primary	8/27/2010	0.295921228		2.38E-04	
	AR4-2 FD1	Primary	8/27/2010	4.82E-02			
	AR4-2 FD2	Primary	8/27/2010	6.56E-02			
	AR4-2 FD3	Primary	8/27/2010	3.71E-02			
	AR4-2 N	Primary	8/27/2010	8.40E-02		7.39E-04	
AR5	AR5-1 FD1	Primary	8/27/2010	0.156684993			
	AR5-1 FD2	Primary	8/27/2010	0.499290979			
	AR5-1 FD3	Primary	8/27/2010	0.123633852			
	AR5-1 N	Primary	8/27/2010	0.116498839		1.26E-03	
	AR5-2 FD1	Primary	8/27/2010	0.223483269			
	AR5-2 FD2	Primary	8/27/2010	0.129693459			
	AR5-2 FD3	Primary	8/27/2010	0.662100045			
	AR5-2 N	Primary	8/27/2010	0.261345301		1.39E-03	
AR6	DUP01-SD-20060919	Duplicate	9/19/2006	0.11			
	MD01-SD-20060919	Primary	9/19/2006	0.11			
	AR6-00-SDCH0001-0-090918	Primary	9/18/2009	0.26	0.00045 U	0.00028	56.3
	AR6-2 FD1	Primary	8/26/2010	5.77E-02			
	AR6-2 FD2	Primary	8/26/2010	9.75E-02			
	AR6-2 FD3	Primary	8/26/2010	0.184130027			
	AR6-2 N	Primary	8/26/2010	6.53E-02		6.54E-04	
	AR6-3 FD1	Primary	8/26/2010	0.114424837			
	AR6-3 FD2	Primary	8/26/2010	0.237092659			
	AR6-3 FD3	Primary	8/26/2010	8.65E-02			
	AR6-3 N	Primary	8/26/2010	0.332780477		1.70E-03	
AR7	RHD01-SD-20060919	Primary	9/19/2006	0.11			
	AR7-1 FD1	Primary	8/26/2010	0.229489709			
	AR7-1 FD2	Primary	8/26/2010	0.359431184			
	AR7-1 FD3	Primary	8/26/2010	0.208944052			
	AR7-1 N	Primary	8/26/2010	0.13029937		7.84E-04	
	AR7-2 FD1	Primary	8/26/2010	0.112957255			
	AR7-2 FD2	Primary	8/26/2010	0.090391834			
	AR7-2 FD3	Primary	8/26/2010	0.137139153			
	AR7-2 N	Primary	8/26/2010	0.110235674		1.29E-03	
AR8	DPWD01-SD-20060919	Primary	9/19/2006	0.1			
	DPWD02-SD-20060919	Primary	9/19/2006	0.17			
	AR8-00-SDCH0001-0-090918	Primary	9/18/2009	0.1 U	0.00045 U	0.00053	65.3
	AR8-00-SDCH0002-0-090918	Primary	9/18/2009	0.19	0.00045 U	0.00103	57.9
	AR8-00-SDCH0003-0-090918	Primary	9/18/2009	0.11 U	0.00045 U	0.001	56.4
	AR8-4 FD1	Primary	8/24/2010	0.12013018			
	AR8-4 FD2	Primary	8/24/2010	0.123820923			
	AR8-4 FD3	Primary	8/24/2010	0.108166564			
	AR8-4 N	Primary	8/24/2010	0.122654307		9.57E-04	
	AR8-5 FD1	Primary	8/24/2010	0.130109872			
	AR8-5 FD2	Primary	8/24/2010	0.158837105			
	AR8-5 FD3	Primary	8/24/2010	8.15E-02			
	AR8-5 N	Primary	8/24/2010	0.321010751		6.52E-04	

TABLE G-4
ANALYTICAL RESULTS - SEDIMENT - 2006, 2009, AND 2010 - MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Reach	Sample ID	Type	Date	Mercury (mg/kg)	Mercury, divalent (mg/kg)	Methylmercury (mg/kg)	Residue, total (%)
AR9	AR9-00-SDCH0001-0-090917	Primary	9/17/2009	0.1 U	0.00045 U	0.00092	57.1
	AR9-00-SDCH0002-0-090917	Primary	9/17/2009	7.9	0.00012 J	0.00022	69.1
	AR9-00-SDCH0002-1-090917	Duplicate	9/17/2009	0.1 U	0.00045 U	0.00071	66
	AR9-00-SDCH0003-0-090917	Primary	9/17/2009	0.1 U	0.00045 U	0.001	50.9
	AR9-00-SDCH0004-0-090917	Primary	9/17/2009	0.1 U	0.00045 U	0.00204	57.9
	AR9-5 FD1	Primary	8/24/2010	0.124000817			
	AR9-5 FD2	Primary	8/24/2010	2.34E-02			
	AR9-5 FD3	Primary	8/24/2010	4.61E-02			
	AR9-5 N	Primary	8/24/2010	3.62E-02		3.39E-04	
	AR9-6 FD1	Primary	8/25/2010	0.175237102			
	AR9-6 FD2	Primary	8/25/2010	8.88E-02			
	AR9-6 FD3	Primary	8/25/2010	0.111304626			
	AR9-6 N	Primary	8/25/2010	8.81E-02		1.23E-03	
	AR9-7 FD1	Primary	8/25/2010	0.185584663			
	AR9-7 FD2	Primary	8/25/2010	3.49E-02			
	AR9-7 FD3	Primary	8/25/2010	5.23E-02			
	AR9-7 N	Primary	8/25/2010	0.374607154		1.61E-03	

TABLE G5
ANALYTICAL RESULTS - LARVAE - 2009
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Reach	Sample ID	Type	Date	Species	Total Mercury (µg/kg WW)
AR2	AR2-IT-01A	Primary	9/16/2009	Burrow Mayfly Larve	10.6442
	AR2-IT-01C	Primary	9/16/2009	Burrow Mayfly Larve	10.2085
AR3	AR3-ET-01A	Primary	9/15/2009	Water Pennies	1877.197
	AR3-ET-01B	Primary	9/15/2009	Stonefly Larvae	124.9706
	AR3-ET-01C	Primary	9/15/2009	Mayfly Larvae	103.6185
	AR3-ET-02A	Primary	9/15/2009	Mayfly Larvae	32.7816
	AR3-ET-02B	Primary	9/15/2009	Dragonfly Larvae	30.0484
	AR3-ET-03A	Primary	9/15/2009	Mayfly Larvae	40.5052
	AR3-ET-03B	Primary	9/15/2009	Stonefly Larvae	76.6059
	AR3-ET-03C	Primary	9/15/2009	Water Pennies	38.4102

TABLE G-6
ANALYTICAL RESULTS - ROCK BASKET COMPOSITES - 2009
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Reach	Sample ID	Type	Date	Mercury (µg/kg FW)
AR2	AR2-RB- DUP	Duplicate	9/22/2009	45.885
	AR2-RB	Primary	9/22/2009	45.2603
AR3	AR3-RB	Primary	9/22/2009	235.352
AR4	AR4-RB	Primary	9/22/2009	121.5727
AR8	AR8-RB	Primary	9/21/2009	57.4357
AR9	AR9-RB	Primary	9/21/2009	71.378

TABLE G-7
ANALYTICAL RESULTS - OLIGOCHAETES - 2009 - ORGANICS
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR5	AR6	AR8	AR9
	Sample ID	AR5-IT-02-100827	AR6-IT-03-100826	AR8-IT-04-100824	AR9-IT-07-100825
	Type	Primary	Primary	Primary	Primary
	Date	8/27/2010	8/26/2010	8/24/2010	8/25/2010
Analyte	**Units**				
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg WW	0.0012 U	0.00224 J	0.00152 U	0.0259
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg WW	0.00633 J	0.0159	0.0111 J	0.00352 J
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg WW	0.00109 J	0.00183 J	0.00151 J	0.0397
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg WW	0.00144 J	0.00355 J	0.00237 J	0.000637
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg WW	0.000369 J	0.000277 J	0.000194	0.0102
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg WW	0.00276 J	0.00424 J	0.00266 J	0.129
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.00024 J	0.000457 J	0.000423 J	0.000198 U
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000778 J	0.000929 J	0.000741 J	0.03
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000123 U	0.000264 U	0.000135 U	0.000189 U
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg WW	0.000832 U	0.00103	0.000499 U	0.0327
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000269 J	0.000219 J	0.000242 J	0.000199 U
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg WW	0.00373 J	0.00567	0.00377 J	0.128
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg WW	0.000215	0.000188 U	0.000111 U	0.00016 U
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000477 U	0.000575 J	0.000386 U	0.0119
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg WW	0.0033 J	0.00534 J	0.00308 J	0.127
2,3,7,8-TCDD TEQ (bird)	µg/kg WW	0.014907383	0.023823584	0.011369422	0.407970379
2,3,7,8-TCDD TEQ (mammal)	µg/kg WW	0.003092749	0.004627112	0.002469526	0.087831896
2,3,7,8-Tetrachlorodibenzofuran	µg/kg WW	0.0103	0.0168	0.00725	0.247
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg WW	0.000179	0.00018 J	0.0000568 U	0.000118 U
Heptachlorodibenzofuran (total)	µg/kg WW	0.00251 J	0.0044 J	0.00313	0.0766
Heptachlorodibenzo-p-dioxin (total)	µg/kg WW	0.00292 J	0.0067	0.00532 J	0.000637 U
Hexachlorodibenzofuran (total)	µg/kg WW	0.00611	0.00886	0.0058	0.245
Hexachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000864	0.00195	0.00159	0.000199 U
Pentachlorodibenzofuran (total)	µg/kg WW	0.0153	0.024	0.0136	0.532
Pentachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000688 U	0.000239 U	0.000141 U	0.000204 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg WW	0.000753	0.000464	0.000583	0.000333
Tetrachlorodibenzofuran (total)	µg/kg WW	0.034	0.0447	0.0203	0.72
Decachlorobiphenyl	µg/kg WW	0.0209 J	0.0489 J	0.0286 J	0.0366 J
Total DiCB	µg/kg WW	0.222 UJ	0.172 UJ	0.181 UJ	0.15 UJ
Total HpCB	µg/kg WW	6.44 J	90.3 J	21.1 J	4.07 J
Total HxCB	µg/kg WW	10.9 J	207 J	32 J	6.04 J
Total MoCB	µg/kg WW	0.0453 UJ	0.029 UJ	0.0335 UJ	0.0241 UJ
Total NoCB	µg/kg WW	0.0897 J	0.731 J	0.265 J	0.0966 J
Total OcCB	µg/kg WW	1.14 J	16.5 J	4.29 J	0.807 J
Total PCB homologues	µg/kg WW	26.1 J	362 J	65.9 J	13.2 J
Total PeCB	µg/kg WW	5.52 J	41.9 J	7.07 J	1.61 J
Total TeCB	µg/kg WW	2.02 J	5.3 J	1.17 J	0.506 J
Total TrCB	µg/kg WW	0.356 UJ	0.527 UJ	0.287 UJ	0.27 UJ
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	0.0182	0.209	0.0579	0.0134 EMPC
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg WW	0.0954	0.834	0.18	0.0424
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg WW	0.119	0.421	0.15	0.0343
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.0307	0.272	0.055	0.0199
2',3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00537 EMPC	0.0227 U	0.0064 EMPC	0.00609 U
2,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.395	1.75	0.47	0.114
2,3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00922	0.0288 UJ	0.00854 EMPC	0.0297
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.00258 EMPC	0.0298 EMPC	0.0129 U	0.0076 U
3,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00331 U	0.0314 U	0.00739 U	0.00842 U
3,3',4,4'-Tetrachlorobiphenyl	µg/kg WW	0.00753	0.015	0.00903	0.00323 U
3,4,4',5-Tetrachlorobiphenyl	µg/kg WW	0.002 U	0.00782 U	0.00501 U	0.0036 U
Decachlorobiphenyl	µg/kg WW	0.0209 J	0.0489 J	0.0286 J	0.0366 J
PCB Dioxin-like Congener TEQ (bird)	µg/kg WW	0.000405935	0.000930717	0.000504147	0.000181274
PCB Dioxin-like Congener TEQ (mammal)	µg/kg WW	9.83397E-05	0.001001625	0.000415738	0.000236117
tPCBs_all	µg/kg WW	0.68831	3.62152	0.96217	0.28264
tPCBs_detects	µg/kg WW	0.683	3.5308	0.93687	0.2537

TABLE G-8
ANALYTICAL RESULTS - OLIGOCHAETES - 2009 AND 2010 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Reach	Sample ID	Type	Date	Total Mercury (µg/kg WW)
AR2	AR2-IT-01B	Primary	9/16/2009	22.2662
	AR2-IT-01B-DUP	Duplicate	9/16/2009	20.8649
	AR2-IT-02A	Primary	9/16/2009	19.535
	AR2-IT-03	Primary	9/16/2009	18.2749
	AR2-IT-04-100823	Primary	8/23/2010	16.8201
	AR2-IT-05-100823	Primary	8/23/2010	21.613
	AR2-IT-05-DUP-100823	Duplicate	8/23/2010	19.94
AR4	AR4-IT-01-100827	Primary	8/27/2010	22.1498
AR5	AR5-IT-01-100827	Primary	8/27/2010	39.3736
	AR5-IT-02-100827	Primary	8/27/2010	44.2675
AR6	AR6-IT-01	Primary	9/18/2009	34.5264
	AR6-IT-03-100826	Primary	8/26/2010	45.1992
AR7	AR7-IT-01-100826	Primary	8/26/2010	25.5057
	AR7-IT-02-100826	Primary	8/26/2010	29.9454
AR8	AR8-IT-01	Primary	9/18/2009	36.3108
	AR8-IT-02	Primary	9/18/2009	23.5626
	AR8-IT-03	Primary	9/18/2009	35.0352
	AR8-IT-04-100824	Primary	8/24/2010	30.7631
	AR8-IT-05-100824	Primary	8/24/2010	31.2684
AR9	AR9-IT-01	Primary	9/17/2009	30.7139
	AR9-IT-03	Primary	9/17/2009	41.1677
	AR9-IT-04	Primary	9/17/2009	47.0796
	AR9-IT-05-100824	Primary	8/24/2010	17.4051
	AR9-IT-06-100825	Primary	8/25/2010	21.374
	AR9-IT-07-100825	Primary	8/25/2010	200.927

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR7
	Sample ID	AR2-WB-CC00WB01-0-090824	AR2-WB-CC00WB02-0-090824	AR3-00-CC00WB01-0-090826	AR3-00-CC00WB02-0-090827	AR4-00-CC00WB01-0-090826	AR4-00-CC00WB02-0-090827	AR7-00-CC00WB01-0-090828	AR8-00-CC00WB01-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/27/2009	8/26/2009	8/27/2009	8/28/2009	8/26/2009
Analyte	**Units**								
1,1'-Biphenyl	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Acetophenone	µg/kg WW	120 U	71 U	20 U	19 U	32 U	43 U	20 U	23 U
Benzaldehyde	µg/kg WW	1000 U	930 U	960 U	940 U	950 U	370 J	1600 JD	940 U
Bis(2-Chloroethyl)Ether	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Hexachlorobenzene	µg/kg WW	0.98 U	0.97 U	6.7	1.9	0.99 U	0.99 U	2 U	0.99 U
Hexachloroethane	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
1,2,4,5-Tetrachlorobenzene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
2,3,4,6-Tetrachlorophenol	µg/kg WW	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
2,4,5-Trichlorophenol	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
2,4,6-Trichlorophenol	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
2,4-Dichlorophenol	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
2,4-Dimethylphenol	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
2,4-Dinitrophenol	µg/kg WW	250 U	240 U	240 U	240 U	240 U	250 U	250 U	240 U
2,4-Dinitrotoluene	µg/kg WW	40 U	38 U	39 U	38 U	38 U	40 U	40 U	38 U
2,6-Dinitrotoluene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
2-Chlorophenol	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
2-Methylphenol	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	5.1 J
2-Nitroaniline	µg/kg WW	100 U	93 U	96 U	94 U	95 U	100 U	98 U	94 U
2-Nitrophenol	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
3,3'-Dichlorobenzidine	µg/kg WW	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	5000 U	1000 U
3-Nitroaniline	µg/kg WW	200 U	190 U	200 U	190 U	190 U	200 U	200 U	190 U
4,6-Dinitro-2-Methylphenol	µg/kg WW	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
4-Bromophenyl-Phenylether	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
4-Chloro-3-Methylphenol	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
4-Chloroaniline	µg/kg WW	400 U	400 U	400 U	400 U	400 U	400 U	400 U	400 U
4-Chlorophenyl-Phenylether	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
4-Methylphenol	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
4-Nitroaniline	µg/kg WW	200 U	190 U	200 U	190 U	190 U	200 U	200 U	190 U
4-Nitrophenol	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Atrazine	µg/kg WW	390 U	370 U	380 U	370 U	370 U	390 U	400 U	370 U
Bis(2-Chloroethoxy)Methane	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Bis(2-chloroisopropyl) ether	µg/kg WW	100 U	93 U	96 U	69 U	76 U	100 U	490 U	440
Bis(2-Ethylhexyl)Phthalate	µg/kg WW	20 U	19 U	20 U	19 J	19 J	20 U	98 U	19 U
Butylbenzylphthalate	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Caprolactam	µg/kg WW	100 U	93 U	96 U	94 U	95 U	100 U	98 U	94 U
Dibenzofuran	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	10 J	19 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR7
	Sample ID	AR2-WB-CC00WB01-0-090824	AR2-WB-CC00WB02-0-090824	AR3-00-CC00WB01-0-090826	AR3-00-CC00WB02-0-090827	AR4-00-CC00WB01-0-090826	AR4-00-CC00WB02-0-090827	AR7-00-CC00WB01-0-090828	AR8-00-CC00WB01-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/27/2009	8/26/2009	8/27/2009	8/28/2009	8/26/2009
Analyte	**Units**								
Diethylphthalate	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Dimethylphthalate	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Di-n-butyl phthalate	µg/kg WW	100 U	100 U	100 U	100 U	100 U	190 U	150 U	100 U
Di-n-octyl phthalate	µg/kg WW	20 U	19 J	20 U	50	19 U	20 U	20 U	19 U
Hexachlorobutadiene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Hexachlorocyclopentadiene	µg/kg WW	500 U	470 U	480 U	470 U	480 U	500 U	490 U	470 U
Isophorone	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Nitrobenzene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
N-Nitroso-Di-N-Propylamine	µg/kg WW	22 U	22 U	22 U	22 U	22 U	22 U	22 U	22 U
N-Nitrosodiphenylamine	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Pentachlorophenol	µg/kg WW	50 U	47 U	48 U	47 U	48 U	50 U	49 U	47 U
Phenol	µg/kg WW	53	47 U	48 U	47 U	48 U	50 U	54	47 U
2-Chloronaphthalene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
2-Methylnaphthalene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	20 U	19 U
Acenaphthene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	19 J	19 U
Acenaphthylene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	35	19 U
Anthracene	µg/kg WW	20 U	19 U	20 U	10 J	19 U	21	84	19 U
Benzo(a)anthracene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	210 J	19 U
Benzo(a)pyrene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	170	19 U
Benzo(b)fluoranthene	µg/kg WW	20 U	19 U	20 U	19 U	6.2 J	4.2 J	540	3.9 J
Benzo(g,h,i)perylene	µg/kg WW	20 U	19 U	20 U	19 U	6.2 J	20 U	160 J	19 U
Benzo(k)fluoranthene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	2.4 J	190	19 U
Carbazole	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	110	19 U
Chrysene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	920	19 U
Dibenz(a,h)anthracene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	45 J	19 U
Fluoranthene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	13 J	5100 D	19 U
Fluorene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	38	19 U
Indeno(1,2,3-cd)pyrene	µg/kg WW	20 U	19 U	20 U	19 U	6.8 J	20 U	220 J	19 U
Naphthalene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	4.9 J	20 U	19 U
Phenanthrene	µg/kg WW	20 U	19 U	20 U	8.8 J	8.8 J	11 J	1600	6.9 J
Pyrene	µg/kg WW	20 U	19 U	20 U	19 U	19 U	20 U	1800	19 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg WW	0.000896 U	0.000842 U	0.000966 U	0.000638 U	0.000648 U	0.00065 J	0.000734 U	0.00124 *
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg WW	0.000965 U	0.000854 U	0.00173 *	0.00186 J	0.00466 J	0.00413 J	0.00413 J	0.00231 J
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg WW	0.000275 U	0.000288 U	0.0026 J	0.000271 J	0.000369 J	0.000465 *	0.000614 J	0.000988 J
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg WW	0.000535 U	0.000604 U	0.000632 U	0.00043 U	0.000834 *	0.000733 J	0.000976 J	0.000996 J
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg WW	0.000432 U	0.000469 U	0.000953 J	0.000337 U	0.000389 U	0.00033 U	0.000436 U	0.000488 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR7
	Sample ID	AR2-WB-CC00WB01-0-090824	AR2-WB-CC00WB02-0-090824	AR3-00-CC00WB01-0-090826	AR3-00-CC00WB02-0-090827	AR4-00-CC00WB01-0-090826	AR4-00-CC00WB02-0-090827	AR7-00-CC00WB01-0-090828	AR8-00-CC00WB01-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/27/2009	8/26/2009	8/27/2009	8/28/2009	8/26/2009
Analyte	**Units**								
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000209 U	0.000231 U	0.0247	0.00216 J	0.000256 J	0.000336 *	0.00121 J	0.00341 J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000259 U	0.000346 U	0.000351 U	0.000271 U	0.000278 U	0.000226 U	0.000343 U	0.000383 U
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000204 U	0.000227 U	0.00588	0.000484 *	0.000166 U	0.000218 *	0.000373 J	0.000762 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000257 U	0.000342 U	0.000379 U	0.000286 U	0.000285 U	0.000245 U	0.000354 U	0.000389 J
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg WW	0.000285 U	0.000332 U	0.0039 J	0.000221 U	0.000232 U	0.000221 U	0.000251 U	0.000334 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000266 U	0.000355 U	0.000377 U	0.000287 U	0.00029 U	0.000243 U	0.00036 U	0.000393 U
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg WW	0.000133 U	0.000174 U	0.0463	0.00628	0.000309	0.000558 J	0.00235 J	0.00512
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg WW	0.0002 U	0.000274 U	0.000312 U	0.000192 U	0.000396 *	0.000496 *	0.000187 U	0.000266 U
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000205 U	0.00024 U	0.00212 J	0.000171 U	0.000176 U	0.000165 U	0.000194 U	0.000308 *
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg WW	0.000135 U	0.000171 U	0.0443	0.00406 J	0.000565 J	0.000796 J	0.00238 J	0.0049 J
2,3,7,8-TCDD TEQ (bird)	µg/kg WW	0.0009259611 U	0.0011631636 U	0.193254222	0.02134522	0.002806695	0.003753411	0.010012302	0.017771401
2,3,7,8-TCDD TEQ (fish)	µg/kg WW								
2,3,7,8-TCDD TEQ (mammal)	µg/kg WW	0.0005561683 U	0.0007555388 U	0.033043559	0.003873729	0.001028782	0.001485754	0.002184419	0.003767685
2,3,7,8-Tetrachlorodibenzofuran	µg/kg WW	0.000327 U	0.000347 U	0.14	0.0158	0.00155	0.00189	0.00671	0.0114
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg WW	0.00015 U	0.000239 U	0.000312 *	0.000352 *	0.00017 U	0.00041 J	0.000282 J	0.000192 U
Heptachlorodibenzofuran (total)	µg/kg WW	0.000275 U	0.000288 U	0.00356 J	0.000271 J	0.000369 J	0.000225 U	0.000614 J	0.000988 J
Heptachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000535 U	0.000604 U	0.000632 U	0.00043 U	0.000749 J	0.00159 J	0.000976 J	0.00194 J
Hexachlorodibenzofuran (total)	µg/kg WW	0.000204 U	0.000227 U	0.0434 J	0.00278 J	0.00168 J	0.00224 J	0.00396 J	0.00708 J
Hexachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000257 U	0.000342 U	0.000351 U	0.000271 U	0.000496 J	0.00084 J	0.000343 U	0.00181 J
Pentachlorodibenzofuran (total)	µg/kg WW	0.00013 J	0.000247 J	0.179 J	0.0191 J	0.0033 J	0.00509 J	0.0119 J	0.0241 J
Pentachlorodibenzo-p-dioxin (total)	µg/kg WW	0.0002 U	0.000274 U	0.000546 J	0.000192 U	0.000289 J	0.000258 J	0.000276 J	0.000266 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg WW	0.00015 U	0.000469 J	0.00131 J	0.000893 J	0.000539 J	0.00041 J	0.00158 J	0.000381 J
Tetrachlorodibenzofuran (total)	µg/kg WW	0.000832 U	0.000241 U	0.391 J	0.0422 J	0.00457 J	0.00844 J	0.0206 J	0.0385 J
4,4'-DDD	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
4,4'-DDe	µg/kg WW	0.98 U	0.97 U	1.9 J	0.96 U	0.99 U	0.99 U	2 U	1.2 J
4,4'-DDT	µg/kg WW	0.98 U	0.97 U	4.1	1.8	6.4	9.7	1.6 J	9 U
Aldrin	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
Alpha-Bhc	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
alpha-Chlordane	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
beta-BHC	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
beta-Chlordane	µg/kg WW	0.98 U	0.97 U	2.3 J	0.96 U	3.9 J	5.8 J	2 U	0.99 U
Chlordane	µg/kg WW	9.8 U	9.7 U	9.9 U	9.6 U	9.9 U	9.9 U	20 U	9.9 U
Chlorpyrifos	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
cis-Nonachlor	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	3 U	4.5 U	2 U	0.99 U
Delta-Bhc	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
Dieldrin	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR7
	Sample ID	AR2-WB-CC00WB01-0-090824	AR2-WB-CC00WB02-0-090824	AR3-00-CC00WB01-0-090826	AR3-00-CC00WB02-0-090827	AR4-00-CC00WB01-0-090826	AR4-00-CC00WB02-0-090827	AR7-00-CC00WB01-0-090828	AR8-00-CC00WB01-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/27/2009	8/26/2009	8/27/2009	8/28/2009	8/26/2009
Analyte	**Units**								
Endosulfan I	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	1.2 J	2 U	0.99 U
Endosulfan II	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	0.82 J	0.3 J
Endosulfan Sulfate	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
Endrin aldehyde	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	1.3 J	2 U	0.99 U
Endrin Ketone	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
Endrin	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
gamma-BHC (Lindane)	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
Heptachlor epoxide	µg/kg WW	0.98 U	0.97 U	1.2 J	0.61 J	2 J	0.99 U	0.61 J	0.99 U
Heptachlor	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
Methoxychlor	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
Mirex	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
o,p'-DDD	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	1.2 U	2 U	1.5 J
O,P'-Dde	µg/kg WW	0.98 U	0.97 U	0.99 U	1.1 U	0.99 U	0.99 U	2 U	0.99 U
o,p'-DDT	µg/kg WW	0.98 U	0.97 U	4.1	2.3	6.2	9.7	2 U	1.8 U
Oxychlordane	µg/kg WW	49 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
Toxaphene	µg/kg WW	0.98 U	49 U	160 U	61 U	190 U	67 U	100 U	350 U
trans-Nonachlor	µg/kg WW	0.98 U	0.97 U	0.99 U	0.96 U	0.99 U	0.99 U	2 U	0.99 U
Decachlorobiphenyl	µg/kg WW	0.000919 U	0.0012 U	0.0092 *	0.0232 J	0.0119 J	0.0161 J	0.00773 J	0.0151 *
Total DiCB	µg/kg WW								
Total HpCB	µg/kg WW								
Total HxCB	µg/kg WW								
Total MoCB	µg/kg WW								
Total NoCB	µg/kg WW								
Total OcCB	µg/kg WW								
Total PCB homologues	µg/kg WW								
Total PeCB	µg/kg WW								
Total TeCB	µg/kg WW								
Total TrCB	µg/kg WW								
1,1'-Biphenyl, 2,2'-dichloro-	µg/kg WW	0.00936 U	0.0191 U	0.0186 U	0.0218 U	0.0126 U	0.0363 U	0.0131 U	0.00904 U
1,1'-Biphenyl, 2,4'-dichloro-	µg/kg WW	0.0183 U	0.0544 U	0.0306 U	0.046 U	0.0159 U	0.0917 U	0.0213 U	0.0269 U
1,1'-Biphenyl, 3,3'-dichloro-	µg/kg WW	0.0434 U	0.0581 U	0.0513 U	0.049 U	0.0666 U	0.0713 U	0.0592 U	0.0641 U
103-PeCB	µg/kg WW	0.00695 U	0.00902 U	0.0457	0.024	0.0506	0.0605	0.0198	0.164
104-PeCB	µg/kg WW	0.0011 U	0.000835 U	0.00063 U	0.000382 U	0.000347 U	0.000558 U	0.000338 U	0.00287 U
106-PeCB	µg/kg WW	0.0027 U	0.00507 U	0.00924 U	0.00699 U	0.0104 U	0.0141 U	0.00603 U	0.0222 U
107-PeCB [C]	µg/kg WW	0.00279 U	0.00538 U	0.181	0.087	0.454	0.642	0.0346	0.0636
109-PeCB	µg/kg WW	0.00382	0.0052 U	0.296	0.123	0.647	0.833	0.0541	0.132

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR7
	Sample ID	AR2-WB-CC00WB01-0-090824	AR2-WB-CC00WB02-0-090824	AR3-00-CC00WB01-0-090826	AR3-00-CC00WB02-0-090827	AR4-00-CC00WB01-0-090826	AR4-00-CC00WB02-0-090827	AR7-00-CC00WB01-0-090828	AR8-00-CC00WB01-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/27/2009	8/26/2009	8/27/2009	8/28/2009	8/26/2009
Analyte	**Units**								
10-DiCB	µg/kg WW	0.000801 U	0.000627 U	0.00106 U	0.001 U	0.000842 U	0.00181 U	0.00105 U	0.000619 U
110-PeCB [C]	µg/kg WW	0.0482 U	0.0259 U	1.36	0.651	5.6 J	9.09 J	0.351	1.46
111-PeCB	µg/kg WW	0.00515 U	0.00733 U	0.00424 U	0.00389 U	0.0087 U	0.00553 U	0.00369 U	0.0129 U
112-PeCB	µg/kg WW	0.00494 U	0.00713 U	0.00421 U	0.00386 U	0.00828 U	0.00549 U	0.00374 U	0.0113 U
120-PeCB	µg/kg WW	0.00482 U	0.00686 U	0.0123 *	0.0054 *	0.00788 U	0.00958	0.00348 U	0.0296
121-PeCB	µg/kg WW	0.00533 U	0.00736 U	0.00437 U	0.00413 U	0.00856 U	0.00588 U	0.00385 U	0.0124 U
122-PeCB	µg/kg WW	0.00304 U	0.00566 U	0.046	0.00799 U	0.121	0.168	0.00701 U	0.0264 U
127-PeCB	µg/kg WW	0.00287 U	0.00545 U	0.00944 U	0.00702 U	0.0107 U	0.0141 U	0.00639 U	0.0235 U
128-HxCB [C]	µg/kg WW	0.00589 U	0.00907 U	0.919	0.402	2.24	2.84	0.185	1.07
129-HxCB [C]	µg/kg WW	0.102 U	0.0973	6.14 J	3.01	12.9 J	16.2 J	2.34	19.8 J
12-DiCB [C]	µg/kg WW	0.00775 U	0.00523 U	0.00411 U	0.00455 U	0.012 U	0.015	0.00482 U	0.00348 U
130-HxCB	µg/kg WW	0.00721 U	0.0111 U	0.328	0.157	0.798	1.04	0.0926	0.566
131-HxCB	µg/kg WW	0.00698 U	0.00983 U	0.0435 U	0.016 U	0.0753	0.0824	0.0074 U	0.0423 *
132-HxCB	µg/kg WW	0.0176 U	0.0111 U	0.48	0.26	1.44	2.03	0.146	2.48
133-HxCB	µg/kg WW	0.00693 U	0.0104 U	0.0929	0.0474	0.167	0.199	0.0528	0.284
134-HxCB	µg/kg WW	0.007 U	0.0124 U	0.103	0.0651	0.368	0.587	0.0573	0.429
135-HxCB [C]	µg/kg WW	0.0316 U	0.0183 U	0.874	0.554 J	2.3	2.86	0.665	7.97 J
136-HxCB	µg/kg WW	0.0148 U	0.00771 U	0.519	0.402	0.828	1.02	0.281	2.66
137-HxCB	µg/kg WW	0.00723 U	0.0106 U	0.472	0.202	0.973	1.29	0.0754	0.315
139-HxCB [C]	µg/kg WW	0.00655 U	0.00969 U	0.0677	0.0283	0.178	0.251	0.0154	0.0673
141-HxCB	µg/kg WW	0.019	0.0141	0.825	0.411	1.63	2.1	0.39	4.65 J
142-HxCB	µg/kg WW	0.00726 U	0.0104 U	0.0474 U	0.0172 U	0.00852 U	0.0121 U	0.0078 U	0.028 U
143-HxCB	µg/kg WW	0.007 U	0.00897 U	0.0464 U	0.0164 U	0.00794 U	0.0116 U	0.00697 U	0.0314 U
144-HxCB	µg/kg WW	0.00534 U	0.00389 U	0.189	0.114	0.444	0.556	0.0965	1.19
145-HxCB	µg/kg WW	0.00188 U	0.00313 U	0.00184 U	0.00142 U	0.00314 U	0.00132 U	0.00131 U	0.00956 U
146-HxCB	µg/kg WW	0.0205 J	0.0171	0.881	0.391	1.45 J	1.81	0.441	3.21
147-HxCB [C]	µg/kg WW	0.0733 U	0.0475 U	2.65	1.63	6.05 J	8.43 J	1.4	16.7 J
148-HxCB	µg/kg WW	0.00225 U	0.00384 U	0.00323	0.00172 U	0.00475	0.00651	0.00163 U	0.0116 U
14-DiCB	µg/kg WW	0.000664 U	0.00115 U	0.00047 U	0.00039 U	0.00051 U	0.000546 U	0.000422 U	0.000704 U
150-HxCB	µg/kg WW	0.00185 U	0.00298 U	0.0039	0.00255	0.00814	0.01	0.00252	0.0192 *
152-HxCB	µg/kg WW	0.00178 U	0.00291 U	0.00181 U	0.00131 U	0.00294 U	0.00122 U	0.00121 U	0.0088 U
154-HxCB	µg/kg WW	0.00198 U	0.00339 U	0.0407	0.0169	0.0732	0.0952	0.0238	0.141
155-HxCB	µg/kg WW	0.00126 U	0.00269 U	0.000858 U	0.000684 U	0.00181 U	0.000716 U	0.000714 U	0.00722 U
158-HxCB	µg/kg WW	0.00455 U	0.00715 U	0.49	0.224	1.28	1.63	0.165	1.53
159-HxCB	µg/kg WW	0.00274 U	0.00458 U	0.00666 U	0.00438 U	0.00789 U	0.006 U	0.00631 U	0.279
160-HxCB	µg/kg WW	0.00498 U	0.00803 U	0.0329 U	0.0121 U	0.006 U	0.00854 U	0.00566 U	0.0205 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR7
	Sample ID	AR2-WB-CC00WB01-0-090824	AR2-WB-CC00WB02-0-090824	AR3-00-CC00WB01-0-090826	AR3-00-CC00WB02-0-090827	AR4-00-CC00WB01-0-090826	AR4-00-CC00WB02-0-090827	AR7-00-CC00WB01-0-090828	AR8-00-CC00WB01-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/27/2009	8/26/2009	8/27/2009	8/28/2009	8/26/2009
Analyte	**Units**								
161-HxCB	µg/kg WW	0.00491 U	0.00747 U	0.0308 U	0.0111 U	0.00557 U	0.00783 U	0.0054 U	0.0195 U
162-HxCB	µg/kg WW	0.00274 U	0.00467 U	0.00676 U	0.00434 U	0.00775 U	0.00594 U	0.00626 U	0.0203 U
164-HxCB	µg/kg WW	0.00481 U	0.00748 U	0.306	0.178	0.657	0.818	0.147	1.28
165-HxCB	µg/kg WW	0.00556 U	0.00858 U	0.0353 U	0.0132 U	0.00656 U	0.00933 U	0.00606 U	0.0219 U
16-TrCB	µg/kg WW	0.0108 U	0.0206 U	0.0167 U	0.0298 U	0.0149 U	0.0681 U	0.0178 U	0.0173 U
171-HpCB [C]	µg/kg WW	0.00534 U	0.00893 U	0.0974 J	0.0387 J	0.284 J	0.373 J	0.103 J	1.94
172-HpCB	µg/kg WW	0.00559 U	0.00887 U	0.149 J	0.0917 J	0.241 J	0.307 J	0.0047 U	0.0434 U
174-HpCB	µg/kg WW	0.0303 J	0.0299	0.629 J	0.451 J	1.18 J	1.38 J	0.667 J	9.97 J
175-HpCB	µg/kg WW	0.00345 U	0.00436 U	0.0167 J	0.00731	0.0416 J	0.0499 J	0.0201 J	0.293
176-HpCB	µg/kg WW	0.00459 U	0.00343 U	0.0888 J	0.0944 J	0.152 J	0.188 J	0.126 J	1.17
177-HpCB	µg/kg WW	0.0221 J	0.0168	0.435 J	0.282 J	0.833 J	1.02 J	0.501 J	5.29 J
178-HpCB	µg/kg WW	0.0138 *	0.0116	0.214 J	0.163 J	0.346 J	0.367 J	0.317 J	2.39
179-HpCB	µg/kg WW	0.0096 U	0.0056 U	0.103 J	0.0896 J	0.301 J	0.33 J	0.171 J	2.59
17-TrCB	µg/kg WW	0.0143 U	0.0218 U	0.0198 U	0.0316 U	0.0181 U	0.0779 U	0.0199 U	0.0132 U
181-HpCB	µg/kg WW	0.00502 U	0.00873 U	0.0204 J	0.00878 U	0.0288 J	0.0405 J	0.00461 U	0.0428 U
182-HpCB	µg/kg WW	0.00347 U	0.00439 U	0.00412 U	0.00676 U	0.00898	0.0145 J	0.0034 U	0.0107 U
183-HpCB [C]	µg/kg WW	0.0214 J	0.00881 U	0.462 J	0.265 J	0.998 J	0.955 J	0.511 J	6.84 J
184-HpCB	µg/kg WW	0.00281 U	0.00335 U	0.0033 U	0.00536 U	0.00255 U	0.00301 U	0.00267 U	0.00831 U
186-HpCB	µg/kg WW	0.00293 U	0.00362 U	0.00344 U	0.00563 U	0.00268 U	0.00316 U	0.00281 U	0.00899 U
187-HpCB	µg/kg WW	0.081 J	0.0857	1.08 J	0.842 J	1.8 J	1.8 J	1.52 J	15.5 J
188-HpCB	µg/kg WW	0.00241 U	0.0037 U	0.00207 U	0.0039 U	0.00208 J	0.00212 *	0.00207 U	0.00969 U
18-TrCB [C]	µg/kg WW	0.0242 U	0.0417 U	0.0498 U	0.068 U	0.143 U	0.299	0.059 U	0.0364 U
190-HpCB	µg/kg WW	0.0071 J	0.00669 U	0.107 J	0.0639 J	0.221 J	0.287 J	0.123 J	2.08
191-HpCB	µg/kg WW	0.00438 U	0.00622 U	0.0294 J	0.0225	0.0508 J	0.0741 J	0.0318 J	0.405
192-HpCB	µg/kg WW	0.00778 *	0.00714 U	0.0114 U	0.0069 U	0.00668 U	0.0133 U	0.0995 J	1.48
195-OcCB	µg/kg WW	0.00558 *	0.00572 *	0.0406 J	0.0265 J	0.0752 J	0.0819 J	0.0607 J	1.75
196-OcCB	µg/kg WW	0.00717 J	0.00638	0.0815 *	0.0676 J	0.163 J	0.157 J	0.101 J	2.26
197-OcCB [C]	µg/kg WW	0.00339 J	0.00393 U	0.0335 J	0.0387 J	0.0731 J	0.0671 J	0.052 J	0.695
198-OcCB [C]	µg/kg WW	0.0323 *	0.0344	0.337 J	0.401 J	0.585 J	0.595 J	0.385 J	5.02 J
19-TrCB	µg/kg WW	0.00611 U	0.00732 U	0.00598 U	0.01 U	0.00465 U	0.0187 U	0.00494 U	0.00439 U
1-MoCB	µg/kg WW	0.003 U	0.00428 U	0.00633 U	0.00509 U	0.00604 U	0.00622 U	0.00539 U	0.00446 U
2,2',3,3',4,4',5,5'-Octachlorobiphenyl	µg/kg WW	0.00187 U	0.00797 *	0.0514 J	0.047 J	0.107 J	0.103 J	0.0798 J	2.42 J
2,2',3,3',4,4',5-Heptachlorobiphenyl	µg/kg WW	0.0271 J	0.0237	0.488 J	0.233 J	1.05 J	1.46 J	0.426 J	8.5 J
2,2',3,4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	0.108 J	0.105	1.79 J	1.34 J	2.82 J	3.53 J	1.95 J	23.2 J
2,2',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.132	0.123	5.29 J	2.68	9.71 J	11.3 J	2.98	25.4 J
2,2',5,5'-Tetrachlorobiphenyl	µg/kg WW	0.0683 U	0.0537 U	2.23	1.66	5.79 J	10.6 J	0.528	1

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR7
	Sample ID	AR2-WB-CC00WB01-0-090824	AR2-WB-CC00WB02-0-090824	AR3-00-CC00WB01-0-090826	AR3-00-CC00WB02-0-090827	AR4-00-CC00WB01-0-090826	AR4-00-CC00WB02-0-090827	AR7-00-CC00WB01-0-090828	AR8-00-CC00WB01-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/27/2009	8/26/2009	8/27/2009	8/28/2009	8/26/2009
Analyte	**Units**								
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	0.00236 U	0.0017 U	0.0301	0.024	0.0484	0.0687	0.0343	0.309
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg WW	0.00981 *	0.01	0.765	0.375	1.69	2.22	0.211	1.44
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg WW	0.0256 U	0.0256 U	1.7 J	0.796 J	4.81 J	6.04 J	0.319 J	0.576 J
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.00496	0.00569	0.278	0.149	0.568	0.742	0.0955	0.574
2',3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00278 U	0.00488 U	0.0578 *	0.03 J	0.147 J	0.169 J	0.0152 J	0.0211 U
2,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0584 U	0.0558 U	5.4 J	2.42	12.2 J	16 J	0.926	2.39
2,3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00322 U	0.00546 U	0.124 J	0.0592 J	0.31 J	0.372 J	0.0227 J	0.0451 J
201-OcCB	µg/kg WW	0.00195 U	0.00404 U	0.0296 J	0.036 J	0.0547 J	0.0566 J	0.0412 J	0.511
202-OcCB	µg/kg WW	0.00531 J	0.00461 J	0.0567 J	0.0868 J	0.0901 J	0.0884 J	0.0728 J	0.677
203-OcCB	µg/kg WW	0.00895 J	0.00824	0.0822 J	0.12 J	0.193 J	0.173 J	0.12 J	2.23
204-OcCB	µg/kg WW	0.00201 U	0.00394 U	0.00399 U	0.0045 U	0.00468 U	0.00575 U	0.00706 U	0.00513 U
205-OcCB	µg/kg WW	0.00173 U	0.0024 U	0.0117 U	0.00885 U	0.0146 J	0.0105 J	0.00919 J	0.135
206-NoCB	µg/kg WW	0.00148 U	0.00259	0.0261 J	0.13 J	0.0746 J	0.0872 J	0.0302 J	0.332 J
207-NoCB	µg/kg WW	0.00154 U	0.00148 U	0.00649 *	0.0213 J	0.0135 J	0.0144 J	0.00562 J	0.0597
208-NoCB	µg/kg WW	0.00199 U	0.00188 U	0.0121 J	0.0679 J	0.0356 J	0.0408 *	0.0146 J	0.0748 J
20-TrCB [C]	µg/kg WW	0.045 U	0.0572 U	0.265	0.156 U	1.1	1.03	0.361	0.144 U
21-TrCB [C]	µg/kg WW	0.019 U	0.0288 U	0.0324 U	0.0443 U	0.074	0.167	0.0428 U	0.0329 U
22-TrCB	µg/kg WW	0.0131 U	0.0195 U	0.0192 U	0.0279 U	0.097 U	0.13	0.0317 U	0.0222 U
23-TrCB	µg/kg WW	0.000612 U	0.00106 U	0.000552 J	0.000629 U	0.000566 U	0.000565 U	0.000721 U	0.00135 U
24-TrCB	µg/kg WW	0.00114 U	0.00119 U	0.00076 U	0.00206 U	0.00114 U	0.00404 U	0.00127 U	0.0014 U
25-TrCB	µg/kg WW	0.0039 U	0.0035 U	0.0134 U	0.00813 U	0.0401	0.0386	0.00774 U	0.0048 U
26-TrCB [C]	µg/kg WW	0.00877 U	0.00963 U	0.0355 U	0.0223 U	0.106	0.121	0.0301 U	0.0156 U
27-TrCB	µg/kg WW	0.00274 U	0.00113 U	0.00333 U	0.00611 U	0.00361 U	0.0135 U	0.00303 U	0.00265 U
2-MoCB	µg/kg WW	0.0037 U	0.00283 U	0.00265 U	0.00279 U	0.00307 U	0.00332 U	0.00273 U	0.00128 U
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.00354 U	0.00443 U	0.012 U	0.00725 U	0.0123 U	0.00876 U	0.00931 U	0.0223 U
3,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00332 U	0.00609 U	0.037 J	0.0166 *	0.0985 J	0.122 J	0.00864 J	0.0477 J
3,3',4,4'-Tetrachlorobiphenyl	µg/kg WW	0.00275 U	0.00311	0.031	0.0132	0.163	0.199	0.028	0.0157 U
3,4,4',5-Tetrachlorobiphenyl	µg/kg WW	0.00159 U	0.00281 U	0.00466 U	0.00446 U	0.00963 U	0.0101 U	0.00499 U	0.0127 U
31-TrCB	µg/kg WW	0.0303 U	0.0478 U	0.116 U	0.101 U	0.569	0.668	0.146 U	0.0809 U
32-TrCB	µg/kg WW	0.00686 U	0.013 U	0.0106 U	0.0186 U	0.00944 U	0.0436 U	0.0117 U	0.0116 U
34-TrCB	µg/kg WW	0.000611 U	0.00109 U	0.00157	0.000727	0.00211	0.00058 U	0.000846 *	0.0013 U
35-TrCB	µg/kg WW	0.00266 U	0.00145 U	0.00241	0.00108 U	0.0109 *	0.0133	0.00386 *	0.00333 U
36-TrCB	µg/kg WW	0.00105 U	0.00129 U	0.00123 U	0.000958 U	0.00163 U	0.00192 U	0.00119 U	0.00295 U
37-TrCB	µg/kg WW	0.0112 U	0.0118 U	0.0522	0.0268 U	0.263	0.283	0.112	0.0402 U
38-TrCB	µg/kg WW	0.00108 U	0.00135 U	0.00137 U	0.00107 U	0.00177 U	0.00213 U	0.00132 U	0.00326 U
39-TrCB	µg/kg WW	0.00109 U	0.00134 U	0.00128 U	0.00103 U	0.00173 U	0.00206 U	0.00124 U	0.0032 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR7
	Sample ID	AR2-WB-CC00WB01-0-090824	AR2-WB-CC00WB02-0-090824	AR3-00-CC00WB01-0-090826	AR3-00-CC00WB02-0-090827	AR4-00-CC00WB01-0-090826	AR4-00-CC00WB02-0-090827	AR7-00-CC00WB01-0-090828	AR8-00-CC00WB01-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/27/2009	8/26/2009	8/27/2009	8/28/2009	8/26/2009
Analyte	**Units**								
3-MoCB	µg/kg WW	0.0058 U	0.00543 U	0.00598 U	0.00499 U	0.00618 U	0.00636 U	0.00569 U	0.00546 U
4,4'-Dichlorobiphenyl	µg/kg WW	0.0125 U	0.0199 U	0.0598 U	0.036 U	0.136 J	0.164 J	0.0439 U	0.03 U
40-TeCB [C]	µg/kg WW	0.0161 U	0.0152 U	0.028 U	0.0288 U	0.0865	0.193	0.0324 U	0.0294 U
41-TeCB	µg/kg WW	0.00615 U	0.00563 U	0.00463 U	0.00992 U	0.0139 U	0.0338	0.00769 U	0.0115 U
42-TeCB	µg/kg WW	0.00974 U	0.00939 U	0.0146 U	0.0142 U	0.044	0.0753	0.0153 U	0.0148 U
43-TeCB	µg/kg WW	0.00253 U	0.00271 U	0.00876	0.00754 U	0.0151	0.0355	0.00437	0.00958 U
44-TeCB [C]	µg/kg WW	0.0495 U	0.0409 U	0.565	0.295	0.965	1.89	0.213	0.23
45-TeCB [C]	µg/kg WW	0.0118 U	0.00581 U	0.00859 U	0.0135 U	0.00907 U	0.0374	0.011 U	0.0118 U
46-TeCB	µg/kg WW	0.00386 U	0.00261	0.00188 *	0.00353 *	0.00224	0.00993	0.00283 *	0.00272 U
48-TeCB	µg/kg WW	0.0106 U	0.00858 U	0.0117 U	0.0162 U	0.0365 U	0.0769	0.0152 U	0.0189 U
49-TeCB [C]	µg/kg WW	0.0317 U	0.0209 U	0.54	0.265	1.04	1.74	0.17	0.325
50-TeCB [C]	µg/kg WW	0.00868 U	0.00293 U	0.00731 U	0.00923 U	0.0115 U	0.0425	0.00851 U	0.00993 U
54-TeCB	µg/kg WW	0.00124 *	0.00157 U	0.000298 U	0.000397 U	0.000726 U	0.000839 U	0.000436 U	0.00118 U
55-TeCB	µg/kg WW	0.00145 U	0.00285 U	0.0141	0.00654	0.0212	0.0366	0.0105	0.0131 U
56-TeCB	µg/kg WW	0.0156 U	0.0166 U	0.106	0.0633	0.444	0.854	0.0977	0.0672
57-TeCB	µg/kg WW	0.00162 U	0.00298 U	0.00457	0.00412 U	0.00756 U	0.0113 U	0.00522 U	0.0128 U
58-TeCB	µg/kg WW	0.00165 U	0.00309 U	0.00445 U	0.00442 U	0.00791 U	0.0121 U	0.00535 U	0.014 U
59-TeCB [C]	µg/kg WW	0.00485 U	0.004 U	0.0265	0.0142 U	0.0662	0.105	0.0217	0.0168 U
5-DiCB	µg/kg WW	0.00127 U	0.00283 U	0.00438 U	0.00377 U	0.00361 U	0.0122 J	0.00339 U	0.00226 U
60-TeCB	µg/kg WW	0.0116 U	0.0169 U	0.129	0.0571	0.337	0.567	0.113	0.0582
61-TeCB [C]	µg/kg WW	0.0659 U	0.0598 U	1.32	0.732	3.35	6.28 J	0.547	0.516
63-TeCB	µg/kg WW	0.00205 *	0.00289 U	0.0406	0.0194	0.0701	0.1	0.0194	0.0154
64-TeCB	µg/kg WW	0.0153 U	0.0145 U	0.0454 U	0.0234 U	0.157	0.287	0.0306 U	0.058 U
66-TeCB	µg/kg WW	0.0391 U	0.0427 U	0.94	0.42	1.72	2.62	0.424	0.36
67-TeCB	µg/kg WW	0.00208	0.0026 U	0.00774	0.0036 U	0.0255	0.0386	0.0131	0.0112 U
68-TeCB	µg/kg WW	0.00203 *	0.00285 U	0.021	0.0079	0.00684 U	0.0107 U	0.00521 U	0.0138 U
6-DiCB	µg/kg WW	0.00634 U	0.0124 U	0.011 U	0.0126 U	0.0125 U	0.0331 U	0.00942 U	0.00641 U
72-TeCB	µg/kg WW	0.00178 U	0.00313 U	0.0286	0.0106	0.00958	0.0133	0.00573 U	0.0136 U
73-TeCB	µg/kg WW	0.00106 U	0.00192 U	0.0075	0.00556	0.00918	0.0228	0.0027	0.00683 U
78-TeCB	µg/kg WW	0.00151 U	0.00313 U	0.00442 U	0.00422 U	0.00774 U	0.0116 U	0.00514 U	0.014 U
79-TeCB	µg/kg WW	0.00139 U	0.00279 U	0.0588	0.0315	0.15	0.305	0.0129	0.0325 *
7-DiCB	µg/kg WW	0.00184 U	0.00328 U	0.00332 U	0.00282 U	0.00234 U	0.00567 U	0.00208 U	0.00175 U
80-TeCB	µg/kg WW	0.00144 U	0.00294 U	0.00415 U	0.00387 U	0.00675 U	0.0106 U	0.00449 U	0.0121 U
82-PeCB	µg/kg WW	0.00743 U	0.00978 U	0.0673	0.0199 *	0.281	0.387	0.0157	0.0179 U
83-PeCB	µg/kg WW	0.00894 U	0.0114 U	0.128	0.0867	0.472	0.533	0.0228	0.111
84-PeCB	µg/kg WW	0.0157 U	0.0101 U	0.232	0.154	0.888	1.23	0.0473	0.131

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR3	AR3	AR4	AR4	AR6	AR7
	Sample ID	AR2-WB-CC00WB01-0-090824	AR2-WB-CC00WB02-0-090824	AR3-00-CC00WB01-0-090826	AR3-00-CC00WB02-0-090827	AR4-00-CC00WB01-0-090826	AR4-00-CC00WB02-0-090827	AR7-00-CC00WB01-0-090828	AR8-00-CC00WB01-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/27/2009	8/26/2009	8/27/2009	8/28/2009	8/26/2009
Analyte	**Units**								
85-PeCB [C]	µg/kg WW	0.0129 U	0.00934	0.887	0.403	2.01	2.53	0.153	0.219
86-PeCB [C]	µg/kg WW	0.0401 U	0.0235 U	2.1	1.04	6.68 J	9.01 J	0.379	0.999
88-PeCB [C]	µg/kg WW	0.0139 U	0.00926 U	0.225	0.129	0.567	0.763	0.0483	0.256
89-PeCB	µg/kg WW	0.00751 U	0.01 U	0.0062 U	0.00589 U	0.0124 U	0.00838 U	0.00545 U	0.0175 U
90-PeCB [C]	µg/kg WW	0.0841 U	0.0425 U	5.32 J	2.59	12.3 J	16 J	1.14	7.44 J
92-PeCB	µg/kg WW	0.0141 U	0.00941 U	0.757	0.387 J	1.82	2.49	0.148	0.887
93-PeCB [C]	µg/kg WW	0.00773 U	0.009 U	0.0134 *	0.00601	0.0199	0.0267	0.0052 U	0.0397
94-PeCB	µg/kg WW	0.00793 U	0.0101 U	0.00715 U	0.00598 U	0.0124 U	0.00852 U	0.00585 U	0.0198 U
95-PeCB	µg/kg WW	0.0746 U	0.0295 U	2.58	1.53	5.59 J	7.58 J	0.498	3.34
96-PeCB	µg/kg WW	0.00298	0.00123 U	0.00145 U	0.00136 *	0.00231	0.00404 *	0.000747 *	0.00409 U
98-PeCB [C]	µg/kg WW	0.00682 U	0.00895 U	0.00566 U	0.00553 U	0.0167	0.0288	0.00523 U	0.0156 U
99-PeCB	µg/kg WW	0.0399 U	0.0266 U	3.03	1.33	5.64 J	7.28 J	0.521	1.86
9-DiCB	µg/kg WW	0.00269 U	0.00472 U	0.00382 U	0.0039 U	0.00596 U	0.0105 U	0.00315 U	0.00207 U
Decachlorobiphenyl	µg/kg WW	0.000919 U	0.0012 U	0.0092 *	0.0232 J	0.0119 J	0.0161 J	0.00773 J	0.0151 *
PCB Dioxin-like Congener TEQ (bird)	µg/kg WW	0.000474048	0.000769287	0.005566559	0.00246925	0.018810634	0.023182997	0.00232998	0.005794051
PCB Dioxin-like Congener TEQ (fish)	µg/kg WW								
PCB Dioxin-like Congener TEQ (mammal)	µg/kg WW	0.000335489	0.000612585	0.003953747	0.001776916	0.010459502	0.012988251	0.000915511	0.004932226
tPCBs_all	µg/kg WW	2.230148	2.223342	60.244518	32.954277	135.940661	183.039474	25.709394	214.476863
tPCBs_detects	µg/kg WW	0.58175	0.62486	59.216702	31.830687	135.21017	182.31118	24.846423	213.0133
Antimony	µg/kg WW	13.3 U	13.8 U	14.1 U	14.4 U	14 U	15.8 U	14.8 U	14.6 U
Arsenic	µg/kg WW	240 U	260 U	188	193	260	339	157	178
Beryllium	µg/kg WW	2.1 J	3.1 J	3.7 J	2.2 J	1.5 J	1.3 J	2.8 J	3.3 J
Cadmium	µg/kg WW	175	150	127	127	103	118	112	130
Chromium	µg/kg WW	381 U	287 U	498 J	253 J	197 J	970 J	222	1070 J
Copper	µg/kg WW	22700 J	22600 J	29300 J	28500 J	26900 J	32500 J	22700	34600
Lead	µg/kg WW	328	226	198	141	148	156	226	401 J
Nickel	µg/kg WW	1230	1070	1360	889	903	1430	1130	1370 J
Selenium	µg/kg WW	154	170	291	232	257	356	337	195
Strontium	µg/kg WW	102000	99000	118000	119000	111000	113000	142000	121000
Vanadium	µg/kg WW	161	208	236	182	180	206	291	221
Zinc	µg/kg WW	27400	31300	28700 J	24500 J	22300 J	26500 J	20100	26500 J
Lipids, total	%	0.33	0.37	0.82	0.44	0.99	1.3	1.7	0.97
Residue, total	%	26.7	28	30.3	29.4	29.2	31.8	31	29.8

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR7	AR9	AR9
	Sample ID	AR8-00-CC00WB02-0-090826	AR8-00-CC00WB02-1-090826	AR9-00-CC00WB01-0-090825	AR9-00-CC00WB02-0-090825
	Type	Primary	Duplicate	Primary	Primary
	Date	8/26/2009	8/26/2009	8/25/2009	8/25/2009
Analyte	**Units**				
1,1'-Biphenyl	µg/kg WW	19 U	20 U	20 U	19 U
Acetophenone	µg/kg WW	250	260	20 U	19 U
Benzaldehyde	µg/kg WW	940 U	1000 U	960 U	940 U
Bis(2-Chloroethyl)Ether	µg/kg WW	19 U	20 U	20 U	19 U
Hexachlorobenzene	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Hexachloroethane	µg/kg WW	19 U	20 U	20 U	19 U
1,2,4,5-Tetrachlorobenzene	µg/kg WW	19 U	20 U	20 U	19 U
2,3,4,6-Tetrachlorophenol	µg/kg WW	40 U	40 U	40 U	40 U
2,4,5-Trichlorophenol	µg/kg WW	19 U	20 U	20 U	19 U
2,4,6-Trichlorophenol	µg/kg WW	19 U	20 U	20 U	19 U
2,4-Dichlorophenol	µg/kg WW	19 U	20 U	20 U	19 U
2,4-Dimethylphenol	µg/kg WW	19 U	20 U	20 U	19 U
2,4-Dinitrophenol	µg/kg WW	240 U	250 U	240 U	240 U
2,4-Dinitrotoluene	µg/kg WW	38 U	40 U	39 U	38 U
2,6-Dinitrotoluene	µg/kg WW	19 U	20 U	20 U	19 U
2-Chlorophenol	µg/kg WW	19 U	20 U	20 U	19 U
2-Methylphenol	µg/kg WW	19 U	4.5 J	20 U	19 U
2-Nitroaniline	µg/kg WW	94 U	100 U	96 U	94 U
2-Nitrophenol	µg/kg WW	19 U	20 U	20 U	19 U
3,3'-Dichlorobenzidine	µg/kg WW	1000 U	1000 U	1000 U	1000 U
3-Nitroaniline	µg/kg WW	190 U	200 U	200 U	190 U
4,6-Dinitro-2-Methylphenol	µg/kg WW	260 U	260 U	260 U	260 U
4-Bromophenyl-Phenylether	µg/kg WW	19 U	20 U	20 U	19 U
4-Chloro-3-Methylphenol	µg/kg WW	19 U	20 U	20 U	19 U
4-Chloroaniline	µg/kg WW	400 U	400 U	400 U	400 U
4-Chlorophenyl-Phenylether	µg/kg WW	19 U	20 U	20 U	19 U
4-Methylphenol	µg/kg WW	19 U	20 U	20 U	19 U
4-Nitroaniline	µg/kg WW	190 U	200 U	200 U	190 U
4-Nitrophenol	µg/kg WW	19 U	20 U	20 U	19 U
Atrazine	µg/kg WW	370 U	390 U	380 U	370 U
Bis(2-Chloroethoxy)Methane	µg/kg WW	19 U	20 U	20 U	19 U
Bis(2-chloroisopropyl) ether	µg/kg WW	94 U	100 U	96 U	94 U
Bis(2-Ethylhexyl)Phthalate	µg/kg WW	19 U	20 U	20 J	19 U
Butylbenzylphthalate	µg/kg WW	19 U	20 U	20 U	19 U
Caprolactam	µg/kg WW	94 U	100 U	96 U	94 U
Dibenzofuran	µg/kg WW	19 U	20 U	20 U	19 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR7	AR9	AR9
	Sample ID	AR8-00-CC00WB02-0-090826	AR8-00-CC00WB02-1-090826	AR9-00-CC00WB01-0-090825	AR9-00-CC00WB02-0-090825
	Type	Primary	Duplicate	Primary	Primary
	Date	8/26/2009	8/26/2009	8/25/2009	8/25/2009
Analyte	**Units**				
Diethylphthalate	µg/kg WW	19 U	20 U	20 U	19 U
Dimethylphthalate	µg/kg WW	19 U	20 U	20 U	19 U
Di-n-butyl phthalate	µg/kg WW	100 U	100 U	370 U	100 U
Di-n-octyl phthalate	µg/kg WW	19 U	20 U	20 U	19 U
Hexachlorobutadiene	µg/kg WW	19 U	20 U	20 U	19 U
Hexachlorocyclopentadiene	µg/kg WW	470 U	500 U	480 U	470 U
Isophorone	µg/kg WW	19 U	20 U	20 U	19 U
Nitrobenzene	µg/kg WW	19 U	20 U	20 U	19 U
N-Nitroso-Di-N-Propylamine	µg/kg WW	22 U	22 U	22 U	22 U
N-Nitrosodiphenylamine	µg/kg WW	19 U	20 U	20 U	19 U
Pentachlorophenol	µg/kg WW	47 U	50 U	48 U	47 U
Phenol	µg/kg WW	100	100	48 U	47 U
2-Chloronaphthalene	µg/kg WW	19 U	20 U	20 U	19 U
2-Methylnaphthalene	µg/kg WW	19 U	20 U	20 U	19 U
Acenaphthene	µg/kg WW	19 U	2.6 J	20 U	19 U
Acenaphthylene	µg/kg WW	19 U	20 U	20 U	19 U
Anthracene	µg/kg WW	5.8 J	13 J	12 J	19 U
Benzo(a)anthracene	µg/kg WW	13 J	35 J	20 U	6.8 J
Benzo(a)pyrene	µg/kg WW	11 J	30	7.3 J	4.5 J
Benzo(b)fluoranthene	µg/kg WW	14 J	41	8 J	7.4 J
Benzo(g,h,i)perylene	µg/kg WW	11 J	30 J	6.6 J	7.7 J
Benzo(k)fluoranthene	µg/kg WW	5.2 J	15 J	3.3 J	3.2 J
Carbazole	µg/kg WW	19 U	20 U	20 U	19 U
Chrysene	µg/kg WW	27 J	92 J	20 U	19 U
Dibenz(a,h)anthracene	µg/kg WW	19 U	12 J	20 U	19 U
Fluoranthene	µg/kg WW	22 J	71 J	14 J	19 U
Fluorene	µg/kg WW	19 U	3.4 J	20 U	19 U
Indeno(1,2,3-cd)pyrene	µg/kg WW	13 J	35 J	6.8 J	7.5 J
Naphthalene	µg/kg WW	19 U	20 U	20 U	19 U
Phenanthrene	µg/kg WW	17 J	42	8.9 J	9.3 J
Pyrene	µg/kg WW	14 J	32	20 U	19 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg WW	0.00124 U	0.00108 U	0.000625 U	0.000608 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg WW	0.00326 J	0.00304 J	0.00516 J	0.00196 J
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg WW	0.000419 *	0.000338 *	0.000886 J	0.000359 J
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg WW	0.000566 U	0.000498 U	0.000852 *	0.000427 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg WW	0.000591 U	0.000428 U	0.000391 U	0.000342 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR7	AR9	AR9
	Sample ID	AR8-00-CC00WB02-0-090826	AR8-00-CC00WB02-1-090826	AR9-00-CC00WB01-0-090825	AR9-00-CC00WB02-0-090825
	Type	Primary	Duplicate	Primary	Primary
	Date	8/26/2009	8/26/2009	8/25/2009	8/25/2009
Analyte	**Units**				
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg WW	0.00287 J	0.003 J	0.0135	0.00351 J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000343 U	0.000344 U	0.000291 U	0.000285 U
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000591 J	0.0007 J	0.00282 J	0.000758 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000378 U	0.000353 U	0.000302 U	0.000309 U
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg WW	0.000296 U	0.000291 U	0.0013 J	0.00039 J
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000372 U	0.000359 U	0.000306 U	0.000306 U
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg WW	0.00588	0.0055	0.0236	0.00586
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg WW	0.000224 U	0.000225 U	0.000216 U	0.000224 U
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.00023 U	0.000196 U	0.000838 J	0.000227 *
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg WW	0.00458 J	0.00457 J	0.0239	0.006
2,3,7,8-TCDD TEQ (bird)	µg/kg WW	0.017560198		0.085404021	0.019400284
2,3,7,8-TCDD TEQ (fish)	µg/kg WW				
2,3,7,8-TCDD TEQ (mammal)	µg/kg WW	0.003557943		0.015938026	0.00411225
2,3,7,8-Tetrachlorodibenzofuran	µg/kg WW	0.0107	0.0125	0.0568	0.0119
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg WW	0.000193 U	0.000146 U	0.000265 *	0.000191 U
Heptachlorodibenzofuran (total)	µg/kg WW	0.000369 U	0.000254 U	0.000886 J	0.000359 J
Heptachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000651 J	0.000653 J	0.00041 U	0.000427 U
Hexachlorodibenzofuran (total)	µg/kg WW	0.00382 J	0.00535 J	0.0237 J	0.00628 J
Hexachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000343 U	0.000344 U	0.000291 U	0.000285 U
Pentachlorodibenzofuran (total)	µg/kg WW	0.0232 J	0.0243 J	0.104 J	0.0285 J
Pentachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000224 U	0.000225 U	0.000216 U	0.000224 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg WW	0.000193 U	0.000833 J	0.000187 U	0.000191 U
Tetrachlorodibenzofuran (total)	µg/kg WW	0.0374 J	0.0447 J	0.197 J	0.0399 J
4,4'-DDD	µg/kg WW	2.4 U	0.97 U	0.99 U	1 U
4,4'-DDe	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
4,4'-DDT	µg/kg WW	1.7 U	2.3 U	2	1.9
Aldrin	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Alpha-Bhc	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
alpha-Chlordane	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
beta-BHC	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
beta-Chlordane	µg/kg WW	0.99 U	0.62 J	0.99 U	1 U
Chlordane	µg/kg WW	9.9 U	9.7 U	9.9 U	10 U
Chlorpyrifos	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
cis-Nonachlor	µg/kg WW	4.7 U	0.97 U	1.8 U	1.8 U
Delta-Bhc	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Dieldrin	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR7	AR9	AR9
	Sample ID	AR8-00-CC00WB02-0-090826	AR8-00-CC00WB02-1-090826	AR9-00-CC00WB01-0-090825	AR9-00-CC00WB02-0-090825
	Type	Primary	Duplicate	Primary	Primary
	Date	8/26/2009	8/26/2009	8/25/2009	8/25/2009
Analyte	**Units**				
Endosulfan I	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Endosulfan II	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Endosulfan Sulfate	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Endrin aldehyde	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Endrin Ketone	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Endrin	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
gamma-BHC (Lindane)	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Heptachlor epoxide	µg/kg WW	0.64 J	0.55 J	0.99 U	0.31 J
Heptachlor	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Methoxychlor	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Mirex	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
o,p'-DDD	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
O,P'-Dde	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
o,p'-DDT	µg/kg WW	0.99 U	0.97 U	0.99 U	1 U
Oxychlordane	µg/kg WW	1.7 U	0.97 U	0.99 U	1 U
Toxaphene	µg/kg WW	96 U	160 U	91 U	64 U
trans-Nonachlor	µg/kg WW	1.8 J	0.97 U	0.99 U	1 U
Decachlorobiphenyl	µg/kg WW	0.00715 *	0.0121 J	0.00996 J	0.00716 J
Total DiCB	µg/kg WW				
Total HpCB	µg/kg WW				
Total HxCB	µg/kg WW				
Total MoCB	µg/kg WW				
Total NoCB	µg/kg WW				
Total OcCB	µg/kg WW				
Total PCB homologues	µg/kg WW				
Total PeCB	µg/kg WW				
Total TeCB	µg/kg WW				
Total TrCB	µg/kg WW				
1,1'-Biphenyl, 2,2'-dichloro-	µg/kg WW	0.00928 U	0.0105 U	0.0147 U	0.0435 U
1,1'-Biphenyl, 2,4'-dichloro-	µg/kg WW	0.0231 U	0.0334 U	0.0247 U	0.091 U
1,1'-Biphenyl, 3,3'-dichloro-	µg/kg WW	0.0605 U	0.0665 U	0.0548 U	0.0601 U
103-PeCB	µg/kg WW	0.0937	0.125	0.0668	0.0533
104-PeCB	µg/kg WW	0.000686 U	0.00127 U	0.000454 U	0.000378 U
106-PeCB	µg/kg WW	0.00593 U	0.0226 U	0.0054 U	0.00608 U
107-PeCB [C]	µg/kg WW	0.0247	0.0331 *	0.0178	0.0206
109-PeCB	µg/kg WW	0.0494	0.0669 *	0.0378	0.0443

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR7	AR9	AR9
	Sample ID	AR8-00-CC00WB02-0-090826	AR8-00-CC00WB02-1-090826	AR9-00-CC00WB01-0-090825	AR9-00-CC00WB02-0-090825
	Type	Primary	Duplicate	Primary	Primary
	Date	8/26/2009	8/26/2009	8/25/2009	8/25/2009
Analyte	**Units**				
10-DiCB	µg/kg WW	0.00056 U	0.000583 U	0.000432 U	0.00217 U
110-PeCB [C]	µg/kg WW	0.264	0.432	0.184	0.192
111-PeCB	µg/kg WW	0.00353 U	0.0185 U	0.00596 U	0.00488 U
112-PeCB	µg/kg WW	0.00339 U	0.0163 U	0.00568 U	0.00465 U
120-PeCB	µg/kg WW	0.0116 J	0.0172 U	0.00765	0.00827
121-PeCB	µg/kg WW	0.00365 U	0.0178 U	0.00587 U	0.00481 U
122-PeCB	µg/kg WW	0.00668 U	0.0269 U	0.00596 U	0.00671 U
127-PeCB	µg/kg WW	0.00631 U	0.0239 U	0.0056 U	0.0063 U
128-HxCB [C]	µg/kg WW	0.186	0.275	0.17	0.183
129-HxCB [C]	µg/kg WW	3.53	4.34 J	2.63	3.27
12-DiCB [C]	µg/kg WW	0.00375 U	0.00335 U	0.00363 U	0.0112 U
130-HxCB	µg/kg WW	0.106	0.152	0.0938	0.105
131-HxCB	µg/kg WW	0.00673 U	0.0195 U	0.0143 U	0.00767 U
132-HxCB	µg/kg WW	0.194 J	0.327 J	0.165	0.193
133-HxCB	µg/kg WW	0.0903	0.103	0.0583	0.0773
134-HxCB	µg/kg WW	0.0652	0.101	0.0495	0.0668 *
135-HxCB [C]	µg/kg WW	1.05	1.67	0.875	1.18
136-HxCB	µg/kg WW	0.693	0.619	0.409	0.563
137-HxCB	µg/kg WW	0.0747	0.0936 *	0.0701	0.0843
139-HxCB [C]	µg/kg WW	0.0229 J	0.0194 U	0.0164	0.0166
141-HxCB	µg/kg WW	0.814	0.935	0.485	0.715
142-HxCB	µg/kg WW	0.007 U	0.0212 U	0.0152 U	0.00813 U
143-HxCB	µg/kg WW	0.00675 U	0.0238 U	0.0142 U	0.00758 U
144-HxCB	µg/kg WW	0.186	0.247	0.134	0.172
145-HxCB	µg/kg WW	0.00204 U	0.00417 U	0.00125 U	0.00117 U
146-HxCB	µg/kg WW	0.754 J	0.936	0.511	0.705
147-HxCB [C]	µg/kg WW	2.7	3.71	1.86	2.5
148-HxCB	µg/kg WW	0.00448 J	0.00504 U	0.00307 *	0.00306
14-DiCB	µg/kg WW	0.000696 U	0.00087 U	0.000471 U	0.000369 U
150-HxCB	µg/kg WW	0.0102 J	0.0173 J	0.0104	0.00704
152-HxCB	µg/kg WW	0.00193 U	0.00384 U	0.00118 U	0.0011 U
154-HxCB	µg/kg WW	0.0575	0.0797	0.0391	0.046
155-HxCB	µg/kg WW	0.00235 J	0.00291 U	0.000978 *	0.000973 *
158-HxCB	µg/kg WW	0.221	0.317	0.165	0.248
159-HxCB	µg/kg WW	0.00661 U	0.0169 U	0.0053 U	0.0053 U
160-HxCB	µg/kg WW	0.00481 U	0.0155 U	0.0107 U	0.00573 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR7	AR9	AR9
	Sample ID	AR8-00-CC00WB02-0-090826	AR8-00-CC00WB02-1-090826	AR9-00-CC00WB01-0-090825	AR9-00-CC00WB02-0-090825
	Type	Primary	Duplicate	Primary	Primary
	Date	8/26/2009	8/26/2009	8/25/2009	8/25/2009
Analyte	**Units**				
161-HxCB	µg/kg WW	0.00473 U	0.0147 U	0.00995 U	0.00532 U
162-HxCB	µg/kg WW	0.00659 U	0.0152 U	0.00521 U	0.0052 U
164-HxCB	µg/kg WW	0.233	0.296	0.151	0.197
165-HxCB	µg/kg WW	0.00536 U	0.0165 U	0.0117 U	0.00625 U
16-TrCB	µg/kg WW	0.015 U	0.0185 U	0.0152 U	0.0796 U
171-HpCB [C]	µg/kg WW	0.136 J	0.243 J	0.133 J	0.16 J
172-HpCB	µg/kg WW	0.0109 U	0.0172 U	0.228 J	0.345 J
174-HpCB	µg/kg WW	1.35 J	1.84	1.11 J	1.68 J
175-HpCB	µg/kg WW	0.0231 *	0.0344	0.0221 J	0.0352 J
176-HpCB	µg/kg WW	0.263 J	0.244	0.174 J	0.251 J
177-HpCB	µg/kg WW	0.924 J	1.16	0.785 J	1.15 J
178-HpCB	µg/kg WW	0.554 J	0.601	0.421 J	0.585 J
179-HpCB	µg/kg WW	0.251 J	0.401	0.255 J	0.367 J
17-TrCB	µg/kg WW	0.0177 U	0.0174 U	0.017 U	0.0818 U
181-HpCB	µg/kg WW	0.00981 U	0.0169 U	0.0122 U	0.00894 U
182-HpCB	µg/kg WW	0.00276 U	0.00751 U	0.00264 U	0.00331 U
183-HpCB [C]	µg/kg WW	0.822 J	1.2	0.725 J	1.16 J
184-HpCB	µg/kg WW	0.00224 U	0.00586 U	0.00211 U	0.00265 U
186-HpCB	µg/kg WW	0.00233 U	0.00634 U	0.00222 U	0.00278 U
187-HpCB	µg/kg WW	3.17 J	4.12 J	2.06 J	2.96 J
188-HpCB	µg/kg WW	0.00629 J	0.00804 *	0.00489 J	0.00261 J
18-TrCB [C]	µg/kg WW	0.0345 U	0.0434 U	0.032 U	0.161 U
190-HpCB	µg/kg WW	0.292 J	0.421	0.184 J	0.265 J
191-HpCB	µg/kg WW	0.0651 J	0.0789	0.0401 J	0.0777 J
192-HpCB	µg/kg WW	0.262 J	0.323	0.0103 U	0.0076 U
195-OcCB	µg/kg WW	0.137 J	0.283 J	0.0884 J	0.121 J
196-OcCB	µg/kg WW	0.207 J	0.402 J	0.176 J	0.292 J
197-OcCB [C]	µg/kg WW	0.0807 J	0.126	0.0783 J	0.13 J
198-OcCB [C]	µg/kg WW	0.792 J	1.17	0.644 J	0.947 J
19-TrCB	µg/kg WW	0.00394 U	0.00519 U	0.00529 U	0.0217 U
1-MoCB	µg/kg WW	0.00395 U	0.00414 U	0.00606 U	0.00622 U
2,2',3,3',4,4',5,5'-Octachlorobiphenyl	µg/kg WW	0.196 J	0.425 J	0.109 J	0.151 J
2,2',3,3',4,4',5-Heptachlorobiphenyl	µg/kg WW	0.845 J	1.32	0.735 J	1.03 J
2,2',3,4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	4.77 J	5.23 J	2.85 J	5.02 J
2,2',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	4.94 J	6.01 J	3.59	4.59 J
2,2',5,5'-Tetrachlorobiphenyl	µg/kg WW	0.489	0.588	0.296	0.352

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR7	AR9	AR9
	Sample ID	AR8-00-CC00WB02-0-090826	AR8-00-CC00WB02-1-090826	AR9-00-CC00WB01-0-090825	AR9-00-CC00WB02-0-090825
	Type	Primary	Duplicate	Primary	Primary
	Date	8/26/2009	8/26/2009	8/25/2009	8/25/2009
Analyte	**Units**				
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	0.0612	0.0706	0.0293	0.0513
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg WW	0.306	0.336	0.16	0.241
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg WW	0.212 J	0.265 J	0.152 J	0.175 J
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.148	0.157	0.0789	0.113
2',3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0109 J	0.0244 U	0.00598 J	0.00687 *
2,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.83	0.965	0.535	0.648
2,3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0204 J	0.0291 U	0.0133 J	0.0166 J
201-OcCB	µg/kg WW	0.0573 J	0.0954	0.0523 J	0.0826 J
202-OcCB	µg/kg WW	0.117 J	0.172	0.0914 J	0.13 J
203-OcCB	µg/kg WW	0.219 J	0.386 J	0.187 J	0.24 J
204-OcCB	µg/kg WW	0.00465 U	0.00519 U	0.00423 U	0.00925 U
205-OcCB	µg/kg WW	0.0133 J	0.0203 *	0.02 U	0.0169 U
206-NoCB	µg/kg WW	0.0294 J	0.0637 J	0.0404 J	0.0431 J
207-NoCB	µg/kg WW	0.00766 J	0.0107	0.00778 *	0.00944 J
208-NoCB	µg/kg WW	0.0139 J	0.0226 J	0.0142 J	0.0169 J
20-TrCB [C]	µg/kg WW	0.116 U	0.156 U	0.0888 U	0.229
21-TrCB [C]	µg/kg WW	0.0275 U	0.0348 U	0.0251 U	0.107 U
22-TrCB	µg/kg WW	0.0227 U	0.026 U	0.0177 U	0.067 U
23-TrCB	µg/kg WW	0.000535 U	0.00148 U	0.000387 U	0.000616 U
24-TrCB	µg/kg WW	0.000611 U	0.00153 U	0.00129 U	0.00393 U
25-TrCB	µg/kg WW	0.0047 U	0.00628 U	0.00428 U	0.0137 U
26-TrCB [C]	µg/kg WW	0.0135 U	0.0166 U	0.0106 U	0.0373 U
27-TrCB	µg/kg WW	0.0027 U	0.00269 U	0.00259 U	0.0105 U
2-MoCB	µg/kg WW	0.00264 U	0.00276 U	0.00226 U	0.00242 U
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.0084 U	0.0156 U	0.00959 U	0.00909 U
3,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00708 U	0.0277 U	0.00705 U	0.00932 J
3,3',4,4'-Tetrachlorobiphenyl	µg/kg WW	0.011	0.0125	0.00621	0.00844
3,4,4',5-Tetrachlorobiphenyl	µg/kg WW	0.0027 U	0.00763 U	0.00357 U	0.00493 U
31-TrCB	µg/kg WW	0.0672 U	0.0914 U	0.0535 U	0.185
32-TrCB	µg/kg WW	0.0114 U	0.0137 U	0.0101 U	0.0489 U
34-TrCB	µg/kg WW	0.000534 U	0.00142 U	0.000406 U	0.000645 U
35-TrCB	µg/kg WW	0.00191 U	0.00214 U	0.00172	0.00258
36-TrCB	µg/kg WW	0.000807 U	0.0019 U	0.000952 U	0.00105 U
37-TrCB	µg/kg WW	0.0281 U	0.0383 U	0.0211 U	0.0369 U
38-TrCB	µg/kg WW	0.000832 U	0.0021 U	0.00104 U	0.00115 U
39-TrCB	µg/kg WW	0.000844 U	0.00206 U	0.00101 U	0.00112 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR7	AR9	AR9
	Sample ID	AR8-00-CC00WB02-0-090826	AR8-00-CC00WB02-1-090826	AR9-00-CC00WB01-0-090825	AR9-00-CC00WB02-0-090825
	Type	Primary	Duplicate	Primary	Primary
	Date	8/26/2009	8/26/2009	8/25/2009	8/25/2009
Analyte	**Units**				
3-MoCB	µg/kg WW	0.00626 U	0.00681 U	0.00561 U	0.00673 U
4,4'-Dichlorobiphenyl	µg/kg WW	0.0284 U	0.0324 U	0.0384 U	0.0598 J
40-TeCB [C]	µg/kg WW	0.019 U	0.0198 U	0.0105 U	0.0294 U
41-TeCB	µg/kg WW	0.00533 U	0.00718 U	0.00377 U	0.0117 U
42-TeCB	µg/kg WW	0.0114 U	0.013 U	0.00675 U	0.0182 U
43-TeCB	µg/kg WW	0.00304 U	0.00599 U	0.00334 U	0.00444
44-TeCB [C]	µg/kg WW	0.117 U	0.157 U	0.0651 U	0.113 U
45-TeCB [C]	µg/kg WW	0.00873 U	0.00902 U	0.00627 U	0.0213 U
46-TeCB	µg/kg WW	0.00224 U	0.00212 U	0.0015 *	0.00566
48-TeCB	µg/kg WW	0.0111 U	0.0102 U	0.00591 U	0.0232 U
49-TeCB [C]	µg/kg WW	0.164	0.233	0.0907 U	0.108
50-TeCB [C]	µg/kg WW	0.00792 U	0.00923 U	0.00418 U	0.0139 U
54-TeCB	µg/kg WW	0.000681 U	0.000889 U	0.00046 *	0.000704 *
55-TeCB	µg/kg WW	0.00281 J	0.00737 U	0.00239 U	0.00352 U
56-TeCB	µg/kg WW	0.0436 U	0.0548 U	0.0177 U	0.0229 U
57-TeCB	µg/kg WW	0.00279 U	0.00724 U	0.00238 U	0.00351 U
58-TeCB	µg/kg WW	0.0148 *	0.00789 U	0.00249 U	0.00367 U
59-TeCB [C]	µg/kg WW	0.00942 U	0.013 U	0.00542 U	0.0105 U
5-DiCB	µg/kg WW	0.00242 U	0.00218 U	0.0039 U	0.0123 J
60-TeCB	µg/kg WW	0.0378 U	0.0489	0.0178 U	0.0213 U
61-TeCB [C]	µg/kg WW	0.227	0.335	0.126 U	0.16
63-TeCB	µg/kg WW	0.00749	0.0117 *	0.00513	0.00508
64-TeCB	µg/kg WW	0.0225 U	0.0307 U	0.0125 U	0.0293 U
66-TeCB	µg/kg WW	0.186	0.243	0.0924 U	0.104
67-TeCB	µg/kg WW	0.00338 *	0.0063 U	0.0021 U	0.0031 U
68-TeCB	µg/kg WW	0.00406 J	0.00777 U	0.00215 U	0.00318 U
6-DiCB	µg/kg WW	0.00605 U	0.00646 U	0.00849 U	0.0311 U
72-TeCB	µg/kg WW	0.00688	0.00925	0.00368 *	0.00393 U
73-TeCB	µg/kg WW	0.00191 *	0.00427 U	0.00223 U	0.00101 U
78-TeCB	µg/kg WW	0.0026 U	0.00791 U	0.00244 U	0.00359 U
79-TeCB	µg/kg WW	0.00577 *	0.00665 U	0.00443	0.00538
7-DiCB	µg/kg WW	0.00178 U	0.00159 U	0.00257 U	0.00557 U
80-TeCB	µg/kg WW	0.00248 U	0.0068 U	0.00213 U	0.00313 U
82-PeCB	µg/kg WW	0.00879 J	0.0257 U	0.00833 U	0.00683 U
83-PeCB	µg/kg WW	0.0315	0.0306	0.0257	0.0266
84-PeCB	µg/kg WW	0.0379	0.0547	0.0271 U	0.0303 U

TABLE G-9
ANALYTICAL RESULTS - CRAYFISH - 2009 - ALL ANALYTES EXCEPT FOR MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR7	AR7	AR9	AR9
	Sample ID	AR8-00-CC00WB02-0-090826	AR8-00-CC00WB02-1-090826	AR9-00-CC00WB01-0-090825	AR9-00-CC00WB02-0-090825
	Type	Primary	Duplicate	Primary	Primary
	Date	8/26/2009	8/26/2009	8/25/2009	8/25/2009
Analyte	**Units**				
85-PeCB [C]	µg/kg WW	0.103	0.13	0.0796	0.0797
86-PeCB [C]	µg/kg WW	0.302	0.443	0.228	0.253
88-PeCB [C]	µg/kg WW	0.0833	0.129	0.0672	0.0538
89-PeCB	µg/kg WW	0.00515 U	0.0251 U	0.00848 U	0.00695 U
90-PeCB [C]	µg/kg WW	1.57	2.1	1.06	1.31
92-PeCB	µg/kg WW	0.213	0.315	0.149	0.189
93-PeCB [C]	µg/kg WW	0.0181 J	0.0246 U	0.011	0.0096
94-PeCB	µg/kg WW	0.00543 U	0.0285 U	0.00849 U	0.00696 U
95-PeCB	µg/kg WW	0.758	0.992	0.491	0.513
96-PeCB	µg/kg WW	0.00116 U	0.00231 U	0.000847 U	0.000906 *
98-PeCB [C]	µg/kg WW	0.00467 U	0.0224 U	0.00781 U	0.0064 U
99-PeCB	µg/kg WW	0.681	0.963	0.498	0.518
9-DiCB	µg/kg WW	0.00208 U	0.00251 U	0.00306 U	0.00869 U
Decachlorobiphenyl	µg/kg WW	0.00715 *	0.0121 J	0.00996 J	0.00716 J
PCB Dioxin-like Congener TEQ (bird)	µg/kg WW	0.003426758		0.001054522	0.001405452
PCB Dioxin-like Congener TEQ (fish)	µg/kg WW				
PCB Dioxin-like Congener TEQ (mammal)	µg/kg WW	0.002822376		0.000734855	0.000970397
tPCBs_all	µg/kg WW	46.0868495		28.142637	39.446641
tPCBs_detects	µg/kg WW	44.709705		26.919678	37.950173
Antimony	µg/kg WW	14.2 U	14.1 U	11 U	11 U
Arsenic	µg/kg WW	201	220	250	189
Beryllium	µg/kg WW	2.9 J	4 J	7.1	6.6
Cadmium	µg/kg WW	105	90	108	96.9
Chromium	µg/kg WW	796 J	2140 J	681 J	492 J
Copper	µg/kg WW	30600	36300	38900 J	29200 J
Lead	µg/kg WW	327 J	566 J	683	306
Nickel	µg/kg WW	1270 J	2250 J	1150	779
Selenium	µg/kg WW	170	161	239	112
Strontium	µg/kg WW	127000	116000	95000	91000
Vanadium	µg/kg WW	252	285	517	370
Zinc	µg/kg WW	24100 J	30000 J	27400 J	23400 J
Lipids, total	%	0.75	0.73	0.74	0.54
Residue, total	%	28.6	28.6	28.6	25.9

TABLE G-10
ANALYTICAL RESULTS - CRAYFISH - 2009 AND 2011 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Reach	Sample ID	Type	Date	Total Mercury (µg/kg WW)
AR2	AR2-WB-CC00WB01-0-090824	Primary	8/24/2009	68.1
	AR2-WB-CC00WB02-0-090824	Primary	8/24/2009	75
	AR2-WB-CIWB01	Primary	2011	57.29162252
	AR2-WB-CIWB02	Primary	2011	51.00196091
	AR2-WB-CIWB03	Primary	2011	45.36523575
	AR2-WB-CIWB04	Primary	2011	61.7727061
	AR2-WB-CIWB05	Primary	2011	50.20678536
	AR2-WB-CIWB06	Primary	2011	61.22649183
	AR2-WB-CIWB07	Primary	2011	64.26578077
	AR2-WB-CIWB08	Primary	2011	64.44346026
	AR2-WB-CIWB09	Primary	2011	42.14337307
	AR2-WB-CIWB10	Primary	2011	49.25091467
AR3	AR3-00-CC00WB01-0-090826	Primary	8/26/2009	158
	AR3-00-CC00WB02-0-090827	Primary	8/27/2009	111
AR4	AR4-00-CC00WB01-0-090826	Primary	8/26/2009	56.6
	AR4-00-CC00WB02-0-090827	Primary	8/27/2009	50.9
AR5	AR5-0-CIWB01	Primary	2011	104.9751481
	AR5-0-CIWB02	Primary	2011	122.3967142
	AR5-0-CIWB03	Primary	2011	66.37880222
	AR5-0-CIWB04	Primary	2011	169.3361813
	AR5-0-CIWB05	Primary	2011	109.7447277
	AR5-0-CIWB06	Primary	2011	147.4357571
	AR5-0-CIWB07	Primary	2011	176.0511218
	AR5-0-CIWB08	Primary	2011	87.23356046
	AR5-0-CIWB09	Primary	2011	109.5599959
	AR5-0-CIWB10	Primary	2011	69.21406545
AR6	AR7-00-CC00WB01-0-090828	Primary	8/28/2009	85.6
	AR6-0-CIWB01	Primary	2011	94.95565854
	AR6-0-CIWB02	Primary	2011	72.46694766
	AR6-0-CIWB03	Primary	2011	76.4961068
	AR6-0-CIWB04	Primary	2011	88.76990948
	AR6-0-CIWB05	Primary	2011	106.3945265
	AR6-0-CIWB06	Primary	2011	70.15645424
	AR6-0-CIWB07	Primary	2011	93.23507343
	AR6-0-CIWB08	Primary	2011	137.5629593
	AR6-0-CIWB09	Primary	2011	106.963364
	AR6-0-CIWB10	Primary	2011	88.76162111
AR7	AR7-0-CIWB01	Primary	2011	105.9238394
	AR7-0-CIWB02	Primary	2011	122.3216868
	AR7-0-CIWB03	Primary	2011	61.19921452
	AR7-0-CIWB04	Primary	2011	115.7728169
	AR7-0-CIWB05	Primary	2011	80.99162424
	AR7-0-CIWB06	Primary	2011	46.20845193
	AR7-0-CIWB07	Primary	2011	53.44075834
	AR7-0-CIWB08	Primary	2011	72.28492104
	AR7-0-CIWB09	Primary	2011	113.9225613
	AR7-0-CIWB10	Primary	2011	71.80741796
AR8	AR8-00-CC00WB01-0-090826	Primary	8/26/2009	74
	AR8-00-CC00WB02-0-090826	Primary	8/26/2009	74.2
	AR8-00-CC00WB02-1-090826	Duplicate	8/26/2009	61.1
AR9	AR9-00-CC00WB01-0-090825	Primary	8/25/2009	104
	AR9-00-CC00WB02-0-090825	Primary	8/25/2009	68.4

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR3	AR3	AR4	AR6	AR6
	Sample ID	AR2-WB-FFSBSO04-0-090824	AR2-WB-FFSBSO05-0-090824	AR2-WB-FFSBSO06-0-090824	AR3-00-FFSBSO02-0-090827	AR3-00-FFSBSO03-0-090827	AR4-00-FFSBSO01-0-090826	AR7-00-FFSBSO01-0-090827	AR7-00-FFSBSO02-0-090827
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/24/2009	8/27/2009	8/27/2009	8/26/2009	8/27/2009	8/27/2009
Analyte	**Units**								
1,1'-Biphenyl	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Acetophenone	µg/kg WW	55 U	30 U	22 U	29 U	19 U	35 U	20 U	19 U
Benzaldehyde	µg/kg WW	1000 U	1000 U	1000 U	1000 U	950 U	960 U	980 U	920 U
Bis(2-Chloroethyl)Ether	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Hexachlorobenzene	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	1	2 U	2 U
Hexachloroethane	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
1,2,4,5-Tetrachlorobenzene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
2,3,4,6-Tetrachlorophenol	µg/kg WW	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
2,4,5-Trichlorophenol	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
2,4,6-Trichlorophenol	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
2,4-Dichlorophenol	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
2,4-Dimethylphenol	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
2,4-Dinitrophenol	µg/kg WW	250 U	250 U	250 U	250 U	240 U	240 U	250 U	230 U
2,4-Dinitrotoluene	µg/kg WW	40 U	40 U	40 U	40 U	38 U	39 U	40 U	37 U
2,6-Dinitrotoluene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
2-Chlorophenol	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
2-Methylphenol	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
2-Nitroaniline	µg/kg WW	100 U	100 U	100 U	100 U	95 U	96 U	98 U	92 U
2-Nitrophenol	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
3,3'-Dichlorobenzidine	µg/kg WW	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
3-Nitroaniline	µg/kg WW	200 U	200 U	200 U	200 U	190 U	200 U	200 U	190 U
4,6-Dinitro-2-Methylphenol	µg/kg WW	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
4-Bromophenyl-Phenylether	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
4-Chloro-3-Methylphenol	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
4-Chloroaniline	µg/kg WW	400 U	400 U	400 U	400 U	400 U	400 U	400 U	400 U
4-Chlorophenyl-Phenylether	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
4-Methylphenol	µg/kg WW	14 J	20 U	20 U	20 U	19 U	20 U	20 U	19 U
4-Nitroaniline	µg/kg WW	200 U	200 U	200 U	200 U	190 U	200 U	200 U	190 U
4-Nitrophenol	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Atrazine	µg/kg WW	390 U	390 U	390 U	390 U	380 U	380 U	390 U	360 U
Bis(2-Chloroethoxy)Methane	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Bis(2-chloroisopropyl) ether	µg/kg WW	100 U	100 U	100 U	100 U	95 U	96 U	98 U	92 U
Bis(2-Ethylhexyl)Phthalate	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Butylbenzylphthalate	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Caprolactam	µg/kg WW	100 U	100 U	100 U	100 U	95 U	96 U	98 U	92 U
Dibenzofuran	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR3	AR3	AR4	AR6	AR6
	Sample ID	AR2-WB-FFSBSO04-0-090824	AR2-WB-FFSBSO05-0-090824	AR2-WB-FFSBSO06-0-090824	AR3-00-FFSBSO02-0-090827	AR3-00-FFSBSO03-0-090827	AR4-00-FFSBSO01-0-090826	AR7-00-FFSBSO01-0-090827	AR7-00-FFSBSO02-0-090827
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/24/2009	8/27/2009	8/27/2009	8/26/2009	8/27/2009	8/27/2009
Analyte	**Units**								
Diethylphthalate	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Dimethylphthalate	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Di-n-butyl phthalate	µg/kg WW	100 U	100 U	120 U	100 U	100 U	100 U	100 U	100 U
Di-n-octyl phthalate	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Hexachlorobutadiene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Hexachlorocyclopentadiene	µg/kg WW	500 U	500 U	500 U	500 U	480 U	480 U	490 U	460 U
Isophorone	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Nitrobenzene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
N-Nitroso-Di-N-Propylamine	µg/kg WW	22 U	22 U	22 U	22 U	22 U	22 U	22 U	22 U
N-Nitrosodiphenylamine	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Pentachlorophenol	µg/kg WW	50 U	50 U	50 U	50 U	48 U	48 U	49 U	46 U
Phenol	µg/kg WW	50 U	50 U	50 U	50 U	48 U	48 U	49 U	46 U
2-Chloronaphthalene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
2-Methylnaphthalene	µg/kg WW	20 U	20 U	20 U	20 U	4.3 J	20 U	20 U	19 U
Acenaphthene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Acenaphthylene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Anthracene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Benzo(a)anthracene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Benzo(a)pyrene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Benzo(b)fluoranthene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Benzo(g,h,i)perylene	µg/kg WW	20 U	20 U	20 U	5.1 J	19 U	20 U	20 U	19 U
Benzo(k)fluoranthene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Carbazole	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Chrysene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Dibenz(a,h)anthracene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Fluoranthene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Fluorene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
Indeno(1,2,3-cd)pyrene	µg/kg WW	20 U	20 U	20 U	7.2 J	19 U	20 U	20 U	19 U
Naphthalene	µg/kg WW	20 U	20 U	20 U	20 U	6 J	20 U	5.1 J	19 U
Phenanthrene	µg/kg WW	20 U	20 U	20 U	20 U	2.7 J	2.8 J	3.6 J	3.7 J
Pyrene	µg/kg WW	20 U	20 U	20 U	20 U	19 U	20 U	20 U	19 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg WW	0.000988 U	0.000816 U	0.000613 U	0.000661 U	0.000581 U	0.00102 U	0.000933 U	0.000755 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg WW	0.0013 U	0.00217 J	0.00101 U	0.000791 U	0.000826 J	0.00154 U	0.00176 *	0.000891 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg WW	0.000312 U	0.000261 U	0.00025 U	0.000233 U	0.000235 U	0.00046 J	0.000265 U	0.000237 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg WW	0.000567 U	0.000515 U	0.000477 U	0.000391 U	0.000448 U	0.000691 U	0.000581 U	0.000448 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg WW	0.000513 U	0.000403 U	0.000375 U	0.000337 U	0.000365 U	0.000614 U	0.000429 U	0.00037 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR3	AR3	AR4	AR6	AR6
	Sample ID	AR2-WB-FFSBSO04-0-090824	AR2-WB-FFSBSO05-0-090824	AR2-WB-FFSBSO06-0-090824	AR3-00-FFSBSO02-0-090827	AR3-00-FFSBSO03-0-090827	AR4-00-FFSBSO01-0-090826	AR7-00-FFSBSO01-0-090827	AR7-00-FFSBSO02-0-090827
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/24/2009	8/27/2009	8/27/2009	8/26/2009	8/27/2009	8/27/2009
Analyte	**Units**								
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000175 U	0.000199 U	0.000184 U	0.000167 U	0.000175 U	0.00235 J	0.000249 J	0.000175 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000367 U	0.000299 U	0.000312 U	0.000253 U	0.000256 U	0.000473 U	0.000329 U	0.000266 U
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000183 U	0.000191 U	0.000183 U	0.000152 U	0.000176 U	0.000288 *	0.000183 U	0.000167 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000371 U	0.000309 U	0.00032 U	0.000267 U	0.000273 U	0.00046 U	0.000352 U	0.000271 U
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg WW	0.000252 U	0.000265 U	0.00026 U	0.000217 U	0.000248 U	0.000412 U	0.000278 U	0.000252 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000381 U	0.000313 U	0.000326 U	0.000268 U	0.000273 U	0.000481 U	0.000351 U	0.000277 U
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg WW	0.000131 U	0.000144 U	0.000123 U	0.000146 *	0.000243 J	0.00194 J	0.00103 J	0.000509 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg WW	0.000253 U	0.000221 U	0.000197 U	0.000192 U	0.000223 U	0.000348 U	0.000242 U	0.00018 U
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000178 U	0.000198 U	0.000181 U	0.000162 U	0.000192 U	0.000269 U	0.000206 U	0.000171 U
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg WW	0.000137 U	0.00015 U	0.000122 U	0.000245 J	0.000597 J	0.00261 J	0.00134 J	0.000824 J
2,3,7,8-TCDD TEQ (bird)	µg/kg WW	0.0011282488 U	0.001377309	0.0009076623 U	0.001403975	0.002103891	0.009148656	0.006790119	0.003092635
2,3,7,8-TCDD TEQ (fish)	µg/kg WW	0.0006228488 U	0.000946459	0.0004899623 U	0.000568325	0.000795741	0.002588156	0.001442119	0.000897685
2,3,7,8-TCDD TEQ (mammal)	µg/kg WW	0.0006159364 U	0.000932526	0.0004818769 U	0.000553846	0.000724262	0.002299368	0.001397558	0.000815534
2,3,7,8-Tetrachlorodibenzofuran	µg/kg WW	0.000453 U	0.000367 U	0.000369 U	0.000743 J	0.00105	0.00543	0.00487	0.00185
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg WW	0.000233 U	0.000583 *	0.000168 U	0.000175 U	0.000172 U	0.000298 *	0.000189 U	0.000151 U
Heptachlorodibenzofuran (total)	µg/kg WW	0.000312 U	0.000261 U	0.00025 U	0.000233 U	0.000235 U	0.00046 J	0.000265 U	0.000237 U
Heptachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000567 U	0.000515 U	0.000477 U	0.000391 U	0.000448 U	0.000691 U	0.000581 U	0.000448 U
Hexachlorodibenzofuran (total)	µg/kg WW	0.000175 U	0.000202 J	0.000181 U	0.000152 U	0.000175 U	0.00235 J	0.000249 J	0.000167 U
Hexachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000367 U	0.000299 U	0.000312 U	0.000253 U	0.000256 U	0.00046 U	0.000329 U	0.000266 U
Pentachlorodibenzofuran (total)	µg/kg WW	0.000131 U	0.000144 U	0.000122 U	0.000245 J	0.00084 J	0.00574 J	0.00237 J	0.00133 J
Pentachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000253 U	0.000221 U	0.000197 U	0.000192 U	0.000223 U	0.000348 U	0.000242 U	0.00018 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg WW	0.000233 U	0.000193 U	0.000168 U	0.000175 U	0.000172 U	0.00026 U	0.000189 U	0.000151 U
Tetrachlorodibenzofuran (total)	µg/kg WW	0.000453 U	0.000229 U	0.000591 U	0.000743 J	0.00105 J	0.00586 J	0.00487 J	0.00203 J
4,4'-DDD	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	1.4 U	2 U	2 U
4,4'-DDe	µg/kg WW	3.2	1.9 U	2.2 J	2 J	1.9 U	1.3 U	3.2 J	2 U
4,4'-DDT	µg/kg WW	1.9 U	1.9 U	2 U	9	4.3	210 D	6.2	3.7
Aldrin	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
Alpha-Bhc	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
alpha-Chlordane	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
beta-BHC	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	1.4	2 U	2 U
beta-Chlordane	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	1.7 U	1.3 J	2 U
Chlordane	µg/kg WW	19 U	19 U	20 U	20 U	19 U	15 U	20 U	20 U
Chlorpyrifos	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
cis-Nonachlor	µg/kg WW	1.9 U	1.9 U	2 U	2 U	4.3 U	170 U	5.3 U	3.3 U
Delta-Bhc	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
Dieldrin	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR3	AR3	AR4	AR6	AR6
	Sample ID	AR2-WB-FFSBSO04-0-090824	AR2-WB-FFSBSO05-0-090824	AR2-WB-FFSBSO06-0-090824	AR3-00-FFSBSO02-0-090827	AR3-00-FFSBSO03-0-090827	AR4-00-FFSBSO01-0-090826	AR7-00-FFSBSO01-0-090827	AR7-00-FFSBSO02-0-090827
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/24/2009	8/27/2009	8/27/2009	8/26/2009	8/27/2009	8/27/2009
Analyte	**Units**								
Endosulfan I	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.53 J	2 U	2 U
Endosulfan II	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	2.7 U	2 U	2 U
Endosulfan Sulfate	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
Endrin aldehyde	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	11 U	2 U	2 U
Endrin Ketone	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
Endrin	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
gamma-BHC (Lindane)	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
Heptachlor epoxide	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
Heptachlor	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
Methoxychlor	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
Mirex	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
o,p'-DDD	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	56 JD	2 U	2 U
O,P'-Dde	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
o,p'-DDT	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	18 U	2.2 U	2 U
Oxychlordane	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
Toxaphene	µg/kg WW	94 U	95 U	100 U	300 U	140 U	2500 U	190 U	140 U
trans-Nonachlor	µg/kg WW	1.9 U	1.9 U	2 U	2 U	1.9 U	0.99 U	2 U	2 U
Decachlorobiphenyl	µg/kg WW	0.0279 J	0.0077	0.00748 J	0.0202 J	0.0185 *	0.0725	0.0205 J	0.013 J
1,1'-Biphenyl, 2,2'-dichloro-	µg/kg WW	0.0218 U	0.0134 U	0.016 U	0.0437 U	0.0266 U	0.0215 U	0.0219 U	0.0152 U
1,1'-Biphenyl, 2,4'-dichloro-	µg/kg WW	0.0143 U	0.031 U	0.036 U	0.111 U	0.0509 U	0.0332 U	0.0176 U	0.0259 U
1,1'-Biphenyl, 3,3'-dichloro-	µg/kg WW	0.0461 U	0.0445 U	0.0448 U	0.0482 U	0.0472 U	0.0556 U	0.0363 U	0.0472 U
103-PeCB	µg/kg WW	0.00542 U	0.00533 U	0.00504 U	0.0342	0.0179	0.214	0.0354	0.0164
104-PeCB	µg/kg WW	0.000545 U	0.00104 U	0.000408 U	0.000696 U	0.000557 U	0.00171 U	0.000795 U	0.000671 U
106-PeCB	µg/kg WW	0.00488 U	0.0045 U	0.00337 U	0.0114 U	0.00906 U	0.0492 U	0.0104 U	0.00822 U
107-PeCB [C]	µg/kg WW	0.0134	0.00477 U	0.00527	0.0295	0.0249	0.509	0.0463	0.0247
109-PeCB	µg/kg WW	0.0332	0.00461 U	0.0127	0.0725	0.067	0.632	0.0983	0.0663
10-DiCB	µg/kg WW	0.00158 U	0.000831 U	0.00101 U	0.00218 U	0.00133 U	0.000723 U	0.0015 U	0.000932 U
110-PeCB [C]	µg/kg WW	0.253	0.0391 U	0.0952	0.826	0.721	36.2 J	1.25	0.57
111-PeCB	µg/kg WW	0.00407 U	0.00433 U	0.00364 U	0.00443 U	0.00854 U	0.0251 U	0.00409 U	0.00409 U
112-PeCB	µg/kg WW	0.00405 U	0.00421 U	0.00369 U	0.00441 U	0.00848 U	0.0221 U	0.00406 U	0.00406 U
120-PeCB	µg/kg WW	0.00378 U	0.00405 U	0.00344 U	0.0119	0.00794 U	0.0233 U	0.0108	0.00585
121-PeCB	µg/kg WW	0.00433 U	0.00434 U	0.0038 U	0.00472 U	0.00908 U	0.0242 U	0.00435 U	0.00421 U
122-PeCB	µg/kg WW	0.00558 U	0.00502 U	0.00391 U	0.0131 U	0.0103 U	0.104	0.0119 U	0.00948 U
127-PeCB	µg/kg WW	0.00491 U	0.00484 U	0.00357 U	0.0115 U	0.0091 U	0.052 U	0.0105 U	0.0084 U
128-HxCB [C]	µg/kg WW	0.0988	0.00899 U	0.0317	0.608	0.394	14.3 J	0.417	0.299
129-HxCB [C]	µg/kg WW	1.08	0.0984	0.348	10.7 J	6.03 J	283 J	5.78 J	4.86 J

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR3	AR3	AR4	AR6	AR6
	Sample ID	AR2-WB-FFSBSO04-0-090824	AR2-WB-FFSBSO05-0-090824	AR2-WB-FFSBSO06-0-090824	AR3-00-FFSBSO02-0-090827	AR3-00-FFSBSO03-0-090827	AR4-00-FFSBSO01-0-090826	AR7-00-FFSBSO01-0-090827	AR7-00-FFSBSO02-0-090827
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/24/2009	8/27/2009	8/27/2009	8/26/2009	8/27/2009	8/27/2009
Analyte	**Units**								
12-DiCB [C]	µg/kg WW	0.00449 U	0.00132 U	0.00414 U	0.0104 U	0.0062 U	0.00945 U	0.00513 U	0.00362 U
130-HxCB	µg/kg WW	0.0508	0.011 U	0.0182	0.301	0.178	7.75 J	0.218	0.157
131-HxCB	µg/kg WW	0.00888 U	0.00975 U	0.00915 U	0.042 U	0.0133 *	0.676	0.0213 U	0.0266 U
132-HxCB	µg/kg WW	0.0952	0.0126 U	0.0336 U	1.3	0.782	68.8 J	0.796	0.484
133-HxCB	µg/kg WW	0.0229	0.0103 U	0.00933 U	0.178	0.12	3.04	0.11	0.0883
134-HxCB	µg/kg WW	0.0168	0.0123 U	0.0119 U	0.215	0.113	10 J	0.14	0.0761
135-HxCB [C]	µg/kg WW	0.212	0.0245 U	0.0724	3.62	1.92	164 J	2.34 J	1.67
136-HxCB	µg/kg WW	0.0356	0.008 U	0.0152 U	0.944	0.363	32.9 J	0.499	0.401
137-HxCB	µg/kg WW	0.0363	0.0105 U	0.0123	0.173	0.136	2.37	0.152	0.109
139-HxCB [C]	µg/kg WW	0.00949	0.00961 U	0.00862 U	0.0409 U	0.0259	0.227	0.0489	0.0253 U
141-HxCB	µg/kg WW	0.125	0.0122	0.0456	2.56	1.3	85.1 J	1.07	0.962
142-HxCB	µg/kg WW	0.00952 U	0.0103 U	0.00965 U	0.045 U	0.0094 U	0.0592 U	0.0128 U	0.029 U
143-HxCB	µg/kg WW	0.00909 U	0.0089 U	0.00862 U	0.043 U	0.00897 U	0.0665 U	0.0122 U	0.0284 U
144-HxCB	µg/kg WW	0.0254	0.00474 U	0.00891	0.524	0.27	21 J	0.28 J	0.197
145-HxCB	µg/kg WW	0.00223 U	0.00381 U	0.00165 U	0.00287 U	0.00276 U	0.00793 U	0.00279 U	0.00237 U
146-HxCB	µg/kg WW	0.209 J	0.021	0.0724	2.04	1.19	41.9 J	1.02	0.957
147-HxCB [C]	µg/kg WW	0.482	0.0646 U	0.161	7.87 J	4.35 J	324 J	4.22 J	3.45
148-HxCB	µg/kg WW	0.0027 U	0.00468 U	0.00206 U	0.00985	0.00897	0.0261	0.0114	0.00475
14-DiCB	µg/kg WW	0.000522 U	0.00128 U	0.000449 U	0.000476 U	0.000472 U	0.000936 U	0.000511 U	0.000555 U
150-HxCB	µg/kg WW	0.00207 U	0.00363 U	0.00157 U	0.00669	0.00323 *	0.0388	0.0114	0.0035 *
152-HxCB	µg/kg WW	0.00205 U	0.00355 U	0.00153 U	0.00265 U	0.00254 U	0.0073 U	0.00257 U	0.00233 U
154-HxCB	µg/kg WW	0.0107	0.00413 U	0.00377	0.0891	0.0693	0.347	0.101 J	0.0416
155-HxCB	µg/kg WW	0.00109 U	0.00321 U	0.00074 U	0.00145 U	0.00148 U	0.00658	0.00123 U	0.00124 U
158-HxCB	µg/kg WW	0.0666	0.00709 U	0.0204	0.741	0.437	21.5 J	0.439	0.301
159-HxCB	µg/kg WW	0.00401 U	0.00439 U	0.00377 U	0.0116 U	0.00811 U	5.85 J	0.00704 U	0.00796 U
160-HxCB	µg/kg WW	0.00671 U	0.00796 U	0.00701 U	0.0318 U	0.00663 U	0.0435 U	0.00901 U	0.0201 U
161-HxCB	µg/kg WW	0.00615 U	0.00741 U	0.00669 U	0.0291 U	0.00607 U	0.0413 U	0.00826 U	0.0188 U
162-HxCB	µg/kg WW	0.00397 U	0.00448 U	0.00374 U	0.0115 U	0.00803 U	0.0843 U	0.0448	0.00809 U
164-HxCB	µg/kg WW	0.041	0.00742 U	0.0157 *	0.663	0.321	21.1 J	0.315	0.267
165-HxCB	µg/kg WW	0.00733 U	0.00851 U	0.0075 U	0.0347 U	0.00723 U	0.0463 U	0.00984 U	0.0216 U
16-TrCB	µg/kg WW	0.0193 U	0.0144 U	0.0221 U	0.0841 U	0.0369 U	0.0377 U	0.0377 U	0.0183 U
171-HpCB [C]	µg/kg WW	0.0808 J	0.00778 U	0.0198 *	1.24 J	0.662 J	34.8 J	0.501 J	0.389 J
172-HpCB	µg/kg WW	0.101 J	0.00773 U	0.00801 U	1.27 J	0.661 J	0.174 U	0.3 J	0.0137 U
174-HpCB	µg/kg WW	0.283 J	0.0365	0.0769 J	5.73 J	2.56 J	201 J	1.74 J	2.34 J
175-HpCB	µg/kg WW	0.016 J	0.00448 U	0.00708 U	0.173 J	0.109 J	4.72 J	0.0755 J	0.0593 J
176-HpCB	µg/kg WW	0.0243 J	0.00352 U	0.00826 *	0.688 J	0.266 J	18.6 J	0.246 J	0.267 J

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR3	AR3	AR4	AR6	AR6
	Sample ID	AR2-WB-FFSBSO04-0-090824	AR2-WB-FFSBSO05-0-090824	AR2-WB-FFSBSO06-0-090824	AR3-00-FFSBSO02-0-090827	AR3-00-FFSBSO03-0-090827	AR4-00-FFSBSO01-0-090826	AR7-00-FFSBSO01-0-090827	AR7-00-FFSBSO02-0-090827
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/24/2009	8/27/2009	8/27/2009	8/26/2009	8/27/2009	8/27/2009
Analyte	**Units**								
177-HpCB	µg/kg WW	0.216 J	0.0247	0.0625 J	3.75 J	1.68 J	91.3 J	1.3 J	1.46 J
178-HpCB	µg/kg WW	0.133 J	0.0125	0.0465 J	1.53 J	0.775 J	36.1 J	0.641 J	0.734 J
179-HpCB	µg/kg WW	0.0786 J	0.00904 U	0.0213 J	1.37 J	0.653 J	64.3 J	0.747 J	0.647 J
17-TrCB	µg/kg WW	0.0226 U	0.0156 U	0.0266 U	0.0946 U	0.0409 U	0.0866	0.0412 U	0.0214 U
181-HpCB	µg/kg WW	0.0106 U	0.00761 U	0.00786 U	0.0165 J	0.0105 U	0.172 U	0.00978 U	0.013 U
182-HpCB	µg/kg WW	0.0038 U	0.00451 U	0.00677 U	0.022 U	0.0108 J	0.157	0.00752 U	0.00926 J
183-HpCB [C]	µg/kg WW	0.336 J	0.0262 J	0.0985 J	4.29 J	2.15 J	108 J	1.5 J	1.47 J
184-HpCB	µg/kg WW	0.00301 U	0.00344 U	0.00531 U	0.0175 U	0.00265 U	0.0144 U	0.00597 U	0.00493 U
186-HpCB	µg/kg WW	0.00316 U	0.00372 U	0.00559 U	0.0183 U	0.00278 U	0.0156 U	0.00627 U	0.00514 U
187-HpCB	µg/kg WW	0.691 J	0.117	0.232 J	7.77 J	3.68 J	224 J	3.15 J	4.18 J
188-HpCB	µg/kg WW	0.00185 U	0.00403 U	0.00347 U	0.0113 U	0.00172 U	0.0164 U	0.00408 U	0.00327 U
18-TrCB [C]	µg/kg WW	0.0427 U	0.0272 U	0.0432 U	0.185	0.0763 U	0.301	0.0762 U	0.036 U
190-HpCB	µg/kg WW	0.0809 J	0.0108 J	0.0252 J	1.18 J	0.546 J	23.7 J	0.308 J	0.351 J
191-HpCB	µg/kg WW	0.0135	0.00542 U	0.00571 U	0.304 J	0.135 J	5.42 J	0.0735 J	0.0856 J
192-HpCB	µg/kg WW	0.00833 U	0.0101	0.0279 J	0.0123 U	0.00827 U	21.7 J	0.00768 U	0.38 J
195-OcCB	µg/kg WW	0.0518 J	0.00735 J	0.0145	0.54 J	0.281 J	19.4 J	0.186 J	0.144 J
196-OcCB	µg/kg WW	0.0914 J	0.0133 J	0.0255	1.18 J	0.577 J	22.8 J	0.34 J	0.289 J
197-OcCB [C]	µg/kg WW	0.0273 J	0.00382 U	0.00702 J	0.36 J	0.182 J	8.87 J	0.134 J	0.124 J
198-OcCB [C]	µg/kg WW	0.354 J	0.0548	0.109 J	3.21 J	1.59 J	50.3 J	0.893 J	1.05 J
19-TrCB	µg/kg WW	0.00712 U	0.00518 U	0.00722 U	0.0253	0.0131 U	0.00779 U	0.0115 U	0.00618 U
1-MoCB	µg/kg WW	0.00617 U	0.00343 U	0.00443 U	0.00639 U	0.00598 U	0.0113 U	0.00511 U	0.005 U
2,2',3,3',4,4',5,5'-Octachlorobiphenyl	µg/kg WW	0.0889 J	0.0191	0.0253 J	0.591 J	0.376 *	28.9 J	0.241 J	0.225 J
2,2',3,3',4,4',5-Heptachlorobiphenyl	µg/kg WW	0.334 J	0.0341	0.0924 J	5.4 J	2.67 J	119 J	1.5 J	1.53 J
2,2',3,4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	1.22 J	0.127	0.331 J	17.2 J	7.77 J	325 J	4.18 J	5.29 J
2,2',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	1.56	0.124	0.501	14.4 J	8.66 J	344 J	7.76 J	6.47 J
2,2',5,5'-Tetrachlorobiphenyl	µg/kg WW	0.167 U	0.0609 U	0.0891 U	0.359	0.223 U	6.95 J	0.586	0.169 U
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	0.0163	0.00218 U	0.00597 *	0.153 J	0.0858	2.87	0.0516	0.0557
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg WW	0.0791	0.00867	0.0285	0.768	0.471	14.7 J	0.404	0.303
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg WW	0.125 J	0.0192 U	0.0538 J	0.321 J	0.308 J	4.5 J	0.454 J	0.254 J
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.0463	0.00437	0.015 *	0.314	0.186	5.9 J	0.166	0.137
2',3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00534	0.00423 U	0.00383 U	0.0129 *	0.0114 *	0.127 J	0.019 J	0.0119 J
2,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.365	0.0472 U	0.137	1.28	1.19	19.3 J	1.52	0.845
2,3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00806 J	0.00519 U	0.00396 U	0.0226 J	0.0208 J	0.287 J	0.0403 J	0.0201 J
201-OcCB	µg/kg WW	0.0288 J	0.00392 U	0.00889 *	0.294 J	0.183 J	5.88 J	0.117 J	0.0944 J
202-OcCB	µg/kg WW	0.052 J	0.0075	0.0183 J	0.332 J	0.188 J	8.39 J	0.142 J	0.143 J
203-OcCB	µg/kg WW	0.166 J	0.0232	0.0552 J	0.971 J	0.572 J	20 J	0.422 J	0.366 J

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR3	AR3	AR4	AR6	AR6
	Sample ID	AR2-WB-FFSBSO04-0-090824	AR2-WB-FFSBSO05-0-090824	AR2-WB-FFSBSO06-0-090824	AR3-00-FFSBSO02-0-090827	AR3-00-FFSBSO03-0-090827	AR4-00-FFSBSO01-0-090826	AR7-00-FFSBSO01-0-090827	AR7-00-FFSBSO02-0-090827
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/24/2009	8/27/2009	8/27/2009	8/26/2009	8/27/2009	8/27/2009
Analyte	**Units**								
204-OcCB	µg/kg WW	0.00816 U	0.00383 U	0.00625 U	0.0123 U	0.0101 U	0.00988 U	0.0069 U	0.0026 U
205-OcCB	µg/kg WW	0.0141	0.00368 U	0.0096 U	0.0913 J	0.0567 J	1.45 J	0.0323 J	0.0328 J
206-NoCB	µg/kg WW	0.0938 J	0.0145 J	0.0263 J	0.204 J	0.152 J	3.23 J	0.135 J	0.0841 J
207-NoCB	µg/kg WW	0.0097 J	0.00242 U	0.00383 U	0.037 J	0.0265 J	0.604	0.0155 *	0.0111 J
208-NoCB	µg/kg WW	0.0242	0.0055 J	0.00735 J	0.0445 *	0.031 J	0.825 J	0.0324 J	0.0217
20-TrCB [C]	µg/kg WW	0.0709 U	0.0446 U	0.0607 U	0.215 U	0.1 U	0.768	0.2 U	0.0713 U
21-TrCB [C]	µg/kg WW	0.0289 U	0.0222 U	0.0307 U	0.117 U	0.0512 U	0.216	0.0595 U	0.0283 U
22-TrCB	µg/kg WW	0.0231 U	0.0184 U	0.0222 U	0.0718 U	0.0337 U	0.122	0.0509 U	0.0216 U
23-TrCB	µg/kg WW	0.000538 U	0.000692 U	0.000557 U	0.000862 U	0.000552 U	0.00299 U	0.000751 U	0.00061 U
24-TrCB	µg/kg WW	0.000605 U	0.000788 U	0.00111 U	0.0055 *	0.00179 U	0.0031 U	0.00195 U	0.000938 U
25-TrCB	µg/kg WW	0.00449 U	0.00298 U	0.00465 U	0.0143 U	0.00735 U	0.0303	0.00988 U	0.00351 U
26-TrCB [C]	µg/kg WW	0.0107 U	0.00664 U	0.0105 U	0.037 U	0.0172 U	0.132	0.024 U	0.00925 U
27-TrCB	µg/kg WW	0.00353 U	0.00292 U	0.00424 U	0.0136 U	0.00609 U	0.012	0.00662 U	0.00304 U
2-MoCB	µg/kg WW	0.00321 U	0.000841 U	0.00196 U	0.003 U	0.00273 U	0.00456 U	0.00214 U	0.00164 U
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.0066 U	0.0042 U	0.00578 U	0.0156 U	0.0123 U	0.0871 U	0.0124 U	0.0129 U
3,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00609 U	0.00541 U	0.00459 U	0.0285 J	0.0137 *	0.669 J	0.016 U	0.0137 J
3,3',4,4'-Tetrachlorobiphenyl	µg/kg WW	0.00868	0.00473 U	0.00382	0.00738	0.00762	0.169	0.0135	0.00542
3,4,4',5-Tetrachlorobiphenyl	µg/kg WW	0.00301 U	0.00431 U	0.00268 U	0.00376 U	0.00369 U	0.0118 U	0.00454 U	0.00365 U
31-TrCB	µg/kg WW	0.0517 U	0.0385 U	0.0517 U	0.188 U	0.0838 U	0.698	0.128 U	0.0501 U
32-TrCB	µg/kg WW	0.0133 U	0.01 U	0.0152 U	0.0551 U	0.0223 U	0.0368 U	0.0258 U	0.0128 U
34-TrCB	µg/kg WW	0.000552 U	0.000714 U	0.000554 U	0.000885 U	0.000566 U	0.00287 U	0.000771 U	0.000645 U
35-TrCB	µg/kg WW	0.00112 U	0.00165 U	0.000779 U	0.00225 *	0.0018	0.00391 U	0.00117 U	0.00145 U
36-TrCB	µg/kg WW	0.000998 U	0.00146 U	0.0007 U	0.00111 U	0.000659 U	0.00347 U	0.00104 U	0.00129 U
37-TrCB	µg/kg WW	0.0122 U	0.00911 U	0.00994 U	0.0275 U	0.0168 U	0.189	0.0234 U	0.0119 U
38-TrCB	µg/kg WW	0.00111 U	0.00153 U	0.000775 U	0.00123 U	0.000732 U	0.00383 U	0.00116 U	0.00143 U
39-TrCB	µg/kg WW	0.00107 U	0.00153 U	0.00073 U	0.00119 U	0.000708 U	0.00451	0.00112 U	0.00133 U
3-MoCB	µg/kg WW	0.00645 U	0.00433 U	0.00448 U	0.00598 U	0.0059 U	0.00971 U	0.00469 U	0.00492 U
4,4'-Dichlorobiphenyl	µg/kg WW	0.0152 U	0.0118 U	0.0156 U	0.0536 U	0.0255 U	0.0755 U	0.0228 U	0.013 U
40-TeCB [C]	µg/kg WW	0.0232 U	0.0163 U	0.0171 U	0.0524 U	0.0336 U	0.397	0.0638 U	0.022 U
41-TeCB	µg/kg WW	0.00707 U	0.00751 U	0.00592 U	0.0174 U	0.0078 U	0.0716 *	0.0127 U	0.00731 U
42-TeCB	µg/kg WW	0.0163 U	0.00995 U	0.0109 U	0.0297 U	0.0189 U	0.165	0.055	0.0158 U
43-TeCB	µg/kg WW	0.00266	0.0061 U	0.0027 U	0.00749	0.00444 *	0.0458	0.0074 *	0.00305 U
44-TeCB [C]	µg/kg WW	0.0881 U	0.047 U	0.0535 U	0.172	0.123 U	0.00996 U	0.293	0.0884
45-TeCB [C]	µg/kg WW	0.0103 U	0.00506 U	0.00955 U	0.0338 U	0.0176 U	0.0517 *	0.0283 U	0.0109 U
46-TeCB	µg/kg WW	0.00275 *	0.00228 U	0.00262 *	0.00902	0.00486	0.00361 U	0.00587	0.0029
48-TeCB	µg/kg WW	0.0135 U	0.00882 U	0.00893 U	0.0342 U	0.0181 U	0.211	0.0365 U	0.0118 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR3	AR3	AR4	AR6	AR6
	Sample ID	AR2-WB-FFSBSO04-0-090824	AR2-WB-FFSBSO05-0-090824	AR2-WB-FFSBSO06-0-090824	AR3-00-FFSBSO02-0-090827	AR3-00-FFSBSO03-0-090827	AR4-00-FFSBSO01-0-090826	AR7-00-FFSBSO01-0-090827	AR7-00-FFSBSO02-0-090827
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/24/2009	8/27/2009	8/27/2009	8/26/2009	8/27/2009	8/27/2009
Analyte	**Units**								
49-TeCB [C]	µg/kg WW	0.0592 U	0.0247 U	0.0331 U	0.145	0.0868 U	1.23	0.246	0.0692 U
50-TeCB [C]	µg/kg WW	0.00769 U	0.00281 U	0.00625 U	0.0233 U	0.0122 U	0.0452	0.0196 U	0.00769 U
54-TeCB	µg/kg WW	0.000481 U	0.00154 U	0.000371 U	0.00141 U	0.000863 U	0.00177 U	0.000797 *	0.000354 U
55-TeCB	µg/kg WW	0.00266 U	0.0044 U	0.00265 U	0.00331 U	0.00314 U	0.0346 *	0.00418 U	0.00347
56-TeCB	µg/kg WW	0.0271 U	0.0163 U	0.0151 U	0.0232 U	0.0219 U	0.567	0.0695	0.0263 U
57-TeCB	µg/kg WW	0.00277 U	0.0046 U	0.00268 U	0.00345 U	0.00327 U	0.0108 U	0.00436 U	0.00342 U
58-TeCB	µg/kg WW	0.00297 U	0.00477 U	0.00275 U	0.0037 U	0.00351 U	0.047 *	0.00468 U	0.00346 U
59-TeCB [C]	µg/kg WW	0.00698 U	0.00406 U	0.00499 U	0.0139 U	0.00956 U	0.0781	0.0224	0.00614 U
5-DiCB	µg/kg WW	0.00282 U	0.00509 U	0.00421 U	0.0131 *	0.00563 U	0.00477 U	0.00488 U	0.00329 U
60-TeCB	µg/kg WW	0.0245 U	0.0138 U	0.0127 U	0.0226 U	0.0183 U	0.405	0.0595	0.0248 U
61-TeCB [C]	µg/kg WW	0.158 U	0.0578 U	0.0791 U	0.181	0.163 U	3.13	0.493	0.164 U
63-TeCB	µg/kg WW	0.00491	0.00446 U	0.00277	0.00579	0.00546	0.0632	0.0137	0.00515
64-TeCB	µg/kg WW	0.0334 U	0.016 U	0.0194 U	0.0515 U	0.0347 U	0.415	0.111	0.0307 U
66-TeCB	µg/kg WW	0.0919 U	0.0355 U	0.0469 U	0.113	0.105	1.62	0.265	0.096 U
67-TeCB	µg/kg WW	0.00242 U	0.00401 U	0.00229 U	0.00363	0.00285 U	0.00942 U	0.00632	0.003 U
68-TeCB	µg/kg WW	0.00262 U	0.00441 U	0.00268 U	0.00326 U	0.00309 U	0.0116 U	0.00432	0.00353 U
6-DiCB	µg/kg WW	0.012 U	0.00724 U	0.00965 U	0.0316 U	0.0166 U	0.0124 U	0.0134 U	0.0078 U
72-TeCB	µg/kg WW	0.00298 U	0.00483 U	0.00294 U	0.00371 U	0.00352 U	0.0222 *	0.00607	0.00373 U
73-TeCB	µg/kg WW	0.00172 U	0.00431 U	0.00194 U	0.00212 U	0.00197 U	0.0258	0.00237 U	0.00208 U
78-TeCB	µg/kg WW	0.00284 U	0.00484 U	0.00264 U	0.00354 U	0.00335 U	0.0118 U	0.00447 U	0.00344 U
79-TeCB	µg/kg WW	0.00242 U	0.00431 U	0.00231 U	0.0114	0.00719 *	0.403	0.0199	0.0105
7-DiCB	µg/kg WW	0.00287 U	0.00123 U	0.00238 U	0.00566 U	0.0036 U	0.00261 U	0.0027 U	0.00231 U
80-TeCB	µg/kg WW	0.0026 U	0.00453 U	0.0023 U	0.00324 U	0.00307 U	0.0102 U	0.0041 U	0.00323 U
82-PeCB	µg/kg WW	0.0188	0.00578 U	0.00644	0.0263	0.0289	0.409	0.0765 *	0.0341
83-PeCB	µg/kg WW	0.00658 U	0.00671 U	0.00607 U	0.0449	0.0278 *	0.812	0.0066 U	0.027
84-PeCB	µg/kg WW	0.0299 U	0.0081 U	0.0149	0.0515	0.0485	1.77	0.139	0.0477
85-PeCB [C]	µg/kg WW	0.0626	0.00907	0.0251	0.0981	0.0931	0.937	0.223	0.1
86-PeCB [C]	µg/kg WW	0.159	0.027 U	0.0656	0.476	0.378	12.9 J	0.795	0.375
88-PeCB [C]	µg/kg WW	0.0284	0.00547 U	0.0124 *	0.0599	0.0484	0.692	0.18	0.0604
89-PeCB	µg/kg WW	0.00617 U	0.00591 U	0.00538 U	0.00672 U	0.0129 U	0.0341 U	0.00619 U	0.00598 U
90-PeCB [C]	µg/kg WW	0.359	0.0541 U	0.144	3.01	1.81	109 J	2.59	1.39
92-PeCB	µg/kg WW	0.0554	0.00906	0.0241	0.39	0.251	11 J	0.417	0.195
93-PeCB [C]	µg/kg WW	0.00576 U	0.00532 U	0.00513 U	0.0104	0.0121 U	0.133	0.0218	0.00575 *
94-PeCB	µg/kg WW	0.00627 U	0.00594 U	0.00578 U	0.00683 U	0.0131 U	0.0387 U	0.00629 U	0.00689 U
95-PeCB	µg/kg WW	0.143	0.0349 U	0.0717 U	1.03	0.636	63.3 J	1.08	0.46
96-PeCB	µg/kg WW	0.0011 U	0.00162 U	0.000835 U	0.00226 *	0.00109 U	0.00254 U	0.0031	0.00139 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR3	AR3	AR4	AR6	AR6
	Sample ID	AR2-WB-FFSBSO04-0-090824	AR2-WB-FFSBSO05-0-090824	AR2-WB-FFSBSO06-0-090824	AR3-00-FFSBSO02-0-090827	AR3-00-FFSBSO03-0-090827	AR4-00-FFSBSO01-0-090826	AR7-00-FFSBSO01-0-090827	AR7-00-FFSBSO02-0-090827
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/24/2009	8/27/2009	8/27/2009	8/26/2009	8/27/2009	8/27/2009
Analyte	**Units**								
98-PeCB [C]	µg/kg WW	0.00579 U	0.00528 U	0.00516 U	0.0111	0.0121 U	0.0835	0.0249	0.00719 *
99-PeCB	µg/kg WW	0.212	0.0237 U	0.0795	0.757	0.62	4.84 J	1.15	0.427
9-DiCB	µg/kg WW	0.00483 U	0.00386 U	0.00409 U	0.00952 U	0.00564 U	0.00679 U	0.00423 U	0.00297 U
Decachlorobiphenyl	µg/kg WW	0.0279 J	0.0077	0.00748 J	0.0202 J	0.0185 *	0.0725	0.0205 J	0.013 J
PCB Dioxin-like Congener TEQ (bird)	µg/kg WW	0.001376145	0.001216586	0.000934024	0.003739359	0.002227012	0.07884777	0.002848796	0.002087106
PCB Dioxin-like Congener TEQ (fish)	µg/kg WW	3.63785E-05	3.03432E-05	2.62013E-05	0.000160256	0.000083087	0.003610575	9.75145E-05	7.96455E-05
PCB Dioxin-like Congener TEQ (mammal)	µg/kg WW	0.000828124	0.000671497	0.000641028	0.003406011	0.001809059	0.07096396	0.002054359	0.001807438
tPCBs_all	µg/kg WW	12.228731	2.300996	4.653408	119.854519	64.182869	3212.523719	59.063945	49.575155
tPCBs_detects	µg/kg WW	10.78959	0.83092	3.38569	117.79636	62.42327	3210.97259	57.799977	48.14414
Lipids, total	%	1.1	1.1	0.68	0.86	0.7	1.8	2.1	0.55
Residue, total	%	24.8	25.9	24.3	24	25	25.7	26.5	25.4

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR6	AR6	AR6	AR8	AR8	AR8	AR8	AR8
	Sample ID	AR7-00-FFSBSO03-0-090827	AR7-00-FFSBSO04-0-090827	AR7-00-FFSBSO05-0-090828	AR8-00-FFSBSO01-0-090826	AR8-00-FFSBSO02-0-090826	AR8-00-FFSBSO03-0-090826	AR8-00-FFSBSO04-0-090826	AR8-00-FFSBSO05-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/27/2009	8/27/2009	8/28/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009
Analyte	**Units**								
1,1'-Biphenyl	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Acetophenone	µg/kg WW	20 U	36 U	19 U	33 U	20 U	30 U	27 U	20 U
Benzaldehyde	µg/kg WW	980 U	1000 U	950 U	1000 U	1000 U	980 U	970 U	1000 U
Bis(2-Chloroethyl)Ether	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Hexachlorobenzene	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
Hexachloroethane	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
1,2,4,5-Tetrachlorobenzene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
2,3,4,6-Tetrachlorophenol	µg/kg WW	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
2,4,5-Trichlorophenol	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
2,4,6-Trichlorophenol	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
2,4-Dichlorophenol	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
2,4-Dimethylphenol	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
2,4-Dinitrophenol	µg/kg WW	250 U	250 U	240 U	250 U	250 U	250 U	250 U	250 U
2,4-Dinitrotoluene	µg/kg WW	39 U	40 U	38 U	40 U	40 U	40 U	39 U	40 U
2,6-Dinitrotoluene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
2-Chlorophenol	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
2-Methylphenol	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
2-Nitroaniline	µg/kg WW	98 U	100 U	95 U	100 U	100 U	98 U	97 U	100 U
2-Nitrophenol	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
3,3'-Dichlorobenzidine	µg/kg WW	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
3-Nitroaniline	µg/kg WW	200 U	200 U	190 U	200 U	200 U	200 U	200 U	200 U
4,6-Dinitro-2-Methylphenol	µg/kg WW	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
4-Bromophenyl-Phenylether	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
4-Chloro-3-Methylphenol	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
4-Chloroaniline	µg/kg WW	400 U	400 U	400 U	400 U	400 U	400 U	400 U	400 U
4-Chlorophenyl-Phenylether	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
4-Methylphenol	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
4-Nitroaniline	µg/kg WW	200 U	200 U	190 U	200 U	200 U	200 U	200 U	200 U
4-Nitrophenol	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Atrazine	µg/kg WW	380 U	390 U	370 U	390 U	390 U	390 U	380 U	390 U
Bis(2-Chloroethoxy)Methane	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Bis(2-chloroisopropyl) ether	µg/kg WW	98 U	100 U	95 U	100 U	100 U	98 U	97 U	100 U
Bis(2-Ethylhexyl)Phthalate	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Butylbenzylphthalate	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Caprolactam	µg/kg WW	98 U	100 U	95 U	100 U	100 U	98 U	97 U	100 U
Dibenzofuran	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR6	AR6	AR6	AR8	AR8	AR8	AR8	AR8
	Sample ID	AR7-00-FFSBSO03-0-090827	AR7-00-FFSBSO04-0-090827	AR7-00-FFSBSO05-0-090828	AR8-00-FFSBSO01-0-090826	AR8-00-FFSBSO02-0-090826	AR8-00-FFSBSO03-0-090826	AR8-00-FFSBSO04-0-090826	AR8-00-FFSBSO05-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/27/2009	8/27/2009	8/28/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009
Analyte	**Units**								
Diethylphthalate	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Dimethylphthalate	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Di-n-butyl phthalate	µg/kg WW	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Di-n-octyl phthalate	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Hexachlorobutadiene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Hexachlorocyclopentadiene	µg/kg WW	490 U	500 U	480 U	500 U	500 U	490 U	490 U	500 U
Isophorone	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Nitrobenzene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
N-Nitroso-Di-N-Propylamine	µg/kg WW	22 U	22 U	22 U	22 U	22 U	22 U	22 U	22 U
N-Nitrosodiphenylamine	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Pentachlorophenol	µg/kg WW	49 U	50 U	48 U	50 U	50 U	49 U	49 U	50 U
Phenol	µg/kg WW	49 U	50 U	48 U	50 U	50 U	49 U	49 U	50 U
2-Chloronaphthalene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
2-Methylnaphthalene	µg/kg WW	5.1 J	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Acenaphthene	µg/kg WW	20 U	20 U	19 U	20 U	2.1 J	20 U	20 U	20 U
Acenaphthylene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Anthracene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Benzo(a)anthracene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Benzo(a)pyrene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Benzo(b)fluoranthene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Benzo(g,h,i)perylene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Benzo(k)fluoranthene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Carbazole	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Chrysene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Dibenz(a,h)anthracene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Fluoranthene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Fluorene	µg/kg WW	20 U	20 U	19 U	20 U	3.8 J	20 U	20 U	20 U
Indeno(1,2,3-cd)pyrene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Naphthalene	µg/kg WW	8.2 J	20 U	19 U	20 U	20 U	20 U	20 U	20 U
Phenanthrene	µg/kg WW	4.8 J	20 U	3.8 J	20 U	6.9 J	4.8 J	20 U	2.8 J
Pyrene	µg/kg WW	20 U	20 U	19 U	20 U	20 U	20 U	20 U	20 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg WW	0.00106 U	0.00126 J	0.000799 U	0.000767 U	0.000813 U	0.00077 U	0.000709 U	0.000987 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg WW	0.00142 *	0.000906 U	0.00108 U	0.00097 U	0.00102 U	0.000967 U	0.000941 U	0.00106 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg WW	0.000301 U	0.00028 U	0.000277 U	0.000266 U	0.000276 U	0.000301 U	0.000232 U	0.000314 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg WW	0.00058 U	0.000458 U	0.000546 U	0.00065 U	0.000547 U	0.000492 U	0.000465 U	0.000594 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg WW	0.000475 U	0.000459 U	0.000459 U	0.000411 U	0.000472 U	0.000477 U	0.000361 U	0.000519 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR6	AR6	AR6	AR8	AR8	AR8	AR8	AR8
	Sample ID	AR7-00-FFSBSO03-0-090827	AR7-00-FFSBSO04-0-090827	AR7-00-FFSBSO05-0-090828	AR8-00-FFSBSO01-0-090826	AR8-00-FFSBSO02-0-090826	AR8-00-FFSBSO03-0-090826	AR8-00-FFSBSO04-0-090826	AR8-00-FFSBSO05-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/27/2009	8/27/2009	8/28/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009
Analyte	**Units**								
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000383 *	0.000181 U	0.000247 *	0.00249 J	0.000173 U	0.000279 J	0.000744 J	0.000655 *
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000308 U	0.00031 U	0.00031 U	0.000352 U	0.000311 U	0.000331 U	0.000329 U	0.000337 U
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000182 U	0.000186 U	0.000186 U	0.000593 J	0.000178 U	0.000208 U	0.000187 J	0.000232 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000325 U	0.000301 U	0.000314 U	0.000371 U	0.000309 U	0.000322 U	0.000313 U	0.000334 U
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg WW	0.000276 U	0.000263 U	0.000259 U	0.000264 U	0.000263 U	0.000294 U	0.000246 U	0.000316 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000326 U	0.000315 U	0.000322 U	0.000373 U	0.00032 U	0.000337 U	0.000331 U	0.000346 U
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg WW	0.00185 J	0.00032 J	0.00142 J	0.00926	0.000718	0.00107 J	0.003 J	0.00395 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg WW	0.00023 U	0.0002 U	0.000235 U	0.000196 U	0.000201 U	0.000215 U	0.000194 U	0.00022 U
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000195 U	0.000196 U	0.000197 U	0.000194 U	0.000179 U	0.000207 U	0.000185 U	0.000208 U
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg WW	0.00295 J	0.000489 *	0.00248 J	0.0138	0.00139 J	0.00141 J	0.00513	0.00689
2,3,7,8-TCDD TEQ (bird)	µg/kg WW	0.009196758	0.001956717	0.006599258	0.033826134	0.005591843	0.005079884	0.012559585	0.018304045
2,3,7,8-TCDD TEQ (fish)	µg/kg WW	0.002318758	0.000717717	0.001934758	0.008983134	0.001317443	0.001366884	0.003489085	0.004686545
2,3,7,8-TCDD TEQ (mammal)	µg/kg WW	0.001971754	0.00066545	0.001587234	0.006958281	0.00121195	0.001219331	0.002737915	0.003754954
2,3,7,8-Tetrachlorodibenzofuran	µg/kg WW	0.00559	0.00103 U	0.00353	0.0184	0.00373	0.00311	0.00669	0.0105
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg WW	0.000182 U	0.000166 U	0.000166 U	0.000193 U	0.000161 U	0.000186 U	0.00015 U	0.000207 U
Heptachlorodibenzofuran (total)	µg/kg WW	0.000301 U	0.00028 U	0.000277 U	0.000266 U	0.000276 U	0.000301 U	0.000232 U	0.000314 U
Heptachlorodibenzo-p-dioxin (total)	µg/kg WW	0.00058 U	0.000458 U	0.000546 U	0.00065 U	0.000547 U	0.000492 U	0.000465 U	0.000594 U
Hexachlorodibenzofuran (total)	µg/kg WW	0.000182 U	0.000181 U	0.000186 U	0.00308 J	0.000173 U	0.000279 J	0.000932 J	0.000208 U
Hexachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000308 U	0.000301 U	0.00031 U	0.000352 U	0.000309 U	0.000322 U	0.000313 U	0.000334 U
Pentachlorodibenzofuran (total)	µg/kg WW	0.0048 J	0.00032 J	0.0039 J	0.0242 J	0.00139 J	0.0027 J	0.0084 J	0.0108 J
Pentachlorodibenzo-p-dioxin (total)	µg/kg WW	0.00023 U	0.0002 U	0.000235 U	0.000196 U	0.000201 U	0.000215 U	0.000194 U	0.00022 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg WW	0.000182 U	0.000166 U	0.000166 U	0.000193 U	0.000161 U	0.000186 U	0.00015 U	0.000207 U
Tetrachlorodibenzofuran (total)	µg/kg WW	0.00559 J	0.00103 U	0.00374 J	0.0193 J	0.00373 J	0.00311 J	0.0069 J	0.0105 J
4,4'-DDD	µg/kg WW	2 U	1.9 U	2 U	1.2 U	2.6 U	0.97 U	2.4 U	1.4 U
4,4'-DDe	µg/kg WW	2 U	1.9 U	2.7 J	1.5 U	7.6 J	4.3 J	3 J	6.2 J
4,4'-DDT	µg/kg WW	1.7 J	1.8 J	5.1	29	13	13	7	11 U
Aldrin	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
Alpha-Bhc	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
alpha-Chlordane	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
beta-BHC	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	1.1 U
beta-Chlordane	µg/kg WW	2 U	1.9 U	1.1 J	5.8 J	2.2 J	2.7 J	1.2 J	2.8 J
Chlordane	µg/kg WW	20 U	19 U	20 U	14 U	12 U	9.7 U	9.6 U	9.9 U
Chlorpyrifos	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
cis-Nonachlor	µg/kg WW	2 U	1.9 U	2 U	26 U	14 U	0.97 U	0.96 U	0.99 U
Delta-Bhc	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
Dieldrin	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR6	AR6	AR6	AR8	AR8	AR8	AR8	AR8
	Sample ID	AR7-00-FFSBSO03-0-090827	AR7-00-FFSBSO04-0-090827	AR7-00-FFSBSO05-0-090828	AR8-00-FFSBSO01-0-090826	AR8-00-FFSBSO02-0-090826	AR8-00-FFSBSO03-0-090826	AR8-00-FFSBSO04-0-090826	AR8-00-FFSBSO05-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/27/2009	8/27/2009	8/28/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009
Analyte	**Units**								
Endosulfan I	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
Endosulfan II	µg/kg WW	2 U	1.9 U	2 U	1.6	0.91 J	0.83 J	0.38 J	1.5
Endosulfan Sulfate	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
Endrin aldehyde	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
Endrin Ketone	µg/kg WW	2 U	1.9 U	2 U	4.9 U	2.7 U	3 U	1.3 U	0.99 U
Endrin	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
gamma-BHC (Lindane)	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
Heptachlor epoxide	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	1.2 U	0.96 U	0.99 U
Heptachlor	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
Methoxychlor	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
Mirex	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
o,p'-DDD	µg/kg WW	2 U	1.9 U	2 U	4.3	2.6	2.3	1.2	3.2 J
O,P'-Dde	µg/kg WW	2 U	1.9 U	2 U	2.1 U	0.98 U	0.97 U	0.96 U	0.99 U
o,p'-DDT	µg/kg WW	2 U	1.9 U	2 U	5.3 U	3 U	2.7 U	1.4 U	3.7 U
Oxychlordane	µg/kg WW	2 U	1.9 U	2 U	1.2 U	2.1 U	0.97 U	1.7 U	0.99 U
Toxaphene	µg/kg WW	99 U	95 U	170 U	380 U	310 U	260 U	170 U	360 U
trans-Nonachlor	µg/kg WW	2 U	1.9 U	2 U	0.96 U	0.98 U	0.97 U	0.96 U	0.99 U
Decachlorobiphenyl	µg/kg WW	0.0121 *	0.00939 J	0.0178 J	0.0348 J	0.0457 *	0.0417 J	0.0214 J	0.0395 J
1,1'-Biphenyl, 2,2'-dichloro-	µg/kg WW	0.0167 U	0.0137 U	0.0142 U	0.0147 U	0.0189 U	0.0145 U	0.0118 U	0.0155 U
1,1'-Biphenyl, 2,4'-dichloro-	µg/kg WW	0.0267 U	0.0245 U	0.022 U	0.0206 U	0.0109 U	0.0156 U	0.018 U	0.0153 U
1,1'-Biphenyl, 3,3'-dichloro-	µg/kg WW	0.0468 U	0.0493 U	0.0501 U	0.0392 U	0.0453 U	0.0502 U	0.0431 U	0.0504 U
103-PeCB	µg/kg WW	0.0245	0.00861 *	0.0491	0.298	0.18	0.202	0.0877	0.138
104-PeCB	µg/kg WW	0.000427 *	0.00071 U	0.000601 U	0.00195 *	0.00499	0.00258 *	0.00194 *	0.00314 J
106-PeCB	µg/kg WW	0.00547 U	0.00566 U	0.0103 U	0.0497 U	0.00857 U	0.00773 U	0.0118 U	0.00958 U
107-PeCB [C]	µg/kg WW	0.0268	0.018	0.0589	0.18	0.147	0.157	0.0546	0.175
109-PeCB	µg/kg WW	0.0554	0.0371	0.13	0.354	0.307	0.338	0.106	0.385
10-DiCB	µg/kg WW	0.0011 U	0.000825 U	0.00112 U	0.000935 U	0.00114 U	0.000856 U	0.000636 U	0.00106 U
110-PeCB [C]	µg/kg WW	0.399	0.356	0.801	3.94 J	3.81 J	3.91 J	1.3	5.1 J
111-PeCB	µg/kg WW	0.00333 U	0.0035 U	0.00441 U	0.00721 U	0.0452 U	0.00803 U	0.00452 U	0.0054 *
112-PeCB	µg/kg WW	0.00331 U	0.00348 U	0.00438 U	0.00665 U	0.0417 U	0.0074 U	0.00417 U	0.00389 U
120-PeCB	µg/kg WW	0.00646	0.00333 U	0.00986	0.0513	0.0406 U	0.0455	0.0147	0.0352
121-PeCB	µg/kg WW	0.00343 U	0.00361 U	0.00454 U	0.00731 U	0.0458 U	0.00814 U	0.00458 U	0.00419 U
122-PeCB	µg/kg WW	0.00632 U	0.00653 U	0.0119 U	0.0576 U	0.035	0.0423	0.0137 U	0.0437
127-PeCB	µg/kg WW	0.0056 U	0.00579 U	0.0106 U	0.0541 U	0.00935 U	0.00842 U	0.0129 U	0.0102 U
128-HxCB [C]	µg/kg WW	0.211	0.128	0.515	2.31	1.74	1.44	0.677	1.75
129-HxCB [C]	µg/kg WW	3.05	1.75	7.4 J	39.4 J	26.7 J	24.9 J	11.1 J	22.4 J

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR6	AR6	AR6	AR8	AR8	AR8	AR8	AR8
	Sample ID	AR7-00-FFSBSO03-0-090827	AR7-00-FFSBSO04-0-090827	AR7-00-FFSBSO05-0-090828	AR8-00-FFSBSO01-0-090826	AR8-00-FFSBSO02-0-090826	AR8-00-FFSBSO03-0-090826	AR8-00-FFSBSO04-0-090826	AR8-00-FFSBSO05-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/27/2009	8/27/2009	8/28/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009
Analyte	**Units**								
12-DiCB [C]	µg/kg WW	0.00349 U	0.00383 U	0.00417 U	0.00549 U	0.0073 U	0.00412 U	0.00278 U	0.0043 U
130-HxCB	µg/kg WW	0.105	0.0637	0.258	1.35	0.898	0.773	0.332	0.763
131-HxCB	µg/kg WW	0.0209 U	0.00859 U	0.0206 U	0.0625	0.0886	0.0256 U	0.0341 U	0.0933
132-HxCB	µg/kg WW	0.252	0.204	0.643	4.09 J	4.17 J	3.17	1.43	3.52
133-HxCB	µg/kg WW	0.0655	0.0302	0.141	0.592	0.413	0.399	0.174	0.34
134-HxCB	µg/kg WW	0.0583	0.0345	0.12	1.06	0.655	0.597	0.212	0.548
135-HxCB [C]	µg/kg WW	1.03	0.558	2.39	15.1 J	8.78 J	9.51 J	4.03 J	7.57 J
136-HxCB	µg/kg WW	0.312	0.128	0.795	2.69	1.79	1.9	1.05	1.73
137-HxCB	µg/kg WW	0.0864	0.0585	0.233	0.68	0.37	0.468	0.177	0.591
139-HxCB [C]	µg/kg WW	0.0199 U	0.0132	0.0403	0.215	0.192	0.221	0.0573	0.207
141-HxCB	µg/kg WW	0.521	0.371	1.69	9.78 J	5.83 J	5.76 J	2.36	4.65 J
142-HxCB	µg/kg WW	0.0228 U	0.00936 U	0.0224 U	0.0143 U	0.0148 U	0.0272 U	0.0362 U	0.00948 U
143-HxCB	µg/kg WW	0.0223 U	0.00916 U	0.022 U	0.0151 U	0.0157 U	0.0287 U	0.0382 U	0.00913 U
144-HxCB	µg/kg WW	0.117	0.0662	0.347	1.95	1.3	1.22	0.535	1.14
145-HxCB	µg/kg WW	0.00426 U	0.00204 U	0.00218 U	0.00261 U	0.0029 U	0.00269 U	0.00316 U	0.00132 U
146-HxCB	µg/kg WW	0.573	0.341	1.37	6.87 J	4.72 J	4.82 J	1.93	3.72 J
147-HxCB [C]	µg/kg WW	2.07	1.35	4.9 J	34.4 J	21.7 J	22.3 J	9.77 J	17.2 J
148-HxCB	µg/kg WW	0.00556 U	0.00266 U	0.00826	0.0324	0.034	0.0392	0.0097	0.0266
14-DiCB	µg/kg WW	0.000399 U	0.00057 U	0.000506 U	0.000308 U	0.000415 U	0.000355 U	0.000373 U	0.000547 U
150-HxCB	µg/kg WW	0.00645	0.00239	0.00758	0.0491	0.0362	0.0549	0.017	0.0429
152-HxCB	µg/kg WW	0.00419 U	0.002 U	0.00214 U	0.00245 U	0.00273 U	0.00253 U	0.00298 U	0.00125 U
154-HxCB	µg/kg WW	0.0415	0.0205	0.0745	0.406	0.314	0.376	0.108	0.27
155-HxCB	µg/kg WW	0.00224 U	0.0011 U	0.00124 U	0.00378 *	0.00687	0.00559	0.0022 U	0.000983 U
158-HxCB	µg/kg WW	0.175	0.124	0.508	2.91	2.12	1.96	0.793	1.82
159-HxCB	µg/kg WW	0.00679 U	0.00599 U	0.00963 U	0.575 *	0.281	0.362	0.013 U	0.242
160-HxCB	µg/kg WW	0.0158 U	0.00649 U	0.0155 U	0.0107 U	0.0111 U	0.0202 U	0.027 U	0.0065 U
161-HxCB	µg/kg WW	0.0148 U	0.00608 U	0.0146 U	0.00974 U	0.0101 U	0.0185 U	0.0246 U	0.0064 U
162-HxCB	µg/kg WW	0.00689 U	0.00608 U	0.00978 U	0.0117 U	0.0125 U	0.0103 U	0.116	0.0117 U
164-HxCB	µg/kg WW	0.156	0.0908	0.422	2.63	1.56	1.4	0.648	1.25
165-HxCB	µg/kg WW	0.0169 U	0.00696 U	0.0167 U	0.0132 *	0.0245	0.0212 U	0.0283 U	0.00725 U
16-TrCB	µg/kg WW	0.0187 U	0.0178 U	0.021 U	0.000609 U	0.023 U	0.0317 U	0.0176 U	0.0177 U
171-HpCB [C]	µg/kg WW	0.157 J	0.134 J	0.503 J	4.33 J	3.42	3.23	1.14	2.36 J
172-HpCB	µg/kg WW	0.00939 U	0.144 J	0.578 J	0.0398 U	0.0144 U	0.0125 U	0.0124 U	0.0092 U
174-HpCB	µg/kg WW	1.15 J	0.664 J	3.08 J	23.4 J	12.2 J	13.3 J	5.07 J	9.2 J
175-HpCB	µg/kg WW	0.0252 J	0.0222	0.0915 J	0.604 J	0.499	0.489	0.152	0.307 J
176-HpCB	µg/kg WW	0.148 J	0.0751 J	0.444 J	2.2 J	1.23	1.32	0.575	1.02 J

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR6	AR6	AR6	AR8	AR8	AR8	AR8	AR8
	Sample ID	AR7-00-FFSBSO03-0-090827	AR7-00-FFSBSO04-0-090827	AR7-00-FFSBSO05-0-090828	AR8-00-FFSBSO01-0-090826	AR8-00-FFSBSO02-0-090826	AR8-00-FFSBSO03-0-090826	AR8-00-FFSBSO04-0-090826	AR8-00-FFSBSO05-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/27/2009	8/27/2009	8/28/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009
Analyte	**Units**								
177-HpCB	µg/kg WW	0.706 J	0.389 J	2.02 J	13.3 J	7.79 J	8.1 J	3.1	5.97 J
178-HpCB	µg/kg WW	0.402 J	0.207 J	1.03 J	5.49 J	3.14	3.4	1.39	2.55 J
179-HpCB	µg/kg WW	0.298 J	0.187 J	0.701 J	5.58 J	3.35	3.86 J	1.38	2.69 J
17-TrCB	µg/kg WW	0.0228 U	0.0205 U	0.0242 U	0.02 U	0.0291 U	0.0985	0.0214 U	0.0234 U
181-HpCB	µg/kg WW	0.00893 U	0.00812 U	0.0142 J	0.0753 J	0.0556	0.0538	0.0267 *	0.0511 J
182-HpCB	µg/kg WW	0.00482 J	0.00187 U	0.0163 J	0.0579 J	0.042	0.035 *	0.0176 *	0.0293 J
183-HpCB [C]	µg/kg WW	0.668 J	0.543 J	2.11 J	16.6 J	11.2 J	11.6 J	4.09 J	8.07 J
184-HpCB	µg/kg WW	0.00266 U	0.00149 U	0.00404 U	0.0039 U	0.00464 U	0.00417 U	0.00384 U	0.00187 U
186-HpCB	µg/kg WW	0.00277 U	0.00156 U	0.00421 U	0.0042 U	0.00499 U	0.00448 U	0.00413 U	0.00195 U
187-HpCB	µg/kg WW	1.96 J	1.28 J	5.14 J	31.5 J	19.6 J	22.9 J	9.21 J	15.7 J
188-HpCB	µg/kg WW	0.00247 J	0.00105 U	0.00326 *	0.0201 J	0.0215	0.0274	0.00923	0.0183 J
18-TrCB [C]	µg/kg WW	0.0398 U	0.0335 U	0.0422 U	0.0359 U	0.0461 U	0.104 U	0.033 U	0.04 U
190-HpCB	µg/kg WW	0.198 J	0.12 J	0.46 J	4.58 J	3.4	3.39	1.3	2.32 J
191-HpCB	µg/kg WW	0.0443 J	0.0277 J	0.0876 J	0.951 J	0.605	0.731	0.243	0.45 J
192-HpCB	µg/kg WW	0.174 J	0.0069 U	0.0115 U	3.36 J	2.42	2.38	0.884	1.64 J
195-OcCB	µg/kg WW	0.0836 J	0.0591 J	0.219 J	2.79 J	2.21 J	2.48 J	0.839	1.29 J
196-OcCB	µg/kg WW	0.153 J	0.107 J	0.455 J	4.51 J	4.2 J	4.13 J	1.45	2.22 J
197-OcCB [C]	µg/kg WW	0.0722 J	0.0404 J	0.204 J	1.38 J	0.927 J	1.01 J	0.361	0.664 J
198-OcCB [C]	µg/kg WW	0.589 J	0.347 J	1.7 J	10.9 J	8.59 J	8.71 J	3.28	5.36 J
19-TrCB	µg/kg WW	0.00768 U	0.00606 U	0.00738 U	0.00853 U	0.0137 U	0.0103 U	0.00616 U	0.0079 U
1-MoCB	µg/kg WW	0.00534 U	0.0043 U	0.00446 U	0.00493 U	0.00483 U	0.00492 U	0.00336 U	0.00464 U
2,2',3,3',4,4',5,5'-Octachlorobiphenyl	µg/kg WW	0.138 J	0.0846 J	0.274 J	3.69 J	3.54 J	3.82 J	1.36 J	1.87 J
2,2',3,3',4,4',5-Heptachlorobiphenyl	µg/kg WW	0.823 J	0.528 J	1.87 J	18.8 J	14.9 J	13.9 J	4.95 J	10 J
2,2',3,4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	3.27 J	1.75 J	7.8 J	56.5 J	40.4 J	38.8 J	14.7 J	27.7 J
2,2',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	3.99 J	2.43	9.27 J	54 J	38.2 J	36 J	15.4 J	29.3 J
2,2',5,5'-Tetrachlorobiphenyl	µg/kg WW	0.282	0.13 U	0.432	1.81	1.3	3.19	0.657	1.35 J
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	0.0381	0.0167 J	0.0734	0.592	0.382	0.4	0.162	0.264 J
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg WW	0.245	0.134	0.54	2.79	2.04	1.77	0.76	1.78
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg WW	0.222 J	0.171 J	0.582 J	1.53 J	1.32 J	1.46 J	0.479 J	1.97 J
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.1	0.0523	0.23	1.18	0.906	0.791	0.34	0.742
2',3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.00828 *	0.00827 J	0.0258 J	0.0533 U	0.0665 J	0.0623 J	0.0171 J	0.082 J
2,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.753	0.509	1.93	5.95 J	4.9 J	4.61 J	1.78	6.11 J
2,3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0175 J	0.0106 J	0.0469 J	0.107 J	0.11 J	0.12 J	0.0364 J	0.143 J
201-OcCB	µg/kg WW	0.0509 J	0.0333 J	0.187 J	0.958 J	0.709 J	0.788 J	0.248	0.47 J
202-OcCB	µg/kg WW	0.0856 J	0.0486 J	0.273 J	1.34 J	0.883 J	1.03 J	0.413	0.668 J
203-OcCB	µg/kg WW	0.18 J	0.149 J	0.486 J	4.57 J	5.22 J	4.61 J	1.75	2.85 J

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR6	AR6	AR6	AR8	AR8	AR8	AR8	AR8
	Sample ID	AR7-00-FFSBSO03-0-090827	AR7-00-FFSBSO04-0-090827	AR7-00-FFSBSO05-0-090828	AR8-00-FFSBSO01-0-090826	AR8-00-FFSBSO02-0-090826	AR8-00-FFSBSO03-0-090826	AR8-00-FFSBSO04-0-090826	AR8-00-FFSBSO05-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/27/2009	8/27/2009	8/28/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009
Analyte	**Units**								
204-OcCB	µg/kg WW	0.00504 U	0.00455 U	0.00184 U	0.00334 U	0.00202 U	0.00233 U	0.0085 U	0.00171 U
205-OcCB	µg/kg WW	0.0203 J	0.00959 *	0.0337 J	0.246 J	0.272 J	0.282 J	0.0976 J	0.165 J
206-NoCB	µg/kg WW	0.0552 J	0.0441 J	0.121 J	0.655 J	0.889 J	0.81 J	0.281 J	0.57 J
207-NoCB	µg/kg WW	0.00762 J	0.00481 J	0.0265 J	0.111 J	0.127 J	0.129 J	0.0423	0.0756 J
208-NoCB	µg/kg WW	0.0154 *	0.0111 J	0.0487 J	0.148 J	0.166 J	0.174 J	0.0668 J	0.11 J
20-TrCB [C]	µg/kg WW	0.0944 U	0.0645 U	0.123 U	0.13 U	0.177 U	2.98	0.114 U	0.131 U
21-TrCB [C]	µg/kg WW	0.0322 U	0.0274 U	0.0354 U	0.0313 U	0.0459 U	0.198	0.0325 U	0.0362 U
22-TrCB	µg/kg WW	0.0246 U	0.0201 U	0.0274 U	0.0252 U	0.0466 U	0.998	0.028 U	0.0326 U
23-TrCB	µg/kg WW	0.0004 U	0.000516 U	0.00049 U	0.000356 U	0.000897 U	0.00117 *	0.000483 U	0.000701 U
24-TrCB	µg/kg WW	0.00127 U	0.000965 U	0.00128 U	0.0056 *	0.0018 U	0.00354 U	0.000952 U	0.00191 U
25-TrCB	µg/kg WW	0.0051 U	0.00408 U	0.00662 U	0.00546 U	0.00888 U	0.103	0.00523 U	0.00546 U
26-TrCB [C]	µg/kg WW	0.0119 U	0.01 U	0.0157 U	0.0182 U	0.0222 U	0.259	0.0135 U	0.0157 U
27-TrCB	µg/kg WW	0.00361 U	0.00333 U	0.00385 U	0.00337 U	0.0053 U	0.0233	0.0028 U	0.00379 U
2-MoCB	µg/kg WW	0.00252 U	0.00274 U	0.0027 U	0.00357 U	0.00401 U	0.00252 U	0.00226 U	0.0028 U
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.0107 U	0.00814 U	0.0156 U	0.047 *	0.0386 *	0.0437 *	0.0163 *	0.0257 *
3,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0082 J	0.00718 U	0.0207 J	0.0638 U	0.0639 J	0.05 J	0.0256 J	0.0695 J
3,3',4,4'-Tetrachlorobiphenyl	µg/kg WW	0.00965	0.00487	0.0146	0.0151	0.0266	0.349	0.0107	0.016
3,4,4',5-Tetrachlorobiphenyl	µg/kg WW	0.00496 U	0.00297 U	0.00438 U	0.00538 U	0.00459 U	0.0206	0.00479 U	0.0028 U
31-TrCB	µg/kg WW	0.0608 U	0.0466 U	0.0742 U	0.0633 U	0.102 U	0.965	0.061 U	0.0724 U
32-TrCB	µg/kg WW	0.0139 U	0.0119 U	0.0144 U	0.013 U	0.0198 U	0.188	0.0134 U	0.0164 U
34-TrCB	µg/kg WW	0.000423 U	0.000546 U	0.000519 U	0.000361 U	0.000909 U	0.00505	0.000489 U	0.000699 U
35-TrCB	µg/kg WW	0.000854 U	0.00112 U	0.0019 U	0.0018 U	0.00133 U	0.00226 U	0.00125 U	0.00115 U
36-TrCB	µg/kg WW	0.000758 U	0.000995 U	0.00169 U	0.00108 U	0.0012 U	0.00203 U	0.00112 U	0.00101 U
37-TrCB	µg/kg WW	0.0162 U	0.0119 U	0.0187 U	0.0173 U	0.0237 U	0.434	0.0153 U	0.0169 U
38-TrCB	µg/kg WW	0.000843 U	0.00111 U	0.00187 U	0.00111 U	0.00123 U	0.00209 U	0.00115 U	0.00104 U
39-TrCB	µg/kg WW	0.000784 U	0.00103 U	0.00174 U	0.00109 U	0.00142	0.0166	0.00113 U	0.00105 U
3-MoCB	µg/kg WW	0.00538 U	0.0053 U	0.00515 U	0.00533 U	0.00653 U	0.00602 U	0.00433 U	0.00573 U
4,4'-Dichlorobiphenyl	µg/kg WW	0.0149 U	0.012 U	0.0153 U	0.0124 U	0.0149 U	0.0185 U	0.0136 U	0.016 U
40-TeCB [C]	µg/kg WW	0.0272 U	0.0207 U	0.0342 U	0.037 U	0.0866	1.09	0.0364 U	0.0701
41-TeCB	µg/kg WW	0.00879 U	0.00776 U	0.013 U	0.0101 U	0.0118 U	0.131	0.00955 U	0.0116 U
42-TeCB	µg/kg WW	0.0181 U	0.016 U	0.0258 U	0.028 U	0.0696	0.795	0.0273 U	0.0611
43-TeCB	µg/kg WW	0.00732 U	0.0035 U	0.00357 *	0.00599 U	0.01	0.0837	0.00745 U	0.00733 *
44-TeCB [C]	µg/kg WW	0.125 U	0.0804 U	0.195	0.363	0.416	2.61	0.195	0.475
45-TeCB [C]	µg/kg WW	0.013 U	0.0102 U	0.0146 U	0.0189 U	0.0396	0.111	0.0202 U	0.0267 U
46-TeCB	µg/kg WW	0.00311	0.00266	0.00303 *	0.00358 U	0.00516 U	0.0197 *	0.00337 U	0.00366 U
48-TeCB	µg/kg WW	0.014 U	0.0127 U	0.0193 U	0.025 U	0.0512	0.651	0.0182 U	0.046

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR6	AR6	AR6	AR8	AR8	AR8	AR8	AR8
	Sample ID	AR7-00-FFSBSO03-0-090827	AR7-00-FFSBSO04-0-090827	AR7-00-FFSBSO05-0-090828	AR8-00-FFSBSO01-0-090826	AR8-00-FFSBSO02-0-090826	AR8-00-FFSBSO03-0-090826	AR8-00-FFSBSO04-0-090826	AR8-00-FFSBSO05-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/27/2009	8/27/2009	8/28/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009
Analyte	**Units**								
49-TeCB [C]	µg/kg WW	0.117	0.0593 U	0.177	0.587	0.483	1.89	0.241	0.493
50-TeCB [C]	µg/kg WW	0.00772 U	0.00665 U	0.00888 U	0.0159 U	0.0378	0.117	0.0164 U	0.0233
54-TeCB	µg/kg WW	0.0007 U	0.000655 U	0.000582 *	0.00223 J	0.00329 J	0.0023 J	0.00261 *	0.00199 J
55-TeCB	µg/kg WW	0.00491 U	0.00298	0.00547 *	0.00836	0.00988 *	0.126	0.0044 U	0.00807 *
56-TeCB	µg/kg WW	0.0376 U	0.0261 U	0.0564 U	0.107	0.159	2.23	0.0546 U	0.11
57-TeCB	µg/kg WW	0.00512 U	0.00309 U	0.00414 U	0.00582 U	0.00425 U	0.0272	0.00458 U	0.00288 U
58-TeCB	µg/kg WW	0.00519 U	0.00313 U	0.00419 U	0.0058 U	0.00424 U	0.00889 *	0.00456 U	0.00294 U
59-TeCB [C]	µg/kg WW	0.00953 U	0.00692 U	0.0138 U	0.0188	0.0282	0.267	0.0135 U	0.0211
5-DiCB	µg/kg WW	0.00435 U	0.00269 U	0.00342 U	0.00253 U	0.00264 U	0.00299 U	0.00278 U	0.00273 U
60-TeCB	µg/kg WW	0.0344	0.0245 U	0.0706	0.104	0.139	1.58	0.0548	0.13
61-TeCB [C]	µg/kg WW	0.238	0.136 U	0.397	1.05	1.02	6.58 J	0.375	0.908
63-TeCB	µg/kg WW	0.00702	0.00403	0.0148	0.0275	0.0292	0.195	0.0113	0.0299
64-TeCB	µg/kg WW	0.0364 U	0.0299 U	0.0473 U	0.0846	0.19	1.4	0.0708 U	0.174 J
66-TeCB	µg/kg WW	0.149	0.0853 U	0.304	0.657	0.597	4.54 J	0.257	0.647
67-TeCB	µg/kg WW	0.0045 U	0.00277 *	0.00606	0.00799 *	0.0137	0.162	0.00519	0.00937
68-TeCB	µg/kg WW	0.00529 U	0.00319 U	0.00504	0.00933	0.00932	0.0153	0.00442	0.00696
6-DiCB	µg/kg WW	0.00902 U	0.00763 U	0.00842 U	0.0072 U	0.00909 U	0.00702 U	0.0056 U	0.00709 U
72-TeCB	µg/kg WW	0.00558 U	0.00336 U	0.00524	0.015	0.014	0.0289	0.00685 *	0.0115
73-TeCB	µg/kg WW	0.00498 U	0.00238 U	0.00149 U	0.00252 U	0.00232 U	0.0101	0.005 U	0.00187 U
78-TeCB	µg/kg WW	0.00515 U	0.0031 U	0.00416 U	0.00566 U	0.00414 U	0.00754 U	0.00445 U	0.00269 U
79-TeCB	µg/kg WW	0.0102	0.00268 U	0.0218 *	0.0201	0.0566	0.0315 *	0.00758	0.0277 *
7-DiCB	µg/kg WW	0.00234 U	0.00194 U	0.00229 U	0.00199 U	0.00245 U	0.00216 U	0.00141 U	0.00193 U
80-TeCB	µg/kg WW	0.00483 U	0.00291 U	0.0039 U	0.00529 U	0.00386 U	0.00704 U	0.00416 U	0.00256 U
82-PeCB	µg/kg WW	0.0214	0.0231	0.0379	0.0629	0.18	0.319	0.0458	0.374
83-PeCB	µg/kg WW	0.0202	0.0191	0.0657	0.159	0.102	0.153	0.036	0.251
84-PeCB	µg/kg WW	0.0469	0.0317 U	0.0885	0.209	0.296	0.375	0.101	0.618
85-PeCB [C]	µg/kg WW	0.111	0.0691	0.269	0.627	0.494	0.653	0.187	0.805
86-PeCB [C]	µg/kg WW	0.341	0.231	0.756	2.47	2.1	2.44	0.754	3.25
88-PeCB [C]	µg/kg WW	0.063	0.0366	0.0978	0.445	0.596	0.649	0.21	0.705
89-PeCB	µg/kg WW	0.00487 U	0.00512 U	0.00645 U	0.0102 U	0.0636 U	0.0156	0.00637 U	0.0059 U
90-PeCB [C]	µg/kg WW	1.2	0.681	2.82	14.3 J	8.58 J	8.82 J	3.87 J	9.37 J
92-PeCB	µg/kg WW	0.175	0.0934	0.37	1.99	1.11	1.29	0.47	1.15 J
93-PeCB [C]	µg/kg WW	0.00798	0.00489 U	0.00941	0.0641	0.0834	0.0751	0.0292	0.0817
94-PeCB	µg/kg WW	0.00561 U	0.00591 U	0.00743 U	0.0111 U	0.0695 U	0.0124 U	0.00696 U	0.00623 U
95-PeCB	µg/kg WW	0.481	0.237	1.01	4.73 J	3.52	3.26	1.53	3.87 J
96-PeCB	µg/kg WW	0.00149 *	0.00148 U	0.00153 *	0.00486	0.0102	0.00672	0.00314 *	0.00831 J

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR6	AR6	AR6	AR8	AR8	AR8	AR8	AR8
	Sample ID	AR7-00-FFSBSO03-0-090827	AR7-00-FFSBSO04-0-090827	AR7-00-FFSBSO05-0-090828	AR8-00-FFSBSO01-0-090826	AR8-00-FFSBSO02-0-090826	AR8-00-FFSBSO03-0-090826	AR8-00-FFSBSO04-0-090826	AR8-00-FFSBSO05-0-090826
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/27/2009	8/27/2009	8/28/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009
Analyte	**Units**								
98-PeCB [C]	µg/kg WW	0.00561 *	0.00468 U	0.00708	0.00925 U	0.058 U	0.0611	0.0119 *	0.0511
99-PeCB	µg/kg WW	0.5	0.277	1.12	4.74 J	2.99	4.06 J	1.32	3.71 J
9-DiCB	µg/kg WW	0.00335 U	0.00332 U	0.00382 U	0.00307 U	0.00343 U	0.00269 U	0.00198 U	0.00277 U
Decachlorobiphenyl	µg/kg WW	0.0121 *	0.00939 J	0.0178 J	0.0348 J	0.0457 *	0.0417 J	0.0214 J	0.0395 J
PCB Dioxin-like Congener TEQ (bird)	µg/kg WW	0.001866644	0.001304063	0.003393082	0.008240453	0.008627145	0.024947333	0.003740831	0.00851698
PCB Dioxin-like Congener TEQ (fish)	µg/kg WW	5.18994E-05	4.27884E-05	0.000125071	0.000386562	0.000375008	0.000343452	0.000150153	0.00040724
PCB Dioxin-like Congener TEQ (mammal)	µg/kg WW	0.001184969	0.000990634	0.002643617	0.008159193	0.007843772	0.006628479	0.003158742	0.00805617
tPCBs_all	µg/kg WW	31.127428	19.073532	74.967078	452.654219	314.313911	344.414071	126.025853	252.22951
tPCBs_detects	µg/kg WW	30.031387	17.77978	73.915772	451.531	313.09287	343.8786	124.93006	251.50527
Lipids, total	%	1.1	0.38	1.1	1.6	1.8	1.4	1	1.2
Residue, total	%	29.1	23.1	24.1	25.6	25.1	26.6	27.1	26.3

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9
	Sample ID	AR9-00-FFSBSO01-0-090825	AR9-00-FFSBSO02-0-090825	AR9-00-FFSBSO03-0-090825	AR9-00-FFSBSO04-0-090825	AR9-00-FFSBSO04-1-090825	AR9-00-FFSBSO06-0-090825	AR9-00-FFSBSO07-0-090825	AR9-00-FFSBSO08-0-090825
	Type	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary
	Date	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**								
1,1'-Biphenyl	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Acetophenone	µg/kg WW	78 U	120 U	48 U	32 U	35 U	26 U	35 U	22 U
Benzaldehyde	µg/kg WW	950 U	940 U	920 U	990 U	970 U	980 U	960 U	930 U
Bis(2-Chloroethyl)Ether	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Hexachlorobenzene	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
Hexachloroethane	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
1,2,4,5-Tetrachlorobenzene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
2,3,4,6-Tetrachlorophenol	µg/kg WW	40 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
2,4,5-Trichlorophenol	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
2,4,6-Trichlorophenol	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
2,4-Dichlorophenol	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
2,4-Dimethylphenol	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
2,4-Dinitrophenol	µg/kg WW	240 U	240 U	230 U	250 U	250 U	250 U	240 U	240 U
2,4-Dinitrotoluene	µg/kg WW	38 U	38 U	37 U	40 U	39 U	40 U	39 U	38 U
2,6-Dinitrotoluene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
2-Chlorophenol	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
2-Methylphenol	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
2-Nitroaniline	µg/kg WW	95 U	94 U	92 U	99 U	97 U	98 U	96 U	93 U
2-Nitrophenol	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
3,3'-Dichlorobenzidine	µg/kg WW	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
3-Nitroaniline	µg/kg WW	190 U	190 U	190 U	200 U	200 U	200 U	200 U	190 U
4,6-Dinitro-2-Methylphenol	µg/kg WW	260 U	260 U	260 U	260 U	260 U	260 U	260 U	260 U
4-Bromophenyl-Phenylether	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
4-Chloro-3-Methylphenol	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
4-Chloroaniline	µg/kg WW	400 U	400 U	400 U	400 U	400 U	400 U	400 U	400 U
4-Chlorophenyl-Phenylether	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
4-Methylphenol	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
4-Nitroaniline	µg/kg WW	190 U	190 U	190 U	200 U	200 U	200 U	200 U	190 U
4-Nitrophenol	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Atrazine	µg/kg WW	370 U	370 U	360 U	390 U	380 U	390 U	380 U	370 U
Bis(2-Chloroethoxy)Methane	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Bis(2-chloroisopropyl) ether	µg/kg WW	95 U	94 U	92 U	99 U	97 U	98 U	96 U	93 U
Bis(2-Ethylhexyl)Phthalate	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Butylbenzylphthalate	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Caprolactam	µg/kg WW	190 J	94 U	210 J	99 U	97 U	430 J	180 J	430 J
Dibenzofuran	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9
	Sample ID	AR9-00-FFSBSO01-0-090825	AR9-00-FFSBSO02-0-090825	AR9-00-FFSBSO03-0-090825	AR9-00-FFSBSO04-0-090825	AR9-00-FFSBSO04-1-090825	AR9-00-FFSBSO06-0-090825	AR9-00-FFSBSO07-0-090825	AR9-00-FFSBSO08-0-090825
	Type	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary
	Date	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**								
Diethylphthalate	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Dimethylphthalate	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Di-n-butyl phthalate	µg/kg WW	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Di-n-octyl phthalate	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Hexachlorobutadiene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Hexachlorocyclopentadiene	µg/kg WW	480 U	470 U	460 U	500 U	490 U	490 U	480 U	470 U
Isophorone	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Nitrobenzene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
N-Nitroso-Di-N-Propylamine	µg/kg WW	22 U	22 U	22 U	22 U	22 U	22 U	22 U	22 U
N-Nitrosodiphenylamine	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Pentachlorophenol	µg/kg WW	48 U	47 U	46 U	50 U	49 U	49 U	48 U	47 U
Phenol	µg/kg WW	48 U	47 J	46 U	50 U	49 U	49 U	48 U	47 U
2-Chloronaphthalene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
2-Methylnaphthalene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Acenaphthene	µg/kg WW	19 U	3.1 J	1.9 J	2.2 J	2.9 J	20 U	20 U	19 U
Acenaphthylene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Anthracene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Benzo(a)anthracene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Benzo(a)pyrene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Benzo(b)fluoranthene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Benzo(g,h,i)perylene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Benzo(k)fluoranthene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Carbazole	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Chrysene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Dibenz(a,h)anthracene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Fluoranthene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Fluorene	µg/kg WW	19 U	4.6 J	3 J	3.1 J	4.8 J	3 J	20 U	2.5 J
Indeno(1,2,3-cd)pyrene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Naphthalene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
Phenanthrene	µg/kg WW	6.1 J	11 J	7.5 J	8.3 J	10 J	7.5 J	20 U	4.2 J
Pyrene	µg/kg WW	19 U	19 U	19 U	20 U	20 U	20 U	20 U	19 U
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg WW	0.000986 U	0.00109 U	0.00102 U	0.00301 U	0.000911 U	0.00121 U	0.000901 U	0.000924 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg WW	0.0013 J	0.00134 U	0.00124 U	0.00319 U	0.00328 J	0.0017 U	0.00131 U	0.000903 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg WW	0.000322 U	0.000329 U	0.000345 U	0.000602 U	0.000555 J	0.000355 U	0.000328 U	0.000265 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg WW	0.000602 U	0.000618 U	0.000683 U	0.00104 U	0.000536 U	0.000728 U	0.000604 U	0.000504 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg WW	0.000534 U	0.000518 U	0.000553 U	0.000886 U	0.000421 U	0.000558 U	0.000509 U	0.000435 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9
	Sample ID	AR9-00-FFSBSO01-0-090825	AR9-00-FFSBSO02-0-090825	AR9-00-FFSBSO03-0-090825	AR9-00-FFSBSO04-0-090825	AR9-00-FFSBSO04-1-090825	AR9-00-FFSBSO06-0-090825	AR9-00-FFSBSO07-0-090825	AR9-00-FFSBSO08-0-090825
	Type	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary
	Date	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**								
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg WW	0.00017 U	0.000331 J	0.000296 *	0.000502 *	0.000497 J	0.000234 U	0.000259 U	0.000189 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000302 U	0.000371 U	0.000379 U	0.000589 U	0.000277 U	0.000431 U	0.000357 U	0.000278 U
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000164 U	0.000211 U	0.000193 U	0.000307 U	0.000235 J	0.00023 U	0.000259 U	0.000182 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000307 U	0.000391 U	0.000384 U	0.000635 U	0.00028 U	0.000482 U	0.000367 U	0.000285 U
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg WW	0.000266 U	0.000326 U	0.00031 U	0.000494 U	0.000266 U	0.000374 U	0.00037 U	0.000265 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000314 U	0.000393 U	0.000393 U	0.000631 U	0.000287 U	0.000471 U	0.000373 U	0.00029 U
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg WW	0.000814 J	0.0019 J	0.00123 J	0.00209 J	0.00239 J	0.00074 J	0.000416 J	0.000603 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg WW	0.000216 U	0.000238 U	0.000251 U	0.000402 U	0.000214 U	0.00027 U	0.000243 U	0.000192 U
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000184 U	0.000226 U	0.000209 U	0.000356 U	0.00019 U	0.000258 U	0.000267 U	0.000194 U
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg WW	0.00149 J	0.00272 J	0.00232 J	0.00361 J	0.0039 J	0.00149 J	0.000787 J	0.00117 J
2,3,7,8-TCDD TEQ (bird)	µg/kg WW	0.010058249	0.015714733	0.011499576	0.023611629		0.010221241	0.003815901	0.005937233
2,3,7,8-TCDD TEQ (fish)	µg/kg WW	0.001606049	0.002574733	0.002222076	0.004284629		0.001725241	0.001036101	0.001227583
2,3,7,8-TCDD TEQ (mammal)	µg/kg WW	0.001695726	0.002608219	0.002157928	0.004402587		0.001819023	0.000995323	0.001197388
2,3,7,8-Tetrachlorodibenzofuran	µg/kg WW	0.00807	0.0123	0.00848	0.0171	0.0194	0.00812	0.00249	0.00431
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg WW	0.000164 U	0.000209 U	0.000273 *	0.000285 U	0.000901 J	0.000217 U	0.000199 U	0.000165 U
Heptachlorodibenzofuran (total)	µg/kg WW	0.000322 U	0.000329 U	0.000345 U	0.000602 U	0.000555 J	0.000355 U	0.000328 U	0.000265 U
Heptachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000602 U	0.000618 U	0.000683 U	0.00104 U	0.000536 U	0.000728 U	0.000604 U	0.000504 U
Hexachlorodibenzofuran (total)	µg/kg WW	0.000164 U	0.000331 J	0.000193 U	0.000527 J	0.00115 J	0.00023 U	0.000259 U	0.000182 U
Hexachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000302 U	0.000371 U	0.000379 U	0.000589 U	0.000277 U	0.000431 U	0.000357 U	0.000278 U
Pentachlorodibenzofuran (total)	µg/kg WW	0.0023 J	0.00492 J	0.00355 J	0.00608 J	0.00674 J	0.00223 J	0.0012 J	0.00178 J
Pentachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000216 U	0.000238 U	0.000251 U	0.000402 U	0.000214 U	0.00027 U	0.000243 U	0.000192 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg WW	0.000164 U	0.000209 U	0.000188 U	0.000285 U	0.00121 J	0.000217 U	0.000199 U	0.000165 U
Tetrachlorodibenzofuran (total)	µg/kg WW	0.00807 J	0.0123 J	0.00877 J	0.0171 J	0.0201 J	0.00812 J	0.00249 U	0.00454 J
4,4'-DDD	µg/kg WW	0.99 U	0.96 U	2.2 U	1 U	1.4 U	1.5 U	0.99 U	0.94 U
4,4'-DDe	µg/kg WW	2.9	7.9	5.3	7.4	6.1	4.7 J	0.99 U	4.4 J
4,4'-DDT	µg/kg WW	6.6 U	13 U	13	19	13	12	3.3	7.1
Aldrin	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
Alpha-Bhc	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
alpha-Chlordane	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
beta-BHC	µg/kg WW	0.99 U	3.9	0.98 U	0.83 J	0.99 U	0.97 U	0.9 J	2.1
beta-Chlordane	µg/kg WW	1.9 J	3.3 J	3.1 J	4 J	3 J	3 J	0.51 J	1.4 J
Chlordane	µg/kg WW	9.9 U	17 U	14 U	13 U	9.9 U	9.7 U	9.9 U	9.4 U
Chlorpyrifos	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
cis-Nonachlor	µg/kg WW	8.2 U	0.96 U	14 U	1 U	14 U	13 U	3.5 U	7 U
Delta-Bhc	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
Dieldrin	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9
	Sample ID	AR9-00-FFSBSO01-0-090825	AR9-00-FFSBSO02-0-090825	AR9-00-FFSBSO03-0-090825	AR9-00-FFSBSO04-0-090825	AR9-00-FFSBSO04-1-090825	AR9-00-FFSBSO06-0-090825	AR9-00-FFSBSO07-0-090825	AR9-00-FFSBSO08-0-090825
	Type	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary
	Date	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**								
Endosulfan I	µg/kg WW	0.99 U	0.96 U	0.98 U	0.34 J	0.99 U	0.97 U	0.99 U	0.94 U
Endosulfan II	µg/kg WW	0.54 J	1.3	1	1.6	0.89 J	1.1	0.99 U	0.57 J
Endosulfan Sulfate	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
Endrin aldehyde	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
Endrin Ketone	µg/kg WW	1.2 U	2.6 U	2.3 U	3.3 U	2.6 U	1.9 U	0.99 U	1.2 U
Endrin	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
gamma-BHC (Lindane)	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
Heptachlor epoxide	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
Heptachlor	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
Methoxychlor	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
Mirex	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
o,p'-DDD	µg/kg WW	1.8	3.1	2.8	3.7	2.8	3	0.99 U	1.6
O,P'-Dde	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
o,p'-DDT	µg/kg WW	2.1 U	3.6 U	3.3 U	4.5 U	3.3 U	3.2 U	0.99 U	1.9 U
Oxychlordane	µg/kg WW	0.99 U	0.96 U	0.98 U	1 U	0.99 U	0.97 U	0.99 U	0.94 U
Toxaphene	µg/kg WW	200 U	290 U	270 U	320 U	240 U	240 U	130 U	250 U
trans-Nonachlor	µg/kg WW	0.99 U	1.3 J	0.98 U	0.97 J	0.99 U	0.97 U	0.99 U	0.94 U
Decachlorobiphenyl	µg/kg WW	0.0371 J	0.0824 J	0.0528 J	0.106 J	0.105 J	0.0638 J	0.0412 J	0.0413 J
1,1'-Biphenyl, 2,2'-dichloro-	µg/kg WW	0.0151 U	0.0203 U	0.0176 U	0.0228 U	0.0219 U	0.0197 U	0.0125 U	0.0168 U
1,1'-Biphenyl, 2,4'-dichloro-	µg/kg WW	0.0121 U	0.0133 U	0.0175 U	0.0149 U	0.0171 U	0.0128 U	0.0206 U	0.0166 U
1,1'-Biphenyl, 3,3'-dichloro-	µg/kg WW	0.0413 U	0.044 U	0.0602 U	0.0444 U	0.0445 U	0.0443 U	0.0529 U	0.0563 U
103-PeCB	µg/kg WW	0.17	0.249	0.248	0.326	0.267	0.322	0.052	0.146
104-PeCB	µg/kg WW	0.00927	0.0105	0.00915	0.0123	0.012 *	0.0122	0.00238 U	0.00545 *
106-PeCB	µg/kg WW	0.0202 U	0.0165 U	0.0262 U	0.00981 U	0.0185 U	0.0153 U	0.00831 U	0.00907 U
107-PeCB [C]	µg/kg WW	0.0899	0.173	0.164	0.178	0.176	0.2	0.0373	0.104
109-PeCB	µg/kg WW	0.237	0.393	0.402	0.497	0.466	0.512	0.105	0.278
10-DiCB	µg/kg WW	0.000887 U	0.00138 U	0.000944 U	0.00137 U	0.00148 U	0.00135 U	0.000519 U	0.00117 U
110-PeCB [C]	µg/kg WW	2.35	4.09 J	4.04 J	4.86 J	5.01 J	6.33 J	1.09	2.9
111-PeCB	µg/kg WW	0.00977	0.0138	0.0145	0.0202	0.0178	0.0165	0.00505 U	0.0065 U
112-PeCB	µg/kg WW	0.00567 U	0.00433 U	0.00406 U	0.00646 U	0.0128 U	0.00784 U	0.00462 U	0.00595 U
120-PeCB	µg/kg WW	0.0399	0.0626	0.0609	0.0809	0.0818	0.0805	0.0186	0.0357
121-PeCB	µg/kg WW	0.00622 U	0.00475 U	0.00446 U	0.00804 *	0.0139 U	0.00861 *	0.00502 U	0.00646 U
122-PeCB	µg/kg WW	0.0245 U	0.0305	0.0318 U	0.0397	0.0399	0.0468	0.0104	0.027 *
127-PeCB	µg/kg WW	0.0217 U	0.0177 U	0.0282 U	0.0105 U	0.0194 U	0.016 U	0.00873 U	0.00953 U
128-HxCB [C]	µg/kg WW	0.903	1.77	1.62	2.21	2.01	2.14	0.527	1.15
129-HxCB [C]	µg/kg WW	13.5 J	25.5 J	23.6 J	32.5 J	31.5 J	32.8 J	8.01 J	16.7 J

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9
	Sample ID	AR9-00-FFSBSO01-0-090825	AR9-00-FFSBSO02-0-090825	AR9-00-FFSBSO03-0-090825	AR9-00-FFSBSO04-0-090825	AR9-00-FFSBSO04-1-090825	AR9-00-FFSBSO06-0-090825	AR9-00-FFSBSO07-0-090825	AR9-00-FFSBSO08-0-090825
	Type	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary
	Date	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**								
12-DiCB [C]	µg/kg WW	0.00951 U	0.0101 U	0.00526 U	0.0113 U	0.00971 U	0.00891 U	0.00461 U	0.0037 U
130-HxCB	µg/kg WW	0.493	0.879	0.827	1.12	1.1	1.17	0.282	0.601
131-HxCB	µg/kg WW	0.0517	0.079	0.086	0.113	0.0979	0.112	0.027	0.0556
132-HxCB	µg/kg WW	2.02	3.72	3.44	4.83 J	4.49 J	5.23 J	1.07	2.57
133-HxCB	µg/kg WW	0.27	0.439	0.419	0.562	0.564	0.572	0.147	0.28
134-HxCB	µg/kg WW	0.307	0.476	0.462	0.646	0.736	0.92	0.166	0.369
135-HxCB [C]	µg/kg WW	4.43 J	8.05 J	7.33 J	10 J	9.96 J	12.7 J	2.51	5.35 J
136-HxCB	µg/kg WW	0.854	1.4	1.41	1.88	1.86	2.3	0.448	0.983
137-HxCB	µg/kg WW	0.206	0.392 *	0.411 *	0.445 *	0.401	0.479	0.106	0.224
139-HxCB [C]	µg/kg WW	0.131	0.225	0.21	0.279	0.271	0.276	0.0734	0.158
141-HxCB	µg/kg WW	2.5	4.42 J	4.55 J	6.2 J	5.8 J	6.51 J	1.5	3.01
142-HxCB	µg/kg WW	0.0264 U	0.0265 U	0.0142 U	0.0138 U	0.0324 U	0.0179 U	0.0203 U	0.0139 U
143-HxCB	µg/kg WW	0.0281 U	0.0283 U	0.0152 U	0.0147 U	0.0349 U	0.0192 U	0.0218 U	0.015 U
144-HxCB	µg/kg WW	0.546	1	0.951	1.29	1.31	1.57	0.337	0.774
145-HxCB	µg/kg WW	0.00182 U	0.00193 U	0.00169 U	0.00304 U	0.00288 U	0.003 U	0.00653 U	0.00202 U
146-HxCB	µg/kg WW	2.63	4.81 J	4.44 J	6.32 J	5.83 J	5.94 J	1.42	2.96
147-HxCB [C]	µg/kg WW	10.5 J	19.8 J	18.3 J	26.1 J	24.9 J	27.9 J	5.48 J	11.7 J
148-HxCB	µg/kg WW	0.0302	0.0454	0.0395	0.0524	0.0564	0.0528	0.0146	0.031 *
14-DiCB	µg/kg WW	0.000583 U	0.000571 U	0.000415 U	0.000492 U	0.000735 U	0.000623 U	0.000672 U	0.000597 U
150-HxCB	µg/kg WW	0.0272	0.0443	0.04	0.0527	0.0528	0.0588	0.0157	0.0302
152-HxCB	µg/kg WW	0.00169 U	0.00178 U	0.00156 U	0.00282 U	0.00266 U	0.00278 U	0.00605 U	0.00187 U
154-HxCB	µg/kg WW	0.265	0.415	0.396	0.517	0.517	0.527	0.144	0.292
155-HxCB	µg/kg WW	0.00484	0.00711	0.00589	0.008 *	0.00689 *	0.00774	0.00449 U	0.00451 *
158-HxCB	µg/kg WW	1.05	1.97	1.85	2.5	2.45	2.6	0.631	1.38
159-HxCB	µg/kg WW	0.11	0.275	0.239	0.386 J	0.016 U	0.346	0.0111 U	0.0111 U
160-HxCB	µg/kg WW	0.0195 U	0.0196 U	0.0105 U	0.0102 U	0.0252 U	0.0139 U	0.0158 U	0.0108 U
161-HxCB	µg/kg WW	0.0181 U	0.0182 U	0.00977 U	0.00945 U	0.0234 U	0.0129 U	0.0146 U	0.01 U
162-HxCB	µg/kg WW	0.0126 U	0.125	0.0803	0.0197 U	0.015 U	0.0174 U	0.0105 U	0.0105 U
164-HxCB	µg/kg WW	0.641	1.22	1.1	1.58	1.61	1.81	0.385	0.882
165-HxCB	µg/kg WW	0.0265	0.036	0.0377	0.0422	0.0439	0.0455	0.0166 U	0.025
16-TrCB	µg/kg WW	0.0165 U	0.0231 U	0.0231 U	0.0282 U	0.0256 U	0.0215 U	0.0174 U	0.0197 U
171-HpCB [C]	µg/kg WW	1.68 J	2.92	2.66 J	4.26 J	3.75	3.41	0.879	1.9
172-HpCB	µg/kg WW	0.0148 U	0.0211 U	0.00916 U	0.0158 U	0.0161 U	0.0158 U	0.0108 U	0.0126 U
174-HpCB	µg/kg WW	4.83 J	9.79 J	8.81 J	14.5 J	11 J	13 J	2.6	5.66 J
175-HpCB	µg/kg WW	0.246 J	0.422	0.38 J	0.581 J	0.551	0.513	0.129	0.309
176-HpCB	µg/kg WW	0.518 J	0.845	0.846 J	1.29 J	1.2	1.35	0.289	0.602

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9
	Sample ID	AR9-00-FFSBSO01-0-090825	AR9-00-FFSBSO02-0-090825	AR9-00-FFSBSO03-0-090825	AR9-00-FFSBSO04-0-090825	AR9-00-FFSBSO04-1-090825	AR9-00-FFSBSO06-0-090825	AR9-00-FFSBSO07-0-090825	AR9-00-FFSBSO08-0-090825
	Type	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary
	Date	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**								
177-HpCB	µg/kg WW	3.62 J	6.54 J	5.93 J	9.14 J	8.24 J	8.16 J	1.91	4.1 J
178-HpCB	µg/kg WW	1.57 J	2.73	2.42 J	3.61 J	3.3	3.49	0.845	1.72
179-HpCB	µg/kg WW	1.64 J	2.64	2.6 J	3.97 J	3.75	4.37 J	0.804	1.89
17-TrCB	µg/kg WW	0.0245 U	0.0362 U	0.0291 U	0.0395 U	0.0423 U	0.0363 U	0.0203 U	0.028 U
181-HpCB	µg/kg WW	0.0336 J	0.05	0.0491 J	0.0805 J	0.0696	0.064	0.0174 *	0.0124 U
182-HpCB	µg/kg WW	0.0221 J	0.038	0.0248 J	0.0438 J	0.0593	0.0542	0.0119 *	0.0228
183-HpCB [C]	µg/kg WW	5.19 J	9.64 J	8.3 J	13.4 J	12.6 J	11.5 J	2.66	6.02 J
184-HpCB	µg/kg WW	0.0058 U	0.00557 *	0.00437 J	0.00716 J	0.00612 U	0.00757 U	0.0056 U	0.00475 U
186-HpCB	µg/kg WW	0.00621 U	0.00566 U	0.00417 U	0.00395 U	0.0064 U	0.00792 U	0.00586 U	0.00497 U
187-HpCB	µg/kg WW	8.46 J	19.2 J	15.3 J	24.3 J	22.3 J	21 J	5.35 J	10.4 J
188-HpCB	µg/kg WW	0.0146 J	0.0244	0.0226 J	0.0308 J	0.0319	0.0267	0.00874 *	0.0166
18-TrCB [C]	µg/kg WW	0.0364 U	0.0562 U	0.0471 U	0.067 U	0.0712 U	0.0603 U	0.0346 U	0.0452 U
190-HpCB	µg/kg WW	1.44 J	2.76	2.43 J	3.87 J	3.53	3.14	0.813	1.76
191-HpCB	µg/kg WW	0.256 J	0.492	0.441 J	0.694 J	0.678	0.611	0.159	0.34
192-HpCB	µg/kg WW	0.966 J	1.93	1.72 J	2.74 J	2.38	2.17	0.536	1.14
195-OcCB	µg/kg WW	0.995 J	2.37 J	1.7 J	2.95 J	2.87 J	1.95 J	0.635	1.11 J
196-OcCB	µg/kg WW	1.44 J	3.17 J	2.83 J	4.25 J	3.79 J	3.08 J	0.896	1.77 J
197-OcCB [C]	µg/kg WW	0.333 J	0.641 J	0.595 J	0.966 J	0.887 J	0.84 J	0.208	0.392 J
198-OcCB [C]	µg/kg WW	3.41 J	6.96 J	6.11 J	9.82 J	8.63 J	7.55 J	2.16	3.83 J
19-TrCB	µg/kg WW	0.0105 U	0.0148 U	0.0113 U	0.0188 U	0.0174 U	0.0143 U	0.00607 U	0.0109 U
1-MoCB	µg/kg WW	0.00472 U	0.00601 U	0.00503 U	0.00664 U	0.00608 U	0.0057 U	0.00443 U	0.00443 U
2,2',3,3',4,4',5,5'-Octachlorobiphenyl	µg/kg WW	1.25 J	3.26 J	2.28 J	3.77 J	3.86 J	2.6 J	0.837	1.81 J
2,2',3,3',4,4',5-Heptachlorobiphenyl	µg/kg WW	6.3 J	11.7 J	10.6 J	16.9 J	14.7 J	13.1 J	3.3	7.56 J
2,2',3,4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	16.3 J	31.2 J	28.3 J	44.2 J	38.7 J	34.7 J	8.77 J	19.6 J
2,2',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	20.1 J	37 J	34.5 J	47.6 J	47.6 J	46.8 J	12 J	24.4 J
2,2',5,5'-Tetrachlorobiphenyl	µg/kg WW	1.26	1.93	1.82	2.47	2.61	3.12	0.316	1.06
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	0.156 J	0.33 J	0.266	0.405 J	0.398	0.341	0.0886	0.205
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg WW	0.826	1.65	1.49	2.04	2.04	2.01	0.471	1.11
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg WW	0.693 J	1.33 J	1.39 J	1.58 J	1.58 J	1.87 J	0.352 J	0.986 J
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.379	0.767	0.697	0.963	0.977	0.916	0.225	0.512
2',3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0271 J	0.0753 J	0.0472 J	0.0713 J	0.0866 *	0.0748 *	0.0176 J	0.0428 J
2,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	2.67	5.03 J	4.79 J	5.98 J	5.92 J	6.91 J	1.35	3.42
2,3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0609 J	0.111 J	0.103 J	0.129 J	0.129 J	0.144 J	0.0327 J	0.0816 J
201-OcCB	µg/kg WW	0.307 J	0.572 J	0.521 J	0.827 J	0.743 J	0.629 J	0.185	0.342 J
202-OcCB	µg/kg WW	0.375 J	0.779 J	0.663 J	1.02 J	0.973 J	0.85 J	0.241	0.463 J
203-OcCB	µg/kg WW	2.07 J	4.43 J	3.39 J	5.95 J	5.65 J	4.34 J	1.31	2.67 J

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9
	Sample ID	AR9-00-FFSBSO01-0-090825	AR9-00-FFSBSO02-0-090825	AR9-00-FFSBSO03-0-090825	AR9-00-FFSBSO04-0-090825	AR9-00-FFSBSO04-1-090825	AR9-00-FFSBSO06-0-090825	AR9-00-FFSBSO07-0-090825	AR9-00-FFSBSO08-0-090825
	Type	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary
	Date	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**								
204-OcCB	µg/kg WW	0.00188 U	0.00952 U	0.00182 U	0.00239 U	0.00311 U	0.00373 U	0.00222 U	0.00219 U
205-OcCB	µg/kg WW	0.123 J	0.259 J	0.192	0.343 J	0.292	0.232	0.0692	0.136
206-NoCB	µg/kg WW	0.396 J	0.874 J	0.714 J	1.21 J	1.13 J	0.768 J	0.284 J	0.519 J
207-NoCB	µg/kg WW	0.0471 J	0.105 J	0.0884 J	0.145 J	0.119 J	0.0959	0.0349	0.0612 J
208-NoCB	µg/kg WW	0.0924 J	0.168 J	0.136 J	0.251 J	0.22 J	0.164 J	0.0568 J	0.101 J
20-TrCB [C]	µg/kg WW	0.163 U	0.278 U	0.21 U	0.303	0.306	0.261	0.0897 U	0.169 U
21-TrCB [C]	µg/kg WW	0.0374 U	0.0576 U	0.053 U	0.066 U	0.0629 U	0.0533 U	0.0301 U	0.0448 U
22-TrCB	µg/kg WW	0.04 U	0.0631 U	0.0517 U	0.0697 U	0.07 U	0.057 U	0.0235 U	0.0403 U
23-TrCB	µg/kg WW	0.000855 U	0.002 U	0.00057 U	0.000636 U	0.000997 U	0.00106 U	0.000705 U	0.000719 U
24-TrCB	µg/kg WW	0.00124 U	0.00149 U	0.00179 U	0.00279 U	0.00205 U	0.00183 U	0.00122 U	0.00142 U
25-TrCB	µg/kg WW	0.00964 U	0.0147 U	0.0113 U	0.0172 *	0.0179	0.0154 U	0.00492 U	0.00866 U
26-TrCB [C]	µg/kg WW	0.0232 U	0.0361	0.0269 U	0.0445	0.0436	0.0342	0.0121 U	0.0209 U
27-TrCB	µg/kg WW	0.00507 U	0.00652 U	0.00548 U	0.00717 U	0.00803 U	0.00712 U	0.00384 U	0.00526 U
2-MoCB	µg/kg WW	0.00412 U	0.00411 U	0.00274 U	0.00452 U	0.00404 U	0.00347 U	0.00284 U	0.00257 U
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.0158	0.0156 U	0.0254 *	0.0471 *	0.0153 U	0.0177 U	0.0118 U	0.0103 U
3,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0292 J	0.0596 J	0.0339 U	0.0747 J	0.0742 J	0.0764 J	0.0153 J	0.0434 J
3,3',4,4'-Tetrachlorobiphenyl	µg/kg WW	0.0197	0.0399	0.0307	0.0458	0.0445 *	0.0369	0.00699 U	0.0239
3,4,4',5-Tetrachlorobiphenyl	µg/kg WW	0.00442 U	0.00542 U	0.00422 U	0.00711 U	0.00839 U	0.00767 U	0.00571 U	0.00539 U
31-TrCB	µg/kg WW	0.0968 U	0.169 U	0.134 U	0.184 U	0.175 U	0.144 U	0.0553 U	0.0963 U
32-TrCB	µg/kg WW	0.0149 U	0.0224 U	0.0212 U	0.0262 U	0.0271 U	0.0223 U	0.0139 U	0.019 U
34-TrCB	µg/kg WW	0.00088 U	0.00124 *	0.000587 U	0.00146	0.00102 U	0.00108 U	0.000719 U	0.000733 U
35-TrCB	µg/kg WW	0.00235 U	0.00295 U	0.00185 U	0.00318 U	0.00274 U	0.00266 U	0.00214 U	0.00308 U
36-TrCB	µg/kg WW	0.0152	0.00168 U	0.00168 U	0.00147 U	0.0248 J	0.00233 U	0.00284 *	0.0027 U
37-TrCB	µg/kg WW	0.0232 U	0.0403 U	0.0281 U	0.0459 U	0.0458 U	0.0359 U	0.0144 U	0.0192 U
38-TrCB	µg/kg WW	0.00183 U	0.0018 U	0.0018 U	0.00158 U	0.00266 U	0.00259 U	0.00209 U	0.003 U
39-TrCB	µg/kg WW	0.00176 U	0.00225	0.0018	0.00293	0.00253 U	0.00246 U	0.00198 U	0.00285 U
3-MoCB	µg/kg WW	0.00717 U	0.0065 U	0.00621 U	0.0078 U	0.00759 U	0.00646 U	0.0066 U	0.00541 U
4,4'-Dichlorobiphenyl	µg/kg WW	0.0151 U	0.019 U	0.0195 U	0.0196 U	0.0215 U	0.0186 U	0.0173 U	0.0174 U
40-TeCB [C]	µg/kg WW	0.0641 U	0.109	0.0926	0.117	0.11	0.117	0.0256 U	0.0711
41-TeCB	µg/kg WW	0.0122 U	0.0137 U	0.0173 U	0.0188 U	0.0216 U	0.0151 U	0.00826 U	0.0169 U
42-TeCB	µg/kg WW	0.0674 *	0.102	0.0886	0.116	0.117	0.117	0.0195 U	0.0642
43-TeCB	µg/kg WW	0.00739 *	0.013	0.0107	0.0153	0.0148	0.015	0.00626 U	0.00795
44-TeCB [C]	µg/kg WW	0.409	0.63	0.622	0.74	0.729	0.823	0.116 U	0.386
45-TeCB [C]	µg/kg WW	0.0494	0.068	0.0512	0.071	0.0872	0.0874	0.0177 U	0.0406
46-TeCB	µg/kg WW	0.00498 U	0.00812 U	0.00586 U	0.00833 U	0.00955 U	0.00919 U	0.0038 U	0.00498 U
48-TeCB	µg/kg WW	0.0384 U	0.0663	0.0527	0.0721	0.068	0.068	0.0134 U	0.0405 U

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9
	Sample ID	AR9-00-FFSBSO01-0-090825	AR9-00-FFSBSO02-0-090825	AR9-00-FFSBSO03-0-090825	AR9-00-FFSBSO04-0-090825	AR9-00-FFSBSO04-1-090825	AR9-00-FFSBSO06-0-090825	AR9-00-FFSBSO07-0-090825	AR9-00-FFSBSO08-0-090825
	Type	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary
	Date	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**								
49-TeCB [C]	µg/kg WW	0.621	0.881	0.831	1.1	1.07	1.17	0.143	0.457
50-TeCB [C]	µg/kg WW	0.0425	0.0676	0.0485	0.0839	0.0987	0.0849	0.0129 U	0.0345
54-TeCB	µg/kg WW	0.00593	0.00816	0.00573	0.00936 *	0.00845 *	0.00758	0.00118 U	0.00294 *
55-TeCB	µg/kg WW	0.00821	0.0138	0.00936 *	0.0189	0.0158 *	0.0103	0.00485 U	0.0115
56-TeCB	µg/kg WW	0.117	0.199	0.187	0.238	0.216	0.204	0.0334 U	0.118
57-TeCB	µg/kg WW	0.00453 U	0.00531 U	0.00437 U	0.0077 U	0.00865 U	0.00725 U	0.00515 U	0.0052 U
58-TeCB	µg/kg WW	0.00504 U	0.00592 U	0.00531 *	0.00857 U	0.00907 U	0.0076 U	0.0054 U	0.00544 U
59-TeCB [C]	µg/kg WW	0.0279	0.0454	0.0385	0.0494	0.0497	0.0473	0.00938 U	0.0252
5-DiCB	µg/kg WW	0.00263 U	0.0021 U	0.00282 U	0.00419 U	0.00263 U	0.00333 U	0.000841 U	0.00338 U
60-TeCB	µg/kg WW	0.0985	0.178	0.164	0.201	0.172	0.156	0.0311 U	0.107
61-TeCB [C]	µg/kg WW	0.861	1.5	1.46	1.75	1.64	1.74	0.23	0.846
63-TeCB	µg/kg WW	0.0234	0.0393	0.0379	0.0502	0.0456	0.0413	0.00797	0.0237
64-TeCB	µg/kg WW	0.199	0.305	0.29	0.364	0.367	0.385	0.0624 U	0.19
66-TeCB	µg/kg WW	0.463	0.797	0.791	0.939	0.886	0.863	0.155	0.488
67-TeCB	µg/kg WW	0.0106	0.0208	0.0174	0.0247	0.0222 *	0.0186	0.00454 U	0.011
68-TeCB	µg/kg WW	0.0107 *	0.0147	0.014	0.0197	0.0165	0.0171	0.00471 U	0.00738
6-DiCB	µg/kg WW	0.00849 U	0.00942 U	0.00904 U	0.012 U	0.0106 U	0.0102 U	0.00644 U	0.00777 U
72-TeCB	µg/kg WW	0.0169 *	0.0259	0.0232	0.0324	0.0308	0.0289	0.00546 U	0.0134
73-TeCB	µg/kg WW	0.00581	0.00335 *	0.00455	0.00913	0.0152	0.0151	0.00548 U	0.00653 U
78-TeCB	µg/kg WW	0.00485 U	0.00569 U	0.00469 U	0.00825 U	0.00839 U	0.00703 U	0.005 U	0.00504 U
79-TeCB	µg/kg WW	0.0173 *	0.022 *	0.0237	0.0371	0.0238 *	0.0272 *	0.00513 *	0.0138
7-DiCB	µg/kg WW	0.00232 U	0.00267 U	0.00242 U	0.00301 U	0.00283 U	0.00252 U	0.00168 U	0.00191 U
80-TeCB	µg/kg WW	0.00446 U	0.00524 U	0.00431 U	0.00759 U	0.00771 U	0.00646 U	0.00459 U	0.00463 U
82-PeCB	µg/kg WW	0.116	0.212	0.222	0.233	0.239	0.334	0.0542	0.154
83-PeCB	µg/kg WW	0.0785	0.161	0.192	0.168	0.184	0.223	0.0227	0.115
84-PeCB	µg/kg WW	0.258	0.374	0.419	0.465	0.449	0.641	0.0826	0.252
85-PeCB [C]	µg/kg WW	0.355	0.6	0.646	0.754	0.731	0.849	0.169	0.45
86-PeCB [C]	µg/kg WW	1.34	2.28	2.39	2.78	2.81	3.65 J	0.623	1.69
88-PeCB [C]	µg/kg WW	0.56	0.824	0.816	1.03	1.02	1.14	0.206	0.551
89-PeCB	µg/kg WW	0.00812 U	0.0062 U	0.00582 U	0.00925 U	0.0191 U	0.0117 U	0.00689 U	0.00887 U
90-PeCB [C]	µg/kg WW	5.3 J	8.88 J	8.86 J	11 J	11 J	13.4 J	2.5	5.95 J
92-PeCB	µg/kg WW	0.853	1.34	1.32	1.66	1.62	2.07	0.35	0.859
93-PeCB [C]	µg/kg WW	0.106	0.141	0.141	0.181	0.182	0.189	0.0414	0.0886
94-PeCB	µg/kg WW	0.00881 U	0.00672 U	0.00631 U	0.01 U	0.0196 U	0.012 U	0.00709 U	0.00912 U
95-PeCB	µg/kg WW	2.6	4.11 J	3.92	5.03 J	4.96 J	6.25 J	0.849	2.48
96-PeCB	µg/kg WW	0.0146	0.0194	0.0149	0.0231	0.0261	0.0223	0.00377	0.00813

TABLE G-11
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN-ON - 2009 - ORGANICS
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9	AR9	AR9	AR9	AR9	AR9	AR9
	Sample ID	AR9-00-FFSBSO01-0-090825	AR9-00-FFSBSO02-0-090825	AR9-00-FFSBSO03-0-090825	AR9-00-FFSBSO04-0-090825	AR9-00-FFSBSO04-1-090825	AR9-00-FFSBSO06-0-090825	AR9-00-FFSBSO07-0-090825	AR9-00-FFSBSO08-0-090825
	Type	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary
	Date	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**								
98-PeCB [C]	µg/kg WW	0.035	0.0575	0.0484	0.062	0.0688	0.0741	0.0127	0.0311 *
99-PeCB	µg/kg WW	2.35	3.78	3.76	4.65 J	4.62 J	5.02 J	1.12	2.58
9-DiCB	µg/kg WW	0.00379 U	0.00407 U	0.00343 U	0.00503 U	0.0044 U	0.00371 U	0.0029 U	0.00281 U
Decachlorobiphenyl	µg/kg WW	0.0371 J	0.0824 J	0.0528 J	0.106 J	0.105 J	0.0638 J	0.0412 J	0.0413 J
PCB Dioxin-like Congener TEQ (bird)	µg/kg WW	0.004553111	0.008883723	0.005728702	0.010973505		0.010754518	0.002564682	0.006343858
PCB Dioxin-like Congener TEQ (fish)	µg/kg WW	0.00017503	0.000351947	0.000219866	0.000438742		0.000451739	9.33285E-05	0.000254387
PCB Dioxin-like Congener TEQ (mammal)	µg/kg WW	0.003541656	0.006712415	0.004419832	0.009199324		0.008544965	0.001962519	0.004843729
tPCBs_all	µg/kg WW	152.619965	286.074941	260.682796	366.200365		360.739673	83.153166	180.237939
tPCBs_detects	µg/kg WW	151.60702	284.88578	259.61956	365.163955		359.85363	82.05245	179.28286
Lipids, total	%	1.4	3.5	1.6	3.9	2.8	2	0.43	1.3
Residue, total	%	27.6	33.9	25.7	29.1	26.9	26.3	24.5	27.4

TABLE G-12
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN REMOVED - 2009 - INORGANICS EXCEPT MERCURY
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR2	AR2	AR2	AR3	AR3	AR3	AR3	AR4	AR6
	Sample ID	AR2-WB-FFSBSR01-0-090824	AR2-WB-FFSBSR02-0-090824	AR2-WB-FFSBSR04-0-090824	AR2-WB-FFSBSR05-0-090824	AR2-WB-FFSBSR06-0-090824	AR3-00-FFSBSR02-0-090827	AR3-00-FFSBSR03-0-090827	AR3-00-FFSBSR04-0-090827	AR3-00-FFSBSR05-0-090827	AR4-00-FFSBSR01-0-090826	AR7-00-FFSBSR01-0-090827
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/24/2009	8/24/2009	8/24/2009	8/24/2009	8/24/2009	8/27/2009	8/27/2009	8/27/2009	8/27/2009	8/26/2009	8/27/2009
Analyte	**Units**											
Antimony	µg/kg WW	10.1 U	20.1 U	10 U	10.8 U	11 U	11 U	9.5 U	10.5 U	10.7 U	10.7 U	11.3 U
Arsenic	µg/kg WW	101 U	104 U	118	122 U	120 U	116	85 J	160	72 J	98 J	64 J
Beryllium	µg/kg WW	4.1 U	4.1 U	4 U	4.3 U	4.4 U	4.4 U	3.8 U	4.2 U	4.3 U	4.3 U	4.5 U
Cadmium	µg/kg WW	4.1 U	1.1 J	1.4 J	1.3 J	4.4 U	4.4 U	1.8 J	4.2 U	2.5 J	4.3 U	4.5 U
Chromium	µg/kg WW	189 U	89	40 U	43 U	44 U	77 J	76 J	48 J	47 J	86 J	54 J
Copper	µg/kg WW	244 J	190 J	242 J	179 J	180 J	214 J	180 J	158 J	182 J	200	271 J
Lead	µg/kg WW	2.1 J	47.1	4 U	4.3 U	4.4 U	3.4 J	1 J	5.2	9.1	1.6 J	4.1 J
Nickel	µg/kg WW	48 J	22 J	40 U	43 U	44 U	21 J	10 J	12 J	24 J	14 J	30 J
Selenium	µg/kg WW	222	283	251	303	257	433	460	402	517	239	371
Strontium	µg/kg WW	359 U	1130	164 U	138 U	355 U	849	307	347	1780	183	2160
Vanadium	µg/kg WW	19 J	18 J	21 J	20 J	20 J	15 J	14 J	17 J	16 J	20 J	29 J
Zinc	µg/kg WW	3630	4070	3310	3680	3560	3760 J	3820 J	3730 J	4380 J	3360 J	4480 J

TABLE G-12
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN REMOVED - 2009 - INORGANICS EXCEPT MERCURY
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR6	AR6	AR6	AR6	AR8	AR8	AR8	AR8	AR8	AR9	AR9
	Sample ID	AR7-00-FFSBSR02-0-090827	AR7-00-FFSBSR03-0-090827	AR7-00-FFSBSR04-0-090827	AR7-00-FFSBSR05-0-090828	AR8-00-FFSBSR01-0-090826	AR8-00-FFSBSR02-0-090826	AR8-00-FFSBSR03-0-090826	AR8-00-FFSBSR04-0-090826	AR8-00-FFSBSR05-0-090826	AR9-00-FFSBSR01-0-090825	AR9-00-FFSBSR02-0-090825
	Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
	Date	8/27/2009	8/27/2009	8/27/2009	8/28/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009
Analyte	**Units**											
Antimony	µg/kg WW	10.4 U	10.8 U	9.7 U	11 U	11 U	10.9 U	10.7 U	11.2 U	10.5 U	13.3 U	11.8 U
Arsenic	µg/kg WW	179	110	553	126	88 J	46 J	55 J	83 J	52 J	29 J	34 J
Beryllium	µg/kg WW	4.2 U	4.3 U	3.9 U	4.4 U	4.4 U	4.4 U	4.3 U	4.5 U	4.2 U	4.2 U	4.7 U
Cadmium	µg/kg WW	4.2 U	4.3 U	3.9 U	4.4 U	4.4 U	4.4 U	4.3 U	4.5 U	4.2 U	1.4 J	4.7 U
Chromium	µg/kg WW	29 J	73 J	493 J	104	128 J	65 J	81 J	269 J	82 J	61 U	118 U
Copper	µg/kg WW	204 J	315 J	237 J	193	262	192	177	205	177	193	200
Lead	µg/kg WW	10.2	2.4 J	7.6	2.7 J	4.4 U	9.9 J	4.3 U	4.5 U	4.2 U	8.3	3.6 J
Nickel	µg/kg WW	42 U	7 J	75	20 J	5 J	28 J	10 J	121 J	14 J	14 J	7 J
Selenium	µg/kg WW	398	318	430	302	249	392	352	275	292	306 J	329 J
Strontium	µg/kg WW	262	197	760	582	514	115	79	383	322	78	214
Vanadium	µg/kg WW	15 J	16 J	13 J	20 J	20 J	55	16 J	18 J	21 J	31 J	23 J
Zinc	µg/kg WW	3690 J	3500 J	3710 J	3240	4170 J	3430 J	3410 J	3290 J	3110 J	3470	3600

TABLE G-12
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN REMOVED - 2009 - INORGANICS EXCEPT MERCURY
CJHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9	AR9	AR9	AR9	AR9	AR9
	Sample ID	AR9-00-FFSBSR03-0-090825	AR9-00-FFSBSR05-0-090825	AR9-00-FFSBSR05-1-090825	AR9-00-FFSBSR06-0-090825	AR9-00-FFSBSR07-0-090825	AR9-00-FFSBSR08-0-090825
	Type	Primary	Primary	Duplicate	Primary	Primary	Primary
	Date	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**						
Antimony	µg/kg WW	10.8 U	11.7 U	11.1 U	10.6 U	8.8 U	11.1 U
Arsenic	µg/kg WW	38 J	27 J	17 J	19 J	27 J	40 J
Beryllium	µg/kg WW	4.3 U	4.7	4.5 U	4.3 U	3.5 U	4.4 U
Cadmium	µg/kg WW	4.3 U	4.7 U	4.5 U	4.3 U	3.5 U	4.4 U
Chromium	µg/kg WW	481	49 U	74 U	45 U	35 U	44 U
Copper	µg/kg WW	198	256	183	210	219	353
Lead	µg/kg WW	4.3 U	9	1.3 J	4.3 U	3.5 U	2 J
Nickel	µg/kg WW	20 J	136	9 J	43 U	35 U	29 J
Selenium	µg/kg WW	330 J	308 J	177 J	394 J	326 J	389 J
Strontium	µg/kg WW	565	9860	824	121	277	69
Vanadium	µg/kg WW	12 J	45 J	26 J	19 J	20 J	17 J
Zinc	µg/kg WW	3390	5550	3850	3300	3630	3700

TABLE G-13
ANALYTICAL RESULTS - SMALLMOUTH BASS FILLETS, SKIN REMOVED - 2009 AND 2011 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Reach	Sample ID	Type	Date	Total Mercury (µg/kg WW)
AR2	AR2-WB-FFSBSR01-0-090824	Primary	8/24/2009	432
	AR2-WB-FFSBSR02-0-090824	Primary	8/24/2009	388
	AR2-WB-FFSBSR04-0-090824	Primary	8/24/2009	415
	AR2-WB-FFSBSR05-0-090824	Primary	8/24/2009	421
	AR2-WB-FFSBSR06-0-090824	Primary	8/24/2009	302
	AR2-WB-FFSMBSR01	Primary	2011	421.358
	AR2-WB-FFSMBSR02	Primary	2011	421.5142
	AR2-WB-FFSMBSR03	Primary	2011	564.3871
	AR2-WB-FFSMBSR04	Primary	2011	397.0795
	AR2-WB-FFSMBSR05	Primary	2011	275.2419
AR3	AR3-00-FFSBSR02-0-090827	Primary	8/27/2009	568
	AR3-00-FFSBSR03-0-090827	Primary	8/27/2009	393
	AR3-00-FFSBSR04-0-090827	Primary	8/27/2009	302
	AR3-00-FFSBSR05-0-090827	Primary	8/27/2009	251
AR4	AR4-00-FFSBSR01-0-090826	Primary	8/26/2009	392
AR5	AR5-0-FFSMBSR01	Primary	2011	508.325
	AR5-0-FFSMBSR02	Primary	2011	654.4471
	AR5-0-FFSMBSR03	Primary	2011	441.9349
	AR5-0-FFSMBSR04	Primary	2011	528.2714
	AR5-0-FFSMBSR05	Primary	2011	527.75
AR6	AR6-0-FFSMBSR01	Primary	2011	678.9806
	AR6-0-FFSMBSR02	Primary	2011	842.9357
	AR6-0-FFSMBSR03	Primary	2011	688.2738
	AR6-0-FFSMBSR04	Primary	2011	581.1057
	AR6-0-FFSMBSR05	Primary	2011	594.2674
	AR7-00-FFSBSR01-0-090827	Primary	8/27/2009	435
	AR7-00-FFSBSR02-0-090827	Primary	8/27/2009	318
	AR7-00-FFSBSR03-0-090827	Primary	8/27/2009	572
	AR7-00-FFSBSR04-0-090827	Primary	8/27/2009	337
	AR7-00-FFSBSR05-0-090828	Primary	8/28/2009	858
AR7	AR7-0-FFSMBSR01	Primary	2011	1229.7607
	AR7-0-FFSMBSR02	Primary	2011	591.1512
	AR7-0-FFSMBSR03	Primary	2011	607.1954
	AR7-0-FFSMBSR04	Primary	2011	563.5499
	AR7-0-FFSMBSR05	Primary	2011	629.3405
AR8	AR8-00-FFSBSR01-0-090826	Primary	8/26/2009	519
	AR8-00-FFSBSR02-0-090826	Primary	8/26/2009	739
	AR8-00-FFSBSR03-0-090826	Primary	8/26/2009	795
	AR8-00-FFSBSR04-0-090826	Primary	8/26/2009	655
	AR8-00-FFSBSR05-0-090826	Primary	8/26/2009	639
AR9	AR9-00-FFSBSR01-0-090825	Primary	8/25/2009	633
	AR9-00-FFSBSR02-0-090825	Primary	8/25/2009	635
	AR9-00-FFSBSR03-0-090825	Primary	8/25/2009	583
	AR9-00-FFSBSR05-0-090825	Primary	8/25/2009	631
	AR9-00-FFSBSR05-1-090825	Duplicate	8/25/2009	580
	AR9-00-FFSBSR06-0-090825	Primary	8/25/2009	574
	AR9-00-FFSBSR07-0-090825	Primary	8/25/2009	407
	AR9-00-FFSBSR08-0-090825	Primary	8/25/2009	626

TABLE G-14
ANALYTICAL RESULTS - WHITE SUCKER - WHOLE BODY - 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR2-WB-FCWSWB01-0-090824	AR2-WB-FCWSWB02-0-090824	AR8-00-FCWSWB01-0-090826	AR8-00-FCWSWB02-0-090826	AR2-WB-FCWSWB01-0-090825	AR2-WB-FCWSWB01-1-090825	AR2-WB-FCWSWB02-0-090825
	Type	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**							
1,1'-Biphenyl	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
Acetophenone	µg/kg WW	20 U	19 U	140	87 U	100 U	82 U	78 U
Benzaldehyde	µg/kg WW	960 U	950 U	980 U	980 U	1000 U	920 U	1000 U
Bis(2-Chloroethyl)Ether	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
Hexachlorobenzene	µg/kg WW	1 U	1.3 J	0.97 U	0.99 U	2.1 U	2.3 U	0.99 U
Hexachloroethane	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
1,2,4,5-Tetrachlorobenzene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
2,3,4,6-Tetrachlorophenol	µg/kg WW	40 U	40 U	40 U	40 U	40 U	40 U	40 U
2,4,5-Trichlorophenol	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
2,4,6-Trichlorophenol	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
2,4-Dichlorophenol	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
2,4-Dimethylphenol	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
2,4-Dinitrophenol	µg/kg WW	240 U	240 U	250 U	250 U	250 U	230 U	250 U
2,4-Dinitrotoluene	µg/kg WW	39 U	38 U	40 U	39 U	40 U	37 U	40 U
2,6-Dinitrotoluene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
2-Chlorophenol	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
2-Methylphenol	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
2-Nitroaniline	µg/kg WW	96 U	95 U	98 U	98 U	100 U	92 U	100 U
2-Nitrophenol	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
3,3'-Dichlorobenzidine	µg/kg WW	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
3-Nitroaniline	µg/kg WW	200 U	190 U	200 U	200 U	200 U	190 U	200 U
4,6-Dinitro-2-Methylphenol	µg/kg WW	260 U	260 U	260 U	260 U	260 U	260 U	260 U
4-Bromophenyl-Phenylether	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
4-Chloro-3-Methylphenol	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
4-Chloroaniline	µg/kg WW	400 U	400 U	400 U	400 U	400 U	400 U	400 U
4-Chlorophenyl-Phenylether	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
4-Methylphenol	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
4-Nitroaniline	µg/kg WW	200 U	190 U	200 U	200 U	200 U	190 U	200 U
4-Nitrophenol	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
Atrazine	µg/kg WW	380 U	370 U	390 U	390 U	390 U	360 U	390 U
Bis(2-Chloroethoxy)Methane	µg/kg WW	20 U	19 U	20 U	20 J	20	19	20 J
Bis(2-chloroisopropyl) ether	µg/kg WW	360 U	480 U	680 U	110 U	170 U	240 U	260 U
Bis(2-Ethylhexyl)Phthalate	µg/kg WW	20	19	20 U	20	20	19	20
Butylbenzylphthalate	µg/kg WW	20 U	19 U	20 U	18 U	32 U	19 U	17 U
Caprolactam	µg/kg WW	96 U	95 U	98 U	98 U	400 U	92 U	100 U
Dibenzofuran	µg/kg WW	20 U	19 U	20 U	20 U	20 U	4.7 J	20 U

TABLE G-14
ANALYTICAL RESULTS - WHITE SUCKER - WHOLE BODY - 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR2-WB-FCWSWB01-0-090824	AR2-WB-FCWSWB02-0-090824	AR8-00-FCWSWB01-0-090826	AR8-00-FCWSWB02-0-090826	AR2-WB-FCWSWB01-0-090825	AR2-WB-FCWSWB01-1-090825	AR2-WB-FCWSWB02-0-090825
	Type	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**							
Diethylphthalate	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
Dimethylphthalate	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
Di-n-butyl phthalate	µg/kg WW	100 U	100 U	1900 U	100 U	100 U	100 U	100 U
Di-n-octyl phthalate	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
Hexachlorobutadiene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
Hexachlorocyclopentadiene	µg/kg WW	480 U	480 U	490 U	490 U	500 U	460 U	500 U
Isophorone	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
Nitrobenzene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
N-Nitroso-Di-N-Propylamine	µg/kg WW	22 U	22 U	22 U	22 U	22 U	22 U	22 U
N-Nitrosodiphenylamine	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
Pentachlorophenol	µg/kg WW	48 U	48 U	49 U	49 U	50 U	46 U	50 U
Phenol	µg/kg WW	48 U	48 U	59	49 U	50 U	46 U	50 U
2-Chloronaphthalene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
2-Methylnaphthalene	µg/kg WW	20 U	5.5 J	4.1 J	4.9 J	5 J	19 U	20 U
Acenaphthene	µg/kg WW	20 U	19 U	5.3 J	20 U	20 U	19 U	20 U
Acenaphthylene	µg/kg WW	20 U	19 U	20 U	20 U	3.9 J	19 U	20 U
Anthracene	µg/kg WW	17 J	5.7 J	9.7 J	13 J	20 U	24	24
Benzo(a)anthracene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	59	20 U
Benzo(a)pyrene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	49	20 U
Benzo(b)fluoranthene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	74	20 U
Benzo(g,h,i)perylene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	52	20 U
Benzo(k)fluoranthene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	28	20 U
Carbazole	µg/kg WW	20 U	19 U	20 U	20 U	20 U	19 U	20 U
Chrysene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	81	20 U
Dibenz(a,h)anthracene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	21	20 U
Fluoranthene	µg/kg WW	20 U	19 U	9.5 J	20 U	8.2 J	130	20 U
Fluorene	µg/kg WW	20 U	19 U	6.4 J	20 U	5.3 J	7.8 J	5 J
Indeno(1,2,3-cd)pyrene	µg/kg WW	20 U	19 U	20 J	20 U	20 U	67	20 U
Naphthalene	µg/kg WW	20 U	7.5 J	20 U	15 J	20 U	19 U	20 U
Phenanthrene	µg/kg WW	20 U	4 J	15 J	9.1 J	11 J	51	9.1 J
Pyrene	µg/kg WW	20 U	19 U	20 U	20 U	20 U	63	20 UJ
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg WW	0.000872 U	0.00116 U	0.000967 U	0.000587 U	0.00111 U	0.00104 U	0.00108 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg WW	0.00101 U	0.00134 U	0.0012 U	0.0015 *	0.00155 U	0.00131 U	0.0014 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg WW	0.000268 U	0.000334 U	0.000312 U	0.000228 U	0.00039 U	0.000315 U	0.000335 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg WW	0.000521 U	0.00071 U	0.000615 U	0.00042 U	0.000715 U	0.000652 U	0.000641 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg WW	0.000423 U	0.000535 U	0.000523 U	0.000366 U	0.000659 U	0.000561 U	0.000562 U

TABLE G-14
ANALYTICAL RESULTS - WHITE SUCKER - WHOLE BODY - 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR2-WB-FCWSWB01-0-090824	AR2-WB-FCWSWB02-0-090824	AR8-00-FCWSWB01-0-090826	AR8-00-FCWSWB02-0-090826	AR2-WB-FCWSWB01-0-090825	AR2-WB-FCWSWB01-1-090825	AR2-WB-FCWSWB02-0-090825
	Type	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**							
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000175 U	0.000233 U	0.000985 J	0.000809 J	0.000286 U	0.000586 *	0.00063 J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000314 U	0.000399 U	0.000365 U	0.000222 U	0.000421 U	0.000391 U	0.000359 U
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000171 U	0.000237 U	0.000207 U	0.000184 U	0.000276 U	0.000231 U	0.000218 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000312 U	0.000444 U	0.000375 U	0.000227 U	0.000454 U	0.000388 U	0.000384 U
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg WW	0.000258 U	0.000371 U	0.00034 U	0.000269 U	0.000413 U	0.000361 U	0.000341 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg WW	0.000323 U	0.000435 U	0.000382 U	0.000231 U	0.000451 U	0.000402 U	0.000383 U
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg WW	0.000124 U	0.000178 U	0.00358 J	0.0027 J	0.0011 J	0.0016 J	0.0017 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg WW	0.000186 U	0.000243 U	0.000203 U	0.000188 U	0.000282 U	0.00026 U	0.000218 U
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg WW	0.000187 U	0.000254 U	0.000217 U	0.000198 U	0.000298 U	0.000243 U	0.000235 U
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg WW	0.000119 U	0.000168 U	0.0045 J	0.00378 J	0.00149 J	0.00235 J	0.00228 J
2,3,7,8-TCDD TEQ (bird)	µg/kg WW	0.000888001 U	0.001308234 U	0.03712262	0.04144805	0.016334743		0.02160814
2,3,7,8-TCDD TEQ (fish)	µg/kg WW	0.000260851 U	0.000358434 U	0.00438862	0.00446305	0.002007243		0.00242814
2,3,7,8-TCDD TEQ (mammal)	µg/kg WW	0.000264323 U	0.000366642 U	0.00501226	0.00549335	0.002296529		0.00288342
2,3,7,8-Tetrachlorodibenzofuran	µg/kg WW	0.000591 U	0.000902 U	0.0319	0.0368	0.0109	0.0171	0.0189
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg WW	0.000148 U	0.000197 U	0.000266 J	0.000517 *	0.000227 U	0.000215 U	0.000195 U
Heptachlorodibenzofuran (total)	µg/kg WW	0.000268 U	0.000334 U	0.000312 U	0.000228 U	0.00039 U	0.000315 U	0.000335 U
Heptachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000521 U	0.00071 U	0.000615 U	0.00042 U	0.000715 U	0.000652 U	0.000641 U
Hexachlorodibenzofuran (total)	µg/kg WW	0.000171 U	0.000233 U	0.00143 J	0.000966 J	0.000276 U	0.000231 U	0.00063 J
Hexachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000312 U	0.000399 U	0.000365 U	0.000222 U	0.000421 U	0.000388 U	0.000359 U
Pentachlorodibenzofuran (total)	µg/kg WW	0.000119 U	0.000326 J	0.00912 J	0.00726 J	0.00292 J	0.00436 J	0.00451 J
Pentachlorodibenzo-p-dioxin (total)	µg/kg WW	0.000186 U	0.000243 U	0.000203 U	0.000188 U	0.000282 U	0.00026 U	0.000218 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg WW	0.000602 J	0.000197 U	0.000266 J	0.000159 U	0.000227 U	0.000215 U	0.000195 U
Tetrachlorodibenzofuran (total)	µg/kg WW	0.000723 U	0.00122 U	0.034 J	0.0416 J	0.0112 J	0.0174 J	0.019 J
4,4'-DDD	µg/kg WW	1.6	2.9	0.97 U	4.2 J	0.95 J	1.9 J	2.9 U
4,4'-DDe	µg/kg WW	12	9.2	7.5	12	3.4	8.3	5.7
4,4'-DDT	µg/kg WW	2.3 J	2.4	21 U	36	8.8 U	21 U	13 U
Aldrin	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
Alpha-Bhc	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
alpha-Chlordane	µg/kg WW	0.56 J	0.49 J	0.97 U	1.2 J	0.96 U	0.95 J	0.88 J
beta-BHC	µg/kg WW	6.3	4 J	0.97 U	10	7.4 J	7.1	8.8 J
beta-Chlordane	µg/kg WW	1 U	0.97 U	7.1 J	7 J	1 J	4.3 J	3.9 J
Chlordane	µg/kg WW	10 U	9.7 U	9.7 U	15 U	11 U	11 U	9.9 U
Chlorpyrifos	µg/kg WW	1 U	1.2 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
cis-Nonachlor	µg/kg WW	0.87 J	1.2 U	0.97 U	1.4 U	0.96 U	0.96 U	16
Delta-Bhc	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
Dieldrin	µg/kg WW	0.21 J	0.33 J	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U

TABLE G-14
ANALYTICAL RESULTS - WHITE SUCKER - WHOLE BODY - 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR2-WB-FCWSWB01-0-090824	AR2-WB-FCWSWB02-0-090824	AR8-00-FCWSWB01-0-090826	AR8-00-FCWSWB02-0-090826	AR2-WB-FCWSWB01-0-090825	AR2-WB-FCWSWB01-1-090825	AR2-WB-FCWSWB02-0-090825
	Type	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**							
Endosulfan I	µg/kg WW	0.38 J	0.97 U	0.97 U	0.99 U	0.96 U	0.64 J	1.1 J
Endosulfan II	µg/kg WW	1 U	0.97 U	2.4	2.5 U	0.63 J	1.9	1.4
Endosulfan Sulfate	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
Endrin aldehyde	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
Endrin Ketone	µg/kg WW	1 U	0.97 U	5.6 U	7.9 U	0.96 U	0.96 U	3.1 U
Endrin	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	1.3 U
gamma-BHC (Lindane)	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
Heptachlor epoxide	µg/kg WW	1 U	0.97 U	0.97 U	1.7 U	0.96 U	1.2 U	1.6
Heptachlor	µg/kg WW	0.96 J	0.97 U	0.97 U	0.99 U	0.75 J	0.71 J	1
Methoxychlor	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
Mirex	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
o,p'-DDD	µg/kg WW	1 U	0.97 U	7.6 J	7	0.96 U	4.6	3.4
O,P'-Dde	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
o,p'-DDT	µg/kg WW	1 U	0.56 J	7.6 U	7.5 U	2.2 U	4.8 U	4.2 U
Oxychlordane	µg/kg WW	1 U	0.97 U	0.97 U	0.99 U	0.96 U	0.96 U	0.99 U
Toxaphene	µg/kg WW	50 U	49 U	460 U	450 U	190 U	350 U	300 U
trans-Nonachlor	µg/kg WW	0.84 J	0.99 U	0.73 J	0.64 J	0.96 U	0.5 J	0.39 J
Decachlorobiphenyl	µg/kg WW	0.0515 J	0.0252 J	0.0644	0.125 J	0.0224 J	0.106 J	0.102 J
Total DiCB	µg/kg WW		0.082 U			0.0907 U	0.108 U	0.107 U
Total HpCB	µg/kg WW		4.06 J			1.92 J	164 J	128 J
Total HxCB	µg/kg WW		5 J			2.36 J	167 J	145 J
Total MoCB	µg/kg WW		0.0116 U			0.0134 U	0.011 U	0.00435 U
Total NoCB	µg/kg WW		0.101 J			0.0629 J	1.47 J	1.42 J
Total OcCB	µg/kg WW		1.12 J			0.561 J	30.3 J	26.8 J
Total PCB homologues	µg/kg WW		12.5 J			5.99 J	408 J	343 J
Total PeCB	µg/kg WW		2.22 J			1.06 J	38.8 J	35.4 J
Total TeCB	µg/kg WW		0.724 U			0.567 U	5.93 J	6.41 J
Total TrCB	µg/kg WW		0.286 U			0.318 U	0.766 U	0.813 U
1,1'-Biphenyl, 2,2'-dichloro-	µg/kg WW	0.0224 U		0.0177 U	0.0242 U			
1,1'-Biphenyl, 2,4'-dichloro-	µg/kg WW	0.0247 U		0.0195 U	0.0143 U			
1,1'-Biphenyl, 3,3'-dichloro-	µg/kg WW	0.0506 U		0.0572 U	0.0477 U			
103-PeCB	µg/kg WW	0.0165 U		0.275	0.51			
104-PeCB	µg/kg WW	0.000517 U		0.0179	0.018 J			
106-PeCB	µg/kg WW	0.0103 U		0.0311 U	0.0857 U			
107-PeCB [C]	µg/kg WW	0.0123		0.141	0.172 *			
109-PeCB	µg/kg WW	0.0263		0.35	0.538			

TABLE G-14
ANALYTICAL RESULTS - WHITE SUCKER - WHOLE BODY - 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR2-WB-FCWSWB01-0-090824	AR2-WB-FCWSWB02-0-090824	AR8-00-FCWSWB01-0-090826	AR8-00-FCWSWB02-0-090826	AR2-WB-FCWSWB01-0-090825	AR2-WB-FCWSWB01-1-090825	AR2-WB-FCWSWB02-0-090825
	Type	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**							
10-DiCB	µg/kg WW	0.000902 U		0.00113 U	0.00163 U			
110-PeCB [C]	µg/kg WW	0.21		4.4 J	5.7 J			
111-PeCB	µg/kg WW	0.0134 U		0.0179 U	0.14 U			
112-PeCB	µg/kg WW	0.013 U		0.0158 U	0.128 U			
120-PeCB	µg/kg WW	0.0125 U		0.0455	0.135 U			
121-PeCB	µg/kg WW	0.0134 U		0.0172 U	0.137 U			
122-PeCB	µg/kg WW	0.0116 U		0.0369 U	0.106 U			
127-PeCB	µg/kg WW	0.0111 U		0.0328 U	0.0995 U			
128-HxCB [C]	µg/kg WW	0.0679		1.32	2.17			
129-HxCB [C]	µg/kg WW	0.75		20.1 J	32.7 J			
12-DiCB [C]	µg/kg WW	0.00661 U		0.00409 U	0.00166 U			
130-HxCB	µg/kg WW	0.03 *		0.575	0.945 U			
131-HxCB	µg/kg WW	0.0166 U		0.0549 U	0.843 U			
132-HxCB	µg/kg WW	0.0931		2.82	4.49 J			
133-HxCB	µg/kg WW	0.0175 U		0.323	0.867 U			
134-HxCB	µg/kg WW	0.021 U		0.399	0.928 U			
135-HxCB [C]	µg/kg WW	0.207		13.9 J	10.7 J			
136-HxCB	µg/kg WW	0.0284		1.46	2.16 J			
137-HxCB	µg/kg WW	0.0283		0.335	0.909 U			
139-HxCB [C]	µg/kg WW	0.0164 U		0.202	0.824 U			
141-HxCB	µg/kg WW	0.0847		2.04	2.72			
142-HxCB	µg/kg WW	0.0176 U		0.0595 U	0.882 U			
143-HxCB	µg/kg WW	0.0152 U		0.0668 U	0.812 U			
144-HxCB	µg/kg WW	0.022 *		0.727	1.26 J			
145-HxCB	µg/kg WW	0.00271 U		0.00673 U	0.0528 U			
146-HxCB	µg/kg WW	0.14		3.59	5.5 J			
147-HxCB [C]	µg/kg WW	0.45		19.1 J	19.2 J			
148-HxCB	µg/kg WW	0.00333 U		0.0401	0.067 U			
14-DiCB	µg/kg WW	0.00138 U		0.000852 U	0.00157 U			
150-HxCB	µg/kg WW	0.00259 U		0.054	0.076			
152-HxCB	µg/kg WW	0.00253 U		0.0062 U	0.0498 U			
154-HxCB	µg/kg WW	0.00824 *		0.381	0.452 J			
155-HxCB	µg/kg WW	0.00199 U		0.00604 U	0.0512 U			
158-HxCB	µg/kg WW	0.047		1.36	2.57			
159-HxCB	µg/kg WW	0.00868 U		0.0204 U	0.0623 U			
160-HxCB	µg/kg WW	0.0136 U		0.0437 U	0.653 U			

TABLE G-14
ANALYTICAL RESULTS - WHITE SUCKER - WHOLE BODY - 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR2-WB-FCWSWB01-0-090824	AR2-WB-FCWSWB02-0-090824	AR8-00-FCWSWB01-0-090826	AR8-00-FCWSWB02-0-090826	AR2-WB-FCWSWB01-0-090825	AR2-WB-FCWSWB01-1-090825	AR2-WB-FCWSWB02-0-090825
	Type	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**							
161-HxCB	µg/kg WW	0.0126 U		0.0415 U	0.609 U			
162-HxCB	µg/kg WW	0.00884 U		0.0184 U	0.0626 U			
164-HxCB	µg/kg WW	0.027 *		1.02	0.632 U			
165-HxCB	µg/kg WW	0.0145 U		0.0465 U	0.722 U			
16-TrCB	µg/kg WW	0.0359 U		0.0325 U	0.0346 U			
171-HpCB [C]	µg/kg WW	0.0809		2.04	4.47 J			
172-HpCB	µg/kg WW	0.079		0.0257 U	3.03			
174-HpCB	µg/kg WW	0.342		5.65 J	7.62 J			
175-HpCB	µg/kg WW	0.0103 U		0.237	0.572			
176-HpCB	µg/kg WW	0.025 *		0.683	1.34			
177-HpCB	µg/kg WW	0.238		4.15 J	10.2 J			
178-HpCB	µg/kg WW	0.108		2.32	3.7 J			
179-HpCB	µg/kg WW	0.0982		2.34	3.9 J			
17-TrCB	µg/kg WW	0.0415 U		0.0485 U	0.0543 U			
181-HpCB	µg/kg WW	0.0164 U		0.0299 *	0.093 U			
182-HpCB	µg/kg WW	0.0103 U		0.0092 U	0.132 U			
183-HpCB [C]	µg/kg WW	0.282 J		5.69 J	17.8 J			
184-HpCB	µg/kg WW	0.00789 U		0.00718 U	0.101 U			
186-HpCB	µg/kg WW	0.00854 U		0.00777 U	0.108 U			
187-HpCB	µg/kg WW	0.803		26.1 J	32.6 J			
188-HpCB	µg/kg WW	0.00795 U		0.0222 *	0.134 U			
18-TrCB [C]	µg/kg WW	0.0713 U		0.0493 U	0.048 U			
190-HpCB	µg/kg WW	0.0849 J		1.93	4.33 J			
191-HpCB	µg/kg WW	0.0117 U		0.285	0.881			
192-HpCB	µg/kg WW	0.0134 U		1.19	0.0835 U			
195-OcCB	µg/kg WW	0.102 J		1.65	4.1 J			
196-OcCB	µg/kg WW	0.136 J		1.7	5.95 J			
197-OcCB [C]	µg/kg WW	0.0399 J		0.486	0.894			
198-OcCB [C]	µg/kg WW	0.409 J		5.62 J	11.7 J			
19-TrCB	µg/kg WW	0.0104 U		0.0163 U	0.0149 U			
1-MoCB	µg/kg WW	0.00388 U		0.00495 U	0.0056 U			
2,2',3,3',4,4',5,5'-Octachlorobiphenyl	µg/kg WW	0.114 *		2.27 J	6.88 J			
2,2',3,3',4,4',5-Heptachlorobiphenyl	µg/kg WW	0.288		7.34 J	18.6 J			
2,2',3,4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	0.964		17.2 J	46.6 J			
2,2',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	1.06		24.5 J	42.8 J			
2,2',5,5'-Tetrachlorobiphenyl	µg/kg WW	0.0914 U		0.794	1.08			

TABLE G-14
ANALYTICAL RESULTS - WHITE SUCKER - WHOLE BODY - 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR2-WB-FCWSWB01-0-090824	AR2-WB-FCWSWB02-0-090824	AR8-00-FCWSWB01-0-090826	AR8-00-FCWSWB02-0-090826	AR2-WB-FCWSWB01-0-090825	AR2-WB-FCWSWB01-1-090825	AR2-WB-FCWSWB02-0-090825
	Type	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**							
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg WW	0.00876 J	0.00766	0.223	0.454 J	0.00618 *	0.433 J	0.321
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg WW	0.0522	0.0622	1.33	2.16	0.0396 J	2.18 J	1.59
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg WW	0.0904 J	0.128 J	1.26 J	1.83 J	0.0527 J	1.73 J	1.12 J
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.0276	0.0322	0.524	1.03	0.0168 J	0.943 J	0.745
2',3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0107 U	0.0067 *	0.0423 *	0.104 U	0.00588 U	0.0662 *	0.069 J
2,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.233	0.399	4.26 J	7.57 J	0.152 J	6.35 J	4.68 J
2,3,4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0112 U	0.00606 *	0.0706 J	0.136 U	0.00619 U	0.141 J	0.107 *
201-OcCB	µg/kg WW	0.0344 J		0.344	0.862			
202-OcCB	µg/kg WW	0.0626 J		0.582	1.14			
203-OcCB	µg/kg WW	0.188 J		2.8	6.32 J			
204-OcCB	µg/kg WW	0.00819 U		0.0154 U	0.0776 U			
205-OcCB	µg/kg WW	0.015 J		0.183	0.357 J			
206-NoCB	µg/kg WW	0.103 J		0.612 J	1.44 J			
207-NoCB	µg/kg WW	0.0145 *		0.068	0.154 J			
208-NoCB	µg/kg WW	0.0327 J		0.136 J	0.269 J			
20-TrCB [C]	µg/kg WW	0.126 U		0.272	0.335			
21-TrCB [C]	µg/kg WW	0.0581 U		0.0608 U	0.081 U			
22-TrCB	µg/kg WW	0.0402 U		0.066 U	0.0887 U			
23-TrCB	µg/kg WW	0.000894 U		0.00137 U	0.00217 U			
24-TrCB	µg/kg WW	0.00203 U		0.00178 U	0.00237 U			
25-TrCB	µg/kg WW	0.00738 U		0.0127 U	0.0133 U			
26-TrCB [C]	µg/kg WW	0.0169 U		0.028 U	0.0277 U			
27-TrCB	µg/kg WW	0.00621 U		0.00722 U	0.00637 U			
2-MoCB	µg/kg WW	0.000958 U		0.00236 U	0.0012 U			
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg WW	0.00955 U	0.00385 U	0.0186 U	0.0976 *	0.00497 U	0.103 J	0.0675
3,3',4,4',5-Pentachlorobiphenyl	µg/kg WW	0.0125 U	0.00571 U	0.0449 *	0.0962 U	0.00858 U	0.0161 U	0.0234 U
3,3',4,4'-Tetrachlorobiphenyl	µg/kg WW	0.00802 *	0.0122	0.0197 U	0.0565 U	0.0103 J	0.0379 J	0.0344
3,4,4',5-Tetrachlorobiphenyl	µg/kg WW	0.00608 U	0.0025 U	0.0169 U	0.0419 U	0.00408 U	0.0127 U	0.00633 U
31-TrCB	µg/kg WW	0.0968 U		0.162 U	0.22			
32-TrCB	µg/kg WW	0.0241 U		0.0348 U	0.0393 U			
34-TrCB	µg/kg WW	0.000923 U		0.00131 U	0.00236 U			
35-TrCB	µg/kg WW	0.00244 U		0.00275 U	0.00409 U			
36-TrCB	µg/kg WW	0.00217 U		0.00244 U	0.00363 U			
37-TrCB	µg/kg WW	0.0181 U		0.0295 U	0.0305 U			
38-TrCB	µg/kg WW	0.00227 U		0.00269 U	0.00387 U			
39-TrCB	µg/kg WW	0.00226 U		0.00265 U	0.00388 U			

TABLE G-14
ANALYTICAL RESULTS - WHITE SUCKER - WHOLE BODY - 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR2-WB-FCWSWB01-0-090824	AR2-WB-FCWSWB02-0-090824	AR8-00-FCWSWB01-0-090826	AR8-00-FCWSWB02-0-090826	AR2-WB-FCWSWB01-0-090825	AR2-WB-FCWSWB01-1-090825	AR2-WB-FCWSWB02-0-090825
	Type	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**							
3-MoCB	µg/kg WW	0.00463 U		0.00735 U	0.00122 U			
4,4'-Dichlorobiphenyl	µg/kg WW	0.0273 U		0.0209 U	0.0187 U			
40-TeCB [C]	µg/kg WW	0.0355 U		0.132	0.283			
41-TeCB	µg/kg WW	0.0143 U		0.0302 U	0.0474			
42-TeCB	µg/kg WW	0.0242 U		0.103	0.241			
43-TeCB	µg/kg WW	0.00684 U		0.0252 U	0.0192 U			
44-TeCB [C]	µg/kg WW	0.104 U		0.695	1.43 J			
45-TeCB [C]	µg/kg WW	0.0108 U		0.141	0.198			
46-TeCB	µg/kg WW	0.00322 *		0.0117 J	0.014 J			
48-TeCB	µg/kg WW	0.0187 U		0.05	0.0889			
49-TeCB [C]	µg/kg WW	0.0682 U		1.01	1.98			
50-TeCB [C]	µg/kg WW	0.0068 U		0.15	0.16			
54-TeCB	µg/kg WW	0.00264 U		0.0202 J	0.0168 *			
55-TeCB	µg/kg WW	0.00684 U		0.0168 U	0.0435 U			
56-TeCB	µg/kg WW	0.0341 U		0.199	0.303			
57-TeCB	µg/kg WW	0.00715 U		0.159	0.0473 U			
58-TeCB	µg/kg WW	0.00741 U		0.0179 U	0.0434 U			
59-TeCB [C]	µg/kg WW	0.0101 U		0.046	0.087			
5-DiCB	µg/kg WW	0.00364 U		0.00267 U	0.00352 U			
60-TeCB	µg/kg WW	0.0292 U		0.128	0.212			
61-TeCB [C]	µg/kg WW	0.182 J		1.51	2.44 *			
63-TeCB	µg/kg WW	0.00693 U		0.0346	0.0709			
64-TeCB	µg/kg WW	0.0453 U		0.359	0.682 J			
66-TeCB	µg/kg WW	0.106 J		0.769	1.33			
67-TeCB	µg/kg WW	0.00623 U		0.0143 U	0.0384 U			
68-TeCB	µg/kg WW	0.00685 U		0.0177 U	0.0453 U			
6-DiCB	µg/kg WW	0.0158 U		0.00853 U	0.0121 U			
72-TeCB	µg/kg WW	0.00751 U		0.023	0.0436 U			
73-TeCB	µg/kg WW	0.00483 U		0.018 U	0.0138 U			
78-TeCB	µg/kg WW	0.00752 U		0.018 U	0.0454 U			
79-TeCB	µg/kg WW	0.0067 U		0.0404	0.0716			
7-DiCB	µg/kg WW	0.0037 U		0.00269 U	0.00386 U			
80-TeCB	µg/kg WW	0.00705 U		0.0154 U	0.0404 U			
82-PeCB	µg/kg WW	0.0178 U		0.207	0.283 *			
83-PeCB	µg/kg WW	0.0207 U		0.107	0.233 U			
84-PeCB	µg/kg WW	0.0201 U		0.446	0.683			

TABLE G-14
ANALYTICAL RESULTS - WHITE SUCKER - WHOLE BODY - 2009 - ALL ANALYTES EXCEPT MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR2	AR2	AR8	AR8	AR9	AR9	AR9
	Sample ID	AR2-WB-FCWSWB01-0-090824	AR2-WB-FCWSWB02-0-090824	AR8-00-FCWSWB01-0-090826	AR8-00-FCWSWB02-0-090826	AR2-WB-FCWSWB01-0-090825	AR2-WB-FCWSWB01-1-090825	AR2-WB-FCWSWB02-0-090825
	Type	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary
	Date	8/24/2009	8/24/2009	8/26/2009	8/26/2009	8/25/2009	8/25/2009	8/25/2009
Analyte	**Units**							
85-PeCB [C]	µg/kg WW	0.0405		0.485	0.512 J			
86-PeCB [C]	µg/kg WW	0.122		2.26	3.79 J			
88-PeCB [C]	µg/kg WW	0.0193		1.23	1.79			
89-PeCB	µg/kg WW	0.0183 U		0.0243 U	0.193 U			
90-PeCB [C]	µg/kg WW	0.214		8.02 J	10.8 J			
92-PeCB	µg/kg WW	0.026		1.46	1.54			
93-PeCB [C]	µg/kg WW	0.0164 U		0.165	0.347			
94-PeCB	µg/kg WW	0.0183 U		0.0276 U	0.22 U			
95-PeCB	µg/kg WW	0.0838 U		4.56 J	6.15 J			
96-PeCB	µg/kg WW	0.000689 *		0.0449	0.0512 *			
98-PeCB [C]	µg/kg WW	0.0163 U		0.0882	0.179 U			
99-PeCB	µg/kg WW	0.131		3.96 J	7.24 J			
9-DiCB	µg/kg WW	0.00595 U		0.0037 U	0.00836 U			
Decachlorobiphenyl	µg/kg WW	0.0515 J	0.0252 J	0.0644	0.125 J	0.0224 J	0.106 J	0.102 J
PCB Dioxin-like Congener TEQ (bird)	µg/kg WW	0.001678731	0.001208932	0.005810153	0.01304678	0.004091022		0.00446735
PCB Dioxin-like Congener TEQ (fish)	µg/kg WW	6.59488E-05	3.31716E-05	0.00026595	0.00055795	0.000148656		0.000166975
PCB Dioxin-like Congener TEQ (mammal)	µg/kg WW	0.001550318	0.000706975	0.005281267	0.01295217	0.005059086		0.0046274
tPCBs_all	µg/kg WW	11.150843	0.66608	232.152852	400.84196	12.0129		8.76363
tPCBs_detects	µg/kg WW	9.201029	0.65402	230.5684	387.0634	11.9841		8.7339
Antimony	µg/kg WW	12.1 U	13.7 U	13.5 U	12.3 U	12.6 U	12.2 U	11.9 U
Arsenic	µg/kg WW	121 U	21 J	69 J	47 J	42 J	42 J	40 J
Beryllium	µg/kg WW	1.1 J	5.5 U	5.4 U	4.9 U	1.3 J	1.8 J	2.1 J
Cadmium	µg/kg WW	49.7	39.9	28.2	28.8	47.3	58.5	48.3
Chromium	µg/kg WW	114 U	33 J	568 J	956 J	888	416	346
Copper	µg/kg WW	1870 J	639 J	659	790 J	653 J	751 J	639
Lead	µg/kg WW	62.9	6.6	126 J	83.3	68.1	116	88.1
Nickel	µg/kg WW	314	164	475 J	718	464	394	376
Selenium	µg/kg WW	234	231	358	324	169	193	202
Strontium	µg/kg WW	14000	10000	12000	12000	12000	14000	14000
Vanadium	µg/kg WW	114	45 J	159	114	142	233	206
Zinc	µg/kg WW	17700	16500	14900 J	16600 J	16900	20600	18600
Lipids, total	%	3.9	7	5.1	3.7	3.9	4.7	4.2
Residue, total	%	24.7	28.5	27.2	25.3	25.9	25.7	25.3

TABLE G-15
ANALYTICAL RESULTS - WHITE SUCKER WHOLE BODY - 2011 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Reach	Sample ID	Type	Date	Mercury (µg/kg WW)
AR2	AR2-WB-FCWSWB01-0-090824	Primary	8/24/2009	134
	AR2-WB-FCWSWB01-0-090825	Primary	8/25/2009	238
	AR2-WB-FCWSWB01-1-090825	Duplicate	8/25/2009	304
	AR2-WB-FCWSWB02-0-090824	Primary	8/24/2009	135
	AR2-WB-FCWSWB02-0-090825	Primary	8/25/2009	306
	AR2-WB-FCWSWB01	Primary	2011	114.1884
	AR2-WB-FCWSWB02	Primary	2011	132.0505
	AR2-WB-FCWSWB03	Primary	2011	123.7891
	AR2-WB-FCWSWB04	Primary	2011	93.4382
	AR2-WB-FCWSWB05	Primary	2011	152.6458
AR5	AR5-0-FCWSWB01	Primary	2011	84.2456
	AR5-0-FCWSWB02	Primary	2011	89.1705
	AR5-0-FCWSWB03	Primary	2011	163.423
	AR5-0-FCWSWB04	Primary	2011	57.1276
	AR5-0-FCWSWB05	Primary	2011	143.3773
AR6	AR6-0-FCWSWB01	Primary	2011	129.3041
	AR6-0-FCWSWB02	Primary	2011	212.4991
	AR6-0-FCWSWB03	Primary	2011	238.0552
	AR6-0-FCWSWB04	Primary	2011	355.9534
	AR6-0-FCWSWB05	Primary	2011	207.5734
AR7	AR7-0-FCWSWB01	Primary	2011	182.3096
	AR7-0-FCWSWB02	Primary	2011	180.8125
	AR7-0-FCWSWB03	Primary	2011	111.6441
	AR7-0-FCWSWB04	Primary	2011	449.6216
	AR7-0-FCWSWB05	Primary	2011	250.8812
AR8	AR8-00-FCWSWB01-0-090826	Primary	8/26/2009	343
	AR8-00-FCWSWB02-0-090826	Primary	8/26/2009	377

TABLE G-16
ANALYTICAL RESULTS - BIRD BLOOD AND FEATHERS - 2010 - ORGANICS
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR1	AR1	AR9	AR9	AR9
	Tissue	Bird Blood	Bird Blood	Bird Blood	Bird Blood	Bird Blood
	Sample ID	AR1-01-BBSWSPC1-0-101102	AR1-01-BBSWSPC2-0-101102	AR9-01-BBEAKIC1-0-101102	AR9-01-BBSWSPC1-0-101102	AR9-01-BBSWSPC2-0-101102
	Type	Primary	Primary	Primary	Primary	Primary
	Date	11/2/2010	11/2/2010	11/2/2010	11/2/2010	11/2/2010
Analyte	**Units**					
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg FW	0.0132 U	0.00983 U	0.00854 U	0.0102 U	0.00714 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg FW	0.0148 U	0.0101 U	0.00992 U	0.00909 U	0.011 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg FW	0.00647 U	0.00372 U	0.0039 U	0.00378 U	0.00341 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg FW	0.00962 U	0.00917 U	0.011 U	0.00824 U	0.00577 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg FW	0.0102 U	0.00584 U	0.0066 U	0.00643 U	0.00535 U
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg FW	0.00491 U	0.00446 U	0.00447 U	0.00406 U	0.00299 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.0106 U	0.00785 U	0.00729 U	0.00635 U	0.00417 U
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.00455 U	0.00462 U	0.00392 U	0.00381 U	0.00301 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.01 U	0.00784 U	0.007 U	0.00627 U	0.00412 U
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg FW	0.00732 U	0.00669 U	0.00656 U	0.00597 U	0.00464 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.0106 U	0.00807 U	0.00735 U	0.00649 U	0.00426 U
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg FW	0.00455 U	0.00291 U	0.00428 U	0.00297 U	0.00232 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg FW	0.00831 U	0.00538 U	0.00787 U	0.00746 U	0.00516 U
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.00485 U	0.00458 U	0.00451 U	0.00417 U	0.00316 U
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg FW	0.00449 U	0.00272 U	0.0114 J	0.00294 U	0.00238 U
2,3,7,8-TCDD TEQ (bird)	µg/kg FW	0.00449 U	0.00272 U	0.0114	0.00294 U	0.00238 U
2,3,7,8-Tetrachlorodibenzofuran	µg/kg FW	0.00544 U	0.00339 U	0.00373 U	0.00502 U	0.00299 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg FW	0.0082 U	0.00452 U	0.0051 U	0.00443 U	0.00391 U
Heptachlorodibenzofuran (total)	µg/kg FW	0.0102 U	0.00584 U	0.0066 U	0.00643 U	0.00535 U
Heptachlorodibenzo-p-dioxin (total)	µg/kg FW	0.00962 U	0.00917 U	0.011 U	0.00824 U	0.00577 U
Hexachlorodibenzofuran (total)	µg/kg FW	0.00732 U	0.00669 U	0.00656 U	0.00597 U	0.00464 U
Hexachlorodibenzo-p-dioxin (total)	µg/kg FW	0.0106 U	0.00807 U	0.00735 U	0.00649 U	0.00426 U
Pentachlorodibenzofuran (total)	µg/kg FW	0.00455 U	0.00291 U	0.0114 J	0.00297 U	0.00238 U
Pentachlorodibenzo-p-dioxin (total)	µg/kg FW	0.00831 U	0.00538 U	0.00787 U	0.00746 U	0.00516 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg FW	0.00844 U	0.00452 U	0.0051 U	0.00443 U	0.00391 U
Tetrachlorodibenzofuran (total)	µg/kg FW	0.00544 U	0.00339 U	0.00373 U	0.00502 U	0.00299 U
Decachlorobiphenyl	µg/kg FW	0.0656 J	0.0172 J	0.278 J	0.0517 J	0.0709 J
Total DiCB	µg/kg FW	31.5 U	15.6 U	17.5 U	16 U	20.7 U
Total HpCB	µg/kg FW	2.76 J	0.366 J	62.3 J	16.6 J	21.6 J
Total HxCB	µg/kg FW	2.75 J	0.553 J	56.9 J	15.9 J	16.1 J
Total MoCB	µg/kg FW	1.09 U	0.544 U	0.639 U	0.609 U	0.756 U
Total NoCB	µg/kg FW	0.234 J	0.0298 J	1.64 J	0.334 J	0.456 J
Total OcCB	µg/kg FW	1.22 J	0.152 J	21.1 J	4.56 J	6.75 J
Total PCB homologues	µg/kg FW	7.03 J	1.12 J	147 J	37.4 J	45 J
Total TeCB	µg/kg FW	5.71 U	2.88 U	3.38 U	2.92 U	3.81 U

TABLE G-16
ANALYTICAL RESULTS - BIRD BLOOD AND FEATHERS - 2010 - ORGANICS
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR1	AR1	AR9	AR9	AR9
	Tissue	Bird Blood	Bird Blood	Bird Blood	Bird Blood	Bird Blood
	Sample ID	AR1-01-BBSWSPC1-0-101102	AR1-01-BBSWSPC2-0-101102	AR9-01-BBEAKIC1-0-101102	AR9-01-BBSWSPC1-0-101102	AR9-01-BBSWSPC2-0-101102
	Type	Primary	Primary	Primary	Primary	Primary
	Date	11/2/2010	11/2/2010	11/2/2010	11/2/2010	11/2/2010
Analyte	**Units**					
Total TrCB	µg/kg FW	9.16 U	4.66 U	5.14 U	4.85 U	6.5 U
17-TrCB	µg/kg FW	2.22 U	1.05 U	4.72 J	2.68 U	2.82 U
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg FW	0.0275 J	0.00592 U	0.51	0.103	0.135
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg FW	0.103 J	0.0184 J	1.75	0.362	0.447
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg FW	0.143 U	0.0589 U	0.432	0.204	0.232
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW	0.0618	0.00989 U	0.687	0.175	0.201
2',3,4,4',5-Pentachlorobiphenyl	µg/kg FW	0.0364 U	0.0201 U	0.0541 U	0.0319 U	0.0304 U
2,3',4,4',5-Pentachlorobiphenyl	µg/kg FW	0.477	0.171 U	1.88	0.763	0.781
2,3,4,4',5-Pentachlorobiphenyl	µg/kg FW	0.033 U	0.0212 U	0.0565 U	0.0364 U	0.0314 U
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW	0.0235 U	0.01 U	0.0563 U	0.024 U	0.0196 U
3,3',4,4',5-Pentachlorobiphenyl	µg/kg FW	0.0317 U	0.0186 U	0.0563 U	0.031 U	0.0281 U
3,3',4,4'-Tetrachlorobiphenyl	µg/kg FW	0.024 U	0.014 U	0.0168 U	0.0252 U	0.0153 U
3,4,4',5-Tetrachlorobiphenyl	µg/kg FW	0.0248 U	0.0145 U	0.0166 U	0.0252 U	0.0157 U
Decachlorobiphenyl	µg/kg FW	0.0656 J	0.0172 J	0.278 J	0.0517 J	0.0709 J
PCB Dioxin-like Congener TEQ (bird)	µg/kg FW	0.000030263	9.5981E-06	0.00024897	0.00006701	0.00007907
tPCBs_all	µg/kg FW	3.2057	1.41251	10.2356	4.4607	4.7565
tPCBs_detects	µg/kg FW	0.6693	0.0184	9.979	1.607	1.796

TABLE G-17
ANALTYICAL RESULTS - SONGBIRD BLOOD AND FEATHERS - 2010 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Tissue	Reach	Sample ID	Type	Date	Mercury (µg/kg FW)
Blood	AR1	AR1-01-BBGRCA01-0-100811	Primary	8/11/2010	88.0453
		AR1-01-BBGRCA02-0-100811	Primary	8/11/2010	15.9446
		AR1-01-BBRWBL01-0-100811	Primary	8/8/2010	1358.744
		AR1-01-BBSOSP01-0-100811	Primary	8/11/2010	1382.3256
		AR1-01-BBSOSP02-0-100813	Primary	8/13/2010	170.8794
		AR1-01-BBSOSP03-0-100813	Primary	8/13/2010	155.4789
		AR1-01-BBSOSP04-0-100813	Primary	8/13/2010	208.004
		AR1-01-BBSWSP01-0-100811	Primary	8/11/2010	293.8518
		AR1-01-BBSWSP02-0-100811	Primary	8/11/2010	233.7471
		AR1-01-BBSWSP03-0-100811	Primary	8/11/2010	117.4825
		AR1-01-BBSWSP06-0-100812	Primary	8/12/2010	135.5164
		AR1-01-BBTRFL01-0-100811	Primary	8/11/2010	81.3894
		AR1-01-BBTRFL02-0-100812	Primary	8/12/2010	364.4108
		AR1-01-BBTRFL03-0-100812	Primary	8/12/2010	156.5399
		AR1-01-BBTRFL04-0-100812	Primary	8/12/2010	138.1126
		AR1-01-BBTRFL05-0-100813	Primary	8/13/2010	169.4841
		AR1-01-BBYWAR01-0-100811	Primary	8/11/2010	129.3226
		AR1-01-BBYWAR02-0-100812	Primary	8/12/2010	78.4465
		AR1-01-BBYWAR03-0-100812	Primary	8/8/2010	256.9532
	AR9	AR9-01-BBACFL01-0-100810	Primary	8/10/2010	109.6432
		AR9-01-BBACFL02-0-100810	Primary	8/10/2010	81.9662
		AR9-01-BBALFL01-0-100802	Primary	8/2/2010	106.3627
		AR9-01-BBAMGO01-0-100810	Primary	8/10/2010	6.2381
		AR9-01-BBAMRE01-0-100809	Primary	8/9/2010	270.7784
		AR9-01-BBBAWW01-0-100810	Primary	8/10/2010	251.1226
		AR9-01-BBBCCH01-0-100804	Primary	8/4/2010	103.517
		AR9-01-BBBCCH02-0-100809	Primary	8/9/2010	76.7368
		AR9-01-BBBCCH03-0-100809	Primary	8/9/2010	96.762
		AR9-01-BBBCCH04-0-100809	Primary	8/9/2010	186.7453
		AR9-01-BBBCCH05-0-100809	Primary	8/9/2010	50.3425
		AR9-01-BBBTNW01-0-100809	Primary	8/9/2010	54.7538
		AR9-01-BBCEDW01-0-100802	Primary	8/2/2010	10.4946
		AR9-01-BBCOYE01-0-100804	Primary	8/4/2010	108.1611
		AR9-01-BBCOYE02-0-100810	Primary	8/10/2010	598.172
		AR9-01-BBCSWA01-0-100809	Primary	8/9/2010	115.7206
		AR9-01-BBCSWA02-0-100810	Primary	8/10/2010	192.2073
		AR9-01-BBCSWA03-0-100810	Primary	8/10/2010	101.561
		AR9-01-BBDOWO01-0-100810	Primary	8/10/2010	147.0684
		AR9-01-BBDOWO02-0-100810	Primary	8/10/2010	23.5326
		AR9-01-BBEAKI01-0-100802	Primary	8/2/2010	766.0962
		AR9-01-BBEAKI02-0-100802	Primary	8/2/2010	369.5334
		AR9-01-BBLEFL01-0-100809	Primary	8/9/2010	149.708
		AR9-01-BBMAWA01-0-100810	Primary	8/10/2010	124.9582
		AR9-01-BBNAWA01-0-100803	Primary	8/3/2010	164.2036
		AR9-01-BBSOSP01-0-100802	Primary	8/2/2010	55.1668
		AR9-01-BBSOSP02-0-100802	Primary	8/2/2010	1232.2954
		AR9-01-BBSWSP01-0-100802	Primary	8/2/2010	462.8687
		AR9-01-BBSWSP02-0-100810	Primary	8/10/2010	256.0463
		AR9-01-BBSWSP03-0-100810	Primary	8/10/2010	341.6989
		AR9-01-BBSWSP04-0-100810	Primary	8/10/2010	199.1212
		AR9-01-BBSWSP05-0-100810	Primary	8/10/2010	914.7719
		AR9-01-BBSWSP06-0-100810	Primary	8/10/2010	503.8169
		AR9-01-BBWBNU01-0-100809	Primary	8/9/2010	218.6569
		AR9-01-BBWIWA01-0-100809	Primary	8/9/2010	249.0795
		AR9-01-BBYBFL01-0-100809	Primary	8/9/2010	172.1556

TABLE G-17
ANALTYICAL RESULTS - SONGBIRD BLOOD AND FEATHERS - 2010 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Tissue	Reach	Sample ID	Type	Date	Mercury (µg/kg FW)
Feathers - Primary	AR1	AR1-01-BFGRCA02-0-100811P	Primary	8/11/2010	154.7782
		AR1-01-BFRWBL01-0-100811P	Primary	8/11/2010	3983.407
		AR1-01-BFSOSP01-0-100811P	Primary	8/11/2010	921.345
		AR1-01-BFSOSP02-0-100813P	Primary	8/13/2010	1569.5201
		AR1-01-BFSOSP03-0-100813P	Primary	8/13/2010	514.956
		AR1-01-BFSOSP04-0-100813P	Primary	8/13/2010	1097.6023
		AR1-01-BFSWSP01-0-100811P	Primary	8/11/2010	2383.2083
		AR1-01-BFSWSP02-0-100811P	Primary	8/11/2010	3442.1545
		AR1-01-BFSWSP03-0-100811P	Primary	8/11/2010	2102.5784
		AR1-01-BFSWSP04-0-100811P	Primary	8/11/2010	3468.3589
		AR1-01-BFSWSP05-0-100812P	Primary	8/12/2010	3508.8196
		AR1-01-BFSWSP06-0-100812P	Primary	8/12/2010	2365.5222
		AR1-01-BFTRFL01-0-100811P	Primary	8/11/2010	1675.2717
		AR1-01-BFTRFL02-0-100812P	Primary	8/12/2010	410.3932
		AR1-01-BFTRFL05-0-100813P	Primary	8/13/2010	3965.4248
		AR1-01-BFYWAR01-0-100811P	Primary	8/11/2010	5679.5
		AR1-01-BFYWAR02-0-100812P	Primary	8/12/2010	2714.676
		AR1-01-BFYWAR03-0-100812P	Primary	8/12/2010	3578.9937
	AR9	AR9-01-BFACFL01-0-100810P	Primary	8/10/2010	241.7134
		AR9-01-BFACFL02-0-100810P	Primary	8/10/2010	1262.7745
		AR9-01-BFALFL01-0-100802P	Primary	8/2/2010	313.3003
		AR9-01-BFAMGO01-0-100810P	Primary	8/10/2010	60.5846
		AR9-01-BFAMRE01-0-100809P	Primary	8/9/2010	3407.6804
		AR9-01-BFBAWW01-0-100810P	Primary	8/10/2010	559.9616
		AR9-01-BFBCCH01-0-100804P	Primary	8/4/2010	672.8597
		AR9-01-BFBCCH02-0-100809P	Primary	8/9/2010	1534.579
		AR9-01-BFBCCH03-0-100809P	Primary	8/9/2010	1287.7672
		AR9-01-BFBCCH04-0-100809P	Primary	8/9/2010	235.0119
		AR9-01-BFBCCH05-0-100809P	Primary	8/9/2010	2000.1923
		AR9-01-BFBTNW01-0-100809P	Primary	8/9/2010	243.6812
		AR9-01-BFCEDW01-0-100802P	Primary	8/2/2010	56.6873
		AR9-01-BFCOYE01-0-100804P	Primary	8/4/2010	2334.9526
		AR9-01-BFCOYE02-0-100810P	Primary	8/10/2010	1223.2589
		AR9-01-BFCSWA01-0-100809P	Primary	8/9/2010	1216.4639
		AR9-01-BFCSWA02-0-100810P	Primary	8/10/2010	858.6309
		AR9-01-BFCSWA03-0-100810P	Primary	8/10/2010	954.7553
		AR9-01-BFDOWO01-0-100810P	Primary	8/10/2010	1476.5651
		AR9-01-BFDOWO02-0-100810P	Primary	8/10/2010	429.489
		AR9-01-BFEAKI01-0-100802P	Primary	8/2/2010	178.4844
		AR9-01-BFEAKI02-0-100802P	Primary	8/2/2010	163.5086
		AR9-01-BFLEFL01-0-100809P	Primary	8/9/2010	1259.2089
		AR9-01-BFMAWA01-0-100810P	Primary	8/10/2010	1809.4991
		AR9-01-BFSOSP01-0-100802P	Primary	8/2/2010	217.0086
		AR9-01-BFSOSP02-0-100802P	Primary	8/2/2010	834.2745
		AR9-01-BFSWSP01-0-100802P	Primary	8/2/2010	1584.1292
		AR9-01-BFSWSP02-0-100810P	Primary	8/10/2010	5063.5693
		AR9-01-BFSWSP03-0-100810P	Primary	8/10/2010	2413.9568
		AR9-01-BFSWSP04-0-100810P	Primary	8/10/2010	3332.1897
		AR9-01-BFSWSP05-0-100810P	Primary	8/10/2010	9404.7939
		AR9-01-BFSWSP06-0-100810P	Primary	8/10/2010	2753.5549
		AR9-01-BFWBNU01-0-100809P	Primary	8/9/2010	319.1878
		AR9-01-BFWIWA01-0-100809P	Primary	8/9/2010	1677.9437
		AR9-01-BFYBFL01-0-100809P	Primary	8/9/2010	852.1547

TABLE G-17
ANALTYICAL RESULTS - SONGBIRD BLOOD AND FEATHERS - 2010 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Tissue	Reach	Sample ID	Type	Date	Mercury (µg/kg FW)
Feathers - Tail	AR1	AR1-01-BFGRCA01-0-100811T	Primary	8/11/2010	739.8575
		AR1-01-BFRWBL01-0-100811T	Primary	8/11/2010	4935.985
		AR1-01-BFSOSP01-0-100811T	Primary	8/11/2010	218.4883
		AR1-01-BFSOSP02-0-100813T	Primary	8/13/2010	1994.7107
		AR1-01-BFSOSP03-0-100813T	Primary	8/13/2010	2173.9724
		AR1-01-BFSOSP04-0-100813T	Primary	8/13/2010	974.942
		AR1-01-BFSWSP01-0-100811T	Primary	8/11/2010	3920.9285
		AR1-01-BFSWSP02-0-100811T	Primary	8/11/2010	4515.0864
		AR1-01-BFSWSP03-0-100811T	Primary	8/11/2010	2510.8962
		AR1-01-BFSWSP04-0-100811T	Primary	8/11/2010	4205.4497
		AR1-01-BFSWSP06-0-100812T	Primary	8/12/2010	3116.1367
		AR1-01-BFTRFL01-0-100811T	Primary	8/11/2010	2508.6267
		AR1-01-BFTRFL02-0-100812T	Primary	8/12/2010	457.0758
		AR1-01-BFTRFL05-0-100813T	Primary	8/13/2010	5817.9561
		AR1-01-BFYWAR01-0-100811T	Primary	8/11/2010	3273.9321
		AR1-01-BFYWAR02-0-100812T	Primary	8/12/2010	2525.1189
		AR1-01-BFYWAR03-0-100812T	Primary	8/12/2010	3476.6897
	AR9	AR9-01-BFACFL01-0-100810T	Primary	8/10/2010	287.0593
		AR9-01-BFACFL02-0-100810T	Primary	8/10/2010	1304.4058
		AR9-01-BFALFL01-0-100802T	Primary	8/2/2010	336.2681
		AR9-01-BFAMGO01-0-100810T	Primary	8/10/2010	39.5334
		AR9-01-BFBAWW01-0-100810T	Primary	8/10/2010	677.8297
		AR9-01-BFBCCH01-0-100804T	Primary	8/4/2010	2532.0552
		AR9-01-BFBCCH02-0-100809T	Primary	8/9/2010	3035.5784
		AR9-01-BFBCCH03-0-100809T	Primary	8/9/2010	1899.2306
		AR9-01-BFBCCH04-0-100809T	Primary	8/9/2010	426.7216
		AR9-01-BFBCCH05-0-100809T	Primary	8/9/2010	3127.718
		AR9-01-BFBTNW01-0-100809T	Primary	8/9/2010	298.3666
		AR9-01-BFCEDW01-0-100802T	Primary	8/2/2010	67.5212
		AR9-01-BFCOYE02-0-100810T	Primary	8/10/2010	4396.144
		AR9-01-BFCSWA01-0-100809T	Primary	8/9/2010	1323.0933
		AR9-01-BFCSWA02-0-100810T	Primary	8/10/2010	1376.4851
		AR9-01-BFCSWA03-0-100810T	Primary	8/10/2010	1119.0837
		AR9-01-BFDOWO01-0-100810T	Primary	8/10/2010	1455.204
		AR9-01-BFDOWO02-0-100810T	Primary	8/10/2010	617.5679
		AR9-01-BFEAKI01-0-100802T	Primary	8/2/2010	184.5807
		AR9-01-BFEAKI02-0-100802T	Primary	8/2/2010	149.7054
		AR9-01-BFLEFL01-0-100809T	Primary	8/9/2010	2156.5195
		AR9-01-BFMAWA01-0-100810T	Primary	8/10/2010	2209.0044
		AR9-01-BFSOSP01-0-100802T	Primary	8/2/2010	441.5641
		AR9-01-BFSOSP02-0-100802T	Primary	8/2/2010	1721.1212
		AR9-01-BFSWSP01-0-100802T	Primary	8/2/2010	1441.4303
		AR9-01-BFSWSP02-0-100810T	Primary	8/10/2010	7767.9536
		AR9-01-BFSWSP03-0-100810T	Primary	8/10/2010	774.3022
		AR9-01-BFSWSP05-0-100810T	Primary	8/10/2010	10454.5654
		AR9-01-BFSWSP06-0-100810T	Primary	8/10/2010	2739.2749
		AR9-01-BFWBNU01-0-100809T	Primary	8/9/2010	532.0795
		AR9-01-BFWIWA01-0-100809T	Primary	8/9/2010	2992.2468
		AR9-01-BFYBFL01-0-100809T	Primary	8/9/2010	1632.4492

TABLE G-18
ANALYTICAL RESULTS - TREE SWALLOW BLOOD, FEATHERS, AND EGGS - 2010 - ORGANICS
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR1	AR2	AR3	AR8
	Tissue	Egg	Egg	Egg	Egg
	Sample ID	AR1-0-BETSC001-101112	AR2-0-BETSC001-101112	AR3-0-BETSC001-101112	AR8-0-BETSC001-101112
	Type	Primary	Primary	Primary	Primary
	Date	11/12/2010	11/12/2010	11/12/2010	11/12/2010
Analyte	**Units**				
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg FW	0.000893 U	0.00198 U	0.00579 U	0.0012 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg FW	0.0898	0.117	0.179	0.154
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg FW	0.00711 J	0.0177 J	0.0209 J	0.0153 J
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg FW	0.138	0.262	0.138	0.16
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg FW	0.000748 U	0.000968	0.00369 U	0.000962 U
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg FW	0.0115 J	0.0121 J	0.0592 J	0.033 J
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.0347	0.02 J	0.0294	0.029 J
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.00833 J	0.00624 J	0.0223 J	0.012 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.18	0.131	0.0888	0.107
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg FW	0.000759 U	0.000551 U	0.00394 U	0.000866 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.0153 J	0.0127 J	0.0149	0.0161 J
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg FW	0.0144 J	0.00817 J	0.0941	0.0441 J
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg FW	0.0357 J	0.0251 J	0.0355 J	0.029 J
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.00609 J	0.00365 J	0.00994 J	0.00561 J
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg FW	0.0207 J	0.015 J	0.085	0.0437 J
2,3,7,8-TCDD TEQ (bird)	µg/kg FW	0.10315256	0.07200638	0.5654038	0.27969902
2,3,7,8-Tetrachlorodibenzofuran	µg/kg FW	0.0318	0.0201	0.409	0.185
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg FW	0.00563 J	0.00475 J	0.0131	0.00806 J
Heptachlorodibenzofuran (total)	µg/kg FW	0.00711 J	0.0201	0.0209 J	0.0153 J
Heptachlorodibenzo-p-dioxin (total)	µg/kg FW	0.142	0.262 J	0.148 J	0.169 J
Hexachlorodibenzofuran (total)	µg/kg FW	0.029	0.0251 J	0.104	0.056 J
Hexachlorodibenzo-p-dioxin (total)	µg/kg FW	0.233	0.164 J	0.133	0.158 J
Pentachlorodibenzofuran (total)	µg/kg FW	0.0432 J	0.0313	0.2	0.105
Pentachlorodibenzo-p-dioxin (total)	µg/kg FW	0.0383 U	0.0251 U	0.0355 U	0.029 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg FW	0.00563 J	0.00475 J	0.0131	0.00806 J
Tetrachlorodibenzofuran (total)	µg/kg FW	0.0404 J	0.0268	0.432 J	0.202
Decachlorobiphenyl	µg/kg FW	10.4 J	4.13 J	6.89 J	9.31 J
Total DiCB	µg/kg FW	1.31 UJ	1.64 UJ	2.33 UJ	2.2 UJ
Total HpCB	µg/kg FW	340 J	353 J	2650 J	1050 J
Total HxCB	µg/kg FW	368 J	335 J	4090 J	1290 J
Total MoCB	µg/kg FW	0.17 UJ	0.117 UJ	0.377 UJ	0.235 UJ
Total NoCB	µg/kg FW	27.1 J	17 J	51.3 J	32.9 J
Total OcCB	µg/kg FW	80.4 J	79.1 J	447 J	176 J
Total PCB homologues	µg/kg FW	988 J	900 J	10600 J	2940 J
Total PeCB	µg/kg FW	127 J	87.3 J	2640 J	295 J
Total TeCB	µg/kg FW	29.3 J	24.6 J	692 J	82.8 J
Total TrCB	µg/kg FW	5.94 J	5.76 UJ	45.6 UJ	16.6 UJ

TABLE G-18
ANALYTICAL RESULTS - TREE SWALLOW BLOOD, FEATHERS, AND EGGS - 2010 - ORGANICS
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR1	AR2	AR3	AR8
	Tissue	Egg	Egg	Egg	Egg
	Sample ID	AR1-0-BETSC001-101112	AR2-0-BETSC001-101112	AR3-0-BETSC001-101112	AR8-0-BETSC001-101112
	Type	Primary	Primary	Primary	Primary
	Date	11/12/2010	11/12/2010	11/12/2010	11/12/2010
Analyte	**Units**				
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg FW	1.43 J	1.6 J	12.9	4.31
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg FW	9.82	10.2	134	24.6
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg FW	12.8	11	268	27.1
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW	5.32	5.57	50.2	14
2',3,4,4',5-Pentachlorobiphenyl	µg/kg FW	0.933	0.764	11.9	1.66 EMPC
2,3',4,4',5-Pentachlorobiphenyl	µg/kg FW	39.6 J	34.9	658 J	86.8
2,3,4,4',5-Pentachlorobiphenyl	µg/kg FW	0.987	0.804	19.5	2.21
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW	0.475	0.212	0.955 U	0.621
3,3',4,4',5-Pentachlorobiphenyl	µg/kg FW	0.135 U	0.284	1.83	0.638
3,3',4,4'-Tetrachlorobiphenyl	µg/kg FW	1.5	1.13	15.7	2.95
3,4,4',5-Tetrachlorobiphenyl	µg/kg FW	0.0858 EMPC	0.0531 EMPC	1.1	0.125 U
Decachlorobiphenyl	µg/kg FW	10.4 J	4.13 J	6.89 J	9.31 J
PCB Dioxin-like Congener TEQ (bird)	µg/kg FW	0.10038853	0.09305074	1.128435	0.2308797
tPCBs_all	µg/kg FW	73.0858	66.5171	1174.085	165.014
tPCBs_detects	µg/kg FW	72.9508	66.5171	1173.13	164.889

TABLE G-18
ANALYTICAL RESULTS - TREE SWALLOW BLOOD, FEATHERS, AND EGGS - 2010 - ORGANICS
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9
	Tissue	Egg
	Sample ID	AR9-1-BETSC001-101112
	Type	Primary
	Date	11/12/2010
Analyte	**Units**	
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg FW	0.00103 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg FW	0.158
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg FW	0.0174 J
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg FW	0.156
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg FW	0.00135
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg FW	0.0421
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.0289
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.0147
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.109
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg FW	0.00116 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.0144 J
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg FW	0.0583
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg FW	0.0266
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.00608 J
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg FW	0.0552
2,3,7,8-TCDD TEQ (bird)	µg/kg FW	0.3445923
2,3,7,8-Tetrachlorodibenzofuran	µg/kg FW	0.239
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg FW	0.00734
Heptachlorodibenzofuran (total)	µg/kg FW	0.021
Heptachlorodibenzo-p-dioxin (total)	µg/kg FW	0.164 J
Hexachlorodibenzofuran (total)	µg/kg FW	0.0684
Hexachlorodibenzo-p-dioxin (total)	µg/kg FW	0.154
Pentachlorodibenzofuran (total)	µg/kg FW	0.129
Pentachlorodibenzo-p-dioxin (total)	µg/kg FW	0.0288
Tetrachlorodibenzo(p)dioxin (total)	µg/kg FW	0.00734 J
Tetrachlorodibenzofuran (total)	µg/kg FW	0.258
Decachlorobiphenyl	µg/kg FW	5.96 J
Total DiCB	µg/kg FW	1.98 UJ
Total HpCB	µg/kg FW	1660 J
Total HxCB	µg/kg FW	1950 J
Total MoCB	µg/kg FW	0.076 UJ
Total NoCB	µg/kg FW	29.6 J
Total OcCB	µg/kg FW	193 J
Total PCB homologues	µg/kg FW	4360 J
Total PeCB	µg/kg FW	416 J
Total TeCB	µg/kg FW	102 J
Total TrCB	µg/kg FW	13.7 UJ

TABLE G-18
ANALYTICAL RESULTS - TREE SWALLOW BLOOD, FEATHERS, AND EGGS - 2010 - ORGANICS
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR9
	Tissue	Egg
	Sample ID	AR9-1-BETSC001-101112
	Type	Primary
	Date	11/12/2010
Analyte	**Units**	
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg FW	5.19 J
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg FW	30.9
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg FW	31.7
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW	17.6
2',3,4,4',5-Pentachlorobiphenyl	µg/kg FW	1.82
2,3',4,4',5-Pentachlorobiphenyl	µg/kg FW	108
2,3,4,4',5-Pentachlorobiphenyl	µg/kg FW	2.49
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW	0.334 U
3,3',4,4',5-Pentachlorobiphenyl	µg/kg FW	0.514
3,3',4,4'-Tetrachlorobiphenyl	µg/kg FW	2.51
3,4,4',5-Tetrachlorobiphenyl	µg/kg FW	0.136
Decachlorobiphenyl	µg/kg FW	5.96 J
PCB Dioxin-like Congener TEQ (bird)	µg/kg FW	0.1986691
tPCBs_all	µg/kg FW	201.194
tPCBs_detects	µg/kg FW	200.86

TABLE G-19
ANALYTICAL RESULTS - TREE SWALLOW BLOOD, FEATEHRS, AND EGGS - 2010 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Tissue	Reach	Sample ID	Type	Date	Mercury (µg/kg FW)
Blood Adult	AR1	AR1-0-BBTS0001-100602	Primary	6/2/2010	346.1372
		AR1-0-BBTS00013-100630	Primary	6/30/2010	411.3268
		AR1-0-BBTS0002-100602	Primary	6/2/2010	290.2114
		AR1-0-BBTS0003-100602	Primary	6/2/2010	277.5044
		AR1-0-BBTS0004-100602	Primary	6/2/2010	295.2358
		AR1-0-BBTS0005-100602	Primary	6/2/2010	285.9425
		AR1-0-BBTS0006-100616	Primary	6/16/2010	434.1416
	AR2	AR2-0-BBTS0001-100603	Primary	6/3/2010	315.0816
		AR2-0-BBTS0002-100603	Primary	6/3/2010	339.1635
		AR2-0-BBTS0003-100603	Primary	6/3/2010	305.9428
		AR2-0-BBTS0004-100609	Primary	6/9/2010	233.9324
	AR3	AR3-0-BBTS0001-100609	Primary	6/9/2010	465.8303
	AR4	AR4-0-BBTS0001-100609	Primary	6/9/2010	490.6147
	AR8	AR8-0-BBTS0001-100602	Primary	6/2/2010	570.3193
		AR8-0-BBTS0002-100602	Primary	6/2/2010	416.3971
		AR8-0-BBTS0003-100609	Primary	6/9/2010	589.4766
		AR8-0-BBTS0004-100609	Primary	6/9/2010	457.2948
		AR8-0-BBTS0007-100623	Primary	6/23/2010	438.5023
	AR9	AR9-1-BBTS0001-100521	Primary	5/21/2010	303.6566
		AR9-1-BBTS0002-100601	Primary	6/1/2010	505.0965
		AR9-2-BBTS0001-100601	Primary	6/1/2010	560.8555
		AR9-2-BBTS0002-100608	Primary	6/8/2010	677.5916
		AR9-2-BBTS0003-100608	Primary	6/8/2010	535.279
		AR9-2-BBTS0005-100623	Primary	6/23/2010	667.8649
		AR9-3-BBTS0001-100608	Primary	6/8/2010	435.1205
		AR9-3-BBTS0002-100608	Primary	6/8/2010	671.6212
Blood Nestling	AR1	AR1-0-BBTS0007-100622	Primary	6/22/2010	40.1277
		AR1-0-BBTS0008-100622	Primary	6/22/2010	71.2426
		AR1-0-BBTS0009-100622	Primary	6/22/2010	58.9028
		AR1-0-BBTS0010-100622	Primary	6/22/2010	43.7073
		AR1-0-BBTS0011-100622	Primary	6/22/2010	39.9202
		AR1-0-BBTS0012-100622	Primary	6/22/2010	39.8894
	AR2	AR2-0-BBTS0005-100623	Primary	6/23/2010	20.9038
		AR2-0-BBTS0006-100623	Primary	6/23/2010	29.5483
		AR2-0-BBTS0007-100623	Primary	6/23/2010	37.2171
		AR2-0-BBTS0008-100623	Primary	6/23/2010	30.2731
		AR2-0-BBTS0009-100623	Primary	6/23/2010	23.4405
		AR2-0-BBTS0010-100630	Primary	6/30/2010	35.912
		AR2-0-BBTS0011-100630	Primary	6/23/2010	40.0948
	AR4	AR4-0-BBTS0002-100623	Primary	6/23/2010	53.039
		AR4-0-BBTS0003-100623	Primary	6/23/2010	41.8167
	AR8	AR8-0-BBTS0005-100623	Primary	6/23/2010	30.8547
		AR8-0-BBTS0006-100623	Primary	6/23/2010	83.4934
		AR8-0-BBTS0008-100701	Primary	7/1/2010	46.6793
	AR9	AR9-1-BBTS0003-100623	Primary	6/23/2010	72.8395
		AR9-2-BBTS0004-100617	Primary	6/17/2010	72.898
		AR9-3-BBTS0003-100623	Primary	6/23/2010	36.49
		AR9-3-BBTS0004-100623	Primary	6/23/2010	55.6243
Feather Adult	AR1	AR1-0-BFTS0001-100602	Primary	6/2/2010	2042.1832
		AR1-0-BFTS0002-100602	Primary	6/2/2010	916.5793
		AR1-0-BFTS0003-100602	Primary	6/2/2010	977.5943
		AR1-0-BFTS0004-100602	Primary	6/2/2010	1328.3385
		AR1-0-BFTS-0005-100609	Primary	6/9/2010	1168.1537
		AR1-0-BFTS0006-100609	Primary	6/9/2010	1098.6364
		AR1-0-BFTS0007-100616	Primary	6/16/2010	1112.8179
		AR1-0-BFTS0014-100630	Primary	6/30/2010	883.386

TABLE G-19
ANALYTICAL RESULTS - TREE SWALLOW BLOOD, FEATEHRS, AND EGGS - 2010 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Tissue	Reach	Sample ID	Type	Date	Mercury (µg/kg FW)
	AR2	AR2-0-BFTS0001-100603	Primary	6/3/2010	818.1835
		AR2-0-BFTS0002-100603	Primary	6/3/2010	1311.6602
		AR2-0-BFTS0003-100603	Primary	6/3/2010	1142.589
		AR2-0-BFTS0004-100603	Primary	6/3/2010	1052.3705
		AR2-0-BFTS0005-100609	Primary	6/9/2010	2419.7114
		AR2-0-BFTS0006-100906	Primary	6/9/2010	1527.0309
	AR3	AR3-0-BFTS0001-100609	Primary	6/9/2010	1010.5112
	AR4	AR4-0-BFTS0001-100609	Primary	6/9/2010	1609.9214
	AR8	AR8-0-BFTS0001-100602	Primary	6/2/2010	953.0016
		AR8-0-BFTS0002-100602	Primary	6/2/2010	998.4752
		AR8-0-BFTS0003-100602	Primary	6/2/2010	1848.8157
		AR8-0-BFTS0004-100602	Primary	6/2/2010	1878.2367
		AR8-0-BFTS0005-100609	Primary	6/9/2010	1418.4387
		AR8-0-BFTS0006-100609	Primary	6/9/2010	1488.4264
		AR8-0-BFTS0009-100623	Primary	6/23/2010	1249.2472
	AR9	AR9-1-BFTS0001-100521	Primary	5/21/2010	933.4453
		AR9-1-BFTS0002-100521	Primary	5/21/2010	1542.3715
		AR9-1-BFTS0003-100601	Primary	6/1/2010	857.3197
		AR9-2-BFTS0001-100521	Primary	5/21/2010	774.5306
		AR9-2-BFTS0002-100521	Primary	5/21/2010	994.1475
		AR9-2-BFTS0003-100601	Primary	6/1/2010	1837.4683
		AR9-2-BFTS0004-100608	Primary	6/8/2010	1643.3903
		AR9-2-BFTS0005-100608	Primary	6/8/2010	1415.8358
		AR9-2-BFTS0006-100608	Primary	6/8/2010	1644.3423
		AR9-2-BFTS0007-100617	Primary	6/17/2010	1400.8048
		AR9-3-BFTS0001-100608	Primary	6/8/2010	1234.2329
		AR9-3-BFTS0002-100608	Primary	6/8/2010	1692.0321
Feather Nestling	AR1	AR1-0-BFTS0008-100622	Primary	6/22/2010	1446.597
		AR1-0-BFTS0009-100622	Primary	6/22/2010	1779.3983
		AR1-0-BFTS0010-100622	Primary	6/22/2010	1620.4282
		AR1-0-BFTS0011-100622	Primary	6/22/2010	1432.5778
		AR1-0-BFTS0012-100622	Primary	6/22/2010	1435.5421
		AR1-0-BFTS0013-100622	Primary	6/22/2010	1488.6937
	AR2	AR2-0-BFTS0007-100623	Primary	6/23/2010	931.2124
		AR2-0-BFTS0008-100623	Primary	6/23/2010	1058.7769
		AR2-0-BFTS0009-100623	Primary	6/23/2010	1076.9104
		AR2-0-BFTS0010-100623	Primary	6/23/2010	1308.8296
		AR2-0-BFTS0011-100623	Primary	6/23/2010	882.9145
		AR2-0-BFTS0012-100630	Primary	6/30/2010	1002.0049
		AR2-0-BFTS0013-100630	Primary	6/30/2010	1195.7598
	AR4	AR4-0-BFTS0003-100623	Primary	6/23/2010	1644.1135
	AR8	AR8-0-BFTS0007-100623	Primary	6/23/2010	1255.2605
		AR8-0-BFTS0008-100623	Primary	6/23/2010	2516.8667
		AR8-0-BFTS0010-100701	Primary	7/1/2010	1420.3262
	AR9	AR9-1-BFTS0004-100623	Primary	6/23/2010	2449.9104
		AR9-2-BFTS0008-100617	Primary	6/17/2010	2069.228
		AR9-2-BFTS0009-100617	Primary	6/17/2010	2117.8992
		AR9-3-BFTS0003-100623	Primary	6/23/2010	1646.5198
		AR9-3-BFTS0004-100623	Primary	6/23/2010	1646.1038
Egg	AR1	AR1-0-BETS0001	Primary	6/2/2010	526.7872
		AR1-0-BETS0003	Primary	6/2/2010	528.8286
		AR1-0-BETS0005	Primary	6/2/2010	489.5265
		AR1-0-BETS0007	Primary	6/2/2010	515.176
		AR1-0-BETS0009	Primary	6/9/2010	706.3962
		AR1-0-BETS0011	Primary	6/22/2010	560.7598

TABLE G-19
ANALYTICAL RESULTS - TREE SWALLOW BLOOD, FEATEHRS, AND EGGS - 2010 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Tissue	Reach	Sample ID	Type	Date	Mercury (µg/kg FW)
	AR2	AR2-0-BETS0001	Primary	6/3/2010	580.3622
		AR2-0-BETS0003	Primary	6/3/2010	489.6655
		AR2-0-BETS0005	Primary	6/9/2010	425.7141
		AR2-0-BETS0007	Primary	6/9/2010	523.6732
		AR2-0-BETS0009	Primary	6/9/2010	494.7347
		AR2-0-BETS0011	Primary	6/9/2010	776.7261
		AR2-0-BETS0013	Primary	6/9/2010	568.0993
	AR3	AR3-0-BETS0001	Primary	6/9/2010	813.2795
	AR4	AR4-0-BETS0001	Primary	6/9/2010	846.6601
	AR8	AR8-0-BETS0001	Primary	8/12/2010	815.9874
		AR8-0-BETS0003	Primary	8/13/2010	784.5419
		AR8-0-BETS0005	Primary	8/13/2010	580.8265
		AR8-0-BETS0007	Primary	8/13/2010	838.7885
		AR8-0-BETS0009	Primary	8/13/2010	739.4534
	AR9	AR9-1-BETS0001	Primary	6/1/2010	814.8287
		AR9-1-BETS0002	Primary	6/1/2010	714.1678
		AR9-1-BETS0003	Primary	6/1/2010	632.8652
		AR9-2-BETS0001	Primary	6/1/2010	773.402
		AR9-2-BETS0003	Primary	6/1/2010	558.9357
		AR9-2-BETS0005	Primary	6/1/2010	544.0197
		AR9-2-BETS0007	Primary	6/8/2010	576.116
		AR9-2-BETS0009	Primary	6/8/2010	783.9294
		AR9-3-BETS0001	Primary	6/8/2010	791.3737

TABLE G-20
ANALYTICAL RESULTS - BALD EAGLE PLASMA - 2008 AND 2011 - ORGANICS
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR1	AR1	AR9	AR9
	Sample ID	AR1-00-BPBE0001-0-0-80604	AR1-00-BPBE0002-0-0-80604	AR9-00-BPBE0001-0-0-80604	AR9-00-BPBE0002-0-0-80604
	Type	Primary	Primary	Primary	Primary
	Date	6/4/2008	6/4/2008	6/4/2008	6/4/2008
Analyte	**Units**				
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg FW	0.000828 U	0.000977 U	0.000841 U	0.00172 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg FW	0.00712 U	0.0043 U	0.0056 U	0.01 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg FW	0.000694 U	0.000562 U	0.000685 U	0.00133 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg FW	0.00127 U	0.0009 U	0.00107 U	0.0017 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg FW	0.00049 U	0.00062 U	0.000514 U	0.000989 U
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg FW	0.000544 U	0.000382 U	0.000367 U	0.00066 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.000316 U	0.000345 U	0.000314 U	0.000456 U
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.000435 U	0.000279 U	0.00034 U	0.000649 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.000335 U	0.000342 U	0.000322 U	0.000476 U
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg FW	0.000375 U	0.000423 U	0.000376 U	0.000563 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.000335 U	0.000354 U	0.000327 U	0.000481 U
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg FW	0.000845 U	0.0005 U	0.000378 U	0.000775 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg FW	0.000221 U	0.000233 U	0.000199 U	0.000532 U
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.000275 J	0.00029 U	0.000253 U	0.000513 *
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg FW	0.00109 J	0.000602 J	0.000279 *	0.000576 J
2,3,7,8-TCDD TEQ (bird)	µg/kg FW	0.00677589	0.00378529	0.00242801	0.00447285
2,3,7,8-Tetrachlorodibenzofuran	µg/kg FW	0.00449 J	0.00232 J	0.000926 U	0.00146 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg FW	0.000663 *	0.000375 *	0.000789 *	0.00149 J
Heptachlorodibenzofuran (total)	µg/kg FW	0.0011 U	0.000562 U	0.000685 U	0.00066 U
Heptachlorodibenzo-p-dioxin (total)	µg/kg FW	0.00218 U	0.00151 U	0.00201 U	0.00312 U
Hexachlorodibenzofuran (total)	µg/kg FW	0.00125 U	0.00113 U	0.000367 U	0.00185 U
Hexachlorodibenzo-p-dioxin (total)	µg/kg FW	0.000316 U	0.000342 U	0.000314 U	0.000456 U
Pentachlorodibenzofuran (total)	µg/kg FW	0.00226 J	0.00113 J	0.000849 J	0.00135 J
Pentachlorodibenzo-p-dioxin (total)	µg/kg FW	0.000221 U	0.000233 U	0.000199 U	0.000532 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg FW	0.000151 U	0.000189 U	0.000164 U	0.00149 U
Tetrachlorodibenzofuran (total)	µg/kg FW	0.00563 U	0.00281 U	0.00121 U	0.00342 U
Decachlorobiphenyl	µg/kg FW				
Total DiCB	µg/kg FW				
Total HpCB	µg/kg FW				
Total HxCB	µg/kg FW				
Total MoCB	µg/kg FW				
Total NoCB	µg/kg FW				
Total OcCB	µg/kg FW				
Total PCB homologues	µg/kg FW				
Total PeCB	µg/kg FW				
Total TeCB	µg/kg FW				
Total TrCB	µg/kg FW				
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg FW				
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg FW				
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg FW				
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW				
2',3,4,4',5-Pentachlorobiphenyl	µg/kg FW				
2,3',4,4',5-Pentachlorobiphenyl	µg/kg FW				
2,3,4,4',5-Pentachlorobiphenyl	µg/kg FW				
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW				
3,3',4,4',5-Pentachlorobiphenyl	µg/kg FW				
3,3',4,4'-Tetrachlorobiphenyl	µg/kg FW				
3,4,4',5-Tetrachlorobiphenyl	µg/kg FW				
Decachlorobiphenyl	µg/kg FW				
PCB Dioxin-like Congener TEQ (bird)	µg/kg FW				
tPCBs_all	µg/kg FW				
tPCBs_detects	µg/kg FW				

TABLE G-20
ANALYTICAL RESULTS - BALD EAGLE PLASMA - 2008 AND 2011 - ORGANICS
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR1	AR1	AR9
	Sample ID	AR1-00-BPBE0001-N-110623	AR1-00-BPBE0002-N-110623	AR9-00-BPBE0001-N-110623
	Type	Primary	Primary	Primary
	Date	6/23/2011	6/23/2011	6/23/2011
Analyte	**Units**			
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg FW	0.000666 UEMC	0.00532 U	0.000302 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg FW	0.00135 UEMC	0.0104 U	0.00161 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg FW	0.000551 UEMC	0.00412 U	0.00391 EMPC
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg FW	0.000481 U	0.00409 U	0.000671 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg FW	0.000313 U	0.00189 J	0.000684 U
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg FW	0.000303 EMPC	0.00423 J	0.00037 EMPC
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.000244 EMPC	0.00237 J	0.000492 EMPC
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.000456 EMPC	0.00279 J	0.000827 J
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.000301 EMPC	0.00208 J	0.000258 J
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg FW	0.000198 EMPC	0.0018 J	0.000261 EMPC
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.00016 EMPC	0.00245 J	0.000344 EMPC
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg FW	0.00019 U	0.00187 EMPC	0.000434 EMPC
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg FW	0.000243 U	0.000604 U	0.000369 EMPC
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.000429 EMPC	0.00261 J	0.000394 EMPC
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg FW	0.000282 UEMC	0.00231 UEMC	0.000856 U
2,3,7,8-TCDD TEQ (bird)	µg/kg FW	0.00125045	0.0056804	0.00310612
2,3,7,8-Tetrachlorodibenzofuran	µg/kg FW	0.000404 U	0.000634 J	0.00142 J
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg FW	0.000124 U	0.000358 U	0.000125 U
Heptachlorodibenzofuran (total)	µg/kg FW	0.000237 UJ	0.00601 UJ	0.00127 UJ
Heptachlorodibenzo-p-dioxin (total)	µg/kg FW	0.00105 UJ	0.00603 UJ	0.000206 UJ
Hexachlorodibenzofuran (total)	µg/kg FW	0.000799 J	0.0154 J	0.00622 J
Hexachlorodibenzo-p-dioxin (total)	µg/kg FW	0.000134 UJ	0.00689 J	0.000258 J
Pentachlorodibenzofuran (total)	µg/kg FW	0.00176 UJ	0.000721 UJ	0.00818 J
Pentachlorodibenzo-p-dioxin (total)	µg/kg FW	0.000243 UJ	0.000604 UJ	0.000523 UJ
Tetrachlorodibenzo(p)dioxin (total)	µg/kg FW	0.000124 UJ	0.000358 UJ	0.000125 UJ
Tetrachlorodibenzofuran (total)	µg/kg FW	0.00444 J	0.00552 J	0.024 J
Decachlorobiphenyl	µg/kg FW	0.0235 J	0.0339 J	0.129
Total DiCB	µg/kg FW	0.131 U	0.111 U	0.652 U
Total HpCB	µg/kg FW	1.93	2.3	24.8
Total HxCB	µg/kg FW	2.28	2.81	32.2
Total MoCB	µg/kg FW	0.0394 U	0.0389 U	0.0155 J
Total NoCB	µg/kg FW	0.121	0.146	0.663
Total OcCB	µg/kg FW	0.71	0.825	6.93
Total PCB homologues	µg/kg FW	6.18 J	7.35 J	78 J
Total PeCB	µg/kg FW	0.851	0.974	7.45
Total TeCB	µg/kg FW	0.201	0.205	3.46
Total TrCB	µg/kg FW	0.0683	0.0601	2.37
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg FW	0.0394 U	0.0148 J	0.109
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg FW	0.0477 J	0.0544 J	0.461
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg FW	0.0672	0.0796	0.391
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW	0.0272 J	0.0284 J	0.211
2',3,4,4',5-Pentachlorobiphenyl	µg/kg FW	0.0394 U	0.0067 J	0.0243 J
2,3',4,4',5-Pentachlorobiphenyl	µg/kg FW	0.221	0.238	1.46
2,3,4,4',5-Pentachlorobiphenyl	µg/kg FW	0.0394 U	0.0065 J	0.0301 J
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW	0.0394 U	0.0389 U	0.0398 U
3,3',4,4',5-Pentachlorobiphenyl	µg/kg FW	0.0394 U	0.0389 U	0.0398 U
3,3',4,4'-Tetrachlorobiphenyl	µg/kg FW	0.0394 U	0.0062 J	0.0196 J
3,4,4',5-Tetrachlorobiphenyl	µg/kg FW	0.0394 U	0.0389 U	0.0398 U
Decachlorobiphenyl	µg/kg FW	0.0235 J	0.0339 J	0.129
PCB Dioxin-like Congener TEQ (bird)	µg/kg FW	0.0019887	0.000326929	0.001086253
tPCBs_all	µg/kg FW	0.6389	0.5513	2.8254
tPCBs_detects	µg/kg FW	0.3631	0.4346	2.706

TABLE G-21
ANALYTICAL RESULTS - BALD EAGLE BLOOD AND FEATHERS - 2008 AND 2011
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Tissue	Reach	Sample ID	Type	Date	Total Mercury (µg/kg FW)
Blood	AR1	AR1-00-BBBE0001-0-080604	Primary	6/4/2008	539
		AR1-00-BBBE0002-0-080604	Primary	6/4/2008	442
	AR9	AR9-00-BBBE0001-0-080604	Primary	6/4/2008	635
		AR9-00-BBBE0002-0-080604	Primary	6/4/2008	434
Feathers	AR1	AR1-00-BFBE0001-0-080604	Primary	6/4/2008	15100
		AR1-00-BFBE0002-0-080604	Primary	6/4/2008	9490
	AR9	AR9-00-BFBE0001-0-080604	Primary	6/4/2008	18200
		AR9-00-BFBE0002-0-080604	Primary	6/4/2008	23300

TABLE G-22
ANALYTICAL RESULTS - BAT BLOOD - 2010 - ORGANICS
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

	Reach	AR1	AR9	AR9	AR9
	Tissue	Blood	Blood	Blood	Blood
	Sample ID	AR1-00-BTBMYLUC1-0-101102	AR9-0-BTBMYLUC1-0-101102	AR9-0-BTBMYLUC2-0-101102	AR9-0-BTBMYLUC3-0-101102
	Type	Primary	Primary	Primary	Primary
	Date	11/2/2010	11/2/2010	11/2/2010	11/2/2010
Analyte	**Units**				
1,2,3,4,6,7,8,9-Octachlorodibenzofuran	µg/kg FW	0.0114 U	0.0154 U	0.0126 U	0.0105 U
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin	µg/kg FW	0.0114 U	0.0118 U	0.0145 U	0.0216 U
1,2,3,4,6,7,8-Heptachlorodibenzofuran	µg/kg FW	0.00428 U	0.00509 U	0.00511 U	0.00769 U
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin	µg/kg FW	0.00894 U	0.00803 U	0.0101 U	0.0178 U
1,2,3,4,7,8,9-Heptachlorodibenzofuran	µg/kg FW	0.00656 U	0.00756 U	0.00798 U	0.0114 U
1,2,3,4,7,8-Hexachlorodibenzofuran	µg/kg FW	0.00473 U	0.00413 U	0.00382 U	0.00443 U
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.00705 U	0.00675 U	0.00532 U	0.0103 U
1,2,3,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.00439 U	0.00384 U	0.00353 U	0.00445 U
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.00707 U	0.00632 U	0.00522 U	0.0097 U
1,2,3,7,8,9-Hexachlorodibenzofuran	µg/kg FW	0.00722 U	0.00594 U	0.00546 U	0.00693 U
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin	µg/kg FW	0.00727 U	0.0067 U	0.00542 U	0.0102 U
1,2,3,7,8-Pentachlorodibenzofuran	µg/kg FW	0.00348 U	0.00315 U	0.00403 U	0.0035 U
1,2,3,7,8-Pentachlorodibenzo-p-dioxin	µg/kg FW	0.0081 U	0.00704 U	0.00894 U	0.00613 U
2,3,4,6,7,8-Hexachlorodibenzofuran	µg/kg FW	0.00482 U	0.00405 U	0.00375 U	0.00478 U
2,3,4,7,8-Pentachlorodibenzofuran	µg/kg FW	0.00325 U	0.00308 U	0.00375 U	0.00356 U
2,3,7,8-Tetrachlorodibenzofuran	µg/kg FW	0.00621 U	0.00412 U	0.00674 U	0.00623 U
2,3,7,8-Tetrachlorodibenzo-p-dioxin	µg/kg FW	0.00573 U	0.00501 U	0.00729 U	0.00743 U
Heptachlorodibenzofuran (total)	µg/kg FW	0.00656 U	0.00756 U	0.00798 U	0.0114 U
Heptachlorodibenzo-p-dioxin (total)	µg/kg FW	0.00894 U	0.0251 J	0.0101 U	0.0178 U
Hexachlorodibenzofuran (total)	µg/kg FW	0.00722 U	0.00594 U	0.00546 U	0.00693 U
Hexachlorodibenzo-p-dioxin (total)	µg/kg FW	0.00727 U	0.00675 U	0.00542 U	0.0103 U
Pentachlorodibenzofuran (total)	µg/kg FW	0.00348 U	0.00315 U	0.00403 U	0.00356 U
Pentachlorodibenzo-p-dioxin (total)	µg/kg FW	0.0114 U	0.00704 U	0.00894 U	0.00967 U
Tetrachlorodibenzo(p)dioxin (total)	µg/kg FW	0.00573 U	0.00501 U	0.00729 U	0.00743 U
Tetrachlorodibenzofuran (total)	µg/kg FW	0.00621 U	0.00412 U	0.00674 U	0.00623 U
Decachlorobiphenyl	µg/kg FW	0.0355 J	0.0696 J	0.0351 J	0.0559 J
Total DiCB	µg/kg FW	16.4 U	72.5 U	76 U	71.1 U
Total HpCB	µg/kg FW	2.24 J	8.88 J	8.92 J	9.87 J
Total HxCB	µg/kg FW	2.16 J	11.3 J	9.9 J	9.37 J
Total MoCB	µg/kg FW	0.647 U	2.4 U	2.33 U	2.27 U
Total NoCB	µg/kg FW	0.0921 J	0.215 J	0.241 J	0.288 J
Total OcCB	µg/kg FW	0.892 J	2.55 J	2.98 J	3.62 J
Total PCB homologues	µg/kg FW	5.42 J	30.1 J	22.1 J	23.2 J
Total TeCB	µg/kg FW	3.36 U	12.6 U	12.4 U	10.3 U
Total TrCB	µg/kg FW	4.98 U	21.2 U	19.9 U	19.5 U
17-TrCB	µg/kg FW	1.63 U	7.13 J	5.51 U	5.41 U
2,3,3',4,4',5,5'-Heptachlorobiphenyl	µg/kg FW	0.0151	0.0578	0.0482 J	0.0658
2,3,3',4,4',5-Hexachlorobiphenyl	µg/kg FW	0.0917 J	0.444	0.331	0.31
2,3,3',4,4'-Pentachlorobiphenyl	µg/kg FW	0.121 U	0.437	0.3	0.343
2,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW	0.0471 J	0.203	0.145	0.15
2',3,4,4',5-Pentachlorobiphenyl	µg/kg FW	0.0371 U	0.0294	0.0455 U	0.0348 U
2,3',4,4',5-Pentachlorobiphenyl	µg/kg FW	0.444	1.91	1.14	1.25
2,3,4,4',5-Pentachlorobiphenyl	µg/kg FW	0.0354 U	0.0497	0.0461 U	0.0373 U
3,3',4,4',5,5'-Hexachlorobiphenyl	µg/kg FW	0.015 U	0.028 U	0.0339 U	0.019 U
3,3',4,4',5-Pentachlorobiphenyl	µg/kg FW	0.0344 U	0.0307 U	0.0441 U	0.0329 U
3,3',4,4'-Tetrachlorobiphenyl	µg/kg FW	0.0282 U	0.04 J	0.034	0.0335 J
3,4,4',5-Tetrachlorobiphenyl	µg/kg FW	0.0296 U	0.0279 U	0.0315 U	0.0299 U
Decachlorobiphenyl	µg/kg FW	0.0355 J	0.0696 J	0.0351 J	0.0559 J
PCB Dioxin-like Congener TEQ (mammal)	µg/kg FW	0.000026562	0.000097927	0.000065074	0.000069077
tPCBs_all	µg/kg FW	2.5286	10.3875	7.7093	7.7162
tPCBs_detects	µg/kg FW	0.5979	10.3009	1.9982	2.1523

TABLE G-23
ANALYTICAL RESULTS - BAT BLOOD AND FUR - 2010 - TOTAL MERCURY
CHLOR ALKALI SUPERFUND SITE
BERLIN, NEW HAMPSHIRE

Tissue	Reach	Sample ID	Type	Date	Mercury (µg/kg FW)
Blood	AR1	AR1-0-BTBMYLU02-0-100809	Primary	8/9/2010	178.0668
		AR1-0-BTBMYLU03-0-100809	Primary	8/9/2010	131.1117
		AR1-0-BTBMYLU10-0-100809	Primary	8/9/2010	382.6009
		AR1-0-BTBMYLU11-0-100809	Primary	8/9/2010	288.4846
	AR9	AR9-0-BTBEPFU01-0-100809	Primary	8/9/2010	295.979
		AR9-0-BTBMYLU04-0-100809	Primary	8/9/2010	360.7298
		AR9-0-BTBMYLU05-0-100809	Primary	8/9/2010	142.427
		AR9-0-BTBMYLU08-0-100809	Primary	8/9/2010	324.8819
		AR9-0-BTBMYLU12-0-100809	Primary	8/9/2010	608.5849
		AR9-0-BTBMYLU13-0-100809	Primary	8/9/2010	516.6596
		AR9-0-BTBMYLU16-0-100809	Primary	8/9/2010	393.2911
		AR9-0-BTBMYLU19-0-100810	Primary	8/10/2010	462.9391
		AR9-0-BTBMYLU20-0-100810	Primary	8/10/2010	987.7927
		AR9-0-BTBMYLU22-0-100810	Primary	8/10/2010	551.8798
		AR9-0-BTBMYLU24-0-100810	Primary	8/10/2010	1418.6078
		AR9-0-BTBMYLU26-0-100810	Primary	8/10/2010	188.0807
Fur	AR1	AR1-00-BTFMYLU07-0-100812	Primary	8/12/2010	5102.5576
		AR1-00-BTFMYLU08-0-100812	Primary	8/12/2010	4183.6948
		AR1-00-BTFMYLU09-0-100812	Primary	8/12/2010	3371.0588
		AR1-00-BTFMYLU10-0-100812	Primary	8/12/2010	40575.1836
		AR1-00-BTFMYLU11-0-100812	Primary	8/12/2010	4968.7822
		AR1-00-BTFMYLU12-0-100812	Primary	8/12/2010	5935.9497
		AR1-0-BTFMYLU02-0-100809	Primary	8/9/2010	6807.7373
		AR1-0-BTFMYLU03-0-100809	Primary	8/9/2010	4554.1772
		AR1-0-BTFMYLU04-0-100809	Primary	8/9/2010	19783.8027
		AR1-0-BTFMYLU05-0-100809	Primary	8/9/2010	5061.8433
		AR1-0-BTFMYLU06-0-100809	Primary	8/9/2010	2599.0557
	AR9	AR9-0-BTFEPFU01-0-100809	Primary	8/9/2010	39088.7461
		AR9-0-BTFMYLU01-0-100809	Primary	8/9/2010	196644.562
		AR9-0-BTFMYLU02-0-100809	Primary	8/9/2010	88295.375
		AR9-0-BTFMYLU03-0-100809	Primary	8/9/2010	165931.656
		AR9-0-BTFMYLU04-0-100809	Primary	8/9/2010	22681.3867
		AR9-0-BTFMYLU05-0-100809	Primary	8/9/2010	2156.2644
		AR9-0-BTFMYLU06-0-100809	Primary	8/9/2010	2078.708
		AR9-0-BTFMYLU07-0-100809	Primary	8/9/2010	111869.054
		AR9-0-BTFMYLU08-0-100809	Primary	8/9/2010	16796.1836
		AR9-0-BTFMYLU09-0-100809	Primary	8/9/2010	2435.7664
		AR9-0-BTFMYLU10-0-100809	Primary	8/9/2010	50037.1914
		AR9-0-BTFMYLU11-0-100809	Primary	8/9/2010	71428
		AR9-0-BTFMYLU12-0-100809	Primary	8/9/2010	69943.9531
		AR9-0-BTFMYLU13-0-100809	Primary	8/9/2010	56826.3398
		AR9-0-BTFMYLU14-0-100809	Primary	8/9/2010	71819.9297
		AR9-0-BTFMYLU15-0-100809	Primary	8/9/2010	180055.39
		AR9-0-BTFMYLU16-0-100809	Primary	8/12/2010	24981.1191
		AR9-0-BTFMYLU17-0-100809	Primary	8/9/2010	153610.953
		AR9-0-BTFMYLU18-0-100809	Primary	8/9/2010	22303.3125
		AR9-0-BTFMYLU19-0-100810	Primary	8/10/2010	77681.4453
		AR9-0-BTFMYLU20-0-100810	Primary	8/10/2010	125014.25
		AR9-0-BTFMYLU21-0-100810	Primary	8/10/2010	7049.3564
		AR9-0-BTFMYLU22-0-100810	Primary	8/10/2010	2170.4297
		AR9-0-BTFMYLU23-0-100810	Primary	8/10/2010	4712.8652
		AR9-0-BTFMYLU24-0-100810	Primary	8/10/2010	167222.046
		AR9-0-BTFMYLU25-0-100810	Primary	8/10/2010	194606.296
		AR9-0-BTFMYLU26-0-100810	Primary	8/10/2010	1117.9143

APPENDIX H

APPENDIX H

ProUCL OUTPUTS

General UCL Statistics for Full Data Sets

User Selected Options

From File	J:\Projects\Nobis RAC Region 1\Chlor-Alkali Berlin NH\Reports\BERA\ERA_ProUCL_Input.wst
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Appendix H - ProUCL Outputs

Fish_AR9_2,3,7,8-TCDD TEQ (bird)

General Statistics

Number of Valid Observations 9

Number of Distinct Observations 9

Raw Statistics

Minimum	0.00382
Maximum	0.0236
Mean	0.0132
Geometric Mean	0.0115
Median	0.0115
SD	0.00669
Std. Error of Mean	0.00223
Coefficient of Variation	0.507
Skewness	0.268

Log-transformed Statistics

Minimum of Log Data	-5.569
Maximum of Log Data	-3.746
Mean of log Data	-4.466
SD of log Data	0.594

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.957
Shapiro Wilk Critical Value	0.829

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.0173

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.0171
95% Modified-t UCL (Johnson-1978)	0.0174

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL	0.0228
95% Chebyshev (MVUE) UCL	0.0252
97.5% Chebyshev (MVUE) UCL	0.0303
99% Chebyshev (MVUE) UCL	0.0403

Gamma Distribution Test

k star (bias corrected)	2.592
Theta Star	0.00509
MLE of Mean	0.0132
MLE of Standard Deviation	0.0082
nu star	46.65
Approximate Chi Square Value (.05)	31.98
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	29.44
Anderson-Darling Test Statistic	0.227
Anderson-Darling 5% Critical Value	0.725
Kolmogorov-Smirnov Test Statistic	0.149
Kolmogorov-Smirnov 5% Critical Value	0.281

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	0.0193
95% Adjusted Gamma UCL (Use when n < 40)	0.0209

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	0.0169
95% Jackknife UCL	0.0173
95% Standard Bootstrap UCL	0.0167
95% Bootstrap-t UCL	0.0176
95% Hall's Bootstrap UCL	0.0179
95% Percentile Bootstrap UCL	0.0169
95% BCA Bootstrap UCL	0.0171
95% Chebyshev(Mean, Sd) UCL	0.0229
97.5% Chebyshev(Mean, Sd) UCL	0.0271
99% Chebyshev(Mean, Sd) UCL	0.0354

Potential UCL to Use

Use 95% Student's-t UCL 0.0173

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Fish_AR9_2,3,7,8-TCDD TEQ (mammal)

General Statistics

Number of Valid Observations 9 | Number of Distinct Observations 9

Raw Statistics

Minimum	0.0009953
Maximum	0.0044
Mean	0.00223
Geometric Mean	0.00204
Median	0.00216
SD	0.00102
Std. Error of Mean	0.0003404
Coefficient of Variation	0.458
Skewness	1.12

Log-transformed Statistics

Minimum of Log Data	-6.912
Maximum of Log Data	-5.426
Mean of log Data	-6.196
SD of log Data	0.452

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.925
Shapiro Wilk Critical Value	0.829

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.983
Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.00286

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.00292
95% Modified-t UCL (Johnson-1978)	0.00288

Assuming Lognormal Distribution

95% H-UCL	0.0032
95% Chebyshev (MVUE) UCL	0.00371
97.5% Chebyshev (MVUE) UCL	0.00435
99% Chebyshev (MVUE) UCL	0.00561

Gamma Distribution Test

k star (bias corrected)	3.887
Theta Star	0.0005732
MLE of Mean	0.00223
MLE of Standard Deviation	0.00113
nu star	69.97
Approximate Chi Square Value (.05)	51.72
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	48.42
Anderson-Darling Test Statistic	0.169
Anderson-Darling 5% Critical Value	0.723
Kolmogorov-Smirnov Test Statistic	0.107
Kolmogorov-Smirnov 5% Critical Value	0.28

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	0.00302
95% Adjusted Gamma UCL (Use when n < 40)	0.00322

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	0.00279
95% Jackknife UCL	0.00286
95% Standard Bootstrap UCL	0.00274
95% Bootstrap-t UCL	0.00311
95% Hall's Bootstrap UCL	0.00379
95% Percentile Bootstrap UCL	0.0028
95% BCA Bootstrap UCL	0.00288
95% Chebyshev(Mean, Sd) UCL	0.00371
97.5% Chebyshev(Mean, Sd) UCL	0.00435
99% Chebyshev(Mean, Sd) UCL	0.00562

Potential UCL to Use

Use 95% Student's-t UCL 0.00286

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Fish_AR9_PCB Dioxin-like Congener TEQ (bird)

General Statistics

Number of Valid Observations 9 | Number of Distinct Observations 9

Raw Statistics

Minimum	0.00256
Maximum	0.011
Mean	0.00648
Geometric Mean	0.00586
Median	0.00573
SD	0.00303
Std. Error of Mean	0.00101
Coefficient of Variation	0.468
Skewness	0.532

Log-transformed Statistics

Minimum of Log Data	-5.966
Maximum of Log Data	-4.512
Mean of log Data	-5.14
SD of log Data	0.486

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.903
Shapiro Wilk Critical Value	0.829

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.945
Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.00836

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.00834
95% Modified-t UCL (Johnson-1978)	0.00839

Assuming Lognormal Distribution

95% H-UCL	0.00965
95% Chebyshev (MVUE) UCL	0.0112
97.5% Chebyshev (MVUE) UCL	0.0132
99% Chebyshev (MVUE) UCL	0.0171

Gamma Distribution Test

k star (bias corrected)	3.465
Theta Star	0.00187
MLE of Mean	0.00648
MLE of Standard Deviation	0.00348
nu star	62.38
Approximate Chi Square Value (.05)	45.21
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	42.14
Anderson-Darling Test Statistic	0.319
Anderson-Darling 5% Critical Value	0.723
Kolmogorov-Smirnov Test Statistic	0.17
Kolmogorov-Smirnov 5% Critical Value	0.28

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	0.00895
95% Adjusted Gamma UCL (Use when n < 40)	0.0096

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	0.00815
95% Jackknife UCL	0.00836
95% Standard Bootstrap UCL	0.00807
95% Bootstrap-t UCL	0.00883
95% Hall's Bootstrap UCL	0.00827
95% Percentile Bootstrap UCL	0.00802
95% BCA Bootstrap UCL	0.00816
95% Chebyshev(Mean, Sd) UCL	0.0109
97.5% Chebyshev(Mean, Sd) UCL	0.0128
99% Chebyshev(Mean, Sd) UCL	0.0165

Potential UCL to Use

Use 95% Student's-t UCL 0.00836

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Fish_AR9_PCB Dioxin-like Congener TEQ (mammal)

General Statistics

Number of Valid Observations 9 | Number of Distinct Observations 9

Raw Statistics

Minimum	0.00196
Maximum	0.0092
Mean	0.00543
Geometric Mean	0.00497
Median	0.00484
SD	0.00233
Std. Error of Mean	0.0007754
Coefficient of Variation	0.428
Skewness	0.448

Log-transformed Statistics

Minimum of Log Data	-6.234
Maximum of Log Data	-4.689
Mean of log Data	-5.305
SD of log Data	0.469

Warning: There are only 9 Values in this data

Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical Value	0.829

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical Value	0.829

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	0.00688

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	0.00683
95% Modified-t UCL (Johnson-1978)	0.0069

Assuming Lognormal Distribution

95% H-UCL	0.00799
95% Chebyshev (MVUE) UCL	0.00925
97.5% Chebyshev (MVUE) UCL	0.0109
99% Chebyshev (MVUE) UCL	0.0141

Gamma Distribution Test

k star (bias corrected)	3.882
Theta Star	0.0014
MLE of Mean	0.00543
MLE of Standard Deviation	0.00276
nu star	69.87
Approximate Chi Square Value (.05)	51.63
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	48.34
Anderson-Darling Test Statistic	0.281
Anderson-Darling 5% Critical Value	0.723
Kolmogorov-Smirnov Test Statistic	0.178
Kolmogorov-Smirnov 5% Critical Value	0.28

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	0.00735
95% Adjusted Gamma UCL (Use when n < 40)	0.00786

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	0.00671
95% Jackknife UCL	0.00688
95% Standard Bootstrap UCL	0.00662
95% Bootstrap-t UCL	0.00734
95% Hall's Bootstrap UCL	0.00769
95% Percentile Bootstrap UCL	0.00673
95% BCA Bootstrap UCL	0.00679
95% Chebyshev(Mean, Sd) UCL	0.00881
97.5% Chebyshev(Mean, Sd) UCL	0.0103
99% Chebyshev(Mean, Sd) UCL	0.0131

Potential UCL to Use

Use 95% Student's-t UCL 0.00688

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Fish_AR9_tPCBs_all

General Statistics

Number of Valid Observations 9 | Number of Distinct Observations 9

Raw Statistics

Minimum	8.764
Maximum	366.2
Mean	190.1
Geometric Mean	110.1
Median	180.2
SD	137.8
Std. Error of Mean	45.93
Coefficient of Variation	0.725
Skewness	-0.0738

Log-transformed Statistics

Minimum of Log Data	2.171
Maximum of Log Data	5.903
Mean of log Data	4.701
SD of log Data	1.425

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.921
Shapiro Wilk Critical Value	0.829

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.796
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	275.5
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	264.4
95% Modified-t UCL (Johnson-1978)	275.3

Assuming Lognormal Distribution

95% H-UCL	2589
95% Chebyshev (MVUE) UCL	797.1
97.5% Chebyshev (MVUE) UCL	1032
99% Chebyshev (MVUE) UCL	1494

Gamma Distribution Test

k star (bias corrected)	0.775
Theta Star	245.3
MLE of Mean	190.1
MLE of Standard Deviation	215.9
nu star	13.94
Approximate Chi Square Value (.05)	6.533
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	5.5
Anderson-Darling Test Statistic	0.607
Anderson-Darling 5% Critical Value	0.743
Kolmogorov-Smirnov Test Statistic	0.213
Kolmogorov-Smirnov 5% Critical Value	0.287

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	405.7
95% Adjusted Gamma UCL (Use when n < 40)	481.9

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	265.6
95% Jackknife UCL	275.5
95% Standard Bootstrap UCL	261.8
95% Bootstrap-t UCL	274.6
95% Hall's Bootstrap UCL	261.8
95% Percentile Bootstrap UCL	260.2
95% BCA Bootstrap UCL	263.7
95% Chebyshev(Mean, Sd) UCL	390.2
97.5% Chebyshev(Mean, Sd) UCL	476.9
99% Chebyshev(Mean, Sd) UCL	647

Potential UCL to Use

Use 95% Student's-t UCL 275.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Crayfish_AR2_Mercury

General Statistics

Number of Valid Observations 12 | Number of Distinct Observations 12

Raw Statistics

Minimum	42.14
Maximum	75
Mean	57.51
Geometric Mean	56.7
Median	59.26
SD	9.96
Std. Error of Mean	2.875
Coefficient of Variation	0.173
Skewness	0.0744

Log-transformed Statistics

Minimum of Log Data	3.741
Maximum of Log Data	4.317
Mean of log Data	4.038
SD of log Data	0.176

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.965
Shapiro Wilk Critical Value	0.859

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.962
Shapiro Wilk Critical Value	0.859

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	62.67

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	62.3
95% Modified-t UCL (Johnson-1978)	62.68

Assuming Lognormal Distribution

95% H-UCL	63.45
95% Chebyshev (MVUE) UCL	70.3
97.5% Chebyshev (MVUE) UCL	75.83
99% Chebyshev (MVUE) UCL	86.69

Gamma Distribution Test

k star (bias corrected)	26.91
Theta Star	2.137
MLE of Mean	57.51
MLE of Standard Deviation	11.09
nu star	645.8
Approximate Chi Square Value (.05)	587.8
Adjusted Level of Significance	0.029
Adjusted Chi Square Value	579.4
Anderson-Darling Test Statistic	0.282
Anderson-Darling 5% Critical Value	0.731
Kolmogorov-Smirnov Test Statistic	0.168
Kolmogorov-Smirnov 5% Critical Value	0.245

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	63.18
95% Adjusted Gamma UCL (Use when n < 40)	64.1

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	62.24
95% Jackknife UCL	62.67
95% Standard Bootstrap UCL	62.06
95% Bootstrap-t UCL	63.1
95% Hall's Bootstrap UCL	62.44
95% Percentile Bootstrap UCL	62.17
95% BCA Bootstrap UCL	62.37
95% Chebyshev(Mean, Sd) UCL	70.04
97.5% Chebyshev(Mean, Sd) UCL	75.46
99% Chebyshev(Mean, Sd) UCL	86.12

Potential UCL to Use

Use 95% Student's-t UCL 62.67

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Crayfish_AR5_Mercury

General Statistics

Number of Valid Observations 10

Number of Distinct Observations 10

Raw Statistics

Minimum	66.38
Maximum	176.1
Mean	116.2
Geometric Mean	110.5
Median	109.7
SD	38.24
Std. Error of Mean	12.09
Coefficient of Variation	0.329
Skewness	0.348

Log-transformed Statistics

Minimum of Log Data	4.195
Maximum of Log Data	5.171
Mean of log Data	4.705
SD of log Data	0.338

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.935
Shapiro Wilk Critical Value	0.842

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.943
Shapiro Wilk Critical Value	0.842

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	138.4

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	137.5
95% Modified-t UCL (Johnson-1978)	138.6

Assuming Lognormal Distribution

95% H-UCL	146.9
95% Chebyshev (MVUE) UCL	171.1
97.5% Chebyshev (MVUE) UCL	194.8
99% Chebyshev (MVUE) UCL	241.3

Gamma Distribution Test

k star (bias corrected)	7.138
Theta Star	16.28
MLE of Mean	116.2
MLE of Standard Deviation	43.5
nu star	142.8
Approximate Chi Square Value (.05)	116.2
Adjusted Level of Significance	0.0267
Adjusted Chi Square Value	112
Anderson-Darling Test Statistic	0.267
Anderson-Darling 5% Critical Value	0.725
Kolmogorov-Smirnov Test Statistic	0.13
Kolmogorov-Smirnov 5% Critical Value	0.267

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	142.9
95% Adjusted Gamma UCL (Use when n < 40)	148.2

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	136.1
95% Jackknife UCL	138.4
95% Standard Bootstrap UCL	134.9
95% Bootstrap-t UCL	141.6
95% Hall's Bootstrap UCL	141.4
95% Percentile Bootstrap UCL	135.5
95% BCA Bootstrap UCL	137.5
95% Chebyshev(Mean, Sd) UCL	168.9
97.5% Chebyshev(Mean, Sd) UCL	191.7
99% Chebyshev(Mean, Sd) UCL	236.6

Potential UCL to Use

Use 95% Student's-t UCL 138.4

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Crayfish_AR6_Mercury

General Statistics

Number of Valid Observations 11 | Number of Distinct Observations 11

Raw Statistics

Minimum	70.16
Maximum	137.6
Mean	92.85
Geometric Mean	91.21
Median	88.77
SD	19.16
Std. Error of Mean	5.776
Coefficient of Variation	0.206
Skewness	1.21

Log-transformed Statistics

Minimum of Log Data	4.251
Maximum of Log Data	4.924
Mean of log Data	4.513
SD of log Data	0.194

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.904
Shapiro Wilk Critical Value	0.85

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.949
Shapiro Wilk Critical Value	0.85

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	103.3

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	104.6
95% Modified-t UCL (Johnson-1978)	103.7

Assuming Lognormal Distribution

95% H-UCL	104.2
95% Chebyshev (MVUE) UCL	116.6
97.5% Chebyshev (MVUE) UCL	126.9
99% Chebyshev (MVUE) UCL	147.1

Gamma Distribution Test

k star (bias corrected)	20.6
Theta Star	4.508
MLE of Mean	92.85
MLE of Standard Deviation	20.46
nu star	453.1
Approximate Chi Square Value (.05)	404.8
Adjusted Level of Significance	0.0278
Adjusted Chi Square Value	397.3
Anderson-Darling Test Statistic	0.305
Anderson-Darling 5% Critical Value	0.729
Kolmogorov-Smirnov Test Statistic	0.155
Kolmogorov-Smirnov 5% Critical Value	0.255

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	103.9
95% Adjusted Gamma UCL (Use when n < 40)	105.9

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	102.4
95% Jackknife UCL	103.3
95% Standard Bootstrap UCL	101.8
95% Bootstrap-t UCL	107.7
95% Hall's Bootstrap UCL	113.5
95% Percentile Bootstrap UCL	102.6
95% BCA Bootstrap UCL	103.9
95% Chebyshev(Mean, Sd) UCL	118
97.5% Chebyshev(Mean, Sd) UCL	128.9
99% Chebyshev(Mean, Sd) UCL	150.3

Potential UCL to Use

Use 95% Student's-t UCL 103.3

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Crayfish_AR7_Mercury

General Statistics

Number of Valid Observations 10

Number of Distinct Observations 10

Raw Statistics

Minimum	46.21
Maximum	122.3
Mean	84.39
Geometric Mean	80.09
Median	76.64
SD	27.95
Std. Error of Mean	8.838
Coefficient of Variation	0.331
Skewness	0.125

Log-transformed Statistics

Minimum of Log Data	3.833
Maximum of Log Data	4.807
Mean of log Data	4.383
SD of log Data	0.346

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.911
Shapiro Wilk Critical Value	0.842

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.924
Shapiro Wilk Critical Value	0.842

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	100.6

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	99.3
95% Modified-t UCL (Johnson-1978)	100.6

Assuming Lognormal Distribution

95% H-UCL	107.4
95% Chebyshev (MVUE) UCL	125.2
97.5% Chebyshev (MVUE) UCL	142.8
99% Chebyshev (MVUE) UCL	177.4

Gamma Distribution Test

k star (bias corrected)	6.876
Theta Star	12.27
MLE of Mean	84.39
MLE of Standard Deviation	32.18
nu star	137.5
Approximate Chi Square Value (.05)	111.4
Adjusted Level of Significance	0.0267
Adjusted Chi Square Value	107.3
Anderson-Darling Test Statistic	0.392
Anderson-Darling 5% Critical Value	0.725
Kolmogorov-Smirnov Test Statistic	0.2
Kolmogorov-Smirnov 5% Critical Value	0.267

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	104.2
95% Adjusted Gamma UCL (Use when n < 40)	108.1

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	98.92
95% Jackknife UCL	100.6
95% Standard Bootstrap UCL	97.93
95% Bootstrap-t UCL	101.2
95% Hall's Bootstrap UCL	96.91
95% Percentile Bootstrap UCL	98.12
95% BCA Bootstrap UCL	98.64
95% Chebyshev(Mean, Sd) UCL	122.9
97.5% Chebyshev(Mean, Sd) UCL	139.6
99% Chebyshev(Mean, Sd) UCL	172.3

Potential UCL to Use

Use 95% Student's-t UCL 100.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General Statistics

Number of Valid Observations 17 | Number of Distinct Observations 17

Raw Statistics

Minimum	93.44
Maximum	564.4
Mean	289.6
Geometric Mean	246.8
Median	302
SD	152.8
Std. Error of Mean	37.06
Coefficient of Variation	0.528
Skewness	0.0643

Log-transformed Statistics

Minimum of Log Data	4.537
Maximum of Log Data	6.336
Mean of log Data	5.508
SD of log Data	0.611

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.863
Shapiro Wilk Critical Value	0.892

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.847
Shapiro Wilk Critical Value	0.892

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	354.3

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	351.1
95% Modified-t UCL (Johnson-1978)	354.4

Assuming Lognormal Distribution

95% H-UCL	413.5
95% Chebyshev (MVUE) UCL	492.6
97.5% Chebyshev (MVUE) UCL	578.7
99% Chebyshev (MVUE) UCL	747.7

Gamma Distribution Test

k star (bias corrected)	2.743
Theta Star	105.6
MLE of Mean	289.6
MLE of Standard Deviation	174.8
nu star	93.27
Approximate Chi Square Value (.05)	72
Adjusted Level of Significance	0.0346
Adjusted Chi Square Value	70.04
Anderson-Darling Test Statistic	1.237
Anderson-Darling 5% Critical Value	0.745
Kolmogorov-Smirnov Test Statistic	0.24
Kolmogorov-Smirnov 5% Critical Value	0.21

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	375.1
95% Adjusted Gamma UCL (Use when n < 40)	385.6

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	350.5
95% Jackknife UCL	354.3
95% Standard Bootstrap UCL	347.4
95% Bootstrap-t UCL	356.3
95% Hall's Bootstrap UCL	349.2
95% Percentile Bootstrap UCL	354.5
95% BCA Bootstrap UCL	351
95% Chebyshev(Mean, Sd) UCL	451.1
97.5% Chebyshev(Mean, Sd) UCL	521
99% Chebyshev(Mean, Sd) UCL	658.3

Potential UCL to Use

Use 95% Chebyshev (Mean, Sd) UCL 451.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General Statistics

Number of Valid Observations 10

Number of Distinct Observations 10

Raw Statistics

Minimum	57.13
Maximum	654.4
Mean	319.8
Geometric Mean	229.9
Median	302.7
SD	231.5
Std. Error of Mean	73.21
Coefficient of Variation	0.724
Skewness	0.126

Log-transformed Statistics

Minimum of Log Data	4.045
Maximum of Log Data	6.484
Mean of log Data	5.438
SD of log Data	0.926

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.845
Shapiro Wilk Critical Value	0.842

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	454

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	443.3
95% Modified-t UCL (Johnson-1978)	454.5

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.862
Shapiro Wilk Critical Value	0.842

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL	878.2
95% Chebyshev (MVUE) UCL	779.2
97.5% Chebyshev (MVUE) UCL	971.8
99% Chebyshev (MVUE) UCL	1350

Gamma Distribution Test

k star (bias corrected)	1.23
Theta Star	260.1
MLE of Mean	319.8
MLE of Standard Deviation	288.4
nu star	24.6
Approximate Chi Square Value (.05)	14.3
Adjusted Level of Significance	0.0267
Adjusted Chi Square Value	12.96
Anderson-Darling Test Statistic	0.733
Anderson-Darling 5% Critical Value	0.738
Kolmogorov-Smirnov Test Statistic	0.256
Kolmogorov-Smirnov 5% Critical Value	0.271

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	550
95% Adjusted Gamma UCL (Use when n < 40)	607.1

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	440.2
95% Jackknife UCL	454
95% Standard Bootstrap UCL	430.4
95% Bootstrap-t UCL	448.7
95% Hall's Bootstrap UCL	418.7
95% Percentile Bootstrap UCL	436.8
95% BCA Bootstrap UCL	438.6
95% Chebyshev(Mean, Sd) UCL	638.9
97.5% Chebyshev(Mean, Sd) UCL	777
99% Chebyshev(Mean, Sd) UCL	1048

Potential UCL to Use

Use 95% Student's-t UCL 454

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

General Statistics

Number of Valid Observations 15 | Number of Distinct Observations 15

Raw Statistics

Minimum	129.3
Maximum	858
Mean	469.9
Geometric Mean	409.1
Median	435
SD	235.9
Std. Error of Mean	60.91
Coefficient of Variation	0.502
Skewness	0.25

Log-transformed Statistics

Minimum of Log Data	4.862
Maximum of Log Data	6.755
Mean of log Data	6.014
SD of log Data	0.574

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.938
Shapiro Wilk Critical Value	0.881

Data appear Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical Value	0.881

Data appear Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	577.2

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	574.3
95% Modified-t UCL (Johnson-1978)	577.9

Assuming Lognormal Distribution

95% H-UCL	670.5
95% Chebyshev (MVUE) UCL	795.6
97.5% Chebyshev (MVUE) UCL	933.7
99% Chebyshev (MVUE) UCL	1205

Gamma Distribution Test

k star (bias corrected)	3.056
Theta Star	153.8
MLE of Mean	469.9
MLE of Standard Deviation	268.8
nu star	91.69
Approximate Chi Square Value (.05)	70.61
Adjusted Level of Significance	0.0324
Adjusted Chi Square Value	68.33
Anderson-Darling Test Statistic	0.339
Anderson-Darling 5% Critical Value	0.741
Kolmogorov-Smirnov Test Statistic	0.18
Kolmogorov-Smirnov 5% Critical Value	0.223

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	610.2
95% Adjusted Gamma UCL (Use when n < 40)	630.5

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	570.1
95% Jackknife UCL	577.2
95% Standard Bootstrap UCL	567.6
95% Bootstrap-t UCL	583.6
95% Hall's Bootstrap UCL	566.8
95% Percentile Bootstrap UCL	570.6
95% BCA Bootstrap UCL	568
95% Chebyshev(Mean, Sd) UCL	735.4
97.5% Chebyshev(Mean, Sd) UCL	850.3
99% Chebyshev(Mean, Sd) UCL	1076

Potential UCL to Use

Use 95% Student's-t UCL 577.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Fish_AR7_Mercury

General Statistics

Number of Valid Observations 10

Number of Distinct Observations 10

Raw Statistics

Minimum	111.6
Maximum	1230
Mean	479.6
Geometric Mean	381.3
Median	506.6
SD	331.2
Std. Error of Mean	104.7
Coefficient of Variation	0.691
Skewness	1.203

Log-transformed Statistics

Minimum of Log Data	4.715
Maximum of Log Data	7.115
Mean of log Data	5.944
SD of log Data	0.745

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.869
Shapiro Wilk Critical Value	0.842

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	671.6

95% UCLs (Adjusted for Skewness)

95% Adjusted-CLT UCL (Chen-1995)	694.5
95% Modified-t UCL (Johnson-1978)	678.3

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical Value	0.842

Data appear Lognormal at 5% Significance Level

Assuming Lognormal Distribution

95% H-UCL	962.5
95% Chebyshev (MVUE) UCL	1004
97.5% Chebyshev (MVUE) UCL	1228
99% Chebyshev (MVUE) UCL	1667

Gamma Distribution Test

k star (bias corrected)	1.7
Theta Star	282.2
MLE of Mean	479.6
MLE of Standard Deviation	367.9
nu star	33.99
Approximate Chi Square Value (.05)	21.66
Adjusted Level of Significance	0.0267
Adjusted Chi Square Value	19.96
Anderson-Darling Test Statistic	0.409
Anderson-Darling 5% Critical Value	0.734
Kolmogorov-Smirnov Test Statistic	0.181
Kolmogorov-Smirnov 5% Critical Value	0.269

Data appear Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	752.8
95% Adjusted Gamma UCL (Use when n < 40)	816.7

Data Distribution

Data appear Normal at 5% Significance Level

Nonparametric Statistics

95% CLT UCL	651.9
95% Jackknife UCL	671.6
95% Standard Bootstrap UCL	642
95% Bootstrap-t UCL	720.1
95% Hall's Bootstrap UCL	799.7
95% Percentile Bootstrap UCL	641.4
95% BCA Bootstrap UCL	685.1
95% Chebyshev(Mean, Sd) UCL	936.1
97.5% Chebyshev(Mean, Sd) UCL	1134
99% Chebyshev(Mean, Sd) UCL	1522

Potential UCL to Use

Use 95% Student's-t UCL 671.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Fish_AR9_Mercury

General Statistics

Number of Valid Observations 9 | Number of Distinct Observations 9

Raw Statistics

Minimum	271
Maximum	635
Mean	515.6
Geometric Mean	493
Median	583
SD	146.6
Std. Error of Mean	48.85
Coefficient of Variation	0.284
Skewness	-0.982

Log-transformed Statistics

Minimum of Log Data	5.602
Maximum of Log Data	6.454
Mean of log Data	6.201
SD of log Data	0.335

Warning: There are only 9 Values in this data
Note: It should be noted that even though bootstrap methods may be performed on this data set, the resulting calculations may not be reliable enough to draw conclusions

The literature suggests to use bootstrap methods on data sets having more than 10-15 observations.

Relevant UCL Statistics

Normal Distribution Test

Shapiro Wilk Test Statistic	0.782
Shapiro Wilk Critical Value	0.829

Data not Normal at 5% Significance Level

Lognormal Distribution Test

Shapiro Wilk Test Statistic	0.761
Shapiro Wilk Critical Value	0.829

Data not Lognormal at 5% Significance Level

Assuming Normal Distribution

95% Student's-t UCL	606.5
95% UCLs (Adjusted for Skewness)	
95% Adjusted-CLT UCL (Chen-1995)	578.9
95% Modified-t UCL (Johnson-1978)	603.8

Assuming Lognormal Distribution

95% H-UCL	665.2
95% Chebyshev (MVUE) UCL	772.3
97.5% Chebyshev (MVUE) UCL	882.3
99% Chebyshev (MVUE) UCL	1098

Gamma Distribution Test

k star (bias corrected)	7.621
Theta Star	67.65
MLE of Mean	515.6
MLE of Standard Deviation	186.8
nu star	137.2
Approximate Chi Square Value (.05)	111.1
Adjusted Level of Significance	0.0231
Adjusted Chi Square Value	106.2
Anderson-Darling Test Statistic	1.042
Anderson-Darling 5% Critical Value	0.722
Kolmogorov-Smirnov Test Statistic	0.346
Kolmogorov-Smirnov 5% Critical Value	0.279

Data not Gamma Distributed at 5% Significance Level

Assuming Gamma Distribution

95% Approximate Gamma UCL (Use when n >= 40)	636.5
95% Adjusted Gamma UCL (Use when n < 40)	666.2

Data Distribution

Data do not follow a Discernable Distribution (0.05)

Nonparametric Statistics

95% CLT UCL	596
95% Jackknife UCL	606.5
95% Standard Bootstrap UCL	592.3
95% Bootstrap-t UCL	587.7
95% Hall's Bootstrap UCL	574.8
95% Percentile Bootstrap UCL	588.6
95% BCA Bootstrap UCL	579.3
95% Chebyshev(Mean, Sd) UCL	728.5
97.5% Chebyshev(Mean, Sd) UCL	820.7
99% Chebyshev(Mean, Sd) UCL	1002

Potential UCL to Use

Use 95% Student's-t UCL	606.5
or 95% Modified-t UCL	603.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). For additional insight, the user may want to consult a statistician.

Note: For highly negative-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

APPENDIX I

APPENDIX I

USGS REPORT –

CHARACTERIZATION OF MERCURY CONTAMINATION

IN THE ANDROSCOGGIN RIVER

Prepared in cooperation with the U.S. Environmental Protection Agency

Characterization of Mercury Contamination in the Androscoggin River, Coos County, New Hampshire

Open-File Report 2013–1076

U.S. Department of the Interior
U.S. Geological Survey

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Characterization of Mercury Contamination in the Androscoggin River, Coos County, New Hampshire

By Ann T. Chalmers, Mark C. Marvin-DiPasquale, James R. Degnan,
James F. Coles, Jennifer L. Agee, and Darryl Luce

Prepared in cooperation with the U.S. Environmental Protection Agency

Open-File Report 2013–1076

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
SALLY JEWELL, Secretary

U.S. Geological Survey
Suzette M. Kimball, Acting Director

U.S. Geological Survey, Reston, Virginia: 2013

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Contents

Abstract 1
Introduction 2
Site History and Previous Work 2
Purpose and Scope 2
Study Approach and Methods 3
Field Methods 4
Surface-Water Sampling 4
Sediment Pore-Water Sampling 6
Streambed-Sediment Sampling 6
Toxicity Tests 6
Epifaunal Invertebrate Assemblages 7
Infaunal Invertebrate Tissue 7
White Sucker, Smallmouth Bass, and Crayfish 7
Bats and Birds 7
Laboratory Methods 7
Total Mercury 8
Methylmercury 8
Reactive Inorganic Mercury 8
Methylmercury Production Potential and Microbial Divalent-Mercury-Methylation Rate Constant 8
Mercury Sequential Extraction 9
Iron Speciation 9
Total Reduced Sulfur 9
Grain Size 10
Dry Weight, Bulk Density, Porosity, and Organic Content 10
Total and Organic Carbon, Total Nitrogen, and Carbon and Nitrogen Isotopes 10
Pore-Water Dissolved Organic Carbon 10
Pore-Water Sulfate and Chloride 10
Pore-Water Ferrous Iron 10
Data Analysis 10
Results and Discussion 11
Mercury Speciation and Distribution 11
Surface Water 11
Sediment and Pore Water 11
Biota 15
Mercury Bioavailability 15
Controls on Mercury Distribution 19
Controls on Divalent Mercury Availability for Methylation 23
Controls on Partitioning between Bed Sediment and Pore Water 23
River-Reach Integrated Mercury Species Inventories and Methylmercury Production Potential Rates 25
Ecological Impact 30
Comparison to Other Studies 33

Summary and Conclusions 35
Selected References 35
Appendix 1. Quality Assurance and Control at the U.S. Geological Survey Laboratory in Menlo Park, California 53
Appendix 2. Surface-Water, Pore-Water, Sediment, Invertebrate, and Biota Data 55

Figures

1. Graph showing generalized locations of sediment and pore-water sampling sites on the Androscoggin River downstream from a former chloralkali facility in Berlin, New Hampshire 3
2. Map of study area on the Androscoggin River, Coos County, New Hampshire 5
3. Boxplots showing concentrations of sediment *A,* total mercury (THg), *B,* methylmercury (MeHg), and *C,* percentage of THg as MeHg from the Androscoggin River, Coos County, New Hampshire 12
4. Boxplots showing concentrations of pore-water *A,* total mercury (pw.THg), *B,* methylmercury (pw.MeHg), and *C,* percentage of THg as MeHg (pw% MeHg) from the Androscoggin River, Coos County, New Hampshire 13
5. Boxplots showing concentrations of *A,* dissolved organic carbon (pw.DOC) and *B,* sediment loss on ignition (LOI) from the Androscoggin River, Coos County, New Hampshire 14
6. Boxplots showing mercury partitioning coefficients from the Androscoggin River, Coos County, New Hampshire 16
7. Bar graph showing sequential extractions of surficial sediment in the Androscoggin River, Coos County, New Hampshire 17
8. Boxplots showing concentrations of total mercury (THg) in *A,* smallmouth bass and *B,* white sucker from the Androscoggin River, Coos County, New Hampshire 18
9. Boxplot showing concentrations of total mercury (THg) in smallmouth bass from the Androscoggin River 19
10. Boxplots showing sediment mercury methylation potential from the Androscoggin River, Coos County, New Hampshire 20
11. Boxplots showing concentrations of *A,* pore-water sulfate ($pw.SO_4^{-2}$) and *B,* sediment total reduced sulfur (TRS) from the Androscoggin River, Coos County, New Hampshire 21
12. Boxplots showing *A,* sediment grain size less than 63 micrometers (µm) and *B,* oxidation reduction potential (redox, E_h) from the Androscoggin River, Coos County, New Hampshire 22
13. Graphs showing predicted against measured sediment total mercury (THg) for *A,* near, *B,* far, and *C,* all stream reaches of the Androscoggin River, Coos County, New Hampshire 24
14. Graph showing predicted against measured methylmercury (MeHg) from the Androscoggin River, Coos County, New Hampshire 25
15. Graphs showing predicted against measured sediment inorganic reactive mercury ($Hg(II)_R$) for *A,* near, *B,* far, and *C,* all stream reaches of the Androscoggin River, Coos County, New Hampshire 26
16. Graphs showing predicted against measured mercury methylation potential (MPP) *A,* constant (k_{meth}) and *B,* rate for the Androscoggin River, Coos County, New Hampshire 27

17. Graphs showing predicted against measured partitioning coefficient for *A,* total mercury (k_d[THg]) and *B,* methylmercury (k_d[MeHg]) for the Androscoggin River, Coos County, New Hampshire 28
18. Graph showing sediment total mercury partitioning coefficient as a function of dissolved organic carbon and grain size 29
19. Graph showing sediment methylmercury partitioning coefficient as a function of dissolved organic carbon and grain size 29
20. Bar graph showing New Hampshire Department of Environmental Services (NHDES) benthic index of biotic integrity (B–IBI) for the Androscoggin River, Coos County, New Hampshire 32

Tables

1. Study sampling area description and dates for the Androscoggin River from Pontook Reservoir to Shelburne Dam, New Hampshire 4
2. Summary of methods used for analysis of sediment, pore water, surface water, and biota from the Androscoggin River, Coos County, New Hampshire 42
3. Sequential extraction scheme applied to surface sediment samples from the Androscoggin River, Coos County, New Hampshire 9
4. Wilcoxon rank sum test comparing results upstream and downstream from a former chloralkali site on the Androscoggin River in Berlin, New Hampshire 45
5. Kruskal-Wallis rank sum test results comparing data grouped by sample distance from a former chloralkali site on the Androscoggin River in Berlin, New Hampshire 47
6. Sequential extraction results for surface sediment, Androscoggin River, Coos County, New Hampshire 49
7. Stream reach parameters used to calculate reach specific depth integrated mercury species inventories and rates 30
8. Depth-integrated mercury species inventories and rates, by river reach 31
9. Guidelines for total mercury in surface water, sediment, and fish and methylmercury in surface water 34
10. Comparison of mercury concentrations in the Androscoggin River, Coos County, New Hampshire, with National Water-Quality Assessment Program and Northeastern Ecosystem Research Cooperative datasets 34

Conversion Factors and Datum

SI to Inch/Pound

Multiply	By	To obtain
	Length	
centimeter (cm)	0.3937	inch (in.)
meter (m)	3.281	foot (ft)
kilometer (km)	0.6214	mile (mi)
meter (m)	1.094	yard (yd)
	Area	
square meter (m^2)	0.0002471	acre
square meter (m^2)	10.76	square foot (ft^2)
square centimeter (cm^2)	0.1550	square inch (ft^2)
square kilometer (km^2)	0.3861	square mile (mi^2)
	Mass	
kilogram (kg)	2.205	pound avoirdupois (lb)
	Hydraulic gradient	
meter per kilometer (m/km)	5.27983	foot per mile (ft/mi)

In this report, the words right and left refer to directions that would be reported by an observer facing downstream.

Vertical coordinate information is referenced to the North American Vertical Datum of 1988 (NAVD 88).

Horizontal coordinate information is referenced to the North American Datum of 1983 (NAD 83).

Altitude, as used in this report, refers to distance above the vertical datum.

Concentrations of chemical constituents in water are either in milligrams per liter (mg/L), micrograms per liter (µg/L), nanograms per liter (ng/L), moles per liter (M), or millimoles per liter (mmol/L).

Characterization of Mercury Contamination in the Androscoggin River, Coos County, New Hampshire

By Ann T. Chalmers[1], Mark C. Marvin-DiPasquale[1], James R. Degnan[1], James F. Coles[1], Jennifer L. Agee[1], and Darryl Luce[2]

Abstract

The former chloralkali facility in Berlin, New Hampshire, was designated a Superfund site in 2005. Historic paper mill activities resulted in the contamination of groundwater, surface water, and sediments with many organic compounds and mercury (Hg). Hg continues to seep into the Androscoggin River in elemental form through bedrock fractures. The objective of this study was to spatially characterize (1) the extent of Hg contamination in water, sediment, and biota; (2) Hg speciation and methylmercury (MeHg) production potential rates in sediment; (3) the availability of inorganic divalent Hg (Hg(II)) for Hg(II)-methylation (MeHg production); and (4) ancillary sediment geochemistry necessary to better understand Hg speciation and MeHg production potential rates in this system.

Concentrations of total mercury (THg) and MeHg in sediment, pore water, and biota in the Androscoggin River were elevated downstream from the former chloralkali facility compared with those upstream from reference sites. Sequential extraction of surface sediment showed a distinct difference in Hg speciation upstream compared with downstream from the contamination site. An upstream site was dominated by potassium hydroxide-extractable forms (for example, organic-Hg or particle-bound Hg(II)), whereas sites downstream from the point source were dominated by more chemically recalcitrant forms (largely concentrated nitric acid-extractable), indicative of elemental mercury or mercurous chloride. At all sites, only a minor fraction (less than 0.1 percent) of THg existed in chemically labile forms (for example, water extractable or weak acid extractable). All metrics indicated that a greater percentage of mercury at an upstream site was available for Hg(II)-methylation compared with sites downstream from the point source, but the absolute concentration of bioavailable Hg(II) was greater downstream from the point source. In addition, the concentration of tin-reducible inorganic reactive mercury, a surrogate measure of bioavailable Hg(II) generally increased with distance downstream from the point source. Whereas concentrations of mercury species on a sediment-dry-weight basis generally reflected the relative location of the sample to the point source, river-reach integrated mercury-species inventories and MeHg production potential (MPP) rates reflected the amount of fine-grained sediment in a given reach.

THg concentrations in biota were significantly higher downstream from the point source compared with upstream reference sites for smallmouth bass, white sucker, crayfish, oligochaetes, bat fur, nestling tree swallow blood and feathers, adult tree swallow blood, and tree swallow eggs. As with tin-reducible inorganic reactive mercury, THg in smallmouth bass also increased with distance downstream from the point source. Toxicity tests and invertebrate community assessments suggested that invertebrates were not impaired at the current (2009 and 2010) levels of mercury contamination downstream from the point source. Concentrations of THg and MeHg in most water and sediment samples from the Androscoggin River were below U.S. Environmental Protection Agency (USEPA), the Canadian Council of Ministers of the Environment, and probable effects level guidelines. Surface-water and sediment samples from the Androscoggin River had similar THg concentrations but lower MeHg concentrations compared with other rivers in the region. Concentrations of THg in fish tissue were all above regional and U.S. Environmental Protection Agency guidelines. Moreover, median THg concentrations in smallmouth bass from the Androscoggin River were significantly higher than those reported in regional surveys of river and streams nationwide and in the Northeastern United States and Canada. The higher concentrations of mercury in smallmouth bass suggest conditions may be more favorable for Hg(II)-methylation and bioaccumulation in the Androscoggin River compared with many other rivers in the United States and Canada.

[1]U.S. Geological Survey.

[2]U.S. Environmental Protection Agency.

Introduction

During operation of the chloralkali facility in Berlin, New Hampshire, elemental mercury (Hg^0) was spilled contaminating the overburden and underlying fractured rock on the east (left) bank of the Androscoggin River. Hg^0 is relatively nontoxic; the primary pathway of Hg^0 toxicity in the environment begins with the oxidation to inorganic divalent mercury (Hg(II)) in the presence of chloride, thiol compounds, and oxygen. In low salinity waters such as those of the Androscoggin River, Hg^0 oxidation is quite slow, and formation of oxidation products on the surface of the liquid further reduces oxidation rates (Amyot and others, 2005). The conversion of Hg(II) to more bioavailable methylmercury (MeHg) is a process that is largely carried out by anaerobic bacteria near the sediment-water interface (Gilmour and others, 1992). Rates of net benthic MeHg production in the sediments are controlled by the activity of the Hg(II)-methylating microbial community and by Hg(II) availability to microbes (Marvin-DiPasquale and others, 2009a). Environmental factors that affect the activity of communities of Hg(II)-methylating bacteria include temperature, pH, and presence of suitable electron acceptors and donors. Availability of Hg(II) to microbes is controlled by total mercury (THg) concentration, dissolved organic carbon (DOC), sediment grain size, and calcium, iron, and sulfur solid-phase mineral chemistry. Understanding the Hg(II) processes and the environments that are conducive to methylation will provide key information for remedial actions and decisions.

Site History and Previous Work

In September 2005, Congress added the former chloralkali facility in Berlin, N.H., to the national priorities list, commonly known as the Superfund list (U.S. Environmental Protection Agency, 2005). Investigations onsite have revealed elevated mercury, lead, arsenic, polycyclic aromatic hydrocarbons, organochlorine chemicals (dioxin and furans, polychlorinated biphenyls), and other toxic metals in groundwater and soils (Darryl Luce, U.S. Environmental Protection Agency (USEPA), written commun., 2008). The mercury contamination originates from two longstanding point sources across from one another on the Androscoggin River in Berlin, N.H. A chloralkali facility that produced chlorine gas for the papermaking industry using electrolytic diaphragm cells operated from the late 1800s through the 1960s (Margaret Bastien, New Hampshire Department of Environmental Services (NHDES), written commun., 2004). How mercury was used at the facility is uncertain. Mercury may have been used in the cells to separate chlorine from a brine solution. The second source of mercury was from a sawmill that used mercuric chloride wood preserving process known as kyanization. Kyanization was used by the sawmill from 1888 through 1930 (Weston Solutions, 2005). The mercuric chloride may have been prepared at the chloralkali facility and then transported across the river for use at the kyanization plant. Regardless of use, the main release of mercury to the environment was at the chloralkali facility on the left bank of the Androscoggin River, just downstream from Sawmill Dam (fig. 1). The total amount of mercury released from the facility that seeped into the overburden and into the underlying fractured bedrock is unknown (Degnan and others, 2005). Efforts to contain the mercury at the chloralkali site and eliminate seepage to the river include demolition of the cell houses, installation of a bentonite-soil slurry barrier wall on the site perimeter, and pressure grouting the bedrock along the riverbank (Margaret Bastien, NHDES, written commun., 2003). Despite earlier actions to address the source of contamination, mercury continues to seep into the Androscoggin River through fractures in the bedrock at the edge of the site (Darryl Luce, USEPA, written commun., 2008). Mercury has also been found in the sediment of the adjacent Androscoggin River from sampling conducted by the former site owners and the NHDES (Darryl Luce, USEPA, written commun., 2008). THg concentrations (average plus or minus standard deviation) in sediments collected at dam impoundments by the NHDES (Lori Siegel, NHDES, written commun., 2004) were highly variable, from 75 ±177 nanograms per gram (ng/g) at Sawmill Dam (upstream from the facility) to 361 ±483 ng/g at Riverside Dam and 354 ±277 ng/g at Smith Hydro Dam (both downstream from the facility). MeHg concentrations in sediments collected by the NHDES were lowest at Sawmill Dam (0.071 ±0.082 ng/g) and higher at Smith Hydro Dam (1.00 ±0.79 ng/g) and Riverside Dam (1.28 ±2.16 ng/g). Subsequently, further investigation into the extent of mercury contamination and transformation processes within the Androscoggin River was deemed warranted by the USEPA to determine the potential impacts on the environment and to provide a more comprehensive understanding of mercury dynamics in this system to guide potential remediation activities. To that end, the USEPA funded a study conducted by the U.S. Geological Survey (USGS) from 2009 through 2012 to provide more detailed information regarding the extent of mercury contamination and speciation within the Androscoggin River. The major objectives of this study were to characterize the extent of mercury contamination in sediment, water, and biota of the Androscoggin River and to assess mercury speciation and the potential availability of in-situ mercury for Hg(II)-methylation.

Purpose and Scope

This report (1) compares surface-water, pore-water, sediment, and biota THg and MeHg concentrations upstream and downstream from a former chloralkali facility; (2) evaluates the potential for Hg(II)-methylation and mercury bioaccumulation; (3) explains differences in MeHg production rates and bioavailable Hg(II) patterns among sites using nonparametric rank sum tests and best-fit linear model equations; (4) assesses the health of the aquatic ecosystem surrounding the former chloralkali facility using a variety of surface-water, sediment,

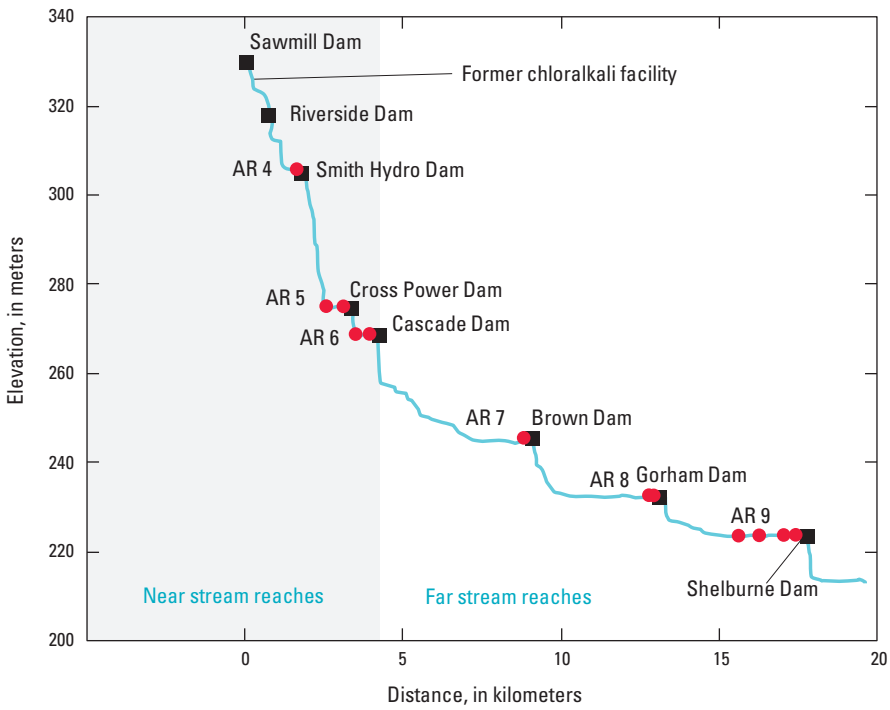


Figure 1. Generalized locations of sediment and pore-water sampling sites on the Androscoggin River downstream from a former chloralkali facility in Berlin, New Hampshire. Stream reaches are signified by AR followed by number. The reference reach (AR2) is 16 kilometers upstream from the former chloralkali facility and is not shown. Sampling locations are indicated by red circles, dams are indicated by black squares. Elevation and distance data from Google Earth, February 17, 2012.

and biological indices and guidelines; and (5) compares THg and MeHg concentrations in water, sediment, and biota from the study site to concentrations reported in other river systems nationally and regionally in the Northeastern United States and Canada.

In addition, this report also summarizes concurrent biomonitoring data collected by BioDiversity Research Institute (Gorham, Maine) and Avatar Environmental (West Chester, Pennsylvania) contracted by the USEPA for the purposes of providing additional context regarding the human health and ecological impacts of mercury within the study area.

Study Approach and Methods

The study area encompasses a 40-kilometer (km) reach of the Androscoggin River from Pontook Reservoir to just upstream from Shelburne Dam, including the former chloralkali facility site in Berlin (table 1, fig. 2). Individual river reaches (coded as AR followed by the number of the reach#) were defined by the presence of dam structures at the upper and lower boundary of each reach. The precise coordinates for all sampling locations are listed in table 2–1. Pontook Reservoir (AR1) and Wheeler Bay (within the upper portion of AR2), both upstream from the facility, were used as reference sites of background (nonpoint-source) conditions. AR1 was used as a reference site for birds and bats, whereas AR2 was a reference site for sediment, pore water, surface water, epifaunal invertebrates, crayfish, and birds. Seven stream reaches, from the facility (within AR3) to just upstream from Shelburne Dam (AR9), were sampled to characterize the mercury contamination downstream from the point source.

THg and MeHg concentrations were analyzed in surface water, pore water, and sediment and THg in macroinvertebrates, crayfish, fish, bats, and birds (tables 1, A2–1). The potential for Hg(II)-methylation and MeHg bioaccumulation was assessed by a number of different metrics. The percentage of THg as MeHg (percent MeHg) in sediment was used as a proxy for Hg(II)-methylation efficiency. Tin-reducible reactive inorganic mercury ($Hg(II)_R$) was used as a surrogate for the pool of inorganic Hg(II) readily available to sediment bacteria for Hg(II)-methylation. This methodologically defined assay measures simple Hg(II)-salts, such as mercury sulfate and mercury chloride, Hg(II) bound to low molecular weight organic ligands, and Hg(II) weakly adsorbed to particle surfaces (Marvin-DiPasquale and others, 2006; Marvin-DiPasquale,

Table 1. Study sampling area description and dates for the Androscoggin River from Pontook Reservoir to Shelburne Dam, New Hampshire.

[Epifaunal invertebrates were collected in rock baskets]

Reach code	Reach description	Sampling dates	Sample types
AR1	Above Pontook Dam	2010	Bat, bird
AR2	Pontook Dam to Wheeler Bay	2009, 2010, 2011	Sediment, pore-water, surface-water, epifaunal invertebrate, oligochaetes, crayfish, fish, bird
AR3	Sawmill Dam to Riverside Dam	2009, 2010	Surface-water, epifaunal invertebrate, crayfish, fish, bird
AR4	Riverside Dam to Smith Hydro Dam	2009, 2010	Sediment, pore-water, surface-water, epifaunal invertebrate, oligochaetes, crayfish, fish, bird
AR5	Smith Hydro Dam to Cross Power Dam	2010, 2011	Sediment, pore-water, oligochaetes, crayfish, fish
AR6	Cross Power Dam to Cascade Dam	2009, 2010, 2011	Sediment, pore-water, oligochaetes, crayfish, fish
AR7	Cascade Dam to Brown Dam	2010, 2011	Sediment, pore-water, oligochaetes, crayfish, fish
AR8	Brown Dam to Gorham Dam	2009, 2010	Sediment, pore-water, surface-water, epifaunal invertebrate, oligochaetes, crayfish, fish, bird
AR9	Gorham Dam to Shelburne Dam	2009, 2010	Sediment, pore-water, surface-water, epifaunal invertebrate, oligochaetes, crayfish, fish, bat, bird

unpub. data). Microbial MeHg production potential (MPP) rates were measured in sediment using ^{200}Hg(II) stable isotope incubations to measure the microbial rate constant for Hg(II)-methylation (k_{meth}) and calculated based on k_{meth} and the independently measured $Hg(II)_R$ concentration (Marvin-DiPasquale and others, 2008). Another approach used to assess mercury availability was a five-step sequential extraction (Bloom and others, 2003) that chemically characterizes the THg pool from most labile (water-extractable) to most refractory (aqua regia-extractable). Site-specific differences in MPP rates were examined in terms of a suite of environmental factors, such as sediment redox conditions, particle size, sulfur and iron chemistry, and organic content in sediment, all of which can affect both the activity of Hg(II)-methylating bacteria and the availability of Hg(II) to those bacteria.

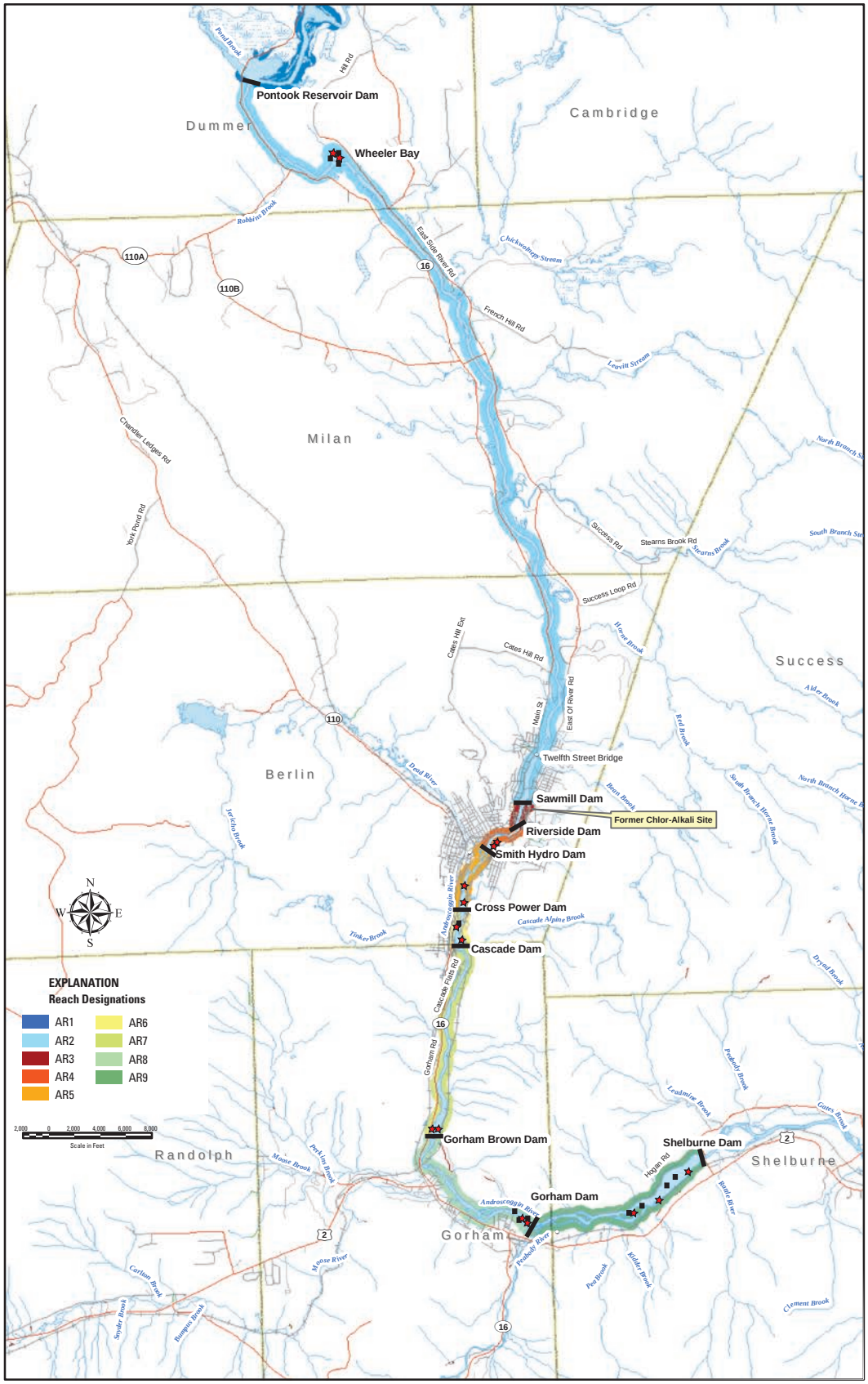
The potential biological impact of the mercury contamination in the study area was assessed by the community composition of epifaunal macroinvertebrate assemblages and toxicity testing of surface waters, pore waters, and bulk sediment. Surface-water, sediment, and biological indices and guidelines were also used to evaluate the potential ecological impact of the mercury contamination within the study area.

Field Methods

Field sampling was performed during 3 years (table 1). Samples were collected from a wide range of media during August and September 2009, including surface water, sediment pore water, whole sediment, fish, crayfish, epifaunal invertebrates, and infaunal invertebrates. Surface-water, sediment pore-water, and whole-sediment samples were collected by the USGS, fish and crayfish were collected by Avatar Environmental, and epifaunal invertebrates and infaunal invertebrates were collected by USGS and USEPA Region 1 Environmental Services Assistance Team (ESAT). During August 2010, USGS field sampling focused on mercury speciation and Hg(II)-methylation in sediment and on ancillary sediment parameters associated with carbon, iron, and sulfur. Additional biological sampling was conducted during 2010 and 2011 by BioDiversity Research Institute, ESAT, and the USEPA and included fish, infaunal invertebrates, bats, and marsh birds.

Surface-Water Sampling

Surface-water samples were collected during low streamflow conditions (average daily flow of 1,620 cubic feet per second) in September 2009 using multiple sampling points, based on standard USGS protocols (U.S. Geological Survey, 2005), and were processed using trace-metal clean techniques (Olson and DeWild, 1999). At wadeable sections of the river, samples were collected with a hand-held teflon depth integrating sampler (DH–81). At nonwadeable sections, samples were collected using an isokinetic sampler (D–95; equipped with a teflon nozzle and a teflon bottle) that was lowered from bridges using a reel and cable. Specific conductance, pH, dissolved oxygen, and water temperature were determined during the collection of surface-water samples using a multiprobe sonde (YSI 600XL). Samples were filtered using 0.45-micrometer (µm) high-capacity capsule filters. Both dissolved (filter passing) and total (nonfiltered) surface-water samples were collected during 2009; THg and MeHg



Base map prepared by AVATAR Environmental, LLC.

Figure 2. Map of study area on the Androscoggin River, Coos County, New Hampshire. Stream reaches are signified by AR followed by number. Pore-water and sediment sampling sites are black squares (2009) and red stars (2010). Base map prepared by AVATAR Environmental LCC.

samples were preserved with hydrochloric acid to a pH of less than 2, total recoverable metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, strontium, vanadium, and zinc) samples were preserved with nitric acid to a pH of less than 2, and organic carbon samples were preserved with sulfuric acid to a pH of less than 2. All samples were kept chilled in coolers with wet ice and then refrigerated upon return to the laboratory.

Sediment Pore-Water Sampling

Pore-water samples were collected in depositional areas of the stream channel, typically along the channel margins. Pore-water samples were obtained in-situ during low streamflow conditions during September 2009 and August 2010 using a push-point sampler as described in Zimmerman and others (2005) and were processed using trace-metal clean techniques (Olson and DeWild, 1999). A push-point sampler is designed to sample pore water with minimal disturbance to the sediment matrix. Specific conductance was used to monitor chemical differences between surface water and pore water during sampling and to verify that surface water was not drawn down into the pore-water sampling zone.

Other field parameters measured with the YSI 600XL multiprobe sonde included pH, dissolved oxygen, oxidation-reduction (redox) potential (ORP), and water temperature. ORP was measured with a platinum band electrode. Pore-water samples were collected at depths between 7 and 15 centimeters (cm) below the interface between the sediment and surface water using a peristaltic pump with teflon tubing. In-line filtration with 0.45-µm high-capacity capsule filters was used during 2009, and 0.4-µm precombusted quartz-fiber filters in teflon filter assemblies were used during 2010. Both dissolved (filter passing) and nonfiltered pore-water samples collected during 2009 were preserved for THg and MeHg (pw.THg and pw.MeHg), total recoverable metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, strontium, vanadium, and zinc), and dissolved organic carbon (pw.DOC), as described above for surface water. All samples collected during 2010 were filtered and preserved immediately upon collection as follows: pw.THg and pw.MeHg with 6 moles per liter (M) hydrochloric acid (1 percent final concentration), ferrous iron (pw.Fe(II)) with 10 percent hydrochloric acid (2 percent final concentration), pw.DOC with phosphoric acid to a pH less than 2, and pore-water sulfate (pw.SO_4) was frozen.

Streambed-Sediment Sampling

Streambed-sediment samples were collected from undisturbed, continuously wetted, depositional zones in the stream channel that coincided with pore-water sampling locations (table 2–1). Samples collected during 2009 were composites of 5 to 10 representative subsamples over a 5- to 10-square meter (m^2) area of relatively homogeneous sediment (Shelton and Capel, 1994). The upper 0- to 10-cm-depth interval of streambed sediment was sampled with a hand-held glass coring device, except at water depth greater than 1 meter (m) where an Eckman dredge was used. Samples collected for THg and MeHg were frozen onsite, whereas all other sediment samples were kept chilled on wet ice.

Streambed-sediment samples were collected during 2010 from one or two sediment cores (0- to 10-cm depth) per site as described in Lutz and others (2008). To better document spatial variability, both on a small scale around each site as well as on a larger scale between stream reaches, two to three primary sites per reach were sampled (for a total of 15 primary sites), plus three additional field replicate sediment samples collected within 10 to 50 m from each primary site (for a total of 45 field replicate sites; table 2–1). For each sampling location (primary and field replicate; total of 60 sampling sites), sediment was composited in a ziplock bag and kept cold and dark on wet ice in a cooler until further processed and subsampled (within 8 hours of sample collection). Sediment sample processing included homogenizing, subsampling, and preserving as appropriate for each analyte. Sediment ORP and pH were measured by standard electrochemical probe techniques (Marvin-DiPasquale and Agee, 2003). Incubations associated with benthic MPP rates were initiated within 8 hours of sample collection, as described below. Subsamples collected for organic content (as percent loss on ignition (percent LOI)), grain size less than 63 µm (percent fines), porosity, dry weight, and bulk density were stored chilled on wet ice. All other subsamples were frozen.

Toxicity Tests

Surface-water and pore-water toxicity tests were conducted by the USEPA Region 1 ESAT of North Chelmsford, Massachusetts. Surface water (10–12 liters (L)) was collected for chronic, 7-day bioassays with larval fathead minnow (*Pimephales promelas*) and the cladoceran (*Ceriodaphnia dubia*) using survival, growth, and reproductive criteria (U.S. Environmental Protection Agency, 2008a, b). At least 1 L of pore water was collected at each site, which was used for acute, 96-hour survival bioassays conducted using the freshwater amphipod (*Hyalella Azteca*) and the larval midge (*Chironomus tentans*), as described by the U.S. Environmental Protection Agency (2001a). Detailed methods of pore-water and surface-water toxicity testing are described by Environmental Services Assistance Team (2009a, 2009b, respectively). Whole-sediment toxicity tests were run by EnviroSystems, Inc., of Hampton, N.H. Sediment samples were collected at locations coincident with pore-water samples and were used for bulk sediment toxicity tests with the *Hyallela azteca* (28-day exposure) and *Chironomus dilutus* (20-day exposure) using survival- and growth-based criteria as described by EnviroSystems, Inc., (2010a, 2010b, respectively). All surface-water, pore-water, and bulk-sediment samples collected for toxicity tests were kept chilled on wet ice or refrigerated until use in the above bioassays.

Epifaunal Invertebrate Assemblages

Epifaunal invertebrate samples were collected following NHDES benthic index of biotic integrity (B–IBI) protocols (New Hampshire Department of Environmental Services, 2004). Rock baskets (16.5 cm × 28 cm) containing 3.8- to 7.6-cm-diameter gravel were placed in riffle habitats upstream from water-chemistry sampling sites at water depths deep enough to maintain continuous flow over the artificial substrate. Four baskets per site were anchored to the streambed by sections of steel reinforcing rod (rebar) that were approximately 1.2 m long and 19 millimeters (mm) in diameter. Invertebrate samples collected from three of the four rock baskets were used to evaluate the aquatic ecosystem health, which is based on the presence of certain taxa and the abundance of organisms at the sampling sites. The organisms collected from the fourth rock basket at each site were combined in a single sample that was analyzed for THg. The rock baskets were deployed August 6–7, 2009, and retrieved 6.5 weeks later (September 21–22, 2009).

Rock baskets were retrieved by placing a 500-mesh D-frame net downstream from the rock basket and gently lifting and sliding the rock basket into the net. Rock baskets were emptied into 500-µm sieve buckets. The empty basket cages were gently scrubbed and rinsed into 5-gallon pails, and the contents were poured into the sieve bucket. Rocks in the sieve buckets were gently brushed and rinsed to remove organisms and detritus and returned to basket cage. Leaves and detritus in the sieve bucket were rinsed, inspected for organisms, and returned to the stream. The contents of the sieve bucket were transferred to jars and preserved with 70-percent ethanol. Samples for tissue chemistry were thoroughly rinsed with site water, placed in glass jars, and frozen for subsequent analysis of THg using a Milestone direct mercury analyzer (DMA) at the USEPA laboratory in Chelmsford, Mass. Invertebrate assemblage samples were processed according to NHDES B–IBI protocols (New Hampshire Department of Environmental Services, 2004) with a 300-organism count and identified to genus and species level by Lotic, Inc., of Unity, Maine.

Infaunal Invertebrate Tissue

Infaunal worms (*Oligochaeta spp.*) were collected from the top 15 cm of sediment in the same locations as the pore-water and sediment samples. A minimum of 5 grams (g) of infaunal worms were washed of external sediment and debris, placed in glass jars, and frozen. Tissue samples were analyzed for THg using a DMA at the U.S. Department of Energy National Renewable Energy Laboratory in North Chelmsford (Nobis Engineering, 2009).

White Sucker, Smallmouth Bass, and Crayfish

Fish samples were collected by Avatar Environmental using electroshocking during August 2009 and by the U.S. Fish and Wildlife Service, the USEPA, and ESAT using rod and reel and gill nets during August 2011 (Nobis Engineering, 2009). Two whole-body composite samples of white sucker (*Catostomus commersoni*) were collected at three stream reaches during 2009 (table 1). Composite white sucker samples consisted of two to five fish. During 2011, individual whole-body samples of white sucker were collected at four stream reaches. Smallmouth bass (*Micropterus dolomieui*) of 25- to 38-cm length were collected in 2009 and greater than 25-cm length during 2011. Smallmouth bass samples were five individual skinless fillets of at least 5 g. All fish samples were rinsed with deionized water, wrapped in plastic wrap, placed in ziplock bags, and frozen. Crayfish were collected by trapping or electroshocking. Two composites of 5 to 10 whole crayfish (more than 100 g wet weight) were collected at each site during August 2009, and 10 individual whole crayfish were collected at each site during August 2011 (Nobis Engineering, 2009). Crayfish were rinsed with deionized water, placed in a ziploc bag, and immediately chilled on wet ice.

Bats and Birds

Blood and fur from little brown bats (*Myotis lucifugus*) and big brown bats (*Eptesicus fuscus*) were sampled by BioDiversity Research Institute at the AR1 reference site (Pontook Reservoir) and downstream at AR9. Bats were collected using mist nets as described by Buck and Evers (2011). Tree swallows (*Tachycineta bicolor*) were sampled by ESAT at the two reference locations (Pontook Reservoir (AR1) and Wheeler Bay (AR2)) and four downstream stream reaches (AR3, AR4, AR8, and AR9). Blood, eggs, and feathers of adult and nestling tree swallows were collected as described in the Ecological Investigation Quality Assurance Project plan (Nobis Engineering, 2011).

Laboratory Methods

The laboratory methods detailed below were conducted by the USGS Branch of Regional Research, Western Region (USGS BRR–WR) Laboratory in Menlo Park, California, and were associated with the streambed-sediment and pore-water samples collected during 2010 only. These methods reflect the key parameters discussed in detail in this report. These and all other laboratory methods are summarized in table 2 (in back of report).

Total Mercury

THg analysis was conducted on all 60 streambed-sediment samples collected during 2010. Samples were stored frozen until analysis. After thawing, sediment THg was first extracted overnight in concentrated acid (aqua regia; concentrated nitric acid (HNO_3) plus hydrochloric acid (HCl) at a 1:3 ratio), followed by the addition of the oxidant bromine monochloride (BrCl) and heating overnight at 60 degrees Celsius (°C) to ensure all the mercury was in the divalent inorganic form (Hg(II)) in accordance with standard USGS protocol (Olund and others, 2004). THg in the extract was assayed by cold vapor atomic fluorescence spectrometry (CVAFS) using a Tekran 2006 automated total mercury analyzer in accordance with USEPA method 1631 (U.S. Environmental Protection Agency, 2001b, 2002). Further details on the method are described in Marvin-DiPasquale and others (2011). Each batch of analytical samples was accompanied by the analysis of the following minimum number of quality assurance (QA) samples: one certified reference material, one matrix spike, one analytical duplicate, one field duplicate, one method blank, and calibration standards prepared from commercially certified mercuric chloride ($HgCl_2$) solution.

Pore-water samples collected for pw.THg analysis were preserved in the field with a final concentration of 0.5-percent HCl and stored refrigerated in the dark until further processing. Subsequently, the samples were initially oxidized with BrCl and similarly analyzed by CVAFS using a Tekran 2600 automated total mercury analyzer in accordance with USEPA method (U.S. Environmental Protection Agency, 2001b, 2002). Each batch of analytical samples was accompanied by the analysis of the following minimum number of QA samples: one matrix spike, one analytical duplicate, one field duplicate, one method blank, and calibration standards prepared from commercially certified $HgCl_2$ solution. For sediment and pore water, the detection limit for the THg assay is approximately 0.5 nanogram per liter (ng/L) at the level of the autoanalyzer. QA results for sediment and pore-water THg assays are detailed in appendix 1.

Methylmercury

MeHg analysis was conducted on the 15 primary streambed-sediment samples collected during 2010. Samples were stored frozen until analysis. After thawing, sediment MeHg was first extracted with a solution of 25-percent potassium hydroxide (KOH) in methanol at 60 °C for 4 hours (Xianchao and others, 2005). Quantification of MeHg in the extract was then carried out after ethylation of the analyte using a Brooks Rand Labs automated MeHg analyzer (MERX). Further method details are described in Marvin-DiPasquale and others (2011). Each batch of analytical samples was accompanied by the analysis of the following minimum number of QA samples: one certified reference material, one matrix spike, one analytical duplicate, one field duplicate, one method blank, and calibration standards prepared from commercial crystalline methylmercury chloride (MeHgCl) and compared with a separate, commercially available MeHg standard solution.

Pore-water samples collected for pw.MeHg analysis were preserved in the field with a final concentration of 0.5 percent HCl and stored refrigerated in the dark until further processing. Subsequently samples were distilled (U.S. Environmental Protection Agency, 2001b) and then quantified after ethylation of the analyte using a MERX (Marvin-DiPasquale and others, 2011).The detection limit for the MeHg assay is approximately 0.5 picogram (pg; absolute mass as mercury). QA results for sediment and pore-water MeHg assays are detailed in appendix 1.

Reactive Inorganic Mercury

$Hg(II)_R$ analysis was conducted on all 60 streambed-sediment samples collected during 2010. Sediment $Hg(II)_R$ is methodologically defined as the fraction of total Hg(II) that is readily reduced to Hg^0 by an excess of tin chloride ($SnCl_2$) over an exposure time of 15 minutes. Further method details are described in Marvin-DiPasquale and Cox (2007). Sediment subsamples for $Hg(II)_R$ were stored frozen until analysis. Each batch of analytical samples was accompanied by the analysis of the following minimum number of QA samples: one analytical duplicate, one field duplicate, four bubbler blanks, and calibration standards prepared from a commercial $HgCl_2$ stock solution. No commercially available certified reference material exists for $Hg(II)_R$ in sediment. The detection limit for the $Hg(II)_R$ assay is approximately 40 pg (absolute mass). QA results are detailed in appendix 1.

Methylmercury Production Potential and Microbial Divalent-Mercury-Methylation Rate Constant

MPP rates were assessed for the 15 primary streambed-sediment samples collected during 2010. Bulk sediment MPP rates were quantified using a stable isotope incubation approach (Marvin-DiPasquale and others, 2011). Incubations were initiated 4 to 8 days after initial field collection of the sediment. Three subsamples of sediment (3.0 g wet weight) per site were transferred into 13-cubic centimeter (cm^3) sealed serum vials under anaerobic conditions (nitrogen gas (N_2)-flushed glove bag). An isotopically enriched solution (0.1 milliliter (mL)) of mercury chloride ($^{200}HgCl_2$) was then injected through the sepum of each vial for a final amendment concentration of 38 nanograms (ng) of isotopic mercury ($^{200}Hg(II)$) per gram of sediment (wet weight). The samples were vortexed for 1 minute each immediately following the isotope amendment. One sample per set was immediately flash frozen in a bath of dry ice and ethanol. This sample represented the killed control. The remaining two samples per set were incubated at 20 °C for 5 hours, after which they too

were flash frozen in dry ice and ethanol and stored at -80 °C until further processing, which consisted of extraction with 25-percent KOH in methanol and quantification by isotope-dilution inductively coupled plasma mass spectrometry (ICP–MS; Marvin-DiPasquale and others, 2011).

Pseudo-first-order rate constants for ^{200}Hg(II)-methylation (k_{meth}, units = 1/done per day) were then calculated from the incubated samples as described for the radiotracer ^{203}Hg(II)-methylation assay in Marvin-DiPasquale and others (2008).

Daily MPP rates (in ng/g dry sediment per day) were calculated as:

$$\mathrm{MPP} = \mathrm{Hg(II)}_R - \left(\mathrm{Hg(II)}_R \times \exp\left(-k_{meth} \times t\right)\right), \qquad (1)$$

where

t is the time during which methylation occurred (for the purposes of this rate, 1 day); and

$\mathrm{Hg(II)}_R$ is the independently measured in-situ concentration of inorganic reactive mercury, in ng/g dry weight.

QA consisted of killed controls, analytical duplicates for every site, and the use of internal standards (that is, isotopically enriched MeHg (Me^{199}Hg)).

Mercury Sequential Extraction

THg sequential extraction analysis was conducted on the 15 primary streambed-sediment samples collected during 2010. Sediment sequential extraction followed the five-fraction (F1 thru F5) scheme detailed in Bloom and others (2003) and Marvin-DiPasquale and others (2011) with each successive fraction using a stronger extraction solution (from deionized water to aqua regia) to dissolve mercury in the sediment sample. The specific extraction solutions and typical mercury species extracted with them are detailed in table 3. The starting sample mass extracted was 3 ±0.2 g wet weight with the exact weight (±0.001 g) noted. Each extraction step was conducted overnight for a minimum of 12 hours. The analysis of THg on each extraction fraction was conducted as described above for pore water. For QA, 3 of the 15 samples were run in duplicate, as were reagent blanks for all extractants. The relative percent difference (mean plus or minus standard error) for analytical duplicates associated with the five fractions were as follows (number of samples in each case equals three): F1 = 21 ±16 percent, F2 = 30 ±6 percent, F3 = 7.5 ±3.9 percent, F4 = 22 ±14 percent, and F5 = 9.6 ±5.3 percent. No certified reference material is commercially available for these method-defined sequential extraction fractions.

Iron Speciation

Iron speciation analysis was conducted on the 15 primary streambed-sediment samples collected during 2010. Samples were stored frozen until analysis. Three forms of sediment iron were assayed: acid-extractable ferrous iron ($\mathrm{Fe(II)}_{AE}$), amorphous (poorly crystalline) ferric iron ($\mathrm{Fe(III)}_a$), and crystalline ferric iron ($\mathrm{Fe(III)}_c$). Method details are described in Marvin-DiPasquale and others (2008). The typical detection limit for each iron fraction is approximately 0.01 milligram per milliliter (mg/mL) at the level of the spectrophotometric analysis. Each batch of analytical samples was accompanied by the analysis of the following minimum number of QA samples: one analytical duplicate, one field duplicate, one matrix spike for $\mathrm{Fe(II)}_{AE}$ and $\mathrm{Fe(III)}_c$ fractions only, one method blank, and ferrous sulfate ($FeSO_4$) calibration standards prepared from analytical-grade crystalline reagents. No certified reference material is commercially available for these method-defined iron species. QA results are detailed in appendix 1.

Total Reduced Sulfur

Total reduced sulfur (TRS) analysis was conducted on the 15 primary streambed-sediment samples collected during 2010. Samples were stored frozen until analysis. After

Table 3. Sequential extraction scheme applied to surface sediment samples from the Androscoggin River, Coos County, New Hampshire.

[The mercury sequential extraction sequence (Bloom and others, 2003) with each fraction number (F#) is described by the extraction solution used and the dominant mercury species associated with that fraction. DI, deionized; Hg, mercury; $HgCl_2$, mercuric chloride; $HgSO_4$, mercuric sulfate; M, moles per liter; HCl, hydrochloric acid; HgO, mercuric oxide; KOH, potassium hydroxide; Hg(II), inorganic divalent mercury; MeHg, methylmercury; Hg_2Cl_2, mercurous chloride; HNO_3, nitric acid; Hg^0, elemental mercury; HgS, cinnabar; m-HgS, metacinnabar; HgAu, mercury gold amalgam]

F#	Extraction	Dominant mercury species
F1	DI water	Soluble, $HgCl_2$, $HgSO_4$
F2	pH = 2; 0.1 M acetic acid plus 0.01 M HCl	HgO, $HgSO_4$
F3	1 M KOH	Organic or particle bound Hg(II), MeHg, Hg_2Cl_2
F4	12 M HNO_3	Elemental Hg^0, Hg_2Cl_2
F5	Aqua regia (concentrated HNO_3 and HCl at 1:3 ratio)	HgS, m-HgS, HgAu

thawing, sediment TRS was extracted by a single-step hot acid chromium reduction approach and quantified spectrophotometrically (Marvin-DiPasquale and others, 2008). Each batch of analytical samples was accompanied by the analysis of the following minimum number of QA samples: one analytical duplicate, one field duplicate, one method blank, and zinc sulfide (ZnS) calibration standards. No certified reference material is commercially available for the TRS assay. The detection limit for this assay is approximately 0.2 micromole per milliliter (µmol/mL) at the level of the spectrophotometric analysis. QA results are detailed in appendix 1.

Grain Size

Grain-size analysis was conducted on all 60 streambed-sediment samples collected during 2010. Samples were stored refrigerated until analysis. Sediment percent fines was assayed as the weight percentage of dry sediment less than 63 micrometers (less than 63 µm, the sand/silt split) and was conducted by wet sieving (Matthes and others, 1992). Each batch of analytical samples was accompanied by the analysis of the following minimum number of QA samples: one analytical duplicate and onefield duplicate. No certified reference material is commercially available for the grain size analysis. QA results are detailed in appendix 1.

Dry Weight, Bulk Density, Porosity, and Organic Content

Analysis of bulk density, dry weight, porosity, and organic content (as percent LOI) was conducted on all 60 streambed-sediment samples collected during 2010. Samples were stored refrigerated until analysis. These four sediment parameters were analyzed consecutively from single sediment subsamples, as previously detailed (Marvin-DiPasquale and others, 2008). Each batch of analytical samples was accompanied by the analysis of the following minimum number of QA samples: one analytical duplicate at all sites and one field duplicate. No certified reference material is commercially available for this suite of sediment analyses. QA results are detailed in appendix 1 (table 1–3).

Total and Organic Carbon, Total Nitrogen, and Carbon and Nitrogen Isotopes

Analysis of total carbon (TC), total organic carbon (TOC), and total nitrogen (TN), with associated isotopes ($\delta^{13}C$ and $\delta^{15}N$, respectively), was conducted on all 60 streambed-sediment samples collected during 2010. Samples were stored frozen until analysis. Analysis was conducted as described in Kendall and others (2001) using a Carlo Erba model 1500 elemental analyzer connected to an Elementar Isoprime mass spectrometer before and after acidification (HCl acid fuming overnight to remove inorganic carbon). Each batch of analytical samples was accompanied by the analysis of the following minimum number of QA samples: one analytical duplicate, one field duplicate, and calibration standards prepared from ethylene-diamine-tetra-acetic acid. QA results for TC and TN are detailed in appendix 1.

Pore-Water Dissolved Organic Carbon

Analysis of pw.DOC was conducted on pore water collected from the 15 primary streambed sites sampled during 2010. Samples were stored refrigerated and acidified (to a pH of less than 2) until analysis. Analysis for pw.DOC was conducted using high temperature combustion and infrared (IR) detection on a Shimadzu Scientific Instruments TOC–VCPH total organic carbon analyzer. QA measures included analytical duplicates, field duplicates, calibration standards, method blanks, and reagent blanks. QA results are detailed in appendix 1.

Pore-Water Sulfate and Chloride

Analysis of pw.SO_4 and pore-water chloride (pw.Cl) was conducted on pore water collected from the 15 primary streambed sites sampled during 2010. Samples were stored frozen until analysis and assayed by ion chromatography as described in Marvin-DiPasquale and others (2008). QA measures included analytical duplicates, field duplicates, calibration standards, method blanks, and reagent blanks. QA results are detailed in appendix 1.

Pore-Water Ferrous Iron

Analysis of pw.Fe(II) was conducted on pore water collected from the 15 primary streambed sites sampled during 2010. Samples were stored refrigerated and acidified (to a pH of less than 2) until analysis and assayed by the colorimetric ferrozine assay as described in Marvin-DiPasquale and others (2008). QA measures included analytical duplicates, field duplicates, calibration standards, method blanks, and reagent blanks. QA results are detailed in appendix 1.

Data Analysis

Statistical analysis was performed using the TICBO Sptofire S+, version 8.1 software. Type II error probability (p) was set at less than 0.05 for all statistical tests, unless otherwise noted. We generally report median and interquartile range (IQR) data throughout the Results and Discussion section because the two-sided Kolmogorov-Smirnov goodness-of-fit test indicated that a majority (more than 60 percent) of the parameters measured in this study were not normally distributed. For data below the reporting limit, medians and IQRs were calculated using maximum likelihood estimation (Helsel, 2005) subroutines developed by the USGS for the

S+ statistical platform. The mercury distribution in sediment, pore water, and biota was analyzed by comparing grouped medians from samples collected downstream from the former chloralkali facility to the reference sites using the nonparametric Wilcoxon rank sum (WRS) test. Downstream stream reaches were split into two spatial groupings determined by stream gradient: near-stream reaches (AR3 (fish only), AR4, AR5, and AR6), 0 to 4 km downstream from the point source in an area of steep stream gradients, and far-stream reaches (AR7, AR8, and AR9), 8 to 16 km downstream from the point source where stream gradients were much more gradual (fig. 1). Grouped medians of samples collected from reference, near, and far-stream reaches were compared using the nonparametric Kruskal-Wallis rank sum (KWRS) test. If KWRS indicated a significant difference between groupings, Tukey multiple-comparison test was used to determine which medians differed significantly.

Starting with multiple (four to seven) explanatory variables, best-fit linear model equations were developed using step-wise linear regression to describe the spatial variability in key mercury metrics. Prior to model development, parameters that were not normally distributed were log-base 10 ($\log_{10}$)-transformed and used in the model. Explanatory variables (independent or *x* variables) with type II error p more than 0.1 were removed from the regression equations; all overall model fits required p less than 0.05 as a testing criterion.

Results and Discussion

Samples from various matrices were collected to (1) define areas of mercury contamination, (2) better understand factors controlling MeHg production and bioaccumulation, and (3) assess the ecological impact of the mercury contamination. Tabular results of all physical parameters measured and chemical analysis conducted on surface water, pore water, sediment, invertebrates, fish, bats, and birds are listed in tables A2–2 through 2–22. Sediment and pore-water analyses included in this report are only of depositional areas, not the entire stream channel. The results from the statistical (nonparametric WRS) assessment of sediment, pore water, toxicity tests, and select biota data, comparing the reference reaches (AR1 and AR2) to all stream reaches downstream from the former chloralkali plant, are summarized in table 4 (in back of report).

The results from the statistical (nonparametric KWRS) assessment of sediment, pore water, toxicity tests, and select biota data, comparing the reference reach (AR2) with near downstream stream reaches (AR3, AR4, AR5, and AR6) and with far downstream stream reaches (AR7, AR8, and AR9), are summarized in table 5 (in back of report). Ancillary parameters that showed no significant differences among the spatial groupings were not included in tables 4 or 5 (in back of report); these parameters included sediment TC, TN, carbon to nitrogen ratio (C:N), TOC, percent LOI, TRS, $Fe(II)_{AE}$, $Fe(III)_a$, $Fe(III)_c$, carbon 13 (^{13}C) and nitrogen 15 (^{15}N) isotopes, and pore-water parameters pw.Fe(II), pw.SO_4, and pw.DOC. The lack of significant spatial differences generally reflected the limited range of parameter concentrations in the study area.

Mercury Speciation and Distribution

THg and MeHg concentrations in surface water, sediment, pore water, and biota were compared downstream from the former chloralkali facility relative to reference sites. Sequential extraction of surface sediment was used to assess differences in mercury speciation upstream and downstream from the facility.

Surface Water

The number (n) of observations associated with the 2009 surface-water samples was too small (n=5) for statistical evaluation of the spatial groupings used for sediment. However, visual inspection of the data (table 2–2) showed little difference among the various stream reaches sampled for filtered THg (range from 0.70 to 1.00 ng/L, mean of 0.87 ng/L), nonfiltered THg (range from 0.44 to 2.17 ng/L, mean of 1.13 ng/L), filtered MeHg (all less than 0.1 ng/L), nonfiltered MeHg (all less than 0.1 ng/L), and 1M KOH-extractable Hg(II) (all less than 0.08 ng/L). This observed limited variability between surface-water samples collected around a point source in a high-gradient stream is not surprising because of the short hydrologic residence time.

Sediment and Pore Water

Sediment THg and MeHg concentrations were significantly higher downstream from the point source than at the reference site (table 4, in back of report). The highest median sediment THg and MeHg concentrations were in stream reach AR5, 2.5 km downstream from the point source (figs. 3A and B). No significant difference existed between near- and far-stream reaches, suggesting that sediment THg and MeHg concentrations were not decreasing downstream from the point source as far as Shelburne Dam, and could possibly continue at elevated levels downstream from Shelburne Dam (table 5, in back of report).

Whereas pw.MeHg concentrations were significantly higher downstream from the point source than at the reference site, pw.THg concentrations were not (table 4, in back of report). The highest pw.THg and pw.MeHg concentrations were in stream reach AR4, 2 km downstream from the point source (figs. 4A and B). Samples from AR4 were collected in a depositional area in and around a dense stand of aquatic emergent vegetation. The median pw.DOC concentrations at this location were also three times higher than other stream reaches (fig. 5). The elevated pw.DOC concentrations at AR4 may facilitate the desorption of organic and inorganic mercury

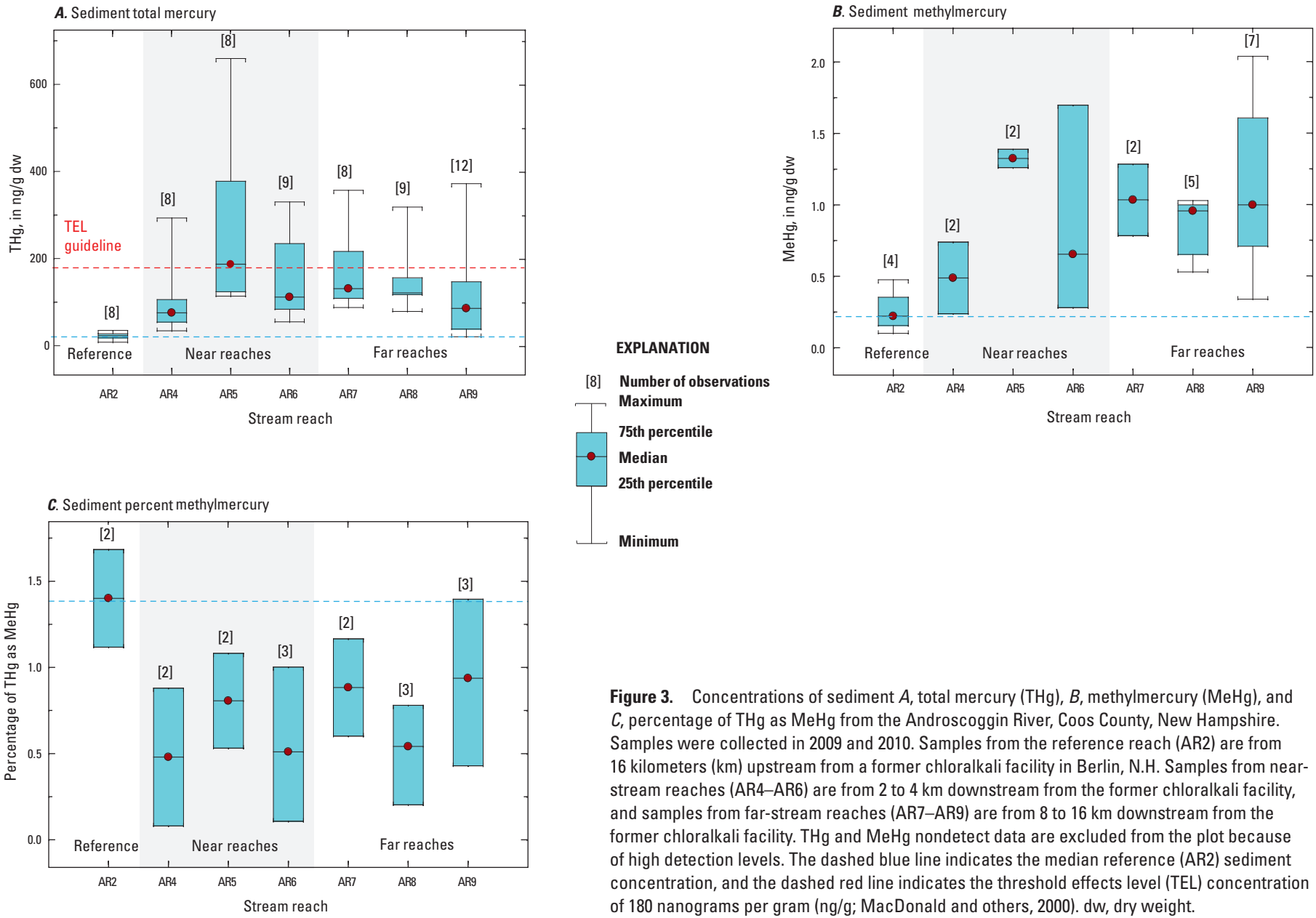


Figure 3. Concentrations of sediment *A*, total mercury (THg), *B*, methylmercury (MeHg), and *C*, percentage of THg as MeHg from the Androscoggin River, Coos County, New Hampshire. Samples were collected in 2009 and 2010. Samples from the reference reach (AR2) are from 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H. Samples from near-stream reaches (AR4–AR6) are from 2 to 4 km downstream from the former chloralkali facility, and samples from far-stream reaches (AR7–AR9) are from 8 to 16 km downstream from the former chloralkali facility. THg and MeHg nondetect data are excluded from the plot because of high detection levels. The dashed blue line indicates the median reference (AR2) sediment concentration, and the dashed red line indicates the threshold effects level (TEL) concentration of 180 nanograms per gram (ng/g; MacDonald and others, 2000). dw, dry weight.

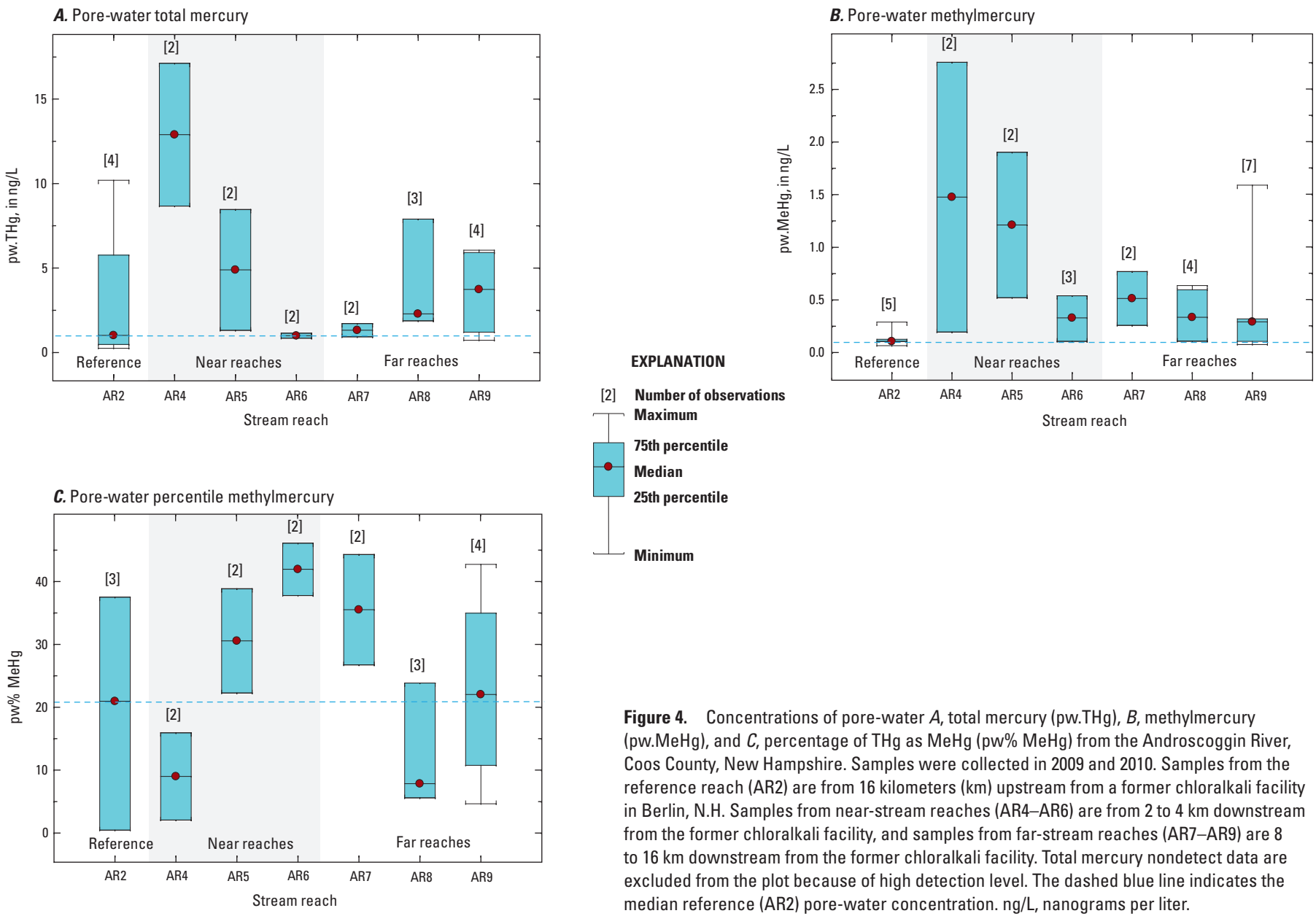


Figure 4. Concentrations of pore-water *A*, total mercury (pw.THg), *B*, methylmercury (pw.MeHg), and *C*, percentage of THg as MeHg (pw% MeHg) from the Androscoggin River, Coos County, New Hampshire. Samples were collected in 2009 and 2010. Samples from the reference reach (AR2) are from 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H. Samples from near-stream reaches (AR4–AR6) are from 2 to 4 km downstream from the former chloralkali facility, and samples from far-stream reaches (AR7–AR9) are 8 to 16 km downstream from the former chloralkali facility. Total mercury nondetect data are excluded from the plot because of high detection level. The dashed blue line indicates the median reference (AR2) pore-water concentration. ng/L, nanograms per liter.

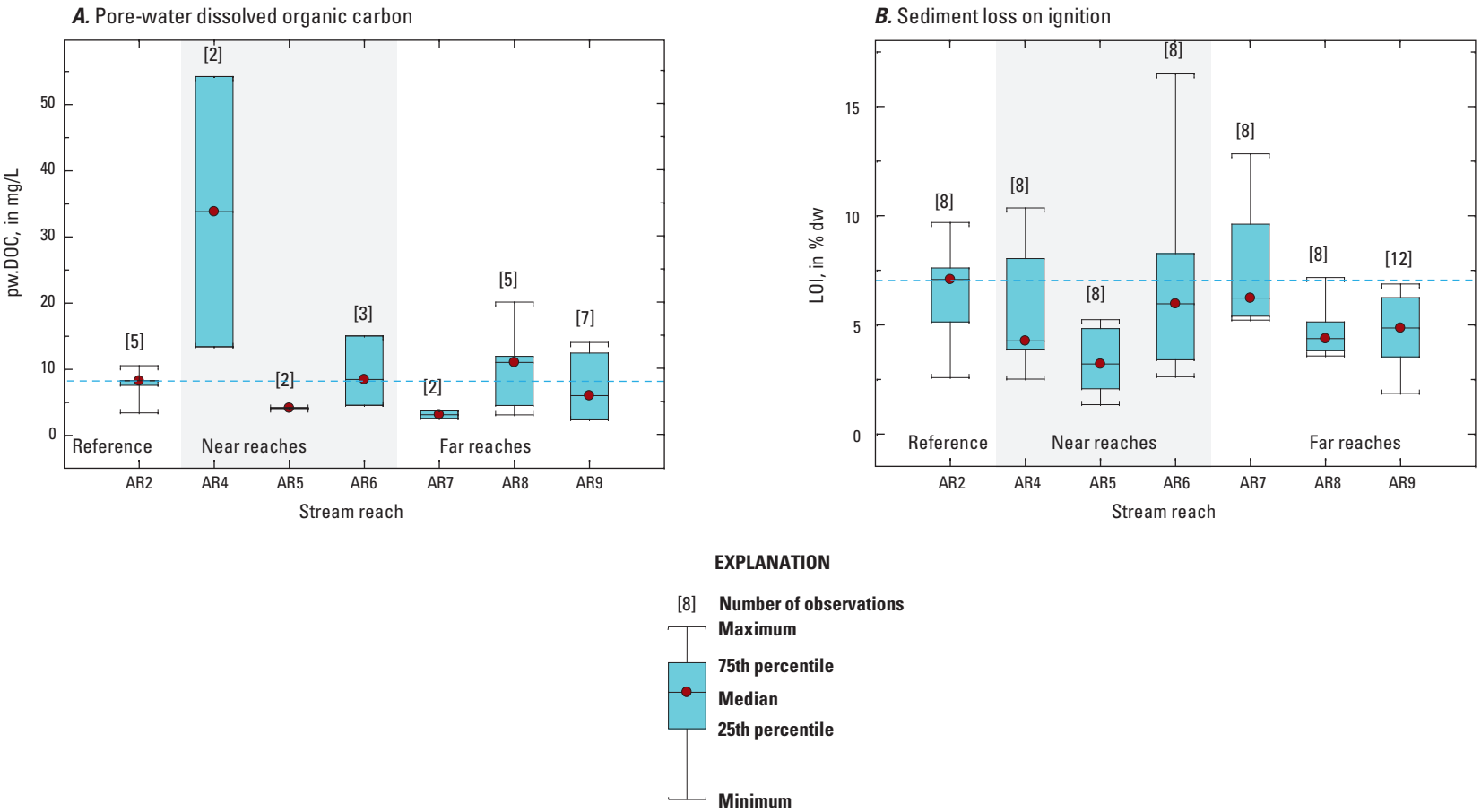


Figure 5. Concentrations of *A*, dissolved organic carbon (pw.DOC) and *B*, sediment loss on ignition (LOI) from the Androscoggin River, Coos County, New Hampshire. Samples were collected in 2009 and 2010 for pw.DOC and in 2010 for LOI. Samples from the reference reach (AR2) are from 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H. Samples from near-stream reaches (AR4–AR6) are from 2 to 4 km downstream from the former chloralkali facility, and samples from far-stream reaches (AR7–AR9) are from 8 to 16 km downstream from the former chloralkali facility. Dashed blue line is median reference (AR2) pore-water (DOC) and sediment (LOI) concentration. dw, dry weight; mg/L, milligrams per liter; %, percent.

species off particles and into the pore water dissolved phase (Hill and others, 2009; Dong and others, 2010). The lower sediment partitioning coefficients (K_d^s) at AR4 confirmed that THg and MeHg partitioned into the dissolved phase to a greater extent in this particular reach compared with all other stream reaches (figs. 6A and B).

The distribution of mercury species as identified in surficial-sediment sequential extractions was also significantly different between the reference site and downstream from the point source (tables 4, 6, in back of report). Concentrations of the three refractory fractions (F3, F4 and F5; table 3) were all significantly higher downstream from the point source, compared with the reference site. The highest concentration of 12M HNO_3-extractable mercury (F4 fraction typified by Hg^0 or mercurous chloride (Hg_2Cl_2)) was found at AR4, the first reach downstream from the point source. At all sites, only a minor percentage (less than 0.1 percent) of THg existed in chemically labile forms (fractions F1 and F2; table 3). The relative composition of mercury species also changed downstream from the point source. The reference site had greater than 86 percent of THg in the KOH fraction, consistent with organic or particle bound Hg(II) (table 3), whereas downstream from the point source, the percentage of the F4 fraction increased dramatically (fig. 7). As much as 86 percent of the THg was found in this F4 fraction in stream reach AR4. No significant change in mercury species distribution was noted between near and far-stream reaches (table 5, in back of report), suggesting the elevated levels of refractory mercury species (potentially Hg^0 or Hg_2Cl_2) continues at least as far as Shelburne Dam.

Biota

THg concentrations in smallmouth bass, white sucker, crayfish, oligochaetes, bat fur, nestling tree swallow blood and feathers, adult tree swallow blood, and tree swallow eggs were all significantly higher downstream from the point source than at the reference sites (table 4, in back of report). Far-stream reaches had significantly higher smallmouth bass and white sucker THg concentrations than near-stream reaches (fig. 8; table 5, in back of report). Median THg concentrations in bat blood and adult swallow feathers were higher downstream from the point source than the reference site, but the difference was not significant. The highest THg concentrations in epifaunal macroinvertebrates were found in the stream reach adjacent to the point source (AR3); however, the sample size (n=5) was too small to conduct a statistical spatial comparison (table 2–16).

Smallmouth bass THg concentrations from this study were also compared with smallmouth bass fillet concentrations collected from the Androscoggin River between Rumford and Lisbon, Maine, (80–180 km downstream from the study area) by the Maine Department of Environmental Protection from 2000 to 2009 as part of the Surface Water Ambient Toxic Monitoring Program (Maine Department of Environmental Protection, 2009). Grouped medians from reference, near, far, and Maine stream reaches were compared using nonparameteric KWRS test. Smallmouth bass THg concentrations from Maine were significantly higher than the New Hampshire reference site in Wheeler Bay (AR2) and similar to far-stream reaches (AR7–AR9) between Gorham and Shelburne, suggesting elevated THg levels in smallmouth bass continue downstream from the study area (fig. 9).

Mercury Bioavailability

The potential for Hg(II)-methylation was evaluated using a number of different metrics including the percentage of THg as MeHg (percent MeHg) in sediment, tin-reducible inorganic mercury ($Hg(II)_R$), stable isotope $^{200}Hg(II)$-methylation rate incubations to derive k_{meth}, MPP rates calculated from independently measured k_{meth} and $Hg(II)_R$ data, and THg sequential extraction. Selective sequential extractions measured how readily mercury was leached from sediment; more readily leached organic bound mercury species are presumably more bioavailable for Hg(II)-methylation than the more refractory (strong acid soluble) compounds. All metrics indicated that mercury was relatively more available for Hg(II)-methylation at the reference site than downstream from the point source. The sediment percent $Hg(II)_R$ was significantly higher at the reference site than downstream from the point source (fig. 10B; table 4, in back of report). The median percent MeHg in sediment was highest at the reference site (fig. 3C); however, the difference was not significant, most likely due to the limited number of samples from the reference site (table 4, in back of report). Sequential extraction results indicated that a significantly higher percentage of THg was associated with the F3 fraction (KOH soluble, indicative of organic or particle bound mercury) at the reference site, whereas sites downstream from the point source had a significantly higher percentage of refractory forms (F4 and F5 fractions; fig. 7; table 4, in back of report).

Although the proportion of mercury readily available for Hg(II)-methylation appeared greater at the reference site compared with stream reaches downstream from the point source, the absolute concentration of Hg(II) readily available for Hg(II)-methylation and the extent of mercury bioaccumulation in biota was greater downstream from the point source. Sediment $Hg(II)_R$ concentrations were significantly higher downstream from the point source than at the reference site, as were THg concentrations in smallmouth bass, white sucker, crayfish, oligochaetes, bat fur, and swallow feathers, blood, and eggs (figs. 10A, 8A and B; table 4, in back of report). Sequential extractions of surficial sediment also indicated significantly higher concentrations of organic or particle bound mercury (F3 fraction) downstream from the point source compared with the reference site (table 4, in back of report). Median values for MPP and k_{meth} were also higher downstream from the point source compared with the reference site, but the difference was not significant most likely due to the small number of observations (n=2) at the

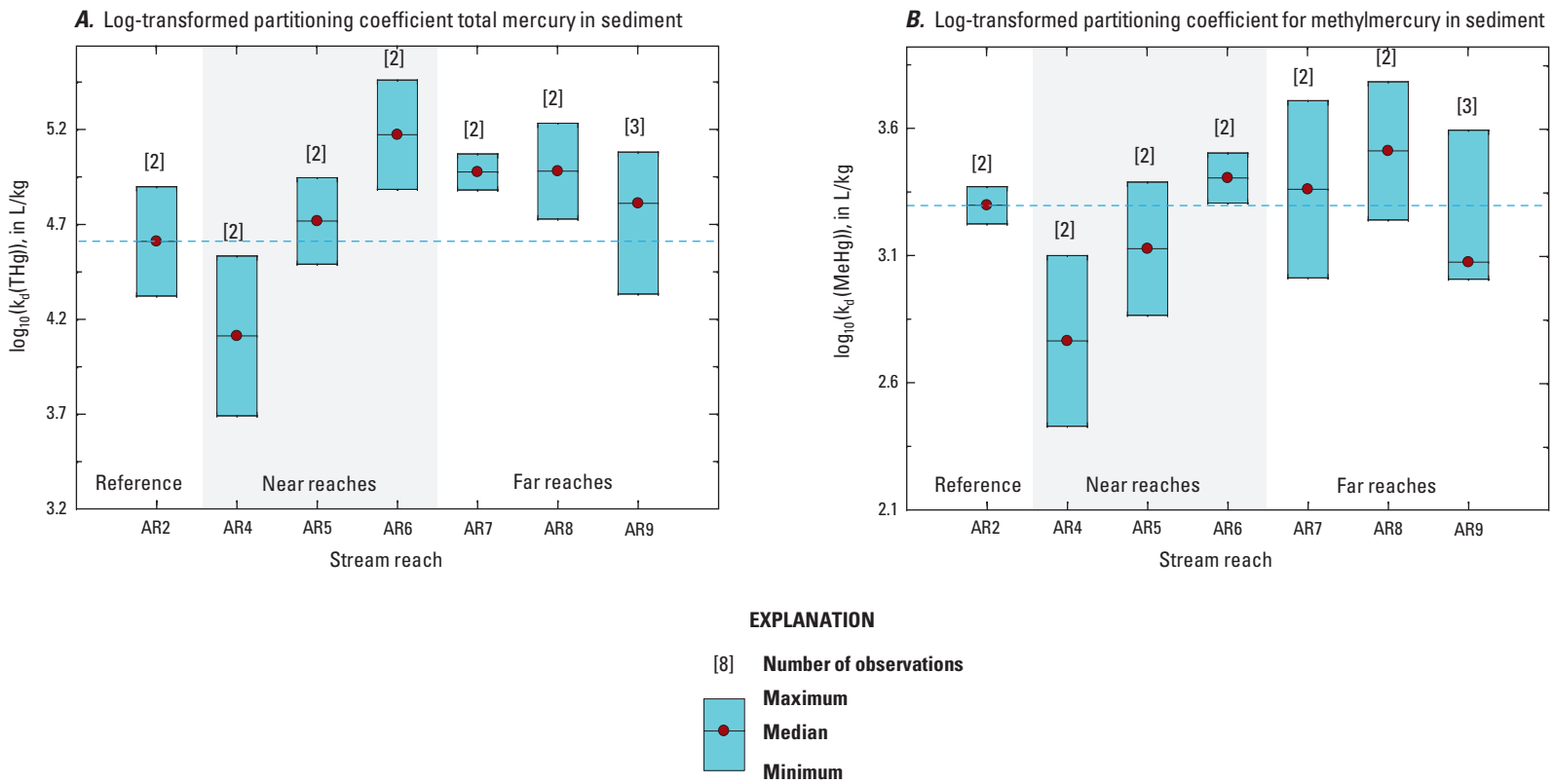


Figure 6. Mercury partitioning coefficients from the Androscoggin River, Coos County, New Hampshire. Samples were collected in 2010. Samples from the reference reach (AR2) are from 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H. Samples from near-stream reaches (AR4–AR6) are from 2 to 4 km downstream from the former chloralkali facility, and samples from far-stream reaches (AR7–AR9) are from 8 to 16 km downstream from the former chloralkali facility. Dashed blue line is median reference (AR2) partitioning coefficient for total mercury (k_d(THg)), and partitioning coefficient for methylmercury (k_d(MeHg)). L/kg, liters per kilogram; $\log_{10}$, base-10 logarithm.

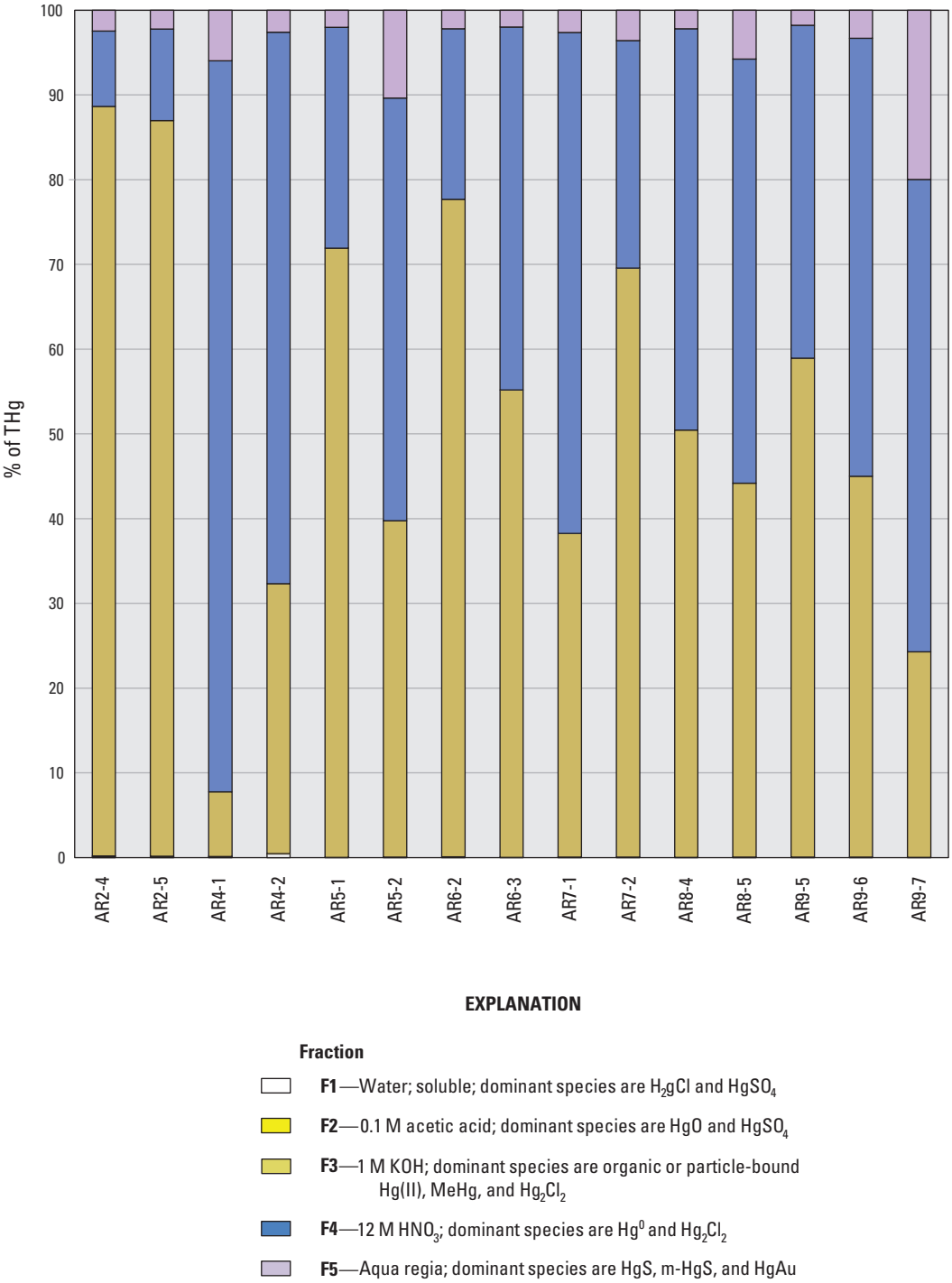


Figure 7. Sequential extractions of surficial sediment in the Androscoggin River, Coos County, New Hampshire. The mercury sequential extraction sequence (Bloom and others, 2003) shows each fraction number (F#) described by both the extraction solution used and the dominant mercury species associated with that fraction. AR, Androscoggin River, shows reach and site number (for example, AR2–4 is reach 2, site 4); Hg^0, elemental mercury; Hg(II), divalent inorganic mercury; HgAu, mercury and gold amalgam; $HgCl_2$, mercuric chloride; Hg_2Cl_2, mercurous chloride; HgO, mercuric oxide; HgS, cinnabar; $HgSO_4$, mercuric sulfate; HNO_3, nitric acid; KOH, potassium hydroxide; M, moles per liter; MeHg, methylmercury; m-HgS, metacinnabar; % of THg, percentage of total mercury as fraction number (F#).

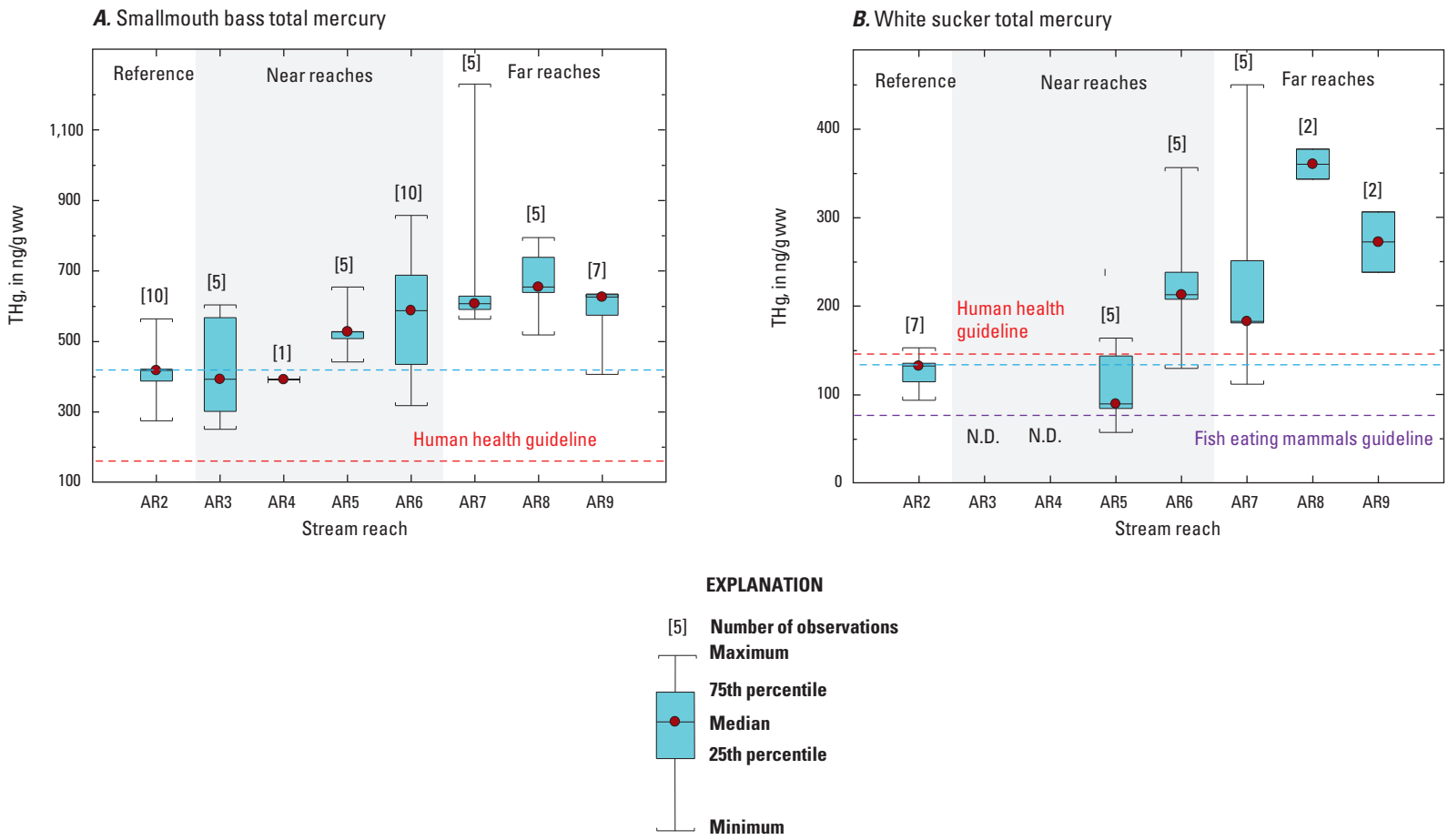


Figure 8. Concentrations of total mercury (THg) in *A*, smallmouth bass and *B*, white sucker from the Androscoggin River, Coos County, New Hampshire. Smallmouth bass samples are skin-off fillets; white sucker samples are whole fish. Samples were collected in 2009 and 2011. Stream reaches are signified by AR followed by number. The dashed blue line is the median reference (AR2) fish tissue concentration. The dashed red line is U.S. Environmental Protection Agency (2001, 2010) human health guideline for concentration of methylmercury (MeHg; less than 95 percent of THg), which in fish is 140 nanograms per gram (ng/g). The purple dashed line is the fish-eating mammal (otter) guideline concentration of 79 ng/g (Sample and others, 1996). N.D., no data were collected from stream reach; ng/g, nanograms per gram; ww, wet weight.

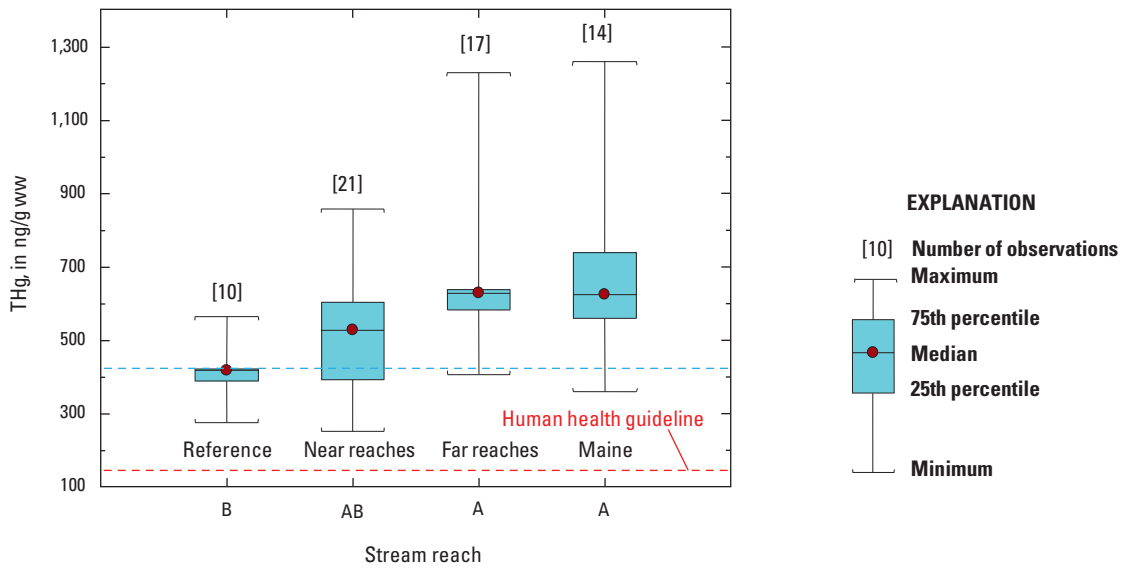


Figure 9. Concentrations of total mercury (THg) in smallmouth bass from the Androscoggin River. The reference reach is 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H., near-stream reaches are 0 to 4 km downstream from the former chloralkali facility, far-stream reaches are 8 to 16 km downstream from the former chloralkali facility in Gorham and Shelburne, N.H., and the Maine sampling reach is 80 to 180 km downstream from the former chloralkali facility (Rumford to Lisbon, Maine). Data from Maine were collected by the Maine Department of Environmental Protection Surface Water Ambient Toxics Monitoring Program from 1990 through 2009. Data for New Hampshire were collected between 2009 and 2011. The dashed blue line is median reference (AR2) fish tissue concentration; red dashed line is the U.S. Environmental Protection Agency (2001, 2009) human health guideline. Letters A, B, and AB indicate statistical significance: Stream reaches labeled with "A" are statistically different than stream reaches labeled with "B", and stream reaches labeled "AB" are not statistically different than stream reaches labeled "A" or "B." ng/g, nanograms per gram; ww, wet weight.

reference site (table 4, in back of report). The highest values of k_{meth} were observed at AR4 (fig. 10C), an observation that was likely driven by the high concentrations of pw.SO_4 and pw.DOC fueling sulfate-reducing Hg(II)-methylating microbial activity and consistent with the high sediment TRS concentrations and low sediment oxidation reduction potential (also known as redox; E_h) also observed at this site (figs. 5, 11, and 12B). The highest calculated MPP rates were at stream reaches AR4 and AR7 (fig. 10D). Interestingly, the elevated MPP rates at AR4 were driven by the high k_{meth} values, whereas the elevated MPP rates at AR7 were driven by high $Hg(II)_R$ concentrations (fig. 10A).

Not only was the absolute concentration of $Hg(II)_R$ greater downstream from the point source than at the reference site, but the concentration generally increased with distance downstream from the point source (fig. 10A). Far sites (8 to 16 km downstream from the point source) had significantly higher $Hg(II)_R$ concentrations in whole sediment than near sites (table 5, in back of report). Similarly, the bioaccumulation of mercury generally increased with distance downstream from the point source. THg concentrations in smallmouth bass and white sucker were significantly higher in far-stream reaches than near-stream reaches (table 5, in back of report). Near-stream reaches are comparatively short and have a high gradient, whereas far-stream reaches are longer and lower in gradient (fig. 1). The longer, lower gradient far-stream reaches appear to have conditions more conducive to methylation than the high-gradient near-stream reaches, which may reflect a difference in the type and size of particles that are likely to be deposited in these two contrasting hydrologic settings and the effect that particles have on the speciation and availability of mercury deposited to the benthos.

Controls on Mercury Distribution

Using step-wise linear regression and beginning with potential explanatory variables of sediment organic carbon (measured as percent LOI), bulk density (BD), percent fines, and percent dry weight, the best single model of sediment

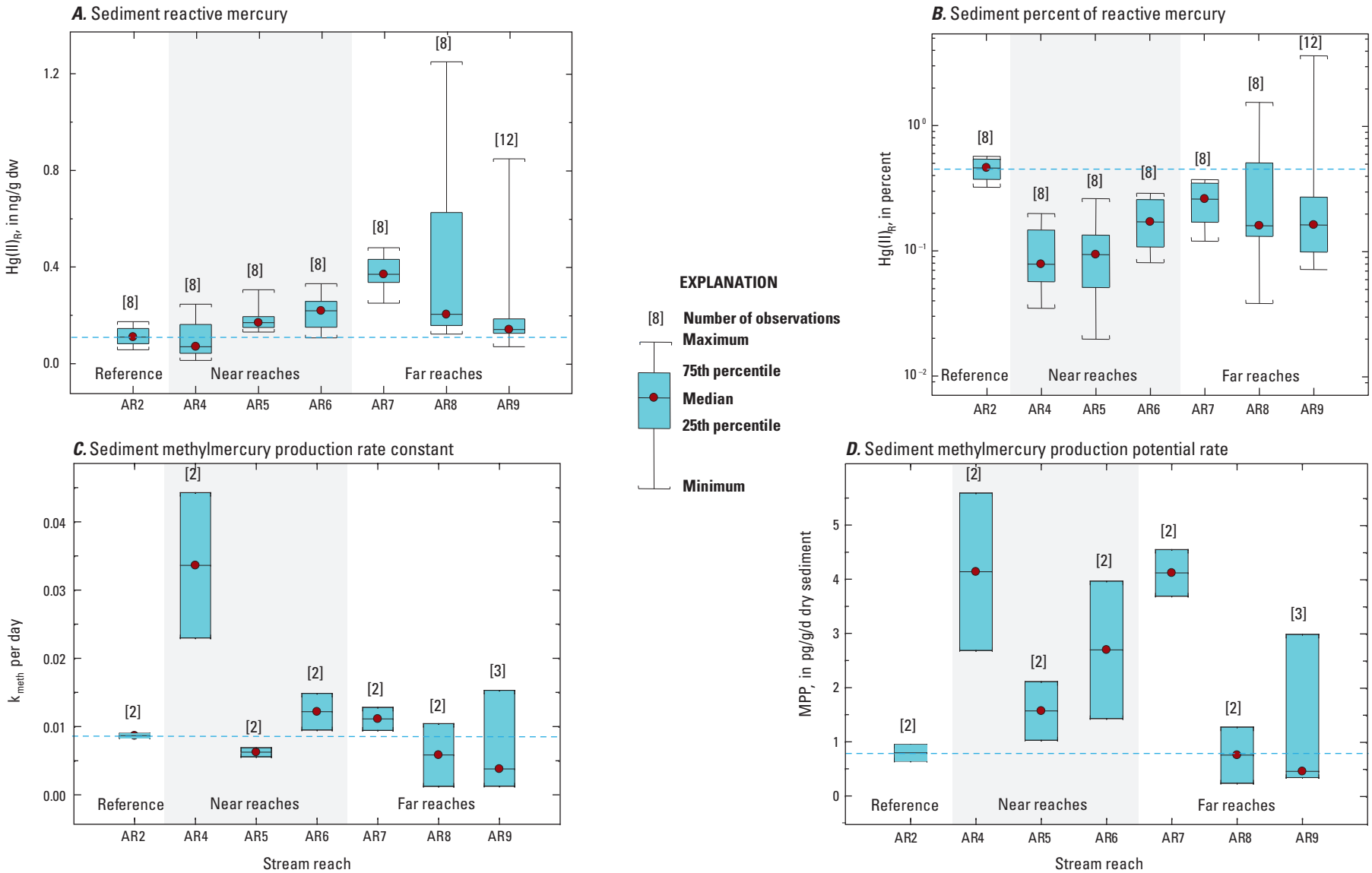


Figure 10. Sediment mercury methylation potential from the Androscoggin River, Coos County, New Hampshire. *A*, Inorganic reactive mercury ($Hg(II)_R$). *B*, Sediment percentage of THg as $Hg(II)_R$. *C*, Methylmercury production rate constant (k_{meth}). *D*, Methylmercury production potential (MPP) rate based on $Hg(II)_R$. Samples were collected in 2010. Samples from the reference reach (AR2) are 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H. Samples from near-stream reaches (AR4–AR6) are 2 to 4 km downstream from the former chloralkali facility, and samples from far-stream reaches (AR7–AR9) are 8 to 16 km downstream from the former chloralkali facility. The dashed blue line is the median reference (AR2) for sediment $Hg(II)_R$ concentration (A), sediment percentage of THg as $Hg(II)_R$ (B), rate constant (C), or potential rate (D). dw, dry weight; ng/g, nanograms per gram; pg/g/d, picograms per gram per day.

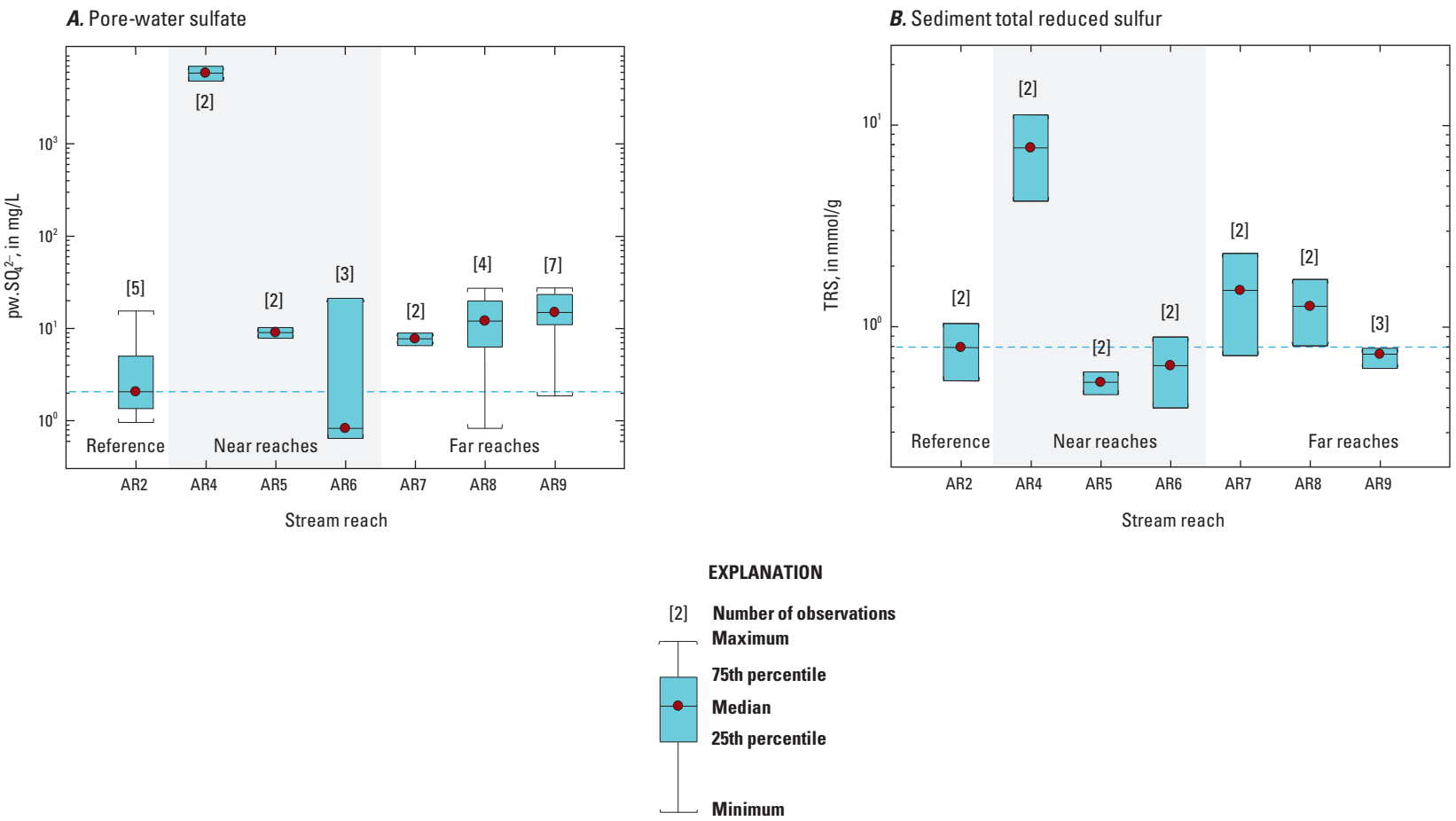


Figure 11. Concentrations of *A*, pore-water sulfate ($pw.SO_4^{-2}$) and *B*, sediment total reduced sulfur (TRS) from the Androscoggin River, Coos County, New Hampshire. Samples for $pw.SO_4^{-2}$ were collected in 2009 and 2010, and for TRS, in 2010. Samples from the reference reach (AR2) are 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H. Samples from near-stream reaches (AR4–R6) are 2 to 4 km downstream from the former chloralkali facility, and samples from far-stream reaches (AR7–R9) are 8 to 16 km downstream from the former chloralkali facility. The dashed blue line is the median reference (AR2) pore-water (sulfate) or sediment (TRS) concentration. mg/L, milligrams per liter; mmol/g, micromoles per gram.

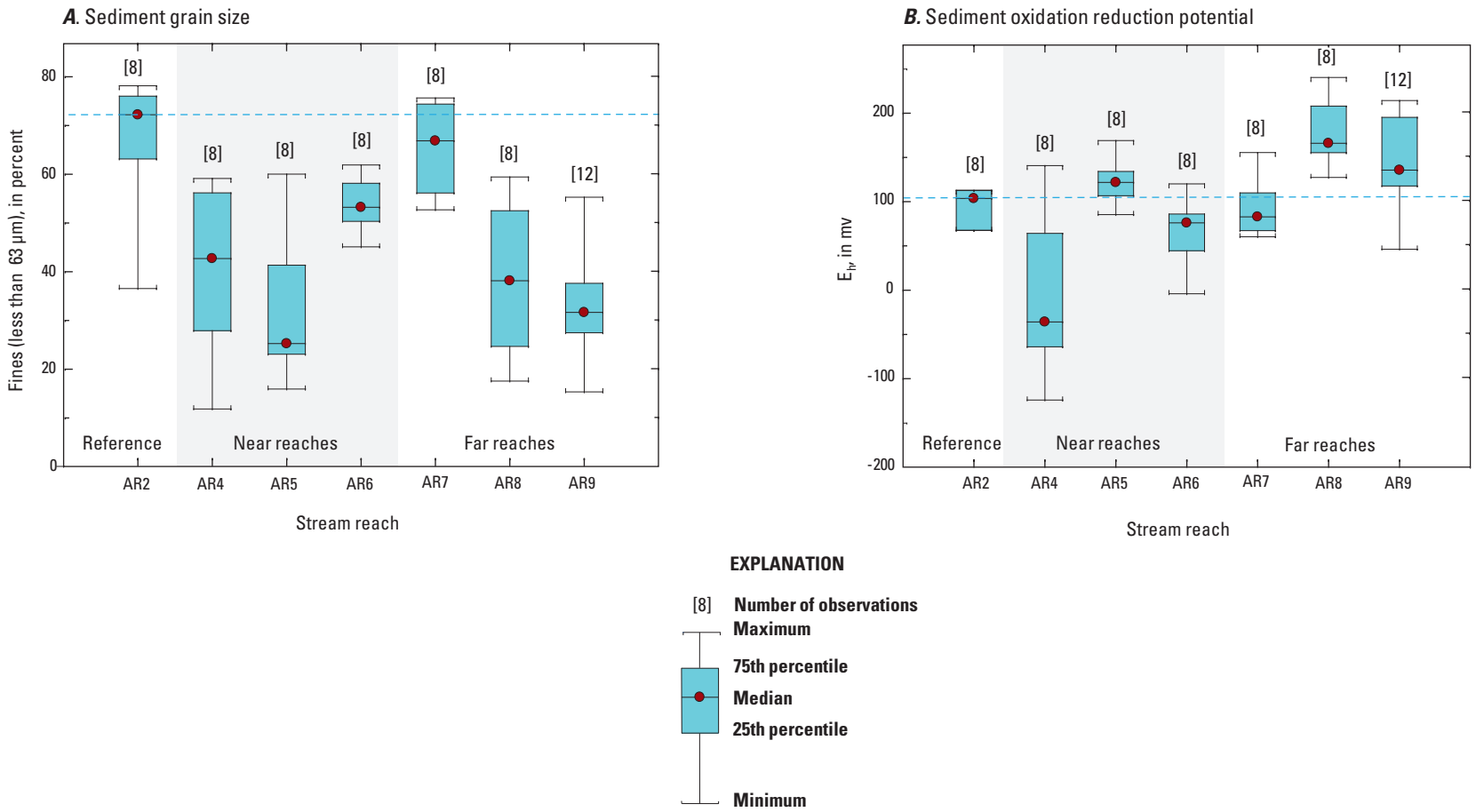


Figure 12. *A*, Sediment grain size less than 63 micrometers (µm) and *B*, oxidation reduction potential (redox, E_h) from the Androscoggin River, Coos County, New Hampshire. Samples were collected in 2010. Samples from the reference reach (AR2) are 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H. Samples from near-stream reaches (AR4–R6) are 2 to 4 km downstream from the former chloralkali facility, and samples from far-stream reaches (AR7–R9) are 8 to 16 km downstream from the former chloralkali facility. The dashed blue line is the median reference (AR2) for sediment percent grain size less than 63 micrometers (A) or sediment E_h (B). mv, millivolt.

THg concentration throughout the whole study area included only percent LOI and BD, although it had low explanatory power (coefficient of determination (R^2) of 0.19). However, by grouping the downstream study area into near (AR4, AR5, and AR6) and far (AR7, AR8, and AR9) stream reaches, regression models could explain 49 to 55 percent of the variability in THg concentration (fig. 13). In the far-stream reaches, percent LOI alone explained 49 percent of the variability in sediment THg concentration. A positive relation between THg and percent LOI has been observed in a number of other studies (Hammerschmidt and Fitzgerald, 2006; Han and others, 2007; Marvin-DiPasquale and others, 2009a, b). In the higher gradient near-stream reaches, sediment BD became an important explanatory variable in addition to percent LOI, alluding to the nature of the particles that are likely to be deposited in the high-gradient environment.

Sediment MeHg concentration across all stream reaches was best described as a positive function of sediment THg concentration and a negative function of sediment TRS concentration (fig. 14), when starting with THg, $Hg(II)_R$, k_{meth}, E_h, percent LOI, TRS, and percent fines as initial explanatory variables in the stepwise regression. Sediment MeHg and THg are often correlated at lower THg concentrations (Krabbenhoft and others, 1999; Kamman and others, 2005b; Marvin-DiPasquale and others, 2009a; Scudder and others, 2009), as seen in this study. The negative relation between MeHg concentration and TRS concentration may reflect Hg(II) binding to solid-phase reduced sulfur compounds, thus reducing the amount of Hg(II) available for methylation (Huerta-Diaz and Morse, 1992; Marvin-DiPasquale and others, 2009a).

Controls on Divalent Mercury Availability for Methylation

Explanatory variables used in stepwise linear regression to describe controls on $Hg(II)_R$, k_{meth}, and MPP included percent LOI, TRS, E_h, percent fines, and THg concentration. The availability of sediment Hg(II) for Hg(II)-methylation, as assessed by the Hg(II)R assay, was best described as a multivariable linear function of sediment THg, percent fines, and E_h. Approximately 50 percent of the variability in sediment $Hg(II)_R$ could be explained by these three variables across all stream reaches, but 76 percent of $Hg(II)_R$ variability was accounted for in near-stream reaches alone using the same three variables (fig. 15). One-third of the variability in sediment $Hg(II)_R$ in far-stream reaches was explained by a combination of percent fines and E_h. Low variability in sediment THg concentrations appeared to make sediment THg a weak explanatory variable for sediment $Hg(II)_R$ in these stream reaches. The positive relation between sediment $Hg(II)_R$ and E_h likely reflects the binding kinetics of inorganic Hg(II) to solid-phase minerals and organics, which appear to increase under reducing conditions and decrease under more oxic conditions (Marvin-DiPasquale and Cox, 2007; Marvin-DiPasquale and others, 2009a, b). An increase in percent fines (a decrease in sediment grain size) reflects more surface area and solid-phase binding sites for Hg(II).

The activity of the in-situ Hg(II)-methylating microbial community, as assessed by k_{meth}, was best predicted by E_h alone (R^2=0.59; fig. 16). The highest k_{meth} values were measured at the most chemically reducing site (AR4), and the lowest k_{meth} values were measured at the two most oxidized sites (AR8 and AR9; fig. 10). The importance of reducing conditions for microbial Hg(II)-methylation has been documented in Morel and others (1998).

Calculated MPP rates were best modeled as a combined positive function of THg concentration and negative function of sediment E_h. Because MPP rates are a function of both microbial activity (k_{meth}) and in-situ Hg(II) availability, controls on $Hg(II)_R$ and k_{meth} would also apply to MPP. Sediment organic carbon (as percent LOI) was less of an explanatory variable for predicting Hg(II)-methylation in this study compared with other studies (Lambertsson and Nilsson, 2006; Marvin-DiPasquale and others, 2009a), reflecting the limited range of organic carbon concentrations in the study area (fig. 5).

Controls on Partitioning between Bed Sediment and Pore Water

The distribution of inorganic Hg(II) and MeHg between sediment particles (solid-phase) and pore water affects the availability of inorganic Hg(II) and MeHg for Hg(II)-methylation and bioaccumulation, respectively. Grain size (Bloom and others, 1999) and organic content (Hammerschmidt and others, 2006; Sunderland and others, 2006) are often key factors in partitioning between pore water and sediment. Typically, partitioning of both THg and MeHg from sediment to pore water increases with increasing pw.DOC and decreasing percent fines (increasing grain size; Marvin-DiPasquale and others, 2009a). DOC contains strong mercury-binding ligands that increase mercury dissolution into pore water by stabilizing nanoparticles of compounds such as cinnabar (HgS; Slowey, 2010; Gerbig and others, 2011), whereas decreasing percent fines reduces particulate surface area and thus potential binding sites on sediments. The relation between the distribution coefficient for total mercury (k_d[THg]) and the ratio of pw.DOC to grain size [pw.DOC/percent fines] was first described by Marvin-DiPasquale and others (2009a) for eight diverse nonpoint-source streams across the United States (in Florida, Wisconsin, and Oregon) as part of the USGS National Water Quality Assessment Program (NAWQA) mercury topical study. The same pw.DOC/percent fines ratio explained 44 and 40 percent of the variability in the partitioning coefficients for THg and MeHg, respectively, in the Androscoggin River data (fig. 17).

Plotting the Androscoggin River data along with the NAWQA data (as k_d[THg] against the pw.DOC/percent fines ratio; both log-base-10-transformed), we find that the both datasets fall along the same line but that the majority of the

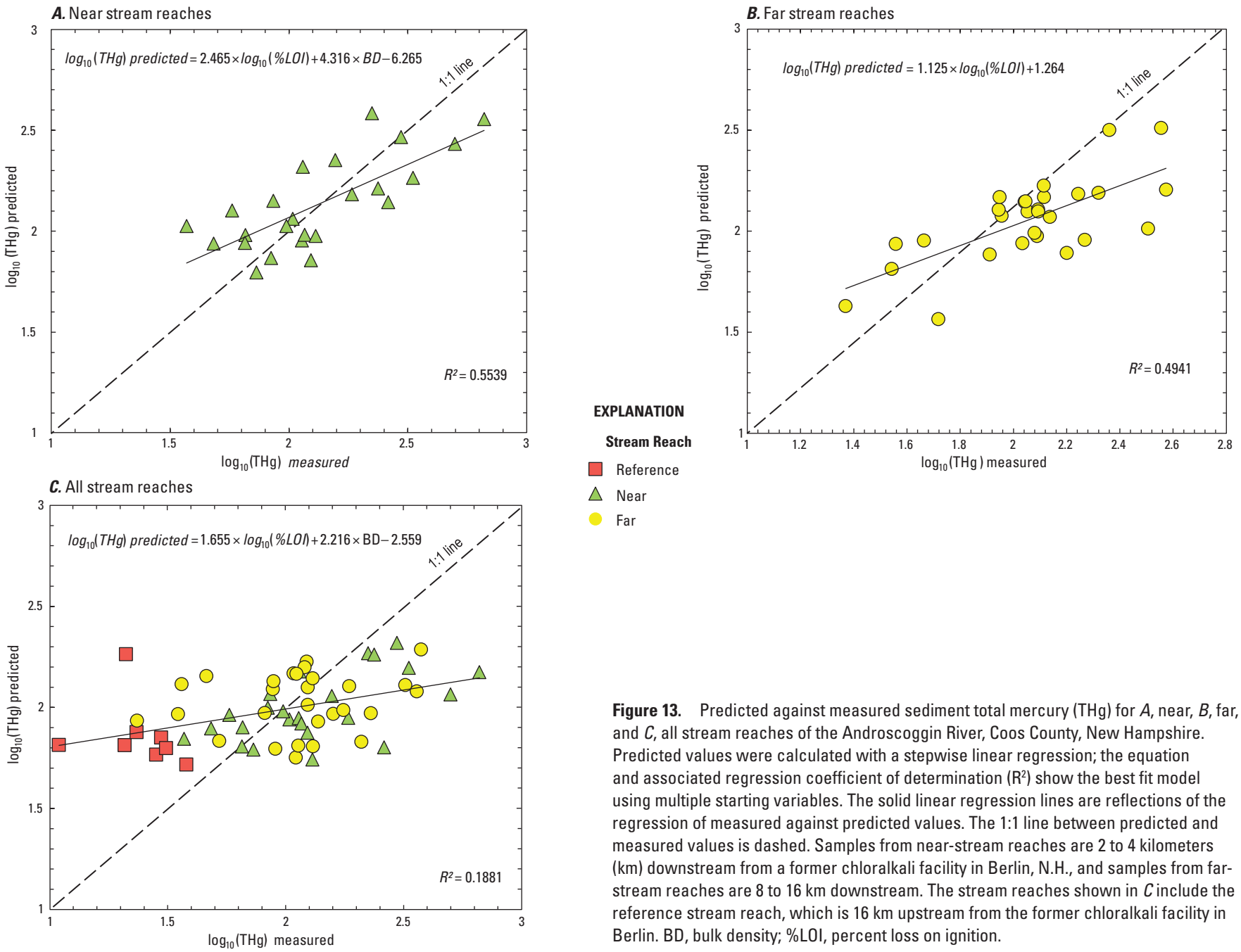


Figure 13. Predicted against measured sediment total mercury (THg) for *A*, near, *B*, far, and *C*, all stream reaches of the Androscoggin River, Coos County, New Hampshire. Predicted values were calculated with a stepwise linear regression; the equation and associated regression coefficient of determination (R^2) show the best fit model using multiple starting variables. The solid linear regression lines are reflections of the regression of measured against predicted values. The 1:1 line between predicted and measured values is dashed. Samples from near-stream reaches are 2 to 4 kilometers (km) downstream from a former chloralkali facility in Berlin, N.H., and samples from far-stream reaches are 8 to 16 km downstream. The stream reaches shown in *C* include the reference stream reach, which is 16 km upstream from the former chloralkali facility in Berlin. BD, bulk density; %LOI, percent loss on ignition.

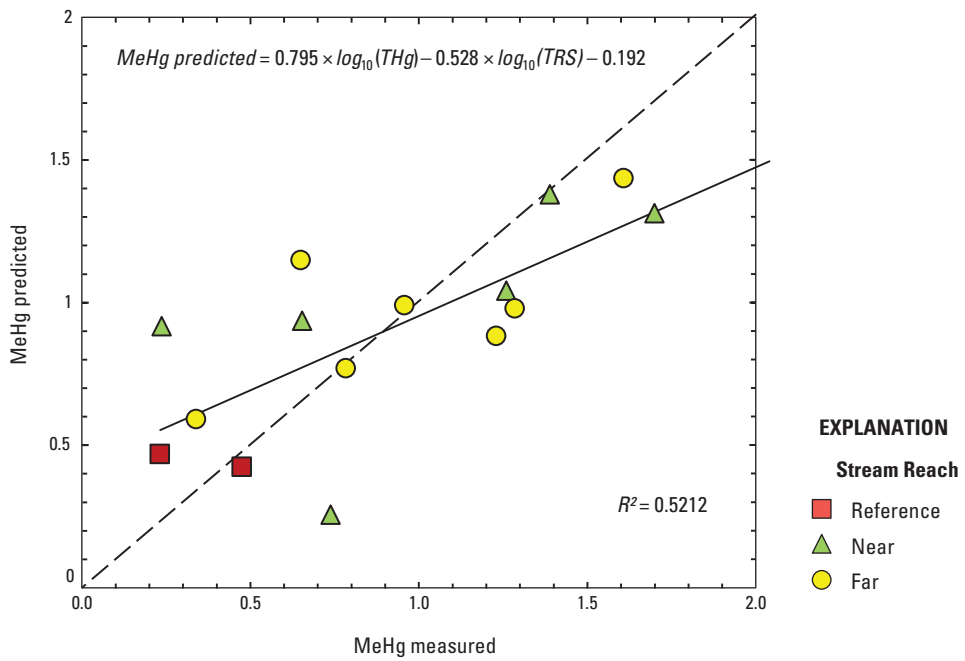


Figure 14. Predicted against measured methylmercury (MeHg) from the Androscoggin River, Coos County, New Hampshire. Predicted values were calculated with a stepwise linear regression; the equation and associated regression coefficient of determination (R^2) show the best fit model using multiple starting variables. The solid linear regression line is a reflection of the regression of measured against predicted values. The 1:1 line between predicted and measured values is dashed. Samples from the reference stream reach are 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H. Samples from near-stream reaches are 2 to 4 km downstream from the former chloralkali facility, and samples from far-stream reaches are 8 to 16 km downstream from the former chloralkali facility. THg, total mercury; TRS, total reduced sulfur.

Androscoggin River data only occupies the upper one-third of the regression line (fig. 18). This suggests that, due to comparatively low pw.DOC or high percent fines (or some combination), THg in the Androscoggin River partitions to a greater extent onto sediment particles (larger k_d[THg] values). This would imply that THg (almost all as Hg(II)) in the samples from the Androscoggin River was comparatively less available for Hg(II)-methylation than more than one-half of the sites from the earlier NAWQA study. In contrast, MeHg partitioning coefficients (k_d[MeHg]) for the Androscoggin River fell along a parallel line to those from the NAWQA study but were generally lower for the same pw.DOC/percent fines ratio (fig. 19). This implies that MeHg in the Androscoggin River partitions to a greater extent in pore water and may be more available for bioaccumulation into the food web compared with the nonpoint source streams sampled for the NAWQA mercury study.

River-Reach Integrated Mercury Species Inventories and Methylmercury Production Potential Rates

Stream reach integrated inventories of sediment THg, $Hg(II)_R$, and MeHg, as well as MPP rates, were calculated for each stream reach sampled during 2010. These calculations were based on stream reach-specific parameters (table 7), including total stream reach area, %fine substrate (percentage of stream reach area with grain size less than 63 micrometers), stream reach-specific sediment percent dry weight (median from all samples collected for mercury analysis), stream reach-specific sediment bulk density (median from all samples collected for mercury analysis), and depth of fine substrate, as assessed with ground-penetrating radar (Degnan and others, 2011) in combination with a nonparametric analysis of the mercury species concentration data distribution (table 8),

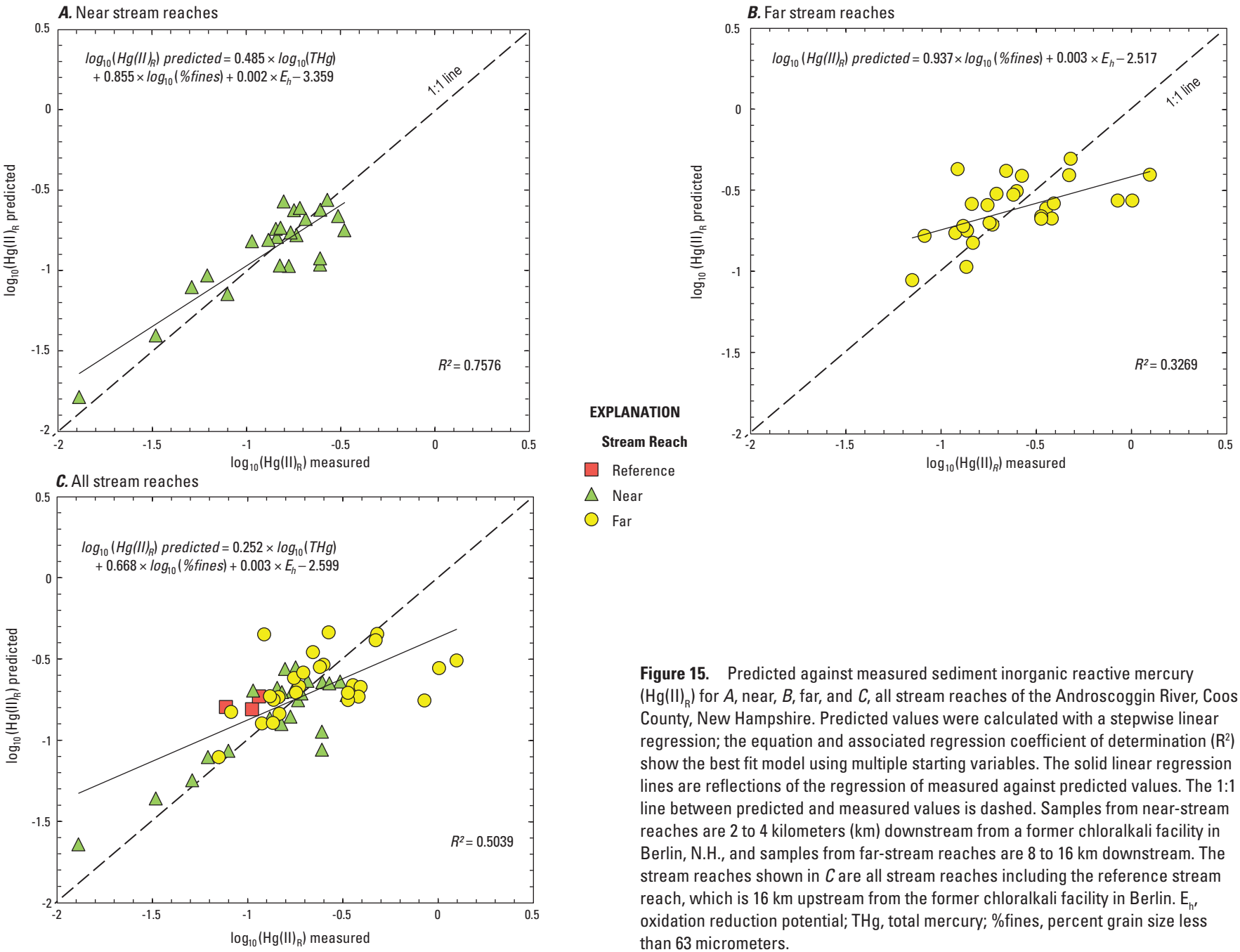


Figure 15. Predicted against measured sediment inorganic reactive mercury ($Hg(II)_R$) for *A*, near, *B*, far, and *C*, all stream reaches of the Androscoggin River, Coos County, New Hampshire. Predicted values were calculated with a stepwise linear regression; the equation and associated regression coefficient of determination (R^2) show the best fit model using multiple starting variables. The solid linear regression lines are reflections of the regression of measured against predicted values. The 1:1 line between predicted and measured values is dashed. Samples from near-stream reaches are 2 to 4 kilometers (km) downstream from a former chloralkali facility in Berlin, N.H., and samples from far-stream reaches are 8 to 16 km downstream. The stream reaches shown in *C* are all stream reaches including the reference stream reach, which is 16 km upstream from the former chloralkali facility in Berlin. E_h, oxidation reduction potential; THg, total mercury; %fines, percent grain size less than 63 micrometers.

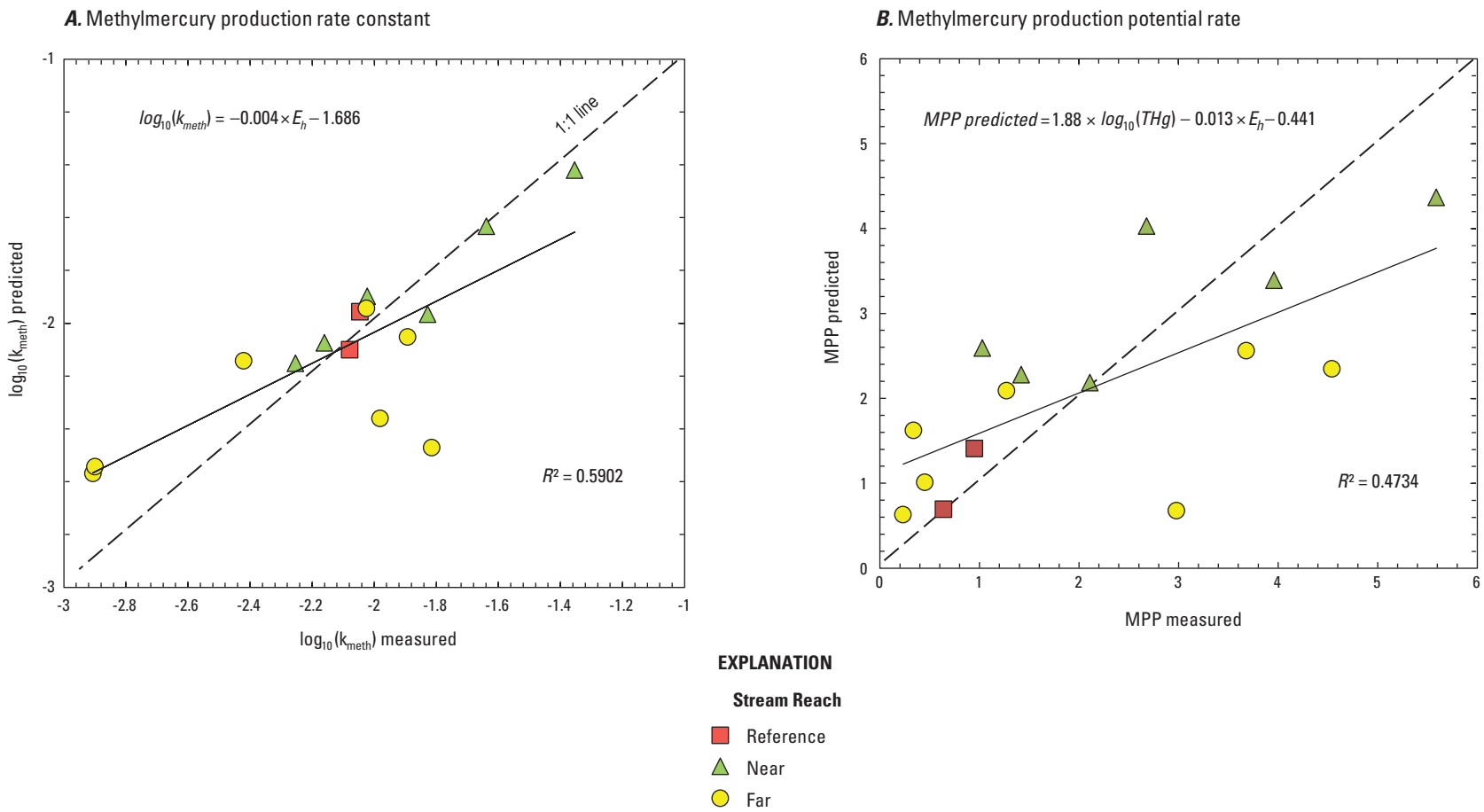


Figure 16. Predicted against measured mercury methylation potential (MPP) *A*, constant (k_{meth}) and *B*, rate for the Androscoggin River, Coos County, New Hampshire. MPP rate based on reactive mercury. Predicted values were calculated with a stepwise linear regression; the equation and associated regression coefficient of determination (R^2) show the best fit model using multiple starting variables. The solid linear regression lines are reflections of the regression of measured against predicted values. The 1:1 line between predicted and measured values is dashed. Samples from the reference stream reach are 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H. Samples from near-stream reaches are 2 to 4 km downstream from the former chloralkali facility, and samples from far-stream reaches are 8 to 16 km downstream from the former chloralkali facility. E_h, oxidation reduction potential (redox); THg, total mercury.

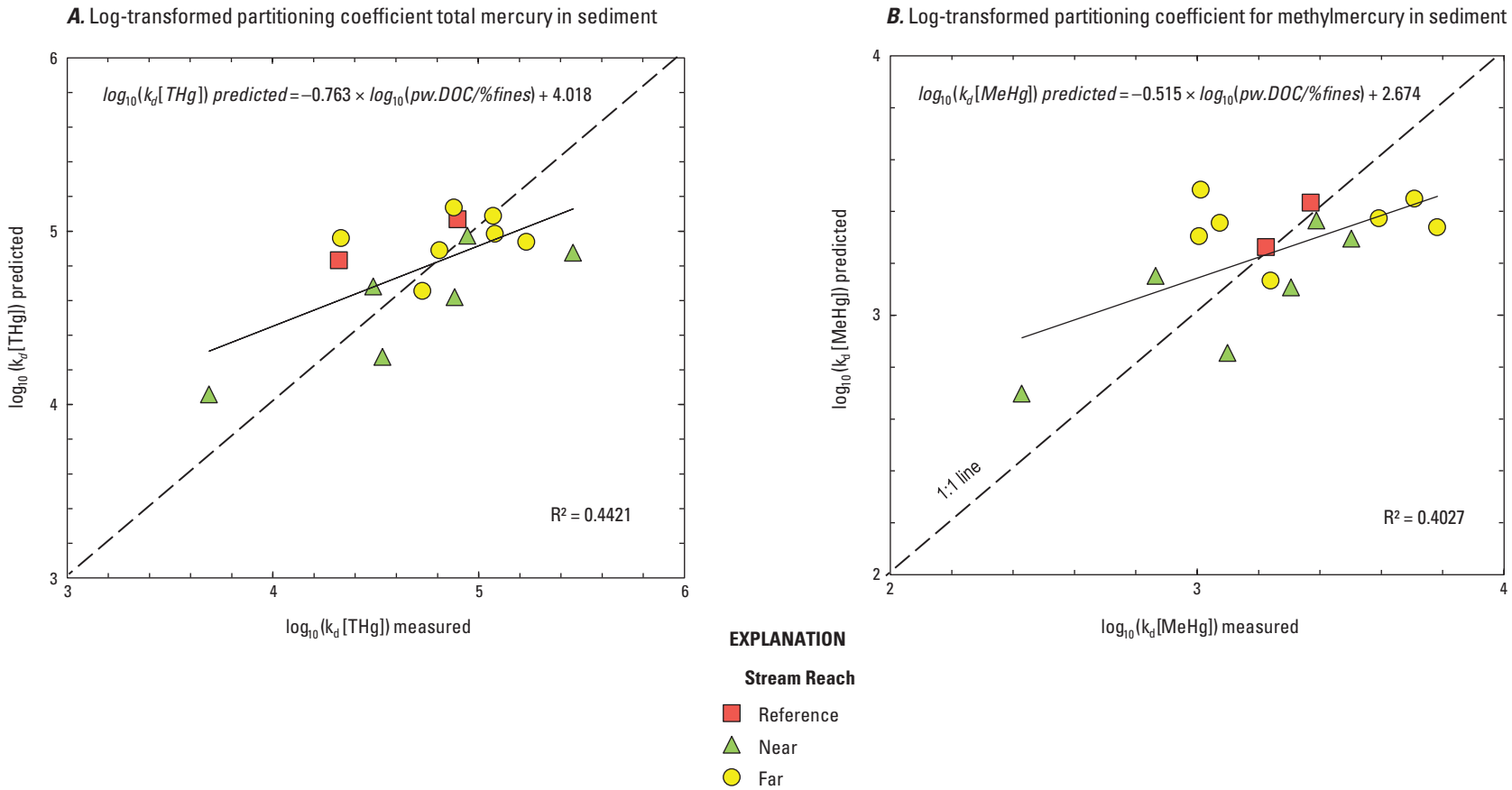


Figure 17. Predicted against measured partitioning coefficient for *A*, total mercury (k_d[THg]) and *B*, methylmercury (k_d[MeHg]) for the Androscoggin River, Coos County, New Hampshire. Predicted values were calculated with a stepwise linear regression; the equation and associated regression coefficient of determination (R^2) show the best fit model using multiple starting variables. The solid linear regression lines are reflections of the regression of measured against predicted values. The 1:1 line between predicted and measured values is dashed. Samples from the reference stream reach are 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H. Samples from near-stream reaches are 2 to 4 km downstream from the former chloralkali facility, and samples from far-stream reaches are 8 to 16 km downstream from the former chloralkali facility. pw.DOC/%fines, ratio of pore-water dissolved organic carbon to percent grain size less than 63 micrometers.

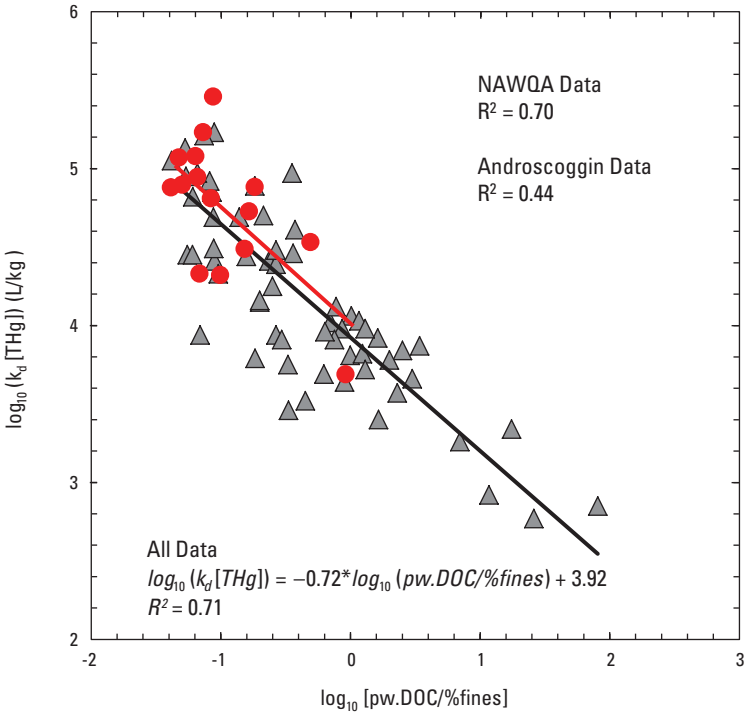


Figure 18. Sediment total mercury partitioning coefficient as a function of dissolved organic carbon and grain size. Sites on the Androscoggin River (red circles) are compared with sites sampled for the U.S. Geological Survey National Water-Quality Assessment Program (NAWQA, grey triangles) across the United States (Marvin-DiPasquale and others, 2008, 2009a). k_d [THg], sediment total mercury partitioning coefficient; L/kg, liters per kilogram; pw.DOC/%fines, ratio of dissolved organic carbon to percent grain size less than 63 micrometers; R^2, coefficient of determination]

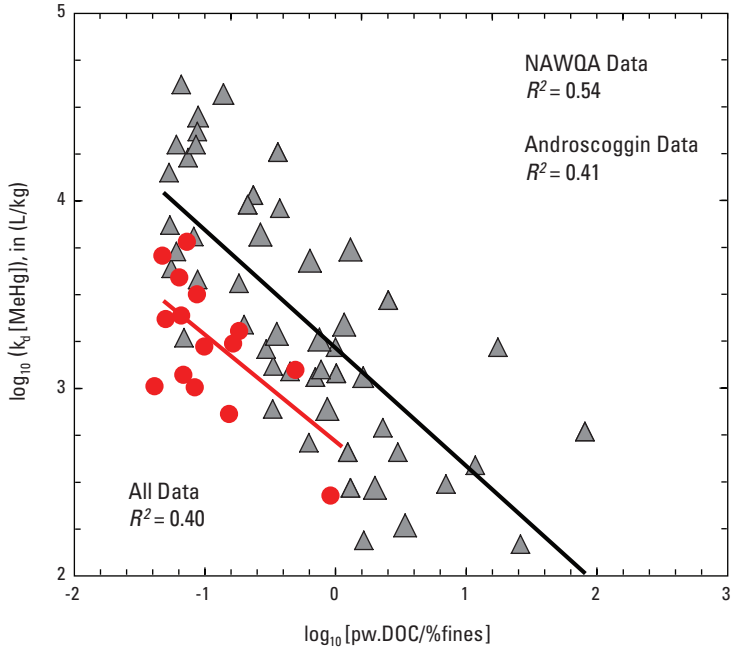


Figure 19. Sediment methylmercury partitioning coefficient as a function of dissolved organic carbon and grain size. Sites on the Androscoggin River (red circles) are compared with sites sampled for the U.S. Geological Survey National Water-Quality Assessment Program (NAWQA, grey triangles) across the United States (Marvin-DiPasquale and others, 2008, 2009a). k_d [MeHg], sediment methylmercury partitioning coefficient; L/kg, liters per kilogram; pw.DOC/%fines, ratio of dissolved organic carbon to percent grain size less than 63 micrometers; R^2, coefficient of determination]

Table 7. Stream reach parameters used to calculate reach specific depth integrated mercury species inventories and rates.

[Stream reach area data are from Degnan and others (2011). Median sediment dry weight (dw) and bulk density were calculated from 2010 data only. Median depth of fine substrate was calculated excluding unknown (zero) observations. m^2, square meters; g/cm^3 ww, grams of wet weight per cubic centimeter; m, meters]

Reach	Description	Reach area, in m^2	Fine substrate, in percent of area	Median sediment, in percent dw	Median sediment bulk density, in g/cm^3 ww	Median depth of sand, silt, and clay layer, in m
AR2	Wheeler Bay	89,108	55.6	47.2	1.37	1.18
AR4	Upstream of Smith Dam	31,129	14.4	60	1.53	0.64
AR5	Upstream of Power Dam	53,662	10	71.7	1.73	0.95
AR6	Power Dam to Cascade Dam	62,717	27.6	57.8	1.5	1.12
AR7	Cascade to Brown Dam	296,807	10.5	48.2	1.37	0.79
AR8	Brown Dam to Gorham Dam	205,155	7.6	66.8	1.63	0.97
AR9	Gorham Dam to Shelburne Dam	696,373	45.7	64.4	1.6	1.07

quartile distribution, and medians and 25 to 75 percent interquartile data. A simplifying assumption used in the calculation was that mercury species concentrations and MPP rates were zero for any substrate coarser than sand. Because large areas within each stream reach had substrate coarser than sand (table 7), it is likely that this simplifying assumption resulted in these inventories underestimating the actual amount of mercury species and MPP rates in each case and should be considered as minimum estimates. All mercury species inventories and MPP rates were first calculated for the top 10 cm only because that was the actual sediment sampling depth. A second simplifying assumption was that THg and $Hg(II)_R$ concentrations were constant with sediment depth. As such, we then calculated the stream reach-specific THg and $Hg(II)_R$ inventories for the full depth of the fine substrate, based on the median depth for the given reach (table 7).

Concentrations of mercury species and MPP rates, on a sediment dry weight basis, were higher in stream reaches downstream from the point source (figs. 3A, B, 10A and D; table 8). Whereas the distribution of sediment dry weight concentrations reflected the relative location of the sampling sites to the point source, stream reach-specific mercury inventories reflected the amount depositional environments with fine-grained sediment in each reach. AR9 was the largest stream reach sampled and had the largest percentage of area as fine substrate downstream from the point source (table 7). These geophysical conditions resulted in mercury inventories (total mass) being much larger in reach AR9 than in any other reach (table 8). In contrast, reach AR4 had the smallest area and the fourth smallest areal percentage of fine substrate (table 7), and as a consequence, typically had the smallest calculated mercury species inventories. For the top 0- to 10-cm-depth interval, median mercury inventory range estimates for all stream reaches downstream from the point source were as follows: THg, 0.03 to 2.91 kilograms (kg); $Hg(II)_R$, 0.03 to 4.64 grams (g); MeHg, 0.20 to 32.9 g; and MPP rate, 1.10 to 14.8 milligrams per day (mg/d). On the basis of the median depth of the fine deposits in each reach, the median mass inventories for THg and $Hg(II)_R$ ranged from 0.21 to 31.0 kg and 0.19 to 49.4 g, respectively (table 8).

Ecological Impact

The health of the aquatic ecosystem that was potentially affected by the former chloralkali facility was evaluated using a variety of toxicity tests, biological indices, and guidelines. Results of pore-water and surface-water bioassays are detailed in Environmental Services Assistance Team (2009a, b, respectively), and bulk sediment bioassays, in EnviroSystems, Inc., (2010a, b). Survival and growth of *Hyalella azteca* and *Chironomus dilutus* in sediment and survival of *Hyalella azteca* and *Chironomus tentans* in pore water collected downstream from the former chloralkali facility were not significantly different from the reference site (table 5, in back of report). Survival and reproduction of *Ceriodaphnia dubia* and survival and growth of *Pimephales promelas* provided no evidence of toxicity of surface water collected downstream from the former chloralkali site (table 2–13; Environmental Services Assistance Team, 2009b); however, the number of samples (n=5) collected did not allow for statistical testing.

Sites were evaluated for biological condition based on scores calculated with the use of the NHDES B–IBI for invertebrate assemblages (table 2–17). The B–IBI is designed to provide a relative measure of stream health and is centered on the mean (average) value of seven indicator metrics that reflect the biological condition of streams and rivers in the region, including the Androscoggin River. The Androscoggin River reaches AR2 through AR9 were classified as being exclusive to the Hills reference sites. The 25th percentile (64.5) for

Table 8. Depth-integrated mercury species inventories and rates, by river reach.

[Mercury species and rates were calculated from 2010 data. Full depth inventories are based on median depth of fine substrate. ng/g dw, nanograms per gram dry weight; mg/m², milligrams per square meter; cm, centimeters; kg, kilograms; g, grams; Q, quartile; <, less than; %, percent]

Reach	Quartile data by reach, in ng/g dw			10-cm depth integrated, in mg/m²			Reach integrated (top 10 cm), in kg			Reach integrated (full depth), in kg		
	25th% Q	50th% Q	75th% Q	25th% Q	50th% Q	75th% Q	25th% Q	50th% Q	75th% Q	25th% Q	50th% Q	75th% Q
A. Total mercury												
AR2	21	26	30	1.3	1.7	1.9	0.07	0.08	0.10	0.78	0.97	1.70
AR4	61	79	106	5.6	7.2	9.7	0.03	0.03	0.04	0.16	0.21	0.39
AR5	128	190	321	15.9	23.6	39.9	0.09	0.13	0.21	0.81	1.21	2.44
AR6	81	106	197	7.0	9.2	17.1	0.12	0.16	0.30	1.36	1.78	4.38
AR7	112	134	214	7.4	8.8	14.1	0.23	0.27	0.44	1.82	2.17	4.80
AR8	117	123	137	12.8	13.4	15.0	0.20	0.21	0.23	1.92	2.02	3.53
AR9	44	88	137	4.5	9.1	14.1	1.43	2.91	4.50	15.3	31.0	78.6
B. Reactive inorganic mercury												
AR2	0.09	0.11	0.13	0.0055	0.0071	0.0086	0.27	0.35	0.43	3.23	4.16	7.57
AR4	0.05	0.07	0.15	0.0043	0.0065	0.0141	0.02	0.03	0.06	0.12	0.19	0.56
AR5	0.15	0.17	0.19	0.0191	0.0211	0.0236	0.1	0.11	0.13	0.98	1.08	1.44
AR6	0.15	0.22	0.25	0.0131	0.0189	0.0218	0.23	0.33	0.38	2.54	3.67	5.6
AR7	0.34	0.37	0.41	0.0222	0.0244	0.0272	0.69	0.76	0.85	5.46	6.00	9.22
AR8	0.17	0.2	0.43	0.0184	0.0222	0.0471	0.29	0.34	0.73	2.77	3.33	11.1
AR9	0.13	0.14	0.18	0.0132	0.0146	0.0187	4.21	4.64	5.94	44.8	49.4	104
Reach	**Quartile data by reach, in ng/g**			**10-cm depth integrated, in mg/m²**			**Reach integrated (top 10 cm), in g**					
	25th% Q	50th% Q	75th% Q	25th% Q	50th% Q	75th% Q	25th% Q	50th% Q	75th% Q			
C. Methylmercury												
AR2	0.155	0.221	0.353	0.010	0.014	0.023	0.50	0.71	1.13			
AR4	0.24	0.49	0.74	0.022	0.045	0.068	0.10	0.20	0.30			
AR5	1.26	1.32	1.39	0.157	0.164	0.173	0.84	0.88	0.93			
AR6	0.28	0.65	1.7	0.024	0.057	0.147	0.42	0.98	2.54			
AR7	0.78	1.03	1.29	0.052	0.068	0.085	1.61	2.12	2.64			
AR8	0.65	0.96	1	0.071	0.104	0.109	1.10	1.62	1.69			
AR9	0.71	1	1.61	0.073	0.103	0.166	23.3	32.9	52.8			
D. Methylmercury production potential rate												
AR2	0.00064	0.00079	0.00095	0.041	0.051	0.061	2.05	2.54	3.03			
AR4	0.00268	0.00414	0.00559	0.25	0.38	0.51	1.10	1.70	2.30			
AR5	0.00103	0.00157	0.00211	0.13	0.20	0.26	0.69	1.05	1.41			
AR6	0.00142	0.00269	0.00396	0.12	0.23	0.34	2.12	4.02	5.92			
AR7	0.00368	0.00411	0.00454	0.24	0.27	0.30	7.60	8.40	9.30			
AR8	<0.00050	0.00075	0.00127	<0.054	0.082	0.14	<0.85	1.27	2.15			
AR9	<0.00034	0.00045	0.00298	<0.035	0.047	0.31	<11.0	14.8	98.0			

Hills reference sites is operationally defined as the threshold, and 90 percent (58) of the threshold categorizes the stream as unimpaired for the NHDES listing of impaired waters (Neils, NHDES, 2007). The B–IBI integrates the following metrics, which are denoted with (+) to indicate where values increase with improving conditions and (-) to indicate where values decrease with improving conditions:

- total taxa richness (+)
- plecoptera (stoneflies) taxa (+)
- percent chironomidae (midge) taxa (-)
- percent noninsect taxa (-)
- tolerant taxa (-)
- percent intolerant (sensitive) taxa (+)
- percent clinger taxa (+)

For (-) metrics that decrease with improving conditions, the inverse values were used in calculating the B–IBI score so that these metrics would contribute to the B–IBI increasing with improving condition. All replicates at all sites exceeded the B–IBI threshold of 58, indicating that the sites were categorized as meeting the criteria for unimpaired streams by NHDES standards (fig. 20; David Neils, NHDES, written commun., April 2011).

Jaccard's indices were used to compare species diversity within and between stream reaches. The percentage of similarity within stream reaches was 51 ±9 (average plus or minus (±) standard deviation). This compares closely to the percentage of similarity among stream reaches AR2, AR3, AR8, and AR9 (55 ±5). AR4 was the most different from other stream reaches with the percentage of similarity equal to 35 ±2. This section of the river is highly regulated, and the rock baskets were not in flowing water the entire 6.5 weeks they were in the river. Jaccard's indices did not show differences in species diversity upstream and downstream from the point source; however, Jaccard's indices did suggest flow characteristics were a major factor controlling species diversity in the study area.

Differences in total abundance, total taxa, and Ephemeroptera, Plecoptera, Trichoptera (EPT) taxa between invertebrate assemblages upstream and downstream from the point source were compared using nonparametric WRS and KWRS tests. The total abundance of organisms is a general indicator of productivity, whereas total taxa and EPT taxa are two indicators of taxonomic complexity in the assemblages. The highest total abundance occurred at AR3 adjacent to the former chloralkali facility (table 2–17). The higher abundance

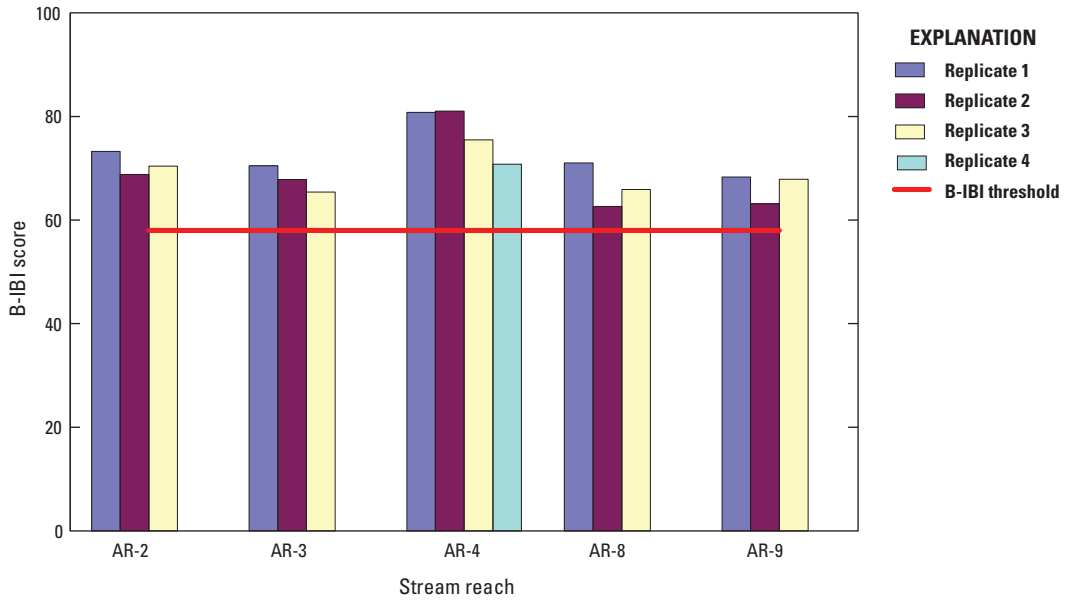


Figure 20. New Hampshire Department of Environmental Services (NHDES) benthic index of biotic integrity (B–IBI) for the Androscoggin River, Coos County, New Hampshire. The reference reach (AR2) is 16 kilometers (km) upstream from a former chloralkali facility in Berlin, N.H., and stream reaches AR3, AR4, AR8, and AR9 are 0 to 16 km downstream from the former chloralkali facility. Three replicate samples were collected at AR2, AR3, AR8, and AR9, and four replicate samples at AR4. The NHDES B–IBI threshold is 58. Stream reaches that score higher than the B–IBI threshold are categorized as unimpaired.

at AR3 compared with other sites was mainly due to greater abundance of Diptera Simuliidae *Simulium*, which presumably favored the steady low-flow water conditions at this site. Abundance downstream from the point source was not significantly different from the reference site (table 4, in back of report). Total taxa (the total number of taxa in the sample) and EPT taxa (taxa in the generally more environmentally sensitive orders Ephemeroptera (mayflies), Plecoptera, and Trichoptera (caddisflies)) were both highest at AR9 (table 5, in back of report); however, there was no significant difference in either metric among the spatial grouping of far (AR8, AR9), near (AR3, AR4), or reference (AR2) stream reaches.

Surface-water THg and MeHg concentrations in the Androscoggin River were all below the Canadian guideline for the protection of aquatic life (table 9; Canadian Council of Ministers of the Environment, 1999). One surface-water THg concentration exceeded the 30-day standard of 1.3 ng/L set by the USEPA for Great Lakes fish-eating wildlife (U.S. Environmental Protection Agency, 1995). Sediment THg concentrations did not exceed the 1,060 ng/g dry weight consensus-based probable effect concentration (PEC) for adverse effects to benthic organisms in any sample (MacDonald and others, 2000), but one-quarter of the sediment samples did exceed the 180 ng/g dry weight consensus-based threshold effects concentration (TEC) for adverse effects to benthic organisms (MacDonald and others, 2000) and the 170 ng/g Canadian interim sediment quality guidelines (ISQG) for the protection of aquatic life (Canadian Council of Ministers of the Environment, 1999). The Wheeler Bay reference site was the only site that had no sediment sample with concentrations above the TEC and ISQG guidelines, and only AR5 had a median sediment THg concentration higher than the TEC and ISQG guidelines. Whereas water and sediment THg were mostly below guidelines, smallmouth bass THg concentrations in all samples (table 9) were higher than guidelines set for fish-eating birds (13 ng/g, kingfisher; Sample and others, 1996), fish-eating mammals (79 ng/g, river otter; Sample and others, 1996), and human health (140 ng/g; U.S. Environmental Protection Agency, 2001c, 2009).

Comparison to Other Studies

Data from the Androscoggin River were compared with datasets from the Northeastern Ecosystems Research Cooperative (NERC) and the USGS NAWQA (Kamman and others, 2005a, b; Shanley and others, 2005; Bauch and others, 2009). The NERC dataset is a compilation of regional stream data from New England, New York, Quebec, Ontario, and the Atlantic provinces of Canada, whereas the NAWQA dataset includes stream data from across the United States. Grouped medians from the Androscoggin River, the NERC, and the NAWQA datasets were compared using a KWRS test. For purposes of comparison, Androscoggin River smallmouth bass THg data from the NERC dataset were combined with data from the study of this report. Androscoggin River sediment THg concentrations were not significantly different than concentrations in the regional or national surveys. Sediment from the Androscoggin River had significantly lower MeHg concentrations than other streams in the Northeastern region but similar MeHg concentrations to streams across the country (table 10). However, comparisons between the surficial sediment from the Androscoggin River study and from other studies may have some bias because the sediment in the Androscoggin River study was sampled to 10 cm, whereas sediments in the NERC and NAWQA studies were generally sampled to 2 cm and never deeper than 5 cm. The greater sampling depth of the Androscoggin sediments could have a diluting effect, lowering THg and MeHg concentrations relative to the other surveys. Smallmouth bass THg concentrations from the Androscoggin River downstream from the point source were significantly higher than smallmouth bass from across the country, but only smallmouth bass from the furthest downstream stream reaches (AR7–AR9) were significantly higher than smallmouth bass from the Northeastern region studies (table 10). Surface-water THg and MeHg concentrations from the Androscoggin River study were similar to those from regional and national studies that focused on uncontaminated or nonpoint source lotic systems; however, the number of observations was too small (n=1–2) for statistical evaluation.

Table 9. Guidelines for total mercury in surface water, sediment, and fish and methylmercury in surface water.

[Guidelines are listed with the percentage of samples from the Androscoggin River that exceeded the guideline shown in brackets. Methylmercury (MeHg) guidelines are used for fish-eating wildlife and human health because more than 95 percent of mercury in smallmouth bass is MeHg. ng/L, nanograms per liter; dw, dry weight; THg, total mercury; ng/g, nanograms per gram; ww, wet weight; --, no data]

Guideline	Unfiltered surface water, in ng/L		THg surfical sediment, in ng/g dw	THg smallmouth bass fillet, in ng/g ww
	THg	MeHg		
Fish-eating wildlife[1]	1.3 [20]	--	--	--
Aquatic life[2]	26 [0]	4 [0]	170 [25]	--
Threshold effects level[3]	--	--	180 [23]	--
Probable effects level[3]	--	--	1,060 [0]	--
Fish-eating mammal[4]	--	--	--	79 [100]
Human health[5]	--	--	--	140 [100]

[1]U.S. Environmental Protection Agency, 1995a.

[2]Canadian Council of Ministers of the Environment, 1999.

[3]MacDonald and others, 2000.

[4]Sample and others, 1996.

[5]U.S. Environmental Protection Agency, 2001c, 2009.

Table 10. Comparison of mercury concentrations in the Androscoggin River, Coos County, New Hampshire, with National Water-Quality Assessment Program and Northeastern Ecosystem Research Cooperative datasets.

[Mercury concentrations are median values; values in bold are statistically different. Letters A, B, and C, indicate which medians are different: A medians are statistically different than B medians, AB medians are not statistically different than A or B but are different from C, and ABC indicates medians are not statistically different than A, B, or C. The nonparametric Kruskal-Wallis rank sum test was run only for sites with at least five samples. Data are from streams only. Numbers in brackets are the number of samples from each site. Data for the Northeastern Ecosystem Research Cooperative (NERC) study were collected from 1983 through 2002; data for the National Water-Quality Assessment Program study were collected from 1998 through 2005; data for the Androscoggin River study were collected from 2009 through 2011. Surficial sediments are from the top 10 centimeters (cm) in the Androscoggin study and the top 2 or 5 cm in other studies. For purposes of comparison, all smallmouth bass lengths were restricted to 25 to 38 cm, and data for smallmouth bass from the NERC dataset have been combined with the Androscoggin River study data. All smallmouth bass samples are fillets. THg, total mercury; MeHg, methylmercury; dw, dry weight; ng/g, nanograms per gram; ng/L, nanograms per liter; ww, wet weight]

Site location	THg unfiltered surface water, in ng/L		MeHg unfiltered surface water, in ng/L		THg surfical sediment, in ng/g dw		MeHg surfical sediment, in ng/g dw		THg smallmouth bass fillet, in ng/g ww	
Androscoggin River data										
Upstream of point source	1.00 [1]		0.05 [1]		30 [11]	AB	0.23 [5]	B	418 [10]	ABC
Downstream near point source	1.02 [2]		0.05 [2]		117 [25]	AB	0.74 [7]	B	528 [26]	AB
Downstream far from point source	1.30 [2]		.06 [2]		111 [35]	AB	0.98 [14]	B	599 [28]	A
Other datasets										
Northeastern North America[1,2,3]	2.20 [388]	A	0.20 [101]	A	160 [182]	A	2.70 [69]	A	410 [179]	B
United States[4]	2.06 [287]	B	0.09 [288]	B	25.4 [296]	B	0.40 [295]	B	273 [46]	C

[1]Shanley and others, 2005.

[2]Kamman and others, 2005b.

[3]Kamman and others, 2005a.

[4]Bauch and others, 2009.

Summary and Conclusions

During operation of the chloralkali facility in Berlin, New Hampshire, elemental mercury (Hg^0) was spilled into the Androscoggin River, contaminating the overburden and underlying fractured rock on the east (left) bank of the Androscoggin River. In September 2005, Congress added the former chloralkali facility in Berlin to the national priorities list, commonly known as the Superfund list. Mercury contamination from historical paper and saw mill activities represents a significant potential risk to human health and the environment.

Total mercury (THg) and methylmercury (MeHg) concentrations in Androscoggin River sediment, pore water, and biota were elevated downstream from the former chloralkali facility relative to reference sites. Sequential extraction of surface sediment showed a distinct difference in mercury speciation upstream compared with downstream from the former chloralkali facility. The reference site was dominated by potassium hydroxide-extractable THg consistent with organic mercury or particle-bound divalent mercury (Hg(II)), whereas sites downstream from the point source were dominated by concentrated nitric acid-extractable THg, indicative of Hg^0 or mercurous chloride. Mercury metrics from the study indicated Hg(II) at the reference site was more available for Hg(II)-methylation compared with sites downstream from the point source, but the absolute concentrations of whole sediment $Hg(II)_R$ and THg in biota were greater downstream from the point source. In addition, whole sediment $Hg(II)_R$ and smallmouth bass THg concentrations appeared to increase further downstream from the point source. The furthest downstream reach (AR9 from Gorham Dam to Shelburne Dam) had larger mass of fine sediment and larger estimated mass inventory of mercury species than any other stream reach by an order of magnitude for both masses.

Sediment organic carbon and bulk density were the dominant influences on sediment THg distribution. The availability of Hg(II) for methylation was best described as a positive function of sediment THg, percent fines, and sediment oxidation reduction potential (redox; E_h). The microbial activity associated with Hg(II)-methylation (as measured by the mercury methylation potential (MPP) constant (k_{meth})) was best described by E_h alone. MPP was primarily a function of sediment THg concentration and E_h.

Toxicity tests and invertebrate community assessment suggest that impairment of invertebrates is not occurring at the current (2009 and 2010) levels of mercury contamination downstream from the point source. Concentrations of THg and MeHg in most water and sediment samples from the Androscoggin River were below Federal and consensus-based guidelines, whereas smallmouth bass mercury concentrations were above U.S. Environmental Protection Agency and regional guidelines in all samples. Smallmouth bass THg concentrations from the Androscoggin River downstream from the point source were significantly higher than those reported in a national survey, but only smallmouth bass mercury concentrations from the furthest downstream stream reaches (Cascade Dam to Shelburne Dam) were significantly higher than those in Northeastern region studies.

The apparent greater potential for Hg(II)-methylation and mercury bioaccumulation in the lower gradient stream reaches of the Androscoggin River may reflect changes in the type and size of particles deposited to the benthos and the speciation and availability of mercury for Hg(II)-methylation associated with those particles. These findings suggest that an even greater potential for Hg(II)-methylation and mercury bioaccumulation may exist as the river gradient continues to flatten downstream from Shelburne Dam.

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Tables 2, 4, 5, and 6

Table 2. Summary of methods used for analysis of sediment, pore water, surface water, and biota from the Androscoggin River, Coos County, New Hampshire.

[USGS, U.S. Geological Survey; NRP, National Research Program; USEPA, U.S. Environmental Protection Agency; NERL, New England Regional Laboratory]

Notation	Type of data	Collection period	Source of data	Method and (or) method citation
		Sediment mercury parameters		
THg	Total mercury	2009	Als Laboratory Group, Salt Lake City, Utah	ILM05.4, USEPA (2006).
		2010	USGS NRP Laboratory, Menlo Park, Calif.	Marvin-DiPasquale and others (2011).
MeHg	Methylmercury	2009	Columbia Analytical Services, Kelso, Wash.	1630, USEPA (1998).
		2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2011).
$Hg(II)_R$	Inorganic reactive mercury	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2011).
$Hg(II)_{KOH}$	1M potassium hydroxide (KOH)-extractable mercury	2009	Columbia Analytical Services	Bloom and others (2003).
THg, F1 thru F5	Sequential extraction	2010	USGS NRP Laboratory	Bloom and others (2003).
k_{meth}	MeHg production potential rate constant	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2011).
MPP	MeHg production potential rate (calculated)	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2011).
		Sediment nonmercury parameters		
TAL metals	Target analyte list metals	2009	Als Laboratory Group	ILM05.4, USEPA (2006).
SEM metals	Simultaneously extractable metals	2009	Columbia Analytical Services	SW6010, USEPA (1991).
AVS	Acid volatile sulfur	2009	Columbia Analytical Services	Draft 1991, USEPA (1991).
Dioxin/furans	Dioxin and furans	2009	SGS Environmental, Wilmington, N.C.	SW8290, USEPA (2005).
PCB	Polychlorinated biphenyl	2009	SGS Environmental	CBC0.10, USEPA (2007).
Pesticides	Pesticides	2009	Columbia Analytical Services	SW8081, USEPA (2007).
SVOCs	Semivolital organic compounds	2009	Columbia Analytical Services	SW8270, USEPA (2007).
H. azteca toxicity	*Hyalella azteca* survival and biomass	2009, 2010	EnviroSystems, Inc., Hampton, N.H.	100.4 and 100.5, USEPA (2000).
C. dilutus toxicity	*Chironomus dilutus* survival and biomass	2009, 2010	EnviroSystems, Inc.	100.4 and 100.5, USEPA (2000).
TRS	Total reduced sulfur	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
$Fe(II)_{AE}$	Acid extractable ferrous iron (Fe(II))	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
$Fe(III)_a$	Amorphous (poorly crystalline) ferric iron (Fe(III))	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
$Fe(III)_c$	Crystalline ferric iron (Fe(III))	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
%LOI	Percentage of weight loss on ignition	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
TC	Total carbon	2010	USGS NRP Laboratory	Kendall and others (2001).
TN	Total nitrogen	2010	USGS NRP Laboratory	Kendall and others (2001).
TOC	Total organic carbon	2009	Columbia Analytical Services	SW9060, USEPA (2007).
		2010	USGS NRP Laboratory	Kendall and others (2001).
$\delta^{13}C$	Carbon 13 (^{13}C) isotope	2010	USGS NRP Laboratory	Kendall and others (2001).
$\delta^{15}N$	Nitrogen 15 (^{15}N) isotope	2010	USGS NRP Laboratory	Kendall and others (2001).

Table 2. Summary of methods used for analysis of sediment, pore water, surface water, and biota from the Androscoggin River, Coos County, New Hampshire.—Continued

[USGS, U.S. Geological Survey; NRP, National Research Program; USEPA, U.S. Environmental Protection Agency; NERL, New England Regional Laboratory]

Notation	Type of data	Collection period	Source of data	Method and (or) method citation
		Sediment nonmercury parameters—Continued		
BD	Bulk density	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
%dry wt	Percent dry weight	2009	Columbia Analytical Services	APHA-AWWA-WPCF (1992).
		2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
%fines	Percent grain size (< 74 micrometers (µm))	2009	Columbia Analytical Services	ASTM D422, Plumb (1981), USEPA (1996).
	Percent grain size (< 63 µm)	2010	USGS NRP Laboratory	Matthes and others (1992).
E_h	Oxidation-reduction potential	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
pH	pH	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
		Pore-water mercury parameters		
pw.THg	Total mercury	2009	Columbia Analytical Services	E1631, USEPA (2001, 2002).
		2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2011).
pw.MeHg	Methylmercury	2009	Columbia Analytical Services	1630, USEPA (1998).
		2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2011).
$pw.Hg(II)_{KOH}$	1M KOH extractable mercury	2009	Columbia Analytical Services	Bloom (2009).
		Pore-water nonmercury parameters		
TAL metals	Target analyte list metals	2009	Als Laboratory Group	ILM05.4, USEPA (2006).
$pw.SO_4$	Sulfate	2009	Columbia Analytical Services	E300.0, USEPA (1982).
		2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
pw.Fe(II)	Ferrous iron	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
pw.Cl	Chloride	2010	USGS NRP Laboratory	Marvin-DiPasquale and others (2008).
C. tentans toxicity	*Chironomus tentans* survival	2009, 2010	USEPA NERL, Chelmsford, Mass.	Acute 96-hour bioassay, USEPA (2001).
H. azteca toxicity	*Hyalella azteca* survival	2009, 2010	USEPA NERL	Acute 96-hour bioassay, USEPA (2001).
pw.DOC	Dissolved organic carbon	2009	Columbia Analytical Services	SW9060, USEPA (2007).
		2010	USGS NRP Laboratory	
$pw.E_h$	Oxidation-reduction potential	2009, 2010	USGS field parameter	Wilde (2008).
pw.pH	pH	2009, 2010	USGS field parameter	Wilde (2008).

Table 2. Summary of methods used for analysis of sediment, pore water, surface water, and biota from the Androscoggin River, Coos County, New Hampshire.—Continued

[USGS, U.S. Geological Survey; NRP, National Research Program; USEPA, U.S. Environmental Protection Agency; NERL, New England Regional Laboratory]

Notation	Type of data	Collection period	Source of data	Method and (or) method citation
		Surface-water mercury parameters		
THg	Total mercury	2009	Columbia Analytical Services	E1631, USEPA (2001, 2002).
MeHg	Methylmercury	2009	Columbia Analytical Services	1630, USEPA (1998).
$Hg(II)_{KOH}$	1M KOH-extractable mercury	2009	Columbia Analytical Services	Bloom (2009).
		Surface-water nonmercury parameters		
TAL metals	Target analyte list metals	2009	Als Laboratory Group	ILM05.4, USEPA (2006).
SO_4	Sulfate	2009	Columbia Analytical Services	E300.0, USEPA (1982).
C. dubia toxicity	*Ceriodaphnia dubia* survival & reproduction	2009	USEPA NERL	Chronic 7-day bioassay, USEPA (2008a,b).
P. promelas toxicity	*Pimephales promelas* survival & biomass	2009	USEPA NERL	Chronic 7-day bioassay, USEPA (2008a,b).
TOC	Total organic carbon	2009	Columbia Analytical Services	SW9060, USEPA (2007).
E_h	Oxidation-reduction potential	2010	USGS field parameter	Wilde and others (2005).
pH	pH	2009, 2010	USGS field parameter	Wilde and others (2005).
		Biota mercury parameters		
THg	Total mercury	2009	Columbia Analytical Services	E1631, USEPA (2001, 2002).
		2010, 2011	USEPA NERL	Milestone Inc. Direct Mercury Analyzer operation manual (2008).
		Biota nonmercury parameters		
Invertebrate assemblages		2009	Lotic Inc., Unity, Maine	Neils (2007); New Hampshire Department of Environmental Services (2004).

Table 4. Wilcoxon rank sum test comparing results upstream and downstream from a former chloralkali site on the Androscoggin River in Berlin, New Hampshire.

[The nonparametric Wilcoxon rank sum (WRS) test comparison of medians grouped either upstream (reference, AR1 and (or) AR2) or downstream from a former chloralkali site (AR3 to AR9). The first quartile (25th percentile (%)), median (50th %), and third quartile (75th %) are shown, along with results from all mercury metric comparisons. Only significant results for sediment and pore-water nonmercury metrics are shown. Parameter notations are listed in table 2. dw, dry weight; EPT, Ephemeroptera, Plecoptera, Trichoptera; g/cm^3, grams per cubic centimeter; L/kg, liters per kilogram; µm, micrometer; mg, milligrams; mg/g, milligrams per gram; mg/kg, milligrams per kilogram; mL/cm^3, milliliters per cubic centimeter; N, (number of observations); ng/g, nanograms per gram; ng/L, nanograms per liter; NS, non-significant differences between groupings at a probability level of p less than 0.05; pg/g/d, picograms per gram per day; ww, wet weight; <, less than; †, significant differences between groupings at a probability level of p less than 0.05]

Media			Reference stream reach				Downstream stream reaches				WRS
Parameter	Units of measurement	Years	25th %	Median	75th %	N	25th %	Median	75th %	N	
Sediment mercury parameters											
THg	ng/g dw	2009, 2010	22	30	69	(11)	89	114	184	-60	†
$Hg(II)_R$	ng/g dw	2010	0.09	0.11	0.13	(8)	0.14	0.18	0.27	-52	†
$\%Hg(II)_R$	% of THg	2010	0.37	0.46	0.53	(8)	0.08	0.15	0.23	-52	†
MeHg	ng/g dw	2009, 2010	0.21	0.23	0.47	(5)	0.65	0.96	1.26	-21	†
%MeHg	% of THg	2009, 2010	1.26	1.4	1.54	(2)	0.47	0.6	0.97	-15	NS
k_{meth}	per day	2010	0.0083	0.0087	0.009	(2)	0.0056	0.0095	0.0149	-13	NS
MPP	pg/g/d dw	2010	0.64	0.79	0.95	(2)	1.03	2.11	3.68	-13	NS
K_d[THg]	L/kg	2010	4.47	4.61	4.75	(2)	4.53	4.88	5.07	-13	NS
K_d[MeHg]	L/kg	2010	3.26	3.3	3.33	(2)	3.01	3.24	3.5	-13	NS
Pore-water mercury parameters											
pw.THg	ng/L	2009, 2010	0.26	0.7	1.35	(5)	1.15	1.72	5.93	-20	NS
pw.MeHg	ng/L	2009, 2010	0.06	0.1	0.1	(5)	0.09	0.3	0.59	-20	†
pw%MeHg	% of THg	2009, 2010	10.83	21.07	29.36	(3)	12.02	23.98	38.44	-15	NS
Biota total mercury											
Oligochaete	ng/g ww	2009	18	20	22	(5)	25	31	40	-19	†
Crayfish	ng/g ww	2009, 2011	50	59	64	(12)	72	89	110	-39	†
WS	ng/g ww	2009, 2011	119	132	135	(7)	136	208	278	-19	†
SMB	ng/g ww	2009, 2011	390	418	421	(10)	511	587	638	-38	†
Bat fur	ng/g ww	2010	4,369	5,062	6,372	(11)	11,920	56,830	118,400	-27	†
Bat blood	ng/g ww	2010	166	233	312	(4)	318	428	566	-12	NS
Swallow feather-adult	ng/g ww	2010	996	1,128	1,324	(14)	997	1,417	1,644	-20	NS
Swallow feather-nestling	ng/g ww	2010	1,059	1,309	1,447	(13)	1,644	1,647	2,118	-9	†
Swallow blood-adult	ng/g ww	2010	288	306	343	(11)	433	520	585	-14	†
Swallow blood-nestling	ng/g ww	2010	30	40	40	(13)	42	53	73	-9	†
Swallow egg	ng/g ww	2010	495	527	568	(13)	607	773	803	-15	†
Sediment sequential extractions											
F1: water	ng/g dw	2010	0.03	0.03	0.04	(2)	0.02	0.05	0.07	-13	NS
	% of THg	2010	0.09	0.1	0.11	(2)	0.01	0.02	0.03	-13	NS

Table 4. Wilcoxon rank sum test comparing results upstream and downstream from a former chloralkali site on the Androscoggin River in Berlin, New Hampshire.—Continued

[The nonparametric Wilcoxon rank sum (WRS) test comparison of medians grouped either upstream (reference, AR1 and (or) AR2) or downstream from a former chloralkali site (AR3 to AR9). The first quartile (25th percentile (%)), median (50th %), and third quartile (75th %) are shown, along with results from all mercury metric comparisons. Only significant results for sediment and pore-water nonmercury metrics are shown. Parameter notations are listed in table 2. dw, dry weight; EPT, Ephemeroptera, Plecoptera, Trichoptera; g/cm^3, grams per cubic centimeter; L/kg, liters per kilogram; µm, micrometer; mg, milligrams; mg/g, milligrams per gram; mg/kg, milligrams per kilogram; mL/cm^3, milliliters per cubic centimeter; N, (number of observations); ng/g, nanograms per gram; ng/L, nanograms per liter; NS, non-significant differences between groupings at a probability level of p less than 0.05; pg/g/d, picograms per gram per day; ww, wet weight; <, less than; †, significant differences between groupings at a probability level of p less than 0.05]

Media			Reference stream reach				Downstream stream reaches				WRS
Parameter	Units of measurement	Years	25th %	Median	75th %	N	25th %	Median	75th %	N	
Sediment sequential extractions—Continued											
F2: 0.1 M acetic acid	ng/g dw	2010	0.02	0.02	0.03	(2)	0.02	0.02	0.03	-13	NS
	% of THg	2010	0.07	0.08	0.09	(2)	0.01	0.02	0.02	-13	†
F3: 1.0 M KOH	ng/g dw	2010	23.4	27.3	31.3	(2)	56.3	70.9	111	-13	†
	% of THg	2010	87.2	87.6	88.1	(2)	38.2	45	58.9	-13	†
F4: 12 M HNO_3	ng/g dw	2010	2.69	2.98	3.26	(2)	43.9	71.3	87.2	-13	†
	% of THg	2010	9.36	9.83	10.3	(2)	39.3	49.9	55.8	-13	†
F5: Aqua Regia	ng/g dw	2010	0.62	0.74	0.86	(2)	3.1	3.9	7.2	-13	†
	% of THg	2010	2.29	2.35	2.4	(2)	2.18	2.65	5.77	-13	NS
Sediment nonmercury parameters											
$Fe(II)_{AE}$	mg/g dw	2010	3.92	4.39	4.86	(2)	1.66	2.29	3.07	-13	†
AVS	mg/kg dw	2009	17.8	17.8	25.7	(3)	2.07	2.41	3	-8	†
Bulk density	g/cm^3 ww	2010	1.32	1.37	1.46	(8)	1.47	1.55	1.67	-52	†
% fines	% <74 µm	2009	55	56.3	60	(3)	25.5	32.2	42.1	-8	†
	% <63 µm	2010	63.1	72.1	75.3	(8)	27.9	44.8	56.4	-52	†
Porosity	mL/cm^3 ww	2010	0.64	0.72	0.74	(8)	0.53	0.59	0.64	-52	†
pct.DW	% of ww	2009, 2010	43	46	56	(11)	56	61	68	-60	†
Sediment toxicity											
Hyalella.azteca.survival	%	2009, 2010	78	80	80	(5)	74	79	85	-21	NS
Hyalella.azteca.biomass	mg dw	2009, 2010	0.38	0.39	0.4	(5)	0.34	0.43	0.5	-21	NS
Chironomus.dilutus.survival	%	2009, 2010	70	76	83	(5)	61	75	80	-21	NS
Chironomus.dilutus.biomass	mg dw	2009, 2010	0.44	0.5	1.25	(5)	0.3	1.15	1.29	-21	NS
Pore-water toxicity											
Chironomus.tentans.survival	%	2009, 2010	80	90	100	(5)	80	90	100	-21	NS
Hyalella.azteca.survival	%	2009, 2010	70	80	80	(5)	90	100	100	-21	†
Invertebrate metrics											
Abundance		2009	288	316	486	(3)	148	604	1,020	-12	NS
Total taxa		2009	14	14	15	(3)	9.9	12	13	-12	NS
EPT taxa		2009	16	16	16	(3)	13	15	17	-12	NS

Table 5. Kruskal-Wallis rank sum test results comparing data grouped by sample distance from a former chloralkali site on the Androscoggin River in Berlin, New Hampshire.

[The nonparametric Kruskal-Wallis rank sum (KWRS) test comparison of medians grouped by distance from a former chloralkali site. The reference reach (AR2) is 16 kilometers (km) upstream from the former chloralkali site; near-stream reaches (AR3–AR6) are 0 to 4 km downstream from the former chloralkali site; far-stream reaches (AR7–AR9) are 8 to 16 km downstream from the former chloralkali site. The first quartile (25th percentile (%)), median (50th %), and third quartile (75th %) are shown, along with results from all mercury metric comparisons. Only significant results for nonmercury metrics are shown. Tukey multiple-comparison test was used to determine rankings on data KWRS indicated as significant. Letters A and B, indicate which medians are different: A medians are statistically different than B medians, and AB medians are not statistically different than A or B. Parameter notation definitions are listed in table 2. dw, dry weight; EPT, Ephemeroptera, Plecoptera, Trichoptera; g/cm^3, grams per cubic centimeter; L/kg, liters per kilogram; mg, milligrams; mL/cm^3, milliliters per cubic centimeter; µm, micrometers; mv, millivolts; N, (number of observations); ng/g, nanograms per gram; ng/L, nanograms per liter; NS, nonsignificant differences between groupings at a probability level of p less than 0.05; pg/g/d, picograms per gram per day; THg, total mercury; ww, wet weight; <, less than; †, significant differences between groupings at a probability level of p less than 0.05]

Media			Reference stream reach					Near stream reaches					Far stream reaches					KWRS
Parameter	Units of measure-ment	Year	25th %	Median		75th %	N	25th %	Median		75th %	N	25th %	Median		75th %	N	
Sediment mercury parameters																		
THg	ng/g dw	2009, 2010	21	26	B	30	(11)	84	117	A	240	(25)	82	111	AB	160	(35)	†
$Hg(II)_R$	ng/g dw	2010	0.09	0.11	B	0.13	(8)	0.12	0.16	B	0.22	(24)	0.14	0.21	A	0.36	(28)	†
$\%Hg(II)_R$	% of THg	2010	0.37	0.46	AB	0.53	(8)	0.07	0.12	B	0.18	(24)	0.13	0.17	A	0.32	(28)	†
MeHg	ng/g dw	2009, 2010	0.16	0.22	B	0.35	(5)	0.28	0.74	AB	1.39	(7)	0.71	0.98	A	1.23	(14)	†
%MeHg	% of THg	2009, 2010	1.26	1.40		1.54	(2)	0.31	0.53		0.94	(7)	0.51	0.69		0.99	(8)	NS
k_{meth}	per day	2010	0.01	0.01		0.01	(2)	0.01	0.01		0.02	(6)	0.00	0.01		0.01	(7)	NS
MPP	pg/g/d dw	2010	0.64	0.79		0.95	(2)	1.42	2.39		3.96	(6)	0.34	1.27		3.68	(7)	NS
K_d[THg]	L/kg	2010	4.47	4.61		4.75	(2)	4.50	4.71		4.93	(6)	4.77	4.88		5.08	(7)	NS
K_d[MeHg]	L/kg	2010	3.26	3.30		3.33	(2)	2.92	3.20		3.37	(6)	3.04	3.24		3.65	(7)	NS
Pore-water mercury parameters																		
pw.THg	ng/L	2009, 2010	0.26	0.70		1.35	(5)	1.15	1.32		8.68	(7)	0.94	1.72		2.30	(13)	NS
pw.MeHg	ng/L	2009, 2010	0.06	0.10	B	0.10	(5)	0.19	0.52	A	1.90	(7)	0.07	0.29	AB	0.55	(13)	†
pw%MeHg	% of THg	2009, 2010	10.8	21.1		29.4	(3)	17.7	30.2		38.7	(6)	7.97	24.0		27.3	(9)	NS
Biota total mercury																		
Oligochaete	ng/g ww	2009	18.3	19.5	B	21.6	(5)	24.7	32.2	AB	40.6	(8)	27.1	31.3	A	38.7	(11)	†
Crayfish	ng/g ww	2009, 2011	50.0	59.3	B	64.3	(12)	76.5	95.0	A	111	(25)	69.2	74.1	AB	105	(14)	†
White sucker	ng/g ww	2009, 2011	119	132	B	134	(7)	99.2	153	B	211	(10)	182	251	A	343	(9)	†
Smallmouth bass	ng/g ww	2009, 2011	390	418	B	421	(10)	393	528	B	604	(21)	583	629	A	639	(17)	†
Sediment sequential extractions																		
F1: water	ng/g dw	2010	0.03	0.03		0.04	(2)	0.02	0.04		0.44	(6)	0.03	0.05		0.06	(7)	NS
	% of THg	2010	0.09	0.10		0.11	(2)	0.01	0.02		0.09	(6)	0.02	0.02		0.03	(7)	NS
F2: 0.1 M acetic acid	ng/g dw	2010	0.02	0.02		0.03	(2)	0.02	0.04		0.05	(6)	0.02	0.02		0.02	(7)	NS
	% of THg	2010	0.07	0.08		0.09	(2)	0.01	0.02		0.03	(6)	0.01	0.01		0.02	(7)	NS
F3: 1.0 M KOH	ng/g dw	2010	23.4	27.3		31.3	(2)	63.5	82.6		106	(6)	55.7	67.7		92.2	(7)	NS
	% of THg	2010	87.2	87.6		88.1	(2)	33.8	47.4		67.7	(6)	41.2	45.0		54.6	(7)	NS

Table 5. Kruskal-Wallis rank sum test results comparing data grouped by sample distance from a former chloralkali site on the Androscoggin River in Berlin, New Hampshire.—Continued

[The nonparametric Kruskal-Wallis rank sum (KWRS) test comparison of medians grouped by distance from a former chloralkali site. The reference reach (AR2) is 16 kilometers (km) upstream from the former chloralkali site; near-stream reaches (AR3–AR6) are 0 to 4 km downstream from the former chloralkali site; far-stream reaches (AR7–AR9) are 8 to 16 km downstream from the former chloralkali site. The first quartile (25th percentile (%)), median (50th %), and third quartile (75th %) are shown, along with results from all mercury metric comparisons. Only significant results for nonmercury metrics are shown. Tukey multiple-comparison test was used to determine rankings on data KWRS indicated as significant. Letters A and B, indicate which medians are different: A medians are statistically different than B medians, and AB medians are not statistically different than A or B. Parameter notation definitions are listed in table 2. dw, dry weight; EPT, Ephemeroptera, Plecoptera, Trichoptera; g/cm^3, grams per cubic centimeter; L/kg, liters per kilogram; mg, milligrams; mL/cm^3, milliliters per cubic centimeter; µm, micrometers; mv, millivolts; N, (number of observations); ng/g, nanograms per gram; ng/L, nanograms per liter; NS, nonsignificant differences between groupings at a probability level of p less than 0.05; pg/g/d, picograms per gram per day; THg, total mercury; ww, wet weight; <, less than; †, significant differences between groupings at a probability level of p less than 0.05]

Media			Reference stream reach					Near stream reaches					Far stream reaches					KWRS
Parameter	Units of measurement	Year	25th %	Median		75th %	N	25th %	Median		75th %	N	25th %	Median		75th %	N	
Sediment sequential extractions—Continued																		
F4: 12 M HNO_3	ng/g dw	2010	2.69	2.98		3.26	(2)	48.0	78.1		145	(6)	53.1	66.6		82.5	(7)	NS
	% of THg	2010	9.36	9.83		10.3	(2)	30.3	46.4		61.3	(6)	43.3	50.0		53.7	(7)	NS
F5: aqua regia	ng/g dw	2010	0.62	0.74		0.86	(2)	3.15	3.36		26.6	(6)	3.49	5.02		6.53	(7)	NS
	% of THg	2010	2.29	2.35		2.40	(2)	2.05	2.40		5.13	(6)	2.42	3.33		4.68	(7)	NS
Sediment nonmercury parameters																		
Sediment E_h	mv	2010	86	104	AB	108	(2)	22	85	B	121	(24)	91	136	A	175	(28)	†
Bulk density	g/cm^3 ww	2010	1.32	1.37	B	1.46	(8)	1.48	1.55	A	1.69	(24)	1.44	1.54	AB	1.66	(28)	†
% fines	% <63 µm	2010	63	72	A	75	(8)	26	47	B	56	(24)	29	42	B	57	(28)	†
Porosity	mL/cm^3 ww	2010	0.64	0.72	A	0.74	(8)	0.52	0.59	B	0.64	(24)	0.53	0.59	B	0.65	(28)	†
pct.DW	% of wet wt	2009, 2010	43	46	B	56	(11)	56	61	A	70	(25)	56	61	A	67	(35)	†
Sediment toxicity																		
H.azteca survival	%	2009, 2010	78	80		80	(5)	77	79		86	(7)	72	80		84	(14)	NS
H.azteca biomass	mg dw	2009, 2010	0.38	0.39		0.40	(5)	0.43	0.43		0.49	(7)	0.33	0.42		0.50	(14)	NS
C.dilutus survival	%	2009, 2010	70	76		83	(5)	66	80		88	(7)	60	73		76	(14)	NS
C.dilutus biomass	mg dw	2009, 2010	0.44	0.50		1.25	(5)	1.25	1.29		1.48	(7)	0.30	0.67		1.19	(14)	NS
Pore-water toxicity																		
C.tentans survival	%	2009, 2010	80	90		100	(5)	48	85		95	(7)	83	90		99	(14)	NS
H.azteca survival	%	2009, 2010	70	80		80	(5)	95	100		100	(7)	90	95		100	(14)	NS
Invertebrate metrics																		
Abundance		2009	288	316		486	(3)	69.5	587		1,510	(6)	322	604		890	(6)	NS
Total taxa		2009	14	14		15	(3)	9.4	11		13	(6)	11	13		13	(6)	NS
EPT taxa		2009	16	16		16	(3)	13	14		15	(6)	13	17		19	(6)	NS

Table 6. Sequential extraction results for surface sediment, Androscoggin River, Coos County, New Hampshire.

[Surface sediment encompasses 0- to 10-centimeter (cm) interval. See table 3 for details on the specific fraction number (F#) and associated dominant mercury species extracted. THg, total mercury; ng/g, nanograms per gram; --, no data]

F#	THg, in ng/g dry weight			THg, average, in percent
	Replicate 1	Replicate 2	Average	
		AR2–4		
F1	0.02	0.07	0.05	0.12
F2	0.03	0.02	0.03	0.07
F3	34.2	36.2	35.2	88.6
F4	3.79	3.29	3.54	8.9
F5	0.96	1	0.98	2.46
Total	39	40.5	39.8	100
		AR2–5		
F1	0.02	--	0.02	0.08
F2	0.02	--	0.02	0.09
F3	19.4	--	19.4	86.8
F4	2.41	--	2.41	10.8
F5	0.5	--	0.5	2.24
Total	22.4	--	22.4	100
		AR4–1		
F1	0.83	0.96	0.89	0.11
F2	0.03	0.07	0.05	0.01
F3	62.8	57.6	60.2	7.64
F4	338	1,020	680	86.3
F5	37.8	56.4	47.1	5.97
Total	439	1,140	788	100
		AR4–2		
F1	0.56	0.59	0.58	0.44
F2	0.02	0.02	0.02	0.02
F3	35.2	47.9	41.6	31.9
F4	78.5	91.4	84.9	65.1
F5	3.66	3.17	3.41	2.62
Total	118	143	130	100
		AR5–1		
F1	0.02	--	0.02	0.01
F2	0.03	--	0.03	0.02
F3	111	--	111	71.9
F4	40.2	--	40.2	26.1
F5	3.1	--	3.1	2.01
Total	154	--	154	100
		AR5–2		
F1	0.05	--	0.05	0.01
F2	0.1	--	0.1	0.03
F3	131	--	131	39.7
F4	165	--	165	49.9
F5	34.3	--	34.3	10.4
Total	331	--	331	100

Table 6. Sequential extraction results for surface sediment, Androscoggin River, Coos County, New Hampshire.—Continued

[Surface sediment encompasses 0- to 10-centimeter (cm) interval. See table 3 for details on the specific fraction number (F#) and associated dominant mercury species extracted. THg, total mercury; ng/g, nanograms per gram; --, no data]

F#	THg, in ng/g dry weight			THg, average, in percent
	Replicate 1	Replicate 2	Average	
		AR6–2		
F1	0.03	--	0.03	0.03
F2	0.04	--	0.04	0.05
F3	73.5	--	73.5	77.6
F4	19.1	--	19.1	20.2
F5	2.06	--	2.06	2.18
Total	94.7	--	94.7	100
		AR6–3		
F1	0.01	--	0.01	0.01
F2	0.01	--	0.01	0.01
F3	91.8	--	91.8	55.2
F4	71.3	--	71.3	42.8
F5	3.3	--	3.3	1.98
Total	166	--	166	100
		AR7–1		
F1	0.07	--	0.07	0.05
F2	0.02	--	0.02	0.01
F3	56.3	--	56.3	38.2
F4	87.2	--	87.2	59.1
F5	3.9	--	3.9	2.65
Total	147	--	147	100
		AR7–2		
F1	0.05	--	0.05	0.03
F2	0.02	--	0.02	0.01
F3	114	--	113.5	69.5
F4	43.8	--	43.8	26.8
F5	5.85	--	5.85	3.58
Total	163	--	163	100
		AR8–4		
F1	0.02	--	0.02	0.01
F2	0.03	--	0.03	0.02
F3	70.9	--	70.9	50.4
F4	66.6	--	66.6	47.4
F5	3.08	--	3.08	2.19
Total	141	--	141	100
		AR8–5		
F1	0.03	--	0.03	0.02
F2	0.02	--	0.02	0.02
F3	55.1	--	55.1	44.1
F4	62.4	--	62.4	50
F5	7.2	--	7.2	5.77
Total	125	--	125	100

Table 6. Sequential extraction results for surface sediment, Androscoggin River, Coos County, New Hampshire.—Continued

[Surface sediment encompasses 0- to 10-centimeter (cm) interval. See table 3 for details on the specific fraction number (F#) and associated dominant mercury species extracted. THg, total mercury; ng/g, nanograms per gram; --, no data]

F#	THg, in ng/g dry weight			THg, average, in percent
	Replicate 1	Replicate 2	Average	
		AR9–5		
F1	0.01	--	0.01	0.02
F2	0.02	--	0.02	0.05
F3	28.7	--	28.7	58.9
F4	19.2	--	19.2	39.3
F5	0.86	--	0.86	1.77
Total	48.8	--	48.8	100
		AR9–6		
F1	0.05	--	0.05	0.03
F2	0.02	--	0.02	0.01
F3	67.7	--	67.7	45
F4	77.8	--	77.8	51.7
F5	5.02	--	5.02	3.33
Total	151	--	151	100
		AR9–7		
F1	0.1	--	0.1	0.02
F2	0.02	--	0.02	0
F3	120	--	119.8	24.2
F4	276	--	276	55.8
F5	98.7	--	98.7	20
Total	494	--	494	100

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Appendix 1. Quality Assurance and Control at the U.S. Geological Survey Laboratory in Menlo Park, California

Tables

1–1. Holding times and preservation used for sediment samples collected from the Androscoggin River, Coos County, New Hampshire, August 23–27, 2010
1–2. Method blanks and method detection limits used for the study of the Androscoggin River, Coos County, New Hampshire
1–3. Laboratory analytical replicate results for sediment and pore-water samples from the Androscoggin River, Coos County, New Hampshire, collected August 23–27, 2010
1–4. Matrix spike results for sediment and pore-water samples collected from the Androscoggin River, Coos County, New Hampshire, August 23–27, 2010
1–5. Certified reference material recovery results for the study of the Androscoggin River, Coos County, New Hampshire

Appendix 1. Quality Assurance and Control at the U.S. Geological Survey Laboratory in Menlo Park, California

Quality assurance (QA) and quality control (QC) results for all parameters assayed by the U.S. Geological Survey (USGS) Western Region Research Laboratory in Menlo Park, Calif., are listed below.

Holding Times

All assays were conducted within the prescribed holding times, as established by either the U.S. Environmental Protection Agency (USEPA), the U.S. Geological Survey (USGS), or peer-reviewed studies from the literature (Horvat and others, 1993; Parker and Bloom, 2005; table 1–1). In the case of studies published in the literature, the USGS laboratory takes a conservative prescribed holding time approach by setting sample holding limits lower than the published study results.

Blanks

Method blanks were run to assess contamination introduced in the laboratory. In most cases, values from the method blanks were below our method detection limit (table 1–2), indicating that the methods and equipment used were free of (or did not introduce) contamination. The exceptions were for pore-water dissolved organic carbon (pw.DOC) and chloride (pw.Cl) where small amounts of the analyte were detected.

Laboratory Replicates

Laboratory analytical replicates represent multiple samples taken from the same container of site-specific sediment as a measure of both sample homogeneity and laboratory reproducibility. At least one analytical replicate was analyzed for each sediment and pore-water parameter; the results are listed in table 1–3.

Matrix Spike Samples

Matrix spike percent recoveries were evaluated to determine acceptable accuracy based on method-specific percent recoveries, which are generally set to be 75- to 125-percent recovery for the laboratory's control limit (table 1–4). Typically when spikes are reported below this accepted range, they indicate a low bias, and when reported above this range, they indicate a high bias. However, if the spike concentration was low compared with the sample concentration, a poor recovery is not in itself indicative of a QC problem. Further, not all sediment parameters are amenable to matrix spikes. For example, the addition of mercuric chloride to sediment quickly partitions itself between tin-reducible and nonreducible pools and thus cannot be used as a reliable matrix spike for the reactive divalent mercury ($Hg(II)_R$) assay. Similarly, there is no commercially available material that can mimic the operationally defined amorphous ferric iron ($Fe(III)_a$) sediment pool, and thus the $Fe(III)_a$ assay is not subject to a matrix spike assay.

Certified Reference Material

Certified reference material (CRM) is available for only a limited number of the analytes assayed in the study of the Androscoggin River, specifically for sediment total mercury (THg) and methylmercury (MeHg). Like matrix spikes, CRM recoveries were evaluated to determine acceptable accuracy based on method-specific percent recoveries, which are generally set to be 75 to 125 percent for the laboratory's control limit. CRM recovery results for THg and MeHg are listed in table 1–5.

Appendix 2. Surface-Water, Pore-Water, Sediment, Invertebrate, and Biota Data

Data in the following tables are for whole (unsieved) streambed-sediment, filtered pore-water, and filtered and unfiltered surface-water samples. Pore-water samples were collected directly from the streambed using a push-point sampler and peristaltic pump.

Tables

2–1. Sampling dates, and site descriptions for sediment, water, and benthic invertebrate samples from the Androscoggin River, Coos County, New Hampshire

2–2. Parameters used in the analysis of surface-water samples from the Androscoggin River, Coos County, New Hampshire

2–3. Concentrations of metals in streambed-sediment samples from the Androscoggin River, Coos County, New Hampshire

2–4. Parameters used in the analysis of pore-water samples from the Androscoggin River, Coos County, New Hampshire

2–5. Concentrations of metals in filtered and unfiltered pore-water samples from the Androscoggin River, Coos County, New Hampshire

2–6. Parameters used in the analysis of streambed-sediment samples from the Androscoggin River, Coos County, New Hampshire

2–7. Concentrations of metals in streambed-sediment samples from the Androscoggin River, Coos County, New Hampshire

2–8. Concentrations of acid volatile sulfide and simultaneously extractable metals in streambed-sediment samples from the Androscoggin River, Coos County, New Hampshire

2–9. Concentrations of pesticides in streambed-sediment samples from the Androscoggin River, Coos County, New Hampshire

2–10. Concentrations of semivolatile organic compounds in streambed-sediment samples from the Androscoggin River, Coos County, New Hampshire

2–11. Concentrations of polychlorinated biphenyl compounds in streambed-sediment samples from the Androscoggin River, Coos County, New Hampshire

2–12. Concentrations of dioxin and furan compounds in streambed-sediment samples from the Androscoggin River, Coos County, New Hampshire

2–13. Results of 7-day toxicity tests for cladoceran and fathead minnow exposed to surface water from the Androscoggin River, Coos County, New Hampshire

2–14. Survival rate from 96-hour toxicity tests for amphipod *Hyalella azteca* and midge *Chironomus tentans* exposed to pore-water from the Androscoggin River, Coos County, New Hampshire

2–15. Results of 28-day toxicity tests for amphipod *Hyalella azteca* and 20-day toxicity tests for midge *Chironomus dilutus* exposed to sediments from the Androscoggin River, Coos County, New Hampshire

2–16. Concentrations of total mercury in biota in the Androscoggin River, Coos County, New Hampshire

2–17. New Hampshire Department of Environmental Services benthic index of biotic integrity for the Androscoggin River, Coos County, New Hampshire

2–18. Benthic invertebrates from the Androscoggin River downstream from Pontook Dam, Coos County, New Hampshire
2–19. Benthic invertebrates from the Androscoggin River downstream from Sawmill Dam, Coos County, New Hampshire
2–20. Benthic invertebrates from the Androscoggin River downstream from Riverside Dam, Coos County, New Hampshire
2–21. Benthic invertebrates from the Androscoggin River downstream from Brown Dam, Coos County, New Hampshire
2–22. Benthic invertebrates from the Androscoggin River downstream from Gorham Dam, Coos County, New Hampshire

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Appendix 1: Quality Assurance /Control Report for the USGS Laboratory, Menlo Park, CA

Quality assurance and quality control results for all parameters assayed by the USGS Western Region Research Laboratory, Menlo, CA, are given below.

Holding Times

All assays were conducted within the prescribed holding times, as established by either EPA, USGS, or peer-reviewed studies from the literature (**TableA1-1**). In the case of studies published in the literature, our laboratory (USGS) takes a conservative 'prescribed holding time' approach by setting our sample holding limits lower than the published study results.

Table A1-1. Holding Times and preservation used for Androscoggin River sediment samples collected during August 23-27, 2010

[Parameter notation as given **Table 3**. Maximum holding times 'authority' as established by either the U.S. Environmental Protection Agency (EPA) where indicated. Where no EPA guidance exists, holding times are given as established by our laboratory (USGS). hrs, hours]

Parameter	Authority	Preservation prior to assay	Maximum Prescribed Holding Time	Actual Holding Time
THg	EPA	Frozen, -80°C	1 year	150-154 days
MeHg	USGS	Frozen, -80°C	180 days [a]	82-86 days
$Hg(II)_R$	USGS	Frozen, -80°C	1 year [b]	139-145 days
$Fe(II)_{AE}$	USGS	Frozen, -80°C	1 year[b]	116-120 days
$Fe(III)_a$	USGS	Frozen, -80°C	1 year [b]	116-120 days
$Fe(III)_c$	USGS	Frozen, -80°C	1 year[b]	117-121 days
TRS	USGS	Frozen, -80°C	180 days	132-135 days
E_h	USGS	Refrigerated	< 24 hrs	< 24 hrs
pH	USGS	Refrigerated	< 24 hrs	< 24 hrs
dry weight	USGS	Refrigerated	undetermined [c]	63-67 days
%LOI	USGS	Refrigerated	undetermined [c]	63-67 days
Bulk density	USGS	Refrigerated	undetermined [c]	63-67 days
Porosity	USGS	Refrigerated	undetermined [c]	63-67 days
%fines	USGS	Refrigerated	Indefinite	63-67 days
pw.DOC	EPA	Acidified/Refrigerated	28 days	4-8 days
pw.Fe(ll)	EPA	Acidified /Refrigerated	6 months	4-8 days
pw.SO4/Cl	USGS	Frozen	180 days [d]	102-105 days
pw.MeHg	USGS	Acidified /Refrigerated	180 days [e]	138-142 days
pw.THg	USGS	Acidified /Refrigerated	180 days [e]	102-105 days

[a] EPA has no recommended holding time for MeHg in sediment stored frozen. However, studies published in the literature indicate no significant change in MeHg concentrations for samples stored frozen for periods exceeding 8 months (Horvat and others, 1993)

[b] While there has not been extensive testing of holding time on these operationally defined metal fractions, a study by EPA showed no significant change in acid-extractable metal concentrations for As, Cu, Pb, or Zn after 1 year when samples were held frozen at -80°C (USEPA, 2005).

[c] A holding time for this parameter has not been explicitly determined, but based upon many years of experience samples held refrigerated in tightly sealed containers are stable for this parameter for at least 90 days.

[d] The EPA recommended holding time for dissolved anions in samples stored refrigerated is 28 days. However, there is no EPA recommendation for samples stored frozen. In our experience aqueous anion samples stored frozen at -80°C are stable for at least 180 days, but likely for years.

[e] While the EPA prescribed holding time for acidified aqueous Hg samples, stored refrigerated, is 28 days, a more rigorous examination of preservation techniques and holding times has been published in the literature (Parker and Bloom, 2005), and demonstrates that both THg and MeHg samples preserved in this manner are stable for at least 300 days.

Blanks

Method blanks were run to assess contamination introduced in the laboratory. In most cases, method blanks were below our method detection limit (**Table A1-2**) indicating that the methods and equipment used were free of (or did not introduce) contamination. The exceptions were for pore-water DOC (pw.DOC) and chloride (pw.Cl) where small amounts of the analyte were detected.

Table A1-2. Method blanks and Method Detection Limits.

[Parameter notation as given **Table 3**. ng g-1, nanograms per gram; d.w., dry weight; mg/g, milligrams per gram; µmol/g, micromoles per gram; mV, millivolts; %, percent; mg/g, milligrams per gram; g cm-3, grams per cubic centimeter; <, less than; µm, micrometer; ml PW/cm^3, milliliter pore-water per cubic centimeterµmol/L , micromoles per liter; ng/L, nanograms per liter; pg, picograms; mg/ml, milligrams per milliliter; µmol/ml, micromole per millimeter; mg/ml, milligram per milliliter; µmol/L, micromole per liter]

Parameter	Method Detection Limit	Method Blank
THg	0.5 ng/L at the level of the Tekran 2600 autoanalyzer	<0.5 ng/L
MeHg	0.5 pg (absolute mass as Hg) at the level of the MERX autoanalyzer	< 0.5 pg
$Hg(II)_R$	0.05 ng (absolute mass as Hg) at the level of the fluorescence detector.	< 0.05 ng
$Fe(II)_{AE}$	0.01 mg/ml at the level of the spectrophotometric analysis	< 0.01 mg/ml
$Fe(III)_a$	0.01 mg/ml at the level of the spectrophotometric analysis	< 0.01 mg/ml
$Fe(III)_c$	0.01 mg/ml at the level of the spectrophotometric analysis	< 0.01 mg/ml
TRS	0.2 umol/ml at the level of the spectrophotometric analysis	< 0.2 **µ**mol/ml
pw.DOC	0.20 mg/L at the level of the DOC analyzer	1.7±0.7 mg/L (n=2)
pw.Fe(ll)	0.01 mg/ml at the level of the spectrophotometric analysis	< 0.01 mg/ml
pw.THg	0.5 ng/L at the level of the Tekran 2600 autoanalyzer	<0.5 ng/L
pw.MeHg	0.5 pg (absolute mass as Hg) at the level of the MERX autoanalyzer	< 0.5 pg

Parameter	Method Detection Limit	Method Blank
pw.SO4	0.08 ppm or 0.8 (µmol/L) at the level of the Dionex	< 0.08 ppm, < 0.8 (µmol/L)
pw.Cl	0.07 ppm or 2.0 (µmol/L) at the level of the Dionex	0.11 ppm, 3.1 (µmol/L)

Laboratory Replicates

Laboratory analytical replicates represent multiple samples taken from the same container of site-specific sediment, as a measure of both sample homogeneity and laboratory reproducibility. At least one analytical replicate was run for each sediment and pore-water parameter, with the results given in **Table A1-3**.

Table A1-3. Laboratory Analytical Replicate Results for Androscoggin R. sediment and pore-water samples collected during August 23-27, 2010.

[Parameter notation as given **Table 3**. The deviation (DEV) between n=2 analytical duplicates is calculated as DEV = ABS(X1 – X2)/2, where X1 and X2 represent analytical duplicates. The %DEV is then calculated as %DEV = DEV/mean*100. The mean %DEV is given along with the error if multiple analytical duplicates were assayed (as DEV for n=2 pairs and STDEV for n≥3 pairs). The number of analytical duplicates analyzed for a given parameter is defined as 'N'. ng g-1, nanograms per gram; d.w., dry weight; mg/g, milligrams per gram; µmol/g, micromoles per gram; mV, millivolts; %, percent; mg/g, milligrams per gram; g cm-3, grams per cubic centimeter; <, less than; µm, micrometer; ml PW/cm^3, milliliter pore-water per cubic centimeter; mg/L, milligrams per liter; µmol/L , micromoles per liter; ng/L, nanograms per liter]

Parameter	Units	%DEV	N
THg	(ng/g) d.w.	25.5 ± 20.0	6
MeHg	(ng/g) d.w.	6.3 ± 3.6	2
$Hg(II)_R$	(ng/g) d.w.	16.8 ± 11.4	8
$Fe(II)_{AE}$	(mg/g) d.w.	1.6	1
$Fe(III)_a$	(mg/g) d.w.	n.d.[a]	1
$Fe(III)_c$	(mg/g) d.w.	47.3 [b]	1
TRS	(µmol/g) d.w.	19.5 ± 3.7	2
E_h	(mV)	n.d.	0
pH	pH Units	n.d.	0
dry weight	(% of wet weight)	0.9 ± 0.8	6
%LOI	(% of d.w.)	5.1 ± 3.2	6
Bulk density	(g/cm^3)	0.7 ± 0.8	6
Porosity	(ml PW/cm^3)	1.2 ± 1.6	6
%fines	(% < 64 µm)	2.9 ± 3.3	9
TC	(%)	15 ± 10	6
TN	(%)	5.1 ± 4.6	6
pw.DOC	(mg/L)	6.6 ± 5.2	15

Parameter	Units	%DEV	N
pw.Fe(ll)	(mg/L)	1.5 ± 1.4	15
pw.SO4	(µmol/L)	9.8 ± 14.3	14
pw.Cl	(µmol/L)	9.4 ± 7.8	14
pw.MeHg	(ng/L)	0.1	1
pw.THg	(ng/L)	2.2 ± 2.1	2

[a] The %DEV could not be calculated in this case because both replicates were below our analytical reporting limit of 0.1 mg/g for $Fe(III)_a$.

[b] The %DEV for this analyte pair was high because the $Fe(III)_c$ concentration was quite low (0.54±0.26 mg/g) and just above our analytical reporting limit of 0.1 mg/g.

Matrix Spike Samples

Matrix spike percent recoveries were evaluated to determine acceptable accuracy based on method-specific percent recoveries, which are generally set at 75–125% recovery for our laboratory's control limit (**Table A1-4**). Typically when spikes are reported below this accepted range they indicate a low bias, and when reported above this range they indicate a high bias. However, if the spike concentration was low in comparison with the sample concentration, a poor recovery is not in itself indicative of a QC problem. Further, not all sediment parameters are amenable to matrix spikes. For example, the addition of $HgCl_2$ to sediment quickly partitions itself between Sn-reducible and non-reducible pools, and thus cannot be used as a reliable matrix spike for the $Hg(II)_R$ assay. Similarly, there is no commercially available material that can mimic the operationally defined amorphous Fe(III) sediment pool, and thus the $Fe(III)_a$ assay is not subject to a matrix spike assay.

Table A1-4. Matrix Spike Results for Androscoggin R. sediment and pore-water samples collected during August 23-27, 2010.

[Parameter definitions as given **Table 3**. ng g-1, nanograms per gram; d.w., dry weight; wt. weight; mg/g, milligrams per gram; mg/g, milligrams per gram; mg/L, milligrams per liter; ng/L, nanograms per liter]

Parameter	Units	Recovery (%)	N
THg	(ng/g) d.w.	103 ± 8	5
MeHg	(ng/g) wet wt.	95 ± 3	4
$Fe(II)_{AE}$ [a]	(mg/g) d.w.	96	1
$Fe(III)_c$ [b]	(mg/g) d.w.	108	1
pw.DOC	(mg/L)	106 ± 6	3

pw.Fe(ll)	(mg/L)	118	1
pw.SO4	(mg/L)	131	1
pw.Cl	(mg/L)	111	1
pw.THg	(ng/L)	110 ± 1	2

[a] Spike consisted of $FeSO_4$ solution.

[b] Spike consisted of commercial solid phase powdered magnetite (Fe_2O_3)

Certified Reference Material

Certified reference material (CRM) is available for only a limited number of the analytes assayed in the current study, specifically for sediment THg and MeHg. Like matrix spike's, CRM recoveries were evaluated to determineacceptable accuracy based on method-specific percent recoveries, which are generally set at 75–125% for our laboratory's control limit. CRM recovery results for THg and MeHg given in **Table A1-5.**

Table A1-5. Certified Reference Material Recovery Results

[Parameter definitions as given **Table 3**.]

Parameter	Units	CRM Used	Recovery (%)	N
THg	(µg/g) d.w.	PACS-2 marine sediment	92 ± 3	3
MeHg	(ng/g) d.w.	IAEA 405 estuarine sediment	105 ± 1	2

Appendix 2: Data Tables

Table A2-1. Sediment, water, and benthic invertebrate sampling dates, site locations, and descriptions for Androscoggin River Coos County, New Hampshire.

Table A2-2. Parameters in surface water, Androscoggin River, Coos County, New Hampshire.

Table A2-3. Concentrations of metals in surface sediment (0-10 cm interval), Androscoggin River, Coos County, New Hampshire.

Table A2-4. Parameters in pore water, Androscoggin River, Coos County, New Hampshire.

Table A2-5. Concentrations of metals in filtered and unfiltered pore-water, Androscoggin River, Coos County, New Hampshire.

Table A2-6. Parameters in surface sediment (0-10 cm interval), Androscoggin River, Coos County, New Hampshire.

Table A2-7. Concentrations of metals in surface sediment (0-10 cm interval), Androscoggin River, Coos County, New Hampshire.

Table A2-8. Acid Volatile Sulfide and Simultaneously Extractable Metal results from Androscoggin River stream sediments.

Table A2-9. Concentrations of pesticides in streambed sediment, Androscoggin River, Coos County, New Hampshire.

Table A2-10. Concentrations of semivolatile organic compounds in streambed sediment, Androscoggin River, Coos County, New Hampshire.

Table A2-11. Concentrations of polychlorinated biphenyl compounds in streambed sediment, Androscoggin River, Coos County, New Hampshire.

Table A2-12. Concentrations of dioxin and furan compounds in streambed sediment, Androscoggin River, Coos County, New Hampshire.

Table A2-13. Results of 7-day toxicity tests with the cladoceran, Ceriodaphnia dubia, and fathead minnow, Pimephales promelas, exposed to surface water from the Androscoggin River.

Table A2-14. Percent survival of 96-hour toxicity tests with the amphipod Hyalella azteca and midge Chironomus dilutus exposed to pore-water from the Androscoggin River.

Table A2-15. Results of 28-day toxicity tests with the amphipod, Hyalella azteca, and of 10-day toxicity tests with the midge, Chironomus dilutus, exposed to sediments from the Androscoggin River.

Table A2-16. Concentrations of total Hg in biota, Androscoggin River, Coos County, New Hampshire.

Table A2-17. Benthic Invertebrate sampling dates and metrics for Androscoggin River, Coos County, New Hampshire.

Table A2-18. Benthic Invertebrates, Androscoggin River downstream of Pontock Dam, Coos County, New Hampshire August, 2009.

Table A2-19. Benthic Invertebrates, Androscoggin River downstream of Sawmill Dam, Coos County, New Hampshire August, 2009.

Table A2-20. Benthic Invertebrates, Androscoggin River downstream of Riverside Dam, Coos County, New Hampshire August, 2009.

Table A2-21. Benthic Invertebrates, Androscoggin River downstream of Brown Dam, Coos County, New Hampshire August, 2009.

Table A2-22. Benthic Invertebrates, Androscoggin River downstream of Gorham Dam, Coos County, New Hampshire August, 2009.

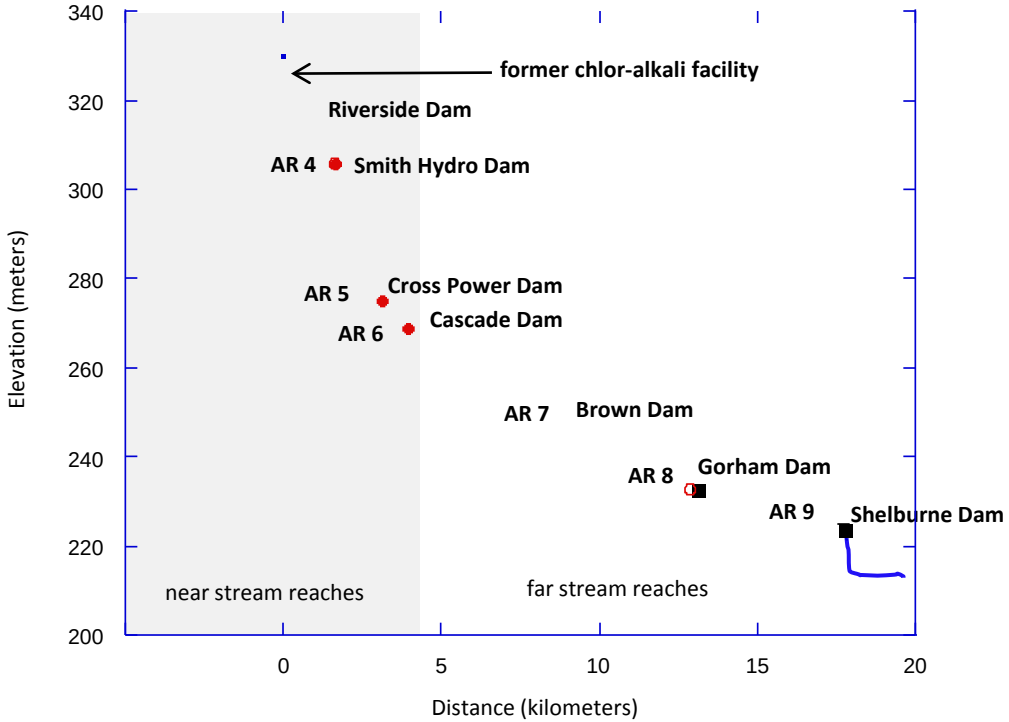
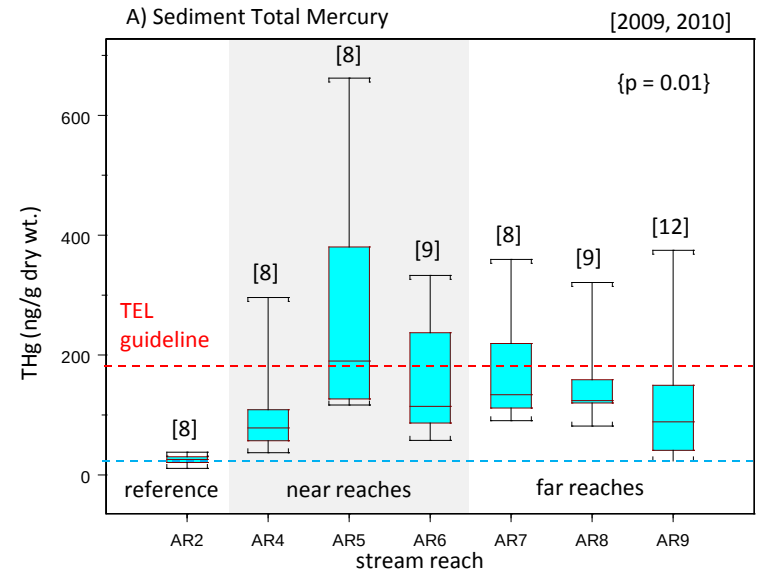
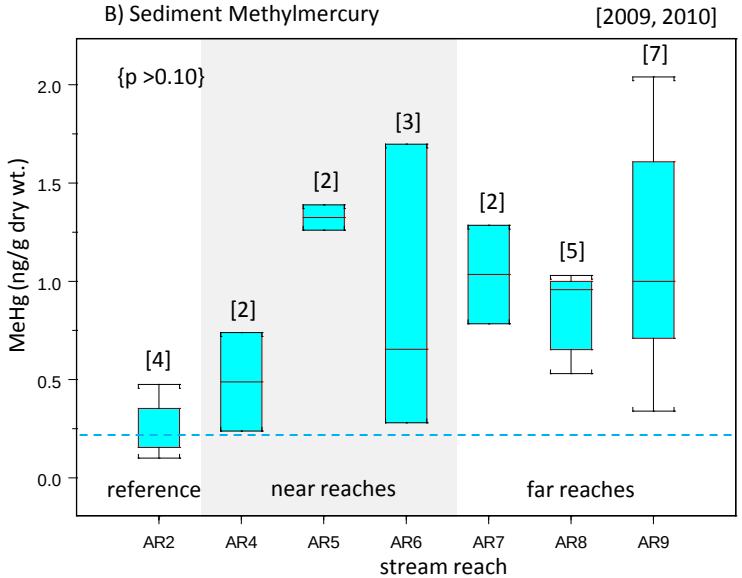


Figure 1. Sediment and pore-water sampling locations (AR4-9) on the Androscoggin River downstream of a former chlor-alkali facility in Berlin, New Hampshire.
The reference reach (AR 2), 16 km upstream from a former chlor-alkali facility in Berlin, NH, is not shown. Sampling locations are shown with red circles, dams are located with black squares. Elevation and distance data from Google Earth 2/17/12.





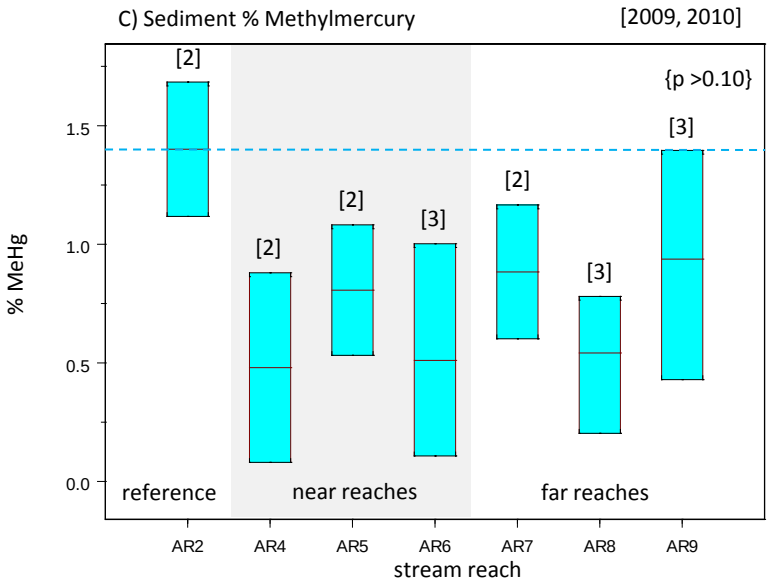
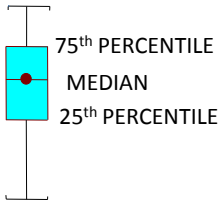


Figure 2. Concentrations of sediment mercury species from 7 reaches of the Androscoggin River, New Hampshire.
A, Sediment total mercury (THg). B, Sediment methylmercury (MeHg). C, Sediment percentage of THg as MeHg (% MeHg). Samples from the reference reach (AR 2) are 16 km upstream from a former chlor-alkali facility in Berlin, NH, samples from near reaches (AR4-6) are 2-4 km downstream, and samples from far reaches (AR7-9) are 8-16 km downstream. THg and MeHg nondectect data excluded because of high detection levels. Dashed blue line is median reference concentration. Dashed red line is MacDonald and others, (2000) consensus -based Threshold Effects Level (TEL) concentration of 180 ng/g. Date of sample collection in brackets [yyyy] The number of observations is given in brackets [N]. Analysis of variance (ANOVA) probability level of significance for differences between individual stream reaches is given in brackets {p = x.xx} [ng/g, nanograms per gram; wt., weight]



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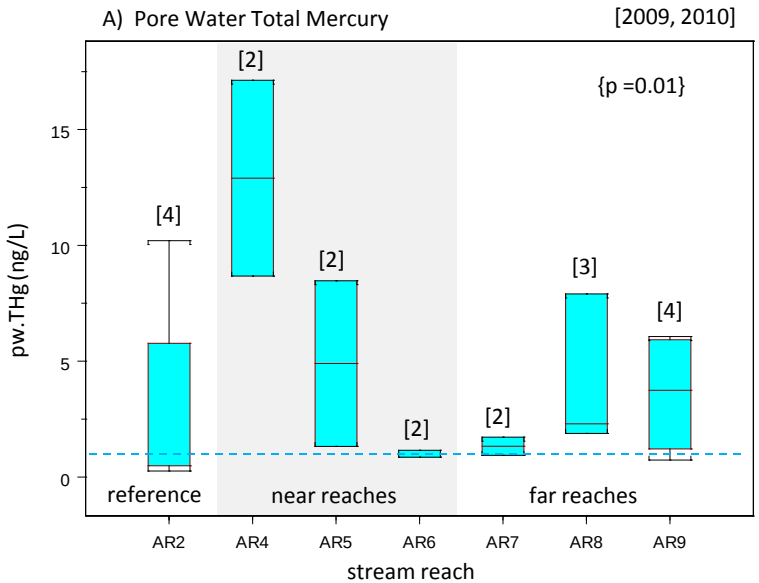
Error bars associated with box plots represent minimum and maximum values



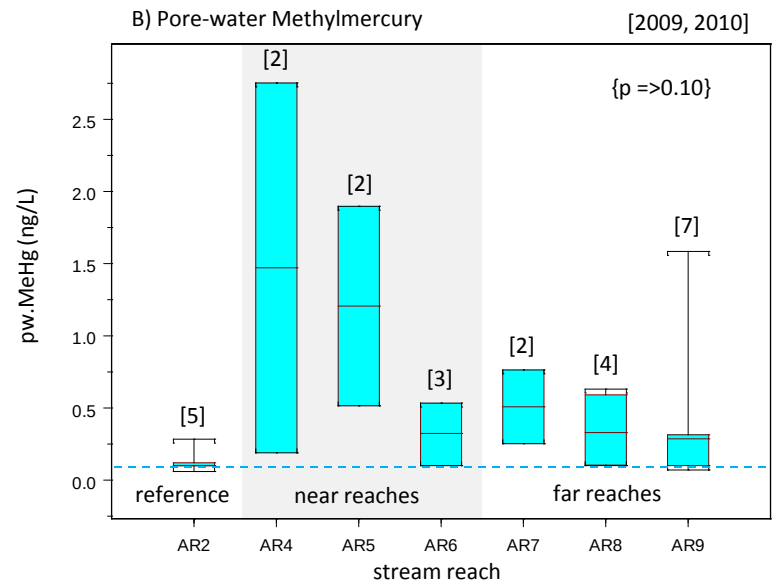
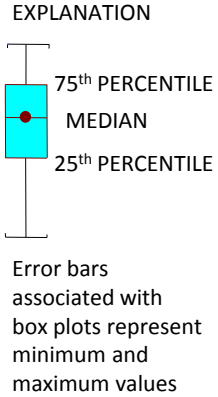
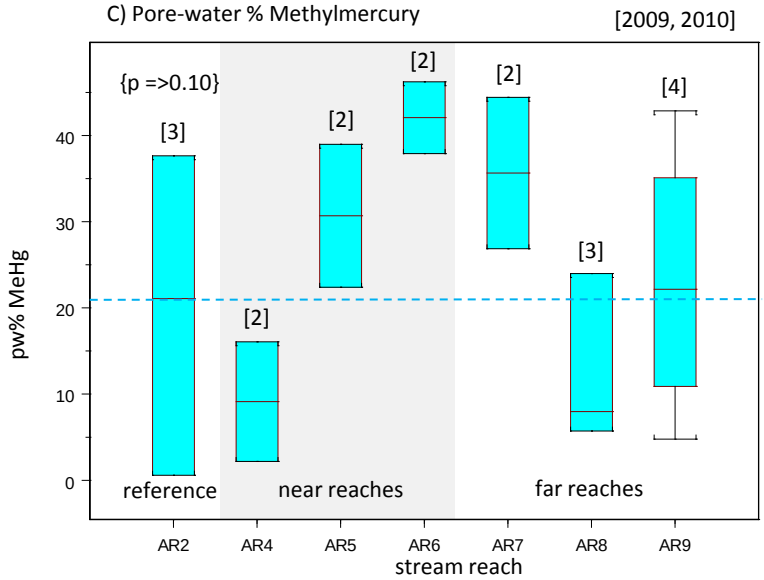
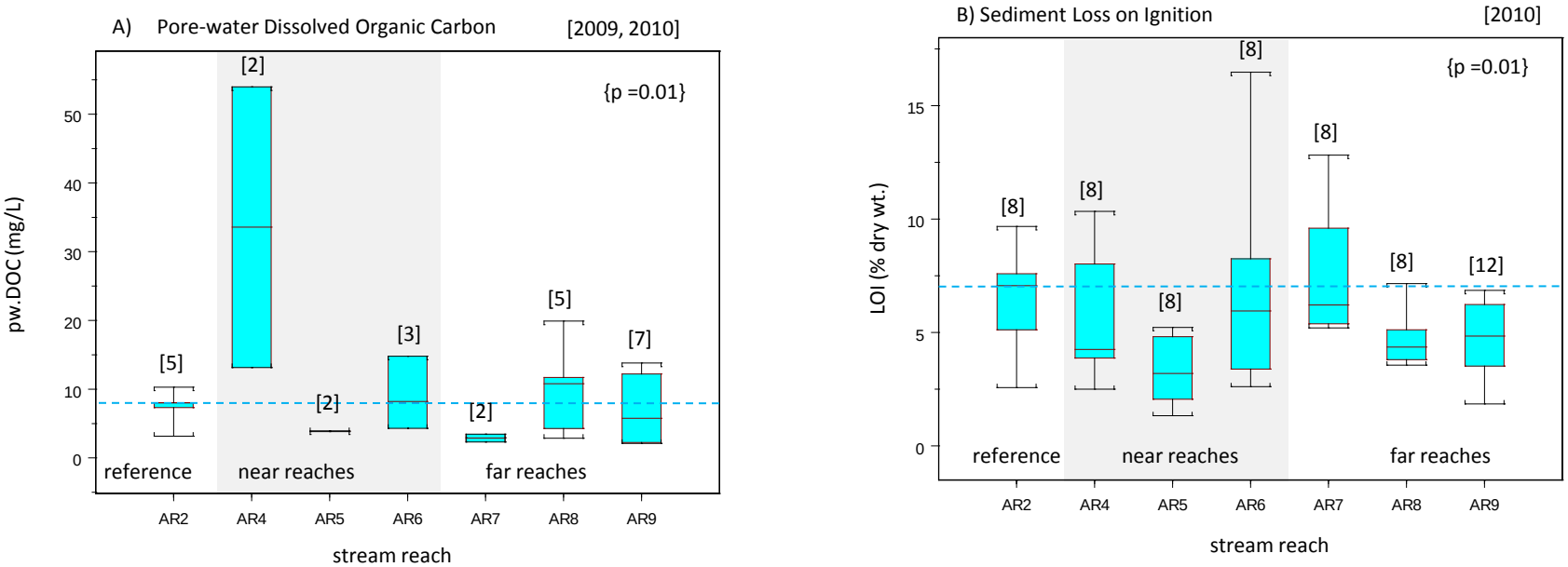


Figure 3. Concentrations of pore-water mercury species from 7 reaches of the Androscoggin River, New Hampshire. A, Pore-water total mercury (pw.THg). B, Pore-water methylmercury (pw.MeHg). C, Pore-water percentage of THg as MeHg (pw% MeHg). Samples from the reference reach (AR 2) are 16 km upstream from a former chlor-alkali facility in Berlin, NH, samples from near reaches (AR4-6) are 2-4 km downstream, and samples from far reaches (AR7-9) are 8-16 km downstream. THg nondectect data excluded because of high detection level. Dashed blue line is median reference concentration. Date of sample collection in brackets [yyyy]. The number of observations is given in brackets [N]. Analysis of variance (ANOVA) probability level of significance for differences between individual stream reaches in brackets {p =x.xx}. [ng/L, nanograms per liter]







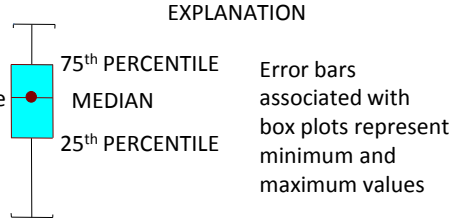
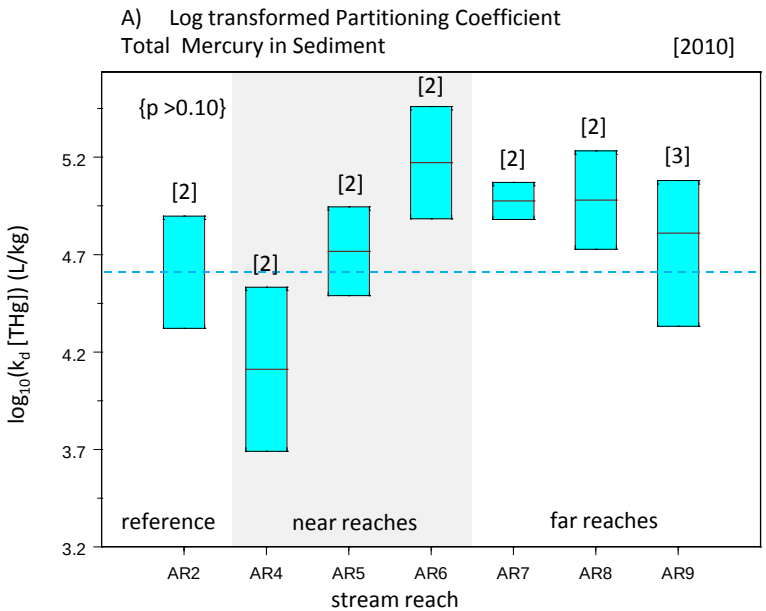
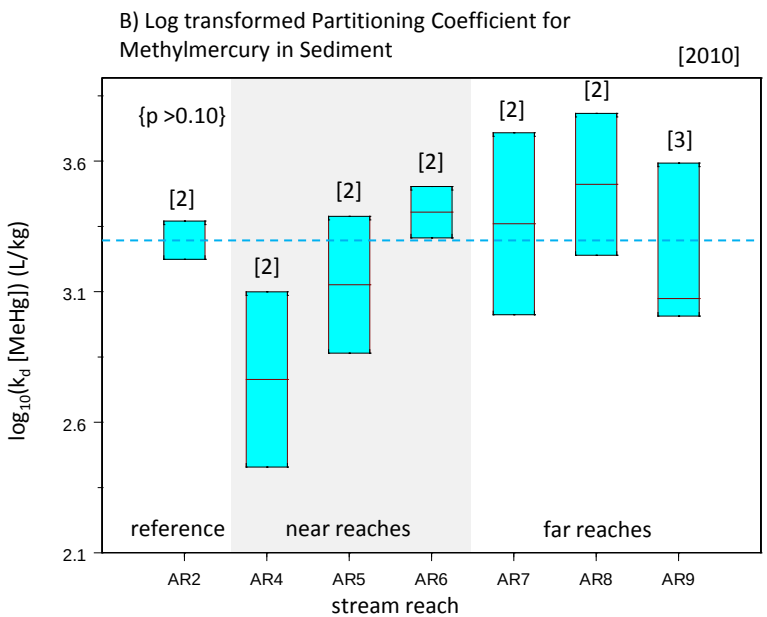
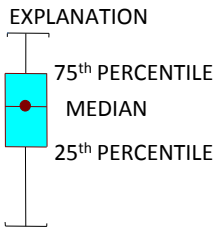


Figure 4. Concentrations of organic carbon in pore-water and sediment from 7 reaches of the Androscoggin River, New Hampshire.
A, Pore-water Dissolved Organic Carbon (pw.DOC). B, Sediment Loss on Ignition (%LOI). Samples from the reference reach (AR 2) are 16 km upstream from a former chlor-alkali facility in Berlin, NH, samples from near reaches (AR4-6) are 2-4 km downstream, and samples from far reaches (AR7-9) are 8-16 km downstream. Dashed blue line is median reference concentration. Date of sample collection in brackets [yyyy]. The number of observations is given in brackets [N]. Analysis of variance (ANOVA) probability level of significance for differences between individual stream reaches in brackets {p x.xx}. [mg/L, milligrams per liter; [%, percent; wt., weight]







Error bars associated with box plots represent minimum and maximum values

Figure 5. Mercury Partitioning Coefficients from 7 reaches of the Androscoggin River, New Hampshire. A, Total Mercury Partitioning Coefficient ($\log_{10}(k_d$ [THg]). B, Methylmercury Partitioning Coefficient ($\log_{10}(k_d$ [MeHg])). Samples from the reference reach (AR 2) are 16 km upstream from a former chlor-alkali facility in Berlin, NH, samples from near reaches (AR4-6) are 2-4 km downstream, and samples from far reaches (AR7-9) are 8-16 km downstream. Dashed blue line is median reference concentration. Date of sample collection in brackets [yyyy]. The number of observations is given in brackets [N]. Analysis of variance (ANOVA) probability level of significance for differences between individual stream reaches in brackets {p =x.xx}. [L/kg, liters per kilogram]

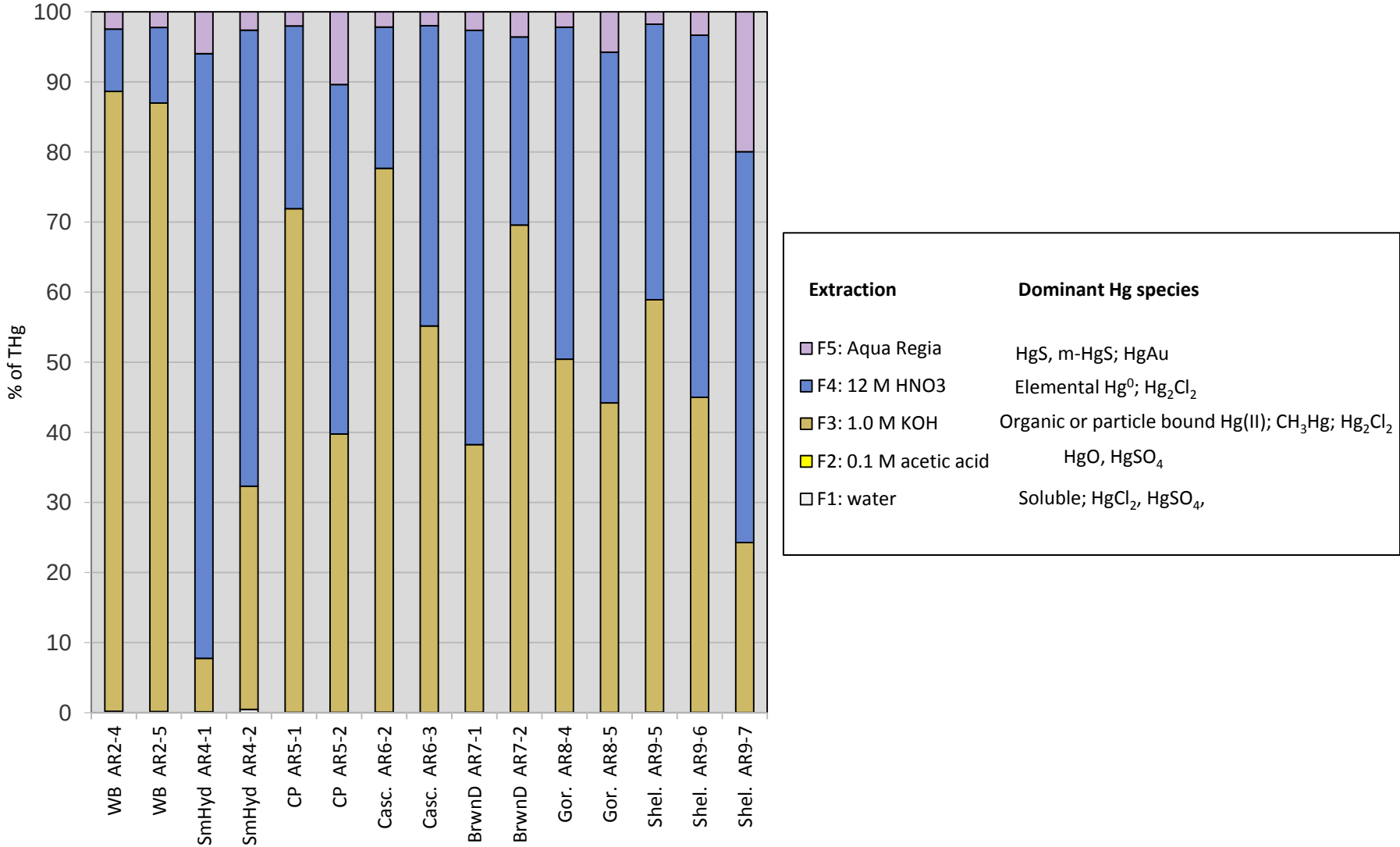


Figure 6. Sequential Extraction of surfical sediment from 7 reaches of the Androscoggin River, New Hampshire. [The mercury sequential extraction sequence, as per Bloom and others (2003), with each fraction number (F#) described by both the extraction solution used and the dominant mercury species associated with that fraction. % of THg, percentage of THg as F#; M, molarity; HCl, hydrochloric acid; HNO_3, nitric acid; KOH, potassium hydroxide; Hg, mercury; $HgCl_2$, mercuric chloride; $HgSO_4$, mercuric sulfate; HgO, mercuric oxide; Hg(II), divalent inorganic mercury; CH_3Hg, methylmercury; Hg^0, elemental mercury; Hg_2Cl_2, mercurous chloride, HgS, cinnabar; m-HgS, meta-cinnabar; HgAu, mercury gold amalgam.]

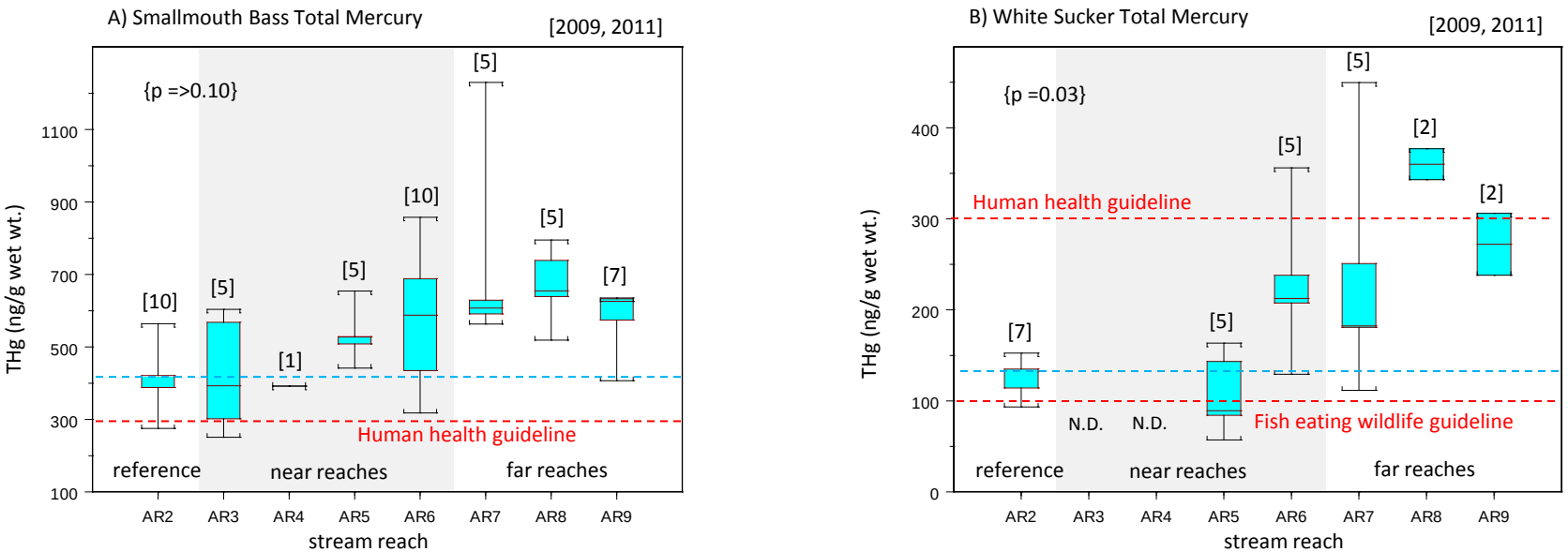
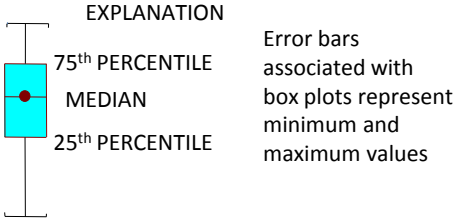


Figure 7. Concentrations of fish total mercury from 8 reaches of the Androscoggin River, New Hampshire. A, Smallmouth Bass total mercury (THg). B, White Sucker total mercury (THg) . Smallmouth Bass samples are skin-off fillets, white suckers samples are whole fish. Dashed blue line is median reference concentration and dashed red lines are fish THg guideline concentrations. EPA Human health guideline HgT concentration in fish is 300 ng/g (USEPA, 2001, 2009), and Yeardley and others (1998) guideline concentration for fish-eating mammals is 100 ng/g. Dates of sample collection in brackets [yyyy] . The number of observations is given in brackets [N]. Analysis of variance (ANOVA) probability level of significance for differences between individual stream reaches in brackets {p =x.xx}. N.D. indicates that no data was collected from that stream reach. [ng/g, nanograms per gram; wt., weight]



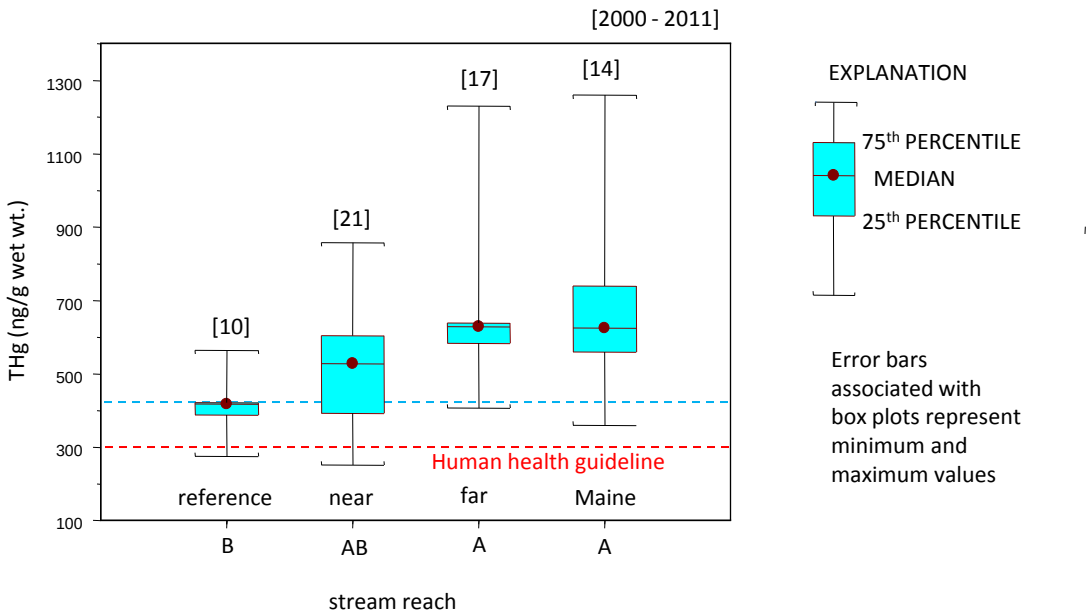


Figure 8. Concentrations of smallmouth bass total mercury from the Androscoggin River, Dummer, New Hampshire to Lisbon, Maine.

The reference reach (Dummer, NH) is 16 km upstream from a former chlor-alkali facility in Berlin, NH, near reaches are 0-4 km downstream from the former facility, far reaches are 5-16 km downstream in Gorham and Shelburne, NH, and the Maine (ME) sampling reach is from Rumford and Lisbon, ME. ME smallmouth bass data was collected by ME Department of Environmental Protection Surface Water Ambient Toxics monitoring program (SWAT) from 1990 - 2009. Dashed blue line is median reference concentration and red dashed line is EPA Human health guideline (USEPA, 2001, 2009). Letters A, B, and AB indicate statistical significance, A reaches labeled are statistically different than B reaches, and AB reaches are not statistically different than A or B. Dates of sample collection in brackets [yyyy-yyyy]. The number of observations is given in brackets [N]. [ng/g, nanograms per gram; wt., weight]

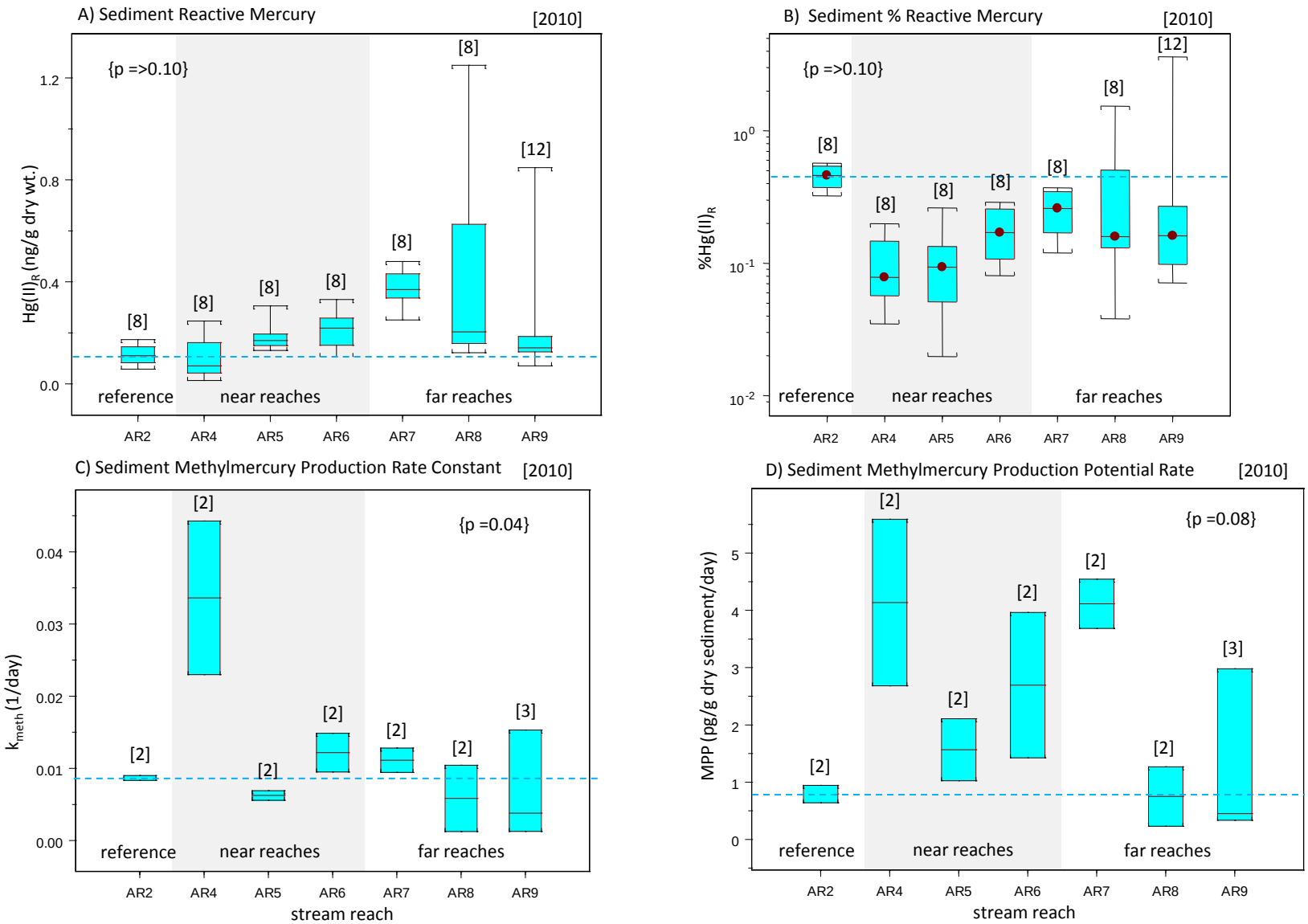


Figure 9. Sediment Mercury Methylation Potential from 7 reaches of the Androscoggin River, New Hampshire. A, Inorganic reactive mercury ($Hg(II)_R$). B, Sediment percentage of THg as inorganic reactive mercury ($\%Hg(II)_R$). C, Methylmercury Production Rate Constant (k_{meth}). D, Methylmercury Production Potential rate (MPP) based on reactive mercury. Samples from the reference reach (AR 2) are 16 km upstream from a former chlor-alkali facility in Berlin, NH, samples from near reaches (AR4-6) are 2-4 km downstream, and samples from far reaches (AR7-9) are 8-16 km downstream. Dashed blue line is median reference concentration. Date of sample collection in brackets [yyyy]. The number of observations is given in brackets [N]. Analysis of variance (ANOVA) probability level of significance for differences between individual stream reaches in brackets {p =x.xx}. [pg/g, picograms per gram; ng/g, nanograms per gram; wt., weight]

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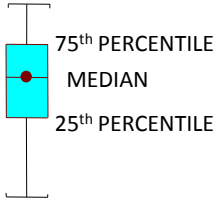
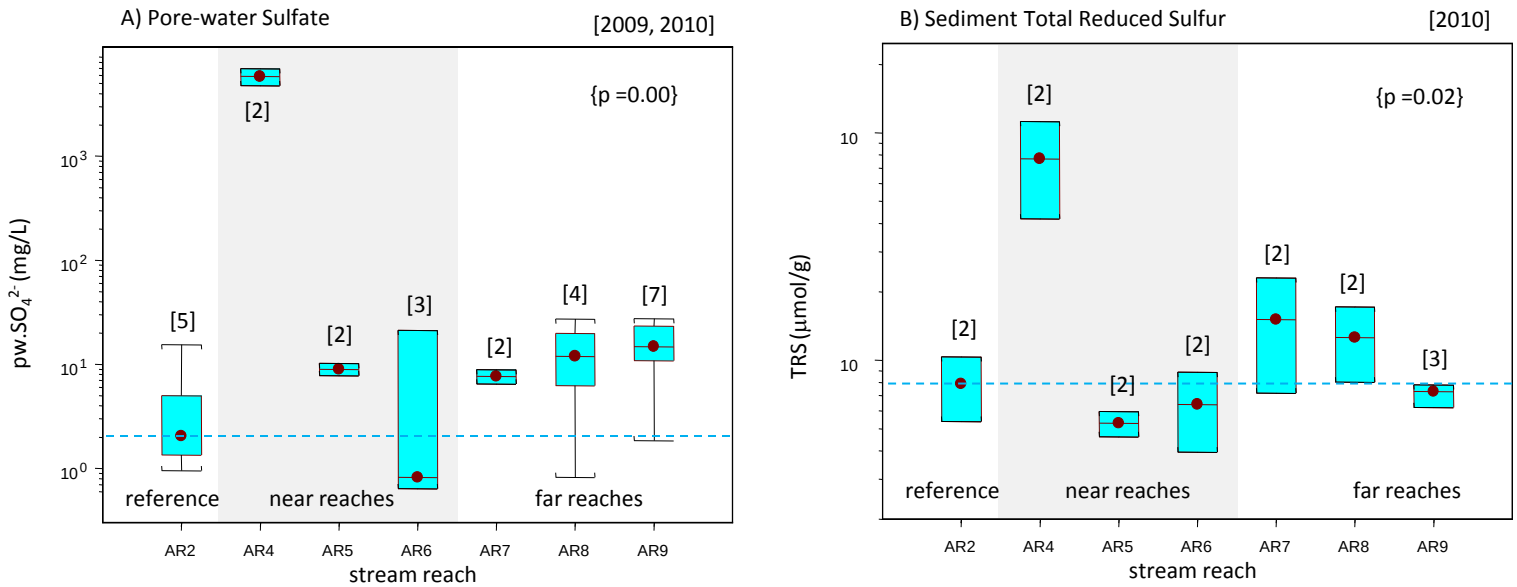


Error bars associated with box plots represent minimum and maximum values



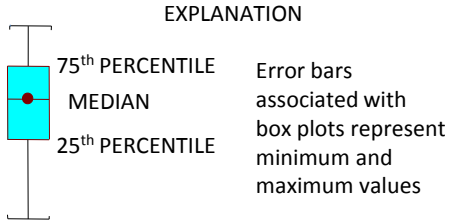


Figure 10. Concentrations of sulfur species in sediment and pore-water from 7 reaches of the Androscoggin River, New Hampshire.
A, Pore-water sulfate (pw.SO_4^{2-}). B, Sediment Total Reduced Sulfur (TRS). Samples from the reference reach (AR 2) are 16 km upstream from a former chlor-alkali facility in Berlin, NH, samples from near reaches (AR4-6) are 2-4 km downstream, and samples from far reaches (AR7-9) are 8-16 km downstream. Dashed blue line is median reference concentration. Date of sample collection in brackets [yyyy]. The number of observations is given in brackets [N]. Analysis of variance (ANOVA) probability level of significance for differences between individual stream reaches in brackets {p =x.xx}. [mg/L, milligrams per liter; µmol/g, micromoles per gram]

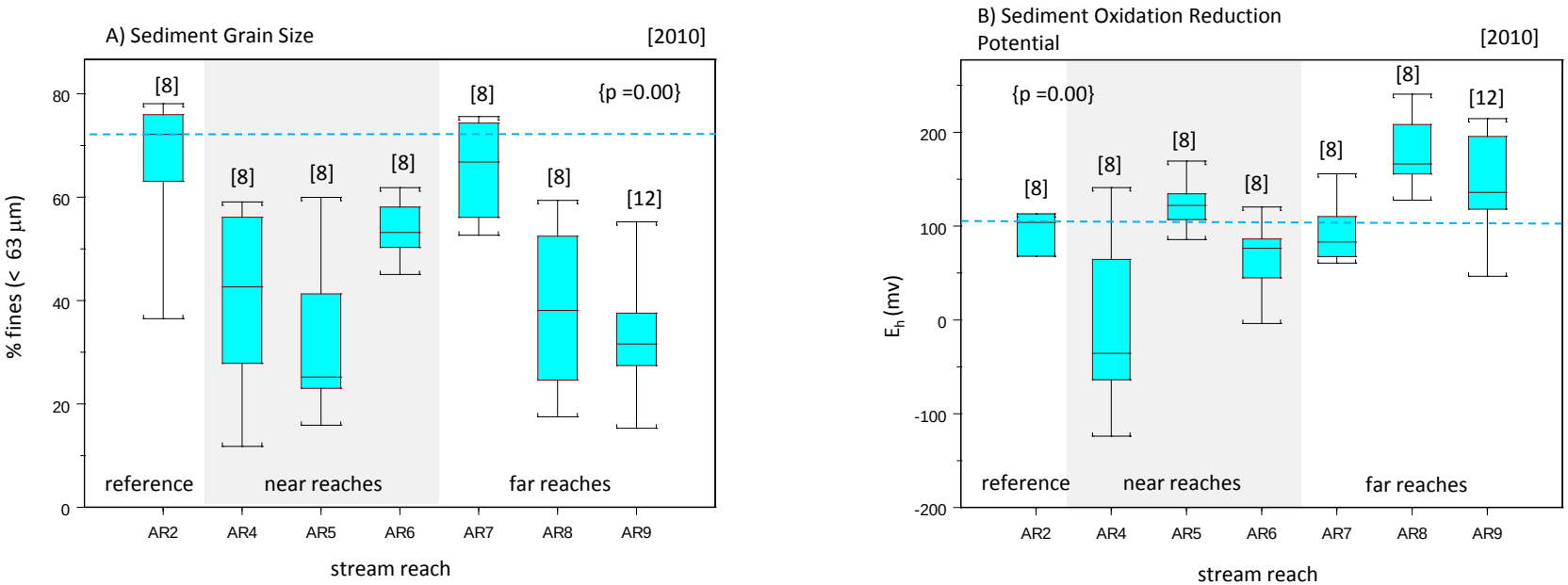
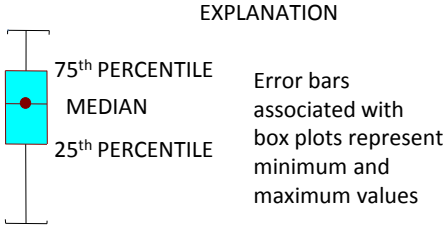


Figure 11. Sediment grain size less than 63 µm and Oxidation Reduction Potential from 7 reaches of the Androscoggin River, New Hampshire.

A, Sediment grain size (%fines < 63 µm) . B, Sediment Oxidation Reduction Potential (E_h). Samples from the reference reach (AR 2) are 16 km upstream from a former chlor-alkali facility in Berlin, NH, samples from near reaches (AR4-6) are 2-4 km downstream, and samples from far reaches (AR7-9) are 8-16 km downstream. Dashed blue line is median reference concentration. The number of observations is given in brackets [N]. Date of sample collection in brackets [yyyy]. Analysis of variance (ANOVA) probability level of significance for differences between individual stream reaches in brackets {p =x.xx}. [%, percent; <, less than; µm, micrometer; mv, millivolt]



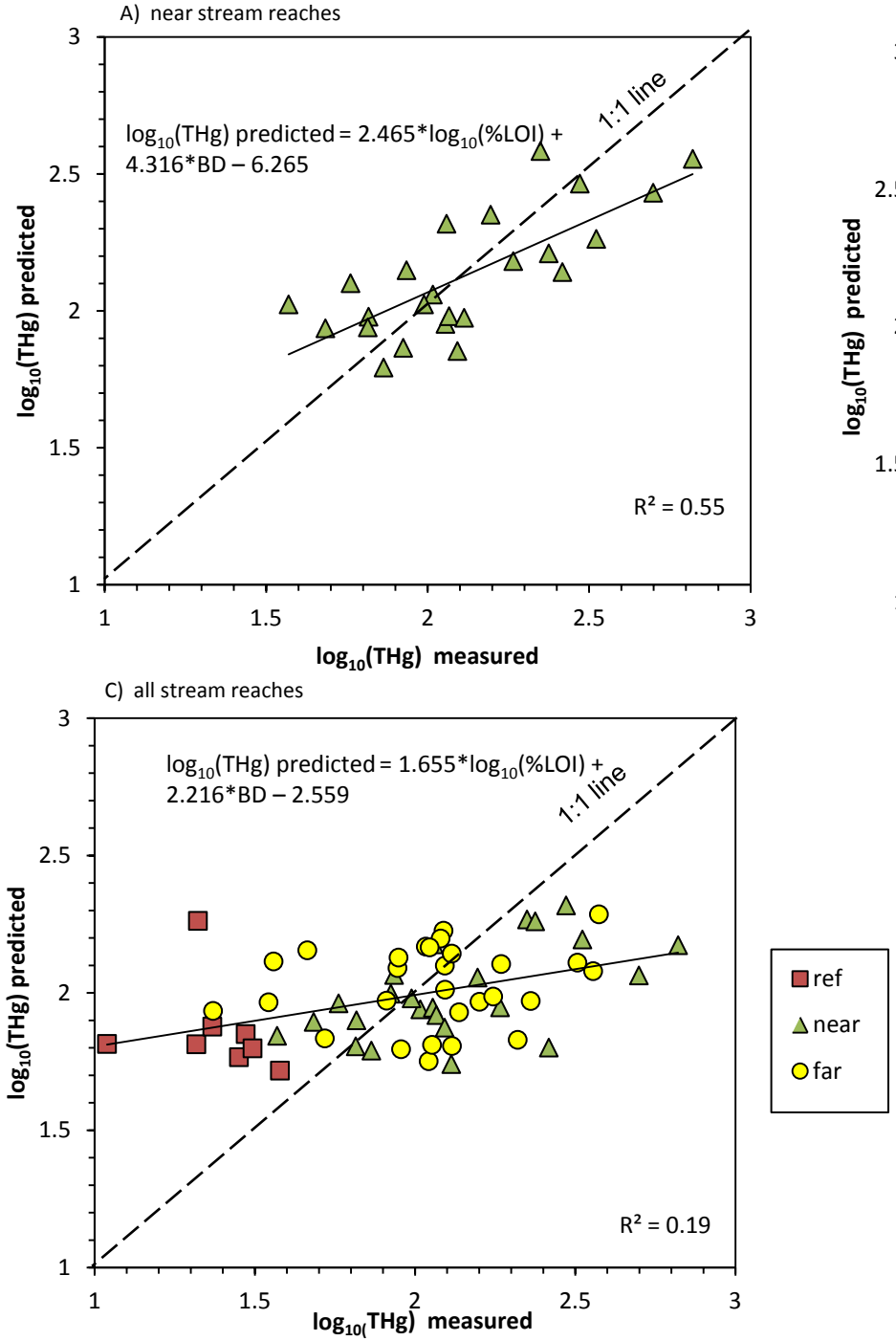


Figure 12. Predicted sediment total mercury (THg) vs measured THg, Androscoggin River, New Hampshire. Predicted values calculated with stepwise linear regression. The equation shows the best fit model using multiple starting variables. The regression coefficient of determination and solid linear regression line are reflections of the regression of measured vs. predicted values. The 1:1 line between predicted and measured values is dashed. A, near stream reaches (near) are 2-4 km downstream from the former facility. B, far stream reaches (far) are 8-16 km downstream. C, all stream reaches include reference reach (ref) , 16 km upstream from a former chlor-alkali facility in Berlin, NH, near, and far reaches. [%LOI, Loss on Ignition; BD, Bulk density]

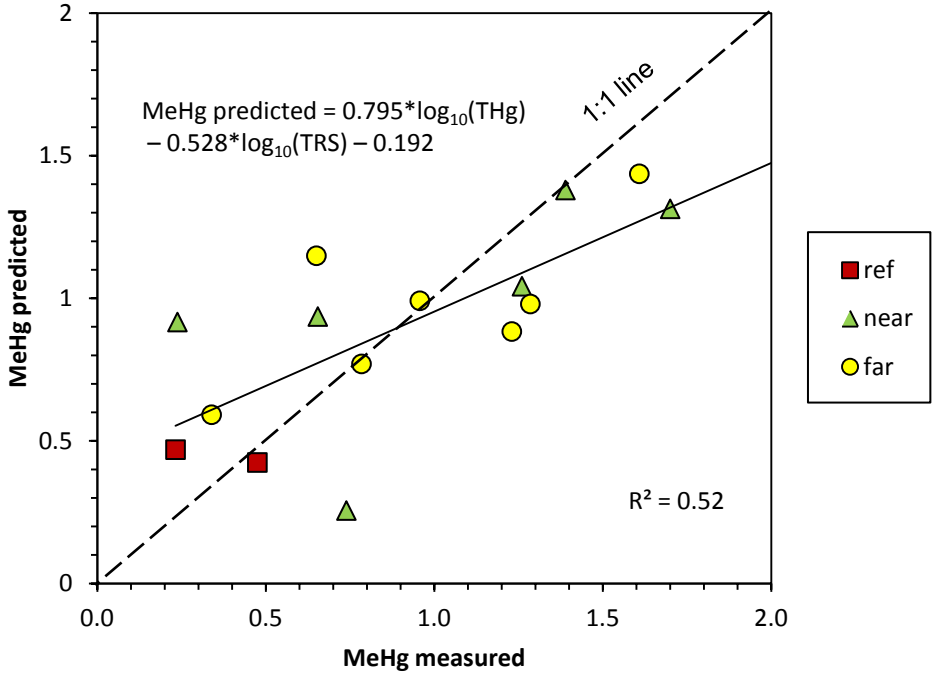


Figure 13. Predicted vs. measured Methylmercury, Androscoggin River, New Hampshire.
Predicted values calculated with stepwise linear regression. The equation shows the best fit model using multiple starting variables. The regression coefficient of determination and solid linear regression lines are reflections of the regression of measured vs. predicted values. The 1:1 line between predicted and measured values is dashed. Reference stream reach (ref) is 16 km upstream from a former chlor-alkali facility in Berlin, NH. Near stream reaches (near) are 2-4 km downstream from the former facility. Far stream reaches (far) are 8-16 km downstream. [MeHg, Methylmercury; THg, Total Mercury; TRS, Total Reduced Sulfur]

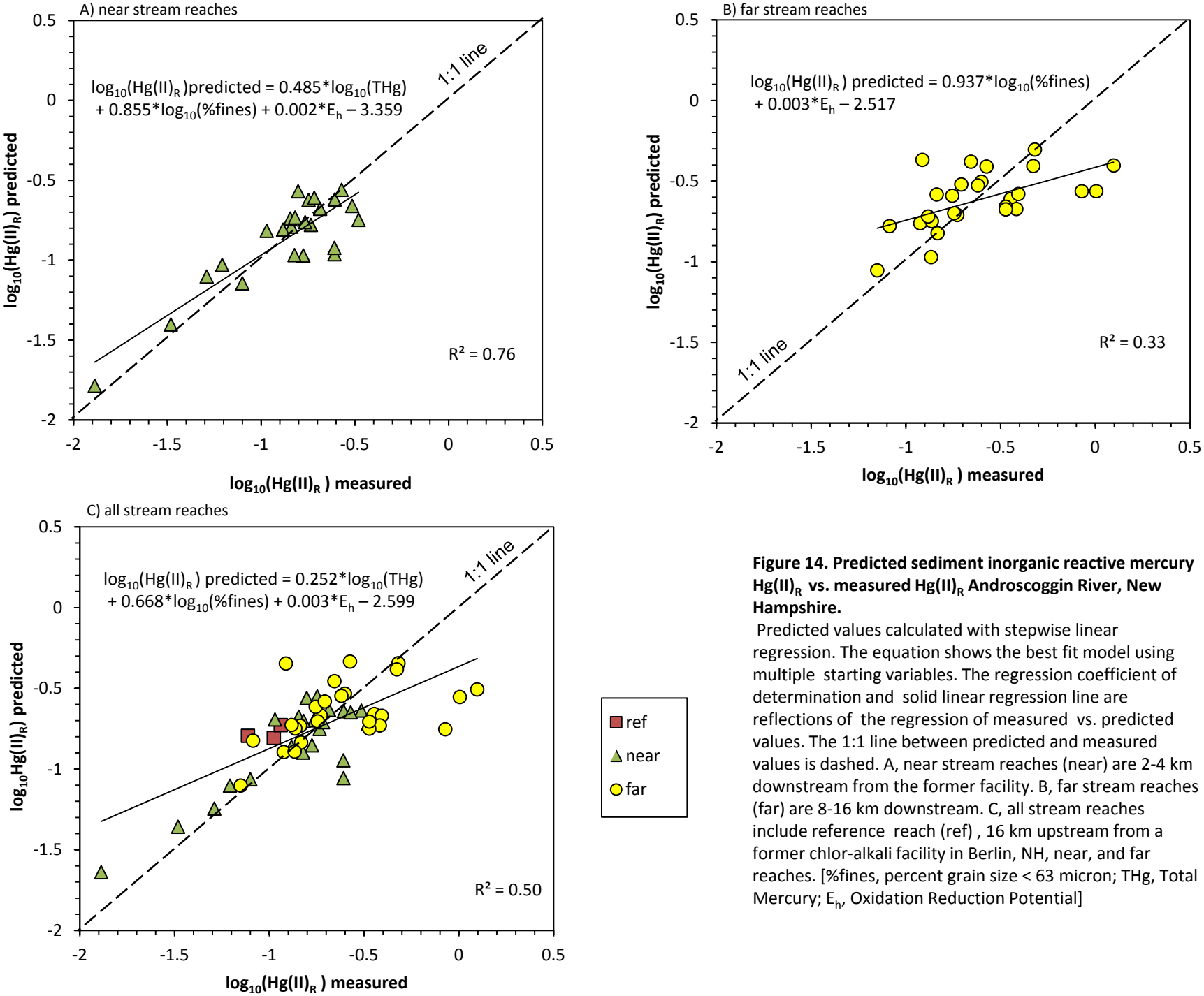


Figure 14. Predicted sediment inorganic reactive mercury $Hg(II)_R$ vs. measured $Hg(II)_R$ Androscoggin River, New Hampshire.

Predicted values calculated with stepwise linear regression. The equation shows the best fit model using multiple starting variables. The regression coefficient of determination and solid linear regression line are reflections of the regression of measured vs. predicted values. The 1:1 line between predicted and measured values is dashed. A, near stream reaches (near) are 2-4 km downstream from the former facility. B, far stream reaches (far) are 8-16 km downstream. C, all stream reaches include reference reach (ref) , 16 km upstream from a former chlor-alkali facility in Berlin, NH, near, and far reaches. [%fines, percent grain size < 63 micron; THg, Total Mercury; E_h, Oxidation Reduction Potential]

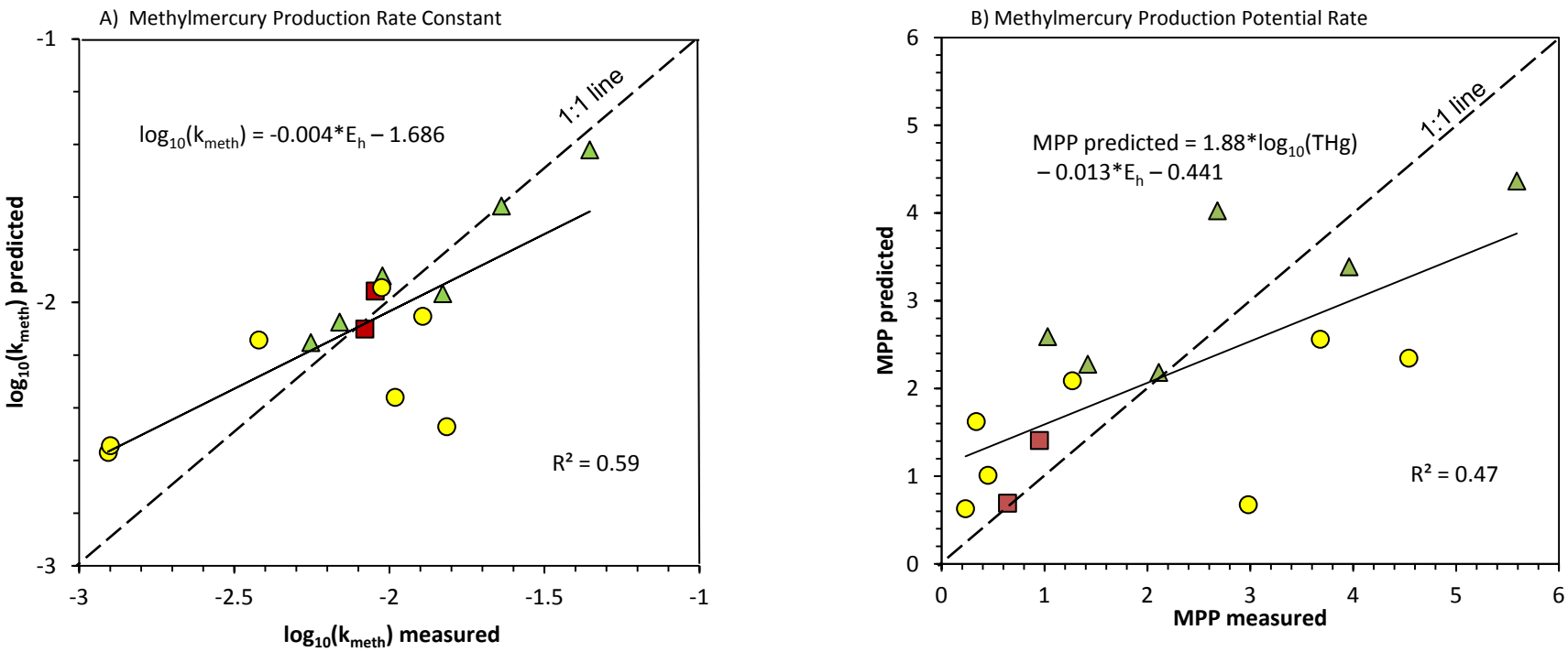


Figure 15. Predicted vs. measured Mercury Methylation Potential, Androscoggin River, New Hampshire.
A, Methylmercury Production Rate Constant (k_{meth}). B, Methylmercury Production Potential rate (MPP) based on reactive mercury. Predicted values calculated with stepwise linear regression. The equation shows the best fit model using multiple starting variables. The regression coefficient of determination and solid linear regression lines are reflections of the regression of measured vs. predicted values. The 1:1 line between predicted and measured values is dashed. Reference stream reach (ref, red square) is 16 km upstream from a former chlor-alkali facility in Berlin, NH. Near stream reaches (near, green triangle) are 2-4 km downstream from the former facility. Far stream reaches (far, yellow circle) are 8-16 km downstream. [THg, Total Mercury; TRS, Total Reduced Sulfur; E_h, Oxidation Reduction Potential]

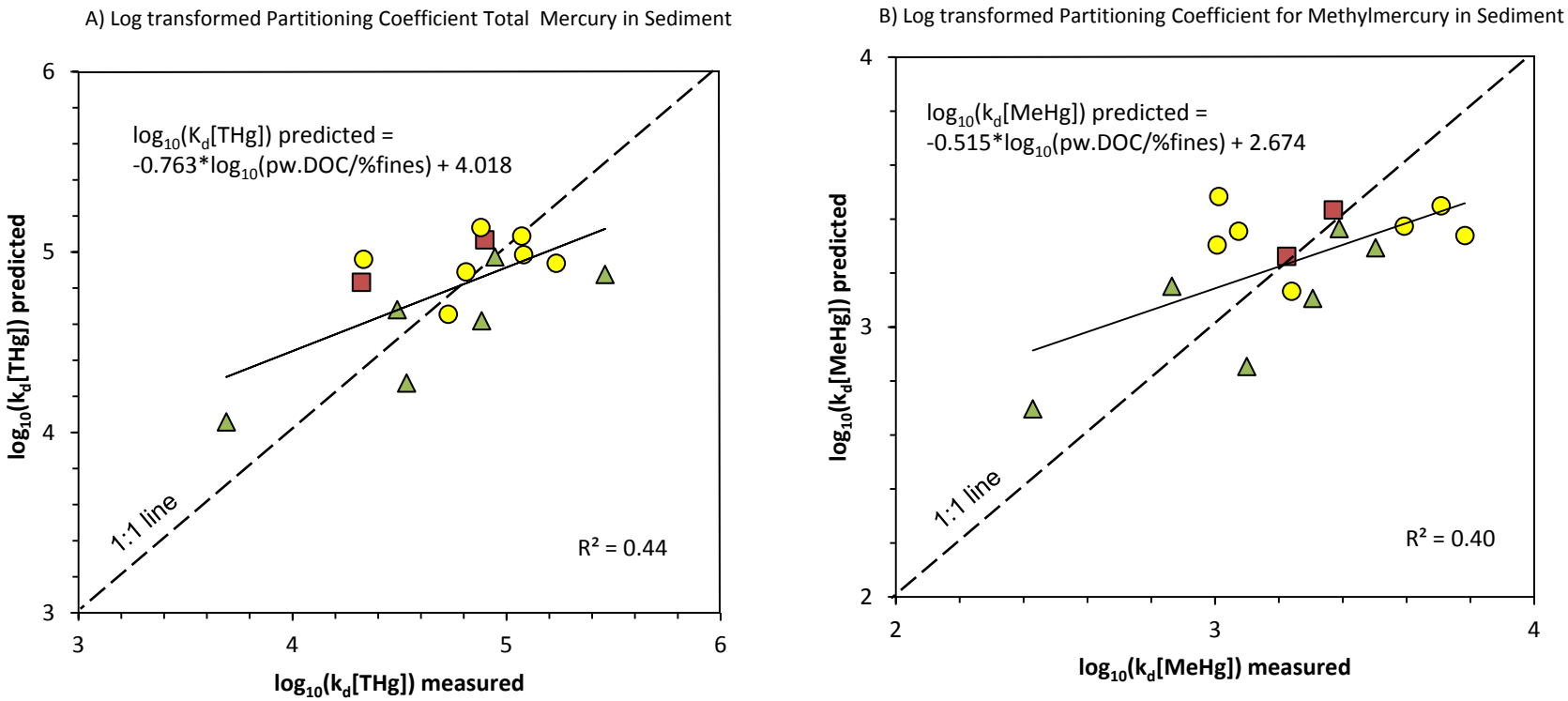


Figure 16. Predicted vs. measured Mercury Partitioning Coefficients, Androscoggin River, New Hampshire.
A, Total Mercury Partitioning Coefficient ($\log_{10}(k_d$ [THg]). B, Methylmercury Partitioning Coefficient ($\log_{10}(k_d$ [MeHg]). Predicted values calculated with stepwise linear regression. The equation shows the best fit model using multiple starting variables. The regression coefficient of determination and solid linear regression lines are reflections of the regression of measured vs. predicted values. The 1:1 line between predicted and measured values is dashed. Reference stream reach (ref, red square) is 16 km upstream from a former chlor-alkali facility in Berlin, NH. Near stream reaches (near, green triangle) are 2-4 km downstream from the former facility. Far stream reaches (far, yellow circle) are 8-16 km downstream. [pw.DOC, pore-water dissolved organic carbon; %fines, percent grain size < 63 micron]

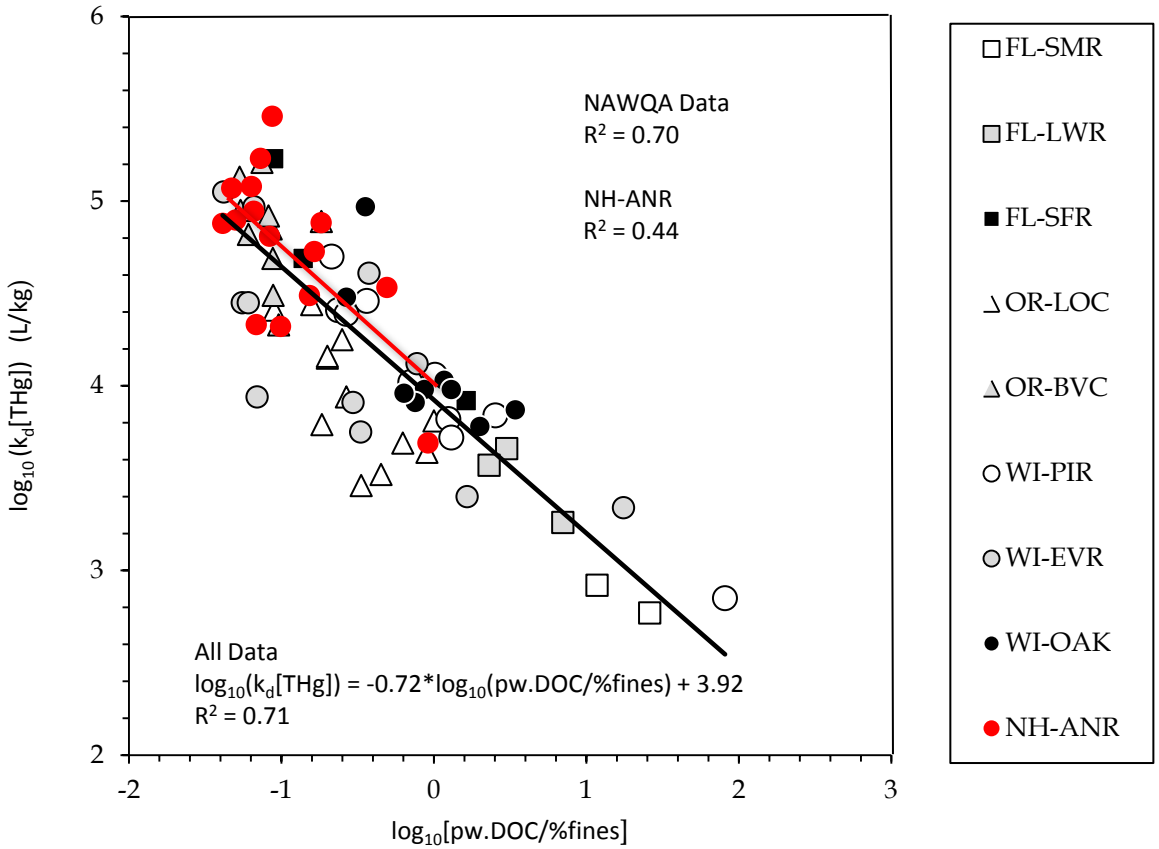


Figure 17. Sediment Total Mercury Partitioning Coefficient as a function of Dissolved Organic Carbon and Grain Size.
Androscoggin sites (red circles, NH-ANR) compared to USGS NAWQA sites (white, grey, and black symbols) across the U.S. USGS NAWQA data previously published (MMD et al. 2008, 2009a). [$\log_{10}$ (k_d [THg]), sediment total mercury partitioning coefficient; L/kg, liters per kilogram; pw.DOC, dissolved organic carbon; %fines, percent grain size < 63 micron; FL, Florida; OR, Oregon; WI, Wisconsin]

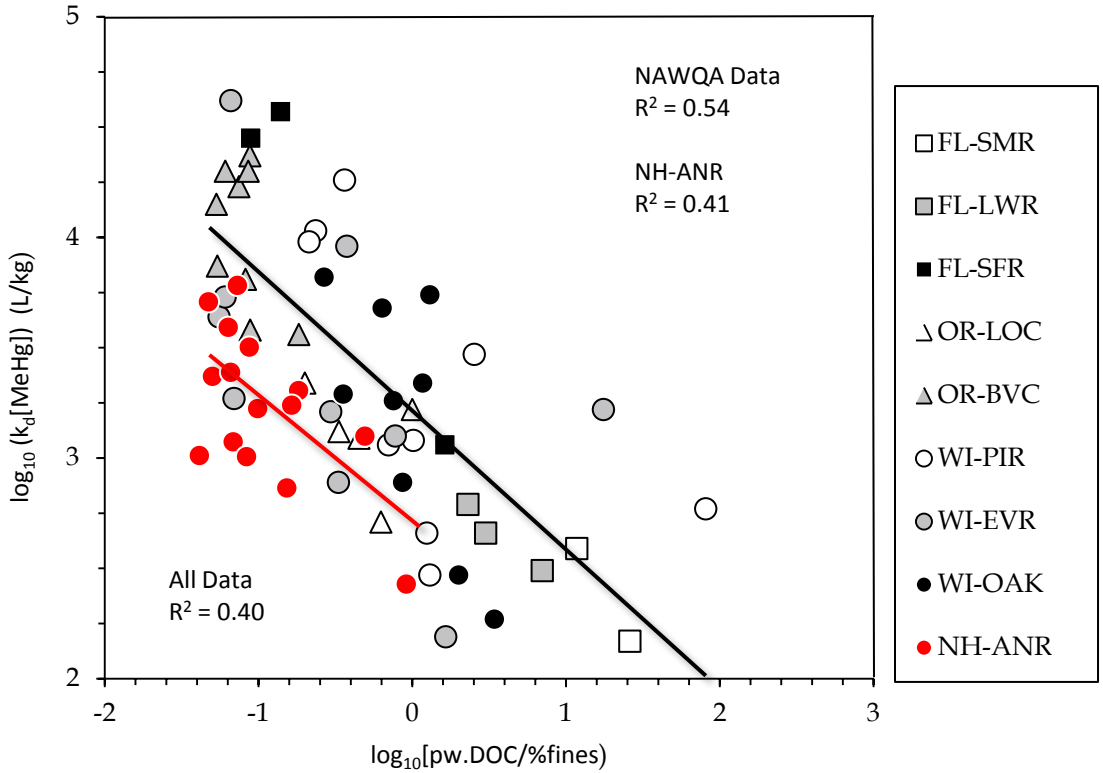


Figure 18. Sediment Methylmercury Partitioning Coefficient as a function of Dissolved Organic Carbon and Grain Size.
Androscoggin sites (red circles, NH-ANR) compared to USGS NAWQA sites (white, grey and black symbols) across the U.S. USGS NAWQA data previously published (MMD et al. 2008, 2009a). [$\log_{10}(k_d$ [MeHg]), sediment methylmercury partitioning coefficient; L/kg, liters per kilogram; pw.DOC, dissolved organic carbon; %fines, percent grain size < 63 micron; FL, Florida; OR, Oregon; WI, Wisconsin]

U.S. Geological Survey Open File Report XXX

Characterization of Mercury Contamination in the Androscoggin River, Coos County, New Hampshire

By Ann Chalmers, Mark C. Marvin DiPasquale, James Degnan, James Coles, Jennifer Agee, and Darryl Luce

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Appendix 2: Surface Water, Pore Water, Sediment, Invertebrate, and Biota Data Tables

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NOTES ON DATA TABLES

These data tables are included as part of U.S. Geological Survey (USGS) Open File Report xxx. Data were collected during a 2009-2011 study of mercury biogeochemistry in the Androscoggin River below a fromer chlor-alkali facility. See report text for details about the study, and for information on sources and compilation of ancillary data.

NOTES ON SEDIMENT, PORE-WATER, SURFACE WATER, AND BIOTA DATA

Remark codes for values:

Code	Explanation
<	Less than the reporting limit
e	Estimated

Data for whole (unsieved) streambed sediment, filtered and unfiltered pore-water and surface water samples. Pore-water samples reported here were collected directly from the streambed using a push-point sampler and peristaltic pump.

Appendix 2 Table 1. Sediment, water, and benthic invertebrate sampling dates, site locations, and descriptions for Androscoggin River, Coos County, New Hampshire.

[Latitude and Longitude are given in decimal degrees (DD.DDDD). Sample collection time is given in the YYYYMMDD format.]

Site Code	Sampling date	Site Description	Site Type	Latitude	Longitude
AR2	20090922	Downstream of Pontook Dam	benthic invertebrates	44.6313	-71.2490
AR2	20090914	Upstream of Wheeler Bay	surface water	44.6148	-71.2237
AR2-1	20090916	Wheeler Bay	sediment and porewater	44.6164	-71.2229
AR2-2	20090916	Wheeler Bay	sediment and porewater	44.6167	-71.2209
AR2-3	20090916	Wheeler Bay	sediment and porewater	44.6161	-71.2196
AR2-4	20100823	Wheeler Bay	sediment and porewater	44.6167	-71.2209
AR2-4	20100823	Wheeler Bay	sediment field duplicate A	44.6168	-71.2209
AR2-4	20100823	Wheeler Bay	sediment field duplicate B	44.6170	-71.2210
AR2-4	20100823	Wheeler Bay	sediment field duplicate C	44.6169	-71.2208
AR2-5	20100823	Wheeler Bay	sediment and porewater	44.6180	-71.2230
AR2-5	20100823	Wheeler Bay	sediment field duplicate A	44.6181	-71.2230
AR2-5	20100823	Wheeler Bay	sediment field duplicate B	44.6183	-71.2229
AR2-5	20100823	Wheeler Bay	sediment field duplicate C	44.6182	-71.2239
AR3	20090922	Downstream of Sawmill Dam	benthic invertebrates	44.4792	-71.1674
AR3	20090915	Railroad Bridge between Smith and Riverside Dams	surface water	44.4759	-71.1693
AR4	20090922	Downstream of Riverside Dam	benthic invertebrates	44.4745	-71.1691
AR4	20090915	Mason Street Bridge	surface water	44.4691	-71.1786
AR4-1	20100827	Upstream of Smith Hydro Dam	sediment and porewater	44.4698	-71.1773
AR4-1	20100827	Upstream of Smith Hydro Dam	sediment field duplicate A	44.4695	-71.1777
AR4-1	20100827	Upstream of Smith Hydro Dam	sediment field duplicate B	44.4695	-71.1776
AR4-1	20100827	Upstream of Smith Hydro Dam	sediment field duplicate C	44.4697	-71.1775
AR4-2	20100827	Upstream of Smith Hydro Dam	sediment and porewater	44.4697	-71.1773
AR4-2	20100827	Upstream of Smith Hydro Dam	sediment field duplicate A	44.4697	-71.1773
AR4-2	20100827	Upstream of Smith Hydro Dam	sediment field duplicate B	44.4696	-71.1774
AR4-2	20100827	Upstream of Smith Hydro Dam	sediment field duplicate C	44.4697	-71.1773
AR5-1	20100827	Downstream of Smith Hydro Dam	sediment and porewater	44.4588	-71.1852
AR5-1	20100827	Downstream of Smith Hydro Dam	sediment field duplicate A	44.4589	-71.1853
AR5-1	20100827	Downstream of Smith Hydro Dam	sediment field duplicate B	44.4589	-71.1857
AR5-1	20100827	Downstream of Smith Hydro Dam	sediment field duplicate C	44.4585	-71.1853
AR5-2	20100827	Upstream of Cross Power Dam	sediment and porewater	44.4633	-71.1846
AR5-2	20100827	Upstream of Cross Power Dam	sediment field duplicate A	44.4631	-71.1847
AR5-2	20100827	Upstream of Cross Power Dam	sediment field duplicate B	44.4635	-71.1846
AR5-2	20100827	Upstream of Cross Power Dam	sediment field duplicate C	44.4630	-71.1847
AR6-1	20090918	Downstream of Cross Power Dam	sediment and porewater	44.4552	-71.1868
AR6-2	20100826	Downstream of Cross Power Dam	sediment and porewater	44.4552	-71.1868
AR6-2	20100826	Downstream of Cross Power Dam	sediment field duplicate A	44.4550	-71.1867
AR6-2	20100826	Downstream of Cross Power Dam	sediment field duplicate B	44.4552	-71.1868
AR6-2	20100826	Downstream of Cross Power Dam	sediment field duplicate C	44.4554	-71.1867
AR6-3	20100826	Upstream of Cascade Dam	sediment and porewater	44.4516	-71.1873
AR6-3	20100826	Upstream of Cascade Dam	sediment field duplicate A	44.4516	-71.1873
AR6-3	20100826	Upstream of Cascade Dam	sediment field duplicate B	44.4515	-71.1871
AR6-3	20100826	Upstream of Cascade Dam	sediment field duplicate C	44.4519	-71.1875
AR7-1	20100826	Upstream of Brown Dam	sediment and porewater	44.4108	-71.1955
AR7-1	20100826	Upstream of Brown Dam	sediment field duplicate A	44.4113	-71.1949
AR7-1	20100826	Upstream of Brown Dam	sediment field duplicate B	44.4109	-71.1953

Appendix 2 Table 1. Sediment, water, and benthic invertebrate sampling dates, site locations, and descriptions for Androscoggin River, Coos County, New Hampshire.

[Latitude and Longitude are given in decimal degrees (DD.DDDD). Sample collection time is given in the YYYYMMDD format.]

Site Code	Sampling date	Site Description	Site Type	Latitude	Longitude
AR7-1	20100826	Upstream of Brown Dam	sediment field duplicate C	44.4102	-71.1957
AR7-2	20100826	Upstream of Brown Dam	sediment and porewater	44.4101	-71.1931
AR7-2	20100826	Upstream of Brown Dam	sediment field duplicate A	44.4098	-71.1933
AR7-2	20100826	Upstream of Brown Dam	sediment field duplicate B	44.4102	-71.1931
AR7-2	20100826	Upstream of Brown Dam	sediment field duplicate C	44.4108	-71.1928
AR8	20090921	Downstream of Brown Dam	benthic invertebrates	44.4060	-71.1965
AR8	20090914	Old ford between Brown and Gorham Dams	surface water	44.4037	-71.1990
AR8-1	20090918	Upstream of Gorham Dam	sediment and porewater	44.3904	-71.1681
AR8-2	20090918	Upstream of Gorham Dam	sediment and porewater	44.3911	-71.1671
AR8-3	20090918	Upstream of Gorham Dam	sediment and porewater	44.3913	-71.1692
AR8-4	20100824	Upstream of Gorham Dam	sediment and porewater	44.3905	-71.1683
AR8-4	20100824	Upstream of Gorham Dam	sediment field duplicate A	44.3904	71.1681
AR8-4	20100824	Upstream of Gorham Dam	sediment field duplicate B	44.3902	-71.1683
AR8-4	20100824	Upstream of Gorham Dam	sediment field duplicate C	44.3901	-71.1683
AR8-5	20100824	Upstream of Gorham Dam	sediment and porewater	44.3911	-71.1670
AR8-5	20100824	Upstream of Gorham Dam	sediment field duplicate A	44.3911	-71.1671
AR8-5	20100824	Upstream of Gorham Dam	sediment field duplicate B	44.3910	-71.1671
AR8-5	20100824	Upstream of Gorham Dam	sediment field duplicate C	44.3910	-71.1671
AR9	20090921	Downstream of Gorham Dam	benthic invertebrates	44.3898	-71.1660
AR9	20090914	Downstream of Gorham Dam	surface water	44.3896	-71.1660
AR9-1	20090917	Upstream of Shelburne Dam	sediment and porewater	44.4012	-71.1222
AR9-2	20090917	Upstream of Shelburne Dam	sediment and porewater	44.4000	-71.1238
AR9-3	20090917	Upstream of Shelburne Dam	sediment and porewater	44.3919	-71.1359
AR9-4	20090917	Upstream of Shelburne Dam	sediment and porewater	44.3913	-71.1355
AR9-5	20100824	Upstream of Shelburne Dam	sediment and porewater	44.4014	-71.1174
AR9-5	20100824	Upstream of Shelburne Dam	sediment field duplicate A	44.4015	-71.1175
AR9-5	20100824	Upstream of Shelburne Dam	sediment field duplicate B	44.4016	-71.1174
AR9-5	20100824	Upstream of Shelburne Dam	sediment field duplicate C	44.4012	-71.1177
AR9-6	20100825	Upstream of Shelburne Dam	sediment and porewater	44.3916	-71.1357
AR9-6	20100825	Upstream of Shelburne Dam	sediment field duplicate A	44.3917	-71.1359
AR9-6	20100825	Upstream of Shelburne Dam	sediment field duplicate B	44.3912	-71.1356
AR9-6	20100825	Upstream of Shelburne Dam	sediment field duplicate C	44.3916	-71.1358
AR9-7	20100825	Upstream of Shelburne Dam	sediment and porewater	44.3947	-71.1285
AR9-7	20100825	Upstream of Shelburne Dam	sediment field duplicate A	44.3945	-71.1286
AR9-7	20100825	Upstream of Shelburne Dam	sediment field duplicate B	44.3946	-71.1290
AR9-7	20100825	Upstream of Shelburne Dam	sediment field duplicate C	44.3948	-71.1289

Appendix 2 Table 2. Parameters in surface water, Androscoggin River, Coos County, New Hampshire.

[Field parameters collected by USGS, sample analysis by Columbia Analytical Services, Kelso, WA; sampling date, YYYYMMDD format; Temp., temperature; ° C, degrees Celsius; D.O., dissolved oxygen; S.C. specific conductance; mS/cm, microSiemen per centimeter; mg/L, milligrams per liter; ng/L, nanograms per liter; Hg(II) $_{KOH}$, 1M KOH extractable inorganic mercury; measurements below analytical detection limit are indicated with '<' and the detection limit value; e, estimated values]

Site Code	Sampling Date	Sampling Time	Temp (°C)	D.O. (mg/L)	S. C. (µS/cm)	pH	Sulfate (mg/L)		Organic Carbon (mg/L)		Total Hg (ng/L)		Methyl Hg (ng/L)		$Hg(II)_{KOH}$ (ng/L)
							filtered	non-filtered	filtered	non-filtered	filtered	non-filtered	filtered	non-filtered	filtered
AR2	20090914	830	17.7	9.2	27	7.04	2.33	2.30	5.03	5.34	e 0.85	e 1	<0.10	<0.10	<0.08
AR3	20090915	830	18.6	8.5	29	6.97	2.30	2.34	4.86	5.34	e 0.7	1.04	<0.10	<0.10	<0.08
AR4	20090915	1230	18.6	9.1	29	7.14	2.41	2.44	5.22	5.27	e 0.87	e 0.99	<0.10	<0.10	<0.08
AR8	20090914	1600	18.8	9.1	43	6.76	2.75	2.75	5.03	5.18	1.00	2.17	<0.10	<0.10	<0.08
AR9	20090914	1200	18.6	9.2	31	7.17	2.63	2.67	5.41	5.12	e 0.94	e 0.44	<0.10	<0.10	<0.08

Appendix Table 3. Concentrations of metals in surface sediment (0-10 cm interval), Androscoggin River, Coos County, New Hampshire.

[Analysis by Als Laboratory Group, Salt Lake City, UT; Sample collection is given in the YYYYMMDD format; <, less than reporting limit; e, estimated values; number in () is the Chemistry Abstracts Service Registry Number; units are milligrams per kilogram dry weight; PEC, probable effects concentration (MacDonald and others, 2000)]

	Compound	Antimony (Sb)	Arsenic (As)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Nickel (Ni)	Selenium (Se)	Strontium (Sr)	Vanadium (V)	Zinc (Zn)
	Reporting limit	2	1	0.5	0.5	1	2.5	1	4	3.5	1	5	6
Site	Sampling Date	(7440-36-0)	(7440-38-2)	(7440-41-7)	(7440-43-9)	(7440-47-3)	(7440-50-8)	(7439-92-1)	(7440-02-0)	(7782-49-2)	(7440-24-6)	(7440-62-2)	(7440-66-6)
AR2-1	20090916	<2	2.2	e 0.29	0.60	11.4	9.0	7.4	11.7	e 0.63	e 5.2	14.4	50.9
AR2-2	20090916	<2	2.1	e 0.27	0.59	10.6	8.1	7.1	10.5	e 0.66	e 4.6	12.7	46.4
AR2-3	20090916	<2	2.5	e 0.37	0.77	14.9	11.7	9.4	15.2	e 0.75	e 6.7	18.2	65.9
AR6-1	20090918	<2	1.8	e 0.31	0.59	11.6	14.4	11.6	9.9	e 0.58	e 5.5	17.0	57.4
AR8-1	20090918	<2	1.7	e 0.35	0.56	13.4	19.0	15.6	9.5	e 0.54	e 5.8	16.3	57.3
AR8-2	20090918	<2	3.6	e 0.30	0.53	10.3	13.8	11.0	8.7	e 0.63	e 5.4	14.9	57.1
AR8-3	20090918	<2	1.7	e 0.35	0.53	11.2	17.7	16.6	8.7	e 0.65	e 5.7	15.9	55.2
AR9-1	20090917	<2	1.4	e 0.25	e 0.37	6.9	10.8	6.9	5.2	e 0.71	e 4.3	10.7	37.4
AR9-2	20090917	<2	<1.0	e 0.27	e 0.39	7.9	8.5	6.6	5.5	e 0.53	e 4.0	11.7	50.2
AR9-3	20090917	<2	1.6	e 0.35	0.56	10.7	28.9	14.7	8.1	e 1.10	e 7.1	15.5	53.6
AR9-4	20090917	<2	1.3	e 0.27	e 0.48	9.4	13.5	13.7	7.1	e 0.74	e 8.0	13.3	46.0
Quality assurance replicate samples													
AR9-2 rep	20090917	<2	7.3	e 0.28	e 0.38	7.4	10.7	9.4	5.7	<3.5	e 4.0	12.2	42.7
PEC			*33*		*4.98*	*111*	*149*	*128*	*48.6*				*459*
Human Health screening level (EPA 2009)		31	3.9	160	70	2800	3100	400	1500	390	47000	390	23000
Ecological Screening value (EPA 2006; Suter and Tsao, 1996)		2	9.8	na	0.99	43.4	31.6	35.8	22.7	na	na	na	121

Appendix Table 4. Parameters in pore water, Androscoggin River, Coos County, New Hampshire.

[Field parameters collected by USGS, 2009 sample analysis by Columbia Analytical Services, Kelso, WA; 2010 sample analysis by USGS NRP laboratory, Menlo Park, CA; sampling date, YYYYMMDD format; Temp., temperature; ° C, degrees Celsius; D.O., dissolved oxygen; mg/L, milligrams per liter; S.C. specific conductance; mS/cm, microSiemen per centimeter; E_h, sediment oxidation-reduction potential corrected for the standard hydrogen half-cell reaction; mV, millivolts; Fe(II), Ferrous Iron; mg/L, milligrams per liter; mmol/L, millimoles per liter; DOC, dissolved organic carbon; THg, total mercury; ng/L, nanograms per liter; MeHg, methylmercury; %, percent; $Hg(II)_{KOH}$, 1M KOH extractable inorganic mercury; analytical error based upon replicate (n=2) measurements is given in parentheses ( ), when no error is expressed the number of analytical measurements was 1; n.d., not determined; measurements below analytical detection limit are indicated with '<' and the detection limit value]

Site Code	Sampling date	Sampling time	Temp (° C)	D.O. (mg/L)	S. C. (µS/cm)	pH	E_h (mV)	Fe(II) (mg/L)	Sulfide (mg/L)	Sulfate (mg /L)	Chloride (mmol /L)	DOC (mg/L)	THg (ng/L)	MeHg (ng/L)	MeHg (% of THg)	$Hg(II)_{KOH}$ (ng/L)
AR2-1	20090916	1130	18.7	<0.05	112	6.36	n.d.	n.d.	n.d.	2.05	n.d.	8.0	0.7	<0.12	n.d.	< 0.13
AR2-2	20090916	1400	19	0.4	164	6.12	n.d.	n.d.	n.d.	0.95	n.d.	10.3	<5.0	<0.10	n.d.	< 0.13
AR2-3	20090916	1600	18.9	0.1	82	6.4	n.d.	n.d.	n.d.	1.35	n.d.	8.0	10.2	0.06	n.d.	< 0.08
AR2-4	20100823	1430	20.8	0.82	177 (14)	6.54	n.d.	21.7 (0.9)	n.d.	15.5 (2.3)	39.9 (0.2)	7.3 (0.3)	1.34	0.28	21.1	n.d.
AR2-5	20100823	1630	n.d.	n.d.	81 (2)	n.d.	n.d.	11.0 (0.2)	n.d.	5.0 (1.1)	32.6 (0.6)	3.2 (0.2)	0.26	0.10	37.6	n.d.
AR4-1	20100827	1400	21.3 (0.3)	0.20	2609 (183)	6.80 (0.01)	18	0.23 (0.0)	1.52	6940 (323)	1710 (166)	13.2 (0.7)	8.68	0.19	2.2	n.d.
AR4-2	20100827	1630	20.5 (0.3)	0.15	3171 (71)	6.69 (0.01)	70	0.61 (0.0)	0.98	4750 (68.2)	2720 (34)	54.0 (2.3)	17.13	2.75	16.1	n.d.
AR5-1	20100827	900	18.0 (0.6)	<0.05	128 (5)	6.30 (0.00)	149	18.1 (0.2)	0.06	10.2 (1.4)	55.8 (13.4)	3.9 (0.1)	1.32	0.51	39.0	n.d.
AR5-2	20100827	1045	18.7 (0.6)	<0.05	162 (4)	6.60 (0.00)	139	6.1 (0.1)	0.05	7.8 (4.0)	218 (14.2)	3.8 (0.3)	8.47	1.90	22.4	n.d.
AR6-1	20090918	1345	17.0 (0.0)	1	298 (74)	6.47 (0.04)	n.d.	n.d.	n.d.	0.8	n.d.	14.8	<5.0	<0.10	n.d.	< 0.08
AR6-2	20100826	1530	20.4 (0.1)	<0.05	392 (23)	6.25 (0.00)	148	43.5 (0.3)	0.06	21.2 (4.1)	826 (16.8)	8.2 (0.5)	0.85 (0.04)	0.32	37.9	n.d.
AR6-3	20100826	1700	20.5 (0.4)	<0.05	158 (8)	6.01 (0.00)	188	15.7 (0.1)	0.28	0.6 (0.0)	66.0	4.3 (0.1)	1.15	0.53	46.2	n.d.
AR7-1	20100826	1000	20.6 (0.4)	<0.05	53 (1)	6.48 (0.02)	144	3.1 (0.0)	0.22	8.9 (0.2)	50.9 (0.4)	2.3 (0.2)	1.72	0.76	44.4	n.d.
AR7-2	20100826	1200	21.5 (0.4)	<0.05	115 (12)	6.33 (0.03)	168	12.6 (0.1)	0.05	6.5 (0.1)	48.8 (9.1)	3.5 (0.2)	0.94	0.25	26.9	n.d.
AR8-1	20090918	830	17.6 (0.2)	<0.05	169 (29)	5.66 (0.01)	n.d.	n.d.	n.d.	27.4	n.d.	19.9	n.d.	0.63	n.d.	< 0.13
AR8-2	20090918	930	16.8 (0.1)	1.5	172 (21)	5.82 (0.02)	n.d.	n.d.	n.d.	0.8	n.d.	11.7	n.d.	<0.10	n.d.	< 0.13
AR8-3	20090918	1100	17.0 (0.2)	1.5	120 (17)	6.50 (0.00)	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR8-4	20100824	1030	20.6 (0.1)	0.25	59 (2)	6.33 (0.06)	133	4.6 (0.0)	0.09	12.3 (0.0)	61.6 (12.0)	2.9 (0.6)	2.30 (0.00)	0.55 (0.00)	24.0	n.d.
AR8-5	20100824	1200	20.1 (0.1)	<0.05	106 (12)	6.04 (0.05)	173	12.1 (0.1)	0.08	11.7 (0.2)	53.3 (9.1)	4.3 (0.7)	1.88	0.11	5.7	n.d.
AR9-1	20090917	900	17.5	<0.05	116 (0)	6.14	n.d.	n.d.	n.d.	1.9	n.d.	10.8	6.06	0.29	n.d.	< 0.13
AR9-2	20090917	1030	18.5	0.8	464 (8)	6.20	n.d.	n.d.	n.d.	13.5	n.d.	12.2	<5.0	<0.10	n.d.	< 0.13
AR9-3	20090917	1430	18.8 (0.4)	0.15	114 (29)	5.88 (0.01)	n.d.	n.d.	n.d.	15.3	n.d.	5.8	<5.0	0.07	n.d.	< 0.08
AR9-4	20090917	1600	18.2 (0.1)	<0.05	169 (16)	5.55 (0.07)	n.d.	n.d.	n.d.	27.6	n.d.	13.8	<5.0	<0.10	n.d.	< 0.19
AR9-5	20100824	1730	21.8 (0.1)	0.05	42 (2)	6.37 (0.02)	159	3.9 (0.0)	0.13	10.9 (0.3)	60.4 (6.8)	2.3 (0.1)	1.68	0.29	17.0	n.d.
AR9-6	20100825	1000	19.5 (0.4)	2.5	60 (7)	6.19 (0.02)	195	4.4 (0.0)	0.03	23.4 (0.3)	54.6 (3.9)	2.1 (0.1)	0.73	0.31	42.9	n.d.
AR9-7	20100825	1230	19.1 (0.2)	1.0	47 (2)	6.15 (0.02)	192	3.6 (0.1)	0.16	14.8 (0.0)	61.5 (5.5)	3.2 (0.0)	5.80	1.58	27.3	n.d.

Table 5. Concentrations of metals in filtered and unfiltered pore-water, Androscoggin River, Coos County, New Hampshire, September 2009.

[Analysis by Als Laboratory Group, Salt Lake City, UT; Results in bold red text were rejected by EPA data validation process; sample collection is given in the YYYYMMDD format; <, less than reporting limit; e, estimated values; number in () is the Chemistry Abstracts Service Registry Number; units are micrograms per liter]

Compound			Antimony	Arsenic	Beryllium	Cadmium	Chromium	Copper	Lead	Nickel	Selenium	Strontium	Vanadium	Zinc
Reporting limit			**2**	**1**	**1**	**1**	**10**	**2**	**1**	**40**	**5**	**10**	**5**	**60**
Site	**Sample type**	**Sampling Date**	**(7440-36-0)**	**(7440-38-2)**	**(7440-41-7)**	**(7440-43-9)**	**(7440-47-3)**	**(7440-50-8)**	**(7439-92-1)**	**(7440-02-0)**	**(7782-49-2)**	**(7440-24-6)**	**(7440-62-2)**	**(7440-66-6)**
AR2-1	filtered	20090916	<2	15.5	<1	<1	e 1.0	<2	<1	<40	<5	29.6	1.2	<60
AR2-2	filtered	20090916	<2	7.8	<1	<1	e 0.52	<2	<1	<40	<5	62.4	0.41	<60
AR2-3	filtered	20090916	<2	3.7	<1	<1	e 0.47	<2	<1	<40	<5	28.2	0.57	<60
AR6-1	filtered	20090918	<2	4.2	<1	<1	e 0.96	e 0.2	e 0.08	<40	<5	72.7	1.5	3.5
AR8-1	filtered	20090918	<2	4.0	<1	<1	e 2.8	e 0.5	1.4	11.5	<5	38.9	4.9	34.5
AR8-2	filtered	20090918	<2	<1	<1	<1	e 0.69	<2	<1	0.55	<5	79.0	<5	3.4
AR8-3	filtered	20090918	<2	6.5	<1	<1	e 0.71	<2	e 0.30	2.2	<5	33.9	1.3	3.6
AR9-1	filtered	20090917	<2	2.5	<1	<1	e 1.2	<2	<1	<40	<5	32.8	1.5	<60
AR9-2	filtered	20090917	<2	2.5	<1	<1	e 0.58	<2	<1	<40	<5	149	0.76	<60
AR9-3	filtered	20090917	<2	1.9	<1	<1	e 0.41	<2	e 0.14	0.93	<5	39.7	0.33	11.1
AR9-4	filtered	20090917	<2	3.0	<1	<1	e 0.76	e 0.2	e 0.12	3.2	<5	59.9	0.52	38.1
AR2-1	non-filtered	20090916	<2	e 20.9	e 1.6	**<1**	49.5	e 43.8	e 35	e 46.4	<5	e 44.4	e 86.8	e 172
AR2-2	non-filtered	20090916	<2	e 8.1	<1	**<1**	<10	<2	**<1**	**<40**	<5	e 65	e 0.62	**<60**
AR2-3	non-filtered	20090916	<2	e 4.2	<1	**<1**	**e** 1.5	<2	e 1.5	**<40**	<5	e 30.9	e 3.4	**<60**
AR6-1	non-filtered	20090918	<2	e 4.4	<1	<1	<10	<2	<1	<40	<5	e 74.3	e 2.1	**<60**
Ar8-1	non-filtered	20090918	<2	e 4.5	<1	<1	e 2.9	4.6	4.4	e 13.0	<5	e 46.6	e 6	e 44.1
AR8-2	non-filtered	20090918	<2	<1	<1	<1	<10	<2	<1	e 0.61	<5	e 82.1	<5	<60
AR8-3	non-filtered	20090918	<2	e 6.7	<1	<1	<10	<2	<1	e 2.1	<5	e 34.8	e 1.6	<60
AR9-1	non-filtered	20090917	<2	e 2.8	<1	**<1**	**e** 2.0	<2	e 0.65	**<40**	<5	e 34.9	e 1.6	**<60**
AR9-2	non-filtered	20090917	<2	e 2.7	<1	**<1**	**e** 0.39	<2	**<1**	**<40**	<5	163	e 0.96	**<60**
AR9-3	non-filtered	20090917	<2	<1	<1	<1	<10	<2	<1	e 0.75	<5	e 38.5	<5	<60
AR9-4	non-filtered	20090917	<2	e 3.2	<1	<1	<10	<2	<1	e 2.9	<5	e 61.4	<5	e 42.0
Quality assurance replicate samples														
AR9-2	filtered		<2	2.4	<1	<1	e 0.67	<2	<1	<40	<5	148	0.61	<60
AR9-2	non-filtered		<2	e 2.6	<1	**<1**	**e** 2.5	e 4.1	e 3.6	**<40**	<5	159	e 4.9	e 19.1

Table 6. Parameters in surface sediment (0-10 cm interval), Androscoggin River, Coos County, New Hampshire.

[Field parameters collected by USGS, 2009 sample analysis by Columbia Analytical Services, Kelso, WA; 2010 sample analysis by USGS NRP laboratory, Menlo Park, CA; sampling date, YYYYMMDD format; Temp., temperature; ° C, degrees Celsius; E_h, sediment oxidation-reduction potential corrected for the standard hydrogen half-cell reactio mg/g, milligram per gram; TRS, total reduced sulfur; AVS, acid volatile sulfur; Fe(II)AE, acid extractable ferrous iron; Fe(III)a, poorly crystalline ferric iron; Fe(III)c, crystalline ferric iron; THg, Total Hg; ng/g, nanograms per gram; $Hg(II)_{KOH}$, 1M KOH extractable inorganic Hg; MeHg, methylmercury; MPP, methylmercury production potential based on measurements was 1; n.d., not determined; measurements below analytical detection limit are indicated with '<' and the detection limit value]

Site Code	Sampling date	Sampling time	Temp (° C)	pH	E_h (mV)	Dry weight (% of wet wt.)	Bulk density (g/cm^3 wet sed.)	Porosity (mL PW/ cm^3 wet sed.)	Grain Size (% < 63 µm)	Grain Size (% < 74 µm)	LOI (% of dry wt.)	TOC (%)	TRS (µmol/g) dry wt.	AVS (mg/kg)	$[Fe(II)]_{AE}$ (mg/g) dry wt.	$[Fe(III)]_a$ (mg/g) dry wt.	$[Fe(III)]_c$ (mg/g) dry wt.	THg (ng/g) dry wt.	Reactive Hg (ng/g) dry wt.	Reactive Hg (% of THg)	$Hg(II)_{KOH}$ (ng/g)
AR2-1	20090916	1330	n.d.	n.d.	n.d.	56.2	n.d.	n.d.	n.d.	53.7	n.d.	1.92	n.d.	17.80	n.d.	n.d.	n.d.	<100	n.d.	n.d.	<0.45
AR2-2	20090916	1530	n.d.	n.d.	n.d.	39.8	n.d.	n.d.	n.d.	63.7	n.d.	3.22	n.d.	33.50	n.d.	n.d.	n.d.	<100	n.d.	n.d.	<0.45
AR2-3	20090916	1645	n.d.	n.d.	n.d.	45.5	n.d.	n.d.	n.d.	56.3	n.d.	2.16	n.d.	17.80	n.d.	n.d.	n.d.	<100	n.d.	n.d.	<0.45
AR2-4 Primary	20100823	1200	19.8	6.46	68	43.5	1.31	0.74	74.3	n.d	7.2	n.d	10.4 (1.6)	n.d.	5.3	0.10	1.65	28	0.11	0.37	n.d.
AR2-4 Fdup A	20100823	n.d.	n.d.	n.d.	n.d.	43.5	1.32	0.75	78.1	n.d	7.8	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	30	0.17	0.57	n.d.
AR2-4 Fdup B	20100823	n.d.	n.d.	n.d.	n.d.	68.6	1.67	0.52	36.5	n.d	2.6	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	11	0.06	0.53	n.d.
AR2-4 Fdup C	20100823	n.d.	n.d.	n.d.	n.d.	55.0	1.44	0.65	63.0	n.d	9.7	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	21 (0)	0.09	0.43	n.d.
AR2-5 Primary	20100823	1513	19.7	6.49	104	58.4	1.51	0.63	63.2	n.d	4.2	n.d	5.4	n.d.	3.4 (0.1)	< 0.08	0.54	21	0.08	0.37	n.d.
AR2-5 Fdup A	20100823	n.d.	n.d.	n.d.	113	50.8	1.42	0.70	70.0	n.d	6.0	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	23	0.11	0.49	n.d.
AR2-5 Fdup B	20100823	n.d.	n.d.	n.d.	n.d.	43.3	1.32	0.75	74.7	n.d	7.3	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	31	0.17	0.56	n.d.
AR2-5 Fdup C	20100823	n.d.	n.d.	n.d.	n.d.	43.2	1.30	0.74	77.2	n.d	6.9	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	38	0.12	0.32	n.d.
AR4-1 Primary	20100827	1320	19.4	6.77	-13	55.7	1.44	0.64	26.8	n.d	10.3	n.d	42	n.d.	0.5	< 0.08	0.16	296	0.25	0.08	n.d.
AR4-1 Fdup A	20100827	n.d.	n.d.	6.14	98	59.5	1.53	0.62	54.9	n.d	3.8	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	73	0.14	0.20	n.d.
AR4-1 Fdup B	20100827	n.d.	n.d.	6.23	141	63.8	1.58	0.57	57.3	n.d	4.0	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	104	0.18	0.17	n.d.
AR4-1 Fdup C	20100827	n.d.	n.d.	6.47	-124	55.9	1.47	0.65	54.1	n.d	5.8	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	114	0.05	0.05	n.d.
AR4-2 Primary	20100827	n.d.	19.8	6.77	-66	41.0 (0.4)	1.30 (0.01)	0.76 (0.00)	59.1 (0.1)	n.d	10.3 (0.4)	n.d	112.0 (26.1)	n.d.	3.7	< 0.08	< 0.08	84	0.06	0.07	n.d.
AR4-2 Fdup A	20100827	n.d.	n.d.	6.82	-61	60.4	1.53	0.60	28.9	n.d	4.5	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	48	0.03	0.07	n.d.
AR4-2 Fdup B	20100827	n.d.	n.d.	6.35	31	62.1	1.56	0.59	31.1	n.d	4.0	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	66	0.08	0.12	n.d.
AR4-2 Fdup C	20100827	n.d.	n.d.	6.83	-58	70.6 (0.1)	1.69 (0.01)	0.50 (0.00)	11.8	n.d	2.5 (0.1)	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	37	0.01	0.03	n.d.
AR5-1 Primary	20100827	0910	19.1	6.16	97	60.9	1.53	0.60	60.0	n.d	4.5	n.d	6.0	n.d.	3.1	< 0.08	1.55	116	0.31	0.26	n.d.
AR5-1 Fdup A	20100827	n.d.	n.d.	6.21	126	70.2	1.71	0.51	42.0 (0.2)	n.d	3.1	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	157	0.21	0.13	n.d.
AR5-1 Fdup B	20100827	n.d.	n.d.	6.02	169	74.0	1.79	0.47	23.7	n.d	2.5	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	499	0.16	0.03	n.d.
AR5-1 Fdup C	20100827	n.d.	n.d.	6.11	122	59.8	1.47	0.59	22.3	n.d	5.1	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	124	0.17	0.14	n.d.
AR5-2 Primary	20100827	1010	18.5	6.31	117	76.6	1.88	0.44	25.1	n.d	1.3	n.d	4.6	n.d.	1.7	0.08	1.04	261	0.18	0.07	n.d.
AR5-2 Fdup A	20100827	n.d.	n.d.	6.03	143	66.8	1.64	0.54	25.3	n.d	5.2	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	223	0.17	0.08	n.d.
AR5-2 Fdup B	20100827	n.d.	n.d.	6.2	122	74.6	1.79	0.45	40.6	n.d	1.6	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	130	0.14	0.11	n.d.
AR5-2 Fdup C	20100827	n.d.	n.d.	6.27	86	73.2	1.75	0.47	15.9 (1.1)	n.d	3.3	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	662 (316)	0.13	0.02	n.d.
AR6-1	20090918	1430	n.d.	n.d.	n.d.	56.3	n.d.	n.d.	n.d.	32.5	n.d.	1.66	n.d.	2.57	n.d.	n.d.	n.d.	260	n.d.	n.d.	<0.45
AR6-2 Primary	20100826	n.d.	20.3	6.25	53	66.5 (0.2)	1.66 (0.00)	0.56 (0.00)	45.0	n.d	2.6 (0.0)	n.d	4.0	n.d.	2.7	< 0.08	1.17	65	0.15	0.23	n.d.
AR6-2 Fdup A	20100826	n.d.	n.d.	6.17	120	64.3	1.60	0.57	52.5	n.d	3.9	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	58	0.11	0.19	n.d.
AR6-2 Fdup B	20100826	n.d.	n.d.	6.2	82	56.2	1.49	0.65	58.7	n.d	5.6	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	97	0.15	0.16	n.d.
AR6-2 Fdup C	20100826	n.d.	n.d.	6.29	88	69.5 (0.3)	1.70 (0.00)	0.52 (0.00)	53.8	n.d	2.8 (0.2)	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	184	0.25	0.13	n.d.
AR6-3 Primary	20100826	1646	20.5	6.31	70	52.5	1.42	0.67	49.5 (0.8)	n.d	9.4	n.d	8.9	n.d.	3.1	< 0.08	1.04	333	0.27	0.08	n.d.
AR6-3 Fdup A	20100826	n.d.	n.d.	5.94	84	58.7	1.50	0.62	51.1	n.d	7.1	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	114	0.33	0.29	n.d.
AR6-3 Fdup B	20100826	n.d.	n.d.	6.38	36	41.7	1.27	0.74	61.8 (0.9)	n.d	16.5	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	237	0.19	0.08	n.d.
AR6-3 Fdup C	20100826	n.d.	n.d.	6.33	-4	56.9	1.49	0.64	57.4	n.d	6.3	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	86 (8)	0.25	0.28	n.d.
AR7-1 Primary	20100826	1128	21.2	6.32	92	47.1	1.37	0.73	56.1	n.d	6.4	n.d	23.1	n.d.	2.7	< 0.08	0.98	130	0.36	0.27	n.d.
AR7-1 Fdup A	20100826	n.d.	n.d.	6.28	156	35.7	1.22	0.79	75.6	n.d	12.6	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	229	0.48	0.21	n.d.
AR7-1 Fdup B	20100826	n.d.	n.d.	6.33	129	40.6	1.27	0.75	71.3	n.d	12.8	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	359	0.47	0.13	n.d.
AR7-1 Fdup C	20100826	n.d.	n.d.	6.39	88	47.6	1.37	0.72	75.1	n.d	6.6	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	209 (30)	0.25	0.12	n.d.
AR7-2 Primary	20100826	1220	20.2	6.63	64	48.8	1.36	0.70	73.5	n.d	6.1	n.d	7.2	n.d.	3.4	0.10	0.82	110	0.39	0.36	n.d.
AR7-2 Fdup A	20100826	n.d.	n.d.	6.56	70	52.1	1.42	0.68	56.1	n.d	5.5	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	113	0.38	0.34	n.d.
AR7-2 Fdup B	20100826	n.d.	n.d.	6.53	60	52.7	1.43	0.67	62.3 (3.3)	n.d	5.3	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	90	0.34	0.37	n.d.
AR7-2 Fdup C	20100826	n.d.	n.d.	6.36	78	57.5	1.49	0.63	52.7	n.d	5.2	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	137	0.34	0.25	n.d.
AR8-1	20090918	915	n.d.	n.d.	n.d.	65.3	n.d.	n.d.	n.d.	47.5	n.d.	1.64	n.d.	1.97	n.d.	n.d.	n.d.	<100	n.d.	n.d.	<0.45
AR8-2	20090918	1000	n.d.	n.d.	n.d.	57.9	n.d.	n.d.	n.d.	40.3	n.d.	1.75	n.d.	3.50	n.d.	n.d.	n.d.	190	n.d.	n.d.	<0.45
AR8-3	20090918	1200	n.d.	n.d.	n.d.	56.4	n.d.	n.d.	n.d.	56.2	n.d.	2.09	n.d.	2.83	n.d.	n.d.	n.d.	<100	n.d.	n.d.	<0.45
AR8-4 Primary	20100824	1100	20.1	5.86	221	69.1	1.69	0.52	17.5	n.d	4.3	n.d	8.0	n.d.	1.5	< 0.08	0.43	123	0.19	0.15	n.d.
AR8-4 Fdup A	20100824	n.d.	n.d.	6.03	241	68.3	1.66	0.53	21.9 (0.3)	n.d	4.4	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	120	1.01	0.84	n.d.
AR8-4 Fdup B	20100824	n.d.	n.d.	6.52	128	62.0	1.54	0.59	31.6	n.d	5.6	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	124	0.14	0.11	n.d.
AR8-4 Fdup C	20100824	n.d.	n.d.	6.33	163	69.2	1.69	0.52	27.3	n.d	4.0	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	108 (33)	0.18	0.17	n.d.
AR8-5 Primary	20100824	1340	21.3	5.47	169	64.2	1.61	0.58	58.9	n.d	4.6	n.d	17.2	n.d.	1.9	< 0.08	0.13	321	0.12	0.04	n.d.
AR8-5 Fdup A	20100824	n.d.	n.d.	n.d.	164	57.6	1.48	0.63	59.4	n.d	7.2	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	130	0.22	0.17	n.d.
AR8-5 Fdup B	20100824	n.d.	n.d.	n.d.	149	66.1	1.63	0.55	46.0	n.d	3.6	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	159	0.24	0.15	n.d.
AR8-5 Fdup C	20100824	n.d.	n.d.	n.d.	196	67.5	1.63	0.53	44.6	n.d	3.6	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	81	1.25	1.53	n.d.
AR9-1	20090917	930	n.d.	n.d.	n.d.	57.1	n.d.	n.d.	n.d.	17.3	n.d.	1.08	n.d.	2.10	n.d.	n.d.	n.d.	<100	n.d.	n.d.	<0.45
AR9-2	20090917	1145	n.d.	n.d.	n.d.	66.0	n.d.	n.d.	n.d.	31.8	n.d.	3.90	n.d.	1.64	n.d.	n.d.	n.d.	<100	n.d.	n.d.	<0.45
AR9-3	20090917	1530	n.d.	n.d.	n.d.	50.9	n.d.	n.d.	n.d.	26.3	n.d.	3.83	n.d.	2.24	n.d.	n.d.	n.d.	<100	n.d.	n.d.	<0.45
AR9-4	20090917	1745	n.d.	n.d.	n.d.	57.9	n.d.	n.d.	n.d.	22.9	n.d.	1.88	n.d.	3.72	n.d.	n.d.	n.d.	<100	n.d.	n.d.	<0.45
AR9-5 Primary	20100824	1630	21.9	5.59	114	67.0	1.66	0.55	33.0	n.d	4.0	n.d	7.3	n.d.	1.2	< 0.08	0.34	36	0.12	0.33	n.d.
AR9-5 Fdup A	20100824	n.d.	n.d.	5.7	158	61.5 (0.9)	1.51 (0.03)	0.58 (0.00)	36.7	n.d	5.5 (0.5)	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	124	0.18	0.14	n.d.
AR9-5 Fdup B	20100824	n.d.	n.d.	5.58	202	74.1	1.79	0.46	28.7	n.d	2.1	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	23	0.85	3.62	n.d.
AR9-5 Fdup C	20100824	n.d.	n.d.	5.47	130	68.4 (1.5)	1.67 (0.01)	0.53 (0.02)	45.7 (0.0)	n.d	4.1 (0.2)	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	46	0.15	0.32	n.d.
AR9-6 Primary	20100825	1030	n.d.	6.05	197	61.0	1.54	0.60	33.2	n.d	5.6	n.d	7.8	n.d.	2.3	< 0.08	0.64	88	0.20	0.22	n.d.

Table 6. Parameters in surface sediment (0-10 cm interval), Androscoggin River, Coos County, New Hampshire.

[Field parameters collected by USGS, 2009 sample analysis by Columbia Analytical Services, Kelso, WA; 2010 sample analysis by USGS NRP laboratory, Menlo Park, CA; sampling date, YYYYMMDD format; Temp., temperature; ° C, degrees Celsius; E_h, sediment oxidation-reduction potential corrected for the standard hydrogen half-cell reactio mg/g, milligram per gram; TRS, total reduced sulfur; AVS, acid volatile sulfur; Fe(II)AE, acid extractable ferrous iron; Fe(III)a, poorly crystalline ferric iron; Fe(III)c, crystalline ferric iron; THg, Total Hg; ng/g, nanograms per gram; $Hg(II)_{KOH}$, 1M KOH extractable inorganic Hg; MeHg, methylmercury; MPP, methylmercury production potential based on measurements was 1; n.d., not determined; measurements below analytical detection limit are indicated with '<' and the detection limit value]

Site Code	Sampling date	Sampling time	Temp (° C)	pH	E_h (mV)	Dry weight (% of wet wt.)	Bulk density (g/cm^3 wet sed.)	Porosity (mL PW/ cm^3 wet sed.)	Grain Size (% < 63 µm)	Grain Size (% < 74 µm)	LOI (% of dry wt.)	TOC (%)	TRS (µmol/g) dry wt.	AVS (mg/kg)	$[Fe(II)]_{AE}$ (mg/g) dry wt.	$[Fe(III)]_a$ (mg/g) dry wt.	$[Fe(III)]_c$ (mg/g) dry wt.	THg (ng/g) dry wt.	Reactive Hg (ng/g) dry wt.	Reactive Hg (% of THg)	$Hg(II)_{KOH}$ (ng/g)
AR9-6 Fdup A	20100825	n.d.	n.d.	6.38	47	55.9	1.44	0.64	55.2	n.d	6.6	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	175	0.14	0.08	n.d.
AR9-6 Fdup B	20100825	n.d.	n.d.	6.16	123	60.0	1.52	0.61	26.8	n.d	6.4	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	89	0.15	0.17	n.d.
AR9-6 Fdup C	20100825	n.d.	n.d.	6.17	142	60.8	1.55	0.61	30.2	n.d	6.1	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	111 (54)	0.13	0.12	n.d.
AR9-7 Primary	20100825	1215	n.d.	5.92	215	62.2	1.56	0.59	38.4	n.d	6.9	n.d	6.2	n.d.	1.9	< 0.08	< 0.08	375	0.27	0.07	n.d.
AR9-7 Fdup A	20100825	n.d.	n.d.	6.13	65	66.6	1.65	0.55	28.1 (2.4)	n.d	4.1	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	186	0.14	0.07	n.d.
AR9-7 Fdup B	20100825	n.d.	n.d.	6.26	122	71.1	1.68	0.48	15.3	n.d	3.1	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	35	0.07	0.20	n.d.
AR9-7 Fdup C	20100825	n.d.	n.d.	6.11	195	73.1	1.78	0.48	17.8	n.d	1.8	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	52	0.08	0.16	n.d.

Table 6. Paramete

[Field parameters on; mV, millivolts; %, percent; wt., weight; sed., sediment; g/cm^3, grams per cubic centimeter; mL PW/cm^3, milliliters porewater per cubic centimeter; LOI, loss on ignition; TOC, total organic carbon; mmol/g, micromole per gram; mg/g, milligram per reactive Hg;pg/g, picograms per gram; kd, partitioning coefficient; L/kg, liters/kilogram; analytical error based upon replicate (n=2) measurements is given in parentheses ( ), when no error is expressed the number of analytica measurements was

Site Code	MeHg (ng/g) dry wt.	MeHg (% of THg)	MeHg Production Rate Const. [k] (1/d)	MPP (pg/g dry sed. /day)	LOG(k_d [THg]) (L/kg)	LOG(k_d [MeHg]) (L/kg)	Malate (µM)	Lactate (µM)	Formate (µM)	Acetate (µM)	Total Carbon (%)	Total Nitrogen (%)	C/N ratio (molar)	d13C (per mil)	d15N (per mil)	Organic Carbon (%)
AR2-1	e 0.1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR2-2	e 0.21	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR2-3	<0.9	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR2-4 Primary	0.47	1.7	9.00E-03 (1.26E-03)	0.95 (0.13)	4.32	3.22	<12	<18	<24	<25	7.83	0.24	37.49	-35.55	1.52	2.95
AR2-4 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.49	0.17	17.27	-28.47	1.98	1.90
AR2-4 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.10	0.05	23.35	-27.59	-6.42	1.51
AR2-4 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.74	0.08	40.14	-27.65	-0.33	1.09
AR2-5 Primary	0.23	1.1	8.33E-03 (6.32E-04)	0.64 (0.05)	4.90	3.37	<12	<18	<24	<25	2.32	0.13	20.66	-27.54	-1.07	2.39
AR2-5 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	4.10	0.14	34.93	-27.43	1.76	2.09
AR2-5 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.18	0.20	18.33	-31.25	2.47	2.18
AR2-5 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.31	0.23	16.84	-28.38	1.49	2.50
AR4-1 Primary	0.24	0.1	2.30E-02 (1.92E-03)	5.59 (0.47)	4.53	3.10	574	492	478	455	6.04	0.26	27.28	-33.67	-3.40	5.46
AR4-1 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.63	0.10	19.28	-27.98	-3.93	1.82
AR4-1 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.22	0.10	26.70	-26.61	-6.66	2.03
AR4-1 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.77	0.15	21.32	-30.36	1.15	2.41
AR4-2 Primary	0.74	0.9	4.43E-02 (1.27E-03)	2.68 (0.08)	3.69	2.43	839	487	478	453	4.38	0.21	23.84	-28.23	1.96	3.69
AR4-2 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.			26.68	-29.07	-2.67	6.37
AR4-2 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.71	0.13	24.53	-28.09	2.20	2.28
AR4-2 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.88	0.04	29.11	-28.07	-5.31	1.35
AR5-1 Primary	1.26	1.1	6.19E-03 (9.60E-04)	2.11 (0.29)	4.95	3.39	<12	<18	<24	<25	2.10	0.11	21.78	-28.47	0.76	3.29
AR5-1 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.55	0.07	24.56	-26.87	-0.67	1.26
AR5-1 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.12	0.06	21.90	-27.88	-2.37	1.28
AR5-1 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.69	0.14	23.09	-30.41	-0.50	1.74
AR5-2 Primary	1.39	0.5	5.58E-03 (6.69E-04)	1.03 (0.12)	4.49	2.86	<12	<18	<24	<25	0.79	0.04	25.41	-26.74	0.87	3.65
AR5-2 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.69	0.07	30.10	-26.51	-6.04	2.13
AR5-2 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.33	0.04	39.28	-25.74	-14.09	2.84
AR5-2 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.84	0.05	44.76	-26.02	-0.34	1.55
AR6-1	0.28	0.11	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR6-2 Primary	0.65	1.0	9.50E-03 (1.38E-03)	1.42 (0.21)	4.88	3.31	<12	<18	<24	<25	0.96	0.05	20.35	-27.70	-5.97	1.28
AR6-2 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.45	0.10	27.79	-27.68	0.14	2.19
AR6-2 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	4.88	0.22	25.90	-32.22	-2.75	2.27
AR6-2 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.28	0.06	26.47	-27.15	-0.76	1.12
AR6-3 Primary	1.70 (0.17)	0.5	1.49E-02 (5.54E-04)	3.96 (0.15)	5.46	3.50	<12	<18	<24	<25	3.47	0.13	30.57	-28.11	-3.54	2.20
AR6-3 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.47	0.13	31.13	-27.60	-0.29	3.73
AR6-3 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	5.90	0.29	23.55	-33.57	0.35	5.88
AR6-3 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.03	0.16	22.04	-28.39	-1.02	2.83
AR7-1 Primary	0.78	0.6	1.28E-02 (1.37E-03)	4.54 (0.49)	4.88	3.01	<12	<18	<24	<25	5.08	0.33	17.71	-32.76	1.15	2.76
AR7-1 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	5.85	0.38	18.17	-33.23	1.19	4.16
AR7-1 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	6.56	0.33	23.44	-27.58	1.23	3.79
AR7-1 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.17	0.18	20.52	-30.41	-1.09	2.44
AR7-2 Primary	1.29	1.2	9.45E-03 (1.11E-03)	3.68 (0.43)	5.07	3.71	<12	<18	<24	<25	4.05	0.21	22.28	-27.92	-1.53	2.35
AR7-2 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.81	0.15	21.69	-27.60	2.13	2.59
AR7-2 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.97	0.18	19.55	-29.16	2.12	2.76
AR7-2 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.48	0.16	25.65	-27.51	-4.09	2.02
AR8-1	*0.53*	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR8-2	*1.03*	0.54	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR8-3	*1.00*	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR8-4 Primary	0.96	0.8	1.24E-02	< 0.23	4.73	3.24	<12	<18	<24	<25	3.59	0.08	50.43	-26.07	-3.18	2.89
AR8-4 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.15	0.08	32.75	-28.13	-1.56	2.35
AR8-4 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.20	0.12	32.43	-28.53	-18.58	3.84
AR8-4 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.98	0.08	27.79	-27.35	0.10	1.13
AR8-5 Primary	0.65 (0.02)	0.2	1.04E-02 (2.19E-03)	1.27 (0.27)	5.23	3.78	<12	<18	<24	<25	3.04	0.11	32.00	-30.39	-9.02	1.85
AR8-5 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.78	0.13	25.20	-29.92	1.06	2.76
AR8-5 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.69	0.09	22.97	-28.50	-0.73	1.56
AR8-5 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.61	0.08	24.15	-28.33	-0.21	1.49
AR9-1	0.92	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR9-2	0.71	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR9-3	1.00	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR9-4	2.04	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
AR9-5 Primary	0.34	0.9	3.79E-03 (7.84E-04)	0.45 (0.09)	4.33	3.07	<12	<18	<24	<25	1.32	0.07	20.92	-27.31	4.15	2.25
AR9-5 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	2.23	0.11	23.95	-28.90	1.45	1.87
AR9-5 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.65	0.03	22.30	-26.47	5.29	1.54
AR9-5 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.78	0.10	21.68	-26.99	3.34	1.59
AR9-6 Primary	1.23	1.4	1.53E-02 (3.09E-04)	2.98 (0.06)	5.08	3.59	<12	<18	<24	<25	2.37	0.10	27.52	-27.87	-0.64	2.16

Table 6. Paramete

[Field parameters on; mV, millivolts; %, percent; wt., weight; sed., sediment; g/cm^3, grams per cubic centimeter; mL PW/cm^3, milliliters porewater per cubic centimeter; LOI, loss on ignition; TOC, total organic carbon; mmol/g, micromole per gram; mg/g, milligram per reactive Hg;pg/g, picograms per gram; kd, partitioning coefficient; L/kg, liters/kilogram; analytical error based upon replicate (n=2) measurements is given in parentheses ( ), when no error is expressed the number of analytica measurements was

Site Code	MeHg (ng/g) dry wt.	MeHg (% of THg)	MeHg Production Rate Const. [k] (1/d)	MPP (pg/g dry sed. /day)	LOG(k_d [THg]) (L/kg)	LOG(k_d [MeHg]) (L/kg)	Malate (µM)	Lactate (µM)	Formate (µM)	Acetate (µM)	Total Carbon (%)	Total Nitrogen (%)	C/N ratio (molar)	d13C (per mil)	d15N (per mil)	Organic Carbon (%)
AR9-6 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.83	0.22	20.71	-29.31	-0.62	2.68
AR9-6 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.34	0.09	41.82	-29.43	-7.99	3.13
AR9-6 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.64	0.08	23.68	-27.81	0.82	2.36
AR9-7 Primary	1.61	0.4	1.26E-03	< 0.34	4.81	3.01	<12	<18	<24	<25	4.19	0.15	32.62	-26.90	-2.67	2.91
AR9-7 Fdup A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.61	0.10	42.78	-27.63	-16.47	1.66
AR9-7 Fdup B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.10	0.04	32.19	-26.63	0.38	1.77
AR9-7 Fdup C	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.73	0.04	22.12	-27.40	-0.79	0.94

Table 7. Concentrations of metals in surface sediment (0-10 cm interval), Androscoggin River, Coos County, New Hampshire.

[Analysis by Als Laboratory Group, Salt Lake City, UT; Sample collection is given in the YYYYMMDD format; <, less than reporting limit; e, estimated values; number in () is the Chemistry Abstracts Service Registry Number; units are milligrams per kilogram dry weight; PEC, probable effects concentration (MacDonald and others, 2000)]

	Compound	Antimony (Sb)	Arsenic (As)	Beryllium (Be)	Cadmium (Cd)	Chromium (Cr)	Copper (Cu)	Lead (Pb)	Nickel (Ni)	Selenium (Se)	Strontium (Sr)	Vanadium (V)	Zinc (Zn)
	Reporting limit	2	1	0.5	0.5	1	2.5	1	4	3.5	1	5	6
Site	Sampling Date	(7440-36-0)	(7440-38-2)	(7440-41-7)	(7440-43-9)	(7440-47-3)	(7440-50-8)	(7439-92-1)	(7440-02-0)	(7782-49-2)	(7440-24-6)	(7440-62-2)	(7440-66-6)
AR2-1	20090916	<2	2.2	e 0.29	0.60	11.4	9.0	7.4	11.7	e 0.63	e 5.2	14.4	50.9
AR2-2	20090916	<2	2.1	e 0.27	0.59	10.6	8.1	7.1	10.5	e 0.66	e 4.6	12.7	46.4
AR2-3	20090916	<2	2.5	e 0.37	0.77	14.9	11.7	9.4	15.2	e 0.75	e 6.7	18.2	65.9
AR6-1	20090918	<2	1.8	e 0.31	0.59	11.6	14.4	11.6	9.9	e 0.58	e 5.5	17.0	57.4
AR8-1	20090918	<2	1.7	e 0.35	0.56	13.4	19.0	15.6	9.5	e 0.54	e 5.8	16.3	57.3
AR8-2	20090918	<2	3.6	e 0.30	0.53	10.3	13.8	11.0	8.7	e 0.63	e 5.4	14.9	57.1
AR8-3	20090918	<2	1.7	e 0.35	0.53	11.2	17.7	16.6	8.7	e 0.65	e 5.7	15.9	55.2
AR9-1	20090917	<2	1.4	e 0.25	e 0.37	6.9	10.8	6.9	5.2	e 0.71	e 4.3	10.7	37.4
AR9-2	20090917	<2	<1	e 0.27	e 0.39	7.9	8.5	6.6	5.5	e 0.53	e 4.0	11.7	50.2
AR9-3	20090917	<2	1.6	e 0.35	0.56	10.7	28.9	14.7	8.1	e 1.1	e 7.1	15.5	53.6
AR9-4	20090917	<2	1.3	e 0.27	e 0.48	9.4	13.5	13.7	7.1	e 0.74	e 8.0	13.3	46.0
Quality assurance replicate samples													
AR9-2 rep	20090917	<2	7.3	e 0.28	e 0.38	7.4	10.7	9.4	5.7	<3.5	e 4.0	12.2	42.7
PEC			*33*		*4.98*	*111*	*149*	*128*	*48.6*				*459*
Human Health screening level (EPA 2009)		31	3.9	160	70	2800	3100	400	1500	390	47000	390	23000
Ecological Screening value (EPA 2006; Suter and Tsao, 1996)		2	9.8	na	0.99	43.4	31.6	35.8	22.7	na	na	na	121

Table 8. Acid Volitile Sulfide and Simultaneously Extractable Metal results from Androscoggin River stream sediments.

[Sample analysis by Columbia Analytical Services, Kelso, WA; sampling date, YYYYMMDD format; units are micromoles per gram; <, analyte not detected above reporting limit; TOC, Total Organic Carbon; AVS, Acid Volitile Sulfide; SEM, Simultaneously Extracted Metals; ESB, Equilibrium partitioning Sediment Benchmark is SEM/AVS normalized to the fraction of organic carbon in sediment]

Site	Sampling date	Solids[1]	TOC	AVS	SEM						total SEM	SEM/AVS	ESB
					Cd	Cu	Pb	Ni	Zn	Ag			
		%	%	µmole/g	µmole/g	µmole/g	µmole/g	µmole/g	µmole/g	µmole/g			
AR2-1	20090916	56.2	1.92	0.5552	< 0.0013	0.0145	0.0103	0.0149	0.1360	< 0.0027	0.18	0.32	-19.8
AR2-2	20090916	39.8	3.22	1.0449	0.0037	0.0642	0.0342	0.0410	0.4149	< 0.0034	0.56	0.53	-15.1
AR2-3	20090916	45.5	2.16	0.5552	0.0026	0.0455	0.0253	0.0358	0.3220	< 0.0027	0.43	0.78	-5.7
AR6-1	20090918	56.3	1.66	0.0802	0.0009	0.0368	0.0186	0.0497	0.1600	< 0.0005	0.27	3.32	11.2
AR8-1	20090918	65.3	1.64	0.0614	0.0010	0.0616	0.0345	0.0137	0.1840	< 0.0004	0.29	4.80	14.2
AR8-2	20090918	57.9	1.75	0.1092	0.0010	0.0287	0.0184	0.0093	0.1940	< 0.0005	0.25	2.30	8.1
AR8-3	20090918	56.4	2.09	0.0883	0.0009	0.0483	0.0291	0.2761	0.1710	< 0.0004	0.53	5.95	20.9
AR9-1	20090917	57.1	1.08	0.0655	0.0007	0.0310	0.0160	0.0094	0.1340	< 0.0004	0.19	2.92	11.6
AR9-2	20090917	69.1	1.75	0.0418	0.0005	0.0439	0.0445	0.0134	0.1020	< 0.0003	0.20	4.89	9.3
AR9-2 rep	20090917	66.0	3.90	0.0512	0.0010	0.1150	0.0239	0.0360	0.1670	< 0.0004	0.34	6.70	7.5
AR9-3	20090917	50.9	3.83	0.0699	0.0015	0.0896	0.0450	0.0308	0.2280	< 0.0005	0.39	5.65	8.5
AR9-4	20090917	57.9	1.88	0.1160	0.0021	0.0875	0.0460	0.0257	0.3379	< 0.0005	0.50	4.30	20.4

[1] solids determined by Method SM2540B

Table 9. Concentrations of pesticides in streambed sediment, Androscoggin River, Coos County, New Hampshire.

[Sample analysis by Columbia Analytical Services, Kelso, WA; analytical method SW8081 (USEPA, 2007); sampling date, YYYYMMDD format; units are micrograms per kilogram dry weight; <, less than reporting limit; e, estimated values]

Site	Sampling Date	Aldrin	Alpha-BHC	Alpha-Chlordane	Beta-BHC	Chlordane	Chlorpyrifos	Cis-Nonachlor	4,4'-DDD	O,p'-DDD	4,4'-DDE	O,p'-DDE	4,4'-DDT	O,p'-DDT	Delta-BHC	Dieldrin	Endosulfan I	Endosulfan II	Endrin	Endrin aldehyde	Endrin ketone	Endosulfan sulfate	Gamma-BHC	Gamma-Chlordane
AR2-1	20090916	<4.5	<4.5	<4.5	<4.5	<89	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5
AR2-2	20090916	<6.3	<6.3	<6.3	<6.3	<130	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3
AR2-3	20090916	<5.5	<5.5	<5.5	<5.5	<110	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5
AR6-1	20090918	<4.5	<4.5	<4.5	<4.5	<89	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5
AR8-1	20090918	<3.9	<3.9	<3.9	<3.9	<77	<3.9	<3.9	<3.9	<3.9	<3.9	<5.2	<3.9	<3.9	<3.9	<3.9	<3.9	<3.9	<3.9	<3.9	<3.9	<3.9	<3.9	<3.9
AR8-2	20090918	<4.4	<4.4	<4.4	<4.4	<87	<5.9	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	e 0.51	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4
AR8-3	20090918	<4.5	<4.5	<4.5	<4.5	<89	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	e 4.4	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5
AR9-1	20090917	<4.4	<4.4	<4.4	<4.4	<88	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4
AR9-2	20090917	<3.6	<3.6	<3.6	<3.6	<72	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6
AR9-3	20090917	<4.9	<4.9	<4.9	<4.9	<98	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	e 2.7	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	e 1.2	<4.9
AR9-4	20090917	<4.4	<4.4	<4.4	<4.4	<87	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	e 3.1	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	e 0.57	<4.4
Quality assurance replicate samples																								
AR9-2	20090917	<3.8	<3.8	<3.8	<3.8	<75	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	e 1.4	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8

Table 9. Cor

[Sample ana

Site	Heptachlor	Heptachlor epoxide	Hexachloro benzene	Methoxych lor	Mirex	Oxychlord ane	Trans-Nonachlor	Toxaphene
AR2-1	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<230
AR2-2	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<6.3	<320
AR2-3	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<5.5	<280
AR6-1	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<260
AR8-1	<3.9	<3.9	<3.9	<3.9	<3.9	<5.1	<3.9	<230
AR8-2	<4.4	<4.4	e 1.3	<4.4	<4.4	<4.4	<4.4	<220
AR8-3	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<4.5	<230
AR9-1	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<220
AR9-2	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<3.6	<180
AR9-3	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<4.9	<270
AR9-4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<4.4	<220
Quality assu								
AR9-2	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<3.8	<250

Table 10. Concentrations of semivolatile organic compounds in streambed sediment, Androscoggin River, Coos County, New Hampshire.

[Sample analysis by Columbia Analytical Services, Kelso, WA; Analytical method SW8270 (USEPA, 2007); Bold values are above probable effects concentrations, PEC (MacDonald and others, 2000); %, percent; sampling date, YYYYMMDD format; units are micrograms per kilogram dry weight; <, less than reporting limit; e, estimated values]

Site	Sampling Date	**1,1'-Biphenyl**	**Ace-naphthene**	**Ace-naphthylene**	**Ace-tophenone**	**Anthracene**	**Benz-aldehyde**	**Benzo(a) anthracene**	**Benzo(a) pyrene**	**Benzo(b) fluoranthene**	**Benzo(g,h,i) perylene**	**Benzo(k) fluoranthene**	**Bis(2-chloro isopropyl) ether**	**Carbazole**	**Chrysene**	**Dibenzo (a,h) anthracene**	**Dibenzo furan**	**Diethyl phthalate**	**Di-n-butyl phthalate**	**Fluor-anthene**	**Fluorene**	**Indeno (1,2,3 CD) pyrene**	**2 Methyl Naphthalene**	**4 Methyl Phenol**	**Naphthalene**	**Phen-anthrene**	**Phenol**	**Pyrene**
AR2-1	20090916	<18	<8.9	e 6.1	100	e 3.2	28	13	e 15	20	13	e 7.7	e 9.4	e 1.4	20	<8.9	<8.9	<8.9	<18	26	e 1.4	e 15	<8.9	<8.9	<8.9	13	<51	30
AR2-2	20090916	<26	<13	e 5	83	e 3.4	28	e 11	e 12	20	e 11	e 6.8	e 13	e 2.2	17	<13	<13	<13	<26	25	<13	e 14	<13	<13	<13	13	<38	28
AR2-3	20090916	<22	<11	e 5.4	60	e 4.2	e 16	12	e 14	18	12	e 6.7	e 8.2	e 1.8	17	<11	<11	e 2	e 10	25	<11	e 12	<11	<11	<11	13	<39	30
AR6-1	20090918	<89	e 34	e 28	<230	150	<89	900	e 880	1200	480	400	<450	61	920	47	e 18	<45	<89	1400	e 33	e 620	<45	<45	<45	530	<140	1200
AR8-1	20090918	e 3.7	48	46	e 15	230	<16	**1400**	1300	1800	610	630	e 36	83	**1500**	66	27	<7.7	e 13	2000	e 55	720	10	< 7.7	16	800	e 10	**1900**
AR8-2	20090918	e 2.2	27	30	e 16	130	e 9.5	790	e 840	1100	460	530	e 21	40	820	38	12	<8.6	e 7.9	1200	e 32	490	e 5.2	< 8.6	9.8	530	e 6.5	1300
AR8-3	20090918	e 3.3	54	38	e 16	260	e 8.7	**1300**	1300	1700	810	670	e 34	88	**1500**	61	24	e 1.6	e 12	2200	e 60	800	9.9	< 8.9	17	930	e 9.3	**2100**
AR9-1	20090917	<18	18	e 23	e 38	92	e 11	590	e 600	780	370	350	e 23	25	620	30	e 8.7	<8.8	<18	810	e 21	380	e 4.5	e 7.6	10	310	e 8.8	860
AR9-2	20090917	<150	e 69	e 38	<370	200	<150	800	e 780	e 1100	e 490	e 350	<730	e 48	e 850	150	e 31	<73	<150	e 1500	e 88	e 580	<73	<73	<73	930	<220	1400
AR9-3	20090917	<200	140	e 55	<490	430	<200	**2300**	**e 2100**	3000	1200	1000	<980	140	**2400**	350	e 70	<98	<200	**3600**	e 150	e 1600	e 33	<98	e 50	**1700**	<300	**3400**
AR9-4	20090917	<87	56	e 20	<220	250	<87	**1200**	e 1000	1400	520	530	<440	59	1200	55	e 19	<44	<87	1800	e 58	e 770	<44	<44	<44	720	<130	1600
% detect		27	73	100	64	100	54	100	100	100	100	100	64	100	100	73	73	18	36	100	82	100	45	9	45	100	36	100
PEC			-----	-----		845		1050	1450						1290					2230	536				561	1170		1520
Quality assurance replicate sample																												
AR9-2	20090917	<76	e 100	48	<190	280	<76	e **2400**	**e 2900**	e 3800	e 2300	e 1400	<380	e 92	e **2700**	140	41	<38	<76	e **3800**	e 98	e 1600	e 19	<38	e 25	**1200**	<120	**3200**

Table 11. Concentrations of polychlorinated biphenyl compounds in streambed sediment, Androscoggin River, Coos County, New Hampshire.

[Sample analysis by Columbia Analytical Services, Kelso, WA; Analytical method CBC01.0 (USEPA, 2007); Bold values are above probable effects concentrations (PEC); %, percent; sampling date, YYYYMMDD format; units are micrograms per kilogram dry weight; <, less than reporting limit; e, estimated values]

Site	Sampling Date	Decachloro biphenyl	Total TrCB	Total PeCB	Total DiCB	Total HxCB	Total TeCB	Total MoCB	Total HpCB	2,3',4,4',5-Pentachlorobiphenyl	3,3',4,4'-Tetrachlorobiphenyl	2,3,3',4,4'-Pentachlorobiphenyl	3,3',4,4',5,5'-Hexachlorobiphenyl	2,3,3',4,4',5-Hexachlorobiphenyl	2,3,3',4,4',5,5'-Heptachlorobiphenyl	2,3',4,4',5,5'-Hexachlorobiphenyl	Total NoCB	Total OcCB	3,3',4,4',5-Pentachlorobiphenyl	2',3,4,4',5-Pentachlorobiphenyl	3,4,4',5-Tetrachlorobiphenyl	2,3,4,4',5-Pentachlorobiphenyl	Toxic Equivalent - PCBC	Total PCB Homologues
AR2-1	20090916	e 4.03	<55.2	<62.6	<56.4	<87.5	<64.6	<8.04	e 76.4	< 13.1	< 3.29	< 3.85	< 3.41	< 4.82	< 2.90	< 4.16	e 4.37	e 37.8	< 5.08	< 3.08	< 2.94	< 3.31	<0.000	e 123
AR2-2	20090916	e 6.64	<78.6	<65.6	<76.2	<119	<90.2	<10.7	e 99.3	< 17.4	< 2.03	< 7.65	< 2.68	< 3.23	< 2.23	< 3.43	e 8.24	e 52.8	< 4.85	< 2.87	< 1.74	< 3.01	<0.000	e 167
AR2-3	20090916	e 10.8	<64.9	<155	<68.4	e 412	<111	<8.56	e 565	26.7	< 2.08	< 11.3	< 3.13	6.70	< 2.05	< 4.01	e 32.2	e 237	< 5.40	< 3.70	< 1.81	< 4.05	e 0.001	e 1260
AR6-1	20090918	e 62.5	e 1020	e 26000	<149	e 77400	e 6340	3.79	e 76200	e 3940	< 31.0	1030	< 61.6	e 1220	e 260	e 616	e 799	e 14100	< 57.9	< 40.2	< 32.7	54.8	e 0.214	e 202000
AR8-1	20090918	e 21.3	<165	e 2790	<82.7	e 9090	e 848	27.7	e 8550	387	< 5.36	e 68.6	< 9.82	147	29.5	53.7	e 173	e 2290	< 16.0	< 9.56	< 5.72	< 8.94	e 0.021	e 23800
AR8-2	20090918	e 24.8	<312	e 2260	<156	e 5590	e 751	45.6	e 3920	254	< 9.77	e 79.9	< 9.55	84.6	13.5	35.2	e 78.3	e 876	< 13.3	< 9.51	< 10.6	< 9.87	e 0.014	e 13500
AR8-3	20090918	e 21.7	<143	e 2340	<61.5	e 5170	e 1010	9.92	e 3570	226	4.50	e 70.9	< 6.77	57.8	12.0	25.5	e 86.5	e 916	< 11.9	< 7.57	< 3.28	< 7.18	e 0.012	e 13100
AR9-1	20090917	e 9.5	<123	e 2220	<68.3	e 6210	e 651	9.78	e 5250	236	< 4.45	e 77.7	< 5.66	79.2	15.5	32.8	e 92.1	e 1310	< 8.06	< 6.08	< 4.31	< 6.80	e 0.013	e 15700
AR9-2	20090917	e 8.25	<150	e 3270	<76.1	e 7750	e 1230	11.9	e 5570	286	< 4.68	e 86.6	< 6.70	93.1	16.9	33.3	e 96.9	e 1250	< 8.23	< 5.91	< 4.18	< 6.79	e 0.016	e 19200
AR9-3	20090917	e 43.9	e 719	e 134000	e 387	e 127000	e 23000	e 102	e 22600	e 23200	36.0	e 7540	< 18.0	5380	e 188	1760	e 134	e 2030	< 36.0	382	< 11.3	e 563	e 1.17	e 310000
AR9-4	20090917	e 16.7	<288	e 5190	111	e 10400	e 1890	27.6	e 5230	695	6.88	e 219	< 6.98	197	19.7	70.5	e 78.8	e 1180	< 12.6	< 9.72	< 5.02	< 10.8	e 0.037	e 24000
Quality assurance replicate sample																								
AR9-2	20090917	e 61.3	<278	e 4600	204	e 10300	e 1750	e 60.7	e 7460	361	7.08	e 96.3	6.39	108	18.7	46.3	e 98.5	e 1430	< 12.0	< 11.0	< 6.10	< 11.10	e 0.02	e 25800

Table 12. Concentrations of dioxin and furan compounds in streambed sediment, Androscoggin River, Coos County, New Hampshire.

[Sample analysis by SGS Environmental, Wilmington, WA; analytical method SW8290 (USEPA, 2005); Bold values are above probable effects concentrations (PEC); %, percent; sampling date, YYYYMMDD format; units are picograms per gram dry weight; <, less than reporting limit; e, estimated values]

Site	Sampling Date	2,3,7,8-Tetrachloro dibenzo-P-Dioxin	1,2,3,7,8,9-Hexachlorodibe nzo-P-Dioxin	Pentachloro dibenzo furan (total)	1,2,3,4,6,7,8,9-Octachloro dibenzo-P-Dioxin	Hexachlorodibe nzo-p-dioxin (total)	1,2,3,4,6,7,8-Heptachlorodiben zo-P-Dioxin	Pentachloro dibenzo-p-dioxin (total)	Heptachloro dibenzo-p-dioxin (total)	Heptachloro dibenzo furan (total)	1,2,3,4,6,7,8,9-Octachloro dibenzofuran	1,2,3,4,7,8-Hexachloro dibenzo-P-Dioxin	1,2,3,7,8-Pentachlorodiben zo-P-Dioxin	Tetrachlorodi benzo(p) dioxin (total)	2,3,7,8-Tetrachloro dibenzo furan	1,2,3,4,7,8,9-Heptachlorodibe nzo furan	Hexachloro dibenzo furan (total)	Tetrachloro dibenzo furan (total)	2,3,4,7,8-Pentachloro dibenzo furan	1,2,3,7,8-Pentachloro dibenzo furan	1,2,3,6,7,8-Hexachloro dibenzo furan	1,2,3,6,7,8-Hexachloro dibenzo-P-Dioxin	2,3,4,6,7,8-Hexachloro dibenzo furan	1,2,3,4,6,7,8-Heptachloro dibenzo furan	1,2,3,4,7,8-Hexachloro dibenzo furan	1,2,3,7,8,9-Hexachloro dibenzo furan	Dioxin/Furan - Toxic Equivalent
AR2-1	20090916	<0.267	<0.456	e 0.748	18.4	e 1.16	e 3.53	<0.325	e 6.84	e 0.805	1.48	<0.442	<0.325	<0.947	e 0.621	<0.732	e 2.19	e 1.49	<0.196	e 0.292	e 0.328	0.442	<0.292	1.08	e 0.326	<0.455	e 0.190
AR2-2	20090916	<0.238	<0.499	e 1.93	17.6	e 1.54	e 3.63	<0.270	e 7.31	e 2.03	e 1.68	<0.496	<0.270	<0.901	e 0.619	<0.744	e 0.963	e 3.61	0.291	0.305	0.419	0.473	0.280	e 1.13	0.388	<0.419	e 0.320
AR2-3	20090916	<0.249	<0.657	e 1.37	19.0	e 0.687	e 3.82	<0.349	e 7.30	e 1.05	<2.44	<0.626	<0.349	<0.878	e 0.609	<0.936	e 2.05	e 2.29	0.307	e 0.337	e 0.362	0.648	<0.300	0.993	0.335	<0.452	e 0.290
AR6-1	20090918	<0.238	e 0.529	e 101	62.4	e 3.14	11.2	<0.356	e 21.8	e 32.4	21.4	<0.465	<0.356	<0.809	40.4	5.14	e 67.4	e 161	19.0	18.6	6.58	e 0.623	e 3.37	15.7	31.3	9.47	e 15.8
AR8-1	20090918	e 0.407	e 0.816	e 164	78.3	e 9.72	15.1	e 0.945	e 35.6	e 25.5	19.4	e 0.485	0.341	<1.010	89.2	4.87	e 61.9	e 397	32.7	32.2	7.12	e 1.27	e 3.28	15.2	31.4	6.85	e 25.9
AR8-2	20090918	0.318	e 0.538	e 215	88.6	e 5.85	13.6	<0.263	e 28.6	e 86.9	37.2	<0.467	<0.263	<0.786	50.2	15.2	e 199	e 177	40.7	42.8	21.5	e 0.935	9.60	40.6	77.4	33.1	e 33.9
AR8-3	20090918	<0.219	e 0.689	e 102	103	e 6.22	17.2	e 0.449	e 32.8	e 25.4	16.2	<0.459	<0.288	<0.625	36.4	e 3.44	e 58.8	e 134	20.6	20.7	6.54	e 0.991	e 3.22	12.3	26.6	6.88	e 15.3
AR9-1	20090917	e 0.378	<0.479	e 46.5	52.3	e 3.58	7.74	<0.257	e 16.3	e 15.2	9.56	<0.456	<0.257	<1.030	28.3	e 2.28	e 28.4	e 90.0	10.3	10.6	e 2.95	e 0.741	e 1.68	7.02	13.5	e 3.44	e 9.00
AR9-2	20090917	<0.167	<0.493	e 119	20.0	e 1.14	e 3.40	<0.216	e 6.99	e 11.0	e 4.88	<0.481	<0.216	<0.408	e 67.0	e 2.15	e 44.3	e 211	e 25.9	37.9	5.59	<0.476	e 2.28	e 5.47	23.6	e 4.85	e 19.4
AR9-3	20090917	812	e 2590	0.362	<0.579	e 1920	55.0	e 4.77	9.15	<0.277	e 19.7	e 125	e 42.9	<0.566	<0.277	<0.364	e 25.7	e 679	458	434	e 79.6	e 0.894	42.6	e 69.0	362	e 86.6	e 290
AR9-4	20090917	e 0.687	<0.550	e 133	1180	e 26.2	89.0	e 0.353	e 707	e 92.1	87.8	<0.520	e 0.353	<0.687	71.4	7.46	e 79.2	e 248	27.6	30.8	9.36	1.88	6.39	26.7	38.1	e 8.77	e 25.4
Quality assurance replicate sample																											
AR9-2	20090917	<0.244	<0.511	e 219	27.8	e 0.548	e 4.52	<0.312	e 10.5	e 25.6	13.0	<0.493	<0.312	<0.244	e 129	5.37	e 80.9	e 569	e 46.5	39.0	8.85	0.498	e 4.36	e 13.2	39.3	e 9.65	e 34.5

Table 13. Results of 7-day toxicity tests with the cladoceran, *Ceriodaphnia dubia* , and fathead minnow, Pimephales promelas, exposed to surface water from the Androscoggin River.

[Sample collection is given in the YYYYMMDD format; Cladoceran data is mean of 10 replicates, minnow data is mean of 4 replicates. Analysis by TechLaw, Inc., (2009b)]

Site	Sampling Date	*Ceriodaphnia dubia*		*Pimephales promelas*	
		Survival (%)	Reproduction[1] (%)	Survival (%)	Mean dry biomass (mg)
Lab Control		90	67	100	0.642
Wheeler Bay[2] AR2	20090914	100	80	85	0.511
Sawmill Dam AR3	20090915	90	100	83	0.503
Smith Dam AR4	20090915	90	78	98	0.565
Gorham Dam AR8-1	20090914	90	78	83	0.517
Shelburne Dam AR9-1	20090914	100	100	75	0.454

[1] Reproduction = surviving brooders producing 3 or more broods with average total number of at least 15 neonates

[2] reference site

Table 14. Percent survival of 96-hour toxicity tests with the amphipod *Hyalella azteca* and midge *Chironomus dilutus* exposed to pore-water from the Androscoggin River.

[Results are the mean of 10 replicates. Sample collection is given in the YYYYMMDD format. Sample analysis by TechLaw, Inc., (2009a)]

Site	Sampling Date	*Chironomus tentans* Survival (%)	*Hyalella azteca* Survival (%)
Lab Control		90	100
Lab Control		100	100
Wheeler Bay[1]			
AR2-1	20090916	100	80
AR2-2	20090916	80	60
AR2-3	20090916	100	70
AR2-4	20100823	0	80
AR2-5	20100823	90	100
Smith Hydro			
AR4-1	20100827	75	90
AR4-2	20100827	0	100
Cross Power			
AR5-1	20100827	100	90
AR5-2	20100827	100	100
Cascade Dam			
AR6-1	20090918	90	100
AR6-2	20100826	20	100
AR6-3	20100826	85	100
Brown Dam			
AR7-1	20100826	100	100
AR7-2	20100826	90	100
Gorham Dam			
AR8-1	20090918	40	0
AR8-2	20090918	90	95
AR8-3	20090918	90	90
AR8-4	20100824	100	100
AR8-5	20100824	95	100
Shelburne Dam			
AR9-1	20090917	80	95
AR9-2	20090917	60	70
AR9-3	20090917	90	95
AR9-4	20090917	80	85
AR9-5	20100824	95	90
AR9-6	20100825	100	100
AR9-7	20100825	100	100

[1] reference site

Table 15. Results of 28-day toxicity tests with the amphipod, *Hyalella azteca* , and of 10-day toxicity tests with the midge, Chironomus dilutus, exposed to sediments from the Androscoggin River.

[Sample collection is given in the YYYYMMDD format; Means and standard errors (Std. Err.; n=8 replicates per sediment) are given. Sample anaylsis by EnvironSystems Inc. (2010a; 2010b)]

Stream reach	Sampling Date	AMPHIPOD, *Hyalella azteca* (28-d test)				MIDGE, *Chironomus dilutus* (20-d test)			
		Survival (%)		Biomass dry wt. (mg)		Survival (%)		Biomass dry wt. (mg)	
		Mean	Std. Err.	Mean	Std. Err.	Mean	Std. Err.	Mean	Std. Err.
Lab Control		85	11	0.258	0.061	90	30	0.71	0.16
Lab Control		81	12	0.588	0.105	88	12	0.97	0.51
Wheeler Bay[1]									
AR2-1	20090916	78	13	0.371	0.103	70	24	0.39	0.11
AR2-2	20090916	88	12	0.376	0.087	90	19	0.44	0.12
AR2-3	20090916	80	13	0.392	0.077	50	42	0.50	0.15
AR2-4	20100823	76	26	0.440	0.112	83	17	1.36	0.33
AR2-5	20100823	80	20	0.400	0.107	76	29	1.25	0.48
Smith Hydro									
AR4-1	20100827	88	10	0.590	0.098	64	47	1.23	0.24
AR4-2	20100827	74	26	0.530	0.156	85	11	1.29	0.27
Cross Power									
AR5-1	20100827	79	25	0.434	0.137	80	23	1.28	0.47
AR5-2	20100827	85	14	0.432	0.114	68	57	1.61	0.29
Cascade Dam									
AR6-1	20090918	50	22	0.284	0.063	15	20	0.06	0.09
AR6-2	20100826	79	11	0.458	0.126	91	13	1.35	0.51
AR6-3	20100826	86	12	0.434	0.163	96	5	1.77	0.48
Brown Dam									
AR7-1	20100826	81	19	0.430	0.108	70	25	1.45	0.28
AR7-2	20100826	79	11	0.479	0.073	75	40	1.14	0.65
Gorham Dam									
AR8-1	20090918	90	9	0.407	0.091	60	27	0.35	0.10
AR8-2	20090918	70	10	0.341	0.083	75	33	0.35	0.12
AR8-3	20090918	90	12	0.256	0.096	75	31	0.29	0.14
AR8-4	20100824	83	21	0.557	0.142	85	17	1.28	0.36
AR8-5	20100824	84	19	0.551	0.104	86	15	1.54	0.42
Shelburne Dam									
AR9-1	20090917	75	22	0.331	0.068	80	32	0.30	0.09
AR9-2	20090917	80	11	0.325	0.017	65	34	0.17	0.11
AR9-3	20090917	65	19	0.341	0.068	45	40	0.27	0.20
AR9-4	20090917	70	13	0.295	0.114	25	30	0.11	0.10
AR9-5	20100824	71	32	0.501	0.121	40	72	0.99	0.57
AR9-6	20100825	86	15	0.494	0.189	61	50	1.15	0.41
AR9-7	20100825	76	25	0.521	0.132	76	25	1.21	0.48

[1] reference site

Table 16. Concentrations of total Hg in biota, Androscoggin River, Coos County, New Hampshire.

[Sample analysis by USEPA NERL, Chelmsford, MA, except 2009 fish and crayfish analysis by Columbia Analytical Services, Kelso, WA; all concentrations are in nanograms per gram wet weight; sampling date is given in the YYYYMMDD format; white suckers are whole body composites of at least 5 fish in 2009, and individual whole body samples in 2011, smallmouth bass individual skinless fillet 2009 and 2011 ,except for one sample at AR3 was a skin-on fillet* crayfish are whole body composites in 2009 and individual whole body samples in 2011; MYLU, little brown bat; EPFU, big brown bat]

Site	Oligochaete sampling date	Oligochaetes	Invertebrate sampling date	Epifaunal Macro-invertebrates	Crayfish Fish sampling date	Crayfish	White Sucker	Smallmouth Bass	Bat sampling date	Bat species	Bat Blood	Bat fur	Adult Swallow sampling date	Adult Swallow Blood	Adult Swallow Feather	Nestling Swallow sampling date	Nestling Swallow Blood	Nestling Swallow Feather	Swallow Egg sampling date	Swallow Egg
AR1									20100809	MYLU	178	6808	20100602	346	2042	20100622	40.1	1447	20100602	527
AR1									20100809	MYLU	131	4554	20100602	290	917	20100622	71.2	1779	20100602	529
AR1									20100809	MYLU	383	19784	20100602	278	978	20100622	58.9	1620	20100602	490
AR1									20100809	MYLU	288	5062	20100602	295	1328	20100622	43.7	1433	20100602	515
AR1									20100809	MYLU		2599	20100602	286		20100622	39.9	1436	20100609	706
AR1									20100812	MYLU		5103	20100609		1168	20100622	39.9	1489	20100622	561
AR1									20100812	MYLU		4184	20100609		1099					
AR1									20100812	MYLU		3371	20100616	434	1113					
AR1									20100812	MYLU		40575	20100630	411	883					
AR1									20100812	MYLU		4969								
AR1									20100812	MYLU		5936								
AR2	20090916	22.3	20090922	45.3	20090824	68.1	134	432					20100603	315	818	20100623	20.9	931	20100603	580
AR2	20090916	19.5			20090824	75.0	135	388					20100603	339	1312	20100623	29.5	1059	20100603	490
AR2	20090916	18.3			20090824			415					20100603	306	1143	20100623	37.2	1077	20100609	426
AR2	20100823	16.8			20090824			421					20100603		1052	20100623	30.3	1309	20100609	524
AR2	20100823	21.6			20090824			302					20100609	234	2420	20100623	23.4	883	20100609	495
AR2					20110808	57.3	114	421							1527	20100623	40.1		20100609	777
AR2					20110808	51.0	132	422								20100630	35.9	1002	20100609	568
AR2					20110808	45.4	124	564								20100630		1196		
AR2					20110808	61.8	93.4	397												
AR2					20110808	50.2	153	275												
AR2					20110808	61.2														
AR2					20110808	64.3														
AR2					20110808	64.4														
AR2					20110808	42.1														
AR2					20110808	49.3														
AR3			20090922	235	20090826	158		604*					20100609	466	1011				20100609	813
AR3					20090827	111		568												
AR3					20090827			393												
AR3					20090827			302												
AR3					20090827			251												
AR4	20100827	19.9	20090922	122	20090826	56.6		392					20100609	491	1610	20100623	53.0	1644	20100609	847
AR4	20100827				20090827	50.9										20100623	41.8			
AR5	20100827	22.1			20110809	105	84.3	508												
AR5	20100827	39.4			20110809	122	89.2	654												
AR5					20110809	66.4	163	442												
AR5					20110809	169	57.1	528												
AR5					20110809	110	143	528												
AR5					20110809	147														
AR5					20110809	176														
AR5					20110809	87.2														
AR5					20110809	110														
AR5					20110809	69.2														
AR6	20090918	34.5			20090827			337												
AR6	20100826	44.3			20090827			435												
AR6	20100826	45.2			20090827			318												
AR6					20090827			572												
AR6					20090828	85.6		858												
AR6					20110811	95.0	129	679												
AR6					20110811	72.5	213	843												
AR6					20110811	76.5	238	688												
AR6					20110811	88.8	356	581												
AR6					20110811	106	208	594												
AR6					20110811	70.2														
AR6					20110811	93.2														
AR6					20110811	138														
AR6					20110811	107														
AR6					20110811	88.8														
AR7	20100826	25.5			20110810	106	182	1230												
AR7	20100826	29.9			20110810	122	181	591												
AR7					20110810	61.2	112	607												
AR7					20110810	116	450	564												
AR7					20110810	81.0	251	629												
AR7					20110810	46.2														
AR7					20110810	53.4														
AR7					20110810	72.3														

AR7					20110810	114														
AR7					20110810	71.8														
AR8	20090918	36.3	20090921	57.4	20090826	74.0	343	519					20100602	570	953	20100623	30.9	1255	20100813	785
AR8	20090918	23.6			20090826	74.2	377	739					20100602	416	998	20100623	83.5	2517	20100813	839
AR8	20090918	35.0			20090826			795					20100602		1849	20100701	46.7	1420	20100813	581
AR8	20100824	30.8			20090826			655					20100602		1878				20100812	816
AR8	20100824	31.3			20090826			639					20100609	589	1418				20100813	739
AR8													20100609	457	1488					
AR8													20100623	439	1249					
AR9	20090917	30.7	20090921	71.4	20090825	104	306	633	20100809	EPFU	296	39088.746	20100521	304	933	20100623	72.8	2450	20100601	815
AR9	20090917	na			20090825	68.4	238	635	20100809	MYLU	361	196644.56	20100521		1542	20100617	72.9	2069	20100601	714
AR9	20090917	41.2			20090825			583	20100809	MYLU	142	88295.375	20100521		775	20100617		2118	20100601	633
AR9	20090917	47.1			20090825			631	20100809	MYLU	325	165931.66	20100521		994	20100623	36.5	1647	20100601	773
AR9	20100824	17.4			20090825			574	20100809	MYLU	609	22681.387	20100601	505	857	20100623	55.6	1646	20100601	559
AR9	20100825	21.4			20090825			407	20100809	MYLU	517	2156.2644	20100601	561	1837				20100601	544
AR9	20100825	201			20090825			626	20100809	MYLU	393	2078.708	20100608	678	1643				20100608	576
AR9									20100809	MYLU		111869.05	20100608	535	1416				20100608	784
AR9									20100809	MYLU		16796.184	20100608	435	1644				20100608	791
AR9									20100809	MYLU		2435.7664	20100608	672	1234					
AR9									20100809	MYLU		50037.191	20100608		1692					
AR9									20100809	MYLU		71428	20100617		1401					
AR9									20100809	MYLU		69943.953	20100623	668						
AR9									20100809	MYLU		56826.34								
AR9									20100809	MYLU		71819.93								
AR9									20100809	MYLU		180055.39								
AR9									20100809	MYLU		153610.95								
AR9									20100809	MYLU		22303.313								
AR9									20100810	MYLU	463	77681.445								
AR9									20100810	MYLU	988	125014.25								
AR9									20100810	MYLU	552	7049.3564								
AR9									20100810	MYLU	1419	2170.4297								
AR9									20100810	MYLU	188	4712.8652								
AR9									20100810	MYLU		167222.05								
AR9									20100810	MYLU		194606.3								
AR9									20100810	MYLU		1117.9143								
AR9									20100810	MYLU		24981.119								
Quality assurance replicate samples																				
AR2	20090916	20.9	20090922	45.9																
AR8					20090826	61.1														
AR9					20090825		304													
AR9					20090825			580												

Table 17. Benthic Invertebrate sampling dates and metrics for Androscoggin River, Coos County, New Hampshire

[Dates are given in the YYYYMMDD format; EPT, ephemeroptera, plecoptera and tricoptera species intolerant of pollution; HBI, Hilsenhoff Biotic Index used to evaluate organic pollution by indexing species relative to their tolerance for low dissolved oxygen, a typical sign of organic and/or nutrient enrichm
0-3.5 = excellent, 3.5-4.5 = very good, possible slight organic pollution, 4.5-5.5 = good, some organic pollution; B-IBI, Benthic Index of Biotic Integrity; PMA-O, Percent Model Affinity of Orders is the sum of percent composition of major groups using minimum value of assessment site or reference sit

Site	Deployment Date	Collection Date	Abundance[1]	Total Taxa by species[2]	Total Taxa by family[2]	Plecotera Taxa	Total EPT species[2]	EPT/EPT chironomidae[3]	EPT (percent)	Chironomidae (percent)	NonInsect (percent)	Intolerant Taxa	Intolerant Taxa (percent)	Tolerant Taxa	Tolerant taxa (percent)	HBI[3]	Filters Taxa	Clingers (percent)	B-IBI score	diptera (percent)	ephemeroptera (percent)	plecoptera (percent)	tricoptera (percent)	PMA-O[2] (percent)
AR2-1	20090806	20090922	260	20	16	1.5	16	0.98	87	1.5	0.0	7.4	19	1.0	11	4.4	5.7	92	73	13	20	2.3	65	68
AR2-2	20090806	20090922	656	18	14	1.5	15	0.96	93	4.3	0.0	5.3	16	1.8	3.7	4.2	6.8	89	69	7	24	1.8	67	66
AR2-3	20090806	20090922	316	20	13	1.5	16	0.99	94	1.3	0.0	5.7	20	1.6	5.1	4.1	4.9	95	70	6	26	1.9	66	67
AR3-1	20090806	20090922	1064	19	10	2.6	13	0.95	37	1.9	0.4	4.3	11	1.4	61	5.7	4.1	92	71	63	1.9	8.7	26	54
AR3-2	20090806	20090922	1664	24	9	2.1	17	0.91	42	4.3	0.2	3.7	6.0	1.0	54	5.6	3.2	92	68	58	2.9	3.9	35	58
AR3-3	20090806	20090922	1740	20	7	1.7	14	0.90	35	3.9	0.0	2.7	3.9	1.0	61	5.9	3.2	95	65	65	1.4	2.5	31	53
AR4-1	20090807	20090922	110	19	13	2.9	15	0.99	90	0.9	0.0	6.8	57	2.0	10	3.5	1.9	90	81	10	77	6.4	6.4	57
AR4-2	20090807	20090922	37	15	13	3.0	12	0.97	81	2.7	0.0	5.0	46	1.0	14	3.8	4.0	92	81	19	51	11	19	79
AR4-3	20090807	20090922	56	17	11	2.0	14	1.0	84	0.0	0.0	5.0	59	2.0	7.1	2.9	2.0	82	76	16	64	13	7.1	65
AR4-net	20090806	20090922	1372	27	12	2.2	20	0.92	86	7.6	0.6	5.5	14	0.9	1.7	4.0	4.5	87	71	9	9.6	4.7	71	61
AR8-1	20090806	20090921	161	21	14	1.8	16	0.81	77	18	0.0	5.6	28	0.0	0.0	4.1	2.8	68	71	22	40	3.3	36	88
AR8-2	20090806	20090921	238	16	10	0.0	12	0.81	81	18	0.0	3.8	19	0.0	0.0	4.2	3.7	78	63	19	34	0.0	47	85
AR8-3	20090806	20090921	576	22	13	1.8	17	0.77	74	22	0.7	4.9	14	0.7	0.7	4.5	4.4	71	66	25	17	2.8	54	71
AR9-1	20090806	20090921	976	25	13	2.1	20	0.90	86	9.0	0.8	5.7	11	1.6	4.1	4.3	3.4	86	68	14	7.8	2.9	75	57
AR9-2	20090806	20090921	632	15	8	1.0	10	0.94	87	5.7	0.0	2.9	4.4	1.0	5.1	4.8	3.0	92	63	13	2.5	1.9	83	50
AR9-3	20090806	20090921	1000	31	13	1.6	24	0.90	86	10	0.0	6.0	8.8	0.9	1.6	4.4	3.5	84	68	13	8.8	2.4	76	57

[1] a general indicator of productivity

[2] taxonomic structure and compositional metrics

[3] indicator taxa and functional group metrics

Table 18. Benthic Invertebrates, Androscoggin River downstream of Pontock Dam, Coos County, New Hampshire August, 2009.

Site code	class	order	family	family/species	number of individuals
AR2-1	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	2
AR2-1	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	2
AR2-1	INSECTA	DIPTERA	EMPIDIDAE	Hemerodromia	2
AR2-1	INSECTA	DIPTERA	SIMULIIDAE	Simulium	28
AR2-1	INSECTA	EPHEMEROPTERA	BAETIDAE	Plauditus	4
AR2-1	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	10
AR2-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	10
AR2-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Leucrocuta	4
AR2-1	INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	Isonychia	10
AR2-1	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	14
AR2-1	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina	2
AR2-1	INSECTA	PLECOPTERA	PERLIDAE	Perlidae	2
AR2-1	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	2
AR2-1	INSECTA	TRICHOPTERA	BRACHYCENTRIDAE	Micrasema	4
AR2-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	132
AR2-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Cheumatopsyche	16
AR2-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	4
AR2-1	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	4
AR2-1	INSECTA	TRICHOPTERA	POLYCENTROPODIDAE	Polycentropodidae	2
AR2-1	INSECTA	TRICHOPTERA	RHYACOPHILIDAE	Rhyacophila fuscula	6
AR2-2	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	16
AR2-2	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	12
AR2-2	INSECTA	DIPTERA	SIMULIIDAE	Simulium	16
AR2-2	INSECTA	EPHEMEROPTERA	BAETIDAE	Acerpenna pygmaea	4
AR2-2	INSECTA	EPHEMEROPTERA	BAETIDAE	Plauditus	4
AR2-2	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	20
AR2-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	40
AR2-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Leucrocuta	8
AR2-2	INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	Isonychia	28
AR2-2	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	56
AR2-2	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina	4
AR2-2	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	8
AR2-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	232
AR2-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Cheumatopsyche	96
AR2-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	64
AR2-2	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	12
AR2-2	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra socia	28
AR2-2	INSECTA	TRICHOPTERA	POLYCENTROPODIDAE	Neureclipsis	8
AR2-3	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	2
AR2-3	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	2
AR2-3	INSECTA	DIPTERA	SIMULIIDAE	Simulium	14
AR2-3	INSECTA	DIPTERA	TIPULIDAE	Antocha	2
AR2-3	INSECTA	EPHEMEROPTERA	BAETIDAE	Acerpenna pygmaea	2
AR2-3	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	10
AR2-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	24
AR2-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	12
AR2-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium vicarium	8
AR2-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Stenacron	2
AR2-3	INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	Isonychia	8
AR2-3	INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	Paraleptophlebia	2
AR2-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	14
AR2-3	INSECTA	PLECOPTERA	PERLIDAE	Acroneuria	4
AR2-3	INSECTA	PLECOPTERA	PERLODIDAE	Perlodidae	2
AR2-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	76
AR2-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Cheumatopsyche	82
AR2-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	44
AR2-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	2
AR2-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra socia	4

Table 19. Benthic Invertebrates, Androscoggin River downstream of Sawmill Dam, Coos County, New Hampshire August, 2009.

Site code	class	order	family	family/species	number of individuals
AR3-1	CLITELLATA	HAPLOTAXIDA	NAIDIDAE	Naididae	4
AR3-1	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	4
AR3-1	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	16
AR3-1	INSECTA	DIPTERA	EMPIDIDAE	Empididae	4
AR3-1	INSECTA	DIPTERA	SIMULIIDAE	Simuliidae	32
AR3-1	INSECTA	DIPTERA	SIMULIIDAE	Simulium	612
AR3-1	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	12
AR3-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Rhithrogena	8
AR3-1	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina immarginata	8
AR3-1	INSECTA	PLECOPTERA	PERLODIDAE	Perlodidae	32
AR3-1	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	52
AR3-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	48
AR3-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Cheumatopsyche	4
AR3-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsyche	4
AR3-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	124
AR3-1	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra	12
AR3-1	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra aterrima	80
AR3-1	INSECTA	TRICHOPTERA	POLYCENTROPODIDAE	Polycentropodidae	4
AR3-1	INSECTA	TRICHOPTERA	RHYACOPHILIDAE	Rhyacophila fuscula	4
AR3-2	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	8
AR3-2	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	60
AR3-2	INSECTA	DIPTERA	CHIRONOMIDAE	Tanypodinae	4
AR3-2	INSECTA	DIPTERA	EMPIDIDAE	Hemerodromia	4
AR3-2	INSECTA	DIPTERA	SIMULIIDAE	Simuliidae	112
AR3-2	INSECTA	DIPTERA	SIMULIIDAE	Simulium	780
AR3-2	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetidae	4
AR3-2	INSECTA	EPHEMEROPTERA	BAETIDAE	Plauditus	12
AR3-2	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	8
AR3-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	8
AR3-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	8
AR3-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Rhithrogena	4
AR3-2	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	4
AR3-2	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina immarginata	8
AR3-2	INSECTA	PLECOPTERA	PERLODIDAE	Perlodidae	20
AR3-2	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	36
AR3-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	84
AR3-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Cheumatopsyche	4
AR3-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	236
AR3-2	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra	144
AR3-2	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra aterrima	104
AR3-2	INSECTA	TRICHOPTERA	POLYCENTROPODIDAE	Polycentropus	4
AR3-2	INSECTA	TRICHOPTERA	RHYACOPHILIDAE	Rhyacophila	4
AR3-2	TURBELLAR	TRICLADIDA	PLANARIIDAE	Planariidae	4
AR3-3	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	12
AR3-3	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	52
AR3-3	INSECTA	DIPTERA	CHIRONOMIDAE	Tanypodinae	4
AR3-3	INSECTA	DIPTERA	EMPIDIDAE	Empididae	4
AR3-3	INSECTA	DIPTERA	SIMULIIDAE	Simuliidae	164
AR3-3	INSECTA	DIPTERA	SIMULIIDAE	Simulium	896
AR3-3	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetidae	4
AR3-3	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	12
AR3-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	4
AR3-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Rhithrogena	4
AR3-3	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina immarginata	16
AR3-3	INSECTA	PLECOPTERA	PERLODIDAE	Perlodidae	24
AR3-3	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	4
AR3-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	140
AR3-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsyche	4
AR3-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	184
AR3-3	INSECTA	TRICHOPTERA	LEPTOCERIDAE	Ceraclea	4
AR3-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra	136
AR3-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra aterrima	64
AR3-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	8

Table 20. Benthic Invertebrates, Androscoggin River downstream of Riverside Dam, Coos County, New Hampshire August, 2009.

Site code	class	order	family	family/species	number of individuals
AR4-1	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	1
AR4-1	INSECTA	DIPTERA	EMPIDIDAE	Hemerodromia	1
AR4-1	INSECTA	DIPTERA	SIMULIIDAE	Simuliidae	2
AR4-1	INSECTA	DIPTERA	SIMULIIDAE	Simulium	7
AR4-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	41
AR4-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Leucrocuta	7
AR4-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium vicarium	11
AR4-1	INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	Leptophlebia	1
AR4-1	INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	Paraleptophlebia	5
AR4-1	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	20
AR4-1	INSECTA	PLECOPTERA	PERLIDAE	Acroneuria	1
AR4-1	INSECTA	PLECOPTERA	PERLIDAE	Agnetina capitata	3
AR4-1	INSECTA	PLECOPTERA	PERLIDAE	Perlidae	1
AR4-1	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	2
AR4-1	INSECTA	TRICHOPTERA	LEPIDOSTOMATIDAE	Lepidostoma	2
AR4-1	INSECTA	TRICHOPTERA	LEPTOCERIDAE	Ceraclea	1
AR4-1	INSECTA	TRICHOPTERA	LEPTOCERIDAE	Oecetis	2
AR4-1	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra	1
AR4-1	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	1
AR4-2	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	1
AR4-2	INSECTA	DIPTERA	EMPIDIDAE	Empididae	1
AR4-2	INSECTA	DIPTERA	SIMULIIDAE	Simulium	5
AR4-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	9
AR4-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Leucrocuta	3
AR4-2	INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	Leptophlebiidae	1
AR4-2	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	6
AR4-2	INSECTA	PLECOPTERA	PERLIDAE	Acroneuria lycorias	1
AR4-2	INSECTA	PLECOPTERA	PERLIDAE	Agnetina capitata	1
AR4-2	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina immarginata	1
AR4-2	INSECTA	PLECOPTERA	PERLIDAE	Perlidae	1
AR4-2	INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	Glossosomatidae	1
AR4-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	2
AR4-2	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra aterrima	3
AR4-2	INSECTA	TRICHOPTERA	POLYCENTROPODIDAE	Polycentropodidae	1
AR4-3	INSECTA	DIPTERA	EMPIDIDAE	Empididae	5
AR4-3	INSECTA	DIPTERA	EMPIDIDAE	Hemerodromia	1
AR4-3	INSECTA	DIPTERA	SIMULIIDAE	Simulium	3
AR4-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	5
AR4-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Leucrocuta	19
AR4-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium vicarium	3
AR4-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Stenacron	1
AR4-3	INSECTA	EPHEMEROPTERA	LEPTOPHLEBIID	Leptophlebia	1
AR4-3	INSECTA	EPHEMEROPTERA	LEPTOPHLEBIID	Leptophlebiidae	2
AR4-3	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	5
AR4-3	INSECTA	PLECOPTERA	PERLIDAE	Acroneuria	4
AR4-3	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina	2
AR4-3	INSECTA	PLECOPTERA	PERLIDAE	Perlidae	1
AR4-3	INSECTA	TRICHOPTERA	LEPTOCERIDAE	Ceraclea	1
AR4-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra	1
AR4-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	1
AR4-3	INSECTA	TRICHOPTERA	PSYCHOMYIIDAE	Psychomyiidae	1
AR4-NET	INSECTA	COLEOPTERA	ELMIDAE	Oulimnius	4
AR4-NET	INSECTA	COLEOPTERA	ELMIDAE	Stenelmis	56
AR4-NET	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	36
AR4-NET	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	56
AR4-NET	INSECTA	DIPTERA	CHIRONOMIDAE	Tanypodinae	12
AR4-NET	INSECTA	DIPTERA	SIMULIIDAE	Simulium	24
AR4-NET	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetidae	4
AR4-NET	INSECTA	EPHEMEROPTERA	BAETIDAE	Plauditus	4
AR4-NET	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	4
AR4-NET	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerellidae	24
AR4-NET	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	36
AR4-NET	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	12
AR4-NET	INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	Isonychia	12
AR4-NET	INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	Leptophlebiidae	32
AR4-NET	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	4

AR4-NET	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina immarginata	24
AR4-NET	INSECTA	PLECOPTERA	PERLIDAE	Perlidae	12
AR4-NET	INSECTA	PLECOPTERA	PERLODIDAE	Perlodidae	20
AR4-NET	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	8
AR4-NET	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	104
AR4-NET	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	64
AR4-NET	INSECTA	Trichoptera	HYDROPSYCHIDAE	Macrostemum zebratum	36
AR4-NET	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra	256
AR4-NET	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra aterrima	68
AR4-NET	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	308
AR4-NET	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra socia	144
AR4-NET	TURBELLAR	TRICLADIDA	PLANARIIDAE	Planariidae	8

Table 21. Benthic Invertebrates, Androscoggin River downstream of Brown Dam, Coos County, New Hampshire August, 2009.

Site code	class	order	family	family/species	number of individuals
AR8-1	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	24
AR8-1	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	1
AR8-1	INSECTA	DIPTERA	CHIRONOMIDAE	Tanypodinae	4
AR8-1	INSECTA	DIPTERA	EMPIDIDAE	Empididae	4
AR8-1	INSECTA	DIPTERA	EMPIDIDAE	Hemerodromia	1
AR8-1	INSECTA	EPHEMEROPT	BAETIDAE	Acerpenna pygmaea	1
AR8-1	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetis flavistriga	7
AR8-1	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetis intercalaris	1
AR8-1	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	3
AR8-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	15
AR8-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	15
AR8-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Leucrocuta	7
AR8-1	INSECTA	EPHEMEROPTERA	LEPTOPHLEBIID	Paraleptophlebia	1
AR8-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	15
AR8-1	INSECTA	Plecoptera	PERLIDAE	Agnetina flavescens	1
AR8-1	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	4
AR8-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	29
AR8-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Cheumatopsyche	20
AR8-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	4
AR8-1	INSECTA	TRICHOPTERA	PHILOPOTAMIDA	Chimarra obscura	1
AR8-1	INSECTA	TRICHOPTERA	RHYACOPHILIDAE	Rhyacophila lobifera	3
AR8-2	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	36
AR8-2	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	2
AR8-2	INSECTA	DIPTERA	CHIRONOMIDAE	Tanypodinae	6
AR8-2	INSECTA	DIPTERA	EMPIDIDAE	Hemerodromia	2
AR8-2	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetis flavistriga	2
AR8-2	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetis intercalaris	2
AR8-2	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	8
AR8-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	22
AR8-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	8
AR8-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Leucrocuta	6
AR8-2	INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	Isonychia	2
AR8-2	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	30
AR8-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	84
AR8-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Cheumatopsyche	16
AR8-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	10
AR8-2	INSECTA	TRICHOPTERA	PHILOPOTAMIDA	Chimarra socia	2
AR8-3	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	100
AR8-3	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	8
AR8-3	INSECTA	DIPTERA	CHIRONOMIDAE	Tanypodinae	20
AR8-3	INSECTA	DIPTERA	EMPIDIDAE	Hemerodromia	12
AR8-3	INSECTA	DIPTERA	SIMULIIDAE	Simulium	4
AR8-3	INSECTA	EPHEMEROPTERA	BAETIDAE	Acerpenna pygmaea	8
AR8-3	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetis intercalaris	4
AR8-3	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	4
AR8-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	36
AR8-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	16
AR8-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium modestum	16
AR8-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium vicarium	4
AR8-3	INSECTA	EPHEMEROPTERA	ISONYCHIIDAE	Isonychia	4
AR8-3	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	8
AR8-3	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina	8
AR8-3	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	8
AR8-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	180
AR8-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Cheumatopsyche	28
AR8-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	92
AR8-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra aterrima	4
AR8-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	8
AR8-3	TURBELLAR	TRICLADIDA	PLANARIIDAE	Planariidae	4

Table 22. Benthic Invertebrates, Androscoggin River downstream of Gorham Dam, Coos County, New Hamps

Site code	class	order	family	family/species	number of individuals
AR9-1	CLITELLATA	HAPLOTAXIDA	NAIDIDAE	Naididae	8
AR9-1	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	72
AR9-1	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	16
AR9-1	INSECTA	DIPTERA	EMPIDIDAE	Hemerodromia	12
AR9-1	INSECTA	DIPTERA	SIMULIIDAE	Simulium	32
AR9-1	INSECTA	EPHEMEROPTERA	BAETIDAE	Acentrella turbida	4
AR9-1	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetis	4
AR9-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	32
AR9-1	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Rhithrogena	12
AR9-1	INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	Paraleptophlebia	12
AR9-1	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	12
AR9-1	INSECTA	PLECOPTERA	PERLIDAE	Perlidae	8
AR9-1	INSECTA	PLECOPTERA	PERLODIDAE	Perlodidae	12
AR9-1	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	8
AR9-1	INSECTA	TRICHOPTERA	GLOSSOSOMATIDAE	Glossosomatidae	4
AR9-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	316
AR9-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Cheumatopsyche	4
AR9-1	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	196
AR9-1	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra	56
AR9-1	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra aterrima	20
AR9-1	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	28
AR9-1	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra socia	88
AR9-1	INSECTA	TRICHOPTERA	RHYACOPHILIDAE	Rhyacophila	4
AR9-1	INSECTA	TRICHOPTERA	RHYACOPHILIDAE	Rhyacophila fuscula	8
AR9-1	INSECTA	TRICHOPTERA	RHYACOPHILIDAE	Rhyacophilidae	8
AR9-2	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	12
AR9-2	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	16
AR9-2	INSECTA	DIPTERA	CHIRONOMIDAE	Tanypodinae	8
AR9-2	INSECTA	DIPTERA	EMPIDIDAE	Hemerodromia	12
AR9-2	INSECTA	DIPTERA	SIMULIIDAE	Simulium	32
AR9-2	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetis flavistriga	4
AR9-2	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	4
AR9-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	4
AR9-2	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus vitreus	4
AR9-2	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina immarginata	12
AR9-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	392
AR9-2	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	96
AR9-2	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	4
AR9-2	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra socia	28
AR9-2	INSECTA	TRICHOPTERA	RHYACOPHILIDAE	Rhyacophila fuscula	4
AR9-3	INSECTA	COLEOPTERA	ELMIDAE	Elmidae	4
AR9-3	INSECTA	DIPTERA	CHIRONOMIDAE	Chironominae	32
AR9-3	INSECTA	DIPTERA	CHIRONOMIDAE	Orthocladiinae	48
AR9-3	INSECTA	DIPTERA	CHIRONOMIDAE	Tanypodinae	20
AR9-3	INSECTA	DIPTERA	EMPIDIDAE	Empididae	8
AR9-3	INSECTA	DIPTERA	EMPIDIDAE	Hemerodromia	4
AR9-3	INSECTA	DIPTERA	SIMULIIDAE	Simulium	16
AR9-3	INSECTA	EPHEMEROPTERA	BAETIDAE	Acerpenna pygmaea	4
AR9-3	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetidae	4
AR9-3	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetis brunneicolor	4
AR9-3	INSECTA	EPHEMEROPTERA	BAETIDAE	Baetis flavistriga	4
AR9-3	INSECTA	EPHEMEROPTERA	BAETIDAE	Heterocloeon curiosum	4
AR9-3	INSECTA	EPHEMEROPTERA	EPHEMERELLIDAE	Ephemerella	12

AR9-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Epeorus	16
AR9-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Heptageniidae	4
AR9-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Leucrocuta	4
AR9-3	INSECTA	EPHEMEROPTERA	HEPTAGENIIDAE	Rhithrogena	12
AR9-3	INSECTA	EPHEMEROPTERA	LEPTOPHLEBIIDAE	Paraleptophlebia	12
AR9-3	Insecta	EPHEMEROPTERA	HEPTAGENIIDAE	Maccaffertium	8
AR9-3	INSECTA	PLECOPTERA	PERLIDAE	Acroneuria abnormis	4
AR9-3	INSECTA	PLECOPTERA	PERLIDAE	Paragnetina immarginata	4
AR9-3	INSECTA	PLECOPTERA	PERLIDAE	Perlidae	4
AR9-3	INSECTA	PLECOPTERA	TAENIOPTERYGIDAE	Taeniopteryx	12
AR9-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Ceratopsyche	348
AR9-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Cheumatopsyche	8
AR9-3	INSECTA	TRICHOPTERA	HYDROPSYCHIDAE	Hydropsychidae	156
AR9-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra	104
AR9-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra aterrima	12
AR9-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra obscura	28
AR9-3	INSECTA	TRICHOPTERA	PHILOPOTAMIDAE	Chimarra socia	96
AR9-3	INSECTA	TRICHOPTERA	RHYACOPHILIDAE	Rhyacophila	4

APPENDIX J

APPENDIX J

STATISTICAL COMPARISONS

Table J-1

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Crayfish_AR5

Background Data: Crayfish_AR2

Raw Statistics

	Site	Background
Number of Valid Data	10	10
Number of Non-Detect Data	0	0
Number of Detect Data	10	10
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	66.38	42.14
Maximum Detected	176.1	64.44
Mean of Detected Data	116.2	54.7
Median of Detected Data	109.7	54.15
SD of Detected Data	38.24	8.125

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	155
WMW Test U-Stat	100
WMW Critical Value (0.050)	72
Approximate P-Value	9.134E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table J-2

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Crayfish_AR6

Background Data: Crayfish_AR2

Raw Statistics

	Site	Background
Number of Valid Data	10	10
Number of Non-Detect Data	0	0
Number of Detect Data	10	10
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	70.16	42.14
Maximum Detected	137.6	64.44
Mean of Detected Data	93.58	54.7
Median of Detected Data	91	54.15
SD of Detected Data	20.03	8.125

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	155
WMW Test U-Stat	100
WMW Critical Value (0.050)	72
Approximate P-Value	9.134E-05

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table J-3

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Crayfish_AR7

Background Data: Crayfish_AR2

Raw Statistics

	Site	Background
Number of Valid Data	10	10
Number of Non-Detect Data	0	0
Number of Detect Data	10	10
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	46.21	42.14
Maximum Detected	122.3	64.44
Mean of Detected Data	84.39	54.7
Median of Detected Data	76.64	54.15
SD of Detected Data	27.95	8.125

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	138
WMW Test U-Stat	83
WMW Critical Value (0.050)	72
Approximate P-Value	0.00701

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table J-4

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: SD_AR4

Background Data: SD_AR2

Raw Statistics

	Site	Background
Number of Valid Data	8	8
Number of Non-Detect Data	0	0
Number of Detect Data	8	8
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	0.0371	0.0109
Maximum Detected	0.296	0.0379
Mean of Detected Data	0.103	0.0253
Median of Detected Data	0.0785	0.0257
SD of Detected Data	0.0822	0.00821

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	99
WMW Test U-Stat	63
WMW Critical Value (0.050)	48
Approximate P-Value	0.0006797

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table J-5

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: SD_AR5

Background Data: SD_AR2

Raw Statistics

	Site	Background
Number of Valid Data	8	8
Number of Non-Detect Data	0	0
Number of Detect Data	8	8
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	0.116	0.0109
Maximum Detected	0.662	0.0379
Mean of Detected Data	0.272	0.0253
Median of Detected Data	0.19	0.0257
SD of Detected Data	0.202	0.00821

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	100
WMW Test U-Stat	64
WMW Critical Value (0.050)	48
Approximate P-Value	0.0004696

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table J-6

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: SD_AR6

Background Data: SD_AR2

Raw Statistics

	Site	Background
Number of Valid Data	8	8
Number of Non-Detect Data	0	0
Number of Detect Data	8	8
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	0.0577	0.0109
Maximum Detected	0.333	0.0379
Mean of Detected Data	0.147	0.0253
Median of Detected Data	0.106	0.0257
SD of Detected Data	0.097	0.00821

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	100
WMW Test U-Stat	64
WMW Critical Value (0.050)	48
Approximate P-Value	0.0004696

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table J-7

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: SD_AR7

Background Data: SD_AR2

Raw Statistics

	Site	Background
Number of Valid Data	8	8
Number of Non-Detect Data	0	0
Number of Detect Data	8	8
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	0.0904	0.0109
Maximum Detected	0.359	0.0379
Mean of Detected Data	0.172	0.0253
Median of Detected Data	0.134	0.0257
SD of Detected Data	0.09	0.00821

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	100
WMW Test U-Stat	64
WMW Critical Value (0.050)	48
Approximate P-Value	0.0004696

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table J-8

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: SD_AR8

Background Data: SD_AR2

Raw Statistics

	Site	Background
Number of Valid Data	8	8
Number of Non-Detect Data	0	0
Number of Detect Data	8	8
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	0.0815	0.0109
Maximum Detected	0.321	0.0379
Mean of Detected Data	0.146	0.0253
Median of Detected Data	0.123	0.0257
SD of Detected Data	0.074	0.00821

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	100
WMW Test U-Stat	64
WMW Critical Value (0.050)	48
Approximate P-Value	0.0004696

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table J-9

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: SD_AR9

Background Data: SD_AR2

Raw Statistics

	Site	Background
Number of Valid Data	12	8
Number of Non-Detect Data	0	0
Number of Detect Data	12	8
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	0.0234	0.0109
Maximum Detected	0.375	0.0379
Mean of Detected Data	0.112	0.0253
Median of Detected Data	0.0884	0.0257
SD of Detected Data	0.0987	0.00821

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	168
WMW Test U-Stat	90
WMW Critical Value (0.050)	69
Approximate P-Value	0.0006829

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

Table J-10

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options	
From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Songbird_Blood_AR9

Background Data: Songbird_Blood_AR1

Raw Statistics

	Site	Background
Number of Valid Data	36	19
Number of Non-Detect Data	0	0
Number of Detect Data	36	19
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	6.238	15.94
Maximum Detected	1232	1382
Mean of Detected Data	246.4	291.3
Median of Detected Data	157	156.5
SD of Detected Data	265.9	389

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	986
WMW Test U-Stat	-0.398
WMW Critical Value (0.050)	1.645
P-Value	0.655

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table J-11

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options	
From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Songbird_Feather_Primary_AR9

Background Data: Songbird_Feather_Primary_AR1

Raw Statistics

	Site	Background
Number of Valid Data	35	19
Number of Non-Detect Data	0	0
Number of Detect Data	35	19
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	56.69	154.8
Maximum Detected	9405	5680
Mean of Detected Data	1492	2495
Median of Detected Data	1216	2383
SD of Detected Data	1775	1497

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	809
WMW Test U-Stat	-2.789
WMW Critical Value (0.050)	1.645
P-Value	0.997

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table J-12

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Songbird_Feather_Tail_AR9

Background Data: Songbird_Feather_Tail_AR1

Raw Statistics

	Site	Background
Number of Valid Data	32	18
Number of Non-Detect Data	0	0
Number of Detect Data	32	18
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	39.53	218.5
Maximum Detected	10455	22592
Mean of Detected Data	1860	3887
Median of Detected Data	1350	2821
SD of Detected Data	2215	4924

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	683
WMW Test U-Stat	-2.698
WMW Critical Value (0.050)	1.645
P-Value	0.997

Conclusion with Alpha = 0.05

Do Not Reject H0, Conclude Site <= Background

P-Value >= alpha (0.05)

Table J-13

Wilcoxon-Mann-Whitney Site vs Background Comparison Test for Data Sets with Non-Detects

User Selected Options

From File	Sheet1.wst
Full Precision	OFF
Confidence Coefficient	95%
Substantial Difference (S)	0
Selected Null Hypothesis	Site or AOC Mean/Median Less Than or Equal to Background Mean/Median (Form 1)
Alternative Hypothesis	Site or AOC Mean/Median Greater Than Background Mean/Median

Area of Concern Data: Bat_Fur_AR9

Background Data: Bat_Fur_AR1

Raw Statistics

	Site	Background
Number of Valid Data	27	11
Number of Non-Detect Data	0	0
Number of Detect Data	27	11
Minimum Non-Detect	N/A	N/A
Maximum Non-Detect	N/A	N/A
Percent Non detects	0.00%	0.00%
Minimum Detected	1118	2599
Maximum Detected	196645	40575
Mean of Detected Data	71428	9359
Median of Detected Data	56826	5062
SD of Detected Data	66995	11352

Wilcoxon-Mann-Whitney Site vs Background Test

Wilcoxon-Mann-Whitney (WMW) Test

H0: Mean/Median of Site or AOC <= Mean/Median of Background

Site Rank Sum W-Stat	605
WMW Test U-Stat	2.511
WMW Critical Value (0.050)	1.645
P-Value	0.00603

Conclusion with Alpha = 0.05

Reject H0, Conclude Site > Background

P-Value < alpha (0.05)

APPENDIX K

APPENDIX K

SAMPLE-SPECIFIC SEDIMENT HAZARD QUOTIENTS

Table K-1
Sediment Benchmark Comparison - Mercury
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Sample ID	Year	Concentration (mg/kg)	Concentration to TEC Ratio	Concentration to PEC Ratio
AR2				
AR2-4 FD1	2010	2.96E-02	0.16	0.028
AR2-4 FD2	2010	1.09E-02	0.061	0.010
AR2-4 FD3	2010	2.05E-02	0.11	0.019
AR2-4 N	2010	2.82E-02	0.16	0.027
AR2-5 FD1	2010	2.33E-02	0.13	0.022
AR2-5 FD2	2010	3.11E-02	0.17	0.029
AR2-5 FD3	2010	3.79E-02	0.21	0.036
AR2-5 N	2010	2.08E-02	0.12	0.020
AR3				
BH01-SD-20060918	2006	1.50E-01	0.83	0.14
BH02-SD-20060918	2006	2.20E-01	1.2	0.21
AR4				
SH1-0-SD-20060918	2006	4.80E-02	0.27	0.045
SH2-0-SD-20060918	2006	1.60E-01	0.89	0.15
AR4-00-SDCH0001-0-091008	2009	6.20E-02	0.34	0.058
AR4-00-SDCH0002-0-091008	2009	2.20E-02	0.12	0.021
AR4-1 FD1	2010	7.30E-02	0.41	0.069
AR4-1 FD2	2010	1.04E-01	0.58	0.098
AR4-1 FD3	2010	1.14E-01	0.63	0.11
AR4-1 N	2010	2.96E-01	1.6	0.28
AR4-2 FD1	2010	4.82E-02	0.27	0.046
AR4-2 FD2	2010	6.56E-02	0.36	0.062
AR4-2 FD3	2010	3.71E-02	0.21	0.035
AR4-2 N	2010	8.40E-02	0.47	0.079
AR5				
AR5-1 FD1	2010	1.57E-01	0.87	0.15
AR5-1 FD2	2010	4.99E-01	2.8	0.47
AR5-1 FD3	2010	1.24E-01	0.69	0.12
AR5-1 N	2010	1.16E-01	0.65	0.11
AR5-2 FD1	2010	2.23E-01	1.2	0.21
AR5-2 FD2	2010	1.30E-01	0.72	0.12
AR5-2 FD3	2010	6.62E-01	3.7	0.62
AR5-2 N	2010	2.61E-01	1.5	0.25
AR6				
MD01-SD-20060919	2006	1.10E-01	0.61	0.10
AR6-00-SDCH0001-0-090918	2009	2.60E-01	1.4	0.25
AR6-2 FD1	2010	5.77E-02	0.32	0.05
AR6-2 FD2	2010	9.75E-02	0.54	0.09
AR6-2 FD3	2010	1.84E-01	1.0	0.17
AR6-2 N	2010	6.53E-02	0.36	0.062
AR6-3 FD1	2010	1.14E-01	0.64	0.11
AR6-3 FD2	2010	2.37E-01	1.3	0.22
AR6-3 FD3	2010	8.65E-02	0.48	0.082
AR6-3 N	2010	3.33E-01	1.8	0.31
AR7				
RHD01-SD-20060919	2006	1.10E-01	0.61	0.10
AR7-1 FD1	2010	2.29E-01	1.3	0.22
AR7-1 FD2	2010	3.59E-01	2.0	0.34
AR7-1 FD3	2010	2.09E-01	1.2	0.20
AR7-1 N	2010	1.30E-01	0.72	0.12
AR7-2 FD1	2010	1.13E-01	0.63	0.11
AR7-2 FD2	2010	9.04E-02	0.50	0.085
AR7-2 FD3	2010	1.37E-01	0.76	0.13
AR7-2 N	2010	1.10E-01	0.61	0.10
AR8				
DPWD01-SD-20060919	2006	1.00E-01	0.56	0.094
DPWD02-SD-20060919	2006	1.70E-01	0.94	0.16
AR8-00-SDCH0002-0-090918	2009	1.90E-01	1.1	0.18
AR8-4 FD1	2010	1.20E-01	0.67	0.11
AR8-4 FD2	2010	1.24E-01	0.69	0.12
AR8-4 FD3	2010	1.08E-01	0.60	0.10

Table K-1
Sediment Benchmark Comparison - Mercury
River Study Area
Chlor-Alkali Facility (Former) Superfund Site
Berlin, New Hampshire

Reach/Sample ID	Year	Concentration (mg/kg)	Concentration to TEC Ratio	Concentration to PEC Ratio
AR8-4 N	2010	1.23E-01	0.68	0.12
AR8-5 FD1	2010	1.30E-01	0.72	0.12
AR8-5 FD2	2010	1.59E-01	0.88	0.15
AR8-5 FD3	2010	8.15E-02	0.45	0.077
AR8-5 N	2010	3.21E-01	1.8	0.30
AR9				
AR9-00-SDCH0002-0-090917	2009	7.90E+00	44	7.5
AR9-5 FD1	2010	1.24E-01	0.69	0.12
AR9-5 FD2	2010	2.34E-02	0.13	0.022
AR9-5 FD3	2010	4.61E-02	0.26	0.043
AR9-5 N	2010	3.62E-02	0.20	0.034
AR9-6 FD1	2010	1.75E-01	0.97	0.165
AR9-6 FD2	2010	8.88E-02	0.49	0.084
AR9-6 FD3	2010	1.11E-01	0.62	0.11
AR9-6 N	2010	8.81E-02	0.49	0.083
AR9-7 FD1	2010	1.86E-01	1.0	0.18
AR9-7 FD2	2010	3.49E-02	0.19	0.033
AR9-7 FD3	2010	5.23E-02	0.29	0.049
AR9-7 N	2010	3.75E-01	2.1	0.35

Benchmarks based on TEC and PEC values of 0.18 mg/kg and 1.06 mg/kg, respectively (MacDonald et al., 2000).
mg/kg = milligrams per kilogram.
PEC = Probable Effect Concentration.
TEC = Threshold Effect Concentration.
Shading indicates ratio > 1.0.