Disclaimer

The Draft Report to Congress: Study of Discharges Incidental to Normal Operation of Commercial Fishing Vessels and Other Non-Recreational Vessels less than 79 feet has been signed by EPA. EPA is announcing this report in the Federal Register. While we've taken steps to ensure the accuracy of this Internet version of the report, it's not the official version. Upon publication you will be able to obtain the official copy of this notice at www.epa.gov/npdes/vessels/reportcongress.cfm or at the Federal Register Web site.

United States
Environmental Protection
Agency

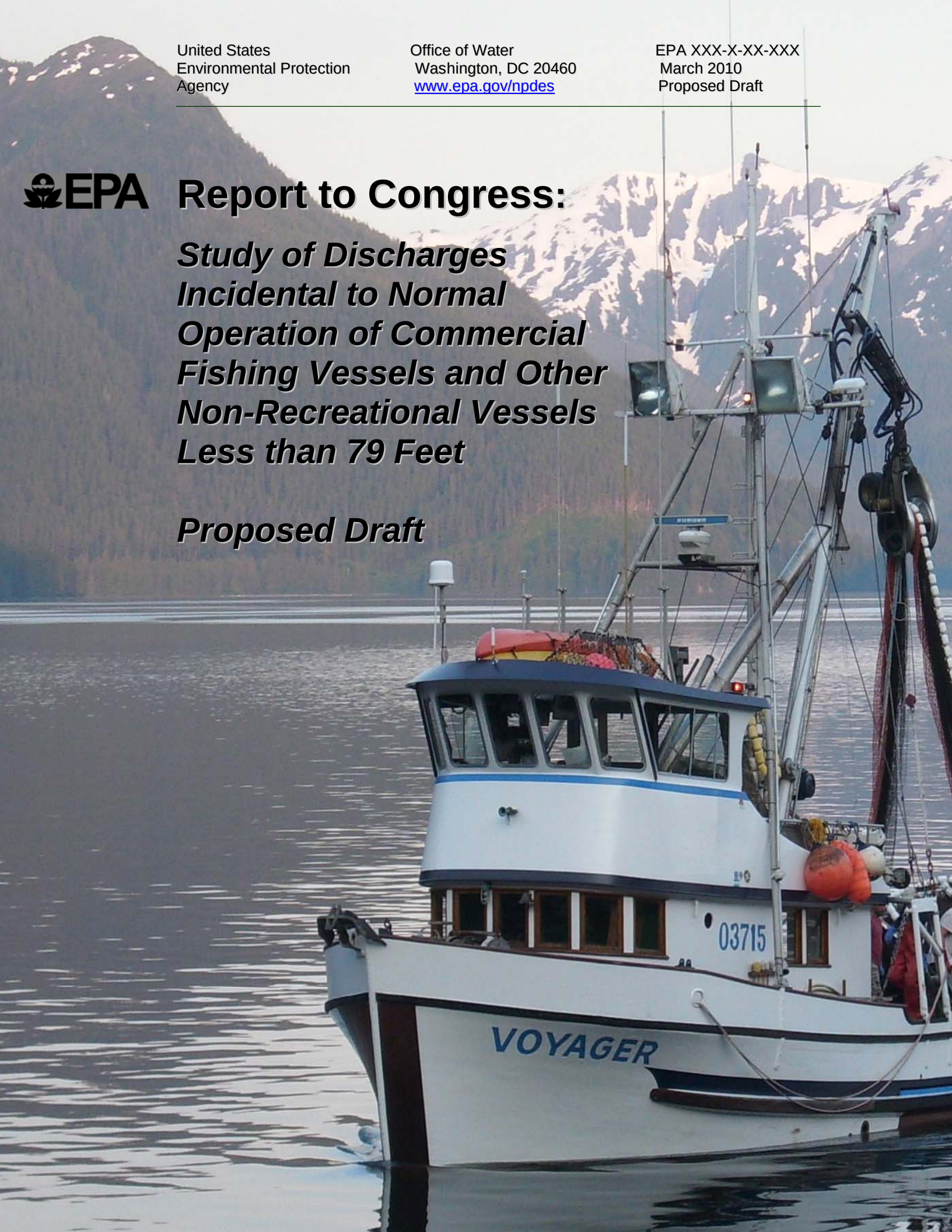
Office of Water
Washington, DC 20460
www.epa.gov/npdes

EPA XXX-X-XX-XXX
March 2010
Proposed Draft

Report to Congress:

Study of Discharges Incidental to Normal Operation of Commercial Fishing Vessels and Other Non-Recreational Vessels Less than 79 Feet

Proposed Draft



ACKNOWLEDGMENTS

The EPA Office of Wastewater Management (OWM) presents this draft Vessels Study Report to Congress conducted to meet the obligations of EPA under Public Law (P.L.) 110-299 (July 31, 2008). EPA would like to thank the numerous trade associations and individual companies who contributed to this project. Those groups who provided assistance to EPA are listed in Chapter 2 of this report. The project could not have been successful without the support by EPA Region 2, 3, and 5 laboratories, EPA Gulf Ecology Division and other EPA program offices. EPA would also like to thank the United States Coast Guard for providing both logistical support and review of many of the report's elements. Finally, EPA would also like to acknowledge the contractor support for this project provided by individuals from Great Lakes Environmental Center, Inc., Eastern Research Group, and Abt Associates.

The primary technical contacts for this document are:

Ryan Albert
U.S. Environmental Protection Agency
Office of Water (Mail Code: 4203M)
1200 Pennsylvania Avenue, NW
Washington, DC 20460
(202) 564-0763 (telephone)
(202) 564-6392 (fax)

Robin Danesi
U.S. Environmental Protection Agency
Office of Water (Mail Code: 4203M)
1200 Pennsylvania Avenue, NW
Washington, DC 20460
(202) 564-1846 (telephone)
(202) 564-6392 (fax)

The primary EPA congressional relations contact for this document is:

Greg Spraul
U.S. Environmental Protection Agency
Office of Congressional and Intergovernmental Relations (Mail Code: 1301A)
1200 Pennsylvania Avenue, NW
Washington, DC 20460
(202) 564-0255 (telephone)
(202) 564-1519 (fax)

EXECUTIVE SUMMARY ..... **vii**
CHAPTER 1 Introduction to the Report **1-1**
1.1. Congressional Study Charge 1-1
1.2. Organization of this report 1-2
1.3. Classes or Types of Vessels 1-2
1.3.1. Commercial Fishing Vessels 1-3
1.3.2. Tugs/Towing Vessels 1-7
1.3.3. Water Taxis/Small Ferries 1-8
1.3.4. Tour Boats 1-8
1.3.5. Recreational Vessels Used for Non-Recreational Purposes 1-9
1.4. Vessel Population 1-10
1.4.1. Vessel Characteristics Data 1-10
1.4.2. Overview of Vessel Universe 1-11
1.5. Discharges from Vessels 1-21
1.6. Pollutants Potentially Found in Vessel Discharges 1-29
1.6.1. Classical Pollutants 1-30
1.6.2. Nutrients 1-32
1.6.3. Pathogen Indicators 1-33
1.6.4. Metals 1-33
1.6.5. Volatile and Semivolatile Organic Compounds 1-33
1.6.6. Nonylphenols 1-34
1.6.7. Chapter Conclusions 1-34
CHAPTER 2 Study Design **2-1**
2.1 Data Sources 2-1
2.1.1 Existing EPA Data Sources 2-1
2.1.2 Industry Participation 2-2
2.1.3 Vessel Sampling 2-3
2.1.4 Literature Review 2-4
2.1.5 Other Governmental Data Sources 2-4
2.2 EPA Vessel Discharge Sampling Program 2-5
2.2.1 Vessels Sampled and Locations 2-5
2.2.2 Sampled Discharges 2-10
2.2.3 Target Analytes 2-12
2.2.4 Sampling Methods 2-15
2.2.5 QA/QC 2-20
2.3 Data Considerations and study limitations 2-23
2.3.1 Voluntary Nature of the Sampling Program 2-23
2.3.2 Vessels/Discharges Not Sampled 2-24
2.3.3 Pollutants Not Sampled 2-25
2.3.4 Application to Other Vessels, Including Larger Vessels Not Sampled for this Study 2-25
CHAPTER 3 Analysis of Discharges and Potential Impact to Human Health and the Environment **3-1**
3.1 Approach to Analyses 3-1
3.1.1 Data Reduction and Presentation 3-2
3.1.2 Summary Statistics and Box Plots 3-3

3.1.3 Calculation of Potential Hazard Quotients 3-4
3.2 Characterization of Discharges 3-13
3.2.1 Bilgewater 3-13
3.2.2 Stern Tube Packing Gland Effluent 3-49
3.2.3 Deck Washdown 3-77
3.2.4 Fish Hold and Fish Hold Cleaning Effluent (Refrigerated Seawater and Ice Slurry) 3-122
3.2.5 Graywater 3-165
3.2.6 Engine Effluent 3-192
3.2.7 Firemain Discharges 3-269
3.2.8 Antifouling Hull Coatings 3-285
CHAPTER 4 Potential Large-Scale Impacts of Study Vessels' Incidental Discharges to Human Health and the Environment 4-1
4.1 Model Selection 4-3
4.2 Fraction of Freshwater Model 4-4
4.2.1 Step 1: Calculate Vessel Discharge Analyte Loading Rates 4-5
4.2.2 Step 2: Calculate the Fraction of Fresh Water in the Harbor 4-6
4.2.3 Step 3: Calculate the Harbor Flushing Time 4-6
4.2.4 Step 4: Calculate the Harbor Analyte Concentration 4-6
4.3 Vessel Discharge Loading Rates 4-7
4.3.1 Calculate the Average Analyte Concentrations 4-7
4.3.2 Discharge Flow Rate Assumptions 4-7
4.3.3 Number of Vessels Present in the Harbor 4-14
4.3.4 Percentage of Vessels Discharging in the Harbor 4-18
4.3.5 Vessel Discharge Loading Rates 4-20
4.3.6 Dissolved Copper Loading Rates from Antifouling Paints 4-20
4.4 Hypothetical Harbor 4-22
4.5 Model Scenarios 4-24
4.6 Model Results 4-25
4.6.1 Dilution Factor Analysis 4-25
4.6.2 Loading Rate Analysis 4-26
4.7 Conclusions 4-31
CHAPTER 5 Summary of Findings 5-1
5.1 Summary of Classes of Vessels Covered By this Study 5-1
5.2 Summary of Effluent Characterization of Select Discharges from the Study Vessels 5-1
5.2.1 Estimated Volumes of Select Discharges from the Study Vessels 5-2
5.2.2 Analytes of Potential Risk in Select Discharges from Study Vessels 5-4
5.3 Summary of Predicted Impacts from Select Pollutants in Study Vessel Discharges 5-16
5.3.1 Potential Watershed-Wide Impacts from Study Vessels 5-16
5.3.2 Potential Localized or Near-Field Impacts of Vessel Discharges to Receiving Waters 5-17
5.4 Possible Benefits to Human Health, Welfare, and the Environment from Reducing, Eliminating, Controlling, or Mitigating One or More of the Discharges from the Study Vessels 5-19

CHAPTER 6 Analysis of the Extent to Which Incidental Discharges are Currently Subject to Regulation Under Federal Law or a Binding International Obligation of the United States 6-1
6.1 International Agreements 6-1
6.1.1 The International Convention for the Prevention of Pollution from Ships (MARPOL 73/78) 6-1
6.1.2 The International Convention on the Control of Harmful Anti-Fouling Systems on Ships 6-11
6.1.3 International Convention for the Safety of Life at Sea (SOLAS) 6-13
6.1.4 Boundary Waters Treaty 6-14
6.1.5 Great Lakes Water Quality Agreement 6-14
6.1.6 St. Lawrence Seaway Regulations 6-16
6.2 Federal Laws 6-17
6.2.1 Act to Prevent Pollution from Ships (APPS) 6-17
6.2.2 Clean Water Act (CWA) §§ 311, 312/Oil Pollution Control Act 6-21
6.2.3 Organotin Antifouling Paint Control Act 6-23
6.2.4 National Invasive Species Act 6-24
6.2.5 Hazardous Materials Transportation Act 6-25
6.2.6 National Marine Sanctuaries Act 6-25
6.2.7 Resource Conservation and Recovery Act 6-26
6.2.8 Federal Insecticide, Fungicide, and Rodenticide Act 6-27
6.3 Additional International and Federal Laws 6-28
6.3.1 International Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 6-28
6.3.2 International Convention on Oil Pollution, Preparedness, Response and Cooperation 6-28
6.3.3 International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties 6-28
6.3.4 Comprehensive Environmental Response, Compensation, and Liability Act6-29
6.3.5 CWA § 402, National Pollutant Discharge Elimination System (NPDES) ... 6-29
6.3.6 Title XIV of the Consolidated Appropriations Act, 2001—Certain Alaskan Cruise Ship Operations 6-29
6.3.7 Toxic Substances Control Act 6-30
6.4 Application of Legal Authorities to Discharges Incidental to the Normal Operation of Study Vessels 6-31
CHAPTER 7 References 7-1
Appendix A List of Acronyms A-1
Appendix B Additional Characteristics of the P.L. 110 – 299 Vessel Population B-1
B.1 Vessel Subcategories B-1
B.1.1 Population of Vessels undergoing Discharge Analysis B-2
B.2 Vessel Geographical Area of Operation B-4
B.3 Other Vessel Characteristics: Construction and Propulsion B-11
B.3.1 Vessel Age B-11
B.3.2 Hull Material Type B-13
B.3.3 Propulsion Method and Type B-15
B.3.4 Horsepower Ahead B-16

B.4 Distribution of the Study Vessel Universe versus the Recreational Vessel Universe .. B-18
B.5 Vessels Documented, Inspected, and/or State Registered B-25
B.6 Uncertainty..... B-26
Appendix C Public Law 110-299 (S. 3298) and Public Law 110-288 (S. 2766) C-1
Appendix D List of Target Analytes..... D-1
Appendix E Analyte Concentrations and Summary Statistics from Ambient Water Samples E-1
Appendix F Analyte Concentrations and Summary Statistics from Source Water Samples F-1
Appendix G Supporting Information for EPA's Screening-Level Water Quality Model . G-1
Appendix H List of Preparers and Contributors.....H-1