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ENTRAINMENT AND IMPINGEMENT STUDIES PERFORMED AT MERRIMACK GENERATING STATION FROM JUNE 2005 THROUGH JUNE 2007

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NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

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1.0 INTRODUCTION

The New England Regional office of the United States Environmental Protection Agency ("EPA") sent an information request letter ("308 Letter") to Public Service Company of New Hampshire ("PSNH") on 3 July 2007. In this 308 Letter, EPA requested certain technology and water quality information to facilitate their evaluation of thermal discharge requirements and cooling water intake structure ("CWIS") limits at Merrimack Station regarding re-issuance of their National Pollutant Discharge Elimination System ("NPDES") Permit No. NH-0001465 ("the NPDES Permit"), which was last renewed by Region 1 of the United States Environmental Protection Agency (USEPA) on 25 June 1992. PSNH owns and operates two separate generating units, Unit 1 and Unit 2, known together as "Merrimack Station" in Bow, New Hampshire. Merrimack Station is located on the west bank of the Merrimack River adjacent to Hooksett Pool, approximately 2.9 miles upstream from the Hooksett Dam and Hydroelectric Station and about 2.9 miles downstream from the Garvins Falls Dam. The River in Hooksett Pool is fresh water. Merrimack Station withdraws and discharges once-through cooling water from the Merrimack River subject to and with the benefits of their NPDES Permit. Unit 1, which became operational in 1960, generates at a rated capacity of 120 MW, and withdraws once-through cooling water from the waters of the Merrimack River using a cooling water intake structure ("CWIS") located in a bulkhead at the shoreline of Hooksett Pool. Unit 2, which became operational in 1968, generates at a rated capacity of 350 MW, and withdraws once-through cooling water from the Merrimack River using a separate CWIS located in a bulkhead approximately 120 feet downstream from the Unit 1 CWIS.

The final regulations implementing §316(b) of the CWA at existing electricity-generating stations cooling water intake structures (the "Phase II Regulations"), among other things, established a working definition of baseline conditions and performance standards for the reduction of impingement mortality by 80 to 95 percent and, under certain circumstances, for the reduction of entrainment by 60 to 90 percent (See 69 Fed. Reg. 41576 dated July 9, 2004). The applicability of these performance standards was to be determined by several factors, including the type of water body from which a plant withdraws cooling water and the plant's capacity utilization factor. Under the Phase II Regulations, applicable performance standards could be met by design and construction technologies, operational measures, restoration measures, or some combination of these compliance alternatives. In a ruling issued January 25, 2007, the Second U.S. Circuit Court of Appeals remanded several key provisions of the Phase II Regulations. A memorandum from Benjamin Grumbles of EPA dated March 20, 2007 directed EPA to prepare NPDES permits for Phase II Facilities like Merrimack Station based on Best Professional Judgment (BPJ) as a result of this Circuit Court ruling.

The now suspended Phase II Regulations required submission of a Proposal for Information Collection ("PIC") in certain circumstances. In a December 30, 2004 letter to PSNH, the EPA requested submission of the PIC for Merrimack Station "as expeditiously as practicable and prior to the start of biological and/or information collection activities, but no later than October 7, 2006." PSNH complied with EPA's request, and submitted a PIC for Merrimack Station in April 2005. After discussions with EPA, PSNH's PIC for Merrimack Station was supplemented in October 2006 to add an entrainment abundance and survival sampling program to complement the already implemented two-year (June 2005 through June 2007) impingement abundance and survival sampling program. Seasonal entrainment studies at Merrimack Station began in late May 2006 and continued through

September 2006, and then resumed in April 2007 and are planned to continue for a second year through September 2007, however the second year of entrainment data was truncated at the end of June 2007 to allow sufficient time to analyze both the impingement and entrainment data and prepare the data in the format requested in Section 7 and Section 8 of the 308 Letter.

Sections 7 and 8 of the 308 letter sent from EPA to PSNH made the following requests for impingement and entrainment data from Merrimack Station.

7. Please provide all fisheries data collected during entrainment and impingement sampling conducted from 2005 to 2007, including all data collected in support of Merrimack Station's Proposal for Information (PIC). Specifically, EPA requests the following for each sampling event that was conducted:

   a. Number of eggs of each fish species collected.
   b. Number of larvae of each fish species collected.
   c. Number of fish (juvenile and adult) of each species collected.
   d. Duration of sampling event (in hours).
   e. The location and method of sampling.
   f. The in-stream temperature(s) measured during the sampling event.

8. Provide the following, based on the data described above in item 7.

   a. The estimated average number of eggs entrained per calendar month for each species, and the estimated annual total number of eggs entrained for each species, based on Merrimack Station's typical recent water withdrawal rate for each calendar month;
   b. The estimated average number of larvae entrained per calendar month for each species, and the estimated annual total number of larvae entrained for each species, based on Merrimack Station's typical recent water withdrawal rate for each calendar month;
   c. The estimated average number of fish (juveniles and adults) of each species impinged per calendar month, and the estimated total number of each species impinged, based on Merrimack Station's typical recent water withdrawal rate and operations for each calendar month; and
   d. The estimated adult equivalent of fish of each species lost to entrainment and impingement for each calendar month, and an annual adult equivalent total for each species, based on Merrimack Station's typical recent water withdrawal rate and operations for each calendar month.
   e. All assumptions, methods, and calculations for each of these estimates of entrainment and impingement effects."

This report describes the results of the recent entrainment and impingement sampling programs conducted as specified in the PIC for Merrimack Station from June 2005 through June 2007.

2.0 METHODS

The Merrimack Station entrainment and impingement studies were conducted following the policies and procedures set forth in the Quality Assurance Plan and Standard Operating Procedures for

Entrainment (Normandeau 2006) and Impingement (Normandeau 2005) Monitoring that were supplied to EPA with the PIC for Merrimack Station.

2.1 Entrainment Sampling

During 2006, entrainment sampling was conducted at both Units 1 and 2 from late-May through mid-September. Figure 2-1 presents the locations of the entrainment sampling tanks at Units 1 and 2 of Merrimack Station. The scheduled sampling was weekly from late May through August (15 sampling weeks) and bi-weekly during the first half of September (1 sampling week). Sampling restarted during early April of 2007 and continued through June 2007. The scheduled sampling was biweekly from early- April to mid May (4 sampling weeks) and weekly during the remainder of the 2007 period (9 sampling weeks). Entrainment sampling was not conducted at an individual unit on days when one or both of the two circulating pumps were not operating. On each sampling day, one daytime sample and one nighttime sample was collected. For sampling purposes, daytime was defined as occurring between one hour after local sunrise and one hour before local sunset as observed at the plant site. Nighttime was defined as occurring between one hour after local sunset and one hour before local sunrise as observed at the plant site. Tables 2-1 and 2-2 provide the achieved sampling design for entrainment sampling at Units 1 and 2 along with the extrapolation periods for each sample.

Entrainment samples were collected through a 0.300 mm mesh plankton net suspended over a barrel sampler located outside of the pumphouses at Units 1 and 2 (Figure 2-2). Water was supplied to each tank from a 3-inch raw-water tap drawing un-chlorinated ambient cooling water from the condenser supply line at a point after the supply (discharge) lines from each intake pump have joined into a common line within the CWIS (Figure 2-3). Water in the 3-in. tap at ambient condenser pressure (15-22 psig) flowed from the condenser supply line located in the basement of each pumphouse, up and out through the upper floor of the pumphouse in a rigid 3-inch PVC pipe to the sampling tank located at ground level. Flow was calculated for each sample using a timed volumetric method to insure that a sample volume of at least 100m^3 was filtered and collected. The timed volumetric method of calculating flow volume for each sample was done by opening the 3-inch ball valve and filling to the overflow ports a sampling tank of known volume (the outer barrel sampler tank holds 320 gallons to the overflow). The time required to fill the tank until it begins to overflow was recorded to the nearest 0.1 second. The observed flow rate (calibration gpm) was calculated as follows:

calibration gpm = volume of calibration tank in gallons / (calibration seconds/60)

The sampling time required to obtain a 100 m^3 entrainment sample was then calculated as follows:

Sampling time in decimal minutes = 26,420 gallons / calibration gpm.

For example, if it takes 80.0 seconds to fill the 320 gallon sampling tank to the overflow, then the calibration gpm = 320/(80/60) = 320/1.33 = 240.6 gpm, and the sampling time is 26,420/240.6 = 109.8 minutes or 1 hour and 49.8 minutes.

Samples were preserved in 10% buffered-formalin and stored until processing in the laboratory. Water temperature, conductivity and dissolved oxygen were recorded for each entrainment sample.

2.1.1 Laboratory Processing of Entrainment Samples

Preserved entrainment samples were processed in Normandeau's biological laboratory in Bedford, New Hampshire. Entrainment samples were manually sorted and eggs and larvae were identified to the lowest distinguishable taxon and enumerated. Samples with high abundances were subsampled in the laboratory using a plankton splitter such that a minimum of 200 eggs and larvae were analyzed. If numbers of eggs and larvae were low but the amount of detritus in the sample was high (more than 400 ml settled volume) then a maximum of one-half of the sample was sorted. Ichthyoplankton was enumerated into the following life stages: eggs, yolk-sac larvae, post-yolk-sac larvae, and juveniles. The total length to the nearest 0.1 mm was measured for up to 30 individuals of each ichthyoplankton life stage (except eggs) per sample. If more than 30 ichthyoplankton larvae were present in a sample, a random selection of 30 specimens was measured. The sorted contents of all entrainment samples will be retained in storage until the Comprehensive Demonstration Study is accepted by the regulatory agencies.

Quality control inspections were performed for sorting, identification, life-stage determination and enumeration. Items were inspected using a quality control (QC) procedure derived from MIL-STD (military-standard) 1235B (single and multiple level continuous sampling procedures and tables for inspection by attributes) to achieve a 10 percent or better AOQL (Average Outgoing Quality Limit). The QC procedure used was the CSP-1 continuous sampling plan, which was conducted in two modes as follows:

Mode 1. Reinspect one hundred percent of the samples until "i" consecutive samples passed.

- *Mode 2.* After "i" consecutive samples have passed QC reinspection, randomly choose (using a random numbers table) the fraction "f" of the samples for reinspection. If any QC sample fails then return to Mode 1.

For this application of CSP-1, **i=8** and **f=1/7**, because the total number of samples analyzed by an individual was less than 500

Within the sort QC process, a sample was considered defective if the sorter failed to remove 10 percent of the total organisms in the sample (or subsample). Percent error was calculated as follows (where "QC count" denotes the number missed by the sorter):

$$\% \text{ error} = 100\% \times \text{QC count}/(\text{sorter's count} + \text{QC count})$$

When the total count (sorter's plus QC) was ≤20, then the sample was considered defective only if the sorter missed more than two organisms.

Within the species identification, life stage determination and counting QC processes, a sample was considered defective if an error of 10 percent or more was made in identifying, assigning a life stage, or counting any species. In determining whether a sample was defective, analyzer and QC results were compared within each taxon/life stage combination.

For each taxon (or for a life stage within a taxon) the percent error was calculated as follows (except where the QC count is ≤20, the percent error was considered to be zero if analyzer and QC counts differ by no more than two organisms):

$$\% \text{ error} = 100\% \times |\text{analyzer count} - \text{QC count}| / \text{QC count}$$

A sample with a percent error of greater than or equal to 10% for any life stage for any taxon was considered defective.

For each defective sample, a resolution was determined in which a third person reanalyzed the sample (resolution value). The error for each species and life stage was then calculated using the resolution counts as the divisor. This was done for both identification and QC counts:

$$\% \text{ error} = 100\% \times |\text{identifier count} - \text{resolution count}| / \text{resolution count}$$
$$\% \text{ error} = 100\% \times |\text{QC count} - \text{resolution count}| / \text{resolution count}$$

If the resolution vs. identifier error was <10 percent, the sample passed. If they were not, the sample failed and identifier counts were replaced by QC counts for all cases, provided the QC vs. resolution error was <10 percent. If the resolution vs. identifier and the resolution vs. QC errors were both 10 percent or more, the sample was thoroughly reviewed by all three people and the identifier's sample processing did not continue until agreement was reached on the identification of the sample. Subsequent samples were reanalyzed by the QC person until eight consecutive samples passed.

A summary of this laboratory QC process and the results for entrainment sampling can be found in Appendix C of this report.

2.1.2 Entrainment Survival Studies

Entrainment survival studies were performed at Merrimack Station during the expected peak period of ichthyoplankton abundance of 2007 to estimate the survival of entrained ichthyoplankton that have passed into the condenser cooling system through the CWIS. Entrainment survival samples were collected using a barrel-type reverse flow entrainment sampler (modified from EA 1982) which was set up at the screen house for each Unit. The entrainment survival sampler consisted of two nested cylindrical tanks and was fitted at the bottom with a funnel that tapered and protruded through the floor of the outer tank (Figure 2-4). Entrainment survival samples were collected after one hour of sampling through the section of tubing passing out of the bottom of the outer tank. The walls of the inner tank were covered with 0.300 mm mesh Nitex plankton netting. The supply water outlet was oriented at a tangential angle to the inner tank so that the incoming water would swirl slowly to disperse the incoming energy throughout the tank. In addition, the swirling motion caused solids (i.e. fish eggs and larvae) to concentrate towards the center of the tank so that they were not subjected to abrasion against the netting covering the walls of the inner tank. The water level in the barrel was maintained by an overflow system so that the water velocity of the supply line was dispersed over the entire inner tank, minimizing the possibility of net abrasion of ichthyoplankton. Supply water was terminated and the stand pipe was removed, allowing the tank to drain while the sample was passively drained down within the Nitex netting and concentrated within the bottom funnel. The sample was then drained from the bottom funnel through a ball valve and into sorting trays for processing.

In addition to the entrainment survival sampling tanks at Units 1 and 2, a smaller version of the tank (without the supporting structure allowing it to stand freely on the ground) was suspended from a boom off of a boat located just upstream from Merrimack Station (Figure 2-5). Water was drawn into this control tank by pumping in a reverse-flow direction to provide an equipment control so that the effects of being drawn into the tank and swirled through the survival collection process could be quantified to allow adjustment (removal) of the sampling mortality from the total entrainment mortality (sampler plus CWIS) observed from the samples collected concurrently in the water from the condenser supply line at Unit 1 or Unit 2.

The entrainment survival studies were staffed continuously during the collection and observation periods, and sufficient volume of water was filtered through the entrainment collection device to insure that at least 200 fish eggs or larvae (in aggregate) were collected and available for the initial (0-hour) survival observations, and at least 100 of these were available for latent (24-hour) survival observations, or 8 hours of sampling had occurred. These entrainment survival samples were sorted in the field into six categories (initial alive, initial stunned, initial dead, latent alive, latent stunned and latent dead) and observed in the field for entrainment survival.

2.2 Impingement Sampling

Impingement sampling was conducted at the Merrimack Station Unit 1 and Unit 2 CWIS's beginning on 29 June, 2005 and continuing for two years through 28 June, 2007. Impingement sampling was conducted one day per weekly from late-June 2005 through mid-December of 2005 (25 sampling weeks), from mid-March of 2006 through November of 2006 (34 sampling weeks) and from mid-March of 2007 through the end of June 2007 (15 sampling weeks). During the intervening time periods, 24-hour impingement samples were collected one day evey other week (14 sampling weeks).

Weekly impingement sampling consisted of one 24-hour sample followed by one six-day sample, and biweekly sampling will consisted of one 24-hour sample followed by one thirteen-day sample. The 24-hour impingement samples are considered the primary sampling units, and "long interval" samples of six or thirteen days are considered secondary sampling units.

Tables 2-3 and 2-4 provide the achieved sampling design for impingement sampling at Units 1 and 2 along with the extrapolation period for each raw 24-hour sample. In addition, the dates of collection efficiency tests are noted along with the associated weeks to which their results were applied.

2.2.1 Impingement Sampling Procedures

Impingement sampling at each Merrimack Station CWIS was conducted by placing a basket in the fish and debris return sluice of Unit 1 and Unit 2 to catch all fish and debris washed off of the operating traveling screens during the sampling interval (Figures 2-1; 2-6). The basket mesh was constructed from the same mesh as the traveling screens, standard 3/8-inch (0.375-inch) square stainless-steel wire. The baskets were placed in sampling position and removed using a davit and chainfall installed and operated by PSNH specifically for impingement sampling.

Merrimack Station 24-hr impingement collections were taken from approximately 0930 on Wednesday to 0930 on Thursday (24 total hours) at both Units 1 and 2 in each weekly or biweekly period. Normandeau personnel were present for the pre-wash and post-wash of all 24-hr samples. During periods of low debris loading, each 24-hour impingement sample typically represented the contents of screenwashes performed by the PSNH operators once every eight hours and accumulated for 24 hours in each collection basket. During periods of high debris loading (spring and fall), the travelling screens required more frequent washing than once every eight hours to prevent the collection basket from overflowing. Each of these multiple screenwashes conducted during the 24-hr sample was bagged by Merrimack Station Operators and held on ice for subsequent processing by Normandeau. This was done to minimize sample loss due to collection basket clogging and subsequent overflow during periods when Normandeau was not present on site. Valid 24-hour samples were collected on the dates shown in Table 2-5. The number of valid 24-hour samples collected at Merrimack Station over the two year study period was 80 at Unit 1 and 76 at Unit 2.

The efficiency of separating fish from debris, as well as all field identifications, counts, weights, and measurements were subject to quality control (QC) inspection. Items were chosen for inspection using a "CSP-1" QC procedure derived from MIL-STD (military-standard) 1235 (Single and Multiple Level Continuous Sampling Procedures and Tables for Inspection by Attributes) to achieve a 10% Average Outgoing Quality Limit (i.e., ≥90% of samples are within specified quality control tolerance limits). Separate QC inspection plans were applied for each individual processor within three categories of data: (1) sorting of fish from debris in a sample; (2) identification, counts, and weights by species; and (3) length and condition of individual fish. For sorting, a QC sample consisted of one complete 24-hour sample at one unit. For the count/weight data and the length/condition data, the term "sample" for the purposes of QC inspections meant QC sample and was not the same as an entire 24-hour impingement sample. For identification/count data, one QC sample consisted of one line of data on the Impingement Count Data Sheet, including the taxon, total weight, and total count recorded on that line. All data appearing on a line selected as a QC sample for inspection must be within tolerance. If any of those values on the line fails, then that QC sample (data line) will fail. For length/condition data, a QC sample consisted of the length and associated condition for one fish.

The QC sampling plan was conducted in two modes as described below.

Mode 1. Reinspected one hundred percent of the QC samples until "i" consecutive samples passed. (The value of the parameter "i" depended on the anticipated size of the data set, differing among the three types of data, shown in the table following the description of Mode 2).

Mode 2. After "i" consecutive samples passed QC reinspection, the fraction "f" of QC samples for reinspection were randomly chosen (using a random numbers table). (The value of the parameter "f" depended on the anticipated size of the data set, differing among the three types of data, as shown in the table below.) If any QC sample failed during a Mode 2 inspection, then the employee returned to Mode 1.

QC inspection plan parameters for Merrimack Station impingement

QC Plan	i	f
Sorting	6	1/4
count/weight	7	1/5
length/condition	8	1/7

A qualified person other than the original processor conducted quality control reinspections. All QC reinspections were performed "blindly," i.e., the individual doing the QC reinspection had no knowledge of the original processor's results. The tolerance for each task was

10% of the total fish count for sorting

±10% for count when the QC count ≥20

±2 for count when the QC count <20

±3% for weight when the QC weight >33 g

±1 g for weight when the QC weight ≤33 g

±3% for length when the QC length >33 mm

±1 g for length when the QC length ≤33 mm

no difference for condition (must agree)

The percent error was calculated as

% error = 100% x (original value – QC value)/QC value

For the sorting task, the QC value for this calculation was the total of the number of fish found by the original processor plus any additional fish found by the QC inspector. A resolution value may be determined for any QC sample found to exceed tolerance. Any person who made an incorrect identification of his/her error was advised and provided with help. If any discrepancies between the original value and the QC value exceeded the acceptance criteria, the data sheet reflected the corrected value. A summary of this laboratory QC process for impingement sampling can be found in Appendix C of this report.

Each fish taxon collected during the Merrimack Station impingement program was represented in the general reference collection at Normandeau's Bedford office. That reference collection was supplemented as needed by removing specimens from Merrimack Station impingement samples and preserving them in formalin. Each jar was labeled with external and internal labels containing the scientific name, date of capture, and capture location. A list of species collected through impingement at Merrimack Station and held in the Normandeau reference collection is provided in Appendix C. These specimens are available for viewing upon request.

In addition to each weekly 24-hr sample, all debris washed from operating screens during the interim periods was collected by PSNH operators, placed in labelled bags, and held on ice for subsequent processing by Normandeau. This debris comprised the long interval samples and provided 6 days worth of debris to process during the weekly sampling periods and 13 days worth of debris to process during the two-week sampling periods. A subsampling protocol was initiated for long interval samples during the season of highest debris loading at Merrimack Station. Long interval samples during the subsampling period comprised one randomly selected hour of debris collected on each of the long interval days (6 or 13 one-hour subsamples).

Water quality parameters were recorded at both the Unit 1 and Unit 2 intakes. Temperature (°C), dissolved oxygen (mg/L), and conductivity (uS) were measured using calibrated electronic meters at the water's surface. Water quality measurements were recorded at the beginning and end of each 24 hour and long interval (6 or 13 day) impingement collection period.

2.2.2 Impingement Collection Efficiency Studies

Impingement collection efficiency was determined during one 24-hour sampling period in each month to adjust each 24-hour sample for fish that are lost between the time they are impinged on the operating intake screens and their collection in the sampling device. A lot of 100 stained dead fish representative of the species and size range that had been observed in impingement samples during the previous sampling events was introduced immediately in front of a randomly selected operating intake screen at each Unit. Fish for release were placed in an injection tank located on the deck of each Unit's CWIS and flushed through a flexible 3-inch hose with running water (Figure 2-7). The discharge end of the hose released test fish at mid-depth below the surface and immediately in front of a stationary screen near the mid-point of the 24-hour collection interval. Collection efficienct test fish were recovered during the next screen wash for each Unit. PSNH employees were responsible for screenwash and bagging of debris loads from the screen wash containing the stained fish. Normandeau employees removed stained fish from debris during the following day's sorting and enumerated them. The number of stained fish subsequently recovered in the collection device at the end of the sampling period, divided by the number released, represents the impingement collection efficiency for that period. These impingement collection efficiency factors were applied to other 24-hour impingement collections from each period centered on the date of the collection efficiency test. Collection efficiency adjustments were not applied to the "long interval" samples.

2.2.3 Impingement Survival Studies

Impingement mortality was determined by collection of released live fish off of continuously rotated and washed screens from each unit at Merrimack Station during a four hour period. Using the same injection setup as for collection efficiency (Figure 2-7), live fish held in an injection tank located on the upper deck of each Unit's CWIS were flushed through a flexible 3-inch hose with the outlet held in front of a rotating screen at mid-depth by running water. Following their trip through the screenwash procedure, impinged fish were collected by a dip net held immediately in front of the impingement collection basket for each Unit. All survival test fish collected were separated from the debris, gently removed and placed into holding tanks set up on the deck of each CWIS, and their initial (time 0) survival status was determined as alive, stunned, or dead. All alive or stunned fish from time 0 were held to determine latent (24-hour) mortality. Fish used for survival tests were purchased at a local bait dealer and trucked to Merrimack Station. An additional 50 randomly selected control fish were handled exactly as the test subjects, except they were transferred directly into the holding facility to quantify the handling mortality associated with transportation. An additional 50 randomly selected control fish were marked and introduced through the injection table directly into the concrete sluiceway and processed in the same manner as impinged fish to quantify mortality from the injection process and separate it from impingement mortality due to the traveling screens and screen wash process.

2.2.4 Impingement Laboratory Procedures

Impinged fish and debris were taken in fresh condition to the processing trailer located on-site at Merrimack Station and were analyzed immediately. All fish were identified to species and enumerated. A maximum of 50 individuals per species per sample were measured to the nearest millimeter total length and weighed to the nearest gram. Any individual fish that could not be identified to species in the field was taken to the laboratory in Bedford, NH for taxonomic identification by microscopic examination.

The amount (number of gallons) and general characterization of debris (aquatic, terrestrial, etc.) collected in each impingement sample were also determined as part of the sample processing protocol.

2.3 Analytical Procedures

Most data analyses were conducted using the Statistical Analysis System (SAS) software (SAS 1989). No rounding of data was done prior to the final step in each analysis. This prevented introduction of rounding error in the final result, and may present the appearance in a table that a column of data does not sum exactly to the total shown in the last row.

2.3.1 Entrainment

Each entrainment sample collected was assigned a Use Code (1, 2, or 5) that defined its collection status and subsequent use in analytical tasks. Use Code 1 samples were entrainment collections from which valid data were collected and no sampling problems were encountered. A use code 1 entrainment sample had no loss of any ichthyoplankton from the sample, and no interruption of circulating water flow during the collection interval. Use Code 1 entrainment samples were used for all analytical tasks. Use Code 2 samples were collections in which there were sampling problems encountered relating to either the accurate measurement of sample duration or volume, but ichthyoplankton were caught. For example, if an unknown part of the sample was spilled when transferring it from the collection cup into a sample jar, or the sample volume was unknown, this sample would be classified as Use Code = 2. Use Code 2 samples were excluded from calculations involving density estimates (number per unit volume) but retained for determination of species richness. Use Code 5 samples were void samples where the entire contents of the sample was lost. Use Code 5 samples were excluded from all analysis.

Entrainment samples from Unit 1 and Unit 2 at Merrimack Station were collected weekly (with occasional exceptions) during the months of May through September 2006, and again weekly during April through June of 2007 (Tables 2-1; 2-2). Counts of eggs and larvae in entrainment samples were converted to densities for each taxon, based on actual sample duration and the flowrate in each sample. Equation 1 was used to calculate entrainment density per sample:

Density = (# Collected in Sample) / (Sample Duration in minutes*Gallons/minute) (Eq. 1)

Densities were corrected to the number per 100 m^3 for presentation in tables and figures. For time periods when samples were not collected, interpolation using estimates from the preceding and succeeding sampling periods provided appropriate estimates for the missing samples. Weekly densities for each Unit (#/100 m^3) were calculated by taking the average of the two diel (one day and one night) density estimates for the samples from that week.

Actual plant CWIS flows were obtained from PSNH records, and weekly plant flows were derived from these data for Unit 1 and Unit 2. Weekly entrainment abundance estimates (number of fish eggs or larvae) were calculated from observed weekly densities and actual weekly plant flows. Weekly entrainment abundance estimates were summed to obtain monthly abundance estimates. In the case where weeks were divided between two sequential months, the weekly entrainment was assigned to the month which contained the Sunday.

2.3.2 Impingement

Each impingement sample collected was assigned a Use Code (1, 2, or 5) that defined its use in analytical tasks. Use Code 1 samples were impingement collections from which valid data were collected and no sampling problems were encountered. Use Code 1 impingement samples were used for all analytical tasks. Use Code 2 samples were collections in which fish were captured, but sampling problems were encountered. Use Code 2 samples were excluded from calculations involving catch per unit of effort and length-frequency distribution, but in the case of the long-interval samples, could be useful for reporting the presence or absence and relative abundance of key migratory fish species. Use Code 5 samples were Use Code 2 samples where no fish were caught. Use Code 5 samples were void and excluded from all analysis.

Fish impingement was estimated from the 24-hour sample collections, which ranged in duration between 22.2 to 27.7 hours (24.1 ±0.1 h; mean ±95% confidence interval). The total number of fish impinged from 29 June 2005 through 27 June 2007 was estimated from Use Code 1 samples and Use Code 2 samples if volumes could be corrected. Fish counts per sample volume were used to provide a fish impingement density or rate assumed to be representative of the daily impingement rate within a week. Because samples were collected from morning of the first day through the morning of the following day instead of midnight to midnight and daily cooling water flow volumes were not constant due to power outages, sample volumes in million cubic meters were estimated using Equation 2 under the assumption that water flow was proportional to pump hours (i.e. constant flow rate).

$$V_s \equiv \left[\frac{1\,\mathrm{Mm}^3}{264.18\,\mathrm{Mg}}\right]\left[(V_1)\left(\frac{\left(\left(\frac{2\,\mathrm{ph}}{1\mathrm{h}}\right)(t_{s1}) - t_{off1}\right)}{t_{f1}}\right) + (V_2)\left(\frac{\left(\left(\frac{2\,\mathrm{ph}}{1\mathrm{h}}\right)(t_{s2}) - t_{off2}\right)}{t_{f2}}\right)\right] \qquad \text{(Eq.2)}$$

Where: V_s = sample volume, in million cubic meters (Mm^3),

V_i = total daily volume in million gallons (Mg) of cooling water pumped through screens on day i (midnight to midnight),

t_{fi} = total duration of cooling water pump hours (ph) on on-line for both pumps on day i,

t_{si} = sample duration in hours on day i,

t_{offi} = total duration in cooling water pump hours (ph) were off-line for both pumps during sampling on day i,

$1\ \mathrm{Mm}^3$ = 264.18 Mg,

and 2 pump hours (ph) equivalent to 1 hour of the sample.

For example, sample 53 was collected from 0925 on 28 August 2005 through 0914 on 29 August 2005 with 14.58 hours of sampling on the first day and 9.23 hours on the second day. The two pumps at Unit 2 were on for the entire first day of sampling with a daily flow volume of 181.261 million gallons, but one of the two pumps was shut off for 1.567 hours during sampling. Daily flow volume on 29 August was 187.201 million gallons. After substituting this information into Equation 2, sample volume is estimated as 0.6805 million cubic meters as shown below.

$$V_s \equiv \left[\frac{1\,\mathrm{Mm}^3}{264.18\,\mathrm{Mg}}\right]\left[(181.261\,\mathrm{Mg})\left(\frac{\left(\left(\frac{2\,\mathrm{ph}}{1\mathrm{h}}\right)(14.583)-1.567\right)}{46.433\,\mathrm{ph}}\right)+(187.201\,\mathrm{Mg})\left(\frac{\left(\left(\frac{2\,\mathrm{ph}}{1\mathrm{h}}\right)(9.233\,\mathrm{h})-0\,\mathrm{ph}\right)}{48.00\,\mathrm{ph}}\right)\right]$$

$$V_s \equiv 0.6805\ \mathrm{Mm}^3$$

Fish impingement rate in number of fish impinged per million cubic meters was estimated using Equation 3 as shown below.

$$I = N/V_s \qquad \text{(Eq. 3)}$$

where I = impingement rate in number of fish per million cubic meters,

N = number of fish collected in a sample, and V_s is as defined in Eq.2.

Following the example of sample 53 from above, a count of 3 black crappie and the sample volume previously shown was substituted into Equation 3 to estimate impingement rate for black crappie as shown below.

I = 3 black crappie/0.6805 Mm^3 = 4.4087 black crappie per million cubic meters

This calculation of impingement rate was equivalent to adjusting the fish count in a sample for an exact 24-hour sample duration and dividing by the daily flow volume, when pumps ran 24 hours in consecutive days at the same rate. However, Equations 2 and 3 also provided an impingement estimate when flow volumes were inconsistent or when pumps were off during portions of the sampling interval by using actual fish count in the sample and estimated actual sample volume in the calculation.

Screen collection efficiency tests were performed periodically (ca. monthly) to provide an adjustment factor for the number of fish that might have been lost and not counted during the impingement sampling interval. Each screen collection efficiency coefficient (*c*), expressed as the proportion (1.0 = 100%) of the fish released in front of the screen (e.g. 100 fish) that were collected in the sample, was applied to sample estimates and assumed to be representative within a period defined approximately by mid-points between consecutive test dates as well as for all species (Table 2-2). Due to screen collections efficiencies less than 100%, impingement rates were expanded higher using Equation 4.

$$I_{adj} = I/c \qquad \text{(Eq. 4)}$$

Where: I_{adj} = impingement rate adjusted for screen collection efficiency expressed in fish impinged per million cubic meters.

I = impingement rate in number of fish per million cubic meters (from Eq. 3), and

c = screen collection efficiency coefficient as a proportion.

An example is provided for sample 53 using the impingement rate previously calculated and a screen collection efficiency of 0.73 (=73%).

I_{adj} = 4.4087/0.73 = 6.0393 black crappie per million cubic meters

For those weeks with void samples due to outages or skipped samples due to a biweekly collection schedule (Tables 2-3; 2-4), impingement rates were linearly interpolated in proportion to the time after the previous known rate and before the next known rate. Daily impingement was then estimated by multiplying the estimated impingement rate, adjusted and unadjusted for screen collection efficiency, by the daily volume. Weekly impingement estimates were calculated as the sum of daily impingement estimates. Fish impingement was also estimated for each calendar month as the sum of daily impingement estimates.

An impingement survival rate was calculated using Abbot's formula (Equation 5).

$$Ps24 = Pt24 / Pc24 \qquad \text{(Eq. 5)}$$

Where: Ps24 = the 24 hour survival rate

Pc24 = the fraction of control organisms alive at the 24 hour observation

Pt24 = the fraction of test organisms alive at the 24 hour observation

For an example of this calculation, consider a scenario where a total of 100 fish (test fish) are recovered in the screen wash of Unit 2 following release through the injection table onto a continuously rotating screen during the month of October. Of those 100 fish, 70 show no sign of injury, 15 are physically injured and 15 are dead at the initial observation (t_o). An additional 100 fish (control fish) are released through the injection table directly into the nets collecting the screenwash. These 100 individuals serve as a control to remove the effects of net handling and the injection process so that only the stresses encountered during the impingement process on the screen are being examined. Of the 100 control fish, 98 show no sign of injury while the remaining 2 are physically injured at t_o. The live fish (85 test fish and 100 controls) are held for 24 hours and are then re-examined. At the 24-hour check (t_{24}) of test fish, 60 show no sign of injury, 10 are injured and an additional 15 have died. At the 24-hour check of control fish, 95 show no sign of injury, 2 are injured and an additional 3 have died.

To calculate Pt24, divide the total number of fish at t_o (100) by the fraction of them which are alive with no injury at t_{24}. For this study, it was assumed that an injured fish would die upon reintroduction to Hooksett Pool to provide a conservative estimate of survival. In this scenario, Pt24 would equal 100/60 or 0.60. To calculate Pc24, divide the total number of control fish alive at t_0 (100) by the fraction of them which are alive with no injury at t_{24}. In this scenario, Pc24 would equal 100/95 or 0.95.

The impingement survival rate (Ps24) of fish in this test can be calculated by dividing Pt24 by Pc24.

$$\begin{aligned} Ps24 &= Pt24 / Pc24 \\ &= 0.60 / 0.95 \\ &= 0.63 \text{ or } 63\% \end{aligned}$$

The impingement survival rate for this scenario is 63 %. This survival rate from this scenario can be applied to the estimated impingement catch for Unit 2 during the month of October. For example, assume that the estimated impingement for Unit 2 during the test month of October at Unit 2 was 200 fish. Based on the survival rate obtained from Abbot's formula, 126 of those fish would survive the impingement process. These results are based on the assumption that all fish were alive at the time they were initially impinged.

2.3.3 Equivalent Adult Losses

The impingement and entrainment abundance of fish at each Unit of Merrimack Station was evaluated at a common life stage (i.e., at the adult age of first reaching sexual maturity) by equivalent adult loss analysis (Saila et al. 1997, EPRI 1999). Entrainment losses (primarily eggs and larvae) and impingement losses (mainly juveniles and adults) are not directly comparable because of the very high natural mortality that is typical of early life stages of fish. The loss of relatively few juveniles or adults is the equivalent of losing much higher (typically order of magnitude higher) numbers of eggs or larvae, in terms of the effect on the population, because eggs and larvae naturally experience high mortality before they reach juvenile or adult age. By expressing all entrainment and impingement losses in terms of a common life stage (i.e., adult), the overall impact of the CWIS can be presented as a single and comparable number for each species or taxon. Lifestage-specific estimates of mortality rates were used to estimate the number of sexually mature adult fish that would have survived if they had not been killed by entrainment or impingement during a different life stage.

Adult equivalents were estimated for the most commonly entrained and impinged species at Merrimack Station because it is not always possible to obtain sufficient mortality rate information for all taxa. Species comprising the upper 90% of individuals enumerated in the combined annual data sets from both years were selected for equivalent adult loss analysis from each of the entrainment or impingement programs. Adult equivalent losses were estimated for white sucker, yellow perch, carp and minnow family and sunfish family representing 90% or more of the individuals entrained at Merrimack Station (both units combined). Adult equivalent losses were estimated for bluegill, spottail shiner, black crappie, largemouth bass, yellow perch and pumpkinseed representing 90% or more of the individuals impinged at Merrimack Station (both units combined). Life stage-specific mortality rates were obtained from the literature for each species selected. These mortality rates are typically obtained from a variety of data for the various life stages of development from egg to through the completed adult lifespan. The mortality rates can represent life stages, length classes, or age classes, depending on the information available. For each life stage of each fish species or taxon, the number of adult equivalents was calculated from the total instantaneous mortality rates for the developmental intervals between the age at entrainment or impingement and sexual maturity:

$$N_a = N_j \exp[-\Sigma_{i=j,a-1} (Z_i)] \qquad \text{(Equation 6)}$$

where N_a = the number that would have survived to stage a (age 1), if they had not been entrained or impinged during life stage j,

N_j = the number entrained or impinged during life stage j, and

Z_i = total instantaneous mortality during life stage i.

Most impinged fish were young-of-the-year (YOY), but adults (equal to or older than age at first reproduction) of some species were also impinged. Total loss of mature fish due to impingement was estimated as the sum of the number of mature fish impinged and the number of immature fish equivalent to age of first maturity for each species. Numbers of impinged fish equal to or older than age of first maturity were not back-calculated to the number at age of first maturity because the estimate represents actual age distribution of mature fish lost due to impingement. Ages of larger impinged fish were estimated based on the size frequency distribution of measured specimens.

Each life stage or age entrained or impinged of a fish species or taxon typically includes individuals from the full spectrum of development from the beginning to the end of the stage. Entrained larvae, for example, often include not only recently hatched larvae, but also late-stage post yolk-sac larvae that are nearly juveniles. The survival potential of a newly-hatched larva is far lower than the survival potential of a larva ready to transform into a juvenile. To adequately represent the wide range of survival potential within each entrained or impinged life stage, the mortality rate for that stage was adjusted by a formula adapted from EPRI (2004):

$$Z_{adj} = Z + \ln(1 + e^{-Z}) - \ln 2 \quad \text{(Equation 7)}$$

where Z_{adj} = adjusted instantaneous mortality for the entrained life stage (stage *j* in the previous equation), corresponding to the interval between the time of entrainment and the end of that life stage, and

Z = instantaneous mortality from the beginning to the end of that life stage.

The adjusted mortality was only used for the entrained or impinged life stage; unadjusted Z values applied to all stages between that stage and age 1.

Tables 2-6 through 2-14 provide the life history parameters used in this report to estimate adult equivalent losses due to impingement and entrainment of each species at Merrimack Station Unit 1 and Unit 2. These tables present the instantaneous mortality rate (Z), survival rates at life stage i (S) and the adjusted survival rate at life stage i (Si)

Mortalities for largemouth bass are those provided by the EPA (EPA 2004; Table 2-6). Length at age data used to partition the length frequency distribution of impinged largemouth bass into age classes was obtained from the average of three populations of fish from a study in Maine (Beamesderfer and North 1995). Age at sexual maturity for largemouth bass was conservatively estimated at 4 years for females (Scott and Crossman 1973).

Mortalities for pumpkinseed are those provided by the EPA (EPA 2004; Table 2-7). Length at age data used to partition the length frequency distribution of impinged pumpkinseed into age classes was obtained from a Michigan population (Scott and Crossman 1973). Age at sexual maturity for pumpkinseed is 2 years (Scott and Crossman 1973).

Mortalities for bluegill are those provided by the EPA (EPA 2004; Table 2-8). Length at age data used to partition the length frequency distribution of impinged bluegill into age classes was obtained from a Michigan population (Beamesderfer and North 1995). Age at sexual maturity for bluegill was conservatively estimated at 3 years (Scott and Crossman 1973).

Mortalities for black crappie are from Barnthouse (2005; Table 2-9). Length at age data used to partition the length frequency distribution of impinged black crappie into age classes was obtained from a Canadian population (Scott and Crossman 1973). Age at sexual maturity for black crappie was conservatively estimated at 2 years (Scott and Crossman 1973).

Mortalities for spottail shiner are those provided by the EPA (EPA 2004; Table 2-10). Length at age data used to partition the length frequency distribution of impinged bluegill into age classes was obtained from a Wisconsin population (Becker 1983). Age at sexual maturity for spottail shiner is 2 years (Becker 1983).

Mortalities for yellow perch are from Barnthouse (2005; Table 2-11). Length at age data used to partition the length frequency distribution of impinged yellow perch into age classes was obtained from a Canadian population (Scott and Crossman 1973). Age at sexual maturity for yellow perch is 4 years (Scott and Crossman 1973).

Mortalities for white sucker are those provided by the EPA (EPA 2004; Table 2-12). Age at sexual maturity for white sucker was conservatively estimated at 4 years (Scott and Crossman 1973).

Mortalities for carp and minnow family are those provided by the EPA (EPA 2004; Table 2-13). Age at sexual maturity for the carp and minnow family was based on that of the spottail shiner. Spottail shiner are abundant within Hooksett Pool (Normandeau 2007) and were the dominant minnow species impinged at Merrimack Station. Age at sexual maturity for spottail shiner is 2 years (Becker 1983).

Mortalities for the sunfish family are those provided by the EPA (EPA 2004; Table 2-14) for bluegill. It is assumed that bluegill larvae are the most dominant in Hooksett Pool based on their dominance of both impingement catches (see Section 4.2 of this report) and electrofish catch (Normandeau 2007) from Hooksett Pool. Age at sexual maturity for the sunfish family was conservatively estimated at 3 years based on the values of bluegill, the most dominant species of fish observed in the impingement catches at Merrimack Station.

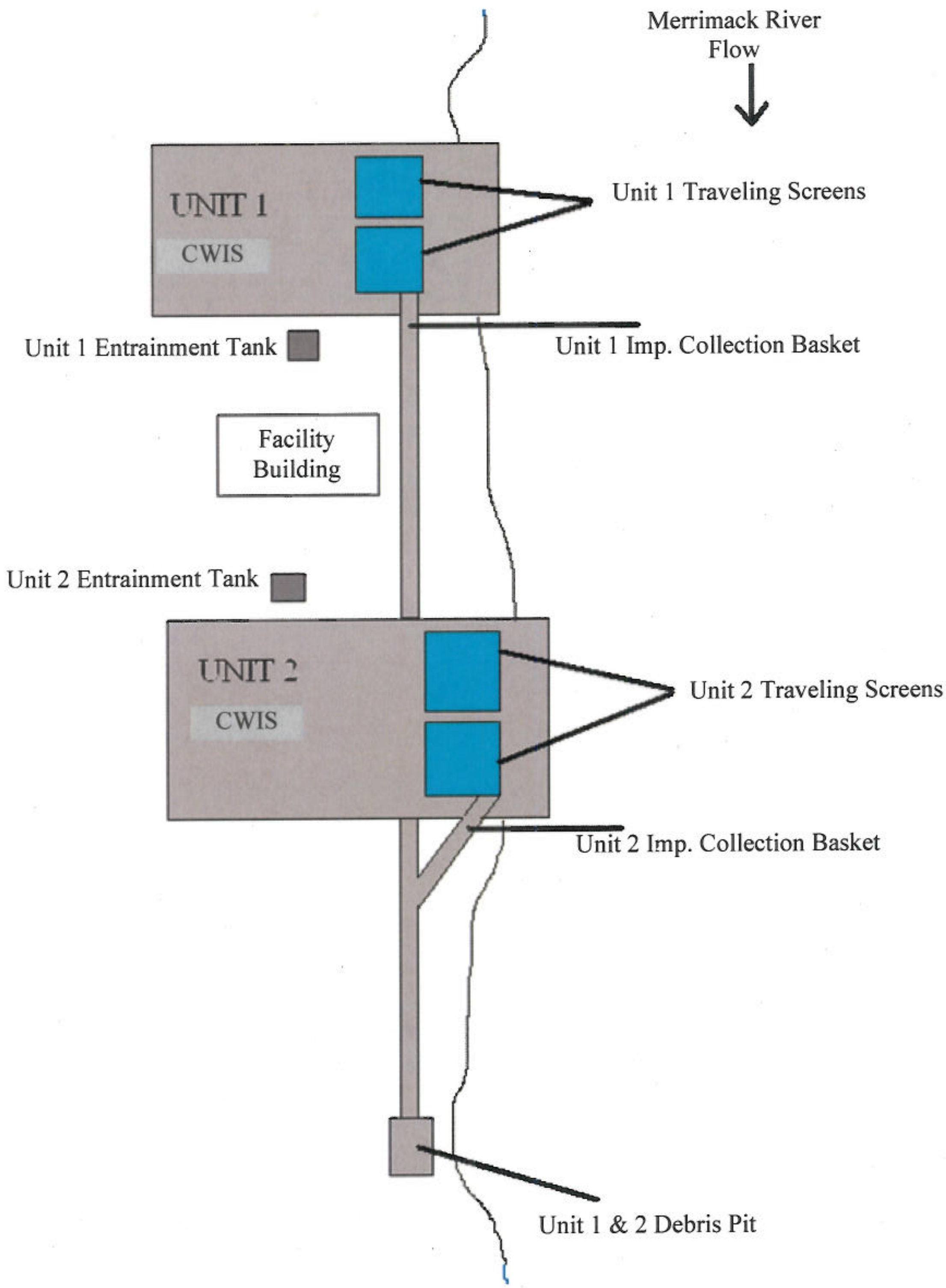


Figure 2-1. Site view showing the location of entrainment samplers and impingement collection baskets relative to the CWIS at Units 1 and 2 of Merrimack Station.

Figure 2-2. Locations of entrainment tank samplers at Units 1 (top) and 2 (bottom) of Merrimack Station.

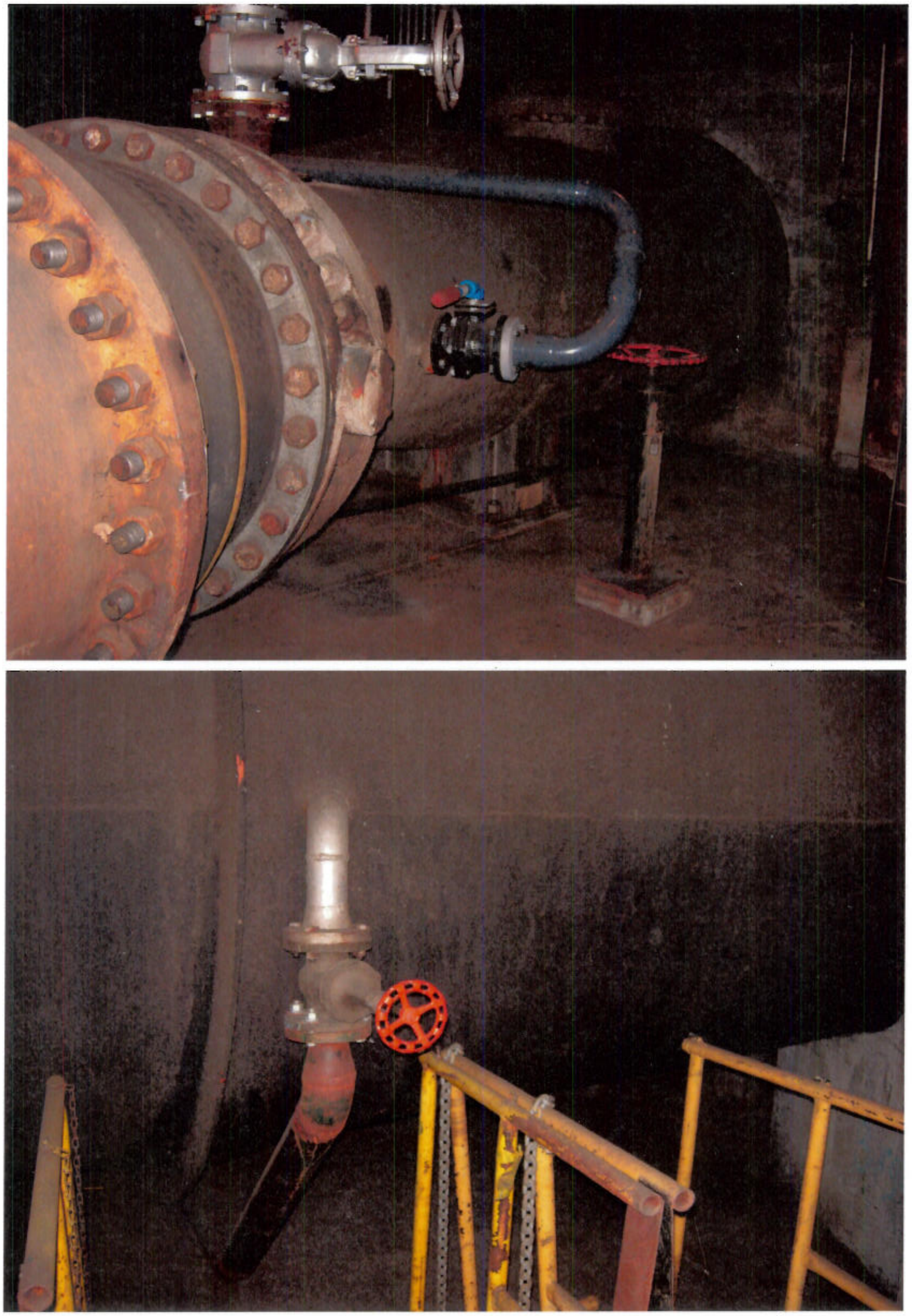


Figure 2-3. Location of the 3-in. tap supplying condenser flow into the entrainment sampling tanks from the main condenser supply lines withing the CWIS at Merrimack Station Unit 1(top) and Unit 2 (bottom).

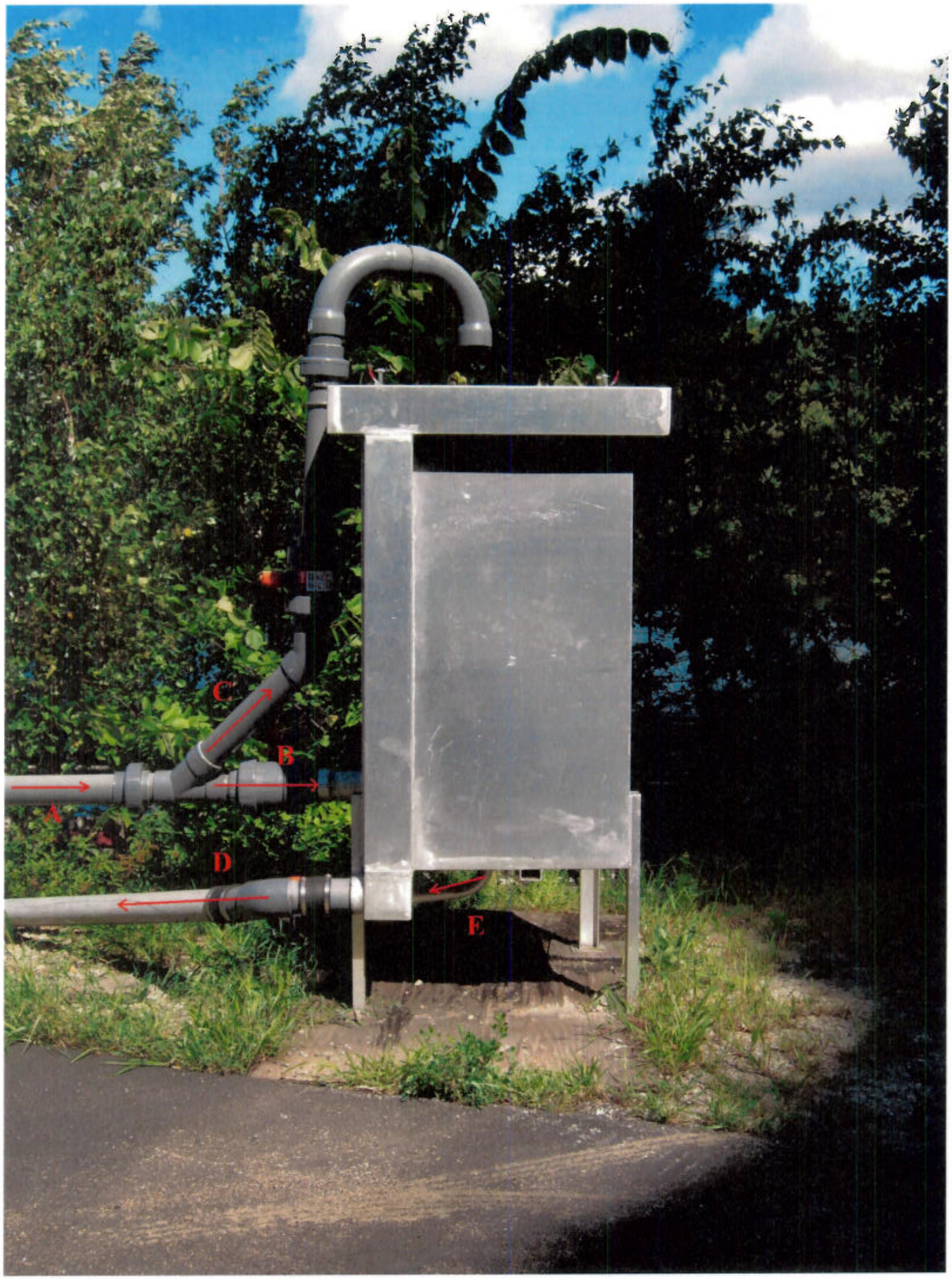


Figure 2-4. Diagram of Merrimack Station entrainment sampler showing flow patterns through tank. A: Intake flow to sampling tank. B: Flow path for water during entrainment survival test – bottom fill to swirl water around in cylindrical net. C: Flow path for water during regular entrainment sampling – top fill filters down through conical net and sample is collected in cod end. D: Drain line connected to tank stand pipe. E: Drain line for use during entrainment survival test which draws sample out of conical collection area at base of inner tank.

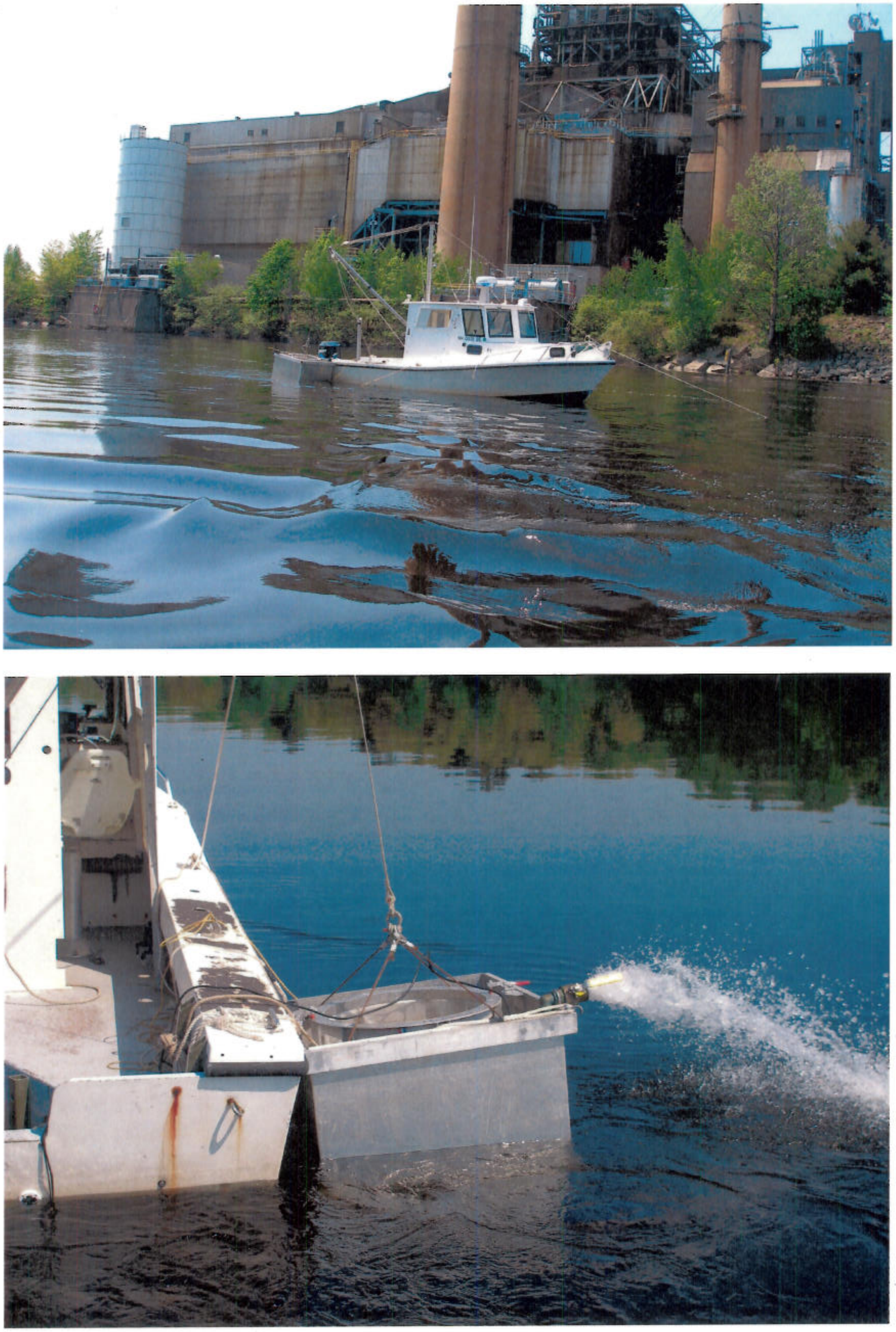


Figure 2-5. Control sampling tank for entrainment survival studies at Merrimack Station.

Figure 2-6. Impingement sample baskets at downstream end of debris sluice at Units 1 (top) and 2 (bottom) of Merrimack Station.

Figure 2-7. Injection device (bottom panel) and fish holding facility (upper panel) used at Units 1 and 2 of Merrimack Station for the release of fish onto the traveling screens associated with collection efficiency and impingement survival testing.

Table 2-1. Achieved sampling schedule for entrainment at Unit 1 of Merrimack Station.

May-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	**31**			

Aug-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	**2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	22	**23**	24	25	26
27	28	29	**30**	31		

Jun-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	21	22	23	24
25	26	27	**28**	29	30	

Sep-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Jul-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	**5**	6	7	8
9	10	11	12	13	14	15
16	17	18	19	**20**	21	22
23	24	25	**26**	27	28	29
30	31					

Table 2-1. (Continued)

Apr-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	**4**	5	6	7
8	9	10	11	12	13	14
15	16	17	**18**	19	20	21
22	23	24	25	26	27	28
29	30					

Jul-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

May-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	**2**	3	4	5
6	7	8	9	10	11	12
13	14	15	**16**	17	18	19
20	21	22	**23**	24	25	26
27	28	29	**30**	31		

Aug-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Jun-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	**6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	**20**	21	22	23
24	25	26	**27**	28	29	30

Sep-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Bolded dates represent paired diel samples. The yellow and blue shaded weeks represent the corresponding periods of extrapolation for that sample. Weeks with alternating blue and yellow blocks are the product of a weighted average of the two weeks on either side of that particular time period.

Table 2-2. Achieved sampling schedule for entrainment at Unit 2 of Merrimack Station.

May-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	**24**	**25**	26	27
28	29	30	**31**			

Aug-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	**2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	22	23	24	25	26
27	28	29	**30**	31		

Jun-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	**21**	22	23	24
25	26	27	**28**	29	30	

Sep-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	**13**	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Jul-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	**5**	6	7	8
9	10	11	**12**	13	14	15
16	17	18	**19**	20	21	22
23	24	25	**26**	27	28	29
30	31					

Table 2-2. (Continued)

Apr-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	**4**	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Jul-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

May-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	**23**	24	25	26
27	28	29	**30**	31		

Aug-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Jun-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	**6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	**20**	21	22	23
24	25	26	**27**	28	29	30

Sep-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Bolded dates represent paired diel samples. The yellow and blue shaded weeks represent the corresponding periods of extrapolation for that sample. Weeks with alternating blue and yellow blocks are the product of a weighted average of the two weeks on either side of that particular time period.

Table 2-3. Achieved sampling schedule for impingement at Unit 1 of Merrimack Station.

Jun-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	**29**	30		

Jul-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	**6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	**20**	21	22	23
24	25	26	**27**	28	29	30
31						

Aug-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	**3**	4	5	6
7	8	9	CE **10**	11	12	13
14	15	16	**17**	18	19	20
21	22	23	**24**	25	26	27
28	29	30	CE **31**			

Sep-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	**21**	22	23	24
25	26	27	CE **28**	29	30	

Oct-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	**5**	6	7	8
9	10	11	12	13	14	15
16	17	18	**19**	20	21	22
23	24	25	**26**	27	28	29
30	31					

Nov-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	CE **2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	**22**	23	24	25	26
27	28	29	30			

Dec-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	CE **7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	**21**	22	23	24
25	26	27	28	29	30	31

Table 2-3. (Continued)

Jan-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			CE			
1	2	3	**4**	5	6	7
8	9	10	11	12	13	14
15	16	17	**18**	19	20	21
22	23	24	25	26	27	28
29	30	31				

Apr-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	**5**	6	7	8
			CE			
9	10	11	**12**	13	14	15
16	17	18	**19**	20	21	22
23	24	25	**26**	27	28	29
30						

Feb-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			CE			
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	**15**	16	17	18
19	20	21	22	23	24	25
26	27	28				

May-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			CE			
	1	2	**3**	4	5	6
7	8	9	**10**	11	12	13
14	15	16	**17**	18	19	20
21	22	23	24	25	26	27
		CE				
28	29	30	**31**			

Mar-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			CE			
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	**15**	16	17	18
19	20	21	**22**	23	24	25
26	27	28	**29**	30	31	

Jun-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	21	22	23	24
25	26	27	**28**	29	30	

Table 2-3. (Continued)

Jul-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	CE **5**	6	7	8
9	10	11	**12**	13	14	15
16	17	18	**19**	20	21	22
23	24	25	CE **26**	27	28	29
30	31					

Oct-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	**4**	5	6	7
8	9	10	**11**	12	13	14
15	16	17	CE **18**	19	20	21
22	23	24	**25**	26	27	28
29	30	31				

Aug-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	**2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	22	**23**	24	25	26
27	28	29	CE **30**	31		

Nov-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	**15**	16	17	18
19	20	21	22	23	24	25
26	27	28	CE **29**	30		

Sep-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Dec-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	**13**	14	15	16
17	18	19	20	21	22	23
24	25	26	CE **27**	28	29	30
31						

Table 2-3. (Continued)

Jan-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	**10**	11	12	13
14	15	16	17	18	19	20
21	22	23	CE **24**	25	26	27
28	29	30	31			

Feb-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	14	15	16	17
18	19	20	CE **21**	22	23	24
25	26	27	28			

Mar-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	14	15	16	17
18	19	20	**21**	22	23	24
25	26	27	CE **28**	29	30	31

Apr-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	**4**	5	6	7
8	9	10	**11**	12	13	14
15	16	17	18	19	20	21
22	23	24	**25**	26	27	28
29	30					

May-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	CE **2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	22	**23**	24	25	26
27	28	29	**30**	31		

Jun-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	CE **6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	CE **20**	21	22	23
24	25	26	**27**	28	29	30

Bolded dates represent 24-hour samples. The yellow and blue shaded weeks represent the corresponding periods of extrapolation for that sample. Weeks with alternating blue and yellow blocks are the product of a weighted average of the two weeks on either side of that particular time period.
CE represents a collection efficiency test. The alternating light gray and white areas represent the corresponding periods of extrapolation covered by that particular test result.

Table 2-4. Achieved sampling schedule for impingement at Unit 2 of Merrimack Station.

Jun-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	**29**	30		

Jul-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	**6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	**20**	21	22	23
24	25	26	**27**	28	29	30
31						

Aug-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	**3**	4	5	6
7	8	9	**10**	11	12	13
14	15	16	CE **17**	18	19	20
21	22	23	**24**	25	26	27
28	29	30	CE **31**			

Sep-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	**21**	22	23	24
25	26	27	CE **28**	29	30	

Oct-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	**5**	6	7	8
9	10	11	12	13	14	15
16	17	18	**19**	20	21	22
23	24	25	**26**	27	28	29
30	31					

Nov-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	CE **2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	**22**	23	24	25	26
27	28	29	**30**			

Dec-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	CE **7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	**21**	22	23	24
25	26	27	28	29	30	31

Table 2-4. (Continued)

Jan-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	CE 4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Apr-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	CE 5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

Feb-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			CE 1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

May-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Mar-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			CE 1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Jun-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

Table 2-4. (Continued)

Jul-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	CE 5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Oct-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	CE 18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Aug-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	CE 30	31		

Nov-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	CE 29	30		

Sep-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	CE 20	21	22	23
24	25	26	27	28	29	30

Dec-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Table 2-4. (Continued)

Jan-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	**10**	11	12	13
14	15	16	17	18	19	20
21	22	23	**24**	25	26	27
28	29	30	31			

Feb-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	14	15	16	17
18	19	20	CE **21**	22	23	24
25	26	27	28			

Mar-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	**28**	29	30	31

Apr-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	**4**	5	6	7
8	9	10	**11**	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

May-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	**23**	24	25	26
27	28	29	**30**	31		

Jun-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	CE **6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	CE **20**	21	22	23
24	25	26	**27**	28	29	30

Bolded dates represent 24-hour samples. The yellow and blue shaded weeks represent the corresponding periods of extrapolation for that sample. Weeks with alternating blue and yellow blocks are the product of a weighted average of the two weeks on either side of that particular time period.
CE represents a collection efficiency test. The alternating light gray and white areas represent the corresponding periods of extrapolation covered by that particular test result.

Table 2-5. Sampling dates[1] for 24-hour impingement monitoring at Merrimack Station Unit 1 and Unit 2 from June 2005 through June 2007.

Sampling Date	Unit 1	Unit 2	Sampling Date	Unit 1	Unit 2	Sampling Date	Unit 1	Unit 2	Sampling Date	Unit 1	Unit 2
29-30 Jun 05	X	X	4-5 Jan 06	X	X	5-6 Jul 06	X	X	10-11 Jan 07	X	X
6-7 Jul 05	X	X	18-19 Jan 06	X	X	12-13 Jul 06	X	X	24-25 Jan 07	X	X
13-14 Jul 05	X	X	1-2 Feb 06	X	X	19-20 Jul 06	X	X	7-8 Feb 07	X	X
20-21 Jul 05	X	X	15-16 Feb 06	X	X	26-27 Jul 06	X	X	21-22 Feb 07	X	X
27-28 Jul 05	X	X	1-2 Mar 06	X	X	2-3 Aug 06	X	X	7-8 Mar 07	X	X
3-4 Aug 05	X	X	15-16 Mar 06	X	X	9-10 Aug 06	X	X	21-22 Mar 07	X	3
10-11 Aug 05	X	X	22-23 Mar 06	X	X	16-17 Aug 06	X	X	28-29 Mar 07	X	X
17-18 Aug 05	X	X	29-30 Mar 06	X	X	23-24 Aug 06	X	X	4-5 Apr 07	X	X
24-25 Aug 05	X	X	5-6 Apr 06	X	X	30-31 Aug 06	X	X	11-12 Apr 07	X	X
31 Aug-1 Sep 05	X	X	12-13 Apr 06	X	X	6-7 Sep 06	3	X	18-19 Apr 07	3	3
7-8 Sep 05	X	X	19-20 Apr 06	X	3	13-14 Sep 06	3	X	25-26 Apr 07	X	3
14-15 Sep 05	X	X	26-27 Apr 06	X	3	20-21 Sep 06	3	X	2-3 May 07	X	3
21-22 Sep 05	X	X	3-4 May 06	X	3	27-28 Sep 06	3	3	9-10 May 07	X	3
28-29 Sep 05	X	X	10-11 May 06	X	3	4-5 Oct 06	X	X	16-17 May 07	X	3
5-6 Oct 05	X	X	17-18 May 06	X	3	11-12 Oct 06	X	X	23-24 May 07	X	X
12-13 Oct 05	3	3	24-25 May 06	3	X	18-19 Oct 06	X	X	30-31 May 07	X	X
19-20 Oct 05	X	X	31 May-1 Jun 06	X	X	25-26 Oct 06	X	X	6-7 Jun 07	X	X
26-27 Oct 05	X	X	7-8 Jun 06	X	X	1-2 Nov 06	X	X	13-14 Jun 07	X	X
2-3 Nov 05	X	X	14-15 Jun 06	X	X	15-16 Nov 06	X	X	20-21 Jun 07	X	X
9-10 Nov 05	X	X	21-22 Jun 06	3	X	29-30 Nov 06	X	X	27-28 Jun 07	X	X
16-17 Nov 05	X	X	28-29 Jun 06	X	X	13-14 Dec 06	X	X			
22-23 Nov 05	X	X				27-28 Dec 06	X	X			
30 Nov-1 Dec 05	3	X									
7-8 Dec 05	X	X									
14-15 Dec 05	X	X									
21-22 Dec 05	X	X									

[1]X= Valid 24-h impingement sample collected (i.e. Use Code = 1)
3 = Voided sample period. No sample collected due to outage, etc. (i.e. Use Code = 5)

Table 2-6. Table of parameters for determination of adult equivalent losses for largemouth bass.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	1.9	0.149568619	0.260216949	
Larvae	2.7	0.067205513	0.125946712	
YOY	0.446	0.640183772	0.780624443	
Age 1+	0.86	0.423162082	0.594678691	82
Age 2+	1.17	0.310366941		188
Age 3+	0.755	0.470010615		266
Age 4+ [c]	1.05	0.349937749		326

* shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-3) (EPA 2004)
b Average from three populations in Maine, Beamesderfer and North 1995.
c Conservative value for the age at sexual maturity for females is 4 years, Scott and Crossman 1973.

Table 2-7. Table of parameters for determination of adult equivalent losses for pumpkinseed.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	1.71	0.180865793	0.306327432	
Larvae	0.687	0.503083057	0.66940154	
YOY	0.687	0.503083057	0.66940154	
Age 1+	1.61	0.199887614	0.333177227	74
Age 2+ [c]	1.61	0.199887614		104

* shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-30) (EPA 2004)
b Taken from a population in Michigan, Scott and Crossman 1973.
c Age at sexual maturity for pumpkinseed is 2 years, Scott and Crossman 1973.

Table 2-8. Table of parameters for determination of adult equivalent losses for bluegill.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	1.73	0.17728441	0.301175159	
Larvae	0.576	0.562142445	0.719707024	
YOY	4.62	0.009852796	0.019513331	
Age 1+	0.39	0.677056874	0.807434601	79
Age 2+	0.151	0.859847699	0.92464313	109
Age 3+ [c]	0.735	0.479505459		137

*shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-7) (EPA 2004)
b Taken from a population in Michigan, Scott and Crossman 1973.
c Conservative value for age at sexual maturity for bluegill is 3 years, Scott and Crossman 1973.

Table 2-9. Table of parameters for determination of adult equivalent losses for black crappie.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	0.5	0.60653066	0.755081338	
Larvae	3.6	0.027323722	0.053193987	
YOY	1.8	0.165298888	0.28370213	
Age 1+	3.65	0.025991129	0.050665406	115
Age 2+ [c]	0.6	0.548811636		173

*shaded box denotes age at sexual maturity a - Taken from Barnthouse 2005.
b Taken from a population in Ontario, Canada, Scott and Crossman 1973. Converted from fork length (TL = 1.02792*FL).
c Conservative value for age at sexual maturity for black crappie is 2 years, Scott and Crossman 1973.

Table 2-10. Table of parameters for determination of adult equivalent losses for spottail shiner.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	1.9	0.149568619	0.260216949	
Larvae	4.61	0.009951818	0.019707511	
YOY	0.777	0.459783294	0.629933629	
Age 1+	0.371	0.690043942	0.816598817	84
Age 2+ [c]	4.61	0.009951818		99

*shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-24) (EPA 2004).
b Taken from a population in Wisconsin, Becker 1983.
c Age at sexual maturity for spottail shiner is 2 years, Becker 1983.

Table 2-11. Table of parameters for determination of adult equivalent losses for yellow perch.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	2.7	0.067205513	0.125946712	
Larvae	3.67	0.02547647	0.049687088	
YOY	2.48	0.083743226	0.154544404	
Age 1+	0.36	0.697676326	0.821919132	75
Age 2+	0.69	0.501576069	0.668066146	91
Age 3+	1.2	0.301194212	0.462950433	131
Age 4+ [c]	1.2	0.301194212		150

*shaded box denotes age at sexual maturity
a Taken from Barnthouse 2005
b Taken from a population in Canada and measurements converted from fork length to total length (TL = FL*1.05838), Scott and Crossman 1973.
c Age at sexual maturity for females is 4 years, Scott and Crossman 1973.

Table 2-12. Table of parameters for determination of adult equivalent losses for white sucker.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si
Egg	2.05	0.128734904	0.228104763
Larvae	2.56	0.07730474	0.143515085
YOY	2.3	0.100258844	0.182245922
Age 1+	0.274	0.760332075	
Age 2+	0.274	0.760332075	
Age 3+	0.274	0.760332075	
Age 4+ [b]	0.274	0.760332075	

*shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-3) (EPA 2004)
b Conservative value for age at sexual maturity for white sucker is 4 years, Scott and Crossman 1973.

Table 2-13. Table of parameters for determination of adult equivalent losses for the carp and minnow family.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si
Egg	1.9	0.149568619	0.260216949
Larvae	4.61	0.009951818	0.019707511
YOY	1.39	0.249075305	0.398815514
Age 1+	0.13	0.878095431	
Age 2+	0.13	0.878095431	

*shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-9) (EPA 2004).
b Conservative estimate of age at sexual maturity based on values for spottail shiner (abundantly present in Hooksett Pool).

Table 2-14. Table of parameters for determination of adult equivilant losses for the sunfish family.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si
Egg	1.73	0.17728441	0.301175159
Larvae	0.576	0.562142445	0.719707024
YOY	4.62	0.009852796	0.019513331
Age 1+	0.39	0.677056874	0.807434601
Age 2+	0.151	0.859847699	0.92464313
Age 3+	0.735	0.479505459	

*shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-7) (EPA 2004).
b Conservative estimate of age at sexual maturity based on value for bluegill (dominant sunfish species present in Hooksett Pool).

3.0 Entrainment Results

A total of 48 valid entrainment samples were collected at Unit 1 and 47 at Unit 2 from 21 May 2006 through 25 June 2007. As requested in the EPA 308 letter to PSNH, this section will present the number of eggs and larvae collected and the physical and environmental parameters collected in conjunction with each sample. Table 1 of Appendix A presents the duration, volume and recorded water quality parameters for each entrainment sample.

3.1 Species Composition

Seven fish species belonging to five families were identified from Merrimack Station entrainment samples (Table 3-1). The additional three taxonomic categories in Table 3-1 represented specimens that were either too badly damaged to identify or were in a life stage or size range in which two or more locally occurring species cannot be reliably distinguished (i.e., Centrarchidae, Clupeidae, or Cyprindae).

Among the total raw or numerical count of individual fish entrained at Merrimack Station (Units 1 & 2 pooled over 2006 and 2007), 89% were post yolk-sac larvae (PYSL). PYSL are defined as the transitional life stage of larval development occurring from the time when a complete functional digestive system has been fully developed to the time when the organism transforms into a fully formed juvenile fish. Yolk-sac larvae (YSL), defined as the transition stage from hatching through the development of a complete, functional digestive system, represented 6.2% of the total entrained. Young of year (YOY), defined as the stage from completed transformation into a juvenile fish to Age 1 (12 months), represented 1.4 % of the total entrained at Merrimack Station Units 1 and 2 combined. A total of just four eggs were entrained among the two years of sampling at Merrimack Station Units 1 and 2, representing 1.1% of the total count of entrained organisms. The remainder (2.3%) were larvae that could not be identified to family or staged due to the damaged condition of the individuals in the sample.

Among PYSL entrained at Merrimack Station (Units 1 and 2 combined), white sucker was the most abundant taxon and the carp and minnow family ranked second, together accounting for 73% of all PYSL (Table 3-2). Other commonly found species included yellow perch and sunfish family. Yolk-sac larvae were mostly of the carp and minnow family (61%; Table 3-2). Sunfish family and tessellated darter made up the remainder of the entrained YSL. Entrained young-of-year fish included white sucker, spottail shiner and margined madtom (Table 3-2). Of the four eggs entrained during sampling, one belonged to the carp and minnow family while the remainder could not be identified to family (Table 3-2). As would be expected, the most abundantly entrained species had the highest mean densities (# per 100 m^3; Table 3-3).

Species composition of entrained larvae was similar at Units 1 and 2 for the season. White sucker, carp and minnow family, sunfish family, and yellow perch were the four most abundant taxa decreasing in order of abundance within the entrained PYSL at both Units 1 and 2 (Table 3-2). The carp and minnow family, sunfish family, and tessellated darter constituted 100% of the yolk sac larvae entrained at both Units 1 and 2 (Table 3-2). Unit 1 entrained a total of four YOY and three eggs while Unit 2 entrained a total of one YOY and one egg during the season (Table 3-2).

3.2 Sizes of Entrained Fish

The mean, range, and length frequency distribution (in 1 mm length classes) of each fish species entrained at Merrimack Station is presented in Table 3-3. The lengths of entrained fish ranged from 3.7 mm (Cyprinidae) to 24.2 mm (white sucker). Peak abundances of entrained larvae occurred within the length classes of 5.0-5.9, 10.0-11.9 and 14.0-16.9 mm (Figure 3-1). Larvae within the 5.0-5.9 mm length class comprised members of the family Centrarchidae (sunfishes and black crappie) and Cyprinidae (minnow species). The peak abundance within the 10.0 – 11.9 mm length classes comprised white sucker and cyprinids, while the abundance within the 14.0 to 16.9 mm length classes was dominated by white sucker.

Among the dominant species entrained, 78.8% of entrained white sucker larvae were between the lengths of 10.0 and 16.9 mm (range = 6.0-24.9 mm). Among the entrained members of the sunfish family, 81.8% were within the range of 5.0 to 6.9 mm (range = 4.0-13.9 mm). Of the 94 entrained cyprinids, more than half (52.1%) were within the 4.0-5.9 mm length classes (range = 3.0-17.9 mm). Entrained larvae of yellow perch ranged from 6.0 to 14.9 mm with the highest abundance (39.2%) within the 7.0 to 7.9 mm length class.

3.3 Seasonal Abundance Patterns

The abundance of entrained larvae (YSL and PYSL pooled) at Merrimack Station (Units 1 and 2 pooled) varied seasonally with a primary peak in late-May and early-June (Figure 3-2). This spring peak occurred during both the 2006 and 2007 sampling years, and coincides with the time required for development into the larval stages from eggs spawned in early- or mid-May. Densities of entrained fish larvae peaked during first week of June in 2006 and 2007 reflecting similar year to year timing of spawning and larval development. Mean densities entrained during the early June peak observed were 0.89 per 100 m^3 in 2006 and 2.01 per 100 m^3 in 2007. A secondary peak in entrainment was observed in late-June of each year. Mean densities of larvae (YSL and PYSL pooled) entrained during the secondary peaks were 0.54 per 100 m^3 in 2006 and 0.75 per 100 m^3 in 2007. As would be expected given the life history strategies of resident fish species, mean densities during the summer months of July, August, and September and the early spring period of April showed lower levels of entrainment because little spawning occurs in then. White sucker accounted for 93% of the 2006 and 75% of the 2007 peak in larval entrainment that was observed during the late-May and early-June (primary) period. The carp and minnow family and sunfish family contributed significantly to the secondary peak in entrainment mean densities observed during the last week of June.

Egg entrainment at Merrimack Station (Units 1 and 2 combined) occurred during late-May and early-August in 2006 and during mid-June in 2007 (Figure 3-3). The 2007 peak was eggs from the carp and minnow family and unidentified. The eggs of the 2006 peaks could not be identified to species. It is possible that some of the unidentified eggs may have been unfertilized and extruded from impinged fish.

When examined separately by Unit at Merrimack Station, seasonal patterns of larval entrainment at Units 1 and 2 were similar to the overall pattern for both Units combined (Figure 3-2). During 2006 and 2007, larval entrainment at Unit 1 peaked during the first week of June, with mean densities of 0.59 per 100 m^3 and 3.15 per 100 m^3, respectively. Larval entrainment at Unit 2 peaked during the last week of May in 2006 (1.31 per 100 m^3) and first week of June in 2007 (0.86 per 100m^3). A secondary larval peak during late-June was present in the larval entrainment collection at both Units 1 and 2 during 2006 and 2007.

Due to the low number (4) of eggs observed in entrainment samples collected at Units 1 and 2 of Merrimack Station (combined), peaks in seasonal abundance of eggs occur when any were present in the sample (Figure 3-3). At Merrimack Station, a peak in egg entrainment occurred in 2006 during the week of 28 May (one egg at Unit 2, or 0.02 eggs per 100 m^3) and during the week of 6 August (one egg at Unit 1, or 0.02 per 100m^3). A peak in egg entrainment occurred at Merrimack Station during the week of 25 June 2007 with a mean density of two eggs at Unit 1, or 0.05 per 100 m^3. There were no eggs entrained at Unit 2 during the 2007 season.

3.4 Diel Patterns

For the two most abundant taxa, their occurrence of PYSL in Merrimack Station entrainment samples was significantly more abundant at night than during the day (Table 3-5). The mean density (#/100m^3) of entrained white sucker (Wilcoxon – two sample test, p=0.00384) and the carp and minnow family (Wilcoxon – two sample test, p=0.00398) were greater during night samples than those during daylight hours. Mean densities of white sucker observed during night samples were 8.8 times those observed during daytime samples while the carp and minnow family mean densities were 4.7 times greater at night than during the day. There were no significant differences observed in the mean densities between day and night samples for the YSL stage of any species.

When examined by individual Unit at Merrimack Station, PYSL of the carp and minnow family (Wilcoxon – two sample test, p=0.02296) entrained at Unit 1 and PYSL of the white sucker (Wilcoxon – two sample test; p=0.02257) entrained at Unit 2 showed significantly greater mean densities during night samples than those taken in during the day (Table 3-5). Yolk-sac larvae did not show any significant differences in mean density (#/100m^3) in night versus day samples at either Unit 1 or 2.

3.5 Estimated Entrainment Abundance

The total estimated entrainment abundance (total number of entrained fish obtained from the product of entrainment density and CWIS flow for the relevant period) over the 17-week 2006 season and the 13-week 2007 season reflected not only the densities of eggs and larvae per unit volume of water but also the volume of water withdrawal by Merrimack Station during periods of larval abundance in Hooksett Pool. Although circulating water pumps operated 100% of the time in many weeks, there were occasional weeks when the pumped volume was lower than normal due to brief changes or interruptions in the operations of the pumps.

The total number of fish larvae entrained at Merrimack Station (both Units combined) during the period of 21 May through 16 September 2006 was 2.8 million, and during the period of 1 April to 30 June 2007 was 2.4 million (Table 3-6). Unit 1 entrained 25 % during 2006 and 64% during 2007. During 2006, the dominant taxa among the larvae were white sucker (1.2 million, or 42%), carp and minnow family (1.0 million, or 36%) and sunfish family (0.4 million, or 14%). During 2007, the dominant taxa among the larvae were white sucker (1.1 million, or 46%), carp and minnow family (0.6 million, or 24%) and yellow perch (0.4 million, or 18%). Within the two sampling periods, larvae entrainment peaked during the month of June during both years (1.6 million in 2006 and 1.8

million in 2007; Table 3-7). Units 1 and 2 entrained their highest numbers of larvae during the month of June during both years of sampling (Table 3-7).

Total estimated entrainment abundance of fish eggs during 21 May through 16 September 2006 was 33,989 (Table 3-8). When separated by Unit, the total abundance for that same time period were 9,141 eggs at Unit 1 and 24,848 eggs at Unit 2. Total estimated entrainment abundance of fish eggs during 2 April to 30 June 2007 was 15,797 (Table 3-8). Entrainment of eggs occurred only at Unit 1 during the 2007 period. One half of the eggs entrained during 2007 belonged to members of the carp and minnow family. The remainder could not be identified to the family level. Within the two sampling periods, egg entrainment peaked in 2006 during the month of May (24,848 eggs) and in 2007 during the month of June (15,797 eggs; Table 3-7).

Tables A-2 and A-3 in Appendix A provide the estimated entrainment abundance for each species on a weekly and monthly basis. These entrainment abundance data are presented for Unit 1, Unit 2 and for both Units combined at Merrimack Station for each sample week during 2006 and 2007.

3.6 Entrainment Survival

Entrainment survival tests were performed at Units 1 and 2 of Merrimack Station during the spring of 2007. Entrainment survival sampling was conducted on 25 May 2007 and 18 June 2007 when larval abundances in Hooksett Pool were expected to be highest based on observations in the weekly entrainment samples. However, due to the overall low densities of larvae in Hooksett Pool, no larvae were collected for survival evaluation at either Unit 1 or Unit 2 during eight hours of continuous sampling on both test dates. There were no eggs or larvae observed in the samples collected during eight hours of pumping in the control tank either.

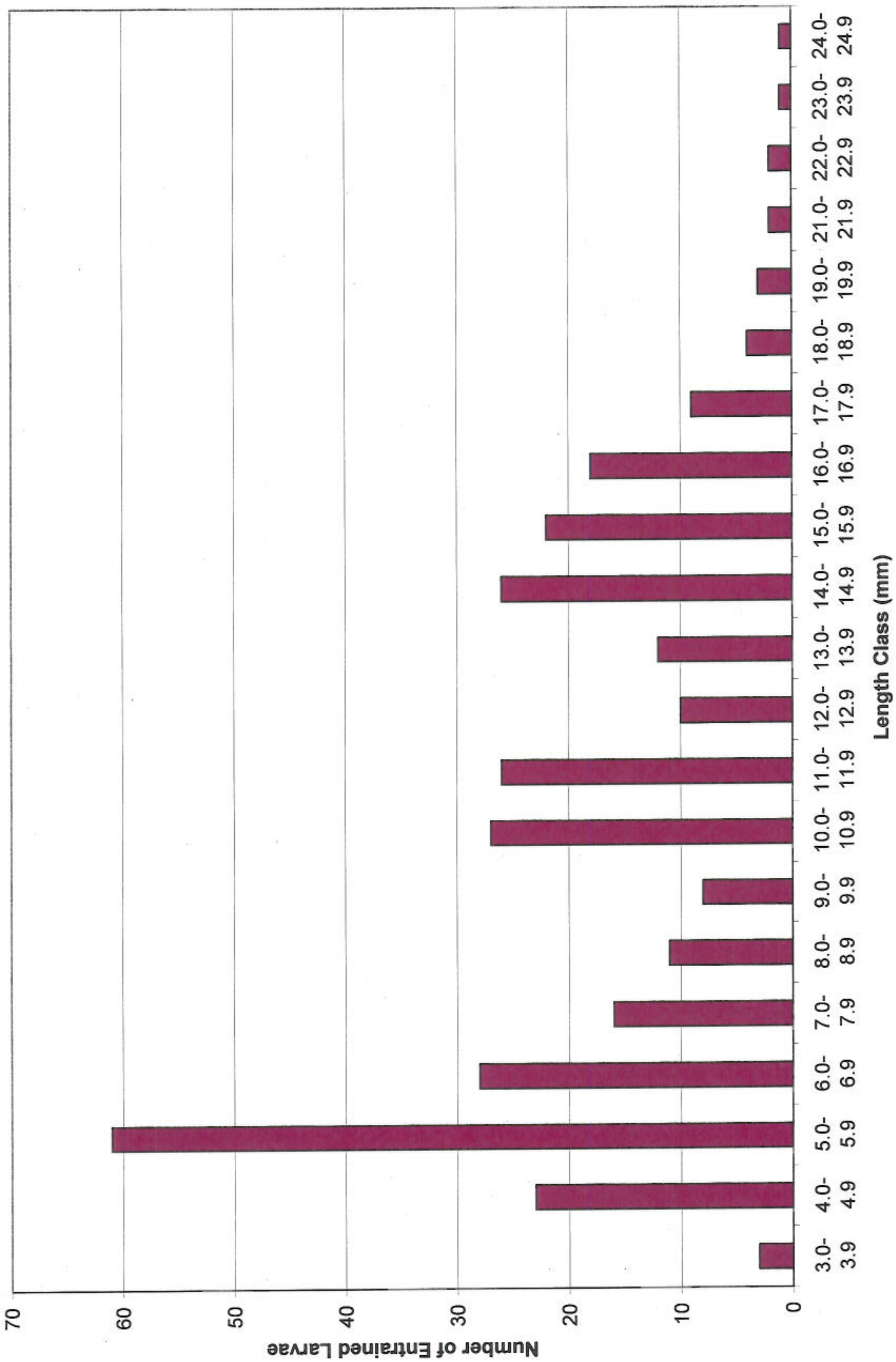
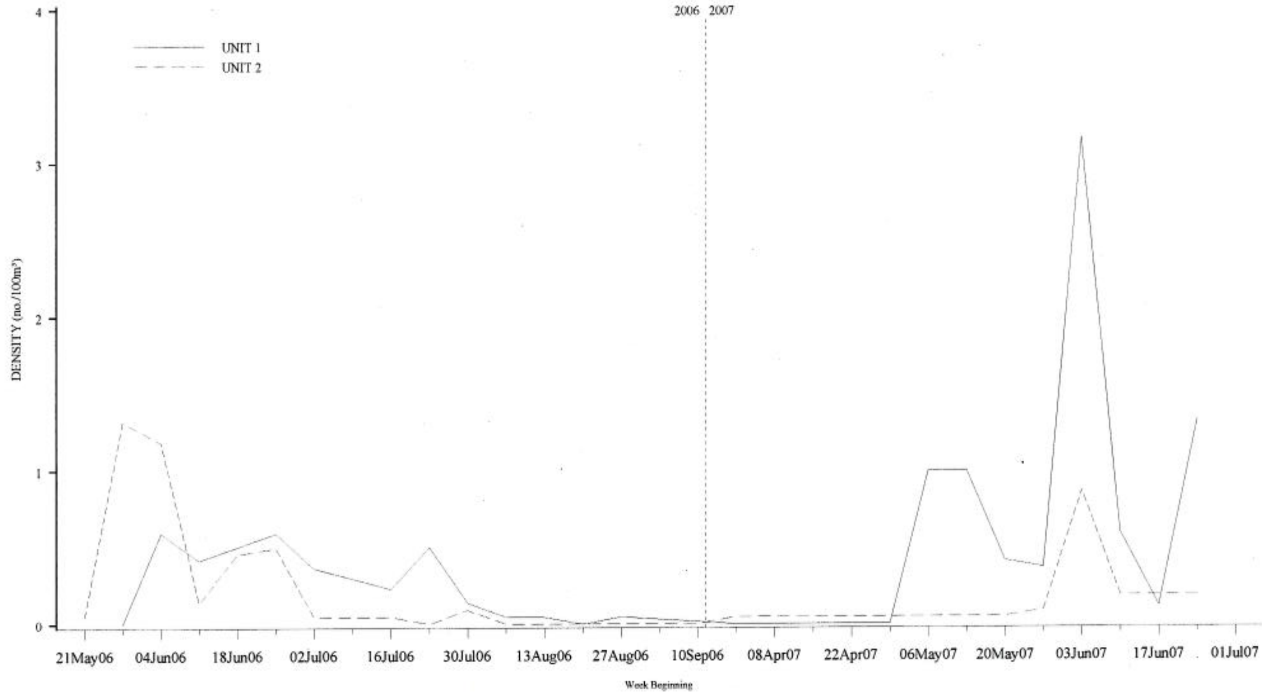


Figure 3-1. Length frequency distribution of entrained larval fish from Units 1 and 2 of Merrimack Station, May 2006 through June 2007.

Entrainment Larvae



Entrainment Larvae – Units 1 and 2 Combined

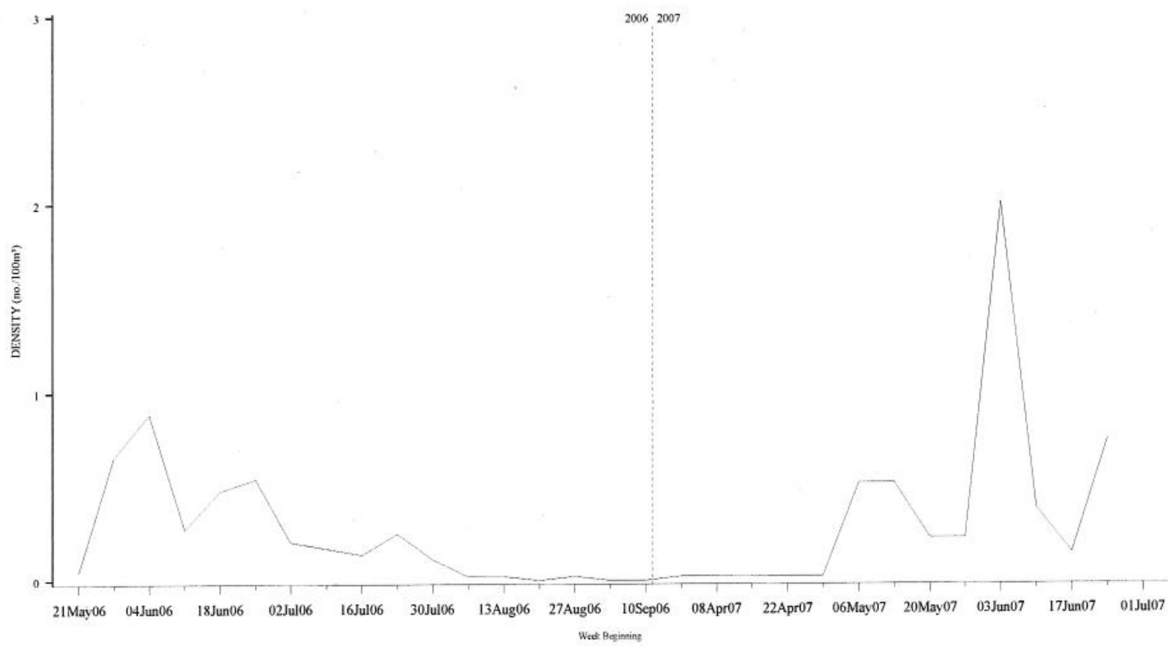
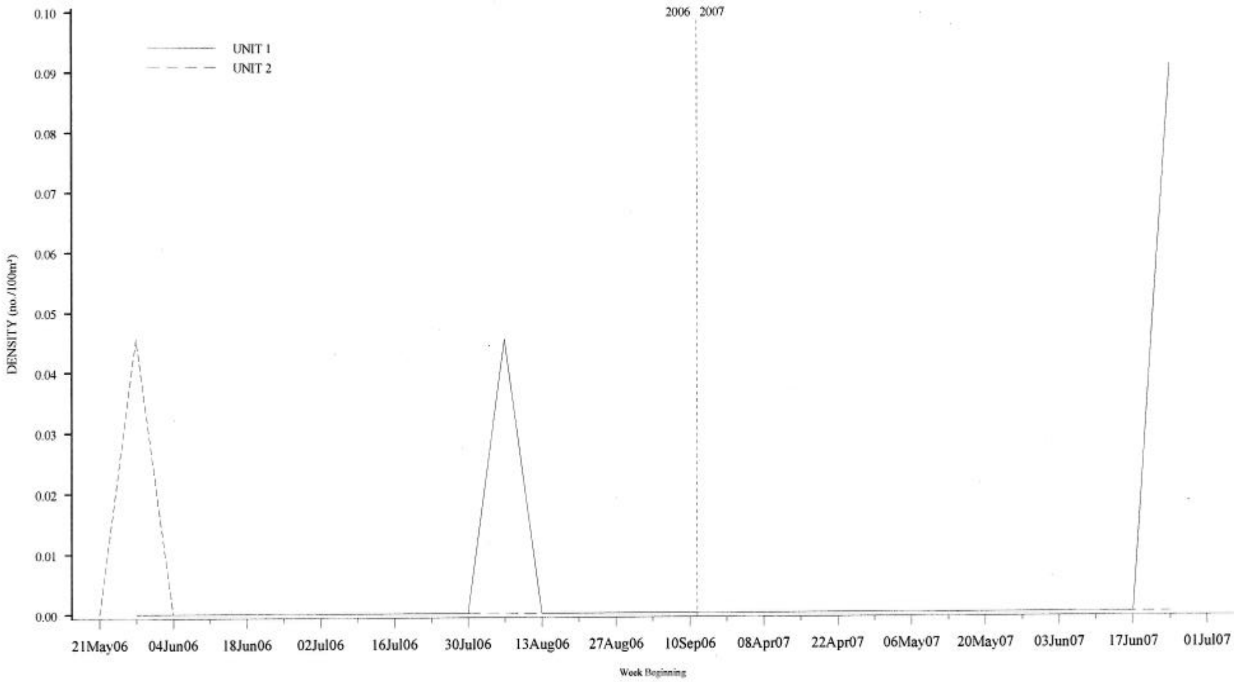


Figure 3-2. Mean larval density (#/100m^3) by week for entrainment samples collected at Merrimack Station from May 2006 through June 2007 at Units 1 and 2 (upper panel) and both Units combined (lower panel).

Entrainment Eggs



Entrainment Eggs – Units 1 and 2 Combined

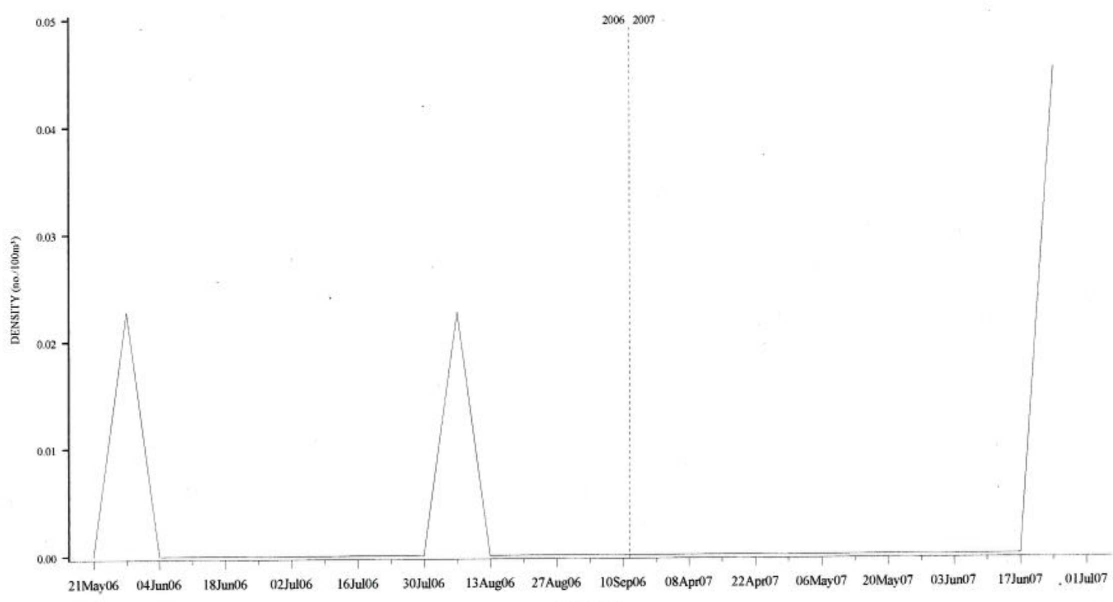


Figure 3-3. Mean egg density (#/100m^3) by week for entrainment samples collected at Merrimack Station from May 2006 through June 2007 at Units 1 and 2 (upper panel) and both Units combined (lower panel).

Table 3-1. Fish species entrained at Merrimack Station, May 2006 through June 2007.

Family	Common Name	Scientific Name
Catostomidae	White sucker	*Catostomus commersonii*
Centrarchidae	Rock bass	*Ambloplites rupestris*
	Sunfish family	Centrarchidae
Clupeidae	Herring family	Clupeidae
Cyprinidae	Spottail shiner	*Notropis hudsonius*
	Carp and minnow family	Cyprinidae
Ictaluridae	Brown bullhead	*Ameiurus nebulosus*
	Margined madtom	*Noturus insignis*
Percidae	Tessellated darter	*Etheostoma olmstedi*
	Yellow perch	*Perca flavescens*

Table 3-2. Total count and percent composition by species of icthyoplankton present in entrainment samples at Merrimack Station, May 2006 through June 2007.

		Count					Percent Composition				
		Unknown	Eggs	YSL	PYSL	YOY	Unknown	Eggs	YSL	PYSL	YOY
Unit 1	Brown bullhead				2					1.0	
	Carp and minnow family		1	8	47			33. 3	57.1	22.9	
	Margined madtom				1	1				0.5	25.0
	Rock bass				5					2.4	
	Spottail shiner				1	2				0.5	50.0
	Sunfish family			2	33				14.3	16.1	
	Tessellated darter			4	2				28.6	1.0	
	Unidentified	6	2				100.0	66. 7			
	White sucker				89	1				43.4	25.0
	Yellow perch				25					12.2	
	Total	**6**	**3**	**14**	**205**	**4**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Unit 2	Brown bullhead				2					1.8	
	Carp and minnow family			6	37				75.0	33.6	
	Herring family				1					0.9	
	Margined madtom				1					0.9	
	Sunfish family			2	7				25.0	6.4	
	Tessellated darter				2					1.8	
	Unidentified	2	1				100.0	100.0			
	White sucker				57	1				51.8	100.0
	Yellow perch				3					2.7	
	Total	**2**	**1**	**8**	**110**	**1**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Unit 1 and Unit 2	Brown bullhead				4					1.3	
	Carp and minnow family		1	14	84			25.0	63.6	26.7	
	Herring family				1					0.3	
	Margined madtom				2	1				0.6	20.0
	Rock bass				5					1.6	
	Spottail shiner				1	2				0.3	40.0
	Sunfish family			4	40				18.2	12.7	
	Tessellated darter			4	4				18.2	1.27	
	Unidentified	8	3				100.0	75.0			
	White sucker				146	2				46.4	40.0
	Yellow perch				28					8. 9	
	Total	**8**	**4**	**22**	**315**	**5**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 3-3. Monthly length frequency distributions (Number of fish in each1 mm size class) of larval and young-of-the-year fish from entrainment collections at Merrimack Station, May 2006 through June 2007.

		3.0 - 3.9	4.0 - 4.9	5.0 - 5.9	6.0 - 6.9	7.0 - 7.9	8.0 - 8.9	9.0 - 9.9	10.0 -10.9	11.0 -11.9	12.0 -12.9	13.0 -13.9	14.0 -14.9	15.0 -15.9	16.0 -16.9	17.0 -17.9	18.0 -18.9	19.0 -19.9	21.0 -21.9	22.0 -22.9	23.0 -23.9	24.0 -24.9	N	Min	Mean	Max
Brown bullhead	Jul 06												2										2	14.2	14.3	14.3
	Aug 06										1	1											2	12.9	13	13.1
	Total										1	1	2										4	12.9	13.6	14.3
Carp and minnow family	Jun 06		6	16	5	3	1	1		1	2		1		1								37	4	6.9	16.5
	Jul 06			5	1											1							7	5.1	7.1	17.2
	Aug 06				1																		1	6	6	6
	Jun 07	3	11	11		1	2	2	9	10													49	3.7	7.6	11.9
	Total	3	17	32	7	4	3	3	9	11	2		1		1	1							94	3.7	7.3	17.2
Herring family	Jun 07																			1			1	22	22	22
	Total																			1			1	22	22	22
Margined madtom	Jun 06										1												1	12	12	12
	Jul 06											1											1	13	13	13
	Aug 06													1									1	15.3	15.3	15.3
	Total										1	1		1									3	12	13.4	15.3
Rock bass	Jun 06					1	1																2	7.6	8.1	8.5
	Jul 06						1					1											2	8.2	10.7	13.1
	Aug 06						1																1	8.3	8.3	8.3
	Total					1	3					1											5	7.6	9.1	13.1
Spottail shiner	Jun 06														1	1							2	16	16.5	17
	Jun 07											1											1	13.9	13.9	13.9
	Total											1			1	1							3	13.9	15.6	17
Sunfish family	May 06			1																			1	5.2	5.2	5.2
	Jun 06		4	5	3																		12	4.2	5.4	6.8
	Jul 06		1	5	5						1	1											13	4.9	7	13.4
	Aug 06			3																			3	5.5	5.6	5.7
	Apr 07		1																				1	4.1	4.1	4.1
	Jun 07			9	5																		14	5	5.8	6.4
	Total		6	23	13						1	1											44	4.1	6	13.4
Tessellated darter	Jun 06				1																		1	6.6	6.6	6.6
	Jul 06			1																			1	5.4	5.4	5.4
	May 07			1																			1	5.9	5.9	5.9
	Jun 07			4	1																		5	5.5	5.8	6.7
	Total			6	2																		8	5.4	5.9	6.7
White sucker	May 06							1	12	10			1	1			2	1					28	9.9	12	19.2
	Jun 06				3		2		4	2	4		3	1		3		1	2			1	26	6.4	13.4	24.2
	Jul 06							1															1	9.4	9.4	9.4
	May 07											4	7		2								13	13.4	14.6	16.6
	Jun 07									1		3	9	19	14	4	2	1		1	1		55	11.5	16	23.5
	Total				3		2	2	16	13	4	7	20	21	16	7	4	3	2	1	1	1	123	6.4	14.3	24.2
Yellow perch	May 06						1																1	8.8	8.8	8.8
	Jun 06								1														1	10.9	10.9	10.9
	May 07				3	11	2	3	1	1			3										24	6.4	8.8	14.7
	Jun 07									1	1												2	11.9	12.3	12.7
	Total				3	11	3	3	2	2	1		3										28	6.4	9.1	14.7

Table 3-4. Overall mean density (#/100m^3) of icthyoplankton entrained at Merrimack Station, Units 1 and 2 combined, May 2006 through June 2007.

		Mean Density				
		Unknown	Eggs	YSL	PYSL	YOY
Unit 1	Brown bullhead	0	0	0	0.045447	0
	Carp and minnow family	0	0.022708	0.18166	1.070741	0
	Herring family	0	0	0	0	0
	Margined madtom	0	0	0	0.022686	0.022711
	Rock bass	0	0	0	0.113594	0
	Spottail shiner	0	0	0	0.01387	0.045421
	Sunfish family	0	0	0.045372	0.740946	0
	Tessellated darter	0	0	0.0914	0.036613	0
	Unidentified	0.136604	0.045395	0	0	0
	White sucker	0	0	0	2.023077	0.022708
	Yellow perch	0	0	0	0.56497	0
Unit 2	Brown bullhead	0	0	0	0.046379	0
	Carp and minnow family	0	0	0.139448	0.857687	0
	Herring family	0	0	0	0.02345	0
	Margined madtom	0	0	0	0.023248	0
	Rock bass	0	0	0	0	0
	Spottail shiner	0	0	0	0	0
	Sunfish family	0	0	0.046389	0.162359	0
	Tessellated darter	0	0	0	0.04651	0
	Unidentified	0.045827	0.0233	0	0	0
	White sucker	0	0	0	1.32367	0.023239
	Yellow perch	0	0	0	0.070082	0
Units 1 and 2 Combined	Brown bullhead	0	0	0	0.045908	0
	Carp and minnow family	0	0.011484	0.160797	0.965439	0
	Herring family	0	0	0	0.01159	0
	Margined madtom	0	0	0	0.022964	0.011486
	Rock bass	0	0	0	0.05745	0
	Spottail shiner	0	0	0	0.007015	0.022972
	Sunfish family	0	0	0.045875	0.454978	0
	Tessellated darter	0	0	0.046225	0.041505	0
	Unidentified	0.091737	0.034475	0	0	0
	White sucker	0	0	0	1.677393	0.02297
	Yellow perch	0	0	0	0.32037	0

Table 3-5 Diel variation (in mean density, #/100m^3) of icthyoplankton entrained at Merrimack Station, May 2006 through June 2007.

		Day					Night				
		Unknown	Eggs	YSL	PYSL	YOY	Unknown	Eggs	YSL	PYSL	YOY
Unit 1	Brown bullhead	0	0	0	0	0	0	0	0	0.090895	0
	Carp and minnow family	0	0	0	0.364576	0	0	0.045415	0.36332	1.776906	0
	Herring family	0	0	0	0	0	0	0	0	0	0
	Margined madtom	0	0	0	0	0	0	0	0	0.045372	0.045421
	Rock bass	0	0	0	0.045486	0	0	0	0	0.181703	0
	Spottail shiner	0	0	0	0	0	0	0	0	0.027741	0.090842
	Sunfish family	0	0	0	0.636121	0	0	0	0.090744	0.845772	0
	Tessellated darter	0	0	0	0.045486	0	0	0	0.1828	0.027741	0
	Unidentified	0.182745	0	0	0	0	0.090463	0.090791	0	0	0
	White sucker	0	0	0	0.59287	0	0	0	0	3.453284	0.045415
	Yellow perch	0	0	0	0.362797	0	0	0	0	0.767142	0
Unit 2	Brown bullhead	0	0	0	0	0	0	0	0	0.094966	0
	Carp and minnow family	0	0	0.045442	0.316413	0	0	0	0.23793	1.424737	0
	Herring family	0	0	0	0.045835	0	0	0	0	0	0
	Margined madtom	0	0	0	0	0	0	0	0	0.047604	0
	Rock bass	0	0	0	0	0	0	0	0	0	0
	Spottail shiner	0	0	0	0	0	0	0	0	0	0
	Sunfish family	0	0	0.045067	0.044785	0	0	0	0.047775	0.285531	0
	Tessellated darter	0	0	0	0.045486	0	0	0	0	0.047584	0
	Unidentified	0.089571	0.045541	0	0	0	0	0	0	0	0
	White sucker	0	0	0	0.089143	0	0	0	0	2.616983	0.047584
	Yellow perch	0	0	0	0.091375	0	0	0	0	0.047775	0
Units 1 and 2 Combined	Brown bullhead	0	0	0	0	0	0	0	0	0.092883	0
	Carp and minnow family	0	0	0.022721	0.340494	0	0	0.023236	0.302083	1.604917	0
	Herring family	0	0	0	0.022917	0	0	0	0	0	0
	Margined madtom	0	0	0	0	0	0	0	0	0.046462	0.023239
	Rock bass	0	0	0	0.022743	0	0	0	0	0.092965	0
	Spottail shiner	0	0	0	0	0	0	0	0	0.014193	0.046477
	Sunfish family	0	0	0.022533	0.340453	0	0	0	0.069759	0.572166	0
	Tessellated darter	0	0	0	0.045486	0	0	0	0.093526	0.037432	0
	Unidentified	0.136158	0.02277	0	0	0	0.046283	0.046451	0	0	0
	White sucker	0	0	0	0.341007	0	0	0	0	3.044858	0.046474
	Yellow perch	0	0	0	0.227086	0	0	0	0	0.415823	0

Table 3-6. Estimated total entrainment abundance by species for fish larvae entrained at Merrimack Station, May 2006 through June 2007.

Species	2006			2007		
	Unit 1[a]	Unit 2[b]	Both Units	Unit 1[c]	Unit 2[c]	Both Units
Brown bullhead	18,311	49,461	67,772	0	0	0
Carp and minnow family	165,914	839,808	1,005,722	343,337	241,396	584,733
Herring family	0	0	0	0	25,009	25,009
Margined madtom	9,140	24,794	33,934	0	0	0
Rock bass	57,729	0	57,729	0	0	0
Spottail shiner	0	0	0	4,762	0	4,762
Sunfish family	240,268	148,208	388,476	94,325	93,772	188,097
Tessellated darter	22,944	0	22,944	32,387	49,602	81,989
Unidentified	0	0	0	0	0	0
White sucker	171,333	988,703	1,160,036	665,804	455,125	1,120,929
Yellow perch	0	49,671	49,671	418,741	25,009	443,750
Total	**685,637**	**2,100,646**	**2,786,283**	**1,559,356**	**889,912**	**2,449,268**

a - Week of 28 May through Week of 27 August, 2006
b - Week of 21 May through Week of 10 September, 2006
c - Week of 2 April through Week of 24 June, 2007

Table 3-7 Estimated total entrainment abundance of fish eggs and larvae by month and developmental stage for Merrimack Station, May 2006 through June 2007.

Month	Stage	2006 Unit 1	2006 Unit 2	2006 Both Units	2007 Unit 1	2007 Unit 2	2007 Both Units
April	Eggs	NS	NS	NS	0	0	0
May	Eggs	0	24,848	24,848	0	0	0
June	Eggs	0	0	0	15,797	0	15,797
July	Eggs	0	0	0	NS	NS	NS
August	Eggs	9,141	0	9,141	NS	NS	NS
September	Eggs	NS	0	0	NS	NS	NS
April	Larvae	NS	NS	NS	0	59,724	59,724
May	Larvae	0	742,481	742,481	556,360	65,726	622,086
June	Larvae	351,603	1,234,410	1,586,013	1,002,996	764,462	1,767,458
July	Larvae	306,731	123,754	430,485	NS	NS	NS
August	Larvae	27,304	0	27,304	NS	NS	NS
September	Larvae	NS	0	0	NS	NS	NS
April	Other	NS	NS	NS	0	0	0
May	Other	0	0	0	36,457	0	36,457
June	Other	21,250	48,872	70,122	0	0	0
July	Other	27,489	0	27,489	NS	NS	NS
August	Other	0	0	0	NS	NS	NS
September	Other	NS	0	0	NS	NS	NS
April	YOY/Older	NS	NS	NS	0	0	0
May	YOY/Older	0	0	0	0	0	0
June	YOY/Older	31,648	0	31,648	7,899	24,783	32,682
July	YOY/Older	0	0	0	NS	NS	NS
August	YOY/Older	0	0	0	NS	NS	NS
September	YOY/Older	NS	0	0	NS	NS	NS
April	Total	NS	NS	NS	0	59,724	59,724
May	Total	0	767,330	767,330	592,818	65,726	658,544
June	Total	404,501	1,283,283	1,687,784	1,026,692	789,245	1,815,937
July	Total	334,220	123,754	457,974	NS	NS	NS
August	Total	36,445	0	36,445	NS	NS	NS
September	Total	NS	0	0	NS	NS	NS

NS – not sampled

Table 3-8. Estimated total entrainment by species for fish eggs entrained at Merrimack Station, May 2006 through June 2007.

Species	2006 Unit 1[a]	2006 Unit 2[b]	2006 Both Units	2007 Unit 1[c]	2007 Unit 2[c]	2007 Both Units
Brown bullhead	0	0	0	0	0	0
Carp and minnow family	0	0	0	7,899	0	7,899
Herring family	0	0	0	0	0	0
Margined madtom	0	0	0	0	0	0
Rock bass	0	0	0	0	0	0
Spottail shiner	0	0	0	0	0	0
Sunfish family	0	0	0	0	0	0
Tessellated darter	0	0	0	0	0	0
Unidentified	9,141	24,848	33,989	7,899	0	7,899
White sucker	0	0	0	0	0	0
Yellow perch	0	0	0	0	0	0
Total	**9,141**	**24,848**	**33,989**	**15,797**	**0**	**15,797**

a - Week of 28 May through Week of 27 August, 2006

b - Week of 21 May through Week of 10 September, 2006

c - Week of 2 April through Week of 24 June, 2007

4.0 IMPINGEMENT RESULTS

A total of 80 valid 24-hour impingement samples were collected at Merrimack Station Unit 1 and 76 at Unit 2 from 29 June 2005 through 28 June 2007 among 89 total 24-hour impingement sampling dates. Nine (9) 24-hour impingement samples were considered void and not analyzed from Unit 1, and 13 24-hour samples were considered void and not analyzed from Unit 2 (see Table 2-5).

As requested in the EPA 308 letter to PSNH, this section will present the number of fish (juvenile and adult) collected and the physical and environmental parameters collected in conjunction with each sample. Table 1 of Appendix B provides the water quality parameters (temperature, dissolved oxygen, conductivity) recorded at the beginning and end of each 24 hour sample at Merrimack Station Units 1 and 2. Table 2 of Appendix B provides the volume of debris (gallons) and dominant debris type (terrestrial or aquatic) for each 24-hour and long interval sample at Units 1 and 2 of Merrimack Station.

4.1 Proportion of Flow Sampled

Valid 24-hour impingement collections were obtained from 80 sampling dates at Merrimack Station Unit 1 and from 76 sampling dates at Unit 2 during the two-year study period from June 2005 through June 2007. A cumulative total of 622.3 million cubic meters of cooling water flow was sampled on these dates, representing 11.8% of the total cooling water flow through the plant during the entire year (Table 4-1). The full month with the smallest percentage of flow sampled was December 2006 (7.2 %) and the month with the highest percentage of flow sampled was August 2005 (17.5 %). The proportion of cooling water flow that was sampled at individual units was 11.7 % at Unit 1 and 11.9 % at Unit 2 during the June 2005 through June 2007 time period.

4.2 Species Composition

Twenty-one species of fish, representing nine families were collected in the 24-hour impingement samples from June 2005 through June 2007 at Merrimack Station Units 1 and 2 (Table 4-2). An additional four species in the carp and minnow family were collected exclusively in low abundance in the long-interval (6-day and 13-day) samples; bridled shiner (*Notropis bifrenatus*, 3 individuals), common shiner (*Luxilis cornutus,* 15 individuals), eastern silvery minnow (*Hybognathus regius,* 3 individuals), and emerald shiner (*N. atherinoides,* 3 individuals). The total number of impinged fish collected in 24-hour samples during this two-year period was 679 fish for both Units combined (Table 4-2). Bluegill was the most commonly collected fish species, accounting for 62.6% of the total number of impinged fish in 24-hour samples during this two-year period for both Units combined. Spottail shiner was the second most abundant fish taxa and they accounted for 7.4% of the fish impinged in 24-hour samples during this two-year period for both Units combined.. Bluegill, spottail shiner, black crappie (5.3%), largemouth bass (4.6%), and yellow perch (4.1%) combined to represent 84% of the total fish impinged in 24-hour samples during the two years of sampling at Merrimack Station for both Units combined.

Most of the fish species collected in this study were resident fish impinged in low numbers and collected infrequently at Merrimack Station Units 1 and 2 (Table 4-3). The only fish taxon collected in more than half of the 25 months consecutively sampled during June 2005 through June 2007 was bluegill (20 months). Other taxa collected in at least 7 months included black crappie (11 months), largemouth bass (10 months), pumpkinseed (10 months), spottail shiner (10 months), golden shiner (8 months), margined madtom (8 months), smallmouth bass (7 months) and yellow perch (7 months). All other species were collected in four or fewer months. Ten of the twenty-one species of fish observed in the Merrimack Station impingement samples were represented by five or fewer individuals among the 25 months of sampling at Unit 1 and Unit 2 combined. No anadromous species (alewife, blueback herring, American shad, or Atlantic salmon) were observed in any impingement samples. One individual American eel, a catadromous species, was impinged during February 2007.

4.3 Sizes of Impinged Fish

The mean, range and size distribution of impinged fish length measurements are presented by species for each month and for the entire two-year sampling period by Unit and for both Units 1 and 2 combined at Merrimack station (Table 4-4). The lengths of impinged fish ranged from 26 mm (largemouth bass) to 880 mm (American eel). With the exception of two smallmouth bass and two white sucker, the lengths of impinged fish were less than 249 mm and the majority (91%) of the lengths were less than 125 mm, representing to overall predominance of young of the year (YOY) fishes in the impingement collections from Merrimack Station Units 1 and 2.

The 425 bluegill impinged during the two-year study had a mean total length of 61 mm (range 35-235 mm; Table 4-4). YOY bluegill in the 50-74 mm size class comprised 62.2% of their total impinged. Spottail shiner, the second most abundant impinged species with 50 individuals impinged, had a mean total length of 92 mm (range 27-135mm); fish in the 100-124 mm size class (Age 2+) accounted for 56% of their total count. The majority of the 36 black crappie (72.2%) and largemouth bass (54.8%) were contained within the 50-74 mm size class representing YOY fish. Black crappie impinged at Merrimack Station had a mean total length of 71 mm (range (37-114 mm) while largemouth bass had a mean total length of 65 mm (range 24-110 mm among 31 fish). The mean length of impinged yellow perch was 128 mm (range 36-235 mm). Yellow perch in the 100-124 mm (Age 2+) and 125-149 (Age 3+) mm size classes accounted for 57.1% of the 28 yellow perch impinged.

4.4 Annual Estimated Impingement Counts and Rates

This section presents the impingement counts compiled from all valid 24-hour samples for each species impinged at Merrimack Station Units 1 and 2 that have been expanded into monthly or annual total abundance using the volumetric extrapolation methods described in Section 2.3.2. Complete summaries of the estimated weekly and monthly impingement rates and total estimated impingement abundance are presented in Appendix B, Tables B-3 and B-4.

4.4.1 Total Estimated Impinged Fish

Figure 4-1 presents the raw counts of impinged fish for each month of sampling at Units 1 and 2 of Merrimack Station. A total of 80 valid 24-hour samples were obtained from Unit 1 and 195 fish were collected among these samples. A total of 76 valid 24-hour samples were obtained from Unit 2, with 484 fish collected. The annual raw total count of all impinged fish collected from 29 June 2005 through 30 June 2006 summed together for both Units was 580. The annual raw total count of all impinged fish collected from 1 July 2006 through 28 June 2007 summed together for both Units was

99. A total of 679 fish were collected in the valid 24-hour samples summed among both units in both years.

Fish count (number) per CWIS flow (volume) in each 24-hour sample represented the impingement sampling unit as a density or rate. Each impingement sampling unit was assumed to be representative of the daily impingement rate for the other unsampled dates within each week or two-week period. The unsampled volume in each week or two-week period represented by the impingement sampling was used to expand the sample unit up to a weekly or biweekly impingement abundance value. Monthly estimates of fish impinged were calculated for Units 1 and 2 of Merrimack Station by summing the impingement abundance for each weekly or two-week period occurring in each month. Annual impingement abundance were similarly obtained by summing each of the 12 months within each "year". These monthly and annual total impingement abundance values are presented in Table 4-5 and Figure 4-2. The estimate for total fish impingement at Merrimack Station, derived from all valid 24-hour samples at Unit 1 and Unit 2 combined, was 5,032 fish for the two-year period of 29 June 2005 through 28 June 2007. The annual total impingement abundance estimate for the first sampling year (29 June 2005 through 30 June 2006) was 4,137 fish. The annual total impingement abundance estimate for the second sampling year (1 July 2006 to 28 June 2007) was 895 fish. Annual estimated impingement was higher at Unit 2 during both years of sampling. During the June 2005 through July 2006 first year, a total of 1,392 fish were estimated to be impinged at Unit 1 compared to a total of 2,745 fish at Unit 2. During the second sampling year of July 2006 through June 2007, a total of 289 fish were estimated to be impinged at Unit 1 compared to a total of 607 fish impinged at Unit 2.

The mean and 95% confidence interval of daily (24-hour) impingement rate for Merrimack Station, Units 1 and 2 combined, was 9.03 (± 4.89, 95% C.I.) fish per Mm^3 for the two-year period of 29 June 2005 through 28 June 2007 (Table 4-6). During the same two-year time period, the mean impingement rate for Unit 1 was 9.41 (± 5.04, 95% C.I.) fish per Mm^3 and for Unit 2 was 8.63 (± 8.66, 95% C.I.) fish per Mm^3. When examined on an annual basis, the mean impingement rate at Merrimack Station (both Units pooled) during the first year of sampling (29 June 2005 to 30 June 2006) was 14.07 (± 8.98, 95% C.I.) fish per Mm^3 and during the second year of sampling (1 July 2006 through 28 June 2007) was 3.15 (± 1.1, 95% C.I.) fish per Mm^3.

4.4.2 Seasonal Patterns of Total Estimated Impinged Fish

Figure 4-2 presents the estimated number of impinged fish by month for Merrimack Station Units 1, 2 and both Units combined. Seasonal peaks in estimated impingement abundance were observed during the late-fall to early-winter months of October, November, December and January and also during the spring and early-summer months of May, June and July. The month with highest estimated impingement abundance was June 2006 when an estimated 2,345 fish were impinged at both Units combined for Merrimack Station, representing 46.6% of the total estimated impingement abundance over the two years of sampling (Figure 4-2). The month with the second highest estimated number of fish impinged was December 2005 (515 fish; 10.2% of total). Of the remaining 22 months of impingement sampling, 20 months had estimates of fewer than 200 fish impinged per month with 11 of those months having an estimate of fewer than 100 fish impinged per month for both Units combined.

The monthly pattern of impingement abundance observed for both Units combined at Merrimack Station (Figure 4-2, Table 4-5) is the same when examined for each Unit separately, with seasonal peaks present during the late-fall/early-winter and spring/early-summer months (Figure 4-2). Monthly values for total estimated impingement abundance at Unit 1 ranged from a high of 338 fish impinged during December of 2005 to a low of 0 fish impinged during August of 2005 (Figure 4-2; Table 4-5). During September of 2006, no fish were also estimated to have been impinged at Unit 1. However, during that month, no 24-hour samples were collected due to the annual outage and maintenance of that Unit by PSNH. Of the 25 months sampled at Unit 1, five had a monthly estimated impingement greater than 100 fish. Those months were October 2005 (103 fish; 6.1% of total), December 2005 (338 fish; 20.1% of total), March 2006 (167 fish; 9.91% of total), May 2006 (210 fish; 12.4 % of total), and June 2006 (296 fish; 17.6% of total). Unit 2 monthly values for total estimated impingement ranged from a high of 2,048 fish impinged during June 2006 to a low of 7 fish impinged during August of 2006 (Figure 4-2; Table 4-5), excluding the estimate of six for June 2005, which was not a full month's estimate. The month of June 2006 accounted for 61.1% of the total estimated fish impinged for the entire two-year sample period at Unit 2 from 29 June 2005 to 28 June 2007. Of the remaining 23 months of impingement sampling at Unit 2, five additional months (October 2005, November 2005, December 2005, July 2006, and November 2006) had a monthly estimated impingement count of 100 or more fish (Figure 4-2, Table 4-5).

Monthly mean impingement rates during the first annual period of sampling (June 2005 through June 2006) for Units 1 and 2 combined ranged from a high of 81.04(± 104.82, 95% C.I.) fish per Mm^3 during June 2006 to a low of 0.44 (± 0.71, 95% C.I.) fish per Mm^3 during August (Table 4-6). Monthly mean impingement rates during the second annual period of sampling (July 2006 through June 2007) for Units 1 and 2 combined ranged from a high of 6.42 (± 7.84, 95% C.I.) fish per Mm^3 during May and a low of 0.47 (± 2.03, 95% C.I.) fish per Mm^3 during September (Table 4-6). Unit 1 mean monthly impingement rates were highest during December (55.19 fish per Mm^3) and lowest during February and August (0 fish per Mm^3) during the first year of sampling. During the second year of sampling, the mean monthly impingement rate was highest during May (6.82 fish per Mm^3) and lowest during August (0.77 fish per Mm^3). The mean monthly impingement rate at Unit 2 was greatest during the month of June 2006 (105.07 fish per Mm^3) and lowest during March (0.71 fish per Mm^3) during the first year of sampling. During the second year of sampling, the mean monthly impingement rate was highest during November (6.5 fish per Mm^3) and similar to Unit 1, lowest during August (0.29 fish per Mm^3). The seasonal trends in impingement rates were similar to those observed in the estimated impingement abundance, with the highest rates occurring during the late-fall/early-winter and spring/early-summer months (Table 4-6).

4.4.3 Impingement Collection Efficiency Adjustment

Factors such as excess space at the bottoms or sides of traveling screens, plugged or misaligned spray headers, or fish becoming entangled in debris that adheres to the screens can result in impingement collections that underestimate the actual number of fish impinged on the traveling screens at Merrimack Station Unit 1 and Unit 2. Impingement collection efficiency tests were conducted monthly for the period of 29 June 2005 through 28 June 2007 (Table 4-7). The impingement collection efficiency values obtained from the two years of monthly tests ranged from 53% to 97 % for Unit 1 (mean = 80%) and from 15% to 94% for Unit 2 (mean = 61%). The mean collection efficiency values for Merrimack Station Unit 1 and Unit 2 were significantly less than 100% (paired t-test; Unit 1 $p<0.0001$; Unit 2 $p<0.0001$).

Adjusted estimates of the numbers of fish impinged, corrected for collection efficiency, were calculated for Merrimack Station Units 1 and 2 (Figure 4-3; Table 4-5). When adjusted for collection efficiency, an estimated 2,008 fish were impinged at Unit 1 and an estimated 5,999 fish were impinged at Unit 2, resulting in a total of 8,007 fish impinged at Merrimack Station during the two year sampling period. Therefore, the collection efficiency adjustment expanded the estimated total impingement abundance summed across the two years of sampling at both Unit 1 and Unit 2 combined by 2,075 total fish to 8,007 fish (Table 4-5). When examined on an annual basis, an adjusted total of 6,736 fish were impinged during the first season of sampling (June 2005 through June 2006) and an adjusted total of 1,271 fish were impinged during the second season of sampling (July 2006 through June 2007). Unit 2 impinged a higher number of fish during both annual periods that at Unit 1 when impingement estimates were corrected for collection efficiency (5,133 fish versus 1,603 fish during year one and 866 fish versus 405 fish during year two). Figure 4-3 presents the monthly estimates of fish impingement abundance at Merrimack Station Units 1 and 2 (and both Units combined) when corrected for collection efficiency. The overall seasonal patterns observed in the estimated monthly impingement abundance (Figure 4-2) are maintained throughout the two years of sampling when the monthly impingement abundance estimates have been adjusted for collection efficiency.

Impingement rates also increased when the estimated monthly impingement abundance was adjusted for collection efficiency (Table 4-6). The overall Merrimack Station impingement rate for the first annual period increased from 14.07 (± 8.98, 95% C.I.) fish per Mm^3 to 20.83(± 14.42, 95% C.I.) fish per Mm^3 while the second year increased from 3.15 (± 1.1, 95% C.I.) fish per Mm^3 to 4.58(± 1.7, 95% C.I.) fish per Mm^3. The overall impingement rate was significantly higher for the estimated values corrected for collection efficiency than those simply estimated from the raw 24-hour counts (paired t-test; Unit 1 $p<0.0001$; Unit 2 $p=0.0472$).

4.4.4 Adjusted Monthly Impingement Abundance for Each Fish Species

The monthly estimated impingement abundance for each taxon of fish impinged, adjusted for collection efficiency, is presented in Table 4-8. When raw catch is corrected for total Merrimack Station CWIS flow (both Units combined) and adjusted for collection efficiency, bluegill, spottail shiner, black crappie, largemouth bass and yellow perch were the five most abundant fish species impinged during the two years of sampling at Merrimack Station. Bluegill was the dominant species observed in impingement collections at Merrimack Station, representing 62.4% of the total adjusted catch for the two-year sampling period. Of the 4,993 impinged bluegills, 88.9% of those were impinged during the months of May, June and July 2006. A combination of high numbers of age 1+ bluegill present in Hooksett Pool and the observed trend of those small fish being impinged during high Merrimack River flow events during those three months led to the increased impingement rates during that time period. Although bluegill were not impinged at as high a rate during the months of May, June, and July of 2005 and 2007 as they were during 2006, they were still the most abundant species observed in those monthly impingement samples. An adjusted total of 605 spottail shiners were impinged at Merrimack Station during the two years of study, and the majority (79.0%) were impinged between the winter months of November 2005 through March 2006. An adjusted total of 447 black crappies were impinged at Merrimack Station during the two years of sampling. Black crappie showed a seasonal pattern of being impinged when the young-of-year were abundant during the fall months (September through December) and again during high water events in the spring (April through June). Largemouth bass were 4.4% (356 fish) of the adjusted total number of fish observed in the impingement collections from Merrimack Station. Similar to black crappie, the impingement of largemouth bass was highest during the months of October through December. During this late-fall early winter period prior to ice cover, young-of- year largemouth bass would be abundant in Hooksett Pool. An adjusted total of 335 yellow perch were impinged during the two years of sampling at Merrimack Station. The majority of the yellow perch were impinged during the fall and winter months of 2005-2006. Small numbers of yellow perch were observed in spring samples during both years of sampling.

4.5 Impingement Survival for the Existing Traveling Screens

Impingement survival tests were conducted at Units 1 and 2 of Merrimack Station from February 2006 through July 2007. The purpose of these tests was to estimate the potential survival rates of fish that become impinged on the existing traveling screens at each Unit, if these screens were operated with a continuous wash cycle. The results from these tests represent survival, which when added to the survival from an effective fish return sluice, would provide an combined estimate of total impingement survival that could be achieved with the existing traveling screens at Merrimack Station. The current fish return for impingement at Units 1 and 2 ends in a pit that is located on the Merrimack River bank above the normal water elevation, and therefore does not typically return fish to Hooksett Pool. Three tests were conducted during the winter and spring of 2006 when suitable numbers of golden shiner could legally be obtained from local bait dealers. Monthly testing at both Units began during January of 2007 and continued through July of 2007. The January 2007 to July 2007 survival tests were conducted using golden shiner purchased from a wholesale bait distributor in Massachusetts. A total of nine survival tests were conducted at Unit 1 with a range in survival rate from 40.4% to 99.7% (mean = 59.6%; Table 4-9). A total of seven impingement survival tests were conducted at Unit 2 with a range in survival rate from 20.2% to 100.0% (mean = 78.5%; Table 4-9).

The traveling screen survival rates obtained from testing at Units 1 and 2 (Table 4-9) were applied to the monthly and annual impingement abundance estimates (adjusted for collection efficiency) for Merrimack Station Unit 1 and Unit 2, based on the following assumptions. The first assumption is that the survival of golden shiner during impingement is representative of all other species impinged at Merrimack Station. Impingement survival testing was limited to using fish supplied by bait dealers (golden shiner) because numerous attempts to obtain sufficient (at least 300 fish) live wild fish from Hooksett Pool were unsuccessful; relatively few fish were caught and those that were caught (by electrofishing) experienced high latent mortality. In addition, there was limited availability of other species for testing from bait and fish dealers licensed and approved by the State of New Hampshire. It was also assumed that the test conditions were representative of the untested months (i.e. water levels, temperatures, debris) when calculated survival rates from the tested months were applied to the monthly estimated impingement abundance values from the untested months to estimate annual total survival. Seasonal survival rates were compiled by averaging the test percentages for months within each season. Seasons were defined by the following month groups: winter (December, January, February), spring (March, April, May), summer (June, July, August), and fall (September, October, November). Survival tests were not conducted during the fall season during 2006 due to the low availability of shiner at the local bait shops. As a result, no fall seasonal estimate for impingement survival is currently available for Units 1 or 2 at Merrimack Station. To compensate for this, survival rates from the summer and winter months were averaged to provide an estimated value for this season until testing can be conducted as planned during the fall of 2007. Seasonal survival rates for Merrimack Station Unit 1 were estimated as 55.0% (winter), 57.8% (spring), 70.2% (summer), and 62.7% (fall). Seasonal survival rates for Merrimack Station Unit 2 were estimated at 88.3% (winter), 84.2% (spring), 60.1% (summer), and 74.2% (fall).

Table 4-10 presents the monthly estimated impingement survival potential for Merrimack Station Units 1 and 2 when seasonal survival rates were applied to the monthly estimated impingement abundance (corrected for collection efficiency). These potential impingement survival numbers assume that all fish that were impinged on Merrimack Station screens were initially alive. With the assumption that 100% of fish were initially alive upon being impinged, it was estimated that 973 of the 1,603 fish impinged at Unit 1 and 3,319 of the 5,133 fish impinged at Unit 2 during the first year of the study would have survived impingement on the existing traveling screens at Merrimack Station if those screens were continuously rotated. It was estimated that 249 of the 406 fish impinged at Unit 1 and 628 of the 877 fish impinged at Unit 2 during the second year of the study would survive impingement.

4.6 Long Interval Impingement Samples

A comparison of estimated impingement abundance derived from the valid 24-hour samples and from the raw number of fish observed from the comparable long-interval samples is presented for Merrimack Station Units 1 and 2 in Table 4-11. The estimated total impingement abundance was calculated based on the valid 24-hour samples for each weekly or biweekly sampling period throughout the two-year program for each Unit as described in Section 4.4.1 and Table 4.5. However, the estimated impingement abundance values presented in Table 4-11 are based on a Wednesday through Tuesday week to be comparable to the timing of the long-interval samples collected. Table 4-11 also presents the comparable weekly or biweekly raw impingement abundance based on the sum of the raw 24-hour collection and the corresponding raw six or thirteen day sample for Units 1 and 2. All values in Table 4-11 were not adjusted for collection efficiency. There was a significant difference between the impingement abundance estimated from valid 24-hour samples and the abundance estimated from the actual total counts at Merrimack Station Units 1 and 2 for the two-year sampling period. Impingement abundance estimated from the valid 24-hour samples at Unit 1 produced an estimated 1,674 impinged fish over the two years that was significantly higher than the total raw impingement count of 1,111 fish derived from the sum of the 24-hour and long interval sample in each week or two-week period (paired t-test; $p=0.0028$). A significantly higher total impingement abundance was estimated from the valid 24-hour samples at Unit 2 compared to the abundance derived from the sum of 24-hour and long interval samples, where an estimated 3,341 fish were impinged based on the 24-hour samples compared to the total raw impingement count of 1,959 fish derived from the sum of the 24-hour and long interval sample in each week or two-week period (paired t-test; $p=0.0359$). When examined on an annual basis, the estimated total impingement was significantly greater when derived from the 24-hour samples than from the sum of the 24-hour and long interval samples at Unit 1 but not Unit 2 for the time period of June 2005 through June 2006 (paired t-test; Unit 1 $p=0.0048$; Unit 2 $p=0.1695$). For the period of July 2006 through June 2007, the estimated total impingement from the 24-hour samples was significantly greater than the total raw impingement count at Unit 2 but not so at Unit 1 (paired t-test; Unit 1 $p=0.0867$; Unit 2 $p=0.0039$). This evaluation demonstrates that the valid 24-hour samples provide the most reliable and perhaps a conservative estimate of monthly or annual total impingement abundance at Merrimack Station Unit 1 and Unit 2 during the period of 29 June 2005 through 28 June 2007.

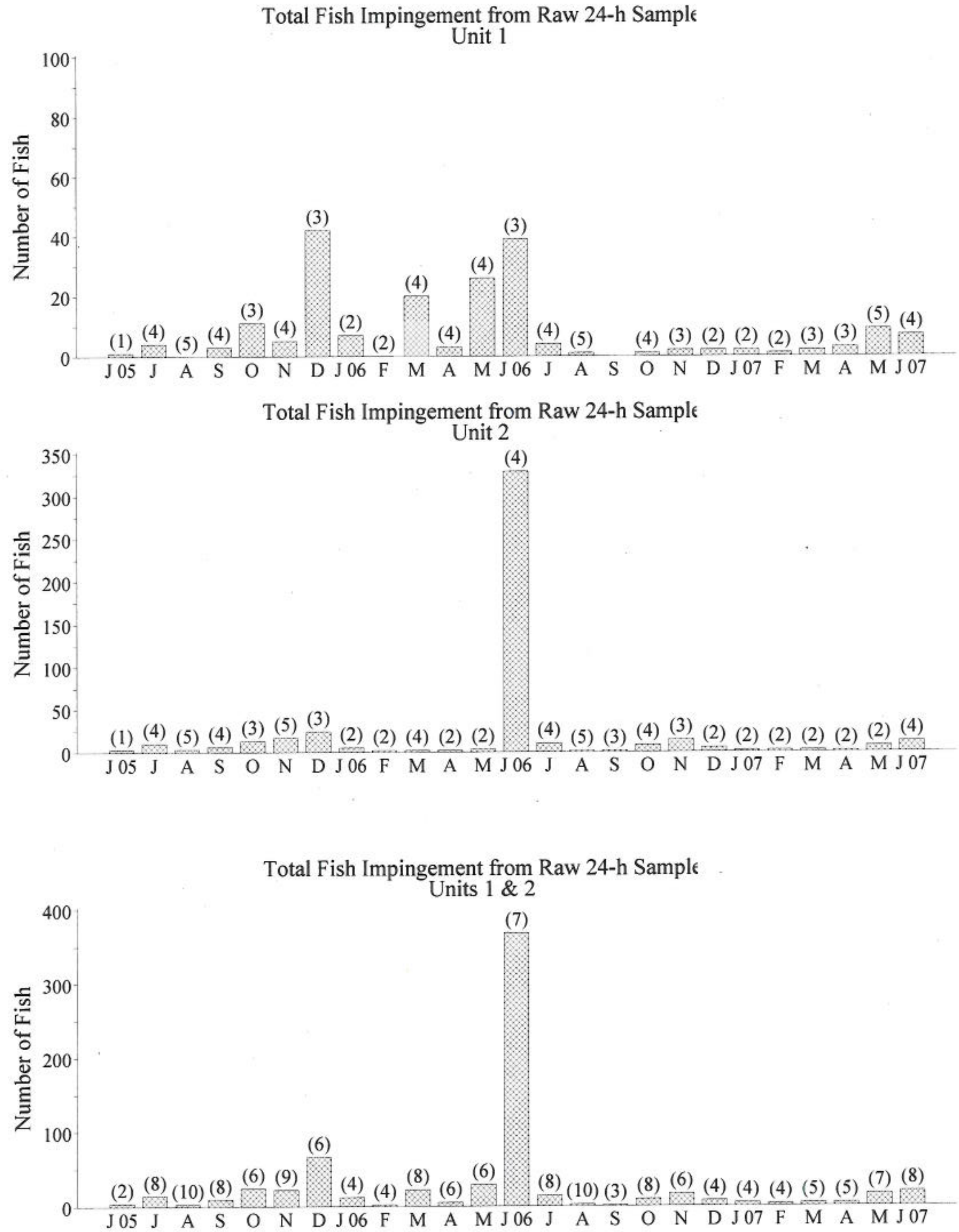


Figure 4-1. Monthly raw total number of fish impinged in 24-hour samples taken at Merrimack Station for Units 1 and 2 and pooled, June 2005 through June 2007. Number of 24-hour samples included in each monthly total is shown in parentheses above each bar.

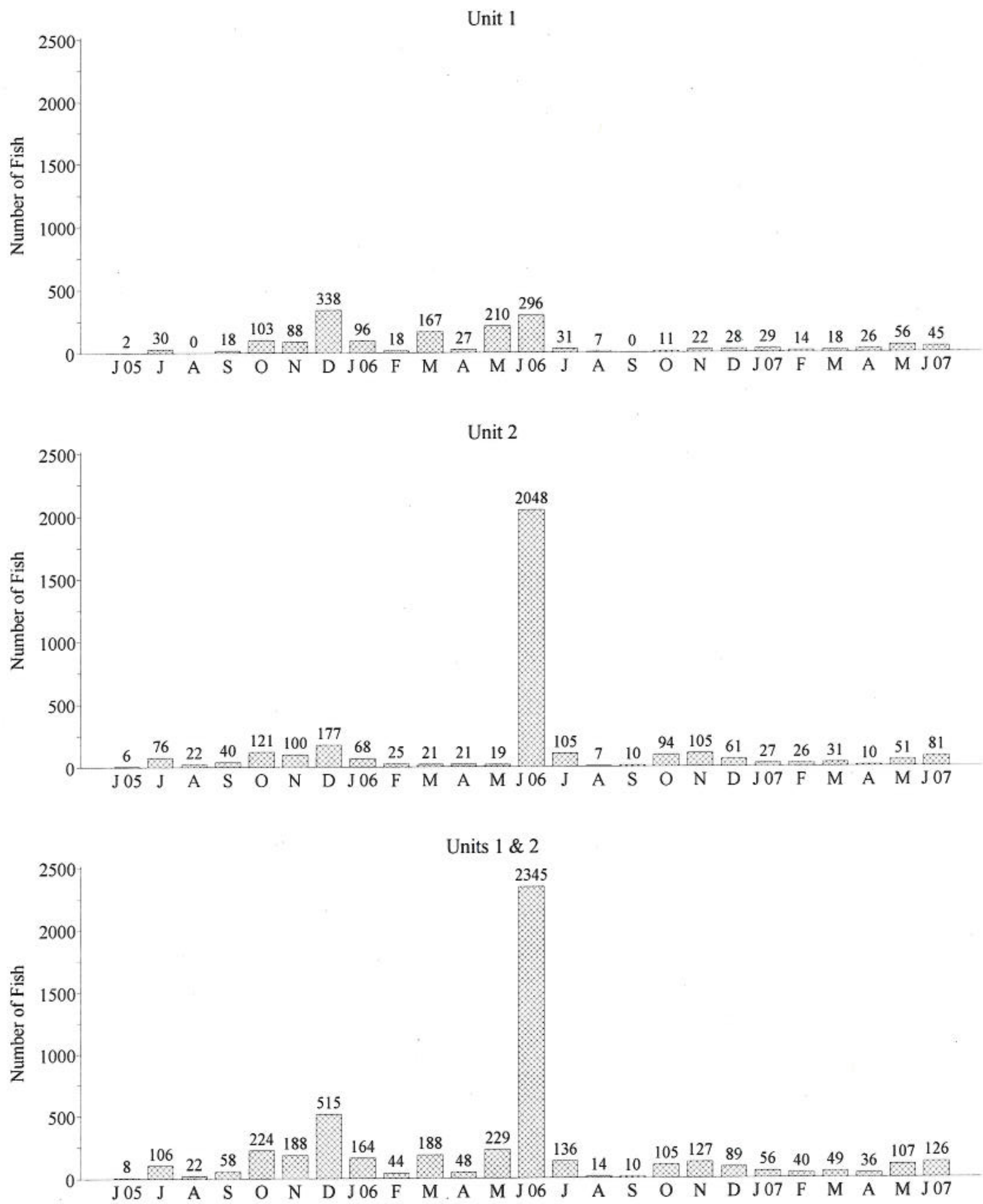


Figure 4-2. Estimated monthly total impingement abundance at Merrimack Station based on 24-hour samples collected at Units 1, 2 and both Units combined, June 2005 through June 2007 (not adjusted for collection efficiency).

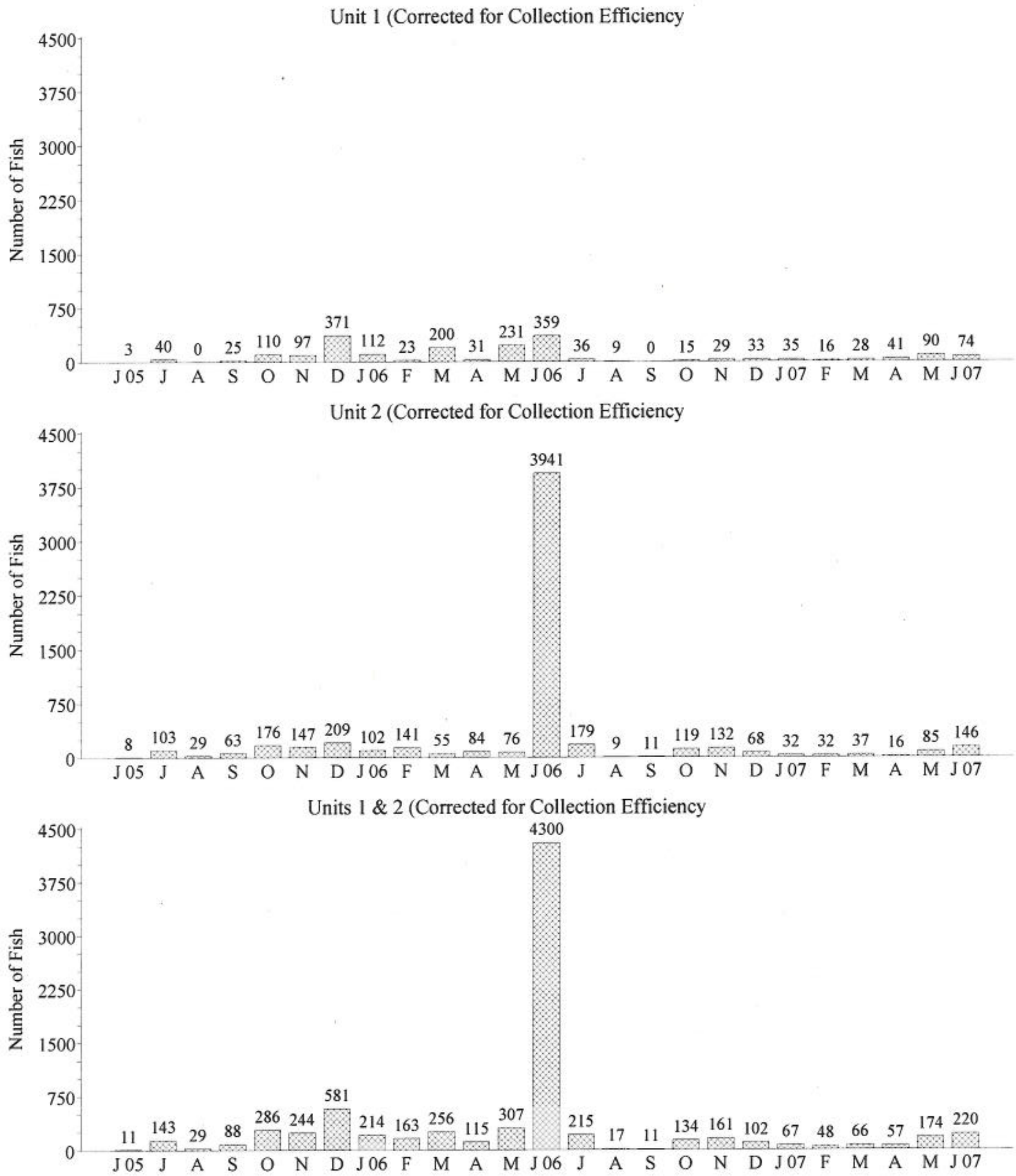


Figure 4-3. Estimated monthly total impingement abundance based on 24-hour samples collected at at Merrimack Station Units 1, 2, and both Units combined that were adjusted for CWIS flow and collection efficiency, June 2005 through June 2007.

Table 4-1. Monthly total plant flow and flow sampled for impingement at Merrimack Station, June 2005 through June 2007.

Month	Unit 1			Unit 2			Units 1 and 2 Combined		
	Total Unit Flow (Mm^3)	Flow Sampled (Mm^3)	Percent of Flow Sampled	Total Unit Flow (Mm^3)	Flow Sampled (Mm^3)	Percent of Flow Sampled	Total Unit Flow (Mm^3)	Flow Sampled (Mm^3)	Percent of Flow Sampled
Jun 05	0.52	0.26	49.9	1.42	0.71	50.0	1.94	0.97	50.0
Jul 05	8.10	1.05	13.0	21.97	2.85	13.0	30.06	3.90	13.0
Aug 05	7.42	1.29	17.4	20.31	3.55	17.5	27.73	4.84	17.5
Sep 05	7.83	1.06	13.6	21.24	2.83	13.3	29.07	3.89	13.4
Oct 05	7.44	0.76	10.2	15.07	1.73	11.5	22.51	2.49	11.1
Nov 05	7.33	1.05	14.3	21.25	3.53	16.6	28.58	4.57	16.0
Dec 05	7.69	0.78	10.1	21.97	2.13	9.7	29.65	2.90	9.8
Jan 06	7.70	0.52	6.7	21.96	1.40	6.4	29.66	1.91	6.4
Feb 06	6.76	0.41	6.1	17.33	1.39	8.0	24.08	1.80	7.5
Mar 06	8.11	1.05	13.0	21.97	2.87	13.1	30.08	3.92	13.0
Apr 06	6.82	0.78	11.5	13.01	1.43	11.0	19.84	2.21	11.2
May 06	6.46	1.06	16.3	7.85	1.38	17.6	14.30	2.44	17.0
Jun 06	6.57	0.80	12.2	21.23	2.91	13.7	27.80	3.71	13.3
Jul 06	8.11	1.04	12.8	21.96	2.82	12.8	30.07	3.86	12.8
Aug 06	8.11	1.31	16.2	21.96	3.56	16.2	30.07	4.87	16.2
Sep 06	1.32	0.00	0.0	18.38	2.13	11.6	19.71	2.13	10.8
Oct 06	7.28	1.05	14.5	21.93	2.83	12.9	29.21	3.89	13.3
Nov 06	7.36	0.53	7.2	21.25	2.17	10.2	28.61	2.69	9.4
Dec 06	7.19	0.52	7.2	19.45	1.41	7.3	26.65	1.93	7.2
Jan 07	8.11	0.52	6.4	18.13	1.43	7.9	26.24	1.94	7.4
Feb 07	7.31	0.52	7.1	18.62	1.40	7.5	25.93	1.92	7.4
Mar 07	7.29	0.79	10.9	21.71	1.43	6.6	29.01	2.22	7.7
Apr 07	7.84	0.78	10.0	12.02	1.45	12.1	19.85	2.24	11.3
May 07	8.11	1.32	16.3	8.40	1.12	13.3	16.51	2.44	14.8
Jun 07	6.54	1.09	16.7	18.63	2.90	15.6	25.17	4.00	15.9
Total	173.3	20.35	11.7	449.0	53.33	11.9	622.3	73.69	11.8

Table 4-2. Species composition[a] of fish in 24-hour impingement collections at Merrimack Station, Units 1 and 2 combined, June 2005 through June 2007.

Scientific Name	Common Name	Count
Anguillidae	eels	
Anguilla rostrata	American eel	1
Cyprinidae	carps and minnows	
Notemigonus crysoleucas	golden shiner	10
Semotilus corporalis	fallfish	3
Notropis hudsonius	spottail shiner	50
Catostomidae	suckers	
Catostomus commersonii	white sucker	2
Ictaluridae	bullhead catfishes	
Ameiurus natalis	yellow bullhead	2
Ameiurus nebulosus	brown bullhead	4
Noturus insignis	margined madtom	18
Esocidae	pikes	
Esox niger	chain pickerel	1
Osmeridae	smelts	
Osmerus mordax	rainbow smelt	12
Moronidae	temperate basses	
Morone americana	white perch	2
Centrarchidae	sunfish family	
Ambloplites rupestris	rock bass	2
Enneacanthus obesus	banded sunfish	4
Lepomis auritus	redbreast sunfish	5
Lepomis gibbosus	pumpkinseed	27
Lepomis macrochirus	bluegill	425
Micropterus dolomieu	smallmouth bass	7
Micropterus salmoides	largemouth bass	31
Pomoxis nigromaculatus	black crappie	36
unidentified centrarchid	unidentified sunfish	3
Percidae	perches	
Etheostoma olmstedi	tessellated darter	6
Perca flavescens	yellow perch	28

[a] Species (count) collected in extended sampling periods not represented by 24-hour samples were *Notropis bifrenatus*, bridle shiner (3); *Luxilis cornutus*, common shiner (15); *Hybognathus regius*, eastern silvery minnow (3); and *N. atherinoides*, emerald shiner (3).

Table 4-3. Monthly count and percent composition of fish species in 24-hour impingement collections at Merrimack Station, Units 1 and 2 combined, June 2005 through June 2007.

Species	Jun 05	Jul 05	Aug 05	Sep 05	Oct 05	Nov 05	Dec 05	Jan 06	Feb 06	Mar 06	Apr 06	May 06	Jun 06	Jul 06	Aug 06	Sep 06	Oct 06	Nov 06	Dec 06	Jan 07	Feb 07	Mar 07	Apr 07	May 07	Jun 07	Total	% of Total
American eel																					1					1	0.1
Banded sunfish											3													1		4	0.6
Black crappie				5	7	7	1				1	4	1				2	3	2					3		36	5.3
Bluegill	1	4	2	2	3	2	4			3		17	349	10	1	1	2	7	4	1		1		6	5	425	62.6
Brown bullhead		1											2												1	4	0.6
Chain pickerel								1																		1	0.1
Fallfish								3																		3	0.4
Golden shiner	1					1		1			1		2	1								2		1		10	1.5
Largemouth bass		1			6	7	2						3	1			3	5	1		2					31	4.6
Margined madtom		1			1			1		3			4										4	2	2	18	2.7
Pumpkinseed					7	2	2			1		6	5				1	1						1	1	27	4.0
Rainbow smelt							9	1	1											1						12	1.8
Redbreast sunfish				1						1		1													2	5	0.7
Rock bass	1						1																			2	0.3
Smallmouth bass	1	1	1			1	1			1					1											7	1.0
Spottail shiner		3				1	33	3	1	1							1			1				1	5	50	7.4
Sunfish family		2		1																						3	0.4
Tessellated darter		1								5																6	0.9
White perch						1														1						2	0.3
White sucker														1											1	2	0.3
Yellow bullhead														1								1				2	0.3
Yellow perch							13	2		7		1	2											1	2	28	4.1
Total	**4**	**14**	**3**	**9**	**24**	**22**	**66**	**12**	**2**	**22**	**5**	**29**	**368**	**14**	**2**	**1**	**9**	**16**	**7**	**4**	**3**	**4**	**4**	**16**	**19**	**679**	**100.0**
Number of taxa	**4**	**8**	**2**	**4**	**5**	**8**	**9**	**7**	**2**	**8**	**3**	**5**	**8**	**5**	**3**	**2**	**5**	**4**	**3**	**4**	**2**	**3**	**1**	**8**	**8**	**22**	

Table 4-4. Monthly length frequency distributions (25 mm size classes) of fish species from 24-hour impingement collections at Merrimack Station, Units 1 and 2 combined, June 2005 through June 2007.

Species		Number of Fish in Each 25 mm Total Length Class															N	Min	Mean	Max
		0-24	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	350-374	400-424	450-474	875-899				
American eel	Feb 07															1	1	880	880	880
	Total															**1**	**1**	**880**	**880**	**880**
Banded sunfish	Apr 06			2	1												3	50	65	87
	May 07			1													1	51	51	51
	Total			**3**	**1**												**4**	**50**	**62**	**87**
Black crappie	Sep 05			1	4												5	57	82	95
	Oct 05			6	1												7	68	71	76
	Nov 05		1	4	1	1											7	37	70	114
	Dec 05			1													1	67	67	67
	Apr 06			1													1	74	74	74
	May 06			4													4	62	68	73
	Jun 06			1													1	73	73	73
	Oct 06			2													2	68	70	71
	Nov 06			1	2												3	65	75	84
	Dec 06			2													2	63	65	67
	May 07			3													3	59	63	65
	Total		**1**	**26**	**8**	**1**											**36**	**37**	**71**	**114**

(continued)

Table 4-4. (Continued)

Species		Number of Fish in Each 25 mm Total Length Class															N	Min	Mean	Max
		0-24	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	350-374	400-424	450-474	875-899				
Bluegill	Jun 05		1														1	47	47	47
	Jul 05		3	1													4	44	51	63
	Aug 05					1					1						2	120	178	235
	Sep 05		1						1								2	43	112	181
	Oct 05			2		1											3	50	71	110
	Nov 05		1	1													2	35	43	51
	Dec 05					2	1	1									4	110	127	160
	Mar 06			3													3	51	57	66
	May 06		7	10													17	45	52	64
	Jun 06		40	102	2												144	42	53	79
	Jul 06		2	7	1												10	42	58	77
	Aug 06						1										1	149	149	149
	Sep 06			1													1	56	56	56
	Oct 06		1	1													2	36	45	54
	Nov 06			1	3		2			1							7	67	118	201
	Dec 06			2			2										4	62	98	130
	Jan 07								1								1	178	178	178
	Mar 07					1											1	120	120	120
	May 07		2	3	1												6	41	56	78
	Jun 07		2	3													5	48	51	56
	Total		60	137	7	5	6	1	2	1	1						220	35	61	235

(continued)

Table 4-4. (Continued)

Species		Number of Fish in Each 25 mm Total Length Class															N	Min	Mean	Max
		0-24	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	350-374	400-424	450-474	875-899				
Brown bullhead	Jul 05		1														1	40	40	40
	Jun 06			2													2	56	61	65
	Jun 07								1								1	193	193	193
	Total		**1**	**2**					**1**								**4**	**40**	**89**	**193**
Chain pickerel	Jan 06							1									1	169	169	169
	Total							1									1	169	169	169
Fallfish	Jan 06				1	1		1									3	95	130	174
	Total				**1**	**1**		**1**									**3**	**95**	**130**	**174**
Golden shiner	Jun 05				1												1	79	79	79
	Nov 05				1												1	87	87	87
	Jan 06					1											1	110	110	110
	Apr 06				1												1	86	86	86
	Jun 06				2												2	84	90	96
	Jul 06			1													1	74	74	74
	Mar 07				1	1											2	75	88	100
	May 07					1											1	100	100	100
	Total			**1**	**6**	**3**											**10**	**74**	**89**	**110**

(continued)

Table 4-4. (Continued)

Species		Number of Fish in Each 25 mm Total Length Class															N	Min	Mean	Max
		0-24	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	350-374	400-424	450-474	875-899				
Largemouth bass	Jul 05		1														1	33	33	33
	Oct 05			4	2												6	59	69	75
	Nov 05			5	2												7	61	70	90
	Dec 05				2												2	77	80	82
	Jun 06	1	2														3	24	27	30
	Jul 06		1														1	32	32	32
	Oct 06			3													3	60	66	74
	Nov 06			3	1	1											5	58	76	110
	Dec 06				1												1	85	85	85
	Feb 07			2													2	61	66	70
	Total	**1**	**4**	**17**	**8**	**1**											**31**	**24**	**65**	**110**
Margined madtom	Jul 05				1												1	85	85	85
	Oct 05			1													1	63	63	63
	Jan 06			1													1	68	68	68
	Mar 06				2		1										3	87	102	126
	Jun 06			1	1	1	1										4	67	98	131
	Apr 07				2	1	1										4	77	105	136
	May 07			2													2	60	61	61
	Jun 07			1	1												2	64	78	92
	Total			**6**	**7**	**2**	**3**										**18**	**60**	**90**	**136**

(continued)

Table 4-4. (Continued)

Species		Number of Fish in Each 25 mm Total Length Class															N	Min	Mean	Max
		0-24	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	350-374	400-424	450-474	875-899				
Pumpkinseed	Oct 05			2		5											7	55	101	123
	Nov 05					2											2	101	111	121
	Dec 05				1	1											2	89	97	104
	Mar 06			1													1	66	66	66
	May 06		1	1	2	2											6	43	78	108
	Jun 06		2	3													5	46	52	56
	Oct 06			1													1	63	63	63
	Nov 06					1											1	106	106	106
	May 07		1														1	45	45	45
	Jun 07			1													1	55	55	55
	Total		**4**	**9**	**3**	**11**											**27**	**43**	**81**	**123**
Rainbow smelt	Dec 05			3	6												9	68	79	97
	Jan 06				1												1	79	79	79
	Feb 06				1												1	82	82	82
	Jan 07				1												1	84	84	84
	Total			**3**	**9**												**12**	**68**	**80**	**97**
Redbreast sunfish	Sep 05					1											1	122	122	122
	Mar 06							1									1	171	171	171
	May 06			1													1	61	61	61
	Jun 07					1		1									2	103	129	155
	Total			**1**		**2**		**2**									**5**	**61**	**122**	**171**

(continued)

Table 4-4. (Continued)

Species		Number of Fish in Each 25 mm Total Length Class															N	Min	Mean	Max
		0-24	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	350-374	400-424	450-474	875-899				
Rock bass	Jun 05			1													1	66	66	66
	Dec 05						1										1	140	140	140
	Total			**1**			**1**										**2**	**66**	**103**	**140**
Smallmouth bass	Jun 05					1											1	102	102	102
	Jul 05				1												1	98	98	98
	Aug 05											1					1	271	271	271
	Nov 05				1												1	89	89	89
	Dec 05				1												1	79	79	79
	Mar 06					1											1	101	101	101
	Aug 06												1				1	370	370	370
	Total				**3**	**2**						**1**	**1**				**7**	**79**	**159**	**370**
Spottail shiner	Jul 05			2	1												3	55	64	81
	Nov 05		1														1	27	27	27
	Dec 05			3	1	26	3										33	58	106	135
	Jan 06			2		1											3	60	79	104
	Feb 06					1											1	119	119	119
	Mar 06			1													1	62	62	62
	Oct 06			1													1	53	53	53
	Jan 07		1														1	46	46	46
	May 07			1													1	56	56	56
	Jun 07			5													5	55	63	67
	Total		**2**	**15**	**2**	**28**	**3**										**50**	**27**	**92**	**135**

(continued)

Table 4-4. (Continued)

Species		Number of Fish in Each 25 mm Total Length Class															N	Min	Mean	Max
		0-24	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	350-374	400-424	450-474	875-899				
Sunfish family	Jul 05			2													2	60	63	65
	Sep 05		1														1	25	25	25
	Total		**1**	**2**													**3**	**25**	**50**	**65**
Tessellated darter	Jul 05			1													1	54	54	54
	Mar 06			1	4												5	63	83	92
	Total			**2**	**4**												**6**	**54**	**78**	**92**
White perch	Nov 05				1												1	84	84	84
	Jan 07							1									1	158	158	158
	Total				**1**			**1**									**2**	**84**	**121**	**158**
White sucker	Jul 06														1		1	470	470	470
	Jun 07													1			1	419	419	419
	Total													**1**	**1**		**2**	**419**	**445**	470
Yellow bullhead	Jul 06						1										1	131	131	131
	Mar 07									1							1	209	209	209
	Total						**1**			**1**							**2**	**131**	**170**	**209**
Yellow perch	Dec 05					8	2	1	2								13	105	131	195
	Jan 06					1	1										2	124	133	142
	Mar 06				3		3	1									7	83	118	169
	May 06							1									1	154	154	154
	Jun 06		1		1												2	36	56	75
	May 07					1											1	115	115	115
	Jun 07								1		1						2	177	206	235
	Total		**1**		**4**	**10**	**6**	**3**	**3**		**1**						**28**	**36**	**128**	**235**

Table 4-5. **Monthly total impingement abundance of fish at Merrimack Station Units 1 and 2, and for both Units combined, from June 2005 through June 2007. Impingement data is presented as Raw counts (Raw) in 24-hour samples, impingement abundance estimates (I) based on the product of 24-hour sample density and CWIS volumes, and adjusted impingement abundance estimates (Adj-I) representing the abundance values (I) expanded for screen collection efficiency.**

	Unit 1			Unit 2			Both Units		
Month	Raw	I	Adj-I	Raw	I	Adj-I	Raw	I	Adj-I
Jun 05	1	2	3	3	6	8	4	8	11
Jul 05	4	30	40	10	76	103	14	106	143
Aug 05	0	0	0	3	22	29	3	22	29
Sep 05	3	18	25	6	40	63	9	58	88
Oct 05	11	103	110	13	121	176	24	224	286
Nov 05	5	88	97	17	100	147	22	188	244
Dec 05	42	338	371	24	177	209	66	515	581
Jan 06	7	96	112	5	68	102	12	164	214
Feb 06	0	18	23	2	25	141	2	44	163
Mar 06	20	167	200	2	21	55	22	188	256
Apr 06	3	27	31	2	21	84	5	48	115
May 06	26	210	231	3	19	76	29	229	307
Jun 06	39	296	359	329	2,048	3,941	368	2,345	4,300
Year 1	**161**	**1,392**	**1,603**	**419**	**2,745**	**5,133**	**580**	**4,137**	**6,736**
Jul 06	4	31	36	10	105	179	14	136	215
Aug 06	1	7	9	1	7	9	2	14	17
Sep 06		0	0	1	10	11	1	10	11
Oct 06	1	11	15	8	94	119	9	105	134
Nov 06	2	22	29	14	105	132	16	127	161
Dec 06	2	28	33	5	61	68	7	89	102
Jan 07	2	29	35	2	27	32	4	56	67
Feb 07	1	14	16	2	26	32	3	40	48
Mar 07	2	18	28	2	31	37	4	49	66
Apr 07	3	26	41	1	10	16	4	36	57
May 07	9	56	90	7	51	85	16	107	174
Jun 07	7	45	74	12	81	146	19	126	220
Year 2	**34**	**289**	**405**	**65**	**607**	**866**	**99**	**895**	**1,271**
Total	**195**	**1,681**	**2,008**	**484**	**3,351**	**5,999**	**679**	**5,032**	**8,007**

Table 4-6. **Monthly mean 24-hour impingement rates (No./million m^3) of fish unadjusted and adjusted for screen collection efficiency at Merrimack Station, June 2005 through June 2007.**

Month	Unit 1			Unit 2			Both Units		
	N	Unadjusted	Adjusted	N	Unadjusted	Adjusted	N	Unadjusted	Adjusted
Jun 05	1	3.83	5.1	1	4.23	5.72	2	4.03 ±2.56	5.41 ±3.9
Jul 05	4	3.83 ±5.05	5.11 ±6.74	4	3.54 ±5.35	4.78 ±7.23	8	3.68 ±2.53	4.94 ±3.4
Aug 05	5	0	0	5	0.88 ±1.64	1.18 ±2.22	10	0.44 ±0.71	0.59 ±0.96
Sep 05	4	2.81 ±5.74	3.68 ±6.78	4	2.16 ±3	3.4 ±4.62	8	2.48 ±2.25	3.54 ±2.82
Oct 05	3	14.36 ±31.24	15.49 ±33.41	3	11.14 ±38.64	15.57 ±52.32	6	12.75 ±13.4	15.53 ±16.59
Nov 05	4	4.85 ±11.81	5.52 ±13.42	5	4.85 ±4.52	7.19 ±7.47	9	4.85 ±4.02	6.45 ±5.19
Dec 05	3	55.19 ±212.84	60.65 ±233.89	3	11.26 ±37.04	13.24 ±43.57	6	33.22 ±63	36.95 ±69.16
Jan 06	2	13.81 ±175.47	16.25 ±206.43	2	3.62 ±28.05	5.4 ±41.87	4	8.71 ±20.44	10.82 ±23.73
Feb 06	2	0	0	2	1.45 ±18.38	8.04 ±102.1	4	0.72 ±2.3	4.02 ±12.79
Mar 06	4	19.1 ±19.45	22.85 ±23.71	4	0.71 ±2.25	1.86 ±5.91	8	9.9 ±10.62	12.35 ±12.59
Apr 06	4	2.86 ±5.82	3.33 ±6.76	2	1.42 ±17.99	5.66 ±71.97	6	2.38 ±3.21	4.11 ±5.26
May 06	4	24.42 ±52.05	27.07 ±55.94	2	2.19 ±9.94	8.77 ±39.75	6	17.01 ±29.19	20.97 ±30.32
Jun 06	3	49 ±127.88	59.36 ±157.14	4	105.07 ±236.69	201.43 ±386.28	7	81.04 ±104.82	140.54 ±176.85
Year 1	**43**	**14.39 ±9.15**	**16.61 ±10.37**	**41**	**13.74 ±16.16**	**25.26 ±28.1**	**84**	**14.07 ±8.98**	**20.83 ±14.42**
Jul 06	4	3.9 ±8.8	4.67 ±9.51	4	3.56 ±2.97	6.03 ±5.03	8	3.73 ±3.2	5.35 ±3.75
Aug 06	5	0.77 ±2.14	0.95 ±2.65	5	0.29 ±0.79	0.35 ±0.98	10	0.53 ±0.9	0.65 ±1.11
Sep 06	0	NS	NS	3	0.47 ±2.03	0.5 ±2.16	3	0.47 ±2.03	0.5 ±2.16
Oct 06	4	0.93 ±2.97	1.21 ±3.86	4	2.82 ±4.04	3.53 ±5.27	8	1.87 ±1.92	2.37 ±2.47
Nov 06	3	4.18 ±10.79	5.35 ±14.04	3	6.5 ±25.03	8.24 ±32.27	6	5.34 ±7.4	6.79 ±9.55
Dec 06	2	3.85 ±0.7	4.61 ±0.92	2	3.54 ±8.49	4.01 ±6.5	4	3.69 ±0.92	4.31 ±0.87
Jan 07	2	3.89 ±1.53	4.57 ±2.49	2	1.4 ±0.29	1.71 ±0.36	4	2.64 ±2.29	3.14 ±2.64
Feb 07	2	1.97 ±25.05	2.22 ±28.14	2	1.45 ±18.36	1.76 ±22.4	4	1.71 ±3.21	1.99 ±3.7
Mar 07	3	2.48 ±10.68	4 ±17.23	2	1.41 ±17.93	1.72 ±21.86	5	2.05 ±4.04	3.09 ±6.46
Apr 07	3	3.65 ±15.73	5.89 ±25.36	2	0.68 ±8.61	1.13 ±14.34	5	2.46 ±5.95	3.99 ±9.58
May 07	5	6.82 ±12.6	10.69 ±20.6	2	5.4 ±36.18	8.99 ±60.3	7	6.42 ±7.84	10.21 ±12.81
Jun 07	4	6.7 ±14.12	10.66 ±23.94	4	4.26 ±6.52	7.91 ±10.16	8	5.48 ±5.46	9.28 ±9.03
Year 2	**37**	**3.63 ±1.84**	**5.22 ±2.92**	**35**	**2.65 ±1.24**	**3.9 ±1.79**	**72**	**3.15 ±1.1**	**4.58 ±1.7**
Total	**80**	**9.41 ±5.04**	**11.34 ±5.77**	**76**	**8.63 ±8.66**	**15.42 ±15.08**	**156**	**9.03 ±4.89**	**13.33 ±7.83**

Table 4-7. Impingement collection efficiency adjustment values obtained from Normandeau releases of dead fish onto the traveling screens at Units 1 and 2 of Merrimack Station, June 2005 through June 2007.

Sample Start Date	Unit 1 Percent (%) Efficiency	Unit 2 Percent (%) Efficiency
8/10/2005	75%	void [a]
8/17/2005	no sample [h]	74%
8/31/2005	53%	50%
9/28/2005	97%	73%
11/2/2005	88%	59%
12/7/2005	91%	85%
1/4/2006	85%	67%
2/1/2006	74%	18%
3/1/2006	82%	38%
4/5/2006	no sample [b]	25%
4/12/2006	86%	no sample [g]
5/3/2006	93%	no sample [b]
5/31/2006	82%	void [c]
7/5/2006	94%	59%
7/26/2006	62%	void [d]
8/30/2006	81%	81%
9/20/2006	no sample [b]	94%
10/18/2006	77%	78%
11/29/2006	81%	93%
12/27/2006	86%	15%
1/24/2007	84%	void [e]
2/21/2007	89%	82%
3/28/2007	62%	void [f]
5/2/2007	73%	no sample [b]
6/6/2007	60%	60%
6/20/2007	89%	41%

[a] Efficiency test interupted by pump shut down. Voided
[b] No sample conducted due to Unit offline.
[c] EENC 06-061 - Observation of screenwash conducted without sample basket in place - sample voided.
[d] EENC 07-015 - Based on actions observed on 5/31/06 the results of this test suggest that screenwash was again conducted without basket in place.
[e] EENC 07-009 - Miscommunication between NAI and PSNH led to fish release onto north screen at U2 which was offline at that time.
[f] EENC 07-010 - Collection basket was allowed to overflow by PSNH employee during screenwash process
[g] Unit 2 sample conducted during previous week
[h] Unit 1sample conducted during previous week

Table 4-8. Monthly estimates of impingement abundance for each fish species at Merrimack Station (Units 1 and 2 combined) based on 24-hour collections adjusted for CWIS flows and screen collection efficiency, June 2005 through June 2007.

Species	Jun 05	Jul 05	Aug 05	Sep 05	Oct 05	Nov 05	Dec 05	Jan 06	Feb 06	Mar 06	Apr 06	May 06	Jun 06	Jul 06	Aug 06	Sep 06	Oct 06	Nov 06	Dec 06	Jan 07	Feb 07	Mar 07	Apr 07	May 07	Jun 07	Total	% of Total
American eel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	2	0	0	0	17	0.2
Banded sunfish	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	12	0	35	0.4
Black crappie	0	0	0	41	91	63	8	0	0	0	39	38	26	0	0	0	27	37	30	7	0	0	2	36	0	447	5.6
Bluegill	3	41	19	20	35	19	34	0	0	33	6	194	4,089	157	9	11	39	67	59	15	0	13	4	65	60	4,993	62.4
Brown bullhead	0	9	0	0	0	0	0	0	0	0	0	0	15	2	0	0	0	0	0	0	0	0	0	0	10	37	0.5
Chain pickerel	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0.2
Fallfish	0	0	0	0	0	0	5	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	0.7
Golden shiner	3	3	0	0	0	8	0	22	0	0	39	0	21	14	0	0	0	0	0	0	0	34	3	7	0	152	1.9
Largemouth bass	0	9	0	0	78	63	16	0	0	0	0	0	31	17	0	0	45	47	11	4	29	4	0	0	0	356	4.4
Margined madtom	0	9	0	0	11	0	0	16	0	43	1	0	40	2	0	0	0	0	0	0	0	0	44	24	26	216	2.7
Pumpkinseed	0	0	0	0	71	15	17	0	0	8	0	57	52	0	0	0	13	9	0	0	0	0	0	12	12	268	3.3
Rainbow smelt	0	0	0	0	0	3	75	22	70	0	0	0	0	0	0	0	0	0	1	15	0	0	0	0	0	186	2.3
Redbreast sunfish	0	0	0	13	0	0	0	0	0	7	1	7	4	0	0	0	0	0	0	0	0	0	0	0	13	45	0.6
Rock bass	3	3	0	0	0	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0.2
Smallmouth bass	3	12	10	0	0	7	8	0	8	9	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	64	0.8
Spottail shiner	0	28	0	0	0	41	285	54	70	28	0	0	0	0	0	0	9	0	0	16	2	0	1	12	59	605	7.6
Sunfish family	0	19	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0.4
Tessellated darter	0	9	0	0	0	0	0	0	0	47	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0.7
White perch	0	0	0	0	0	5	4	0	0	0	0	0	0	0	0	0	0	0	0	10	2	0	0	0	0	20	0.3
White sucker	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	10	21	0.3
Yellow bullhead	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	13	0	0	0	25	0.3
Yellow perch	0	0	0	0	0	17	119	32	15	81	0	10	23	0	0	0	0	0	0	0	0	0	3	7	29	335	4.2
All Species	11	143	29	88	286	244	581	214	163	256	115	307	4,300	215	17	11	134	161	102	67	48	66	57	174	220	8,007	100.0

Table 4-9. **Summary of percent (%) survival observed for live fish (golden shiner) released and impinged on the traveling screens at Unit 1 and Unit 2 of Merrimack Station. (Note: A blank cell in this table means no survival test was preformed on that date.)**

	UNIT 1			UNIT 2		
Date	% Survival	N (fish recaptured)	Standard Error (+/-)	% Survival	N (fish recaptured)	Standard Error (+/-)
2/9/2006	58.6	70	10.7			
3/9/2006				70.6	109	4.4
5/11/2006	66.7	26	9.5			
1/16/2007	48.7	160	4.9	86.0	176	4.9
2/26/2007	57.8	180	3.7	90.6	171	2.2
3/26/2007	57.5	152	5.5	100.0	126	5.1
4/10/2007	64.8	88	5.1	82.1	106	3.7
5/21/2007	42.2	73	6.8			
6/25/2007	40.4	24	16.5	20.2	8	23.0
7/30/2007	99.7	21	9.8	100.0	7	71.4

Table 4-10. Estimated total fish impingement survival for the existing traveling screens at Unit 1 and Unit 2 of Merrimack Station, if operated with a continuous wash cycle and if all impinged fish were alive when first impinged, June 2005 through June 2007.

Month	UNIT 1			UNIT 2			BOTH UNITS	
	Estimated Impingement *	Seasonal Survival Rate	Estimated # Surviving	Estimated Impingement *	Seasonal Survival Rate	Estimated # Surviving	Estimated Impingement *	Estimated # Surviving
Jun-05	3	70.2%	2	8	60.1%	5	11	7
Jul-05	40	70.2%	28	103	60.1%	62	143	90
Aug-05	0	70.2%	0	29	60.1%	17	29	17
Sep-05	25	62.7%	16	63	74.2%	47	88	62
Oct-05	110	62.7%	69	176	74.2%	131	286	200
Nov-05	97	62.7%	61	147	74.2%	109	244	170
Dec-05	371	55.0%	204	209	88.3%	185	581	389
Jan-06	112	55.0%	62	102	88.3%	90	214	152
Feb-06	23	55.0%	13	141	88.3%	125	163	137
Mar-06	200	57.8%	116	55	84.2%	46	256	162
Apr-06	31	57.8%	18	84	84.2%	71	115	89
May-06	231	57.8%	134	76	84.2%	64	307	198
Jun-06	359	70.2%	252	3,941	60.1%	2,369	4,300	2,621
Year 1	1,603	62.7%	973	5,133	70.6%	3,319	6,736	4,292
Jul-06	36	70.2%	25	179	60.1%	108	215	133
Aug-06	9	70.2%	6	9	60.1%	5	17	12
Sep-06	0	62.7%	0	11	74.2%	8	11	8
Oct-06	15	62.7%	9	119	74.2%	88	134	98
Nov-06	29	62.7%	18	132	74.2%	98	161	116
Dec-06	33	55.0%	18	68	88.3%	60	99	78
Jan-07	35	55.0%	19	32	88.3%	28	49	48
Feb-07	16	55.0%	9	32	88.3%	28	48	37
Mar-07	28	57.8%	16	37	84.2%	31	66	47
Apr-07	41	57.8%	24	16	84.2%	13	57	37
May-07	90	57.8%	52	85	84.2%	72	174	124
Jun-07	74	70.2%	52	146	60.1%	88	220	140
Year 2	406	58.7%	249	866	79.8%	628	1,251	877
Total	**2,009**	**59.6%**	**1,222**	**5,999**	**78.5%**	**3,947**	**7,987**	**5,169**

* Estimated numbers are adjusted for collection efficiency.

Table 4-11. Comparison of raw (24-hour or long-interval samples) and estimated total impingement (from 24-hour samples, unadjusted for screen collection efficiency) for each week or two-week period at Merrimack Station Unit 1 and Unit 2, June 2005 through June 2007.

	Unit 1				Unit 2			
Beginning Date of Sample Period (Wed-Tue)	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (Σ 24-h + 6 or 13-day Sample)	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (Σ 24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (24-h + 6 or 13-day Sample)
29 Jun05	1	13	10	14	3	7	24	10
6 Jul05	2	7	11	9	4	10	31	14
13 Jul05	1	4	4	5	5	6	23	11
20 Jul05	0	4	3	4	1	6	4	7
27 Jul05	1	2	4	3	0	3	0	3
3 Aug05	0	1	0	1	0	5	6	5
10 Aug05	0	1	0	1	2	6	11	8
17 Aug05	0	2	0	2	1	7	4	8
24 Aug05	0	0	0	0	0	0	0	0
31 Aug05	0	3	0	3	0	3	6	3
7 Sep05	0	6	3	6	2	5	8	7
14 Sep05	1	0	4	1	0	5	3	5
21 Sep05	0	3	6	3	1	2	13	3
28 Sep05	2	4	8	6	3	8	15	11
5 Oct05	0	27	5	27	1	30	12	31
12 Oct05		56	27	56		89	38	89
19 Oct05	6	10	40	16	10	30	43	40
26 Oct05	5	8	33	13	2	3	30	5
2 Nov05	4	23	19	27	7	11	34	18
9 Nov05	1	5	3	6	2	4	11	6
16 Nov05	0	9	0	9	1	5	19	6
23 Nov05		24	58	24		7	26	7
30 Nov05		22	153	22	2	5	68	7
7 Dec05	39	27	164	66	20	27	92	47
14 Dec05	1	8	10	9	4	4	16	8
21 Dec05 & 28 Dec05	2	51	15	53	0	34	7	34
4 Jan06 & 11 Jan06	0	34	41	34	1	30	34	31
18 Jan06 & 25 Jan06	7	26	54	33	4	13	31	17
1 Feb06 & 8 Feb06	0	6	0	6	0	12	13	12
15 Feb06 & 22 Feb06	0	10	18	10	2	4	12	6
1 Mar06 & 8 Mar06	3	26	80	29	0	14	13	14
15 Mar06	9	1	42	10	2	6	8	8
22 Mar06	2	3	26	5	0	1	0	1
29 Mar06	6	13	24	19	0	9	0	9
5 Apr06	0	1	6	1	0	4	6	4

(continued)

Table 4-11. (Continued)

Beginning Date of Sample Period (Wed-Tue)	Unit 1				Unit 2			
	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (Σ 24-h + 6 or 13-day Sample)	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (Σ 24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (24-h + 6 or 13-day Sample)
12 Apr06	2	18	11	20	2	0	14	2
19 Apr06	1	6	4	7		0	1	0
26 Apr06	0	1	0	1		0	0	0
3 May06	0	4	1	4		0	0	0
10 May06	1	27	60	28		0	0	0
17 May06	19	35	110	54		30	6	30
24 May06		26	34	26	2	79	11	81
31 May06	6	39	108	45	1	73	90	74
7 Jun06	28	60	137	88	29	519	808	548
14 Jun06	9	26	42	35	263	123	930	386
21 Jun06		17	9	17	3	12	117	15
28 Jun06	2	2	17	4	34	22	152	56
Year 1 (29Jun05-28 Jun06)	**161**	**701**	**1,404**	**862**	**414**	**1,273**	**2,792**	**1,687**
5 Jul06	3	10	12	13	4	7	22	11
12 Jul06	0	6	0	6	2	10	17	12
19 Jul06	0	5	3	5	3	4	15	7
26 Jul06	1	0	4	1	1	1	4	2
2 Aug06	0	1	0	1	0	1	0	1
9 Aug06	0	3	3	3	0	2	3	2
16 Aug06	1	4	4	5	1	1	4	2
23 Aug06	0	0	0	0	0	1	0	1
30 Aug06	0	1	0	1	0	2	0	2
6 Sep06		0	0	0	0	1	0	1
13 Sep06		0	0	0	0	2	3	2
20 Sep06		0	0	0	1	0	3	1
27 Sep06		0	0	0		5	7	5
4 Oct06	0	3	0	3	1	3	13	4
11 Oct06	0	6	0	6	3	7	12	10
18 Oct06	0	4	3	4	0	12	12	12
25 Oct06	1	5	8	6	4	7	54	11
1 Nov06 & 8 Nov06	1	8	14	9	13	4	96	17
15 Nov06 & 22 Nov06	0	24	7	24	0	42	6	42
29 Nov06 & 6 Dec06	1	18	10	19	1	24	27	25
13 Dec06 & 20 Dec06	1	8	14	9	3	6	27	9
27 Dec06 & 3 Jan07	1	3	14	4	2	2	22	4
10 Jan07 & 17 Jan07	1	1	14	2	1	0	11	1

(continued)

Table 4-11. (Continued)

Beginning Date of Sample Period (Wed-Tue)	Unit 1				Unit 2			
	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (Σ 24-h + 6 or 13-day Sample)	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (Σ 24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (24-h + 6 or 13-day Sample)
24 Jan07 & 31 Jan07	1	1	8	2	1	2	6	3
7 Feb07 & 14 Feb07	0	1	7	1	0	0	12	0
21 Feb07 & 28 Feb07	1	5	8	6	2	2	15	4
7 Mar07 & 14 Mar07	0	4	13	4	0	3	9	3
21 Mar07	2	6	4	8		8	11	8
28 Mar07	0	13	9	13	2	7	11	9
4 Apr07	3	13	11	16	1	4	4	5
11 Apr07	0	7	0	7	0	4	3	4
18 Apr07		0	0	0		0	0	0
25 Apr07	0	11	9	11		0	0	0
2 May07	3	6	12	9		0	0	0
9 May07	0	6	0	6		0	0	0
16 May07	0	8	18	8		4	20	4
23 May07	6	2	24	8	6	8	29	14
30 May07	0	3	16	3	1	4	27	5
6 Jun07	5	13	23	18	7	7	34	14
13 Jun07	1	3	3	4	2	6	10	8
20 Jun07	0	3	2	3	1	4	10	5
27 Jun07	1		1	1	2		2	2
Year 2 (5 Jul06-27 Jun07)	**34**	**215**	**277**	**249**	**65**	**207**	**560**	**272**
Total	**195**	**916**	**1,681**	**1,111**	**479**	**1,480**	**3,352**	**1,959**

5.0 ADULT EQUIVALENCY

As requested by the EPA 308 letter, this section presents the monthly and annual numbers of adult equivalents for those fish species contributing to the upper 90% of the totals entrained (Table 5-1) and impinged (Table 5-2) at Merrimack Station.

White sucker exhibited the highest number of adult equivalents entrained at Merrimack Station (both Units combined) during 2006 (7,337 adult fish representing 55% of the total 2006 entrainment; Table 5-1), and larvae (PYSL) comprised all of white sucker entrainment. Unit 2 contributed 85% (6,253 adult fish) of white sucker adult equivalents entrained in 2006 at Merrimack Station. Members of the carp and minnow family exhibited the second highest proportion (33%) and number (4,335 adult fish) of adult equivalents entrained at Merrimack Station (both Units combined) during 2006 (Table 5-1). The entrainment of larvae (YSL and PYSL) comprised all of the carp and minnow family entrained during 2006, and Unit 2 contributing most (3,620 or 84%) to the combined entrainment at Merrimack Station. The sunfish family exhibited the third highest proportion (12%) and number (1,604 adult fish; Table 5-1) of adult equivalents entrained at Merrimack Station (both Units combined). Unit 1 entrained 62% of the sunfish family equivalent adults at Merrimack Station during 2006. Yellow perch exhibited the fourth highest proportion (0.1%) and number (22 adult fish) of adult equivalents entrained at Merrimack Station (both Units combined) during 2006 (Table 5-1); all were derived from the PYSL lifestage, and all were entrained at Unit 2.

Similar to 2006, white sucker exhibited the highest proportion (74%) and number (9,707) of adult equivalents entrained at Merrimack Station (both Units combined) during 2007 (Table 5-1). White sucker equivalent adults were entrained equally between Units 1 (4,844 or 50%) and 2 (4,864 or 50%) during 2007. Members of the carp and minnow family exhibited the second highest proportion (19%) and number (2,525 adult fish) of adult equivalents entrained at Merrimack Station (both Units combined) during 2007 (Table 5-1). Adult equivalents entrained for the carp and minnow family include contributions from both the egg and larval lifestages, with the majority (59%) of adult equivalents entrained at Unit 1 of Merrimack Station during 2007 (Table 5-1). The third highest proportion (6%) and number (777 adult fish) of adult equivalents entrained at Merrimack Station during 2007 was the sunfish family, with Unit 1 (50% and 389 adult fish) and Unit 2 (50% and 387 adult fish) contribuing equally to the combined adult equivalents entrained in that year (Table 5-1). Yellow perch exhibited the fourth highest proportion (1%) and number (195 adult fish) of adult equivalents entrained at Merrimack Station (both Units combined) during 2007, with 94% (184) of the total adult equivalents entrained for yellow perch occuring at Unit 1 (Table 5-1).

Spottail shiner exhibited the highest proportion (55%) and number (436) of adult equivalents impinged during the first year (late June 2005 through June 2006) of impingement at Merrimack Station (both Units combined and based on monthly abundance estimates adjusted for collection efficiency; Table 5-2). Impingement at Unit 1 accounted for 232 of the spottail shiner adult equivalents impinged (53%) and impingement at Unit 2 accounted for 204 of the adult equivalents impinged (47%) during the first year of impingement monitoring (Table 5-2). Young-of-year, Age 1+ and adult fish contributed to the adult equivalentsimpinged for spottail shiner during 2006. Bluegill exhibited the second highest proportion (17%) number 138 adult fish) of adult equivalents impinged at Merrimack Station during the first year, and most (69% or 95 adult fish) of the bluegill were impinged at Unit 2 (Table 5-2). Bluegill from the young-of-year and Age 1+, Age 2+ and adult age classes contributed to the adult equivalents impinged for 2006. Yellow perch exhibited the third highest proportion (14%) and number (110 adult fish) of adult equivalents impinged at Merrimack Station during 2006, with the majority of the adult equivalents impinged (97% or 107 adult fish) occurring at Unit 1 (Table 5-2). A total of 103 adult equivalent pumpkinseed representing (13%) of the total were impinged at Merrimack Station (both Units combined) during the first year, and 92% (94 adult fish) were impinged at Unit 1. Largemouth bass and black crappie exhibited 10 or fewer adult equivalents impinged at Merrimack Station (both Units combined) during the first sample year.

Bluegill were impinged in the highest proportion (57%) and abundance (135 adult fish) of adult equivalent fish at Merrimack Station (both Units combined and based on monthly abundance estimates adjusted for collection efficiency) during the second year (July 2006 through June 2007) of impingement sampling (Table 5-2). The bluegill adult equivalents due to impingement at Merrimack Station were represented by a comination of YOY, Age 1+, Age 2+ and older fish that had already reached adulthood. Unit 2 exhibited the highest proportion (62%) and number (84 adult fish) of adult equivalents from impingement compared to Unit 1 (51% and 48 adult fish) during the second year (Table 5-2). Spottail shiner exhibited the second highest proportion (18%) and number (43 adult fish) of adult equivalents impinged at Merrimack Station (both Units combined) during the second year (Table 5-2). Young of year spottail shiners were the only age group which contributed to the impingement losses for this species at Merrimack Station during the second year, and the majority (72% or 31 adult fish) were impinged at Unit 2. The annual numbers of adult equivalents due to impingement at Merrimack Station for yellow perch 13% or 31 adult fish), pumpkinseed (8% or 18 adult fish), and black crappie (0.4% or 1 adult fish) were all lower during the second year of sampling than observed for these species during the first year (Table 5-2). One more adult equivalent largemouth bass (10 adult fish) was impinged during the first year of the study than was during the second year (9 adult fish).

Table 5-3 presents a comparision of the relative contribution of impingement and entrainment to the adult equivalents at Merrimack Station for the two-year period of June 2005 through June 2007. Monthly values of adult equivalents for impinged fish (Table 5-2) were summed for the entire two year period to obtain the values presented in Table 5-3. To obtain the entrainment adult equivalents presented for the comparable time period as impingement in Table 5-3, it was assumed that entrainable eggs and larvae could be present in Hooksett Pool in any month from April through September based on the life histories of the species present, and that ichthyoplankton would not be found during the months of October through March. Weekly species-specific entrainment rates fron the sampled weeks were applied to Station flows for the missing weeks from April through September of each year to provide a set of entrainment adult equivalent losses for the comparable two year period of impingement sampling (i.e., June 2005 through June 2007). Also, for comparative purposes in Table 5-3, impinged fish species were pooled to represent the taxonomic groups defined by the entrainment data. Entrainment data for the family Cyprinidae is compared to the impingement for spottail shiner and entrainment data for the family Centrarchidae is compared to the impingement for bluegill, pumpkinseed and black crappie. These species were the dominant members of their respective families present in Merrimack Station impingement catches. Adult equivalent values for white sucker and yellow perch were available on a species level for both impingement and entrainment.

Adult equivalent values at Merrimack Station were greater for entrainment than impingement for each dominant species/family examined (Table 5-3) during the two year study (June 2005 through June 2007). Adult equivalent values for yellow perch were three times greater due to entrainment than impingement. Adult equivalent values for Cyprinidae and Centrarchidae were 23 and 11 times higher due to entrainment than impingement. White sucker showed the greatest difference with adult equivalent values due to entrainment 973 times greater than those values due to impingement.

5.1 Maximum Capacity Operation

The Unit 1 CWIS at Merrimack Station has two intake pumps, each with a design intake capacity of 29,500 gpm (65.73 cfs), resulting in a combined design intake capacity for both pumps at Unit 1 of 59,000 gpm (131.45 cfs). The Unit 2 CWIS also has two intake pumps, each with a design intake capacity of 70,000 gpm (155.96 cfs), and a combined design intake capacity for both circulating water pumps at Unit 2 of 140,000 gpm (311.92 cfs). When converted to millions of cubic meters (MCM), the maximum daily capacity for Unit 1 was 0.32 MCM and for Unit 2 was 0.76 MCM. Table 5-4 presents the predicted monthly impingement, with and without the correction for collection efficiency for Units 1 and 2 of Merrimack Station using the maximum (design) flow for each Unit. Had the Unit 1 and Unit 2 CWISs at Merrimack Station been operating at maximum (design) intake flows continuously throughout the entire period of June 2005 through June 2007, an estimated 9,806 fish would have been impinged in this period (both Units combined), when adjusted for collection efficiency (Table 5-4). The predicted number of 9,806 fish impinged if the plant CWISs operated at design flows during the two year study at Merrimack Station compares to an estimated total impingement of 8,007 fish based on the actual intake flows during the same period (Table 4-5), representing an 18% reduction in impingement abundance. Based on the predicted annual impingement abundance using design flows, Unit 1 could have impinged 2,139 fish in the first year and 509 fish in the second year of the study (Table 5-4) compared to the actual impingement abundance of 1,603 fish and 405 fish, respectively (Table 4-5). Based on the predicted annual impingement abundance using design flows, Unit 2 could have impinged 6,016 fish in the first year and 1,133 fish in the second year of the study (Table 5-4) compared to the actual impingement abundance of 5,133 fish and 866 fish, respectively (Table 4-5). The actual operation flows observed at Merrimack Station during that two year period resulted in a reduction in the number of impinged fish at Unit 1 of 24.4% and at Unit 2 of 16.1%.

The predominant species of fish impinged (90% of total individuals) at Merrimack Station were black crappie, bluegill, largemouth bass, pumpkinseed, spottail shiner and yellow perch, and the adult equivalent values for these six species are presented for the two years of impingement sampling at Merrimack Station based on design intake flows (Table 5-5). An adult equivalent of 331 bluegill could have been impinged during the two years of sampling at Merrimack Station (both Units combined) if Unit 1 and Unit 2 each operated at design intake flows on every day throughout the two year period. Based on the predicted adult equivalent values for this theoretical maximum intake flow scenario, bluegill would have had the greatest adult equivalents due to impingement during the second year of sampling (165 fish), while spottail shiner would have had the greatest loss of adult equivalents due to impingement during the first year of sampling (550 fish; Table 5-5). The predicted number of 8,541 bluegill, spottail shiner, black crappie, largemouth bass, yellow perch and pumpkinseed impinged if the plant CWISs operated at design flows during the two year study at Merrimack Station (Table 5-5) is reduced to 1,305 adult equivalent fish lost for both Units combined (Table 5-5). The predicted equivalent adult fish lost of 1,305 fish (Table 5-5) impinged if the plant CWISs operated at design flows during the two year study at Merrimack Station compares to an estimated adult equivalent value of 1,033 fish (bluegill, spottail shiner, black crappie, largemouth bass, yellow perch and pumpkinseed) based on the actual intake flows during the same period (Table 5-2), representing a 21% reduction in adult equivalent losses. Therefore, by operating at less than design intake flows, Merrimack Station prevented the impingement losses of 270 adult fish from Hooksett Pool over the two-year study period (Table 5-5).

Table 5-6 presents the predicted monthly entrainment abundance for Units 1 and 2 of Merrimack Station based on the maximum (design) pumping capacity for each Unit applies continuously during the entire sampling period. Had Merrimack Station been withdrawing cooling water continuously at maximum capacity during the time period of 21 May 2006 through 10 September 2006, an estimated 3,194,874 larvae and 37,996 eggs would have been entrained (Table 5-6). Similarly, a total of 3,058,010 larvae and 22,492 eggs would have been entrained during the time period of 2 April 2007 through 25 June 2007 had Merrimack Station been operating at design intake flows (Table 5-6). Entrainment abundance based on actual intake flows at both Units combined during the 2006 period for Merrimack Station were a total of 2,786,283 larvae (Table 3-6) and 33,989 eggs (Table 3-8). Entrainment abundance based on actual intake flows at both Units combined during the 2007 period for Merrimack Station were a total of 2,449,268 larvae (Table 3-6) and 15,797 eggs (Table 3-8). Compare to design intake flows, the entrainment abundance for the actual operating flows at Merrimack Station (both Units combined) resulted in a reduction of potential entrainment abundance for 2006 of 13%, and for the 2007 period a reduction of 20 %.

The predominant fish species entrained (90% of total individuals) at Merrimack Station were white sucker, family Centrarchidae, family Cyprinidae, and yellow perch (Table 3-3). The annual total entrainment abundance and adult equivalence losses for these two species and two families are presented for the two years of entrainment sampling at Merrimack Station based on design intake flows (Table 5-7). Assuming that Merrimack Station was operating at maximum intake flows during the 2006 entrainment season, an adult equivalent of 4,850 cyprinids, 2,264 centrarchids (bluegill and pumpkinseed), 8,354 white sucker and 23 yellow perch would have been lost from Hooksett Pool due to entrainment at Units 1 and 2 combined (Table 5-7). The actual CWIS flows for Merrimack Station during the period of 21 May 2006 through 10 September 2006 reduced the loss of adult equivalents (from maximum capacity numbers) due to entrainment by 10.6% for cyprinids, 29.2% for centrarchids, 12.2% for white sucker, and 4.3% for yellow perch. Assuming that Merrimack Station was operating at maximum capacity during the 2007 entrainment season, an adult equivalent of 2,967 cyprinids, 1,198 centrarchids (bluegill and pumpkinseed), 11,774 white sucker and 238 yellow perch would have been lost from Hooksett Pool due to entrainment at Units 1 and 2 combined (Table 5-7). The actual CWIS flows for Merrimack Station during the period of 2 April 2007 through 25 June 2007 reduced the loss of adult equivalents (from maximum capacity numbers) by 14.9% for cyprinids, 35.1% for centrarchids, 17.6% for white sucker, and 18.1% for yellow perch.

Table 5-1. Entrainment abundance and the corresponding adult equivalent number of fish entrained at Merrimack Station (monthly and annual values) sorted by species, year and Unit, May 2006 through June 2007. (Note: a blank cell in this table means no sample was taken).

			2006						2007					
			Unit				Both Units Combined		Unit				Both Units Combined	
			Unit 1		Unit 2				Unit 1		Unit 2			
Month	Species	Stage	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate
April	Carp and minnow family	Eggs							0	0	0	0	0	0
		Larvae							0	0	0	0	0	0
		YOY/Older							0	0	0	0	0	0
		Total							**0**	**0**	**0**	**0**	**0**	**0**
	Sunfish family	Eggs							0	0	0	0	0	0
		Larvae							0	0	42,083	174	42,083	174
		YOY/Older							0	0	0	0	0	0
		Total							**0**	**0**	**42,083**	**174**	**42,083**	**174**
	White sucker	Eggs							0	0	0	0	0	0
		Larvae							0	0	17,641	112	17,641	112
		YOY/Older							0	0	0	0	0	0
		Total							**0**	**0**	**17,641**	**112**	**17,641**	**112**
	Yellow perch	Eggs							0	0	0	0	0	0
		Larvae							0	0	0	0	0	0
		YOY/Older							0	0	0	0	0	0
		Total							**0**	**0**	**0**	**0**	**0**	**0**
May	Carp and minnow family	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0	0	0	19,478	84	19,478	84
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**19,478**	**84**	**19,478**	**84**
	Sunfish family	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	24,773	102	24,773	102	0	0	2,122	9	2,122	9
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**24,773**	**102**	**24,773**	**102**	**0**	**0**	**2,122**	**9**	**2,122**	**9**
	White sucker	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	692,860	4,382	692,860	4,382	137,434	869	44,126	279	181,560	1,148
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**692,860**	**4,382**	**692,860**	**4,382**	**137,434**	**869**	**44,126**	**279**	**181,560**	**1,148**
	Yellow perch	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	24,848	11	24,848	11	409,742	180	0	0	409,742	180
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**24,848**	**11**	**24,848**	**11**	**409,742**	**180**	**0**	**0**	**409,742**	**180**

(continued)

Table 5-1. (Continued)

			2006						2007					
			Unit				Both Units Combined		Unit				Both Units Combined	
			Unit 1		Unit 2				Unit 1		Unit 2			
Month	Species	Stage	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate
June	Carp and minnow family	Eggs	0	0	0	0	0	0	7,899	4	0	0	7,899	4
		Larvae	78,904	340	815,041	3,513	893,945	3,853	343,337	1,480	221,918	957	565,255	2,436
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**78,904**	**340**	**815,041**	**3,513**	**893,945**	**3,853**	**351,235**	**1,484**	**221,918**	**957**	**573,154**	**2,441**
	Sunfish family	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	71,068	293	123,435	510	194,503	803	94,325	389	49,566	205	143,892	594
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**71,068**	**293**	**123,435**	**510**	**194,503**	**803**	**94,325**	**389**	**49,566**	**205**	**143,892**	**594**
	White sucker	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	171,333	1,084	271,111	1,715	442,444	2,798	528,370	3,342	393,359	2,488	921,728	5,830
		YOY/Older	0	0	0	0	0	0	7,899	633	24,783	1,985	32,682	2,618
		Total	**171,333**	**1,084**	**271,111**	**1,715**	**442,444**	**2,798**	**536,269**	**3,974**	**418,142**	**4,473**	**954,410**	**8,448**
	Yellow perch	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	24,823	11	24,823	11	8,999	4	25,009	11	34,008	15
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**24,823**	**11**	**24,823**	**11**	**8,999**	**4**	**25,009**	**11**	**34,008**	**15**
July	Carp and minnow family	Eggs	0	0	0	0	0	0						
		Larvae	77,868	336	24,767	107	102,635	442						
		YOY/Older	0	0	0	0	0	0						
		Total	**77,868**	**336**	**24,767**	**107**	**102,635**	**442**						
	Sunfish family	Eggs	0	0	0	0	0	0						
		Larvae	160,178	661	0	0	160,178	661						
		YOY/Older	0	0	0	0	0	0						
		Total	**160,178**	**661**	**0**	**0**	**160,178**	**661**						
	White sucker	Eggs	0	0	0	0	0	0						
		Larvae	0	0	24,733	156	24,733	156						
		YOY/Older	0	0	0	0	0	0						
		Total	**0**	**0**	**24,733**	**156**	**24,733**	**156**						
	Yellow perch	Eggs	0	0	0	0	0	0						
		Larvae	0	0	0	0	0	0						
		YOY/Older	0	0	0	0	0	0						
		Total	**0**	**0**	**0**	**0**	**0**	**0**						

(continued)

Table 5-1. (Continued)

			2006						2007					
			Unit				Both Units Combined		Unit				Both Units Combined	
			Unit 1		Unit 2				Unit 1		Unit 2			
Month	Species	Stage	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate
August	Carp and minnow family	Eggs	0	0	0	0	0	0						
		Larvae	9,142	39	0	0	9,142	39						
		YOY/Older	0	0	0	0	0	0						
		Total	**9,142**	**39**	**0**	**0**	**9,142**	**39**						
	Sunfish family	Eggs	0	0	0	0	0	0						
		Larvae	9,021	37	0	0	9,021	37						
		YOY/Older	0	0	0	0	0	0						
		Total	**9,021**	**37**	**0**	**0**	**9,021**	**37**						
	White sucker	Eggs	0	0	0	0	0	0						
		Larvae	0	0	0	0	0	0						
		YOY/Older	0	0	0	0	0	0						
		Total	**0**	**0**	**0**	**0**	**0**	**0**						
	Yellow perch	Eggs	0	0	0	0	0	0						
		Larvae	0	0	0	0	0	0						
		YOY/Older	0	0	0	0	0	0						
		Total	**0**	**0**	**0**	**0**	**0**	**0**						
September	Carp and minnow family	Eggs			0	0	0	0						
		Larvae			0	0	0	0						
		YOY/Older			0	0	0	0						
		Total			0	0	0	0						
	Sunfish family	Eggs			0	0	0	0						
		Larvae			0	0	0	0						
		YOY/Older			0	0	0	0						
		Total			0	0	0	0						
	White sucker	Eggs			0	0	0	0						
		Larvae			0	0	0	0						
		YOY/Older			0	0	0	0						
		Total			0	0	0	0						
	Yellow perch	Eggs			0	0	0	0						
		Larvae			0	0	0	0						
		YOY/Older			0	0	0	0						
		Total			0	0	0	0						

(continued)

Table 5-1. (Continued)

			2006						2007					
			Unit				Both Units Combined		Unit				Both Units Combined	
			Unit 1		Unit 2				Unit 1		Unit 2			
Month	Species	Stage	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate
Total	Carp and minnow family	Eggs	0	0	0	0	0	0	7,899	4	0	0	7,899	4
		Larvae	165,914	715	839,808	3,620	1005722	4,335	343,337	1,480	241,396	1,040	584,733	2,520
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**165,914**	**715**	**839,808**	**3,620**	**1005722**	**4,335**	**351,235**	**1,484**	**241,396**	**1,040**	**592,631**	**2,525**
	Sunfish family	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	240,268	992	148,208	612	388,476	1,604	94,325	389	93,772	387	188,097	777
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**240,268**	**992**	**148,208**	**612**	**388,476**	**1,604**	**94,325**	**389**	**93,772**	**387**	**188,097**	**777**
	White sucker	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	171,333	1,084	988,703	6,253	1160036	7,337	665,804	4,211	455,125	2,878	1120929	7,089
		YOY/Older	0	0	0	0	0	0	7,899	633	24,783	1,985	32,682	2,618
		Total	**171,333**	**1,084**	**988,703**	**6,253**	**1160036**	**7,337**	**673,703**	**4,844**	**479,908**	**4,864**	**1153611**	**9,707**
	Yellow perch	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	49,671	22	49,671	22	418,741	184	25,009	11	443,750	195
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**49,671**	**22**	**49,671**	**22**	**418,741**	**184**	**25,009**	**11**	**443,750**	**195**

Table 5-2. Impingement abundance and the corresponding adult equivalent number of fish impinged at Merrimack Station (monthly and annual values) sorted by species, year and Unit, June 2005 through June 2007. (Note: a blank cell in this table means no sample was taken).

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jun-05	Bluegill	YOY	0	0	3	<1	3	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**3**	**<1**	**3**	**<1**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jul-05	Bluegill	YOY	9	<1	31	<1	41	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**9**	**<1**	**31**	**<1**	**41**	**<1**
	Spottail shiner	YOY	9	4	19	8	28	12
		Age 1+	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	9	4	19	8	28	12
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	9	<1	9	<1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	9	<1	9	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Aug-05	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	9	9	9	9
		Adult	0	0	10	10	10	10
		Total	**0**	**0**	**19**	**19**	**19**	**19**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Sep-05	Bluegill	YOY	6	<1	0	0	6	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	14	14	14	14
		Total	**6**	**<1**	**14**	**14**	**20**	**14**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	6	<1	35	<1	41	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**6**	**<1**	**35**	**<1**	**41**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Oct-05	Bluegill	YOY	13	<1	11	<1	24	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	11	10	11	10
		Adult	0	0	0	0	0	0
		Total	**13**	**<1**	**22**	**10**	**35**	**10**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	27	<1	64	<1	91	1
		Age 1+	0	0	0	0	0	0
		Adult	**0**	**0**	**0**	**0**	**0**	**0**
		Total	**27**	**<1**	**64**	**<1**	**91**	**1**
	Largemouth bass	YOY	10	1	67	3	78	4
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**10**	**1**	**67**	**3**	**78**	**4**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	10	1	11	2	21	3
		Age 1+	2	1	0	0	2	1
		Adult	48	48	0	0	48	48
		Total	**60**	**50**	**11**	**2**	**71**	**51**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Nov-05	Bluegill	YOY	6	<1	8	<1	14	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	3	3	0	0	3	3
		Adult	2	2	0	0	2	2
		Total	**11**	**5**	**8**	**<1**	**19**	**5**
	Spottail shiner	YOY	2	1	5	2	6	3
		Age 1+	0	0	0	0	0	0
		Adult	35	35	0	0	35	35
		Total	**36**	**35**	**5**	**2**	**41**	**38**
	Black crappie	YOY	0	0	63	<1	63	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**63**	**<1**	**63**	**<1**
	Largemouth bass	YOY	6	<1	49	2	55	3
		Age 1+	0	0	8	1	8	1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**6**	**<1**	**58**	**3**	**63**	**3**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	14	3	0	0	14	3
		Age 3+	0	0	0	0	0	0
		Adult	3	3	0	0	3	3
		Total	**17**	**6**	**0**	**0**	**17**	**6**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	8	3	0	0	8	3
		Adult	8	8	0	0	8	8
		Total	**15**	**10**	**0**	**0**	**15**	**10**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Dec-05	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	25	23	0	0	25	23
		Adult	9	9	0	0	9	9
		Total	**34**	**32**	**0**	**0**	**34**	**32**
	Spottail shiner	YOY	9	4	20	9	29	12
		Age 1+	0	0	8	7	8	7
		Adult	175	175	74	74	249	249
		Total	**183**	**178**	**102**	**89**	**285**	**268**
	Black crappie	YOY	0	0	8	<1	8	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**8**	**<1**	**8**	**<1**
	Largemouth bass	YOY	0	0	8	<1	8	<1
		Age 1+	0	0	8	1	8	1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**16**	**1**	**16**	**1**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	81	16	8	2	90	18
		Age 3+	0	0	0	0	0	0
		Adult	29	29	0	0	29	29
		Total	**110**	**45**	**8**	**2**	**119**	**47**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	9	3	0	0	9	3
		Adult	9	9	0	0	9	9
		Total	**17**	**12**	**0**	**0**	**17**	**12**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jan-06	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Spottail shiner	YOY	32	14	0	0	32	14
		Age 1+	0	0	0	0	0	0
		Adult	0	0	22	22	22	22
		Total	**32**	**14**	**22**	**22**	**54**	**36**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	16	3	0	0	16	3
		Age 3+	16	7	0	0	16	7
		Adult	0	0	0	0	0	0
		Total	**32**	**11**	**0**	**0**	**32**	**11**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Feb-06	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	70	70	70	70
		Total	**0**	**0**	**70**	**70**	**70**	**70**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	8	2	0	0	8	2
		Age 3+	8	3	0	0	8	3
		Adult	0	0	0	0	0	0
		Total	**15**	**5**	**0**	**0**	**15**	**5**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Mar-06	Bluegill	YOY	33	<1	0	0	33	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**33**	**<1**	**0**	**0**	**33**	**<1**
	Spottail shiner	YOY	0	0	28	12	28	12
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**28**	**12**	**28**	**12**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	26	3	0	0	26	3
		Age 2+	21	4	0	0	21	4
		Age 3+	21	10	0	0	21	10
		Adult	13	13	0	0	13	13
		Total	**81**	**30**	**0**	**0**	**81**	**30**
	Pumpkinseed	YOY	8	1	0	0	8	1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**8**	**1**	**0**	**0**	**8**	**1**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Apr-06	Bluegill	YOY	1	<1	5	<1	6	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**1**	**<1**	**5**	**<1**	**6**	**<1**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	0	0	39	<1	39	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**39**	**<1**	**39**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
May-06	Bluegill	YOY	135	2	59	1	194	2
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**135**	**2**	**59**	**1**	**194**	**2**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	22	<1	16	<1	38	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**22**	**<1**	**16**	**<1**	**38**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	10	10	0	0	10	10
		Total	**10**	**10**	**0**	**0**	**10**	**10**
	Pumpkinseed	YOY	19	3	0	0	19	3
		Age 1+	29	10	0	0	29	10
		Adult	10	10	0	0	10	10
		Total	**57**	**22**	**0**	**0**	**57**	**22**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jun-06	Bluegill	YOY	319	4	3757	43	4077	46
		Age 1+	0	0	12	8	12	8
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**319**	**4**	**3769**	**51**	**4089**	**55**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	4	<1	22	<1	26	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**4**	**<1**	**22**	**<1**	**26**	**<1**
	Largemouth bass	YOY	0	0	31	2	31	2
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**31**	**2**	**31**	**2**
	Yellow Perch	YOY	0	0	12	<1	12	<1
		Age 1+	0	0	10	1	10	1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**23**	**1**	**23**	**1**
	Pumpkinseed	YOY	0	0	52	7	52	7
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**52**	**7**	**52**	**7**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Year 1	Bluegill	YOY	523	6	3875	44	4397	50
		Age 1+	0	0	12	8	12	8
		Age 2+	29	26	20	19	49	45
		Adult	10	10	24	24	34	34
		Total	**562**	**43**	**3931**	**95**	**4492**	**138**
	Spottail shiner	YOY	52	22	72	31	123	54
		Age 1+	0	0	8	7	8	7
		Adult	209	209	166	166	375	375
		Total	**261**	**232**	**246**	**204**	**507**	**436**
	Black crappie	YOY	58	<1	248	2	307	2
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**58**	**<1**	**248**	**2**	**307**	**2**
	Largemouth bass	YOY	16	1	165	8	181	9
		Age 1+	0	0	16	1	16	1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**16**	**1**	**182**	**9**	**198**	**10**
	Yellow Perch	YOY	0	0	12	<1	12	<1
		Age 1+	26	3	10	1	36	4
		Age 2+	140	28	8	2	149	30
		Age 3+	45	21	0	0	45	21
		Adult	55	55	0	0	55	55
		Total	**266**	**107**	**31**	**3**	**297**	**110**
	Pumpkinseed	YOY	37	5	64	8	101	13
		Age 1+	47	16	0	0	47	16
		Adult	74	74	0	0	74	74
		Total	**158**	**94**	**64**	**8**	**222**	**103**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jul-06	Bluegill	YOY	23	<1	134	2	157	2
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**23**	**<1**	**134**	**2**	**157**	**2**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	17	1	17	1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**17**	**1**	**17**	**1**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Aug-06	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	9	9	0	0	9	9
		Total	**9**	**9**	**0**	**0**	**9**	**9**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Sep-06	Bluegill	YOY	0	0	11	<1	11	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**11**	**<1**	**11**	**<1**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Oct-06	Bluegill	YOY	0	0	21	<1	21	<1
		Age 1+	0	0	11	8	11	8
		Age 2+	0	0	4	3	4	3
		Adult	0	0	4	4	4	4
		Total	**0**	**0**	**39**	**15**	**39**	**15**
	Spottail shiner	YOY	9	4	0	0	9	4
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**9**	**4**	**0**	**0**	**9**	**4**
	Black crappie	YOY	6	<1	22	<1	27	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**6**	**<1**	**22**	**<1**	**27**	**<1**
	Largemouth bass	YOY	0	0	37	2	37	2
		Age 1+	0	0	8	1	8	1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**45**	**2**	**45**	**2**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	9	1	9	1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	4	4	4	4
		Total	**0**	**0**	**13**	**5**	**13**	**5**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Nov-06	Bluegill	YOY	0	0	9	<1	9	<1
		Age 1+	0	0	28	20	28	20
		Age 2+	0	0	9	9	9	9
		Adult	10	10	9	9	20	20
		Total	**10**	**10**	**57**	**38**	**67**	**48**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	18	<1	19	<1	37	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**18**	**<1**	**19**	**<1**	**37**	**<1**
	Largemouth bass	YOY	0	0	28	1	28	1
		Age 1+	0	0	19	2	19	2
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**47**	**3**	**47**	**3**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	9	9	9	9
		Total	**0**	**0**	**9**	**9**	**9**	**9**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Dec-06	Bluegill	YOY	0	0	26	<1	26	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	16	15	13	12	29	27
		Adult	4	4	1	1	4	4
		Total	**20**	**18**	**40**	**13**	**59**	**31**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	13	<1	17	<1	30	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**13**	**<1**	**17**	**<1**	**30**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	11	1	11	1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**11**	**1**	**11**	**1**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jan-07	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	15	15	15	15
		Total	**0**	**0**	**15**	**15**	**15**	**15**
	Spottail shiner	YOY	16	7	0	0	16	7
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**16**	**7**	**0**	**0**	**16**	**7**
	Black crappie	YOY	4	<1	4	<1	7	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**4**	**<1**	**4**	**<1**	**7**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	4	<1	4	<1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**4**	**<1**	**4**	**<1**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Feb-07	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Spottail shiner	YOY	2	1	0	0	2	1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**2**	**1**	**0**	**0**	**2**	**1**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	14	1	15	1	29	1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**14**	**1**	**15**	**1**	**29**	**1**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Mar-07	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	13	12	0	0	13	12
		Adult	0	0	0	0	0	0
		Total	**13**	**12**	**0**	**0**	**13**	**12**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	2	<1	2	<1	4	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**2**	**<1**	**2**	**<1**	**4**	**<1**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Apr-07	Bluegill	YOY	3	<1	2	<1	4	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**3**	**<1**	**2**	**<1**	**4**	**<1**
	Spottail shiner	YOY	0	0	1	<1	1	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**1**	**<1**	**1**	**<1**
	Black crappie	YOY	0	0	2	<1	2	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**2**	**<1**	**2**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	3	1	0	0	3	1
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**3**	**1**	**0**	**0**	**3**	**1**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
May-07	Bluegill	YOY	41	<1	24	<1	65	1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**41**	**<1**	**24**	**<1**	**65**	**1**
	Spottail shiner	YOY	0	0	12	5	12	5
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**12**	**5**	**12**	**5**
	Black crappie	YOY	0	0	36	<1	36	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**36**	**<1**	**36**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	7	1	0	0	7	1
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**7**	**1**	**0**	**0**	**7**	**1**
	Pumpkinseed	YOY	12	2	0	0	12	2
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**12**	**2**	**0**	**0**	**12**	**2**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jun-07	Bluegill	YOY	48	1	12	<1	60	1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**48**	**1**	**12**	**<1**	**60**	**1**
	Spottail shiner	YOY	0	0	59	26	59	26
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**59**	**26**	**59**	**26**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	29	29	29	29
		Total	**0**	**0**	**29**	**29**	**29**	**29**
	Pumpkinseed	YOY	12	2	0	0	12	2
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**12**	**2**	**0**	**0**	**12**	**2**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Year 2	Bluegill	YOY	115	1	239	3	354	4
		Age 1+	0	0	40	28	40	28
		Age 2+	29	27	26	24	56	51
		Adult	23	23	29	29	52	52
		Total	**167**	**51**	**334**	**84**	**501**	**135**
	Spottail shiner	YOY	26	11	72	31	98	43
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**26**	**11**	**72**	**31**	**98**	**43**
	Black crappie	YOY	41	<1	100	1	140	1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**41**	**<1**	**100**	**1**	**140**	**1**
	Largemouth bass	YOY	16	1	100	5	116	6
		Age 1+	0	0	42	4	42	4
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**16**	**1**	**141**	**8**	**158**	**9**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	10	2	0	0	10	2
		Age 3+	0	0	0	0	0	0
		Adult	0	0	29	29	29	29
		Total	**10**	**2**	**29**	**29**	**39**	**31**
	Pumpkinseed	YOY	24	3	9	1	33	4
		Age 1+	0	0	0	0	0	0
		Adult	0	0	13	13	13	13
		Total	**24**	**3**	**23**	**15**	**46**	**18**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Total	Bluegill	YOY	638	7	4113	47	4751	54
		Age 1+	0	0	52	36	52	36
		Age 2+	58	54	46	43	104	97
		Adult	33	33	53	53	86	86
		Total	**729**	**94**	**4264**	**178**	**4993**	**272**
	Spottail shiner	YOY	78	34	143	62	221	96
		Age 1+	0	0	8	7	8	7
		Adult	209	209	166	166	375	375
		Total	**287**	**243**	**317**	**235**	**605**	**478**
	Black crappie	YOY	99	1	348	3	447	3
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**99**	**1**	**348**	**3**	**447**	**3**
	Largemouth bass	YOY	32	2	265	13	297	14
		Age 1+	0	0	58	5	58	5
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**32**	**2**	**323**	**18**	**356**	**19**
	Yellow Perch	YOY	0	0	12	<1	12	<1
		Age 1+	26	3	10	1	36	4
		Age 2+	150	30	8	2	158	32
		Age 3+	45	21	0	0	45	21
		Adult	55	55	29	29	84	84
		Total	**275**	**109**	**60**	**32**	**335**	**141**
	Pumpkinseed	YOY	61	8	73	10	133	18
		Age 1+	47	16	0	0	47	16
		Adult	74	74	13	13	87	87
		Total	**182**	**97**	**86**	**23**	**268**	**120**

*Annual totals may differ slightly from those presented in Table 4-8 due to rounding differences from the application of length-at-age data.

Table 5-3. Adult equivalence losses of fish species impinged or entrained at Units 1 and 2 of Merrimack Station for the June 2005 to June 2007 time period.

Unit	Taxon	Impingement (I)	Entrainment (E)	Ratio of AE losses (E:I)
Unit 1	White sucker	11	7,328	666:1
	Yellow perch	109	323	3:1
	Cyprinidae*	243	2,967	12:1
	Centrarchidae*	192	2,424	13:1
Unit 2	White sucker	10	13,111	1311:1
	Yellow perch	32	41	1:1
	Cyprinidae*	235	8,284	32:1
	Centrarchidae*	204	1,688	8:1
Both Units Combined	White sucker	21	20,439	973:1
	Yellow perch	141	366	3:1
	Cyprinidae*	478	11,251	23:1
	Centrarchidae*	396	4,112	10:1

*Cyprinidae represented by spottail shiner and Centrchidae represented by bluegill, pumpkinseed and black crappie for impingement adult equivalence.

Table 5-4. Predicted monthly total impingement abundance of fish based on design intake flows at Merrimack Station Units 1 and 2, and for both Units combined, from June 2005 through June 2007. Impingement data is presented as Raw counts (Raw) in 24-hour samples, impingement abundance estimates (I) based on the product of 24-hour sample density and design CWIS volumes, and adjusted impingement abundance estimates (Adj-I) representing the abundance values (I) expanded for screen collection efficiency. Note: design (maximum) daily CWIS flows were 0.32 million cubic meters for Unit 1 and 0.76 million cubic meters for Unit 2.

Month	Unit 1			Unit 2			Both Units Combined		
	Raw	I	Adj-I	Raw	I	Adj-I	Raw	I	Adj-I
Jun 05	1	2	3	3	6	9	4	9	12
Jul 05	4	37	49	10	82	110	14	118	159
Aug 05	0	0	0	3	23	31	3	23	31
Sep 05	3	23	30	6	43	68	9	65	98
Oct 05	11	135	145	13	278	390	24	413	535
Nov 05	5	132	146	17	107	158	22	239	304
Dec 05	42	453	498	24	190	225	66	643	723
Jan 06	7	124	146	5	73	109	12	197	255
Feb 06	0	23	28	2	31	171	2	53	199
Mar 06	20	204	245	2	23	59	22	226	304
Apr 06	3	33	39	2	48	191	5	81	230
May 06	26	302	333	3	65	259	29	367	591
Jun 06	39	394	477	329	2,202	4,236	368	2,596	4,713
Year 1	**161**	**1,862**	**2,139**	**419**	**3,169**	**6,016**	**580**	**5,031**	**8,155**
Jul 06	4	37	44	10	113	192	14	150	236
Aug 06	1	9	11	1	8	9	2	16	20
Sep 06		0	0	1	15	16	1	15	16
Oct 06	1	17	22	8	101	128	9	118	150
Nov 06	2	31	40	14	112	142	16	144	182
Dec 06	2	38	46	5	75	84	7	113	130
Jan 07	2	36	42	2	34	42	4	70	84
Feb 07	1	18	20	2	29	35	3	47	55
Mar 07	2	27	42	2	33	41	4	60	83
Apr 07	3	32	50	1	35	59	4	67	109
May 07	9	69	110	7	135	225	16	204	335
Jun 07	7	56	91	12	88	159	19	145	251
Year 2	**34**	**370**	**519**	**65**	**780**	**1,133**	**99**	**1,150**	**1,651**
Total	**195**	**2,232**	**2,657**	**484**	**3,949**	**7,149**	**679**	**6,181**	**9,806**

Table 5-5. Predicted annual total impingement abundance and adult equivalent losses for six abundant species of fish (representing 90% of the fish impinged) based on design intake flows at Merrimack Station Units 1 and 2, and for both Units combined, from June 2005 through June 2007.

			Unit					
			Unit 1		Unit 2		Both Units Combined	
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Year 1	Bluegill	YOY	701	8	4338	49	5038	57
		Age 1+	0	0	13	9	13	9
		Age 2+	39	36	26	24	64	60
		Adult	15	15	26	26	40	40
		Total	**754**	**58**	**4402**	**108**	**5156**	**166**
	Spottail shiner	YOY	67	29	77	33	144	63
		Age 1+	0	0	9	7	9	7
		Adult	292	292	188	188	480	480
		Total	**359**	**321**	**274**	**229**	**633**	**550**
	Black crappie	YOY	80	1	389	3	470	3
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**80**	**1**	**389**	**3**	**470**	**3**
	Largemouth bass	YOY	20	1	276	13	296	14
		Age 1+	0	0	18	2	18	2
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**20**	**1**	**293**	**15**	**313**	**16**
	Yellow Perch	YOY	0	0	13	<1	13	<1
		Age 1+	31	4	11	1	43	5
		Age 2+	187	38	9	2	196	39
		Age 3+	56	26	0	0	56	26
		Adult	73	73	0	0	73	73
		Total	**347**	**140**	**33**	**3**	**380**	**143**
	Pumpkinseed	YOY	51	7	69	9	120	16
		Age 1+	65	22	0	0	65	22
		Adult	99	99	0	0	99	99
		Total	**215**	**127**	**69**	**9**	**283**	**136**
Year 2	Bluegill	YOY	141	2	323	4	464	5
		Age 1+	0	0	43	30	43	30
		Age 2+	41	38	30	28	71	66
		Adult	32	32	32	32	64	64
		Total	**214**	**72**	**428**	**94**	**642**	**165**
	Spottail shiner	YOY	32	14	106	46	138	60
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**32**	**14**	**106**	**46**	**138**	**60**
	Black crappie	YOY	58	<1	196	1	254	2
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**58**	**<1**	**196**	**1**	**254**	**2**
	Largemouth bass	YOY	20	1	108	5	128	6
		Age 1+	0	0	47	4	47	4
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**20**	**1**	**155**	**9**	**175**	**10**

(continued)

Table 5-5. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Year 2 (cont'd)	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	12	2	0	0	12	2
		Age 3+	0	0	0	0	0	0
		Adult	0	0	31	31	31	31
		Total	**12**	**2**	**31**	**31**	**43**	**34**
	Pumpkinseed	YOY	29	4	10	1	39	5
		Age 1+	0	0	0	0	0	0
		Adult	0	0	14	14	14	14
		Total	**29**	**4**	**24**	**16**	**53**	**19**
TOTAL	Bluegill	YOY	842	10	4660	53	5502	63
		Age 1+	0	0	56	39	56	39
		Age 2+	80	74	56	52	136	126
		Adult	47	47	58	58	104	104
		Total	**968**	**130**	**4830**	**201**	**5798**	**331**
	Spottail shiner	YOY	100	43	183	80	283	123
		Age 1+	0	0	9	7	9	7
		Adult	292	292	188	188	480	480
		Total	**391**	**335**	**380**	**275**	**771**	**610**
	Black crappie	YOY	139	1	585	4	724	5
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**139**	**1**	**585**	**4**	**724**	**5**
	Largemouth bass	YOY	40	2	383	18	423	20
		Age 1+	0	0	65	6	65	6
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**40**	**2**	**448**	**24**	**488**	**26**
	Yellow Perch	YOY	0	0	13	<1	13	<1
		Age 1+	31	4	11	1	43	5
		Age 2+	199	40	9	2	208	42
		Age 3+	56	26	0	0	56	26
		Adult	73	73	31	31	104	104
		Total	**359**	**142**	**64**	**35**	**423**	**177**
	Pumpkinseed	YOY	80	11	79	11	158	21
		Age 1+	65	22	0	0	65	22
		Adult	99	99	14	14	113	113
		Total	**243**	**131**	**93**	**25**	**337**	**156**

Table 5-6. Predicted monthly total entrainment abundance of fish (all species) by lifestage based on design intake flows at Merrimack Station Units 1 and 2, and for both Units combined, from May 2006 through June 2007. (Note: a blank cell in this table means no sample was taken).

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
Month						0	0	0
April	Total	Eggs				0	0	0
		YSL				0	79,443	79,443
		PYSL				0	53,408	53,408
		YOY/Older				0	0	0
		Unknown				0	0	0
		Total				**0**	**132,852**	**132,852**
May	Total	Eggs	0	26,760	26,760	0	0	0
		YSL	0	0	0	11,290	26,481	37,771
		PYSL	0	800,515	800,515	672,617	105,538	778,155
		YOY/Older	0	0	0	0	0	0
		Unknown	0	0	0	44,815	0	44,815
		Total	**0**	**827,274**	**827,274**	**728,723**	**132,019**	**860,741**
June	Total	Eggs	0	0	0	22,492	0	22,492
		YSL	11,308	80,234	91,543	112,638	106,716	219,355
		PYSL	507,773	1,251,158	1,758,931	1,168,991	720,888	1,889,878
		YOY/Older	50,615	0	50,615	11,246	26,689	37,936
		Unknown	34,080	52,632	86,711	0	0	0
		Total	**603,776**	**1,384,024**	**1,987,800**	**1,315,367**	**854,293**	**2,169,661**
July	Total	Eggs	0	0	0			
		YSL	22,471	0	22,471			
		PYSL	354,578	133,273	487,851			
		YOY/Older	0	0	0			
		Unknown	33,791	0	33,791			
		Total	**410,840**	**133,273**	**544,113**			
August	Total	Eggs	11,236	0	11,236			
		YSL	0	0	0			
		PYSL	33,563	0	33,563			
		YOY/Older	0	0	0			
		Unknown	0	0	0			
		Total	**44,800**	**0**	**44,800**			
September	Total	Eggs		0	0			
		YSL		0	0			
		PYSL		0	0			
		YOY/Older		0	0			
		Unknown		0	0			
		Total		**0**	**0**			
Total	Total	Eggs	11,236	26,760	37,996	22,492	0	22,492
		YSL	33,779	80,234	114,014	123,928	212,641	336,569
		PYSL	895,915	2,184,945	3,080,860	1,841,608	879,834	2,721,441
		YOY/Older	50,615	0	50,615	11,246	26,689	37,936
		Unknown	67,871	52,632	120,502	44,815	0	44,815
		Total	**1,059,416**	**2,344,571**	**3,403,987**	**2,044,090**	**1,119,164**	**3,163,254**

Table 5-7. Predicted monthly total entrainment abundance and adult equivalent losses of fish (representing 90% of the fish entrained) by taxon and lifestage based on design intake flows at Merrimack Station Units 1 and 2, and for both Units combined, from May 2006 through June 2007.

			2006						2007					
			Unit						Unit					
			Unit 1		Unit 2		Both Units Combined		Unit 1		Unit 2		Both Units Combined	
Month	Species	Stage	Annual Entrain-ment Estimate	Adult Equivalent Estimate	Annual Entrain-ment Estimate	Adult Equivalent Estimate	Annual Entrain-ment Estimate	Adult Equivalent Estimate	Annual Entrain-ment Estimate	Adult Equivalent Estimate	Annual Entrain-ment Estimate	Adult Equivalent Estimate	Annual Entrain-ment Estimate	Adult Equivalent Estimate
Total	Carp and minnow family	Eggs	0	0	0	0	0	0	11,246	6	0	0	11,246	6
		Larvae	219,623	947	905,530	3,903	1,125,153	4,850	451,276	1,816	265,733	1,145	717,009	2,961
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**219,623**	**947**	**905,530**	**3,903**	**1,125,153**	**4,850**	**462,522**	**1,822**	**265,733**	**1,145**	**728,255**	**2,967**
	Sunfish family	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	314,868	1,604	159,884	660	474,752	2,264	130,829	540	159,303	658	290,132	1,198
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**314,868**	**1,604**	**159,884**	**660**	**474,752**	**2,264**	**130,829**	**540**	**159,303**	**658**	**290,132**	**1,198**
	White sucker	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	254,485	1,610	1,066,242	6,744	1,320,727	8,354	820,994	5,192	560,156	3,543	1,381,150	8,735
		YOY/Older	0	0	0	0	0	0	11,246	901	26,689	2,138	37,935	3,039
		Total	**254,485**	**1,610**	**1,066,242**	**6,744**	**1,320,727**	**8,354**	**832,240**	**6,093**	**586,845**	**5,681**	**1,419,085**	**11,774**
	Yellow perch	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	53,556	23	53,556	23	514,739	226	26,932	12	541,671	238
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**53,556**	**23**	**53,556**	**23**	**514,739**	**226**	**26,932**	**12**	**541,671**	**238**

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APPENDIX TABLES

APPENDIX A

Merrimack Station Entrainment

Appendix Table A-1. Entrainment sample duration, sample volume and associated water quality parameters as collected at Merrimack Station, June 2006 – June 2007. (Note: NS means no sample was collected on that date.)

		1000 - 1600					1600 - 2200				
		Duration (hr.)	Volume (Gal.)	Temp. (°C)	Dis. Oxy. (mg/L)	Cond. (µS/cm)	Duration (hr.)	Volume (Gal.)	Temp. (°C)	Dis. Oxy. (mg/L)	Cond. (µS/cm)
Unit 1	31-May-06	4.5	26656	17.3	10	73.9	4.6	26386	18.6	10.1	62.7
	7-Jun-06	1.7	26520	16.8	9.2	70.8	2.5	26296	16.4	9.1	73.4
	14-Jun-06	1.8	25920	17.5	9.6	56	1.7	26520	17.8	8.7	59.2
	28-Jun-06	2.0	26437	21.8	8.6	71.7	2.0	26437	21.9	8.4	75
	5-Jul-06	2.2	26400	22.4	7.8	72.1	2.2	26400	22.9	7.5	75.4
	20-Jul-06	3.7	24024	26.2	5.4	83.2	3.9	26419	25.5	5.5	86.7
	26-Jul-06	5.4	26438	23.5	7.7	62.9	6.3	26422	24	6.4	65.7
	2-Aug-06	5.6	26421	26.8	7	93.3	6.7	26466	27.1	6.9	90.9
	9-Aug-06	5.3	26607	24.5	6.6	91.6	5.3	26464	25	7.3	95
	16-Aug-06	5.2	26815	22.9	8.5		5.1	26383	24.3	6.4	
	23-Aug-06	4.9	26431	22.3	7.7	12.7	4.7	26432	23.3	7.3	111
	30-Aug-06	4.1	26528	19.4	8.7	113.6	4.1	26462	20.9	6.9	
	4-Apr-07	2.7	28684	3.6	12.8	62.6	NS				
	5-Apr-07	NS					2.5	26670	2.1	15.3	85.6
	18-Apr-07	2.1	28804	1.8	13.2	41.3	1.8	26500	2.1	13.2	40.7
	2-May-07	2.8	27733	9.7	6.5	68.9	2.7	26362	10.1	10.2	69.8
	16-May-07	3.2	26423	14.7	9.4	84.3	3.3	26660	13.6	7.7	88.7
	23-May-07	2.8	26400	13	9.8	58.1	2.6	26381	14.3	9	64
	30-May-07	2.8	26400	20.7	4.5	82.2	2.6	26339	20.5	8.1	82
	6-Jun-07	2.3	26880	19.1	5.2	76.2	2.5	26235	17.4	8.6	72.1
	13-Jun-07	3.5	27860	19.7	8	77.4	3.2	26429			
	20-Jun-07	3.3	26911	22.2	4.6	93.1	5.1	43287	22.9	7.3	92.7
	27-Jun-07	8.3	26300	25.1	7.6	102.7	6.4	26441	24.7	3.1	102.8
	2-Jul-07	6.5	26442	22.4	6.2	117.5	4.4	26500	21.6	6	109
	11-Jul-07	3.5	26752	23.5	8	92.3	3.8	26423	23.2	7.4	97.7
Unit 2	25-May-06	3.6	26378	12.9	9.2	48.9	3.6	26378	13.2	9.8	50
	31-May-06	4.3	26368	17.4	9.9	72.3	3.9	26448	18.5	9.9	64.6
	7-Jun-06	4.1	26425	16.7	8.4	59.4	3.6	26429	16.4	9.1	73.4
	14-Jun-06	3.4	17545	17.5	7.4	59.2	3.8	26332	17.6	8.7	57.3
	21-Jun-06	4.8	26391	21.7	8	85	4.8	26391	22.4	8.2	81.9
	28-Jun-06	3.8	26813	21.7	8.2	72	3.8	26813	21.8	7.9	74.1
	5-Jul-06	4.4	26492	22.4	7.8	72.1	4.4	26492	22.9	7.1	75.2
	12-Jul-06	4.4	26426	23.4	5.8		4.4	26426	23.5	6.3	95
	19-Jul-06	4.9	26365	26.3	5.9	77.5	4.9	26455	26.5	6.4	81.9
	26-Jul-06	3.9	26426	23.4	7.9	61.8	4.5	26470	24	7.4	64.3
	2-Aug-06	4.7	26505	26.6	6.8	42.2	4.4	26494	27.2	6.9	89.4
	9-Aug-06	4.1	26528	24.6	6.7	91.1	4.1	26420	24.8	6.8	93.2
	16-Aug-06	5.0	26460	22.9	8.2	99.6	5.0	26460	24.5	7.9	
	30-Aug-06	8.1	26438	19.4	8.2	109.4	8.1	26438	20.7	7.4	
	13-Sep-06	10.8	26445	17.9	6.3	121.9	10.5	25830	18.3	7.3	
	4-Apr-07	6.6	26645	3.3	7.4	63	NS				
	5-Apr-07	NS					5.5	26400	2.1	10.3	86
	23-May-07	8.0	26426	12.9	8.5	62.3	7.6	26423	14.5	9.5	62.5
	30-May-07	3.0	7120	21	6.5	80.5	NS				
	6-Jun-07	8.2	27071	17.7	5.1	94.3	7.7	26380	17.5	8.1	71.5
	13-Jun-07	7.1	26199	19.6	7.3	77	8.1	26395			
	20-Jun-07	11.0	26400	23.3	5.8	87	11.2	26437	22.8	7.5	89.2
	27-Jun-07	7.9	26418	25.1	5.6	98.5	7.3	26465	24.7	5.4	100.6
	2-Jul-07	6.5	26500	22.2	5.6	109.9	6.5	26423	21.5	5.2	107.9
	11-Jul-07	11.8	17837	23.5	5.4	83.3	14.9	26492	23.5	5.1	93

Appendix Table A-2. Monthly and annual estimated entrainment abundance for each species and lifestage observed at Units 1 and 2 of Merrimack Station, June 2006 – June 2007(Note: a blank cell in this table means no sample was taken).

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Month			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
April	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	42,083	42,083
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	42,083	42,083
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	White sucker	Eggs				0	0	0
		Larvae				0	17,641	17,641
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	17,641	17,641

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
April (cont'd)	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	59,724	59,724
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	59,724	59,724
May	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	19,478	19,478
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	19,478	19,478
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	0	24,773	24,773	0	2,122	2,122
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,773	24,773	0	2,122	2,122
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	9,184	0	9,184
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	9,184	0	9,184

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
May (cont'd)	Unidentified	Eggs	0	24,848	24,848	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	36,457	0	36,457
		YOY/Older	0	0	0	0	0	0
		Total	0	24,848	24,848	36,457	0	36,457
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	0	692,860	692,860	137,434	44,126	181,560
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	692,860	692,860	137,434	44,126	181,560
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	24,848	24,848	409,742	0	409,742
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,848	24,848	409,742	0	409,742
	Total	Eggs	0	24,848	24,848	0	0	0
		Larvae	0	742,481	742,481	556,360	65,726	622,086
		Unknown	0	0	0	36,457	0	36,457
		YOY/Older	0	0	0	0	0	0
		Total	0	767,330	767,330	592,818	65,726	658,544
June	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	7,899	0	7,899
		Larvae	78,904	815,041	893,945	343,337	221,918	565,255
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	78,904	815,041	893,945	351,235	221,918	573,154
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	25,009	25,009
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	25,009	25,009
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	10,549	0	10,549	0	0	0
		Total	10,549	0	10,549	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	21,099	0	21,099	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	21,099	0	21,099	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	4,762	0	4,762
		Unknown	0	0	0	0	0	0
		YOY/Older	21,099	0	21,099	0	0	0
		Total	21,099	0	21,099	4,762	0	4,762

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
June (cont'd)	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	71,068	123,435	194,503	94,325	49,566	143,892
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	71,068	123,435	194,503	94,325	49,566	143,892
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	9,199	0	9,199	23,203	49,602	72,804
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	9,199	0	9,199	23,203	49,602	72,804
	Unidentified	Eggs	0	0	0	7,899	0	7,899
		Larvae	0	0	0	0	0	0
		Unknown	21,250	48,872	70,122	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	21,250	48,872	70,122	7,899	0	7,899
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	171,333	271,111	442,444	528,370	393,359	921,728
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	7,899	24,783	32,682
		Total	171,333	271,111	442,444	536,269	418,142	954,410
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	24,823	24,823	8,999	25,009	34,008
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,823	24,823	8,999	25,009	34,008
	Total	Eggs	0	0	0	15,797	0	15,797
		Larvae	351,603	1,234,410	1,586,013	1,002,996	764,462	1,767,458
		Unknown	21,250	48,872	70,122	0	0	0
		YOY/Older	31,648	0	31,648	7,899	24,783	32,682
		Total	404,501	1,283,283	1,687,784	1,026,692	789,245	1,815,937
July	Brown bullhead	Eggs	0	0	0			
		Larvae	18,311	49,461	67,772			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	18,311	49,461	67,772			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	77,868	24,767	102,635			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	77,868	24,767	102,635			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	9,140	24,794	33,934			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,140	24,794	33,934			

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
July (cont'd)	Rock bass	Eggs	0	0	0			
		Larvae	27,489	0	27,489			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	27,489	0	27,489			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	160,178	0	160,178			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	160,178	0	160,178			
	Tessellated darter	Eggs	0	0	0			
		Larvae	13,745	0	13,745			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	13,745	0	13,745			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	27,489	0	27,489			
		YOY/Older	0	0	0			
		Total	27,489	0	27,489			
	White sucker	Eggs	0	0	0			
		Larvae	0	24,733	24,733			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	24,733	24,733			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	306,731	123,754	430,485			
		Unknown	27,489	0	27,489			
		YOY/Older	0	0	0			
		Total	334,220	123,754	457,974			
August	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	9,142	0	9,142			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,142	0	9,142			

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
August (cont'd)	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	9,141	0	9,141			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,141	0	9,141			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	9,021	0	9,021			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,021	0	9,021			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	9,141	0	9,141			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,141	0	9,141			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	9,141	0	9,141			
		Larvae	27,304	0	27,304			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	36,445	0	36,445			

(continued)

Appendix Table A-2. (Continued)

Month			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
September	Brown bullhead	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Carp and minnow family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Herring family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Margined madtom	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Rock bass	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Spottail shiner	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Sunfish family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Tessellated darter	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Unidentified	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	White sucker	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			

(continued)

Appendix Table A-2. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Month			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
September (cont'd)	Yellow perch	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Total	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
Total	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	18,311	49,461	67,772	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	18,311	49,461	67,772	0	0	0
	Carp and minnow family	Eggs	0	0	0	7,899	0	7,899
		Larvae	165,914	839,808	1,005,722	343,337	241,396	584,733
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	165,914	839,808	1,005,722	351,235	241,396	592,631
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	25,009	25,009
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	25,009	25,009
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	9,140	24,794	33,934	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	10,549	0	10,549	0	0	0
		Total	19,690	24,794	44,483	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	57,729	0	57,729	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	57,729	0	57,729	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	4,762	0	4,762
		Unknown	0	0	0	0	0	0
		YOY/Older	21,099	0	21,099	0	0	0
		Total	21,099	0	21,099	4,762	0	4,762
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	240,268	148,208	388,476	94,325	93,772	188,097
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	240,268	148,208	388,476	94,325	93,772	188,097
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	22,944	0	22,944	32,387	49,602	81,989
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	22,944	0	22,944	32,387	49,602	81,989

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
Total (cont'd)	Unidentified	Eggs	9,141	24,848	33,989	7,899	0	7,899
		Larvae	0	0	0	0	0	0
		Unknown	48,739	48,872	97,611	36,457	0	36,457
		YOY/Older	0	0	0	0	0	0
		Total	57,880	73,721	131,601	44,356	0	44,356
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	171,333	988,703	1,160,036	665,804	455,125	1,120,929
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	7,899	24,783	32,682
		Total	171,333	988,703	1,160,036	673,703	479,908	1,153,611
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	49,671	49,671	418,741	25,009	443,750
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	49,671	49,671	418,741	25,009	443,750
	Total	Eggs	9,141	24,848	33,989	15,797	0	15,797
		Larvae	685,637	2,100,646	2,786,283	1,559,356	889,912	2,449,268
		Unknown	48,739	48,872	97,611	36,457	0	36,457
		YOY/Older	31,648	0	31,648	7,899	24,783	32,682
		Total	775,166	2,174,366	2,949,532	1,619,510	914,695	2,534,205

Appendix Table A-3. Weekly and annual totals of estimated entrainment for each species and lifestage observed at Units 1 and 2 of Merrimack Station, June 2006 – June 2007. (Note: a blank cell in this table means no sample was taken).

			2006			2007		
			Unit		Both Units	Unit		Both Units
			Unit 1	Unit 2	Combined	Unit 1	Unit 2	Combined
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
2-Apr	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	24,590	24,590
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	24,590	24,590
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

[a] Weeks are labeled by the Sunday beginning the week in 2006 (weeks in 2007 began one date earlier, e.g. the week labeled 21 May began on 20 May in 2007).

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	24,590	24,590
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	24,590	24,590
9-Apr	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Sunfish family	Eggs				0	0	0
		Larvae				0	12,295	12,295
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	12,295	12,295
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	White sucker	Eggs				0	0	0
		Larvae				0	12,398	12,398
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	12,398	12,398
	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	24,693	24,693
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	24,693	24,693
16-Apr	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	5,198	5,198
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	5,198	5,198
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	White sucker	Eggs				0	0	0
		Larvae				0	5,242	5,242
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	5,242	5,242
	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	10,441	10,441
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	10,441	10,441

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
23-Apr	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
30-Apr	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Sunfish family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	White sucker	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
7-May	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				18,229	0	18,229
		YOY/Older				0	0	0
		Total				18,229	0	18,229
	White sucker	Eggs				0	0	0
		Larvae				9,074	0	9,074
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				9,074	0	9,074
	Yellow perch	Eggs				0	0	0
		Larvae				191,117	0	191,117
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				191,117	0	191,117
	Total	Eggs				0	0	0
		Larvae				200,190	0	200,190
		Unknown				18,229	0	18,229
		YOY/Older				0	0	0
		Total				218,419	0	218,419

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
14-May	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	2,122	2,122
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	2,122	2,122
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				18,229	0	18,229
		YOY/Older				0	0	0
		Total				18,229	0	18,229

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	White sucker	Eggs				0	0	0
		Larvae				9,074	2,140	11,214
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				9,074	2,140	11,214
	Yellow perch	Eggs				0	0	0
		Larvae				191,117	0	191,117
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				191,117	0	191,117
	Total	Eggs				0	0	0
		Larvae				200,190	4,263	204,453
		Unknown				18,229	0	18,229
		YOY/Older				0	0	0
		Total				218,419	4,263	222,682
21-May	Brown bullhead	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Carp and minnow family	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Herring family	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Margined madtom	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Rock bass	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Spottail shiner	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Sunfish family	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Tessellated darter	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Unidentified	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	White sucker	Eggs		0	0	0	0	0
		Larvae		23,981	23,981	55,018	22,508	77,526
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		23,981	23,981	55,018	22,508	77,526
	Yellow perch	Eggs		0	0	0	0	0
		Larvae		0	0	27,509	0	27,509
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	27,509	0	27,509
	Total	Eggs		0	0	0	0	0
		Larvae		23,981	23,981	82,526	22,508	105,034
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		23,981	23,981	82,526	22,508	105,034
28-May	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	19,478	19,478
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	19,478	19,478
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	0	24,773	24,773	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,773	24,773	0	0	0
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	9,184	0	9,184
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	9,184	0	9,184
	Unidentified	Eggs	0	24,848	24,848	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,848	24,848	0	0	0
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	0	668,879	668,879	64,269	19,478	83,747
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	668,879	668,879	64,269	19,478	83,747
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	24,848	24,848	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,848	24,848	0	0	0
	Total	Eggs	0	24,848	24,848	0	0	0
		Larvae	0	718,501	718,501	73,454	38,955	112,409
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	743,349	743,349	73,454	38,955	112,409

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
4-Jun	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	0	0	0
		Larvae	36,797	370,897	407,694	119,868	73,244	193,112
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	36,797	370,897	407,694	119,868	73,244	193,112
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	18,321	74,176	92,497	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	18,321	74,176	92,497	0	0	0
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	9,199	0	9,199	18,441	0	18,441
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	9,199	0	9,199	18,441	0	18,441
	Unidentified	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	54,807	197,802	252,609	488,251	393,359	881,609
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	54,807	197,802	252,609	488,251	393,359	881,609
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	8,999	0	8,999
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	8,999	0	8,999
	Total	Eggs	0	0	0	0	0	0
		Larvae	119,124	642,875	761,999	635,560	466,603	1,102,162
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	119,124	642,875	761,999	635,560	466,603	1,102,162
11-Jun	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	0	0	0
		Larvae	9,063	24,823	33,886	73,224	49,645	122,869
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	9,063	24,823	33,886	73,224	49,645	122,869
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	25,009	25,009
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	25,009	25,009
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	0	24,823	24,823	18,306	0	18,306
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,823	24,823	18,306	0	18,306
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Unidentified	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	9,273	0	9,273	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	9,273	0	9,273	0	0	0
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	73,555	0	73,555	27,459	0	27,459
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	73,555	0	73,555	27,459	0	27,459
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	24,823	24,823	0	25,009	25,009
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,823	24,823	0	25,009	25,009
	Total	Eggs	0	0	0	0	0	0
		Larvae	82,619	74,468	157,087	118,988	99,663	218,651
		Unknown	9,273	0	9,273	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	91,892	74,468	166,360	118,988	99,663	218,651
18-Jun	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	0	0	0
		Larvae	5,593	248,268	253,861	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	5,593	248,268	253,861	0	0	0
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	1,399	0	1,399	0	0	0
		Total	1,399	0	1,399	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	2,799	0	2,799	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	2,799	0	2,799	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	4,762	0	4,762
		Unknown	0	0	0	0	0	0
		YOY/Older	2,799	0	2,799	0	0	0
		Total	2,799	0	2,799	4,762	0	4,762
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	6,997	0	6,997	4,762	49,566	54,328
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	6,997	0	6,997	4,762	49,566	54,328
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	4,762	49,602	54,363
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	4,762	49,602	54,363
	Unidentified	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	2,827	0	2,827	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	2,827	0	2,827	0	0	0
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	15,520	0	15,520	4,762	0	4,762
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	24,783	24,783
		Total	15,520	0	15,520	4,762	24,783	29,545
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Total	Eggs	0	0	0	0	0	0
		Larvae	30,910	248,268	279,178	19,046	99,168	118,214
		Unknown	2,827	0	2,827	0	0	0
		YOY/Older	4,198	0	4,198	0	24,783	24,783
		Total	37,935	248,268	286,203	19,046	123,951	142,997

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
25-Jun	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	7,899	0	7,899
		Larvae	27,450	171,054	198,504	150,245	99,029	249,274
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	27,450	171,054	198,504	158,144	99,029	257,172
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	9,150	0	9,150	0	0	0
		Total	9,150	0	9,150	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	18,300	0	18,300	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	18,300	0	18,300	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	18,300	0	18,300	0	0	0
		Total	18,300	0	18,300	0	0	0
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	45,750	24,436	70,186	71,258	0	71,258
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	45,750	24,436	70,186	71,258	0	71,258
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Unidentified	Eggs	0	0	0	7,899	0	7,899
		Larvae	0	0	0	0	0	0
		Unknown	9,150	48,872	58,023	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	9,150	48,872	58,023	7,899	0	7,899

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	27,450	73,309	100,759	7,899	0	7,899
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	7,899	0	7,899
		Total	27,450	73,309	100,759	15,797	0	15,797
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Total	Eggs	0	0	0	15,797	0	15,797
		Larvae	118,950	268,799	387,749	229,401	99,029	328,430
		Unknown	9,150	48,872	58,023	0	0	0
		YOY/Older	27,450	0	27,450	7,899	0	7,899
		Total	155,551	317,671	473,222	253,098	99,029	352,126
2-Jul	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	36,652	0	36,652			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	36,652	0	36,652			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	18,326	0	18,326			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	18,326	0	18,326			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Sunfish family	Eggs	0	0	0			
		Larvae	9,163	0	9,163			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,163	0	9,163			
	Tessellated darter	Eggs	0	0	0			
		Larvae	9,163	0	9,163			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,163	0	9,163			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	18,326	0	18,326			
		YOY/Older	0	0	0			
		Total	18,326	0	18,326			
	White sucker	Eggs	0	0	0			
		Larvae	0	24,733	24,733			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	24,733	24,733			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	73,304	24,733	98,037			
		Unknown	18,326	0	18,326			
		YOY/Older	0	0	0			
		Total	91,630	24,733	116,363			
9-Jul	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	22,904	0	22,904			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	22,904	0	22,904			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Margined madtom	Eggs	0	0	0			
		Larvae	0	24,794	24,794			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	24,794	24,794			
	Rock bass	Eggs	0	0	0			
		Larvae	9,163	0	9,163			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,163	0	9,163			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	22,895	0	22,895			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	22,895	0	22,895			
	Tessellated darter	Eggs	0	0	0			
		Larvae	4,582	0	4,582			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	4,582	0	4,582			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	9,163	0	9,163			
		YOY/Older	0	0	0			
		Total	9,163	0	9,163			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	59,543	24,794	84,337			
		Unknown	9,163	0	9,163			
		YOY/Older	0	0	0			
		Total	68,706	24,794	93,500			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
16-Jul	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	9,157	24,767	33,923			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,157	24,767	33,923			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	36,626	0	36,626			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	36,626	0	36,626			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	45,783	24,767	70,549			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	45,783	24,767	70,549			
23-Jul	Brown bullhead	Eggs	0	0	0			
		Larvae	18,311	0	18,311			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	18,311	0	18,311			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	9,155	0	9,155			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,155	0	9,155			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Sunfish family	Eggs	0	0	0			
		Larvae	73,214	0	73,214			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	73,214	0	73,214			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	100,680	0	100,680			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	100,680	0	100,680			
30-Jul	Brown bullhead	Eggs	0	0	0			
		Larvae	0	49,461	49,461			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	49,461	49,461			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Margined madtom	Eggs	0	0	0			
		Larvae	9,140	0	9,140			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,140	0	9,140			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	18,280	0	18,280			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	18,280	0	18,280			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	27,420	49,461	76,882			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	27,420	49,461	76,882			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
6-Aug	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	9,141	0	9,141			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,141	0	9,141			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	9,141	0	9,141			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,141	0	9,141			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	9,141	0	9,141			
		Larvae	9,141	0	9,141			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	18,282	0	18,282			
13-Aug	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Sunfish family	Eggs	0	0	0			
		Larvae	9,021	0	9,021			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,021	0	9,021			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	9,021	0	9,021			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,021	0	9,021			
20-Aug	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
27-Aug	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	9,142	0	9,142			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,142	0	9,142			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	9,142	0	9,142			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,142	0	9,142			
3-Sep	Brown bullhead	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Carp and minnow family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Herring family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Margined madtom	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Rock bass	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Spottail shiner	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Sunfish family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Tessellated darter	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Unidentified	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	White sucker	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Yellow perch	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Total	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
10-Sep	Brown bullhead	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Carp and minnow family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Herring family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Margined madtom	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Rock bass	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Spottail shiner	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Sunfish family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Tessellated darter	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Unidentified	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	White sucker	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Yellow perch	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Total	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
Total	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	18,311	49,461	67,772	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	18,311	49,461	67,772	0	0	0
	Carp and minnow family	Eggs	0	0	0	7,899	0	7,899
		Larvae	165,914	839,808	1,005,722	343,337	241,396	584,733
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	165,914	839,808	1,005,722	351,235	241,396	592,631
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	25,009	25,009
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	25,009	25,009
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	9,140	24,794	33,934	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	10,549	0	10,549	0	0	0
		Total	19,690	24,794	44,483	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	57,729	0	57,729	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	57,729	0	57,729	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	4,762	0	4,762
		Unknown	0	0	0	0	0	0
		YOY/Older	21,099	0	21,099	0	0	0
		Total	21,099	0	21,099	4,762	0	4,762
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	240,268	148,208	388,476	94,325	93,772	188,097
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	240,268	148,208	388,476	94,325	93,772	188,097
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	22,944	0	22,944	32,387	49,602	81,989
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	22,944	0	22,944	32,387	49,602	81,989
	Unidentified	Eggs	9,141	24,848	33,989	7,899	0	7,899
		Larvae	0	0	0	0	0	0
		Unknown	48,739	48,872	97,611	36,457	0	36,457
		YOY/Older	0	0	0	0	0	0
		Total	57,880	73,721	131,601	44,356	0	44,356

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	171,333	988,703	1,160,036	665,804	455,125	1,120,929
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	7,899	24,783	32,682
		Total	171,333	988,703	1,160,036	673,703	479,908	1,153,611
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	49,671	49,671	418,741	25,009	443,750
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	49,671	49,671	418,741	25,009	443,750
	Total	Eggs	9,141	24,848	33,989	15,797	0	15,797
		Larvae	685,637	2,100,646	2,786,283	1,559,356	889,912	2,449,268
		Unknown	48,739	48,872	97,611	36,457	0	36,457
		YOY/Older	31,648	0	31,648	7,899	24,783	32,682
		Total	775,166	2,174,366	2,949,532	1,619,510	914,695	2,534,205

APPENDIX B

Merrimack Station Impingement

Appendix Table B-1. Recorded water quality parameters from start and end of each 24-hr and long interval impingement sample at Merrimack Station, June 2005-June 2007. (Note: a blank cell in this table means no sample was taken).

Beginning Sample Date	Unit	Initial Water Temperature (°C)	Initial Dissolved Oxygen (mg/L)	Initial Conductivity (µS/cm)	Final Water Temperature (°C)	Final Dissolved Oxygen (mg/L)	Final Conductivity (µS/cm)
06/29/05	1	23.7	7.3	94.5	22.5	6.9	88.5
	2	23.7	7.3	94.5	22.5	6.9	88.5
07/06/05	1	23.7	7.0	96.3	22.4	6.9	93.0
	2	23.6	7.0	94.3	22.5	6.9	91.3
07/13/05	1	22.8	7.3	75.8	23.6	6.7	90.5
	2	22.6	6.9	73.3	23.5	7.2	87.5
07/20/05	1	26.5	6.3	99.9	26.3	6.3	97.1
	2	26.4	7.1	97.4	26.1	6.0	95.7
07/27/05	1	26.3	7.0	139.3	25.0	7.3	120.9
	2	25.5	7.1	109.1	25.5	7.2	109.7
08/03/05	1	24.6	7.0	122.4	25.0	7.4	118.1
	2	24.6	6.9	116.0	25.0	7.3	114.8
08/10/05	1	25.8	7.2	126.8	26.9	6.2	131.3
	2	25.5	6.4	129.8	27.7	5.6	127.9
08/17/05	1	24.4	6.0	129.0	23.6	5.7	125.8
	2	24.2	6.0	127.9	23.7	5.9	124.1
08/24/05	1	23.3	6.3	123.8	23.1	6.9	125.2
	2	23.2	5.4	122.2	23.4	6.2	119.1
08/31/05	1	23.3	6.8	122.7	23.0	6.5	113.4
	2	23.3	5.7	120.1	22.9	5.2	111.7
09/07/05	1	20.9	7.2	81.1	21.6	7.1	87.8
	2	20.8	6.2	72.4	21.3	5.8	81.6
09/14/05	1	21.5	7.1	99.0	22.5	7.7	100.8
	2	21.5	5.6	97.8	22.6	7.4	101.6
09/21/05	1	NS	NS	NS	20.1	7.5	109.0
	2	NS	NS	NS	19.9	6.0	106.8
09/28/05	1	17.1	8.4	115.8	17.7	7.8	105.3
	2	17.2	7.2	115.5	17.5	7.4	102.3
10/05/05	1	17.2	7.9	99.8	17.3	7.5	98.0
	2	17.2	8.4	97.1	17.5	7.3	97.0
10/19/05	1	11.7	8.9	44.5	11.2	8.6	32.8
	2	11.8	10.4	44.2	11.1	9.8	32.3
10/26/05	1	8.4	10.9	66.0	8.0	10.7	37.7
	2	8.5	11.2	66.0	8.4	11.9	37.8

(continued)

Appendix Table B-1. (Continued)

Beginning Sample Date	Unit	Initial Water Temperature (°C)	Initial Dissolved Oxygen (mg/L)	Initial Conductivity (µS/cm)	Final Water Temperature (°C)	Final Dissolved Oxygen (mg/L)	Final Conductivity (µS/cm)
11/02/05	1	8.8	9.6	65.8	8.4	10.8	72.0
	2	9.4	10.3	64.4	8.4	10.8	71.1
11/09/05	1	8.5	10.5	79.0			
	2	8.7	10.1	74.5			
11/16/05	1	6.9	11.8	70.9	7.3	11.8	70.0
	2	7.1	12.0	68.3	7.2	12.1	67.5
11/22/05	1	5.8	10.6	65.1	5.1	13.2	65.1
	2	5.9	11.0	63.3	5.2	12.8	64.3
11/30/05	2	5.4	14.4	43.5	4.7	13.2	36.7
12/07/05	1	2.6	12.2	67.5	1.4	12.9	38.2
	2	3.0	12.9	66.0	2.1	13.0	37.4
12/14/05	1	0.8	15.4	43.4			
	2	1.7	15.3	49.3	1.4	15.0	45.9
12/21/05	1	2.3	13.5	49.9	2.2	13.6	50.6
	2	2.9	14.4	49.3	2.6	14.8	49.8
01/04/06	1	1.0	14.4	38.7	1.0	14.9	40.5
	2	1.4	15.4	41.8	1.3	15.6	36.6
01/18/06	1	1.2	15.3	34.8	1.2	14.0	38.6
	2	1.6	15.8	33.2	1.6	15.4	37.9
02/01/06	1	1.6	15.5	48.0	2.0	14.1	50.1
	2	1.8	15.1	39.4	2.2	15.1	45.9
02/15/06	1	0.2	14.8	53.8	0.5	13.5	56.2
	2	0.0	14.6	55.5	0.5	13.6	55.9
03/01/06	1	-0.6	13.7	62.4	0.8	14.4	65.4
	2	0.0	14.4	59.4	-0.5	14.9	60.6
03/15/06	1	1.6	12.9	58.3	0.5	13.5	51.3
	2	2.2	13.3	57.6	1.1	13.9	51.0
03/22/06	1	1.7	14.0	57.2	2.0	12.7	107.3
	2	1.9	14.8	55.0	2.1	14.1	57.3
03/29/06	1	5.6	11.8	67.4	6.8	10.4	105.8
	2	5.6	11.9	68.0	6.8	10.4	105.8
04/05/06	1				5.0	12.0	83.7
	2	6.4	10.3	89.4	5.2	12.3	82.9
04/12/06	1	6.8	10.3	88.3	8.4	11.7	88.7
	2	7.2	10.6	85.1	8.8	11.1	86.4

(continued)

Appendix Table B-1. (Continued)

Beginning Sample Date	Unit	Initial Water Temperature (°C)	Initial Dissolved Oxygen (mg/L)	Initial Conductivity (µS/cm)	Final Water Temperature (°C)	Final Dissolved Oxygen (mg/L)	Final Conductivity (µS/cm)
04/19/06	1	11.4	9.8	90.9	12.2	11.4	88.0
04/26/06	1	9.5	10.7	85.0	9.7	10.3	83.7
05/03/06	1	10.9	10.1	99.4	12.4	10.2	76.6
05/10/06	1	14.6	9.3	79.5	14.6	9.0	79.2
05/17/06	1	10.7	10.7	51.2	11.6	10.8	46.5
05/24/06	2	12.0	10.9	48.3	12.1	10.7	47.4
05/31/06	1	17.3	10.0	73.9			
	2	17.4	9.9	72.3			
06/07/06	1	16.7	9.3	69.5	15.7	9.1	73.8
	2	16.8	9.4	67.9	15.8	9.4	73.4
06/14/06	1	17.2	8.6	56.1	17.9	8.7	60.0
	2	17.3	9.1	53.5	17.9	7.9	61.8
06/21/06	2	21.7	8.0	85.0	21.6	8.4	83.1
06/28/06	1	21.7	8.8	71.8	20.7	8.0	68.6
	2	21.8	8.2	70.9	20.7	7.7	68.2
07/05/06	1	22.5	7.7	75.3	22.2	7.0	79.2
	2	22.4	7.8	72.1	22.2	6.7	76.9
07/12/06	1	23.6	7.1		22.4	6.8	103.7
	2	23.4	6.7		22.5	6.5	102.2
07/19/06	1	26.5	6.5	81.1	25.8	5.4	86.7
	2	26.3	5.9	77.5	26.3	5.2	81.3
07/26/06	1	23.5	7.7	62.9	24.1	7.6	68.4
	2	23.4	7.9	61.8	24.0	7.7	66.1
08/02/06	1	26.8	7.3	89.6	27.0	6.8	90.7
	2	26.4	7.0	86.8	26.8	6.9	88.7
08/09/06	1	24.9	6.8	91.9	24.7	7.4	94.4
	2	24.7	7.5	90.4	24.5	7.1	92.6
08/16/06	1	22.9	8.5	105.6	23.2	7.6	107.0
	2	22.9	8.2	99.6	23.0	5.5	103.7
08/23/06	1	22.3	7.6	113.4	21.8	6.1	111.2
	2	22.4	5.6	110.5	21.7	5.3	108.1
08/30/06	1	19.5	9.2	115.0	19.6	5.5	114.7
	2	19.5	7.6	113.0	19.5	6.1	111.1
09/06/06	2	19.4	8.5	109.7	19.5	4.2	111.9
09/13/06	2	18.1	7.0	126.0	18.0	6.4	121.4

(continued)

Appendix Table B-1. (Continued)

Beginning Sample Date	Unit	Initial Water Temperature (°C)	Initial Dissolved Oxygen (mg/L)	Initial Conductivity (μS/cm)	Final Water Temperature (°C)	Final Dissolved Oxygen (mg/L)	Final Conductivity (μS/cm)
09/20/06	2	20.9	6.6	119.2	19.5	5.1	108.4
10/04/06	1	15.5	6.3	112.6	15.7	7.7	111.2
	2	15.5	6.7	112.4	15.7	8.0	108.3
10/11/06	1	14.6	6.6	105.7	14.3	8.7	103.5
	2	14.7	7.4	103.9	14.5	8.0	100.7
10/18/06	1	11.2	9.0	85.3	12.3	7.7	76.7
	2	11.3	9.4	82.7	12.2	8.1	74.9
10/25/06	1	8.6	10.6	49.6	8.7	10.4	53.0
	2	8.6	10.7	49.4	8.8	10.3	48.5
11/01/06	1	7.9	12.5	44.7	7.6	12.6	48.0
	2	7.8	12.1	44.4	7.6	12.6	48.0
11/15/06	1	8.9	12.6	58.0	9.4	12.6	50.0
	2	8.9	12.0	58.0	9.3	12.4	50.0
11/29/06	1	5.6	13.7	73.0	6.1	13.0	75.0
	2	5.6	13.6	71.0	6.1	13.3	72.0
12/13/06	1	2.1	15.7	78.0	3.1	14.5	84.0
	2	2.1	15.9	77.0	2.3	15.7	78.0
12/27/06	1	2.8	14.8	65.0	2.4	15.0	62.0
	2	2.7	14.5	58.0	2.3	15.1	59.0
01/10/07	1	2.3	15.7	50.0	1.1	15.9	53.0
	2	2.3	15.1	49.0	1.1	15.9	49.0
01/24/07	1	1.0	13.7	45.4	1.9	14.4	48.3
	2	1.0	15.3	42.7	0.4	15.4	44.2
02/07/07	1	1.4	14.3	54.3	1.7	15.6	54.5
	2	0.1	15.7	50.1	0.2	15.9	50.4
02/21/07	1	1.1	15.0	67.4	0.5	14.7	67.0
	2	-0.5	14.9	61.9	-0.6	15.2	62.7
03/07/07	1	1.2	12.2	69.1	1.6	13.9	71.1
	2	-0.7	15.0	27.5	-0.6	14.7	65.8
03/21/07	1				-0.1	12.6	52.4
03/28/07	1	2.2	14.4	68.0	1.6	15.5	33.2
	2	2.2	15.1	51.5	1.7	15.6	32.2
04/04/07	1	3.5	10.9	61.7	2.6	13.4	63.7
	2	3.5	13.1	60.6	2.7	14.6	60.3
04/11/07	1	3.8	12.4	79.7	4.8	12.6	83.7
	2	3.7	14.0	77.8	4.8	13.1	78.4

(continued)

Appendix Table B-1. (Continued)

Beginning Sample Date	Unit	Initial Water Temperature (°C)	Initial Dissolved Oxygen (mg/L)	Initial Conductivity (µS/cm)	Final Water Temperature (°C)	Final Dissolved Oxygen (mg/L)	Final Conductivity (µS/cm)
04/25/07	1	7.4	11.3	59.4	7.5	12.2	58.4
05/02/07	1	9.1	11.2	68.0	9.2	11.0	70.5
05/09/07	1	12.7	9.9	86.1	13.1	9.5	84.3
05/16/07	1	14.4	9.0	86.7	12.7	8.6	86.1
05/23/07	1	13.0	9.8	63.5	14.0	8.8	61.6
	2	12.9	9.9	62.5	14.0	8.2	61.6
05/30/07	1	19.5	6.3	83.3	19.8	6.3	85.9
	2	19.4	7.4	79.9	19.9	6.0	81.8
06/06/07	1	17.1	8.1	78.2	17.2	8.3	69.9
	2	17.1	8.1	77.3	17.0	8.7	67.3
06/13/07	1	19.6	7.5	7.8			
	2	19.6	7.5	7.6			
06/20/07	1	21.8	7.0	92.7	21.7	8.0	95.0
	2	21.8	6.0	89.8	21.7	7.2	91.4
06/27/07	1	23.8	6.8	102.8	24.8	5.5	102.9
	2	23.9	6.2	99.0	24.9	5.4	101.8

Appendix Table B-2. Recorded volume and dominant type of debris in 24-hour and long interval impingement samples at Merrimack Station, June 2005 through June 2007.

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
06/29/05	1	24-hour	11	Terrestrial
	2	24-hour	63	Terrestrial
06/30/05	1	6-day	111	Terrestrial
	2	6-day	135	Terrestrial
07/06/05	1	24-hour	9	Aquatic
	2	24-hour	11	Aquatic
07/07/05	1	6-day	31	Aquatic
	2	6-day	169	Aquatic
07/13/05	1	24-hour	7	Aquatic
	2	24-hour	26	Aquatic
07/14/05	1	6-day	32	Aquatic
	2	6-day	96	Aquatic
07/20/05	1	24-hour	10	Aquatic
	2	24-hour	20	Aquatic
07/21/05	1	6-day	30	Aquatic
	2	6-day	65	Aquatic
07/27/05	1	24-hour	6	Aquatic
	2	24-hour	9	Aquatic
07/28/05	1	6-day	31	Aquatic
	2	6-day	62	Aquatic
08/03/05	1	24-hour	10	Aquatic
	2	24-hour	20	Aquatic
08/04/05	1	6-day	33	Aquatic
	2	6-day	106	Aquatic
08/10/05	1	24-hour	15	Aquatic
	2	24-hour	21	Aquatic
08/11/05	1	6-day	64	Aquatic
	2	6-day	128	Aquatic
08/17/05	1	24-hour	12	Aquatic
	2	24-hour	20	Aquatic
08/18/05	1	6-day	30	Aquatic
	2	6-day	91	Aquatic
08/24/05	1	24-hour	10	Aquatic
	2	24-hour	18	Aquatic

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
08/25/05	1	6-day	43	Aquatic
	2	6-day	55	Aquatic
08/31/05	1	24-hour	12	Aquatic
	2	24-hour	16	Aquatic
09/01/05	1	6-day	44	Aquatic
	2	6-day	224	Aquatic
09/07/05	1	24-hour	25	Aquatic
	2	24-hour	25	Aquatic
09/08/05	1	6-day	39	Aquatic
	2	6-day	170	Aquatic
09/14/05	1	24-hour	14	Terrestrial
	2	24-hour	44	Aquatic
09/15/05	1	6-day	16	Aquatic
	2	6-day	80	Aquatic
09/21/05	1	24-hour	1	Terrestrial
	2	24-hour	4	Aquatic
09/22/05	1	6-day	18	Terrestrial
	2	6-day	48	Terrestrial
09/28/05	1	24-hour	8	Terrestrial
	2	24-hour	8	Terrestrial
09/29/05	1	6-day	15	Terrestrial
	2	6-day	32	Terrestrial
10/05/05	1	24-hour	4	Terrestrial
	2	24-hour	25	Terrestrial
10/06/05	1	6-day	32	Terrestrial
	2	6-day	153	Terrestrial
10/12/05	1	6-day	70	Terrestrial
10/14/05	2	6-day	135	Terrestrial
10/19/05	1	24-hour	30	Terrestrial
	2	24-hour	64	Terrestrial
10/20/05	1	6-day	80	Terrestrial
	2	6-day	240	Terrestrial
10/26/05	1	24-hour	50	Terrestrial
	2	24-hour	108	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
10/27/05	1	6-day	28	Terrestrial
	2	6-day	62	Terrestrial
11/02/05	1	24-hour	58	Terrestrial
	2	24-hour	125	Terrestrial
11/03/05	1	6-day	48	Terrestrial
	2	6-day	48	Terrestrial
11/09/05	1	24-hour	26	Terrestrial
	2	24-hour	37	Terrestrial
11/10/05	1	6-day	37	Terrestrial
	2	6-day	59	Terrestrial
11/16/05	1	24-hour	27	Terrestrial
	2	24-hour	44	Terrestrial
11/17/05	1	6-day	32	Terrestrial
	2	6-day	32	Terrestrial
11/22/05	1	24-hour	10	Terrestrial
	2	24-hour	42	Terrestrial
11/23/05	1	6-day	52	Terrestrial
	2	6-day	45	Terrestrial
11/30/05	2	24-hour	25	Terrestrial
12/01/05	2	6-day	80	Terrestrial
12/02/05	1	6-day	64	Terrestrial
12/07/05	1	24-hour	11	Terrestrial
	2	24-hour	25	Terrestrial
12/08/05	1	6-day	60	Terrestrial
	2	6-day	84	Terrestrial
12/14/05	1	24-hour	15	Terrestrial
	2	24-hour	10	Terrestrial
12/15/05	1	6-day	15	Terrestrial
	2	6-day	15	Terrestrial
12/21/05	1	24-hour	5	Terrestrial
	2	24-hour	2	Aquatic
12/22/05	1	13-day	60	Terrestrial
	2	13-day	148	Terrestrial
01/04/06	1	24-hour	5	Terrestrial
	2	24-hour	25	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
01/05/06	1	13-day	62	Terrestrial
	2	13-day	115	Terrestrial
01/18/06	1	24-hour	36	Terrestrial
	2	24-hour	50	Terrestrial
01/19/06	1	13-day	85	Terrestrial
	2	13-day	180	Terrestrial
02/01/06	1	24-hour	5	Terrestrial
	2	24-hour	20	Terrestrial
02/02/06	1	13-day	85	Terrestrial
	2	13-day	121	Terrestrial
02/15/06	1	24-hour	2	Terrestrial
	2	24-hour	20	Terrestrial
02/16/06	1	13-day	128	Terrestrial
	2	13-day	112	Terrestrial
03/01/06	1	24-hour	3	Terrestrial
	2	24-hour	5	Terrestrial
03/02/06	1	13-day	80	Terrestrial
	2	13-day	158	Terrestrial
03/15/06	1	24-hour	20	Terrestrial
	2	24-hour	48	Terrestrial
03/16/06	1	6-day	20	Terrestrial
	2	6-day	30	Terrestrial
03/22/06	1	24-hour	8	Terrestrial
	2	24-hour	12	Terrestrial
03/23/06	1	6-day	8	Terrestrial
	2	6-day	12	Terrestrial
03/29/06	1	24-hour	1	Terrestrial
	2	24-hour	2	Terrestrial
03/30/06	1	6-day	10	Terrestrial
	2	6-day	84	Terrestrial
04/05/06	1	24-hour	25	Terrestrial
	2	24-hour	30	Terrestrial
04/06/06	1	6-day	10	Terrestrial
	2	6-day	62	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
04/12/06	1	24-hour	15	Terrestrial
	2	24-hour	29	Terrestrial
04/13/06	1	6-day	30	Terrestrial
	2	6-day	28	Terrestrial
04/19/06	1	24-hour	3	Terrestrial
04/20/06	1	6-day	25	Terrestrial
04/26/06	1	24-hour	5	Terrestrial
04/27/06	1	6-day	30	Terrestrial
05/03/06	1	24-hour	5	Terrestrial
05/04/06	1	6-day	25	Terrestrial
05/10/06	1	24-hour	2	Terrestrial
05/11/06	1	6-day	60	Aquatic
05/17/06	1	24-hour	12	Terrestrial
05/18/06	1	6-day	25	Terrestrial
05/20/06	2	6-day	32	Terrestrial
05/24/06	2	24-hour	13	Terrestrial
05/25/06	2	6-day	128	Terrestrial
05/26/06	1	6-day	94	Terrestrial
05/31/06	1	24-hour	5	Terrestrial
	2	24-hour	9	Terrestrial
06/01/06	1	6-day	60	Terrestrial
	2	6-day	148	Terrestrial
06/07/06	1	24-hour	20	Terrestrial
	2	24-hour	25	Terrestrial
06/08/06	1	6-day	15	Terrestrial
	2	6-day	96	Terrestrial
06/14/06	1	24-hour	5	Terrestrial
	2	24-hour	15	Terrestrial
06/15/06	1	6-day	42	Terrestrial
	2	6-day	175	Terrestrial
06/21/06	2	24-hour	20	Terrestrial
06/22/06	2	6-day	125	Terrestrial
06/25/06	1	6-day	45	Terrestrial
06/28/06	1	24-hour	12	Terrestrial
	2	24-hour	32	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
06/29/06	1	6-day	35	Terrestrial
	2	6-day	160	Terrestrial
07/05/06	1	24-hour	12	Aquatic
	2	24-hour	28	Aquatic
07/06/06	1	6-day	42	Terrestrial
	2	6-day	128	Terrestrial
07/12/06	1	24-hour	12	Aquatic
	2	24-hour	25	Aquatic
07/13/06	1	6-day	25	Terrestrial
	2	6-day	123	Terrestrial
07/19/06	1	24-hour	4	Aquatic
	2	24-hour	7	Aquatic
07/20/06	1	6-day	75	Aquatic
	2	6-day	175	Aquatic
07/26/06	1	24-hour	10	Terrestrial
	2	24-hour	46	Terrestrial
07/27/06	1	6-day	50	Aquatic
	2	6-day	110	Aquatic
08/02/06	1	24-hour	15	Terrestrial
	2	24-hour	60	Terrestrial
08/03/06	1	6-day	30	Aquatic
	2	6-day	120	Aquatic
08/09/06	1	24-hour	3	Terrestrial
	2	24-hour	10	Aquatic
08/10/06	1	6-day	30	Other
	2	6-day	75	Terrestrial
08/16/06	1	24-hour	13	Terrestrial
	2	24-hour	25	Aquatic
08/17/06	1	6-day	50	Aquatic
	2	6-day	116	Aquatic
08/23/06	1	24-hour	5	Aquatic
	2	24-hour	5	Aquatic
08/24/06	1	6-day	30	Aquatic
	2	6-day	30	Aquatic

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
08/30/06	1	24-hour	5	Aquatic
	2	24-hour	15	Aquatic
08/31/06	1	6-day	23	Aquatic
	2	6-day	50	Aquatic
09/06/06	2	24-hour	10	Aquatic
09/07/06	2	6-day	116	Aquatic
09/13/06	2	24-hour	7	Aquatic
09/14/06	2	6-day	96	Aquatic
09/20/06	2	24-hour	30	Terrestrial
09/28/06	2	6-day	192	Terrestrial
10/04/06	1	24-hour	12	Terrestrial
	2	24-hour	30	Terrestrial
10/05/06	1	6-day	24	Terrestrial
	2	6-day	75	Terrestrial
10/11/06	1	24-hour	15	Terrestrial
	2	24-hour	20	Terrestrial
10/12/06	1	6-day	148	Terrestrial
	2	6-day	48	Terrestrial
10/18/06	1	24-hour	16	Terrestrial
	2	24-hour	28	Terrestrial
10/19/06	1	6-day	55	Terrestrial
	2	6-day	116	Terrestrial
10/25/06	1	24-hour	60	Terrestrial
	2	24-hour	80	Terrestrial
10/26/06	1	6-day	16	Terrestrial
	2	6-day	191	Terrestrial
11/01/06	1	24-hour	10	Terrestrial
	2	24-hour	48	Terrestrial
11/02/06	1	13-day	76	Terrestrial
	2	13-day	96	Terrestrial
11/15/06	1	24-hour	12	Terrestrial
	2	24-hour	17	Terrestrial
11/16/06	1	13-day	96	Terrestrial
	2	13-day	96	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
11/29/06	1	24-hour	30	Terrestrial
	2	24-hour	20	Terrestrial
11/30/06	1	13-day	64	Terrestrial
	2	13-day	184	Terrestrial
12/13/06	1	24-hour	15	Terrestrial
	2	24-hour	20	Terrestrial
12/14/06	1	13-day	78	Terrestrial
	2	13-day	110	Aquatic
12/27/06	1	24-hour	15	Terrestrial
	2	24-hour	25	Terrestrial
12/28/06	1	13-day	92	Terrestrial
	2	13-day	112	Aquatic
01/10/07	1	24-hour	16	Terrestrial
	2	24-hour	17	Aquatic
01/11/07	1	13-day	87	Terrestrial
	2	13-day	64	Terrestrial
01/24/07	1	24-hour	5	Terrestrial
	2	24-hour	1	Terrestrial
01/25/07	1	13-day	25	Terrestrial
	2	13-day	25	Terrestrial
02/07/07	1	24-hour	1	Terrestrial
	2	24-hour	1	Terrestrial
02/08/07	1	13-day	10	Aquatic
	2	13-day	2	Aquatic
02/21/07	1	24-hour	2	Aquatic
	2	24-hour	2	Aquatic
02/22/07	1	13-day	12	Terrestrial
	2	13-day	15	Terrestrial
03/07/07	1	24-hour	1	Terrestrial
	2	24-hour	2	Terrestrial
03/08/07	1	13-day	20	Terrestrial
	2	13-day	25	Terrestrial
03/21/07	1	24-hour	5	Terrestrial
03/22/07	1	6-day	30	Terrestrial
	2	6-day	145	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
03/28/07	1	24-hour	30	Terrestrial
	2	24-hour	32	Terrestrial
03/29/07	1	6-day	62	Terrestrial
	2	6-day	64	Terrestrial
04/04/07	1	24-hour	15	Terrestrial
	2	24-hour	15	Terrestrial
04/05/07	1	6-day	64	Terrestrial
	2	6-day	48	Terrestrial
04/11/07	1	24-hour	4	Terrestrial
	2	24-hour	10	Terrestrial
04/12/07	1	6-day	64	Terrestrial
	2	6-day	144	Terrestrial
04/19/07	1	6-day	44	Terrestrial
04/25/07	1	24-hour	15	Terrestrial
04/26/07	1	6-day	144	Terrestrial
05/02/07	1	24-hour	18	Terrestrial
05/03/07	1	6-day	30	Terrestrial
05/09/07	1	24-hour	10	Terrestrial
05/10/07	1	6-day	32	Terrestrial
05/16/07	1	24-hour	10	Terrestrial
05/17/07	1	6-day	27	Terrestrial
	2	6-day	110	Terrestrial
05/23/07	1	24-hour	10	Terrestrial
	2	24-hour	30	Terrestrial
05/24/07	1	6-day	35	Terrestrial
	2	6-day	200	Terrestrial
05/30/07	1	24-hour	10	Terrestrial
	2	24-hour	32	Terrestrial
05/31/07	1	6-day	64	Terrestrial
	2	6-day	256	Terrestrial
06/06/07	1	24-hour	15	Terrestrial
	2	24-hour	65	Terrestrial
06/07/07	1	6-day	55	Terrestrial
	2	6-day	180	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
06/13/07	1	24-hour	15	Terrestrial
	2	24-hour	20	Aquatic
06/14/07	1	6-day	57	Terrestrial
	2	6-day	96	Terrestrial
06/20/07	1	24-hour	5	Aquatic
	2	24-hour	15	Terrestrial
06/21/07	1	6-day	48	Terrestrial
	2	6-day	96	Terrestrial
06/27/07	1	24-hour	30	Aquatic
	2	24-hour	30	Aquatic

Appendix Table B-3. Weekly and monthly estimated abundance of all fish impinged in Unit 1 at Merrimack Station, 29 June 2005 through 27 June 2007.

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jun 05	26	2	1	0.26	3.83	0.75	5.10	0.52	2.00	2.67	2.00	2.67
Jul 05	26	2	1	0.26	3.83	0.75	5.10	0.52	2.00	2.67		
	27	7	2	0.26	7.78	0.75	10.37	1.83	14.25	19.00		
	28	7	1	0.27	3.77	0.75	5.03	1.83	6.90	9.21		
	29	7	0	0.26	0.00	0.75	0.00	1.83	0.00	0.00		
	30	7	1	0.27	3.77	0.75	5.03	1.82	6.85	9.14		
	31	1	0	0.26	0.00	0.75	0.00	0.26	0.00	0.00	30.01	40.01
Aug 05	31	6	0	0.26	0.00	0.75	0.00	1.30	0.00	0.00		
	32	7	0	0.24	0.00	0.75	0.00	1.42	0.00	0.00		
	33	7	0	0.25	0.00	0.75	0.00	1.83	0.00	0.00		
	34	7	0	0.27	0.00	0.53	0.00	1.83	0.00	0.00		
	35	4	0	0.26	0.00	0.53	0.00	1.05	0.00	0.00	0.00	0.00
Sep 05	35	3	0	0.26	0.00	0.53	0.00	0.78	0.00	0.00		
	36	7	0	0.27	0.00	0.53	0.00	1.83	0.00	0.00		
	37	7	1	0.27	3.66	0.53	6.91	1.83	6.70	12.65		
	38	7	0	0.26	0.00	0.97	0.00	1.83	0.00	0.00		
	39	6	2	0.26	7.56	0.97	7.80	1.55	11.72	12.08	18.42	24.73
Oct 05	39	1	2	0.26	7.56	0.97	7.80	0.26	1.98	2.04		
	40	7	0	0.25	0.00	0.97	0.00	1.83	0.00	0.00		
	41	7			11.71 *		12.07	1.17	13.64	14.07		
	42	7	6	0.26	23.42	0.97	24.15	1.83	42.89	44.22		
	43	7	5	0.25	19.65	0.88	22.33	1.82	35.78	40.65		
	44	2	4	0.26	15.67	0.88	17.81	0.53	8.28	9.41	102.57	110.39

(continued)

Appendix Table B-3. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Nov 05	44	5	4	0.26	15.67	0.88	17.81	1.30	20.31	23.08		
	45	7	1	0.27	3.74	0.88	4.26	1.57	5.88	6.68		
	46	7	0	0.26	0.00	0.88	0.00	1.83	0.00	0.00		
	47	7	0	0.26	0.00	0.91	0.00	1.83	0.00	0.00		
	48	4			77.05 *		84.67	0.80	61.62	67.71	87.80	97.47
Dec 05	48	3			77.05 *		84.67	0.36	27.76	30.50		
	49	7	39	0.25	154.10	0.91	169.34	1.83	282.21	310.12		
	50	7	1	0.26	3.81	0.91	4.19	1.83	6.98	7.67		
	51	7	2	0.26	7.67	0.91	8.42	1.83	14.04	15.43		
	52	7			3.83 *		4.21	1.83	7.02	7.71	338.00	371.43
Jan 06	1	7	0	0.26	0.00	0.85	0.00	1.83	0.00	0.00		
	2	7			13.81 *		16.25	1.43	19.68	23.15		
	3	7	7	0.25	27.62	0.85	32.49	1.83	50.58	59.51		
	4	7			13.81 *		16.25	1.83	25.29	29.75		
	5	3	0	0.17	0.00	0.74	0.00	0.78	0.00	0.00	95.55	112.41
Feb 06	5	4	0	0.17	0.00	0.74	0.00	0.49	0.00	0.00		
	6	7			0.00 *		0.00	1.83	0.00	0.00		
	7	7	0	0.25	0.00	0.74	0.00	1.82	0.00	0.00		
	8	7			5.43 *		6.62	1.83	9.95	12.13		
	9	3	3	0.28	10.86	0.82	13.25	0.78	8.53	10.40	18.47	22.53
Mar 06	9	4	3	0.28	10.86	0.82	13.25	1.05	11.37	13.86		
	10	7			22.63 *		27.60	1.83	41.45	50.55		
	11	7	9	0.26	34.40	0.82	41.95	1.83	63.00	76.83		
	12	7	2	0.26	7.78	0.86	9.05	1.83	14.25	16.57		
	13	6	6	0.26	23.34	0.86	27.14	1.57	36.64	42.60	166.70	200.41

(continued)

Appendix Table B-3. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Apr 06	13	1	6	0.26	23.34	0.86	27.14	0.26	6.11	7.10		
	14	7	0	0.04	0.00	0.86	0.00	0.86	0.00	0.00		
	15	7	2	0.26	7.63	0.86	8.88	1.77	13.53	15.73		
	16	7	1	0.26	3.82	0.86	4.44	1.83	7.00	8.14		
	17	7	0	0.26	0.00	0.93	0.00	1.83	0.00	0.00		
	18	1	0	0.26	0.00	0.93	0.00	0.26	0.00	0.00	26.63	30.97
May 06	18	6	0	0.26	0.00	0.93	0.00	1.28	0.00	0.00		
	19	7	1	0.27	3.74	0.93	4.03	1.20	4.51	4.85		
	20	7	19	0.27	71.14	0.93	76.50	1.83	130.29	140.09		
	21	7			46.96 *		52.14	1.09	51.27	56.92		
	22	4	6	0.26	22.78	0.82	27.78	1.05	23.83	29.07	209.90	230.93
Jun 06	22	3	6	0.26	22.78	0.82	27.78	0.78	17.88	21.80		
	23	7	28	0.26	106.65	0.82	130.07	1.83	195.32	238.20		
	24	7	9	0.28	32.71	0.82	39.89	1.82	59.52	72.58		
	25	7			20.18 *		24.01	0.56	11.30	13.45		
	26	6	2	0.26	7.64	0.94	8.13	1.57	12.00	12.77	296.02	358.79
Jul 06	26	1	2	0.26	7.64	0.94	8.13	0.26	2.00	2.13		
	27	7	3	0.26	11.74	0.94	12.48	1.83	21.49	22.86		
	28	7	0	0.27	0.00	0.94	0.00	1.83	0.00	0.00		
	29	7	0	0.26	0.00	0.62	0.00	1.83	0.00	0.00		
	30	7	1	0.26	3.85	0.62	6.21	1.83	7.05	11.37		
	31	2	0	0.25	0.00	0.62	0.00	0.52	0.00	0.00	30.54	36.36

(continued)

Appendix Table B-3. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Aug 06	31	5	0	0.25	0.00	0.62	0.00	1.31	0.00	0.00		
	32	7	0	0.27	0.00	0.62	0.00	1.83	0.00	0.00		
	33	7	1	0.26	3.86	0.81	4.77	1.83	7.07	8.73		
	34	7	0	0.26	0.00	0.81	0.00	1.83	0.00	0.00		
	35	5	0	0.27	0.00	0.81	0.00	1.31	0.00	0.00	7.07	8.73
Sep 06	35	2	0	0.27	0.00	0.81	0.00	0.52	0.00	0.00		
	36	7			0.00 *		0.00	0.80	0.00	0.00		
	37	7			0.00 *		0.00	0.00	0.00	0.00		
	38	7			0.00 *		0.00	0.00	0.00	0.00		
	39	7			0.00 *		0.00	-0.00	0.00	0.00	0.00	0.00
Oct 06	40	7	0	0.27	0.00	0.77	0.00	1.29	0.00	0.00		
	41	7	0	0.26	0.00	0.77	0.00	1.83	0.00	0.00		
	42	7	0	0.26	0.00	0.77	0.00	1.83	0.00	0.00		
	43	7	1	0.27	3.73	0.77	4.85	1.82	6.78	8.81		
	44	3	1	0.12	8.67	0.77	11.26	0.51	4.41	5.73	11.20	14.54
Nov 06	44	4	1	0.12	8.67	0.77	11.26	0.71	6.18	8.02		
	45	7			4.34 *		5.63	1.82	7.91	10.27		
	46	7	0	0.27	0.00	0.81	0.00	1.75	0.00	0.00		
	47	7			1.94 *		2.39	1.83	3.55	4.39		
	48	5	1	0.26	3.88	0.81	4.79	1.24	4.83	5.96	22.47	28.64
Dec 06	48	2	1	0.26	3.88	0.81	4.79	0.06	0.24	0.30		
	49	7			3.84 *		4.74	1.38	5.28	6.52		
	50	7	1	0.26	3.80	0.81	4.69	1.83	6.95	8.58		
	51	7			3.85 *		4.61	1.83	7.05	8.45		
	52	7	1	0.26	3.91	0.86	4.54	1.83	7.15	8.32		
	53	1			3.84 *		4.46	0.26	1.00	1.17	27.69	33.34

(continued)

Appendix Table B-3. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jan 07	53	6			3.84 *		4.46	1.57	6.02	7.00		
	1	7	1	0.27	3.76	0.86	4.38	1.83	6.89	8.02		
	2	7			3.89 *		4.57	1.83	7.12	8.38		
	3	7	1	0.25	4.01	0.84	4.77	1.83	7.34	8.73		
	4	4			2.00 *		2.38	1.05	2.10	2.50	29.46	34.62
Feb 07	4	3			2.00 *		2.38	0.78	1.57	1.87		
	5	7	0	0.26	0.00	0.84	0.00	1.83	0.00	0.00		
	6	7			1.97 *		2.22	1.82	3.59	4.03		
	7	7	1	0.25	3.94	0.89	4.43	1.83	7.22	8.11		
	8	4			1.97 *		2.22	1.05	2.06	2.32	14.44	16.33
Mar 07	8	3			1.97 *		2.22	0.78	1.55	1.74		
	9	7	0	0.26	0.00	0.89	0.00	1.83	0.00	0.00		
	10	7			3.72 *		6.01	1.82	6.78	10.94		
	11	7	2	0.27	7.45	0.62	12.01	1.30	9.68	15.61		
	12	7	0	0.26	0.00	0.62	0.00	1.56	0.00	0.00	18.00	28.28
Apr 07	13	7	3	0.27	10.96	0.62	17.68	1.83	20.08	32.39		
	14	7	0	0.26	0.00	0.62	0.00	1.83	0.00	0.00		
	15	7			0.00 *		0.00	1.83	0.00	0.00		
	16	7	0	0.25	0.00	0.73	0.00	1.82	0.00	0.00		
	17	2	3	0.26	11.45	0.73	15.69	0.52	5.99	8.21	26.07	40.59
May 07	17	5	3	0.26	11.45	0.73	15.69	1.31	14.98	20.52		
	18	7	0	0.27	0.00	0.73	0.00	1.83	0.00	0.00		
	19	7	0	0.26	0.00	0.73	0.00	1.83	0.00	0.00		
	20	7	6	0.26	22.67	0.60	37.78	1.83	41.51	69.18		
	21	5	0	0.26	0.00	0.60	0.00	1.31	0.00	0.00	56.49	89.70

(continued)

Appendix Table B-3. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jun 07	21	2	0	0.26	0.00	0.60	0.00	0.52	0.00	0.00		
	22	7	5	0.25	19.77	0.60	32.95	1.83	36.21	60.34		
	23	7	1	0.30	3.31	0.60	5.52	1.83	6.06	10.11		
	24	7	0	0.27	0.00	0.89	0.00	1.56	0.00	0.00		
	25	4	1	0.27	3.70	0.89	4.16	0.80	2.95	3.31	45.22	73.76

[a] Weekly impingement rates were interpolated for weeks with missed or voided collections (*)

[b] Screen collection efficiency factors based on proportion of 100 released test fish that passed through screen were used to adjust to sample data

[c] Adjusted impingement rates were interpolated for weeks with missed or voided collections

MCM = Million Cubic Meters

Appendix Table B-4. Weekly and monthly estimated abundance of all fish impinged in Unit 2 at Merrimack Station, June 2005 through June 2007.

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jun 05	26	2	3	0.71	4.23	0.74	5.72	1.42	6.00	8.10	6.00	8.10
Jul 05	26	2	3	0.71	4.23	0.74	5.72	1.42	6.00	8.10		
	27	7	4	0.69	5.76	0.74	7.79	4.96	28.60	38.64		
	28	7	5	0.72	6.98	0.74	9.43	4.96	34.61	46.77		
	29	7	1	0.71	1.40	0.74	1.89	4.96	6.95	9.39		
	30	7	0	0.73	0.00	0.74	0.00	4.96	0.00	0.00		
	31	1	0	0.72	0.00	0.74	0.00	0.71	0.00	0.00	76.15	102.91
Aug 05	31	6	0	0.72	0.00	0.74	0.00	4.25	0.00	0.00		
	32	7	2	0.67	2.97	0.74	4.01	4.95	14.71	19.88		
	33	7	1	0.71	1.41	0.74	1.90	4.96	6.98	9.43		
	34	7	0	0.73	0.00	0.74	0.00	4.69	0.00	0.00		
	35	4	0	0.72	0.00	0.50	0.00	1.46	0.00	0.00	21.69	29.31
Sep 05	35	3	0	0.72	0.00	0.50	0.00	2.13	0.00	0.00		
	36	7	2	0.72	2.79	0.50	5.58	4.96	13.83	27.65		
	37	7	0	0.73	0.00	0.50	0.00	4.96	0.00	0.00		
	38	7	1	0.70	1.44	0.73	1.97	4.96	7.12	9.76		
	39	6	3	0.68	4.41	0.73	6.04	4.23	18.65	25.54	39.60	62.95
Oct 05	39	1	3	0.68	4.41	0.73	6.04	0.71	3.12	4.28		
	40	7	1	0.69	1.44	0.73	1.98	4.96	7.16	9.81		
	41	7			15.26 *		20.91	0.91	13.83	18.95		
	42	7	10	0.34	29.08	0.73	39.83	2.38	69.30	94.94		
	43	7	2	0.69	2.89	0.59	4.90	4.68	13.54	22.96		
	44	2	7	0.69	10.13	0.59	17.17	1.43	14.50	24.58	121.46	175.51

(continued)

Appendix Table B-4. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Nov 05	44	5	7	0.69	10.13	0.59	17.17	3.53	35.77	60.63		
	45	7	2	0.72	2.77	0.59	4.70	4.96	13.76	23.32		
	46	7	1	0.71	1.42	0.59	2.40	4.96	7.02	11.91		
	47	7	5	0.70	7.10	0.85	8.35	4.96	35.20	41.41		
	48	4	2	0.71	2.83	0.85	3.33	2.83	8.03	9.44	99.78	146.71
Dec 05	48	3	2	0.71	2.83	0.85	3.33	2.13	6.02	7.08		
	49	7	20	0.71	28.17	0.85	33.14	4.96	139.71	164.36		
	50	7	4	0.71	5.61	0.85	6.60	4.96	27.81	32.71		
	51	7	0	0.70	0.00	0.85	0.00	4.96	0.00	0.00		
	52	7			0.71 *		1.05	4.96	3.50	5.22	177.04	209.38
Jan 06	1	7	1	0.71	1.41	0.67	2.11	4.96	7.00	10.45		
	2	7			3.62 *		5.40	4.96	17.95	26.79		
	3	7	4	0.69	5.83	0.67	8.70	4.96	28.90	43.14		
	4	7			2.91 *		4.35	4.95	14.42	21.53		
	5	3	0	0.70	0.00	0.18	0.00	2.13	0.00	0.00	68.28	101.91
Feb 06	5	4	0	0.70	0.00	0.18	0.00	2.83	0.00	0.00		
	6	7			1.45 *		8.04	4.96	7.17	39.86		
	7	7	2	0.69	2.89	0.18	16.07	4.96	14.35	79.72		
	8	7			1.45 *		8.04	2.64	3.82	21.21		
	9	3	0	0.75	0.00	0.38	0.00	1.93	0.00	0.00	25.34	140.78
Mar 06	9	4	0	0.75	0.00	0.38	0.00	2.83	0.00	0.00		
	10	7			1.41 *		3.71	4.96	7.00	18.42		
	11	7	2	0.71	2.82	0.38	7.43	4.96	14.00	36.84		
	12	7	0	0.70	0.00	0.38	0.00	4.96	0.00	0.00		
	13	6	0	0.71	0.00	0.25	0.00	4.25	0.00	0.00	21.00	55.26

(continued)

Appendix Table B-4. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Apr 06	13	1	0	0.71	0.00	0.25	0.00	0.71	0.00	0.00		
	14	7	0	0.72	0.00	0.25	0.00	4.93	0.00	0.00		
	15	7	2	0.71	2.83	0.25	11.33	4.96	14.05	56.20		
	16	7			2.86 *		11.42	2.41	6.89	27.56		
	17	7			2.88 *		11.52	0.00	0.00	0.00		
	18	1			2.90 *		11.62	0.00	0.00	0.00	20.94	83.76
May 06	18	6			2.90 *		11.62	0.00	0.00	0.00		
	19	7			2.93 *		11.71	0.00	0.00	0.00		
	20	7			2.95 *		11.81	0.22	0.66	2.62		
	21	7	2	0.67	2.98	0.25	11.90	4.79	14.25	56.99		
	22	4	1	0.71	1.41	0.25	5.64	2.83	4.00	16.00	18.90	75.61
Jun 06	22	3	1	0.71	1.41	0.25	5.64	2.13	3.00	12.00		
	23	7	29	0.72	40.50	0.25	162.01	4.95	200.37	801.49		
	24	7	263	0.81	326.28	0.59	553.02	4.95	1614.6	2736.6		
	25	7	3	0.69	4.32	0.59	7.33	4.96	21.45	36.35		
	26	6	34	0.69	49.18	0.59	83.35	4.25	209.08	354.38	2048.5	3940.8
Jul 06	26	1	34	0.69	49.18	0.59	83.35	0.71	34.85	59.06		
	27	7	4	0.69	5.76	0.59	9.77	4.96	28.60	48.47		
	28	7	2	0.71	2.80	0.59	4.75	4.96	13.91	23.58		
	29	7	3	0.71	4.23	0.59	7.18	4.96	21.00	35.59		
	30	7	1	0.70	1.43	0.59	2.42	4.95	7.07	11.98		
	31	2	0	0.68	0.00	0.81	0.00	1.42	0.00	0.00	105.42	178.68

(continued)

Appendix Table B-4. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Aug 06	31	5	0	0.68	0.00	0.81	0.00	3.54	0.00	0.00		
	32	7	0	0.73	0.00	0.81	0.00	4.96	0.00	0.00		
	33	7	1	0.70	1.43	0.81	1.77	4.95	7.09	8.75		
	34	7	0	0.71	0.00	0.81	0.00	4.96	0.00	0.00		
	35	5	0	0.73	0.00	0.81	0.00	3.54	0.00	0.00	7.09	8.75
Sep 06	35	2	0	0.73	0.00	0.81	0.00	1.42	0.00	0.00		
	36	7	0	0.69	0.00	0.81	0.00	4.96	0.00	0.00		
	37	7	0	0.72	0.00	0.94	0.00	4.96	0.00	0.00		
	38	7	1	0.71	1.41	0.94	1.50	3.72	5.26	5.59		
	39	7			1.42 *		1.51	3.33	4.72	5.03	9.98	10.62
Oct 06	40	7	1	0.70	1.43	0.94	1.52	4.94	7.05	7.50		
	41	7	3	0.69	4.36	0.78	5.59	4.96	21.63	27.73		
	42	7	0	0.71	0.00	0.78	0.00	4.95	0.00	0.00		
	43	7	4	0.73	5.47	0.78	7.02	4.96	27.15	34.81		
	44	3	13	0.72	18.11	0.78	23.21	2.12	38.32	49.13	94.15	119.17
Nov 06	44	4	13	0.72	18.11	0.78	23.21	2.83	51.32	65.80		
	45	7			9.05 *		11.61	4.96	44.91	57.57		
	46	7	0	0.74	0.00	0.93	0.00	4.96	0.00	0.00		
	47	7			0.70 *		0.75	4.95	3.47	3.73		
	48	5	1	0.71	1.40	0.93	1.51	3.54	4.96	5.34	104.66	132.44
Dec 06	48	2	1	0.71	1.40	0.93	1.51	1.42	1.98	2.13		
	49	7			2.80 *		3.01	4.96	13.90	14.95		
	50	7	3	0.71	4.20	0.93	4.52	4.96	20.86	22.42		
	51	7			3.54 *		4.01	2.44	8.64	9.80		
	52	7	2	0.70	2.87	0.82	3.50	4.96	14.23	17.35		
	53	1			2.12 *		2.59	0.71	1.51	1.84	61.12	68.49

(continued)

Appendix Table B-4. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jan 07	53	6			2.12 *		2.59	4.25	9.03	11.01		
	1	7	1	0.72	1.38	0.82	1.68	4.96	6.85	8.35		
	2	7			1.40 *		1.71	3.64	5.10	6.22		
	3	7	1	0.70	1.43	0.82	1.74	2.56	3.65	4.45		
	4	4			0.71 *		0.87	2.72	1.94	2.37	26.57	32.41
Feb 07	4	3			0.71 *		0.87	2.13	1.52	1.85		
	5	7	0	0.70	0.00	0.82	0.00	4.50	0.00	0.00		
	6	7			1.45 *		1.76	4.20	6.07	7.41		
	7	7	2	0.69	2.89	0.82	3.53	4.96	14.34	17.49		
	8	4			1.45 *		1.76	2.83	4.10	5.00	26.02	31.74
Mar 07	8	3			1.45 *		1.76	2.13	3.07	3.75		
	9	7	0	0.72	0.00	0.82	0.00	4.96	0.00	0.00		
	10	7			0.94 *		1.15	4.93	4.64	5.66		
	11	7			1.88 *		2.29	4.74	8.92	10.88		
	12	7	2	0.71	2.82	0.82	3.44	4.96	13.98	17.05	30.61	37.33
Apr 07	13	7	1	0.74	1.35	0.60	2.26	4.96	6.72	11.20		
	14	7	0	0.71	0.00	0.60	0.00	4.96	0.00	0.00		
	15	7			1.37 *		2.29	2.10	2.88	4.80		
	16	7			2.75 *		4.58	0.00	0.00	0.00		
	17	2			4.12 *		6.87	0.00	0.00	0.00	9.60	16.00
May 07	17	5			4.12 *		6.87	0.00	0.00	0.00		
	18	7			5.50 *		9.16	0.00	0.00	0.00		
	19	7			6.87 *		11.45	0.86	5.88	9.80		
	20	7	6	0.73	8.24	0.60	13.74	4.50	37.12	61.86		
	21	5	1	0.39	2.55	0.60	4.25	3.04	7.74	12.91	50.75	84.58

(continued)

Appendix Table B-4. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jun 07	21	2	1	0.39	2.55	0.60	4.25	0.95	2.43	4.05		
	22	7	7	0.68	10.35	0.60	17.24	4.92	50.88	84.79		
	23	7	2	0.79	2.52	0.60	4.20	4.96	12.50	20.83		
	24	7	1	0.71	1.40	0.41	3.42	4.96	6.96	16.98		
	25	4	2	0.72	2.77	0.41	6.76	2.83	7.86	19.17	80.63	145.82

[a] Weekly impingement rates were interpolated for weeks with missed or voided collections (*)
[b] Screen collection efficiency factors based on proportion of 100 released test fish that passed through screen were used to adjust to sample data
[c] Adjusted impingement rates were interpolated for weeks with missed or voided collections
MCM = Million Cubic Meters

APPENDIX C

Merrimack Station Quality Control

Appendix Table C-1. Species present in Normandeau Associates fish reference collection from Hooksett Pool of the Merrimack Station observed during impingement sampling.

Scientific Name	Common Name	Specimen Available
Anguillidae	freshwater eels	
Anguilla rostrata	American eel	x
Cyprinidae	carps and minnows	
Hybognathus regius	eastern silvery minnow	x
Luxilis cornutus	common shiner	x
Notemigonus crysoleucas	golden shiner	x
Notropis atherinoides	emerald shiner	
Notropis bifrenatus	bridle shiner	x
Notropis hudsonius	spottail shiner	x
Semotilus corporalis	fallfish	x
Catostomidae	suckers	
Catostomus commersonii	white sucker	x
Ictaluridae	North American catfishes	
Ameiurus natalis	yellow bullhead	x
Ameiurus nebulosus	brown bullhead	
Noturus insignis	margined madtom	x
Esocidae	pikes	
Esox niger	chain pickerel	x
Osmeridae	smelts	
Osmerus mordax	rainbow smelt	x
Moronidae	temperate basses	
Morone americana	white perch	x
Centrarchidae	sunfishes	
Ambloplites rupestris	rock bass	x
Enneacanthus obesus	banded sunfish	x
Lepomis auritus	redbreast sunfish	x
Lepomis gibbosus	pumpkinseed	x
Lepomis macrochirus	bluegill	x
Micropterus dolomieu	smallmouth bass	x
Micropterus salmoides	largemouth bass	x
Pomoxis nigromaculatus	black crappie	x
Percidae	perches	
Etheostoma olmstedi	tessellated darter	x
Perca flavescens	yellow perch	x

Appendix Table C-2. Summary of QC effort for Merrimack Station impingement and entrainment programs.

Sample Type	Task	Number of Inspections	# Passed	# Failed
Impingement	Sort	63	63	0
Impingement	Identification/Count	83	83	0
Impingement	Fish length	105	102	3
Entrainment	Sort	27	27	0
Entrainment	Count	8	8	0
Entrainment	Identification	21	20	1
Entrainment	Life Stage Determination	21	20	1

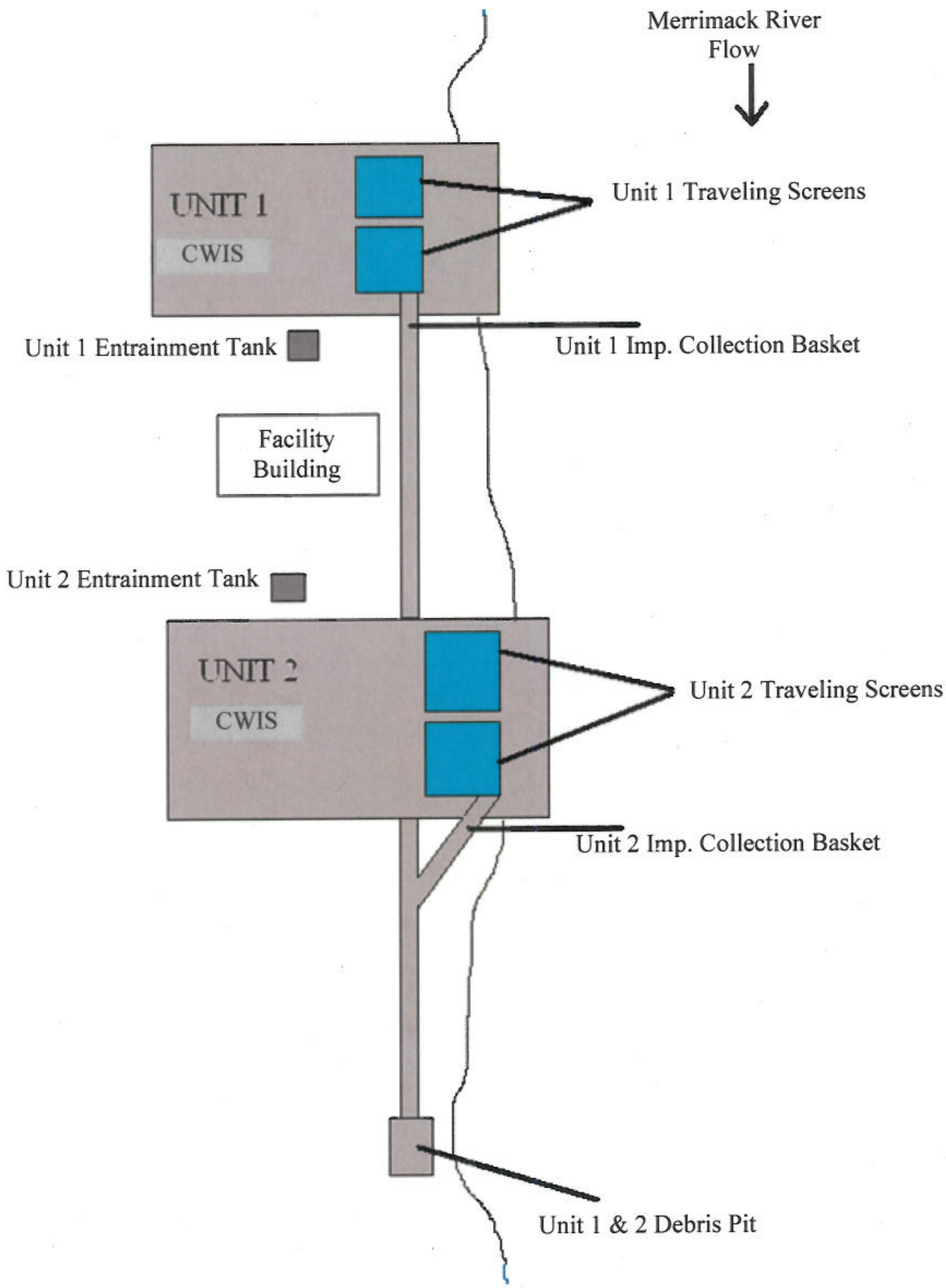


Figure 2-1. Site view showing the location of entrainment samplers and impingement collection baskets relative to the CWIS at Units 1 and 2 of Merrimack Station.

Figure 2-2. Locations of entrainment tank samplers at Units 1 (top) and 2 (bottom) of Merrimack Station.

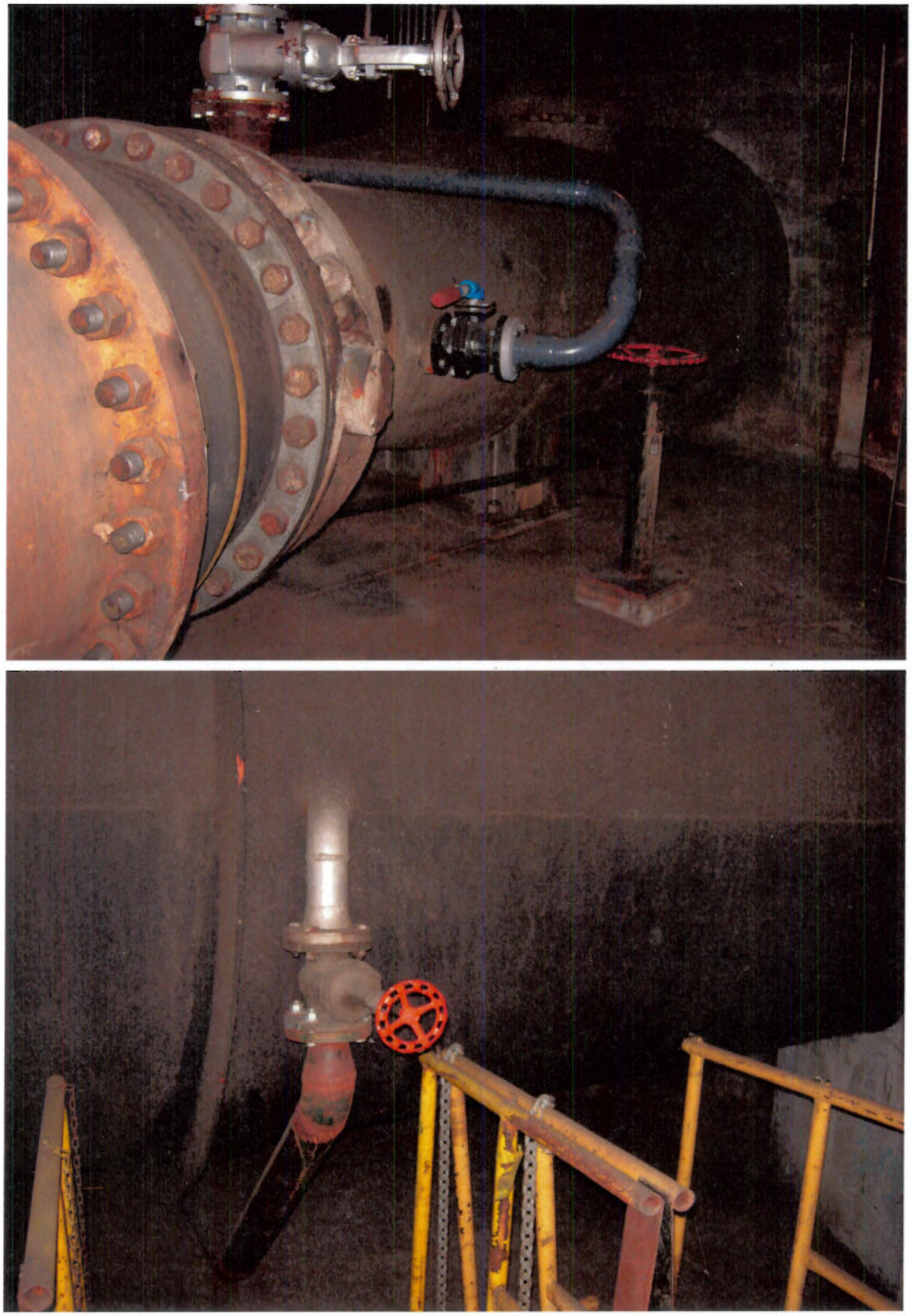


Figure 2-3. Location of the 3-in. tap supplying condenser flow into the entrainment sampling tanks from the main condenser supply lines withing the CWIS at Merrimack Station Unit 1(top) and Unit 2 (bottom).

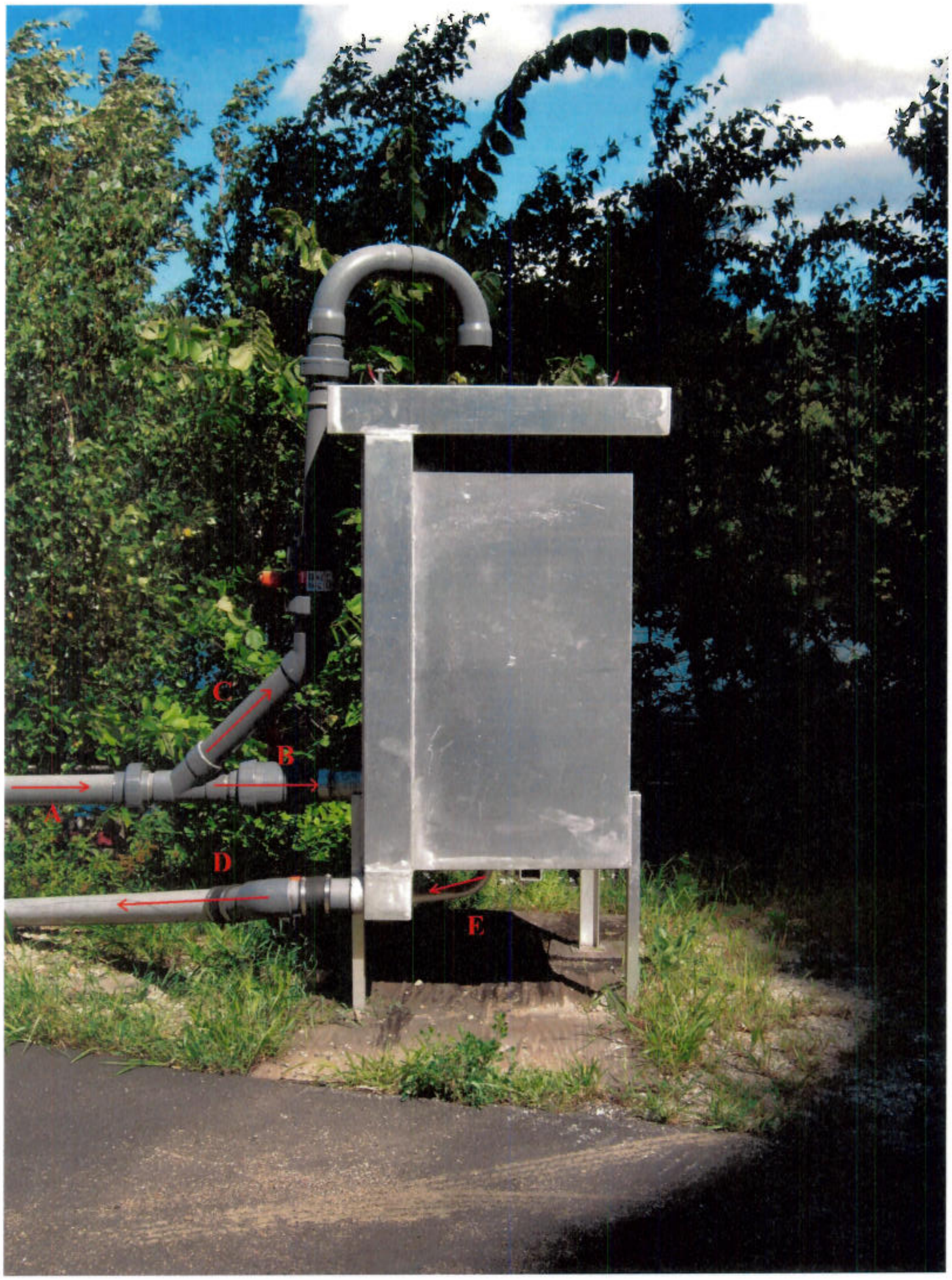


Figure 2-4. Diagram of Merrimack Station entrainment sampler showing flow patterns through tank. A: Intake flow to sampling tank. B: Flow path for water during entrainment survival test – bottom fill to swirl water around in cylindrical net. C: Flow path for water during regular entrainment sampling – top fill filters down through conical net and sample is collected in cod end. D: Drain line connected to tank stand pipe. E: Drain line for use during entrainment survival test which draws sample out of conical collection area at base of inner tank.

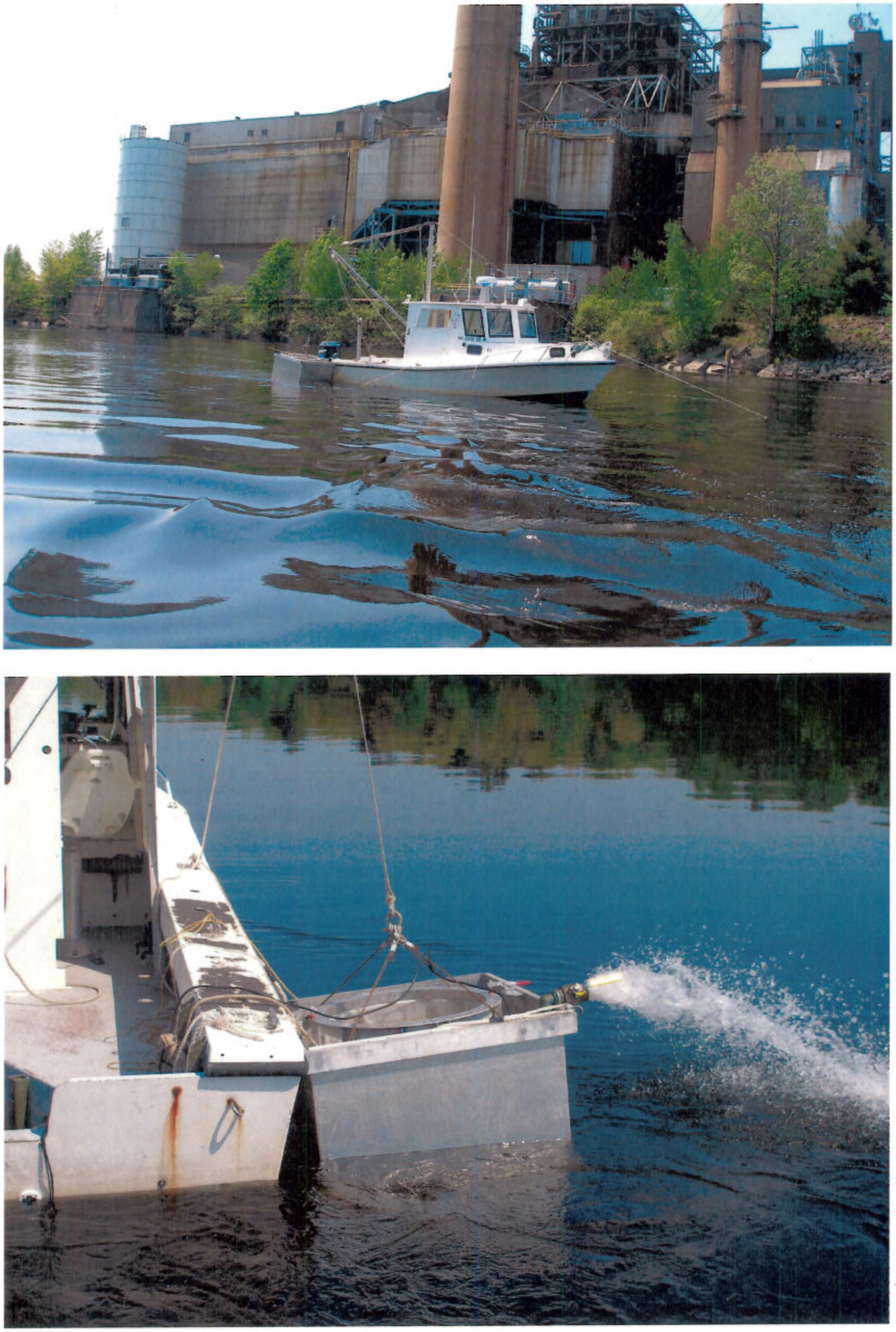


Figure 2-5. Control sampling tank for entrainment survival studies at Merrimack Station.

Figure 2-6. Impingement sample baskets at downstream end of debris sluice at Units 1 (top) and 2 (bottom) of Merrimack Station.

Figure 2-7. Injection device (bottom panel) and fish holding facility (upper panel) used at Units 1 and 2 of Merrimack Station for the release of fish onto the traveling screens associated with collection efficiency and impingement survival testing.

Table 2-1. Achieved sampling schedule for entrainment at Unit 1 of Merrimack Station.

May-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	**31**			

Aug-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	**2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	22	**23**	24	25	26
27	28	29	**30**	31		

Jun-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	21	22	23	24
25	26	27	**28**	29	30	

Sep-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Jul-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	**5**	6	7	8
9	10	11	12	13	14	15
16	17	18	19	**20**	21	22
23	24	25	**26**	27	28	29
30	31					

Table 2-1. (Continued)

Apr-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	**4**	5	6	7
8	9	10	11	12	13	14
15	16	17	**18**	19	20	21
22	23	24	25	26	27	28
29	30					

Jul-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

May-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	**2**	3	4	5
6	7	8	9	10	11	12
13	14	15	**16**	17	18	19
20	21	22	**23**	24	25	26
27	28	29	**30**	31		

Aug-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Jun-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	**6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	**20**	21	22	23
24	25	26	**27**	28	29	30

Sep-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Bolded dates represent paired diel samples. The yellow and blue shaded weeks represent the corresponding periods of extrapolation for that sample. Weeks with alternating blue and yellow blocks are the product of a weighted average of the two weeks on either side of that particular time period.

Table 2-2. Achieved sampling schedule for entrainment at Unit 2 of Merrimack Station.

May-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	**24**	**25**	26	27
28	29	30	**31**			

Aug-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	**2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	22	23	24	25	26
27	28	29	**30**	31		

Jun-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	**21**	22	23	24
25	26	27	**28**	29	30	

Sep-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	**13**	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Jul-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	**5**	6	7	8
9	10	11	**12**	13	14	15
16	17	18	**19**	20	21	22
23	24	25	**26**	27	28	29
30	31					

Table 2-2. (Continued)

Apr-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	**4**	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Jul-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

May-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	**23**	24	25	26
27	28	29	**30**	31		

Aug-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Jun-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	**6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	**20**	21	22	23
24	25	26	**27**	28	29	30

Sep-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Bolded dates represent paired diel samples. The yellow and blue shaded weeks represent the corresponding periods of extrapolation for that sample. Weeks with alternating blue and yellow blocks are the product of a weighted average of the two weeks on either side of that particular time period.

Table 2-3. Achieved sampling schedule for impingement at Unit 1 of Merrimack Station.

Jun-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	29	30		

Jul-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Aug-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	CE 10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	CE 31			

Sep-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	CE 28	29	30	

Oct-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Nov-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	CE 2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

Dec-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	CE 7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Table 2-3. (Continued)

Jan-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	CE 4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Feb-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			CE 1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

Mar-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			CE 1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Apr-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	CE 12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

May-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	CE 3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	CE 30	31			

Jun-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

Table 2-3. (Continued)

Jul-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	CE **5**	6	7	8
9	10	11	**12**	13	14	15
16	17	18	**19**	20	21	22
23	24	25	CE **26**	27	28	29
30	31					

Aug-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	**2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	22	**23**	24	25	26
27	28	29	CE **30**	31		

Sep-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

Oct-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	**4**	5	6	7
8	9	10	**11**	12	13	14
15	16	17	CE **18**	19	20	21
22	23	24	**25**	26	27	28
29	30	31				

Nov-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	**15**	16	17	18
19	20	21	22	23	24	25
26	27	28	CE **29**	30		

Dec-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	**13**	14	15	16
17	18	19	20	21	22	23
24	25	26	CE **27**	28	29	30
31						

Table 2-3. (Continued)

Jan-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	**10**	11	12	13
14	15	16	17	18	19	20
21	22	23	CE **24**	25	26	27
28	29	30	31			

Apr-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	**4**	5	6	7
8	9	10	**11**	12	13	14
15	16	17	18	19	20	21
22	23	24	**25**	26	27	28
29	30					

Feb-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	14	15	16	17
18	19	20	CE **21**	22	23	24
25	26	27	28			

May-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	CE **2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	22	**23**	24	25	26
27	28	29	**30**	31		

Mar-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	14	15	16	17
18	19	20	**21**	22	23	24
25	26	27	CE **28**	29	30	31

Jun-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	CE **6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	CE **20**	21	22	23
24	25	26	**27**	28	29	30

Bolded dates represent 24-hour samples. The yellow and blue shaded weeks represent the corresponding periods of extrapolation for that sample. Weeks with alternating blue and yellow blocks are the product of a weighted average of the two weeks on either side of that particular time period.
CE represents a collection efficiency test. The alternating light gray and white areas represent the corresponding periods of extrapolation covered by that particular test result.

Table 2-4. Achieved sampling schedule for impingement at Unit 2 of Merrimack Station.

Jun-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
26	27	28	**29**	30		

Jul-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	**6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	**20**	21	22	23
24	25	26	**27**	28	29	30
31						

Aug-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	**3**	4	5	6
7	8	9	**10**	11	12	13
14	15	16	CE **17**	18	19	20
21	22	23	**24**	25	26	27
28	29	30	CE **31**			

Sep-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	**21**	22	23	24
25	26	27	CE **28**	29	30	

Oct-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	**5**	6	7	8
9	10	11	12	13	14	15
16	17	18	**19**	20	21	22
23	24	25	**26**	27	28	29
30	31					

Nov-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	CE **2**	3	4	5
6	7	8	**9**	10	11	12
13	14	15	**16**	17	18	19
20	21	**22**	23	24	25	26
27	28	29	**30**			

Dec-05

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	CE **7**	8	9	10
11	12	13	**14**	15	16	17
18	19	20	**21**	22	23	24
25	26	27	28	29	30	31

Table 2-4. (Continued)

Jan-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	CE 4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Apr-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	CE 5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

Feb-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			CE 1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

May-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

Mar-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			CE 1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Jun-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

Table 2-4. (Continued)

Jul-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	CE 5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Oct-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	CE 18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Aug-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	CE 30	31		

Nov-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	CE 29	30		

Sep-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	CE 20	21	22	23
24	25	26	27	28	29	30

Dec-06

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

Table 2-4. (Continued)

Jan-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
	1	2	3	4	5	6
7	8	9	**10**	11	12	13
14	15	16	17	18	19	20
21	22	23	**24**	25	26	27
28	29	30	31			

Apr-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	**4**	5	6	7
8	9	10	**11**	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

Feb-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	14	15	16	17
18	19	20	CE **21**	22	23	24
25	26	27	28			

May-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	**23**	24	25	26
27	28	29	**30**	31		

Mar-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	**7**	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	**28**	29	30	31

Jun-07

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5	CE **6**	7	8	9
10	11	12	**13**	14	15	16
17	18	19	CE **20**	21	22	23
24	25	26	**27**	28	29	30

Bolded dates represent 24-hour samples. The yellow and blue shaded weeks represent the corresponding periods of extrapolation for that sample. Weeks with alternating blue and yellow blocks are the product of a weighted average of the two weeks on either side of that particular time period.
CE represents a collection efficiency test. The alternating light gray and white areas represent the corresponding periods of extrapolation covered by that particular test result.

Table 2-5. Sampling dates[1] for 24-hour impingement monitoring at Merrimack Station Unit 1 and Unit 2 from June 2005 through June 2007.

Sampling Date	Unit 1	Unit 2	Sampling Date	Unit 1	Unit 2	Sampling Date	Unit 1	Unit 2	Sampling Date	Unit 1	Unit 2
29-30 Jun 05	X	X	4-5 Jan 06	X	X	5-6 Jul 06	X	X	10-11 Jan 07	X	X
6-7 Jul 05	X	X	18-19 Jan 06	X	X	12-13 Jul 06	X	X	24-25 Jan 07	X	X
13-14 Jul 05	X	X	1-2 Feb 06	X	X	19-20 Jul 06	X	X	7-8 Feb 07	X	X
20-21 Jul 05	X	X	15-16 Feb 06	X	X	26-27 Jul 06	X	X	21-22 Feb 07	X	X
27-28 Jul 05	X	X	1-2 Mar 06	X	X	2-3 Aug 06	X	X	7-8 Mar 07	X	X
3-4 Aug 05	X	X	15-16 Mar 06	X	X	9-10 Aug 06	X	X	21-22 Mar 07	X	3
10-11 Aug 05	X	X	22-23 Mar 06	X	X	16-17 Aug 06	X	X	28-29 Mar 07	X	X
17-18 Aug 05	X	X	29-30 Mar 06	X	X	23-24 Aug 06	X	X	4-5 Apr 07	X	X
24-25 Aug 05	X	X	5-6 Apr 06	X	X	30-31 Aug 06	X	X	11-12 Apr 07	X	X
31 Aug-1 Sep 05	X	X	12-13 Apr 06	X	X	6-7 Sep 06	3	X	18-19 Apr 07	3	3
7-8 Sep 05	X	X	19-20 Apr 06	X	3	13-14 Sep 06	3	X	25-26 Apr 07	X	3
14-15 Sep 05	X	X	26-27 Apr 06	X	3	20-21 Sep 06	3	X	2-3 May 07	X	3
21-22 Sep 05	X	X	3-4 May 06	X	3	27-28 Sep 06	3	3	9-10 May 07	X	3
28-29 Sep 05	X	X	10-11 May 06	X	3	4-5 Oct 06	X	X	16-17 May 07	X	3
5-6 Oct 05	X	X	17-18 May 06	X	3	11-12 Oct 06	X	X	23-24 May 07	X	X
12-13 Oct 05	3	3	24-25 May 06	3	X	18-19 Oct 06	X	X	30-31 May 07	X	X
19-20 Oct 05	X	X	31 May-1 Jun 06	X	X	25-26 Oct 06	X	X	6-7 Jun 07	X	X
26-27 Oct 05	X	X	7-8 Jun 06	X	X	1-2 Nov 06	X	X	13-14 Jun 07	X	X
2-3 Nov 05	X	X	14-15 Jun 06	X	X	15-16 Nov 06	X	X	20-21 Jun 07	X	X
9-10 Nov 05	X	X	21-22 Jun 06	3	X	29-30 Nov 06	X	X	27-28 Jun 07	X	X
16-17 Nov 05	X	X	28-29 Jun 06	X	X	13-14 Dec 06	X	X			
22-23 Nov 05	X	X				27-28 Dec 06	X	X			
30 Nov-1 Dec 05	3	X									
7-8 Dec 05	X	X									
14-15 Dec 05	X	X									
21-22 Dec 05	X	X									

[1]X= Valid 24-h impingement sample collected (i.e. Use Code = 1)
3 = Voided sample period. No sample collected due to outage, etc. (i.e. Use Code = 5)

Table 2-6. Table of parameters for determination of adult equivalent losses for largemouth bass.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	1.9	0.149568619	0.260216949	
Larvae	2.7	0.067205513	0.125946712	
YOY	0.446	0.640183772	0.780624443	
Age 1+	0.86	0.423162082	0.594678691	82
Age 2+	1.17	0.310366941		188
Age 3+	0.755	0.470010615		266
Age 4+ [c]	1.05	0.349937749		326

* shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-3) (EPA 2004)
b Average from three populations in Maine, Beamesderfer and North 1995.
c Conservative value for the age at sexual maturity for females is 4 years, Scott and Crossman 1973.

Table 2-7. Table of parameters for determination of adult equivalent losses for pumpkinseed.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	1.71	0.180865793	0.306327432	
Larvae	0.687	0.503083057	0.66940154	
YOY	0.687	0.503083057	0.66940154	
Age 1+	1.61	0.199887614	0.333177227	74
Age 2+ [c]	1.61	0.199887614		104

* shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-30) (EPA 2004)
b Taken from a population in Michigan, Scott and Crossman 1973.
c Age at sexual maturity for pumpkinseed is 2 years, Scott and Crossman 1973.

Table 2-8. Table of parameters for determination of adult equivalent losses for bluegill.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	1.73	0.17728441	0.301175159	
Larvae	0.576	0.562142445	0.719707024	
YOY	4.62	0.009852796	0.019513331	
Age 1+	0.39	0.677056874	0.807434601	79
Age 2+	0.151	0.859847699	0.92464313	109
Age 3+ [c]	0.735	0.479505459		137

*shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-7) (EPA 2004)
b Taken from a population in Michigan, Scott and Crossman 1973.
c Conservative value for age at sexual maturity for bluegill is 3 years, Scott and Crossman 1973.

Table 2-9. Table of parameters for determination of adult equivalent losses for black crappie.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	0.5	0.60653066	0.755081338	
Larvae	3.6	0.027323722	0.053193987	
YOY	1.8	0.165298888	0.28370213	
Age 1+	3.65	0.025991129	0.050665406	115
Age 2+ [c]	0.6	0.548811636		173

*shaded box denotes age at sexual maturity a - Taken from Barnthouse 2005.
b Taken from a population in Ontario, Canada, Scott and Crossman 1973. Converted from fork length (TL = 1.02792*FL).
c Conservative value for age at sexual maturity for black crappie is 2 years, Scott and Crossman 1973.

Table 2-10. Table of parameters for determination of adult equivalent losses for spottail shiner.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	1.9	0.149568619	0.260216949	
Larvae	4.61	0.009951818	0.019707511	
YOY	0.777	0.459783294	0.629933629	
Age 1+	0.371	0.690043942	0.816598817	84
Age 2+ [c]	4.61	0.009951818		99

*shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-24) (EPA 2004).
b Taken from a population in Wisconsin, Becker 1983.
c Age at sexual maturity for spottail shiner is 2 years, Becker 1983.

Table 2-11. Table of parameters for determination of adult equivalent losses for yellow perch.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si	Length at Age (mmtl) [b]
Egg	2.7	0.067205513	0.125946712	
Larvae	3.67	0.02547647	0.049687088	
YOY	2.48	0.083743226	0.154544404	
Age 1+	0.36	0.697676326	0.821919132	75
Age 2+	0.69	0.501576069	0.668066146	91
Age 3+	1.2	0.301194212	0.462950433	131
Age 4+ [c]	1.2	0.301194212		150

*shaded box denotes age at sexual maturity
a Taken from Barnthouse 2005
b Taken from a population in Canada and measurements converted from fork length to total length (TL = FL*1.05838), Scott and Crossman 1973.
c Age at sexual maturity for females is 4 years, Scott and Crossman 1973.

Table 2-12. Table of parameters for determination of adult equivalent losses for white sucker.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si
Egg	2.05	0.128734904	0.228104763
Larvae	2.56	0.07730474	0.143515085
YOY	2.3	0.100258844	0.182245922
Age 1+	0.274	0.760332075	
Age 2+	0.274	0.760332075	
Age 3+	0.274	0.760332075	
Age 4+ [b]	0.274	0.760332075	

*shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-3) (EPA 2004)
b Conservative value for age at sexual maturity for white sucker is 4 years, Scott and Crossman 1973.

Table 2-13. Table of parameters for determination of adult equivalent losses for the carp and minnow family.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si
Egg	1.9	0.149568619	0.260216949
Larvae	4.61	0.009951818	0.019707511
YOY	1.39	0.249075305	0.398815514
Age 1+	0.13	0.878095431	
Age 2+	0.13	0.878095431	

*shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-9) (EPA 2004).
b Conservative estimate of age at sexual maturity based on values for spottail shiner (abundantly present in Hooksett Pool).

Table 2-14. Table of parameters for determination of adult equivilant losses for the sunfish family.

Stage (i)	Instantaneous Mortality (Z) [a]	S	Si
Egg	1.73	0.17728441	0.301175159
Larvae	0.576	0.562142445	0.719707024
YOY	4.62	0.009852796	0.019513331
Age 1+	0.39	0.677056874	0.807434601
Age 2+	0.151	0.859847699	0.92464313
Age 3+	0.735	0.479505459	

*shaded box denotes age at sexual maturity
a Taken from Inland Region Life History Parameter Values (Table H1-7) (EPA 2004).
b Conservative estimate of age at sexual maturity based on value for bluegill (dominant sunfish species present in Hooksett Pool).

3.0 ENTRAINMENT RESULTS

A total of 48 valid entrainment samples were collected at Unit 1 and 47 at Unit 2 from 21 May 2006 through 25 June 2007. As requested in the EPA 308 letter to PSNH, this section will present the number of eggs and larvae collected and the physical and environmental parameters collected in conjunction with each sample. Table 1 of Appendix A presents the duration, volume and recorded water quality parameters for each entrainment sample.

3.1 Species Composition

Seven fish species belonging to five families were identified from Merrimack Station entrainment samples (Table 3-1). The additional three taxonomic categories in Table 3-1 represented specimens that were either too badly damaged to identify or were in a life stage or size range in which two or more locally occurring species cannot be reliably distinguished (i.e., Centrarchidae, Clupeidae, or Cyprindae).

Among the total raw or numerical count of individual fish entrained at Merrimack Station (Units 1 & 2 pooled over 2006 and 2007), 89% were post yolk-sac larvae (PYSL). PYSL are defined as the transitional life stage of larval development occurring from the time when a complete functional digestive system has been fully developed to the time when the organism transforms into a fully formed juvenile fish. Yolk-sac larvae (YSL), defined as the transition stage from hatching through the development of a complete, functional digestive system, represented 6.2% of the total entrained. Young of year (YOY), defined as the stage from completed transformation into a juvenile fish to Age 1 (12 months), represented 1.4 % of the total entrained at Merrimack Station Units 1 and 2 combined. A total of just four eggs were entrained among the two years of sampling at Merrimack Station Units 1 and 2, representing 1.1% of the total count of entrained organisms. The remainder (2.3%) were larvae that could not be identified to family or staged due to the damaged condition of the individuals in the sample.

Among PYSL entrained at Merrimack Station (Units 1 and 2 combined), white sucker was the most abundant taxon and the carp and minnow family ranked second, together accounting for 73% of all PYSL (Table 3-2). Other commonly found species included yellow perch and sunfish family. Yolk-sac larvae were mostly of the carp and minnow family (61%; Table 3-2). Sunfish family and tessellated darter made up the remainder of the entrained YSL. Entrained young-of-year fish included white sucker, spottail shiner and margined madtom (Table 3-2). Of the four eggs entrained during sampling, one belonged to the carp and minnow family while the remainder could not be identified to family (Table 3-2). As would be expected, the most abundantly entrained species had the highest mean densities (# per 100 m^3; Table 3-3).

Species composition of entrained larvae was similar at Units 1 and 2 for the season. White sucker, carp and minnow family, sunfish family, and yellow perch were the four most abundant taxa decreasing in order of abundance within the entrained PYSL at both Units 1 and 2 (Table 3-2). The carp and minnow family, sunfish family, and tessellated darter constituted 100% of the yolk sac larvae entrained at both Units 1 and 2 (Table 3-2). Unit 1 entrained a total of four YOY and three eggs while Unit 2 entrained a total of one YOY and one egg during the season (Table 3-2).

3.2 Sizes of Entrained Fish

The mean, range, and length frequency distribution (in 1 mm length classes) of each fish species entrained at Merrimack Station is presented in Table 3-3. The lengths of entrained fish ranged from 3.7 mm (Cyprinidae) to 24.2 mm (white sucker). Peak abundances of entrained larvae occurred within the length classes of 5.0-5.9, 10.0-11.9 and 14.0-16.9 mm (Figure 3-1). Larvae within the 5.0-5.9 mm length class comprised members of the family Centrarchidae (sunfishes and black crappie) and Cyprinidae (minnow species). The peak abundance within the 10.0 – 11.9 mm length classes comprised white sucker and cyprinids, while the abundance within the 14.0 to 16.9 mm length classes was dominated by white sucker.

Among the dominant species entrained, 78.8% of entrained white sucker larvae were between the lengths of 10.0 and 16.9 mm (range = 6.0-24.9 mm). Among the entrained members of the sunfish family, 81.8% were within the range of 5.0 to 6.9 mm (range = 4.0-13.9 mm). Of the 94 entrained cyprinids, more than half (52.1%) were within the 4.0-5.9 mm length classes (range = 3.0-17.9 mm). Entrained larvae of yellow perch ranged from 6.0 to 14.9 mm with the highest abundance (39.2%) within the 7.0 to 7.9 mm length class.

3.3 Seasonal Abundance Patterns

The abundance of entrained larvae (YSL and PYSL pooled) at Merrimack Station (Units 1 and 2 pooled) varied seasonally with a primary peak in late-May and early-June (Figure 3-2). This spring peak occurred during both the 2006 and 2007 sampling years, and coincides with the time required for development into the larval stages from eggs spawned in early- or mid-May. Densities of entrained fish larvae peaked during first week of June in 2006 and 2007 reflecting similar year to year timing of spawning and larval development. Mean densities entrained during the early June peak observed were 0.89 per 100 m^3 in 2006 and 2.01 per 100 m^3 in 2007. A secondary peak in entrainment was observed in late-June of each year. Mean densities of larvae (YSL and PYSL pooled) entrained during the secondary peaks were 0.54 per 100 m^3 in 2006 and 0.75 per 100 m^3 in 2007. As would be expected given the life history strategies of resident fish species, mean densities during the summer months of July, August, and September and the early spring period of April showed lower levels of entrainment because little spawning occurs in then. White sucker accounted for 93% of the 2006 and 75% of the 2007 peak in larval entrainment that was observed during the late-May and early-June (primary) period. The carp and minnow family and sunfish family contributed significantly to the secondary peak in entrainment mean densities observed during the last week of June.

Egg entrainment at Merrimack Station (Units 1 and 2 combined) occurred during late-May and early-August in 2006 and during mid-June in 2007 (Figure 3-3). The 2007 peak was eggs from the carp and minnow family and unidentified. The eggs of the 2006 peaks could not be identified to species. It is possible that some of the unidentified eggs may have been unfertilized and extruded from impinged fish.

When examined separately by Unit at Merrimack Station, seasonal patterns of larval entrainment at Units 1 and 2 were similar to the overall pattern for both Units combined (Figure 3-2). During 2006 and 2007, larval entrainment at Unit 1 peaked during the first week of June, with mean densities of 0.59 per 100 m^3 and 3.15 per 100 m^3, respectively. Larval entrainment at Unit 2 peaked during the last week of May in 2006 (1.31 per 100 m^3) and first week of June in 2007 (0.86 per 100m^3). A secondary larval peak during late-June was present in the larval entrainment collection at both Units 1 and 2 during 2006 and 2007.

Due to the low number (4) of eggs observed in entrainment samples collected at Units 1 and 2 of Merrimack Station (combined), peaks in seasonal abundance of eggs occur when any were present in the sample (Figure 3-3). At Merrimack Station, a peak in egg entrainment occurred in 2006 during the week of 28 May (one egg at Unit 2, or 0.02 eggs per 100 m^3) and during the week of 6 August (one egg at Unit 1, or 0.02 per 100m^3). A peak in egg entrainment occurred at Merrimack Station during the week of 25 June 2007 with a mean density of two eggs at Unit 1, or 0.05 per 100 m^3. There were no eggs entrained at Unit 2 during the 2007 season.

3.4 Diel Patterns

For the two most abundant taxa, their occurrence of PYSL in Merrimack Station entrainment samples was significantly more abundant at night than during the day (Table 3-5). The mean density (#/100m^3) of entrained white sucker (Wilcoxon – two sample test, p=0.00384) and the carp and minnow family (Wilcoxon – two sample test, p=0.00398) were greater during night samples than those during daylight hours. Mean densities of white sucker observed during night samples were 8.8 times those observed during daytime samples while the carp and minnow family mean densities were 4.7 times greater at night than during the day. There were no significant differences observed in the mean densities between day and night samples for the YSL stage of any species.

When examined by individual Unit at Merrimack Station, PYSL of the carp and minnow family (Wilcoxon – two sample test, p=0.02296) entrained at Unit 1 and PYSL of the white sucker (Wilcoxon – two sample test; p=0.02257) entrained at Unit 2 showed significantly greater mean densities during night samples than those taken in during the day (Table 3-5). Yolk-sac larvae did not show any significant differences in mean density (#/100m^3) in night versus day samples at either Unit 1 or 2.

3.5 Estimated Entrainment Abundance

The total estimated entrainment abundance (total number of entrained fish obtained from the product of entrainment density and CWIS flow for the relevant period) over the 17-week 2006 season and the 13-week 2007 season reflected not only the densities of eggs and larvae per unit volume of water but also the volume of water withdrawal by Merrimack Station during periods of larval abundance in Hooksett Pool. Although circulating water pumps operated 100% of the time in many weeks, there were occasional weeks when the pumped volume was lower than normal due to brief changes or interruptions in the operations of the pumps.

The total number of fish larvae entrained at Merrimack Station (both Units combined) during the period of 21 May through 16 September 2006 was 2.8 million, and during the period of 1 April to 30 June 2007 was 2.4 million (Table 3-6). Unit 1 entrained 25 % during 2006 and 64% during 2007. During 2006, the dominant taxa among the larvae were white sucker (1.2 million, or 42%), carp and minnow family (1.0 million, or 36%) and sunfish family (0.4 million, or 14%). During 2007, the dominant taxa among the larvae were white sucker (1.1 million, or 46%), carp and minnow family (0.6 million, or 24%) and yellow perch (0.4 million, or 18%). Within the two sampling periods, larvae entrainment peaked during the month of June during both years (1.6 million in 2006 and 1.8

million in 2007; Table 3-7). Units 1 and 2 entrained their highest numbers of larvae during the month of June during both years of sampling (Table 3-7).

Total estimated entrainment abundance of fish eggs during 21 May through 16 September 2006 was 33,989 (Table 3-8). When separated by Unit, the total abundance for that same time period were 9,141 eggs at Unit 1 and 24,848 eggs at Unit 2. Total estimated entrainment abundance of fish eggs during 2 April to 30 June 2007 was 15,797 (Table 3-8). Entrainment of eggs occurred only at Unit 1 during the 2007 period. One half of the eggs entrained during 2007 belonged to members of the carp and minnow family. The remainder could not be identified to the family level. Within the two sampling periods, egg entrainment peaked in 2006 during the month of May (24,848 eggs) and in 2007 during the month of June (15,797 eggs; Table 3-7).

Tables A-2 and A-3 in Appendix A provide the estimated entrainment abundance for each species on a weekly and monthly basis. These entrainment abundance data are presented for Unit 1, Unit 2 and for both Units combined at Merrimack Station for each sample week during 2006 and 2007.

3.6 Entrainment Survival

Entrainment survival tests were performed at Units 1 and 2 of Merrimack Station during the spring of 2007. Entrainment survival sampling was conducted on 25 May 2007 and 18 June 2007 when larval abundances in Hooksett Pool were expected to be highest based on observations in the weekly entrainment samples. However, due to the overall low densities of larvae in Hooksett Pool, no larvae were collected for survival evaluation at either Unit 1 or Unit 2 during eight hours of continuous sampling on both test dates. There were no eggs or larvae observed in the samples collected during eight hours of pumping in the control tank either.

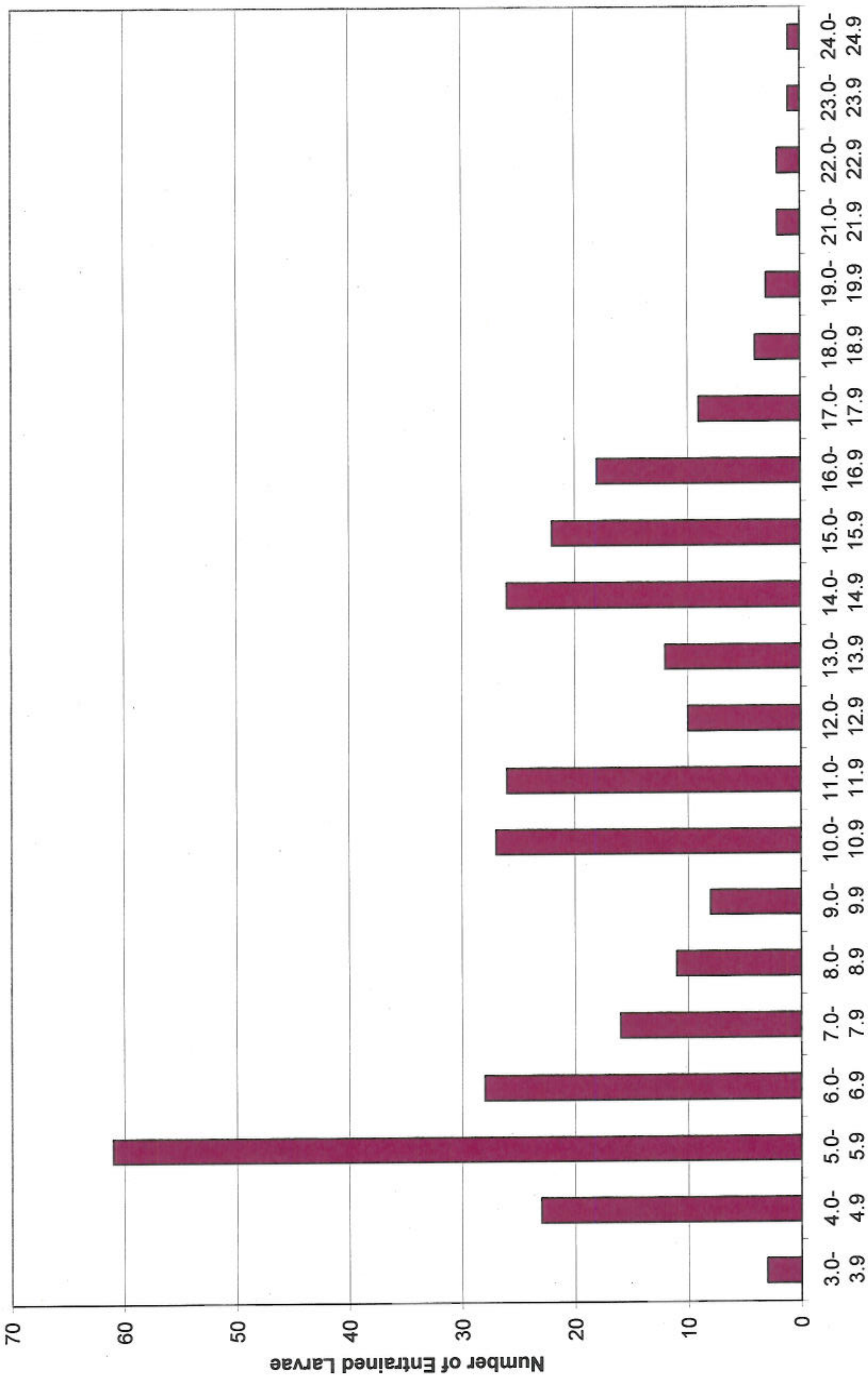


Figure 3-1. Length frequency distribution of entrained larval fish from Units 1 and 2 of Merrimack Station, May 2006 through June 2007.

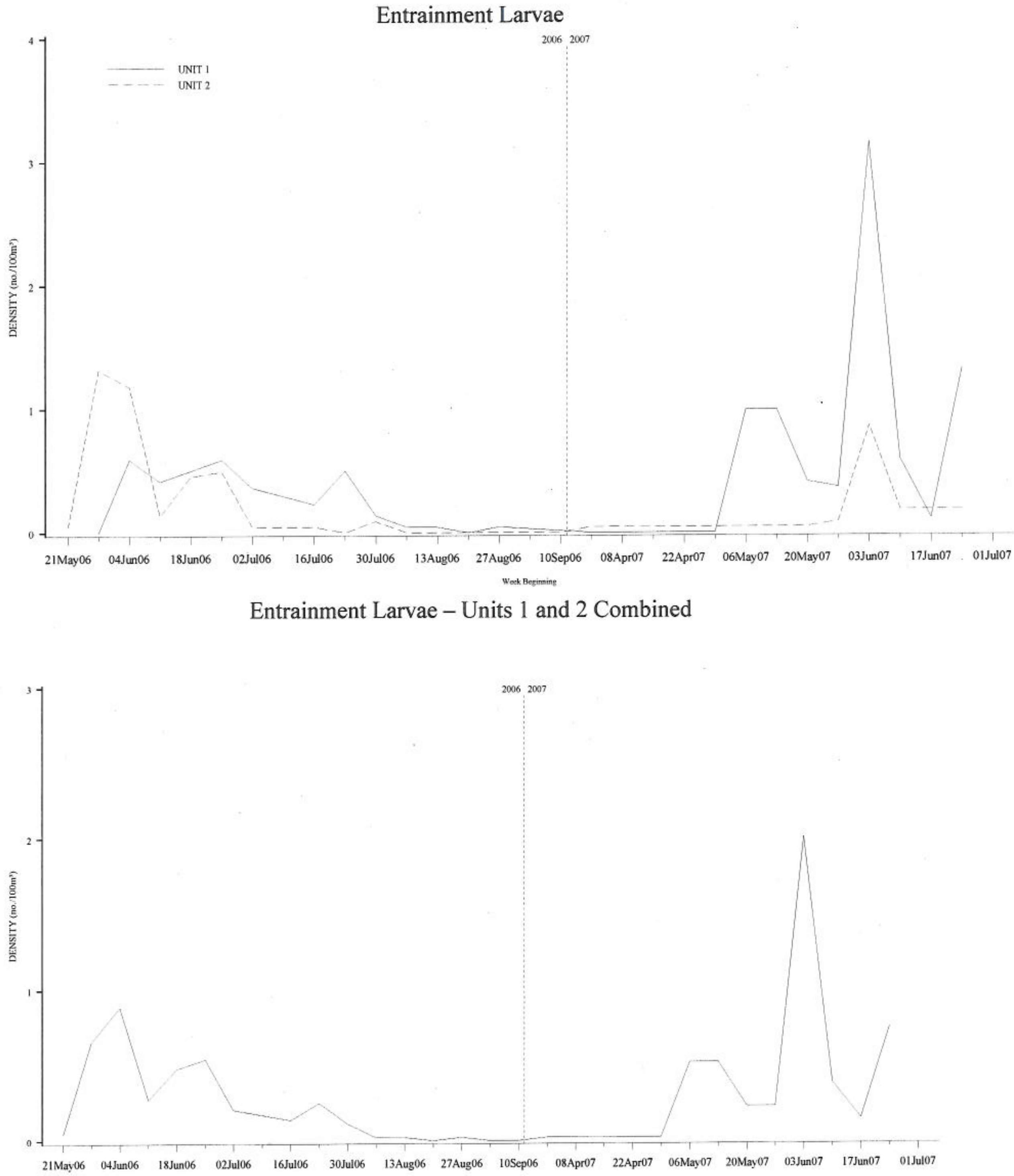
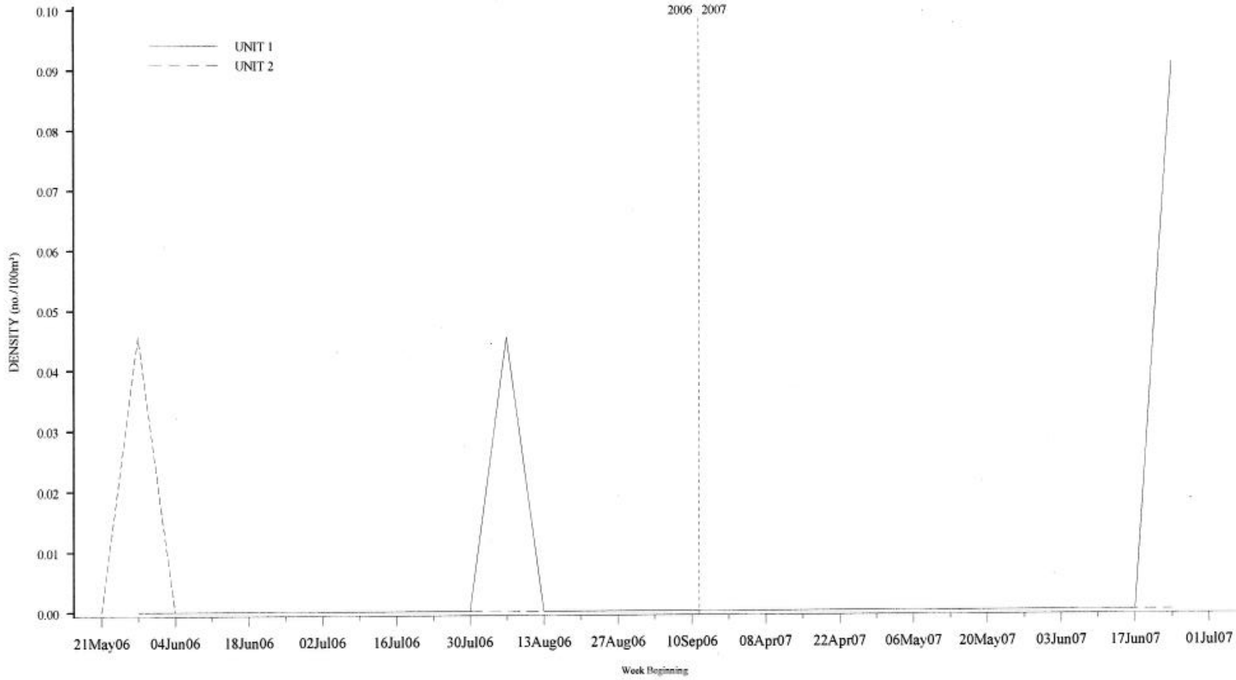


Figure 3-2. Mean larval density (#/100m^3) by week for entrainment samples collected at Merrimack Station from May 2006 through June 2007 at Units 1 and 2 (upper panel) and both Units combined (lower panel).

Entrainment Eggs



Entrainment Eggs – Units 1 and 2 Combined

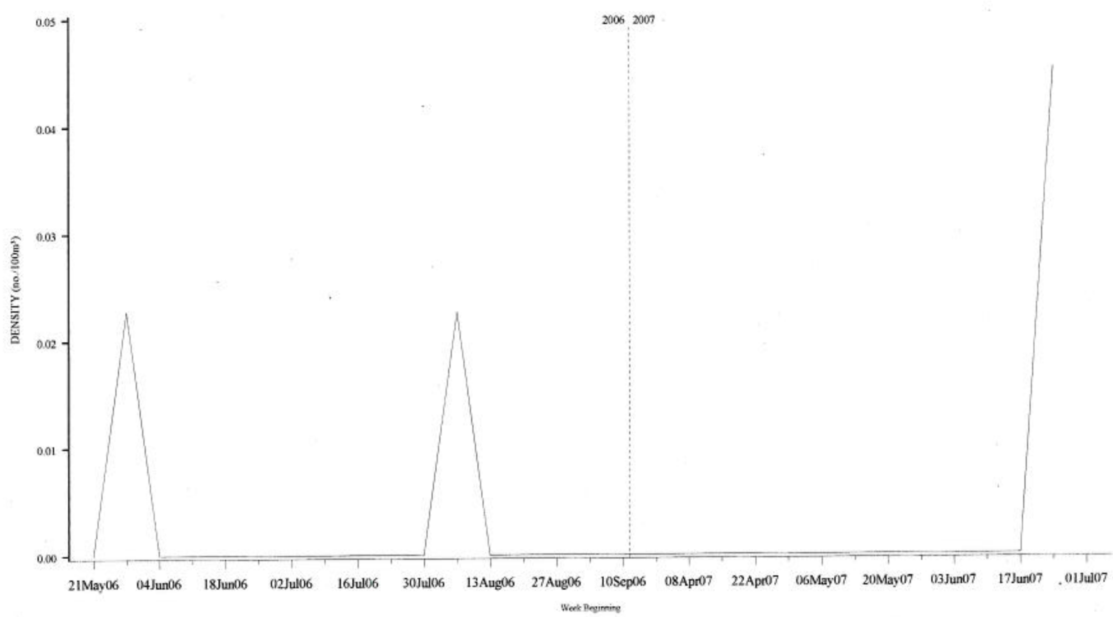


Figure 3-3. Mean egg density (#/100m^3) by week for entrainment samples collected at Merrimack Station from May 2006 through June 2007 at Units 1 and 2 (upper panel) and both Units combined (lower panel).

Table 3-1. Fish species entrained at Merrimack Station, May 2006 through June 2007.

Family	Common Name	Scientific Name
Catostomidae	White sucker	*Catostomus commersonii*
Centrarchidae	Rock bass	*Ambloplites rupestris*
	Sunfish family	Centrarchidae
Clupeidae	Herring family	Clupeidae
Cyprinidae	Spottail shiner	*Notropis hudsonius*
	Carp and minnow family	Cyprinidae
Ictaluridae	Brown bullhead	*Ameiurus nebulosus*
	Margined madtom	*Noturus insignis*
Percidae	Tessellated darter	*Etheostoma olmstedi*
	Yellow perch	*Perca flavescens*

Table 3-2. Total count and percent composition by species of icthyoplankton present in entrainment samples at Merrimack Station, May 2006 through June 2007.

		Count					Percent Composition				
		Unknown	**Eggs**	**YSL**	**PYSL**	**YOY**	**Unknown**	**Eggs**	**YSL**	**PYSL**	**YOY**
Unit 1	Brown bullhead				2					1.0	
	Carp and minnow family		1	8	47			33. 3	57.1	22.9	
	Margined madtom				1	1				0.5	25.0
	Rock bass				5					2.4	
	Spottail shiner				1	2				0.5	50.0
	Sunfish family			2	33				14.3	16.1	
	Tessellated darter			4	2				28.6	1.0	
	Unidentified	6	2				100.0	66. 7			
	White sucker				89	1				43.4	25.0
	Yellow perch				25					12.2	
	Total	**6**	**3**	**14**	**205**	**4**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Unit 2	Brown bullhead				2					1.8	
	Carp and minnow family			6	37				75.0	33.6	
	Herring family				1					0.9	
	Margined madtom				1					0.9	
	Sunfish family			2	7				25.0	6.4	
	Tessellated darter				2					1.8	
	Unidentified	2	1				100.0	100.0			
	White sucker				57	1				51.8	100.0
	Yellow perch				3					2.7	
	Total	**2**	**1**	**8**	**110**	**1**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Unit 1 and Unit 2	Brown bullhead				4					1.3	
	Carp and minnow family		1	14	84			25.0	63.6	26.7	
	Herring family				1					0.3	
	Margined madtom				2	1				0.6	20.0
	Rock bass				5					1.6	
	Spottail shiner				1	2				0.3	40.0
	Sunfish family			4	40				18.2	12.7	
	Tessellated darter			4	4				18.2	1.27	
	Unidentified	8	3				100.0	75.0			
	White sucker				146	2				46.4	40.0
	Yellow perch				28					8. 9	
	Total	**8**	**4**	**22**	**315**	**5**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Table 3-3. Monthly length frequency distributions (Number of fish in each1 mm size class) of larval and young-of-the-year fish from entrainment collections at Merrimack Station, May 2006 through June 2007.

		3.0 - 3.9	4.0 - 4.9	5.0 - 5.9	6.0 - 6.9	7.0 - 7.9	8.0 - 8.9	9.0 - 9.9	10.0 -10.9	11.0 -11.9	12.0 -12.9	13.0 -13.9	14.0 -14.9	15.0 -15.9	16.0 -16.9	17.0 -17.9	18.0 -18.9	19.0 -19.9	21.0 -21.9	22.0 -22.9	23.0 -23.9	24.0 -24.9	N	Min	Mean	Max
Brown bullhead	Jul 06												2										2	14.2	14.3	14.3
	Aug 06										1	1											2	12.9	13	13.1
	Total										1	1	2										4	12.9	13.6	14.3
Carp and minnow family	Jun 06		6	16	5	3	1	1		1	2		1		1								37	4	6.9	16.5
	Jul 06			5	1											1							7	5.1	7.1	17.2
	Aug 06				1																		1	6	6	6
	Jun 07	3	11	11		1	2	2	9	10													49	3.7	7.6	11.9
	Total	3	17	32	7	4	3	3	9	11	2		1		1	1							94	3.7	7.3	17.2
Herring family	Jun 07																			1			1	22	22	22
	Total																			1			1	22	22	22
Margined madtom	Jun 06										1												1	12	12	12
	Jul 06											1											1	13	13	13
	Aug 06													1									1	15.3	15.3	15.3
	Total										1	1		1									3	12	13.4	15.3
Rock bass	Jun 06					1	1																2	7.6	8.1	8.5
	Jul 06						1					1											2	8.2	10.7	13.1
	Aug 06						1																1	8.3	8.3	8.3
	Total					1	3					1											5	7.6	9.1	13.1
Spottail shiner	Jun 06														1	1							2	16	16.5	17
	Jun 07											1											1	13.9	13.9	13.9
	Total											1			1	1							3	13.9	15.6	17
Sunfish family	May 06			1																			1	5.2	5.2	5.2
	Jun 06		4	5	3																		12	4.2	5.4	6.8
	Jul 06		1	5	5						1	1											13	4.9	7	13.4
	Aug 06			3																			3	5.5	5.6	5.7
	Apr 07		1																				1	4.1	4.1	4.1
	Jun 07			9	5																		14	5	5.8	6.4
	Total		6	23	13						1	1											44	4.1	6	13.4
Tessellated darter	Jun 06				1																		1	6.6	6.6	6.6
	Jul 06			1																			1	5.4	5.4	5.4
	May 07			1																			1	5.9	5.9	5.9
	Jun 07			4	1																		5	5.5	5.8	6.7
	Total			6	2																		8	5.4	5.9	6.7
White sucker	May 06							1	12	10			1	1			2	1					28	9.9	12	19.2
	Jun 06				3		2		4	2	4		3	1		3		1	2			1	26	6.4	13.4	24.2
	Jul 06							1															1	9.4	9.4	9.4
	May 07											4	7		2								13	13.4	14.6	16.6
	Jun 07									1		3	9	19	14	4	2	1		1	1		55	11.5	16	23.5
	Total				3		2	2	16	13	4	7	20	21	16	7	4	3	2	1	1	1	123	6.4	14.3	24.2
Yellow perch	May 06						1																1	8.8	8.8	8.8
	Jun 06								1														1	10.9	10.9	10.9
	May 07				3	11	2	3	1	1			3										24	6.4	8.8	14.7
	Jun 07									1	1												2	11.9	12.3	12.7
	Total				3	11	3	3	2	2	1		3										28	6.4	9.1	14.7

Table 3-4. Overall mean density (#/100m^3) of icthyoplankton entrained at Merrimack Station, Units 1 and 2 combined, May 2006 through June 2007.

		Mean Density				
		Unknown	Eggs	YSL	PYSL	YOY
Unit 1	Brown bullhead	0	0	0	0.045447	0
	Carp and minnow family	0	0.022708	0.18166	1.070741	0
	Herring family	0	0	0	0	0
	Margined madtom	0	0	0	0.022686	0.022711
	Rock bass	0	0	0	0.113594	0
	Spottail shiner	0	0	0	0.01387	0.045421
	Sunfish family	0	0	0.045372	0.740946	0
	Tessellated darter	0	0	0.0914	0.036613	0
	Unidentified	0.136604	0.045395	0	0	0
	White sucker	0	0	0	2.023077	0.022708
	Yellow perch	0	0	0	0.56497	0
Unit 2	Brown bullhead	0	0	0	0.046379	0
	Carp and minnow family	0	0	0.139448	0.857687	0
	Herring family	0	0	0	0.02345	0
	Margined madtom	0	0	0	0.023248	0
	Rock bass	0	0	0	0	0
	Spottail shiner	0	0	0	0	0
	Sunfish family	0	0	0.046389	0.162359	0
	Tessellated darter	0	0	0	0.04651	0
	Unidentified	0.045827	0.0233	0	0	0
	White sucker	0	0	0	1.32367	0.023239
	Yellow perch	0	0	0	0.070082	0
Units 1 and 2 Combined	Brown bullhead	0	0	0	0.045908	0
	Carp and minnow family	0	0.011484	0.160797	0.965439	0
	Herring family	0	0	0	0.01159	0
	Margined madtom	0	0	0	0.022964	0.011486
	Rock bass	0	0	0	0.05745	0
	Spottail shiner	0	0	0	0.007015	0.022972
	Sunfish family	0	0	0.045875	0.454978	0
	Tessellated darter	0	0	0.046225	0.041505	0
	Unidentified	0.091737	0.034475	0	0	0
	White sucker	0	0	0	1.677393	0.02297
	Yellow perch	0	0	0	0.32037	0

Table 3-5 Diel variation (in mean density, #/100m^3) of icthyoplankton entrained at Merrimack Station, May 2006 through June 2007.

		Day					Night				
		Unknown	Eggs	YSL	PYSL	YOY	Unknown	Eggs	YSL	PYSL	YOY
Unit 1	Brown bullhead	0	0	0	0	0	0	0	0	0.090895	0
	Carp and minnow family	0	0	0	0.364576	0	0	0.045415	0.36332	1.776906	0
	Herring family	0	0	0	0	0	0	0	0	0	0
	Margined madtom	0	0	0	0	0	0	0	0	0.045372	0.045421
	Rock bass	0	0	0	0.045486	0	0	0	0	0.181703	0
	Spottail shiner	0	0	0	0	0	0	0	0	0.027741	0.090842
	Sunfish family	0	0	0	0.636121	0	0	0	0.090744	0.845772	0
	Tessellated darter	0	0	0	0.045486	0	0	0	0.1828	0.027741	0
	Unidentified	0.182745	0	0	0	0	0.090463	0.090791	0	0	0
	White sucker	0	0	0	0.59287	0	0	0	0	3.453284	0.045415
	Yellow perch	0	0	0	0.362797	0	0	0	0	0.767142	0
Unit 2	Brown bullhead	0	0	0	0	0	0	0	0	0.094966	0
	Carp and minnow family	0	0	0.045442	0.316413	0	0	0	0.23793	1.424737	0
	Herring family	0	0	0	0.045835	0	0	0	0	0	0
	Margined madtom	0	0	0	0	0	0	0	0	0.047604	0
	Rock bass	0	0	0	0	0	0	0	0	0	0
	Spottail shiner	0	0	0	0	0	0	0	0	0	0
	Sunfish family	0	0	0.045067	0.044785	0	0	0	0.047775	0.285531	0
	Tessellated darter	0	0	0	0.045486	0	0	0	0	0.047584	0
	Unidentified	0.089571	0.045541	0	0	0	0	0	0	0	0
	White sucker	0	0	0	0.089143	0	0	0	0	2.616983	0.047584
	Yellow perch	0	0	0	0.091375	0	0	0	0	0.047775	0
Units 1 and 2 Combined	Brown bullhead	0	0	0	0	0	0	0	0	0.092883	0
	Carp and minnow family	0	0	0.022721	0.340494	0	0	0.023236	0.302083	1.604917	0
	Herring family	0	0	0	0.022917	0	0	0	0	0	0
	Margined madtom	0	0	0	0	0	0	0	0	0.046462	0.023239
	Rock bass	0	0	0	0.022743	0	0	0	0	0.092965	0
	Spottail shiner	0	0	0	0	0	0	0	0	0.014193	0.046477
	Sunfish family	0	0	0.022533	0.340453	0	0	0	0.069759	0.572166	0
	Tessellated darter	0	0	0	0.045486	0	0	0	0.093526	0.037432	0
	Unidentified	0.136158	0.02277	0	0	0	0.046283	0.046451	0	0	0
	White sucker	0	0	0	0.341007	0	0	0	0	3.044858	0.046474
	Yellow perch	0	0	0	0.227086	0	0	0	0	0.415823	0

Table 3-6. Estimated total entrainment abundance by species for fish larvae entrained at Merrimack Station, May 2006 through June 2007.

Species	2006 Unit 1[a]	2006 Unit 2[b]	2006 Both Units	2007 Unit 1[c]	2007 Unit 2[c]	2007 Both Units
Brown bullhead	18,311	49,461	67,772	0	0	0
Carp and minnow family	165,914	839,808	1,005,722	343,337	241,396	584,733
Herring family	0	0	0	0	25,009	25,009
Margined madtom	9,140	24,794	33,934	0	0	0
Rock bass	57,729	0	57,729	0	0	0
Spottail shiner	0	0	0	4,762	0	4,762
Sunfish family	240,268	148,208	388,476	94,325	93,772	188,097
Tessellated darter	22,944	0	22,944	32,387	49,602	81,989
Unidentified	0	0	0	0	0	0
White sucker	171,333	988,703	1,160,036	665,804	455,125	1,120,929
Yellow perch	0	49,671	49,671	418,741	25,009	443,750
Total	**685,637**	**2,100,646**	**2,786,283**	**1,559,356**	**889,912**	**2,449,268**

a - Week of 28 May through Week of 27 August, 2006
b - Week of 21 May through Week of 10 September, 2006
c - Week of 2 April through Week of 24 June, 2007

Table 3-7 Estimated total entrainment abundance of fish eggs and larvae by month and developmental stage for Merrimack Station, May 2006 through June 2007.

Month	Stage	2006 Unit 1	2006 Unit 2	2006 Both Units	2007 Unit 1	2007 Unit 2	2007 Both Units
April	Eggs	NS	NS	NS	0	0	0
May	Eggs	0	24,848	24,848	0	0	0
June	Eggs	0	0	0	15,797	0	15,797
July	Eggs	0	0	0	NS	NS	NS
August	Eggs	9,141	0	9,141	NS	NS	NS
September	Eggs	NS	0	0	NS	NS	NS
April	Larvae	NS	NS	NS	0	59,724	59,724
May	Larvae	0	742,481	742,481	556,360	65,726	622,086
June	Larvae	351,603	1,234,410	1,586,013	1,002,996	764,462	1,767,458
July	Larvae	306,731	123,754	430,485	NS	NS	NS
August	Larvae	27,304	0	27,304	NS	NS	NS
September	Larvae	NS	0	0	NS	NS	NS
April	Other	NS	NS	NS	0	0	0
May	Other	0	0	0	36,457	0	36,457
June	Other	21,250	48,872	70,122	0	0	0
July	Other	27,489	0	27,489	NS	NS	NS
August	Other	0	0	0	NS	NS	NS
September	Other	NS	0	0	NS	NS	NS
April	YOY/Older	NS	NS	NS	0	0	0
May	YOY/Older	0	0	0	0	0	0
June	YOY/Older	31,648	0	31,648	7,899	24,783	32,682
July	YOY/Older	0	0	0	NS	NS	NS
August	YOY/Older	0	0	0	NS	NS	NS
September	YOY/Older	NS	0	0	NS	NS	NS
April	Total	NS	NS	NS	0	59,724	59,724
May	Total	0	767,330	767,330	592,818	65,726	658,544
June	Total	404,501	1,283,283	1,687,784	1,026,692	789,245	1,815,937
July	Total	334,220	123,754	457,974	NS	NS	NS
August	Total	36,445	0	36,445	NS	NS	NS
September	Total	NS	0	0	NS	NS	NS

NS - not sampled

Table 3-8. Estimated total entrainment by species for fish eggs entrained at Merrimack Station, May 2006 through June 2007.

Species	2006			2007		
	Unit 1[a]	Unit 2[b]	Both Units	Unit 1[c]	Unit 2[c]	Both Units
Brown bullhead	0	0	0	0	0	0
Carp and minnow family	0	0	0	7,899	0	7,899
Herring family	0	0	0	0	0	0
Margined madtom	0	0	0	0	0	0
Rock bass	0	0	0	0	0	0
Spottail shiner	0	0	0	0	0	0
Sunfish family	0	0	0	0	0	0
Tessellated darter	0	0	0	0	0	0
Unidentified	9,141	24,848	33,989	7,899	0	7,899
White sucker	0	0	0	0	0	0
Yellow perch	0	0	0	0	0	0
Total	**9,141**	**24,848**	**33,989**	**15,797**	**0**	**15,797**

a - Week of 28 May through Week of 27 August, 2006

b - Week of 21 May through Week of 10 September, 2006

c - Week of 2 April through Week of 24 June, 2007

4.0 IMPINGEMENT RESULTS

A total of 80 valid 24-hour impingement samples were collected at Merrimack Station Unit 1 and 76 at Unit 2 from 29 June 2005 through 28 June 2007 among 89 total 24-hour impingement sampling dates. Nine (9) 24-hour impingement samples were considered void and not analyzed from Unit 1, and 13 24-hour samples were considered void and not analyzed from Unit 2 (see Table 2-5).

As requested in the EPA 308 letter to PSNH, this section will present the number of fish (juvenile and adult) collected and the physical and environmental parameters collected in conjunction with each sample. Table 1 of Appendix B provides the water quality parameters (temperature, dissolved oxygen, conductivity) recorded at the beginning and end of each 24 hour sample at Merrimack Station Units 1 and 2. Table 2 of Appendix B provides the volume of debris (gallons) and dominant debris type (terrestrial or aquatic) for each 24-hour and long interval sample at Units 1 and 2 of Merrimack Station.

4.1 Proportion of Flow Sampled

Valid 24-hour impingement collections were obtained from 80 sampling dates at Merrimack Station Unit 1 and from 76 sampling dates at Unit 2 during the two-year study period from June 2005 through June 2007. A cumulative total of 622.3 million cubic meters of cooling water flow was sampled on these dates, representing 11.8% of the total cooling water flow through the plant during the entire year (Table 4-1). The full month with the smallest percentage of flow sampled was December 2006 (7.2 %) and the month with the highest percentage of flow sampled was August 2005 (17.5 %). The proportion of cooling water flow that was sampled at individual units was 11.7 % at Unit 1 and 11.9 % at Unit 2 during the June 2005 through June 2007 time period.

4.2 Species Composition

Twenty-one species of fish, representing nine families were collected in the 24-hour impingement samples from June 2005 through June 2007 at Merrimack Station Units 1 and 2 (Table 4-2). An additional four species in the carp and minnow family were collected exclusively in low abundance in the long-interval (6-day and 13-day) samples; bridled shiner (*Notropis bifrenatus*, 3 individuals), common shiner (*Luxilis cornutus,* 15 individuals), eastern silvery minnow (*Hybognathus regius,* 3 individuals), and emerald shiner (*N. atherinoides,* 3 individuals). The total number of impinged fish collected in 24-hour samples during this two-year period was 679 fish for both Units combined (Table 4-2). Bluegill was the most commonly collected fish species, accounting for 62.6% of the total number of impinged fish in 24-hour samples during this two-year period for both Units combined. Spottail shiner was the second most abundant fish taxa and they accounted for 7.4% of the fish impinged in 24-hour samples during this two-year period for both Units combined.. Bluegill, spottail shiner, black crappie (5.3%), largemouth bass (4.6%), and yellow perch (4.1%) combined to represent 84% of the total fish impinged in 24-hour samples during the two years of sampling at Merrimack Station for both Units combined.

Most of the fish species collected in this study were resident fish impinged in low numbers and collected infrequently at Merrimack Station Units 1 and 2 (Table 4-3). The only fish taxon collected in more than half of the 25 months consecutively sampled during June 2005 through June 2007 was bluegill (20 months). Other taxa collected in at least 7 months included black crappie (11 months), largemouth bass (10 months), pumpkinseed (10 months), spottail shiner (10 months), golden shiner (8 months), margined madtom (8 months), smallmouth bass (7 months) and yellow perch (7 months). All other species were collected in four or fewer months. Ten of the twenty-one species of fish observed in the Merrimack Station impingement samples were represented by five or fewer individuals among the 25 months of sampling at Unit 1 and Unit 2 combined. No anadromous species (alewife, blueback herring, American shad, or Atlantic salmon) were observed in any impingement samples. One individual American eel, a catadromous species, was impinged during February 2007.

4.3 Sizes of Impinged Fish

The mean, range and size distribution of impinged fish length measurements are presented by species for each month and for the entire two-year sampling period by Unit and for both Units 1 and 2 combined at Merrimack station (Table 4-4). The lengths of impinged fish ranged from 26 mm (largemouth bass) to 880 mm (American eel). With the exception of two smallmouth bass and two white sucker, the lengths of impinged fish were less than 249 mm and the majority (91%) of the lengths were less than 125 mm, representing to overall predominance of young of the year (YOY) fishes in the impingement collections from Merrimack Station Units 1 and 2.

The 425 bluegill impinged during the two-year study had a mean total length of 61 mm (range 35-235 mm; Table 4-4). YOY bluegill in the 50-74 mm size class comprised 62.2% of their total impinged. Spottail shiner, the second most abundant impinged species with 50 individuals impinged, had a mean total length of 92 mm (range 27-135mm); fish in the 100-124 mm size class (Age 2+) accounted for 56% of their total count. The majority of the 36 black crappie (72.2%) and largemouth bass (54.8%) were contained within the 50-74 mm size class representing YOY fish. Black crappie impinged at Merrimack Station had a mean total length of 71 mm (range (37-114 mm) while largemouth bass had a mean total length of 65 mm (range 24-110 mm among 31 fish). The mean length of impinged yellow perch was 128 mm (range 36-235 mm). Yellow perch in the 100-124 mm (Age 2+) and 125-149 (Age 3+) mm size classes accounted for 57.1% of the 28 yellow perch impinged.

4.4 Annual Estimated Impingement Counts and Rates

This section presents the impingement counts compiled from all valid 24-hour samples for each species impinged at Merrimack Station Units 1 and 2 that have been expanded into monthly or annual total abundance using the volumetric extrapolation methods described in Section 2.3.2. Complete summaries of the estimated weekly and monthly impingement rates and total estimated impingement abundance are presented in Appendix B, Tables B-3 and B-4.

4.4.1 Total Estimated Impinged Fish

Figure 4-1 presents the raw counts of impinged fish for each month of sampling at Units 1 and 2 of Merrimack Station. A total of 80 valid 24-hour samples were obtained from Unit 1 and 195 fish were collected among these samples. A total of 76 valid 24-hour samples were obtained from Unit 2, with 484 fish collected. The annual raw total count of all impinged fish collected from 29 June 2005 through 30 June 2006 summed together for both Units was 580. The annual raw total count of all impinged fish collected from 1 July 2006 through 28 June 2007 summed together for both Units was

99. A total of 679 fish were collected in the valid 24-hour samples summed among both units in both years.

Fish count (number) per CWIS flow (volume) in each 24-hour sample represented the impingement sampling unit as a density or rate. Each impingement sampling unit was assumed to be representative of the daily impingement rate for the other unsampled dates within each week or two-week period. The unsampled volume in each week or two-week period represented by the impingement sampling was used to expand the sample unit up to a weekly or biweekly impingement abundance value. Monthly estimates of fish impinged were calculated for Units 1 and 2 of Merrimack Station by summing the impingement abundance for each weekly or two-week period occurring in each month. Annual impingement abundance were similarly obtained by summing each of the 12 months within each "year". These monthly and annual total impingement abundance values are presented in Table 4-5 and Figure 4-2. The estimate for total fish impingement at Merrimack Station, derived from all valid 24-hour samples at Unit 1 and Unit 2 combined, was 5,032 fish for the two-year period of 29 June 2005 through 28 June 2007. The annual total impingement abundance estimate for the first sampling year (29 June 2005 through 30 June 2006) was 4,137 fish. The annual total impingement abundance estimate for the second sampling year (1 July 2006 to 28 June 2007) was 895 fish. Annual estimated impingement was higher at Unit 2 during both years of sampling. During the June 2005 through July 2006 first year, a total of 1,392 fish were estimated to be impinged at Unit 1 compared to a total of 2,745 fish at Unit 2. During the second sampling year of July 2006 through June 2007, a total of 289 fish were estimated to be impinged at Unit 1 compared to a total of 607 fish impinged at Unit 2.

The mean and 95% confidence interval of daily (24-hour) impingement rate for Merrimack Station, Units 1 and 2 combined, was 9.03 (± 4.89, 95% C.I.) fish per Mm^3 for the two-year period of 29 June 2005 through 28 June 2007 (Table 4-6). During the same two-year time period, the mean impingement rate for Unit 1 was 9.41 (± 5.04, 95% C.I.) fish per Mm^3 and for Unit 2 was 8.63 (± 8.66, 95% C.I.) fish per Mm^3. When examined on an annual basis, the mean impingement rate at Merrimack Station (both Units pooled) during the first year of sampling (29 June 2005 to 30 June 2006) was 14.07 (± 8.98, 95% C.I.) fish per Mm^3 and during the second year of sampling (1 July 2006 through 28 June 2007) was 3.15 (± 1.1, 95% C.I.) fish per Mm^3.

4.4.2 Seasonal Patterns of Total Estimated Impinged Fish

Figure 4-2 presents the estimated number of impinged fish by month for Merrimack Station Units 1, 2 and both Units combined. Seasonal peaks in estimated impingement abundance were observed during the late-fall to early-winter months of October, November, December and January and also during the spring and early-summer months of May, June and July. The month with highest estimated impingement abundance was June 2006 when an estimated 2,345 fish were impinged at both Units combined for Merrimack Station, representing 46.6% of the total estimated impingement abundance over the two years of sampling (Figure 4-2). The month with the second highest estimated number of fish impinged was December 2005 (515 fish; 10.2% of total). Of the remaining 22 months of impingement sampling, 20 months had estimates of fewer than 200 fish impinged per month with 11 of those months having an estimate of fewer than 100 fish impinged per month for both Units combined.

The monthly pattern of impingement abundance observed for both Units combined at Merrimack Station (Figure 4-2, Table 4-5) is the same when examined for each Unit separately, with seasonal peaks present during the late-fall/early-winter and spring/early-summer months (Figure 4-2). Monthly values for total estimated impingement abundance at Unit 1 ranged from a high of 338 fish impinged during December of 2005 to a low of 0 fish impinged during August of 2005 (Figure 4-2; Table 4-5). During September of 2006, no fish were also estimated to have been impinged at Unit 1. However, during that month, no 24-hour samples were collected due to the annual outage and maintenance of that Unit by PSNH. Of the 25 months sampled at Unit 1, five had a monthly estimated impingement greater than 100 fish. Those months were October 2005 (103 fish; 6.1% of total), December 2005 (338 fish; 20.1% of total), March 2006 (167 fish; 9.91% of total), May 2006 (210 fish; 12.4 % of total), and June 2006 (296 fish; 17.6% of total). Unit 2 monthly values for total estimated impingement ranged from a high of 2,048 fish impinged during June 2006 to a low of 7 fish impinged during August of 2006 (Figure 4-2; Table 4-5), excluding the estimate of six for June 2005, which was not a full month's estimate. The month of June 2006 accounted for 61.1% of the total estimated fish impinged for the entire two-year sample period at Unit 2 from 29 June 2005 to 28 June 2007. Of the remaining 23 months of impingement sampling at Unit 2, five additional months (October 2005, November 2005, December 2005, July 2006, and November 2006) had a monthly estimated impingement count of 100 or more fish (Figure 4-2, Table 4-5).

Monthly mean impingement rates during the first annual period of sampling (June 2005 through June 2006) for Units 1 and 2 combined ranged from a high of 81.04(± 104.82, 95% C.I.) fish per Mm^3 during June 2006 to a low of 0.44 (± 0.71, 95% C.I.) fish per Mm^3 during August (Table 4-6). Monthly mean impingement rates during the second annual period of sampling (July 2006 through June 2007) for Units 1 and 2 combined ranged from a high of 6.42 (± 7.84, 95% C.I.) fish per Mm^3 during May and a low of 0.47 (± 2.03, 95% C.I.) fish per Mm^3 during September (Table 4-6). Unit 1 mean monthly impingement rates were highest during December (55.19 fish per Mm^3) and lowest during February and August (0 fish per Mm^3) during the first year of sampling. During the second year of sampling, the mean monthly impingement rate was highest during May (6.82 fish per Mm^3) and lowest during August (0.77 fish per Mm^3). The mean monthly impingement rate at Unit 2 was greatest during the month of June 2006 (105.07 fish per Mm^3) and lowest during March (0.71 fish per Mm^3) during the first year of sampling. During the second year of sampling, the mean monthly impingement rate was highest during November (6.5 fish per Mm^3) and similar to Unit 1, lowest during August (0.29 fish per Mm^3). The seasonal trends in impingement rates were similar to those observed in the estimated impingement abundance, with the highest rates occurring during the late-fall/early-winter and spring/early-summer months (Table 4-6).

4.4.3 Impingement Collection Efficiency Adjustment

Factors such as excess space at the bottoms or sides of traveling screens, plugged or misaligned spray headers, or fish becoming entangled in debris that adheres to the screens can result in impingement collections that underestimate the actual number of fish impinged on the traveling screens at Merrimack Station Unit 1 and Unit 2. Impingement collection efficiency tests were conducted monthly for the period of 29 June 2005 through 28 June 2007 (Table 4-7). The impingement collection efficiency values obtained from the two years of monthly tests ranged from 53% to 97 % for Unit 1 (mean = 80%) and from 15% to 94% for Unit 2 (mean = 61%). The mean collection efficiency values for Merrimack Station Unit 1 and Unit 2 were significantly less than 100% (paired t-test; Unit 1 $p<0.0001$; Unit 2 $p<0.0001$).

Adjusted estimates of the numbers of fish impinged, corrected for collection efficiency, were calculated for Merrimack Station Units 1 and 2 (Figure 4-3; Table 4-5). When adjusted for collection efficiency, an estimated 2,008 fish were impinged at Unit 1 and an estimated 5,999 fish were impinged at Unit 2, resulting in a total of 8,007 fish impinged at Merrimack Station during the two year sampling period. Therefore, the collection efficiency adjustment expanded the estimated total impingement abundance summed across the two years of sampling at both Unit 1 and Unit 2 combined by 2,075 total fish to 8,007 fish (Table 4-5). When examined on an annual basis, an adjusted total of 6,736 fish were impinged during the first season of sampling (June 2005 through June 2006) and an adjusted total of 1,271 fish were impinged during the second season of sampling (July 2006 through June 2007). Unit 2 impinged a higher number of fish during both annual periods that at Unit 1 when impingement estimates were corrected for collection efficiency (5,133 fish versus 1,603 fish during year one and 866 fish versus 405 fish during year two). Figure 4-3 presents the monthly estimates of fish impingement abundance at Merrimack Station Units 1 and 2 (and both Units combined) when corrected for collection efficiency. The overall seasonal patterns observed in the estimated monthly impingement abundance (Figure 4-2) are maintained throughout the two years of sampling when the monthly impingement abundance estimates have been adjusted for collection efficiency.

Impingement rates also increased when the estimated monthly impingement abundance was adjusted for collection efficiency (Table 4-6). The overall Merrimack Station impingement rate for the first annual period increased from 14.07 (± 8.98, 95% C.I.) fish per Mm^3 to 20.83(± 14.42, 95% C.I.) fish per Mm^3 while the second year increased from 3.15 (± 1.1, 95% C.I.) fish per Mm^3 to 4.58(± 1.7, 95% C.I.) fish per Mm^3. The overall impingement rate was significantly higher for the estimated values corrected for collection efficiency than those simply estimated from the raw 24-hour counts (paired t-test; Unit 1 $p<0.0001$; Unit 2 $p=0.0472$).

4.4.4 Adjusted Monthly Impingement Abundance for Each Fish Species

The monthly estimated impingement abundance for each taxon of fish impinged, adjusted for collection efficiency, is presented in Table 4-8. When raw catch is corrected for total Merrimack Station CWIS flow (both Units combined) and adjusted for collection efficiency, bluegill, spottail shiner, black crappie, largemouth bass and yellow perch were the five most abundant fish species impinged during the two years of sampling at Merrimack Station. Bluegill was the dominant species observed in impingement collections at Merrimack Station, representing 62.4% of the total adjusted catch for the two-year sampling period. Of the 4,993 impinged bluegills, 88.9% of those were impinged during the months of May, June and July 2006. A combination of high numbers of age 1+ bluegill present in Hooksett Pool and the observed trend of those small fish being impinged during high Merrimack River flow events during those three months led to the increased impingement rates during that time period. Although bluegill were not impinged at as high a rate during the months of May, June, and July of 2005 and 2007 as they were during 2006, they were still the most abundant species observed in those monthly impingement samples. An adjusted total of 605 spottail shiners were impinged at Merrimack Station during the two years of study, and the majority (79.0%) were impinged between the winter months of November 2005 through March 2006. An adjusted total of 447 black crappies were impinged at Merrimack Station during the two years of sampling. Black crappie showed a seasonal pattern of being impinged when the young-of-year were abundant during the fall months (September through December) and again during high water events in the spring (April through June). Largemouth bass were 4.4% (356 fish) of the adjusted total number of fish observed in the impingement collections from Merrimack Station. Similar to black crappie, the impingement of largemouth bass was highest during the months of October through December. During this late-fall early winter period prior to ice cover, young-of- year largemouth bass would be abundant in Hooksett Pool. An adjusted total of 335 yellow perch were impinged during the two years of sampling at Merrimack Station. The majority of the yellow perch were impinged during the fall and winter months of 2005-2006. Small numbers of yellow perch were observed in spring samples during both years of sampling.

4.5 Impingement Survival for the Existing Traveling Screens

Impingement survival tests were conducted at Units 1 and 2 of Merrimack Station from February 2006 through July 2007. The purpose of these tests was to estimate the potential survival rates of fish that become impinged on the existing traveling screens at each Unit, if these screens were operated with a continuous wash cycle. The results from these tests represent survival, which when added to the survival from an effective fish return sluice, would provide an combined estimate of total impingement survival that could be achieved with the existing traveling screens at Merrimack Station. The current fish return for impingement at Units 1 and 2 ends in a pit that is located on the Merrimack River bank above the normal water elevation, and therefore does not typically return fish to Hooksett Pool. Three tests were conducted during the winter and spring of 2006 when suitable numbers of golden shiner could legally be obtained from local bait dealers. Monthly testing at both Units began during January of 2007 and continued through July of 2007. The January 2007 to July 2007 survival tests were conducted using golden shiner purchased from a wholesale bait distributor in Massachusetts. A total of nine survival tests were conducted at Unit 1 with a range in survival rate from 40.4% to 99.7% (mean = 59.6%; Table 4-9). A total of seven impingement survival tests were conducted at Unit 2 with a range in survival rate from 20.2% to 100.0% (mean = 78.5%; Table 4-9).

The traveling screen survival rates obtained from testing at Units 1 and 2 (Table 4-9) were applied to the monthly and annual impingement abundance estimates (adjusted for collection efficiency) for Merrimack Station Unit 1 and Unit 2, based on the following assumptions. The first assumption is that the survival of golden shiner during impingement is representative of all other species impinged at Merrimack Station. Impingement survival testing was limited to using fish supplied by bait dealers (golden shiner) because numerous attempts to obtain sufficient (at least 300 fish) live wild fish from Hooksett Pool were unsuccessful; relatively few fish were caught and those that were caught (by electrofishing) experienced high latent mortality. In addition, there was limited availability of other species for testing from bait and fish dealers licensed and approved by the State of New Hampshire. It was also assumed that the test conditions were representative of the untested months (i.e. water levels, temperatures, debris) when calculated survival rates from the tested months were applied to the monthly estimated impingement abundance values from the untested months to estimate annual total survival. Seasonal survival rates were compiled by averaging the test percentages for months within each season. Seasons were defined by the following month groups: winter (December, January, February), spring (March, April, May), summer (June, July, August), and fall (September, October, November). Survival tests were not conducted during the fall season during 2006 due to the low availability of shiner at the local bait shops. As a result, no fall seasonal estimate for impingement survival is currently available for Units 1 or 2 at Merrimack Station. To compensate for this, survival rates from the summer and winter months were averaged to provide an estimated value for this season until testing can be conducted as planned during the fall of 2007. Seasonal survival rates for Merrimack Station Unit 1 were estimated as 55.0% (winter), 57.8% (spring), 70.2% (summer), and 62.7% (fall). Seasonal survival rates for Merrimack Station Unit 2 were estimated at 88.3% (winter), 84.2% (spring), 60.1% (summer), and 74.2% (fall).

Table 4-10 presents the monthly estimated impingement survival potential for Merrimack Station Units 1 and 2 when seasonal survival rates were applied to the monthly estimated impingement abundance (corrected for collection efficiency). These potential impingement survival numbers assume that all fish that were impinged on Merrimack Station screens were initially alive. With the assumption that 100% of fish were initially alive upon being impinged, it was estimated that 973 of the 1,603 fish impinged at Unit 1 and 3,319 of the 5,133 fish impinged at Unit 2 during the first year of the study would have survived impingement on the existing traveling screens at Merrimack Station if those screens were continuously rotated. It was estimated that 249 of the 406 fish impinged at Unit 1 and 628 of the 877 fish impinged at Unit 2 during the second year of the study would survive impingement.

4.6 Long Interval Impingement Samples

A comparison of estimated impingement abundance derived from the valid 24-hour samples and from the raw number of fish observed from the comparable long-interval samples is presented for Merrimack Station Units 1 and 2 in Table 4-11. The estimated total impingement abundance was calculated based on the valid 24-hour samples for each weekly or biweekly sampling period throughout the two-year program for each Unit as described in Section 4.4.1 and Table 4.5. However, the estimated impingement abundance values presented in Table 4-11 are based on a Wednesday through Tuesday week to be comparable to the timing of the long-interval samples collected. Table 4-11 also presents the comparable weekly or biweekly raw impingement abundance based on the sum of the raw 24-hour collection and the corresponding raw six or thirteen day sample for Units 1 and 2. All values in Table 4-11 were not adjusted for collection efficiency. There was a significant difference between the impingement abundance estimated from valid 24-hour samples and the abundance estimated from the actual total counts at Merrimack Station Units 1 and 2 for the two-year sampling period. Impingement abundance estimated from the valid 24-hour samples at Unit 1 produced an estimated 1,674 impinged fish over the two years that was significantly higher than the total raw impingement count of 1,111 fish derived from the sum of the 24-hour and long interval sample in each week or two-week period (paired t-test; $p=0.0028$). A significantly higher total impingement abundance was estimated from the valid 24-hour samples at Unit 2 compared to the abundance derived from the sum of 24-hour and long interval samples, where an estimated 3,341 fish were impinged based on the 24-hour samples compared to the total raw impingement count of 1,959 fish derived from the sum of the 24-hour and long interval sample in each week or two-week period (paired t-test; $p=0.0359$). When examined on an annual basis, the estimated total impingement was significantly greater when derived from the 24-hour samples than from the sum of the 24-hour and long interval samples at Unit 1 but not Unit 2 for the time period of June 2005 through June 2006 (paired t-test; Unit 1 $p=0.0048$; Unit 2 $p=0.1695$). For the period of July 2006 through June 2007, the estimated total impingement from the 24-hour samples was significantly greater than the total raw impingement count at Unit 2 but not so at Unit 1 (paired t-test; Unit 1 $p=0.0867$; Unit 2 $p=0.0039$). This evaluation demonstrates that the valid 24-hour samples provide the most reliable and perhaps a conservative estimate of monthly or annual total impingement abundance at Merrimack Station Unit 1 and Unit 2 during the period of 29 June 2005 through 28 June 2007.

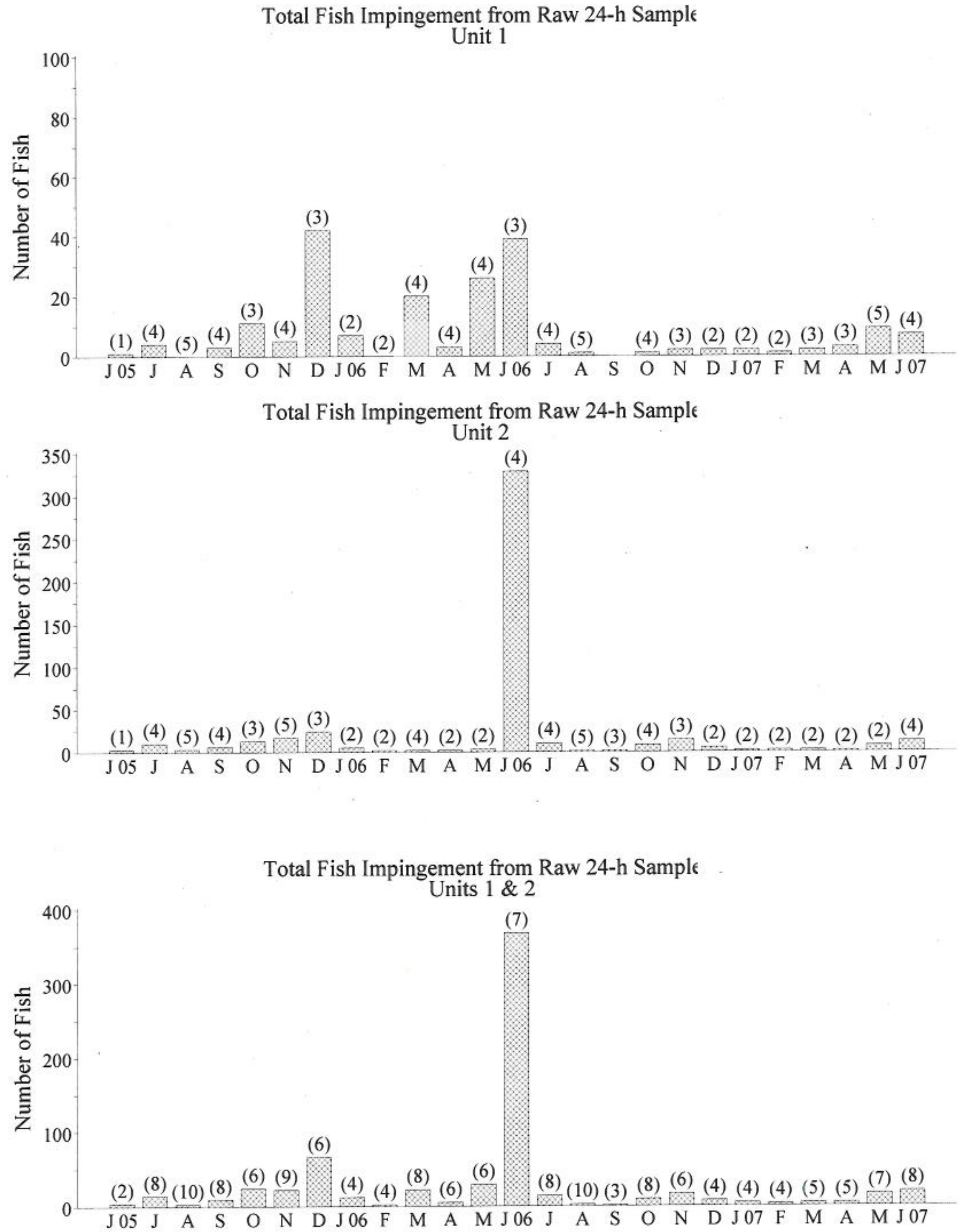


Figure 4-1. Monthly raw total number of fish impinged in 24-hour samples taken at Merrimack Station for Units 1 and 2 and pooled, June 2005 through June 2007. Number of 24-hour samples included in each monthly total is shown in parentheses above each bar.

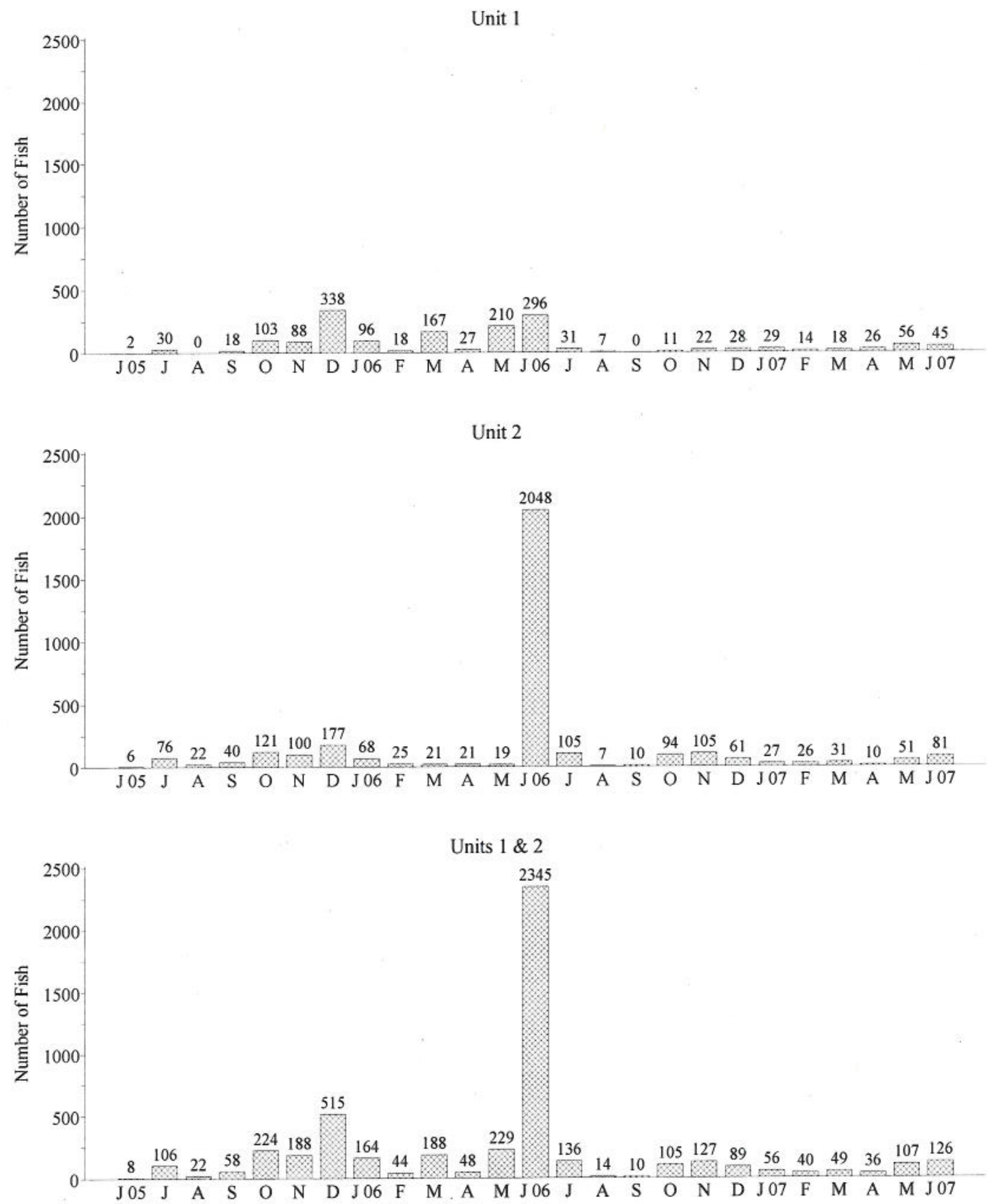


Figure 4-2. Estimated monthly total impingement abundance at Merrimack Station based on 24-hour samples collected at Units 1, 2 and both Units combined, June 2005 through June 2007 (not adjusted for collection efficiency).

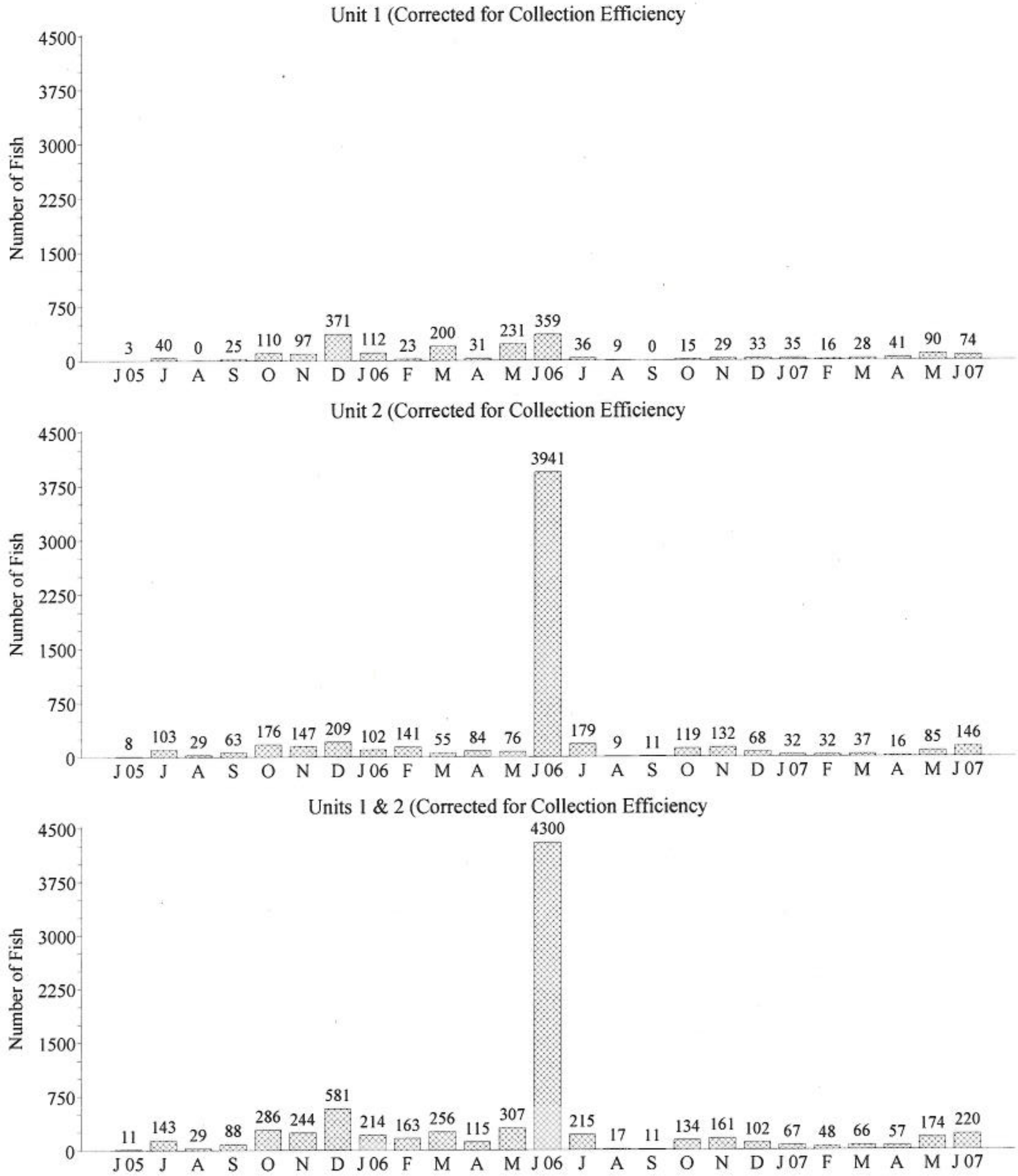


Figure 4-3. Estimated monthly total impingement abundance based on 24-hour samples collected at at Merrimack Station Units 1, 2, and both Units combined that were adjusted for CWIS flow and collection efficiency, June 2005 through June 2007.

Table 4-1. Monthly total plant flow and flow sampled for impingement at Merrimack Station, June 2005 through June 2007.

	Unit 1			Unit 2			Units 1 and 2 Combined		
Month	Total Unit Flow (Mm^3)	Flow Sampled (Mm^3)	Percent of Flow Sampled	Total Unit Flow (Mm^3)	Flow Sampled (Mm^3)	Percent of Flow Sampled	Total Unit Flow (Mm^3)	Flow Sampled (Mm^3)	Percent of Flow Sampled
Jun 05	0.52	0.26	49.9	1.42	0.71	50.0	1.94	0.97	50.0
Jul 05	8.10	1.05	13.0	21.97	2.85	13.0	30.06	3.90	13.0
Aug 05	7.42	1.29	17.4	20.31	3.55	17.5	27.73	4.84	17.5
Sep 05	7.83	1.06	13.6	21.24	2.83	13.3	29.07	3.89	13.4
Oct 05	7.44	0.76	10.2	15.07	1.73	11.5	22.51	2.49	11.1
Nov 05	7.33	1.05	14.3	21.25	3.53	16.6	28.58	4.57	16.0
Dec 05	7.69	0.78	10.1	21.97	2.13	9.7	29.65	2.90	9.8
Jan 06	7.70	0.52	6.7	21.96	1.40	6.4	29.66	1.91	6.4
Feb 06	6.76	0.41	6.1	17.33	1.39	8.0	24.08	1.80	7.5
Mar 06	8.11	1.05	13.0	21.97	2.87	13.1	30.08	3.92	13.0
Apr 06	6.82	0.78	11.5	13.01	1.43	11.0	19.84	2.21	11.2
May 06	6.46	1.06	16.3	7.85	1.38	17.6	14.30	2.44	17.0
Jun 06	6.57	0.80	12.2	21.23	2.91	13.7	27.80	3.71	13.3
Jul 06	8.11	1.04	12.8	21.96	2.82	12.8	30.07	3.86	12.8
Aug 06	8.11	1.31	16.2	21.96	3.56	16.2	30.07	4.87	16.2
Sep 06	1.32	0.00	0.0	18.38	2.13	11.6	19.71	2.13	10.8
Oct 06	7.28	1.05	14.5	21.93	2.83	12.9	29.21	3.89	13.3
Nov 06	7.36	0.53	7.2	21.25	2.17	10.2	28.61	2.69	9.4
Dec 06	7.19	0.52	7.2	19.45	1.41	7.3	26.65	1.93	7.2
Jan 07	8.11	0.52	6.4	18.13	1.43	7.9	26.24	1.94	7.4
Feb 07	7.31	0.52	7.1	18.62	1.40	7.5	25.93	1.92	7.4
Mar 07	7.29	0.79	10.9	21.71	1.43	6.6	29.01	2.22	7.7
Apr 07	7.84	0.78	10.0	12.02	1.45	12.1	19.85	2.24	11.3
May 07	8.11	1.32	16.3	8.40	1.12	13.3	16.51	2.44	14.8
Jun 07	6.54	1.09	16.7	18.63	2.90	15.6	25.17	4.00	15.9
Total	173.3	20.35	11.7	449.0	53.33	11.9	622.3	73.69	11.8

Table 4-2. Species composition[a] of fish in 24-hour impingement collections at Merrimack Station, Units 1 and 2 combined, June 2005 through June 2007.

Scientific Name	Common Name	Count
Anguillidae	eels	
Anguilla rostrata	American eel	1
Cyprinidae	carps and minnows	
Notemigonus crysoleucas	golden shiner	10
Semotilus corporalis	fallfish	3
Notropis hudsonius	spottail shiner	50
Catostomidae	suckers	
Catostomus commersonii	white sucker	2
Ictaluridae	bullhead catfishes	
Ameiurus natalis	yellow bullhead	2
Ameiurus nebulosus	brown bullhead	4
Noturus insignis	margined madtom	18
Esocidae	pikes	
Esox niger	chain pickerel	1
Osmeridae	smelts	
Osmerus mordax	rainbow smelt	12
Moronidae	temperate basses	
Morone americana	white perch	2
Centrarchidae	sunfish family	
Ambloplites rupestris	rock bass	2
Enneacanthus obesus	banded sunfish	4
Lepomis auritus	redbreast sunfish	5
Lepomis gibbosus	pumpkinseed	27
Lepomis macrochirus	bluegill	425
Micropterus dolomieu	smallmouth bass	7
Micropterus salmoides	largemouth bass	31
Pomoxis nigromaculatus	black crappie	36
unidentified centrarchid	unidentified sunfish	3
Percidae	perches	
Etheostoma olmstedi	tessellated darter	6
Perca flavescens	yellow perch	28

[a] Species (count) collected in extended sampling periods not represented by 24-hour samples were *Notropis bifrenatus*, bridle shiner (3); *Luxilis cornutus*, common shiner (15); *Hybognathus regius*, eastern silvery minnow (3); and *N. atherinoides*, emerald shiner (3).

Table 4-3. Monthly count and percent composition of fish species in 24-hour impingement collections at Merrimack Station, Units 1 and 2 combined, June 2005 through June 2007.

Species	Jun 05	Jul 05	Aug 05	Sep 05	Oct 05	Nov 05	Dec 05	Jan 06	Feb 06	Mar 06	Apr 06	May 06	Jun 06	Jul 06	Aug 06	Sep 06	Oct 06	Nov 06	Dec 06	Jan 07	Feb 07	Mar 07	Apr 07	May 07	Jun 07	Total	% of Total
American eel																					1					1	0.1
Banded sunfish											3													1		4	0.6
Black crappie				5	7	7	1				1	4	1				2	3	2					3		36	5.3
Bluegill	1	4	2	2	3	2	4			3		17	349	10	1	1	2	7	4	1		1		6	5	425	62.6
Brown bullhead		1											2												1	4	0.6
Chain pickerel								1																		1	0.1
Fallfish								3																		3	0.4
Golden shiner	1					1		1			1		2	1								2		1		10	1.5
Largemouth bass		1			6	7	2						3	1			3	5	1		2					31	4.6
Margined madtom		1			1			1		3			4										4	2	2	18	2.7
Pumpkinseed					7	2	2			1		6	5				1	1						1	1	27	4.0
Rainbow smelt							9	1	1											1						12	1.8
Redbreast sunfish				1						1		1													2	5	0.7
Rock bass	1						1																			2	0.3
Smallmouth bass	1	1	1			1	1			1					1											7	1.0
Spottail shiner		3				1	33	3	1	1							1			1				1	5	50	7.4
Sunfish family		2		1																						3	0.4
Tessellated darter		1								5																6	0.9
White perch						1														1						2	0.3
White sucker														1											1	2	0.3
Yellow bullhead														1								1				2	0.3
Yellow perch							13	2		7		1	2											1	2	28	4.1
Total	4	14	3	9	24	22	66	12	2	22	5	29	368	14	2	1	9	16	7	4	3	4	4	16	19	679	100.0
Number of taxa	4	8	2	4	5	8	9	7	2	8	3	5	8	5	3	2	5	4	3	4	2	3	1	8	8	22	

Table 4-4. (Continued)

Species		Number of Fish in Each 25 mm Total Length Class															N	Min	Mean	Max
		0-24	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	350-374	400-424	450-474	875-899				
Pumpkinseed	Oct 05			2		5											7	55	101	123
	Nov 05					2											2	101	111	121
	Dec 05				1	1											2	89	97	104
	Mar 06			1													1	66	66	66
	May 06		1	1	2	2											6	43	78	108
	Jun 06		2	3													5	46	52	56
	Oct 06			1													1	63	63	63
	Nov 06					1											1	106	106	106
	May 07		1														1	45	45	45
	Jun 07			1													1	55	55	55
	Total		**4**	**9**	**3**	**11**											**27**	**43**	**81**	**123**
Rainbow smelt	Dec 05			3	6												9	68	79	97
	Jan 06				1												1	79	79	79
	Feb 06				1												1	82	82	82
	Jan 07				1												1	84	84	84
	Total			**3**	**9**												**12**	**68**	**80**	**97**
Redbreast sunfish	Sep 05					1											1	122	122	122
	Mar 06							1									1	171	171	171
	May 06			1													1	61	61	61
	Jun 07					1		1									2	103	129	155
	Total			**1**		**2**		**2**									**5**	**61**	**122**	**171**

(continued)

Table 4-4. (Continued)

Species		Number of Fish in Each 25 mm Total Length Class															N	Min	Mean	Max
		0-24	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	350-374	400-424	450-474	875-899				
Rock bass	Jun 05			1													1	66	66	66
	Dec 05						1										1	140	140	140
	Total			**1**			**1**										**2**	**66**	**103**	**140**
Smallmouth bass	Jun 05					1											1	102	102	102
	Jul 05				1												1	98	98	98
	Aug 05											1					1	271	271	271
	Nov 05				1												1	89	89	89
	Dec 05				1												1	79	79	79
	Mar 06					1											1	101	101	101
	Aug 06												1				1	370	370	370
	Total				**3**	**2**						**1**	**1**				**7**	**79**	**159**	**370**
Spottail shiner	Jul 05			2	1												3	55	64	81
	Nov 05		1														1	27	27	27
	Dec 05			3	1	26	3										33	58	106	135
	Jan 06			2		1											3	60	79	104
	Feb 06					1											1	119	119	119
	Mar 06			1													1	62	62	62
	Oct 06			1													1	53	53	53
	Jan 07		1														1	46	46	46
	May 07			1													1	56	56	56
	Jun 07			5													5	55	63	67
	Total		**2**	**15**	**2**	**28**	**3**										**50**	**27**	**92**	**135**

(continued)

Table 4-4. (Continued)

Species		Number of Fish in Each 25 mm Total Length Class															N	Min	Mean	Max
		0-24	25-49	50-74	75-99	100-124	125-149	150-174	175-199	200-224	225-249	250-274	350-374	400-424	450-474	875-899				
Sunfish family	Jul 05			2													2	60	63	65
	Sep 05		1														1	25	25	25
	Total		**1**	**2**													**3**	**25**	**50**	**65**
Tessellated darter	Jul 05			1													1	54	54	54
	Mar 06			1	4												5	63	83	92
	Total			**2**	**4**												**6**	**54**	**78**	**92**
White perch	Nov 05				1												1	84	84	84
	Jan 07							1									1	158	158	158
	Total				**1**			**1**									**2**	**84**	**121**	**158**
White sucker	Jul 06														1		1	470	470	470
	Jun 07													1			1	419	419	419
	Total													**1**	**1**		**2**	**419**	**445**	470
Yellow bullhead	Jul 06						1										1	131	131	131
	Mar 07									1							1	209	209	209
	Total						**1**			**1**							**2**	**131**	**170**	**209**
Yellow perch	Dec 05					8	2	1	2								13	105	131	195
	Jan 06					1	1										2	124	133	142
	Mar 06				3		3	1									7	83	118	169
	May 06							1									1	154	154	154
	Jun 06		1		1												2	36	56	75
	May 07					1											1	115	115	115
	Jun 07								1		1						2	177	206	235
	Total		**1**		**4**	**10**	**6**	**3**	**3**		**1**						**28**	**36**	**128**	**235**

Table 4-5. Monthly total impingement abundance of fish at Merrimack Station Units 1 and 2, and for both Units combined, from June 2005 through June 2007. Impingement data is presented as Raw counts (Raw) in 24-hour samples, impingement abundance estimates (I) based on the product of 24-hour sample density and CWIS volumes, and adjusted impingement abundance estimates (Adj-I) representing the abundance values (I) expanded for screen collection efficiency.

	Unit 1			Unit 2			Both Units		
Month	Raw	I	Adj-I	Raw	I	Adj-I	Raw	I	Adj-I
Jun 05	1	2	3	3	6	8	4	8	11
Jul 05	4	30	40	10	76	103	14	106	143
Aug 05	0	0	0	3	22	29	3	22	29
Sep 05	3	18	25	6	40	63	9	58	88
Oct 05	11	103	110	13	121	176	24	224	286
Nov 05	5	88	97	17	100	147	22	188	244
Dec 05	42	338	371	24	177	209	66	515	581
Jan 06	7	96	112	5	68	102	12	164	214
Feb 06	0	18	23	2	25	141	2	44	163
Mar 06	20	167	200	2	21	55	22	188	256
Apr 06	3	27	31	2	21	84	5	48	115
May 06	26	210	231	3	19	76	29	229	307
Jun 06	39	296	359	329	2,048	3,941	368	2,345	4,300
Year 1	**161**	**1,392**	**1,603**	**419**	**2,745**	**5,133**	**580**	**4,137**	**6,736**
Jul 06	4	31	36	10	105	179	14	136	215
Aug 06	1	7	9	1	7	9	2	14	17
Sep 06		0	0	1	10	11	1	10	11
Oct 06	1	11	15	8	94	119	9	105	134
Nov 06	2	22	29	14	105	132	16	127	161
Dec 06	2	28	33	5	61	68	7	89	102
Jan 07	2	29	35	2	27	32	4	56	67
Feb 07	1	14	16	2	26	32	3	40	48
Mar 07	2	18	28	2	31	37	4	49	66
Apr 07	3	26	41	1	10	16	4	36	57
May 07	9	56	90	7	51	85	16	107	174
Jun 07	7	45	74	12	81	146	19	126	220
Year 2	**34**	**289**	**405**	**65**	**607**	**866**	**99**	**895**	**1,271**
Total	**195**	**1,681**	**2,008**	**484**	**3,351**	**5,999**	**679**	**5,032**	**8,007**

Table 4-6. Monthly mean 24-hour impingement rates (No./million m^3) of fish unadjusted and adjusted for screen collection efficiency at Merrimack Station, June 2005 through June 2007.

	Unit 1			Unit 2			Both Units		
Month	N	Unadjusted	Adjusted	N	Unadjusted	Adjusted	N	Unadjusted	Adjusted
Jun 05	1	3.83	5.1	1	4.23	5.72	2	4.03 ±2.56	5.41 ±3.9
Jul 05	4	3.83 ±5.05	5.11 ±6.74	4	3.54 ±5.35	4.78 ±7.23	8	3.68 ±2.53	4.94 ±3.4
Aug 05	5	0	0	5	0.88 ±1.64	1.18 ±2.22	10	0.44 ±0.71	0.59 ±0.96
Sep 05	4	2.81 ±5.74	3.68 ±6.78	4	2.16 ±3	3.4 ±4.62	8	2.48 ±2.25	3.54 ±2.82
Oct 05	3	14.36 ±31.24	15.49 ±33.41	3	11.14 ±38.64	15.57 ±52.32	6	12.75 ±13.4	15.53 ±16.59
Nov 05	4	4.85 ±11.81	5.52 ±13.42	5	4.85 ±4.52	7.19 ±7.47	9	4.85 ±4.02	6.45 ±5.19
Dec 05	3	55.19 ±212.84	60.65 ±233.89	3	11.26 ±37.04	13.24 ±43.57	6	33.22 ±63	36.95 ±69.16
Jan 06	2	13.81 ±175.47	16.25 ±206.43	2	3.62 ±28.05	5.4 ±41.87	4	8.71 ±20.44	10.82 ±23.73
Feb 06	2	0	0	2	1.45 ±18.38	8.04 ±102.1	4	0.72 ±2.3	4.02 ±12.79
Mar 06	4	19.1 ±19.45	22.85 ±23.71	4	0.71 ±2.25	1.86 ±5.91	8	9.9 ±10.62	12.35 ±12.59
Apr 06	4	2.86 ±5.82	3.33 ±6.76	2	1.42 ±17.99	5.66 ±71.97	6	2.38 ±3.21	4.11 ±5.26
May 06	4	24.42 ±52.05	27.07 ±55.94	2	2.19 ±9.94	8.77 ±39.75	6	17.01 ±29.19	20.97 ±30.32
Jun 06	3	49 ±127.88	59.36 ±157.14	4	105.07 ±236.69	201.43 ±386.28	7	81.04 ±104.82	140.54 ±176.85
Year 1	**43**	**14.39 ±9.15**	**16.61 ±10.37**	**41**	**13.74 ±16.16**	**25.26 ±28.1**	**84**	**14.07 ±8.98**	**20.83 ±14.42**
Jul 06	4	3.9 ±8.8	4.67 ±9.51	4	3.56 ±2.97	6.03 ±5.03	8	3.73 ±3.2	5.35 ±3.75
Aug 06	5	0.77 ±2.14	0.95 ±2.65	5	0.29 ±0.79	0.35 ±0.98	10	0.53 ±0.9	0.65 ±1.11
Sep 06	0	NS	NS	3	0.47 ±2.03	0.5 ±2.16	3	0.47 ±2.03	0.5 ±2.16
Oct 06	4	0.93 ±2.97	1.21 ±3.86	4	2.82 ±4.04	3.53 ±5.27	8	1.87 ±1.92	2.37 ±2.47
Nov 06	3	4.18 ±10.79	5.35 ±14.04	3	6.5 ±25.03	8.24 ±32.27	6	5.34 ±7.4	6.79 ±9.55
Dec 06	2	3.85 ±0.7	4.61 ±0.92	2	3.54 ±8.49	4.01 ±6.5	4	3.69 ±0.92	4.31 ±0.87
Jan 07	2	3.89 ±1.53	4.57 ±2.49	2	1.4 ±0.29	1.71 ±0.36	4	2.64 ±2.29	3.14 ±2.64
Feb 07	2	1.97 ±25.05	2.22 ±28.14	2	1.45 ±18.36	1.76 ±22.4	4	1.71 ±3.21	1.99 ±3.7
Mar 07	3	2.48 ±10.68	4 ±17.23	2	1.41 ±17.93	1.72 ±21.86	5	2.05 ±4.04	3.09 ±6.46
Apr 07	3	3.65 ±15.73	5.89 ±25.36	2	0.68 ±8.61	1.13 ±14.34	5	2.46 ±5.95	3.99 ±9.58
May 07	5	6.82 ±12.6	10.69 ±20.6	2	5.4 ±36.18	8.99 ±60.3	7	6.42 ±7.84	10.21 ±12.81
Jun 07	4	6.7 ±14.12	10.66 ±23.94	4	4.26 ±6.52	7.91 ±10.16	8	5.48 ±5.46	9.28 ±9.03
Year 2	**37**	**3.63 ±1.84**	**5.22 ±2.92**	**35**	**2.65 ±1.24**	**3.9 ±1.79**	**72**	**3.15 ±1.1**	**4.58 ±1.7**
Total	**80**	**9.41 ±5.04**	**11.34 ±5.77**	**76**	**8.63 ±8.66**	**15.42 ±15.08**	**156**	**9.03 ±4.89**	**13.33 ±7.83**

Table 4-7. Impingement collection efficiency adjustment values obtained from Normandeau releases of dead fish onto the traveling screens at Units 1 and 2 of Merrimack Station, June 2005 through June 2007.

Sample Start Date	Unit 1 Percent (%) Efficiency	Unit 2 Percent (%) Efficiency
8/10/2005	75%	void [a]
8/17/2005	no sample [h]	74%
8/31/2005	53%	50%
9/28/2005	97%	73%
11/2/2005	88%	59%
12/7/2005	91%	85%
1/4/2006	85%	67%
2/1/2006	74%	18%
3/1/2006	82%	38%
4/5/2006	no sample [b]	25%
4/12/2006	86%	no sample [g]
5/3/2006	93%	no sample [b]
5/31/2006	82%	void [c]
7/5/2006	94%	59%
7/26/2006	62%	void [d]
8/30/2006	81%	81%
9/20/2006	no sample [b]	94%
10/18/2006	77%	78%
11/29/2006	81%	93%
12/27/2006	86%	15%
1/24/2007	84%	void [e]
2/21/2007	89%	82%
3/28/2007	62%	void [f]
5/2/2007	73%	no sample [b]
6/6/2007	60%	60%
6/20/2007	89%	41%

[a] Efficiency test interupted by pump shut down. Voided
[b] No sample conducted due to Unit offline.
[c] EENC 06-061 - Observation of screenwash conducted without sample basket in place - sample voided.
[d] EENC 07-015 - Based on actions observed on 5/31/06 the results of this test suggest that screenwash was again conducted without basket in place.
[e] EENC 07-009 - Miscommunication between NAI and PSNH led to fish release onto north screen at U2 which was offline at that time.
[f] EENC 07-010 - Collection basket was allowed to overflow by PSNH employee during screenwash process
[g] Unit 2 sample conducted during previous week
[h] Unit 1sample conducted during previous week

Table 4-8. Monthly estimates of impingement abundance for each fish species at Merrimack Station (Units 1 and 2 combined) based on 24-hour collections adjusted for CWIS flows and screen collection efficiency, June 2005 through June 2007.

Species	Jun 05	Jul 05	Aug 05	Sep 05	Oct 05	Nov 05	Dec 05	Jan 06	Feb 06	Mar 06	Apr 06	May 06	Jun 06	Jul 06	Aug 06	Sep 06	Oct 06	Nov 06	Dec 06	Jan 07	Feb 07	Mar 07	Apr 07	May 07	Jun 07	Total	% of Total
American eel	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	2	0	0	0	17	0.2
Banded sunfish	0	0	0	0	0	0	0	0	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0	12	0	35	0.4
Black crappie	0	0	0	41	91	63	8	0	0	0	39	38	26	0	0	0	27	37	30	7	0	0	2	36	0	447	5.6
Bluegill	3	41	19	20	35	19	34	0	0	33	6	194	4,089	157	9	11	39	67	59	15	0	13	4	65	60	4,993	62.4
Brown bullhead	0	9	0	0	0	0	0	0	0	0	0	0	15	2	0	0	0	0	0	0	0	0	0	0	10	37	0.5
Chain pickerel	0	0	0	0	0	0	0	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0.2
Fallfish	0	0	0	0	0	0	5	53	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	59	0.7
Golden shiner	3	3	0	0	0	8	0	22	0	0	39	0	21	14	0	0	0	0	0	0	0	34	3	7	0	152	1.9
Largemouth bass	0	9	0	0	78	63	16	0	0	0	0	0	31	17	0	0	45	47	11	4	29	4	0	0	0	356	4.4
Margined madtom	0	9	0	0	11	0	0	16	0	43	1	0	40	2	0	0	0	0	0	0	0	0	44	24	26	216	2.7
Pumpkinseed	0	0	0	0	71	15	17	0	0	8	0	57	52	0	0	0	13	9	0	0	0	0	0	12	12	268	3.3
Rainbow smelt	0	0	0	0	0	3	75	22	70	0	0	0	0	0	0	0	0	0	1	15	0	0	0	0	0	186	2.3
Redbreast sunfish	0	0	0	13	0	0	0	0	0	7	1	7	4	0	0	0	0	0	0	0	0	0	0	0	13	45	0.6
Rock bass	3	3	0	0	0	2	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	0.2
Smallmouth bass	3	12	10	0	0	7	8	0	8	9	0	0	0	0	9	0	0	0	0	0	0	0	0	0	0	64	0.8
Spottail shiner	0	28	0	0	0	41	285	54	70	28	0	0	0	0	0	0	9	0	0	16	2	0	1	12	59	605	7.6
Sunfish family	0	19	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	0.4
Tessellated darter	0	9	0	0	0	0	0	0	0	47	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	0.7
White perch	0	0	0	0	0	5	4	0	0	0	0	0	0	0	0	0	0	0	0	10	2	0	0	0	0	20	0.3
White sucker	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	0	0	0	0	0	0	0	10	21	0.3
Yellow bullhead	0	0	0	0	0	0	0	0	0	0	0	0	0	12	0	0	0	0	0	0	0	13	0	0	0	25	0.3
Yellow perch	0	0	0	0	0	17	119	32	15	81	0	10	23	0	0	0	0	0	0	0	0	0	3	7	29	335	4.2
All Species	**11**	**143**	**29**	**88**	**286**	**244**	**581**	**214**	**163**	**256**	**115**	**307**	**4,300**	**215**	**17**	**11**	**134**	**161**	**102**	**67**	**48**	**66**	**57**	**174**	**220**	**8,007**	**100.0**

Table 4-9. Summary of percent (%) survival observed for live fish (golden shiner) released and impinged on the traveling screens at Unit 1 and Unit 2 of Merrimack Station. (Note: A blank cell in this table means no survival test was preformed on that date.)

	UNIT 1			UNIT 2		
Date	% Survival	N (fish recaptured)	Standard Error (+/-)	% Survival	N (fish recaptured)	Standard Error (+/-)
2/9/2006	58.6	70	10.7			
3/9/2006				70.6	109	4.4
5/11/2006	66.7	26	9.5			
1/16/2007	48.7	160	4.9	86.0	176	4.9
2/26/2007	57.8	180	3.7	90.6	171	2.2
3/26/2007	57.5	152	5.5	100.0	126	5.1
4/10/2007	64.8	88	5.1	82.1	106	3.7
5/21/2007	42.2	73	6.8			
6/25/2007	40.4	24	16.5	20.2	8	23.0
7/30/2007	99.7	21	9.8	100.0	7	71.4

Table 4-10. Estimated total fish impingement survival for the existing traveling screens at Unit 1 and Unit 2 of Merrimack Station, if operated with a continuous wash cycle and if all impinged fish were alive when first impinged, June 2005 through June 2007.

	UNIT 1			UNIT 2			BOTH UNITS	
Month	Estimated Impingement *	Seasonal Survival Rate	Estimated # Surviving	Estimated Impingement *	Seasonal Survival Rate	Estimated # Surviving	Estimated Impingement *	Estimated # Surviving
Jun-05	3	70.2%	2	8	60.1%	5	11	7
Jul-05	40	70.2%	28	103	60.1%	62	143	90
Aug-05	0	70.2%	0	29	60.1%	17	29	17
Sep-05	25	62.7%	16	63	74.2%	47	88	62
Oct-05	110	62.7%	69	176	74.2%	131	286	200
Nov-05	97	62.7%	61	147	74.2%	109	244	170
Dec-05	371	55.0%	204	209	88.3%	185	581	389
Jan-06	112	55.0%	62	102	88.3%	90	214	152
Feb-06	23	55.0%	13	141	88.3%	125	163	137
Mar-06	200	57.8%	116	55	84.2%	46	256	162
Apr-06	31	57.8%	18	84	84.2%	71	115	89
May-06	231	57.8%	134	76	84.2%	64	307	198
Jun-06	359	70.2%	252	3,941	60.1%	2,369	4,300	2,621
Year 1	1,603	62.7%	973	5,133	70.6%	3,319	6,736	4,292
Jul-06	36	70.2%	25	179	60.1%	108	215	133
Aug-06	9	70.2%	6	9	60.1%	5	17	12
Sep-06	0	62.7%	0	11	74.2%	8	11	8
Oct-06	15	62.7%	9	119	74.2%	88	134	98
Nov-06	29	62.7%	18	132	74.2%	98	161	116
Dec-06	33	55.0%	18	68	88.3%	60	99	78
Jan-07	35	55.0%	19	32	88.3%	28	49	48
Feb-07	16	55.0%	9	32	88.3%	28	48	37
Mar-07	28	57.8%	16	37	84.2%	31	66	47
Apr-07	41	57.8%	24	16	84.2%	13	57	37
May-07	90	57.8%	52	85	84.2%	72	174	124
Jun-07	74	70.2%	52	146	60.1%	88	220	140
Year 2	406	58.7%	249	866	79.8%	628	1,251	877
Total	**2,009**	**59.6%**	**1,222**	**5,999**	**78.5%**	**3,947**	**7,987**	**5,169**

* Estimated numbers are adjusted for collection efficiency.

Table 4-11. Comparison of raw (24-hour or long-interval samples) and estimated total impingement (from 24-hour samples, unadjusted for screen collection efficiency) for each week or two-week period at Merrimack Station Unit 1 and Unit 2, June 2005 through June 2007.

	Unit 1				Unit 2			
Beginning Date of Sample Period (Wed-Tue)	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (Σ 24-h + 6 or 13-day Sample)	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (Σ 24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (24-h + 6 or 13-day Sample)
29 Jun05	1	13	10	14	3	7	24	10
6 Jul05	2	7	11	9	4	10	31	14
13 Jul05	1	4	4	5	5	6	23	11
20 Jul05	0	4	3	4	1	6	4	7
27 Jul05	1	2	4	3	0	3	0	3
3 Aug05	0	1	0	1	0	5	6	5
10 Aug05	0	1	0	1	2	6	11	8
17 Aug05	0	2	0	2	1	7	4	8
24 Aug05	0	0	0	0	0	0	0	0
31 Aug05	0	3	0	3	0	3	6	3
7 Sep05	0	6	3	6	2	5	8	7
14 Sep05	1	0	4	1	0	5	3	5
21 Sep05	0	3	6	3	1	2	13	3
28 Sep05	2	4	8	6	3	8	15	11
5 Oct05	0	27	5	27	1	30	12	31
12 Oct05		56	27	56		89	38	89
19 Oct05	6	10	40	16	10	30	43	40
26 Oct05	5	8	33	13	2	3	30	5
2 Nov05	4	23	19	27	7	11	34	18
9 Nov05	1	5	3	6	2	4	11	6
16 Nov05	0	9	0	9	1	5	19	6
23 Nov05		24	58	24		7	26	7
30 Nov05		22	153	22	2	5	68	7
7 Dec05	39	27	164	66	20	27	92	47
14 Dec05	1	8	10	9	4	4	16	8
21 Dec05 & 28 Dec05	2	51	15	53	0	34	7	34
4 Jan06 & 11 Jan06	0	34	41	34	1	30	34	31
18 Jan06 & 25 Jan06	7	26	54	33	4	13	31	17
1 Feb06 & 8 Feb06	0	6	0	6	0	12	13	12
15 Feb06 & 22 Feb06	0	10	18	10	2	4	12	6
1 Mar06 & 8 Mar06	3	26	80	29	0	14	13	14
15 Mar06	9	1	42	10	2	6	8	8
22 Mar06	2	3	26	5	0	1	0	1
29 Mar06	6	13	24	19	0	9	0	9
5 Apr06	0	1	6	1	0	4	6	4

(continued)

Table 4-11. (Continued)

Beginning Date of Sample Period (Wed-Tue)	Unit 1				Unit 2			
	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (Σ 24-h + 6 or 13-day Sample)	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (Σ 24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (24-h + 6 or 13-day Sample)
12 Apr06	2	18	11	20	2	0	14	2
19 Apr06	1	6	4	7		0	1	0
26 Apr06	0	1	0	1		0	0	0
3 May06	0	4	1	4		0	0	0
10 May06	1	27	60	28		0	0	0
17 May06	19	35	110	54		30	6	30
24 May06		26	34	26	2	79	11	81
31 May06	6	39	108	45	1	73	90	74
7 Jun06	28	60	137	88	29	519	808	548
14 Jun06	9	26	42	35	263	123	930	386
21 Jun06		17	9	17	3	12	117	15
28 Jun06	2	2	17	4	34	22	152	56
Year 1 (29Jun05-28 Jun06)	**161**	**701**	**1,404**	**862**	**414**	**1,273**	**2,792**	**1,687**
5 Jul06	3	10	12	13	4	7	22	11
12 Jul06	0	6	0	6	2	10	17	12
19 Jul06	0	5	3	5	3	4	15	7
26 Jul06	1	0	4	1	1	1	4	2
2 Aug06	0	1	0	1	0	1	0	1
9 Aug06	0	3	3	3	0	2	3	2
16 Aug06	1	4	4	5	1	1	4	2
23 Aug06	0	0	0	0	0	1	0	1
30 Aug06	0	1	0	1	0	2	0	2
6 Sep06		0	0	0	0	1	0	1
13 Sep06		0	0	0	0	2	3	2
20 Sep06		0	0	0	1	0	3	1
27 Sep06		0	0	0		5	7	5
4 Oct06	0	3	0	3	1	3	13	4
11 Oct06	0	6	0	6	3	7	12	10
18 Oct06	0	4	3	4	0	12	12	12
25 Oct06	1	5	8	6	4	7	54	11
1 Nov06 & 8 Nov06	1	8	14	9	13	4	96	17
15 Nov06 & 22 Nov06	0	24	7	24	0	42	6	42
29 Nov06 & 6 Dec06	1	18	10	19	1	24	27	25
13 Dec06 & 20 Dec06	1	8	14	9	3	6	27	9
27 Dec06 & 3 Jan07	1	3	14	4	2	2	22	4
10 Jan07 & 17 Jan07	1	1	14	2	1	0	11	1

(continued)

Table 4-11. (Continued)

Beginning Date of Sample Period (Wed-Tue)	Unit 1				Unit 2			
	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (Σ 24-h + 6 or 13-day Sample)	Raw 24-h Sample	Raw 6- or 13-day Sample	Estimated Weekly Impingement (Σ 24-h Rate X Σ Daily Flow)	Total Raw Impingement Count (24-h + 6 or 13-day Sample)
24 Jan07 & 31 Jan07	1	1	8	2	1	2	6	3
7 Feb07 & 14 Feb07	0	1	7	1	0	0	12	0
21 Feb07 & 28 Feb07	1	5	8	6	2	2	15	4
7 Mar07 & 14 Mar07	0	4	13	4	0	3	9	3
21 Mar07	2	6	4	8		8	11	8
28 Mar07	0	13	9	13	2	7	11	9
4 Apr07	3	13	11	16	1	4	4	5
11 Apr07	0	7	0	7	0	4	3	4
18 Apr07		0	0	0		0	0	0
25 Apr07	0	11	9	11		0	0	0
2 May07	3	6	12	9		0	0	0
9 May07	0	6	0	6		0	0	0
16 May07	0	8	18	8		4	20	4
23 May07	6	2	24	8	6	8	29	14
30 May07	0	3	16	3	1	4	27	5
6 Jun07	5	13	23	18	7	7	34	14
13 Jun07	1	3	3	4	2	6	10	8
20 Jun07	0	3	2	3	1	4	10	5
27 Jun07	1		1	1	2		2	2
Year 2 (5 Jul06-27 Jun07)	**34**	**215**	**277**	**249**	**65**	**207**	**560**	**272**
Total	**195**	**916**	**1,681**	**1,111**	**479**	**1,480**	**3,352**	**1,959**

5.0 ADULT EQUIVALENCY

As requested by the EPA 308 letter, this section presents the monthly and annual numbers of adult equivalents for those fish species contributing to the upper 90% of the totals entrained (Table 5-1) and impinged (Table 5-2) at Merrimack Station.

White sucker exhibited the highest number of adult equivalents entrained at Merrimack Station (both Units combined) during 2006 (7,337 adult fish representing 55% of the total 2006 entrainment; Table 5-1), and larvae (PYSL) comprised all of white sucker entrainment. Unit 2 contributed 85% (6,253 adult fish) of white sucker adult equivalents entrained in 2006 at Merrimack Station. Members of the carp and minnow family exhibited the second highest proportion (33%) and number (4,335 adult fish) of adult equivalents entrained at Merrimack Station (both Units combined) during 2006 (Table 5-1). The entrainment of larvae (YSL and PYSL) comprised all of the carp and minnow family entrained during 2006, and Unit 2 contributing most (3,620 or 84%) to the combined entrainment at Merrimack Station. The sunfish family exhibited the third highest proportion (12%) and number (1,604 adult fish; Table 5-1) of adult equivalents entrained at Merrimack Station (both Units combined). Unit 1 entrained 62% of the sunfish family equivalent adults at Merrimack Station during 2006. Yellow perch exhibited the fourth highest proportion (0.1%) and number (22 adult fish) of adult equivalents entrained at Merrimack Station (both Units combined) during 2006 (Table 5-1); all were derived from the PYSL lifestage, and all were entrained at Unit 2.

Similar to 2006, white sucker exhibited the highest proportion (74%) and number (9,707) of adult equivalents entrained at Merrimack Station (both Units combined) during 2007 (Table 5-1). White sucker equivalent adults were entrained equally between Units 1 (4,844 or 50%) and 2 (4,864 or 50%) during 2007. Members of the carp and minnow family exhibited the second highest proportion (19%) and number (2,525 adult fish) of adult equivalents entrained at Merrimack Station (both Units combined) during 2007 (Table 5-1). Adult equivalents entrained for the carp and minnow family include contributions from both the egg and larval lifestages, with the majority (59%) of adult equivalents entrained at Unit 1 of Merrimack Station during 2007 (Table 5-1). The third highest proportion (6%) and number (777 adult fish) of adult equivalents entrained at Merrimack Station during 2007 was the sunfish family, with Unit 1 (50% and 389 adult fish) and Unit 2 (50% and 387 adult fish) contribuing equally to the combined adult equivalents entrained in that year (Table 5-1). Yellow perch exhibited the fourth highest proportion (1%) and number (195 adult fish) of adult equivalents entrained at Merrimack Station (both Units combined) during 2007, with 94% (184) of the total adult equivalents entrained for yellow perch occuring at Unit 1 (Table 5-1).

Spottail shiner exhibited the highest proportion (55%) and number (436) of adult equivalents impinged during the first year (late June 2005 through June 2006) of impingement at Merrimack Station (both Units combined and based on monthly abundance estimates adjusted for collection efficiency; Table 5-2). Impingement at Unit 1 accounted for 232 of the spottail shiner adult equivalents impinged (53%) and impingement at Unit 2 accounted for 204 of the adult equivalents impinged (47%) during the first year of impingement monitoring (Table 5-2). Young-of-year, Age 1+ and adult fish contributed to the adult equivalentsimpinged for spottail shiner during 2006. Bluegill exhibited the second highest proportion (17%) number 138 adult fish) of adult equivalents impinged at Merrimack Station during the first year, and most (69% or 95 adult fish) of the bluegill were impinged at Unit 2 (Table 5-2). Bluegill from the young-of-year and Age 1+, Age 2+ and adult age classes contributed to the adult equivalents impinged for 2006. Yellow perch exhibited the third highest proportion (14%) and number (110 adult fish) of adult equivalents impinged at Merrimack Station during 2006, with the majority of the adult equivalents impinged (97% or 107 adult fish) occurring at Unit 1 (Table 5-2). A total of 103 adult equivalent pumpkinseed representing (13%) of the total were impinged at Merrimack Station (both Units combined) during the first year, and 92% (94 adult fish) were impinged at Unit 1. Largemouth bass and black crappie exhibited 10 or fewer adult equivalents impinged at Merrimack Station (both Units combined) during the first sample year.

Bluegill were impinged in the highest proportion (57%) and abundance (135 adult fish) of adult equivalent fish at Merrimack Station (both Units combined and based on monthly abundance estimates adjusted for collection efficiency) during the second year (July 2006 through June 2007) of impingement sampling (Table 5-2). The bluegill adult equivalents due to impingement at Merrimack Station were represented by a comination of YOY, Age 1+, Age 2+ and older fish that had already reached adulthood. Unit 2 exhibited the highest proportion (62%) and number (84 adult fish) of adult equivalents from impingement compared to Unit 1 (51% and 48 adult fish) during the second year (Table 5-2). Spottail shiner exhibited the second highest proportion (18%) and number (43 adult fish) of adult equivalents impinged at Merrimack Station (both Units combined) during the second year (Table 5-2). Young of year spottail shiners were the only age group which contributed to the impingement losses for this species at Merrimack Station during the second year, and the majority (72% or 31 adult fish) were impinged at Unit 2. The annual numbers of adult equivalents due to impingement at Merrimack Station for yellow perch 13% or 31 adult fish), pumpkinseed (8% or 18 adult fish), and black crappie (0.4% or 1 adult fish) were all lower during the second year of sampling than observed for these species during the first year (Table 5-2). One more adult equivalent largemouth bass (10 adult fish) was impinged during the first year of the study than was during the second year (9 adult fish).

Table 5-3 presents a comparision of the relative contribution of impingement and entrainment to the adult equivalents at Merrimack Station for the two-year period of June 2005 through June 2007. Monthly values of adult equivalents for impinged fish (Table 5-2) were summed for the entire two year period to obtain the values presented in Table 5-3. To obtain the entrainment adult equivalents presented for the comparable time period as impingement in Table 5-3, it was assumed that entrainable eggs and larvae could be present in Hooksett Pool in any month from April through September based on the life histories of the species present, and that ichthyoplankton would not be found during the months of October through March. Weekly species-specific entrainment rates fron the sampled weeks were applied to Station flows for the missing weeks from April through September of each year to provide a set of entrainment adult equivalent losses for the comparable two year period of impingement sampling (i.e., June 2005 through June 2007). Also, for comparative purposes in Table 5-3, impinged fish species were pooled to represent the taxonomic groups defined by the entrainment data. Entrainment data for the family Cyprinidae is compared to the impingement for spottail shiner and entrainment data for the family Centrarchidae is compared to the impingement for bluegill, pumpkinseed and black crappie. These species were the dominant members of their respective families present in Merrimack Station impingement catches. Adult equivalent values for white sucker and yellow perch were available on a species level for both impingement and entrainment.

Adult equivalent values at Merrimack Station were greater for entrainment than impingement for each dominant species/family examined (Table 5-3) during the two year study (June 2005 through June 2007). Adult equivalent values for yellow perch were three times greater due to entrainment than impingement. Adult equivalent values for Cyprinidae and Centrarchidae were 23 and 11 times higher due to entrainment than impingement. White sucker showed the greatest difference with adult equivalent values due to entrainment 973 times greater than those values due to impingement.

5.1 Maximum Capacity Operation

The Unit 1 CWIS at Merrimack Station has two intake pumps, each with a design intake capacity of 29,500 gpm (65.73 cfs), resulting in a combined design intake capacity for both pumps at Unit 1 of 59,000 gpm (131.45 cfs). The Unit 2 CWIS also has two intake pumps, each with a design intake capacity of 70,000 gpm (155.96 cfs), and a combined design intake capacity for both circulating water pumps at Unit 2 of 140,000 gpm (311.92 cfs). When converted to millions of cubic meters (MCM), the maximum daily capacity for Unit 1 was 0.32 MCM and for Unit 2 was 0.76 MCM. Table 5-4 presents the predicted monthly impingement, with and without the correction for collection efficiency for Units 1 and 2 of Merrimack Station using the maximum (design) flow for each Unit. Had the Unit 1 and Unit 2 CWISs at Merrimack Station been operating at maximum (design) intake flows continuously throughout the entire period of June 2005 through June 2007, an estimated 9,806 fish would have been impinged in this period (both Units combined), when adjusted for collection efficiency (Table 5-4). The predicted number of 9,806 fish impinged if the plant CWISs operated at design flows during the two year study at Merrimack Station compares to an estimated total impingement of 8,007 fish based on the actual intake flows during the same period (Table 4-5), representing an 18% reduction in impingement abundance. Based on the predicted annual impingement abundance using design flows, Unit 1 could have impinged 2,139 fish in the first year and 509 fish in the second year of the study (Table 5-4) compared to the actual impingement abundance of 1,603 fish and 405 fish, respectively (Table 4-5). Based on the predicted annual impingement abundance using design flows, Unit 2 could have impinged 6,016 fish in the first year and 1,133 fish in the second year of the study (Table 5-4) compared to the actual impingement abundance of 5,133 fish and 866 fish, respectively (Table 4-5). The actual operation flows observed at Merrimack Station during that two year period resulted in a reduction in the number of impinged fish at Unit 1 of 24.4% and at Unit 2 of 16.1%.

The predominant species of fish impinged (90% of total individuals) at Merrimack Station were black crappie, bluegill, largemouth bass, pumpkinseed, spottail shiner and yellow perch, and the adult equivalent values for these six species are presented for the two years of impingement sampling at Merrimack Station based on design intake flows (Table 5-5). An adult equivalent of 331 bluegill could have been impinged during the two years of sampling at Merrimack Station (both Units combined) if Unit 1 and Unit 2 each operated at design intake flows on every day throughout the two year period. Based on the predicted adult equivalent values for this theoretical maximum intake flow scenario, bluegill would have had the greatest adult equivalents due to impingement during the second year of sampling (165 fish), while spottail shiner would have had the greatest loss of adult equivalents due to impingement during the first year of sampling (550 fish; Table 5-5). The predicted number of 8,541 bluegill, spottail shiner, black crappie, largemouth bass, yellow perch and pumpkinseed impinged if the plant CWISs operated at design flows during the two year study at Merrimack Station (Table 5-5) is reduced to 1,305 adult equivalent fish lost for both Units combined (Table 5-5). The predicted equivalent adult fish lost of 1,305 fish (Table 5-5) impinged if the plant CWISs operated at design flows during the two year study at Merrimack Station compares to an estimated adult equivalent value of 1,033 fish (bluegill, spottail shiner, black crappie, largemouth bass, yellow perch and pumpkinseed) based on the actual intake flows during the same period (Table 5-2), representing a 21% reduction in adult equivalent losses. Therefore, by operating at less than design intake flows, Merrimack Station prevented the impingement losses of 270 adult fish from Hooksett Pool over the two-year study period (Table 5-5).

Table 5-6 presents the predicted monthly entrainment abundance for Units 1 and 2 of Merrimack Station based on the maximum (design) pumping capacity for each Unit applies continuously during the entire sampling period. Had Merrimack Station been withdrawing cooling water continuously at maximum capacity during the time period of 21 May 2006 through 10 September 2006, an estimated 3,194,874 larvae and 37,996 eggs would have been entrained (Table 5-6). Similarly, a total of 3,058,010 larvae and 22,492 eggs would have been entrained during the time period of 2 April 2007 through 25 June 2007 had Merrimack Station been operating at design intake flows (Table 5-6). Entrainment abundance based on actual intake flows at both Units combined during the 2006 period for Merrimack Station were a total of 2,786,283 larvae (Table 3-6) and 33,989 eggs (Table 3-8). Entrainment abundance based on actual intake flows at both Units combined during the 2007 period for Merrimack Station were a total of 2,449,268 larvae (Table 3-6) and 15,797 eggs (Table 3-8). Compare to design intake flows, the entrainment abundance for the actual operating flows at Merrimack Station (both Units combined) resulted in a reduction of potential entrainment abundance for 2006 of 13%, and for the 2007 period a reduction of 20 %.

The predominant fish species entrained (90% of total individuals) at Merrimack Station were white sucker, family Centrarchidae, family Cyprinidae, and yellow perch (Table 3-3). The annual total entrainment abundance and adult equivalence losses for these two species and two families are presented for the two years of entrainment sampling at Merrimack Station based on design intake flows (Table 5-7). Assuming that Merrimack Station was operating at maximum intake flows during the 2006 entrainment season, an adult equivalent of 4,850 cyprinids, 2,264 centrarchids (bluegill and pumpkinseed), 8,354 white sucker and 23 yellow perch would have been lost from Hooksett Pool due to entrainment at Units 1 and 2 combined (Table 5-7). The actual CWIS flows for Merrimack Station during the period of 21 May 2006 through 10 September 2006 reduced the loss of adult equivalents (from maximum capacity numbers) due to entrainment by 10.6% for cyprinids, 29.2% for centrarchids, 12.2% for white sucker, and 4.3% for yellow perch. Assuming that Merrimack Station was operating at maximum capacity during the 2007 entrainment season, an adult equivalent of 2,967 cyprinids, 1,198 centrarchids (bluegill and pumpkinseed), 11,774 white sucker and 238 yellow perch would have been lost from Hooksett Pool due to entrainment at Units 1 and 2 combined (Table 5-7). The actual CWIS flows for Merrimack Station during the period of 2 April 2007 through 25 June 2007 reduced the loss of adult equivalents (from maximum capacity numbers) by 14.9% for cyprinids, 35.1% for centrarchids, 17.6% for white sucker, and 18.1% for yellow perch.

Table 5-1. Entrainment abundance and the corresponding adult equivalent number of fish entrained at Merrimack Station (monthly and annual values) sorted by species, year and Unit, May 2006 through June 2007. (Note: a blank cell in this table means no sample was taken).

			2006						2007					
			Unit				Both Units Combined		Unit				Both Units Combined	
			Unit 1		Unit 2				Unit 1		Unit 2			
Month	Species	Stage	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate
April	Carp and minnow family	Eggs							0	0	0	0	0	0
		Larvae							0	0	0	0	0	0
		YOY/Older							0	0	0	0	0	0
		Total							**0**	**0**	**0**	**0**	**0**	**0**
	Sunfish family	Eggs							0	0	0	0	0	0
		Larvae							0	0	42,083	174	42,083	174
		YOY/Older							0	0	0	0	0	0
		Total							**0**	**0**	**42,083**	**174**	**42,083**	**174**
	White sucker	Eggs							0	0	0	0	0	0
		Larvae							0	0	17,641	112	17,641	112
		YOY/Older							0	0	0	0	0	0
		Total							**0**	**0**	**17,641**	**112**	**17,641**	**112**
	Yellow perch	Eggs							0	0	0	0	0	0
		Larvae							0	0	0	0	0	0
		YOY/Older							0	0	0	0	0	0
		Total							**0**	**0**	**0**	**0**	**0**	**0**
May	Carp and minnow family	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0	0	0	19,478	84	19,478	84
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**19,478**	**84**	**19,478**	**84**
	Sunfish family	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	24,773	102	24,773	102	0	0	2,122	9	2,122	9
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**24,773**	**102**	**24,773**	**102**	**0**	**0**	**2,122**	**9**	**2,122**	**9**
	White sucker	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	692,860	4,382	692,860	4,382	137,434	869	44,126	279	181,560	1,148
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**692,860**	**4,382**	**692,860**	**4,382**	**137,434**	**869**	**44,126**	**279**	**181,560**	**1,148**
	Yellow perch	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	24,848	11	24,848	11	409,742	180	0	0	409,742	180
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**24,848**	**11**	**24,848**	**11**	**409,742**	**180**	**0**	**0**	**409,742**	**180**

(continued)

Table 5-1. (Continued)

Month	Species	Stage	2006						2007					
			Unit				Both Units Combined		Unit				Both Units Combined	
			Unit 1		Unit 2				Unit 1		Unit 2			
			Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate
June	Carp and minnow family	Eggs	0	0	0	0	0	0	7,899	4	0	0	7,899	4
		Larvae	78,904	340	815,041	3,513	893,945	3,853	343,337	1,480	221,918	957	565,255	2,436
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**78,904**	**340**	**815,041**	**3,513**	**893,945**	**3,853**	**351,235**	**1,484**	**221,918**	**957**	**573,154**	**2,441**
	Sunfish family	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	71,068	293	123,435	510	194,503	803	94,325	389	49,566	205	143,892	594
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**71,068**	**293**	**123,435**	**510**	**194,503**	**803**	**94,325**	**389**	**49,566**	**205**	**143,892**	**594**
	White sucker	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	171,333	1,084	271,111	1,715	442,444	2,798	528,370	3,342	393,359	2,488	921,728	5,830
		YOY/Older	0	0	0	0	0	0	7,899	633	24,783	1,985	32,682	2,618
		Total	**171,333**	**1,084**	**271,111**	**1,715**	**442,444**	**2,798**	**536,269**	**3,974**	**418,142**	**4,473**	**954,410**	**8,448**
	Yellow perch	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	24,823	11	24,823	11	8,999	4	25,009	11	34,008	15
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**24,823**	**11**	**24,823**	**11**	**8,999**	**4**	**25,009**	**11**	**34,008**	**15**
July	Carp and minnow family	Eggs	0	0	0	0	0	0						
		Larvae	77,868	336	24,767	107	102,635	442						
		YOY/Older	0	0	0	0	0	0						
		Total	**77,868**	**336**	**24,767**	**107**	**102,635**	**442**						
	Sunfish family	Eggs	0	0	0	0	0	0						
		Larvae	160,178	661	0	0	160,178	661						
		YOY/Older	0	0	0	0	0	0						
		Total	**160,178**	**661**	**0**	**0**	**160,178**	**661**						
	White sucker	Eggs	0	0	0	0	0	0						
		Larvae	0	0	24,733	156	24,733	156						
		YOY/Older	0	0	0	0	0	0						
		Total	**0**	**0**	**24,733**	**156**	**24,733**	**156**						
	Yellow perch	Eggs	0	0	0	0	0	0						
		Larvae	0	0	0	0	0	0						
		YOY/Older	0	0	0	0	0	0						
		Total	**0**	**0**	**0**	**0**	**0**	**0**						

(continued)

Table 5-1. (Continued)

			2006						2007					
			Unit				Both Units Combined		Unit				Both Units Combined	
			Unit 1		Unit 2				Unit 1		Unit 2			
Month	Species	Stage	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate
August	Carp and minnow family	Eggs	0	0	0	0	0	0						
		Larvae	9,142	39	0	0	9,142	39						
		YOY/Older	0	0	0	0	0	0						
		Total	**9,142**	**39**	**0**	**0**	**9,142**	**39**						
	Sunfish family	Eggs	0	0	0	0	0	0						
		Larvae	9,021	37	0	0	9,021	37						
		YOY/Older	0	0	0	0	0	0						
		Total	**9,021**	**37**	**0**	**0**	**9,021**	**37**						
	White sucker	Eggs	0	0	0	0	0	0						
		Larvae	0	0	0	0	0	0						
		YOY/Older	0	0	0	0	0	0						
		Total	**0**	**0**	**0**	**0**	**0**	**0**						
	Yellow perch	Eggs	0	0	0	0	0	0						
		Larvae	0	0	0	0	0	0						
		YOY/Older	0	0	0	0	0	0						
		Total	**0**	**0**	**0**	**0**	**0**	**0**						
September	Carp and minnow family	Eggs			**0**	**0**	**0**	**0**						
		Larvae			**0**	**0**	**0**	**0**						
		YOY/Older			**0**	**0**	**0**	**0**						
		Total			**0**	**0**	**0**	**0**						
	Sunfish family	Eggs			**0**	**0**	**0**	**0**						
		Larvae			**0**	**0**	**0**	**0**						
		YOY/Older			**0**	**0**	**0**	**0**						
		Total			**0**	**0**	**0**	**0**						
	White sucker	Eggs			**0**	**0**	**0**	**0**						
		Larvae			**0**	**0**	**0**	**0**						
		YOY/Older			**0**	**0**	**0**	**0**						
		Total			**0**	**0**	**0**	**0**						
	Yellow perch	Eggs			**0**	**0**	**0**	**0**						
		Larvae			**0**	**0**	**0**	**0**						
		YOY/Older			**0**	**0**	**0**	**0**						
		Total			0	0	0	0						

(continued)

Table 5-1. (Continued)

Month	Species	Stage	2006						2007					
			Unit				Both Units Combined		Unit				Both Units Combined	
			Unit 1		Unit 2				Unit 1		Unit 2			
			Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate	Annual Entrain-ment Estimate	Adult Equiva-lent Estimate
Total	Carp and minnow family	Eggs	0	0	0	0	0	0	7,899	4	0	0	7,899	4
		Larvae	165,914	715	839,808	3,620	1005722	4,335	343,337	1,480	241,396	1,040	584,733	2,520
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**165,914**	**715**	**839,808**	**3,620**	**1005722**	**4,335**	**351,235**	**1,484**	**241,396**	**1,040**	**592,631**	**2,525**
	Sunfish family	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	240,268	992	148,208	612	388,476	1,604	94,325	389	93,772	387	188,097	777
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**240,268**	**992**	**148,208**	**612**	**388,476**	**1,604**	**94,325**	**389**	**93,772**	**387**	**188,097**	**777**
	White sucker	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	171,333	1,084	988,703	6,253	1160036	7,337	665,804	4,211	455,125	2,878	1120929	7,089
		YOY/Older	0	0	0	0	0	0	7,899	633	24,783	1,985	32,682	2,618
		Total	**171,333**	**1,084**	**988,703**	**6,253**	**1160036**	**7,337**	**673,703**	**4,844**	**479,908**	**4,864**	**1153611**	**9,707**
	Yellow perch	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	49,671	22	49,671	22	418,741	184	25,009	11	443,750	195
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**49,671**	**22**	**49,671**	**22**	**418,741**	**184**	**25,009**	**11**	**443,750**	**195**

Table 5-2. Impingement abundance and the corresponding adult equivalent number of fish impinged at Merrimack Station (monthly and annual values) sorted by species, year and Unit, June 2005 through June 2007. (Note: a blank cell in this table means no sample was taken).

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jun-05	Bluegill	YOY	0	0	3	<1	3	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**3**	**<1**	**3**	**<1**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jul-05	Bluegill	YOY	9	<1	31	<1	41	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**9**	**<1**	**31**	**<1**	**41**	**<1**
	Spottail shiner	YOY	9	4	19	8	28	12
		Age 1+	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	9	4	19	8	28	12
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	9	<1	9	<1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	9	<1	9	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Aug-05	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	9	9	9	9
		Adult	0	0	10	10	10	10
		Total	**0**	**0**	**19**	**19**	**19**	**19**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Sep-05	Bluegill	YOY	6	<1	0	0	6	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	14	14	14	14
		Total	**6**	**<1**	**14**	**14**	**20**	**14**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	6	<1	35	<1	41	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**6**	**<1**	**35**	**<1**	**41**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Oct-05	Bluegill	YOY	13	<1	11	<1	24	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	11	10	11	10
		Adult	0	0	0	0	0	0
		Total	**13**	**<1**	**22**	**10**	**35**	**10**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	27	<1	64	<1	91	1
		Age 1+	0	0	0	0	0	0
		Adult	**0**	**0**	**0**	**0**	**0**	**0**
		Total	**27**	**<1**	**64**	**<1**	**91**	**1**
	Largemouth bass	YOY	10	1	67	3	78	4
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**10**	**1**	**67**	**3**	**78**	**4**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	10	1	11	2	21	3
		Age 1+	2	1	0	0	2	1
		Adult	48	48	0	0	48	48
		Total	**60**	**50**	**11**	**2**	**71**	**51**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Nov-05	Bluegill	YOY	6	<1	8	<1	14	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	3	3	0	0	3	3
		Adult	2	2	0	0	2	2
		Total	**11**	**5**	**8**	**<1**	**19**	**5**
	Spottail shiner	YOY	2	1	5	2	6	3
		Age 1+	0	0	0	0	0	0
		Adult	35	35	0	0	35	35
		Total	**36**	**35**	**5**	**2**	**41**	**38**
	Black crappie	YOY	0	0	63	<1	63	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**63**	**<1**	**63**	**<1**
	Largemouth bass	YOY	6	<1	49	2	55	3
		Age 1+	0	0	8	1	8	1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**6**	**<1**	**58**	**3**	**63**	**3**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	14	3	0	0	14	3
		Age 3+	0	0	0	0	0	0
		Adult	3	3	0	0	3	3
		Total	**17**	**6**	**0**	**0**	**17**	**6**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	8	3	0	0	8	3
		Adult	8	8	0	0	8	8
		Total	**15**	**10**	**0**	**0**	**15**	**10**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Dec-05	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	25	23	0	0	25	23
		Adult	9	9	0	0	9	9
		Total	**34**	**32**	**0**	**0**	**34**	**32**
	Spottail shiner	YOY	9	4	20	9	29	12
		Age 1+	0	0	8	7	8	7
		Adult	175	175	74	74	249	249
		Total	**183**	**178**	**102**	**89**	**285**	**268**
	Black crappie	YOY	0	0	8	<1	8	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**8**	**<1**	**8**	**<1**
	Largemouth bass	YOY	0	0	8	<1	8	<1
		Age 1+	0	0	8	1	8	1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**16**	**1**	**16**	**1**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	81	16	8	2	90	18
		Age 3+	0	0	0	0	0	0
		Adult	29	29	0	0	29	29
		Total	**110**	**45**	**8**	**2**	**119**	**47**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	9	3	0	0	9	3
		Adult	9	9	0	0	9	9
		Total	**17**	**12**	**0**	**0**	**17**	**12**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jan-06	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Spottail shiner	YOY	32	14	0	0	32	14
		Age 1+	0	0	0	0	0	0
		Adult	0	0	22	22	22	22
		Total	**32**	**14**	**22**	**22**	**54**	**36**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	16	3	0	0	16	3
		Age 3+	16	7	0	0	16	7
		Adult	0	0	0	0	0	0
		Total	**32**	**11**	**0**	**0**	**32**	**11**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Feb-06	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	70	70	70	70
		Total	**0**	**0**	**70**	**70**	**70**	**70**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	8	2	0	0	8	2
		Age 3+	8	3	0	0	8	3
		Adult	0	0	0	0	0	0
		Total	**15**	**5**	**0**	**0**	**15**	**5**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Mar-06	Bluegill	YOY	33	<1	0	0	33	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**33**	**<1**	**0**	**0**	**33**	**<1**
	Spottail shiner	YOY	0	0	28	12	28	12
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**28**	**12**	**28**	**12**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	26	3	0	0	26	3
		Age 2+	21	4	0	0	21	4
		Age 3+	21	10	0	0	21	10
		Adult	13	13	0	0	13	13
		Total	**81**	**30**	**0**	**0**	**81**	**30**
	Pumpkinseed	YOY	8	1	0	0	8	1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**8**	**1**	**0**	**0**	**8**	**1**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jan-07	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	15	15	15	15
		Total	**0**	**0**	**15**	**15**	**15**	**15**
	Spottail shiner	YOY	16	7	0	0	16	7
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**16**	**7**	**0**	**0**	**16**	**7**
	Black crappie	YOY	4	<1	4	<1	7	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**4**	**<1**	**4**	**<1**	**7**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	4	<1	4	<1
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**4**	**<1**	**4**	**<1**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Feb-07	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Spottail shiner	YOY	2	1	0	0	2	1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**2**	**1**	**0**	**0**	**2**	**1**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	14	1	15	1	29	1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**14**	**1**	**15**	**1**	**29**	**1**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Mar-07	Bluegill	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	13	12	0	0	13	12
		Adult	0	0	0	0	0	0
		Total	**13**	**12**	**0**	**0**	**13**	**12**
	Spottail shiner	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	2	<1	2	<1	4	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**2**	**<1**	**2**	**<1**	**4**	**<1**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Apr-07	Bluegill	YOY	3	<1	2	<1	4	<1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**3**	**<1**	**2**	**<1**	**4**	**<1**
	Spottail shiner	YOY	0	0	1	<1	1	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**1**	**<1**	**1**	**<1**
	Black crappie	YOY	0	0	2	<1	2	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**2**	**<1**	**2**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	3	1	0	0	3	1
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**3**	**1**	**0**	**0**	**3**	**1**
	Pumpkinseed	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
May-07	Bluegill	YOY	41	<1	24	<1	65	1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**41**	**<1**	**24**	**<1**	**65**	**1**
	Spottail shiner	YOY	0	0	12	5	12	5
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**12**	**5**	**12**	**5**
	Black crappie	YOY	0	0	36	<1	36	<1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**36**	**<1**	**36**	**<1**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	7	1	0	0	7	1
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**7**	**1**	**0**	**0**	**7**	**1**
	Pumpkinseed	YOY	12	2	0	0	12	2
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**12**	**2**	**0**	**0**	**12**	**2**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Jun-07	Bluegill	YOY	48	1	12	<1	60	1
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**48**	**1**	**12**	**<1**	**60**	**1**
	Spottail shiner	YOY	0	0	59	26	59	26
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**59**	**26**	**59**	**26**
	Black crappie	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Largemouth bass	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**0**	**0**	**0**	**0**	**0**	**0**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	29	29	29	29
		Total	**0**	**0**	**29**	**29**	**29**	**29**
	Pumpkinseed	YOY	12	2	0	0	12	2
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**12**	**2**	**0**	**0**	**12**	**2**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Year 2	Bluegill	YOY	115	1	239	3	354	4
		Age 1+	0	0	40	28	40	28
		Age 2+	29	27	26	24	56	51
		Adult	23	23	29	29	52	52
		Total	**167**	**51**	**334**	**84**	**501**	**135**
	Spottail shiner	YOY	26	11	72	31	98	43
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**26**	**11**	**72**	**31**	**98**	**43**
	Black crappie	YOY	41	<1	100	1	140	1
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**41**	**<1**	**100**	**1**	**140**	**1**
	Largemouth bass	YOY	16	1	100	5	116	6
		Age 1+	0	0	42	4	42	4
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**16**	**1**	**141**	**8**	**158**	**9**
	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	10	2	0	0	10	2
		Age 3+	0	0	0	0	0	0
		Adult	0	0	29	29	29	29
		Total	**10**	**2**	**29**	**29**	**39**	**31**
	Pumpkinseed	YOY	24	3	9	1	33	4
		Age 1+	0	0	0	0	0	0
		Adult	0	0	13	13	13	13
		Total	**24**	**3**	**23**	**15**	**46**	**18**

(continued)

Table 5-2. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Total	Bluegill	YOY	638	7	4113	47	4751	54
		Age 1+	0	0	52	36	52	36
		Age 2+	58	54	46	43	104	97
		Adult	33	33	53	53	86	86
		Total	**729**	**94**	**4264**	**178**	**4993**	**272**
	Spottail shiner	YOY	78	34	143	62	221	96
		Age 1+	0	0	8	7	8	7
		Adult	209	209	166	166	375	375
		Total	**287**	**243**	**317**	**235**	**605**	**478**
	Black crappie	YOY	99	1	348	3	447	3
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**99**	**1**	**348**	**3**	**447**	**3**
	Largemouth bass	YOY	32	2	265	13	297	14
		Age 1+	0	0	58	5	58	5
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**32**	**2**	**323**	**18**	**356**	**19**
	Yellow Perch	YOY	0	0	12	<1	12	<1
		Age 1+	26	3	10	1	36	4
		Age 2+	150	30	8	2	158	32
		Age 3+	45	21	0	0	45	21
		Adult	55	55	29	29	84	84
		Total	**275**	**109**	**60**	**32**	**335**	**141**
	Pumpkinseed	YOY	61	8	73	10	133	18
		Age 1+	47	16	0	0	47	16
		Adult	74	74	13	13	87	87
		Total	**182**	**97**	**86**	**23**	**268**	**120**

*Annual totals may differ slightly from those presented in Table 4-8 due to rounding differences from the application of length-at-age data.

Table 5-3. Adult equivalence losses of fish species impinged or entrained at Units 1 and 2 of Merrimack Station for the June 2005 to June 2007 time period.

Unit	Taxon	Impingement (I)	Entrainment (E)	Ratio of AE losses (E:I)
Unit 1	White sucker	11	7,328	666:1
	Yellow perch	109	323	3:1
	Cyprinidae*	243	2,967	12:1
	Centrarchidae*	192	2,424	13:1
Unit 2	White sucker	10	13,111	1311:1
	Yellow perch	32	41	1:1
	Cyprinidae*	235	8,284	32:1
	Centrarchidae*	204	1,688	8:1
Both Units Combined	White sucker	21	20,439	973:1
	Yellow perch	141	366	3:1
	Cyprinidae*	478	11,251	23:1
	Centrarchidae*	396	4,112	10:1

*Cyprinidae represented by spottail shiner and Centrchidae represented by bluegill, pumpkinseed and black crappie for impingement adult equivalence.

Table 5-4. **Predicted monthly total impingement abundance of fish based on design intake flows at Merrimack Station Units 1 and 2, and for both Units combined, from June 2005 through June 2007. Impingement data is presented as Raw counts (Raw) in 24-hour samples, impingement abundance estimates (I) based on the product of 24-hour sample density and design CWIS volumes, and adjusted impingement abundance estimates (Adj-I) representing the abundance values (I) expanded for screen collection efficiency. Note: design (maximum) daily CWIS flows were 0.32 million cubic meters for Unit 1 and 0.76 million cubic meters for Unit 2.**

Month	Unit 1			Unit 2			Both Units Combined		
	Raw	I	Adj-I	Raw	I	Adj-I	Raw	I	Adj-I
Jun 05	1	2	3	3	6	9	4	9	12
Jul 05	4	37	49	10	82	110	14	118	159
Aug 05	0	0	0	3	23	31	3	23	31
Sep 05	3	23	30	6	43	68	9	65	98
Oct 05	11	135	145	13	278	390	24	413	535
Nov 05	5	132	146	17	107	158	22	239	304
Dec 05	42	453	498	24	190	225	66	643	723
Jan 06	7	124	146	5	73	109	12	197	255
Feb 06	0	23	28	2	31	171	2	53	199
Mar 06	20	204	245	2	23	59	22	226	304
Apr 06	3	33	39	2	48	191	5	81	230
May 06	26	302	333	3	65	259	29	367	591
Jun 06	39	394	477	329	2,202	4,236	368	2,596	4,713
Year 1	**161**	**1,862**	**2,139**	**419**	**3,169**	**6,016**	**580**	**5,031**	**8,155**
Jul 06	4	37	44	10	113	192	14	150	236
Aug 06	1	9	11	1	8	9	2	16	20
Sep 06		0	0	1	15	16	1	15	16
Oct 06	1	17	22	8	101	128	9	118	150
Nov 06	2	31	40	14	112	142	16	144	182
Dec 06	2	38	46	5	75	84	7	113	130
Jan 07	2	36	42	2	34	42	4	70	84
Feb 07	1	18	20	2	29	35	3	47	55
Mar 07	2	27	42	2	33	41	4	60	83
Apr 07	3	32	50	1	35	59	4	67	109
May 07	9	69	110	7	135	225	16	204	335
Jun 07	7	56	91	12	88	159	19	145	251
Year 2	**34**	**370**	**519**	**65**	**780**	**1,133**	**99**	**1,150**	**1,651**
Total	**195**	**2,232**	**2,657**	**484**	**3,949**	**7,149**	**679**	**6,181**	**9,806**

Table 5-5. Predicted annual total impingement abundance and adult equivalent losses for six abundant species of fish (representing 90% of the fish impinged) based on design intake flows at Merrimack Station Units 1 and 2, and for both Units combined, from June 2005 through June 2007.

			Unit					
			Unit 1		Unit 2		Both Units Combined	
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Year 1	Bluegill	YOY	701	8	4338	49	5038	57
		Age 1+	0	0	13	9	13	9
		Age 2+	39	36	26	24	64	60
		Adult	15	15	26	26	40	40
		Total	**754**	**58**	**4402**	**108**	**5156**	**166**
	Spottail shiner	YOY	67	29	77	33	144	63
		Age 1+	0	0	9	7	9	7
		Adult	292	292	188	188	480	480
		Total	**359**	**321**	**274**	**229**	**633**	**550**
	Black crappie	YOY	80	1	389	3	470	3
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**80**	**1**	**389**	**3**	**470**	**3**
	Largemouth bass	YOY	20	1	276	13	296	14
		Age 1+	0	0	18	2	18	2
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**20**	**1**	**293**	**15**	**313**	**16**
	Yellow Perch	YOY	0	0	13	<1	13	<1
		Age 1+	31	4	11	1	43	5
		Age 2+	187	38	9	2	196	39
		Age 3+	56	26	0	0	56	26
		Adult	73	73	0	0	73	73
		Total	**347**	**140**	**33**	**3**	**380**	**143**
	Pumpkinseed	YOY	51	7	69	9	120	16
		Age 1+	65	22	0	0	65	22
		Adult	99	99	0	0	99	99
		Total	**215**	**127**	**69**	**9**	**283**	**136**
Year 2	Bluegill	YOY	141	2	323	4	464	5
		Age 1+	0	0	43	30	43	30
		Age 2+	41	38	30	28	71	66
		Adult	32	32	32	32	64	64
		Total	**214**	**72**	**428**	**94**	**642**	**165**
	Spottail shiner	YOY	32	14	106	46	138	60
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**32**	**14**	**106**	**46**	**138**	**60**
	Black crappie	YOY	58	<1	196	1	254	2
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**58**	**<1**	**196**	**1**	**254**	**2**
	Largemouth bass	YOY	20	1	108	5	128	6
		Age 1+	0	0	47	4	47	4
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**20**	**1**	**155**	**9**	**175**	**10**

(continued)

Table 5-5. (Continued)

			Unit				Both Units Combined	
			Unit 1		Unit 2			
Month	Species	Stage	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate	Annual Impingement Estimate	Adult Equivalent Estimate
Year 2 (cont'd)	Yellow Perch	YOY	0	0	0	0	0	0
		Age 1+	0	0	0	0	0	0
		Age 2+	12	2	0	0	12	2
		Age 3+	0	0	0	0	0	0
		Adult	0	0	31	31	31	31
		Total	**12**	**2**	**31**	**31**	**43**	**34**
	Pumpkinseed	YOY	29	4	10	1	39	5
		Age 1+	0	0	0	0	0	0
		Adult	0	0	14	14	14	14
		Total	**29**	**4**	**24**	**16**	**53**	**19**
TOTAL	Bluegill	YOY	842	10	4660	53	5502	63
		Age 1+	0	0	56	39	56	39
		Age 2+	80	74	56	52	136	126
		Adult	47	47	58	58	104	104
		Total	**968**	**130**	**4830**	**201**	**5798**	**331**
	Spottail shiner	YOY	100	43	183	80	283	123
		Age 1+	0	0	9	7	9	7
		Adult	292	292	188	188	480	480
		Total	**391**	**335**	**380**	**275**	**771**	**610**
	Black crappie	YOY	139	1	585	4	724	5
		Age 1+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**139**	**1**	**585**	**4**	**724**	**5**
	Largemouth bass	YOY	40	2	383	18	423	20
		Age 1+	0	0	65	6	65	6
		Age 2+	0	0	0	0	0	0
		Age 3+	0	0	0	0	0	0
		Adult	0	0	0	0	0	0
		Total	**40**	**2**	**448**	**24**	**488**	**26**
	Yellow Perch	YOY	0	0	13	<1	13	<1
		Age 1+	31	4	11	1	43	5
		Age 2+	199	40	9	2	208	42
		Age 3+	56	26	0	0	56	26
		Adult	73	73	31	31	104	104
		Total	**359**	**142**	**64**	**35**	**423**	**177**
	Pumpkinseed	YOY	80	11	79	11	158	21
		Age 1+	65	22	0	0	65	22
		Adult	99	99	14	14	113	113
		Total	**243**	**131**	**93**	**25**	**337**	**156**

Table 5-6. Predicted monthly total entrainment abundance of fish (all species) by lifestage based on design intake flows at Merrimack Station Units 1 and 2, and for both Units combined, from May 2006 through June 2007. (Note: a blank cell in this table means no sample was taken).

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
Month						0	0	0
April	Total	Eggs				0	0	0
		YSL				0	79,443	79,443
		PYSL				0	53,408	53,408
		YOY/Older				0	0	0
		Unknown				0	0	0
		Total				**0**	**132,852**	**132,852**
May	Total	Eggs	0	26,760	26,760	0	0	0
		YSL	0	0	0	11,290	26,481	37,771
		PYSL	0	800,515	800,515	672,617	105,538	778,155
		YOY/Older	0	0	0	0	0	0
		Unknown	0	0	0	44,815	0	44,815
		Total	**0**	**827,274**	**827,274**	**728,723**	**132,019**	**860,741**
June	Total	Eggs	0	0	0	22,492	0	22,492
		YSL	11,308	80,234	91,543	112,638	106,716	219,355
		PYSL	507,773	1,251,158	1,758,931	1,168,991	720,888	1,889,878
		YOY/Older	50,615	0	50,615	11,246	26,689	37,936
		Unknown	34,080	52,632	86,711	0	0	0
		Total	**603,776**	**1,384,024**	**1,987,800**	**1,315,367**	**854,293**	**2,169,661**
July	Total	Eggs	0	0	0			
		YSL	22,471	0	22,471			
		PYSL	354,578	133,273	487,851			
		YOY/Older	0	0	0			
		Unknown	33,791	0	33,791			
		Total	**410,840**	**133,273**	**544,113**			
August	Total	Eggs	11,236	0	11,236			
		YSL	0	0	0			
		PYSL	33,563	0	33,563			
		YOY/Older	0	0	0			
		Unknown	0	0	0			
		Total	**44,800**	**0**	**44,800**			
September	Total	Eggs		0	0			
		YSL		0	0			
		PYSL		0	0			
		YOY/Older		0	0			
		Unknown		0	0			
		Total		**0**	**0**			
Total	Total	Eggs	11,236	26,760	37,996	22,492	0	22,492
		YSL	33,779	80,234	114,014	123,928	212,641	336,569
		PYSL	895,915	2,184,945	3,080,860	1,841,608	879,834	2,721,441
		YOY/Older	50,615	0	50,615	11,246	26,689	37,936
		Unknown	67,871	52,632	120,502	44,815	0	44,815
		Total	**1,059,416**	**2,344,571**	**3,403,987**	**2,044,090**	**1,119,164**	**3,163,254**

Table 5-7. Predicted monthly total entrainment abundance and adult equivalent losses of fish (representing 90% of the fish entrained) by taxon and lifestage based on design intake flows at Merrimack Station Units 1 and 2, and for both Units combined, from May 2006 through June 2007.

			2006						2007					
			Unit						Unit					
			Unit 1		Unit 2		Both Units Combined		Unit 1		Unit 2		Both Units Combined	
Month	Species	Stage	Annual Entrain-ment Estimate	Adult Equivalent Estimate	Annual Entrain-ment Estimate	Adult Equivalent Estimate	Annual Entrain-ment Estimate	Adult Equivalent Estimate	Annual Entrain-ment Estimate	Adult Equivalent Estimate	Annual Entrain-ment Estimate	Adult Equivalent Estimate	Annual Entrain-ment Estimate	Adult Equivalent Estimate
Total	Carp and minnow family	Eggs	0	0	0	0	0	0	11,246	6	0	0	11,246	6
		Larvae	219,623	947	905,530	3,903	1,125,153	4,850	451,276	1,816	265,733	1,145	717,009	2,961
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**219,623**	**947**	**905,530**	**3,903**	**1,125,153**	**4,850**	**462,522**	**1,822**	**265,733**	**1,145**	**728,255**	**2,967**
	Sunfish family	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	314,868	1,604	159,884	660	474,752	2,264	130,829	540	159,303	658	290,132	1,198
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**314,868**	**1,604**	**159,884**	**660**	**474,752**	**2,264**	**130,829**	**540**	**159,303**	**658**	**290,132**	**1,198**
	White sucker	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	254,485	1,610	1,066,242	6,744	1,320,727	8,354	820,994	5,192	560,156	3,543	1,381,150	8,735
		YOY/Older	0	0	0	0	0	0	11,246	901	26,689	2,138	37,935	3,039
		Total	**254,485**	**1,610**	**1,066,242**	**6,744**	**1,320,727**	**8,354**	**832,240**	**6,093**	**586,845**	**5,681**	**1,419,085**	**11,774**
	Yellow perch	Eggs	0	0	0	0	0	0	0	0	0	0	0	0
		Larvae	0	0	53,556	23	53,556	23	514,739	226	26,932	12	541,671	238
		YOY/Older	0	0	0	0	0	0	0	0	0	0	0	0
		Total	**0**	**0**	**53,556**	**23**	**53,556**	**23**	**514,739**	**226**	**26,932**	**12**	**541,671**	**238**

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APPENDIX TABLES

APPENDIX A

Merrimack Station Entrainment

Appendix Table A-1. Entrainment sample duration, sample volume and associated water quality parameters as collected at Merrimack Station, June 2006 – June 2007. (Note: NS means no sample was collected on that date.)

		1000 - 1600					1600 - 2200				
		Duration (hr.)	Volume (Gal.)	Temp. (°C)	Dis. Oxy. (mg/L)	Cond. (µS/cm)	Duration (hr.)	Volume (Gal.)	Temp. (°C)	Dis. Oxy. (mg/L)	Cond. (µS/cm)
Unit 1	31-May-06	4.5	26656	17.3	10	73.9	4.6	26386	18.6	10.1	62.7
	7-Jun-06	1.7	26520	16.8	9.2	70.8	2.5	26296	16.4	9.1	73.4
	14-Jun-06	1.8	25920	17.5	9.6	56	1.7	26520	17.8	8.7	59.2
	28-Jun-06	2.0	26437	21.8	8.6	71.7	2.0	26437	21.9	8.4	75
	5-Jul-06	2.2	26400	22.4	7.8	72.1	2.2	26400	22.9	7.5	75.4
	20-Jul-06	3.7	24024	26.2	5.4	83.2	3.9	26419	25.5	5.5	86.7
	26-Jul-06	5.4	26438	23.5	7.7	62.9	6.3	26422	24	6.4	65.7
	2-Aug-06	5.6	26421	26.8	7	93.3	6.7	26466	27.1	6.9	90.9
	9-Aug-06	5.3	26607	24.5	6.6	91.6	5.3	26464	25	7.3	95
	16-Aug-06	5.2	26815	22.9	8.5		5.1	26383	24.3	6.4	
	23-Aug-06	4.9	26431	22.3	7.7	12.7	4.7	26432	23.3	7.3	111
	30-Aug-06	4.1	26528	19.4	8.7	113.6	4.1	26462	20.9	6.9	
	4-Apr-07	2.7	28684	3.6	12.8	62.6	NS				
	5-Apr-07	NS					2.5	26670	2.1	15.3	85.6
	18-Apr-07	2.1	28804	1.8	13.2	41.3	1.8	26500	2.1	13.2	40.7
	2-May-07	2.8	27733	9.7	6.5	68.9	2.7	26362	10.1	10.2	69.8
	16-May-07	3.2	26423	14.7	9.4	84.3	3.3	26660	13.6	7.7	88.7
	23-May-07	2.8	26400	13	9.8	58.1	2.6	26381	14.3	9	64
	30-May-07	2.8	26400	20.7	4.5	82.2	2.6	26339	20.5	8.1	82
	6-Jun-07	2.3	26880	19.1	5.2	76.2	2.5	26235	17.4	8.6	72.1
	13-Jun-07	3.5	27860	19.7	8	77.4	3.2	26429			
	20-Jun-07	3.3	26911	22.2	4.6	93.1	5.1	43287	22.9	7.3	92.7
	27-Jun-07	8.3	26300	25.1	7.6	102.7	6.4	26441	24.7	3.1	102.8
	2-Jul-07	6.5	26442	22.4	6.2	117.5	4.4	26500	21.6	6	109
	11-Jul-07	3.5	26752	23.5	8	92.3	3.8	26423	23.2	7.4	97.7
Unit 2	25-May-06	3.6	26378	12.9	9.2	48.9	3.6	26378	13.2	9.8	50
	31-May-06	4.3	26368	17.4	9.9	72.3	3.9	26448	18.5	9.9	64.6
	7-Jun-06	4.1	26425	16.7	8.4	59.4	3.6	26429	16.4	9.1	73.4
	14-Jun-06	3.4	17545	17.5	7.4	59.2	3.8	26332	17.6	8.7	57.3
	21-Jun-06	4.8	26391	21.7	8	85	4.8	26391	22.4	8.2	81.9
	28-Jun-06	3.8	26813	21.7	8.2	72	3.8	26813	21.8	7.9	74.1
	5-Jul-06	4.4	26492	22.4	7.8	72.1	4.4	26492	22.9	7.1	75.2
	12-Jul-06	4.4	26426	23.4	5.8		4.4	26426	23.5	6.3	95
	19-Jul-06	4.9	26365	26.3	5.9	77.5	4.9	26455	26.5	6.4	81.9
	26-Jul-06	3.9	26426	23.4	7.9	61.8	4.5	26470	24	7.4	64.3
	2-Aug-06	4.7	26505	26.6	6.8	42.2	4.4	26494	27.2	6.9	89.4
	9-Aug-06	4.1	26528	24.6	6.7	91.1	4.1	26420	24.8	6.8	93.2
	16-Aug-06	5.0	26460	22.9	8.2	99.6	5.0	26460	24.5	7.9	
	30-Aug-06	8.1	26438	19.4	8.2	109.4	8.1	26438	20.7	7.4	
	13-Sep-06	10.8	26445	17.9	6.3	121.9	10.5	25830	18.3	7.3	
	4-Apr-07	6.6	26645	3.3	7.4	63	NS				
	5-Apr-07	NS					5.5	26400	2.1	10.3	86
	23-May-07	8.0	26426	12.9	8.5	62.3	7.6	26423	14.5	9.5	62.5
	30-May-07	3.0	7120	21	6.5	80.5	NS				
	6-Jun-07	8.2	27071	17.7	5.1	94.3	7.7	26380	17.5	8.1	71.5
	13-Jun-07	7.1	26199	19.6	7.3	77	8.1	26395			
	20-Jun-07	11.0	26400	23.3	5.8	87	11.2	26437	22.8	7.5	89.2
	27-Jun-07	7.9	26418	25.1	5.6	98.5	7.3	26465	24.7	5.4	100.6
	2-Jul-07	6.5	26500	22.2	5.6	109.9	6.5	26423	21.5	5.2	107.9
	11-Jul-07	11.8	17837	23.5	5.4	83.3	14.9	26492	23.5	5.1	93

Appendix Table A-2. Monthly and annual estimated entrainment abundance for each species and lifestage observed at Units 1 and 2 of Merrimack Station, June 2006 – June 2007(Note: a blank cell in this table means no sample was taken).

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
April	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	42,083	42,083
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	42,083	42,083
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	White sucker	Eggs				0	0	0
		Larvae				0	17,641	17,641
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	17,641	17,641

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
April (cont'd)	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	59,724	59,724
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	59,724	59,724
May	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	19,478	19,478
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	19,478	19,478
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	0	24,773	24,773	0	2,122	2,122
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,773	24,773	0	2,122	2,122
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	9,184	0	9,184
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	9,184	0	9,184

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
May (cont'd)	Unidentified	Eggs	0	24,848	24,848	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	36,457	0	36,457
		YOY/Older	0	0	0	0	0	0
		Total	0	24,848	24,848	36,457	0	36,457
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	0	692,860	692,860	137,434	44,126	181,560
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	692,860	692,860	137,434	44,126	181,560
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	24,848	24,848	409,742	0	409,742
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,848	24,848	409,742	0	409,742
	Total	Eggs	0	24,848	24,848	0	0	0
		Larvae	0	742,481	742,481	556,360	65,726	622,086
		Unknown	0	0	0	36,457	0	36,457
		YOY/Older	0	0	0	0	0	0
		Total	0	767,330	767,330	592,818	65,726	658,544
June	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	7,899	0	7,899
		Larvae	78,904	815,041	893,945	343,337	221,918	565,255
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	78,904	815,041	893,945	351,235	221,918	573,154
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	25,009	25,009
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	25,009	25,009
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	10,549	0	10,549	0	0	0
		Total	10,549	0	10,549	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	21,099	0	21,099	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	21,099	0	21,099	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	4,762	0	4,762
		Unknown	0	0	0	0	0	0
		YOY/Older	21,099	0	21,099	0	0	0
		Total	21,099	0	21,099	4,762	0	4,762

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
June (cont'd)	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	71,068	123,435	194,503	94,325	49,566	143,892
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	71,068	123,435	194,503	94,325	49,566	143,892
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	9,199	0	9,199	23,203	49,602	72,804
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	9,199	0	9,199	23,203	49,602	72,804
	Unidentified	Eggs	0	0	0	7,899	0	7,899
		Larvae	0	0	0	0	0	0
		Unknown	21,250	48,872	70,122	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	21,250	48,872	70,122	7,899	0	7,899
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	171,333	271,111	442,444	528,370	393,359	921,728
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	7,899	24,783	32,682
		Total	171,333	271,111	442,444	536,269	418,142	954,410
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	24,823	24,823	8,999	25,009	34,008
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,823	24,823	8,999	25,009	34,008
	Total	Eggs	0	0	0	15,797	0	15,797
		Larvae	351,603	1,234,410	1,586,013	1,002,996	764,462	1,767,458
		Unknown	21,250	48,872	70,122	0	0	0
		YOY/Older	31,648	0	31,648	7,899	24,783	32,682
		Total	404,501	1,283,283	1,687,784	1,026,692	789,245	1,815,937
July	Brown bullhead	Eggs	0	0	0			
		Larvae	18,311	49,461	67,772			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	18,311	49,461	67,772			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	77,868	24,767	102,635			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	77,868	24,767	102,635			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	9,140	24,794	33,934			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,140	24,794	33,934			

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
July (cont'd)	Rock bass	Eggs	0	0	0			
		Larvae	27,489	0	27,489			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	27,489	0	27,489			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	160,178	0	160,178			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	160,178	0	160,178			
	Tessellated darter	Eggs	0	0	0			
		Larvae	13,745	0	13,745			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	13,745	0	13,745			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	27,489	0	27,489			
		YOY/Older	0	0	0			
		Total	27,489	0	27,489			
	White sucker	Eggs	0	0	0			
		Larvae	0	24,733	24,733			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	24,733	24,733			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	306,731	123,754	430,485			
		Unknown	27,489	0	27,489			
		YOY/Older	0	0	0			
		Total	334,220	123,754	457,974			
August	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	9,142	0	9,142			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,142	0	9,142			

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
August (cont'd)	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	9,141	0	9,141			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,141	0	9,141			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	9,021	0	9,021			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,021	0	9,021			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	9,141	0	9,141			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,141	0	9,141			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	9,141	0	9,141			
		Larvae	27,304	0	27,304			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	36,445	0	36,445			

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
September	Brown bullhead	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Carp and minnow family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Herring family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Margined madtom	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Rock bass	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Spottail shiner	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Sunfish family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Tessellated darter	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Unidentified	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	White sucker	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
September (cont'd)	Yellow perch	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Total	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
Total	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	18,311	49,461	67,772	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	18,311	49,461	67,772	0	0	0
	Carp and minnow family	Eggs	0	0	0	7,899	0	7,899
		Larvae	165,914	839,808	1,005,722	343,337	241,396	584,733
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	165,914	839,808	1,005,722	351,235	241,396	592,631
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	25,009	25,009
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	25,009	25,009
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	9,140	24,794	33,934	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	10,549	0	10,549	0	0	0
		Total	19,690	24,794	44,483	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	57,729	0	57,729	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	57,729	0	57,729	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	4,762	0	4,762
		Unknown	0	0	0	0	0	0
		YOY/Older	21,099	0	21,099	0	0	0
		Total	21,099	0	21,099	4,762	0	4,762
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	240,268	148,208	388,476	94,325	93,772	188,097
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	240,268	148,208	388,476	94,325	93,772	188,097
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	22,944	0	22,944	32,387	49,602	81,989
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	22,944	0	22,944	32,387	49,602	81,989

(continued)

Appendix Table A-2. (Continued)

Month			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
Total (cont'd)	Unidentified	Eggs	9,141	24,848	33,989	7,899	0	7,899
		Larvae	0	0	0	0	0	0
		Unknown	48,739	48,872	97,611	36,457	0	36,457
		YOY/Older	0	0	0	0	0	0
		Total	57,880	73,721	131,601	44,356	0	44,356
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	171,333	988,703	1,160,036	665,804	455,125	1,120,929
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	7,899	24,783	32,682
		Total	171,333	988,703	1,160,036	673,703	479,908	1,153,611
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	49,671	49,671	418,741	25,009	443,750
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	49,671	49,671	418,741	25,009	443,750
	Total	Eggs	9,141	24,848	33,989	15,797	0	15,797
		Larvae	685,637	2,100,646	2,786,283	1,559,356	889,912	2,449,268
		Unknown	48,739	48,872	97,611	36,457	0	36,457
		YOY/Older	31,648	0	31,648	7,899	24,783	32,682
		Total	775,166	2,174,366	2,949,532	1,619,510	914,695	2,534,205

Appendix Table A-3. Weekly and annual totals of estimated entrainment for each species and lifestage observed at Units 1 and 2 of Merrimack Station, June 2006 – June 2007. (Note: a blank cell in this table means no sample was taken).

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
2-Apr	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	24,590	24,590
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	24,590	24,590
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

[a] Weeks are labeled by the Sunday beginning the week in 2006 (weeks in 2007 began one date earlier, e.g. the week labeled 21 May began on 20 May in 2007).

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	24,590	24,590
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	24,590	24,590
9-Apr	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Sunfish family	Eggs				0	0	0
		Larvae				0	12,295	12,295
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	12,295	12,295
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	White sucker	Eggs				0	0	0
		Larvae				0	12,398	12,398
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	12,398	12,398
	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	24,693	24,693
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	24,693	24,693
16-Apr	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	5,198	5,198
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	5,198	5,198
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	White sucker	Eggs				0	0	0
		Larvae				0	5,242	5,242
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	5,242	5,242
	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	10,441	10,441
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	10,441	10,441

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
23-Apr	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
30-Apr	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Sunfish family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	White sucker	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Yellow perch	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Total	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
7-May	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				18,229	0	18,229
		YOY/Older				0	0	0
		Total				18,229	0	18,229
	White sucker	Eggs				0	0	0
		Larvae				9,074	0	9,074
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				9,074	0	9,074
	Yellow perch	Eggs				0	0	0
		Larvae				191,117	0	191,117
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				191,117	0	191,117
	Total	Eggs				0	0	0
		Larvae				200,190	0	200,190
		Unknown				18,229	0	18,229
		YOY/Older				0	0	0
		Total				218,419	0	218,419

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
14-May	Brown bullhead	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Carp and minnow family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Herring family	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Margined madtom	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Rock bass	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Spottail shiner	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Sunfish family	Eggs				0	0	0
		Larvae				0	2,122	2,122
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	2,122	2,122
	Tessellated darter	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				0	0	0
	Unidentified	Eggs				0	0	0
		Larvae				0	0	0
		Unknown				18,229	0	18,229
		YOY/Older				0	0	0
		Total				18,229	0	18,229

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs				0	0	0
		Larvae				9,074	2,140	11,214
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				9,074	2,140	11,214
	Yellow perch	Eggs				0	0	0
		Larvae				191,117	0	191,117
		Unknown				0	0	0
		YOY/Older				0	0	0
		Total				191,117	0	191,117
	Total	Eggs				0	0	0
		Larvae				200,190	4,263	204,453
		Unknown				18,229	0	18,229
		YOY/Older				0	0	0
		Total				218,419	4,263	222,682
21-May	Brown bullhead	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Carp and minnow family	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Herring family	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Margined madtom	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Rock bass	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Spottail shiner	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Sunfish family	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Tessellated darter	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	Unidentified	Eggs		0	0	0	0	0
		Larvae		0	0	0	0	0
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	0	0	0
	White sucker	Eggs		0	0	0	0	0
		Larvae		23,981	23,981	55,018	22,508	77,526
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		23,981	23,981	55,018	22,508	77,526
	Yellow perch	Eggs		0	0	0	0	0
		Larvae		0	0	27,509	0	27,509
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		0	0	27,509	0	27,509
	Total	Eggs		0	0	0	0	0
		Larvae		23,981	23,981	82,526	22,508	105,034
		Unknown		0	0	0	0	0
		YOY/Older		0	0	0	0	0
		Total		23,981	23,981	82,526	22,508	105,034
28-May	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	19,478	19,478
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	19,478	19,478
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	0	24,773	24,773	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,773	24,773	0	0	0
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	9,184	0	9,184
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	9,184	0	9,184
	Unidentified	Eggs	0	24,848	24,848	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,848	24,848	0	0	0
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	0	668,879	668,879	64,269	19,478	83,747
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	668,879	668,879	64,269	19,478	83,747
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	24,848	24,848	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,848	24,848	0	0	0
	Total	Eggs	0	24,848	24,848	0	0	0
		Larvae	0	718,501	718,501	73,454	38,955	112,409
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	743,349	743,349	73,454	38,955	112,409

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
4-Jun	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	0	0	0
		Larvae	36,797	370,897	407,694	119,868	73,244	193,112
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	36,797	370,897	407,694	119,868	73,244	193,112
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	18,321	74,176	92,497	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	18,321	74,176	92,497	0	0	0
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	9,199	0	9,199	18,441	0	18,441
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	9,199	0	9,199	18,441	0	18,441
	Unidentified	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	54,807	197,802	252,609	488,251	393,359	881,609
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	54,807	197,802	252,609	488,251	393,359	881,609
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	8,999	0	8,999
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	8,999	0	8,999
	Total	Eggs	0	0	0	0	0	0
		Larvae	119,124	642,875	761,999	635,560	466,603	1,102,162
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	119,124	642,875	761,999	635,560	466,603	1,102,162
11-Jun	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	0	0	0
		Larvae	9,063	24,823	33,886	73,224	49,645	122,869
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	9,063	24,823	33,886	73,224	49,645	122,869
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	25,009	25,009
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	25,009	25,009
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	0	24,823	24,823	18,306	0	18,306
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,823	24,823	18,306	0	18,306
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Unidentified	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	9,273	0	9,273	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	9,273	0	9,273	0	0	0
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	73,555	0	73,555	27,459	0	27,459
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	73,555	0	73,555	27,459	0	27,459
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	24,823	24,823	0	25,009	25,009
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	24,823	24,823	0	25,009	25,009
	Total	Eggs	0	0	0	0	0	0
		Larvae	82,619	74,468	157,087	118,988	99,663	218,651
		Unknown	9,273	0	9,273	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	91,892	74,468	166,360	118,988	99,663	218,651
18-Jun	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	0	0	0
		Larvae	5,593	248,268	253,861	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	5,593	248,268	253,861	0	0	0
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	1,399	0	1,399	0	0	0
		Total	1,399	0	1,399	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	2,799	0	2,799	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	2,799	0	2,799	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	4,762	0	4,762
		Unknown	0	0	0	0	0	0
		YOY/Older	2,799	0	2,799	0	0	0
		Total	2,799	0	2,799	4,762	0	4,762
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	6,997	0	6,997	4,762	49,566	54,328
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	6,997	0	6,997	4,762	49,566	54,328
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	4,762	49,602	54,363
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	4,762	49,602	54,363
	Unidentified	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	2,827	0	2,827	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	2,827	0	2,827	0	0	0
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	15,520	0	15,520	4,762	0	4,762
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	24,783	24,783
		Total	15,520	0	15,520	4,762	24,783	29,545
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Total	Eggs	0	0	0	0	0	0
		Larvae	30,910	248,268	279,178	19,046	99,168	118,214
		Unknown	2,827	0	2,827	0	0	0
		YOY/Older	4,198	0	4,198	0	24,783	24,783
		Total	37,935	248,268	286,203	19,046	123,951	142,997

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
25-Jun	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Carp and minnow family	Eggs	0	0	0	7,899	0	7,899
		Larvae	27,450	171,054	198,504	150,245	99,029	249,274
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	27,450	171,054	198,504	158,144	99,029	257,172
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	9,150	0	9,150	0	0	0
		Total	9,150	0	9,150	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	18,300	0	18,300	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	18,300	0	18,300	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	18,300	0	18,300	0	0	0
		Total	18,300	0	18,300	0	0	0
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	45,750	24,436	70,186	71,258	0	71,258
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	45,750	24,436	70,186	71,258	0	71,258
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Unidentified	Eggs	0	0	0	7,899	0	7,899
		Larvae	0	0	0	0	0	0
		Unknown	9,150	48,872	58,023	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	9,150	48,872	58,023	7,899	0	7,899

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	27,450	73,309	100,759	7,899	0	7,899
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	7,899	0	7,899
		Total	27,450	73,309	100,759	15,797	0	15,797
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	0	0
	Total	Eggs	0	0	0	15,797	0	15,797
		Larvae	118,950	268,799	387,749	229,401	99,029	328,430
		Unknown	9,150	48,872	58,023	0	0	0
		YOY/Older	27,450	0	27,450	7,899	0	7,899
		Total	155,551	317,671	473,222	253,098	99,029	352,126
2-Jul	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	36,652	0	36,652			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	36,652	0	36,652			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	18,326	0	18,326			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	18,326	0	18,326			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Sunfish family	Eggs	0	0	0			
		Larvae	9,163	0	9,163			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,163	0	9,163			
	Tessellated darter	Eggs	0	0	0			
		Larvae	9,163	0	9,163			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,163	0	9,163			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	18,326	0	18,326			
		YOY/Older	0	0	0			
		Total	18,326	0	18,326			
	White sucker	Eggs	0	0	0			
		Larvae	0	24,733	24,733			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	24,733	24,733			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	73,304	24,733	98,037			
		Unknown	18,326	0	18,326			
		YOY/Older	0	0	0			
		Total	91,630	24,733	116,363			
9-Jul	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	22,904	0	22,904			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	22,904	0	22,904			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Margined madtom	Eggs	0	0	0			
		Larvae	0	24,794	24,794			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	24,794	24,794			
	Rock bass	Eggs	0	0	0			
		Larvae	9,163	0	9,163			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,163	0	9,163			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	22,895	0	22,895			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	22,895	0	22,895			
	Tessellated darter	Eggs	0	0	0			
		Larvae	4,582	0	4,582			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	4,582	0	4,582			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	9,163	0	9,163			
		YOY/Older	0	0	0			
		Total	9,163	0	9,163			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	59,543	24,794	84,337			
		Unknown	9,163	0	9,163			
		YOY/Older	0	0	0			
		Total	68,706	24,794	93,500			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
16-Jul	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	9,157	24,767	33,923			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,157	24,767	33,923			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	36,626	0	36,626			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	36,626	0	36,626			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	45,783	24,767	70,549			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	45,783	24,767	70,549			
23-Jul	Brown bullhead	Eggs	0	0	0			
		Larvae	18,311	0	18,311			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	18,311	0	18,311			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	9,155	0	9,155			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,155	0	9,155			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Sunfish family	Eggs	0	0	0			
		Larvae	73,214	0	73,214			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	73,214	0	73,214			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	100,680	0	100,680			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	100,680	0	100,680			
30-Jul	Brown bullhead	Eggs	0	0	0			
		Larvae	0	49,461	49,461			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	49,461	49,461			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Margined madtom	Eggs	0	0	0			
		Larvae	9,140	0	9,140			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,140	0	9,140			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	18,280	0	18,280			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	18,280	0	18,280			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	27,420	49,461	76,882			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	27,420	49,461	76,882			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
6-Aug	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	9,141	0	9,141			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,141	0	9,141			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	9,141	0	9,141			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,141	0	9,141			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	9,141	0	9,141			
		Larvae	9,141	0	9,141			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	18,282	0	18,282			
13-Aug	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Sunfish family	Eggs	0	0	0			
		Larvae	9,021	0	9,021			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,021	0	9,021			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	9,021	0	9,021			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,021	0	9,021			
20-Aug	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
27-Aug	Brown bullhead	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Carp and minnow family	Eggs	0	0	0			
		Larvae	9,142	0	9,142			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,142	0	9,142			
	Herring family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Margined madtom	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Rock bass	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Spottail shiner	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Sunfish family	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Tessellated darter	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Unidentified	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	White sucker	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Yellow perch	Eggs	0	0	0			
		Larvae	0	0	0			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	0	0	0			
	Total	Eggs	0	0	0			
		Larvae	9,142	0	9,142			
		Unknown	0	0	0			
		YOY/Older	0	0	0			
		Total	9,142	0	9,142			
3-Sep	Brown bullhead	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Carp and minnow family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Herring family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Margined madtom	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Rock bass	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Spottail shiner	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Sunfish family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Tessellated darter	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Unidentified	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	White sucker	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Yellow perch	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Total	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
10-Sep	Brown bullhead	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Carp and minnow family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Herring family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
	Margined madtom	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Rock bass	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Spottail shiner	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Sunfish family	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Tessellated darter	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Unidentified	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	White sucker	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Yellow perch	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			
	Total	Eggs		0	0			
		Larvae		0	0			
		Unknown		0	0			
		YOY/Older		0	0			
		Total		0	0			

(continued)

Appendix Table A-3. (Continued)

			2006			2007		
			Unit		Both Units Combined	Unit		Both Units Combined
			Unit 1	Unit 2		Unit 1	Unit 2	
Week[a]			# Entrained	# Entrained	# Entrained	# Entrained	# Entrained	# Entrained
Total	Brown bullhead	Eggs	0	0	0	0	0	0
		Larvae	18,311	49,461	67,772	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	18,311	49,461	67,772	0	0	0
	Carp and minnow family	Eggs	0	0	0	7,899	0	7,899
		Larvae	165,914	839,808	1,005,722	343,337	241,396	584,733
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	165,914	839,808	1,005,722	351,235	241,396	592,631
	Herring family	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	0	25,009	25,009
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	0	0	0	25,009	25,009
	Margined madtom	Eggs	0	0	0	0	0	0
		Larvae	9,140	24,794	33,934	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	10,549	0	10,549	0	0	0
		Total	19,690	24,794	44,483	0	0	0
	Rock bass	Eggs	0	0	0	0	0	0
		Larvae	57,729	0	57,729	0	0	0
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	57,729	0	57,729	0	0	0
	Spottail shiner	Eggs	0	0	0	0	0	0
		Larvae	0	0	0	4,762	0	4,762
		Unknown	0	0	0	0	0	0
		YOY/Older	21,099	0	21,099	0	0	0
		Total	21,099	0	21,099	4,762	0	4,762
	Sunfish family	Eggs	0	0	0	0	0	0
		Larvae	240,268	148,208	388,476	94,325	93,772	188,097
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	240,268	148,208	388,476	94,325	93,772	188,097
	Tessellated darter	Eggs	0	0	0	0	0	0
		Larvae	22,944	0	22,944	32,387	49,602	81,989
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	22,944	0	22,944	32,387	49,602	81,989
	Unidentified	Eggs	9,141	24,848	33,989	7,899	0	7,899
		Larvae	0	0	0	0	0	0
		Unknown	48,739	48,872	97,611	36,457	0	36,457
		YOY/Older	0	0	0	0	0	0
		Total	57,880	73,721	131,601	44,356	0	44,356

(continued)

Appendix Table A-3. (Continued)

Week[a]			2006 Unit 1 # Entrained	2006 Unit 2 # Entrained	2006 Both Units Combined # Entrained	2007 Unit 1 # Entrained	2007 Unit 2 # Entrained	2007 Both Units Combined # Entrained
	White sucker	Eggs	0	0	0	0	0	0
		Larvae	171,333	988,703	1,160,036	665,804	455,125	1,120,929
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	7,899	24,783	32,682
		Total	171,333	988,703	1,160,036	673,703	479,908	1,153,611
	Yellow perch	Eggs	0	0	0	0	0	0
		Larvae	0	49,671	49,671	418,741	25,009	443,750
		Unknown	0	0	0	0	0	0
		YOY/Older	0	0	0	0	0	0
		Total	0	49,671	49,671	418,741	25,009	443,750
	Total	Eggs	9,141	24,848	33,989	15,797	0	15,797
		Larvae	685,637	2,100,646	2,786,283	1,559,356	889,912	2,449,268
		Unknown	48,739	48,872	97,611	36,457	0	36,457
		YOY/Older	31,648	0	31,648	7,899	24,783	32,682
		Total	775,166	2,174,366	2,949,532	1,619,510	914,695	2,534,205

APPENDIX B

Merrimack Station Impingement

Appendix Table B-1. Recorded water quality parameters from start and end of each 24-hr and long interval impingement sample at Merrimack Station, June 2005-June 2007. (Note: a blank cell in this table means no sample was taken).

Beginning Sample Date	Unit	Initial Water Temperature (°C)	Initial Dissolved Oxygen (mg/L)	Initial Conductivity (µS/cm)	Final Water Temperature (°C)	Final Dissolved Oxygen (mg/L)	Final Conductivity (µS/cm)
06/29/05	1	23.7	7.3	94.5	22.5	6.9	88.5
	2	23.7	7.3	94.5	22.5	6.9	88.5
07/06/05	1	23.7	7.0	96.3	22.4	6.9	93.0
	2	23.6	7.0	94.3	22.5	6.9	91.3
07/13/05	1	22.8	7.3	75.8	23.6	6.7	90.5
	2	22.6	6.9	73.3	23.5	7.2	87.5
07/20/05	1	26.5	6.3	99.9	26.3	6.3	97.1
	2	26.4	7.1	97.4	26.1	6.0	95.7
07/27/05	1	26.3	7.0	139.3	25.0	7.3	120.9
	2	25.5	7.1	109.1	25.5	7.2	109.7
08/03/05	1	24.6	7.0	122.4	25.0	7.4	118.1
	2	24.6	6.9	116.0	25.0	7.3	114.8
08/10/05	1	25.8	7.2	126.8	26.9	6.2	131.3
	2	25.5	6.4	129.8	27.7	5.6	127.9
08/17/05	1	24.4	6.0	129.0	23.6	5.7	125.8
	2	24.2	6.0	127.9	23.7	5.9	124.1
08/24/05	1	23.3	6.3	123.8	23.1	6.9	125.2
	2	23.2	5.4	122.2	23.4	6.2	119.1
08/31/05	1	23.3	6.8	122.7	23.0	6.5	113.4
	2	23.3	5.7	120.1	22.9	5.2	111.7
09/07/05	1	20.9	7.2	81.1	21.6	7.1	87.8
	2	20.8	6.2	72.4	21.3	5.8	81.6
09/14/05	1	21.5	7.1	99.0	22.5	7.7	100.8
	2	21.5	5.6	97.8	22.6	7.4	101.6
09/21/05	1	NS	NS	NS	20.1	7.5	109.0
	2	NS	NS	NS	19.9	6.0	106.8
09/28/05	1	17.1	8.4	115.8	17.7	7.8	105.3
	2	17.2	7.2	115.5	17.5	7.4	102.3
10/05/05	1	17.2	7.9	99.8	17.3	7.5	98.0
	2	17.2	8.4	97.1	17.5	7.3	97.0
10/19/05	1	11.7	8.9	44.5	11.2	8.6	32.8
	2	11.8	10.4	44.2	11.1	9.8	32.3
10/26/05	1	8.4	10.9	66.0	8.0	10.7	37.7
	2	8.5	11.2	66.0	8.4	11.9	37.8

(continued)

Appendix Table B-1. (Continued)

Beginning Sample Date	Unit	Initial Water Temperature (°C)	Initial Dissolved Oxygen (mg/L)	Initial Conductivity (µS/cm)	Final Water Temperature (°C)	Final Dissolved Oxygen (mg/L)	Final Conductivity (µS/cm)
11/02/05	1	8.8	9.6	65.8	8.4	10.8	72.0
	2	9.4	10.3	64.4	8.4	10.8	71.1
11/09/05	1	8.5	10.5	79.0			
	2	8.7	10.1	74.5			
11/16/05	1	6.9	11.8	70.9	7.3	11.8	70.0
	2	7.1	12.0	68.3	7.2	12.1	67.5
11/22/05	1	5.8	10.6	65.1	5.1	13.2	65.1
	2	5.9	11.0	63.3	5.2	12.8	64.3
11/30/05	2	5.4	14.4	43.5	4.7	13.2	36.7
12/07/05	1	2.6	12.2	67.5	1.4	12.9	38.2
	2	3.0	12.9	66.0	2.1	13.0	37.4
12/14/05	1	0.8	15.4	43.4			
	2	1.7	15.3	49.3	1.4	15.0	45.9
12/21/05	1	2.3	13.5	49.9	2.2	13.6	50.6
	2	2.9	14.4	49.3	2.6	14.8	49.8
01/04/06	1	1.0	14.4	38.7	1.0	14.9	40.5
	2	1.4	15.4	41.8	1.3	15.6	36.6
01/18/06	1	1.2	15.3	34.8	1.2	14.0	38.6
	2	1.6	15.8	33.2	1.6	15.4	37.9
02/01/06	1	1.6	15.5	48.0	2.0	14.1	50.1
	2	1.8	15.1	39.4	2.2	15.1	45.9
02/15/06	1	0.2	14.8	53.8	0.5	13.5	56.2
	2	0.0	14.6	55.5	0.5	13.6	55.9
03/01/06	1	-0.6	13.7	62.4	0.8	14.4	65.4
	2	0.0	14.4	59.4	-0.5	14.9	60.6
03/15/06	1	1.6	12.9	58.3	0.5	13.5	51.3
	2	2.2	13.3	57.6	1.1	13.9	51.0
03/22/06	1	1.7	14.0	57.2	2.0	12.7	107.3
	2	1.9	14.8	55.0	2.1	14.1	57.3
03/29/06	1	5.6	11.8	67.4	6.8	10.4	105.8
	2	5.6	11.9	68.0	6.8	10.4	105.8
04/05/06	1				5.0	12.0	83.7
	2	6.4	10.3	89.4	5.2	12.3	82.9
04/12/06	1	6.8	10.3	88.3	8.4	11.7	88.7
	2	7.2	10.6	85.1	8.8	11.1	86.4

(continued)

Appendix Table B-1. (Continued)

Beginning Sample Date	Unit	Initial Water Temperature (°C)	Initial Dissolved Oxygen (mg/L)	Initial Conductivity (µS/cm)	Final Water Temperature (°C)	Final Dissolved Oxygen (mg/L)	Final Conductivity (µS/cm)
04/19/06	1	11.4	9.8	90.9	12.2	11.4	88.0
04/26/06	1	9.5	10.7	85.0	9.7	10.3	83.7
05/03/06	1	10.9	10.1	99.4	12.4	10.2	76.6
05/10/06	1	14.6	9.3	79.5	14.6	9.0	79.2
05/17/06	1	10.7	10.7	51.2	11.6	10.8	46.5
05/24/06	2	12.0	10.9	48.3	12.1	10.7	47.4
05/31/06	1	17.3	10.0	73.9			
	2	17.4	9.9	72.3			
06/07/06	1	16.7	9.3	69.5	15.7	9.1	73.8
	2	16.8	9.4	67.9	15.8	9.4	73.4
06/14/06	1	17.2	8.6	56.1	17.9	8.7	60.0
	2	17.3	9.1	53.5	17.9	7.9	61.8
06/21/06	2	21.7	8.0	85.0	21.6	8.4	83.1
06/28/06	1	21.7	8.8	71.8	20.7	8.0	68.6
	2	21.8	8.2	70.9	20.7	7.7	68.2
07/05/06	1	22.5	7.7	75.3	22.2	7.0	79.2
	2	22.4	7.8	72.1	22.2	6.7	76.9
07/12/06	1	23.6	7.1		22.4	6.8	103.7
	2	23.4	6.7		22.5	6.5	102.2
07/19/06	1	26.5	6.5	81.1	25.8	5.4	86.7
	2	26.3	5.9	77.5	26.3	5.2	81.3
07/26/06	1	23.5	7.7	62.9	24.1	7.6	68.4
	2	23.4	7.9	61.8	24.0	7.7	66.1
08/02/06	1	26.8	7.3	89.6	27.0	6.8	90.7
	2	26.4	7.0	86.8	26.8	6.9	88.7
08/09/06	1	24.9	6.8	91.9	24.7	7.4	94.4
	2	24.7	7.5	90.4	24.5	7.1	92.6
08/16/06	1	22.9	8.5	105.6	23.2	7.6	107.0
	2	22.9	8.2	99.6	23.0	5.5	103.7
08/23/06	1	22.3	7.6	113.4	21.8	6.1	111.2
	2	22.4	5.6	110.5	21.7	5.3	108.1
08/30/06	1	19.5	9.2	115.0	19.6	5.5	114.7
	2	19.5	7.6	113.0	19.5	6.1	111.1
09/06/06	2	19.4	8.5	109.7	19.5	4.2	111.9
09/13/06	2	18.1	7.0	126.0	18.0	6.4	121.4

(continued)

Appendix Table B-1. (Continued)

Beginning Sample Date	Unit	Initial Water Temperature (°C)	Initial Dissolved Oxygen (mg/L)	Initial Conductivity (µS/cm)	Final Water Temperature (°C)	Final Dissolved Oxygen (mg/L)	Final Conductivity (µS/cm)
09/20/06	2	20.9	6.6	119.2	19.5	5.1	108.4
10/04/06	1	15.5	6.3	112.6	15.7	7.7	111.2
	2	15.5	6.7	112.4	15.7	8.0	108.3
10/11/06	1	14.6	6.6	105.7	14.3	8.7	103.5
	2	14.7	7.4	103.9	14.5	8.0	100.7
10/18/06	1	11.2	9.0	85.3	12.3	7.7	76.7
	2	11.3	9.4	82.7	12.2	8.1	74.9
10/25/06	1	8.6	10.6	49.6	8.7	10.4	53.0
	2	8.6	10.7	49.4	8.8	10.3	48.5
11/01/06	1	7.9	12.5	44.7	7.6	12.6	48.0
	2	7.8	12.1	44.4	7.6	12.6	48.0
11/15/06	1	8.9	12.6	58.0	9.4	12.6	50.0
	2	8.9	12.0	58.0	9.3	12.4	50.0
11/29/06	1	5.6	13.7	73.0	6.1	13.0	75.0
	2	5.6	13.6	71.0	6.1	13.3	72.0
12/13/06	1	2.1	15.7	78.0	3.1	14.5	84.0
	2	2.1	15.9	77.0	2.3	15.7	78.0
12/27/06	1	2.8	14.8	65.0	2.4	15.0	62.0
	2	2.7	14.5	58.0	2.3	15.1	59.0
01/10/07	1	2.3	15.7	50.0	1.1	15.9	53.0
	2	2.3	15.1	49.0	1.1	15.9	49.0
01/24/07	1	1.0	13.7	45.4	1.9	14.4	48.3
	2	1.0	15.3	42.7	0.4	15.4	44.2
02/07/07	1	1.4	14.3	54.3	1.7	15.6	54.5
	2	0.1	15.7	50.1	0.2	15.9	50.4
02/21/07	1	1.1	15.0	67.4	0.5	14.7	67.0
	2	-0.5	14.9	61.9	-0.6	15.2	62.7
03/07/07	1	1.2	12.2	69.1	1.6	13.9	71.1
	2	-0.7	15.0	27.5	-0.6	14.7	65.8
03/21/07	1				-0.1	12.6	52.4
03/28/07	1	2.2	14.4	68.0	1.6	15.5	33.2
	2	2.2	15.1	51.5	1.7	15.6	32.2
04/04/07	1	3.5	10.9	61.7	2.6	13.4	63.7
	2	3.5	13.1	60.6	2.7	14.6	60.3
04/11/07	1	3.8	12.4	79.7	4.8	12.6	83.7
	2	3.7	14.0	77.8	4.8	13.1	78.4

(continued)

Appendix Table B-1. (Continued)

Beginning Sample Date	Unit	Initial Water Temperature (°C)	Initial Dissolved Oxygen (mg/L)	Initial Conductivity (µS/cm)	Final Water Temperature (°C)	Final Dissolved Oxygen (mg/L)	Final Conductivity (µS/cm)
04/25/07	1	7.4	11.3	59.4	7.5	12.2	58.4
05/02/07	1	9.1	11.2	68.0	9.2	11.0	70.5
05/09/07	1	12.7	9.9	86.1	13.1	9.5	84.3
05/16/07	1	14.4	9.0	86.7	12.7	8.6	86.1
05/23/07	1	13.0	9.8	63.5	14.0	8.8	61.6
	2	12.9	9.9	62.5	14.0	8.2	61.6
05/30/07	1	19.5	6.3	83.3	19.8	6.3	85.9
	2	19.4	7.4	79.9	19.9	6.0	81.8
06/06/07	1	17.1	8.1	78.2	17.2	8.3	69.9
	2	17.1	8.1	77.3	17.0	8.7	67.3
06/13/07	1	19.6	7.5	7.8			
	2	19.6	7.5	7.6			
06/20/07	1	21.8	7.0	92.7	21.7	8.0	95.0
	2	21.8	6.0	89.8	21.7	7.2	91.4
06/27/07	1	23.8	6.8	102.8	24.8	5.5	102.9
	2	23.9	6.2	99.0	24.9	5.4	101.8

Appendix Table B-2. Recorded volume and dominant type of debris in 24-hour and long interval impingement samples at Merrimack Station, June 2005 through June 2007.

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
06/29/05	1	24-hour	11	Terrestrial
	2	24-hour	63	Terrestrial
06/30/05	1	6-day	111	Terrestrial
	2	6-day	135	Terrestrial
07/06/05	1	24-hour	9	Aquatic
	2	24-hour	11	Aquatic
07/07/05	1	6-day	31	Aquatic
	2	6-day	169	Aquatic
07/13/05	1	24-hour	7	Aquatic
	2	24-hour	26	Aquatic
07/14/05	1	6-day	32	Aquatic
	2	6-day	96	Aquatic
07/20/05	1	24-hour	10	Aquatic
	2	24-hour	20	Aquatic
07/21/05	1	6-day	30	Aquatic
	2	6-day	65	Aquatic
07/27/05	1	24-hour	6	Aquatic
	2	24-hour	9	Aquatic
07/28/05	1	6-day	31	Aquatic
	2	6-day	62	Aquatic
08/03/05	1	24-hour	10	Aquatic
	2	24-hour	20	Aquatic
08/04/05	1	6-day	33	Aquatic
	2	6-day	106	Aquatic
08/10/05	1	24-hour	15	Aquatic
	2	24-hour	21	Aquatic
08/11/05	1	6-day	64	Aquatic
	2	6-day	128	Aquatic
08/17/05	1	24-hour	12	Aquatic
	2	24-hour	20	Aquatic
08/18/05	1	6-day	30	Aquatic
	2	6-day	91	Aquatic
08/24/05	1	24-hour	10	Aquatic
	2	24-hour	18	Aquatic

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
08/25/05	1	6-day	43	Aquatic
	2	6-day	55	Aquatic
08/31/05	1	24-hour	12	Aquatic
	2	24-hour	16	Aquatic
09/01/05	1	6-day	44	Aquatic
	2	6-day	224	Aquatic
09/07/05	1	24-hour	25	Aquatic
	2	24-hour	25	Aquatic
09/08/05	1	6-day	39	Aquatic
	2	6-day	170	Aquatic
09/14/05	1	24-hour	14	Terrestrial
	2	24-hour	44	Aquatic
09/15/05	1	6-day	16	Aquatic
	2	6-day	80	Aquatic
09/21/05	1	24-hour	1	Terrestrial
	2	24-hour	4	Aquatic
09/22/05	1	6-day	18	Terrestrial
	2	6-day	48	Terrestrial
09/28/05	1	24-hour	8	Terrestrial
	2	24-hour	8	Terrestrial
09/29/05	1	6-day	15	Terrestrial
	2	6-day	32	Terrestrial
10/05/05	1	24-hour	4	Terrestrial
	2	24-hour	25	Terrestrial
10/06/05	1	6-day	32	Terrestrial
	2	6-day	153	Terrestrial
10/12/05	1	6-day	70	Terrestrial
10/14/05	2	6-day	135	Terrestrial
10/19/05	1	24-hour	30	Terrestrial
	2	24-hour	64	Terrestrial
10/20/05	1	6-day	80	Terrestrial
	2	6-day	240	Terrestrial
10/26/05	1	24-hour	50	Terrestrial
	2	24-hour	108	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
10/27/05	1	6-day	28	Terrestrial
	2	6-day	62	Terrestrial
11/02/05	1	24-hour	58	Terrestrial
	2	24-hour	125	Terrestrial
11/03/05	1	6-day	48	Terrestrial
	2	6-day	48	Terrestrial
11/09/05	1	24-hour	26	Terrestrial
	2	24-hour	37	Terrestrial
11/10/05	1	6-day	37	Terrestrial
	2	6-day	59	Terrestrial
11/16/05	1	24-hour	27	Terrestrial
	2	24-hour	44	Terrestrial
11/17/05	1	6-day	32	Terrestrial
	2	6-day	32	Terrestrial
11/22/05	1	24-hour	10	Terrestrial
	2	24-hour	42	Terrestrial
11/23/05	1	6-day	52	Terrestrial
	2	6-day	45	Terrestrial
11/30/05	2	24-hour	25	Terrestrial
12/01/05	2	6-day	80	Terrestrial
12/02/05	1	6-day	64	Terrestrial
12/07/05	1	24-hour	11	Terrestrial
	2	24-hour	25	Terrestrial
12/08/05	1	6-day	60	Terrestrial
	2	6-day	84	Terrestrial
12/14/05	1	24-hour	15	Terrestrial
	2	24-hour	10	Terrestrial
12/15/05	1	6-day	15	Terrestrial
	2	6-day	15	Terrestrial
12/21/05	1	24-hour	5	Terrestrial
	2	24-hour	2	Aquatic
12/22/05	1	13-day	60	Terrestrial
	2	13-day	148	Terrestrial
01/04/06	1	24-hour	5	Terrestrial
	2	24-hour	25	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
01/05/06	1	13-day	62	Terrestrial
	2	13-day	115	Terrestrial
01/18/06	1	24-hour	36	Terrestrial
	2	24-hour	50	Terrestrial
01/19/06	1	13-day	85	Terrestrial
	2	13-day	180	Terrestrial
02/01/06	1	24-hour	5	Terrestrial
	2	24-hour	20	Terrestrial
02/02/06	1	13-day	85	Terrestrial
	2	13-day	121	Terrestrial
02/15/06	1	24-hour	2	Terrestrial
	2	24-hour	20	Terrestrial
02/16/06	1	13-day	128	Terrestrial
	2	13-day	112	Terrestrial
03/01/06	1	24-hour	3	Terrestrial
	2	24-hour	5	Terrestrial
03/02/06	1	13-day	80	Terrestrial
	2	13-day	158	Terrestrial
03/15/06	1	24-hour	20	Terrestrial
	2	24-hour	48	Terrestrial
03/16/06	1	6-day	20	Terrestrial
	2	6-day	30	Terrestrial
03/22/06	1	24-hour	8	Terrestrial
	2	24-hour	12	Terrestrial
03/23/06	1	6-day	8	Terrestrial
	2	6-day	12	Terrestrial
03/29/06	1	24-hour	1	Terrestrial
	2	24-hour	2	Terrestrial
03/30/06	1	6-day	10	Terrestrial
	2	6-day	84	Terrestrial
04/05/06	1	24-hour	25	Terrestrial
	2	24-hour	30	Terrestrial
04/06/06	1	6-day	10	Terrestrial
	2	6-day	62	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
04/12/06	1	24-hour	15	Terrestrial
	2	24-hour	29	Terrestrial
04/13/06	1	6-day	30	Terrestrial
	2	6-day	28	Terrestrial
04/19/06	1	24-hour	3	Terrestrial
04/20/06	1	6-day	25	Terrestrial
04/26/06	1	24-hour	5	Terrestrial
04/27/06	1	6-day	30	Terrestrial
05/03/06	1	24-hour	5	Terrestrial
05/04/06	1	6-day	25	Terrestrial
05/10/06	1	24-hour	2	Terrestrial
05/11/06	1	6-day	60	Aquatic
05/17/06	1	24-hour	12	Terrestrial
05/18/06	1	6-day	25	Terrestrial
05/20/06	2	6-day	32	Terrestrial
05/24/06	2	24-hour	13	Terrestrial
05/25/06	2	6-day	128	Terrestrial
05/26/06	1	6-day	94	Terrestrial
05/31/06	1	24-hour	5	Terrestrial
	2	24-hour	9	Terrestrial
06/01/06	1	6-day	60	Terrestrial
	2	6-day	148	Terrestrial
06/07/06	1	24-hour	20	Terrestrial
	2	24-hour	25	Terrestrial
06/08/06	1	6-day	15	Terrestrial
	2	6-day	96	Terrestrial
06/14/06	1	24-hour	5	Terrestrial
	2	24-hour	15	Terrestrial
06/15/06	1	6-day	42	Terrestrial
	2	6-day	175	Terrestrial
06/21/06	2	24-hour	20	Terrestrial
06/22/06	2	6-day	125	Terrestrial
06/25/06	1	6-day	45	Terrestrial
06/28/06	1	24-hour	12	Terrestrial
	2	24-hour	32	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
06/29/06	1	6-day	35	Terrestrial
	2	6-day	160	Terrestrial
07/05/06	1	24-hour	12	Aquatic
	2	24-hour	28	Aquatic
07/06/06	1	6-day	42	Terrestrial
	2	6-day	128	Terrestrial
07/12/06	1	24-hour	12	Aquatic
	2	24-hour	25	Aquatic
07/13/06	1	6-day	25	Terrestrial
	2	6-day	123	Terrestrial
07/19/06	1	24-hour	4	Aquatic
	2	24-hour	7	Aquatic
07/20/06	1	6-day	75	Aquatic
	2	6-day	175	Aquatic
07/26/06	1	24-hour	10	Terrestrial
	2	24-hour	46	Terrestrial
07/27/06	1	6-day	50	Aquatic
	2	6-day	110	Aquatic
08/02/06	1	24-hour	15	Terrestrial
	2	24-hour	60	Terrestrial
08/03/06	1	6-day	30	Aquatic
	2	6-day	120	Aquatic
08/09/06	1	24-hour	3	Terrestrial
	2	24-hour	10	Aquatic
08/10/06	1	6-day	30	Other
	2	6-day	75	Terrestrial
08/16/06	1	24-hour	13	Terrestrial
	2	24-hour	25	Aquatic
08/17/06	1	6-day	50	Aquatic
	2	6-day	116	Aquatic
08/23/06	1	24-hour	5	Aquatic
	2	24-hour	5	Aquatic
08/24/06	1	6-day	30	Aquatic
	2	6-day	30	Aquatic

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
08/30/06	1	24-hour	5	Aquatic
	2	24-hour	15	Aquatic
08/31/06	1	6-day	23	Aquatic
	2	6-day	50	Aquatic
09/06/06	2	24-hour	10	Aquatic
09/07/06	2	6-day	116	Aquatic
09/13/06	2	24-hour	7	Aquatic
09/14/06	2	6-day	96	Aquatic
09/20/06	2	24-hour	30	Terrestrial
09/28/06	2	6-day	192	Terrestrial
10/04/06	1	24-hour	12	Terrestrial
	2	24-hour	30	Terrestrial
10/05/06	1	6-day	24	Terrestrial
	2	6-day	75	Terrestrial
10/11/06	1	24-hour	15	Terrestrial
	2	24-hour	20	Terrestrial
10/12/06	1	6-day	148	Terrestrial
	2	6-day	48	Terrestrial
10/18/06	1	24-hour	16	Terrestrial
	2	24-hour	28	Terrestrial
10/19/06	1	6-day	55	Terrestrial
	2	6-day	116	Terrestrial
10/25/06	1	24-hour	60	Terrestrial
	2	24-hour	80	Terrestrial
10/26/06	1	6-day	16	Terrestrial
	2	6-day	191	Terrestrial
11/01/06	1	24-hour	10	Terrestrial
	2	24-hour	48	Terrestrial
11/02/06	1	13-day	76	Terrestrial
	2	13-day	96	Terrestrial
11/15/06	1	24-hour	12	Terrestrial
	2	24-hour	17	Terrestrial
11/16/06	1	13-day	96	Terrestrial
	2	13-day	96	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
11/29/06	1	24-hour	30	Terrestrial
	2	24-hour	20	Terrestrial
11/30/06	1	13-day	64	Terrestrial
	2	13-day	184	Terrestrial
12/13/06	1	24-hour	15	Terrestrial
	2	24-hour	20	Terrestrial
12/14/06	1	13-day	78	Terrestrial
	2	13-day	110	Aquatic
12/27/06	1	24-hour	15	Terrestrial
	2	24-hour	25	Terrestrial
12/28/06	1	13-day	92	Terrestrial
	2	13-day	112	Aquatic
01/10/07	1	24-hour	16	Terrestrial
	2	24-hour	17	Aquatic
01/11/07	1	13-day	87	Terrestrial
	2	13-day	64	Terrestrial
01/24/07	1	24-hour	5	Terrestrial
	2	24-hour	1	Terrestrial
01/25/07	1	13-day	25	Terrestrial
	2	13-day	25	Terrestrial
02/07/07	1	24-hour	1	Terrestrial
	2	24-hour	1	Terrestrial
02/08/07	1	13-day	10	Aquatic
	2	13-day	2	Aquatic
02/21/07	1	24-hour	2	Aquatic
	2	24-hour	2	Aquatic
02/22/07	1	13-day	12	Terrestrial
	2	13-day	15	Terrestrial
03/07/07	1	24-hour	1	Terrestrial
	2	24-hour	2	Terrestrial
03/08/07	1	13-day	20	Terrestrial
	2	13-day	25	Terrestrial
03/21/07	1	24-hour	5	Terrestrial
03/22/07	1	6-day	30	Terrestrial
	2	6-day	145	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
03/28/07	1	24-hour	30	Terrestrial
	2	24-hour	32	Terrestrial
03/29/07	1	6-day	62	Terrestrial
	2	6-day	64	Terrestrial
04/04/07	1	24-hour	15	Terrestrial
	2	24-hour	15	Terrestrial
04/05/07	1	6-day	64	Terrestrial
	2	6-day	48	Terrestrial
04/11/07	1	24-hour	4	Terrestrial
	2	24-hour	10	Terrestrial
04/12/07	1	6-day	64	Terrestrial
	2	6-day	144	Terrestrial
04/19/07	1	6-day	44	Terrestrial
04/25/07	1	24-hour	15	Terrestrial
04/26/07	1	6-day	144	Terrestrial
05/02/07	1	24-hour	18	Terrestrial
05/03/07	1	6-day	30	Terrestrial
05/09/07	1	24-hour	10	Terrestrial
05/10/07	1	6-day	32	Terrestrial
05/16/07	1	24-hour	10	Terrestrial
05/17/07	1	6-day	27	Terrestrial
	2	6-day	110	Terrestrial
05/23/07	1	24-hour	10	Terrestrial
	2	24-hour	30	Terrestrial
05/24/07	1	6-day	35	Terrestrial
	2	6-day	200	Terrestrial
05/30/07	1	24-hour	10	Terrestrial
	2	24-hour	32	Terrestrial
05/31/07	1	6-day	64	Terrestrial
	2	6-day	256	Terrestrial
06/06/07	1	24-hour	15	Terrestrial
	2	24-hour	65	Terrestrial
06/07/07	1	6-day	55	Terrestrial
	2	6-day	180	Terrestrial

(continued)

Appendix Table B-2. (Continued)

Beginning Sample Date	Unit	Sample Duration	Gallons of Debris	Dominant Debris Type
06/13/07	1	24-hour	15	Terrestrial
	2	24-hour	20	Aquatic
06/14/07	1	6-day	57	Terrestrial
	2	6-day	96	Terrestrial
06/20/07	1	24-hour	5	Aquatic
	2	24-hour	15	Terrestrial
06/21/07	1	6-day	48	Terrestrial
	2	6-day	96	Terrestrial
06/27/07	1	24-hour	30	Aquatic
	2	24-hour	30	Aquatic

Appendix Table B-3. Weekly and monthly estimated abundance of all fish impinged in Unit 1 at Merrimack Station, 29 June 2005 through 27 June 2007.

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jun 05	26	2	1	0.26	3.83	0.75	5.10	0.52	2.00	2.67	2.00	2.67
Jul 05	26	2	1	0.26	3.83	0.75	5.10	0.52	2.00	2.67		
	27	7	2	0.26	7.78	0.75	10.37	1.83	14.25	19.00		
	28	7	1	0.27	3.77	0.75	5.03	1.83	6.90	9.21		
	29	7	0	0.26	0.00	0.75	0.00	1.83	0.00	0.00		
	30	7	1	0.27	3.77	0.75	5.03	1.82	6.85	9.14		
	31	1	0	0.26	0.00	0.75	0.00	0.26	0.00	0.00	30.01	40.01
Aug 05	31	6	0	0.26	0.00	0.75	0.00	1.30	0.00	0.00		
	32	7	0	0.24	0.00	0.75	0.00	1.42	0.00	0.00		
	33	7	0	0.25	0.00	0.75	0.00	1.83	0.00	0.00		
	34	7	0	0.27	0.00	0.53	0.00	1.83	0.00	0.00		
	35	4	0	0.26	0.00	0.53	0.00	1.05	0.00	0.00	0.00	0.00
Sep 05	35	3	0	0.26	0.00	0.53	0.00	0.78	0.00	0.00		
	36	7	0	0.27	0.00	0.53	0.00	1.83	0.00	0.00		
	37	7	1	0.27	3.66	0.53	6.91	1.83	6.70	12.65		
	38	7	0	0.26	0.00	0.97	0.00	1.83	0.00	0.00		
	39	6	2	0.26	7.56	0.97	7.80	1.55	11.72	12.08	18.42	24.73
Oct 05	39	1	2	0.26	7.56	0.97	7.80	0.26	1.98	2.04		
	40	7	0	0.25	0.00	0.97	0.00	1.83	0.00	0.00		
	41	7			11.71 *		12.07	1.17	13.64	14.07		
	42	7	6	0.26	23.42	0.97	24.15	1.83	42.89	44.22		
	43	7	5	0.25	19.65	0.88	22.33	1.82	35.78	40.65		
	44	2	4	0.26	15.67	0.88	17.81	0.53	8.28	9.41	102.57	110.39

(continued)

Appendix Table B-3. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Nov 05	44	5	4	0.26	15.67	0.88	17.81	1.30	20.31	23.08		
	45	7	1	0.27	3.74	0.88	4.26	1.57	5.88	6.68		
	46	7	0	0.26	0.00	0.88	0.00	1.83	0.00	0.00		
	47	7	0	0.26	0.00	0.91	0.00	1.83	0.00	0.00		
	48	4			77.05 *		84.67	0.80	61.62	67.71	87.80	97.47
Dec 05	48	3			77.05 *		84.67	0.36	27.76	30.50		
	49	7	39	0.25	154.10	0.91	169.34	1.83	282.21	310.12		
	50	7	1	0.26	3.81	0.91	4.19	1.83	6.98	7.67		
	51	7	2	0.26	7.67	0.91	8.42	1.83	14.04	15.43		
	52	7			3.83 *		4.21	1.83	7.02	7.71	338.00	371.43
Jan 06	1	7	0	0.26	0.00	0.85	0.00	1.83	0.00	0.00		
	2	7			13.81 *		16.25	1.43	19.68	23.15		
	3	7	7	0.25	27.62	0.85	32.49	1.83	50.58	59.51		
	4	7			13.81 *		16.25	1.83	25.29	29.75		
	5	3	0	0.17	0.00	0.74	0.00	0.78	0.00	0.00	95.55	112.41
Feb 06	5	4	0	0.17	0.00	0.74	0.00	0.49	0.00	0.00		
	6	7			0.00 *		0.00	1.83	0.00	0.00		
	7	7	0	0.25	0.00	0.74	0.00	1.82	0.00	0.00		
	8	7			5.43 *		6.62	1.83	9.95	12.13		
	9	3	3	0.28	10.86	0.82	13.25	0.78	8.53	10.40	18.47	22.53
Mar 06	9	4	3	0.28	10.86	0.82	13.25	1.05	11.37	13.86		
	10	7			22.63 *		27.60	1.83	41.45	50.55		
	11	7	9	0.26	34.40	0.82	41.95	1.83	63.00	76.83		
	12	7	2	0.26	7.78	0.86	9.05	1.83	14.25	16.57		
	13	6	6	0.26	23.34	0.86	27.14	1.57	36.64	42.60	166.70	200.41

(continued)

Appendix Table B-3. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Apr 06	13	1	6	0.26	23.34	0.86	27.14	0.26	6.11	7.10		
	14	7	0	0.04	0.00	0.86	0.00	0.86	0.00	0.00		
	15	7	2	0.26	7.63	0.86	8.88	1.77	13.53	15.73		
	16	7	1	0.26	3.82	0.86	4.44	1.83	7.00	8.14		
	17	7	0	0.26	0.00	0.93	0.00	1.83	0.00	0.00		
	18	1	0	0.26	0.00	0.93	0.00	0.26	0.00	0.00	26.63	30.97
May 06	18	6	0	0.26	0.00	0.93	0.00	1.28	0.00	0.00		
	19	7	1	0.27	3.74	0.93	4.03	1.20	4.51	4.85		
	20	7	19	0.27	71.14	0.93	76.50	1.83	130.29	140.09		
	21	7			46.96 *		52.14	1.09	51.27	56.92		
	22	4	6	0.26	22.78	0.82	27.78	1.05	23.83	29.07	209.90	230.93
Jun 06	22	3	6	0.26	22.78	0.82	27.78	0.78	17.88	21.80		
	23	7	28	0.26	106.65	0.82	130.07	1.83	195.32	238.20		
	24	7	9	0.28	32.71	0.82	39.89	1.82	59.52	72.58		
	25	7			20.18 *		24.01	0.56	11.30	13.45		
	26	6	2	0.26	7.64	0.94	8.13	1.57	12.00	12.77	296.02	358.79
Jul 06	26	1	2	0.26	7.64	0.94	8.13	0.26	2.00	2.13		
	27	7	3	0.26	11.74	0.94	12.48	1.83	21.49	22.86		
	28	7	0	0.27	0.00	0.94	0.00	1.83	0.00	0.00		
	29	7	0	0.26	0.00	0.62	0.00	1.83	0.00	0.00		
	30	7	1	0.26	3.85	0.62	6.21	1.83	7.05	11.37		
	31	2	0	0.25	0.00	0.62	0.00	0.52	0.00	0.00	30.54	36.36

(continued)

Appendix Table B-3. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Aug 06	31	5	0	0.25	0.00	0.62	0.00	1.31	0.00	0.00		
	32	7	0	0.27	0.00	0.62	0.00	1.83	0.00	0.00		
	33	7	1	0.26	3.86	0.81	4.77	1.83	7.07	8.73		
	34	7	0	0.26	0.00	0.81	0.00	1.83	0.00	0.00		
	35	5	0	0.27	0.00	0.81	0.00	1.31	0.00	0.00	7.07	8.73
Sep 06	35	2	0	0.27	0.00	0.81	0.00	0.52	0.00	0.00		
	36	7			0.00 *		0.00	0.80	0.00	0.00		
	37	7			0.00 *		0.00	0.00	0.00	0.00		
	38	7			0.00 *		0.00	0.00	0.00	0.00		
	39	7			0.00 *		0.00	-0.00	0.00	0.00	0.00	0.00
Oct 06	40	7	0	0.27	0.00	0.77	0.00	1.29	0.00	0.00		
	41	7	0	0.26	0.00	0.77	0.00	1.83	0.00	0.00		
	42	7	0	0.26	0.00	0.77	0.00	1.83	0.00	0.00		
	43	7	1	0.27	3.73	0.77	4.85	1.82	6.78	8.81		
	44	3	1	0.12	8.67	0.77	11.26	0.51	4.41	5.73	11.20	14.54
Nov 06	44	4	1	0.12	8.67	0.77	11.26	0.71	6.18	8.02		
	45	7			4.34 *		5.63	1.82	7.91	10.27		
	46	7	0	0.27	0.00	0.81	0.00	1.75	0.00	0.00		
	47	7			1.94 *		2.39	1.83	3.55	4.39		
	48	5	1	0.26	3.88	0.81	4.79	1.24	4.83	5.96	22.47	28.64
Dec 06	48	2	1	0.26	3.88	0.81	4.79	0.06	0.24	0.30		
	49	7			3.84 *		4.74	1.38	5.28	6.52		
	50	7	1	0.26	3.80	0.81	4.69	1.83	6.95	8.58		
	51	7			3.85 *		4.61	1.83	7.05	8.45		
	52	7	1	0.26	3.91	0.86	4.54	1.83	7.15	8.32		
	53	1			3.84 *		4.46	0.26	1.00	1.17	27.69	33.34

(continued)

Appendix Table B-3. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jan 07	53	6			3.84 *		4.46	1.57	6.02	7.00		
	1	7	1	0.27	3.76	0.86	4.38	1.83	6.89	8.02		
	2	7			3.89 *		4.57	1.83	7.12	8.38		
	3	7	1	0.25	4.01	0.84	4.77	1.83	7.34	8.73		
	4	4			2.00 *		2.38	1.05	2.10	2.50	29.46	34.62
Feb 07	4	3			2.00 *		2.38	0.78	1.57	1.87		
	5	7	0	0.26	0.00	0.84	0.00	1.83	0.00	0.00		
	6	7			1.97 *		2.22	1.82	3.59	4.03		
	7	7	1	0.25	3.94	0.89	4.43	1.83	7.22	8.11		
	8	4			1.97 *		2.22	1.05	2.06	2.32	14.44	16.33
Mar 07	8	3			1.97 *		2.22	0.78	1.55	1.74		
	9	7	0	0.26	0.00	0.89	0.00	1.83	0.00	0.00		
	10	7			3.72 *		6.01	1.82	6.78	10.94		
	11	7	2	0.27	7.45	0.62	12.01	1.30	9.68	15.61		
	12	7	0	0.26	0.00	0.62	0.00	1.56	0.00	0.00	18.00	28.28
Apr 07	13	7	3	0.27	10.96	0.62	17.68	1.83	20.08	32.39		
	14	7	0	0.26	0.00	0.62	0.00	1.83	0.00	0.00		
	15	7			0.00 *		0.00	1.83	0.00	0.00		
	16	7	0	0.25	0.00	0.73	0.00	1.82	0.00	0.00		
	17	2	3	0.26	11.45	0.73	15.69	0.52	5.99	8.21	26.07	40.59
May 07	17	5	3	0.26	11.45	0.73	15.69	1.31	14.98	20.52		
	18	7	0	0.27	0.00	0.73	0.00	1.83	0.00	0.00		
	19	7	0	0.26	0.00	0.73	0.00	1.83	0.00	0.00		
	20	7	6	0.26	22.67	0.60	37.78	1.83	41.51	69.18		
	21	5	0	0.26	0.00	0.60	0.00	1.31	0.00	0.00	56.49	89.70

(continued)

Appendix Table B-3. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jun 07	21	2	0	0.26	0.00	0.60	0.00	0.52	0.00	0.00		
	22	7	5	0.25	19.77	0.60	32.95	1.83	36.21	60.34		
	23	7	1	0.30	3.31	0.60	5.52	1.83	6.06	10.11		
	24	7	0	0.27	0.00	0.89	0.00	1.56	0.00	0.00		
	25	4	1	0.27	3.70	0.89	4.16	0.80	2.95	3.31	45.22	73.76

[a] Weekly impingement rates were interpolated for weeks with missed or voided collections (*)
[b] Screen collection efficiency factors based on proportion of 100 released test fish that passed through screen were used to adjust to sample data
[c] Adjusted impingement rates were interpolated for weeks with missed or voided collections
MCM = Million Cubic Meters

Appendix Table B-4. Weekly and monthly estimated abundance of all fish impinged in Unit 2 at Merrimack Station, June 2005 through June 2007.

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jun 05	26	2	3	0.71	4.23	0.74	5.72	1.42	6.00	8.10	6.00	8.10
Jul 05	26	2	3	0.71	4.23	0.74	5.72	1.42	6.00	8.10		
	27	7	4	0.69	5.76	0.74	7.79	4.96	28.60	38.64		
	28	7	5	0.72	6.98	0.74	9.43	4.96	34.61	46.77		
	29	7	1	0.71	1.40	0.74	1.89	4.96	6.95	9.39		
	30	7	0	0.73	0.00	0.74	0.00	4.96	0.00	0.00		
	31	1	0	0.72	0.00	0.74	0.00	0.71	0.00	0.00	76.15	102.91
Aug 05	31	6	0	0.72	0.00	0.74	0.00	4.25	0.00	0.00		
	32	7	2	0.67	2.97	0.74	4.01	4.95	14.71	19.88		
	33	7	1	0.71	1.41	0.74	1.90	4.96	6.98	9.43		
	34	7	0	0.73	0.00	0.74	0.00	4.69	0.00	0.00		
	35	4	0	0.72	0.00	0.50	0.00	1.46	0.00	0.00	21.69	29.31
Sep 05	35	3	0	0.72	0.00	0.50	0.00	2.13	0.00	0.00		
	36	7	2	0.72	2.79	0.50	5.58	4.96	13.83	27.65		
	37	7	0	0.73	0.00	0.50	0.00	4.96	0.00	0.00		
	38	7	1	0.70	1.44	0.73	1.97	4.96	7.12	9.76		
	39	6	3	0.68	4.41	0.73	6.04	4.23	18.65	25.54	39.60	62.95
Oct 05	39	1	3	0.68	4.41	0.73	6.04	0.71	3.12	4.28		
	40	7	1	0.69	1.44	0.73	1.98	4.96	7.16	9.81		
	41	7			15.26 *		20.91	0.91	13.83	18.95		
	42	7	10	0.34	29.08	0.73	39.83	2.38	69.30	94.94		
	43	7	2	0.69	2.89	0.59	4.90	4.68	13.54	22.96		
	44	2	7	0.69	10.13	0.59	17.17	1.43	14.50	24.58	121.46	175.51

(continued)

Appendix Table B-4. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Nov 05	44	5	7	0.69	10.13	0.59	17.17	3.53	35.77	60.63		
	45	7	2	0.72	2.77	0.59	4.70	4.96	13.76	23.32		
	46	7	1	0.71	1.42	0.59	2.40	4.96	7.02	11.91		
	47	7	5	0.70	7.10	0.85	8.35	4.96	35.20	41.41		
	48	4	2	0.71	2.83	0.85	3.33	2.83	8.03	9.44	99.78	146.71
Dec 05	48	3	2	0.71	2.83	0.85	3.33	2.13	6.02	7.08		
	49	7	20	0.71	28.17	0.85	33.14	4.96	139.71	164.36		
	50	7	4	0.71	5.61	0.85	6.60	4.96	27.81	32.71		
	51	7	0	0.70	0.00	0.85	0.00	4.96	0.00	0.00		
	52	7			0.71 *		1.05	4.96	3.50	5.22	177.04	209.38
Jan 06	1	7	1	0.71	1.41	0.67	2.11	4.96	7.00	10.45		
	2	7			3.62 *		5.40	4.96	17.95	26.79		
	3	7	4	0.69	5.83	0.67	8.70	4.96	28.90	43.14		
	4	7			2.91 *		4.35	4.95	14.42	21.53		
	5	3	0	0.70	0.00	0.18	0.00	2.13	0.00	0.00	68.28	101.91
Feb 06	5	4	0	0.70	0.00	0.18	0.00	2.83	0.00	0.00		
	6	7			1.45 *		8.04	4.96	7.17	39.86		
	7	7	2	0.69	2.89	0.18	16.07	4.96	14.35	79.72		
	8	7			1.45 *		8.04	2.64	3.82	21.21		
	9	3	0	0.75	0.00	0.38	0.00	1.93	0.00	0.00	25.34	140.78
Mar 06	9	4	0	0.75	0.00	0.38	0.00	2.83	0.00	0.00		
	10	7			1.41 *		3.71	4.96	7.00	18.42		
	11	7	2	0.71	2.82	0.38	7.43	4.96	14.00	36.84		
	12	7	0	0.70	0.00	0.38	0.00	4.96	0.00	0.00		
	13	6	0	0.71	0.00	0.25	0.00	4.25	0.00	0.00	21.00	55.26

(continued)

Appendix Table B-4. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Apr 06	13	1	0	0.71	0.00	0.25	0.00	0.71	0.00	0.00		
	14	7	0	0.72	0.00	0.25	0.00	4.93	0.00	0.00		
	15	7	2	0.71	2.83	0.25	11.33	4.96	14.05	56.20		
	16	7			2.86 *		11.42	2.41	6.89	27.56		
	17	7			2.88 *		11.52	0.00	0.00	0.00		
	18	1			2.90 *		11.62	0.00	0.00	0.00	20.94	83.76
May 06	18	6			2.90 *		11.62	0.00	0.00	0.00		
	19	7			2.93 *		11.71	0.00	0.00	0.00		
	20	7			2.95 *		11.81	0.22	0.66	2.62		
	21	7	2	0.67	2.98	0.25	11.90	4.79	14.25	56.99		
	22	4	1	0.71	1.41	0.25	5.64	2.83	4.00	16.00	18.90	75.61
Jun 06	22	3	1	0.71	1.41	0.25	5.64	2.13	3.00	12.00		
	23	7	29	0.72	40.50	0.25	162.01	4.95	200.37	801.49		
	24	7	263	0.81	326.28	0.59	553.02	4.95	1614.6	2736.6		
	25	7	3	0.69	4.32	0.59	7.33	4.96	21.45	36.35		
	26	6	34	0.69	49.18	0.59	83.35	4.25	209.08	354.38	2048.5	3940.8
Jul 06	26	1	34	0.69	49.18	0.59	83.35	0.71	34.85	59.06		
	27	7	4	0.69	5.76	0.59	9.77	4.96	28.60	48.47		
	28	7	2	0.71	2.80	0.59	4.75	4.96	13.91	23.58		
	29	7	3	0.71	4.23	0.59	7.18	4.96	21.00	35.59		
	30	7	1	0.70	1.43	0.59	2.42	4.95	7.07	11.98		
	31	2	0	0.68	0.00	0.81	0.00	1.42	0.00	0.00	105.42	178.68

(continued)

Appendix Table B-4. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Aug 06	31	5	0	0.68	0.00	0.81	0.00	3.54	0.00	0.00		
	32	7	0	0.73	0.00	0.81	0.00	4.96	0.00	0.00		
	33	7	1	0.70	1.43	0.81	1.77	4.95	7.09	8.75		
	34	7	0	0.71	0.00	0.81	0.00	4.96	0.00	0.00		
	35	5	0	0.73	0.00	0.81	0.00	3.54	0.00	0.00	7.09	8.75
Sep 06	35	2	0	0.73	0.00	0.81	0.00	1.42	0.00	0.00		
	36	7	0	0.69	0.00	0.81	0.00	4.96	0.00	0.00		
	37	7	0	0.72	0.00	0.94	0.00	4.96	0.00	0.00		
	38	7	1	0.71	1.41	0.94	1.50	3.72	5.26	5.59		
	39	7			1.42 *		1.51	3.33	4.72	5.03	9.98	10.62
Oct 06	40	7	1	0.70	1.43	0.94	1.52	4.94	7.05	7.50		
	41	7	3	0.69	4.36	0.78	5.59	4.96	21.63	27.73		
	42	7	0	0.71	0.00	0.78	0.00	4.95	0.00	0.00		
	43	7	4	0.73	5.47	0.78	7.02	4.96	27.15	34.81		
	44	3	13	0.72	18.11	0.78	23.21	2.12	38.32	49.13	94.15	119.17
Nov 06	44	4	13	0.72	18.11	0.78	23.21	2.83	51.32	65.80		
	45	7			9.05 *		11.61	4.96	44.91	57.57		
	46	7	0	0.74	0.00	0.93	0.00	4.96	0.00	0.00		
	47	7			0.70 *		0.75	4.95	3.47	3.73		
	48	5	1	0.71	1.40	0.93	1.51	3.54	4.96	5.34	104.66	132.44
Dec 06	48	2	1	0.71	1.40	0.93	1.51	1.42	1.98	2.13		
	49	7			2.80 *		3.01	4.96	13.90	14.95		
	50	7	3	0.71	4.20	0.93	4.52	4.96	20.86	22.42		
	51	7			3.54 *		4.01	2.44	8.64	9.80		
	52	7	2	0.70	2.87	0.82	3.50	4.96	14.23	17.35		
	53	1			2.12 *		2.59	0.71	1.51	1.84	61.12	68.49

(continued)

Appendix Table B-4. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jan 07	53	6			2.12 *		2.59	4.25	9.03	11.01		
	1	7	1	0.72	1.38	0.82	1.68	4.96	6.85	8.35		
	2	7			1.40 *		1.71	3.64	5.10	6.22		
	3	7	1	0.70	1.43	0.82	1.74	2.56	3.65	4.45		
	4	4			0.71 *		0.87	2.72	1.94	2.37	26.57	32.41
Feb 07	4	3			0.71 *		0.87	2.13	1.52	1.85		
	5	7	0	0.70	0.00	0.82	0.00	4.50	0.00	0.00		
	6	7			1.45 *		1.76	4.20	6.07	7.41		
	7	7	2	0.69	2.89	0.82	3.53	4.96	14.34	17.49		
	8	4			1.45 *		1.76	2.83	4.10	5.00	26.02	31.74
Mar 07	8	3			1.45 *		1.76	2.13	3.07	3.75		
	9	7	0	0.72	0.00	0.82	0.00	4.96	0.00	0.00		
	10	7			0.94 *		1.15	4.93	4.64	5.66		
	11	7			1.88 *		2.29	4.74	8.92	10.88		
	12	7	2	0.71	2.82	0.82	3.44	4.96	13.98	17.05	30.61	37.33
Apr 07	13	7	1	0.74	1.35	0.60	2.26	4.96	6.72	11.20		
	14	7	0	0.71	0.00	0.60	0.00	4.96	0.00	0.00		
	15	7			1.37 *		2.29	2.10	2.88	4.80		
	16	7			2.75 *		4.58	0.00	0.00	0.00		
	17	2			4.12 *		6.87	0.00	0.00	0.00	9.60	16.00
May 07	17	5			4.12 *		6.87	0.00	0.00	0.00		
	18	7			5.50 *		9.16	0.00	0.00	0.00		
	19	7			6.87 *		11.45	0.86	5.88	9.80		
	20	7	6	0.73	8.24	0.60	13.74	4.50	37.12	61.86		
	21	5	1	0.39	2.55	0.60	4.25	3.04	7.74	12.91	50.75	84.58

(continued)

Appendix Table B-4. Continued

Month	Week in Year	Number of Days in Week	Number of Fish Collected	Flow Sampled (Mm3)	Impingement Rate[a] (No./Mm3)	Screen Collection Efficiency[b]	Adjusted Impingement Rate[c] (No./Mm3)	Weekly Flow (Mm3)	Weekly Impingement Estimate (Rate X Flow)	Weekly Adjusted Impingement Estimate (Adj. Rate X Flow)	Monthly Impingement Estimate	Monthly Adjusted Impingement Estimate
Jun 07	21	2	1	0.39	2.55	0.60	4.25	0.95	2.43	4.05		
	22	7	7	0.68	10.35	0.60	17.24	4.92	50.88	84.79		
	23	7	2	0.79	2.52	0.60	4.20	4.96	12.50	20.83		
	24	7	1	0.71	1.40	0.41	3.42	4.96	6.96	16.98		
	25	4	2	0.72	2.77	0.41	6.76	2.83	7.86	19.17	80.63	145.82

[a] Weekly impingement rates were interpolated for weeks with missed or voided collections (*)
[b] Screen collection efficiency factors based on proportion of 100 released test fish that passed through screen were used to adjust to sample data
[c] Adjusted impingement rates were interpolated for weeks with missed or voided collections
MCM = Million Cubic Meters

APPENDIX C

Merrimack Station Quality Control

Appendix Table C-1. Species present in Normandeau Associates fish reference collection from Hooksett Pool of the Merrimack Station observed during impingement sampling.

Scientific Name	Common Name	Specimen Available
Anguillidae	freshwater eels	
Anguilla rostrata	American eel	x
Cyprinidae	carps and minnows	
Hybognathus regius	eastern silvery minnow	x
Luxilis cornutus	common shiner	x
Notemigonus crysoleucas	golden shiner	x
Notropis atherinoides	emerald shiner	
Notropis bifrenatus	bridle shiner	x
Notropis hudsonius	spottail shiner	x
Semotilus corporalis	fallfish	x
Catostomidae	suckers	
Catostomus commersonii	white sucker	x
Ictaluridae	North American catfishes	
Ameiurus natalis	yellow bullhead	x
Ameiurus nebulosus	brown bullhead	
Noturus insignis	margined madtom	x
Esocidae	pikes	
Esox niger	chain pickerel	x
Osmeridae	smelts	
Osmerus mordax	rainbow smelt	x
Moronidae	temperate basses	
Morone americana	white perch	x
Centrarchidae	sunfishes	
Ambloplites rupestris	rock bass	x
Enneacanthus obesus	banded sunfish	x
Lepomis auritus	redbreast sunfish	x
Lepomis gibbosus	pumpkinseed	x
Lepomis macrochirus	bluegill	x
Micropterus dolomieu	smallmouth bass	x
Micropterus salmoides	largemouth bass	x
Pomoxis nigromaculatus	black crappie	x
Percidae	perches	
Etheostoma olmstedi	tessellated darter	x
Perca flavescens	yellow perch	x

Appendix Table C-2. Summary of QC effort for Merrimack Station impingement and entrainment programs.

Sample Type	Task	Number of Inspections	# Passed	# Failed
Impingement	Sort	63	63	0
Impingement	Identification/Count	83	83	0
Impingement	Fish length	105	102	3
Entrainment	Sort	27	27	0
Entrainment	Count	8	8	0
Entrainment	Identification	21	20	1
Entrainment	Life Stage Determination	21	20	1