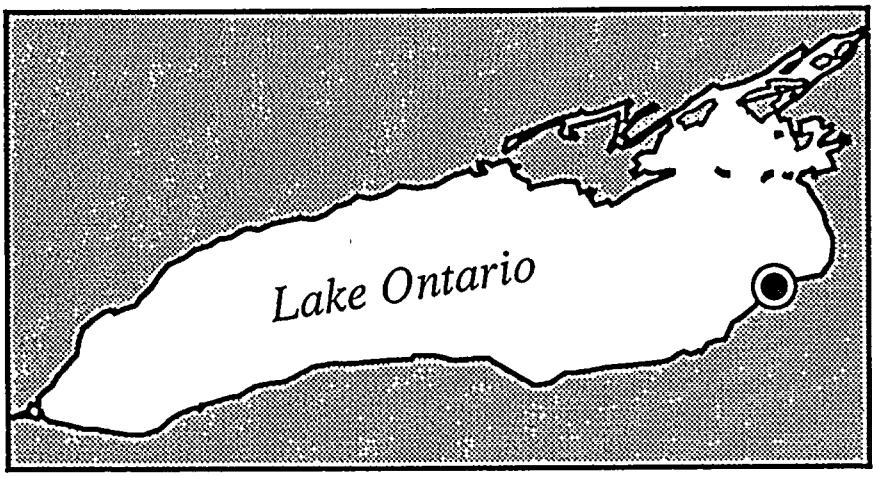
Niagara Mohawk Power Corporation



June 1993

FINAL

SPDES Annual Biological Monitoring Report

Nine Mile Point Nuclear Station

1992

EA Engineering, Science, and Technology

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Final

Nine Mile Point Nuclear Station
1992 SPDES Annual
Biological Monitoring Report

Prepared for

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EXECUTIVE SUMMARY

This report, prepared by EA Engineering, Science, and Technology, presents the results of impingement abundance studies conducted during 1992, as required by the State Pollutant Discharge Elimination System (SPDES) Permit No. NY 000 1015, Section IV.C (dated 1 July 1983) for the Nine Mile Point Nuclear Station Unit 1 (NMP Unit 1).

Impingement abundance was monitored between 4 and 20 samples per month, for a total of 78 samples from January through December 1992.

In 1992, outages occurred at NMP Unit 1 from 16 February through 1 April and 2 May through 4 August. Both main circulating water pumps were usually turned off during both outages, however, at times at least one main circulating water pump was in operation. The collection of impinged organisms was reduced during the period of time when the main circulating water pumps were not operating. Changes in the station's operating regime; changes in the Lake Ontario trophic structure; and seasonal, behavioral, and meteorological factors all played a role in influencing the 1992 impingement collections.

Impingement sampling at NMP Unit 1 in 1992 resulted in the collection and identification of 30 fish taxa. One taxon (sculpin) was identified to the genus level and the remaining 29 taxa were identified to the species level. Crayfish and clams were the only invertebrates found in the impingement collections in 1992. Alewife was the most numerous (10,255) comprising 70 percent of the total fish catch (14,588 excluding fragments). Alewife, rainbow smelt, threespine stickleback, and spottail shiner accounted for 92 percent (13,482) of all fish collected (14,588). The estimated impingement (based on volume) for 1992 was 46,215 (excluding fragments and invertebrates). The estimated impingement for the representative important species were as follows: alewife, 28,099 (61 percent of the total); white perch, 218; yellow perch, 868; smallmouth bass, 97; lake trout, 10; and brown trout, 7. No rare, endangered, or threatened fish species were collected at NMP Unit 1 in 1992. No *Corbicula* sp. molluscs were found in the 1992 impingement collections at NMP Unit 1. Zebra mussels (*Dreissena polymorpha*) were identified in the Nine Mile Point area in late Summer 1990. Shells of dead zebra mussels were first noted in the impingement sample collections in late 1991, and their presence (by volume) has been noted on applicable data sheets as part of the regular impingement sample analysis procedure.

1. INTRODUCTION

Nine Mile Point Nuclear Station Unit 1 (NMP Unit 1) is solely owned and operated by Niagara Mohawk Power Corporation. The station is located on a 900-acre site in Oswego County, New York, and is approximately 6.8 mi north-northeast of the City of Oswego. The power conversion system utilizes a 1,850-megawatt (thermal) boiling water reactor designed and manufactured by the General Electric Corporation, and a 610,000-kilowatt (net electric) turbine-generator.

NMP Unit 1 has been operational since December 1969. The station is a critical, integral part of the New York State Energy Master Plan, and a cost-efficient source of electrical energy within Niagara Mohawk Power Corporation's service area.

NMP Unit 1 utilizes a once-through, non-contact cooling water system to dissipate thermal energy from the main condensers and auxiliary cooling systems. Cooling water is drawn from Lake Ontario by means of two main circulating water pumps rated at 946.25 m^3 (250,000 gal) per minute (total) and two service water pumps which operate at approximately 68.13 m^3 (18,000 gal) per minute (total). Usually, one service water pump is operating except during the mid-summer months.

The lake intake structure is an open-sided hexagonal concrete structure located in approximately 5.5 m (18 ft) of water (mean lake level) and approximately 259 m (850 ft) from the existing shoreline. The lake discharge structure is of a design that is similar to the intake structure. This structure is hexagonal with open-sided ports and is located approximately 102 m (335 ft) from the shoreline and 3.8 m (12.5 ft) below the surface (mean lake level).

Aquatic organisms, detritus, and other debris enter with the water pumped from the vicinity of the submerged intake structure. These materials flow through trash racks, which are used for removing large items, such as logs, and are impinged on a total of three traveling screens comprised of 9-mm (3/8-in.) mesh, which are used for screening out smaller materials. Periodically, the traveling screens are rotated and washed to remove any accumulation of impinged organisms or other material into a sluiceway which empties into an impingement collection basket. The aquatic organisms impinged at NMP Unit 1 have been monitored since 1972 in order to estimate species abundance and composition.

This report presents the results of the biological monitoring program conducted by EA during 1992, as required by the SPDES Permit No. NY 000 1015, Section IV (dated 1 July 1983) covering Niagara Mohawk Power Corporation's NMP Unit 1.

Impingement catches (as required by Section IV.B of the permit) were monitored on a frequency of 4-20 samples per month from January through December 1992 (a total of 78 samples in 1992).

Impingement sampling at NMP Unit 1 in 1992 resulted in the collection and identification of 30 fish taxa. One taxon (sculpin) was identified to the genus level and the remaining 29 taxa were identified to the species level. Crayfish and clams were the only invertebrates found in the impingement collections in 1992. Alewife was the most numerous species (10,255), comprising 70 percent of the total fish catch (14,588). Alewife, rainbow smelt, threespine stickleback, and spottail shiner accounted for 92 percent (13,482) of all fish collected (14,588 excluding fragments).

As required by correspondence from Niagara Mohawk Power Corporation to the Nuclear Regulatory Commission, all fish impingement samples are checked for the presence of the Asiatic clam (*Corbicula* sp.). No *Corbicula* sp. molluscs were found in the 1992 impingement collections. Zebra mussels (*Dreissena polymorpha*) were identified in the Nine Mile Point area in late Summer 1990. Shells of dead zebra mussels were first noted in the impingement sample collections in late 1992, and their presence has been noted (by volume) on applicable data sheets.

2. METHODS AND MATERIALS

2.1 SCHEDULE (PERMIT SECTION IV.B.1)

In accordance with permit requirements, 78 impingement collections were scheduled between 1 January and 31 December 1992 (Table 2-1). Samples were collected over a 24-hour period on randomly selected days. Randomly selected sample dates were scheduled such that no more than 10 days occurred between samples. Every attempt was made when rescheduling samples to reschedule such that no more than 10 days occurred between samples. Table 2-2 lists the scheduled sampling dates.

In 1992, a total of 78 impingement samples were successfully collected. Impingement samples had to be rescheduled three times during 1992 (Appendix A). All three rescheduled samples were due to maintenance work in the intake/traveling screen area. All three samples were successfully completed on the rescheduled dates.

2.2 SAMPLING PROCEDURE (PERMIT SECTION IV.B.2,3,4,5)

Sample collection was initiated at approximately 1300 hours of the sampling day. At the beginning of the sample collection period, the traveling screens were rotated and washed for approximately five minutes. The collection basket with a 3.2-mm (1/8-in.) stretched mesh liner was then positioned at the end of the sluiceway. (In January 1992, the stretch mesh liner was changed to 3.2-mm [1/8-in.] from the original 9.5-mm [3/8-in.] liner by request of the New York State Department of Environmental Conservation [NYSDEC].) The collection basket remained in place for the duration of the sample period, unless high impingement or debris loads required that it be emptied. For such occasions, it was removed, emptied, and repositioned.

At the end of the 24-hour period, the traveling screens were rotated and washed for approximately five minutes. The impinged organisms were washed into the collection basket; the basket was removed and emptied.

From September through mid-November (10 samples) scheduled impingement samples were collected using alternating operational modes of the traveling screens. Five samples were collected with the traveling screens operating in a continuous wash cycle for the 24-hour duration of the sample. Alternating with these samples were five samples collected with the traveling screens operating in the normal programmed wash cycle (usually once per hour for 15-20 minutes). The data collected was to determine what (if any) variation in size of impinged fish, particularly alewife, would be between the two operating modes. Results of the study showed no difference in the impingement between the two operating modes. Based on the results, NYSDEC determined that no additional monitoring was necessary.

TABLE 2-1 IMPINGEMENT SAMPLING INTENSITY
AS REQUIRED BY THE SPDES PERMIT FOR
NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

Month	Number of Sampling Days Scheduled Per Month*
January	4
February	4
March	4
April	16
May	20
June	4
July	4
August	6
September	4
October	4
November	4
December	4
Total	78

* Days assigned within each month were selected randomly using random numbers tables (Rand Corporation 1955).

TABLE 2-2 IMPINGEMENT SAMPLING DATES FOR NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

Scheduled* Sampling Date	Sampling Results	Scheduled* Sampling Date	Sampling Results	Scheduled* Sampling Date	Sampling Results
03 JAN	C	02 MAY	C	05 AUG	C
13 JAN	C	03 MAY	C	06 AUG	C
21 JAN	C	04 MAY	C	14 AUG	C
29 JAN	C	05 MAY	C	18 AUG	C
		06 MAY	C	19 AUG	C
05 FEB	C	07 MAY	C	28 AUG	C
12 FEB	C	09 MAY	C		
20 FEB	C	10 MAY	C	04 SEP	C
26 FEB	C	11 MAY	C	11 SEP	C
		12 MAY	C	16 SEP	C
04 MAR	C	13 MAY	C	24 SEP	C
11 MAR	C	15 MAY	C		
18 MAR	C	16 MAY	C	02 OCT	C
26 MAR	C	17 MAY	C	11 OCT	C
		18 MAY	C	20 OCT	C
02 APR	C	20 MAY	C	29 OCT	C
03 APR	C	21 MAY	C		
05 APR	C	22 MAY	C	05 NOV	C
07 APR	R*C; Completed 10-11 APR	30 MAY	C	13 NOV	C
08 APR	R*C; Completed 15-16 APR	31 MAY	C	20 NOV	C
09 APR	C			24 NOV	C
10 APR	C	08 JUN	C		
14 APR	C	17 JUN	C	03 DEC	C
15 APR	C	23 JUN	C	11 DEC	C
17 APR	C	29 JUN	C	20 DEC	C
18 APR	C			30 DEC	C
21 APR	C	07 JUL	C		
24 APR	C	15 JUL	C		
25 APR	C	23 JUL	R*C; Completed 28-29 JUL		
27 APR	C	30 JUL	C		
30 APR	C				

* Sample collection date.

NOTE: C = Completed sample.
R*C = Sample rescheduled and completed on a different date within the confines of a random numbers table and any remaining available dates in the month (Appendix A).

Plant operational data were obtained from station records for each sample date to document cooling water flow rates, intake and discharge temperatures, and power production (Appendix B).

A subsampling routine was utilized for occasions when high impingement rates or high debris loads were encountered. The subsampling technique was based on volume, and the total 24-hour catch was estimated using the formula:

$$\textit{Estimated No. of Fish in Total Sample} = \frac{\textit{Volume of Total Sample} \times \textit{No. of Fish in Subsample}}{\textit{Volume of Subsample}}$$

The volume of the total sample was determined by repeatedly filling a volumetrically graduated container, recording the values, and adding them. The total volume was thoroughly mixed by hand or with a shovel and spread out evenly over a flat surface. An aliquot(s) of the total sample was randomly selected and this portion of the sample was removed and measured to determine its volume.

During 1992, subsamples constituted at least 25 percent by volume of the total sample. The fish in the subsample were then processed according to regular laboratory procedures (Section 2.3).

2.3 LABORATORY PROCESSING (PERMIT SECTION IV.B.4)

After the impingement sample was collected, it was returned to the laboratory and organisms were sorted, identified, and enumerated. Identification was made to the lowest possible taxonomic level, which was usually species. For the convenience of the reader, common names are used in the text; however, a list of common and their associated scientific names are included in Appendix C.

Specimens (to a maximum of 25 individuals) of the following species were analyzed for length and weight: white perch, alewife, rainbow smelt, smallmouth bass, yellow perch, and each species of salmonid collected. Any other species present in the collections were enumerated and weighed to obtain a total count and total weight for each species (or lowest taxonomic level).

Total lengths were measured to the nearest millimeter. For the purposes of this report, 100 millimeters was used as a determinant of size class differentiation between young of the year (YOY) and adults based on size range information in Scott and Crossman (1973). Weights were measured to the nearest 0.1 gram for specimens less than 10 grams, to the nearest 1.0 gram for specimens between 10 and 2,000 grams, and to the nearest 25 grams for specimens over 2,000 grams based on the precision of the scales used for measurement.

When possible, measurements were recorded with greater accuracy than required (e.g., to the nearest 0.1 gram for specimens between 10 and 2,000 grams) if the scales would allow. Any unusual conditions, abnormalities, or presence of fish tags were noted on the data sheets.

2.4 WATER QUALITY DETERMINATIONS (PERMIT SECTION IV.B.5)

Intake and discharge temperatures were recorded from the station operating conditions presented in Appendix B.

2.5 DATA PRESENTATION (PERMIT SECTION IV.C)

Data are presented according to the requirements set forth in the SPDES permit:

a. Monthly and annual total of impingement by species and grand total of all species.

b. Monthly "mean" is equal to the total number of fish impinged by species on all sampling days in a given month divided by the total volume of water pumped on sampling days.

c. Total estimated impingement for each month was calculated using the following formula:

$$d = \frac{c}{v*} (x)$$

where

d = Total estimated impingement
c = Number of fish collected during the period
v* = Volume of cooling water used during the period
* = Based on main circulating water pump(s) operating regime
x = Total monthly volume of cooling water used.

The annual impingement estimate was then calculated by adding the 12 monthly impingement estimates.

d. Additional tables were calculated for mean daily impingement rate (total number of fishes impinged [by species] on all sampling days in a month divided by the total number of sampling days) and a monthly estimated impingement based on rate (mean daily impingement rate multiplied by the total number of days in a particular month) and are available for comparison of data presentation methods.

e. Monthly and annual total biomass (grams) by species and grand totals of all species.

f. Total estimated biomass (adjusted for flow) was calculated in the same manner as estimated impingement.

3. RESULTS AND DISCUSSION

3.1 IMPINGEMENT ABUNDANCE AND COMPOSITION (PERMIT SECTION IV.C.3)

In 1992, the seasonal variation in species diversity and abundance seen at NMP Unit 1 during the course of impingement sampling was evident but reduced due at least in part to station outages. Outages at NMP Unit 1 occurred over two extended periods in 1992: 16 February - 1 April and 2 May - 4 August. Both main circulating water pumps were usually shut off during both outages though for brief periods a main circulating water pump was turned on. During the outages, water through the intake was diminished as a direct result of the shut down of the main circulating water pump(s). Several other outages of brief duration occurred during 1992.

Preliminary results of U.S. Fish and Wildlife Service (USFWS) 1992 forage fish assessment data for Lake Ontario reported a record low biomass of both adult alewife and rainbow smelt (O'Gorman et al. 1993). Reductions in phosphorus levels (approximately 25 percent) and zooplankton, salmonid predation, poor survival of yearling alewife, and cannibalistic yearling rainbow smelt are all apparent contributing factors to the decline in forage fish (Lange and Smith 1992). It is difficult to evaluate the influence the biomass reductions may demonstrate on the 1992 impingement data; particularly in a year of extended outages. However, this information should be taken into consideration when interpreting the impingement data.

In addition to the outages and changes in Lake Ontario's trophic structure, seasonal, behavioral, and meteorological factors also played a role in influencing the collection of impinged organisms in 1992.

Historically, impingement abundance at NMP Unit 1 increases in the spring, corresponding to the migration of alewife and rainbow smelt inshore. Impingement abundance then decreases for the summer months as adult fish complete spawning and move offshore. During this time, larval and juvenile fishes have not attained a size susceptible to the impingement process. They generally reach an impingeable size in the late summer and autumn when impingement abundance increases sporadically, primarily due to the frequency of storm conditions and the inability of YOY to avoid the intake structure during storms.

The collections of impinged fish at NMP Unit 1 for 1992 followed the historical seasonal pattern: April and May impingement collections increased in volume as fish came inshore to spawn followed by a decrease through late spring and summer (Table 3-1). Impingement increased slightly in September and October as a result of storm conditions coinciding with the presence of fish near shore. Samples collected in January 1992 also reflect winter storm conditions and the presence of YOY near shore. The largest fish impingement collections occurred in January (864), April (7,531), May (2,910), and September (965) accounting for 82 percent of the total 1992 fish collection.

TABLE 3-1 ACTUAL MONTHLY IMPINGEMENT COLLECTIONS, NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

	JAN	FEB	MAR	APR	MAY		JUN		JUL		AUG	SEP	OCT	NOV	DEC	Annual Total
No. of Samples	4	4	4	16	20		4		4		6	4	4	4	4	78
					a	b	a	b	a	b						
SPECIES																
Alewife	—	—	—	5,485	2,458	236	165	—	198	—	199	928	567	16	3	10,255
Rainbow smelt	636	142	3	1,337	111	—	—	—	—	—	21	—	3	14	25	2,292
Threespine stickleback	36	48	3	385	8	—	1	—	5	—	—	—	—	—	—	486
Spottail shiner	4	—	—	118	5	—	4	—	92	—	213	2	3	4	4	449
Sculpins	15	50	—	39	28	1	2	—	19	—	42	3	15	44	14	272
Gizzard shad	161	24	—	24	—	—	—	—	—	—	—	—	17	—	10	236
Trout-perch	—	1	—	31	33	1	1	—	53	—	47	—	—	7	4	178
Yellow perch	—	1	—	24	—	—	—	1	4	—	15	4	1	90	—	140
White perch	7	3	—	42	3	—	—	—	—	—	—	—	—	8	—	63
Stonecat	—	3	—	7	12	1	—	—	—	—	3	3	7	4	2	42
Tessellated darter	—	—	—	1	4	1	4	—	2	—	14	3	2	3	1	35
White sucker	—	—	—	—	—	—	1	—	—	—	6	21	—	2	1	31
Smallmouth bass	—	6	—	2	2	—	—	—	1	—	5	1	—	—	1	18
Rock bass	1	3	1	—	—	—	—	—	2	—	1	—	—	3	2	13
Central mudminnow	—	—	—	12	—	—	—	—	—	—	—	—	—	—	—	12
Emerald shiner	—	—	—	1	—	—	—	—	—	—	11	—	—	—	—	12
American eel	—	—	1	3	2	2	—	—	—	—	—	—	—	1	2	11
White bass	4	—	—	4	—	—	—	—	—	—	—	—	—	—	—	8

a. Collected when a minimum of one main circulating water pump was operating.
b. Collected when no main circulating water pumps were operating; service water only.

NOTE: Dashes (—) indicate no catches made.

TABLE 3-1 (Continued)

	JAN	FEB	MAR	APR	MAY		JUN		JUL		AUG	SEP	OCT	NOV	DEC	Annual Total
					a	b	a	b	a	b						
Freshwater drum	—	1	—	3	—	—	—	—	—	—	—	—	—	—	2	6
Brook stickleback	—	—	—	6	—	—	—	—	—	—	—	—	—	—	—	6
Carp	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	5
Pumpkinseed	—	—	—	3	—	—	—	—	1	—	—	—	—	—	—	4
Bluegill	—	—	—	1	—	—	—	—	1	—	1	—	—	—	—	3
Walleye	—	—	—	—	1	—	—	—	—	—	1	—	—	1	—	3
Lake trout	—	—	—	1	—	—	—	—	—	—	—	—	—	1	—	2
Bluntnose minnow	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	2
Brown trout	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Lake herring (Cisco)	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1
Longnose dace	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1
Brown bullhead	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1
Subtotal	864	283	8	7,531	2,668	242	178	1	378	0	586	965	615	198	71	14,588
Other Species																
Crayfish	2	4	—	11	2	—	—	—	2	1	1	—	1	11	—	35
Clam (non-corbicula)	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1
Fish Fragments																
Crayfish	2	—	—	—	—	1	—	—	—	—	2	—	1	1	1	8
Rainbow smelt	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	2
Spottail shiner	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Alewife	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	1
TOTAL	869	287	8	7,542	2,670	244	178	1	382	1	589	965	617	211	72	14,636

Alewife and rainbow smelt continued to dominate the impingement collections as in most previous years, accounting for 86 percent of the annual fish impingement totals. Threespine stickleback (486) and spottail shiner (449) were third and fourth in abundance. Together with alewife and rainbow smelt, they resulted in 92 percent of the annual fish impingement. All representative important species (RIS) combined (alewife, rainbow smelt, yellow perch, smallmouth bass, white perch, and salmonids [lake trout and brown trout]) equaled 12,771 individuals and 88 percent of the annual impingement total. Daily impingement sample results for 1992 are presented in Appendix D.

Fish species diversity occurred in accordance with seasonal abundances and/or behavioral influences. The highest diversity occurred in April (23 species), May (13 species), August (16 species), November (14 species), and December (13 species). The high species diversities in April and May correspond to the inshore movements of many fish species toward their spawning grounds. The increase in diversity in August was due to the influence of storm conditions on young fish that remain in nearshore areas and the return of NMP Unit 1 to service with a corresponding increase in flow thorough the intake. November and December were influenced by storm conditions which can affect the diversity as well as the abundance of fish collected during the impingement sample process.

Lowest fish species diversity occurred in March (4 species); outage conditions in March are reflected in the number of species collected during the month. The number of species collected in the remaining months varied from 8 to 12 species per month with 8 being the most common.

No single species was collected in all 12 months of 1992. Alewife and rainbow smelt were collected in 9 months of the year. Alewife dominated the impingement collections in 8 of those months. Rainbow smelt dominated the impingement collections made in January and February; months when alewife were entirely absent from the samples. Yellow perch and smallmouth bass, both RIS, were collected in 8 and 7 months, respectively, and are considered relatively common in the collections. White perch, another RIS, were collected in 5 months of 1992. Non-RIS found commonly in the impingement and in relative abundance include stonecat, sculpins, spottail shiner, threespine stickleback, and trout-perch. These species were found in most seasons of 1992.

In previous years, high rates of impingement occurred at NMP Unit 1 when strong winds from the west or northwest resulted in heavy wave action. Lifton and Storr (1977) statistically correlated wave height, water temperature, and wind with impingement at power plants on Lake Erie and Lake Ontario. Wave height was found to be the most significant factor contributing to the correlation. They hypothesized that wave-induced turbulence and possibly turbidity interfere with a fish's normal ability to detect and avoid an intake structure, resulting in a higher rate of impingement. YOY of most species of fish appear to be most susceptible to meteorological influences (Lifton and Storr 1977). In 1992, several occasions occurred when storm conditions influenced the impingement abundances at NMP Unit 1. Storm conditions occurred during samples collected in January, February, July,

September, and October. Storms in January, February, September, and October affected the abundance of YOY fish in impingement. A storm that occurred in July influenced the abundance of adult fish (mostly alewife) in the sample collections. Adult fish had migrated to nearshore areas to spawn. Storm conditions most often affect fish in the nearshore areas. Several examples of winter and spring storm conditions are discussed further:

- An impingement sample collected over the 24-hour period of 20-21 January resulted in the collection of 61 percent of the monthly impingement total. The sample also contained 53 percent of the month's collection of rainbow smelt. Winds were from the west to northwest at 15-20 knots for the period with rough water.

- In July, an impingement sample collected from 28-29 July contained 88 percent of the month's impingement total (with both main circulating water pumps operating). Winds were from the southwest through northwest from 15 to 25 knots during the sample. Waves were 5-7 ft. (1.8-2.5-m.). The sample resulted in the collection of 90 percent of the adult alewife for the month.

- In September, a 24-hour sample collected from 23 to 24 September during 15- to 25-knot north-northwest winds and 6- to 8-ft waves resulted in the collection of 97 percent of the monthly impingement totals and nearly 100 percent of the September total for alewife. All of the alewife collected were YOY.

- In October, a sample collected over the 24-hour period of 10-11 October contained 77 percent of the monthly total for impingement and 83 percent of the total for alewife YOY. Winds were southwest at 15-25 knots; waves increased to 3-5 ft.

Rates of impingement were calculated using two different methods. The mean daily impingement rate (Table 3-2) is defined as the average number of fish collected per day per month and is included for comparison. The mean daily impingement rate based on flow (Table 3-3) is defined as the total number of fish impinged on sample days in the month divided by the volume of water pumped in million cubic meters (MCM) during those days. Each table defines the rate per species per month and the total impingement rate for the month. Rates of impingement whether calculated over time (Table 3-2) or volume (Table 3-3) generally demonstrate the same trends as the actual impingement (Table 3-1). In the spring, rates peak as fish migrate inshore then decrease through the summer. In autumn, the rates of impingement increase in response to the occasional influx of YOY during storms. From February to August, due to the station outages, pump operation (i.e., flow) was often diminished. Impingement rates per MCM are presented for the time when at least one main circulating water pump was operating (Table 3-3, "a" columns) and for the time when only service water pumps were operating (Table 3-3, "b" columns). Actual volumes of water pumped are listed at the top of the columns. Pump operating regimes are recorded in Appendix B. For months when the circulating water pump(s) were operated a portion of

TABLE 3-2 MEAN DAILY IMPINGEMENT RATE* BY SPECIES AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total
No. of Samples	4	4	4	16	20	4	4	6	4	4	4	4	78
SPECIES													
Alewife	—	—	—	342.81	134.70	41.25	49.50	33.17	232.00	141.75	4.00	0.75	131.47
Rainbow smelt	159.00	35.50	0.75	83.56	5.55	—	—	3.50	—	0.75	3.50	6.25	29.38
Threespine stickleback	9.00	12.00	0.75	24.06	0.40	0.25	1.25	—	—	—	—	—	6.23
Spottail shiner	1.00	—	—	7.38	0.25	1.00	23.00	35.50	0.50	0.75	1.00	1.00	5.76
Sculpins	3.75	12.50	—	2.44	1.45	0.50	4.75	7.00	0.75	3.75	11.00	3.50	3.49
Gizzard shad	40.25	6.00	—	1.50	—	—	—	—	—	4.25	—	2.50	3.03
Trout-perch	—	0.25	—	1.94	1.70	0.25	13.25	7.83	—	—	1.75	1.00	2.28
Yellow perch	—	0.25	—	1.50	—	0.25	1.00	2.50	1.00	0.25	22.50	—	1.79
White perch	1.75	0.75	—	2.62	0.15	—	—	—	—	—	2.00	—	0.81
Stonecat	—	0.75	—	0.44	0.65	—	—	0.50	0.75	1.75	1.00	0.50	0.54
Tessellated darter	—	—	—	0.06	0.25	1.00	0.50	2.33	0.75	0.50	0.75	0.25	0.45
White sucker	—	—	—	—	—	0.25	—	1.00	5.25	—	0.50	0.25	0.40
Smallmouth bass	—	1.50	—	0.12	0.10	—	0.25	0.83	0.25	—	—	0.25	0.23
Rock bass	0.25	0.75	0.25	—	—	—	0.50	0.17	—	—	0.75	0.50	0.17
Central mudminnow	—	—	—	0.75	—	—	—	—	—	—	—	—	0.15
Emerald shiner	—	—	—	0.06	—	—	—	1.83	—	—	—	—	0.15
American eel	—	—	0.25	0.19	0.20	—	—	—	—	—	0.25	0.50	0.14

* Rate = Average number of fish impinged per day.

NOTE: Dashes (—) indicate no catches made.

TABLE 3-2 (Continued)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total
White bass	1.00	---	---	0.25	---	---	---	---	---	---	---	---	0.10
Freshwater drum	---	0.25	---	0.19	---	---	---	---	---	---	---	0.50	0.08
Brook stickleback	---	---	---	0.38	---	---	---	---	---	---	---	---	0.08
Carp	---	---	---	---	---	---	---	0.83	---	---	---	---	0.06
Pumpkinseed	---	---	---	0.19	---	---	0.25	---	---	---	---	---	0.05
Bluegill	---	---	---	0.06	---	---	0.25	0.17	---	---	---	---	0.04
Walleye	---	---	---	---	0.05	---	---	0.17	---	---	0.25	---	0.04
Lake trout	---	---	---	0.06	---	---	---	---	---	---	0.25	---	0.03
Bluntnose minnow	---	---	---	---	---	---	---	0.33	---	---	---	---	0.03
Brown trout	---	0.25	---	---	---	---	---	---	---	---	---	---	0.01
Lake herring (Cisco)	---	---	---	0.06	---	---	---	---	---	---	---	---	0.01
Longnose dace	---	---	---	0.06	---	---	---	---	---	---	---	---	0.01
Brown bullhead	---	---	---	---	0.05	---	---	---	---	---	---	---	0.01
Subtotal	216.00	70.75	2.00	470.68	145.50	44.75	94.50	97.66	241.25	153.75	49.50	17.75	187.03
Other Species													
Crayfish	0.50	1.00	---	0.69	0.10	---	0.75	0.17	---	0.25	2.75	---	0.45
Clam (non-corbicula)	0.25	---	---	---	---	---	---	---	---	---	---	---	0.01
Fish Fragments													
Crayfish	0.50	---	---	---	0.05	---	---	0.33	---	0.25	0.25	0.25	0.10
Rainbow smelt	---	---	---	---	---	---	0.50	---	---	---	---	---	0.03
Spottail shiner	---	---	---	---	0.05	---	---	---	---	---	---	---	0.01
Alewife	---	---	---	---	---	---	---	---	---	---	0.25	---	0.01
TOTAL	217.25	71.75	2.00	471.37	145.70	44.75	95.75	98.16	241.25	154.25	52.75	18.00	187.64

TABLE 5-3 MONTHLY IMPINGEMENT RATE* (BASED ON FLOW) AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

	JAN	FEB	MAR	APR	MAY		JUN		JUL		AUG	SEP	OCT	NOV	DEC	Annual Total
No. of Samples	4	4	4	16	20		4		4		6	4	4	4	4	78
Sample Volume (MCM)	5.586	3.836	1.539	20.893	9.441	0.557	1.222	0.130	2.965	0.173	9.241	6.149	5.959	5.789	5.801	79.281
					a	b	a	b	a	b						
SPECIES																
Alewife	—	—	—	262.528	260.354	423.698	135.025	—	66.779	—	21.534	150.919	95.150	2.764	0.517	N/A
Rainbow smelt	113.856	37.018	1.949	63.993	11.757	—	—	—	—	—	2.272	—	0.503	2.418	4.310	N/A
Threespine stickleback	6.445	12.513	1.949	18.427	0.847	—	0.818	—	1.686	—	—	—	—	—	—	N/A
Spottail shiner	0.716	—	—	5.648	0.530	—	3.273	—	31.029	—	23.049	0.325	0.503	0.691	0.690	N/A
Sculpins	2.685	13.034	—	1.867	2.966	1.795	1.637	—	6.408	—	4.545	0.488	2.517	7.601	2.413	N/A
Gizzard shad	28.822	6.257	—	1.149	—	—	—	—	—	—	—	—	2.853	—	1.724	N/A
Trout-perch	—	0.261	—	1.484	3.495	1.795	0.818	—	17.875	—	5.086	—	—	1.209	0.690	N/A
Yellow perch	—	0.261	—	1.149	—	—	—	7.692	1.349	—	1.623	0.651	0.168	15.547	—	N/A
White perch	1.253	0.782	—	2.010	0.318	—	—	—	—	—	—	—	—	1.382	—	N/A
Stonecat	—	0.782	—	0.335	1.271	1.795	—	—	—	—	0.325	0.488	1.175	0.691	0.345	N/A
Tessellated darter	—	—	—	0.048	0.424	1.795	3.273	—	0.675	—	1.515	0.488	0.336	0.518	0.172	N/A
White sucker	—	—	—	—	—	—	0.818	—	—	—	0.649	3.415	—	0.345	0.172	N/A
Smallmouth bass	—	1.564	—	0.096	0.212	—	—	—	0.337	—	0.541	0.163	—	—	0.172	N/A
Rock bass	0.179	0.782	0.650	—	—	—	—	—	0.675	—	0.108	—	—	0.518	0.345	N/A
Central mudminnow	—	—	—	0.574	—	—	—	—	—	—	—	—	—	—	—	N/A
Emerald shiner	—	—	—	0.048	—	—	—	—	—	—	1.190	—	—	—	—	N/A
American eel	—	—	0.650	0.144	0.212	3.591	—	—	—	—	—	—	—	0.173	0.345	N/A

* Rate = Average number of fish impinged per day by volume.

a. Collected when a minimum of one main circulating water pump was operating.
b. Collected when no main circulating water pumps were operating; service water only.

NOTE: Dashes (—) indicate no catches made; MCM = million cubic meters.

TABLE 3-3 (Continued)

	JAN	FEB	MAR	APR	MAY		JUN		JUL		AUG	SEP	OCT	NOV	DEC	Annual Total
					a	b	a	b	a	b						
White bass	0.716	—	—	0.191	—	—	—	—	—	—	—	—	—	—	—	N/A
Freshwater drum	—	0.261	—	0.144	—	—	—	—	—	—	—	—	—	—	0.345	N/A
Brook stickleback	—	—	—	0.287	—	—	—	—	—	—	—	—	—	—	—	N/A
Carp	—	—	—	—	—	—	—	—	—	—	0.541	—	—	—	—	N/A
Pumpkinseed	—	—	—	0.144	—	—	—	—	0.337	—	—	—	—	—	—	N/A
Bluegill	—	—	—	0.048	—	—	—	—	0.337	—	0.108	—	—	—	—	N/A
Walleye	—	—	—	—	0.106	—	—	—	—	—	0.108	—	—	0.173	—	N/A
Lake trout	—	—	—	0.048	—	—	—	—	—	—	—	—	—	0.173	—	N/A
Bluntnose minnow	—	—	—	—	—	—	—	—	—	—	0.216	—	—	—	—	N/A
Brown trout	—	0.261	—	—	—	—	—	—	—	—	—	—	—	—	—	N/A
Lake herring (Cisco)	—	—	—	0.048	—	—	—	—	—	—	—	—	—	—	—	N/A
Longnose dace	—	—	—	0.048	—	—	—	—	—	—	—	—	—	—	—	N/A
Brown bullhead	—	—	—	—	0.106	—	—	—	—	—	—	—	—	—	—	N/A
Subtotal	154.672	73.776	5.198	360.458	282.598	434.469	145.662	7.692	127.487	0.000	63.410	156.937	103.205	34.203	12.240	N/A
Other Species																
Crayfish	0.358	1.043	—	0.526	0.212	—	—	—	0.675	5.780	0.108	—	0.168	1.900	—	N/A
Clam (non-corbicula)	0.179	—	—	—	—	—	—	—	—	—	—	—	—	—	—	N/A
Fish Fragments																
Crayfish	0.358	—	—	—	—	1.795	—	—	—	—	0.216	—	0.168	0.173	0.172	N/A
Rainbow smelt	—	—	—	—	—	—	—	—	0.675	—	—	—	—	—	—	N/A
Spottail shiner	—	—	—	—	—	1.795	—	—	—	—	—	—	—	—	—	N/A
Alewife	—	—	—	—	—	—	—	—	—	—	—	—	—	0.173	—	N/A
TOTAL	155.567	74.819	5.198	360.984	282.810	438.059	145.662	7.692	128.837	5.780	63.734	156.937	103.541	36.449	12.412	N/A

the time, the impingement rate per volume was higher when the pumps were operating than when only the service water pumps were running (May, June, and July). The mean daily impingement rate determined by volume (Table 3-3) was highest in April (361 fish/MCM), and May (721 fish/MCM). These impingement rates are reflective of adult spawning movements, predominantly by alewife. A slight increase in the rate of impingement was seen in January (156 fish /MCM), September (157 fish/MCM), and October (105 fish/MCM), reflective of the influx of YOY during storm conditions.

The lowest rates of impingement occurred in March (5 fish/MCM) and December (12 fish/MCM). In March, the station was off line with only one main circulating water pump operating. December's weather was relatively absent of storms, reducing meteorological influences on the fish impingement.

The collection of a particular species on a seasonal basis is also reflected in the daily rate of impingement. The rates of impingement for April, May, and June are a direct result of alewife movements inshore. Rainbow smelt also increased in the impingement in April and May as the result of inshore spawning movements. Several species, including spottail shiner, threespine stickleback, and white perch also increased the impingement rate in April and May in response to spawning behavior. Seasonal meteorological events, particularly winter storms, influenced the daily rate of impingement as already discussed for Table 3-1. The effects of storm conditions are particularly evident on the collection of several RIS during 1992: alewife (September and October), white perch (January and November), and yellow perch (April and November). Non-RIS influenced by winter storms include gizzard shad (January) and threespine stickleback (January and February). Compared to the daily rate of impingement (Table 3-2) for these months, the rate by volume appeared higher due to the pump operational regime. In general, the monthly impingement rates based on flow volume should reflect the collection of fish at times of seasonal abundance and/or under storm conditions seen in Table 3-1.

Calculations of the estimated number of organisms impinged at NMP Unit 1 during 1992 were based on the mean daily impingement rate (Table 3-4) and on the rate of impingement adjusted for flow (Table 3-5). Estimates are similar for both methods of data expression. Estimates of impingement based on daily average rate (Table 3-4) are given for comparison. Based on volume, the estimated number of fish impinged was 46,215 (excluding fragments and invertebrates). Of those, 28,099 were estimated to be alewife equaling 61 percent of the annual total. The number of rainbow smelt estimated impinged in 1992 was 9,016 (20 percent of the total). The RIS fish were estimated impinged in the following numbers: white perch - 218, yellow perch - 868, smallmouth bass - 97, lake trout - 10, brown trout - 7. All RIS fish combined (38,315) comprised 83 percent of the annual estimated fish impingement. Overall, in 1992, the estimated impingement generally followed the seasonal and meteorological patterns previously discussed.

TABLE 3-4 ESTIMATED* MONTHLY IMPINGEMENT (BASED ON DAILY AVERAGE RATE) AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total
No. of Samples	4	4	4	16	20	4	4	6	4	4	4	4	78
SPECIES													
Alewife	---	---	---	10,284	4,176	1,238	1,534	1,028	6,960	4,394	120	23	29,757
Rainbow smelt	4,929	1,030	23	2,507	172	---	---	108	---	23	105	194	9,091
Threespine stickleback	279	348	23	722	12	8	39	---	---	---	---	---	1,431
Spottail shiner	31	---	---	221	8	30	713	1,100	15	23	30	31	2,202
Sculpins	116	362	---	73	45	15	147	217	23	116	330	108	1,552
Gizzard shad	1,248	174	---	45	---	---	---	---	---	132	---	78	1,677
Trout-perch	---	7	---	58	53	8	411	243	---	---	52	31	863
Yellow perch	---	7	---	45	---	8	31	78	30	8	675	---	882
White perch	54	22	---	79	5	---	---	---	---	---	60	---	220
Stonecat	---	22	---	13	20	---	---	16	23	54	30	16	194
Tessellated darter	---	---	---	2	8	30	16	72	23	16	22	8	197
White sucker	---	---	---	---	---	8	---	31	158	---	15	8	220
Smallmouth bass	---	44	---	4	3	---	8	26	8	---	---	8	101
Rock bass	8	22	8	---	---	---	16	5	---	---	22	16	97
Central mudminnow	---	---	---	22	---	---	---	---	---	---	---	---	22
Emerald shiner	---	---	---	2	---	---	---	57	---	---	---	---	59
American eel	---	---	8	6	6	---	---	---	---	---	8	16	44
White bass	31	---	---	8	---	---	---	---	---	---	---	---	39

* Estimate = Number of fish impinged per month.

NOTE: Dashes (---) indicate no catches made.

TABLE 3-4 (Continued)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total
Freshwater drum	---	7	---	6	---	---	---	---	---	---	---	16	29
Brook stickleback	---	---	---	11	---	---	---	---	---	---	---	---	11
Carp	---	---	---	---	---	---	---	26	---	---	---	---	26
Pumpkinseed	---	---	---	6	---	---	8	---	---	---	---	---	14
Bluegill	---	---	---	2	---	---	8	5	---	---	---	---	15
Walleye	---	---	---	---	2	---	---	5	---	---	8	---	15
Lake trout	---	---	---	2	---	---	---	---	---	---	8	---	10
Bluntnose minnow	---	---	---	---	---	---	---	10	---	---	---	---	10
Brown trout	---	7	---	---	---	---	---	---	---	---	---	---	7
Lake herring (Cisco)	---	---	---	2	---	---	---	---	---	---	---	---	2
Longnose dace	---	---	---	2	---	---	---	---	---	---	---	---	2
Brown bullhead	---	---	---	---	2	---	---	---	---	---	---	---	2
Subtotal	6,696	2,052	62	14,122	4,512	1,345	2,931	3,027	7,240	4,766	1,485	553	48,791
Other Species													
Crayfish	16	29	---	21	3	---	23	5	---	8	82	---	187
Clam (non-corbicula)	8	---	---	---	---	---	---	---	---	---	---	---	8
Fish Fragments													
Crayfish	16	---	---	---	2	---	---	10	---	8	8	8	52
Rainbow smelt	---	---	---	---	---	---	16	---	---	---	---	---	16
Spottail shiner	---	---	---	---	2	---	---	---	---	---	---	---	2
Alewife	---	---	---	---	---	---	---	---	---	---	8	---	8
TOTAL	6,736	2,081	62	14,143	4,519	1,345	2,970	3,042	7,240	4,782	1,583	561	49,064

TABLE 3-5 ESTIMATED* MONTHLY IMPINGEMENT (BASED ON FLOW) AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

	JAN	FEB	MAR	APR	MAY		JUN		JUL		AUG	SEP	OCT	NOV	DEC	Annual Total
No. of Samples	4	4	4	16	20		4		4		6	4	4	4	4	78
Total Sample Volume (MCM)	5.586	3.836	1.539	20.893	9.441	0.557	1.222	0.130	2.965	0.173	9.241	6.149	5.959	5.789	5.801	79.281
Total Monthly Volume (MCM)	42.431	28.727	12.513	39.494	11.965	0.771	7.810	1.258	9.735	2.039	47.582	46.246	46.623	43.608	45.050	385.852
					a	b	a	b	a	b						
SPECIES																
Alewife	—	—	—	10,368	3,115	327	1,055	—	650	—	1,025	6,979	4,436	121	23	28,099
Rainbow smelt	4,831	1,063	24	2,527	141	—	—	—	—	—	108	—	23	105	194	9,016
Threespine stickleback	273	359	24	728	10	—	6	—	16	—	—	—	—	—	—	1,416
Spottail shiner	30	—	—	223	6	—	26	—	302	—	1,097	15	23	30	31	1,783
Sculpins	114	374	—	74	35	1	13	—	62	—	216	23	117	331	109	1,469
Gizzard shad	1,223	180	—	45	—	—	—	—	—	—	—	—	133	—	78	1,659
Trout-perch	—	7	—	59	42	1	6	—	174	—	242	—	—	53	31	615
Yellow perch	—	7	—	45	—	—	—	10	13	—	77	30	8	678	—	868
White perch	53	22	—	79	4	—	—	—	—	—	—	—	—	60	—	218
Stonecat	—	22	—	13	15	1	—	—	—	—	15	23	55	30	16	190
Tessellated darter	—	—	—	2	5	1	26	—	7	—	72	23	16	23	8	183
White sucker	—	—	—	—	—	—	6	—	—	—	31	158	—	15	8	218
Smallmouth bass	—	45	—	4	3	—	—	—	3	—	26	8	—	—	8	97
Rock bass	8	22	8	—	—	—	—	—	7	—	5	—	—	23	16	89
Central mudminnow	—	—	—	23	—	—	—	—	—	—	—	—	—	—	—	23
Emerald shiner	—	—	—	2	—	—	—	—	—	—	57	—	—	—	—	59
American eel	—	—	8	6	3	3	—	—	—	—	—	—	—	8	16	44

* Estimate = Number of fish per million cubic meters (MCM) of water pumped per month.

a. Collected when a minimum of one main circulating water pump was operating.
b. Collected when no main circulating water pumps were operating; service water only.

NOTE: Dashes (—) indicate no catches made.

TABLE 3-5 (Continued)

	JAN	FEB	MAR	APR	MAY		JUN		JUL		AUG	SEP	OCT	NOV	DEC	Annual Total
					a	b	a	b	a	b						
White bass	30	—	—	8	—	—	—	—	—	—	—	—	—	—	—	38
Freshwater drum	—	7	—	6	—	—	—	—	—	—	—	—	—	—	16	29
Brook stickleback	—	—	—	11	—	—	—	—	—	—	—	—	—	—	—	11
Carp	—	—	—	—	—	—	—	—	—	—	26	—	—	—	—	26
Pumpkinseed	—	—	—	6	—	—	—	—	3	—	—	—	—	—	—	9
Bluegill	—	—	—	2	—	—	—	—	3	—	5	—	—	—	—	10
Walleye	—	—	—	—	1	—	—	—	—	—	5	—	—	8	—	14
Lake trout	—	—	—	2	—	—	—	—	—	—	—	—	—	8	—	10
Bluntnose minnow	—	—	—	—	—	—	—	—	—	—	10	—	—	—	—	10
Brown trout	—	7	—	—	—	—	—	—	—	—	—	—	—	—	—	7
Lake herring (Cisco)	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	2
Longnose dace	—	—	—	2	—	—	—	—	—	—	—	—	—	—	—	2
Brown bullhead	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	1
Subtotal	6,562	2,115	64	14,237	3,381	334	1,138	10	1,240	0	3,017	7,259	4,811	1,493	554	46,215
Other Species																
Crayfish	15	30	—	21	3	—	—	—	7	12	5	—	8	83	—	184
Clam (non-corbicula)	8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8
Fish Fragments																
Crayfish	15	—	—	—	—	1	—	—	—	—	10	—	8	8	8	50
Rainbow smelt	—	—	—	—	—	—	—	—	7	—	—	—	—	—	—	7
Spottail shiner	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Alewife	—	—	—	—	—	—	—	—	—	—	—	—	—	8	—	8
TOTAL	6,600	2,145	64	14,258	3,384	336	1,138	10	1,254	12	3,032	7,259	4,827	1,592	562	46,473

3.2 LENGTH DISTRIBUTIONS (PERMIT SECTION IV.B.4)

Length-frequency distributions are determined in Tables 3-6a through 3-6f for the following species: alewife, rainbow smelt, white perch, yellow perch, smallmouth bass, and the salmonids (lake trout and brown trout). Length frequency for species such as alewife and rainbow smelt which are collected throughout the year generally follow a seasonal pattern. Adults and subadults (>100 mm; >4 in.) of both species are most often collected during spring months when spawning migrations move adult fish into inshore waters. Late summer and fall collections are primarily composed of YOY (<100 mm; <4 in.) which are found in shallow inshore nursery areas. (Scott and Crossman [1973] note the late summer length attained by alewife as 51-75 mm [2-3 in.] and that of rainbow smelt as 51 mm [2 in.].) At times during the year, YOY of both species were collected damaged to an extent that made it impossible to accurately obtain length measurements on individual fish (i.e., August, September, and October). (During the fall season, some of these fish may have originated from the service water strainers and may not have been collected directly from impingement.)

In 1992, collections of alewife followed the seasonal length distribution pattern as described (Table 3-6a). Alewife collected from March through July were adult and subadult fish. From August through December, most alewife collected were YOY. Alewife measured from samples collected in 1992 were comprised of 89 percent adults and subadults and 21 percent YOY. The minimum length measured was 4.0 cm (1.6 in.); the maximum length recorded was 19.8 cm (7.9 in.).

Rainbow smelt collections in 1992 (Table 3-6b) were dominated by adults and subadults in January, February, April, and May. The 1991 year class rainbow smelt were collected from January through May; YOY (1992 year class) were collected sporadically from August through December. Overall, YOY rainbow smelt comprised 25 percent of the smelt measured. The minimum length recorded was 3.9 cm (1.5 in.); the maximum length recorded was 20.7 cm (8.2 in.).

White perch (Table 3-6c) measured from the 1992 impingement samples were predominantly YOY (77 percent). Fifty percent of the yearlings measured were collected in April; 63 percent (19 individuals) of those were found in a storm-influenced sample. Adult white perch were collected as individuals and were collected only in April and May. The minimum length measured for white perch was 6.2 cm (2.4 in.); the maximum length recorded was 31.8 cm (12.5 in.).

Yellow perch (Table 3-6d) were collected sporadically throughout 1992. One storm-influenced impingement in April resulted in the collection of 13 yearlings. The yellow perch measured during impingement collections at NMP Unit 1 were comprised of 45 percent YOY and 55 percent adults/subadults. The minimum length measured was 5.4 cm (2.1 in.); the maximum length was 29.0 cm (11.4 in.) Yellow perch appear to have had a successful spawning in 1992 as evidenced by the increased number of YOY in the impingement samples. Preliminary assessment data on yellow perch captured by USFWS trawls during 1992 also indicate a successful 1992 spawing (O'Gorman 1993).

TABLE 3-6a LENGTH DISTRIBUTION OF SELECT SPECIES OF SPECIAL INTEREST IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

ALEWIFE													
Length Interval (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
3.0 - 4.9	0	0	0	0	0	0	0	0	7	5	0	0	12
5.0 - 6.9	0	0	0	14	0	0	0	3	19	36	6	3	81
7.0 - 8.9	0	0	0	36	12	0	0	2	0	10	2	0	62
9.0 - 10.9	0	0	0	12	24	7	2	3	0	0	1	0	49
11.0 - 12.9	0	0	0	7	10	2	0	2	0	0	0	0	21
13.0 - 14.9	0	0	0	19	43	10	4	17	0	0	0	0	93
15.0 - 16.9	0	0	0	221	210	28	38	26	2	0	1	0	526
17.0 - 18.9	0	0	0	71	41	2	1	2	0	0	1	0	118
19.0 - 20.9	0	0	0	4	1	1	0	1	0	0	0	0	7
Total Measured	0	0	0	384	341	50	45	56	28	51	11	3	969
Mean Length	0.0	0.0	0.0	14.8	15.0	13.8	14.6	14.2	5.9	6.2	8.6	6.4	14.0
Length (Minimum)	0.0	0.0	0.0	6.0	7.0	8.2	9.0	5.0	4.0	4.5	5.1	5.7	4.0
Length (Maximum)	0.0	0.0	0.0	19.8	19.0	18.5	19.0	19.7	16.0	7.8	17.0	6.9	19.8

TABLE 3-6b LENGTH DISTRIBUTION OF SELECT SPECIES OF SPECIAL INTEREST IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

RAINBOW SMELT													
Length Interval (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
3.0 - 4.9	0	0	0	0	1	0	0	1	0	0	1	0	3
5.0 - 6.9	1	2	0	10	16	0	0	0	0	0	8	5	42
7.0 - 8.9	2	0	0	13	4	0	0	0	0	0	0	3	22
9.0 - 10.9	22	10	1	41	12	0	0	2	0	1	1	4	94
11.0 - 12.9	45	39	2	161	41	0	0	2	0	0	2	6	298
13.0 - 14.9	6	5	0	87	17	0	0	0	0	0	1	7	123
15.0 - 16.9	2	0	0	31	8	0	0	0	0	0	0	0	41
17.0 - 18.9	0	0	0	8	2	0	0	0	0	0	0	0	10
19.0 - 20.9	1	0	0	2	2	0	0	0	0	0	0	0	5
Total Measured	79	56	3	353	103	0	0	5	0	1	13	25	638
Mean Length	11.5	11.5	11.3	12.4	11.5	0.0	0.0	9.5	0.0	9.3	7.5	10.5	11.8
Length (Minimum)	5.8	6.2	10.7	5.4	4.5	0.0	0.0	3.9	0.0	9.3	4.8	5.7	3.9
Length (Maximum)	19.8	14.2	11.8	20.7	19.6	0.0	0.0	11.7	0.0	9.3	14.0	14.3	20.7

TABLE 3-6c LENGTH DISTRIBUTION OF SELECT SPECIES OF SPECIAL INTEREST IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

WHITE PERCH													
Length Interval (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
5.0 - 6.9	1	0	0	2	0	0	0	0	0	0	1	0	4
7.0 - 8.9	4	0	0	19	0	0	0	0	0	0	6	0	29
9.0 - 10.9	1	2	0	9	0	0	0	0	0	0	1	0	13
11.0 - 12.9	0	0	0	0	0	0	0	0	0	0	0	0	0
13.0 - 14.9	0	0	0	0	0	0	0	0	0	0	0	0	0
15.0 - 16.9	0	0	0	0	0	0	0	0	0	0	0	0	0
17.0 - 18.9	0	0	0	1	0	0	0	0	0	0	0	0	1
19.0 - 20.9	0	0	0	1	1	0	0	0	0	0	0	0	2
21.0 - 22.9	0	0	0	0	0	0	0	0	0	0	0	0	0
23.0 - 24.9	0	0	0	3	1	0	0	0	0	0	0	0	4
25.0 - 26.9	0	0	0	2	0	0	0	0	0	0	0	0	2
27.0 - 28.9	0	0	0	2	1	0	0	0	0	0	0	0	3
29.0 - 30.9	0	0	0	1	0	0	0	0	0	0	0	0	1
31.0 - 32.9	0	0	0	1	0	0	0	0	0	0	0	0	1
Total Measured	6	2	0	41	3	0	0	0	0	0	8	0	60
Mean Length	7.9	10.6	0.0	12.8	23.6	0.0	0.0	0.0	0.0	0.0	5.9	0.0	11.9
Length (Minimum)	6.7	10.2	0.0	6.2	20.1	0.0	0.0	0.0	0.0	0.0	4.5	0.0	6.2
Length (Maximum)	9.7	10.9	0.0	31.8	27.0	0.0	0.0	0.0	0.0	0.0	9.1	0.0	31.8

TABLE 3-6d LENGTH DISTRIBUTION OF SELECT SPECIES OF SPECIAL INTEREST IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

YELLOW PERCH													
Length Interval (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
5.0 - 6.9	0	0	0	0	0	0	1	1	0	0	1	0	3
7.0 - 8.9	0	0	0	5	0	0	1	0	0	0	6	0	12
9.0 - 10.9	0	1	0	14	0	0	1	4	0	0	27	0	47
11.0 - 12.9	0	0	0	2	0	0	0	7	1	1	36	0	47
13.0 - 14.9	0	0	0	0	0	0	0	0	1	0	12	0	13
15.0 - 16.9	0	0	0	0	0	0	1	1	1	0	7	0	10
17.0 - 18.9	0	0	0	0	0	0	0	0	0	0	0	0	0
19.0 - 20.9	0	0	0	0	0	0	0	0	0	0	1	0	1
21.0 - 22.9	0	0	0	1	0	0	0	0	0	0	0	0	1
23.0 - 24.9	0	0	0	0	0	0	0	0	0	0	0	0	0
25.0 - 26.9	0	0	0	0	0	0	0	0	0	0	0	0	0
27.0 - 28.9	0	0	0	0	0	0	0	1	0	0	0	0	1
29.0 - 30.9	0	0	0	2	0	0	0	1	1	0	0	0	4
Total Measured	0	1	0	24	0	0	4	15	4	1	90	0	139
Mean Length	0.0	10.2	0.0	11.8	0.0	0.0	9.8	13.6	17.7	11.1	11.6	0.0	11.9
Length (Minimum)	0.0	10.2	0.0	8.1	0.0	0.0	7.3	5.4	12.4	11.1	5.8	0.0	5.4
Length (Maximum)	0.0	10.2	0.0	29.0	0.0	0.0	16.0	29.0	29.0	11.1	19.5	0.0	29.0

TABLE 3-6e LENGTH DISTRIBUTION OF SELECT SPECIES OF SPECIAL INTEREST IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

SMALLMOUTH BASS													
Length Interval (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
3.0 - 4.9	0	0	0	0	0	0	0	2	0	0	0	0	2
5.0 - 6.9	0	0	0	0	0	0	1	0	0	0	0	0	1
7.0 - 8.9	0	0	0	0	1	0	0	0	0	0	0	0	1
9.0 - 10.9	0	0	0	0	0	0	0	1	0	0	0	0	1
11.0 - 12.9	0	0	0	0	0	0	0	2	0	0	0	0	2
13.0 - 14.9	0	0	0	1	0	0	0	0	1	0	0	0	2
15.0 - 16.9	0	0	0	0	0	0	0	0	0	0	0	0	0
17.0 - 18.9	0	0	0	0	0	0	0	0	0	0	0	0	0
19.0 - 20.9	0	0	0	0	0	0	0	0	0	0	0	0	0
21.0 - 22.9	0	0	0	0	0	0	0	0	0	0	0	0	0
23.0 - 24.9	0	1	0	0	0	0	0	0	0	0	0	0	0
25.0 - 26.9	0	0	0	0	0	0	0	0	0	0	0	0	0
27.0 - 28.9	0	0	0	0	0	0	0	0	0	0	0	0	0
29.0 - 30.9	0	0	0	0	0	0	0	0	0	0	0	0	0
31.0 - 32.9	0	0	0	0	0	0	0	0	0	0	0	0	1
33.0 - 34.9	0	1	0	0	0	0	0	0	0	0	0	0	1
35.0 - 36.9	0	1	0	0	0	0	0	0	0	0	0	1	2
37.0 - 38.9	0	2	0	0	0	0	0	0	0	0	0	0	2
39.0 - 40.9	0	0	0	1	0	0	0	0	0	0	0	0	1
41.0 - 42.9	0	1	0	0	0	0	0	0	0	0	0	0	1
Total Measured	0	6	0	2	1	0	1	5	1	0	0	1	17
Mean Length	0.0	35.3	0.0	26.2	8.1	0.0	5.6	8.3	13.9	0.0	0.0	36.8	21.8
Length (Minimum)	0.0	23.2	0.0	13.5	8.1	0.0	5.6	3.3	13.9	0.0	0.0	36.8	3.3
Length (Maximum)	0.0	41.4	0.0	39.0	8.1	0.0	5.6	12.2	13.9	0.0	0.0	36.8	41.4

TABLE 3-6f LENGTH DISTRIBUTION OF SELECT SPECIES OF SPECIAL INTEREST IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

BROWN TROUT													
Length Interval (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
46.0 - 47.9	0	1	0	0	0	0	0	0	0	0	0	0	1
Total Measured	0	1	0	0	0	0	0	0	0	0	0	0	1
Mean Length	0.0	46.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.5
Length (Minimum)	0.0	46.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.5
Length (Maximum)	0.0	46.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	46.5
LAKE TROUT													
Length Interval (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
68.0 - 69.9	0	0	0	1	0	0	0	0	0	0	0	0	1
74.0 - 75.9	0	0	0	0	0	0	0	0	0	0	1	0	1
Total Measured	0	0	0	1	0	0	0	0	0	0	1	0	2
Mean Length	0.0	0.0	0.0	68.5	0.0	0.0	0.0	0.0	0.0	0.0	74.5	0.0	71.5
Length (Minimum)	0.0	0.0	0.0	68.5	0.0	0.0	0.0	0.0	0.0	0.0	74.5	0.0	68.5
Length (Maximum)	0.0	0.0	0.0	68.5	0.0	0.0	0.0	0.0	0.0	0.0	74.5	0.0	74.5

Few smallmouth bass (Table 3-6e) were collected during 1992. Those collected were predominantly adult/subadult (71 percent) and were collected sporadically through the year. The minimum length recorded for smallmouth bass collected in 1992 was 3.3 cm (1.3 in.); the maximum length recorded was 41.4 cm (16.3 in.).

The two salmonid species collected (lake trout and brown trout) were collected as individuals throughout the year. The lake trout and brown trout were all collected as adults.

3.3 BIOMASS (PERMIT SECTION IV.B.4)

The total biomass (Table 3-7) collected in the 1992 impingement samples at NMP Unit 1 was 291,945 grams, excluding invertebrates and fragments. Alewife accounted for 173,416 grams (173 kilograms) or 59 percent of the annual total biomass. Alewife and rainbow smelt (17,726 grams; 18 kilograms) combined with the other RIS (white perch - 4,098 grams; yellow perch - 4,277 grams; smallmouth bass - 5,490 grams; and the salmonids [combined species] - 7,422 grams) comprised 73 percent of the annual total biomass at NMP Unit 1. Biomass is generally more widely distributed among species collected since a few heavy-bodied fish (i.e., salmonids, basses, etc.) may weigh more than a more abundant fragile-bodied species such as rainbow smelt.

The estimated biomass (excluding fragments) (Table 3-8) calculated based on flow volume was 990,785 grams (991 kilograms) of which alewife constituted 33 percent (329,585 grams; 330 kilograms). Alewife, rainbow smelt, and the other RIS collected in 1992 accounted for 50 percent (500,350 grams) of the annual estimated biomass (excluding fragments).

3.4 WATER QUALITY (PERMIT SECTION IV.B.5)

Intake and discharge temperatures recorded along with station generating conditions are listed in Appendix B. From the Appendix B tables, intake temperatures ranged from a minimum of 0.0 C on 18 January to a maximum of 21.3 C on 27 August. The discharge temperatures (when the plant was operating at full power) ranged from a minimum of 17.4 C on 1 February to a maximum of 38.9 C on 27 August 1992. Temperatures discussed above may have occurred on additional days, however, the dates given are the first dates of occurrence for minimum and maximum temperatures in the intake and discharge canals at NMP Unit 1 during 1992.

TABLE 3-7 TOTAL BIOMASS* OF IMPINGED ORGANISMS COLLECTED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

	JAN	FEB	MAR	APR	MAY		JUN		JUL		AUG	SEP	OCT	NOV	DEC	Annual Total
No. of Samples	4	4	4	16	20		4		4		6	4	4	4	4	78
					a	b	a	b	a	b						
SPECIES																
Alewife	—	—	—	114,614	45,222	3,589	2,025	—	3,771	—	2,706	755	636	93	5	173,416
Rainbow smelt	4,377	940	16	11,248	933	—	—	—	—	—	19	—	4	38	151	17,726
Threespine stickleback	47	57	4	573	15	—	2	—	9	—	—	—	—	—	—	707
Spottail shiner	19	—	—	948	31	—	42	—	404	—	1,005	2	12	18	24	2,505
Sculpins	40	174	—	153	81	1	1	—	71	—	122	6	36	121	49	855
Gizzard shad	13,794	4,871	—	5,244	—	—	—	—	—	—	—	—	140	—	7,155	31,204
Trout-perch	—	5	—	220	249	14	8	—	524	—	504	—	—	33	23	1,580
Yellow perch	—	84	—	1,046	—	—	—	226	69	—	887	374	11	1,580	—	4,277
White perch	38	78	—	3,300	660	—	—	—	—	—	—	—	—	22	—	4,098
Stonecat	—	73	—	408	400	71	—	—	—	—	244	182	452	152	123	2,105
Tessellated darter	—	—	—	3	6	3	3	—	2	—	6	1	1	2	<1(0.4)	27
White sucker	—	—	—	—	—	—	194	—	—	—	4,500	15,559	—	1,372	1,029	22,654
Smallmouth bass	—	4,019	—	756	160	—	—	—	1	—	52	30	—	—	472	5,490
Rock bass	251	374	137	—	—	—	—	—	504	—	3	—	—	20	677	1,966
Central mudminnow	—	—	—	63	—	—	—	—	—	—	—	—	—	—	—	63
Emerald shiner	—	—	—	2	—	—	—	—	—	—	29	—	—	—	—	31

* Biomass recorded in grams.

a. Collected when a minimum of one main circulating water pump was operating.
b. Collected when no main circulating water pumps were operating; service water only.

NOTE: Dashes (—) indicate no catches made.

TABLE 3-7 (Continued)

	JAN	FEB	MAR	APR	MAY		JUN		JUL		AUG	SEP	OCT	NOV	DEC	Annual Total
					a	b	a	b	a	b						
American eel	—	—	2,250	1,469	1,607	188	—	—	—	—	—	—	—	637	472	6,623
White bass	133	—	—	180	—	—	—	—	—	—	—	—	—	—	—	313
Freshwater drum	—	237	—	2,265	—	—	—	—	—	—	—	—	—	—	2,098	4,600
Brook stickleback	—	—	—	6	—	—	—	—	—	—	—	—	—	—	—	6
Carp	—	—	—	—	—	—	—	—	—	—	10	—	—	—	—	10
Pumpkinseed	—	—	—	201	—	—	—	—	115	—	—	—	—	—	—	316
Bluegill	—	—	—	2	—	—	—	—	11	—	1	—	—	—	—	14
Walleye	—	—	—	—	176	—	—	—	—	—	2	—	—	2,550	—	2,728
Lake trout	—	—	—	3,180	—	—	—	—	—	—	—	—	—	3,300	—	6,480
Bluntnose minnow	—	—	—	—	—	—	—	—	—	—	22	—	—	—	—	22
Brown trout	—	942	—	—	—	—	—	—	—	—	—	—	—	—	—	942
Lake herring (Cisco)	—	—	—	1,141	—	—	—	—	—	—	—	—	—	—	—	1,141
Longnose dace	—	—	—	20	—	—	—	—	—	—	—	—	—	—	—	20
Brown bullhead	—	—	—	—	26	—	—	—	—	—	—	—	—	—	—	26
Subtotal	18,699	11,854	2,407	147,042	49,566	3,866	2,275	226	5,481	0	10,112	16,909	1,292	9,938	12,278	291,945
Other Species																
Crayfish	34	9	—	32	18	—	—	—	13	1	2	—	<1(0.3)	30	—	139
Clam (non-corbicula)	4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4
Fish Fragments																
Crayfish	6	—	—	—	—	1	—	—	—	—	1	—	<1(0.1)	<1(0.5)	1	10
Rainbow smelt	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1
Spottail shiner	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Alewife	—	—	—	—	—	—	—	—	—	—	—	—	—	<1(0.3)	—	0
TOTAL	18,743	11,863	2,407	147,074	49,584	3,868	2,275	226	5,495	1	10,115	16,909	1,292	9,969	12,279	292,100

TABLE 3-8 ESTIMATED* MONTHLY BIOMASS OF COLLECTED TAXA (BASED ON FLOW) AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

	JAN	FEB	MAR	APR	MAY		JUN		JUL		AUG	SEP	OCT	NOV	DEC	Annual Total
No. of Samples	4	4	4	16	20		4		4		6	4	4	4	4	78
Total Sample Volume (MCM)	5.586	3.836	1.539	20.893	9.441	0.557	1.222	0.130	2.965	0.173	9.241	6.149	5.959	5.789	5.801	79.281
Total Monthly Volume (MCM)	42.431	28.727	12.513	39.494	11.965	0.771	7.810	1.258	9.735	2.039	47.582	46.246	46.623	43.608	45.050	385.852
					a	b	a	b	a	b						
SPECIES																
Alewife	—	—	—	216,655	57,312	4,968	12,942	—	12,381	—	13,933	5,678	4,976	701	39	329,585
Rainbow smelt	33,247	7,039	130	21,262	1,182	—	—	—	—	—	98	—	31	286	1,173	64,448
Threespine stickleback	357	427	32	1,083	19	—	13	—	30	—	—	—	—	—	—	1,961
Spottail shiner	144	—	—	1,792	39	—	268	—	1,326	—	5,175	15	94	136	186	9,175
Sculpins	304	1,303	—	289	103	1	6	—	233	—	628	45	282	911	381	4,486
Gizzard shad	104,779	36,478	—	9,913	—	—	—	—	—	—	—	—	1,095	—	55,565	207,830
Trout-perch	—	37	—	416	316	19	51	—	1,720	—	2,595	—	—	249	179	5,582
Yellow perch	—	629	—	1,977	—	—	—	2,187	227	—	4,567	2,813	86	11,902	—	24,388
White perch	289	584	—	6,238	836	—	—	—	—	—	—	—	—	166	—	8,113
Stonecat	—	547	—	771	507	98	—	—	—	—	1,256	1,369	3,536	1,145	955	10,184
Tessellated darter	—	—	—	6	8	4	19	—	7	—	31	8	8	15	3	109
White sucker	—	—	—	—	—	—	1,240	—	—	—	23,171	117,018	—	10,335	7,991	159,755
Smallmouth bass	—	30,097	—	1,429	203	—	—	—	3	—	268	226	—	—	3,666	35,892
Rock bass	1,907	2,801	1,114	—	—	—	—	—	1,655	—	15	—	—	151	5,258	12,901
Central mudminnow	—	—	—	119	—	—	—	—	—	—	—	—	—	—	—	119
Emerald shiner	—	—	—	4	—	—	—	—	—	—	149	—	—	—	—	153
American eel	—	—	18,294	2,777	2,037	260	—	—	—	—	—	—	—	4,798	3,666	31,832

* Estimate = Number of grams per million cubic meters (MCM) of water pumped per month.

a. Collected when a minimum of one main circulating water pump was operating.
b. Collected when no main circulating water pumps were operating; service water only.

NOTE: Dashes (—) indicate no catches made.

TABLE 3-8 (Continued)

	JAN	FEB	MAR	APR	MAY		JUN		JUL		AUG	SEP	OCT	NOV	DEC	Annual Total
					a	b	a	b	a	b						
White bass	1,010	—	—	340	—	—	—	—	—	—	—	—	—	—	—	1,350
Freshwater drum	—	1,775	—	4,282	—	—	—	—	—	—	—	—	—	—	16,293	22,350
Brook stickleback	—	—	—	11	—	—	—	—	—	—	—	—	—	—	—	11
Carp	—	—	—	—	—	—	—	—	—	—	51	—	—	—	—	51
Pumpkinseed	—	—	—	380	—	—	—	—	378	—	—	—	—	—	—	758
Bluegill	—	—	—	4	—	—	—	—	36	—	5	—	—	—	—	45
Walleye	—	—	—	—	223	—	—	—	—	—	10	—	—	19,209	—	19,442
Lake trout	—	—	—	6,011	—	—	—	—	—	—	—	—	—	24,859	—	30,870
Bluntnose minnow	—	—	—	—	—	—	—	—	—	—	113	—	—	—	—	113
Brown trout	—	7,054	—	—	—	—	—	—	—	—	—	—	—	—	—	7,054
Lake herring (Cisco)	—	—	—	2,157	—	—	—	—	—	—	—	—	—	—	—	2,157
Longnose dace	—	—	—	38	—	—	—	—	—	—	—	—	—	—	—	38
Brown bullhead	—	—	—	—	33	—	—	—	—	—	—	—	—	—	—	33
Subtotal	142,037	88,771	19,570	277,954	62,818	5,350	14,539	2,187	17,996	0	52,065	127,172	10,108	74,863	95,355	990,785
Other Species																
Crayfish	258	67	—	60	23	—	—	—	43	12	10	—	2	226	—	701
Clam (non-corbicula)	30	—	—	—	—	—	—	—	—	—	—	—	—	—	—	30
Fish Fragments																
Crayfish	46	—	—	—	—	1	—	—	—	—	5	—	1	4	8	65
Rainbow smelt	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	3
Spottail shiner	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	1
Alewife	—	—	—	—	—	—	—	—	—	—	—	—	—	2	—	2
TOTAL	142,371	88,838	19,570	278,014	62,841	5,352	14,539	2,187	18,042	12	52,080	127,172	10,111	75,095	95,363	991,587

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Appendix A

Exceptions to Standard Operating Procedures for Impingement at Nine Mile Point Nuclear Station Unit 1, 1992 (Permit Section IV.B.5)

APPENDIX A

EXCEPTIONS TO STANDARD OPERATING PROCEDURES FOR IMPINGEMENT AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992 (PERMIT SECTION IV.B.5)

6 APR — Void Impingement Sample. The impingement sample scheduled for collection over the period 6-7 April 1992 could not be collected as planned. A previously marked up traveling screen was washed and rotated during the 24-hour sample period. This deposited an unknown quantity of debris and fish into the collection basket, voiding the sample. The sample was rescheduled and successfully collected over the period 10-11 April 1992.

7 APR — Void Impingement Sample. The impingement sample scheduled for collection over the period 7-8 April 1992 could not be collected as planned. A previously marked up traveling screen was washed and rotated during the 24-hour sample period. This deposited and unknown quantity of debris and fish into the collection basket, voiding the sample. The sample was rescheduled and successfully collected over the period 15-16 April 1992.

22 JUL — Void Impingement Sample. The impingement sample scheduled for collection over the period 22-23 July 1992 could not be collected as planned. A previously marked up traveling screen was washed and rotated during the 24-hour sample period. This action deposited an unknown quantity of fish and debris into the sample collection basket, voiding the sample. The sample was rescheduled and successfully collected over the period 28-29 July 1992.

Appendix B

Station Operating Conditions at Nine Mile Point Nuclear Station Unit 1, 1992 (Permit Sections IV.B.5 and IV.C.9)

TABLE B-1 STATION OPERATING CONDITIONS AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1992

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: January 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperatures	
					Intake	Discharge
1	2	1	1,450,896.48	608	3.8	21.2
2	2	1	1,450,896.48	606	4.2	21.5
3	2	1	1,320,086.88	606	3.9	22.1
4	2	1	1,320,086.88	604	2.8	21.6
5	2	1	1,320,086.88	609	2.4	21.1
6	2	1	1,320,086.88	607	2.8	21.4
7	2	1	1,320,086.88	607	2.2	20.9
8	2	1	1,320,086.88	605	2.6	21.3
9	2	1	1,304,825.76	607	3.3	21.4
10	2	1	1,449,806.40	592	1.9	18.9
11	2	1	1,449,806.40	552	2.3	19.9
12	2	1	1,449,806.40	605	3.2	21.4
13	2	1	1,454,711.76	607	3.4	20.9
14	2	1	1,456,891.92	600	2.7	20.1
15	2	1	1,267,763.04	606	1.2	20.6
16	2	1	1,297,195.20	599	1.2	20.2
17	2	1	1,277,028.72	606	0.7	20.1
18	2	1	1,277,028.72	602	0.0	19.1
19	2	1	1,262,312.64	606	0.1	19.7
20	2	1	1,262,312.64	609	0.1	19.7
21	2	1	1,262,312.64	607	0.0	19.3
22	2	1	1,271,033.28	595	9.9*	28.4*
23	2	1	1,409,473.44	595	5.1	22.7
24	2	1	1,453,076.64	607	0.8	19.5
25	2	1	1,453,076.64	602	0.3	20.1
26	2	1	1,453,076.64	607	1.5	20.6
27	2	1	1,291,199.76	604	2.2	21.2
28	2	1	1,450,896.48	608	3.3	21.2
29	2	1	1,453,076.64	606	1.8	19.6
30	2	1	1,450,896.48	606	1.5	19.4
31	2	1	1,450,896.48	609	1.1	18.9

* Reverse flow occurred on 22 January 1992.

TABLE B-1 (Continued)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: February 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	2	1	1,453,076.64	545	1.1	17.4
2	2	1	1,453,076.64	609	0.9	18.8
3	2	1	1,453,076.64	606	1.2	19.1
4	2	1	1,450,896.48	607	1.5	19.8
5	2	1	1,277,028.72	606	0.4	19.7
6	2	1	1,247,596.56	608	0.6	20.2
7	2	1	1,450,896.48	605	3.3	21.7
8	2	1	1,450,896.48	600	0.7	18.4
9	2	1	725,448.24	592	8.2*	27.4*
10	2	1	1,206,173.52	600	2.4	20.9
11	2	1	1,349,519.04	597	2.7	21.4
12	2	1	1,274,848.56	597	2.4	20.8
13	2	1	1,280,298.96	606	1.7	20.5
14	2	1	1,382,221.44	607	1.1	19.3
15	2	1	1,382,221.44	605	1.2	19.8
16	2	1	723,813.12	25	0.7	2.2
17	2	1	723,813.12	0	0.2	0.9
18	2	1	723,813.12	0	0.4	0.9
19	2	1	723,813.12	0	0.9	1.5
20	2	1	723,813.12	0	0.9	1.5
21	2\1	1	1,014,864.48	0	0.9	1.3
22	1	1	773,411.76	0	0.8	1.2
23	1	1	773,411.76	0	0.8	1.2
24	1	1	797,938.56	0	0.8	1.3
25	1	1	383,163.12	0	1.2	1.7
26	1	1	382,073.04	0	1.3	1.9
27	1	1	382,073.04	0	1.2	1.8
28	1	1	382,073.04	0	1.2	1.8
29	1	1	382,073.04	0	0.8	1.4

* Reverse flow occurred on 9 February 1992.

TABLE B-1 (Continued)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: March 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	1	1	382,073.04	0	0.0	0.7
2	1	1	382,073.04	0	0.2	0.7
3	1	1	382,073.04	0	0.3	1.1
4	1	1	383,708.16	0	0.7	1.3
5	1	1	384,798.24	0	1.1	1.8
6	1	1	383,708.16	0	1.4	2.0
7	1	1	383,708.16	0	1.6	2.2
8	1	1	383,708.16	0	1.0	1.7
9	1	1	388,068.48	0	1.3	1.9
10	1	1	384,798.24	0	1.7	2.3
11	1	1	383,708.16	0	1.9	2.5
12	1	1	383,708.16	0	0.7	1.4
13	1	1	382,618.08	0	0.0	0.3
14	1	1	382,618.08	0	0.0	0.4
15	1	1	384,253.20	0	0.0	0.3
16	1	1	383,708.16	0	0.0	0.4
17	1	1	383,708.16	0	0.0	0.4
18	1	1	383,708.16	0	0.3	0.7
19	1	1	383,708.16	0	0.4	0.8
20	1	1	383,708.16	0	0.6	0.9
21	1	1	380,437.92	0	0.7	1.3
22	1	1	380,437.92	0	0.7	1.2
23	1	1	380,437.92	0	0.3	0.7
24	1	1	380,437.92	0	0.3	0.8
25	1	1	380,437.92	0	0.8	1.2
26	1	1	380,437.92	0	1.2	1.8
27	1	1	380,982.96	0	1.3	2.9
28	1	1	383,708.16	0	1.4	1.8
29	1	1	383,708.16	0	1.3	1.7
30	1\2	1	683,480.16	0	1.2	1.6
31	2	1	724,358.16	0	1.5	1.8

TABLE B-1 (Continued)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: April 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	2	1	1,277,028.72	19	1.6	4.3
2	2	1	1,277,573.76	89	1.9	6.7
3	2	1	1,277,573.76	195	2.2	9.9
4	2	1	1,277,573.76	226	2.4	10.9
5	2	1	1,277,573.76	175	2.4	9.4
6	2	1	1,279,753.92	414	2.9	16.9
7	2	1	1,277,573.76	496	4.0	19.3
8	2	1	1,451,986.56	531	3.4	18.7
9	2	1	1,454,166.72	605	4.3	21.4
10	2	1	1,448,716.32	607	3.8	21.0
11	2	1	1,448,716.32	602	4.1	21.1
12	2	1	1,448,716.32	607	4.6	21.7
13	2	1	1,456,346.88	605	3.8	20.8
14	2	1	1,445,991.12	606	4.3	21.4
15	2	1	1,445,991.12	606	4.6	21.7
16	2	1	1,451,986.56	607	4.1	21.1
17	2	1	1,451,986.56	607	4.3	21.4
18	2	1	1,451,986.56	250	4.3	11.9
19	2	1	1,445,991.12	0	3.4	3.8
20	2	1	1,445,991.12	0	4.1	4.4
21	2	1	1,445,991.12	0	5.3	5.6
22	2	1	1,451,986.56	0	6.2	6.6
23	2/1	1	1,068,823.44	0	7.5	7.8
24	1	1	770,686.56	0	6.6	6.9
25	1	1	770,686.56	0	5.8	6.2
26	1	1	770,686.56	0	6.0	6.3
27	1/2	1	1,068,823.44	0	6.4	6.7
28	2	1	1,447,626.24	0	7.5	8.6
29	2	1	1,449,806.40	146	7.4	13.7
30	2	1	1,455,256.80	538	6.9	22.2

TABLE B-1 (Continued)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: May 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	2	1	1,449,806.40	344	6.3	16.2
2	2/1	1	1,121,147.28	0	5.1	5.4
3	1	1	570,111.84	0	7.0	7.3
4	1	1	570,111.84	0	6.8	7.1
5	1	1	768,506.40	0	6.3	6.6
6	1	1/2	830,095.92	0	5.6	5.9
7	1	2/1	777,772.08	0	6.2	6.4
8	1	1	775,591.92	0	6.6	6.9
9	1	1	775,591.92	0	5.2	5.5
10	1	1	775,591.92	0	6.8	7.2
11	1	1	771,776.64	0	8.9	9.2
12	1	1	771,776.64	0	6.5	6.9
13	1	1	773,411.76	0	8.4	8.8
14	1	1	771,776.64	0	9.2	9.8
15	1/0	1	499,256.64	0	8.6	10.6
16	0	1	45,238.32	0	6.8	14.4
17	0	1	45,238.32	0	6.1	13.8
18	0	1	45,238.32	0	8.3	13.2
19	0	1	49,598.64	0	8.2	17.5
20	0	1	46,873.44	0	7.3	15.1
21	0	1	46,873.44	0	9.2	18.1
22	0	1	42,513.12	0	9.2	13.4
23	0	1	45,783.36	0	9.9	13.9
24	0	1	45,783.36	0	8.5	14.6
25	0	1	45,783.36	0	5.1	12.5
26	0	1	45,783.36	0	5.4	16.9
27	0	1	52,323.84	0	6.7	22.7
28	0	1	49,053.60	0	8.2	13.4
29	0	1	42,513.12	0	8.0	12.1
30	0	1	42,513.12	0	8.2	14.6
31	0	1	42,513.12	0	8.1	13.9

TABLE B-1 (Continued)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: June 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	0	1	41,968.08	0	9.3	13.8
2	0	1	41,968.08	0	8.2	13.8
3	0	1	44,148.24	0	9.9	18.7
4	0	1	43,058.16	0	10.3	15.8
5	0	1	43,058.16	0	8.3	13.0
6	0	1	43,058.16	0	5.1	9.8
7	0	1	43,058.16	0	5.4	10.1
8	0	1	43,058.16	0	7.3	10.9
9	0/1	1	68,675.04	0	11.3	17.0
10	1	1	381,528.00	0	12.9	13.9
11	1	1	384,798.24	0	13.9	14.7
12	1/0	1	589,188.24	0	14.4	16.1
13	0	1	90,476.64	0	14.9	18.4
14	0/1	1	227,281.68	0	15.4	17.9
15	1	1	771,776.64	0	15.2	15.9
16	1	1	761,965.92	0	14.7	15.4
17	1	1	766,326.24	0	13.5	14.2
18	1	1	766,326.24	0	15.1	15.8
19	1	1	773,956.80	0	16.1	16.8
20	1	1	773,956.80	0	16.3	16.9
21	1	1	773,956.80	0	15.7	16.4
22	1	1	771,776.64	0	15.7	16.4
23	1/0	1	211,475.52	0	14.7	17.0
24	0	1	86,116.32	0	14.7	17.2
25	0	1	88,296.48	0	14.4	17.1
26	0	1	88,296.48	0	15.0	17.1
27	0	1	88,296.48	0	14.9	17.3
28	0	1	88,296.48	0	15.9	18.2
29	0	1	86,116.32	0	16.0	18.9
30	0	1	86,116.32	0	16.2	18.6

TABLE B-1 (Continued)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: July 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	0	1	86,116.32	0	16.9	19.1
2	0	1	88,296.48	0	16.4	19.6
3	0	1	88,296.48	0	11.4	14.8
4	0	1	88,296.48	0	9.4	13.0
5	0	1	88,296.48	0	13.6	21.4
6	0	1	88,296.48	0	16.2	19.1
7	0	1	88,296.48	0	16.6	18.7
8	0/1	1	579,377.52	0	16.4	17.8
9	1/0	1	386,978.40	0	16.7	18.1
10	0	1	94,836.96	0	16.7	20.2
11	0	1	94,836.96	0	17.0	19.7
12	0	1	94,836.96	0	17.3	19.8
13	0	1	88,296.48	0	17.9	21.1
14	0	1	85,026.24	0	17.8	20.2
15	0	1	85,026.24	0	17.3	20.5
16	0	1	85,026.24	0	17.3	19.9
17	0	1	88,296.48	0	17.6	19.7
18	0	1	88,296.48	0	18.8	21.4
19	0	1	88,296.48	0	19.4	21.6
20	0	1	90,476.64	0	20.1	22.7
21	0/1	1	675,849.60	0	20.3	21.3
22	1	1	772,866.72	0	20.7	21.4
23	1	1	391,338.72	0	19.1	20.9
24	1/2/0	1	180,953.28	0	16.3	18.4
25	0	1	92,111.76	0	14.4	17.3
26	0	1	92,111.76	0	16.0	18.2
27	0/2	1	1,068,278.40	0	19.4	20.8
28	2	1	1,450,896.48	0	19.7	20.3
29	2	1	1,462,887.36	0	19.7	20.3
30	2	1/2	1,511,395.92	0	19.7	20.4
31	2	2	1,509,760.80	0	18.8	19.4

TABLE B-1 (Continued)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: August 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	2	2	1,509,760.80	0	18.9	19.6
2	2	2/1	1,458,527.04	0	19.6	20.5
3	2	1/2	1,489,594.32	0	19.8	23.1
4	2	2	1,535,922.72	66	19.8	25.1
5	2	2	1,538,102.88	120	19.9	25.6
6	2	2	1,545,733.44	238	19.8	28.6
7	2	2	1,544,643.36	72	19.4	22.3
8	2	2	1,544,643.36	0	19.1	21.5
9	2	2	1,544,643.36	279	19.3	29.8
10	2	2	1,540,283.04	552	20.0	36.5
11	2	2	1,543,553.28	493	20.4	36.0
12	2	2	1,533,742.56	177	19.9	30.3
13	2	2	1,538,102.88	556	19.4	36.0
14	2	2	1,538,102.88	592	19.1	36.3
15	2	2	1,538,102.88	591	19.1	36.4
16	2	2	1,538,102.88	599	17.5	35.1
17	2	2	1,525,021.92	598	17.7	35.3
18	2	2	1,525,021.92	598	19.0	36.7
19	2	2	1,531,017.36	595	19.6	37.3
20	2	2	1,531,017.36	597	19.6	37.2
21	2	2	1,527,747.12	595	19.5	37.1
22	2	2	1,527,747.12	593	19.7	37.3
23	2	2	1,527,747.12	595	19.7	37.3
24	2	2	1,540,283.04	594	19.9	37.7
25	2	2	1,527,747.12	594	20.3	38.1
26	2	2	1,569,715.20	587	21.0	38.6
27	2	2	1,569,715.20	588	21.3	38.9
28	2	2	1,551,728.88	592	19.6	37.2
29	2	2	1,551,728.88	217	20.5	30.1
30	2	2	1,551,728.88	502	20.2	36.1
31	2	2	1,542,463.20	589	20.0	37.5

TABLE B-1 (Continued).

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: September 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	2	2	1,542,463.20	591	19.9	37.4
2	2	2	1,542,463.20	523	19.5	35.1
3	2	2	1,540,283.04	9	19.2	20.6
4	2	2	1,544,643.36	124	19.6	24.7
5	2	2	1,544,643.36	481	19.5	34.6
6	2	2	1,544,643.36	586	18.8	35.7
7	2	2	1,544,643.36	588	19.1	36.3
8	2	2	1,542,463.20	589	19.2	36.4
9	2	2	1,544,643.36	588	19.4	36.8
10	2	2	1,552,273.92	589	19.0	36.4
11	2	2	1,550,093.76	592	19.4	36.7
12	2	2	1,550,093.76	593	19.0	36.3
13	2	2	1,550,093.76	595	18.7	36.2
14	2	2	1,540,283.04	597	18.4	35.9
15	2	2	1,544,643.36	596	N/A	36.0
16	2	2	1,544,643.36	594	18.7	36.4
17	2	2	1,546,823.52	594	18.8	36.6
18	2	2	1,546,823.52	592	19.0	36.8
19	2	2	1,546,823.52	588	19.2	36.8
20	2	2	1,546,823.52	595	18.6	36.3
21	2	2	1,540,828.08	597	17.6	35.4
22	2	2	1,538,102.88	595	17.6	35.4
23	2	2	1,518,481.44	597	17.6	35.3
24	2	2	1,527,747.12	598	17.1	34.8
25	2	2	1,527,747.12	596	16.9	34.7
26	2	2	1,527,747.12	596	16.6	34.5
27	2	2	1,527,747.12	599	16.6	34.3
28	2	2	1,542,463.20	599	16.8	34.4
29	2	2	1,542,463.20	598	16.1	33.7
30	2	2	1,542,463.20	601	15.9	33.4

TABLE B-1 (Continued)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: October 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	2	2	1,540,283.04	601	15.8	33.4
2	2	2	1,540,283.04	599	15.7	33.3
3	2	2	1,540,283.04	600	14.9	32.5
4	2	2	1,540,283.04	601	15.1	32.9
5	2	2	1,531,017.36	602	14.6	32.3
6	2	2	1,522,841.76	601	14.4	32.2
7	2	2	1,522,841.76	604	14.6	32.4
8	2	2	1,517,391.36	603	14.5	32.3
9	2	2	1,517,391.36	599	14.3	32.0
10	2	2	1,517,391.36	485	14.6	29.3
11	2	2	1,517,391.36	587	14.4	31.9
12	2	2	1,525,021.92	598	14.3	32.1
13	2	2	1,525,021.92	600	13.4	31.2
14	2	2	1,514,121.12	599	13.5	31.3
15	2	2	1,525,021.92	603	13.7	31.5
16	2	2	1,525,021.92	604	13.3	31.0
17	2	2	1,525,021.92	604	12.2	29.9
18	2	2	1,525,021.92	606	12.6	30.3
19	2	2	1,518,481.44	609	12.0	29.7
20	2	2	1,518,481.44	610	11.7	29.4
21	2	2	1,518,481.44	608	11.9	29.5
22	2	2/1	1,455,256.80	610	11.8	29.4
23	2	1	1,460,707.20	608	12.1	29.2
24	2	1	1,460,707.20	604	12.0	29.6
25	2	1	1,460,707.20	608	11.2	28.9
26	2	1	1,457,436.96	611	11.2	28.8
27	2	1	1,455,256.80	612	11.1	28.8
28	2	1	1,455,256.80	610	11.1	28.9
29	2	1	1,466,157.60	607	11.2	28.9
30	2	1	1,462,342.32	611	10.8	28.6
31	2	1	1,462,342.32	612	10.1	27.8

TABLE B-1 (Continued)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: November 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	2	1	1,462,342.32	613	9.2	26.9
2	2	1	1,454,166.72	612	8.4	26.2
3	2	1	1,457,436.96	615	6.4	24.0
4	2	1	1,454,166.72	616	8.1	25.7
5	2	1	1,454,166.72	611	9.4	27.1
6	2	1	1,455,256.80	613	9.1	26.8
7	2	1	1,454,711.76	609	9.4	27.1
8	2	1	1,454,711.76	610	8.8	26.6
9	2	1	1,454,711.76	612	9.2	26.8
10	2	1	1,455,256.80	614	9.0	26.8
11	2	1	1,455,256.80	615	8.4	26.2
12	2	1	1,455,256.80	610	8.9	26.7
13	2	1	1,463,977.44	614	7.8	25.5
14	2	1	1,463,977.44	614	7.2	24.9
15	2	1	1,463,977.44	615	6.8	24.6
16	2	1	1,455,256.80	617	6.7	24.4
17	2	1	1,451,986.56	617	6.7	24.4
18	2	1	1,454,711.76	611	7.0	24.4
19	2	1	1,447,626.24	613	7.3	24.8
20	2	1	1,449,806.40	616	7.1	24.5
21	2	1	1,449,806.40	616	7.2	24.6
22	2	1	1,449,806.40	616	7.2	24.5
23	2	1	1,449,806.40	616	7.4	24.8
24	2	1	1,451,986.56	614	7.3	24.7
25	2	1	1,447,626.24	607	7.1	24.3
26	2	1	1,447,626.24	616	7.4	24.8
27	2	1	1,447,626.24	616	6.6	24.0
28	2	1	1,447,626.24	615	7.1	24.5
29	2	1	1,447,626.24	615	6.5	23.9
30	2	1	1,449,806.40	616	5.9	23.2

TABLE B-1 (Continued)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: December 1992

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume of Water Pumped (m^3)	Mean Electrical Output	Temperature	
					Intake	Discharge
1	2	1	1,449,806.40	618	5.8	23.2
2	2	1	1,449,806.40	617	6.6	23.9
3	2	1	1,451,986.56	615	5.8	23.2
4	2	1	1,449,806.40	617	5.8	23.2
5	2	1	1,449,806.40	595	5.8	22.7
6	2	1	1,449,806.40	616	4.8	22.2
7	2	1	1,447,626.24	618	3.3	20.7
8	2	1	1,457,436.96	615	3.9	21.1
9	2	1	1,455,256.80	614	4.9	22.3
10	2	1	1,451,986.56	616	5.1	22.3
11	2	1	1,449,806.40	617	2.2	19.5
12	2	1	1,449,806.40	616	2.8	20.0
13	2	1	1,449,806.40	619	2.4	19.8
14	2	1	1,447,626.24	522	4.6	19.7
15	2	1	1,457,436.96	608	4.8	22.1
16	2	1	1,455,256.80	618	4.3	21.6
17	2	1	1,453,076.64	615	4.5	21.8
18	2	1	1,459,617.12	616	3.2	20.6
19	2	1	1,459,617.12	618	4.9	22.2
20	2	1	1,459,617.12	620	2.6	19.8
21	2	1	1,455,256.80	615	3.8	21.1
22	2	1	1,453,076.64	618	3.8	21.2
23	2	1	1,453,076.64	618	3.4	20.8
24	2	1	1,453,076.64	617	1.6	19.4
25	2	1	1,453,076.64	618	2.2	20.0
26	2	1	1,453,076.64	618	0.4	19.2
27	2	1	1,453,076.64	618	2.8	20.7
28	2	1	1,454,711.76	618	4.1	21.6
29	2	1	1,454,711.76	614	3.3	20.8
30	2	1	1,454,711.76	613	2.9	20.3
31	2	1	1,456,891.92	618	3.1	20.6

Appendix C

Scientific and Common Names of all Taxa Collected in 1992

APPENDIX C

SCIENTIFIC AND COMMON NAMES OF ALL TAXA COLLECTED IN 1992

Scientific Name	Common Name
Alosa pseudoharengus	Alewife
Ambloplites rupestris	Rock bass
Anguilla rostrata	American eel
Aplodinotus grunniens	Freshwater drum
Cambaridae	Crayfish Family
Catostomus commersoni	White sucker
Coregonus artedi	Lake herring (Cisco)
Cottus spp.	Sculpins
Culaea inconstans	Brook stickleback
Cyprinus carpio	Carp
Dorosoma cepedianum	Gizzard shad
Etheostoma olmstedi	Tessellated darter
Gasterosteus aculeatus	Threespine stickleback
Ictalurus nebulosus	Brown bullhead
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill
Micropterous dolomieui	Smallmouth bass
Mollusca	Clam (non-corbicula)
Morone americana	White perch
Morone chrysops	White bass
Notropis atherinoides	Emerald shiner
Notropis hudsonius	Spottail shiner
Noturus flavus	Stonecat
Osmerus mordax	Rainbow smelt
Perca flavescens	Yellow perch
Percopsis omiscomaycus	Trout-perch
Pimephales notatus	Bluntnose minnow
Rhinichthys cataractae	Longnose dace
Salmo trutta	Brown trout
Salvelinus namaycush	Lake trout
Stizostedion vitreum	Walleye
Umbra limi	Central mudminnow

Appendix D

Daily Impingement Collection Totals at Nine Mile Point Nuclear Station Unit 1, 1992

TABLE D-1 DAILY IMPINGEMENT COLLECTION TOTALS AT NINE MILE POINT STATION UNIT 1, 1992

	JAN				FEB				MAR			
	3	13	21	29	5	12	20	26	4	11	18	26
Species												
Alewife	---	---	---	---	---	---	---	---	---	---	---	---
Rainbow smelt	10	28	336	262	51	84	7	---	2	---	1	---
Threespine stickleback	---	3	21	12	20	26	2	---	---	---	3	---
Spottail shiner	1	---	---	3	---	---	---	---	---	---	---	---
Sculpins	1	---	4	10	1	44	5	---	---	---	---	---
Gizzard shad	---	---	156	5	5	19	---	---	---	---	---	---
Trout-perch	---	---	---	---	1	---	---	---	---	---	---	---
Yellow perch	---	---	---	---	---	1	---	---	---	---	---	---
White perch	---	3	4	---	2	1	---	---	---	---	---	---
Stonecat	---	---	---	---	---	3	---	---	---	---	---	---
Tessellated darter	---	---	---	---	---	---	---	---	---	---	---	---
White sucker	---	---	---	---	---	---	---	---	---	---	---	---
Smallmouth bass	---	---	---	---	---	6	---	---	---	---	---	---
Rock bass	---	---	1	---	1	2	---	---	---	---	1	---
Central mudminnow	---	---	---	---	---	---	---	---	---	---	---	---
Emerald shiner	---	---	---	---	---	---	---	---	---	---	---	---
American eel	---	---	---	---	---	---	---	---	---	1	---	---
White bass	---	---	2	2	---	---	---	---	---	---	---	---
Freshwater drum	---	---	---	---	---	1	---	---	---	---	---	---
Brook stickleback	---	---	---	---	---	---	---	---	---	---	---	---

TABLE D-1 (Continued)

	JAN				FEB				MAR			
	3	13	21	29	5	12	20	26	4	11	18	26
Carp	---	---	---	---	---	---	---	---	---	---	---	---
Pumpkinseed	---	---	---	---	---	---	---	---	---	---	---	---
Bluegill	---	---	---	---	---	---	---	---	---	---	---	---
Walleye	---	---	---	---	---	---	---	---	---	---	---	---
Lake trout	---	---	---	---	---	---	---	---	---	---	---	---
Bluntnose minnow	---	---	---	---	---	---	---	---	---	---	---	---
Brown trout	---	---	---	---	---	1	---	---	---	---	---	---
Lake herring (Cisco)	---	---	---	---	---	---	---	---	---	---	---	---
Longnose dace	---	---	---	---	---	---	---	---	---	---	---	---
Brown bullhead	---	---	---	---	---	---	---	---	---	---	---	---
Subtotal	12	34	524	294	81	188	14	0	2	1	5	0
Other Species												
Crayfish	---	2	---	---	---	3	---	1	---	---	---	---
Clam (non-corbicula)	---	---	1	---	---	---	---	---	---	---	---	---
Fish Fragments												
Crayfish	---	---	2	---	---	---	---	---	---	---	---	---
Rainbow smelt	---	---	---	---	---	---	---	---	---	---	---	---
Spottail shiner	---	---	---	---	---	---	---	---	---	---	---	---
Alewife	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	12	36	527	294	81	191	14	1	2	1	5	0

NOTE: Dashes (---) indicate no catches made.

TABLE D-1 (Continued)

	APR															
	2	3	5	9	10	11	14	15	16	17	18	21	24	25	27	30
Species																
Alewife	22	157	261	251	1,420	763	809	259	207	118	144	511	22	17	27	497
Rainbow smelt	129	245	186	78	72	74	113	70	63	72	95	72	5	8	16	39
Threespine stickleback	34	134	57	25	27	30	16	19	8	6	13	4	---	2	7	3
Spottail shiner	14	51	12	1	2	2	21	4	3	1	4	2	1	---	---	---
Sculpins	---	3	---	---	7	3	6	2	3	3	2	3	2	2	1	2
Gizzard shad	1	---	---	---	---	---	16	1	2	1	2	---	---	1	---	---
Trout-perch	1	7	2	4	1	1	1	---	2	2	5	1	---	---	---	4
Yellow perch	9	13	---	1	1	---	---	---	---	---	---	---	---	---	---	---
White perch	2	19	10	2	1	---	3	1	---	---	---	1	---	1	1	1
Stonecat	---	---	2	---	1	---	---	---	---	1	2	---	---	---	---	1
Tessellated darter	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---
White sucker	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Smallmouth bass	---	---	1	---	---	---	---	1	---	---	---	---	---	---	---	---
Rock bass	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Central mudminnow	1	8	1	---	---	---	---	---	2	---	---	---	---	---	---	---
Emerald shiner	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---
American eel	---	---	1	---	---	---	---	---	---	---	---	1	---	---	---	1
White bass	---	2	2	---	---	---	---	---	---	---	---	---	---	---	---	---
Freshwater drum	---	---	---	---	---	2	---	---	---	---	---	---	1	---	---	---
Brook stickleback	---	1	2	---	---	1	---	---	---	2	---	---	---	---	---	---

TABLE D-1 (Continued)

	APR															
	2	3	5	9	10	11	14	15	16	17	18	21	24	25	27	30
Carp	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pumpkinseed	---	2	---	---	---	---	1	---	---	---	---	---	---	---	---	---
Bluegill	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Walleye	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lake trout	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---
Bluntnose minnow	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Brown trout	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lake herring (Cisco)	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---
Longnose dace	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---
Brown bullhead	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Subtotal	213	643	537	362	1,533	877	987	358	290	207	267	595	31	31	52	548
Other Species																
Crayfish	---	---	1	1	1	2	1	1	2	1	---	---	---	---	1	---
Clam (non-corbicula)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fish Fragments																
Crayfish	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Rainbow smelt	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Spottail shiner	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Alewife	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	213	643	538	363	1,534	879	988	359	292	208	267	595	31	31	53	548

NOTE: Dashes (---) indicate no catches made.

TABLE D-1 (Continued)

	MAY																			
	2	3	4	5	6	7	9	10	11	12	13	15	16	17	18	20	21	22	30	31
Species																				
Alewife	979	111	937	141	58	63	51	25	35	33	18	7	---	7	6	134	79	10	---	---
Rainbow smelt	28	10	16	22	18	5	2	6	1	1	1	1	---	---	---	---	---	---	---	---
Threespine stickleback	3	1	1	1	---	1	---	---	---	---	---	1	---	---	---	---	---	---	---	---
Spottail shiner	1	1	---	---	1	---	---	1	---	---	---	1	---	---	---	---	---	---	---	---
Sculpins	2	4	5	5	1	---	4	---	5	2	---	---	---	---	1	---	---	---	---	---
Gizzard shad	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Trout-perch	18	5	1	2	---	---	3	1	1	---	2	---	---	---	---	1	---	---	---	---
Yellow perch	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
White perch	---	---	---	---	---	1	2	---	---	---	---	---	---	---	---	---	---	---	---	---
Stonecat	1	---	2	2	---	---	2	1	1	1	2	---	---	---	1	---	---	---	---	---
Tessellated darter	---	3	---	---	---	---	1	---	---	---	---	---	1	---	---	---	---	---	---	---
White sucker	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Smallmouth bass	---	1	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock bass	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Central mudminnow	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Emerald shiner	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
American eel	---	---	---	---	---	---	---	---	1	---	---	1	---	---	---	---	1	---	1	---
White bass	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Freshwater drum	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE D-1 (Continued)

	MAY																			
	2	3	4	5	6	7	9	10	11	12	13	15	16	17	18	20	21	22	30	31
Brook stickleback	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Carp	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Pumpkinseed	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Bluegill	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Walleye	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lake trout	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Bluntnose minnow	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Brown trout	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lake herring (Cisco)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Longnose dace	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Brown bullhead	---	---	---	---	1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Subtotal	1,032	136	963	173	79	70	66	34	44	37	23	11	1	7	8	135	80	10	1	0
Other Species																				
Crayfish	---	1	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	---	---
Clam (non-corbicula)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fish Fragments																				
Crayfish	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---
Rainbow smelt	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Spottail shiner	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---
Alewife	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	1,032	137	963	173	79	70	66	34	44	37	24	11	2	8	8	135	80	10	1	0

NOTE: Dashes (---) indicate no catches made.

TABLE D-1 (Continued)

	JUN				JUL				AUG					
	8	17	23	29	7	15	29	30	5	6	14	18	19	28
Species														
Alewife	---	43	122	---	---	---	178	20	99	93	6	---	---	1
Rainbow smelt	---	---	---	---	---	---	---	---	15	6	---	---	---	---
Threespine stickleback	---	---	1	---	---	---	4	1	---	---	---	---	---	---
Spottail shiner	---	---	4	---	---	---	80	12	68	145	---	---	---	---
Sculpins	---	---	2	---	---	---	18	1	25	15	1	1	---	---
Gizzard shad	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Trout-perch	---	---	1	---	---	---	44	9	28	19	---	---	---	---
Yellow perch	1	---	---	---	---	---	3	1	12	3	---	---	---	---
White perch	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Stonecat	---	---	---	---	---	---	---	---	2	1	---	---	---	---
Tessellated darter	---	---	4	---	---	---	2	---	10	2	---	---	2	---
White sucker	---	1	---	---	---	---	---	---	3	2	---	1	---	---
Smallmouth bass	---	---	---	---	---	---	1	---	5	---	---	---	---	---
Rock bass	---	---	---	---	---	---	2	---	1	---	---	---	---	---
Central mudminnow	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Emerald shiner	---	---	---	---	---	---	---	---	2	9	---	---	---	---
American eel	---	---	---	---	---	---	---	---	---	---	---	---	---	---
White bass	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Freshwater drum	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Brook stickleback	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE D-1 (Continued)

	JUN				JUL				AUG					
	8	17	23	29	7	15	29	30	5	6	14	18	19	28
Carp	---	---	---	---	---	---	---	---	1	4	---	---	---	---
Pumpkinseed	---	---	---	---	---	---	1	---	---	---	---	---	---	---
Bluegill	---	---	---	---	---	---	1	---	1	---	---	---	---	---
Walleye	---	---	---	---	---	---	---	---	---	1	---	---	---	---
Lake trout	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Bluntnose minnow	---	---	---	---	---	---	---	---	2	---	---	---	---	---
Brown trout	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Lake herring (Cisco)	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Longnose dace	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Brown bullhead	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Subtotal	1	44	134	0	0	0	334	44	274	300	7	2	2	1
Other Species														
Crayfish	---	---	---	---	1	---	1	1	1	---	---	---	---	---
Clam (non-corbicula)	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Fish Fragments														
Crayfish	---	---	---	---	---	---	---	---	---	---	---	---	1	1
Rainbow smelt	---	---	---	---	---	---	2	---	---	---	---	---	---	---
Spottail shiner	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Alewife	---	---	---	---	---	---	---	---	---	---	---	---	---	---
TOTAL	1	44	134	0	1	0	337	45	275	300	7	2	3	2

NOTE: Dashes (---) indicate no catches made.

TABLE D-1 (Continued)

	SEP				OCT				NOV				DEC				
	4	11	16	24	2	11	20	29	5	13	20	24	3	11	20	30	Totals
Species																	
Alewife	3	---	---	925	10	468	85	4	---	14	---	2	2	---	1	---	10,255
Rainbow smelt	---	---	---	---	---	---	3	---	---	6	6	2	7	3	8	7	2,292
Threespine stickleback	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	486
Spottail shiner	---	---	---	2	---	---	2	1	2	2	---	---	---	---	3	1	449
Sculpins	---	---	---	3	1	1	8	5	6	32	3	3	---	1	10	3	272
Gizzard shad	---	---	---	---	2	---	15	---	---	---	---	---	---	---	3	7	236
Trout-perch	---	---	---	---	---	---	---	---	---	7	---	---	1	---	3	---	178
Yellow perch	2	---	---	2	---	---	1	---	3	87	---	---	---	---	---	---	140
White perch	---	---	---	---	---	---	---	---	---	7	1	---	---	---	---	---	63
Stonecat	1	---	---	2	1	5	---	1	---	4	---	---	1	---	---	1	42
Tessellated darter	---	---	---	3	---	---	---	2	---	3	---	---	1	---	---	---	35
White sucker	9	9	2	1	---	---	---	---	1	1	---	---	1	---	---	---	31
Smallmouth bass	---	1	---	---	---	---	---	---	---	---	---	---	---	1	---	---	18
Rock bass	---	---	---	---	---	---	---	---	---	3	---	---	---	1	---	1	13
Central mudminnow	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	12
Emerald shiner	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2	12
American eel	---	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	11
White bass	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	8
Freshwater drum	---	---	---	---	---	---	---	---	---	---	---	---	---	1	---	1	6
Brook stickleback	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	6

TABLE D-1 (Continued)

	SEP				OCT				NOV				DEC				
	4	11	16	24	2	11	20	29	5	13	20	24	3	11	20	30	Totals
Carp	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	5
Pumpkinseed	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	4
Bluegill	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	3
Walleye	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	3
Lake trout	---	---	---	---	---	---	---	---	---	---	---	1	---	---	---	---	2
Bluntnose minnow	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
Brown trout	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Lake herring (Cisco)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Longnose dace	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Brown bullhead	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Subtotal	15	10	2	938	14	474	114	13	12	167	10	9	13	7	28	23	14,588
Other Species																	
Crayfish	---	---	---	---	---	---	1	---	---	11	---	---	---	---	---	---	35
Clam (non-corbicula)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Fish Fragments																	
Crayfish	---	---	---	---	---	---	---	1	1	---	---	---	---	---	1	---	8
Rainbow smelt	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	2
Spottail shiner	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	1
Alewife	---	---	---	---	---	---	---	---	1	---	---	---	---	---	---	---	1
TOTAL	15	10	2	938	14	474	115	14	14	178	10	9	13	7	29	23	14,636

NOTE: Dashes (---) indicate no catches made.