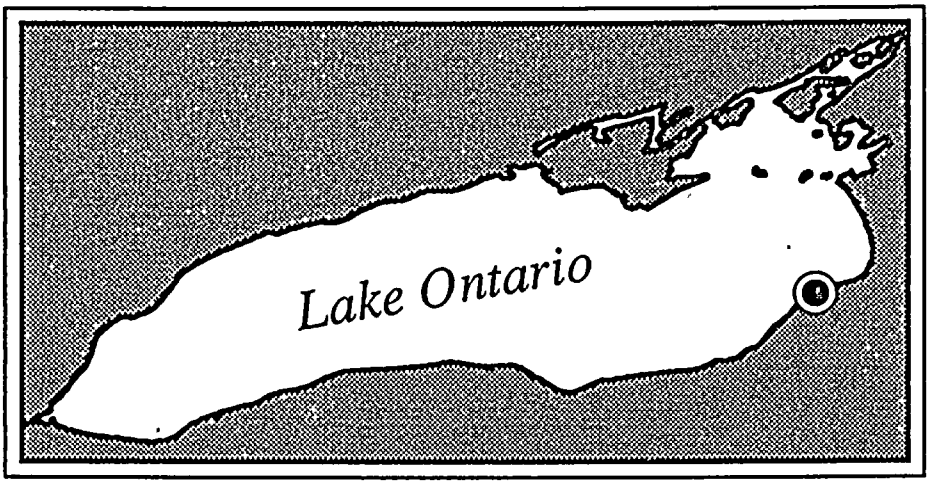
Niagara Mohawk Power Corporation



June 1991

SPDES Annual Biological Monitoring Report

Nine Mile Point Nuclear Station

1990

EA Engineering, Science, and Technology

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FINAL

NINE MILE POINT NUCLEAR STATION 1990 SPDES ANNUAL BIOLOGICAL MONITORING REPORT

Prepared for

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EXECUTIVE SUMMARY

This report presents the results of impingement abundance studies conducted during 1990, 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 1990.

In 1990, NMP Unit 1 was shut down for maintenance work from 1 January through 31 August. During this period, a minimum of one main circulating water pump was operating in conjunction with a service water pump. The station's operating regime for the main circulating water pumps influenced the collection of impinged organisms in 1990 in association with seasonal, behavioral, and/or meteorological factors.

Impingement sampling at NMP Unit 1 in 1990 resulted in the collection and identification of 37 fish taxa. One taxon (sculpin) was identified to the genus level and the remaining 36 taxa were identified to the species level. Crayfish were the only invertebrates found in the impingement collections in 1990. An amphibian, the mudpuppy (*Necturus* sp.) was collected in an impingement sample in April 1990. Alewife was the most numerous (52,009) comprising 78 percent of the total catch (66,794 excludes fragments). Alewife, rainbow smelt, and gizzard shad accounted for 93 percent (61,970) of all fish collected (66,794). No rare, endangered, or threatened fish species were collected at NMP Unit 1 in 1990. No *Corbicula* sp. molluscs were found in the 1990 impingement collections at NMP Unit 1.

1. INTRODUCTION

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 Master Energy Plan; and, with the exception of installed hydroelectric capacity, the station is one of the most cost efficient sources of electrical energy within Niagara Mohawk'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 aquatic ecological studies conducted by EA Engineering, Science, and Technology during 1990, 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 1990 (a total of 78 samples in 1990).

Impingement sampling at NMP Unit 1 in 1990 resulted in the collection and identification of 37 fish taxa. One taxon (sculpin) was identified to the genus level and the remaining 36 taxa were identified to the species level. Crayfish were the only invertebrates found in the impingement collections in 1990. An amphibian, the mudpuppy, was collected in an impingement sample in April 1990. Alewife was the most numerous species (52,009) comprising 78 percent of the total fish catch (66,794). Alewife, rainbow smelt, and gizzard shad accounted for 93 percent (61,970) of all fish collected (66,794 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 1990 impingement collections.

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 1990 (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 1990, a total of 78 impingement samples were successfully collected. Three times during the year samples had to be rescheduled due to maintenance work conducted in the intake area (Appendix A). One sample in October had to be rescheduled when a large influx of debris entered the sample collection basket causing it to overflow. All rescheduled samples were successfully completed.

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 9.5-mm (3/8-in.) stretch mesh liner, was then positioned at the end of the sluiceway. 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.

TABLE 2-1 IMPINGEMENT SAMPLING INTENSITY AS REQUIRED BY THE SPDES PERMIT FOR NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

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, 1990

Scheduled* Sampling Date	Sampling Results	Scheduled* Sampling Date	Sampling Results	Scheduled* Sampling Date	Sampling Results
05 JAN	C	02 MAY	C	02 AUG	C
12 JAN	C	03 MAY	C	08 AUG	C
17 JAN	C	04 MAY	C	15 AUG	C
25 JAN	C	05 MAY	C	16 AUG	C
		06 MAY	C	22 AUG	C
02 FEB	C	07 MAY	C	29 AUG	C
08 FEB	C	08 MAY	C		
15 FEB	C	10 MAY	C	06 SEP	C
23 FEB	C	11 MAY	C	13 SEP	C
		12 MAY	C	19 SEP	C
02 MAR	C	15 MAY	C	26 SEP	R*C; Completed 01 OCT
07 MAR	C	16 MAY	C		
16 MAR	C	17 MAY	C	03 OCT	R*C; Completed 10 OCT
26 MAR	C	18 MAY	C	11 OCT	C
		21 MAY	C	19 OCT	R*C; Completed 20 OCT
02 APR	C	22 MAY	C	29 OCT	C
04 APR	C	23 MAY	C		
05 APR	C	24 MAY	C	08 NOV	C
06 APR	C	25 MAY	C	15 NOV	C
07 APR	C	30 MAY	C	21 NOV	C
10 APR	C			28 NOV	C
11 APR	C	05 JUN	C		
12 APR	C	14 JUN	C	05 DEC	C
13 APR	C	19 JUN	C	14 DEC	C
14 APR	C	27 JUN	C	20 DEC	C
17 APR	C			28 DEC	C
20 APR	C	06 JUL	C		
21 APR	C	13 JUL	C		
25 APR	C	19 JUL	R*C; Completed 24 JUL		
26 APR	C	25 JUL	C		
27 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:

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

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 1990, 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 over 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 = the number of fish collected during the period
v* = the volume of cooling water used during the period
* = based on main circulating water pump(s) operating regime
x = the 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 over 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 1990, NMP Unit 1 was shut down for maintenance work from 1 January through 31 August. During this period a minimum of one main circulating water pump was operating in conjunction with a service water pump. Both main circulating water pumps were operating (with a service water pump) during portions of February and April and all of March (Appendix B). In July, the station began the operation of both main circulating water pumps, which continued to operate throughout the remainder of 1990. The station's operating regime for the main circulating water pumps influenced the collection of impinged organisms in 1990 in conjunction with seasonal, behavioral, and/or meteorological factors.

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 1990 generally follow this pattern: March, April, and May impingement collections increased in abundance as fish came inshore to spawn followed by a decrease through late spring and summer (Table 3-1). Impingement increased in October and December as a result of storm conditions coinciding with the presence of YOY near shore. The largest impingement collections occurred in April (31,081), May (14,568), and October (7,051). Overall, impingement sampling at NMP Unit 1 during 1990 resulted in the collection of 66,794 fish (excluding fragments) composed of

TABLE 3-1 ACTUAL MONTHLY IMPINGEMENT COLLECTIONS, NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

	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	---	---	4,282	28,315	11,747	2,087	156	127	193	3,885	234	983	52,009
Rainbow smelt	68	21	354	1,873	1,115	27	---	185	187	539	696	2,721	7,786
Gizzard shad	---	---	1	2	1	---	---	1	4	1,770	266	130	2,175
Spottail shiner	---	1	133	365	633	76	1	88	17	117	4	64	1,499
Sculpins	35	9	24	87	231	31	---	83	2	147	6	44	699
Trout-perch	1	1	21	131	458	48	---	4	---	1	3	12	680
White perch	2	---	22	81	13	1	---	12	---	392	17	101	641
Tessellated darter	---	---	---	---	133	242	---	---	2	3	---	---	380
Stonecat	---	---	---	27	94	53	12	12	2	12	---	8	220
Threespine stickleback	1	---	20	136	33	3	---	---	---	1	8	10	212
Rock bass	4	---	6	4	10	2	11	5	---	82	---	5	129
Smallmouth bass	---	2	5	2	4	---	---	37	6	19	4	7	86
White bass	---	---	1	---	1	2	---	---	---	---	7	45	56
Bluegill	---	---	---	---	---	---	---	---	---	36	2	11	49
Yellow perch	---	---	6	21	4	1	1	---	---	1	1	7	42
Freshwater drum	---	---	2	2	---	---	2	---	---	8	---	11	25
Lake chub	---	---	2	14	6	---	---	---	---	---	---	----	22
Emerald shiner	1	1	12	1	---	---	---	---	---	---	---	4	19
Pumpkinseed	---	---	3	2	4	---	---	---	---	2	---	6	17
Black crappie	---	---	5	2	---	---	---	---	---	---	---	1	8
Lake trout	---	---	---	2	3	---	---	---	---	---	1	---	6
White sucker	---	---	---	---	2	1	---	1	---	---	2	---	6
Brown trout	---	---	---	---	1	---	1	1	---	---	---	2	5
Sea lamprey	---	---	---	---	---	1	3	---	---	---	---	---	4
Central mudminnow	---	---	---	1	---	---	---	---	---	---	---	2	3
American eel	---	---	---	---	1	---	---	1	---	1	---	---	3
Brook stickleback	---	---	---	2	---	---	---	---	---	---	---	---	2
Largemouth bass	--	---	---	---	---	---	1	1	---	---	---	---	2
Lake herring (Cisco)	---	---	---	1	---	---	---	---	---	---	---	---	1
Chinook salmon	---	---	---	---	1	---	---	---	---	---	---	---	1
Creek chub	---	---	---	---	1	---	---	---	---	---	---	---	1
Longnose dace	---	---	---	---	1	---	---	---	---	---	---	---	1
Burbot	---	---	---	---	---	---	1	---	---	---	---	---	1
Golden shiner	---	---	---	---	---	---	---	1	---	---	---	---	1
Walleye	---	---	---	---	---	---	---	1	---	---	---	---	1
Carp	---	---	---	---	---	---	---	---	---	1	---	---	1
Atlantic salmon	---	---	---	---	---	---	---	---	---	---	---	1	1
Subtotal	112	35	4,899	31,071	14,497	2,575	189	560	413	7,017	1,251	4,175	66,794
Other Species													
Crayfish	---	---	5	9	70	4	---	2	2	34	10	12	148
Mudpuppy	---	---	---	1	---	---	---	---	---	---	---	---	1
Fish Fragments													
Rainbow smelt	---	8	---	---	---	---	---	3	---	---	---	---	11
Crayfish	---	---	---	---	---	---	---	2	3	---	---	---	5
Sculpins	1	1	---	---	---	---	---	---	---	---	---	---	2
Spottail shiner	---	1	---	---	1	---	---	---	---	---	---	---	2
Threespine stickleback	---	2	---	---	---	---	---	---	---	---	---	---	2
Tessellated darter	---	---	---	---	---	---	---	1	---	---	---	---	1
Unidentified	---	---	---	---	---	---	---	1	---	---	---	---	1
Total	113	47	4,904	31,081	14,568	2,579	189	569	418	7,051	1,261	4,187	66,967

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

36 species. Sculpins are identified only to genus (*Cottus*), representing an additional taxon of fish. Crayfish were the only invertebrates collected during 1990 and totaled 148 for the year. One amphibian, a mudpuppy (*Necturus* sp.) was collected in an impingement sample in April.

Highest fish species diversity occurred in May (23 species), April, and December (21 species each). The high species diversity in April and May corresponds to the inshore movements of many fish species to their spawning grounds. The increase in diversity in December is a function of the influence of storm conditions on the YOY fish still in the nearshore areas. Lowest fish species diversity occurred in January (7 species), February (6 species), and September (8 species). NMP Unit 1 was offline for the months of January and February with only one main circulating water pump operating. Many fish species also spend the winter months offshore in deeper water which can reduce the impingement abundance for the winter season.

No one species was collected in every month of 1990. Alewife were collected in 10 months of 1990 and dominated the collections (more than 50 percent of the total) in 6 of those months: March (87 percent), April (91 percent), May (81 percent), June (81 percent), July (83 percent), and October (55 percent). The large collections during spring and summer reflected adult and subadult alewife; the October collection was predominantly YOY.

Rainbow smelt were collected in 11 months of 1990 and dominated the impingement collections in 3 months: January (60 percent), November (55 percent), and December (65 percent). Large collections of rainbow smelt in November and December are associated with the influence of storm conditions on schools of YOY rainbow smelt present in the nearshore area.

The remaining three months of 1990 (February, August, and September) contained collections which were not dominated by any one species of fish. Alewife and rainbow smelt were present in August and September in nearly equivalent numbers and together dominated the impingement collections in both months. In addition to alewife and rainbow smelt, species which were frequently present throughout 1990 were spottail shiner and trout-perch in 11 months;

white perch (representative important species [RIS]) in 10 months; tessellated darter, rock bass, smallmouth bass (RIS), and crayfish in 9 months; and yellow perch (RIS) in 8 months of 1990. Four species of salmonids were collected individually in samples throughout 1990.

Alewife was the most abundant species (52,009) and combined with rainbow smelt (7,786) comprised 90 percent of the annual total for 1990. All RIS combined (60,577) accounted for 91 percent of the 1990 impingement collections. Additionally, gizzard shad (a non-RIS fish) comprised 3 percent of the annual impingement.

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 1990, several occasions occurred when storm conditions influenced the impingement abundances at NMP Unit 1. Storm conditions occurred during samples collected in March, October, and December 1990. A sample over the 24-hour period 25-26 March 1990 resulted in the collection of 100 percent of the month's total collection of alewife. The storm conditions (west to northwest 16-25 mph winds) influenced the collection of adult alewife concurrent with their inshore spawning migration.

White perch YOY collected over the sample period from 19 to 20 October 1990 contained 63 percent of the month's collection of white perch (and 38 percent of the annual total). Conditions for the 48-hour period prior to the sample collection were classified as a gale warning with northwest winds of 30-40 knots and 6- to 12-ft waves. In October, a sample collected from 28 to 29 October occurred during west to northwest winds from 15 to 25 knots. Wave heights of 4-6 ft were associated with the storm. YOY alewife collected

during the 24-hour period accounted for 75 percent of the entire month's collection of alewife. In December, a storm during the sample period 27-28 December began with southeast winds which moved to the west; waves increased from 4 to 7 ft. YOY rainbow smelt collected in that sample period accounted for 39 percent of all rainbow smelt YOY collected in December.

Rates of impingement were calculated using two different methods for comparison. The mean daily impingement rate (Table 3-2) is defined as the average number of fish collected per day per month. 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 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.

The mean daily impingement rate (Table 3-2) was highest in April (1,943 fish/day) followed by October (1,763 fish/day), March (1,226 fish/day), and December (1,047 fish/day). April and March numbers are reflective of adult spawning movements. October and December reflect the influx of YOY during storms. The lowest daily impingement rates occurred in January (28 fish/day) and February (12 fish/day) when the station was shut down and most fish are offshore for the winter months. The collection of a particular species on a seasonal basis is also reflected in the daily rate of impingement. The rate of impingement for alewife rose in March (1,071 fish/day) and April (1,770 fish/day) then declined through the summer increasing again in October (971 fish/day) when YOY were collected. Rainbow smelt increased in March (89 fish/day) and April (117 fish/day).

The presence of YOY rainbow smelt in the fall increased the daily impingement rate from October (135 fish/day) through November (174 fish/day) and December (680 fish/day). Rates of impingement for white perch increased in October

TABLE 3-2 MEAN DAILY IMPINGEMENT RATE* BY SPECIES AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

	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	---	---	1,070.50	1,769.70	587.35	521.75	39.00	21.17	48.25	971.25	58.50	245.75	666.78
Rainbow smelt	17.00	5.25	88.50	117.06	55.75	6.75	---	30.83	46.75	134.75	174.00	680.25	99.82
Gizzard shad	---	---	0.25	0.13	0.05	---	---	0.17	1.00	442.50	66.50	32.50	27.88
Spottail shiner	---	0.25	33.25	22.81	31.65	19.00	0.25	14.67	4.25	29.25	1.00	16.00	19.22
Sculpins	8.75	2.25	6.00	5.44	11.55	7.75	---	13.83	0.50	36.75	1.50	11.00	8.96
Trout-perch	0.25	0.25	5.25	8.19	22.90	12.00	---	0.67	---	0.25	0.75	3.00	8.72
White perch	0.50	---	5.50	5.06	0.65	0.25	---	2.00	---	98.00	4.25	25.25	8.22
Tessellated darter	---	---	---	---	6.65	60.50	---	---	0.50	0.75	---	---	4.87
Stonecat	---	---	---	1.69	4.70	13.25	3.00	2.00	0.50	3.00	---	2.00	2.82
Threespine stickleback	0.25	---	5.00	8.50	1.65	0.75	---	---	---	0.25	2.00	2.50	2.72
Rock bass	1.00	---	1.50	0.25	0.50	0.50	2.75	0.83	---	20.50	---	1.25	1.65
Smallmouth bass	---	0.50	1.25	0.13	0.20	---	---	6.17	1.50	4.75	1.00	1.75	1.10
White bass	---	---	0.25	---	0.05	0.50	---	---	---	---	1.75	11.25	0.72
Bluegill	---	---	---	---	---	---	---	---	---	9.00	0.50	2.75	0.63
Yellow perch	---	---	1.50	1.31	0.20	0.25	0.25	---	---	0.25	0.25	1.75	0.54
Freshwater drum	---	---	0.50	0.13	---	---	0.50	---	---	2.00	---	2.75	0.32
Lake chub	---	---	0.50	0.88	0.30	---	---	---	---	---	---	---	0.28
Emerald shiner	0.25	0.25	3.00	0.06	---	---	---	---	---	---	---	1.00	0.24
Pumpkinseed	---	---	0.75	0.13	0.20	---	---	---	---	0.50	---	1.50	0.22
Black crappie	---	---	1.25	0.13	---	---	---	---	---	---	---	0.25	0.10
Lake trout	---	---	---	0.13	0.15	---	---	---	---	---	0.25	---	0.08
White sucker	---	---	---	---	0.10	0.25	---	0.17	---	---	0.50	---	0.08
Brown trout	---	---	---	---	0.05	---	0.25	0.17	---	---	---	0.50	0.06
Sea lamprey	---	---	---	---	---	0.25	0.75	---	---	---	---	---	0.05
Central mudminnow	---	---	---	0.06	---	---	---	---	---	---	---	0.50	0.04
American eel	---	---	---	---	0.05	---	---	0.17	---	0.25	---	---	0.04
Brook stickleback	---	---	---	0.13	---	---	---	---	---	---	---	---	0.03
Largemouth bass	---	---	---	---	---	---	0.25	0.17	---	---	---	---	0.03
Lake herring (Cisco)	---	---	---	0.06	---	---	---	---	---	---	---	---	0.01
Chinook salmon	---	---	---	---	0.05	---	---	---	---	---	---	---	0.01
Creek chub	---	---	---	---	0.05	---	---	---	---	---	---	---	0.01
Longnose dace	---	---	---	---	0.05	---	---	---	---	---	---	---	0.01
Burbot	---	---	---	---	---	---	0.25	---	---	---	---	---	0.01
Golden shiner	---	---	---	---	---	---	---	0.17	---	---	---	---	0.01
Walleye	---	---	---	---	---	---	---	0.17	---	---	---	---	0.01
Carp	---	---	---	---	---	---	---	---	---	0.25	---	---	0.01
Atlantic salmon	---	---	---	---	---	---	---	---	---	---	---	0.25	0.01
Subtotal	28.00	8.75	1,224.75	1,941.98	724.85	643.75	47.25	93.36	103.25	1,754.25	312.75	1,043.75	856.33
Other Species													
Crayfish	---	---	1.25	0.56	3.50	1.00	---	0.33	0.50	8.50	2.50	3.00	1.90
Mudpuppy	---	---	---	0.06	---	---	---	---	---	---	---	---	0.01
Fish Fragments													
Rainbow smelt	---	2.00	---	---	---	---	---	0.50	---	---	---	---	0.14
Crayfish	---	---	---	---	---	---	---	0.33	0.75	---	---	---	0.06
Sculpins	0.25	0.25	---	---	---	---	---	---	---	---	---	---	0.03
Spottail shiner	---	0.25	---	---	0.05	---	---	---	---	---	---	---	0.03
Threespine stickleback	---	0.50	---	---	---	---	---	---	---	---	---	---	0.03
Tessellated darter	---	---	---	---	---	---	---	0.17	---	---	---	---	0.01
Unidentified	---	---	---	---	---	---	---	0.17	---	---	---	---	0.01
Total	28.25	11.75	1,226.00	1,942.60	728.40	644.75	47.25	94.86	104.50	1,762.75	315.25	1,046.75	858.55

* Rate = average number of fish impinged per day.

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

TABLE 3-3 MONTHLY IMPINGEMENT RATE* (BASED ON FLOW) AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

	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)	3.137	3.835	5.827	19.614	17.373	3.081	3.046	8.784	5.935	5.813	5.772	5.658	87.875
Species													
Alewife	---	---	734.855	1,443.612	676.164	677.377	51.215	14.458	32.519	668.330	40.541	173.736	N/A
Rainbow smelt	21.677	5.476	60.752	95.493	64.180	8.763	---	21.061	31.508	92.723	120.582	480.912	N/A
Gizzard shad	---	---	0.172	0.102	0.058	---	---	0.114	0.674	304.490	46.085	22.976	N/A
Spottail shiner	---	0.261	22.825	18.609	36.436	24.667	0.328	10.018	2.864	20.127	0.693	11.311	N/A
Sculpins	11.157	2.347	4.119	4.436	13.296	10.062	---	9.449	0.337	25.288	1.040	7.777	N/A
Trout-perch	0.319	0.261	3.604	6.679	26.363	15.579	---	0.455	---	0.172	0.520	2.121	N/A
White perch	0.638	---	3.776	4.130	0.748	0.325	---	1.366	---	67.435	2.945	17.851	N/A
Tessellated darter	---	---	---	----	7.656	78.546	---	---	0.337	0.516	---	---	N/A
Stonecat	---	---	---	1.377	5.411	17.202	3.940	1.366	0.337	2.064	----	1.414	N/A
Threespine stickleback	0.319	---	3.432	6.934	1.899	0.974	---	---	---	1.172	1.386	1.767	N/A
Rock bass	1.275	---	1.030	0.204	0.576	0.649	3.611	0.569	---	14.106	---	0.884	N/A
Smallmouth bass	---	0.522	0.858	0.102	0.230	---	---	4.212	1.011	3.269	0.693	1.237	N/A
White bass	---	---	0.172	---	0.058	0.649	---	---	---	---	1.213	7.953	N/A
Bluegill	---	---	---	----	---	---	---	---	---	6.193	0.347	1.844	N/A
Yellow perch	---	---	1.030	1.071	0.230	0.325	0.328	---	---	0.172	0.173	1.237	N/A
Freshwater drum	---	---	0.343	0.102	---	---	0.657	---	---	1.376	---	1.944	N/A
Lake chub	---	---	0.343	0.714	0.345	---	---	---	---	---	---	---	N/A
Emerald shiner	0.319	0.261	2.059	0.051	---	---	---	---	---	---	---	0.707	N/A
Pumpkinseed	---	---	0.515	0.102	0.230	---	---	---	---	0.344	---	1.060	N/A
Black crappie	---	---	0.858	0.102	---	---	---	---	---	---	---	0.177	N/A
Lake trout	---	---	---	0.102	0.173	---	---	---	---	---	0.173	---	N/A
White sucker	---	---	---	---	0.115	0.325	---	0.114	---	---	0.347	---	N/A
Brown trout	---	---	---	---	0.058	---	0.328	0.114	---	---	---	0.353	N/A
Sea lamprey	---	---	---	---	---	0.325	0.985	---	---	---	---	---	N/A
Central mudminnow	---	---	---	0.051	---	---	---	---	---	---	---	0.353	N/A
American eel	---	---	---	---	0.058	---	---	0.114	---	0.172	---	---	N/A
Brook stickleback	---	---	---	0.102	---	---	---	---	---	---	---	---	N/A
Largemouth bass	---	---	---	---	---	---	0.328	0.114	---	---	---	---	N/A
Lake herring (Cisco)	---	---	---	0.051	---	---	---	---	---	---	---	---	N/A
Chinook salmon	---	---	---	---	0.058	---	---	---	---	---	---	---	N/A
Creek chub	---	---	---	---	0.058	---	---	---	---	---	---	---	N/A
Longnose dace	---	---	---	---	0.058	---	---	---	---	---	---	---	N/A
Burbot	---	---	---	---	---	---	0.328	---	---	---	---	---	N/A
Golden shiner	---	---	---	---	---	---	---	0.114	---	---	---	---	N/A
Walleye	---	---	---	---	---	---	---	0.114	---	---	---	---	N/A
Carp	---	---	---	---	---	---	---	---	---	0.172	---	---	N/A
Atlantic salmon	---	---	---	---	---	---	---	---	---	---	---	0.177	N/A
Subtotal	35.704	9.128	840.743	1,584.126	834.458	835.768	62.048	63.752	69.587	1,207.121	216.738	737.893	N/A
Other Species													
Crayfish	---	---	0.858	0.459	4.029	1.298	---	0.228	0.337	5.849	1.733	2.121	N/A
Mudpuppy	---	---	---	0.051	---	---	---	---	---	---	---	---	N/A
Fish fragments													
Rainbow smelt	---	2.086	---	---	---	---	---	0.342	---	---	---	---	N/A
Crayfish	---	---	---	---	---	---	---	0.228	0.505	---	---	---	N/A
Sculpins	0.319	0.261	---	---	---	---	---	---	---	---	---	---	N/A
Spottail shiner	---	0.261	---	---	0.058	---	---	---	---	---	---	---	N/A
Threespine stickleback	---	0.522	---	---	---	---	---	---	---	---	---	---	N/A
Tessellated darter	---	---	---	---	---	---	---	0.114	---	---	---	---	N/A
Unidentified	---	---	---	---	---	---	---	0.114	---	---	---	---	N/A
Total	36.023	12.258	841.601	1,584.636	838.543	837.066	62.048	64.778	70.430	1,212.970	218.471	740.014	N/A

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

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

(98 fish/day) when YOY were impinged during storm conditions. YOY smallmouth bass increased the daily impingement rate for that species in August (6 fish/day) and October (5 fish/day) also under the influence of storm conditions. No other RIS fish exhibited seasonal and/or meteorological influences on the daily rate of impingement.

Several species including gizzard shad, spottail shiner, and threespine stickleback exhibited increases in their daily impingement rates relative to their behavior and/or meteorologic conditions. Gizzard shad and spottail shiner impingement rates increased in the month of October due to the influence of weather on YOY of both species. Spottail shiners increased in the impingement in the spring ranging from 33 to 23 fish/day for March and April and 32 fish/day in May. Threespine sticklebacks increased in March (5 fish/day) and April (8 fish/day) in response to their spawning behaviors.

The same pattern of seasonal and meteorological influences on impingement were observed when the rate was calculated based on the flow volumes during the sample periods (Table 3-3). The rate of impingement expressed as the number of fish per million cubic meters (MCM) increased in March (842 fish/MCM) and April (1,585 fish/MCM) as fish moved inshore. The rate of impingement remained high through May (839 fish/MCM), and June (837 fish/MCM) then decreased for the summer months increasing again in October (1,213 fish/MCM) and December (740 fish/MCM) as YOY were collected. Alewife exhibited the highest rates of impingement; particularly in March (735 fish/MCM), April (1,444 fish/MCM), May (676 fish/MCM), June (677 fish/MCM), and October (668 fish/MCM). Rainbow smelt showed increased rates of impingement in March (61 fish/MCM), April (95 fish/MCM), and May (64 fish/MCM) corresponding to adult inshore migratory movements. The rate of impingement for YOY rainbow smelt increased in October (93 fish/MCM), November (121 fish/MCM), and December (481 fish/MCM) in response to the influence of storm conditions. Calculations of the estimated number of organisms impinged at NMP Unit 1 during 1990 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

TABLE 3-4 ESTIMATED* MONTHLY IMPINGEMENT (BASED ON DAILY AVERAGE RATE) NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

	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	---	---	33,186	53,091	18,208	15,653	1,209	656	1,448	30,109	1,755	7,618	162,933
Rainbow smelt	527	147	2,744	3,512	1,728	203	---	956	1,403	4,177	5,220	21,088	41,705
Gizzard shad	---	---	8	4	2	---	---	5	30	13,718	1,995	1,008	16,770
Spottail shiner	---	7	1,031	684	981	570	8	455	128	907	30	496	5,297
Sculpins	271	63	186	163	358	233	---	429	15	1,139	45	341	3,243
Trout-perch	8	7	163	246	710	360	---	21	---	8	23	93	1,639
White perch	16	---	171	152	20	8	---	62	---	3,038	128	783	4,378
Tessellated darter	---	---	---	---	206	1,815	---	---	15	23	---	---	2,059
Stonecat	---	---	---	51	146	398	93	62	15	93	---	62	920
Threespine stickleback	8	---	155	255	51	23	---	---	---	8	60	78	638
Rock bass	31	---	47	8	16	15	85	26	---	636	---	39	903
Smallmouth bass	---	14	39	4	6	---	---	191	45	147	30	54	530
White bass	---	---	8	---	2	15	---	---	---	---	53	349	427
Bluegill	---	---	---	---	---	---	---	---	---	279	15	85	379
Yellow perch	---	---	47	39	6	8	8	---	---	8	8	54	178
Freshwater drum	---	---	16	4	---	---	16	---	---	62	---	85	183
Lake chub	---	---	16	26	9	---	---	---	---	---	---	---	51
Emerald shiner	8	7	93	2	---	---	---	---	---	---	---	31	141
Pumpkinseed	---	---	23	4	6	---	---	---	---	16	---	47	96
Black crappie	---	---	39	4	---	---	---	---	---	---	---	8	51
Lake trout	---	---	---	4	5	---	---	---	---	---	8	---	17
White sucker	---	---	---	---	3	8	---	5	---	---	15	---	31
Brown trout	---	---	---	---	2	---	8	5	---	---	---	16	31
Sea lamprey	---	---	---	---	---	8	23	---	---	---	---	---	31
Central mudminnow	---	---	---	2	---	---	---	---	---	---	---	16	18
American eel	---	---	---	---	2	---	---	5	---	8	---	---	15
Brook stickleback	---	---	---	4	---	---	---	---	---	---	---	---	4
Largemouth bass	--	---	---	---	---	---	8	5	---	---	---	---	13
Lake herring (Cisco)	---	---	---	2	---	---	---	---	---	---	---	---	2
Chinook salmon	---	---	---	---	2	---	---	---	---	---	---	---	2
Creek chub	---	---	---	---	2	---	---	---	---	---	---	---	2
Longnose dace	---	---	---	---	2	---	---	---	---	---	---	---	2
Burbot	---	---	---	---	---	---	8	---	---	---	---	---	8
Golden shiner	---	---	---	---	---	---	---	5	---	---	---	---	5
Walleye	---	---	---	---	---	---	---	5	---	---	---	---	5
Carp	---	---	---	---	---	---	---	---	---	8	---	---	8
Atlantic salmon	---	---	---	---	---	---	---	---	---	---	---	8	8
Subtotal	869	245	37,972	58,261	22,473	19,317	1,466	2,893	3,099	54,384	9,385	32,359	242,723
Other Species													
Crayfish	---	---	39	17	109	30	---	10	15	264	75	93	652
Mudpuppy	---	---	---	2	---	---	---	---	---	---	---	---	2
Fish Fragments													
Rainbow smelt	---	56	---	---	---	---	---	16	---	---	---	---	72
Crayfish	---	---	---	---	---	---	---	10	23	---	---	---	33
Sculpins	8	7	---	---	---	---	---	---	---	---	---	---	15
Spottail shiner	---	7	---	---	2	---	---	---	---	---	---	---	9
Threespine stickleback	---	14	---	---	---	---	---	---	---	---	---	---	14
Tessellated darter	---	---	---	---	---	---	---	5	---	---	---	---	5
Unidentified	---	---	---	---	---	---	---	5	---	---	---	---	5
Total	877	329	38,011	58,280	22,584	19,347	1,466	2,939	3,137	54,648	9,460	32,452	243,530

* Estimate = number of fish impinged per month.

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

TABLE 3-5 ESTIMATED* MONTHLY IMPINGEMENT (BASED ON FLOW) AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

	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)	3.137	3.835	5.827	19.614	17.373	3.081	3.046	8.784	5.935**	5.813	5.772	5.658	87.875
Total Monthly Volume (MCM)	23.322	28.561	45.452	34.246	26.033	23.050	25.973	45.148	44.823**	45.334	43.607	44.912	430.461
Species													
Alewife	---	---	33,401	49,438	17,603	15,614	1,330	653	1,458	30,298	1,768	7,803	159,366
Rainbow smelt	506	156	2,761	3,270	1,671	202	---	951	1,412	4,204	5,258	21,599	41,990
Gizzard shad	---	---	8	3	2	---	---	5	30	13,804	2,010	1,032	16,894
Spottail shiner	---	7	1,037	637	949	569	9	452	128	912	30	508	5,238
Sculpins	260	67	187	152	346	232	---	427	15	1,146	45	349	3,226
Trout-perch	7	7	164	229	686	359	---	21	---	8	23	95	1,599
White perch	15	---	172	141	19	7	---	62	---	3,057	128	802	4,403
Tessellated darter	---	---	---	---	199	1,810	---	---	15	23	---	---	2,047
Stonecat	---	---	---	47	141	397	102	62	15	94	---	64	922
Threespine stickleback	7	---	156	237	49	22	---	---	---	8	60	79	618
Rock bass	30	---	47	7	15	15	94	26	---	639	---	40	913
Smallmouth bass	---	15	39	3	6	---	---	190	45	148	30	56	532
White bass	---	---	8	---	2	15	---	---	---	---	53	357	435
Bluegill	---	---	---	---	---	---	---	---	---	281	15	87	383
Yellow perch	---	---	47	37	6	7	9	---	---	8	8	56	178
Freshwater drum	---	---	16	3	---	---	17	---	---	62	---	87	185
Lake chub	---	---	16	24	9	---	---	---	---	---	---	---	49
Emerald shiner	7	7	94	2	---	---	---	---	---	---	---	32	142
Pumpkinseed	---	---	23	3	---	---	---	---	---	16	---	48	90
Black crappie	---	---	39	3	---	---	---	---	---	---	---	8	50
Lake trout	---	---	---	3	5	---	---	---	---	---	8	---	16
White sucker	---	---	---	---	3	7	---	5	---	---	15	---	30
Brown trout	---	---	---	---	2	---	9	5	---	---	---	16	32
Sea lamprey	---	---	---	---	---	7	26	---	---	---	---	---	33
Central mudminnow	---	---	---	2	---	---	---	---	---	---	---	16	18
American eel	---	---	---	---	2	---	---	5	---	8	---	---	15
Brook stickleback	---	---	---	3	---	---	---	---	---	---	---	---	3
Largemouth bass	--	---	---	---	---	---	9	5	---	---	---	---	14
Lake herring (Cisco)	---	---	---	2	---	---	---	---	---	---	---	---	2
Chinook salmon	---	---	---	---	2	---	---	---	---	---	---	---	2
Creek chub	---	---	---	---	2	---	---	---	---	---	---	---	2
Longnose dace	---	---	---	---	2	---	---	---	---	---	---	---	2
Burbot	---	---	---	---	---	---	9	---	---	---	---	---	9
Golden shiner	---	---	---	---	---	---	---	5	---	---	---	---	5
Walleye	---	---	---	---	---	---	---	5	---	---	---	---	5
Carp	---	---	---	---	---	---	---	---	---	8	---	---	8
Atlantic salmon	---	---	---	---	---	---	---	---	---	---	---	8	8
Subtotal	832	259	38,215	54,246	21,721	19,263	1,614	2,879	3,118	54,724	9,451	33,142	239,464
Other Species													
Crayfish	---	---	39	16	105	30	---	10	15	265	76	95	651
Mudpuppy	---	---	---	2	---	---	---	---	---	---	---	---	2
Fish Fragments													
Rainbow smelt	---	60	---	---	---	---	---	15	---	---	---	---	75
Crayfish	---	---	---	---	---	---	---	10	23	---	---	---	33
Sculpins	7	7	---	---	---	---	---	---	---	---	---	---	14
Spottail shiner	---	7	---	---	2	---	---	---	---	---	---	---	9
Threespine stickleback	---	15	---	---	---	---	---	---	---	---	---	---	15
Tessellated darter	---	---	---	---	---	---	---	5	---	---	---	---	5
Unidentified	---	---	---	---	---	---	---	5	---	---	---	---	5
Total	839	348	38,254	54,264	21,828	19,293	1,614	2,924	3,156	54,989	9,527	33,237	240,273

* Estimate = number of fish per million cubic meters (MCM) of water pumped per month.
** Includes 1 October 1990 flow for 13 hours 30 minutes to completion of sample of 30 September - 1 October 1990.

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

estimated number of fish impinged was 239,464 (excluding fragments). Of those, 159,366 were estimated to be alewife equaling 67 percent of the annual total. The number of rainbow smelt estimated impinged in 1990 was 41,990 (18 percent of the total). The RIS fish were estimated to be impinged in the following numbers: white perch - 4,403, smallmouth bass - 532, yellow perch - 178, lake trout - 16, brown trout - 32, chinook salmon - 2, and Atlantic salmon - 8. All RIS fish combined (206,527) comprised 86 percent of the annual estimated impingement. In 1990, the estimated impingement by month generally followed the seasonal and meteorological patterns previously discussed.

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, brown trout, chinook salmon, and Atlantic salmon).

Length frequency for species such as alewife and rainbow smelt which are collected throughout the year generally follow a seasonal pattern. Adults and subadults of both species are most often collected during spring months when spawning migrations move fish into inshore waters. Late summer and fall collections are primarily comprised of YOY (<100 mm; <4 in.) which have moved into shallow inshore 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.

In 1990, 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 (>100 mm; 4 in.). From September through December, most alewife collected were YOY (<100 mm; 4 in.). Overall, the alewife measured from samples collected in 1990 were comprised of 75 percent

TABLE 3-6a LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

ALEWIFE

Length Intervals (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
1.0 - 2.9	0	0	0	0	0	0	0	0	0	0	0	0	0
3.0 - 4.9	0	0	0	0	0	0	0	2	7	10	2	0	21
5.0 - 6.9	0	0	0	5	0	0	0	0	25	57	34	29	150
7.0 - 8.9	0	0	6	53	33	1	0	2	0	9	23	36	163
9.0 - 10.9	0	0	1	13	30	6	0	1	1	0	2	3	57
11.0 - 12.9	0	0	0	16	17	5	1	2	0	1	0	2	44
13.0 - 14.9	0	0	2	92	137	32	24	17	0	0	2	1	307
15.0 - 16.9	0	0	10	137	184	45	9	11	0	0	3	7	406
17.0 - 18.9	0	0	6	83	95	11	1	3	0	0	0	3	202
19.0 - 20.9	0	0	0	0	4	0	0	0	0	0	0	0	4
21.0 - 22.9	0	0	0	0	0	0	0	0	0	0	0	0	0
23.0 - 24.9	0	0	0	1	0	0	0	0	0	0	0	0	1
Total Measured	0	0	25	400	500	100	35	38	33	77	66	81	1,355
Mean Length	0.0	0.0	14.0	14.3	14.8	14.9	14.5	13.7	5.6	6.0	7.4	8.4	11.4
Minimum Length	0.0	0.0	7.0	6.4	7.7	8.5	12.6	3.2	3.9	4.5	4.8	5.3	3.2
Maximum Length	0.0	0.0	17.7	23.6	18.2	17.8	17.1	18.0	10.6	12.5	15.3	17.3	23.6

TABLE 3-6b LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

RAINBOW SMELT

Length Intervals (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
1.0 - 2.9	0	0	0	0	0	0	0	0	0	0	0	0	0
3.0 - 4.9	0	0	0	0	0	0	0	65	10	0	41	0	116
5.0 - 6.9	18	7	2	20	40	8	0	7	27	24	26	38	217
7.0 - 8.9	14	7	21	65	57	3	0	13	2	13	11	42	248
9.0 - 10.9	7	2	15	30	17	4	0	5	3	5	13	4	105
11.0 - 12.9	11	4	27	97	85	3	0	4	3	6	5	7	252
13.0 - 14.9	3	0	16	95	137	2	0	0	1	6	3	7	270
15.0 - 16.9	0	0	4	65	54	0	0	0	0	7	1	2	133
17.0 - 18.9	0	0	1	11	10	0	0	0	0	1	0	0	23
19.0 - 20.9	0	0	0	2	3	0	0	0	0	0	0	0	5
21.0 - 22.9	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Measured	53	20	86	385	403	20	0	94	46	62	100	100	1,369
Mean Length	8.6	8.3	11.1	11.9	12.2	8.8	0.0	5.5	6.2	9.1	8.3	8.1	8.9
Minimum Length	5.0	5.3	6.8	5.9	5.1	5.4	0.0	3.5	3.9	5.0	5.2	5.4	3.5
Maximum Length	13.2	12.7	17.0	20.0	20.0	14.6	0.0	12.8	13.0	17.5	17.1	15.5	20.0

TABLE 3-6c LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

WHITE PERCH

Length Intervals (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
1.0 - 2.9	0	0	0	0	0	0	0	0	0	0	0	0	0
3.0 - 4.9	0	0	0	0	0	0	0	4	0	0	0	0	4
5.0 - 6.9	2	0	2	1	0	0	0	4	0	16	2	20	47
7.0 - 8.9	0	0	1	4	0	0	0	0	0	31	13	33	82
9.0 - 10.9	0	0	3	2	2	0	0	0	0	3	2	13	25
11.0 - 12.9	0	0	0	0	0	0	0	0	0	0	0	1	1
13.0 - 14.9	0	0	0	1	0	0	0	0	0	0	0	0	1
15.0 - 16.9	0	0	0	2	0	0	0	0	0	0	0	0	2
17.0 - 18.9	0	0	2	0	0	0	0	0	0	0	0	0	2
19.0 - 20.9	0	0	3	2	2	0	0	0	0	0	0	0	7
21.0 - 22.9	0	0	3	7	2	0	0	0	0	0	0	0	12
23.0 - 24.9	0	0	3	12	2	0	0	0	0	0	0	0	17
25.0 - 26.9	0	0	2	10	1	0	0	0	0	0	0	0	13
27.0 - 28.9	0	0	1	14	3	0	0	0	0	0	0	0	18
29.0 - 31.9	0	0	0	2	0	1	0	0	0	0	0	0	3
Total Measured	2	0	20	57	12	1	0	8	0	50	17	67	234
Mean Length	6.4	0.0	18.1	21.5	21.6	31.0	0.0	4.9	0.0	7.3	8.0	7.8	12.7
Minimum Length	6.1	0.0	9.8	6.6	9.0	31.0	0.0	3.9	0.0	5.8	6.6	5.3	3.9
Maximum Length	6.7	0.0	27.3	30.7	28.5	31.0	0.0	6.2	0.0	10.1	9.6	11.3	30.7

TABLE 3-6d LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

YELLOW PERCH

Length Intervals (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
1.0 - 2.9	0	0	0	0	0	0	0	0	0	0	0	0	0
3.0 - 4.9	0	0	0	0	0	0	0	0	0	0	0	0	0
5.0 - 6.9	0	0	0	0	0	0	0	0	0	0	0	4	4
7.0 - 8.9	0	0	0	0	0	0	0	0	0	0	1	0	1
9.0 - 10.9	0	0	0	0	0	0	0	0	0	0	0	1	1
11.0 - 12.9	0	0	0	0	0	1	0	0	0	0	0	0	1
13.0 - 14.9	0	0	2	1	0	0	0	0	0	0	0	0	3
15.0 - 16.9	0	0	0	2	1	0	0	0	0	1	0	0	4
17.0 - 18.9	0	0	1	3	2	0	0	0	0	0	0	0	6
19.0 - 20.9	0	0	0	3	1	0	0	0	0	0	0	0	4
21.0 - 22.9	0	0	1	0	0	0	0	0	0	0	0	0	1
23.0 - 24.9	0	0	0	2	0	0	1	0	0	0	0	0	3
25.0 - 26.9	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Measured	0	0	4	11	4	1	1	0	0	1	1	5	28
Mean Length	0.0	0.0	16.7	18.8	17.8	11.9	24.4	0.0	0.0	16.1	7.4	6.7	15.0
Minimum Length	0.0	0.0	13.1	14.8	15.2	11.9	24.4	0.0	0.0	16.1	7.4	5.1	5.1
Maximum Length	0.0	0.0	21.5	24.8	19.4	11.9	24.4	0.0	0.0	16.1	7.4	9.1	24.8

TABLE 3-6e LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

SMALLMOUTH BASS

Length Intervals (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	30	0	1	0	0	31
5.0 - 6.9	0	1	0	0	0	0	0	5	2	1	1	0	10
7.0 - 8.9	0	1	0	0	0	0	0	0	2	13	3	2	21
9.0 - 10.9	0	0	0	0	0	0	0	0	0	3	0	1	4
11.0 - 12.9	0	0	0	0	0	0	0	0	0	1	0	0	1
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	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	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	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	1	0	0	0	0	0	0	0	1
33.0 - 34.9	0	0	0	0	0	0	0	0	1	0	0	0	1
35.0 - 36.9	0	0	0	0	0	0	0	0	0	0	0	0	0
37.0 - 38.9	0	0	1	0	0	0	0	0	0	0	0	0	1
39.0 - 40.9	0	0	0	0	1	0	0	0	0	0	0	0	1
41.0 - 42.9	0	0	3	1	1	0	0	0	0	0	0	0	5
43.0 - 44.9	0	0	0	0	1	0	0	0	0	0	0	0	1
45.0 - 46.9	0	0	0	1	0	0	0	0	0	0	0	0	1
Total Measured	0	2	4	2	4	0	0	35	5	19	4	3	78
Mean Length	0.0	7.4	40.9	43.2	39.8	0.0	0.0	4.3	12.5	8.2	7.8	15.6	20.0
Minimum Length	0.0	6.3	37.5	41.0	32.6	0.0	0.0	3.3	6.0	4.1	6.2	8.0	3.3
Maximum Length	0.0	8.5	42.5	45.3	44.7	0.0	0.0	6.7	33.9	11.0	8.5	37.2	45.3

TABLE 3-6f LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

SALMONIDS - CHINOOK SALMON

Length Intervals (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
14.0 - 15.9	0	0	0	0	1	0	0	0	0	0	0	0	1
Total Measured	0	0	0	0	1	0	0	0	0	0	0	0	1
Mean Length	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0
Minimum Length	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0
Maximum Length	0.0	0.0	0.0	0.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0

SALMONIDS - BROWN TROUT

Length Intervals (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
34.0 - 35.9	0	0	0	0	1	0	0	0	0	0	0	0	1
36.0 - 37.2	0	0	0	0	0	0	0	0	0	0	0	1	1
44.0 - 45.9	0	0	0	0	0	0	0	1	0	0	0	0	1
46.0 - 47.9	0	0	0	0	0	0	1	0	0	0	0	0	1
56.0 - 57.9	0	0	0	0	0	0	0	0	0	0	0	1	1
Total Measured	0	0	0	0	1	0	1	1	0	0	0	2	5
Mean Length	0.0	0.0	0.0	0.0	35.0	0.0	47.5	44.9	0.0	0.0	0.0	59.3	46.7
Minimum Length	0.0	0.0	0.0	0.0	35.0	0.0	47.5	44.9	0.0	0.0	0.0	57.6	35.0
Maximum Length	0.0	0.0	0.0	0.0	35.0	0.0	47.5	44.9	0.0	0.0	0.0	61.0	61.0

SALMONIDS - LAKE TROUT

Length Intervals (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
68.0 - 69.9	0	0	0	0	1	0	0	0	0	0	0	0	1
70.0 - 71.9	0	0	0	0	1	0	0	0	0	0	0	0	1
74.5 - 75.9	0	0	0	0	1	0	0	0	0	0	0	0	1
80.0 - 81.9	0	0	0	1	0	0	0	0	0	0	0	0	1
Total Measured	0	0	0	1	3	0	0	0	0	0	0	0	4
Mean Length	0.0	0.0	0.0	81.6	72.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	768.5
Minimum Length	0.0	0.0	0.0	81.6	69.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	69.6
Maximum Length	0.0	0.0	0.0	81.6	75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	81.6

SALMONIDS - ATLANTIC SALMON

Length Intervals (cm)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Interval Total
10.0 - 11.9	0	0	0	0	0	0	0	0	0	0	0	1	1
Total Measured	0	0	0	0	0	0	0	0	0	0	0	1	1
Mean Length	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	10.5
Minimum Length	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	10.5
Maximum Length	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.5	10.5

adults and subadults and 25 percent YOY. The minimum length measured was 3.2 cm (1.3 in.); the maximum length recorded was 23.6 cm (9.4 in.).

Rainbow smelt collections in 1990 (Table 3-6b) were dominated by adults and subadults from January through May. From August through December, most rainbow smelt collected were YOY (<100 mm; 4 in.). Throughout the year, 58 percent of the rainbow smelt measured from the impingement collections were adult/subadults. The minimum length measured for rainbow smelt collected in 1990 was 3.5 cm (1.4 in.); the maximum length recorded was 20.0 cm (8 in.).

White perch (Table 3-6c) measured from the 1990 impingement samples were predominantly adults in the spring months (March, April, and May) and YOY in the fall (October, November, and December). Overall, 67 percent of the white perch were collected as YOY. The minimum length recorded for white perch was 3.9 cm (1.6 in.); the maximum length recorded was 31.0 cm (12.4 in.).

Yellow perch (Table 3-6d) were collected sporadically as individuals throughout 1990. Six of the 28 yellow perch measured were YOY (21 percent). All of the YOY yellow perch were collected in November and December. The minimum length measured was 5.1 cm (2 in.); the maximum length was 24.8 cm (9.9 in.).

Smallmouth bass (3-6e) were collected primarily as adults and subadults in March, April, and May. YOY smallmouth bass dominated the collections of smallmouth bass from August through December. Of the smallmouth bass measured in 1990, 85 percent were YOY. In August, all of the smallmouth bass collected were YOY, as a result of storm conditions (west-northwest winds at 12-16 mph) corresponding to documented meteorological influences on the impingement process (EA 1988, 1989; Lifton and Storr 1977). The minimum length measured was 3.3 cm (1.32 in.); the maximum length was 45.3 cm (18.1 in.).

The four salmonid species collected (lake trout, brown trout, chinook salmon, and Atlantic salmon) were collected as individuals throughout the year. The

lake trout and brown trout were collected as adults. The chinook salmon was collected as a juvenile; the Atlantic salmon was collected as a parr-marked fingerling.

3.3 BIOMASS (PERMIT SECTION IV.B.4)

Total biomass (Table 3-7) of the 1990 impingement samples collected at NMP Unit 1 was 1,205,166 grams (1,205 kilograms). Alewife accounted for 1,036,430 grams (1,036 kilograms) or 86 percent of the annual total biomass. Alewife and rainbow smelt (37,517 grams; 37.5 kilograms) combined with the other RIS fish (white perch, 24,334 grams; yellow perch, 2,643 grams; smallmouth bass, 10,435 grams; and the salmonids, 27,250 grams) accounted for 94 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 3,399,442 grams (3,399 kilograms) of which alewife constituted 79 percent (2,677,709 grams; 2,678 kilograms). Alewife, rainbow smelt, and the other RIS species collected in 1990 accounted for 90 percent (3,056,366 grams) of the annual estimated biomass (excluding fragments).

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

Intake and discharge temperatures were recorded along with station generating conditions and are listed in Appendix B. From the Appendix B tables, intake temperatures ranged from a minimum of 0.0 C on 21 February 1990 to a maximum of 23.6 C on 18 August 1990. The discharge temperatures (when the plant was operating at full power) ranged from a minimum of 20.1 C on 28 December 1990 to a maximum of 30.9 C on 21 September 1990. Discharge temperatures in Appendix B for the months of January through July 1990 represent the station's outage condition. Discharge temperatures for the month of August 1990 represent days of low power operation (12-17 and 21-31 August) and a lake

TABLE 3-7 TOTAL BIOMASS OF IMPINGED ORGANISMS COLLECTED AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

	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	---	---	105,712	693,580	189,067	33,616	2,367	2,846	247	3,891	521	4,583	1,036,430
Rainbow smelt	209	61	2,102	15,801	9,752	83	---	207	182	1,309	2,293	5,518	37,517
Gizzard shad	---	---	508	947	6	---	---	1	9	4,942	3,230	3,663	13,306
Spottail shiner	---	4	878	2,981	3,937	533	8	482	63	294	25	418	9,623
Sculpins	124	24	98	273	829	72	---	252	4	219	16	151	2,062
Trout-perch	4	5	140	1,051	3,748	390	---	31	---	4	11	89	5,473
White perch	5	---	2,858	16,696	2,509	438	---	24	---	1,651	93	60	24,334
Tessellated darter	---	---	---	---	275	188	---	1	4	5	---	---	473
Stonecat	---	---	---	907	2,103	2,040	518	671	65	471	---	293	7,068
Threespine stickleback	1	---	24	189	50	8	---	---	---	1	8	10	291
Rock bass	12	---	202	466	1,558	1	2,829	1,249	---	1,406	---	357	8,080
Smallmouth bass	---	10	4,328	1,872	3,008	---	---	45	506	29	24	613	10,435
White bass	---	---	14	---	381	---	---	---	---	---	552	542	1,489
Bluegill	---	---	---	---	---	---	---	---	---	---	2	16	18
Yellow perch	---	---	457	1,661	313	17	144	1	---	47	3	---	2,643
Freshwater drum	---	---	331	469	---	---	72	---	---	96	---	219	1,187
Lake chub	---	---	36	173	92	---	---	---	---	---	---	---	301
Emerald shiner	1	4	41	2	---	---	---	---	---	---	---	21	69
Pumpkinseed	---	---	37	56	8	---	---	---	---	4	---	9	114
Black crappie	---	---	60	11	---	---	---	---	---	---	---	3	74
Lake trout	---	---	---	6,562	8,845	---	---	---	---	---	4,350	---	19,757
White sucker	---	---	---	---	1,888	781	---	1,325	---	---	2,293	24	6,311
Brown trout	---	---	---	---	500	---	1,475	1,139	---	---	---	4,350	7,464
Sea lamprey	---	---	---	---	---	157	576	---	---	---	---	---	733
Central mudminnow	---	---	---	3	---	---	---	---	---	---	---	12	15
American eel	---	---	---	---	1,069	---	156	---	---	114	---	---	1,339
Brook stickleback	---	---	---	1	---	---	---	---	---	---	---	---	1
Largemouth bass	---	---	---	---	---	---	1	1	---	---	---	---	2
Lake herring (Cisco)	---	---	---	1,200	---	---	---	---	---	---	---	---	1,200
Chinook salmon	---	---	---	---	22	---	---	---	---	---	---	---	22
Creek chub	---	---	---	---	11	---	---	---	---	---	---	---	11
Longnose dace	---	---	---	---	2	---	---	---	---	---	---	---	2
Burbot	---	---	---	---	---	---	2,175	---	---	---	---	---	2,175
Golden shiner	---	---	---	---	---	---	---	11	---	---	---	---	11
Walleye	---	---	---	---	---	---	---	2,500	---	---	---	---	2,500
Carp	---	---	---	---	---	---	---	---	---	1,700	---	---	1,700
Atlantic salmon	---	---	---	---	---	---	---	---	---	---	---	7	7
Subtotal	356	108	117,826	744,901	229,973	38,324	10,321	10,786	1,080	16,183	13,421	20,958	1,204,237
Other Species													
Crayfish	---	---	10	47	525	25	---	2	20	54	51	34	768
Mudpuppy	---	---	---	144	---	---	---	---	---	---	---	---	144
Fish Fragments													
Rainbow smelt	---	4	---	---	---	---	---	1	---	---	---	---	5
Crayfish	---	---	---	---	---	---	---	3	2	---	---	---	5
Sculpins	2	1	---	---	---	---	---	---	---	---	---	---	3
Spottail shiner	---	<1	---	---	1	---	---	---	---	---	---	---	1
Threespine stickleback	---	1	---	---	---	---	---	---	---	---	---	---	1
Tessellated darter	---	---	---	---	---	---	---	1	---	---	---	---	1
Unidentified	---	---	---	---	---	---	---	1	---	---	---	---	1
Total	358	114	117,826	745,092	230,499	38,349	10,321	10,794	1,102	16,237	13,472	20,992	1,205,166

NOTE: Dashes (---) indicate no catches made. Biomass recorded in grams.

TABLE 3-8 ESTIMATED* MONTHLY BIOMASS OF COLLECTED TAXA (BASED ON FLOW) AT NINE MILE POINT NUCLEAR STATION UNIT 1, 1990

	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)	3.137	3.835	5.827	19.614	17.373	3.081	3.046	8.784	5.934**	5.813	5.772	5.658	87.874
Total Monthly Volume (MCM)	23.322	28.561	45.452	34.246	26.033	23.050	25.973	45.148	44.823**	45.334	43.607	44.912	430.461
Species													
Alewife	---	---	824,579	1,210,989	283,312	251,493	20,183	14,628	1,866	30,345	3,936	36,379	2,677,710
Rainbow smelt	1,554	454	16,396	27,589	14,613	621	---	1,064	1,375	10,209	17,323	43,801	134,999
Gizzard shad	---	---	3,963	1,653	9	---	---	5	68	38,541	24,402	29,076	97,717
Spottail shiner	---	30	6,849	5,205	5,899	3,988	68	2,477	476	2,293	189	3,318	30,792
Sculpins	922	179	764	477	1,242	539	---	1,295	30	1,708	121	1,199	8,476
Trout-perch	30	37	1,092	1,835	5,616	2,918	---	159	---	31	83	706	12,507
White perch	37	---	22,293	29,151	3,760	3,277	---	123	---	12,876	703	476	72,696
Tessellated darter	---	---	---	---	412	1,406	---	5	30	39	---	---	1,892
Stonecat	---	---	---	1,584	3,151	15,262	4,417	3,449	491	3,673	---	2,326	34,353
Threespine stickleback	7	---	187	330	75	60	---	---	---	8	60	79	806
Rock bass	89	---	1,576	814	2,335	7	24,123	6,420	---	10,965	---	2,834	49,163
Smallmouth bass	---	74	33,759	3,269	4,507	---	---	231	3,822	226	181	4,866	50,935
White bass	---	---	109	---	571	---	---	---	---	---	4,170	4,302	9,152
Bluegill	---	---	---	---	---	---	---	---	---	---	15	127	142
Yellow perch	---	---	3,565	2,900	469	127	1,228	5	---	367	23	---	8,654
Freshwater drum	---	---	2,582	819	---	---	614	---	---	749	---	1,738	6,502
Lake chub	---	---	281	302	138	---	---	---	---	---	---	---	721
Emerald shiner	7	30	320	3	---	---	---	---	---	---	---	167	527
Pumpkinseed	---	---	289	98	12	---	---	---	---	31	---	71	501
Black crappie	---	---	468	19	---	---	---	---	---	---	---	24	511
Lake trout	---	---	---	11,457	13,254	---	---	---	---	---	32,864	---	57,575
White sucker	---	---	---	---	2,829	5,843	---	6,810	---	---	17,323	191	32,996
Brown trout	---	---	---	---	749	---	12,577	5,854	---	---	---	34,529	53,709
Sea lamprey	---	---	---	---	---	1,175	4,912	---	---	---	---	---	6,087
Central mudminnow	---	---	---	5	---	---	---	---	---	---	---	95	100
American eel	---	---	---	---	1,602	---	---	801	---	889	---	---	3,292
Brook stickleback	---	---	---	2	---	---	---	---	---	---	---	---	2
Largemouth bass	---	---	---	---	---	---	9	5	---	---	---	---	14
Lake herring (Cisco)	---	---	---	2,095	---	---	---	---	---	---	---	---	2,095
Chinook salmon	---	---	---	---	33	---	---	---	---	---	---	---	33
Creek chub	---	---	---	---	16	---	---	---	---	---	---	---	16
Longnose dace	---	---	---	---	3	---	---	---	---	---	---	---	3
Burbot	---	---	---	---	---	---	18,546	---	---	---	---	---	18,546
Golden shiner	---	---	---	---	---	---	---	57	---	---	---	---	57
Walleye	---	---	---	---	---	---	---	12,849	---	---	---	---	12,849
Carp	---	---	---	---	---	---	---	---	---	13,258	---	---	13,258
Atlantic salmon	---	---	---	---	---	---	---	---	---	---	---	56	56
Subtotal	2,646	804	919,072	1,300,596	344,607	286,716	86,677	56,237	8,158	126,178	101,393	166,360	3,399,444
Other Species													
Crayfish	---	---	78	82	787	187	---	10	151	421	385	270	2,371
Mudpuppy	---	---	---	251	---	---	---	---	---	---	---	---	251
Fish Fragments													
Rainbow smelt	---	30	---	---	---	---	---	5	---	---	---	---	35
Crayfish	---	---	---	---	---	---	---	15	15	---	---	---	30
Sculpins	15	7	---	---	---	---	---	---	---	---	---	---	22
Spottail shiner	---	3	---	---	1	---	---	---	---	---	---	---	4
Threespine stickleback	---	7	---	---	---	---	---	---	---	---	---	---	7
Tessellated darter	---	---	---	---	---	---	---	5	---	---	---	---	5
Unidentified	---	---	---	---	---	---	---	5	---	---	---	---	5
Total	2,661	851	919,150	1,300,929	345,395	286,903	86,677	56,277	8,324	126,599	101,778	166,630	3,402,174

* Estimate = number of grams per million cubic meters (MCM) of water pumped.
** Include 1 October 1990 flow for 13 hours and 30 minutes to completion of sample of 30 September - 1 October 1990.

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

turnover on 19 August 1990. Temperatures listed 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 1990.

REFERENCES

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APPENDIX A

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

APPENDIX A

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

19 JUL — Void Impingement Sample: The impingement sample scheduled for collection on 19 July 1990 was declared void at the time of collection. Maintenance work on a traveling screen had been completed and the previously tagged screen was washed and back in service during the sample period. An unknown quantity of debris and fish was released into the sample, voiding the sample. The sample was rescheduled and successfully completed on 24 July 1990.

26 SEP — Void Impingement Sample: The impingement sample scheduled for collection on 26 September 1990 was declared void at the time of collection. The traveling screens could not be rotated for the final sample screenwash, voiding the sample. Plant personnel were unavailable to correct the problem due to a critical startup surveillance being test conducted at the time. The sample was rescheduled and collected on 1 October 1990.

03 OCT — Void Impingement Sample: The impingement sample scheduled for collection on 3 October 1990 was declared void at the time of collection. Maintenance work on a traveling screen was completed and the screen was washed and placed back into service. This caused an unknown quantity of fish and debris to be washed into the collection basket, voiding the sample. The sample was rescheduled and successfully completed on 10 October 1990.

19 OCT — Void Impingement Sample: The impingement sample scheduled for collection on 19 October 1990 was declared void prior to completion. Plant personnel were forced to remove the collection basket prior to the sample end time due to a large influx of debris during an unusually violent wind storm. The void sample was reset and successfully collected on 20 October 1990.

APPENDIX B

STATION OPERATING CONDITIONS
(PERMIT SECTIONS IV.B.5 AND IV.C.9)

TABLE B-1 STATION OPERATING CONDITIONS AT NINE MILE POINT NUCLEAR STATION-UNIT 1, 1990

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: January 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	1	1	785,947.68	0	0.9	0.9
2	1	1	787,037.76	0	0.3	0.3
3	1	1	809,384.40	0	0.6	0.7
4	1	1	784,312.56	0	0.6	0.6
5	1	1	782,677.44	0	0.9	0.9
6	1	1	782,677.44	0	0.9	0.9
7	1	1	782,677.44	0	0.8	0.8
8	1	1	790,308.00	0	0.6	0.6
9	1	1	790,308.00	0	1.2	1.1
10	1	1	784,312.56	0	1.3	1.2
11	1	1	788,672.88	0	1.0	1.0
12	1	1	787,582.80	0	0.8	0.9
13	1	1	787,582.80	0	0.3	0.3
14	1	1	787,582.80	0	0.3	0.3
15	1	1	787,037.76	0	1.0	1.1
16	1	1	787,037.76	0	0.5	0.7
17	1	1	789,762.96	0	0.8	1.0
18	1	1	787,037.76	0	1.4	1.6
19	1	1	787,037.76	0	1.0	1.3
20	1	1	787,037.76	0	0.8	1.1
21	1	1	787,037.76	0	0.7	0.9
22	1	1	789,762.96	0	0.6	0.8
23	1	1	787,037.76	0	0.6	0.7
24	1	1	787,582.80	0	0.9	0.9
25	1	1	787,037.76	0	1.3	1.3
26	1	1	787,582.80	0	1.4	1.4
27	1	1	787,582.80	0	1.2	1.3
28	1	1	787,582.80	0	1.4	1.9
29	1	1	787,037.76	0	1.3	1.6
30	1/0	1	374,442.48	0	1.4	2.1
31	0	1	103,557.60	0	1.4	2.6

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: February 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	0/1	1	766,871.28	0	1.4	1.6
2	1	1	790,853.04	0	1.4	1.6
3	1	1	790,853.04	0	1.0	1.4
4	1	1	790,853.04	0	1.4	1.9
5	1	1	790,853.04	0	1.0	1.8
6	1	1	792,488.16	0	0.7	0.9
7	1	1	790,308.00	0	0.9	1.0
8	1	1	790,308.00	0	1.0	1.4
9	1	1	792,488.16	0	1.3	1.7
10	1	1	792,488.16	0	1.3	1.8
11	1	1	792,488.16	0	1.0	1.6
12	1	1	790,308.00	0	0.9	1.4
13	1	1	788,672.88	0	1.2	1.7
14	1	1	790,853.04	0	1.4	1.8
15	1	1	790,308.00	0	1.9	2.3
16	1	1	790,853.04	0	1.4	1.9
17	1	1	790,853.04	0	1.2	1.6
18	1	1	790,853.04	0	1.0	1.4
19	1/2	1	1,139,678.64	0	0.7	1.0
20	2	1	1,466,157.60	0	0.1	0.2
21	2	1	1,466,157.60	0	0.0	0.2
22	2	1	1,468,337.76	0	0.3	0.6
23	2	1	1,469,427.84	0	0.7	1.0
24	2	1	1,469,427.84	0	0.9	1.0
25	2	1	1,469,427.84	0	0.1	0.3
26	2	1	1,466,157.60	0	0.0	0.1
27	2	1	1,466,157.60	0	0.1	0.3
28	2	1	1,466,157.60	0	0.0	0.1

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: March 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	2	1	1,466,157.60	0	0.0	0.1
2	2	1	1,466,157.60	0	0.0	0.4
3	2	1	1,466,157.60	0	0.2	0.5
4	2	1	1,466,157.60	0	0.3	0.4
5	2	1	1,466,157.60	0	0.3	0.4
6	2	1	1,466,157.60	0	0.1	0.2
7	2	1	1,466,157.60	0	0.2	0.4
8	2	1	1,466,157.60	0	0.6	0.8
9	2	1	1,466,157.60	0	0.8	1.0
10	2	1	1,466,157.60	0	0.6	0.7
11	2	1	1,466,157.60	0	0.8	1.0
12	2	1	1,466,157.60	0	1.0	1.2
13	2	1	1,466,157.60	0	1.4	1.6
14	2	1	1,466,157.60	0	1.5	1.8
15	2	1	1,466,157.60	0	1.8	2.2
16	2	1	1,467,792.72	0	1.9	2.3
17	2	1	1,467,792.72	0	1.8	2.1
18	2	1	1,467,792.72	0	3.6	4.3
19	2	1	1,467,792.72	0	2.6	2.7
20	2	1	1,469,427.84	0	2.5	2.6
21	2	1	1,467,792.72	0	3.3	3.4
22	2	1	1,466,157.60	0	2.8	3.1
23	2	1	1,465,067.52	0	4.0	4.2
24	2	1	1,465,067.52	0	3.1	3.2
25	2	1	1,465,067.52	0	2.5	2.7
26	2	1	1,463,977.44	0	3.1	3.2
27	2	1	1,462,342.32	0	2.7	2.8
28	2	1	1,462,342.32	0	2.4	2.7
29	2	1	1,462,342.32	0	2.4	2.6
30	2	1	1,469,427.84	0	3.2	3.4
31	2	1	1,469,427.84	0	2.7	2.9

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: April 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	2	1	1,469,427.84	0	2.6	2.8
2	2	1	1,463,977.44	0	2.6	2.8
3	2	1	1,475,968.32	0	2.6	2.8
4	2	1	1,465,067.52	0	2.3	2.5
5	2	1	1,465,067.52	0	3.3	3.5
6	2	1	1,465,067.52	0	3.4	3.6
7	2	1	1,465,067.52	0	2.8	3.0
8	2	1	1,465,067.52	0	3.5	3.7
9	2	1	1,465,067.52	0	3.1	3.3
10	2	1	1,469,427.84	0	3.0	3.2
11	2	1	1,465,067.52	0	2.8	3.0
12	2	1	1,465,067.52	0	3.7	3.8
13	2	1	1,465,067.52	0	3.8	4.0
14	2	1	1,465,067.52	0	3.6	3.8
15	2	1	1,465,067.52	0	3.3	3.7
16	2/1	1	1,273,213.44	0	3.9	4.2
17	1	1	782,132.40	0	4.8	5.2
18	1	1	782,132.40	0	5.4	5.7
19	1	1	786,492.72	0	4.0	4.3
20	1	1	782,132.40	0	4.8	5.3
21	1	1	782,132.40	0	3.7	4.2
22	1	1	782,132.40	0	4.8	5.2
23	1	1	783,767.52	0	6.1	6.5
24	1	1	783,767.52	0	5.7	6.2
25	1	1	783,767.52	0	5.7	6.2
26	1	1	783,767.52	0	7.5	8.0
27	1	1	786,492.72	0	7.2	7.7
28	1	1	786,492.72	0	6.9	7.3
29	1	1	786,492.72	0	4.7	5.3
30	1	1	786,492.72	0	4.9	5.4

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: May 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	1	1	786,492.72	0	6.1	6.6
2	1	1	786,492.72	0	7.9	8.2
3	1	1	786,492.72	0	7.6	7.8
4	1	1	786,492.72	0	7.1	7.5
5	1	1	786,492.72	0	5.9	6.3
6	1	1	786,492.72	0	7.3	6.9
7	1	1	786,492.72	0	5.9	6.2
8	1	1	782,132.40	0	5.8	6.2
9	1	1	786,492.72	0	5.9	6.4
10	1	1	786,492.72	0	6.2	6.7
11	1	1	786,492.72	0	8.2	8.7
12	1	1	786,492.72	0	7.1	7.7
13	1	1	786,492.72	0	7.8	8.3
14	1	1	782,132.40	0	7.3	7.9
15	1/2	1	954,365.04	0	8.1	8.4
16	2	1	1,438,905.60	0	8.2	8.6
17	2	1	1,438,905.60	0	7.0	7.4
18	2/1	1	1,268,853.12	0	9.1	9.4
19	1	1	761,965.92	0	8.5	8.9
20	1	1	761,965.92	0	7.2	7.7
21	1	1	761,965.92	0	6.8	7.3
22	1	1	761,965.92	0	7.9	8.4
23	1	1	767,416.32	0	8.5	8.9
24	1	1	772,866.72	0	9.1	9.0
25	1	1	764,691.12	0	10.2	10.7
26	1	1	764,691.12	0	9.6	10.3
27	1	1	764,691.12	0	9.9	10.4
28	1	1	761,965.92	0	11.1	11.8
29	1	1	761,965.92	0	8.5	9.3
30	1	1	761,965.92	0	9.5	10.1
31	1	1	761,965.92	0	9.6	10.2

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: June 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	1	1	761,965.92	0	9.7	10.3
2	1	1	761,965.92	0	9.8	10.6
3	1	1	761,965.92	0	10.4	11.2
4	1	1	761,965.92	0	12.3	12.9
5	1	1	761,965.92	0	11.2	11.9
6	1	1	767,416.32	0	11.4	12.1
7	1	1	761,965.92	0	11.7	12.5
8	1	1	761,965.92	0	10.7	11.4
9	1	1	761,965.92	0	10.8	11.6
10	1	1	761,965.92	0	11.5	12.1
11	1	1	761,965.92	0	11.3	12.1
12	1	1	761,965.92	0	12.8	13.4
13	1	1	761,965.92	0	12.6	13.3
14	1	1	779,407.20	0	14.3	15.1
15	1	1	777,227.04	0	15.0	15.6
16	1	1	777,227.04	0	15.1	15.6
17	1	1	777,227.04	0	15.8	16.4
18	1	1	769,596.48	0	15.4	15.9
19	1	1	767,416.32	0	16.0	16.4
20	1	1	772,866.72	0	16.1	16.6
21	1	1	775,046.88	0	15.2	15.7
22	1	1	775,046.88	0	16.1	16.6
23	1	1	775,046.88	0	15.9	16.3
24	1	1	775,046.88	0	16.9	17.4
25	1	1	767,416.32	0	15.9	16.3
26	1	1	767,416.32	0	15.4	15.9
27	1	1	769,596.48	0	16.1	16.5
28	1	1	769,596.48	0	16.4	16.9
29	1	1	771,776.64	0	16.2	16.7
30	1	1	771,776.64	0	15.4	15.9

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: July 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	1	1	771,776.64	0	16.8	17.2
2	1	1	764,691.12	0	17.6	18.1
3	1	1	764,691.12	0	17.7	18.2
4	1	1	764,691.12	0	18.2	18.7
5	1	1	764,691.12	0	18.8	19.2
6	1	1	767,416.32	0	18.4	19.0
7	1	1	767,416.32	0	18.7	19.1
8	1	1	767,416.32	0	18.7	19.2
9	1	1	771,776.64	0	19.3	19.8
10	1	1	769,596.48	0	19.9	20.4
11	1	1	769,596.48	0	19.8	20.3
12	1	1	769,596.48	0	19.4	20.0
13	1	1	769,596.48	0	15.3	15.9
14	1	1	769,596.48	0	6.6	6.7
15	1	1	769,596.48	0	7.0	7.7
16	1	1	767,416.32	0	13.8	14.3
17	1	1	775,046.88	0	18.7	19.2
18	1	1	769,596.48	0	20.1	20.7
19	1	1	769,596.48	0	21.3	21.9
20	1	1	769,596.48	0	21.7	22.2
21	1	1	769,596.48	0	21.7	22.3
22	1	1	769,596.48	0	22.1	22.8
23	1	1	769,596.48	0	21.8	22.4
24	1	1	773,956.80	0	21.8	22.4
25	1	1	769,596.48	0	21.9	22.5
26	1	1	771,776.64	0	22.1	22.6
27	1	1	771,776.64	0	22.1	22.7
28	1/2	1	852,442.56	0	21.6	22.2
29	2	1	1,453,076.64	0	21.8	22.3
30	2	1	1,450,896.48	0	22.8	22.9
31	2	1	1,447,626.24	0	23.2	23.7

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: August 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	2	1	1,450,896.48	0	23.1	23.6
2	2	1	1,450,896.48	0	23.3	23.8
3	2	1	1,450,896.48	0	23.1	23.8
4	2	1	1,450,896.48	0	23.0	24.3
5	2	1	1,450,896.48	0	22.9	26.1
6	2	1	1,453,076.64	0	22.9	26.2
7	2	1	1,460,707.20	0	22.8	23.3
8	2	1	1,450,896.48	0	22.9	23.4
9	2	1	1,450,896.48	0	22.7	23.3
10	2	1	1,449,806.40	0	22.6	23.1
11	2	1	1,449,806.40	0	22.7	23.3
12	2	1	1,449,806.40	18	23.3	26.1
13	2	1	1,469,427.84	78	23.1	27.6
14	2	1	1,462,342.32	92	22.6	27.9
15	2	1	1,463,977.44	95	22.8	27.7
16	2	1	1,469,427.84	88	23.1	27.9
17	2	1	1,467,792.72	48	23.1	28.3
18	2	1	1,467,792.72	0	23.6	29.4
19	2	1	1,467,792.72	0	13.9	19.2
20	2	1	1,455,256.80	0	5.3	5.7
21	2	1	1,459,617.12	6	6.2	7.8
22	2	1	1,462,342.32	101	6.8	11.6
23	2	1	1,449,806.40	100	8.1	12.9
24	2	1	1,455,256.80	97	6.8	11.7
25	2	1	1,455,256.80	101	7.5	12.4
26	2	1	1,455,256.80	99	11.9	17.0
27	2	1	1,449,806.40	100	14.9	20.0
28	2	1	1,459,617.12	98	19.0	24.1
29	2	1	1,455,256.80	89	20.0	25.2
30	2	1	1,449,806.40	90	20.6	25.7
31	2	1	1,453,076.64	90	20.4	26.3

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: September 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	2	1	1,453,076.64	97	21.0	25.9
2	2	1	1,453,076.64	101	21.2	26.1
3	2	1	1,453,076.64	102	16.8	21.8
4	2	1	1,463,977.44	103	17.2	22.1
5	2	1	1,471,608.00	101	18.2	23.1
6	2	1	1,466,157.60	98	19.6	24.4
7	2	1	1,469,427.84	97	20.1	25.0
8	2	1	1,469,427.84	120	11.3	16.1
9	2	1	1,469,427.84	110	7.7	12.4
10	2	1	1,468,337.76	109	9.4	14.2
11	2	1	1,455,256.80	105	12.5	17.3
12	2	1	1,455,256.80	109	12.4	17.2
13	2	1	1,479,783.60	104	16.1	21.1
14	2	1	1,468,337.76	174	16.1	23.0
15	2	1	1,468,337.76	244	16.9	24.9
16	2	1	1,468,337.76	349	17.9	29.4
17	2	1	1,476,513.36	371	18.1	29.9
18	2	1	1,463,977.44	416	17.6	30.5
19	2	1	1,463,432.40	380	17.9	30.4
20	2	1	1,463,977.44	427	17.4	30.5
21	2	1	1,463,432.40	440	17.4	30.9
22	2	1	1,463,432.40	440	17.1	30.8
23	2	1	1,463,432.40	446	16.3	30.1
24	2	1	1,463,432.40	322	15.5	25.9
25	2	1	1,459,617.12	220	16.4	24.3
26	2	1	1,454,166.72	89	16.6	24.3
27	2	1	1,449,806.40	0	16.4	24.0
28	2	1	1,449,806.40	6	16.6	23.3
29	2	1	1,449,806.40	222	16.7	24.9
30	2	1	1,449,806.40	257	16.3	25.3

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: October 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	2	1	1,475,423.28	439	16.1	29.5
2	2	1	1,468,337.76	441	15.4	28.9
3	2	1	1,468,337.76	446	15.6	29.2
4	2	1	1,475,423.28	445	15.3	29.0
5	2	1	1,468,337.76	445	15.2	28.8
6	2	1	1,468,337.76	444	15.7	29.3
7	2	1	1,468,337.76	445	15.9	29.7
8	2	1	1,461,252.24	450	15.6	29.3
9	2	1	1,461,252.24	446	15.4	29.7
10	2	1	1,459,617.12	448	15.0	28.8
11	2	1	1,468,337.76	447	15.3	29.1
12	2	1	1,461,252.24	445	14.9	28.7
13	2	1	1,461,252.24	448	14.6	28.6
14	2	1	1,461,252.24	446	14.2	27.9
15	2	1	1,454,166.72	445	13.8	27.5
16	2	1	1,463,977.44	446	14.1	27.7
17	2	1	1,461,252.24	434	14.1	27.8
18	2	1	1,459,617.12	446	14.1	27.7
19	2	1	1,463,977.44	439	13.0	27.1
20	2	1	1,463,977.44	300	12.8	22.8
21	2	1	1,463,977.44	406	12.8	25.6
22	2	1	1,451,986.56	439	12.3	25.7
23	2	1	1,451,986.56	442	12.1	25.4
24	2	1	1,459,617.12	449	13.0	26.6
25	2	1	1,459,617.12	464	12.9	26.9
26	2	1	1,463,977.44	523	12.3	28.0
27	2	1	1,463,977.44	565	11.6	28.1
28	2	1	1,463,977.44	593	10.6	27.7
29	2	1	1,451,986.56	597	10.5	27.8
30	2	1	1,451,986.56	596	10.6	27.9
31	2	1	1,457,436.96	596	10.7	28.0

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: November 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	2	1	1,454,166.72	576	10.8	27.7
2	2	1	1,457,436.96	573	11.0	27.8
3	2	1	1,457,436.96	520	11.3	27.0
4	2	1	1,457,436.96	591	11.7	29.1
5	2	1	1,459,617.12	596	11.3	26.6
6	2	1	1,462,342.32	597	10.0	27.4
7	2	1	1,454,166.72	598	9.6	26.9
8	2	1	1,451,986.56	567	9.4	26.1
9	2	1	1,454,166.72	591	10.0	27.2
10	2	1	1,454,166.72	596	10.1	27.4
11	2	1	1,454,166.72	598	8.3	25.6
12	2	1	1,454,166.72	566	6.4	22.9
13	2	1	1,451,986.56	558	5.9	22.1
14	2	1	1,454,166.72	599	7.7	24.8
15	2	1	1,454,166.72	583	7.3	24.2
16	2	1	1,457,436.96	584	7.8	24.3
17	2	1	1,457,436.96	525	8.1	23.3
18	2	1	1,457,436.96	0	8.1	8.7
19	2	1	1,449,806.40	0	7.2	7.8
20	2	1	1,449,806.40	0	6.8	7.3
21	2	1	1,451,986.56	0	7.0	7.6
22	2	1	1,445,991.12	48	7.2	11.1
23	2	1	1,445,991.12	406	7.9	20.6
24	2	1	1,445,991.12	584	6.4	23.2
25	2	1	1,445,991.12	604	6.3	23.4
26	2	1	1,449,806.40	603	7.1	23.9
27	2	1	1,454,166.72	601	7.5	24.8
28	2	1	1,451,986.56	602	7.0	24.3
29	2	1	1,451,986.56	599	6.6	23.4
30	2	1	1,459,617.12	602	6.3	23.8

TABLE B-1 (Cont.)

STATION: Nine Mile Point Nuclear Station Unit 1 MONTH: December 1990

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m^3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	2	1	1,459,617.12	603	6.7	24.1
2	2	1	1,459,617.12	604	5.7	23.1
3	2	1	1,456,346.88	604	6.4	23.8
4	2	1	1,457,436.96	604	5.9	23.3
5	2	1	1,449,806.40	606	3.8	21.3
6	2	1	1,459,617.12	607	3.8	21.6
7	2	1	1,457,436.96	578	4.7	21.6
8	2	1	1,457,436.96	533	4.8	21.0
9	2	1	1,457,436.96	600	5.3	22.2
10	2	1	1,455,256.80	604	3.5	21.3
11	2	1	1,459,617.12	606	5.6	23.3
12	2	1	1,454,166.72	607	6.3	23.9
13	2	1	1,451,986.56	608	4.2	22.2
14	2	1	1,449,806.40	600	5.2	22.9
15	2	1	1,449,806.40	603	5.4	23.3
16	2	1	1,449,806.40	604	5.2	23.1
17	2	1	1,449,806.40	605	4.4	22.4
18	2	1	1,454,166.72	605	5.6	23.8
19	2	1	1,451,986.56	603	3.9	21.9
20	2	1	1,449,806.40	604	5.3	23.2
21	2	1	1,451,986.56	599	5.9	23.8
22	2	1	1,451,986.56	581	5.6	23.4
23	2	1	1,451,986.56	604	5.3	23.2
24	2	1	1,451,986.56	604	4.4	22.4
25	2	1	1,451,986.56	605	3.6	21.5
26	2	1	1,389,306.96	605	1.8	20.2
27	2	1	1,328,807.52	600	2.8	21.8
28	2	1	1,459,617.12	606	3.7	20.1
29	2	1	1,459,617.12	159	4.0	9.6
30	2	1	1,459,617.12	0	3.7	4.0
31	2	1	1,463,977.44	0	4.9	5.1

APPENDIX C

SCIENTIFIC AND COMMON NAMES OF ALL TAXA COLLECTED IN 1990

APPENDIX C

SCIENTIFIC AND COMMON NAMES OF ALL TAXA COLLECTED IN 1990

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
Couesius plumbeus	Lake chub
Culaea inconstans	Brook stickleback
Cyprinus carpio	Carp
Dorosoma cepedianum	Gizzard shad
Etheostoma olmstedi	Tessellated darter
Gasterosteus aculeatus	Threespine stickleback
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill
Lota lota	Burbot
Micropterus dolomieui	Smallmouth bass
Micropterus salmoides	Largemouth bass
Morone americana	White perch
Morone chrysops	White bass
Necturus maculosus	Mudpuppy
Notemigonus crysoleucas	Golden shiner
Notropis atherinoides	Emerald shiner
Notropis hudsonius	Spottail shiner
Noturus flavus	Stonecat
Oncorhynchus tschawytscha	Chinook salmon
Osmerus mordax	Rainbow smelt
Perca flavescens	Yellow perch
Percopsis omiscomaycus	Trout-perch
Petromyzon marinus	Sea lamprey
Pomoxis nigromaculatus	Black crappie
Rhinichthys cataractae	Longnose dace
Salmo salar	Atlantic salmon
Salmo trutta	Brown trout
Salvelinus namaycush	Lake trout
Semotilus atromaculatus	Creek chub
Stizostedion vitreum	Walleye
Umbra limi	Central mudminnow