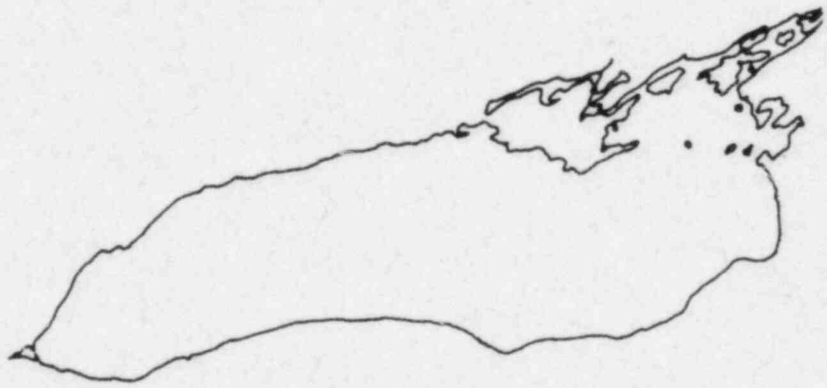
Niagara Mohawk Power Corporation
Power Authority of the State of New York



1982
Nine Mile Point Aquatic Ecology Studies

March 1983

ECOLOGICAL ANALYSTS, INC.

EA Report NMP11K

1982 NINE MILE POINT AQUATIC ECOLOGY STUDIES

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1. INTRODUCTION

This report presents the results of aquatic ecological studies conducted by Ecological Analysts, Inc. (EA) during 1982 in the vicinity of the Nine Mile Point promontory in southeastern Lake Ontario. These aquatic studies were conducted in accordance with Environmental Technical Specifications for the Nine Mile Point Unit 1 and the James A. FitzPatrick nuclear generating stations, as prescribed by the United States Nuclear Regulatory Commission.

The ecological interaction of the Nine Mile Point Unit 1 and James A. FitzPatrick plants with the Lake Ontario environment in the vicinity of the Nine Mile Point promontory has been under study since the 1960s. This 1982 study represents a continuation of those early studies which were initiated during construction of the two nuclear plants (Nine Mile Point began operation in December 1969, James A. FitzPatrick started operation in July 1975).

The two stations are located on the shore of Lake Ontario approximately 11 kilometers (seven miles) northeast of the city of Oswego, New York. Nine Mile Point Unit 1 is a 620 MWe boiling water reactor with the cooling water intake structure located off shore in approximately 7.6 meters (25 feet) of water and the discharge structure located near shore in approximately 5.2 meters (17 feet) of water. James A. FitzPatrick is an 821 MWe boiling water reactor with the water intake structure located near shore in approximately 7.3 meters (24 feet) of water and the discharge, with a 236-meter (774-ft) diffuser, located off shore in approximately 9.1 meters (30 feet) of water.

This annual report consists of data descriptions and discussions of results from the sampling program conducted by EA from January 1982 through December 1982. The sampling program included impingement studies at both power plants throughout the year and gill net collections from the vicinity of the two nuclear generating stations from April through December. Chapter 2 describes field fisheries, impingement, and laboratory methodologies. Chapter 3 treats the results of in-plant impingement studies and Lake Ontario Studies. Chapter 4 is a comparison of results from gill net and impingement sampling. Chapter 5 provides an environmental impact assessment as required by the Environmental Technical Specifications.

2. METHODS AND MATERIALS

2.1 LAKE ONTARIO STUDIES

The sampling design and methods described in this section represent a continuation of a program that has evolved as a result of changes which occurred during the spring of 1979 in U.S. Nuclear Regulatory Commission Environmental Technical Specifications for the Nine Mile Point Unit 1 and the James A. FitzPatrick nuclear power plants.

2.1.1 Gill Net Sampling

Gill net sampling for the 1982 program was conducted along four transects extending perpendicular from the Lake Ontario shoreline (Figure 2-1). The transects NMPP (Nine Mile Point Plant) and FITZ (James A. FitzPatrick Plant) represent a zone in the lake near the two plants submerged intake and discharge structures. This zone can be influenced by the removal of cooling water and by subsequent thermal discharges and has been referred to as the experimental area. The transect to the west of the power stations, NMPW (Nine Mile Point West), is generally upcurrent (approximately 1.1 statute kilometers) of the experimental area with respect to the prevailing currents, and thus represents a zone considered outside the influence of the intakes and thermal discharges; this area has been referred to as a control area. The NMPE (Nine Mile Point East) transect is usually downcurrent (approximately 1.9 statute kilometers) from the discharge structures with respect to the prevailing currents and represents an area that sometimes is influenced by the thermal discharges; this zone has been referred to as the far-field area.

Sampling of finfish with gill nets during 1982 was conducted twice a month from April through August and monthly from September through December (Table 2-1). One experimental gill net was set at each of the four sampling stations. Each gill net measured 2.4 meters (8-ft deep) and 45.7 meters (150-ft long), comprised of six 7.6-meter (25-ft) panels with bar-mesh sizes ranging from 1.3 cm to 6.4 cm in 1.3 cm (0.5 to 2.5 inches in 0.5-in.) increments. All nets were set parallel to shore at the 9.1-meter (30-ft) depth contour. The nets were set at sunset of the night preceding an impingement collection and retrieved approximately 12 hours later.

2.1.2 Laboratory Processing

After collection of the nets, the samples were returned to the laboratory and all 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 E. For each taxa collected, total number and total weight were determined. In addition, individual lengths and individual weights were recorded for a maximum of 40 specimens per species per gill net collection. Total lengths were measured to the nearest millimeter; 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. Any unusual conditions, abnormalities, or presence of fish tags were noted on the data sheets.

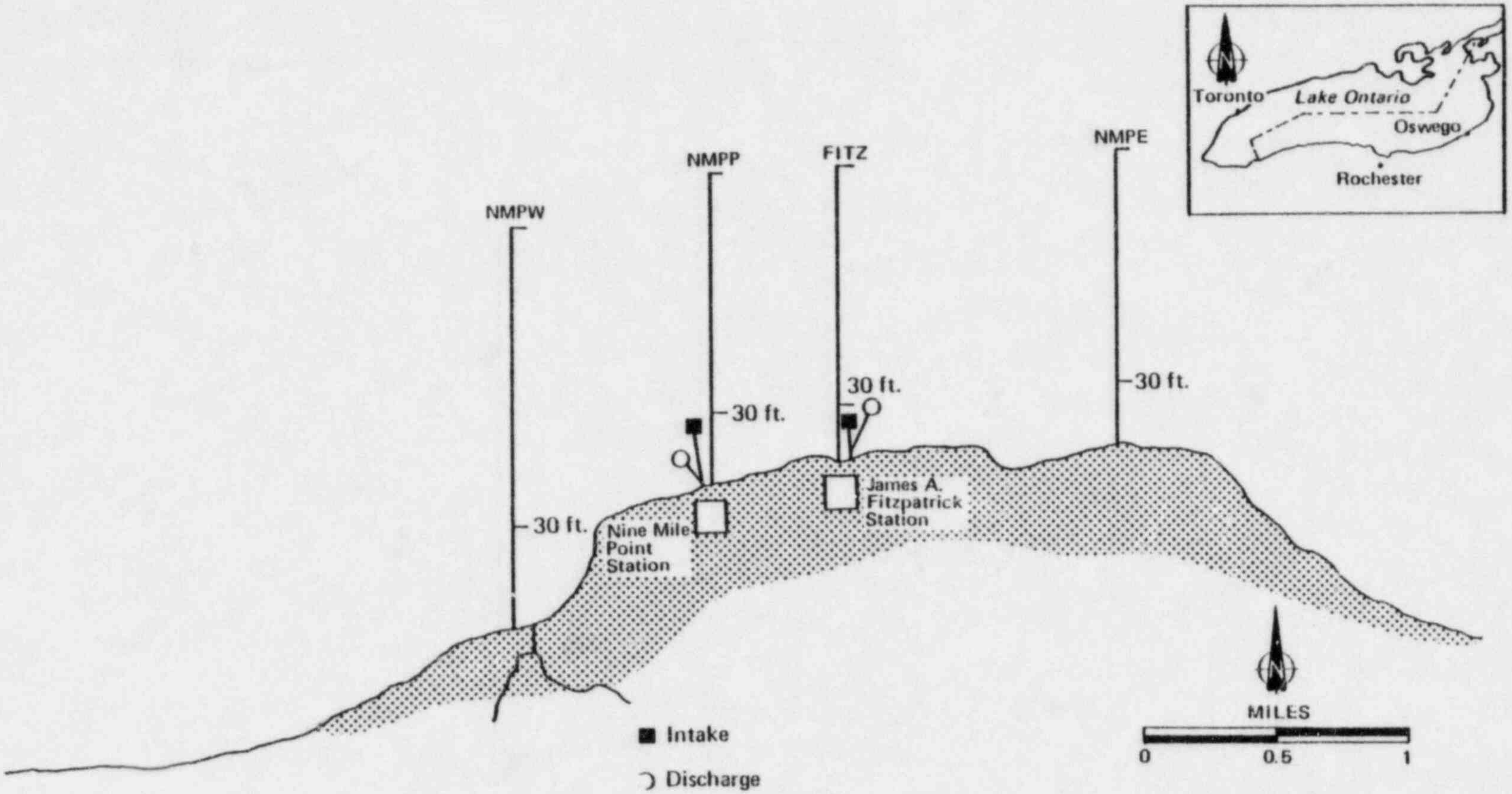

Figure 2-1. Sampling area for Nine Mile Point gill net studies showing location of sampling transects and intake and discharge structures.

TABLE 2-1 SAMPLING FREQUENCY FOR GILL NET STUDIES AND ASSOCIATED WATER QUALITY AT EACH OF THE FOUR TRANSECT LOCATIONS (NMPW, NMPP, FITZ, AND NMPE) IN LAKE ONTARIO NEAR NINE MILE POINT UNIT 1 AND JAMES A. FITZPATRICK, 1982

		Records Per Station[a]	
	Gill Nets	Water Temperature	Dissolved Oxygen
January	0	0	0
February	0	0	0
March	0	0	0
April	2	2	2
May	2	2	2
June	2	2	2
July	2	2	2
August	2	2	2
September	1	1	1
October	1	1	1
November	1	1	1
December	1	1	1
Totals for Year (per station)	14	14	14
Totals for Year	56	56	56

(a) Bottom water temperatures and dissolved oxygen concentrations were recorded when gill nets were harvested.

2.1.3 Data Analysis

Catch data from gill nets were expressed as a catch-per-unit-effort (c/f) where a unit of effort was defined as a 12-hour set:

$$c/f = \frac{(X)\ (12)}{T}$$

where

X = number of fish caught in the sample
T = duration of set in hours.

2.2 IN-PLANT STUDIES

2.2.1 Impingement Sampling

In accordance with the requirements of the NRC's Environmental Technical Specifications, impingement catches were monitored on a frequency of 4 to 20 samples per month from January through December 1982 at the Nine Mile Point Unit 1 and the James A. FitzPatrick nuclear power stations (Table 2-2).

Samples were collected over a 24-hour period on randomly selected days. Samples were initiated around 1300 hours of the sampling day and were terminated 24 hours later. Organisms impinged on the traveling screens were mechanically washed into a collection basket with a 9.5-mm (3/8-in.) stretch mesh net liner. The collection basket remained in place for the duration of the sample, unless high impingement or debris loads required that it be emptied, in which case it was removed, emptied, and repositioned.

Plant operational data were obtained for each sampling date to document cooling water flow rates, intake and discharge temperatures, and power production. Meteorological data such as wind speed and direction and air temperature were obtained twice during the impingement sample.

Plans existed for continuing impingement monitoring at either power plant if impingement rates exceeded 20,000 fish per 24-hour period. In addition, plant procedures at James A. FitzPatrick required continued impingement sampling when limits of the fish contingency plan were exceeded. The fish contingency plan specified a maximum number of individuals for each species, based on historical impingement patterns, which might be expected to be impinged during one 24-hour sampling period.

2.2.2 Laboratory Processing

Laboratory processing of organisms collected in impingement was conducted as described for organisms collected with gill nets (see Section 2.1.2).

TABLE 2-2 IMPINGEMENT SAMPLING REGIME ASSOCIATED WITH ENVIRONMENTAL TECHNICAL SPECIFICATIONS FOR NINE MILE POINT UNIT 1 AND JAMES A. FITZPATRICK, 1982

	No. of Sampling Days per Month[a]	
	Nine Mile Point	James A. FitzPatrick
January	4	4
February	4	4
March	4	4
April	16	16
May	20	20
June	4	6
July	4	4
August	6	4
September	4	4
October	4	4
November	4	4
December	5[b]	6[b][c]
TOTALS	79	80

(a) Days assigned within each month were selected randomly using random number tables (Rand Corporation 1955).
(b) One additional impingement sample, above the required four samples, was scheduled to coordinate with the December gill net collection.
(c) At James A. FitzPatrick, an additional impingement sample was required because impingement rates exceeded 20,000 fish in one 24-hour period.

2.2.3 Data Analysis

Data were tabulated to present impingement rates (number and weight) for each species as well as all species combined. Total estimated impingement for each month was calculated using the formula:

$$D = \frac{\Sigma c}{\Sigma v} (X)$$

where

- c = the number of fish collected during the sampling period
- v = the volume of cooling water used during the sampling period
- X = the total monthly volume of cooling water used.

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

2.3 WATER QUALITY DETERMINATIONS

2.3.1 Impingement Sampling

At the onset and completion of each impingement sample, discharge temperature ($\pm$0.5 C) was determined with a bucket of water retrieved from the discharge.

2.3.2 Gill Net Sampling

In association with each gill net sample, temperature and dissolved oxygen were measured at each gill net station (NMPE, NMPP, FITZ, and NMPW) (Table 2-1). Water was collected with a Kemmerer bottle at the 7.6-meter (25-ft) depth. Temperatures were determined with a hand-held thermometer ($\pm$ 0.5 C). Samples for dissolved oxygen analysis were fixed, stored on ice, and taken to the laboratory.

2.3.3 Laboratory Analysis

Dissolved oxygen values were determined (to the nearest 0.1 mg/ℓ) using the U.S. Environmental Protection Agency's modified version of the Winkler method (U.S. EPA 1979).

3. RESULTS

3.1 LAKE ONTARIO STUDIES

The 1982 Lake Ontario monitoring program was designed to describe the composition, relative abundance, and seasonal patterns of fish in the vicinity of the Nine Mile Point promontory. For ease in describing seasonal patterns, the months of the year were divided into winter (January through March), spring (April through June), summer (July through September), and fall (October through December). The aquatic studies also monitored water quality (temperature and dissolved oxygen) in the collection area. The results obtained during the 1982 gill net program using the methods and materials described in Chapter 2 follow.

3.1.1 Species Composition

Of the 14,395 specimens collected with gill nets from the Nine Mile Point study area during 1982, 23 species of fish and one taxa of crustacean were identified (Table 3-1). Alewife accounted for over 80 percent of all fish collected. Spottail shiner comprised almost 12 percent of the total catch, rainbow smelt comprised 3.3 percent, and the remaining 4 percent of the total catch was represented by 21 taxa.

Spottail shiner and white sucker were the only species collected during all months sampled in 1982. Alewife, brown trout, lake chub, and white perch were collected during seven of the nine months sampled. The remaining species were collected in six or less of the months sampled. The number of species collected each month remained between 11 and 13, with the exceptions of August when 16 different species were caught and October and December when only four and eight species, respectively, were collected.

3.1.2 Temporal and Spatial Distribution

The temporal distribution of fish collected by gill nets showed that peak abundance occurred during spring and early summer; July was the month of highest abundance. Collections of fish dropped in September and continued low through the fall (Table 3-1). Alewife was the dominant species during eight of the nine months sampled. In October, lake trout was the most numerous species collected.

Catch rates (catch per 12-hour set) among the transects ranged from one fish per 12-hour set to 820 fish per 12-hour set (Table 3-2). The lowest catch rate occurred in October at transect NMPE and the highest catch rate was in July at transect NMPW. The annual mean catch rates for all the transects, NMPW, NMPP, FITZ, and NMPE were similar in 1982. However, the annual mean catch rate for the FITZ transect was 5.0-7.7 percent lower than the annual mean catch rate for the other transects.

3.1.3 Selected Key (RIS) Species

Niagara Mohawk Power Corporation, the U.S. Nuclear Regulatory Commission, the Power Authority of the State of New York, the Environmental Protection Agency, and the New York State Department of Environmental Conservation have classified

TABLE 3-1 TEMPORAL ABUNDANCE AND PERCENT COMPOSITION OF TAXA COLLECTED BY GILL NETS, 1982

Species Name	APR(a) Number	APR(a) %	MAY(a) Number	MAY(a) %	JUN(a)(b) Number	JUN(a)(b) %	JUL(a) Number	JUL(a) %	AUG(a) Number	AUG(a) %
Alewife	1,445	78.5	1,035	88.7	2,984	82.3	4,765	83.7	829	66.1
Spottail shiner	14	0.8	14	1.2	518	14.3	771	13.5	310	24.7
Rainbow smelt	349	19.0	64	5.5	6	0.2	1	T	--	--
Yellow perch	1	0.1	--	--	24	0.7	44	0.8	11	0.9
White sucker	1	0.1	1	0.1	9	0.2	36	0.6	26	2.1
White perch	8	0.4	7	0.6	21	0.6	32	0.6	32	2.5
Lake trout	2	0.1	24	2.1	30	0.8	--	--	--	--
Trout-perch	1	0.1	11	0.9	15	0.4	24	0.4	--	--
Brown trout	15	0.8	2	0.2	13	0.3	10	0.2	1	0.1
Smallmouth bass	1	0.1	1	0.1	1	T	1	T	19	1.5
Lake chub	--	--	5	0.4	3	0.1	2	T	--	--
Rock bass	1	0.1	--	--	1	T	4	0.1	5	0.4
Brown bullhead	--	--	--	--	--	--	--	--	9	0.7
Rainbow trout	--	--	--	--	--	--	3	0.1	1	0.1
White bass	--	--	--	--	--	--	--	--	5	0.4
Stonecat	--	--	--	--	1	T	--	--	3	0.2
Chinook salmon	3	0.2	--	--	--	--	--	--	--	--
Crayfish	--	--	2	0.2	--	--	--	--	--	--
Gizzard shad	--	--	--	--	--	--	--	--	1	0.1
Black bullhead	--	--	--	--	--	--	--	--	1	0.1
Walleye	--	--	--	--	--	--	--	--	1	0.1
Freshwater drum	--	--	--	--	--	--	--	--	--	--
Pumpkinseed	--	--	--	--	--	--	--	--	1	0.1
Cisco	--	--	1	0.1	--	--	--	--	--	--
Total	1,841		1,167		3,626		5,693		1,255	

(a) Gill net collections were made twice a month from April through August.
(b) The second gill net set for June was collected on 7-8 July 1982 due to inclement weather at time of originally scheduled sampling date.

NOTE: "T" represents a trace percentage of less than 0.1 percent.
Dashes (--) indicate no catch.

TABLE 3-1 (CONT.)

Species Name	SEP		OCT		NOV		DEC		Totals	
	Number	%	Number	%	Number	%	Number	%	Number	%
Alewife	210	77.8	--	--	225	55.6	110	88.0	11,603	80.6
Spottail shiner	6	2.2	4	30.8	69	17.0	1	0.8	1,707	11.9
Rainbow smelt	--	--	--	--	52	12.8	1	0.8	473	3.3
Yellow perch	16	5.9	--	--	25	6.2	--	--	121	0.8
White sucker	10	3.7	2	15.4	18	4.4	5	4.0	108	0.8
White perch	2	0.7	--	--	1	0.2	--	--	103	0.7
Lake trout	--	--	6	46.2	4	1.0	2	1.6	68	0.5
Trout-perch	--	--	--	--	3	0.7	--	--	54	0.4
Brown trout	1	0.4	--	--	--	--	2	1.6	44	0.3
Smallmouth bass	10	3.7	--	--	--	--	--	--	33	0.2
Lake chub	1	0.4	1	7.7	4	1.0	3	2.4	19	0.1
Rock bass	5	1.9	--	--	2	0.5	--	--	18	0.1
Brown bullhead	8	3.0	--	--	--	--	--	--	17	0.1
Rainbow trout	--	--	--	--	1	0.2	1	0.8	6	T
White bass	--	--	--	--	--	--	--	--	5	T
Stonecat	--	--	--	--	--	--	--	--	4	T
Chinook salmon	--	--	--	--	--	--	--	--	3	T
Crayfish	--	--	--	--	1	0.2	--	--	3	T
Gizzard shad	--	--	--	--	--	--	--	--	1	T
Black bullhead	--	--	--	--	--	--	--	--	1	T
Walleye	--	--	--	--	--	--	--	--	1	T
Freshwater drum	1	0.4	--	--	--	--	--	--	1	T
Pumpkinseed	--	--	--	--	--	--	--	--	1	T
Cisco	--	--	--	--	--	--	--	--	1	T
Total	270		13		405		125		14,395	

NOTE: "T" represents a trace percentage of less than 0.1 percent.
Dashes (--) indicate no catch.

TABLE 3-2 SPATIAL AND SEASONAL DISTRIBUTION OF TOTAL FISH COLLECTED IN GILL NETS, 1982

Transect	Catch Per 12-Hour Set[a]									Annual
	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Mean
NMPW	315	91	337	820	136	57	4	104	5	208
NMPP	190	108	417	812	88	108	3	88	36	206
FITZ	199	128	376	610	253	24	3	88	43	192
NMPE	182	236	607	492	129	63	1	83	22	202

(a) Monthly mean catch rate.

nine species of fish in the Nine Mile Point area as representative important species (RIS). The species so designated are alewife, brown trout, coho, rainbow smelt, smallmouth bass, spottail shiner, threespine stickleback, white perch, and yellow perch. Of these nine species six have been selected, because of their abundance and trophic level, for detailed studies in the 1982 report. These six include alewife, rainbow smelt, smallmouth bass, spottail shiner, white perch, and yellow perch. The following results relate to the temporal and spatial distribution (catch per 12-hour set) and the length-frequency distribution of the six selected RIS species.

Alewife

Gill net catches of alewives were high in the spring and reached a peak (mean catch rate of 573 fish) in July. Catches declined rapidly in August and remained low (mean catch rate less than or equal to 101 fish) through the fall (Appendix Table A-1). These trends are consistent with gill net data from previous years. Annual mean catch rates for alewife were highest at transects NMPW, NMPP, and NMPE and were lower at transect FITZ (Table A-2).

Alewife collected with gill nets during 1982 ranged from 105 to 240 millimeters (mm) in total length. Most alewife collected were adult fish in the 150-190 mm range with a mean length of 172.7 mm; this size group was most abundant during the spring and summer (Table A-3).

Rainbow smelt

Gill net catches of rainbow smelt were highest in early spring and November (mean catch rate greater than or equal to 8 fish). Catches of smelt declined in late spring and no smelt were collected from August through October (Table A-1). A large catch of rainbow smelt at transect FITZ in April resulted in the highest annual mean catch rate at this transect.

Total lengths of rainbow smelt collected with gill nets ranged from 124 to 254 mm; with 163.3 mm as the mean length. Most rainbow smelt collected in the spring were yearling or older and fell within the length intervals of 130-170 mm, whereas rainbow smelt from the fall collections fell within 150-190 mm. However, the mean lengths for rainbow smelt in all months collected were quite similar.

Spottail shiner

Spottail shiner were collected with gill nets in each month sampled during 1982. Low catch rates in the early spring gave way to larger collections in the summer and declining catches in the fall. Annual mean catch rates were identical at transects FITZ and NMPE (33 fish per 12-hour set), lower for transect NMPW (20 fish per 12-hour set), and half that value for transect NMPP (16 fish per 12-hour set) (Table A-2).

Spottail shiners from the gill net collections ranged in length from 97 to 138 mm. The mean length was 118.0 mm and the most abundant length interval was 110-130 mm, generally adult fish in spawning condition. Approximately 94 percent of the adult spottail shiners caught were collected from June through August (Table A-3).

Smallmouth bass

Gill net catches of smallmouth bass were low throughout the year (Table A-1). The higher catch rates in August and September were due to relatively large catches of bass at transect FITZ (5 and 8 fish per 12-hour set) in those months (Table A-2).

Gill net collections yielded adult smallmouth bass ranging from 298 to 456 mm in total length, with a mean length of 363.4 mm. Although most of the smallmouth bass were caught in August and September, the lengths were evenly distributed over five length categories (310-410 mm) (Table A-3).

White perch

Collections of white perch with gill nets were highest in late spring and summer (June through August) (> mean catch rate of 3 fish) and only one white perch was caught in the fall (Table A-1). The most numerous collections of white perch occurred at transect NMPW during the summer months (Table A-2).

White perch collected with gill nets varied from 91 to 311 mm. Almost 75 percent of the white perch caught were adults in the length range of 210-270 mm, and the only white perch caught in the fall was a young of the year at 97 mm (Table A-3).

Yellow perch

Gill net catches of yellow perch were highest (mean catch rates of 2-6 fish) during the late spring, summer, and in November. Catch rates (Table A-1) were near zero during the cold water sampling months in early spring and in October and December.

Yellow perch from gill net collections were yearling to adult and ranged from 142 to 330 mm in total length with a mean length of 239.7 mm. The most abundant catch for yellow perch occurred in July and approximately 45 percent of those individuals were adults between 190 and 230 mm in length (Table A-3).

3.2 IN-PLANT STUDIES

Nine Mile Point Unit 1 and James A. FitzPatrick power plants have once-through cooling systems with intake and discharge structures located nearby in Lake Ontario. Aquatic organisms, detritus, and other debris enter with the water pumped from the vicinity of the submerged intake pipes. These organisms, detritus, and debris are impinged on trash racks, which are used for screening out large items, and the traveling screens are used for screening out smaller materials. The traveling screens are backwashed to remove any accumulation of organisms, detritus, and debris into a sluiceway which empties into the impingement collection baskets. Studies of fish impingement began in the Spring of 1972 at Nine Mile Point Unit 1 and in 1975 at James A. FitzPatrick. The fish impinged at both plants have been monitored yearly in order to estimate abundance and biomass losses for each species.

The objectives of the 1982 impingement sampling program were to estimate annual fish losses, to determine species composition of impinged fish, and to describe

seasonal patterns of fish impingement. In addition, plant operating conditions (Table 3-3 and Appendix Tables B-1 and B-2) were logged during 1982. The results obtained during the 1982 impingement sampling program follow.

3.2.1 Nine Mile Point Unit 1 Nuclear Station

3.2.1.1 Species Composition and Estimated Impingement

Impingement sampling at Nine Mile Point Unit 1 during 1982 resulted in the collection of 27 taxa. Twenty-six fish species or genera and one invertebrate species, crayfish, were identified. Rainbow smelt was the most numerous species collected comprising 66.8 percent of the total catch. Rainbow smelt together with alewife and the sculpin family accounted for 90 percent of all the taxa collected (Table 3-4). No single species was caught in all 12 months. Sculpins, which were the most frequently caught taxa, were caught during nine months of the year. Alewife were caught in six months of the year and rainbow smelt in only five months during 1982 (Table B-3).

Ninety-two percent of the total biomass collected at Nine Mile Point Unit 1 during 1982 was comprised of gizzard shad, alewife, and rainbow smelt (Table 3-5). Gizzard shad dominated biomass collections during the winter months. During the spring, summer, and fall months of 1982, Nine Mile Point Unit 1 was shut down for repairs and impinged few fish. Therefore, no one species dominated biomass collections. Rather, the dominant species, by weight, in each of the other months was determined by the largest fish caught in that month (Table B-4).

The total number of aquatic organisms impinged at Nine Mile Point Unit 1 during 1982 was estimated to be approximately 89,526 individuals (Table B-5). Rainbow smelt were estimated at 59,921 which is 67 percent of the total. Total weight was estimated to be 1,860 kilograms with gizzard shad estimated at 1,409 kilograms and 76 percent of the total biomass.

3.2.1.2 Temporal and Length Distributions

January was the month of peak impingement at Nine Mile Point Unit 1 in 1982. However, overall impingement collections were very low in 1982. The fact that Nine Mile Point Unit 1 main circulating water pumps were shut down for repairs from March through December accounts for the low impingement collections.

Rainbow smelt dominated the winter impingement collections, comprising over 60 percent of the total catch during those months. Alewife ranked second in abundance in January, accounting for 14.5 percent of the total catch. Sculpins ranked second in abundance in February and March comprising 22.4 and 15.1 percent, respectively, of the total monthly catch.

Length-frequency distributions are given for six representative important species (RIS): alewife, rainbow smelt, spottail shiner, smallmouth bass, white perch, and yellow perch (Table B-6). Alewife collected in the spring and summer at Nine Mile Point Unit 1 were subadult to adult fish; a few young-of-the-year alewife were collected in the late summer. Young-of-the-year as opposed to adult rainbow smelt dominated impingement collections in the winter.

TABLE 3-3 RECORD OF OUTAGES AT NINE MILE POINT UNIT 1 AND JAMES A. FITZPATRICK POWER PLANTS DURING 1982

Nine Mile Point Unit 1		James A. FitzPatrick	
Outage Start Date	Outage Duration (Days)	Outage Start Date	Outage Duration (Days)
20 MAR[1]	286	1 JAN[2]	67
		12 JUL	4
		8 OCT	10
		17 DEC	6

1. Plant scheduled to return to service in September 1983.
2. Refueling outage.

TABLE 3-4 NUMERICAL ABUNDANCE AND PERCENT COMPOSITION OF IMPINGED TAXA COLLECTED AT NINE MILE POINT UNIT 1, 1982

Species Name	Number Collected	Percent Composition
Rainbow smelt	5,915	66.8
Alewife	1,113	12.6
Sculpin family	937	10.6
Gizzard shad	323	3.6
White perch	119	1.3
Spottail shiner	90	1.0
Crayfish	79	0.9
Threespine stickleback	52	0.6
Emerald shiner	49	0.6
White bass	41	0.5
Yellow perch	30	0.3
Rock bass	25	0.3
Bluegill	15	0.2
Trout-perch	13	0.1
Tesselated darter	13	0.1
Black crappie	8	0.1
Lake chub	5	0.1
Pumpkinseed	5	0.1
Minnow family	5	0.1
Goldfish	5	0.1
American eel	3	0.0
Freshwater drum	2	0.0
Smallmouth bass	2	0.0
Central mudminnow	2	0.0
Unidentified fish	1	0.0
White crappie	1	0.0
Stonecat	1	0.0
Brown trout	1	0.0
Total	8,855	100.0

TABLE 3-5 BIOMASS (G) AND PERCENT COMPOSITION OF IMPINGED TAXA COLLECTED AT NINE MILE POINT UNIT 1, 1982

Species Name	Weight Collected	Percent Composition
Gizzard shad	137,294	75.3
Alewife	18,848	10.3
Rainbow smelt	11,691	6.4
Yellow perch	3,326	1.8
Sculpin family	3,174	1.7
White perch	1,802	1.0
American eel	1,321	0.7
Smallmouth bass	887	0.5
Brown trout	874	0.5
Spottail shiner	852	0.5
White bass	682	0.4
Rock bass	487	0.3
Crayfish	243	0.1
Goldfish	161	0.1
Emerald shiner	147	0.1
Trout-perch	124	0.1
Bluegill	93	0.1
Pumpkinseed	69	0.0
Threespine stickleback	59	0.0
Freshwater drum	47	0.0
Black crappie	29	0.0
Lake chub	28	0.0
Tesselated darter	9	0.0
Central mudminnow	4	0.0
Minnow family	3	0.0
White crappie	1	0.0
Stonecat	1	0.0
Unidentified fish	0	0.0
Total	182,256	100.0

Adult spottail shiner and adult yellow perch were also collected during this period; whereas the white perch collected in the winter of 1982 were less than one year in age. Few smallmouth bass were impinged.

3.2.2 James A. FitzPatrick Nuclear Power Plant

3.2.2.1 Species Composition and Estimated Impingement

Impingement sampling at James A. FitzPatrick during 1982 resulted in the collection of 48 taxa; 45 fish species or genera were identified. Three of the 48 taxa collected were non-fish species: a mollusk, a crustacean, and an amphibian. Alewife and rainbow smelt comprised approximately 97 percent of the total impingement catch (Table 3-6) and were caught in each month sampled. Also caught in each of the 12 months were rock bass and yellow perch. White perch and spottail shiner were collected during 11 months of the year and sculpin and smallmouth bass were found in 10 months (Table B-7).

Alewife comprised 78 percent of the total fish biomass collected in 1982 (Table 3-7). Gizzard shad and rainbow smelt comprised 13.9 percent of the total biomass. Alewife dominated biomass collections in the spring, summer, and fall. In January, gizzard shad presented the largest percentage of the total biomass collected. Brown trout comprised roughly half of February catches, by weight; rock bass and gizzard shad codominated in March (Table B-8).

The total number of aquatic organisms impinged at James A. FitzPatrick during 1982 was estimated to be approximately 603,242 individuals (Table B-9). Alewife were estimated at 346,503 which is 57 percent of the total. The rainbow smelt population impinged in 1982 was estimated at 235,289 (39 percent of the total). Total weight was estimated to be 11,235 kilograms and alewife were estimated at 8,670 kilograms or 77 percent of the total biomass.

3.2.2.2 Temporal and Length Distributions

Periods of peak estimated impingement at James A. FitzPatrick in 1982 occurred during the spring and in July and December. In April and May, adult alewife and subadult to adult rainbow smelt contributed to the large impingement. July's peak impingement was composed primarily of adult alewife and, in December, a large collection of young-of-the-year rainbow smelt increased the estimated impingement numbers. Overall, rainbow smelt dominated the winter and early spring (>55 percent of total monthly catches) collections. Alewife prevailed during the rest of the spring and summer (>80 percent of total monthly catches) impingement catches. In the winter months, alewife and rainbow smelt codominated the collections, with the exception of December when one large rainbow smelt collection caused a sharp increase in the impingement estimates. White perch, which was the third most prevalent species impinged in 1982, were caught in large numbers in April (616 fish) and December (126 fish). Sculpins were also collected in large numbers in April (545 fish). Gizzard shad catches were low (<270) in 1982.

Length-frequency distributions are given for the six representative important species (RIS): alewife, rainbow smelt, spottail shiner, smallmouth bass, white perch, and yellow perch (Table B-10). Adults were the principal age group of alewife collected in 11 of the 12 sampling months. In the late summer (September), young-of-the-year alewife predominated the collections.

TABLE 3-6 NUMERICAL ABUNDANCE AND PERCENT COMPOSITION OF IMPINGED TAXA COLLECTED AT JAMES A. FITZPATRICK, 1982

Species Name	Number Collected	Percent Composition
Alewife	109,157	60.0
Rainbow smelt	66,630	36.6
White perch	857	0.5
Sculpin family	814	0.4
Spottail shiner	769	0.4
Trout-perch	541	0.3
Emerald shiner	524	0.3
Rock bass	378	0.2
Threespine stickleback	309	0.2
Crayfish	298	0.2
Gizzard shad	265	0.1
Yellow perch	254	0.1
White bass	176	0.1
Smallmouth bass	161	0.1
Brook stickleback	122	0.1
Central mudminnow	110	0.1
Tesselated darter	94	0.0
Lake chub	45	0.0
Minnow family	37	0.0
Clam	34	0.0
Pumpkinseed	27	0.0
Stonecat	27	0.0
Bluegill	23	0.0
Brown trout	23	0.0
Sea lamprey	21	0.0
Brown bullhead	14	0.0
White sucker	13	0.0
Fathead minnow	12	0.0
Golden shiner	12	0.0
American eel	8	0.0
Lake trout	7	0.0
Rainbow trout	7	0.0
Chinook salmon	6	0.0
Goldfish	6	0.0
Black crappie	4	0.0
Cisco	3	0.0
Longnose dace	3	0.0
Logperch	2	0.0
Black bullhead	2	0.0
Freshwater drum	2	0.0
Brook silverside	2	0.0
Northern pike	2	0.0
Bluntnose minnow	1	0.0
Channel catfish	1	0.0
Burbot	1	0.0
Spotted mudpuppy	1	0.0
Brook trout	1	0.0
Coho salmon	1	0.0
Total	181,807	100.0

TABLE 3-7 BIOMASS (G) AND PERCENT COMPOSITION OF IMPINGED TAXA COLLECTED AT JAMES A. FITZPATRICK, 1982

Species Name	Weight Collected	Percent Composition
Alewife	3,015,208	78.0
Rainbow smelt	344,519	8.9
Gizzard shad	194,297	5.0
White perch	117,042	3.0
Rock bass	45,039	1.2
Brown trout	36,873	1.0
Yellow perch	30,634	0.8
Smallmouth bass	22,239	0.6
Trout-perch	7,735	0.2
Rainbow trout	6,760	0.2
Spottail shiner	5,284	0.1
White bass	5,133	0.1
Sea lamprey	4,582	0.1
White sucker	4,564	0.1
Sculpin family	3,652	0.1
American eel	3,118	0.1
Northern pike	2,998	0.1
Brown bullhead	2,450	0.1
Lake trout	1,988	0.1
Cisco	1,876	0.0
Pumpkinseed	1,344	0.0
Stonecat	1,238	0.0
Emerald shiner	1,215	0.0
Crayfish	1,076	0.0
Coho salmon	802	0.0
Black bullhead	713	0.0
Lake chub	691	0.0
Burbot	501	0.0
Central mudminnow	413	0.0
Threespine stickleback	371	0.0
Tesselated darter	176	0.0
Bluegill	161	0.0
Brook stickleback	139	0.0
Spotted mudpuppy	130	0.0
Goldfish	98	0.0
Golden shiner	80	0.0
Freshwater drum	71	0.0
Clam	47	0.0
Logperch	43	0.0
Minnow family	32	0.0
Fathead minnow	29	0.0
Brook trout	19	0.0
Chinook salmon	19	0.0
Longnose dace	19	0.0
Brook silverside	3	0.0
Channel catfish	3	0.0
Bluntnose minnow	2	0.0
Black crappie	2	0.0
Total	3,865,428	100.0

Young-of-the-year alewife were also caught in April and August. In contrast to the alewife, the young-of-the-year age group dominated collections of impinged rainbow smelt throughout most of the year. Only in May did adult rainbow smelt outnumber the young-of-the-year smelt. The majority of white perch collected in the spring were adults; however, about one-third of the white perch measured in April were yearlings.

A few young-of-the-year white perch (<55) were collected in the winter and late fall (December). Adult yellow perch were collected at James A. FitzPatrick during most of the year with increased occurrence in the spring and summer. Few young yellow perch (<20) were collected during 1982. The size of the spottail shiners collected increased during the first half of the year and then declined in the latter half of the year: yearling fish in the winter gave way to adult fish during the spring and early summer and then young-of-the-year fish in late summer and fall. Adult smallmouth bass were caught throughout the spring and summer. In the fall, only young-of-the-year smallmouth bass were collected. Generally, at James A. FitzPatrick as at Nine Mile Point Unit 1, adult and subadult fish were impinged during the winter and spring months. Young-of-the-year fish appeared in impingement samples in the summer and dominated the fall collections.

3.3 WATER QUALITY

3.3.1 Gill Net Sampling

Water temperature and dissolved oxygen were measured during sampling efforts to indicate the water quality in the vicinity of the Nine Mile Point gill net transects. Collections were made near the bottom of the 30-ft contour using the methods and materials described in Chapter 2 of this report.

Water temperatures taken at the four gill net transects ranged from 2.1 C to 21.4 C during the 1982 sampling program (Table 3-8) and are typical of a northern temperate lake. Temperatures were lowest in April, increased gradually through June, increased rapidly through July and August, to a maximum in mid-August. Water temperatures declined slightly in September, dropped rapidly in October (possibly as a result of an internal seiche), increased in November and declined again in December. Variations of 1 C or more between transects were rare in 1982. In April at transect NMPW, the water temperature was about 4 C higher than the other transects. Influence from nearby streams and tributaries may have contributed to the higher temperature.

Dissolved oxygen (DO) concentrations were greatest (>9.5 ppm) in the spring and fall months when water temperatures were low (Table 3-8). Lower DO values occurred during the late summer months when water temperatures were at the highest values for the year, reflecting the fact that oxygen solubility decreases with increasing water temperature. The lowest DO value recorded was 8.8 ppm on 24 August 1982 at transect FITZ. DO concentrations were not low enough to cause stress in aquatic organisms and were not likely to have influenced distribution.

TABLE 3-8 WATER TEMPERATURE AND DISSOLVED OXYGEN MEASUREMENTS DURING GILL NET SAMPLING, 1982

	Dissolved Oyxgen (ppm)					Water Temperature (C)				
	Transect					Transect				
Date	NMPW	NMPP	FITZ	NMPE	Mean	NMPW	NMPP	FITZ	NMPE	Mean
15 APR	14.0	14.0	14.0	14.1	14.0	2.5	2.2	2.8	2.1	2.4
27 APR	13.2	14.1	14.1	14.2	13.9	7.8	3.2	3.8	4.4	4.8
11 MAY	13.6	13.9	14.0	14.1	13.9	7.6	7.0	6.2	6.3	6.8
28 MAY	14.0	13.7	13.9	13.8	13.8	6.4	5.1	5.7	5.4	5.6
12 JUN	13.4	13.4	13.3	13.2	13.3	8.4	8.5	8.9	9.0	8.7
7 JUL	11.5	11.5	11.3	11.6	11.5	16.3	16.2	16.4	16.4	16.3
10 JUL	11.0	11.3	11.2	11.3	11.2	18.8	18.6	18.2	17.8	18.3
14 JUL	10.5	11.1	10.8	11.0	10.8	18.8	18.0	18.2	17.7	18.2
18 AUG	9.5	9.6	9.5	9.5	9.5	21.4	21.2	21.4	21.4	21.3
24 AUG	8.9	9.0	8.8	9.2	9.0	20.7	20.8	20.6	20.4	20.6
2 SEP	8.9	9.1	8.9	9.1	9.0	19.0	19.4	19.7	19.5	19.4
11 OCT	11.3	11.4	11.3	11.1	11.3	5.5	5.1	5.2	6.0	5.4
3 NOV	9.6	9.7	9.8	9.8	9.7	12.7	12.9	12.7	12.7	12.7
15 DEC	11.6	12.0	11.8	11.8	11.8	6.1	5.1	6.5	6.0	5.9

3.3.2 Impingement Sampling

Intake and discharge temperatures were measured at the beginning and end of each impingement sample. Intake temperatures were taken from plant operational logs. Discharge temperatures were measured in the discharge canal by EA personnel.

Intake temperatures measured by EA on sampling days at Nine Mile Point Unit 1 ranged from a minimum of -0.3 C on 19 and 29 January to a maximum of 22.6 C on 20 August. Discharge temperatures (when the plant was operating near generating capacity during January through March) on sampling days varied from a low of 20.2 C on 20 January to a high of 24.9 C on 6 and 28 January (Table B-1).

At James A. FitzPatrick, intake temperatures measured by EA on sampling days reached a minimum of -1.1 C on 10 March and a maximum of 22.2 C on 20 July. Discharge temperatures during plant operation (at least 75 percent of generating capacity) were lowest on 25 March and highest on 17 August. The lowest discharge temperature was 17.7 and the highest was 38.5 C (Table B-2). Minimum and maximum temperatures corresponded with normal seasonal cycles in lake temperatures.

4. COMPARISON OF SPECIES COMPOSITION AND TEMPORAL DISTRIBUTION FOR FISH COLLECTED IN GILL NETS AND IMPINGEMENT SAMPLES, 1982

Trends in the species composition and temporal distribution for fish collected with gill nets were generally comparable to trends observed in the impingement collections at Nine Mile Point Unit 1 and James A. FitzPatrick during 1982. Differences in these trends were largely due to several factors: the selectivity of the gill net gear to certain age or size class fish, scheduled or unscheduled outages at the power plants, and the different lengths of the sampling seasons.

Size selectivity of the gill nets may account for some differences in species composition between impingement and gill net collections. Although all of the 24 taxa (23 fish and one crustacean) with the exception of walleye collected with gill nets were present in the impingement collections, more than an additional 20 species were caught in impingement at James A. FitzPatrick. James A. FitzPatrick impinged 46 species of fish and Nine Mile Point Unit 1 impinged 27 species of fish. Many species such as sculpins, darters, and sticklebacks were too small to be caught in the gill nets used.

Size selectivity of the gill nets and absence of winter gill net sampling also explained a difference in temporal abundance of fish between gill nets and impingement collections. Gill net collections (catch per 12-hour set) of fish were highest in spring and early summer with peak catches coinciding with the spawning runs of several fish species. The highest impingement collections (number per 1,000 m^3 of water pumped) for Nine Mile Point Unit 1 were in January (Figure 4-1) and for James A. FitzPatrick during early winter and late fall (January and December), spring (April and May), and midsummer (July) months (Figure 4-2). The impingement abundance peaks in January reflected large collections of rainbow smelt. Because gill nets were not collected in January, coincidental peaks were not observed. A large collection of young-of-the-year rainbow smelt in December contributed to the impingement peak at James A. Fitzpatrick. Gill nets do not effectively catch young-of-the-year fish, therefore, no similar abundance peak was observed in the December gill net catch.

A power plant outage can obscure the usual trends in the temporal distribution of impingement catches. For example, few fish were impinged at Nine Mile Point Unit 1 from March through December during the outage. In past years, high numbers of alewife were impinged in the spring. Data from the Spring 1982 gill net collections reflected this trend as large numbers of alewife in spawning condition were caught. Spring collections of alewife in 1982 at James A. FitzPatrick and in gill nets compared similarly. In both types of collections, adult alewife dominated the spring catches.

Another factor that made comparison of gill net data and impingement data difficult was the different lengths of the sampling seasons. Gill net collections were made in nine months, April through December, whereas impingement sampling was conducted year-round. In terms of species composition some fish species, for example whitefish and gizzard shad, were present and/or abundant during winter impingement samples but were absent or poorly represented in the Nine Mile Point area during the gill net sampling season (spring through fall).

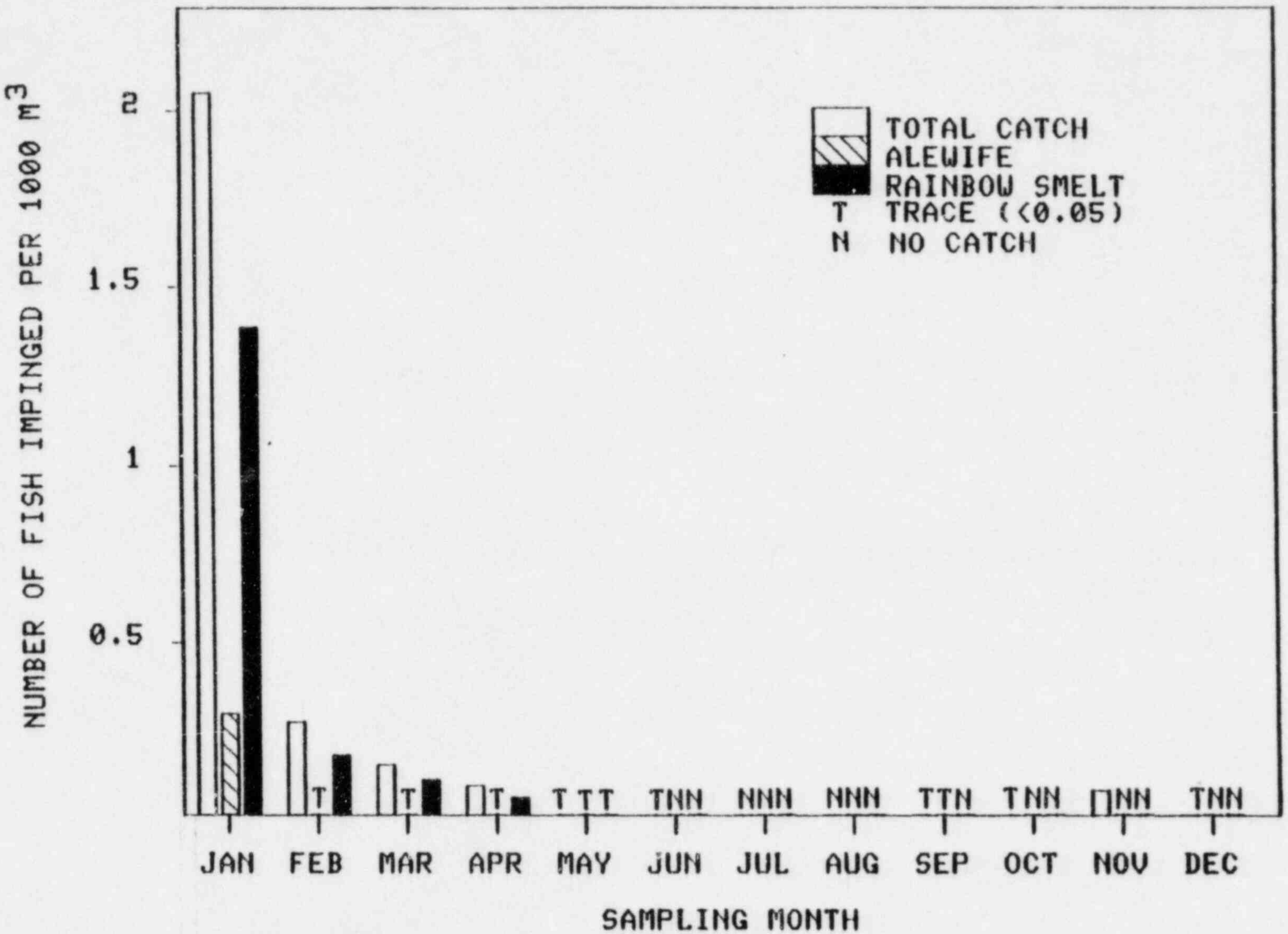

Figure 4-1. Seasonal variations in impingement rates at Nine Mile Point Unit 1, 1982.

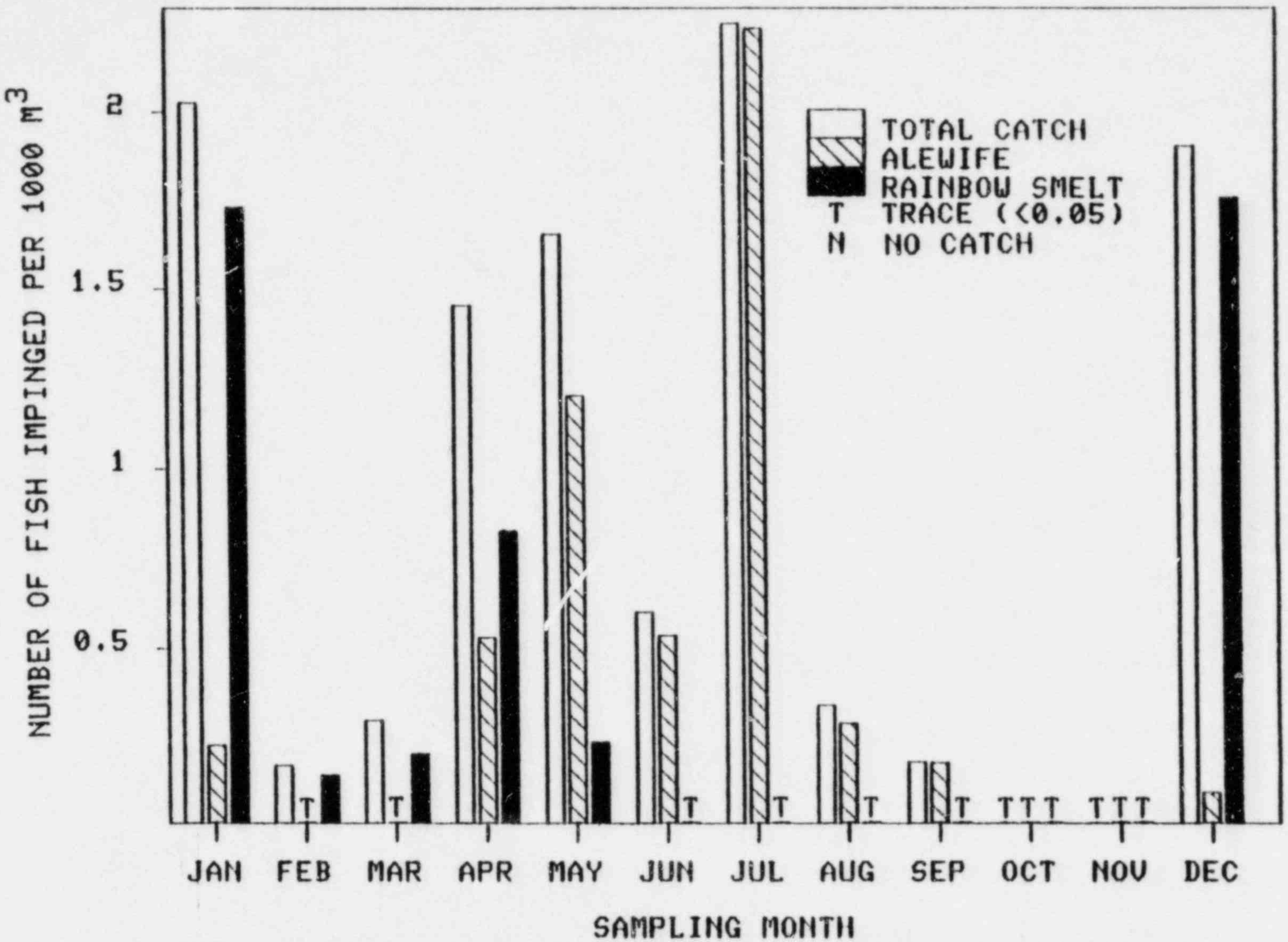

Figure 4-2. Seasonal variations in impingement rates at James A. Fitzpatrick, 1982.

The gill net sampling did not catch as many different species nor did it have identical temporal distribution patterns as did impingement collections. Rainbow smelt, which were dominant in the winter impingement collections, were not dominant in any month in the gill net catches.

Despite the differences mentioned above, the trends in species composition and temporal distribution were similar for gill nets and impingement collections. Almost all of the same species collected with gill nets were also found in impingement samples. In terms of numerical abundance, alewife dominated both gill net and James A. FitzPatrick impingement catches. Rainbow smelt, which dominated Nine Mile Point Unit 1 impingement catches, were second in abundance at James A. FitzPatrick and third in abundance in gill net catches. Taking into account the size selectivity of gill nets, temporal distribution patterns between impingement and gill nets were similar. Spring and summer impingement abundance peaks at James A. FitzPatrick (composed mainly of alewife) coincided with gill net peak catches (also mainly alewife). Spottail shiner were collected at James A. FitzPatrick and in gill nets for most of the sampling season. Rainbow smelt were present in higher numbers in the early spring and in the fall than during the summer. Generally, these trends were evidence that species occurrence and abundance is largely due to temperature preference and migrations of spawning fish populations, and that subadult and adult fish are collected in the winter and spring while young-of-the-year fish are mainly caught in the summer and fall.

5. ENVIRONMENTAL IMPACT ASSESSMENT

5.1 INTRODUCTION

Aquatic ecology studies were initiated for Nine Mile Point Unit 1 in the late 1960s and for James A. FitzPatrick in mid-1975. These studies were designed to evaluate potential effects to the aquatic environment from power plant operation in the vicinity of the Nine Mile Point promontory. A third nuclear station, Nine Mile Point Unit 2, is now under construction at this site.

The 1982 report is submitted to fulfill requirements of Niagara Mohawk Power Corporation and the Power Authority of the State of New York as amended by the U.S. Nuclear Regulatory Commission in the Spring of 1979 to assess any environmental impact. If total monthly impingement catches deviate from the daily ranges as specified in Section 3.1.2 of the Nine Mile Point Unit 1 Environmental Technical Specifications (Table 5-1) or exceed the monthly maximum limit by greater than 50 percent as specified in Section 4.1.1-B of the James A. FitzPatrick Enviromental Technical Specifications (Table 5-2), a discussion of events is to be included in the annual report. The results of impingement and gill net studies are detailed in Chapter 3 and discussed with respect to the effects of plant operation on the fish community.

5.2 IMPINGEMENT COLLECTIONS AT NINE MILE POINT UNIT 1 NUCLEAR STATION AND JAMES A. FITZPATRICK NUCLEAR PLANT, 1982

Periodic collections of impinged fish have been conducted at Nine Mile Point Unit 1 since 1972 and at James A. FitzPatrick since 1975. The species composition of impingement collections in 1982 was similar to that observed during the past years' impingement catches. Between 37 and 48 fish species have been caught at Nine Mile Point Unit 1 in the past years. This year's collection of 26 fish taxa was lower than previous years and may be attributed to the fact that main circulating water pumps were shut down during repairs for most of the year. At James A. FitzPatrick, impingement studies have yielded between 43 and 54 fish species per year. The 1982 study resulted in the collection of 44 fish taxa.

Impingement catches have consistently been dominated by alewife. However, there are two exceptions: in 1978 threespine stickleback was the dominant species and in 1979 rainbow smelt was the dominant species. Rainbow smelt has been second in abundance during most years except in 1976 when threespine stickleback was second in abundance and in 1979 when rainbow smelt was dominant. During 1982, alewife dominated impingement collections at James A. FitzPatrick power plant constituting over 60 percent of the total catch. During the three months of operation, January through 16 March, at Nine Mile Point Unit 1, rainbow smelt was the dominant species constituting 66.8 percent of the total catch. Rainbow smelt was second in abundance during 1982 at James A. FitzPatrick accounting for 36.6 percent of the total catch, and alewife was second in abundance at Nine Mile Point Unit 1. White perch was the third most abundant species at James A. FitzPatrick with 0.5 percent of the total catch, and sculpins were third in abundance at Nine Mile Point Unit 1 with 10.6 percent of the total catch. Threespine stickleback was low in abundance at both power plants during 1982.

TABLE 5-1 COMPARISON OF EXPECTED MONTHLY IMPINGEMENT RANGES AND ACTUAL SAMPLING RESULTS AT NINE MILE POINT UNIT 1, 1982

Month	Daily Average Number of Fish*		Actual Daily Average Impingement
	Low	High	(No. of Fish/Day)
January	231	631	1,871
February	211	718	217
March	482	2,864	101
April	5,552	20,923	3.2
May	8,501	50,759	0.5
June	1,366	3,213	0.8
July	718	2,648	0
August	0	5,020	0
September	0	1,397	1.8
October	154	338	2.8
November	103	1,565	3.8
December	294	1,713	1

* From Table 3.1-4, Section 3.1.2 of the Nine Mile Point Unit 1 Nuclear Power Station's Environmental Technical Specification.

TABLE 5-2 COMPARISON OF SPECIFIED MONTHLY MAXIMUM IMPINGEMENT ALLOWANCES AND ESTIMATED MONTHLY IMPINGEMENT FOR 1982 AT JAMES A. FITZPATRCK

Month	Monthly Maximum Impingement*	Plus 50 Percent	Total Estimated Monthly Impingement
January	41,596	62,394	47,283
February	16,646	24,969	3,533
March	22,595	36,152	14,095
April	413,854	620,781	91,148
May	1,750,162	2,625,243	110,301
June	131,769	197,653	38,986
July	67,249	100,873	142,100
August	33,708	50,562	22,753
September	31,570	47,355	11,453
October	32,428	48,642	877
November	87,928	131,892	2,205
December	30,837	46,255	118,508

* From Table 4.1.1-2, Section 4.1.1-B of the James A. FitzPatrick Nuclear Power Plant's Environmental Technical Specifications. The reportable monthly maximum estimated impingement is limit specified plus 50 percent.

In terms of biomass, alewife has been the dominant species during most years of impingement study. Gizzard shad dominated biomass collection in 1978 because of an abundance of large individuals. Rainbow smelt has been either second or third in dominance with other species such as smallmouth bass, white perch, or rock bass dominating in other years. During 1982, alewife was the dominant species, in terms of biomass, at James A. FitzPatrick and second in weight at Nine Mile Point Unit 1. Gizzard shad was the dominant species by weight at Nine Mile Point Unit 1 and third in dominance at James A. FitzPatrick. Rainbow smelt was the second dominant species, by weight, at James A. FitzPatrick and third in dominance at Nine Mile Point Unit 1.

Estimated annual impingement at both power plants has been highly variable over the years. Estimated annual impingement at Nine Mile Point Unit 1 from 1974 to 1981 ranged from a low of 135,000 fish in 1977 to a high of 3.4 million fish in 1976. James A. FitzPatrick annual estimated impingement ranged from 244,000 fish in 1979 to a high of 4.3 million fish in 1976. Impingement estimates for 1982 were low compared to estimates for previous years. Nine Mile Point Unit 1 impinged 89,526 organisms; James A. FitzPatrick impinged 603,242 organisms. In comparison to the standing stock estimates (O'Gorman and Bergstedt 1983, personal communication) for the two most abundant impinged species, alewife (4 to 4.5 billion) and rainbow smelt (0.5 billion), the numbers impinged at either power plant represented a negligible portion of the fish community of Lake Ontario.

5.3 OCCASIONS WHEN SPECIFIED LIMITS WERE EXCEEDED

During 1982, the average daily catch at Nine Mile Point Unit 1 was lower than the established daily ranges in March through July and October through December (Table 5-1). Nine Mile Point Unit 1 main circulating water pumps were shut down from March through December and therefore few organisms were impinged. However, in January, the established daily impingement range was exceeded. The January impingement catch was approximately three and one-half times greater than the specified range. Of the total fish collected in January, over 68 percent were rainbow smelt, and of the total rainbow smelt collected, over 95 percent were young-of-the-year fish. According to the Oswego Fish and Wildlife Station (FWS) (O'Gorman and Bergstedt 1982, 1983 personal communication), the rainbow smelt population has oscillated during recent years resulting in higher recruitment of smelt during the odd years. Impingement data on young-of-the-year rainbow smelt collected during the 1981 and 1982 winter seasons at the Nine Mile Point power plants was comparable with the FWS data. Collections of rainbow smelt at both Nine Mile Point Unit 1 and James A. FitzPatrick during the 1981 winter (EA 1982) were low (1,202 and 2,639, respectively). Young-of-the-year smelt, which were spawned in spring 1980, comprised a low percentage (less than 20 percent) of the total smelt catch. However, during the winter of 1982, the catches of rainbow smelt at both power plants were high and young-of-the-year smelt, spawned in spring 1981, comprised a high percentage (around 95 percent) of the total smelt catch.

Established monthly limits at James A. FitzPatrick were exceeded by 50 percent in July and December 1982 (Table 5-2). In July, large collections of alewives caused the monthly limits to be exceeded. At this time of the year, alewife move inshore in large numbers to spawn. Gill net data collected in spring and early summer 1982 pointed to a large spawning population of alewife in the vicinity of the Nine Mile Point promontory. In addition, one impingement

collection on 22 July contained almost 42 percent of the total fish collected for the month. In December, one large collection of young-of-the-year rainbow smelt caused the monthly limits to be exceeded. The impingement collection of 30 December contained over 86 percent of the total fish collected for the month. Of the fish collected, over 93 percent were rainbow smelt and over 90 percent of the smelt caught were young-of-the-year fish. One very large collection can introduce a considerable bias to monthly impingement estimates if it is included in calculation of the mean monthly impingement collection. Since large impingement collections typically have been associated with short-lived meteorological phenomenon, an alternate method can be used to estimate the December total: the total number collected on 30 December was added to the estimate for the other 30 days of December which was based on the other five 24-hour samples collected that month. By this method the estimated impingement for December 1982 was approximately 40,000 as compared to 118,508 using the mean of all six 24-hour samples.

The high impingement on 30 December 1982 may be attributed to unusually high west winds of about 40 knots during the sampling period. Previous studies at the Nine Mile Point power plants have indicated that higher rates of impingement may occur during specific weather conditions, such as high winds from the west or northwest. Studies by Ecological Analysts, Inc. in the vicinity of Nine Mile Point have supported these observations. For example, on 25 and 26 August, the wind blew from the west to northwest at 15-40 knots. The impingement collection at James A. FitzPatrick on 26 August constituted over 56 percent of the total collection for that month. On four other dates [in 1981 (29 September and 29 December) and 1982 (5 April and 26 August)] west or northwest winds exceeded 25 knots and impingement collections were greater than on adjacent sampling dates with lower wind velocity.

Environmental factors other than strong winds may also lead to higher impingement at the power plants. Biological factors such as population size, migration patterns, schooling, and spawning behavior in conjunction with environmental factors such as water temperature, currents, heavy waves, and plant operating parameters could affect impingement. Migrations of large populations of adult alewife and rainbow smelt during the spring and early summer seasons are triggered by responses to certain environmental and biological conditions. As the water temperature of the lake increased, these two species move inshore to spawn. The high impingement of adult alewife and rainbow smelt during spring and early summer has been well documented at the Nine Mile Point power plants and elsewhere. Spigarelle et al. (1982) noted similar results at three power plants on Lake Michigan. After spawning, the adult fish moved offshore to deeper, cooler waters and were impinged in fewer numbers at the power plants. In summer and early fall, the young-of-the-year alewife and rainbow smelt tended to remain inshore and appeared in the impingement collections, sometimes in large numbers. During late fall and early winter, alewife and rainbow smelt congregated at deep and midwater depths, respectively, in Lake Ontario (O'Gorman and Bergstedt 1983, personal communication). In addition, from observations by Ecological Analysts, other fish species, such as white perch, although not as numerous as alewife and rainbow smelt, exhibited similar seasonal patterns of occurrence in the impingement collections.

Although seasonal lake temperatures, spawning behavior, and population size were major factors contributing to high impingement, other factors could also cause increases in impingement. Brandt et al. (1980) discussed the possibility

that the most abundant fish species in Lake Michigan were positioned at different temperature strata to reduce competition for food resources. Shifts in the thermocline could cause fish to adjust their position in the water column. In addition, schools and aggregates of certain fish species could induce localized increases in population densities of fish in the lake. O'Gorman and Bergstedt (1983 personal communication) noted that inshore schools and aggregates of fish can disintegrate at night and scatter throughout the water column. Because of the forementioned influences on fish behavior, it is possible that individual fish or whole schools of fish could become more susceptible to impingement. Incidences of high impingement may not, therefore, be the direct result of power plant operation, but may have been caused by biological behavior of fish in combination with external environmental influences.

5.4 EFFECTS OF POWER PLANT OPERATION AT NINE MILE POINT ON THE FISH COMMUNITY

One of the five Great Lakes in North America, Lake Ontario is roughly oval in shape, 190 miles long, and 53 miles wide. The lake was formed by extensive glaciation some 10,000 years ago. It has a surface area of 7,340 square miles with an average depth of 250-300 (TI 1978). Historically, Lake Ontario was listed as an oligotrophic lake with the principal offshore fish stocks consisting of coregonines, lake trout, and burbot (Christie 1974). Lake Ontario as well as the other Great Lakes have undergone some extensive biological changes. Lamprey invasion, overfishing, and changing water quality have played an important role in the fish species and fish population shifts and changes through the years. Introduction of the alewife in the 1870s and the rainbow smelt in 1912 added additional pressure to the changing natural fish community.

Aquatic collections in the vicinity of Nine Mile Point have been in progress since the 1960s through 1982. During the 1960s and early 1970s, studies on the current flow patterns and aquatic populations were conducted by Dr. J.F. Storr under contract to Niagara Mohawk Power Corporation. From 1973 through early 1977, Lawler, Matusky, and Skelly Engineers (LMS) employed gill nets, trawls, seines, and fish traps in their survey of the Nine Mile Point nearfield. Texas Instruments (TI) continued sampling with various years until early 1979 when the current sampling program utilizing gill nets at four selected transects was initiated. Ecological Analysts has conducted this sampling program since 1981. In addition, trawls were conducted by the New York State Department of Environmental Conservation (NYSDEC) in the spring of 1977 (Elrod et al. 1978) and by the U.S. Fish and Wildlife Service (FWS) and NYSDEC in 1978, 1979 (Elrod et al. 1979, 1980), and 1980 and 1981 (O'Gorman and Bergstedt 1982, 1983 personal communication).

Previous data collected by gill net suggest that the fish community structure in the Nine Mile Point vicinity during any given year varies seasonally from one of low species diversity during the winter and early spring to one of high species diversity from spring to fall. However species composition in the vicinity of Nine Mile Point has changed little during the nine years of power plant operation. A total of 23 taxa of fish were collected during the 1982 gill net program. Collections during 1979, 1980 and 1981 yielded 18 to 20 taxa. The similarity indices (Pinkham and Pearson, 1976) between years were consistently greater than 0.75 (where 1.0 indicates identical collections) indicating a relatively high level of similarity in the species composition of the fish community sampled by gill nets between 1979 and 1982 (Table 5-3). The

TABLE 5-3 SIMILARITY INDEX (PINKHAM AND PEARSON, 1976) BETWEEN YEARS CALCULATED FOR RANKS OF ALL TAXA COLLECTED BY GILL NETS IN THE VICINITY OF NINE MILE POINT 1979 TO 1982

	1982	1981	1980	1979
1982	1.0	0.904	0.782	0.773
1981	--	1.0	0.773	0.751
1980	--	--	1.0	0.860
1979	--	--	--	1.0

occurrence of certain dominant species in gill net collections coincided with either spawning behavior (e.g., rainbow smelt and trout perch during spring and brown bullheads in summer) or temperature preference (e.g., lake trout during spring and fall and rainbow smelt in fall). In contrast alewife, spottail shiner, and white sucker are ubiquitous, appearing throughout the sampling season.

Although species composition remained fairly constant, variations in the size of fish populations have been observed throughout Lake Ontario, as well as localized fluctuations. Alewife and rainbow smelt, two species which dominate the fish community in the vicinity of Nine Mile Point in terms of abundance, have exhibited distinct oscillations in population size. Christie (1974) using experimental gill nets showed annual oscillations, which could vary ten-fold, in the size of the spawning run of the alewife from 1958 to 1970. Christie (1974) also correlated certain peaks in the gill net data with significant mortalities along the lakeshore. In the vicinity of the Oswego Steam Station in Oswego, New York, Lawler, Matusky and Skelly Engineers (LMS 1975) reported fluctuations in natural concentrations of the alewife population by as much as 800 percent from year to year. LMS (1977) also reported that populations of alewife in the vicinity of Nine Mile Point vary by as much as half an order of magniude. An important factor in the fluctuations in alewife abundance appears to be periodic large die-offs of the alewife stocks during the spring, possibly due to low temperature shock (Graham 1956, in Colby 1971) reported since their introduction in the Great Lakes. In recent years the greatest numbers were recorded in 1974 and 1976 (LMS 1975, 1977). According to the FWS and NYSDEC (Elrod et al. 1979, 1980), the population of alewife declined because of a die-off during the severe cold winter of 1976-1977. Losses were estimated as high as 60-75 percent of the population in the vicinity of the Nine Mile Point promontory. This population decline was reflected by decreasing catches of alewife in impingement collections from 1975 through 1978 which were not only recorded at Nine Mile Point power plants, but also at Ontario Hydro power stations in Canadian waters (TI 1981). According to the FWS (O'Gorman and Bergstedt 1983, personal communication), lakewide populations of alewife increased through 1981 and then decreased slightly during 1982 as a result of a probable die-off during the winter of 1982.

Increases in the adult alewife population in the 1982 gill net catches and impingement collections at James A. FitzPatrick were local and did not correspond to the lakewide population reduction as noted by the Oswego FWS. Large impingement collections of young-of-the-year alewife during August through October 1981 at the Nine Mile Point power plants were not experienced at the Ginna or Russell power plants near Rochester, New York (Dakin 1982, personal communication). Local fluctuations in the size of spawning alewife populations collected by gill nets are not unique to the Nine Mile Point vicinity but have also been recorded in the Bay of Quinte in Lake Ontario from 1958 to 1972 (Christie 1974). The size and condition of future alewife stocks would most likely be influenced by climatic conditions and possibly by the numbers of salmonids stocked (O'Gorman and Bergstedt 1982, 1983 personal communication).

Rainbow smelt populations have also displayed some oscillations in the Great Lakes from year to year. Introduced in 1912 in Lake Michigan, populations of rainbow smelt became abundant in Lake Ontario in the late 1940s (Christie 1974). This species has also been noted to suffer large population losses possibly as a result of disease (Van Oosten 1947, in Scott and Crossman 1973),

as noted in Lake Huron and Lake Michigan in 1942-1946 and in Lake Erie as recently as 1969 (Scott and Crossman 1973). Rupp (1968, in Kircheis and Stanley 1981) showed ten-fold variations in rainbow smelt abundance during the spawning runs in Branch Lake, Maine over an 8-year period. Commercial yield of rainbow smelt (christie 1974) was noted to decline in Lake Ontario from 1960 through 1970 and then increase after 1970. Studies by NYSDEC and FWS indicated an eleven-fold increase in rainbow smelt populations from 1972-1978 (TI 1981).

Yearly oscillations in the lakewide rainbow smelt population were noted by the biologists at the Oswego Fish and Wildlife Station (O'Gorman and Bergstedt 1982, 1983 personal communication). As gill net collections of rainbow smelt over the past four years were low when compared to population estimates and, because no age measurement determinations of the adults were made, a population trend in the vicinity of Nine Mile Point cannot be identified clearly. However, the number of smelt caught by gill nets in the vicinity of Nine Mile Point has shown an increase from 1979 (TI 1980) when only 103 rainbow smelt were caught compared with 466 rainbow smelt in 1981 (EA 1982) and 473 rainbow smelt collected in 1982. In conclusion, gill net surveys in the Nine Mile Point vicinity during 1982 did not reveal any significant changes in the area's smelt populations. Nevertheless, increases in the local population of alewife were observed. Rainbow smelt also are not evenly distributed in Lake Ontario. The FWS estimated that nearly half the rainbow smelt in all U.S. waters of Lake Ontario were concentrated around Cape Vincent (TI 1981).

Thus it appears that changes in relative abundance of fish populations in the vicinity of Nine Mile Point are the result of fluctuations in natural mortality and variation in both localized and lakewide spawning success of various species which compose the local fish community. Such oscillations in population size of various species should not be confused with community instability in an ecological sense. Stability has numerous definitions and connotations with respect to ecosystems but very generally refers to the ability of a system to remain relatively similar to itself in the presence of perturbation (Levin 1975). That is stability is some measure of the response of a system and its ability to oscillate about and return to some "equilibrium state." Therefore a certain level of fluctuation in population size among various species in a community is inherent in the concept of stability as an ecosystem responds to changes or extremes in natural and anthropogenic factors in the biotic and abiotic environment.

No long-term trends toward reductions in the major fish population in the vicinity of Nine Mile Point have been apparent. The observed fluctuations in population size appear to have occurred over a range within the ability of those populations to maintain themselves. The success of these populations will most likely be determined by natural environmental factors (e.g., temperature, disease) and man-induced changes in the trophic structure (e.g., salmonid stocking programs).

5.5 SUMMARY

Impingement of fish by Nine Mile Point Unit 1 and James A. FitzPatrick power plants appears to have little affect on the fish community structure or fish population size in the vicinity of Nine Mile Point or on the entire Lake

Ontario aquatic ecosystem. Impingement of fish at the power plants tends to affect the populations in the manner of a stationary predator, as discussed by Voigtlander (1980); the fish populations can generally adapt to the predator.

Species composition in the vicinity of Nine Mile Point has shown little variation from year to year. Natural biological factors such as habitat and temperature preference, schooling, and migration behavior play an important role in seasonal variations in species occurrence or absence. Oscillations in fish abundance reflect the biology of species coupled with interactions among species and variable environmental factors. While certain fish species around Nine Mile Point, such as alewife and rainbow smelt, exhibit wide fluctuations in population size, other species, such as white sucker, remain fairly static.

In conclusion, no alterations to the existing fish community or population levels occurred as a result of power plant operation in the Nine Mile Point area during 1982 based on the impingement study. No incidents of cold shock to fish due to shutdowns at either plant were reported or observed during 1982.

No rare, endangered, or threatened fish species were collected in the Nine Mile Point area during 1982. No Corbicula sp. mollusks were found in the 1982 impingement collections at Nine Mile Point Unit 1 or James A. FitzPatrick power plants. High impingement estimates at Nine Mile Point Unit 1 in January 1982 reflected a large recruitment of young-of-the-year rainbow smelt. High impingement estimates at James A. FitzPatrick in July 1982 reflected a large local spawning population of alewife and in December 1982 reflected one large, wind-induced catch of young-of-the-year rainbow smelt. Finally, no unusual or high occurrence of diseases, parasites, or other abnormalities were noted on the fish collected in the Nine Mile Point vicinity during 1982.

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APPENDIX A

FISHERIES TABLES A-1 THROUGH A-3

TABLE A-1 TEMPORAL ABUNDANCE OF SELECT KEY (RIS) SPECIES COLLECTED BY GILL NETS, 1982

Species	Catch Per 12-Hour Set[a]								
	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Alewife	175	125	353	573	101	49	0	51	24
Rainbow smelt	41	8	1	0.3	0	0	0	12	0.3
Spottail shiner	2	4	62	93	37	2	1	15	0.3
Smallmouth bass	0.3	0.3	0.3	0.3	3	3	0	0	0
White perch	1.3	1	3	4	4	0.5	0	0.3	0
Yellow perch	0.3	0	4	6	2	4	0	6	0
Total Catch	219.9	138.3	423.3	676.6	147	58.5	1	84.3	24.6

(a) Mean catch rate of four transects.

TABLE A-2 SPATIAL AND TEMPORAL DISTRIBUTION OF SELECT KEY (RIS) SPECIES COLLECTED BY GILL NETS, 1982

Transect	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Mean
	Catch Per 12-Hour Set[a]									
					Alewife					
NMPW	303	75	298	678	115	50	0	56	2	175
NMPP	176	90	345	732	76	94	0	40	34	176
FITZ	92	112	284	504	101	5	0	54	39	132
NMPE	128	222	484	377	111	46	0	52	20	160
					Rainbow smelt					
NMPW	7	4	0	0	0	0	0	8	0	2
NMPP	11	14	2	0	0	0	0	2	0	3
FITZ	101	7	1	0	0	0	0	14	0	14
NMPE	45	8	1	1	0	0	0	24	1	9
					Spottail shiner					
NMPW	2	4	21	115	4	1	2	30	0	20
NMPP	0	2	60	54	1	1	1	28	0	16
FITZ	0	1	62	96	134	0	1	3	1	33
NMPE	5	1	105	105	9	4	0	0	0	25
					Smallmouth bass					
NMPW	0	1	0	1	3	0	0	0	0	0.5
NMPP	0	0	1	0	2	1	0	0	0	0.4
FITZ	1	0	0	0	5	8	0	0	0	2
NMPE	0	0	0	0	1	1	0	0	0	0.2
					White perch					
NMPW	2	1	6	9	9	0	0	0	0	3
NMPP	0	1	1	4	4	2	0	1	0	1.4
FITZ	2	1	1	1	3	0	0	0	0	0.8
NMPE	1	1	4	3	1	0	0	0	0	1.1
					Yellow perch					
NMPW	0	0	4	9	1	3	0	5	0	2
NMPP	0	0	3	9	1	3	0	9	0	3
FITZ	1	0	4	2	2	7	0	4	0	2
NMPE	0	0	3	2	2	3	0	4	0	2

(a) Data are rounded to numbers of whole fish.

TABLE A-3 LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES
COLLECTED BY GILL NETS, 1982

ALEWIFE

Date	Length Intervals (MM)							
	90.0- 109.9	110.0- 129.9	130.0- 149.9	150.0- 169.9	170.0- 189.9	190.0- 209.9	210.0- 229.9	230.0- 249.9
APR 82	0	0	2	95	199	13	11	0
MAY 82	0	2	2	73	221	7	0	0
JUN 82	0	0	6	89	221	4	0	0
JUL 82	2	5	6	115	188	4	0	0
AUG 82	0	1	7	93	199	15	2	3
SEP 82	0	0	3	26	92	4	0	0
OCT 82	0	0	0	0	0	0	0	0
NOV 82	0	0	3	87	68	2	0	0
DEC 82	0	0	0	41	59	4	0	0
Interval Totals	2	8	29	619	1,247	53	13	3

Date	P	N	X	SD	Range		
					MIN	MED	MAX
APR 82	1,125	320	174.7	12.4	148.0	173.0	228.0
MAY 82	730	305	173.8	9.7	128.0	174.0	206.0
JUN 82	2,664	320	172.8	9.1	131.0	173.0	206.0
JUL 82	4,445	320	170.0	12.8	105.0	173.0	192.0
AUG 82	509	320	173.9	12.7	116.0	174.0	240.0
SEP 82	85	125	174.5	9.8	143.0	175.0	199.0
OCT 82	0	0	0.0	0.0	0.0	0.0	0.0
NOV 82	65	160	168.2	11.0	143.0	168.0	208.0
DEC 82	6	104	171.6	9.1	151.0	171.0	199.0
Summary Totals	9,629	1,974	172.7	11.4	105.0		240.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

RAINBOW SMELT

Date	Length Intervals (MM) 110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9	230.0-249.9	250.0-269.9
APR 82	3	72	33	3	9	6	6	1
MAY 82	0	19	27	3	6	8	1	0
JUN 82	0	2	3	1	0	0	0	0
JUL 82	0	0	1	0	0	0	0	0
AUG 82	0	0	0	0	0	0	0	0
SEP 82	0	0	0	0	0	0	0	0
OCT 82	0	0	0	0	0	0	0	0
NOV 82	0	1	33	14	1	1	2	0
DEC 82	0	0	1	0	0	0	0	0
Interval Totals	3	94	98	21	16	15	9	1

Date	P	N	X	SD	Range MIN	MED	MAX
APR 82	216	133	158.7	28.6	124.0	148.0	254.0
MAY 82	0	64	167.6	26.7	134.0	159.0	232.0
JUN 82	0	6	160.2	16.1	137.0	164.5	182.0
JUL 82	0	1	165.0	0.0	165.0	165.0	165.0
AUG 82	0	0	0.0	0.0	0.0	0.0	0.0
SEP 82	0	0	0.0	0.0	0.0	0.0	0.0
OCT 82	0	0	0.0	0.0	0.0	0.0	0.0
NOV 82	0	52	170.3	19.3	146.0	165.0	241.0
DEC 82	0	1	165.0	0.0	165.0	165.0	165.0
Summary Totals	216	257	163.3	26.5	124.0		254.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE A-3 (CONT.)

WHITE PERCH

	LENGTH INTERVALS (MM)											
Date	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9	230.0-249.9	250.0-269.9	270.0-289.9	290.0-309.9	310.0-329.9
APR 82	1	0	0	0	0	0	1	2	1	2	1	0
MAY 82	0	0	0	0	0	0	4	3	0	0	0	0
JUN 82	0	0	0	0	1	0	5	9	3	2	1	0
JUL 82	0	0	1	0	1	2	5	15	4	2	2	0
AUG 82	0	0	0	2	0	2	4	7	11	3	2	1
SEP 82	0	0	0	0	0	0	1	1	0	0	0	0
OCT 82	0	0	0	0	0	0	0	0	0	0	0	0
NOV 82	1	0	0	0	0	0	0	0	0	0	0	0
DEC 82	0	0	0	0	0	0	0	0	0	0	0	0
Interval Totals	2	0	1	2	2	4	20	37	19	9	6	1

					Range		
Date	P	N	X	SD	MIN	MED	MAX
APR 82	0	8	237.5	64.5	91.0	258.0	295.0
MAY 82	0	7	227.0	9.6	210.0	229.0	240.0
JUN 82	0	21	239.7	23.9	186.0	235.0	291.0
JUL 82	0	32	238.7	31.7	149.0	240.5	300.0
AUG 82	0	32	245.5	34.7	156.0	250.0	311.0
SEP 82	0	2	229.5	13.4	220.0	229.5	239.0
OCT 82	0	0	0.0	0.0	0.0	0.0	0.0
NOV 82	0	1	97.0	0.0	97.0	97.0	97.0
DEC 82	0	0	0.0	0.0	0.0	0.0	0.0
Summary Totals	0	103	238.6	36.0	91.0		311.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE A-3 (CONT.)

YELLOW PERCH

Date	Length Intervals (MM) 130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9	230.0-249.9	250.0-269.9	270.0-289.9	290.0-309.9	310.0-329.9	330.0-349.9
APR 82	0	0	0	0	0	1	0	0	0	0	0
MAY 82	0	0	0	0	0	0	0	0	0	0	0
JUN 82	0	0	1	2	3	6	3	6	2	1	0
JUL 82	0	1	5	10	10	5	8	4	1	0	0
AUG 82	1	0	0	1	1	0	3	3	2	0	0
SEP 82	0	0	2	0	2	0	5	5	1	0	1
OCT 82	0	0	0	0	0	0	0	0	0	0	0
NOV 82	0	2	5	1	3	2	3	7	2	0	0
DEC 82	0	0	0	0	0	0	0	0	0	0	0
Interval Totals	1	3	13	14	19	14	22	25	8	1	1

Date	P	N	X	SD	Range MIN	MED	MAX
APR 82	0	1	241.0	0.0	241.0	241.0	241.0
MAY 82	0	0	0.0	0.0	0.0	0.0	0.0
JUN 82	0	24	251.6	34.6	180.0	253.5	315.0
JUL 82	0	44	225.6	32.0	153.0	221.0	290.0
AUG 82	0	11	253.6	47.1	142.0	267.0	302.0
SEP 82	0	16	258.2	37.8	181.0	266.0	330.0
OCT 82	0	0	0.0	0.0	0.0	0.0	0.0
NOV 82	0	25	235.2	46.2	154.0	248.0	302.0
DEC 82	0	0	0.0	0.0	0.0	0.0	0.0
Summary Totals	0	121	239.7	39.4	142.0		330.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE A-3 (CONT.)

SPOTTAIL SHINER

Date	P	N	X	SD	Length Intervals (MM) 90.0-109.9	110.0-129.9	130.0-149.9	Range MIN	MED	MAX
APR 82	0	14	122.9	6.2	0	13	1	113.0	125.0	135.0
MAY 82	0	14	111.8	5.7	5	9	0	98.0	113.0	119.0
JUN 82	334	184	118.6	8.7	28	138	18	97.0	119.0	138.0
JUL 82	473	298	119.7	8.8	43	212	43	100.0	121.0	137.0
AUG 82	228	82	113.1	8.2	35	43	4	98.0	112.0	132.0
SEP 82	1	5	113.0	8.2	2	3	0	106.0	110.0	126.0
OCT 82	0	4	115.5	10.0	2	2	0	105.0	116.0	125.0
NOV 82	0	69	116.1	6.1	12	55	2	105.0	116.0	131.0
DEC 82	0	1	105.0	0.0	1	0	0	105.0	105.0	105.0
Totals	1,036	671	118.0	8.7	128	475	68	97.0		138.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE A-3 (CONT.)

SMALLMOUTH BASS

Date	P	N	X	SD	Length Intervals (MM) 290.0-309.9	310.0-329.9	330.0-349.9	350.0-369.9	370.0-389.9	390.0-409.9	410.0-429.9	430.0-449.9	450.0-469.9	Range MIN	MED	MAX
APR 82	0	1	380.0	0.0	0	0	0	0	1	0	0	0	0	380.0	380.0	380.0
MAY 82	0	1	327.0	0.0	0	1	0	0	0	0	0	0	0	327.0	327.0	327.0
JUN 82	0	1	298.0	0.0	1	0	0	0	0	0	0	0	0	298.0	298.0	298.0
JUL 82	0	1	409.0	0.0	0	0	0	0	0	1	0	0	0	409.0	409.0	409.0
AUG 82	0	19	369.7	44.0	1	3	4	2	2	4	1	1	1	301.0	355.0	456.0
SEP 82	0	10	355.2	28.9	0	2	2	3	1	2	0	0	0	320.0	356.0	407.0
OCT 82	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
NOV 82	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
DEC 82	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
Summary Totals	0	33	363.4	40.2	2	6	6	5	4	7	1	1	1	298.0		456.0

P = number of unmeasured organisms;
N = number of lengths; MIN = Shortest length
X = mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

APPENDIX B

IMPINGEMENT TABLES B-1 THROUGH B-10

TABLE B-1 PLANT OPERATING CONDITIONS AT NINE MILE POINT UNIT 1 NUCLEAR STATION DURING 1982

STATION: Nine Mile Point   MONTH: January 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	2	1	1209988.8	612	2.7	23.8
2	2	1	1209988.8	612	1.9	22.7
3	2	1	1209988.8	612	0.4	21.2
4	2	1	1209988.8	611	1.3	22.0
5	2	1	1209988.8	611	1.5	22.5
6	2	1	1209988.8	611	1.5	22.6
7	2	1	1209988.8	611	4.4	25.3
8	2	1	1209988.8	609	0.9	21.8
9	2	1	1209988.8	510	0.9	21.8
10	2	1	1209988.8	576	-0.3	18.9
11	2	1	1209988.8	606	-0.3	20.2
12	2	1	1209988.8	607	0.4	20.8
13	2	1	1209988.8	607	1.2	21.1
14	2	1	1209988.8	609	0.2	20.9
15	2	1	1209988.8	611	0.3	20.7
16	2	1	1209988.8	610	0.1	21.3
17	2	1	1209988.8	610	-0.4	20.4
18	2	1	1209988.8	611	0.2	20.6
19	2	1	1209988.8	609	1.1	21.8
20	2	1	1209988.8	609	0.2	21.1
21	2	1	1209988.8	608	-0.3	20.4
22	2	1	1209988.8	611	0.2	21.4
23	2	1	1209988.8	610	1.3	22.3
24	2	1	1209988.8	609	-0.1	20.8
25	2	1	1209988.8	609	-0.3	20.3
26	2	1	1209988.8	610	-0.1	20.6
27	2	1	1182736.8	610	0.2	21.6
28	2	1	1182736.8	603	0.7	22.7
29	2	1	1182736.8	611	-0.2	21.3
30	2	1	1182736.8	611	1.7	22.6
31	2	1	1182736.8	610	0.3	21.6

STATION: Nine Mile Point   MONTH: February 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	2	1	1182736.8	606	-0.3	21.3
2	2	1	1182736.8	609	0.1	21.4
3	2	1	1182736.8	609	0.4	22.0
4	2	1	1182736.8	611	0.3	21.9
5	2	[illegible]	1182736.8	611	0.4	22.2
6	2	[illegible]	1182736.8	562	-0.3	19.6
7	[illegible]	1	1182736.8	611	-0.3	19.5
8	[illegible]	1	1182736.8	601	-0.3	20.9
9	2	1	1182736.8	602	0.2	22.1
10	2	1	1182736.8	608	-0.3	21.2
11	2	1	1182736.8	612	-0.3	21.1
12	2	1	1182736.8	610	-0.1	21.3
13	2	1	1182736.8	609	0.2	21.5
14	2	1	1182736.8	609	0.2	21.6
15	2	1	1182736.8	610	0.1	21.3
16	2	1	1182736.8	613	-0.1	21.3
17	2	1	1182736.8	612	-0.2	21.2
18	2	1	1182736.8	612	-0.1	21.4
19	2	1	1182736.8	612	0.1	21.8
20	2	1	1182736.8	609	0.7	22.0
21	2	1	1182736.8	609	0.4	21.8
22	2	1	1182736.8	609	0.2	21.3
23	2	1	1182736.8	612	0.6	21.9
24	2	1	1182736.8	609	0.3	23.1
25	2	1	1182736.8	579	0.1	22.3
26	2	1	1182736.8	608	0.0	22.1
27	2	1	1182736.8	609	-0.2	21.6
28	2	1	1182736.8	609	-0.2	21.6

TABLE B-1 (CONT.)

STATION: Nine Mile Point — MONTH: March 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	2	1	1155484.8	611	0.2	22.3
2	2	1	1155484.8	610	-0.2	21.7
3	2	1	1155484.8	608	0.5	21.8
4	2	1	1155484.8	603	-0.1	21.5
5	2	1	1155484.8	595	-0.2	21.4
6	2	1	1155484.8	608	0.1	21.9
7	2	1	1155484.8	609	0.6	22.2
8	2	1	1155484.8	611	-0.3	21.4
9	2	1	1155484.8	608	-0.1	21.7
10	2	1	1155484.8	609	0.3	22.4
11	2	1	1155484.8	611	0.7	22.8
12	2	1	1155484.8	611	0.5	22.2
13	2	1	1155484.8	610	2.0	23.6
14	2	1	1155484.8	611	0.9	22.4
15	2	1	1155484.8	612	1.2	22.8
16	2	1	1155484.8	609	3.1	23.6
17	2	1	1155484.8	610	1.3	23.1
18	2	1	1155484.8	608	2.7	23.8
19	2	1	1155484.8	374	1.4	22.6
20	2/0	1	245268.01	0	NA1	NA1
21	0	1	49053.6	0	NA	NA
22	0	1	49053.6	0	NA	NA
23	0	1	49053.6	0	NA	NA
24	0	1	49053.6	0	NA	NA
25	0	1	49053.6	0	NA	NA
26	0	1	49053.6	0	NA	NA
27	0	1	43603.2	0	NA	NA
28	0	1	43603.2	0	NA	NA
29	0	1	43603.2	0	NA	NA
30	0	1	43603.2	0	NA	NA
31	0	1	43603.2	0	NA	NA

STATION: Nine Mile Point — MONTH: April 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	0	1	43603.2	0	NA	NA
2	0	1	43603.2	0	NA	NA
3	0	1	43603.2	0	NA	NA
4	0	1	43603.2	0	NA	NA
5	0	1	43603.2	0	NA	NA
6	0	1	32702.4	0	NA	NA
7	0	1	32702.4	0	NA	NA
8	0	1	32702.4	0	NA	NA
9	0	1	32702.4	0	NA	NA
10	0	1	32702.4	0	NA	NA
11	0	1	32702.4	0	NA	NA
12	0	1	32702.4	0	NA	NA
13	0	1	32702.4	0	NA	NA
14	0	1	32702.4	0	NA	NA
15	0	1	32702.4	0	NA	NA
16	0	1	32702.4	0	NA	NA
17	0	1	32702.4	0	NA	NA
18	0	1	32702.4	0	NA	NA
19	0	1	32702.4	0	NA	NA
20	0	1	32702.4	0	NA	NA
21	0	1	32702.4	0	NA	NA
22	0	1	32702.4	0	NA	NA
23	0	1	32702.4	0	NA	NA
24	0	1	49053.6	0	NA	NA
25	0	1	49053.6	0	NA	NA
26	0	1	49053.6	0	NA	NA
27	0	1	49053.6	0	NA	NA
28	0	1	49053.6	0	NA	NA
29	0	1	49053.6	0	NA	NA
30	0	1	49053.6	0	NA	NA

TABLE B-1 (CONT.)

STATION: Nine Mile Point MONTH: May 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Discharge
1	0	1	49053.6	0	NA	NA
2	0	1	49053.6	0	NA	NA
3	0	1	49053.6	0	NA	NA
4	0	1	49053.6	0	NA	NA
5	0	1	49053.6	0	NA	NA
6	0	1	49053.6	0	NA	NA
7	0	1	49053.6	0	NA	NA
8	0	1	49053.6	0	NA	NA
9	0	1	49053.6	0	NA	NA
10	0	1	49053.6	0	NA	NA
11	0	1	49053.6	0	NA	NA
12	0	1	49053.6	0	NA	NA
13	0	1	49053.6	0	NA	NA
14	0	1	49053.6	0	NA	NA
15	0	1	49053.6	0	NA	NA
16	0	1	49053.6	0	NA	NA
17	0	1	49053.6	0	NA	NA
18	0	1	49053.6	0	NA	NA
19	0	1	49053.6	0	NA	NA
20	0	1	49053.6	0	NA	NA
21	0	1	49053.6	0	NA	NA
22	0	1	49053.6	0	NA	NA
23	0	1	49053.6	0	NA	NA
24	0	1	49053.6	0	NA	NA
25	0	1	49053.6	0	NA	NA
26	0	1	49053.6	0	NA	NA
27	0	1	49053.6	0	NA	NA
28	0	1	49053.6	0	NA	NA
29	0	1	49053.6	0	NA	NA
30	0	1	49053.6	0	NA	NA
31	0	1	49053.6	0	NA	NA

STATION: Nine Mile Point MONTH: June 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Discharge
1	0	1	49053.6	0	NA	NA
2	0	1	49053.6	0	NA	NA
3	0	1	49053.6	0	NA	NA
4	0	1	49053.6	0	NA	NA
5	0	1	49053.6	0	NA	NA
6	0	1	49053.6	0	NA	NA
7	0	1	49053.6	0	NA	NA
8	0	1	49053.6	0	NA	NA
9	0	1	49053.6	0	NA	NA
10	0	1	49053.6	0	NA	NA
11	0	1	49053.6	0	NA	NA
12	0	1	49053.6	0	NA	NA
13	0	1	49053.6	0	NA	NA
14	0	1	49053.6	0	NA	NA
15	0	1	49053.6	0	NA	NA
16	0	1	49053.6	0	NA	NA
17	0	1	49053.6	0	NA	NA
18	0	1	49053.6	0	NA	NA
19	0	1	49053.6	0	NA	NA
20	0	1	49053.6	0	NA	NA
21	0	1	49053.6	0	NA	NA
22	0	1	49053.6	0	NA	NA
23	0	1	49053.6	0	NA	NA
24	0	1	49053.6	0	NA	NA
25	0	1	49053.6	0	NA	NA
26	0	1	49053.6	0	NA	NA
27	0	1	49053.6	0	NA	NA
28	0	1	49053.6	0	NA	NA
29	0	1	49053.6	0	NA	NA
30	0	1	49053.6	0	NA	NA

TABLE B-1 (CONT.)

STATION: Nine Mile Point MONTH: July 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	0	1	49053.6	0	NA	NA
2	0	1	49053.6	0	NA	NA
3	0	1	49053.6	0	NA	NA
4	0	1	49053.6	0	NA	NA
5	0	1	49053.6	0	NA	NA
6	0	1	49053.6	0	NA	NA
7	0	1	49053.6	0	NA	NA
8	0	1	49053.6	0	NA	NA
9	0	1	49053.6	0	NA	NA
10	0	1	49053.6	0	NA	NA
11	0	1	49053.6	0	NA	NA
12	0	1	49053.6	0	NA	NA
13	0	1	49053.6	0	NA	NA
14	0	1	49053.6	0	NA	NA
15	0	1	49053.6	0	NA	NA
16	0	1	49053.6	0	NA	NA
17	0	1	49053.6	0	NA	NA
18	0	1	49053.6	0	NA	NA
19	0	1	49053.6	0	NA	NA
20	0	1	49053.6	0	NA	NA
21	0	1	49053.6	0	NA	NA
22	0	1	49053.6	0	NA	NA
23	0	1	49053.6	0	NA	NA
24	0	1	49053.6	0	NA	NA
25	0	1	49053.6	0	NA	NA
26	0	1	49053.6	0	NA	NA
27	0	1	49053.6	0	NA	NA
28	0	1	49053.6	0	NA	NA
29	0	1	49053.6	0	NA	NA
30	0	1	49053.6	0	NA	NA
31	0	1	49053.6	0	NA	NA

STATION: Nine Mile Point MONTH: August 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	0	1	49053.6	0	NA	NA
2	0	1	49053.6	0	NA	NA
3	0	1	49053.6	0	NA	NA
4	0	1	49053.6	0	NA	NA
5	0	1	49053.6	0	NA	NA
6	0	1	49053.6	0	NA	NA
7	0	1	49053.6	0	NA	NA
8	0	1	49053.6	0	NA	NA
9	0	1	49053.6	0	NA	NA
10	0	1	49053.6	0	NA	NA
11	0	1	49053.6	0	NA	NA
12	0	1	59954.4	0	NA	NA
13	0	1	59954.4	0	NA	NA
14	0	1	59954.4	0	NA	NA
15	0	1	59954.4	0	NA	NA
16	0	1	59954.4	0	NA	NA
17	0	1	59954.4	0	NA	NA
18	0	1	70855.2	0	NA	NA
19	0	1	70855.2	0	NA	NA
20	0	1	70855.2	0	NA	NA
21	0	1	70855.2	0	NA	NA
22	0	1	70855.2	0	NA	NA
23	0	1	70855.2	0	NA	NA
24	0	1	65404.8	0	NA	NA
25	0	1	65404.8	0	NA	NA
26	0	1	65404.8	0	NA	NA
27	0	1	65404.8	0	NA	NA
28	0	1	65404.8	0	NA	NA
29	0	1	65404.8	0	NA	NA
30	0	1	65404.8	0	NA	NA
31	0	1	65404.8	0	NA	NA

TABLE B-1-(CONT.)

STATION: Nine Mile Point MONTH: September 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Discharge
1	0	1	67039.9	0	NA	NA
2	0	1	67039.9	0	NA	NA
3	0	1	67039.9	0	NA	NA
4	0	1	67039.9	0	NA	NA
5	0	1	67039.9	0	NA	NA
6	0	1	67039.9	0	NA	NA
7	0	1	67039.9	0	NA	NA
8	0	1	67039.9	0	NA	NA
9	0	1	67039.9	0	NA	NA
10	0	1	67039.9	0	NA	NA
11	0	1	71945.3	0	NA	NA
12	0	1	71945.3	0	NA	NA
13	0	1	71945.3	0	NA	NA
14	0	1	71945.3	0	NA	NA
15	0	1	71945.3	0	NA	NA
16	0	1	71945.3	0	NA	NA
17	0	1	71945.3	0	NA	NA
18	0	1	71945.3	0	NA	NA
19	0	1	71945.3	0	NA	NA
20	0	1	71945.3	0	NA	NA
21	0	1	71945.3	0	NA	NA
22	0	1	71945.3	0	NA	NA
23	0	1	71945.3	0	NA	NA
24	0	1	71945.3	0	NA	NA
25	0	1	71945.3	0	NA	NA
26	0	1	71945.3	0	NA	NA
27	0	1	71945.3	0	NA	NA
28	0	1	71945.3	0	NA	NA
29	0	1	71945.3	0	NA	NA
30	0	1	71945.3	0	NA	NA

STATION: Nine Mile Point MONTH: October 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Discharge
1	0	1	71945.3	0	NA	NA
2	0	1	71945.3	0	NA	NA
3	0	1	71945.3	0	NA	NA
4	0	1	71945.3	0	NA	NA
5	0	1	71945.3	0	NA	NA
6	0	1	71945.3	0	NA	NA
7	0	1	71945.3	0	NA	NA
8	0	1	71945.3	0	NA	NA
9	0	1	71945.3	0	NA	NA
10	0	1	71945.3	0	NA	NA
11	0	1	71945.3	0	NA	NA
12	0	1	71945.3	0	NA	NA
13	0	1	71945.3	0	NA	NA
14	0	1	41423.0	0	NA	NA
15	0	1	41423.0	0	NA	NA
16	0	1	41423.0	0	NA	NA
17	0	1	41423.0	0	NA	NA
18	0	1	41423.0	0	NA	NA
19	0	1	41423.0	0	NA	NA
20	0	1	41423.0	0	NA	NA
21	0	1	41423.0	0	NA	NA
22	0	1	41423.0	0	NA	NA
23	0	1	41423.0	0	NA	NA
24	0	1	41423.0	0	NA	NA
25	0	1	41423.0	0	NA	NA
26	0	1	35972.6	0	NA	NA
27	0	1	35972.6	0	NA	NA
28	0	1	35972.6	0	NA	NA
29	0	1	35972.6	0	NA	NA
30	0	1	35972.6	0	NA	NA
31	0	1	35972.6	0	NA	NA

TABLE B-1 (CONT.)

STATION: Nine Mile Point　　　　MONTH: November 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C)	
					Intake	Discharge
1	0	1	61044.5	0	NA	NA
2	0	1	61044.5	0	NA	NA
3	0	1	61044.5	0	NA	NA
4	0	1	58319.3	0	NA	NA
5	0	1	58319.3	0	NA	NA
6	0	1	58319.3	0	NA	NA
7	0	1	58319.3	0	NA	NA
8	0	1	58319.3	0	NA	NA
9	0	1	58319.3	0	NA	NA
10	0	1	46873.4	0	NA	NA
11	0	1	46873.4	0	NA	NA
12	0	1	46873.4	0	NA	NA
13	0	1	46873.4	0	NA	NA
14	0	1	46873.4	0	NA	NA
15	0	1	46873.4	0	NA	NA
16	0	1	46873.4	0	NA	NA
17	0	1	46873.4	0	NA	NA
18	0	1	46873.4	0	NA	NA
19	0	1	46873.4	0	NA	NA
20	0	1	46873.4	0	NA	NA
21	0	1	46873.4	0	NA	NA
22	0	1	46873.4	0	NA	NA
23	0	1	46873.4	0	NA	NA
24	0	1	51778.8	0	NA	NA
25	0	1	51778.8	0	NA	NA
26	0	1	51778.8	0	NA	NA
27	0	1	51778.8	0	NA	NA
28	0	1	51778.8	0	NA	NA
29	0	1	51778.8	0	NA	NA
30	0	1	51778.8	0	NA	NA

STATION: Nine Mile Point　　　　MONTH: December 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Intake	Discharge
1	0	1	51778.8	0	NA	NA
2	0	1	51778.8	0	NA	NA
3	0	1	51778.8	0	NA	NA
4	0	1	51778.8	0	NA	NA
5	0	1	51778.8	0	NA	NA
6	0	1	51778.8	0	NA	NA
7	0	1	51778.8	0	NA	NA
8	0	1	51778.8	0	NA	NA
9	0	1	51778.8	0	NA	NA
10	0	1	51778.8	0	NA	NA
11	0	1	51778.8	0	NA	NA
12	0	1	51778.8	0	NA	NA
13	0	1	51778.8	0	NA	NA
14	0	1	51778.8	0	NA	NA
15	0	1	51778.8	0	NA	NA
16	0	1	51778.8	0	NA	NA
17	0	1	51778.8	0	NA	NA
18	0	1	51778.8	0	NA	NA
19	0	1	51778.8	0	NA	NA
20	0	1	51778.8	0	NA	NA
21	0	1	51778.8	0	NA	NA
22	0	1	35972.6	0	NA	NA
23	0	1	35972.6	0	NA	NA
24	0	1	35972.6	0	NA	NA
25	0	1	35972.6	0	NA	NA
26	0	1	35972.6	0	NA	NA
27	0	1	35972.6	0	NA	NA
28	0	1	35972.6	0	NA	NA
29	0	1	35972.6	0	NA	NA
30	0	1	35972.6	0	NA	NA
31	0	1	35972.6	0	NA	NA

TABLE B-1 (CONT.)

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1. On 20 March 1982, NMP Unit 1 went off line. 'NA' represents information not reported on NMP Unit 1 '401' monthly log.

NOTE: Total volume of water pumped, mean electrical output, and water temperature information are all derived from NMP Unit 1 '401' monthly log.

TABLE B-2 PLANT OPERATING CONDITIONS AT JAMES A. FITZPATRICK NUCLEAR POWER PLANT DURING 1982

STATION: James A. FitzPatrick   MONTH: January 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	1	1	752155.2	01a	2.1	2.3
2	1	1	752155.2	0	1.4	1.7
3	1	1	752155.2	0	1.3	1.4
4	1	1	752155.2	0	0.9	1.5
5	1	1	752155.2	0	2.3	1.9
6	1	1	752155.2	0	2.2	2.1
7	1	1	752155.2	0	2.3	2.3
8	1	1	752155.2	0	1.8	1.8
9	1	1	752155.2	0	0.5	0.5
10	1	1	752155.2	0	0.1	0.1
11	1	1	752155.2	0	0.0	0.2
12	1	1	752155.2	0	0.3	0.5
13	1	1	752155.2	0	0.6	1.1
14	1	1	752155.2	0	0.3	0.7
15	1	1	752155.2	0	0.8	1.1
16	1	1	752155.2	0	0.3	0.9
17	1	1	752155.2	0	-0.1	0.6
18	1	1	752155.2	0	-0.1	0.7
19	1	1	752155.2	0	0.1	0.0
20	1	1	752155.2	0	1.9	1.3
21	1	1	752155.2	0	0.2	0.6
22	1	1	752155.2	0	0.8	0.8
23	1	1	752155.2	0	1.8	1.8
24	1	1	752155.2	0	1.5	1.5
25	1	1	752155.2	0	0.6	0.6
26	1	1	752155.2	0	0.3	0.4
27	1	1	752155.2	0	0.7	0.6
28	1	1	752155.2	0	1.5	1.4
29	1	1	752155.2	0	1.1	1.1
30	1	1	752155.2	0	0.6	0.7
31	1	1	752155.2	0	0.8	0.8

STATION: James A. FitzPatrick   MONTH: February 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	1	1	752155.2	0	1.4	1.4
2	1	1	752155.2	0	0.8	0.8
3	1	1	752155.2	0	0.9	0.8
4	1	1	752155.2	0	2.6	2.4
5	1	1	752155.2	0	1.5	1.4
6	1	1	752155.2	0	1.2	1.2
7	1	1	752155.2	0	1.4	0.8
8	1	1	752155.2	0	0.5	0.4
9	1	1	752155.2	0	0.6	0.4
10	1	1	752155.2	0	0.7	0.6
11	1	1	752155.2	0	-0.2	0.2
12	1	1	752155.2	0	-0.7	0.2
13	1	1	752155.2	0	-0.7	-0.3
14	1	1	752155.2	0	-0.6	-0.2
15	1	1	752155.2	0	0.1	0.3
16	1	1	752155.2	0	-0.1	0.2
17	1	1	752155.2	0	0.1	0.2
18	1	1	752155.2	0	0.1	0.3
19	1	1	752155.2	0	1.4	0.7
20	1	1	752155.2	0	2.1	0.8
21	1	1	752155.2	0	0.2	0.5
22	1	1	752155.2	0	0.4	0.5
23	1	1	752155.2	0	1.6	1.3
24	1	1	752155.2	0	0.9	0.2
25	1	1	752155.2	0	0.0	-0.1
26	1	1	752155.2	0	0.3	0.1
27	1	1	752155.2	0	-0.2	0.2
28	1	1	752155.2	0	-0.1	0.2

TABLE B-2 (CONT.)

STATION: James A. FitzPatrick MONTH: March 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	1	1	752155.2	0	0.3	0.4
2	1	1	752155.2	0	0.9	0.7
3	1	1	752155.2	0	0.3	0.7
4	1	1	752155.2	0	0.2	0.8
5	1	1	752155.2	0	0.4	1.0
6	1	1	752155.2	0	0.4	0.9
7	1	1	752155.2	0	0.5	1.6
8	1	1	752155.2	0	1.9	3.3
9	1/2	1	1033759.2	16	0.7	2.3
10	2	1	1315363.2	45	0.7	2.7
11	2	1	1157519.6	110	2.5	7.6
12	2	1	1012829.7	227	4.0	12.1
13	2	1	1012829.7	244	4.2	12.6
14	2	1	999676.0	280	4.9	13.8
15	2/3	1/2	1320014.2	436	6.0	18.1
16	3	2	1683519.6	570	5.7	17.9
17	3	2	2093607.6	582	2.1	14.5
18	3	2	2093607.6	609	2.1	15.0
19	3	2	2115191.2	675	2.5	16.8
20	3	2	2136774.8	613	2.0	14.8
21	3	2	2093607.6	745	2.3	17.6
22	3	2	1985689.7	782	3.7	19.7
23	3	2	2028856.9	822	3.6	20.4
24	3	2	2158358.4	802	2.1	18.5
25	3	2	2158358.4	779	2.1	17.9
26	3	2	2158358.4	761	2.3	17.8
27	3	2	2158358.4	524	2.0	13.3
28	3	2	2158358.4	550	1.7	13.2
29	3	2	2158358.4	604	1.8	14.3
30	3	2	2158358.4	773	1.9	17.6
31	3	2	2158358.4	826	2.5	19.3

STATION: James A. FitzPatrick MONTH: April 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	3	2	2158358.4	816	3.8	20.4
2	3	2	2158358.4	698	3.2	17.6
3	3	2	2158358.4	609	3.1	15.8
4	3	2	2158358.4	755	2.9	18.3
5	3	2	2158358.4	837	2.2	19.3
6	3	2	2158358.4	843	1.9	19.0
7	3	2	2158358.4	843	1.6	18.7
8	3	2	2158358.4	838	1.3	18.3
9	3	2	2158358.4	839	1.4	18.4
10	3	2	1985689.7	841	3.3	20.3
11	3	2	1964106.1	842	3.8	20.8
12	3	2	1964106.1	841	3.9	21.0
13	3	2	1985689.7	843	4.3	21.3
14	3	2	1985689.7	843	4.7	21.8
15	3	2	1985689.7	843	4.3	21.3
16	3	2	2007273.3	843	4.6	21.7
17	3	2	2093607.6	843	6.2	23.3
18	3	2	2115191.2	844	8.2	25.4
19	3	2	2050440.5	845	5.6	22.7
20	3	2	2050440.5	844	5.4	22.7
21	3	2	2093607.6	844	8.2	25.4
22	3	2	2050440.5	843	9.0	26.2
23	3	2	2028856.9	839	9.2	26.3
24	3	2	2050440.5	841	6.6	23.8
25	3	2	2136774.8	841	5.7	22.9
26	3	2	2158358.4	838	4.2	21.4
27	3	2	2158358.4	842	5.4	22.7
28	3	2	2158358.4	846	3.7	20.9
29	3	2	2158358.4	842	5.2	22.6
30	3	2	2158358.4	840	6.1	23.4

TABLE B-2 (CONT.)

STATION: James A. FitzPatrick — MONTH: May 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	3	2	2158358.4	843	7.3	24.7
2	3	2	2158358.4	844	5.4	22.8
3	3	2	2158358.4	843	6.6	23.9
4	3	2	2158358.4	843	6.2	23.5
5	3	2	2158358.4	844	6.1	23.4
6	3	2	2158358.4	843	5.4	22.7
7	3	2	2158358.4	839	5.7	22.9
8	3	2	2158358.4	844	4.1	21.3
9	3	2	2158358.4	843	6.3	23.6
10	3	2	2158358.4	845	6.2	23.4
11	3	2	2158358.4	846	6.1	23.3
12	3	2	2158358.4	845	6.8	24.1
13	3	2	2158358.4	845	8.0	25.3
14	3	2	2158358.4	845	7.4	24.7
15	3	2	2158358.4	619	8.0	21.0
16	3	2	2158358.4	683	6.4	20.5
17	3	2	2158358.4	800	8.6	25.1
18	3	2	2158358.4	840	7.5	24.8
19	3	2	2158358.4	843	6.4	23.6
20	3	2	2158358.4	842	8.8	NA
21	3	2	2158358.4	807	9.1	NA
22	3	2	2158358.4	811	5.9	NA
23	3	2	2158358.4	809	5.2	NA
24	3	2	2158358.4	808	5.8	NA
25	3	2	2158358.4	810	5.9	NA
26	3	2	2158358.4	811	6.3	24.1
27	3	2	2158358.4	794	5.6	23.3
28	3	2	2158358.4	746	5.7	22.8
29	3	2	2158358.4	833	5.8	24.1
30	3	2	2158358.4	840	5.8	24.3
31	3	2	2158358.4	840	6.1	25.2

STATION: James A. FitzPatrick — MONTH: June 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	3	2	2158358.4	842	6.4	24.9
2	3	2	2158358.4	840	7.8	26.0
3	3	2	2158358.4	839	8.8	26.8
4	3	2	2158358.4	840	7.2	25.4
5	3	2	2158358.4	845	6.2	24.7
6	3	2	2158358.4	846	6.8	25.2
7	3	2	2158358.4	846	7.2	25.4
8	3	2	2158358.4	846	9.1	26.9
9	3	2	2158358.4	845	8.7	26.5
10	3	2	2158358.4	845	5.9	24.4
11	3	2	2158358.4	840	8.9	27.1
12	3	2	2158358.4	842	8.7	26.6
13	3	2	2158358.4	844	8.9	26.8
14	3	2	2158358.4	843	9.4	27.1
15	3	2	2158358.4	844	10.3	27.6
16	3	2	2158358.4	843	8.9	26.7
17	3	2	2158358.4	843	9.2	26.9
18	3	2	2158358.4	840	9.8	27.2
19	3	2	2158358.4	842	9.8	27.2
20	3	2	2158358.4	846	10.2	27.7
21	3	2	2158358.4	845	9.9	27.2
22	3	2	2158358.4	843	10.7	27.9
23	3	2	2158358.4	843	10.8	28.1
24	3	2	2158358.4	843	11.4	28.5
25	3	2	2158358.4	836	11.9	28.8
26	3	2	2158358.4	825	13.0	29.4
27	3	2	2158358.4	841	13.1	29.8
28	3	2	2158358.4	720	13.0	28.6
29	3	2	2158358.4	816	13.6	29.7
30	3	2	2158358.4	838	15.3	31.7

TABLE B-2 (CONT.)

STATION: James A. FitzPatrick MONTH: July 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Discharge
1	3	2	2158358.4	840	15.1	31.7
2	3	2	2158358.4	836	15.1	31.7
3	3	2	2158358.4	839	15.4	31.9
4	3	2	2158358.4	843	14.6	31.3
5	3	2	2158358.4	841	15.9	32.5
6	3	2	2158358.4	838	16.1	32.7
7	3	2	2158358.4	838	16.4	32.8
8	3	2	2158358.4	838	17.1	32.9
9	3	2	2158358.4	837	17.3	33.7
10	3	2	2158358.4	632	18.4	31.4
11	2	2	1504310.4	208	16.6	20.2
12	2	2	1504310.4	0c	17.3	16.2
13	2	2	1504310.4	0	18.3	17.9
14	2	2	1504310.4	0	18.6	18.7
15	2	2	1504310.4	0	18.7	19.7
16	2	2	1504310.4	352d	19.7	29.7
17	3	2	2158358.4	608	20.8	33.8
18	3	2	2158358.4	615	21.7	34.7
19	3	2	2158358.4	717	21.9	36.7
20	3	2	2158358.4	798	22.2	38.5
21	3	2	2158358.4	808	20.3	37.1
22	3	2	2158358.4	806	21.9	38.3
23	3	2	2158358.4	801	22.8	38.9
24	3	2	2158358.4	803	23.1	39.3
25	3	2	2158358.4	805	22.6	38.8
26	3	2	2158358.4	803	22.8	39.2
27	3	2	2158358.4	802	23.1	39.3
28	3	2	2158358.4	803	22.3	38.7
29	3	2	2158358.4	804	22.2	38.6
30	3	2	2158358.4	799	22.1	38.4
31	3	2	2158358.4	802	22.0	39.0

STATION: James A. Fitzpatrick MONTH: August 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Discharge
1	3	2	2158358.4	803	22.2	38.8
2	3	2	2158358.4	803	22.2	38.5
3	3	2	2158358.4	806	21.9	38.0
4	3	2	2158358.4	598	22.0	34.5
5	3	2	2158358.4	782	21.7	37.4
6	3	2	2158358.4	800	20.9	37.0
7	3	2	2158358.4	803	21.1	37.2
8	3	2	2158358.4	803	21.2	37.3
9	3	2	2158358.4	805	20.8	36.9
10	3	2	2158358.4	802	22.0	37.9
11	3	2	2158358.4	803	21.4	37.4
12	3	2	2158358.4	803	21.6	37.7
13	3	2	2158358.4	802	21.5	37.5
14	3	2	2158358.4	804	21.4	37.6
15	3	2	2158358.4	803	21.6	37.6
16	3	2	2158358.4	804	21.9	37.8
17	3	2	2158358.4	803	22.1	38.1
18	3	2	2158358.4	804	22.1	38.1
19	3	2	2158358.4	803	22.3	38.2
20	3	2	2158358.4	803	22.1	38.1
21	3	2	2158358.4	806	21.6	37.7
22	3	2	2158358.4	810	21.1	37.3
23	3	2	2158358.4	809	21.0	37.4
24	3	2	2158358.4	808	21.3	37.4
25	3	2	2158358.4	811	20.8	37.1
26	3	2	2158358.4	814	20.4	36.6
27	3	2	2158358.4	811	20.7	36.8
28	3	2	2158358.4	814	19.7	36.3
29	3	2	2158358.4	817	19.3	35.7
30	3	2	2158358.4	816	19.4	35.8
31	3	2	2158358.4	815	19.7	36.0

TABLE B-2 (CONT.)

STATION: James A. FitzPatrick — MONTH: September 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	3	2	2158358.4	814	19.6	35.9
2	3	2	2158358.4	813	19.7	36.0
3	3	2	2158359.4	811	19.4	35.8
4	3	2	2158358.4	816	19.2	35.6
5	3	2	2158358.4	814	19.3	35.7
6	3	2	2158358.4	815	19.3	35.6
7	3	2	2158358.4	815	18.9	35.3
8	3	2	2158358.4	815	18.5	34.9
9	3	2	2158358.4	815	18.4	34.9
10	3	2	2158358.4	813	18.6	35.1
11	3	2	2158358.4	618	19.3	32.4
12	3	2	2158358.4	708	18.6	32.8
13	3	2	2158358.4	804	18.6	34.6
14	3	2	2158359.4	808	18.4	35.2
15	3	2	2158358.4	813	19.3	35.1
16	3	2	2158358.4	816	18.7	35.0
17	3	2	2158353.4	815	18.1	34.6
18	3	2	2158358.4	820	17.1	33.6
19	3	2	2158359.4	817	17.3	33.7
20	3	2	2158358.4	821	16.7	33.3
21	3	2	2158358.4	815	17.1	34.7
22	3	2	2158358.4	820	17.4	33.9
23	3	2	2158358.4	820	17.1	33.6
24	3	2	2158358.4	819	16.7	33.3
25	3	2	2158358.4	825	16.7	33.3
26	3	2	2158358.4	822	16.6	33.2
27	3	2	2158358.4	820	16.6	32.9
28	3	2	2158358.4	821	16.7	33.3
29	3	2	2158358.4	821	16.3	33.0
30	3	2	2158358.4	822	16.2	33.2

STATION: James A. FitzPatrick — MONTH: October 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	3	2	2158358.4	821	16.4	33.1
2	3	2	2158358.4	823	15.1	32.0
3	3	2	2158358.4	827	10.5	28.6
4	3	2	2158358.4	826	14.3	31.3
5	3	2	2158358.4	826	14.6	31.4
6	3	2	2158358.4	824	15.5	32.2
7	2	2	1831334.4	401	15.4	23.7
8	2	2	1831334.4	0e	16.0	15.8
9	2	2	1831334.4	0	15.8	15.7
10	2	2	1831334.4	0	8.3	8.4
11	2	2	1831334.4	0	5.9	6.2
12	2	1	1315363.2	0	5.7	5.9
13	2	1	1315363.2	0	6.7	7.4
14	2	1	1315363.2	0	10.5	11.4
15	2	1	1315363.2	0	13.0	13.9
16	2	1	1315363.2	0	12.8	14.2
17	2	1	1315363.2	0	12.6	13.8
18	2	1	1315363.2	74f	12.8	19.0
19	3	2	1938525.6	384	12.7	24.6
20	3	2	1938525.6	460	12.7	24.3
21	3	2	1938525.6	467	12.2	24.0
22	3	2	1938525.6	532	12.6	25.3
23	3	2	1938525.6	661	12.5	27.4
24	3	2	1938525.6	759	12.4	29.1
25	3	2	1938525.6	814	12.3	29.9
26	3	2	1938525.6	820	12.2	29.9
27	3	2	1938525.6	820	12.6	30.2
28	3	2	1938525.6	821	12.1	29.9
29	3	2	1938525.6	815	11.9	29.7
30	3	2	1938525.6	651	12.4	27.2
31	3	2	1938525.6	763	12.6	29.3

TABLE B-2 (CONT.)

STATION: James A. FitzPatrick — MONTH: November 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	3	2	2158358.4	808	12.7	30.2
2	3	2	2158358.4	816	12.7	30.4
3	3	2	2158358.4	821	12.7	30.3
4	3	2	2158358.4	820	12.9	30.4
5	3	2	2158358.4	809	12.2	29.9
6	3	2	2158358.4	820	10.9	29.2
7	3	2	2158358.4	820	10.4	28.8
8	3	2	2158358.4	819	10.6	28.9
9	3	2	2158358.4	819	10.8	29.1
10	3	2	2158358.4	820	10.4	28.8
11	3	2	2158358.4	819	10.1	28.6
12	3	2	2158358.4	706	10.6	26.8
13	3	2	2158358.4	504	9.7	23.2
14	3	2	2158358.4	517	9.6	22.9
15	3	2	2158358.4	576	8.7	22.9
16	3	2	2158358.4	736	9.1	26.1
17	3	2	2158358.4	818	9.3	27.9
18	3	2	2158358.4	821	9.2	27.9
19	3	2	2158358.4	819	9.2	27.8
20	3	2	2158358.4	822	9.4	28.1
21	3	2	2158358.4	821	9.4	27.9
22	3	2	2158358.4	821	9.8	28.2
23	3	2	2158358.4	821	9.2	27.8
24	3	2	2158358.4	823	9.0	27.6
25	3	2	2158358.4	824	7.3	26.3
26	3	2	2158358.4	823	7.9	26.8
27	3	2	2158358.4	822	7.2	26.2
28	3	2	2158358.4	822	7.6	26.5
29	3	2	2158358.4	821	7.3	26.3
30	3	2	2158358.4	821	6.8	25.9

STATION: James A. FitzPatrick — MONTH: December 1982

Date	No. of Circulating Water Pumps	No. of Service Water Pumps	Total Volume (m3) of Water Pumped	Mean Electrical Output (MWe)	Temperatures (C) Intake	Temperatures (C) Discharge
1	3	2	2158358.4	824	7.5	26.5
2	3	2	2158358.4	823	7.7	26.7
3	3	2	2158358.4	822	7.5	26.5
4	3	2	2158358.4	822	8.1	27.0
5	3	2	2158358.4	823	8.3	27.2
6	3	2	2158358.4	822	8.3	27.1
7	3	2	2158358.4	822	7.7	26.7
8	3	2	2158358.4	822	7.9	26.3
9	3	2	2158358.4	823	7.4	26.4
10	3	2	2158358.4	808	6.2	25.2
11	3	2	2158358.4	782	5.9	24.3
12	3	2	2158358.4	824	5.8	25.0
13	3	2	2158358.4	823	4.7	24.2
14	3	2	2158358.4	823	5.4	24.8
15	3	2	2158358.4	825	5.9	25.2
16	3/2	2	1831334.4	429	5.8	16.3
17	2	2	1504310.4	0g	5.0	6.7
18	2	2	1504310.4	0	4.4	6.7
19	2	2	1504310.4	0	4.6	6.3
20	2	2	1504310.4	0	4.0	4.5
21	2	2	1504310.4	0	5.2	5.7
22	2	2	1504310.4	25h	4.9	9.8
23	2/3	2	1831334.4	419	4.5	18.6
24	3	2	2158358.4	727	4.1	21.9
25	3	2	2158358.4	820	4.7	23.9
26	3	2	2158358.4	814	4.2	23.5
27	3	2	2158358.4	825	4.6	24.0
28	3	2	2158358.4	825	4.3	23.8
29	3	2	2158358.4	825	3.7	23.5
30	3	2	2158358.4	824	3.5	23.3
31	3	2	2158358.4	821	4.4	23.9

1. a. 1 JAN - 8 MAR - plant off line
   b. 9 MAR - plant on line
   c. 12 JUL - plant off line
   d. 16 JUL - plant on line
   e. 8 OCT - plant off line
   f. 18 OCT - plant on line.
   g. 17 DEC - plant off line.
   h. 23 DEC - plant on line.

NOTE: Volume of water pumped each day was derived from gross circulating water flow data reported in James A. FitzPatrick '401' monthly reports. Water volumes were corrected for tempering when applicable. Power production is daily average (gross MWe) from James A. FitzPatrick '401' monthly reports. All temperatures were derived from James A. FitzPatrick '401' monthly reports. Average intake temperatures were from the main condenser inlet water boxes which do reflect any tempering effects. Average discharge temperatures were taken in the discharge tunnel.

TABLE B-3 TEMPORAL ABUNDANCE AND PERCENT COMPOSITION OF IMPINGED TAXA COLLECTED AT NINE MILE POINT UNIT 1, 1982

	JAN(a)		FEB(a)		MAR(a)		APR		MAY		JUN		JUL	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Rainbow smelt	5,053	67.5	549	63.4	282	69.6	30	58.8	1	10.0	--	--	--	--
Alewife	1,082	14.5	5	0.6	11	2.7	11	21.6	2	20.0	--	--	--	--
Sculpin	651	8.7	194	22.4	61	15.1	4	7.8	3	30.0	--	--	--	--
Gizzard shad	290	3.9	30	3.5	2	0.5	1	2.0	--	--	--	--	--	--
White perch	98	1.3	14	1.6	7	1.7	--	--	--	--	--	--	--	--
Spottail shiner	57	0.8	18	2.1	14	3.5	--	--	--	--	--	--	--	--
Crayfish	72	1.0	3	0.3	1	0.2	1	2.0	--	--	1	33.3	--	--
Threespine stickleback	17	0.2	21	2.4	14	3.5	--	--	--	--	--	--	--	--
Emerald shiner	27	0.4	17	2.0	3	0.7	2	3.9	--	--	--	--	--	--
White bass	39	0.5	1	0.1	1	0.2	--	--	--	--	--	--	--	--
Yellow perch	23	0.3	5	0.6	2	0.5	--	--	--	--	--	--	--	--
Rock bass	22	0.3	2	0.2	1	0.2	--	--	--	--	--	--	--	--
Bluegill	15	0.2	--	--	--	--	--	--	--	--	--	--	--	--
Trout-perch	4	0.1	3	0.3	6	1.5	--	--	--	--	--	--	--	--
Tessellated darter	2	T	--	--	--	--	--	--	3	30.0	1	33.3	--	--
Black crappie	8	0.1	--	--	--	--	--	--	--	--	--	--	--	--
Minnow family	4	0.1	1	0.1	--	--	--	--	--	--	--	--	--	--
Goldfish	3	T	1	0.1	--	--	--	--	--	--	--	--	--	--
Lake chub	4	0.1	1	0.1	--	--	--	--	--	--	--	--	--	--
Pumpkinseed	5	0.1	--	--	--	--	--	--	--	--	--	--	--	--
American eel	2	T	--	--	--	--	1	2.0	--	--	--	--	--	--
Central mudminnow	--	--	--	--	--	--	1	2.0	1	10.0	--	--	--	--
Smallmouth bass	1	T	1	0.1	--	--	--	--	--	--	--	--	--	--
Freshwater drum	2	T	--	--	--	--	--	--	--	--	--	--	--	--
Brown trout	--	--	--	--	--	--	--	--	--	--	1	33.3	--	--
Stonecat	--	--	--	--	--	--	--	--	--	--	--	--	--	--
White crappie	1	T	--	--	--	--	--	--	--	--	--	--	--	--
Unidentified fish	1	T	--	--	--	--	--	--	--	--	--	--	--	--
Total	7,483		866		405		51		10		3		0	

(a) Fish impinged on inoperative traveling screen could not be collected and processed and are excluded from this table.

NOTE: "T" represents a trace percentage of less than 0.1 percent. Percentage totals may not equal 100 percent due to rounding.

TABLE B-3 (CONT.)

	AUG Number	AUG %	SEP Number	SEP %	OCT Number	OCT %	NOV Number	NOV %	DEC(a) Number	DEC(a) %	Totals Number	Totals %
Rainbow smelt	--	--	--	--	--	--	--	--	--	--	5,915	66.8
Alewife	--	--	2	28.6	--	--	--	--	--	--	1,113	12.6
Sculpin	--	--	3	42.9	11	100.0	6	40.0	4	100.0	937	10.6
Gizzard shad	--	--	--	--	--	--	--	--	--	--	323	3.6
White perch	--	--	--	--	--	--	--	--	--	--	119	1.3
Spottail shiner	--	--	1	14.3	--	--	--	--	--	--	90	1.0
Crayfish	--	--	1	14.3	--	--	--	--	--	--	79	0.9
Threespine stickleback	--	--	--	--	--	--	--	--	--	--	52	0.6
Emerald shiner	--	--	--	--	--	--	--	--	--	--	49	0.6
White bass	--	--	--	--	--	--	--	--	--	--	41	0.5
Yellow perch	--	--	--	--	--	--	--	--	--	--	30	0.3
Rock bass	--	--	--	--	--	--	--	--	--	--	25	0.3
Bluegill	--	--	--	--	--	--	--	--	--	--	15	0.2
Trout-perch	--	--	--	--	--	--	7	46.7	--	--	13	0.1
Tessellated darter	--	--	--	--	--	--	--	--	--	--	13	0.1
Black crappie	--	--	--	--	--	--	--	--	--	--	8	0.1
Minnow family	--	--	--	--	--	--	1	6.7	--	--	5	0.1
Goldfish	--	--	--	--	--	--	--	--	--	--	5	0.1
Lake chub	--	--	--	--	--	--	--	--	--	--	5	0.1
Pumpkinseed	--	--	--	--	--	--	--	--	--	--	5	0.1
American eel	--	--	--	--	--	--	--	--	--	--	3	T
Central mudminnow	--	--	--	--	--	--	--	--	--	--	2	T
Smallmouth bass	--	--	--	--	--	--	--	--	--	--	2	T
Freshwater drum	--	--	--	--	--	--	--	--	--	--	2	T
Brown trout	--	--	--	--	--	--	1	6.7	--	--	1	T
Stonecat	--	--	--	--	--	--	--	--	--	--	1	T
White crappie	--	--	--	--	--	--	--	--	--	--	1	T
Unidentified fish	--	--	--	--	--	--	--	--	--	--	1	T
Total	0		7		11		15		4		8,855	

TABLE B-4 BIOMASS (G) AND PERCENT COMPOSITION OF IMPINGED TAXA COLLECTED AT NINE MILE POINT UNIT 1, 1982

	JAN(a)		FEB(a)		MAR(a)		APR		MAY		JUN	
	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%
Gizzard shad	108,598	74.7	26,622	86.3	2,070	43.5	4	1.4	--	--	--	--
Alewife	18,181	12.5	147	0.5	427	9.0	25	9.6	67	86.1	--	--
Rainbow smelt	8,540	5.9	2,221	7.2	917	19.3	12	4.6	1	0.9	--	--
Yellow perch	2,480	1.7	444	1.4	402	8.4	--	--	--	--	--	--
Sculpin	2,236	1.5	650	2.1	236	5.0	11	4.1	7	9.0	--	--
White perch	1,585	1.1	165	0.5	52	1.1	--	--	--	--	--	--
American eel	1,120	0.8	--	--	--	--	201	76.5	--	--	--	--
Smallmouth bass	628	0.4	259	0.8	--	--	--	--	--	--	--	--
Brown trout	--	--	--	--	--	--	--	--	--	--	874	99.3
Spottail shiner	509	0.4	162	0.5	179	3.8	--	--	--	--	--	--
White bass	654	0.5	6	T	22	0.5	--	--	--	--	--	--
Rock bass	106	0.1	12	T	369	7.8	--	--	--	--	--	--
Crayfish	216	0.1	11	T	4	0.1	7	2.5	--	--	6	0.7
Goldfish	66	T	20	0.1	--	--	--	--	--	--	--	--
Emerald shiner	79	0.1	58	0.2	8	0.2	2	0.8	--	--	--	--
Trout-perch	24	T	43	0.1	57	1.2	--	--	--	--	--	--
Bluegill	93	0.1	--	--	--	--	--	--	--	--	--	--
Pumpkinseed	69	T	--	--	--	--	--	--	--	--	--	--
Threespine stickleback	18	T	25	0.1	16	0.3	--	--	--	--	--	--
Freshwater drum	47	T	--	--	--	--	--	--	--	--	--	--
Black crappie	29	T	--	--	--	--	--	--	--	--	--	--
Lake chub	11	T	17	0.1	--	--	--	--	--	--	--	--
Tessellated darter	6	T	--	--	--	--	--	--	1	1.0	<1	T
Central mudminnow	--	--	--	--	--	--	1	0.5	2	3.0	--	--
Minnow family	2	T	1	T	--	--	--	--	--	--	--	--
White crappie	1	T	--	--	--	--	--	--	--	--	--	--
Stonecat	--	--	--	--	--	--	--	--	--	--	--	--
Unidentified fish	1	T	--	--	--	--	--	--	--	--	--	--
Total	145,299		30,863		4,759		263		78		880	

(a) Fish impinged on inoperative traveling screen could not be collected and processed and are excluded from this table.

NOTE: "T" represents a trace percentage of less than 0.1 percent. Percentage totals may not equal 100 percent due to rounding.

TABLE B-4 (CONT.)

	JUL		AUG		SEP		OCT		NOV		DEC(a)		Totals	
	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%
Gizzard shad	--	--	--	--	--	--	--	--	--	--	--	--	137,294	75.3
Alewife	--	--	--	--	1	15.1	--	--	--	--	--	--	18,848	10.3
Rainbow smelt	--	--	--	--	--	--	--	--	--	--	--	--	11,691	6.4
Yellow perch	--	--	--	--	--	--	--	--	--	--	--	--	3,326	1.8
Sculpin	--	--	--	--	2	47.2	12	100.0	13	14.6	7	100.0	3,174	1.7
White perch	--	--	--	--	--	--	--	--	--	--	--	--	1,802	1.0
American eel	--	--	--	--	--	--	--	--	--	--	--	--	1,321	0.7
Smallmouth bass	--	--	--	--	--	--	--	--	--	--	--	--	887	0.5
Brown trout	--	--	--	--	--	--	--	--	--	--	--	--	874	0.5
Spottail shiner	--	--	--	--	2	37.7	--	--	--	--	--	--	852	0.5
White bass	--	--	--	--	--	--	--	--	--	--	--	--	682	0.4
Rock bass	--	--	--	--	--	--	--	--	--	--	--	--	487	0.3
Crayfish	--	--	--	--	--	--	--	--	--	--	--	--	243	0.1
Goldfish	--	--	--	--	--	--	--	--	75	82.4	--	--	161	0.1
Emerald shiner	--	--	--	--	--	--	--	--	--	--	--	--	147	0.1
Trout-perch	--	--	--	--	--	--	--	--	--	--	--	--	124	0.1
Bluegill	--	--	--	--	--	--	--	--	--	--	--	--	93	0.1
Pumpkinseed	--	--	--	--	--	--	--	--	--	--	--	--	69	T
Threespine stickleback	--	--	--	--	--	--	--	--	--	--	--	--	59	T
Freshwater drum	--	--	--	--	--	--	--	--	--	--	--	--	47	T
Black crappie	--	--	--	--	--	--	--	--	--	--	--	--	29	T
Lake chub	--	--	--	--	--	--	--	--	--	--	--	--	28	T
Tessellated darter	--	--	--	--	--	--	--	--	2	2.2	--	--	9	T
Central mudminnow	--	--	--	--	--	--	--	--	--	--	--	--	4	T
Minnow family	--	--	--	--	--	--	--	--	--	--	--	--	3	T
White crappie	--	--	--	--	--	--	--	--	--	--	--	--	1	T
Stonecat	--	--	--	--	--	--	--	--	1	0.8	--	--	1	T
Unidentified fish	--	--	--	--	--	--	--	--	--	--	--	--	1	T
	0		0		5		12		91		7		182,257	

TABLE B-5 ESTIMATED ABUNDANCE AND BIOMASS (G) FOR IMPINGED TAXA AT NINE MILE POINT UNIT 1, 1982

	JAN		FEB		MAR		APR		MAY		JUN	
	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight
Rainbow smelt	51,788	87,527	5,749	23,259	2,324	7,558	58	23	2	1	--	--
Alewife	11,089	186,337	52	1,539	91	3,520	21	49	3	104	--	--
Sculpin	6,672	22,917	2,032	6,807	503	1,945	8	21	5	11	--	--
Gizzard shad	2,972	1,113,021	314	278,791	17	17,062	2	7	--	--	--	--
White perch	1,004	16,245	147	1,728	58	429	--	--	--	--	--	--
Spottail shiner	584	5,217	189	1,697	115	1,475	--	--	--	--	--	--
Crayfish	738	2,214	31	114	8	30	2	13	--	--	8	47
Threespine stickleback	174	186	220	260	115	134	--	--	--	--	--	--
Emerald shiner	277	812	178	610	25	64	4	4	--	--	--	--
White bass	400	6,704	11	63	8	181	--	--	--	--	--	--
Yellow perch	236	25,418	52	4,650	17	3,314	--	--	--	--	--	--
Rock bass	226	1,086	21	126	8	3,042	--	--	--	--	--	--
Bluegill	154	953	--	--	--	--	--	--	--	--	--	--
Trout-perch	41	248	31	450	50	470	--	--	--	--	--	--
Tessellated darter	21	61	--	--	--	--	--	--	5	1	8	2
Black crappie	82	297	--	--	--	--	--	--	--	--	--	--
Minnow family	41	26	11	6	--	--	--	--	--	--	--	--
Goldfish	31	676	11	209	--	--	--	--	--	--	--	--
Lake chub	41	113	11	178	--	--	--	--	--	--	--	--
Pumpkinseed	51	702	--	--	--	--	--	--	--	--	--	--
American eel	21	11,479	--	--	--	--	2	390	--	--	--	--
Central mudminnow	--	--	--	--	--	--	2	3	2	4	--	--
Smallmouth bass	10	6,436	11	2,712	--	--	--	--	--	--	--	--
Freshwater drum	21	486	--	--	--	--	--	--	--	--	--	--
Brown trout	--	--	--	--	--	--	--	--	--	--	8	6,594
Stonecat	--	--	--	--	--	--	--	--	--	--	--	--
White crappie	10	12	--	--	--	--	--	--	--	--	--	--
Unidentified fish	10	5	--	--	--	--	--	--	--	--	--	--
Total(a)	76,693	1,489,176	9,069	323,198	3,338	39,223	99	510	16	121	23	6,642

(a) Totals may not equal sum at column or row as a result of rounding.

TABLE B-5 (CONT.)

	JUL		AUG		SEP		OCT		NOV		DEC		Totals	
	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight	No.	Weight	Number	Weight
Rainbow smelt	--	--	--	--	--	--	--	--	--	--	--	--	59,921	118,368
Alewife	--	--	--	--	15	6	--	--	--	--	--	--	11,271	191,555
Sculpin	--	--	--	--	23	19	81	90	45	100	28	45	9,410	31,955
Gizzard shad	--	--	--	--	--	--	--	--	--	--	--	--	3,305	1,408,881
White perch	--	--	--	--	--	--	--	--	--	--	--	--	1,209	18,402
Spottail shiner	--	--	--	--	8	15	--	--	--	--	--	--	896	8,404
Crayfish	--	--	--	--	8	(b)	--	--	--	--	--	--	795	2,418
Threespine stickleback	--	--	--	--	--	--	--	--	--	--	--	--	509	580
Emerald shiner	--	--	--	--	--	--	--	--	--	--	--	--	484	1,190
White bass	--	--	--	--	--	--	--	--	--	--	--	--	419	6,948
Yellow perch	--	--	--	--	--	--	--	--	--	--	--	--	305	33,382
Rock bass	--	--	--	--	--	--	--	--	--	--	--	--	255	4,251
Bluegill	--	--	--	--	--	--	--	--	--	--	--	--	154	953
Trout-perch	--	--	--	--	--	--	--	--	--	--	--	--	122	1,168
Tessellated darter	--	--	--	--	--	--	--	--	53	15	--	--	87	79
Black crappie	--	--	--	--	--	--	--	--	--	--	--	--	82	297
Minnow family	--	--	--	--	--	--	--	--	--	--	--	--	52	32
Goldfish	--	--	--	--	--	--	--	--	8	564	--	--	50	1,449
Lake chub	--	--	--	--	--	--	--	--	--	--	--	--	52	291
Pumpkinseed	--	--	--	--	--	--	--	--	--	--	--	--	51	702
American eel	--	--	--	--	--	--	--	--	--	--	--	--	23	11,869
Central mudminnow	--	--	--	--	--	--	--	--	--	--	--	--	4	7
Smallmouth bass	--	--	--	--	--	--	--	--	--	--	--	--	21	9,148
Freshwater drum	--	--	--	--	--	--	--	--	--	--	--	--	21	486
Brown trout	--	--	--	--	--	--	--	--	--	--	--	--	8	6,594
Stonecat	--	--	--	--	--	--	--	--	8	5	--	--	8	5
White crappie	--	--	--	--	--	--	--	--	--	--	--	--	10	12
Unidentified fish	--	--	--	--	--	--	--	--	--	--	--	--	10	5
Total	0	0	0	0	53	40	81	90	113	684	28	45	89,526	1,859,729

(b) No weight was recorded because specimen was lost on transport.

TABLE B-5 LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES
IMPINGED AT NINE MILE POINT UNIT 1, 1982

ALEWIFE

Date	Length Intervals (MM) 30.0-49.9	50.0-69.9	70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9
JAN 82	0	0	0	0	0	1	17	39	1
FEB 82	0	0	0	0	0	1	2	2	0
MAR 82	0	0	0	0	0	0	1	6	4
APR 82	0	0	3	0	0	0	0	0	0
MAY 82	0	0	0	0	0	0	0	2	0
JUN 82	0	0	0	0	0	0	0	0	0
JUL 82	0	0	0	0	0	0	0	0	0
AUG 82	0	0	0	0	0	0	0	0	0
SEP 82	2	0	0	0	0	0	0	0	0
OCT 82	0	0	0	0	0	0	0	0	0
NOV 82	0	0	0	0	0	0	0	0	0
DEC 82	0	0	0	0	0	0	0	0	0
Interval Totals	2	0	3	0	0	2	20	49	5

Date	P	N	X	SD	Range MIN	MED	MAX
JAN 82	1,024	58	172.7	8.2	144.0	175.0	191.0
FEB 82	0	5	164.4	11.8	145.0	169.0	175.0
MAR 82	0	11	184.7	9.8	169.0	185.0	201.0
APR 82	8	3	75.0	3.5	71.0	77.0	77.0
MAY 82	0	2	181.0	11.3	173.0	181.0	189.0
JUN 82	0	0	0.0	0.0	0.0	0.0	0.0
JUL 82	0	0	0.0	0.0	0.0	0.0	0.0
AUG 82	0	0	0.0	0.0	0.0	0.0	0.0
SEP 82	0	2	38.5	3.5	36.0	38.5	41.0
OCT 82	0	0	0.0	0.0	0.0	0.0	0.0
NOV 82	0	0	0.0	0.0	0.0	0.0	0.0
DEC 82	0	0	0.0	0.0	0.0	0.0	0.0
Summary Totals	1,032	81	167.1	29.5	36.0		201.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

RAINBOW SMELT

Date	Length Intervals (MM) 30.0-49.9	50.0-69.9	70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9
JAN 82	7	113	14	2	3	10	5	3	2	1
FEB 82	9	95	18	1	4	12	10	6	5	0
MAR 82	6	80	11	1	3	4	7	2	2	0
APR 82	8	5	0	0	0	0	0	0	0	0
MAY 82	0	1	0	0	0	0	0	0	0	0
JUN 82	0	0	0	0	0	0	0	0	0	0
JUL 82	0	0	0	0	0	0	0	0	0	0
AUG 82	0	0	0	0	0	0	0	0	0	0
SEP 82	0	0	0	0	0	0	0	0	0	0
OCT 82	0	0	0	0	0	0	0	0	0	0
NOV 82	0	0	0	0	0	0	0	0	0	0
DEC 82	0	0	0	0	0	0	0	0	0	0
Interval Totals	30	294	43	4	10	26	22	11	9	1

Date	P	N	X	SD	Range MIN	MED	MAX
JAN 82	4,893	160	75.3	35.2	46.0	62.0	211.0
FEB 82	389	160	82.8	43.1	38.0	63.0	209.0
MAR 82	166	116	74.8	35.5	44.0	62.0	197.0
APR 82	17	13	48.0	6.1	40.0	47.0	60.0
MAY 82	0	1	63.0	0.0	63.0	63.0	63.0
JUN 82	0	0	0.0	0.0	0.0	0.0	0.0
JUL 82	0	0	0.0	0.0	0.0	0.0	0.0
AUG 82	0	0	0.0	0.0	0.0	0.0	0.0
SEP 82	0	0	0.0	0.0	0.0	0.0	0.0
OCT 82	0	0	0.0	0.0	0.0	0.0	0.0
NOV 82	0	0	0.0	0.0	0.0	0.0	0.0
DEC 82	0	0	0.0	0.0	0.0	0.0	0.0
Summary Totals	5,465	450	77.1	38.2	38.0		211.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE B-6 (CONT.)

WHITE PERCH

Date	Length Intervals (MM) 50.0-69.9	70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9	230.0-249.9	250.0-269.9
JAN 82	16	44	11	2	0	3	1	0	1	1	1
FEB 82	2	3	8	0	0	1	0	0	0	0	0
MAR 82	0	5	1	1	0	0	0	0	0	0	0
APR 82	0	0	0	0	0	0	0	0	0	0	0
MAY 82	0	0	0	0	0	0	0	0	0	0	0
JUN 82	0	0	0	0	0	0	0	0	0	0	0
JUL 82	0	0	0	0	0	0	0	0	0	0	0
AUG 82	0	0	0	0	0	0	0	0	0	0	0
SEP 82	0	0	0	0	0	0	0	0	0	0	0
OCT 82	0	0	0	0	0	0	0	0	0	0	0
NOV 82	0	0	0	0	0	0	0	0	0	0	0
DEC 82	0	0	0	0	0	0	0	0	0	0	0
Interval Totals	18	52	20	3	0	4	1	0	1	1	1

Date	P	N	X	SD	Range MIN	MED	MAX
JAN 82	18	80	90.2	38.6	50.0	80.0	267.0
FEB 82	0	14	92.6	23.1	68.0	90.5	162.0
MAR 82	0	7	85.9	14.0	74.0	83.0	114.0
APR 82	0	0	0.0	0.0	0.0	0.0	0.0
MAY 82	0	0	0.0	0.0	0.0	0.0	0.0
JUN 82	0	0	0.0	0.0	0.0	0.0	0.0
JUL 82	0	0	0.0	0.0	0.0	0.0	0.0
AUG 82	0	0	0.0	0.0	0.0	0.0	0.0
SEP 82	0	0	0.0	0.0	0.0	0.0	0.0
OCT 82	0	0	0.0	0.0	0.0	0.0	0.0
NOV 82	0	0	0.0	0.0	0.0	0.0	0.0
DEC 82	0	0	0.0	0.0	0.0	0.0	0.0
Summary Totals	18	101	90.3	35.5	50.0		267.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE B-6 (CONT.)

YELLOW PERCH

Date	Length Intervals (MM) 70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9	230.0-249.9	250.0-269.9	270.0-289.9
JAN 82	1	0	1	0	1	4	9	5	1	0	1
FEB 82	0	0	0	0	1	1	2	1	0	0	0
MAR 82	0	0	0	0	0	0	0	1	0	0	1
APR 82	0	0	0	0	0	0	0	0	0	0	0
MAY 82	0	0	0	0	0	0	0	0	0	0	0
JUN 82	0	0	0	0	0	0	0	0	0	0	0
JUL 82	0	0	0	0	0	0	0	0	0	0	0
AUG 82	0	0	0	0	0	0	0	0	0	0	0
SEP 82	0	0	0	0	0	0	0	0	0	0	0
OCT 82	0	0	0	0	0	0	0	0	0	0	0
NOV 82	0	0	0	0	0	0	0	0	0	0	0
DEC 82	0	0	0	0	0	0	0	0	0	0	0
Interval Totals	1	0	1	0	2	5	11	7	1	0	2

Date	P	N	X	SD	Range MIN	MED	MAX
JAN 82	0	23	193.8	39.6	87.0	199.0	288.0
FEB 82	0	5	190.0	24.9	163.0	191.0	229.0
MAR 82	0	2	250.0	31.1	228.0	250.0	272.0
APR 82	0	0	0.0	0.0	0.0	0.0	0.0
MAY 82	0	0	0.0	0.0	0.0	0.0	0.0
JUN 82	0	0	0.0	0.0	0.0	0.0	0.0
JUL 82	0	0	0.0	0.0	0.0	0.0	0.0
AUG 82	0	0	0.0	0.0	0.0	0.0	0.0
SEP 82	0	0	0.0	0.0	0.0	0.0	0.0
OCT 82	0	0	0.0	0.0	0.0	0.0	0.0
NOV 82	0	0	0.0	0.0	0.0	0.0	0.0
DEC 82	0	0	0.0	0.0	0.0	0.0	0.0
Summary Totals	0	30	196.9	39.0	87.0		288.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE B-6 (CONT.)

SPOTTAIL SHINER

Date	P	N	X	SD	Length Intervals (MM) 50.0-69.9	70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	Range MIN	MED	MAX
JAN 82	0	57	101.4	14.9	1	7	36	11	1	1	64.0	99.0	164.0
FEB 82	1	17	100.1	19.0	1	3	7	4	2	0	60.0	95.0	132.0
MAR 82	1	13	113.3	15.5	0	1	4	6	2	0	83.0	117.0	136.0
APR 82	0	0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0
MAY 82	0	0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0
JUN 82	0	0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0
JUL 82	0	0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0
AUG 82	0	0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0
SEP 82	1	0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0
OCT 82	0	0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0
NOV 82	0	0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0
DEC 82	0	0	0.0	0.0	0	0	0	0	0	0	0.0	0.0	0.0
Totals	3	87	102.9	16.3	2	11	47	21	5	1	60.0		164.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE B-5 (CONT.)

SMALLMOUTH BASS

Date	P	N	X	SD	Length Intervals (MM) 250.0-269.9	270.0-289.9	290.0-309.9	310.0-329.9	330.0-349.9	Range MIN	MED	MAX
JAN 82	0	1	347.0	0.0	0	0	0	0	1	347.0	347.0	347.0
FEB 82	0	1	259.0	0.0	1	0	0	0	0	259.0	259.0	259.0
MAR 82	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0
APR 82	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0
MAY 82	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0
JUN 82	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0
JUL 82	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0
AUG 82	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0
SEP 82	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0
OCT 82	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0
NOV 82	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0
DEC 82	0	0	0.0	0.0	0	0	0	0	0	0.0	0.0	0.0
Totals	0	2	303.0	62.2	1	0	0	0	1	259.0		347.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE B-7 TEMPORAL ABUNDANCE AND PERCENT COMPOSITION OF IMPINGED TAXA COLLECTED AT JAMES A. FITZPATRICK, 1982

	JAN		FEB		MAR		APR		MAY		JUN	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Alewife	650	11.1	17	3.6	114	6.7	17,660	36.5	60,524	85.0	6,912	88.9
Rainbow smelt	4,987	85.1	382	81.6	1,128	66.7	27,498	56.8	10,069	14.1	505	6.5
White perch	6	0.1	2	0.4	13	0.8	616	1.3	61	0.1	24	0.3
Sculpin family	39	0.7	4	0.9	42	2.5	545	1.1	98	0.1	10	0.1
Spottail shiner	18	0.3	21	4.5	74	4.4	263	0.5	27	T	70	0.9
Trout-perch	1	T	--	--	8	0.5	132	0.3	230	0.3	142	1.8
Emerald shiner	38	0.6	16	3.4	70	4.1	351	0.7	25	T	17	0.2
Rock bass	8	0.1	7	1.5	75	4.4	214	0.4	17	T	22	0.3
Threespine stickleback	6	0.1	4	0.9	23	1.4	273	0.6	2	T	1	T
Crayfish	12	0.2	1	0.2	79	4.7	153	0.3	35	T	3	T
Gizzard shad	55	0.9	2	0.4	18	1.1	167	0.3	--	--	--	--
Yellow perch	1	T	1	0.2	7	0.4	94	0.2	16	T	12	0.2
White bass	4	0.1	1	0.2	2	0.1	23	T	1	T	--	--
Smallmouth bass	--	--	--	--	2	0.1	16	T	7	T	4	0.1
Brook stickleback	--	--	1	0.2	--	--	121	0.2	--	--	--	--
Central mudminnow	2	T	--	--	3	0.2	105	0.2	--	--	--	--
Tesselated darter	1	T	1	0.2	6	0.4	15	T	24	T	28	0.4
Lake chub	--	--	--	--	1	0.1	37	0.1	3	T	2	T
Minnow family	3	0.1	4	0.9	8	0.5	15	T	7	T	--	--
Clam	1	T	--	--	10	0.6	18	T	4	T	1	T
Pumpkinseed	5	0.1	--	--	2	0.1	6	T	--	--	--	--
Stonecat	--	--	1	0.2	4	0.2	12	T	4	T	1	T
Bluegill	12	0.2	--	--	2	0.1	2	T	--	--	--	--
Brown trout	3	0.1	1	0.2	--	--	2	T	9	T	3	T
Sea lamprey	--	--	--	--	--	--	3	T	8	T	4	0.1
Brown bullhead	--	--	--	--	--	--	3	T	--	--	1	T
White sucker	--	--	--	--	--	--	7	T	1	T	--	--
Fathead minnow	--	--	--	--	--	--	12	T	--	--	--	--
Golden shiner	1	T	--	--	--	--	11	T	--	--	--	--
American eel	1	T	--	--	--	--	1	T	--	--	1	T
Lake trout	--	--	1	0.2	--	--	5	T	1	T	--	--
Rainbow trout	--	--	--	--	--	--	2	T	1	T	1	T
Chinook salmon	--	--	--	--	--	--	--	--	--	--	6	0.1
Goldfish	2	T	1	0.2	--	--	3	T	--	--	--	--
Black crappie	2	T	--	--	--	--	--	--	--	--	--	--
Cisco	--	--	--	--	--	--	1	T	2	T	--	--
Longnose dace	--	--	--	--	--	--	3	T	--	--	--	--
Logperch	--	--	--	--	--	--	2	T	--	--	--	--
Black bullhead	--	--	--	--	--	--	2	T	--	--	--	--
Freshwater drum	1	T	--	--	--	--	1	T	--	--	--	--
Brook silverside	--	--	--	--	--	--	2	T	--	--	--	--
Northern pike	--	--	--	--	--	--	2	T	--	--	--	--
Bluntnose minnow	--	--	--	--	--	--	1	T	--	--	--	--
Channel catfish	--	--	--	--	--	--	1	T	--	--	--	--
Burbot	--	--	--	--	1	0.1	--	--	--	--	--	--
Spotted mudpuppy	--	--	--	--	--	--	--	--	1	T	--	--
Brook trout	--	--	--	--	--	--	--	--	--	--	1	T
Coho salmon	--	--	--	--	--	--	--	--	--	--	--	--
Total	5,859		468		1,692		48,400		71,177		7,771	

NOTE: "T" represents a trace percentage of less than 0.1 percent. Percentage totals may not equal 100 percent due to rounding.

TABLE B-7 (CONT.)

	JUL Number	JUL %	AUG Number	AUG %	SEP Number	SEP %	OCT Number	OCT %	NOV Number	NOV %	DEC Number	DEC %	Totals Number	Totals %
Alewife	18,092	99.5	2,463	84.5	1,493	97.9	53	46.1	107	36.3	1,072	4.6	109,157	60.0
Rainbow smelt	6	T	224	7.7	8	0.5	52	45.2	148	50.2	21,623	92.4	66,630	36.6
White perch	3	T	3	0.1	--	--	1	0.9	2	0.7	126	0.5	857	0.5
Sculpin family	2	T	27	0.9	--	--	--	--	10	3.4	35	0.1	814	0.4
Spottail shiner	14	0.1	24	0.8	12	0.8	2	1.7	--	--	246	1.1	769	0.4
Trout-perch	18	0.1	5	0.2	--	--	--	--	1	0.3	4	T	541	0.3
Emerald shiner	--	--	--	--	--	--	--	--	1	0.3	6	T	524	0.3
Rock bass	11	0.1	14	0.5	1	0.1	1	0.9	2	0.7	6	T	378	0.2
Threespine stickleback	--	--	--	--	--	--	--	--	--	--	--	--	309	0.2
Crayfish	2	T	9	0.3	--	--	--	--	--	--	4	T	298	0.2
Gizzard shad	--	--	--	--	--	--	--	--	6	2.0	17	0.1	265	0.1
Yellow perch	19	0.1	64	2.2	5	0.3	2	1.7	3	1.0	30	0.1	254	0.1
White bass	--	--	--	--	--	--	--	--	2	0.7	143	0.6	176	0.1
Smallmouth bass	3	T	61	2.1	4	0.3	2	1.7	6	2.0	56	0.2	161	0.1
Brook stickleback	--	--	--	--	--	--	--	--	--	--	--	--	122	0.1
Central mudminnow	--	--	--	--	--	--	--	--	--	--	--	--	110	0.1
Tesselated darter	--	--	19	0.7	--	--	--	--	--	--	--	--	94	0.1
Lake chub	--	--	--	--	--	--	--	--	--	--	2	T	45	T
Minnow family	--	--	--	--	--	--	--	--	--	--	--	--	37	T
Clam	--	--	--	--	--	--	--	--	--	--	--	--	34	T
Pumpkinseed	--	--	1	T	--	--	--	--	--	--	13	0.1	27	T
Stonecat	3	T	--	--	--	--	1	0.9	1	0.3	--	--	27	T
Bluegill	--	--	--	--	--	--	--	--	1	0.3	6	T	23	T
Brown trout	2	T	--	--	--	--	--	--	1	0.3	2	T	23	T
Sea lamprey	2	T	1	T	--	--	--	--	2	0.7	1	T	21	T
Brown bullhead	1	T	--	--	--	--	--	--	1	0.3	8	T	14	T
White sucker	2	T	--	--	1	0.1	--	--	--	--	2	T	13	T
Fathead minnow	--	--	--	--	--	--	--	--	--	--	--	--	12	T
Golden shiner	--	--	--	--	--	--	--	--	--	--	--	--	12	T
American eel	2	T	1	T	1	0.1	1	0.9	--	--	--	--	8	T
Lake trout	--	--	--	--	--	--	--	--	--	--	--	--	7	T
Rainbow trout	--	--	--	--	--	--	--	--	1	0.3	2	T	7	T
Chinook salmon	--	--	--	--	--	--	--	--	--	--	--	--	6	T
Goldfish	--	--	--	--	--	--	--	--	--	--	--	--	6	T
Black crappie	--	--	--	--	--	--	--	--	--	--	2	T	4	T
Cisco	--	--	--	--	--	--	--	--	--	--	--	--	3	T
Longnose dace	--	--	--	--	--	--	--	--	--	--	--	--	3	T
Logperch	--	--	--	--	--	--	--	--	--	--	--	--	2	T
Black bullhead	--	--	--	--	--	--	--	--	--	--	--	--	2	T
Freshwater drum	--	--	--	--	--	--	--	--	--	--	--	--	2	T
Brook silverside	--	--	--	--	--	--	--	--	--	--	--	--	2	T
Northern pike	--	--	--	--	--	--	--	--	--	--	--	--	2	T
Bluntnose minnow	--	--	--	--	--	--	--	--	--	--	--	--	1	T
Channel catfish	--	--	--	--	--	--	--	--	--	--	--	--	1	T
Burbot	--	--	--	--	--	--	--	--	--	--	--	--	1	T
Spotted mudpuppy	--	--	--	--	--	--	--	--	--	--	--	--	1	T
Brook trout	--	--	--	--	--	--	--	--	--	--	--	--	1	T
Coho salmon	1	T	--	--	--	--	--	--	--	--	--	--	1	T
Total	18,183		2,916		1,525		115		295		23,406		181,807	

TABLE B-8. BIOMASS (G) AND PERCENT COMPOSITION OF IMPINGED TAXA COLLECTED AT JAMES A. FITZPATRICK, 1982

	JAN		FEB		MAR		APR		MAY		JUN	
	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%
Alewife	24,231	36.6	475	6.2	4,117	9.5	547,139	57.1	1,765,200	88.3	181,608	85.7
Rainbow smelt	3,945	6.0	1,036	13.6	2,194	5.1	124,261	13.0	182,850	9.1	2,160	1.0
Gizzard shad	34,096	51.5	1,421	18.6	14,582	33.7	142,798	14.9	--	--	--	--
White perch	273	0.4	12	0.2	1,186	2.7	94,565	9.9	14,198	0.7	5,674	2.7
Rock bass	42	0.1	312	4.1	15,899	36.7	8,025	0.8	6,064	0.3	6,796	3.2
Brown trout	1,595	2.4	4,075	53.4	--	--	2,035	0.2	12,651	0.6	5,968	2.8
Yellow perch	6	T	69	0.9	733	1.7	10,708	1.1	2,315	0.1	911	0.4
Smallmouth bass	--	--	--	--	2,215	5.1	6,025	0.6	4,024	0.2	3,966	1.9
Trout-perch	9	T	--	--	55	0.1	1,370	0.1	3,814	0.2	2,088	1.0
Rainbow trout	--	--	--	--	--	--	1,731	0.2	633	T	95	T
Spottail shiner	80	0.1	132	1.7	647	1.5	2,306	0.2	257	T	932	0.4
White bass	198	0.3	5	0.1	33	0.1	3,684	0.4	225	T	--	--
Sea lamprey	--	--	--	--	--	--	469	T	1,605	0.1	997	0.5
White sucker	--	--	--	--	--	--	50	T	39	T	--	--
Sculpin family	108	0.2	6	0.1	127	0.3	2,819	0.3	366	T	41	T
American eel	1,487	2.2	--	--	--	--	1,267	0.1	--	--	58	T
Northern pike	--	--	--	--	2,998	0.3	--	--	--	--	--	--
Brown bullhead	--	--	--	--	--	--	1,498	0.2	--	--	521	0.2
Lake trout	--	--	6	0.1	--	--	38	T	1,944	0.1	--	--
Cisco	--	--	--	--	--	--	507	0.1	1,369	0.1	--	--
Pumpkinseed	7	T	--	--	276	0.6	544	0.1	--	--	--	--
Stonecat	--	--	1	T	123	0.3	475	T	225	T	14	T
Emerald shiner	60	0.1	63	0.8	173	0.4	863	0.1	24	T	16	T
Crayfish	6	T	<1	T	377	0.9	392	T	210	T	44	T
Coho salmon	--	--	--	--	--	--	--	--	--	--	--	--
Black bullhead	--	--	--	--	--	--	713	0.1	--	--	--	--
Lake chub	--	--	--	--	3	T	454	T	181	T	50	T
Burbot	--	--	--	--	501	1.2	--	--	--	--	--	--
Central mudminnow	12	T	--	--	11	T	390	T	--	--	--	--
Threespine stickleback	7	T	5	0.1	22	0.1	334	T	2	T	1	T
Tesselated darter	<1	T	<1	T	5	T	73	T	59	T	57	T
Bluegill	16	T	--	--	3	T	2	T	--	--	--	--
Brook stickleback	--	--	1	T	--	--	138	T	--	--	--	--
Spotted mudpuppy	--	--	--	--	--	--	--	--	130	T	--	--
Goldfish	10	T	8	0.1	--	--	80	T	--	--	--	--
Golden shiner	3	T	--	--	--	--	77	T	--	--	--	--
Freshwater drum	18	T	--	--	--	--	53	T	--	--	--	--
Clam	1	T	--	--	23	0.1	19	T	4	T	<1	T
Logperch	--	--	--	--	--	--	43	T	--	--	--	--
Minnow family	2	T	4	0.1	4	T	18	T	4	T	--	--
Fathead minnow	--	--	--	--	--	--	29	T	--	--	--	--
Brook trout	--	--	--	--	--	--	--	--	--	--	19	T
Chinook salmon	--	--	--	--	--	--	--	--	--	--	19	T
Longnose dace	--	--	--	--	--	--	19	T	--	--	--	--
Brook silverside	--	--	--	--	--	--	3	T	--	--	--	--
Channel catfish	--	--	--	--	--	--	3	T	--	--	--	--
Bluntnose minnow	--	--	--	--	--	--	2	T	--	--	--	--
Black crappie	2	T	--	--	--	--	--	--	--	--	--	--
Total	66,214		7,631		43,309		958,977		1,998,393		212,035	

NOTE: 'T' represents a trace percentage of less than 0.1 percent. Percentage totals may not equal 100 percent due to rounding.

TABLE B-8 (CONT.)

	JUL		AUG		SEP		OCT		NOV		DEC(a)		Totals	
	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%	Weight	%
Alewife	422,800	95.4	32,099	67.8	1,801	32.9	1,262	50.7	3,096	33.0	31,380	42.7	3,015,208	78.0
Rainbow smelt	19	T	318	0.7	2	T	457	18.4	614	6.5	26,663	36.3	344,519	8.9
Gizzard shad	--	--	--	--	--	--	--	--	1,229	13.1	171	0.2	194,297	5.0
White perch	426	0.1	7	T	--	--	231	9.3	19	0.2	452	0.6	117,042	3.0
Rock bass	3,041	0.7	2,937	6.2	240	4.4	2	0.1	325	3.5	1,357	1.8	45,039	1.2
Brown trout	5,531	1.3	--	--	--	--	--	--	1,776	18.9	3,242	4.4	36,873	1.0
Yellow perch	2,475	0.6	9,586	20.2	739	13.5	359	14.4	638	6.8	2,095	2.9	30,634	0.8
Smallmouth bass	2,562	0.6	1,620	3.4	1,562	28.6	10	0.4	23	0.2	232	0.3	22,239	0.6
Trout-perch	290	0.1	84	0.2	--	--	--	--	7	0.1	17	T	7,735	0.2
Rainbow trout	--	--	--	--	--	--	--	--	615	6.5	3,686	5.0	6,760	0.2
Spottail shiner	219	T	117	0.2	17	0.3	--	--	--	--	577	0.8	5,284	0.1
White bass	--	--	--	--	--	--	--	--	27	0.3	961	1.3	5,133	0.1
Sea lamprey	410	0.1	241	0.5	--	--	--	--	641	6.8	218	0.3	4,582	0.1
White sucker	1,678	0.4	--	--	1,035	18.9	--	--	--	--	1,762	2.4	4,564	0.1
Sculpin family	6	T	57	0.1	--	--	2	0.1	25	0.3	95	0.1	3,652	0.1
American eel	68	T	111	0.2	74	1.4	53	2.1	--	--	--	--	3,118	0.1
Northern pike	--	--	--	--	--	--	--	--	--	--	--	--	2,998	0.1
Brown bullhead	137	T	--	--	--	--	--	--	275	2.9	19	T	2,450	0.1
Lake trout	--	--	--	--	--	--	--	--	--	--	--	--	1,988	0.1
Cisco	--	--	--	--	--	--	--	--	--	--	--	--	1,876	T
Pumpkinseed	--	--	156	0.3	--	--	--	--	--	--	361	0.5	1,344	T
Stonecat	210	T	--	--	--	--	115	4.6	75	0.8	--	--	1,238	T
Emerald shiner	--	--	--	--	--	--	--	--	6	0.1	10	T	1,215	T
Crayfish	32	T	9	T	--	--	--	--	--	--	6	T	1,076	T
Coho salmon	802	0.2	--	--	--	--	--	--	--	--	--	--	802	T
Black bullhead	--	--	--	--	--	--	--	--	--	--	--	--	713	T
Lake chub	--	--	--	--	--	--	--	--	--	--	3	T	691	T
Burbot	--	--	--	--	--	--	--	--	--	--	--	--	501	T
Central mudminnow	--	--	--	--	--	--	--	--	--	--	--	--	413	T
Threespine stickleback	--	--	--	--	--	--	--	--	--	--	--	--	371	T
Tesselated darter	--	--	22	T	--	--	--	--	--	--	--	--	176	T
Bluegill	--	--	--	--	--	--	--	--	1	T	139	0.2	161	T
Brook stickleback	--	--	--	--	--	--	--	--	--	--	--	--	139	T
Spotted mudpuppy	--	--	--	--	--	--	--	--	--	--	--	--	130	T
Goldfish	--	--	--	--	--	--	--	--	--	--	--	--	98	T
Golden shiner	--	--	--	--	--	--	--	--	--	--	--	--	80	T
Freshwater drum	--	--	--	--	--	--	--	--	--	--	--	--	71	T
Clam	--	--	--	--	--	--	--	--	--	--	--	--	47	T
Logperch	--	--	--	--	--	--	--	--	--	--	--	--	43	T
Minnow family	--	--	--	--	--	--	--	--	--	--	--	--	32	T
Fathead minnow	--	--	--	--	--	--	--	--	--	--	--	--	29	T
Brook trout	--	--	--	--	--	--	--	--	--	--	--	--	19	T
Chinook salmon	--	--	--	--	--	--	--	--	--	--	--	--	19	T
Longnose dace	--	--	--	--	--	--	--	--	--	--	--	--	19	T
Brook silverside	--	--	--	--	--	--	--	--	--	--	--	--	3	T
Channel catfish	--	--	--	--	--	--	--	--	--	--	--	--	3	T
Bluntnose minnow	--	--	--	--	--	--	--	--	--	--	--	--	2	T
Black crappie	--	--	--	--	--	--	--	--	--	--	--	--	2	T
Total	440,706		47,364		5,470		2,491		9,392		73,446		3,865,428	

(a) Taxa weights in December do not include weights from the additional contingency sample taken on 31 December 1982.

TABLE B-9 ESTIMATED ABUNDANCE AND BIOMASS (G) FOR IMPINGED TAXA AT JAMES A. FITZPATRICK, 1982

	JAN		FEB		MAR		APR	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Alewife	5,246	195,548	128	3,586	950	34,296	33,258	1,030,389
Rainbow smelt	40,246	31,837	2,884	7,821	9,397	18,277	51,785	234,012
White perch	48	2,203	15	91	108	9,880	1,160	178,088
Sculpin family	315	872	30	45	350	1,058	1,026	5,309
Spottail shiner	145	616	159	997	616	5,390	495	4,343
Trout-perch	8	73	--	--	67	458	249	2,580
Emerald shiner	307	484	121	476	583	1,441	661	1,625
Rock bass	65	339	53	2,356	625	132,443	403	15,113
Threespine stickleback	48	57	30	38	192	183	514	629
Crayfish	97	48	8	<8	658	3,141	288	738
Gizzard shad	444	275,160	15	10,728	150	121,472	315	268,922
Yellow perch	8	48	8	521	58	6,106	177	20,166
White bass	32	1,598	8	38	17	275	43	6,938
Smallmouth bass	--	--	--	--	17	18,452	30	11,347
Brook stickleback	--	--	8	8	--	--	228	260
Central mudminnow	16	97	--	--	25	92	198	735
Tessellated darter	8	<8	8	<8	50	42	28	62
Lake chub	--	--	--	--	8	25	70	855
Minnow family	24	16	30	30	67	33	28	34
Clam	8	8	--	--	83	192	34	36
Pumpkinseed	40	57	--	--	17	2,299	11	1,025
Stonecat	--	--	8	8	33	1,025	23	895
Bluegill	97	129	--	--	17	25	4	6
Brown trout	24	12,872	8	30,765	--	--	4	3,832
Sea lamprey	--	--	--	--	--	--	6	883
Brown bullhead	--	--	--	--	--	--	6	2,821
White sucker	--	--	--	--	--	--	13	94
Fathead minnow	--	--	--	--	--	--	23	55
Golden shiner	8	24	--	--	--	--	21	145
American eel	8	12,000	--	--	--	--	2	2,386
Lake trout	--	--	8	45	--	--	9	72
Rainbow trout	--	--	--	--	--	--	4	3,260
Chinook salmon	--	--	--	--	--	--	--	-
Goldfish	16	81	8	60	--	--	6	151
Black crappie	16	16	--	--	--	--	--	--
Cisco	--	--	--	--	--	--	2	955
Longnose dace	--	--	--	--	--	--	6	36
Logperch	--	--	--	--	--	--	4	81
Black bullhead	--	--	--	--	--	--	4	1,343
Freshwater drum	8	145	--	--	--	--	2	100
Brook silverside	--	--	--	--	--	--	4	6
Northern pike	--	--	--	--	--	--	4	5,646
Bluntnose minnow	--	--	--	--	--	--	2	6
Channel catfish	--	--	--	--	--	--	2	6
Burbot	--	--	--	--	8	4,174	--	--
Spotted mudpuppy	--	--	--	--	--	--	--	--
Brook trout	--	--	--	--	--	--	--	--
Coho salmon	--	--	--	--	--	--	--	--
Total(a)	47,283	534,357	3,533	57,611	14,095	360,777	91,148	1,805,974

(a) Totals may not equal sum of column or row as a result of rounding.

TABLE B-9 (CONT.)

	MAY		JUN		JUL		AUG	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Alewife	93,793	2,735,490	34,676	911,098	141,389	3,304,189	19,218	250,463
Rainbow smelt	15,604	283,359	2,534	10,836	47	149	1,748	2,481
White perch	95	22,002	120	28,466	23	3,329	23	55
Sculpin family	152	567	50	206	16	47	211	445
Spottail shiner	42	398	351	4,676	109	1,712	187	913
Trout-perch	356	5,911	712	10,475	141	2,266	39	655
Emerald shiner	39	37	85	80	--	--	--	--
Rock bass	26	9,397	110	34,094	86	23,766	109	22,917
Threespine stickleback	3	3	5	5	--	--	--	--
Crayfish	54	325	15	221	16	250	70	70
Gizzard shad	--	--	--	--	--	--	--	-
Yellow perch	25	3,588	60	4,570	149	19,342	499	74,798
White bass	2	349	--	--	--	--	--	--
Smallmouth bass	11	6,236	20	19,897	23	20,022	476	12,641
Brook stickleback	--	--	--	--	--	--	--	--
Central mudminnow	--	--	--	--	--	--	--	--
Tesselated darter	37	91	141	286	--	--	148	172
Lake chub	5	281	10	251	--	--	--	--
Minnow family	11	6	--	--	--	--	--	--
Clam	6	6	5	<5	--	--	--	--
Pumpkinseed	--	--	--	--	--	--	8	1,217
Stonecat	6	349	5	70	23	1,641	--	--
Bluegill	--	--	--	--	--	--	--	--
Brown trout	14	19,605	15	29,941	16	43,225	--	--
Sea lamprey	12	2,487	20	5,002	16	3,204	8	1,881
Brown bullhead	--	--	5	2,614	8	1,071	--	--
White sucker	2	60	--	--	16	13,114	--	--
Fathead minnow	--	--	--	--	--	--	--	--
Golden shiner	--	--	--	--	--	--	--	--
American eel	--	--	5	291	16	531	8	866
Lake trout	2	3,013	--	--	--	--	--	--
Rainbow trout	2	981	5	477	--	--	--	--
Chinook salmon	--	--	30	95	--	--	--	--
Goldfish	--	--	--	--	--	--	--	--
Black crappie	--	--	--	--	--	--	--	--
Cisco	3	2,122	--	--	--	--	--	--
Longnose dace	--	--	--	--	--	--	--	--
Logperch	--	--	--	--	--	--	--	--
Black bullhead	--	--	--	--	--	--	--	--
Freshwater drum	--	--	--	--	--	--	--	--
Brook silverside	--	--	--	--	--	--	--	--
Northern pike	--	--	--	--	--	--	--	--
Bluntnose minnow	--	--	--	--	--	--	--	--
Channel catfish	--	--	--	--	--	--	--	--
Burbot	--	--	--	--	--	--	--	--
Spotted mudpuppy	2	202	--	--	--	--	--	--
Brook trout	--	--	5	95	--	--	--	--
Coho salmon	--	--	--	--	8	6,268	--	--
Total	110,301	3,096,864	38,986	1,063,746	142,100	3,444,125	22,753	369,573

TABLE B-9 (CONT.)

	SEP		OCT		NOV		DEC		Totals	
	Number	Weight	Number	Weight	Number	Weight	Number	Weight	Number	Weight
Alewife	11,213	13,526	404	9,625	800	23,144	5,428	158,882	346,503	8,670,236
Rainbow smelt	60	15	397	3,486	1,106	4,590	109,481	134,999	235,289	731,862
White perch	--	--	8	1,762	15	142	638	2,289	2,253	248,307
Sculpin family	--	--	15	15	75	187	177	481	2,417	9,232
Spottail shiner	90	128	--	--	--	--	1,246	2,921	3,440	22,124
Trout-perch	--	--	--	--	8	52	20	86	1,600	22,556
Emerald shiner	--	--	--	--	8	45	30	51	1,834	4,239
Rock bass	8	1,803	8	15	15	2,430	30	6,871	1,538	251,544
Threespine stickleback	--	--	--	--	--	--	--	--	792	915
Crayfish	--	--	--	--	--	--	20	30	1,226	4,830
Gizzard shad	--	--	--	--	45	9,187	86	866	1,055	686,335
Yellow perch	38	5,550	15	2,738	22	4,769	152	10,607	1,211	151,803
White bass	--	--	--	--	15	202	724	4,866	841	14,266
Smallmouth bass	30	11,731	15	76	45	172	284	1,175	951	101,749
Brook stickleback	--	--	--	--	--	--	--	--	236	268
Central mudminnow	--	--	--	--	--	--	--	--	239	924
Tesselated darter	--	--	--	--	--	--	--	--	420	667
Lake chub	--	--	--	--	--	--	10	15	103	1,427
Minnow family	--	--	--	--	--	--	--	--	160	119
Clam	--	--	--	--	--	--	--	--	136	246
Pumpkinseed	--	--	--	--	--	--	66	1,828	142	6,426
Stonecat	--	--	8	877	8	561	--	--	114	5,426
Bluegill	--	--	--	--	8	8	30	704	156	872
Brown trout	--	--	--	--	8	13,276	10	16,415	99	169,931
Sea lamprey	--	--	--	--	15	4,792	5	1,104	82	19,353
Brown bullhead	--	--	--	--	8	2,056	41	96	68	8,658
White sucker	8	7,773	--	--	--	--	10	8,921	49	29,962
Fathead minnow	--	--	--	--	--	--	--	--	23	55
Golden shiner	--	--	--	--	--	--	--	--	29	169
American eel	8	556	8	404	--	--	--	--	55	17,034
Lake trout	--	--	--	--	--	--	--	--	19	3,130
Rainbow trout	--	--	--	--	8	4,597	10	18,663	29	27,978
Chinook salmon	--	--	--	--	--	--	--	--	30	95
Goldfish	--	--	--	--	--	--	--	--	30	292
Black crappie	--	--	--	--	--	--	10	<5	26	20
Cisco	--	--	--	--	--	--	--	--	5	3,077
Longnose dace	--	--	--	--	--	--	--	--	6	36
Logperch	--	--	--	--	--	--	--	--	4	81
Black bullhead	--	--	--	--	--	--	--	--	4	1,343
Freshwater drum	--	--	--	--	--	--	--	--	10	245
Brook silverside	--	--	--	--	--	--	--	--	4	6
Northern pike	--	--	--	--	--	--	--	--	4	5,646
Bluntnose minnow	--	--	--	--	--	--	--	--	2	6
Channel catfish	--	--	--	--	--	--	--	--	2	6
Burbot	--	--	--	--	--	--	--	--	8	4,174
Spotted mudpuppy	--	--	--	--	--	--	--	--	2	202
Brook trout	--	--	--	--	--	--	--	--	5	95
Coho salmon	--	--	--	--	--	--	--	--	8	6,268
Total	11,453	41,082	877	18,999	2,205	70,208	118,508	371,869	603,242	11,235,185

TABLE B-10 LENGTH DISTRIBUTION OF SELECT REPRESENTATIVE IMPORTANT SPECIES IMPINGED AT JAMES A. FITZPATRICK, 1982

ALEWIFE

Date	Length Intervals (MM) 30.0-49.9	50.0-69.9	70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9	230.0-249.9	250.0-269.9	270.0-289.9
JAN 82	0	0	1	0	1	9	44	54	10	0	0	0	0
FEB 82	0	0	0	0	0	3	8	6	0	0	0	0	0
MAR 82	0	0	1	0	0	0	9	51	20	0	0	0	0
APR 82	0	0	37	6	7	24	96	380	84	5	1	0	0
MAY 82	0	0	0	2	4	61	170	480	81	2	0	0	0
JUN 82	0	0	1	0	5	23	41	148	22	0	0	0	0
JUL 82	0	0	0	0	0	7	73	78	2	0	0	0	0
AUG 82	28	1	0	0	0	6	56	66	3	0	0	0	0
SEP 82	49	53	0	0	0	1	6	7	0	0	0	0	0
OCT 82	3	9	0	0	0	6	25	9	1	0	0	0	0
NOV 82	1	6	0	0	0	9	27	33	3	0	0	0	0
DEC 82	0	7	7	0	0	14	92	56	3	1	0	0	0
Interval Totals	81	76	47	8	17	163	647	1,368	229	8	1	0	0

Date	P	N	X	SD	Range MIN	MED	MAX
JAN 82	531	119	169.3	16.5	84.0	170.0	209.0
FEB 82	0	17	162.1	12.2	141.0	162.0	187.0
MAR 82	33	81	180.8	13.9	88.0	182.0	202.0
APR 82	17,020	640	170.7	28.1	70.0	178.0	231.0
MAY 82	59,724	800	173.7	15.3	101.0	175.0	216.0
JUN 82	6,672	240	172.2	17.1	86.0	175.0	204.0
JUL 82	17,932	160	169.1	10.0	132.0	169.5	197.0
AUG 82	2,303	160	145.6	51.6	30.0	167.5	195.0
SEP 82	1,377	116	64.6	39.6	37.0	53.0	184.0
OCT 82	0	53	138.0	47.3	40.0	159.0	200.0
NOV 82	28	79	158.2	31.3	49.0	168.0	192.0
DEC 82	892	180	157.9	28.6	55.0	165.0	212.0
Summary Totals	106,512	2,645	163.8	34.7	30.0		231.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE B-10 (CONT.)

RAINBOW SMELT

Date	30.0-49.9	50.0-69.9	70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9	230.0-249.9	250.0-269.9	270.0-289.9	290.0-309.9
	Length Intervals (MM)													
JAN 82	7	141	8	0	2	1	1	0	0	0	0	0	0	0
FEB 82	12	118	15	1	0	1	3	5	0	0	0	0	0	0
MAR 82	2	125	19	3	3	4	1	1	2	0	0	0	0	0
APR 82	17	322	82	1	9	50	95	37	14	9	2	0	0	2
MAY 82	1	30	45	2	13	133	297	142	60	19	4	3	1	0
JUN 82	1	82	72	5	3	14	12	7	6	3	2	0	0	0
JUL 82	0	4	1	0	0	1	0	0	0	0	0	0	0	0
AUG 82	26	4	49	7	1	0	0	0	0	0	0	0	0	0
SEP 82	4	2	0	0	0	0	0	0	0	0	0	0	0	0
OCT 82	5	13	7	11	2	3	2	2	2	2	0	0	0	0
NOV 82	1	26	11	5	1	3	2	5	2	0	1	0	0	0
DEC 82	1	31	38	7	1	5	4	3	0	1	1	0	0	0
Interval Totals	77	898	347	42	35	265	417	202	86	34	10	3	1	2

Date	P	N	X	SD	Range MIN	MED	MAX
JAN 82	4,827	160	60.6	13.4	46.0	58.0	150.0
FEB 82	227	155	66.3	26.8	44.0	60.0	185.0
MAR 82	968	160	68.5	25.3	49.0	61.0	206.0
APR 82	26,858	640	96.7	50.4	39.0	68.0	300.0
MAY 82	9,269	800	153.8	34.3	44.0	156.0	270.0
JUN 82	298	207	91.5	44.6	49.0	74.0	236.0
JUL 82	0	6	79.8	31.1	64.0	67.5	143.0
AUG 82	137	87	68.2	20.0	32.0	75.0	120.0
SEP 82	2	6	42.3	6.7	35.0	40.0	51.0
OCT 82	3	49	99.9	49.6	40.0	89.0	228.0
NOV 82	91	57	92.0	47.2	46.0	70.0	231.0
DEC 82	21,531	92	87.3	38.3	47.0	73.0	240.0
Summary Totals	64,211	2,419	107.3	52.1	32.0		300.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE B-10 (CONT.)

WHITE PERCH

Date	30.0-49.9	50.0-69.9	70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9	230.0-249.9	250.0-269.9	270.0-289.9
	Length Intervals (MM)												
JAN 82	0	2	3	0	0	0	0	0	0	0	0	1	0
FEB 82	0	0	2	0	0	0	0	0	0	0	0	0	0
MAR 82	0	0	3	4	1	0	1	1	1	0	0	1	0
APR 82	0	2	51	67	9	5	40	17	13	29	53	41	23
MAY 82	0	0	5	7	2	0	2	3	0	5	9	14	7
JUN 82	0	0	0	0	0	0	0	0	1	5	12	1	5
JUL 82	0	0	0	0	0	0	0	0	0	1	2	0	0
AUG 82	0	3	0	0	0	0	0	0	0	0	0	0	0
SEP 82	0	0	0	0	0	0	0	0	0	0	0	0	0
OCT 82	0	0	0	0	0	0	0	0	0	0	1	0	0
NOV 82	0	0	1	1	0	0	0	0	0	0	0	0	0
DEC 82	1	7	29	3	0	0	0	0	0	0	0	0	0
Interval Totals	1	14	94	82	12	5	43	21	15	40	77	58	35

Date	P	N	X	SD	Length Intervals (MM) 290.0-309.9	310.0-329.9	330.0-349.9	Range MIN	MED	MAX
JAN 82	0	6	106.0	76.4	0	0	0	64.0	78.0	261.0
FEB 82	0	2	79.5	9.2	0	0	0	73.0	79.5	86.0
MAR 82	0	13	140.4	72.5	1	0	0	72.0	98.0	298.0
APR 82	253	363	178.6	73.6	9	1	3	69.0	173.0	349.0
MAY 82	0	61	215.5	74.7	4	3	0	78.0	244.0	315.0
JUN 82	0	24	243.7	21.8	0	0	0	199.0	243.0	281.0
JUL 82	0	3	231.0	6.1	0	0	0	224.0	234.0	235.0
AUG 82	0	3	59.7	2.5	0	0	0	57.0	60.0	62.0
SEP 82	0	0	0.0	0.0	0	0	0	0.0	0.0	0.0
OCT 82	0	1	239.0	0.0	0	0	0	239.0	239.0	239.0
NOV 82	0	2	89.5	16.3	0	0	0	78.0	89.5	101.0
DEC 82	86	40	77.1	10.3	0	0	0	47.0	78.0	100.0
Summary Totals	339	518	175.3	77.9	14	4	3	47.0		349.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE B-10 (CONT.)

YELLOW PERCH

Date	Length Intervals (MM) 30.0-49.9	50.0-69.9	70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9	230.0-249.9	250.0-269.9	270.0-289.9	290.0-309.9
JAN 82	0	0	1	0	0	0	0	0	0	0	0	0	0	0
FEB 82	0	0	0	0	0	0	0	1	0	0	0	0	0	0
MAR 82	0	0	0	0	0	0	1	1	3	2	0	0	0	0
APR 82	0	3	1	6	4	7	3	12	19	19	12	4	4	0
MAY 82	0	0	0	0	0	0	2	1	3	2	5	2	1	0
JUN 82	0	0	0	1	0	0	3	3	2	3	0	0	0	0
JUL 82	0	0	0	0	0	0	1	2	5	2	5	3	1	0
AUG 82	0	0	0	0	0	1	1	4	13	13	17	6	1	2
SEP 82	0	0	0	0	0	0	0	2	0	1	1	1	0	0
OCT 82	0	0	0	0	0	0	0	0	0	1	0	1	0	0
NOV 82	0	0	0	0	0	0	0	0	1	0	0	0	1	1
DEC 82	0	2	6	0	1	4	3	2	3	3	2	2	0	0
Interval Totals	0	5	8	7	5	12	14	28	49	46	42	19	8	3

Date	P	N	X	SD	Range MIN	MED	MAX
JAN 82	0	1	84.0	0.0	84.0	84.0	84.0
FEB 82	0	1	178.0	0.0	178.0	178.0	178.0
MAR 82	0	7	195.7	21.8	160.0	197.0	226.0
APR 82	0	94	190.5	52.1	54.0	203.5	278.0
MAY 82	0	16	218.4	34.3	160.0	227.5	275.0
JUN 82	0	12	183.5	34.9	108.0	180.0	227.0
JUL 82	0	19	222.2	31.9	166.0	225.0	286.0
AUG 82	6	58	224.1	29.3	149.0	224.5	300.0
SEP 82	0	5	214.4	39.8	171.0	220.0	257.0
OCT 82	0	2	240.0	28.3	220.0	240.0	260.0
NOV 82	0	3	256.7	48.2	202.0	275.0	293.0
DEC 82	2	28	157.7	62.7	66.0	151.0	260.0
Summary Totals	8	246	200.0	49.9	54.0		300.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE B-10 (CONT.)

SPOTTAIL SHINER

DATE	Length Intervals (MM) 30.0-49.9	50.0-69.9	70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	P	N	X	SD	Range MIN	MED	MAX
JAN 82	4	5	6	1	1	1	0	18	74.5	25.9	45.0	70.0	132.0
FEB 82	0	3	6	9	3	0	0	21	88.7	16.3	53.0	92.0	120.0
MAR 82	0	2	11	40	12	4	5	69	100.3	15.9	60.0	98.0	135.0
APR 82	5	21	33	96	49	18	41	222	98.3	21.9	44.0	98.0	142.0
MAY 82	0	2	3	11	8	2	1	26	102.3	18.9	58.0	104.0	133.0
JUN 82	0	1	3	13	21	16	16	54	116.1	18.0	58.0	124.0	138.0
JUL 82	0	0	0	2	8	4	0	14	123.4	11.1	104.0	126.5	139.0
AUG 82	12	0	3	5	3	1	0	24	72.2	34.7	37.0	63.5	132.0
SEP 82	9	2	0	1	0	0	0	12	48.9	15.9	39.0	45.0	98.0
OCT 82	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
NOV 82	0	0	0	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
DEC 82	1	36	1	0	2	0	206	40	60.4	14.7	47.0	57.0	120.0
Summary Totals	31	72	66	178	107	46	269	500	94.7	26.2	37.0		142.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

TABLE B-10 (CONT.)

SMALLMOUTH BASS

Date	Length Intervals (MM) 30.0-49.9	50.0-69.9	70.0-89.9	90.0-109.9	110.0-129.9	130.0-149.9	150.0-169.9	170.0-189.9	190.0-209.9	210.0-229.9	230.0-249.9	250.0-269.9	270.0-289.9
JAN 82	0	0	0	0	0	0	0	0	0	0	0	0	0
FEB 82	0	0	0	0	0	0	0	0	0	0	0	0	0
MAR 82	0	0	0	0	0	0	0	0	0	0	0	0	0
APR 82	0	0	0	0	1	1	1	0	1	4	0	0	2
MAY 82	0	0	0	0	0	0	1	0	0	0	0	0	0
JUN 82	0	0	0	0	0	0	0	0	0	0	0	0	0
JUL 82	0	0	0	0	0	0	0	0	0	0	0	0	0
AUG 82	11	29	0	0	0	0	0	0	0	0	0	0	0
SEP 82	0	1	0	0	0	0	0	0	0	0	0	0	0
OCT 82	0	1	1	0	0	0	0	0	0	0	0	0	0
NOV 82	0	5	1	0	0	0	0	0	0	0	0	0	0
DEC 82	0	21	21	1	0	0	0	0	0	0	0	0	0
Interval Totals	11	57	23	1	1	1	2	0	1	4	0	0	2

Date	P	N	X	SD	290.0-309.9	310.0-329.9	330.0-349.9	350.0-369.9	370.0-389.9	390.0-409.9	410.0-429.9	450.0-469.9	Range MIN	MED	MAX
JAN 82	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
FEB 82	0	0	0.0	0.0	0	0	0	0	0	0	0	0	0.0	0.0	0.0
MAR 82	0	2	422.0	7.1	0	0	0	0	0	0	2	0	417.0	422.0	427.0
APR 82	0	16	266.6	93.4	0	1	1	1	1	1	1	0	122.0	252.5	413.0
MAY 82	0	7	330.3	93.0	2	0	1	1	0	0	2	0	150.0	336.0	426.0
JUN 82	0	4	404.8	42.1	0	0	0	0	2	0	1	1	370.0	397.0	455.0
JUL 82	0	3	386.0	18.5	0	0	0	1	1	1	0	0	368.0	385.0	405.0
AUG 82	18	43	71.9	71.2	1	1	1	0	0	0	0	0	43.0	53.0	348.0
SEP 82	0	4	300.3	164.0	0	0	0	1	1	0	1	0	57.0	365.5	413.0
OCT 82	0	2	68.0	9.9	0	0	0	0	0	0	0	0	61.0	68.0	75.0
NOV 82	0	6	64.0	9.7	0	0	0	0	0	0	0	0	53.0	65.0	80.0
DEC 82	13	43	69.6	9.5	0	0	0	0	0	0	0	0	50.0	70.0	90.0
Summary Totals	31	130	138.5	129.9	3	2	3	4	5	2	7	1	43.0		455.0

P = Number of unmeasured organisms;
N = Number of lengths; MIN = Shortest length
X = Mean length; MED = Median length
SD = Standard deviation; MAX = Greatest length

APPENDIX C

EXCEPTIONS TO STANDARD OPERATING PROCEDURES

C-1 EXCEPTION TO STANDARD OPERATING PROCEDURES FOR IMPINGEMENT AT NINE MILE POINT UNIT 1 NUCLEAR STATION

13 JAN 1982 Rescheduled Impingement Sample - During the impingement sample, traveling screen No. 11 became inoperable. It could not be determined when the screen shut down, thus an accurate impingement rate could not be calculated. The sample was rescheduled and completed on 15 January 1982.

NOTE: No impingement samples were missed during the 1982 sampling season. The sample was rescheduled using a randomly selected day as required by the Environmental Technical Specifications.

C-2 EXCEPTIONS TO STANDARD OPERATING PROCEDURES FOR IMPINGEMENT AT JAMES A. FITZPATRICK NUCLEAR POWER PLANT

29 JAN 1982 — Time Delay in Starting Impingement Sample - Maintenance work on the traveling screens prevented washing the screens at the scheduled onset of the impingement sample. Washing of the traveling screens and sample initiation were accomplished at 1700 hours and the impingement sample was terminated 24 hours later.

9 JUL 1982 — Rescheduled Impingement Sample - Cleaning of the water boxes inadvertently introduced fish that were not part of the impingement sample into the collection basket. The sample was rescheduled and completed on 20 July 1982.

10 AUG 1982 — Rescheduled Impingement Sample - A full scale test of the radiological emergency response system limited access to the power plant on the scheduled impingement collection day of 11 August. The sample was rescheduled and completed on 10 August 1982.

NOTE: No impingement samples were missed during the 1982 sampling season. All samples were rescheduled using randomly selected days as required by the Environmental Technical Specifications.

C-3 EXCEPTIONS TO STANDARD OPERATING PROCEDURES FOR GILL NET SAMPLING

JUN 1982 — The second gill net collection required by Nine Mile Point Unit 1 Technical Specifications could not be accomplished on the last two scheduled impingement days in June due to bad weather. A gill net set made on 30 June 1982 was voided because a tangled net reduced the fish catch. A successful gill net set and collection was made on 6-7 July 1982; weather conditions prevented gill net sampling between 30 June and 6 July.

19 JUN 1982 — Weather conditions: West to northwest winds at 15-25 knots, waves building to 3-5 feet, showers or thunderstorms, small craft advisory issued.

29 JUN 1982 — Weather conditions: Northwest winds at 10-20 knots, waves to 1-3 feet, hazy, humid, thunderstorms, dense fog settled over lake.

DEC 1982 — The gill net collection for December could not be accomplished on the first two scheduled impingement dates because of bad weather. Since weather conditions are generally adverse and unpredictable during December on Lake Ontario, the final gill net collection was scheduled and completed on the next day with favorable weather conditions, 14-15 December 1982.

7 DEC 1982 — Weather conditions: West winds at 20-30 knots, waves to 5-8 feet, cloudy with snow possible.

13 DEC 1982 — Weather conditions: South to southwest winds at 15-25 knots, waves to 3-6 feet, fair weather.

APPENDIX D

CONDITION OF FISH: ABNORMALITIES, DISEASES, AND EXTERNAL PARASITES

Fish collected in the impingement and gill net samples were checked for any outstanding abnormalities, diseases, or external parasites and for general physical condition. Nineteen species from impingement and six species from gill nets were found to have some kind of abnormality or affliction.

Rainbow smelt and sculpins from impingement collections were most commonly found to have afflictions. Sculpins exhibited an internal abdominal tumor characterized by one or more small white sacs. Fungus (Saprolegnia) affected rainbow smelt caught in February, March, April, May, June, and October. Other abnormalities observed on rainbow smelt were: two occurrences of a tumor-like infection of the intestine, one occurrence of "popeye" (projection of eye), four occurrences of "pugnose" (deformity of snout), six occurrences of scoliosus (curvature of spine), and vertical lacerations on sides of body during April and May.

The three most common afflictions affecting other fish species were fungus, lamprey, and other scars, and black spot infection (characterized by small black spots scattered on body and fins). Black spot infection was noticed on white sucker, golden shiner, yellow perch, central mudminnow, emerald shiner, and pumpkinseed. In most cases, only one specimen of each species was found with the infection. Fungus affected a few individuals of each of the following species: gizzard shad, white perch, yellow perch, brown trout, trout perch, rock bass, smallmouth bass, and alewife. An occasional lamprey scar was observed on white sucker, brown trout, and rainbow trout in the impingement collections and on brown trout, lake trout, and a rainbow smelt from gill net collections. Other incidents of disease affected a variety of species. Two white perch exhibited "popeye." A spottail shiner and white sucker had a tumor-like growth on their bodies. A rock bass from gill net collections had "pugnose."

Overall, the physical condition of the fish collected in impingement and gill nets was healthy. However, alewife in the August impingement collections appeared emaciated. Some gizzard shad exhibited hemmorhaging around the head, and nine lake trout from gill net collections had scars or lacerations on their bodies. All of the aforementioned diseases, abnormalities, and presence of scars are naturally occurring and do not generally result from power plant operation.

APPENDIX E SCIENTIFIC AND COMMON NAMES OF ALL TAXA COLLECTED IN 1982

Scientific Name	Common Name
Alosa pseudoharengus	Alewife
Ambloplites rupestris	Rock bass
Anguilla rostrata	American eel
Aplodinotus grunniens	Freshwater drum
Carassius auratus	Goldfish
Catostomus commersoni	White sucker
Coregonus artedii	Cisco
Cottus spp.	Sculpins
Couesius plumbeus	Lake chub
Culaea inconstans	Brook stickleback
Cyprinidae	Shiners
Dorosoma cepedianum	Gizzard shad
Etheostoma olmstedi	Tesselated darter
Esox lucius	Northern pike
Family Cambaridae	Crayfish
Gasterosteus aculeatus	Threespine stickleback
Ictalurus melas	Black bullhead
Ictalurus nebulosus	Brown bullhead
Ictalurus punctatus	Channel catfish
Labidesthes sicculus	Brook silversides
Lepomis gibbosus	Pumpkinseed
Lepomis macrochirus	Bluegill
Lota lota	Burbot
Micropterus dolomieui	Smallmouth bass
Mollusca	Clam and clam shell
Morone americana	White perch
Morone chrysops	White bass
Necturus maculosus	Spotted mudpuppy
Notemigonus crysoleucas	Colder shiner
Notropis atherinoides	Emerald shiner
Notropis hudsonius	Spottail shiner
Noturus flavus	Stonecat
Oncorhynchus kisutch	Coho salmon
Oncorhynchus tshawytscha	Chinook salmon
Osmerus mordax	Rainbow smelt
Perca flavescens	Yellow perch
Percina caprodes	Logperch
Percopsis omiscomaycus	Trout-perch
Petromyzon marinus	Sea lamprey
Pimephales notatus	Bluntnose minnow
Pimephales promelas	Fathead minnow
Pomoxis annularis	White crappie
Pomoxis nigromaculatus	Black crappie
Rhinichthys cataractae	Longnose dace
Salmo gairdneri	Rainbow trout
Salmo trutta	Brown trout
Salvelinus fontinalis	Brook trout
Salvelinus namaycush	Lake trout
Stizostedion vitreum vitreum	Walleye
Umbra limi	Central mudminnow