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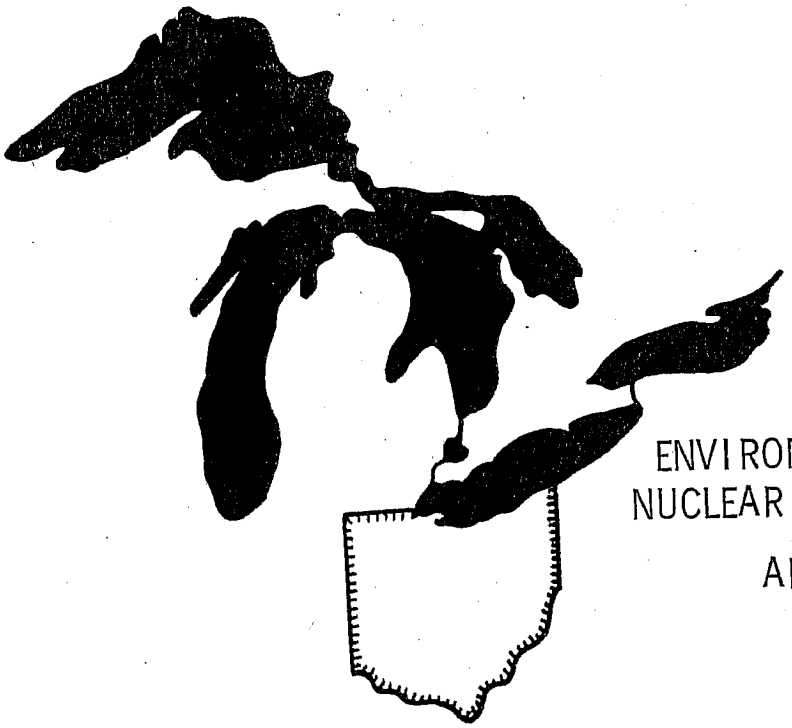

ENVIRONMENTAL EVALUATION OF A NUCLEAR POWER PLANT ON LAKE ERIE

ANNUAL REPORT - 1979
STUDY I
F-41-R-10

Prepared for

U. S. Fish and Wildlife Service
and
Ohio Department of Natural Resources
Division of Wildlife

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COLUMBUS, OHIO

October 1979
(Originally prepared in September 1979)

FEDERAL AID IN SPORT FISH RESTORATION

ANNUAL PERFORMANCE REPORT

Study 1

July 1, 1978 - June 30, 1979

PROJECT F-41-R-10

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September 1979

FEDERAL AID IN SPORT FISH RESTORATION

ANNUAL PERFORMANCE REPORT

STATE OF: Ohio

PROJECT NO.: F-41-R-10

PERIOD COVERED: July 1, 1978 - June 30-1978

DATE: September 12, 1979

STUDY NO.: 1

STUDY TITLE: Response of Fish and Invertebrates to the Heated Discharge from the Davis-Besse Reactor, Lake Erie, Ohio

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Donna D. Larson

Center for Lake Erie Area Research
The Ohio State University

September 1979

The Ohio State University
Center for Lake Erie Area Research

ENVIRONMENTAL EVALUATION OF A NUCLEAR POWER PLANT ON LAKE ERIE
Federal Aid Project F-41-R-10

PERFORMANCE REPORT

State: Ohio

Prepared by: Jeffrey M. Reutter, Charles E. Herdendorf, Mark D. Barnes, and Walter E. Carey

Study No.: 1

Date prepared: 12 September 1979

Study Title: Response of Fish and Invertebrates to the Heated Discharge from the Davis-Besse Reactor, Lake Erie, Ohio

Period Covered: 1 July 1978 to 30 June 1979(1)

ABSTRACT

The Toledo Edison Company and the Cleveland Electric Illuminating Company have completed building the first unit of the Davis-Besse Nuclear Power Station on the southwest shore of Lake Erie at Locust Point. This plant will utilize water from Lake Erie to replenish the cooling tower blowdown which will be returned to the lake with a maximum temperature increase of 11.1°C. Phytoplankton, zooplankton, benthic macroinvertebrates, and fish populations along with the water quality and primary productivity in the vicinity of Locust Point were monitored during 1978, the first complete year of unit operation. These results were compared to the results of previous years in an effort to detect changes larger than those due to natural variation observed in previous years.

(1) All work scheduled for this project segment was done as planned. The spring 1979 work will be reported in the Annual Performance Report for the next project segment.

Phytoplankton populations in 1974 were characterized by diatoms, Melosira sp. In 1975 the diatom population was similar to 1974 but the myxophycean population, Aphanizomenon sp., increased tremendously during the summer and became the dominant algal taxon. It appeared that these differences were due to changes in the water quality. In 1975 the water warmed sooner and was less turbid and more transparent than in 1974. These conditions favor myxophycean populations. The bacillariophycean and chlorophycean components of the 1976 population were quite similar to those observed in 1974 and 1975. The 1976 myxophycean population was between the extremes of 1974 and 1975. The 1977 bacillariophycean population was the greatest observed to date, whereas myxophycean and chlorophycean were similar to previous years. The 1978 total phytoplankton population was almost a mirror image of the 1977 populations. However, the individual classes were quite different in that all three major classes exhibited relatively large blooms in 1978.

Zooplankton populations at Locust Point have been monitored monthly during ice-free periods since 1972. In general, the populations observed at Locust Point in 1974 and 1975 were higher than those observed in 1972 and 1973. Densities in 1976 were intermediate between the two groupings while densities from April-June 1977 were similar to those observed in 1974 and 1975 and those from the remainder of 1977 were similar to those observed in 1972 and 1973. In 1978, zooplankton densities observed during May and June were the lowest recorded to date, although the June density was very similar to that observed in 1973. Results from other months of 1978 fell within the ranges established from 1972-1977.

Benthic macroinvertebrate populations collected at Locust Point during 1978 were typical for populations along the south shore of western Lake Erie. Species composition, mainly immature oligochaetes and chironomids, was similar to that observed from 1972-1977.

Results from previous years indicated that although 49 fish species have been captured at Locust Point since 1963, only ten species, Alosa pseudoharengus, Aplodinotus grunniens, Cyprinus carpio, Notropis atherinoides, N. hudsonius, Perca flavescens, and Stizostedion v. vitreum, were of any real commercial or numerical importance. Populations of the individual species vary greatly from year to year. Although tremendous variability was also observed in the number of larvae and eggs observed from year to year, there appear to be four species, yellow perch, emerald shiners, walleye, and gizzard shad, which contribute significantly to the Locust Point ichthyoplankton populations. These same trends were again obvious in 1978.

Over the past seven years most water quality parameters have shown typical seasonal trends with only small variations from year to year. Temperature and dissolved oxygen show normal seasonal trends for each year with only minor variations from one year to the next or over the entire period. DO appears to have undergone more depletion in 1976 and 1977 than in previous years or in 1978. Hydrogen-ion concentration (pH) and alkalinity remained fairly stable over the period. Transparency, turbidity, phosphorus, and conductivity have shown some radical variations which are probably due to storms and dredging activities that have disturbed the bottom sediments. Phosphorus levels were low in 1977 and 1978, compared to earlier years. In general however, no significant

deviations from the normal quality of the water in this part of western Lake Erie have been observed during the past seven years.

The results of six primary productivity sampling cruises showed no significant impact of plant operation. This same statement can be made for all of the above parameters and populations. However, these results should be tempered with the knowledge that the plant was operating at 50 percent or more of its capacity on only two of our sampling dates from September of 1977 through December of 1978.

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PROJECT STAFF

Charles E. Herdendorf	- Principal Investigator; Analysis of Water Quality and Physical Parameters
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STUDY OBJECTIVE

To specify the changes in plankton, benthos, and fish populations caused by thermal discharges from the Davis-Besse Nuclear Power Station into Lake Erie; and to correlate laboratory predictions of the reactions of Lake Erie fish to thermal discharges (F-41-R Study 2), with the final report including recommendations for developing and managing the fishery in discharge plumes.

JOB 1-b

FISH, PLANKTON, AND BENTHOS POPULATIONS DURING PLANT OPERATION

Objectives

To specify the changes in fish, plankton, and benthos populations and primary productivity due to the operation of the Davis-Besse Nuclear Power Station through field and computer analyses, and to determine the accuracy of laboratory results estimating the thermal preferences of Lake Erie fish and the effects of sudden temperature change on these fish.

Procedures

Sampling Station Location

In 1974 and 1975 field data were collected from 25 stations, 18 along four transects in the open lake, two stations in the intake canal, 2 stations in the marshes, and three stations along the shoreline (Figure 1). Of the four transects, one followed the intake conduit, one the discharge conduit, while control transects were set up on the east and west sides of the entire intake and discharge complex. Control west ran due north from the shore-end of the intake conduit with sampling stations

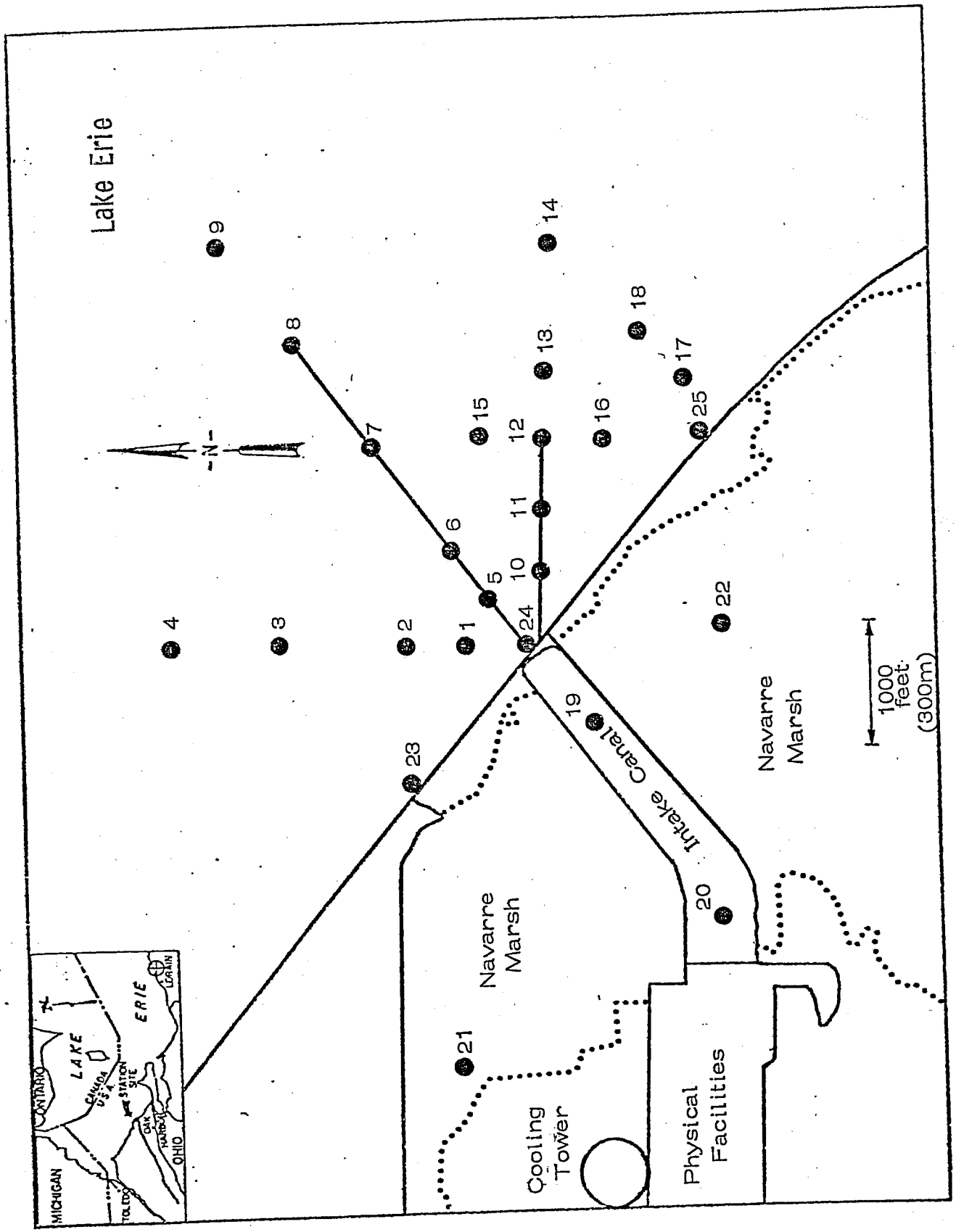


FIGURE 1. BIOLOGICAL SAMPLING STATIONS AT THE DAVIS-BESSE NUCLEAR POWER STATION PRIOR TO 1976

located at 500 ft (150 m) (Station 1), 1000 ft (300 m) (Station 2), 2000 ft (610 m) (Station 3), and 3000 ft (910 m) (Station 4) from the shoreline. Sampling stations on the intake were located at 500 ft (150 m) (Station 5), 1000 ft (300 m) (Station 6), 2000 ft (610 m) (Station 7), 3000 ft (910 m) (Station 8, proposed intake), and 4000 ft (1,220 m) (Station 9) from shore. Along the discharge transect sampling stations were at distances of 500 ft (150 m) (Station 10), 1000 ft (300 m) (Station 11), 1500 ft (460 m) (Station 12, proposed diischarge), 2000 ft (610 m) (Station 13), and 3000 ft (910 m) (Station 14) from shore. Additional stations were placed 500 ft (150 m) due north of Station 12 (Station 15) and 500 ft (150 m) south of Station 12 (Station 16). Control east ran perpendicular to the shoreline, parallel to the intake, and approximately 2500 ft (760 m) east of the intake. Stations were located 500 ft (150 m) (Station 17) and 1000 ft (300 m) (Station 18) from shore. Station 19 was located in the center of the intake canal, 1000 ft (300 m) from the lake shore. Sampling at Station 20 was discontinued when it was drained of all water in 1974. Stations 21 and 22 were located in the northwest and southeast marshes, respectively. Stations 23-25 were on the shoreline at the intersection of the intake conduit and 1500 ft (460 m) to either side.

In 1976 this sampling format was altered slightly to provide control stations on either side of the intake and plume area and to sample the plume area more thoroughly (Figure 2). Stations 2, 4, 5, 10, 19, and 20 were eliminated and Station 26 to 29 were added. In 1977 it was indicated that Stations 7, 11, 12, 16, and 27 could be eliminated without jeopardizing results. Station 26 is on the control west transect and located

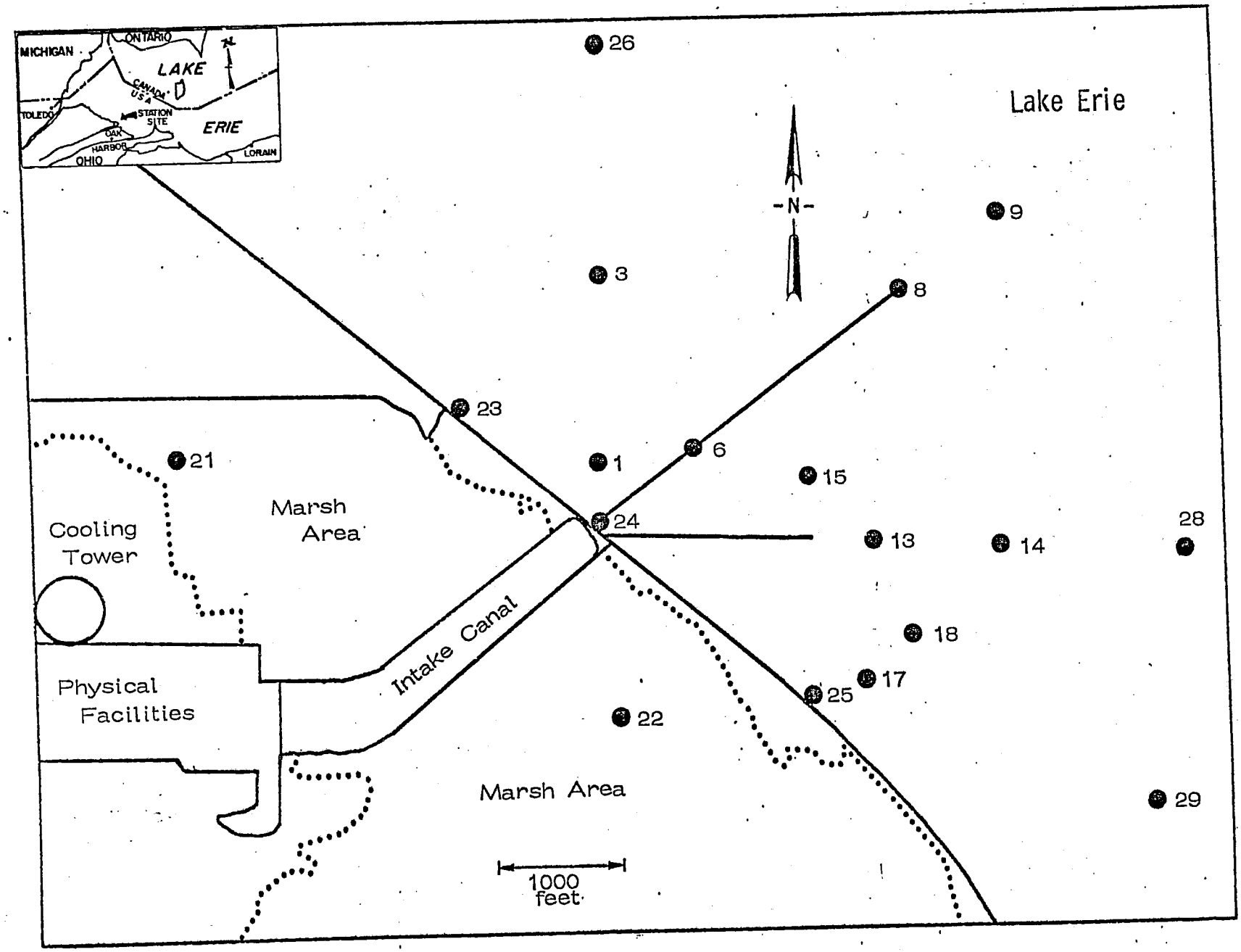


FIGURE 2

REVISED SAMPLING STATIONS AT THE DAVIS-BESSE NUCLEAR POWER STATION

3800 ft (1170 m) from its intersection with the shoreline. Station 26 serves as a control station 3000 ft (910 m) northwest of Station 8 (intake) and the same distance offshore as Station 8 (3000 ft). Station 28 is on the discharge transect 4500 ft (1,380 m) from its intersection with the shoreline. Station 28 also serves as a control station for Station 8 as it is 3000 ft (910 m) southeast of Station 8 and equidistant offshore. Station 29 provides a control 3000 ft (910 m) southeast of Station 13 (plume area). Station 3 is the control to the northwest of Station 13. Stations 3, 13, and 29 are approximately equidistant from shore. Sampling stations in 1978 were the same as those in 1977.

Plankton

Plankton samples were collected approximately once every 30 days from May through November from seven sampling stations in the vicinity of Locust Point (Table 1). Samples could not be collected during April due to an unusually long winter and the presence of ice. Four vertical tows, bottom to surface, were collected at each station with a Wisconsin plankton net (12 cm mouth; no. 20, 0.080 mm mesh). Each sample was concentrated to 50 ml. Two samples were preserved with lugol's and used for phytoplankton analysis. Soda water was added to the remaining two samples to relax the zooplankters prior to preservation with five percent formalin. The volume of water sampled was computed by multiplying the depth of the tow by the area of the net mouth. Three 1-ml aliquots were withdrawn from each 50-ml sample and placed in counting cells.

Whole organism counts of the phytoplankton were made from 25 random Whipple Disk fields in each of the three 1-ml aliquots from two samples. When filamentous forms number 100 or more in ten Whipple fields, they were

TABLE 1

AQUATIC MONITORING PROGRAM SAMPLING DATES - 1978

SAMPLE	April	May	June	July	August	September	October	November
PLANKTON	*	11	29	25	17	15	17	1
BENTHOS		11		26		26		1
FISH								
Gill Net	*	18-19	29-30	24-25	17-18	24-25	17-18	1-2
Shore Seine	*	10	29	24	17	15	18	2
Trawl	*	12	30	25	18	15	19	1
Fry Net	30	22	8, 20	5, 19	1, 11, 23			
WATER QUALITY	*	11	29	25	17	13	17	1
SOLAR RADIATION	*		24		18	15	17	1
PRIMARY PRODUCTIVITY		19	24		5, 22	11	13	

* Inclement weather prohibited sampling.

not counted in the remaining 15 fields. Identification was carried as far as possible, usually to the genus or species level. Results were reported as the number of whole organisms/liter.

All zooplankters within each of the three 1-ml aliquots from two samples were counted by scanning the entire counting cell with a microscope. Identification was carried as far as possible, usually to the genus or species level. Results were reported as the number of organisms/liter.

Benthos

Benthic macroinvertebrates were collected approximately once every 60 days from April through November (Table 1). Three replicates using a Ponar dredge (Area = 0.052 m^2) were collected at Stations 1, 3, 8, 9, 13, 14, 15, 17, 18, and 26 on each date (Figure 2). Samples were sieved on the boat through a U.S. #40 soil sieve, preserved in ten percent formalin and returned to the laboratory for identification and enumeration. Individuals were indentified as far as practicable (usually to genus; to species when possible). Results were reported as number of organisms per m^2 and computed by multiplying the number of each species in each replicate grab sample by 19.1. Sample means and deviations at each station were computed from the three replicates.

Fish

Adult fish populations at Locust Point were sampled by three methods, gill nets, shore seines, and trawls, from May through November 1978 (Table 1). Samples could not be collected in April due to an unusually long winter and the presence of ice. All fish captured were weighed (g), measured (nearest mm total length), and identified to species (Trautman, 1957 and Bailey et al., 1970). All results were keypunched and

stored on magnetic tape at The Ohio State University Computer Center. Results were reported as catch per unit effort (CPE).

Gill Nets. Experimental gill nets were set parallel to the intake pipeline at Stations 8, 26, and 28 and parallel to the discharge pipeline at Stations 3, 13, and 29 (Figure 2). Stations 3 and 26 were control stations and were positioned 3000 feet northwest of Station 13 (plume area) and 8 (intake), respectively, while Stations 29 and 28 were positioned 3000 ft to the southeast. Each gill net, measuring 125 ft (38 m) x 6 ft (1.8 m), consisted of five contiguous panels of different mesh sizes: ½ in (1.3 cm), 3/4 in (1.9 cm), 1 in (2.5 cm), 1½ in (3.8 cm), and 2 in (5.1 cm) bar mesh. Each net was fished on the bottom for 24 consecutive hours monthly (Table 1). One such 24-hr set comprised one unit of effort. The direction of fish movement was determined by recording the directions from which individual fish entered the nets. Fish which fell from the nets before their direction of travel could be determined were classified as unknowns.

Trawls. Four five-minute bottom tows with a 16-ft (4.9 m) trawl were conducted monthly (Table 1) along transects between Stations 3 and 26, 8 and 13, and 28 and 29 (Figure 1) at a speed of 3-4 knots. Transects 3-26 and 28-29 were control transects, while Transect 8-13 was in the intake-discharge area. Four tows on one transect comprised one unit of effort. A representative number of yellow perch (Perca flavescens), white bass (Morone chrysops), freshwater drum (Aplodinotus grunniens), spottail shiners (Notropis hudsonius), and emerald shiners (Notropis atherinoides) from Transects 3-26 and 8-13 were preserved in 5-10 percent formaldehyde for later stomach analysis.

Shore Seines. Shore seining was accomplished monthly (Table 1) with a 100-ft bag seine (1/4 inch or 6 mm bar mesh) at Stations 23, 24, and 25

(Figure 2). The seine was stretched perpendicular to the shoreline until the shore brail was at the water's edge. The off-shore brail was then dragged through a 90^{o} arc back to shore. Two such hauls were made at each station in opposite directions, comprising one unit of effort.

Ichthyoplankton

Duplicate ichthyoplankton (fish eggs and larvae) samples were collected from the surface and bottom of Stations 3, 26, 28, 29 (control stations), 8 (intake), and 13 (plume area) (Figure 2) using a 0.75 meter diameter heavy-duty oceanographic plankton net (No. 00, 0.75 mm mesh) equipped with a calibrated General Oceanics flow meter. Each sample consisted of a five-minute tow at 3 to 4 knots with this net. Samples were collected on nine occasions (approximately ten-day intervals or as weather permitted) between 30 April 1978 and 23 August 1978. Sampling was terminated after 23 August as only one sample at one station contained ichthyoplankters. It should be noted that U.S. EPA (Grosse Ile office) terminates their Western Basin sampling on 15 July each year. Samples were preserved in 5% formalin and returned to the laboratory for sorting and analysis. All specimens were identified and enumerated using the works of Fish (1932), Norden (1961a and b) and Nelson and Cole (1975). Results were reported as the number of individuals per 100 m^3 of water calculated from the volume filtered (flow meter) and the number of individuals within the sample.

Water Quality

Water quality samples were collected and related sensor measurements were made at three routine stations (Figure 2) in Lake Erie during the ice-free period of 1978 (May through November). Because of the severe winter of 1977-78, spring sampling was delayed until May. The 19 parameters

measured and the analytical methods employed for these determinations are listed in Table 2. Solar radiation samples were added as a further check on turbidity changes and a correlation for productivity variations.

Field Measurements. Water quality measurements were made monthly in the field at Stations 1, 8, and 13 (Figure 2). Temperature, dissolved oxygen and conductivity were measured from a small survey boat with submerged sensors and shipboard readout meters. Dissolved oxygen was determined with a YSI model 51 meter and conductivity with a Beckman RB3-3341 solubridge temperature-compensated meter; each meter was equipped with a thermistor for temperature readings. Sensor readings were taken 10 cm below the surface and approximately 50 cm above the bottom. Transparency was determined with a 30 cm diameter Secchi disk lowered on a marked line until it was no longer visible (Welch, 1948). Solar radiation was measured at four stations (1, 3, 8, and 13) from June to November with a Protomatic underwater photometer, at the surface and at one-half meter depth intervals. This meter measures the amount of sunlight, expressed in foot-candles, reaching various depths. Malfunctions of this meter were detected in May and July 1978.

Laboratory Determinations. Surface and bottom (50 cm above) water samples were taken at Stations 1, 8, and 13 with a 3-liter Kemmerer sampler at the same time that field measurements were being made. These samples were placed in polyethylene containers and taken to the laboratory for analysis; in most cases, analyses were completed within 24 hours of the sampling time. Fifteen water quality parameters (Table 2) were determined in the Toledo Edison Company chemical laboratory using the procedures prescribed in Standard Methods for the Examination of

TABLE 2

ANALYTICAL METHODS FOR WATER QUALITY DETERMINATIONS

Parameter	Units	References for Analytical Methods
1. Temperature	^{o}C	APHA (1975): Sec. 212
2. Dissolved Oxygen	ppm	APHA (1975): Sec. 422B
3. Conductivity	μmhos/cm (25^{o}C)	ASTM (1975): D1125-64
4. Transparency	meters	Welch (1948): Secchi disk
5. Calcium (Ca)	mg/l	APHA (1975): Sec. 306C
6. Magnesium (Mg)	mg/l	APHA (1975): Sec. 313C
7. Sodium (Na)	mg/l	ASTM (1973): D1428-64
8. Chloride (Cl)	mg/l	APHA (1975): Sec. 408B
9. Nitrate (NO_3)	mg/l	ASTM (1973): D992-71
10. Sulfate (SO_4)	mg/l	ASTM (1973): D516-68C
11. Phosphorus (Total as P)	mg/l	APHA (1975): Sec. 425F
12. Silica (SiO_2)	mg/l	ASTM (1973): D859-68B
13. Alkalinity (Total as $CaCO_3$)	mg/l	APHA (1975): Sec. 403
14. Biochemical oxygen demand	mg/l	APHA (1975): Sec. 507
15. Suspended solids	mg/l	APHA (1975): Sec. 208D
16. Dissolved solids	mg/l	USEPA (1974)
17. Turbidity	F.T.U.	APHA (1975): Sec. 214A
18. Hydrogen-ion conc.	pH units	ASTM (1973): D1293-65
		Field Procedure
19. Solar radiation	foot - candles	Protomatic underwater photometer (Rich, P.R. and R.G. Wetzel. 1969. A simple, sensitive underwater photometer. Limnology & Oceanography 14: 611-613)

Water and Wastewater, 14th Edition (American Public Health Association, 1975); "ASTM Standards, Part 23, Water" (American Society for Testing and Materials, 1973); and Water Analysis Procedures (U.S. Environmental Protection Agency, 1974).

Primary Productivity

Primary productivity was measured quarterly at Stations 3, 8, 13, and 14 (Table 1). Three additional sampling cruises were conducted for three reasons: a) to document a blue-green algae bloom, b) to obtain additional information when the plant was operating, and c) to correct an error in filter size. Water samples collected from 0.5, 1.0, and 2.0 or 3.0 m (depending on the depth) at each station with a water bottle were placed in 300-ml B.O.D. bottles with a known quantity of sodium bicarbonate tagged with C^{14}. The bottles (two light and two dark) were then suspended for two hours at the depth from which the sample was collected. The contents of the bottles was then filtered. The radiation on the filters was counted using liquid scintillation techniques.

Findings

Phytoplankton. Phytoplankters collected from May through November 1978 were divided into 54 taxa, generally to the genus level (Table 3). Fifteen taxa were grouped in Bacillariophyceae, 23 in Chlorophyceae, 1 in Chrysophyceae, two in Dinophyceae, one in Euglenophyceae, ten in Myxophyceae, and two in Protozoa.

Monthly mean phytoplankton populations ranged from 29,607/l in July to 281,852/l in May (Table 3). The mean density from all samples collected in 1978 was 109,768/l. Phytoplankton densities at individual sampling stations ranged from 3,389/l at Station 8 in June to 504,678/l at

TABLE 3

MONTHLY MEAN POPULATIONS* OF

INDIVIDUAL PHYTOPLANKTON TAXA AT LOCUST POINT - 1978

TAXA	May 11	June 29	July 25	Aug. 17	Sept. 15	Oct. 17	Nov. 1	Grand Mean
BACILLARIOPHYCEAE (Diatoms)								
Asterionella formosa	23896	68	15	1111	354	1159	4841	4492
Diatoma sp.	0	0	0	3	5	0	0	1
Fragilaria crotonensis	10483	676	71	880	3331	8900	9310	4807
Gyrosigma sp.	0	0	0	1	0	0	0	0.2
Melosira sp.	121411	4734	828	927	1040	1882	1977	18972
Navicula sp.	223	34	0	0	0	0	0	37
Nitzschia sigmoidea	0	0	0	3	0	0	0	0.4
Nitzschia sp.	167	0	0	0	0	0	0	24
Sceletonema subsalsa	117382	0	0	0	0	0	0	16769
Stephanodiscus binderanus	3147	0	0	64	65	24	0	471
Stephanodiscus sp.	0	0	0	0	0	0	9	1
Surirella sp.	22	0	0	5	8	0	0	5
Synedra actinastroides	0	0	0	2	0	0	0	0.2
Synedra sp.	673	0	0	40	16	34	18	112
Tabellaria sp	2662	26	0	336	177	506	315	575
Subtotal	280066	5539	915	3372	4997	12505	16471	46267
CHLOROPHYCEAE (Green Algae)								
Actinastrum hantzchii	0	0	0	0	2	2	0	1
Actinastrum sp.	0	0	0	0	0	0	7	1
Ankistrodesmus falcatus	0	0	0	1	2	0	2	1
Binuclearia tatrana	0	0	9958	749	1168	23603	114539	21431
Botryococcus sudeticus	0	0	632	2585	413	64	78	539
Closteriopsis longissima	0	0	0	20	47	30	208	44
Closterium acerosum	0	0	0	0	14	0	0	2
Closterium sp.	0	0	0	1	0	0	0	0.2

TABLE 3 (Con't.)

MONTHLY MEAN POPULATIONS* OF

INDIVIDUAL PHYTOPLANKTON TAXA AT LOCUST POINT - 1978

TAXA	May 11	June 29	July 25	Aug. 17	Sept. 15	Oct. 17	Nov. 1	Grand Mean
CHLOROPHYCEAE (Green Algae)								
Coelastrum sp.	0	0	138	0	3	0	0	20
Cosmarium sp.	0	0	0	6	8	0	0	2
Dictyosphaerium sp.	0	0	982	1	0	0	0	141
Kirchneriella sp.	0	0	8	0	0	0	0	1
Oocystis sp.	0	7	0	6	4	0	7	4
Pediastrum duplex	102	579	441	312	202	2023	1466	733
Pediastrum simplex	225	36	607	441	916	1434	1166	689
Scenedesmus sp.	105	40	11	4	6	4	28	24
Selenastrum sp.	28	0	0	0	0	0	0	4
Spirogyra crassa	0	0	0	0	7	0	0	1
Spirogyra sp.	0	0	2	0	0	0	0	0.2
Staurastrum paradoxum	20	0	198	62	51	3	89	60
Tetraspora sp.	0	0	32	0	0	0	0	5
Trentepohlia sp.	0	0	18	0	0	0	0	3
Unidentified	0	2117	0	0	0	0	0	302
Subtotal	482	2778	13026	4192	2845	27160	117566	24008
CHRYSOPHYSEAE (Brown Algae)								
Dinobryon sp.	0	0	0	0	0	0	4	1
DINOPHYCEAE (Dinoflagellates)								
Ceratium hirundinella	7	100	1164	54	11	0	0	191
Peridinium sp.	0	0	2	0	2	0	0	1
Subtotal	7	100	1166	54	13	0	0	192
EUGLENOPHYCEAE (Euglenas)								
Euglena sp.	0	0	0	0	4	0	0	1

TABLE 3 (Con't.)

MONTHLY MEAN POPULATIONS* OF

INDIVIDUAL PHYTOPLANKTON TAXA AT LOCUST POINT - 1978

TAXA	May 11	June 29	July 25	Aug. 17	Sept. 15	Oct. 17	Nov. 1	Grand Mean
MYXOPHYCEAE								
(Blue-green Algae)								
Anabaena spiroides	0	0	0	18	559	198	523	186
Anabaena sp.	0	239	53	15	371	802	446	275
Aphanizomenon flos-aquae	0	18071	13912	68825	74047	52362	15132	34621
Chroococcus sp.	0	0	94	0	0	0	0	13
Coelsphaerium sp.	0	3	0	0	0	0	0	0.4
Merismopedia sp.	0	0	24	0	0	0	0	3
Microcystis sp.	3	510	148	98	98	67	7	133
Oscillatoria sp.	1289	3590	208	85	502	6686	15530	3984
Raphidiopsis sp.	0	372	0	2	0	0	0	53
Unidentified	0	0	0	0	0	53	14	10
Subtotal	1292	22784	14481	69043	75577	60169	31652	39278
PROTOZOA								
Domatomonas sp.	5	7	14	26	38	12	6	15
Unidentified flagellate	0	0	0	0	9	0	0	1
Subtotal	5	7	14	26	47	12	6	16
TOTAL	281852	31207	29607	76687	83484	99846	165699	109768

* Expressed as no. of whole organisms/liter and computed from duplicate vertical tows (bottom to surface) with a Wisconsin plankton net (12 cm diameter, 0.080 mm mesh) from 7 sampling stations on dates indicated.

Station 1 in May (Table 4). Population pulses were observed in the spring and the fall (Figure 3). The spring pulse was caused by diatoms while the fall pulse was caused by green algae (Figure 4).

Monthly mean bacillariophycean densities ranged from 915/l in July to 280,066/l in May (Table 3). The annual mean bacillariophycean density from all samples collected during 1978 was 46,267/l or 42 percent of the entire phytoplankton density. The dominant diatom taxa were Melosira sp. in May, June, and July; Asterionella formosa in August; and Fragilaria crotonensis in September, October, and November. Melosira sp. had the largest annual mean population, 18,972/l. Diatoms were the dominant phytoplankton group during May when they constituted 99 percent of the entire phytoplankton population.

Monthly mean chlorophycean densities ranged from 482/l in May to 117,566/l in November with an annual mean population from all samples collected during 1978 of 24,008/l or 22 percent of the total phytoplankton population (Table 3). The dominant green algae taxa were Pediastrum simplex in May; an unidentified specimen in June; Binuclearia tatrana in July, September, October, and November; and Botryococcus sudeticus in August. Binuclearia tatrana had the largest annual mean population, 21,431/l. Chlorophyceae was the dominant phytoplankton class in November, representing 71 percent of the entire phytoplankton population.

Chrysophyceae was a rare class represented only by Dinobryon sp. It was present in samples from November, 4/l (Table 3).

Dinophyceae were represented by two taxa, Ceratium hirundinella and Peridinium sp. (Table 3). Neither occurred in samples from October or November. Ceratium hirundinella was the dominant of the two during the remaining months.

TABLE 4

MONTHLY MEAN PHYTOPLANKTON POPULATIONS* FROM

SAMPLING STATIONS AT LOCUST POINT, LAKE ERIE - 1978

Station	May 11	June 29	July 25	August 17	Sept. 15	Oct. 17	Nov. 1	Grand Mean
1	504678	52904	24934	30122	69070	65157	260749	143945
3	267168	15420	28707	48336	67592	226943	244023	128313
6	298575	33599	47841	36724	86274	88069	172088	109024
8	191915	3389	15871	116805	86739	71015	199435	97881
13	214234	42701	23913	119697	93823	77695	75855	92559
14	251516	33442	28692	95567	83979	64988	118177	96623
18	244880	36995	37254	89559	123929	105053	89567	103891
Grand Mean	281852	31207	29602	76687	83484	99846	165699	109768

* Data presented as no. of whole organisms/liter and computed from duplicate vertical tows (bottom to surface) with a Wisconsin plankton net (12 cm diameter, 0.080 mm mesh) at each station.

FIGURE 3. MONTHLY MEAN PHYTOPLANKTON POPULATIONS
FOR LAKE ERIE AT LOCUST POINT, 1974-1978

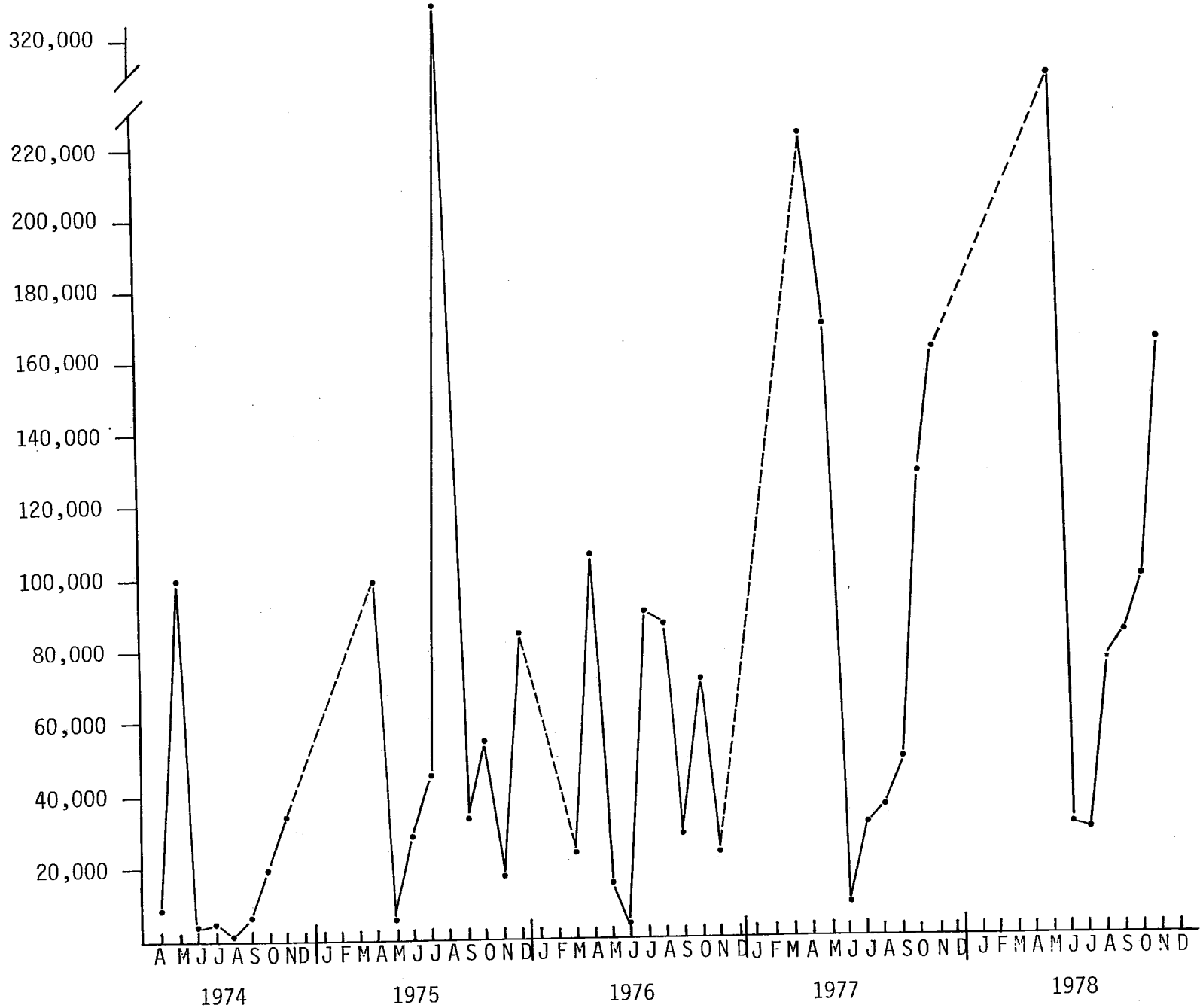
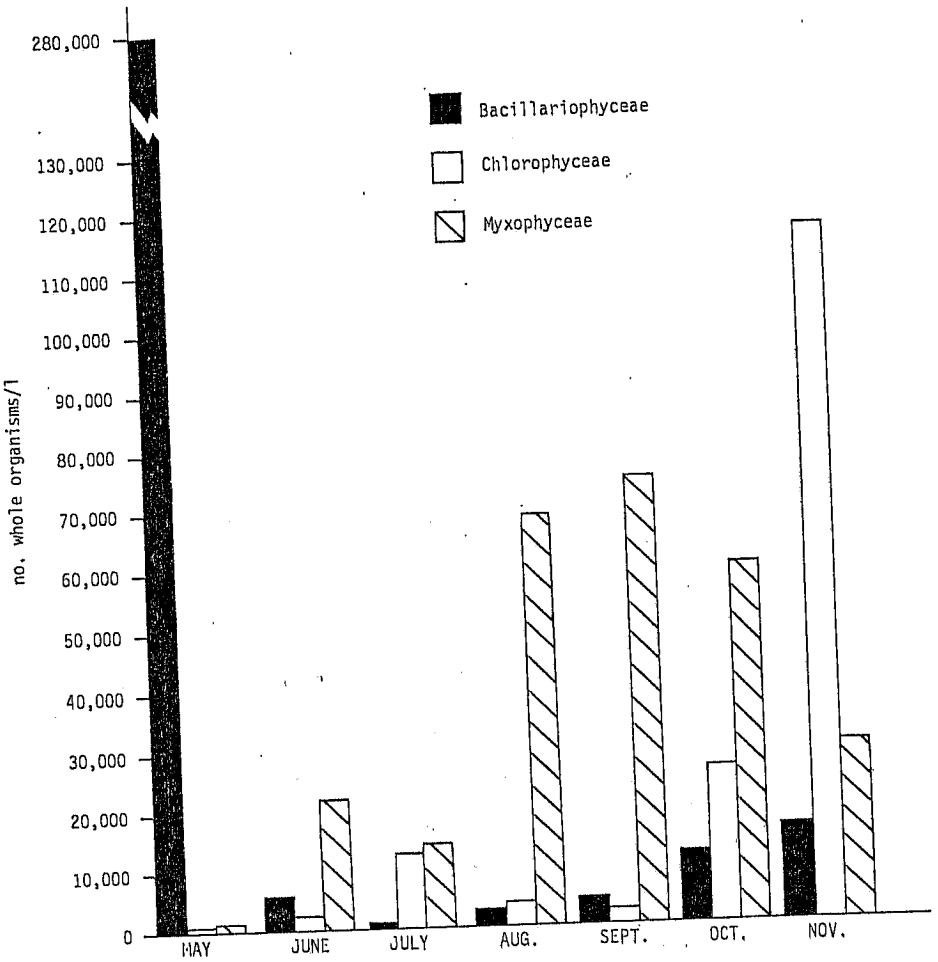


FIGURE 4

MONTHLY MEAN BACILLARIOPHYCEAE, CHLOROPHYCEAE, AND MYXOPHYCEAE POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1978.



Euglenophyceae was represented only by Euglena sp. It occurred in September, 4/l (Table 3).

Monthly mean myxophycean densities ranged from 1,292/l in May to 75,577/l in September with an annual mean density from all samples collected in 1978 of 39,278/l, 36 percent of the total phytoplankton mean (Table 3). The dominant myxophycean taxa were Oscillatoria sp. in May and November and Aphanizomenon flos-aquae from June through October. Aphanizomenon exhibited the largest annual mean density, 36,621/l. Myxophyceae was the dominant algal class from June through October, representing 73 percent, 49 percent, 90 percent, 91 percent, and 60 percent, respectively, of the total phytoplankton population.

Protozoa, grouped here with the phytoplankton, was represented by two taxa, Domatomonas sp. and an unidentified flagellate. Domatomonas occurred in every collection and was always the dominant of the two.

All raw data were keypunched and are stored in Columbus, Ohio at the offices of the Center for Lake Erie Area Research on the campus of The Ohio State University.

Zooplankton. Zooplankters collected May through November 1978 were grouped in 41 taxa generally to the species level (Table 5). Twenty taxa were grouped under Rotifera, 12 under Copepoda, eight under Cladocera, and one under Protozoa. Monthly mean densities ranged from 135/l in November to 557/l in September. The mean density from all samples collected in 1978 was 339/l. Zooplankton densities at individual sampling stations ranged from 124/l at Station 8 in May to 894/l at Station 18 in September (Table 6).

TABLE 5

MONTHLY MEAN POPULATIONS OF

INDIVIDUAL ZOOPLANKTON TAXA AT LOCUST POINT - 1978

TAXA	May 11	June 29	July 25	Aug. 17	Sept. 15	Oct. 17	Nov. 1	Grand Mean
ROTIFERA								
Asplanchna priodonta	0.0	0.0	0.0	0.0	1.2	0.9	0.0	0.3
Brachionus angularis	13.6	13.6	4.3	0.1	47.1	3.0	1.0	11.8
B. calyciflorus	19.3	0.0	0.1	0.1	0.0	0.0	0.0	2.8
B. diversicornus	0.0	0.0	0.0	0.0	2.4	0.1	0.0	0.4
Cephadella spp.	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.1
Chromogaster sp.	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.01
Filinia terminalis	0.9	0.0	0.0	0.0	0.04	0.0	0.0	0.1
Kellicottia longispina	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01
Keratella cochlearis	16.0	0.2	0.1	0.7	8.9	7.3	12.9	6.6
K. quadrata	12.1	3.4	0.0	0.0	0.2	0.0	0.04	2.3
K. vulga	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.1
Lecane spp.	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.01
Lepadella sp.	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.04
Notholca spp.	9.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
Polyarthra vulgaris	27.9	0.1	5.2	5.0	104.2	32.5	34.9	30.0
Synchaeta spp.	148.3	0.3	0.5	0.0	0.04	0.8	0.4	21.5
Trichocerca spp.	0.0	0.0	0.0	0.0	47.4	0.0	0.0	6.8
T. multicrinis	0.2	15.6	28.4	30.1	0.0	0.5	0.1	10.7
Unknown Rotifer A	15.8	0.0	0.0	0.0	0.0	0.0	0.0	2.3
Unknown Rotifer B	0.0	0.0	0.0	0.0	0.0	74.8	0.0	10.7
Subtotal	263.5	33.4	38.5	36.0	212.8	120.0	49.4	107.6
COPEPODA								
Calanoid Copepods								
Diaptomus minutus	0.3	0.3	0.8	0.0	0.1	0.0	0.0	0.2
D. sicilis	0.1	0.2	0.9	2.8	0.2	0.0	0.2	0.6
D. siciloides	0.0	0.03	6.6	50.8	8.4	0.9	0.2	9.6
Eurytemora affinis	0.0	0.0	0.0	0.0	0.0	0.0	0.04	0.01
Copepodids, calanoid	3.8	0.1	4.3	28.6	4.0	2.6	0.4	6.2
Nauplii, calanoid	5.1	0.0	21.0	40.0	17.9	5.9	1.5	13.1

TABLE 5 (Con't.)

MONTHLY MEAN POPULATIONS OF

INDIVIDUAL ZOOPLANKTON TAXA AT LOCUST POINT - 1978

TAXA	May 11	June 29	July 25	Aug. 17	Sept. 15	Oct. 17	Nov. 1	Grand Mean
COPEPODA								
Cyclopoid Copepods								
Cyclops bicuspidatus thomasi	0.04	0.2	0.0	1.1	1.0	0.1	0.6	0.4
C. vernalis	0.5	24.1	11.4	9.0	9.9	4.3	0.5	8.5
Mesocyclops edax	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.02
Tropocyclops prans nex	0.0	0.0	0.0	0.0	4.0	3.3	3.7	1.6
Copepodids, cyclopoid	3.7	10.2	7.2	3.7	16.5	4.0	9.2	7.8
Naupleii, cyclopoid	17.9	55.2	73.9	5.2	46.8	46.0	32.0	39.6
Subtotal	31.4	90.6	126.1	141.2	108.9	67.1	48.4	87.7
CLADOCERA								
Bosmina longirostris	0.0	0.0	0.0	0.0	0.04	0.1	0.0	0.02
Chydorus sphaericus	0.0	1.3	33.5	30.2	83.7	9.8	11.7	24.3
Diaphanosoma leuchtenbergianum	0.3	0.1	0.1	2.3	4.8	0.6	0.1	1.2
Daphnia galeata mendote	0.0	0.1	0.3	0.1	0.04	0.5	0.2	0.2
D. retrocurva	0.2	71.1	42.7	13.6	44.5	16.2	1.9	27.2
Eubosmina corregoni (mature)	0.0	274.7	45.1	25.7	59.2	28.3	12.3	63.6
E. corregoni (immature)	0.0	12.4	0.0	0.0	0.0	0.0	0.0	1.8
Leptodora kindtii	0.0	0.6	0.2	0.3	0.1	0.1	0.0	0.2
Subtotal	0.5	360.3	121.9	72.2	192.4	55.5	26.1	118.4
PROTOZOA								
Difflugia sp.	0.0	33.4	83.9	0.9	49.9	3.4	10.8	25.0
TOTAL	295.3	517.7	370.3	250.3	557.0	245.9	134.7	338.7

TABLE 6

MONTHLY MEAN ZOOPLANKTON POPULATIONS*

FROM SAMPLING STATIONS AT LOCUST POINT, LAKE ERIE - 1978

Station	May 11	June 29	July 25	August 17	Sept. 15	Oct. 17	Nov. 1	Grand Mean
1	591.9	572.9	436.2	306.5	449.1	298.4	131.9	398.1
3	326.9	534.6	549.7	270.7	541.3	265.3	150.7	377.0
6	309.2	666.1	285.9	216.6	517.5	241.3	131.8	338.3
8	124.4	386.3	318.5	227.8	412.3	252.1	137.3	265.5
13	243.4	497.8	336.5	197.4	513.1	179.3	127.0	299.2
14	240.4	460.8	276.9	270.8	571.3	232.9	135.3	312.6
18	231.2	505.2	406.7	262.3	894.2	252.0	129.1	383.0
Grand Mean	295.3	517.7	370.3	250.3	557.0	245.9	134.7	338.7

* Data presented as no. of organisms/liter and computed from duplicate vertical tows (bottom to surface) with a Wisconsin plankton net (12 cm diameter, 0.080 mm mesh) at each station.

Monthly mean rotifer densities ranged from 33/l in June to 264/l in May (Table 5). The annual mean rotifer density for all samples collected in 1978 was 108/l or 32 percent of the entire zooplankton density. The dominant rotifer taxa during 1978 were Synchaeta spp. in May; Trichocerca multicrinis in June, July, and August; Polyarthra vulgaris in September and November; and an unknown rotifer in October. Polyarthra vulgaris had the largest annual mean density, 30/l. Rotifera was the dominant zooplankton group during May, September, October, and November constituting 89 percent, 38 percent, 49 percent, and 37 percent, respectively, of the total zooplankton population. In contrast to this, rotifers consti tuted only six percent of the June population.

Monthly mean copepod densities ranged from 3/l in May to 141/l in August (Table 5). The mean copepod density from all samples collected in 1978 was 88/l or 26 percent of the entire zooplankton population. Cyclopoid nauplii dominated every month but August when Diaptomus siciloides was the dominant taxon. Copepoda was the dominant zooplankton group in July and August representing 34 percent and 56 percent, respectively, of the total zooplankton population.

Monthly mean cladoceran densities ranged from 1/l in May to 360/l in June (Table 5). The mean cladoceran density from all samples collected in 1978 was 118/l or 35 percent of the total zooplankton population. Cladoceran populations were dominated by Diaphanosoma leuchtenbergianum in May; Eubosmina coregoni (mature) in June, July, October, and November; and Chydorus sphaericus in August and September. Eubosmina coregoni (mature) had the largest annual mean density, 64/l. Cladocera was the dominant zooplankton group only in June constituting 70 percent of the total zooplankton population.

Monthly mean protozoan densities ranged from 0/l in May to 84/l in July (Table 5). The annual mean density of 25/l was seven percent of the total zooplankton population. Difflugia sp. was the only protozoa taxon. Protozoa was the dominant zooplanton group.

All raw data were keypunched and are stored in Columbus, Ohio at the offices of the Center for Lake Erie Area Research on the campus of The Ohio State University.

Benthos

Benthic macroinvertebrates collected May through November 1978 were grouped in 25 taxa, generally to the genus or species level within four phyla (Table 7). Two taxa were in Coelenterata, ten in Annelida, 12 in Arthropoda, and one in Mollusca.

Total populations ranged from 559/m^2 in May to 2,044/m^2 in November with an annual mean of 1,108/m^2 (Table 8). These populations were dominated by Annelids which made up 54.0 percent of the total benthos population and Arthropods which made up 32.9 percent of the total benthos population. Annelids were the dominant form during each of the four collections. Immature oligochaetes (no hair setae) was always the dominant Annelid taxon, while Arthropoda was dominated by Leptodora kindtii in May and July and Tanytarsus sp. in September and November. Annelid populations ranged from 302/m^2 in May to 1,788/m^2 in November. Arthropod populations ranged from 169/m^2 in July to 275/m^2 in September. All raw data were keypunched and maintained on file at the offices of the Center for Lake Erie Area Research in Columbus, Ohio.

TABLE 7

MONTHLY MEAN POPULATIONS* OF INDIVIDUAL

BENTHIC MACROINVERTEBRATE TAXA AT LOCUST POINT - 1978

TAXA \ Date	May 11	July 26	Sept. 26	Nov. 1	Grand Mean
COELENTERATA					
Hydra sp. (single polyp)	0.6	1.9	0.6	8.9	3.0
Hydra sp. (budding polyp)		2.5		7.6	2.7
Subtotal	0.6	4.4	0.6	16.5	5.7
ANNELIDA					
Hirudinea					
Helobdella elongata		1.3	1.3		0.7
H. stagnalis		0.6	1.9	0.6	0.8
Oligochaeta					
Immatures (hair setae)	2.5		0.6	3.8	1.8
Immatures (no hair setae)	257.9	528.4	794.6	1695.4	819.1
Branchuira sowerbyi		4.5	5.1	23.6	8.5
Limnodrilus cervix	0.6	5.1			1.5
L. claparedeanus		1.3	0.6	5.1	1.8
L. maumeensis	0.6	3.2	0.6	7.0	2.9
Ophidonais serpentina	35.0	12.7	7.6	52.2	26.9
Potamothrix moldaviensis	5.1	6.4	0.6		3.1
Subtotal	301.8	563.5	813.0	1787.8	866.5
ARTHROPODA					
Cladocera					
Leptodora kindtii	149.0	58.6	18.5	24.2	62.6

TABLE 7 (Con't.)

MONTHLY MEAN POPULATIONS* OF INDIVIDUAL
BENTHIC MACROINVERTEBRATE TAXA AT LOCUST POINT - 1978

TAXA \ Date	May 11	July 26	Sept. 26	Nov. 1	Grand Mean
ARTHROPODA					
Amphipoda					
Gammarus fasciatus	10.2	29.3	1.9	7.6	12.3
Hyallela azteca	0.6				0.2
Chironomidae					
Chironomus sp.	1.9	4.5	12.7	13.4	8.1
Cryptochironomus sp.	5.1	4.5	17.8	35.7	15.8
Glyptotendipes sp.	1.3				0.3
Polypedilum sp.	0.6	1.9			0.7
Procladius sp.	15.3	45.8	57.9	31.8	37.7
Tanytarsus sp.	70.7	22.9	160.4	126.1	95.0
Tanytarsus pupae		1.3	5.1		1.7
Ephemeroptera			0.6		0.2
Ephemeridae				0.6	0.8
Caenis sp.	1.9	0.6			
Subtotal	256.6	169.4	275.0	239.4	235.1
MOLLUSCA					
Pelecypoda			1.3		0.3
Amblema sp.					
TOTAL	559.0	737.3	1090.0	2043.7	1107.5

* Data presented as number of organisms/m^2 and computed from 3 grabs with a Ponar dredge (A=0.052 m^2) at each of 10 sampling stations on the dates indicated.

TABLE 8

MONTHLY MEAN BENTHIC MACROINVERTEBRATE POPULATIONS *
FROM SAMPLING STATIONS AT LOCUST POINT LAKE ERIE - 1978

Station \ Date	May 11	July 26	Sept. 26	Nov. 1	Grand Mean
1	184.6	222.8	76.4	57.3	135.3
3	955.0	19.1	382.0	4081.1	1359.3
8	89.1	553.9	617.6	1706.3	741.7
9	1903.6	1279.7	4399.4	1719.0	2325.4
13	668.5	649.4	1012.3	1833.6	1041.0
14	178.3	1407.0	2132.8	3781.8	1875.0
15	356.5	108.2	744.9	70.0	319.9
17	299.2	579.4	261.0	273.8	353.4
18	350.2	2260.2	935.9	5844.6	2347.7
26	604.8	292.9	337.4	1069.6	576.2
Grand Mean	559.0	737.3	1090.0	2043.7	1107.5

* Data presented as number of organisms per m^2 and computed from 3 grabs with a Ponar dredge (A=0.052 m^2) at each station on the dates indicated.

Fish

Adults. Of the 49 species reported from the Locust Point vicinity since 1963, 26 were collected during 1978, in addition to one newly recorded species, the goldenshiner (Notemigonus crysoleucas) (Table 9). The three fishing methods combined yielded a total of 22,191 fish, of which 31.1 percent occurred in gill nets, 59.4 percent in shore seines, and 9.5 percent in trawls (Table 10). The combined results of all three sampling methods indicated that the numerically dominant species in the Locust Point vicinity during 1978 were gizzard shad (61.0 percent), yellow perch (8.1 percent), spottail shiner (7.7 percent), alewife (6.0 percent), emerald shiner (5.8 percent), white bass (5.2 percent), and freshwater drum (3.4 percent) (Table 11). No other species comprised more than 1.0 percent of the total catch by number.

Gill Nets. Gill nets set from May through November yielded 6,910 fish weighing 463.5 kg and representing 22 species (Table 10, Appendix Tables 31-37). Monthly catches of all stations combined ranged from a maximum 2,026 (CPE=337.7) in September to a minimum 615 (CPE=102.5) in November. Maximum catch occurred at Station 26 in September (637 fish), and minimum catch occurred at Station 8 in May (20 fish) (Table 12). In general, catches were much higher during summer than during spring or fall. Species captured consisted primarily of yearling-size or larger yellow perch, freshwater drum, gizzard shad, spottail shiners, and white bass, as well as primarily young-of-the-year alewives.

There were no marked differences in direction of movement by fishes with respect to either species, month, or station. There was no trend in

TABLE 9

SPECIES FOUND IN THE LOCUST POINT AREA 1963 - 1977

1972	1973	1974	1975	1976	1977	1978	Scientific Name[1]	Common Name
							Amiidae	
*		*	*				Amia calva	bowfin
							Atherinidae	
		*	*	*	*	*	Labidesthes sicculus	brook silversides
							Catostomidae	
*				*	*	*	Carpiodes cyprinus	quillback carpsucker
*	*	*	*	*	*	*	Catostomus commersoni	common white sucker
		*					Minytrema melanops	spotted sucker
*					*		Moxostoma erythrurum	golden redhorse
*							Moxostoma macrolepidotum	shorthead redhorse
				*			Ictiobus cyprinellus	bigmouth buffalo fish
							Hypentelium nigricans	hog sucker
							Centrarchidae	
		*					Ambloplites rupestris	northern rockbass
	*	*	*				Lepomis cyanellus	green sunfish
		*	*				L. gibbosus	pumpkinseed sunfish
	*	*					L. humilis	orangespotted sunfish
		*	*				L. macrochirus	northern bluegill sunfish
	*						L. microlophus	redear sunfish
*	*	*				*	Micropterus dolomieui	smallmouth bass
	*	*					M. salmoides	largemouth bass
	*	*	*	*	*	*	Pomoxis annularis	white crappie
*	*	*	*	*	*	*	P. nigromaculatus	black crappie
							Clupeidae	
*	*	*	*	*	*	*	Alosa pseudoharengus	alewife
*	*	*	*	*	*	*	Dorosoma cepedianum	gizzard shad
							Cyprinidae	
*	*	*	*	*	*	*	Carassius auratus	goldfish
*	*						C. auratus x Cyprinus carpio	carp x goldfish hybrid
*	*	*	*	*	*	*	Cyprinus carpio	carp
	*	*	*	*	*	*	Hybopsis storeriana	silver chub
						*	Notemigonus crysoleucas	goldenshiner
*	*	*	*	*	*	*	Notropis atherinoides	emerald shiner
*	*	*	*	*	*	*	N. hudsonius	spottail shiner
	*		*	*	*		N. spilopterus	spotfin shiner
	*		*				N. volucellus	mimic shiner
			*				Pimephales promelas	fathead minnow
							Esocidae	
							Esox lucius	northern pike
					*		Esox masquinongy	muskellunge

TABLE 9 (CON'T)

SPECIES FOUND IN THE LOCUST POINT AREA 1963 - 1977

1972	1973	1974	1975	1976	1977	1978	Scientific Name[1]	Common Name
							Ictaluridae	
		*	*		*	*	Ictalurus melas	black bullhead
*	*	*				*	I. natalis	yellow bullhead
*	*	*	*	*	*	*	I. nebulosus	brown bullhead
*	*	*	*	*	*	*	I. punctatus	channel catfish
							Noturus flavus	stonecat madtom
							Lepisosteidae	
		*		*	*		Lepisosteus osseus	longnose gar
							Osmeridae	
*	*	*	*	*	*	*	Osmerus mordax	rainbow smelt
							Percidae	
			*		*		Etheostoma nigrum	johnny darter
*	*	*	*	*	*	*	Perca flavescens	yellow perch
	*	*	*	*	*	*	Percina caprodes	logperch darter
			*	*	*	*	Stizostedion canadense	sauger
*	*	*	*	*	*	*	S. v. vitreum	walleye
							Percichthyidae	
*	*	*	*	*	*	*	Morone chrysops	white bass
							Percopsidae	
	*	*	*	*	*	*	Percopsis omiscomaycus	trout-perch
							Petromyzontidae	
		*					Petromyzon marinus	sea lamprey
							Salmonidae	
*		*					Oncorhynchus kisutch	coho salmon
							Sciaenidae	
*	*	*	*	*	*	*	Aplodinotus grunniens	freshwater drum
23	28	34	30	26	27	26		

[1] Bailey et al. (1970)

TABLE 10

NUMBERS OF FISH COLLECTED AT LOCUST POINT FROM MAY-NOVEMBER 1978

WITH EQUAL MONTHLY EFFORT[a] WITH EACH TYPE OF FISHING GEAR

METHOD OF CAPTURE	MAY		JUNE		JULY		AUGUST		SEPTEMBER		OCTOBER		NOVEMBER		TOTAL	
	No. Fish	No. Species	No. Fish	No. Species	No. Fish	No. Species	No. Fish	No. Species	No. Fish	No. Species	No. Fish	No. Species	No. Fish	No. Species	No. Fish	No. Species
Gill Net[b]	768	9	809	13	674	13	1321	11	2026	13	697	11	615	12	6,910	22
Shore Seine[c]	83	9	5869	7	4460	4	1049	7	1052	9	44	2	620	2	13,177	13
Trawl[d]	70	12	103	11	427	10	624	11	147	13	473	11	260	10	2,104	19
TOTAL	921	17	6781	14	5561	15	2994	15	3225	17	1214	17	1495	17	22,191	26

[a] Values represent sum of CPE results from all stations at which a type of gear was used each month.

[b] Six units effort/month.

[c] Three units effort/month, except during May, when only two units effort were completed due to bad weather conditions.

[d] Three units effort/month.

TABLE 11

MONTHLY CATCH IN NUMBERS OF INDIVIDUALS OF FISH BY SPECIES AT LOCUST POINT DURING 1978, USING EQUAL EFFORT[a] WITH EACH TYPE OF GEAR (GILL NETS, TRAWL, SHORE SEINE)

SPECIES \ MONTH	MAY[b]	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	TOTAL	PERCENT TOTAL
Alewife		2		201	689	243	205	1340	6.0
Black Bullhead					6	1	1	8	<1
Black Crappie	1							1	<1
Black Silverside				5				5	<1
Brown Bullhead	1	3	22	10				36	<1
Carp	11	24	32	36	12	1	2	118	<1
Channel Catfish	6	62	23	11	2			104	<1
Emerald Shiner	13	102	1	406	200	24	540	1286	5.8
Freshwater Drum	47	439	206	20	38	5	2	757	3.4
Gizzard Shad	4	5691	4483	1253	1354	426	328	13,539	61.0
Goldenshiner					5			5	<1
Goldfish	2		7	10	2	1	1	23	<1
Logperch	3					1	1	5	<1
Quillback		14	1	1				16	<1
Rainbow Smelt	2	2	14	100	4	1	4	127	<1
Sauger	3	3			1		1	8	<1

TABLE 11(Cont.)

MONTHLY CATCH IN NUMBERS OF INDIVIDUALS OF FISH
BY SPECIES AT LOCUST POINT DURING 1978,
USING EQUAL EFFORT[a] WITH EACH TYPE OF GEAR
(GILL NETS, TRAWL, SHORE SEINE)

SPECIES \ MONTH	MAY[b]	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	TOTAL	PERCENT TOTAL
Silver Chub	1							1	<1
Smallmouth Bass			1					1	<1
Spottail Shiner	599	40	61	60	376	349	232	1717	7.7
Trout-Perch	12					1		13	<1
Walleye	22	25	21	19	7	1	3	98	<1
White Bass	10	288	423	335	91	10	7	1164	5.2
White Crappie			1		2	1	1	5	<1
White Sucker					5	2	1	8	<1
Yellow Bullhead						1	1	2	<1
Yellow Perch	184	86	265	527	431	146	165	1804	8.1
No Species	17	14	15	15	17	17	17	26	-
TOTAL	921	6781	5561	2994	3225	1214	1495	22,191	100

[a] Six units effort per month (gill net); three units effort per month (trawl); three units effort per month (shore seine)

[b] Only two units effort with shore seine due to bad weather conditions

TABLE 12

SUMMARY OF GILL NET CATCH RESULTS AT LOCUST POINT DURING 1978[a]

STATION & DIRECTION[b] \ DATE	MAY 18-19	JUNE 29-30	JULY 24-25	AUG. 17-18	SEPT. 24-25	OCT. 17-18	NOV. 1-2	TOTAL
3 NW	195	94	29	43	78	64	54	557
SE	53	95	20	47	81	43	39	378
UK	71	50	22	151	176	7	69	546
Subtotal	319	239	71	241	335	114	162	1481
26 NW	18	35	58	85	149	14	9	368
SE	14	78	49	111	115	38	19	424
UK	2	62	11	152	373	2	0	602
Subtotal	34	175	118	348	637	54	28	1394
8 NW	11	0	37	49	59	27	9	192
SE	8	0	35	36	37	13	23	152
UK	1	69	14	37	82	14	3	220
Subtotal	20	69	86	122	178	54	35	564
13 NW	148	47	31	51	92	31	24	424
SE	59	38	24	41	112	43	34	351
UK	63	27	30	94	162	19	27	422
Subtotal	270	112	85	186	366	93	85	1197
28 NW	14	0	98	60	101	48	28	349
SE	4	0	64	161	97	64	77	467
UK	6	97	36	52	82	23	1	297
Subtotal	24	97	198	273	280	135	106	1113
29 NW	63	42	61	59	59	127	50	461
SE	27	52	26	52	59	60	90	366
UK	11	23	29	40	112	60	59	334
Subtotal	101	117	116	151	230	247	199	1161
Inshore[c] NW	406	183	121	153	229	222	128	1442
SE	139	185	70	140	252	146	163	1095
UK	145	100	81	285	450	86	155	1302
Subtotal	690	468	272	578	931	454	446	3839

TABLE 12(Cont.)

SUMMARY OF GILL NET CATCH RESULTS AT LOCUST POINT DURING 1978[a]

STATION & DIRECTION[b] \ DATE	MAY 18-19	JUNE 29-30	JULY 24-25	AUG. 17-18	SEPT. 24-25	OCT. 17-18	NOV. 1-2	TOTAL
Offshore[d]								
NW	43	35	193	194	309	89	46	909
SE	26	78	148	308	249	115	119	1043
UK	9	228	61	241	537	39	4	1119
Subtotal	78	341	402	743	1095	243	169	3071
Control West[e]								
NW	213	129	87	128	227	78	63	925
SE	67	173	69	158	196	81	58	802
UK	73	112	33	303	549	9	69	1148
Subtotal	353	414	189	589	972	168	190	2875
Control East[f]								
NW	77	42	159	119	160	175	78	810
SW	31	52	90	213	156	124	167	833
UK	17	120	65	92	194	83	60	631
Subtotal	125	214	314	424	510	382	305	2274
Intake/Discharge[g]								
NW	159	47	68	100	151	58	33	616
SE	67	38	59	77	149	56	57	503
UK	64	96	44	131	244	33	30	642
Subtotal	290	181	171	308	544	147	120	1761
Grand Total								
NW	449	218	314	347	538	311	174	2351
SE	165	263	218	448	501	261	282	2138
UK	154	328	142	526	987	125	159	2421
Total	768	809	674	1321	2026	697	615	6910

[a] As Total numbers of fish collected at each station on each date from a 24-hour set with a 125-ft experimental gill net (five 25-ft x 6-ft panels of ½-in., 3/4-in., 1-in., 1½-in., and 2-in., bar mesh).

[b] NW=northwest; NE=northeast; UK=unknown (fish fell from net before direction determined); determined by direction fish was traveling parallel to shore when entangled in net.

[c] Total of Stations 3, 13, and 29

[d] Total of Stations 26, 8, and 28

[e] Total of Stations 3 and 26

[f] Total of Stations 28 and 29

[g] Total of Stations 8 and 13

abundance of fishes at offshore (8, 26, and 28) vs. inshore stations (3, 13, and 29). Although the differences were not great and not consistent, greater numbers of fish were generally collected at control stations (3, 26, 28, and 29) than at the intake (8) and discharge (13) stations (Table 12). Gill net data are presented in detail in the Appendix (Tables 31-37).

Trawls. Trawling in the Locust Point vicinity during 1978 yielded 2,104 fish weighing 69.4 kg and representing 19 species (Table 10, Appendix Tables 38-44). Monthly catches along all three transects ranged from a maximum 624 (CPE=208.0) in August to a minimum 70 (CPE=23.3) in May. Maximum catch occurred at Transect 28-29 in August (284 fish), and minimum catch occurred at Transect 8-13 in May (15 fish). In general, catches were much higher during summer than during spring or fall (Tables 10, 13). Species captured were primarily young-of-the-year and yearling-size or larger yellow perch, freshwater drum, spottail shiners, white bass, channel catfish, gizzard shad, alewives, and rainbow smelt. Smelt and alewives were caught in greatest numbers as young-of-the-year in late summer and fall. There were no marked differences or trends in the abundance of fishes at control vs. intake-discharge transects (Table 13). Trawl data are presented in detail in the Appendix (Tables 38-44).

Shore Seines. Shore seining in the Locust Point vicinity during 1978 yielded 13,177 fish weighing 28.9 kg and representing 13 species (Table 10, Appendix Tables 45-51). Monthly catches at all three stations ranged from a maximum 5,869 (CPE=1,956.3) in June to a minimum 44 (CPE=14.7) in October. Maximum catch occurred at Station 23 in June (4,780 fish), and minimum catch occurred at Station 25 in October (1 fish). The large June catch consisted primarily of young-of-the-year gizzard shad. In general,

TABLE 13

SUMMARY OF TRAWLING RESULTS AT LOCUST POINT DURING 1978[a]

DATE \ TRANSECT	3-26	8-13	28-29	TOTAL
12 May	26	15	29	70
30 June	24	46	33	103
25 July	66	122	239	427
18 August	121	219	284	624
15 September	49	57	41	147
19 October	193	110	170	473
1 November	44	116	100	260
TOTAL	523	685	896	2104

[a] Totals of four 5-min. tows with a 16-ft (1/8-in. bag mesh) trawl at each transect on each date

catches were much greater during summer than during spring or fall. Species captured were primarily young-of-the-year alewives, gizzard shad, and white bass, and both adult and young-of-the-year emerald shiners and spottail shiners. There were no marked differences or trends in abundance of fishes at control (23 and 25) vs. intake-discharge (24) stations (Table 14). Shore seine data are presented in detail in the Appendix (Tables 45-51).

Food Habits. Food items of the major fish species in the Locust Point vicinity during 1978 were relatively limited in variety. Zooplankton, primarily cyclopoid copepods and Leptodora kindtii were the major dietary items of yellow perch, freshwater drum, spottail shiners, emerald shiners, and young white bass. These species also utilized chironomid larvae, oligochaetes, Hydracarina, and other unidentified plant and animal material. White bass adults were almost entirely piscivorous. Food habits data are presented in detail in the Appendix (Tables 52-58).

Ichthyoplankton. Specimens collected during the 1978 field season represented 11 taxa, ten to the species level and one listed as unidentified shiner (Table 15). Eggs were collected from the bottom of Stations 3 and 13 on June 8. Gizzard shad, emerald shiners, walleye, yellow perch, and freshwater drum were the dominant species representing 67.3 percent, 15.4 percent, 11.0 percent, 2.4 percent, and 2.3 percent, respectively of the total population at Locust Point (Table 15). No other species represented as much as 1.0 percent of the total. Gizzard shad occurred from 8 June through 11 August and peaked on 8 June at 110.4/100 m^3. Emerald shiners occurred from 8 June through 23 August and peaked on 5 July at

TABLE 14

SUMMARY OF SHORE SEINE RESULTS AT LOCUST POINT DURING 1978[a]

DATE \ STATION	23	24	25	TOTAL
10 May[b]	57	26		83
29 June	4780	247	842	5869
24 July	37	513	3910	4460
17 August	630	190	229	1049
15 September	486	275	291	1052
18 October	40	3	1	44
2 November	35	140	445	620
TOTAL	6065	1394	5718	13,177

a Total of two hauls through a 90° arc with a 100-ft bag seine (¼-in. bar mesh) at each station on each date

b Only Stations 23 and 24 were sampled due to progressively bad weather conditions

TABLE 15. Ichthyoplankton Densities at Locust Point - 1978*

SPECIES	STATION	APRIL 30 3	8	13	26	28	29	MEAN	MAY 22 3	8	13	26	28	29	MEAN
arp	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
merald hiner	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
resh-ater rum	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
izzard had	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Rainbow Smelt	Pro-larvae										1.85	1.88	0.93	4.52	1.53
	Post-larvae														
	Surface								1.42			3.11	1.86	8.26	2.44
	Bottom								2.28			0.65		0.78	0.62
	Subtotal **								1.85			1.88	0.93	4.52	1.53
Spottail Shiner	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Unidenti-fied Shiner	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Walleye	Pro-larvae								52.06	5.96	65.17	16.92	12.48	120.79	45.56
	Post-larvae														
	Surface								23.79	1.85	57.22	0.79	11.34	181.26	46.04
	Bottom								80.32	10.07	73.12	33.04	13.62	60.32	45.08
	Subtotal **								52.06	5.96	65.17	16.92	12.48	120.79	45.56
White Bass	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Whitefish	Pro-larvae		0.40					0.07				0.40			0.07
	Post-larvae											0.79			0.13
	Surface		0.81					0.14							
	Bottom											0.40			0.07
	Subtotal **		0.40					0.07							
Yellow Perch	Pro-larvae								4.04	4.82	7.70	4.41	8.68	8.55	6.37
	Post-larvae														
	Surface								3.96	8.64	6.89	6.14	16.49	12.30	9.07
	Bottom								4.12	1.01	8.52	2.68	0.88	4.80	3.66
	Subtotal **								4.04	4.82	7.70	4.41	8.68	8.55	6.37
Total	Pro-larvae		0.40					0.07	56.10	10.78	74.72	23.21	22.09	133.86	53.46
	Post-larvae											0.40			0.07
	Surface		0.81					0.14	27.76	10.49	65.52	10.83	29.69	201.82	57.69
	Bottom								84.44	11.08	83.92	36.38	14.50	65.90	49.37
	Subtotal **		0.40					0.07	56.10	10.78	74.72	23.60	22.09	133.86	53.53
Eggs	Surface														
	Bottom														
	Subtotal **														

TABLE 15 (Cont'd). Ichthyoplankton Densities at Locust Point - 1978*

SPECIES	STATION	JUNE 8 3	8	13	26	28	29	MEAN	JUNE 20 3	8	13	26	28	29	MEAN
Carp	Pro-larvae		0.42					0.07							
	Post-larvae														
	Surface														
	Bottom		0.84					0.14							
	Subtotal **		0.42					0.07							
Emerald Shiner	Pro-larvae	0.57						0.10							
	Post-larvae														
	Surface														
	Bottom	1.14						0.19							
	Subtotal **	0.57						0.10							
Fresh-water Drum	Pro-larvae	1.06	0.74	1.47				0.54	4.22	1.65	25.45		2.91	15.17	8.23
	Post-larvae										0.38			0.33	0.12
	Surface								0.83	1.83	15.92		4.39	12.98	5.99
	Bottom	2.11	1.48	2.94				1.09	7.61	1.47	35.76		1.44	18.01	10.71
	Subtotal **	1.06	0.74	1.47				0.54	4.22	1.65	25.84		2.91	15.50	8.35
Gizzard Shad	Pro-larvae	105.24	33.67	57.45				32.73		0.71	0.66		1.80	1.32	0.75
	Post-larvae	291.67	52.90	121.69				77.71	47.65	15.71	30.74		13.68	49.28	26.18
	Surface	646.82	106.06	239.06				165.32	53.64	31.42	32.35		18.73	59.44	32.59
	Bottom	147.00	67.07	119.21				55.55	41.65	1.42	30.47		12.25	41.76	21.26
	Subtotal **	396.91	86.57	179.14				110.44	47.65	16.42	31.40		15.49	50.60	26.92
Rainbow Smelt	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Spottail Shiner	Pro-larvae	0.80	0.37	0.40				0.26	0.42	0.31	0.57				0.22
	Post-larvae													0.36	0.06
	Surface	0.64	0.80					0.24	0.84	0.61	1.15			0.72	0.55
	Bottom	0.96	0.74					0.28	0.42						0.07
	Subtotal **	0.80	0.37	0.40				0.26		0.31	0.57			0.36	0.28
Unidenti-fied Shiner	Pro-larvae														
	Post-larvae	0.29						0.05							
	Surface														
	Bottom	0.57						0.10							
	Subtotal **	0.29						0.05							
Walleye	Pro-larvae			0.40				0.07							
	Post-larvae														
	Surface			0.80				0.13							
	Bottom														
	Subtotal **			0.40				0.07							
White Bass	Pro-larvae	1.77	0.37	2.50				0.77	0.50	0.35			0.72	1.63	0.53
	Post-larvae	1.02	0.37					0.23	2.08	0.37	1.29			3.06	1.13
	Surface	1.15		1.76				0.49	0.84	0.73	1.80			3.41	1.13
	Bottom	4.43	1.48	3.23				1.52	4.30	0.71	0.77		1.44	5.96	2.20
	Subtotal **	2.79	0.74	2.50				1.00	2.57	0.72	1.29		0.72	4.68	1.66
Whitefish	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Yellow Perch	Pro-larvae	0.29	0.35	1.68				0.39							
	Post-larvae	5.62	4.49	7.05				2.86		0.61	0.96		0.53	0.67	0.46
	Surface	1.66	1.38	7.22				1.71		1.22	1.15		1.06		0.57
	Bottom	10.15	8.29	10.24				4.78			0.77			1.35	0.35
	Subtotal **	5.91	4.83	8.73				3.24		0.61	0.96		0.53	0.67	0.46
Total	Pro-larvae	114.07	35.50	67.45				36.17	5.14	3.02	26.68		5.44	18.12	9.73
	Post-larvae	298.60	57.76	128.74				80.85	49.72	16.69	33.37		14.21	53.69	27.95
	Surface	650.28	107.44	249.64				167.89	56.16	35.82	52.34		24.17	76.54	40.84
	Bottom	175.06	79.06	142.74				66.14	53.56	3.59	67.77		15.13	67.07	34.52
	Subtotal **	412.67	93.25	196.19				117.02	54.86	19.71	60.06		19.65	71.81	37.68
Eggs	Surface														
	Bottom	8.69		6.27				2.49							
	Subtotal **	4.34		3.14				1.25							

TABLE 15 (Cont'd). Ichthyoplankton Densities at Locust Point - 1978*

SPECIES	STATION	JULY 5 3	8	13	26	28	29	MEAN	JULY 19 3	8	13	26	28	29	MEAN
Carp	Pro-larvae		0.44					0.07				0.32			0.05
	Post-larvae											0.65			0.11
	Surface		0.88					0.15							
	Bottom											0.32			0.05
	Subtotal **		0.44					0.07							
Emerald Shiner	Pro-larvae	54.73	62.00	91.99	33.83	1.44	58.36	50.39							
	Post-larvae	3.74	6.45	23.37	39.74		3.52	12.64							
	Surface	109.38	135.99	174.85	109.80	1.06	120.50	108.60							
	Bottom	7.55	0.92	53.87	37.34	1.82		17.46							
	Subtotal **	58.47	68.45	114.36	73.57	1.44	61.88	63.03							
Fresh-water Drum	Pro-larvae		1.04			0.48		0.25	0.29	0.91	0.75			1.05	0.50
	Post-larvae							0.15			1.11			0.48	0.36
	Surface		0.88					0.36	0.59	1.82	0.38			1.62	0.64
	Bottom		1.18			0.96		0.25	0.29	0.91	0.75			1.05	0.50
	Subtotal **		1.04			0.48									
Gizzard Shad	Pro-larvae	5.80	12.75	198.10				36.11		1.43	0.62	0.30	7.64	12.41	4.87
	Post-larvae	128.76	28.19	101.83	76.40	8.37	82.02	70.93	9.78	5.06		3.93	0.48	18.38	6.70
	Surface	51.25	57.55	358.46	21.68	8.46	9.69	84.51	12.42	5.26	13.42	7.87	5.75	23.47	11.36
	Bottom	217.89	24.32	241.40	131.13	8.29		129.56	7.14	7.73	6.57	0.60	10.50	38.11	11.78
	Subtotal **	134.57	40.94	299.93	76.40	8.37	82.02	107.04	9.78	6.49	0.62	4.23	8.13	30.79	11.57
Rainbow Smelt	Pro-larvae									0.20				0.27	0.08
	Post-larvae														
	Surface									0.39				0.54	0.16
	Bottom									0.20				0.27	0.08
	Subtotal **														
Spottail Shiner	Pro-larvae										0.62				0.10
	Post-larvae														
	Surface										1.24				0.21
	Bottom										0.62				0.10
	Subtotal **														
Unidenti-fied Shiner	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Walleye	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
White Bass	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Whitefish	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Yellow Perch	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Total	Pro-larvae	60.53	76.23	290.09	33.83	1.92	58.36	86.83	0.29	2.34	8.79	0.30	7.64	13.46	5.47
	Post-larvae	132.50	34.64	124.20	116.14	8.37	85.54	83.56	9.78	5.26	2.57	4.26	0.48	18.66	6.83
	Surface	160.64	195.31	533.31	131.47	9.52	130.18	193.40	13.01	5.26	15.77	8.51	5.75	23.95	12.04
	Bottom	225.44	26.42	295.26	168.46	11.06	157.60	147.38	7.14	9.94	6.95	0.60	10.50	40.27	12.57
	Subtotal **	193.04	110.87	414.29	149.97	10.29	143.90	170.39	10.07	7.60	11.36	4.56	8.13	32.11	12.30
Eggs	Surface														
	Bottom														
	Subtotal **														

TABLE 15 (Cont'd). Ichthyoplankton Densities at Locust Point - 1978*

SPECIES	STATION	AUGUST 1							AUGUST 11						
		3	8	13	26	28	29	MEAN	3	8	13	26	28	29	MEAN
Carp	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Emerald Shiner	Pro-larvae		0.30	0.26		0.29	0.57	0.24	0.30						0.05
	Post-larvae	1.31	0.27	0.26				0.31	0.22	1.78		1.09			0.51
	Surface	2.62	1.12	1.06		0.58	1.14	1.09	0.60	3.56		2.17			1.06
	Bottom								0.43						0.07
	Subtotal **	1.31	0.56	0.53		0.29	0.57	0.54	0.52	1.78		1.09			0.56
Fresh-water Drum	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Gizzard Shad	Pro-larvae	1.62				2.85		0.74	13.67	66.56	0.30	13.13	4.35	0.34	16.39
	Post-larvae	1.31	7.20	2.32	3.08	5.36	11.31	5.10	1.52	0.28	3.91	0.52	0.53	3.35	1.68
	Surface	2.96	12.36	2.66	5.66	8.73	19.31	8.61	25.74	98.88	1.74	24.89	8.46	6.31	27.67
	Bottom	2.90	2.05	1.98	0.50	7.68	3.31	3.07	4.64	34.81	6.69	2.40	1.29	1.06	8.48
	Subtotal **	2.93	7.20	2.32	3.08	8.20	11.31	5.84	15.19	66.84	4.22	13.65	4.88	3.69	18.08
Rainbow Smelt	Pro-larvae									0.38				0.27	0.11
	Post-larvae														
	Surface									0.76				0.54	0.22
	Bottom									0.38				0.27	0.11
	Subtotal **														
Spottail Shiner	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Unidenti-fied Shiner	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Walleye	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
White Bass	Pro-larvae													0.27	0.05
	Post-larvae														
	Surface													0.54	0.09
	Bottom													0.27	0.05
	Subtotal **														
Whitefish	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Yellow Perch	Pro-larvae														
	Post-larvae														
	Surface														
	Bottom														
	Subtotal **														
Total	Pro-larvae	1.62	0.30	0.26		3.14	0.57	0.98	13.97	66.56	0.30	13.13	4.35	0.61	16.49
	Post-larvae	2.62	7.47	2.58	3.08	5.36	11.31	5.40	1.73	2.44	3.91	1.60	0.53	3.62	2.31
	Surface	5.58	13.48	3.71	5.66	9.30	20.45	9.70	26.34	102.44	1.74	27.06	8.46	6.31	28.73
	Bottom	2.90	2.05	1.98	0.50	7.68	3.31	3.07	5.07	35.56	6.69	2.40	1.29	2.15	8.86
	Subtotal **	4.24	7.76	2.85	3.08	8.49	11.88	6.38	15.70	69.00	4.22	14.73	4.88	4.23	18.79
Eggs	Surface														
	Bottom														
	Subtotal **														

TABLE 15 (Cont'd). Ichthyoplankton Densities at Locust Point - 1978*

SPECIES	STATION	AUGUST 23 3	8	13	26	28	29	MEAN	MEAN 3	8	13	26	28	29	MEAN
Carp	Pro-larvae									0.04	0.04				0.01
	Post-larvae											0.03			0.01
	Surface									0.09		0.06			0.03
	Bottom										0.08				0.01
	Subtotal **									0.04	0.04	0.03			0.02
Emerald Shiner	Pro-larvae	0.30						0.05	5.59	6.23	9.23	3.38	0.17	5.89	5.08
	Post-larvae								0.53	0.85	2.26	4.08		0.35	1.35
	Surface	0.60						0.10	11.32	14.07	17.59	11.20	0.16	12.16	11.08
	Bottom								0.91	0.09	5.39	3.73	0.18	0.33	1.77
	Subtotal **	0.30						0.05	6.12	7.08	11.49	7.47	0.17	6.25	6.43
Fresh-water Drum	Pro-larvae								0.56	0.43	2.77		0.34	1.62	0.95
	Post-larvae										0.04			0.03	0.01
	Surface								0.14	0.27	1.70		0.44	1.35	0.65
	Bottom								0.97	0.60	3.91		0.24	1.96	1.28
	Subtotal **								0.56	0.43	2.81		0.34	1.65	0.96
Gizzard Shad	Pro-larvae								12.63	11.51	26.39	1.34	1.66	1.40	9.16
	Post-larvae								48.07	10.93	26.31	8.39	2.84	16.43	18.83
	Surface								79.28	31.15	64.77	6.01	5.01	11.82	33.01
	Bottom								42.12	13.74	40.63	13.46	4.00	23.86	22.97
	Subtotal **								60.70	22.45	52.70	9.74	4.51	17.84	27.99
Rainbow Smelt	Pro-larvae										0.18	0.19	0.09	0.45	0.15
	Post-larvae									0.06				0.05	0.02
	Surface										0.14	0.31	0.19	0.83	0.24
	Bottom									0.12	0.23	0.07		0.19	0.10
	Subtotal **									0.06	0.18	0.19	0.09	0.51	0.17
Spottail Shiner	Pro-larvae								0.12	0.07	0.16				0.06
	Post-larvae													0.04	0.01
	Surface								0.15	0.06	0.32			0.07	0.10
	Bottom								0.10	0.07					0.03
	Subtotal **								0.12	0.07	0.16			0.04	0.06
Unidenti-fied Shiner	Pro-larvae														0.01
	Post-larvae								0.03						
	Surface														0.01
	Bottom								0.06						0.01
	Subtotal **								0.03						
Walleye	Pro-larvae								5.21	0.60	6.56	1.69	1.25	12.08	4.56
	Post-larvae														
	Surface								2.38	0.19	5.80	0.08	1.13	18.13	4.62
	Bottom								8.03	1.01	7.31	3.30	1.36	6.03	4.51
	Subtotal **								5.21	0.60	6.56	1.69	1.25	12.08	4.56
White Bass	Pro-larvae								0.23	0.07	0.25		0.07	0.19	0.14
	Post-larvae								0.31	0.07	0.13			0.31	0.14
	Surface								0.20	0.07	0.36			0.34	0.16
	Bottom								0.87	0.22	0.40		0.14	0.65	0.38
	Subtotal **								0.54	0.15	0.38		0.07	0.50	0.27
Whitefish	Pro-larvae									0.04					0.01
	Post-larvae											0.04			0.01
	Surface									0.08		0.08			0.03
	Bottom														
	Subtotal **									0.04		0.04			0.01
Yellow Perch	Pro-larvae								0.43	0.52	0.94	0.44	0.87	0.85	0.68
	Post-larvae								0.56	0.51	0.80		0.05	0.07	0.33
	Surface								0.56	1.12	1.53	0.61	1.75	1.23	1.14
	Bottom								1.43	0.93	1.95	0.27	0.09	0.61	0.88
	Subtotal **								0.99	1.03	1.74	0.44	0.92	0.92	1.01
Total	Pro-larvae	0.30						0.05	25.20	19.51	46.83	7.05	4.46	22.50	20.92
	Post-larvae								49.50	12.42	29.54	12.55	2.90	17.28	20.70
	Surface	0.60						0.10	94.04	47.11	92.20	18.35	8.69	45.93	51.05
	Bottom								55.36	16.77	60.53	20.84	6.02	33.63	32.19
	Subtotal **	0.30						0.05	74.70	31.94	76.37	19.59	7.35	39.78	41.62
Eggs	Surface								0.87		0.63				0.25
	Bottom								0.43		0.31				0.12
	Subtotal **														

* Data presented as no./100m^3

** Subtotal of Pro and Post - larvae, mean of surface and bottom samples.

(63.0/100 m^3). Walleye were collected on 22 May (45.6/100 m^3) and 8 June (0.1/100 m^3). Freshwater drum were collected from 8 June through 19 July with maximum density recorded on 20 June, 8.4/100 m^3. Yellow perch were collected 22 May, 8 June, and 20 June at densities of 6.4/100 m^3, 3.24/100 m^3, and 0.5/100 m^3, respectively.

Station 13 (plume area) exhibited the greatest mean larval density, 76.4/100 m^3, while Station 28 exhibited the lowest larval density (Table 15). With the exception of Station 26, all six stations exhibited much greater larval densities at the surface than at the bottom. However, this increased abundance at the surface was heavily weighted by the dominance of gizzard shad and emerald shiners. Drum and white bass were more abundant at the bottom and perch and walleye were uniformly distributed in the water column.

Water Quality

The results of the monthly 1978 water quality determinations at Stations 1, 8, and 13 are presented in Tables 16-22. The results of solar radiation measurements at Stations 1, 3, 8, and 13 are given in Table 23. Mean values and ranges for the monthly water quality determinations (May through November) are listed in Table 24 and a summary of solar radiation means and ranges are presented in Table 25. The monitoring stations were selected to characterize Lake Erie water quality at several areas within the vicinity of the Davis-Besse Nuclear Power Station. Station 1 is only 500 feet offshore and is positioned to monitor nearshore water masses. Station 3 is located 2000 feet offshore and is used as a control station for the power station discharge which is located 3000 feet to the southeast. Station 8 is 3000 feet offshore and Station 13 is 1500 feet

TABLE 19

LAKE ERIE WATER QUALITY ANALYSES FOR AUGUST 1978

Dates:
Field 17 August 1978
Laboratory 18 August 19

Parameters	Station No. 1		Station No. 8		Station No. 13		Range	Mean	Standard Deviation
	Surface	Bottom	Surface	Bottom	Surface	Bottom			
Field Measurements:									
Temperature (°C)	23.0	23.0	23.5	23.0	23.5	23.0	23.0-23.5	23.2	0.3
Dissolved Oxygen (ppm)	8.6	8.4	8.4	8.4	8.5	8.2	8.2-8.6	8.4	0.1
Conductivity (umhos/cm)	265	265	270	265	265	265	265 -270	266	2
Transparency (m)	0.75		0.95		0.70		0.70-0.95	0.80	0.1
Depth (m)		2.0		4.0		3.0	2.0-4.0	3.0	1.0
Laboratory Determinations:									
Calcium (mg/l)	34.4	34.4	36.0	35.6	35.6	35.6	34.4-36.0	35.3	0.7
Magnesium (mg/l)	10.6	10.6	9.6	9.8	9.4	9.6	9.4-10.6	9.9	0.5
Sodium (mg/l)	9.5	9.5	10.1	10.1	10.1	10.1	9.5-10.1	9.9	0.3
Chloride (mg/l)	19.5	20.0	19.5	19.5	19.0	19.0	19.0-20.0	19.4	0.4
Nitrate (mg/l)	2.9	2.3	1.4	1.4	2.0	2.3	1.4-2.9	2.1	0.4
Sulfate (mg/l)	27.5	27.5	26.5	28.0	27.5	27.5	26.5-28.0	27.4	0.5
Phosphorus (mg/l)	0.03	0.003	0.03	0.02	0.01	0.01	0.01-0.03	0.02	0.01
Silica (mg/l)	0.23	0.19	0.16	0.23	0.23	0.19	0.16-0.23	0.20	0.03
Total Alkalinity (mg/l)	96	96	96	96	96	98	96-98	96.3	0.8
B.O.D. (mg/l)	2	2	2	2	2	2	-	2	0
Suspended Solids (mg/l)	10	15	11	11	17	12	10-17	12.7	2.7
Dissolved Solids (mg/l)	168	170	168	174	182	178	168-182	173	6
Turbidity (F.T.U.)	18	22	11	18	17	17	11-22	17	4
pH	8.4	8.4	8.8	8.7	8.7	8.7	8.4-8.8	8.6	0.2
Conductivity (umhos/cm)	295	295	285	295	285	295	285-295	292	5

TABLE 20

LAKE ERIE WATER QUALITY ANALYSES FOR SEPTEMBER 1978

Dates:
Field 13 September 1978
Laboratory 18 Sept. 1978

Parameters	Station No. 1		Station No. 8		Station No. 13		Range	Mean	Standard Deviation
	Surface	Bottom	Surface	Bottom	Surface	Bottom			
Field Measurements:									
Temperature (°C)	22.1	22.1	21.7	21.7	22.5	22.1	21.1-22.5	22.0	0.3
Dissolved Oxygen (ppm)	8.9	8.5	8.9	8.2	9.1	8.7	8.2-9.1	8.7	0.3
Conductivity (umhos/cm)	285	285	285	285	305	300	285 - 305	291	9
Transparency (m)	0.40		0.40		0.40		-	0.40	0
Depth (m)		2.0		4.0		3.0	2.0-4.0	3.0	1.0
Laboratory Determinations:									
Calcium (mg/l)	34.8	34.8	34.0	34.8	34.8	32.0	32.0-348	34.2	1.1
Magnesium (mg/l)	8.4	9.1	7.9	7.0	7.9	9.1	7.0-9.1	8.2	0.8
Sodium (mg/l)	9.5	9.5	10.5	10.5	9.5	10.5	9.5-10.5	10.0	0.6
Chloride (mg/l)	17.5	18.0	17.5	17.5	17.5	19.5	17.5-19.5	17.9	0.8
Nitrate (mg/l)	1.7	1.7	1.7	1.7	1.7	1.7	-	1.7	0
Sulfate (mg/l)	27.0	27.0	24.5	22.0	22.0	22.0	22.0-27.0	24.1	2.5
Phosphorus (mg/l)	0.03	0.08	0.01	0.02	0.04	0.07	0.01-0.08	0.04	0.03
Silica (mg/l)	0.16	0.40	0.10	0.10	0.10	0.23	0.10-0.40	0.18	0.12
Total Alkalinity (mg/l)	98	98	95	95	98	96	95-98	97	1.5
B.O.D. (mg/l)	2	3	1	1	1	2	1-3	1.3	0.5
Suspended Solids (mg/l) *	38	238	24	30	30	104	30-238	77	84
Dissolved Solids (mg/l)	180	198	180	180	192	196	180-198	188	9
Turbidity (F.T.U.)	36	77	17	18	18	47	17-77	36	24
pH	8.7	8.6	8.6	8.6	8.6	8.5	8.5-8.7	8.6	0.06
Conductivity (umhos/cm)	291	294	283	280	296	315	280-296	293	12

* Sampler may have disturbed bottom sediments at Stations 1 and 13.

TABLE 21

LAKE ERIE WATER QUALITY ANALYSES FOR OCTOBER 1978

Dates:
Field 17 Oct. 1978
Laboratory 20 Oct. 1978

Parameters	Station No. 1		Station No. 8		Station No. 13		Range	Mean	Standard Deviation
	Surface	Bottom	Surface	Bottom	Surface	Bottom			
Field Measurements:									
Temperature (°C)	12.0	11.0	11.8	11.2	12.5	11.5	11.0-12.5	11.7	0.6
Dissolved Oxygen (ppm)	11.2	11.0	11.3	11.2	11.3	11.2	11.0-11.3	11.2	0.1
Conductivity (umhos/cm)	260	270	270	270	285	275	260 -285	272	8
Transparency (m)	0.55		0.55		0.50		0.50-0.55	0.53	0.03
Depth (m)		2.0		2.5		2.4	2.0-2.5	2.3	0.3
Laboratory Determinations:									
Calcium (mg/l)	31.2	32.8	32.8	32.8	32.8	32.8	31.2-32.8	32.5	0.7
Magnesium (mg/l)	8.2	7.2	7.2	7.2	6.7	8.2	6.7- 8.2	7.5	0.6
Sodium (mg/l)	8.9	8.9	8.0	8.0	8.4	8.4	8.0- 8.9	8.4	0.4
Chloride (mg/l)	16.0	16.0	16.0	16.0	16.5	16.0	16.0-16.5	16.1	0.2
Nitrate (mg/l)	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	-	<0.3	0
Sulfate (mg/l)	18.0	18.0	18.0	18.0	19.0	20.0	18.0-20.0	18.5	0.8
Phosphorus (mg/l)	0.01	0.01	0.01	0.01	0.01	0.10	0.01- 0.10	0.03	0.04
Silica (mg/l)	0.11	0.09	0.05	0.05	0.09	0.10	0.05-0.11	0.08	0.03
Total Alkalinity (mg/l)	96	95	96	96	97	95	95-97	96	0.8
B.O.D. (mg/l)	4	4	4	4	4	4	-	4	0
Suspended Solids (mg/l)	45	49	26	27	38	30	26-49	36	10
Dissolved Solids (mg/l)	176	156	150	156	158	152	150-176	158	9
Turbidity (F.T.U.)	26	25	12	13	17	21	12-26	19	6
pH	8.0	8.0	8.0	8.0	8.0	8.0	-	8.0	0
Conductivity (umhos/cm)	265	270	265	265	265	265	265-270	266	2

TABLE 22

LAKE ERIE WATER QUALITY ANALYSES FOR NOVEMBER 1978

Dates:
Field 1 Nov. 1978
Laboratory 2 Nov. 1978

Parameters	Station No. 1		Station No. 8		Station No. 13		Range	Mean	Standard Deviation
	Surface	Bottom	Surface	Bottom	Surface	Bottom			
Field Measurements:									
Temperature (°C)	10.2	10.2	11.1	10.2	10.9	10.1	10.1-11.1	10.5	0.4
Dissolved Oxygen (ppm)	12.1	12.1	12.5	12.1	12.2	11.9	11.9-12.5	12.2	0.2
Conductivity (umhos/cm)	265	260	270	270	270	265	260-270	267	4
Transparency (m)	0.40		0.70		0.50		0.40-0.70	0.50	0.15
Depth (m)		2.0		3.7		2.7	2.0-3.7	2.8	0.9
Laboratory Determinations:									
Calcium (mg/l)	32.0	32.0	33.6	32.8	32.0	32.8	32.0-33.6	32.5	0.7
Magnesium (mg/l)	8.2	8.2	7.7	8.2	8.2	8.2	7.7-8.2	8.1	0.2
Sodium (mg/l)	13.3	14.8	14.8	14.8	14.4	14.8	13.3-14.8	14.5	0.6
Chloride (mg/l)	14.0	14.0	15.0	15.0	15.5	17.3	14.0-17.3	15.1	1.2
Nitrate (mg/l)	6.1	5.8	5.1	5.1	6.1	6.5	5.1-6.5	5.8	0.6
Sulfate (mg/l)	29.0	29.0	29.0	29.0	29.0	29.0	-	29.0	0
Phosphorus (mg/l)	0.01	0.01	0.01	0.01	0.01	0.01	-	0.01	0
Silica (mg/l)	0.06	0.09	0.09	0.07	0.09	0.11	0.6-0.11	0.09	0.02
Total Alkalinity (mg/l)	89	89	89	90	91	92	89-92	90	1
B.O.D. (mg/l)	2	3	2	2	2	1	1-3	2	0.6
Suspended Solids (mg/l)	57	58	47	48	60	40	40-60	52	8
Dissolved Solids (mg/l)	152	152	158	158	152	162	152-162	156	4
Turbidity (F.T.U.)	11	28	9	12	8	12	8-28	13	7
pH	8.1	8.3	8.2	8.0	8.0	7.8	7.8-8.3	8.1	0.2
Conductivity (umhos/cm)	260	260	260	270	265	270	260-270	264	5

TABLE 23

SOLAR RADIATION MEASUREMENTS AT LOCUST POINT IN 1978*

(IN FOOT CANDLES)

Station \ Time	Deck	Surface	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0
24 June 1978										
1 1200	9000	4500	2000	550	200	50		-	-	-
8 1235	10200	8000	2800	1100	500	300	120	65	-	-
13 1305	10000	6000	2000	400	1200	30	10	3	-	-
18 August 1978										
1 1135	9000	5100	2000	400	-	32	-	-	-	-
3 1300	8500	5000	1900	310	-	43	-	7.2	-	-
8 1230	8000	4600	1600	360	-	49	-	8.2	-	2.5
13 1030	9500	5000	1800	250	-	52	-	4.2	-	-
15 Sept. 1978										
1 1145	10000	5000	1500	350	-	40	-	-	-	-
3 1330	10000	5000	1600	440	-	53	-	-	-	-
8 1030	10000	4200	2600	700	-	140	-	47	-	20
13 1230	8500	4400	800	270	-	21	-	2.9	-	-
17 Oct. 1978										
1 1610	7000	3100	1100	100	-	14	-	-	-	-
3 1530	7500	3500	1300	100	-	12	5.5	-	-	-
8 1633	6500	2600	1200	100	-	19	7.2	-	-	-
13 1645	5700	1600	410	44	-	2	2	-	-	-
1 Nov. 1978										
1 1105	9300	4000	1500	300	-	50	-	-	-	-
8 1200	7300	9000	2000	350	-	55	-	10	-	-
13 1140	6000	5000	1500	300	-	250	-	-	-	-

* Submarine photometer malfunctioned in May and July 1978

TABLE 24

MEAN VALUES AND RANGES FOR WATER QUALITY

PARAMETERS TESTED IN 1978

Parameter	May - November 1978		Units
	Mean	Range	
1. Temperature	18.2	10.0-26.0	^{o}C
2. Dissolved Oxygen	9.7	5.7-12.5	ppm
3. Conductivity (field)	294	260-380	umhos/cm
4. Transparency	0.50	0.30-0.95	m
5. Calcium	35.2	31.2-41.2	mg/l
6. Magnesium	9.0	6.7-11.5	mg/l
7. Sodium	10.1	8.0-14.8	mg/l
8. Chloride	18.9	14.0-23.0	mg/l
9. Nitrate	5.3	1.4-14.2	mg/l
10. Sulfate	25.8	18.0-35.0	mg/l
11. Phosphorus	0.02	0.01-.10	mg/l
12. Silica	0.41	0.05-1.41	mg/l
13. Total Alkalinity	94	89-98	mg/l
14. BOD	2.5	1-4	mg/l
15. Suspended Solids	41	10-238	mg/l
16. Dissolved Solids	175	150-198	mg/l
17. Turbidity	28	8-77	F.T.U.
18. Hydrogen-ions	8.4	7.8-8.8	pH
19. Conductivity (lab)	291	260-325	umhos/cm

TABLE 25

SUMMARY OF JUNE TO NOVEMBER

SOLAR RADIATION MEASUREMENTS AT LOCUST POINT

(IN FOOT CANDLES)

Station	Range	Mean	Standard Deviation
Station 1			
Deck	10000 - 7000	8825	1287
Surface	5100 - 3100	4300	942
0.5	2000 - 110	1278	813
1.0	400 - 200	288	132
1.5	- -	-	-
2.0	50 - 14	34	15
Station 3			
Deck	10000 - 7500	8667	1475
Surface	5000 - 3500	4500	707
0.5	2000 - 130	1408	868
1.0	550 - 100	350	193
1.5	- -	200	0
2.0	53 - 12	40	19
2.5	20 - 5.5	13	10
3.0	- -	7.2	0
Station 8			
Deck	10200 - 6500	8400	1642
Surface	9000 - 2600	5680	2704
0.5	2800 - 120	1824	1065
1.0	1100 - 100	522	387
1.5	- -	500	0
2.0	300 - 19	113	114
2.5	120 - 7.2	64	80
3.0	65 - 8.2	33	28
3.5	- -	0	0
4.0	20 - 2.5	11	12
Station 13			
Deck	10000 - 5700	7940	1986
Surface	6000 - 1600	4400	1667
0.5	2000 - 410	1302	675
1.0	400 - 44	253	130
1.5	- -	1200	0
2.0	250 - 2	71	102
2.5	10 - 2	6	6
3.0	4.2 - 2.9	3	1

offshore; these stations are located in the vicinity of the power station water intake and discharge, respectively. All of these stations lie within Excepted Area "B" for Lake Erie water quality standards, established by the Ohio Environmental Protection Agency in 1978. Results of the 1978 monitoring program indicated that none of the parameters examined exceeded the Ohio EPA standards.

Primary Productivity

Six primary productivity cruises were conducted during the 1978 field year. The results are summarized in Table 26. Special results or conditions should be noted about several of these cruise dates.

The May 19th cruise produced the highest 0.5-meter productivity values measured at any time during 1978. However, the values at a depth of 1.0 meter were the lowest that were measured during the year. This could have been caused by the general high turbidity of the water on that day. The Secchi depth at each of the four stations was 0.3 meters.

For the June 29th cruise, 8-micron filters were inadvertently loaded onboard instead of the 0.45-micron filters normally used. While this produced lower values of productivity than would have been obtained if the smaller pore-size filters had been used, it did not appear to affect the results of comparing Station 8, the plant intake, and Stations 13 and 14 close to the plant discharge, with Station 3, our "control" station.

On August 5th, an Aphanizomenon bloom was observed. The productivity values at a depth of 0.5 meters were the second highest of the year, for all three stations sampled, and the values at a depth of one meter were the highest of the year for that depth. The values at one meter were higher, for all three stations sampled, than the values at 0.5

TABLE 26

LOCUST POINT PRIMARY PRODUCTIVITY (mg C/m^3/hr)
FOR 1978 FIELD SEASON

Date	Depth (meters)	Station 3	Station 8	Station 13	Station 14
19 May '78	0.5	332	298	261	216
	1	29	59	18	18
	3	17	9	7	11
29 June '78*	0.5	81	91	119	-
	1	76	110	72	-
	3	0.7	0.06	0.09	-
5 Aug. '78‡	0.5	108	163	93	-
	1	201	308	158	-
	2	-	-	20	-
	3	0.4	9	-	-
22 Aug. '78	0.5	70	30	50	-
	1	79	47	72	-
	1.5	59	49	-	-
	2	35	21	12	-
	2.5	11	12	-	-
11 Sept. '78	0.5	83	129	120	105
	1	63	96	59	63
	2	10	20	8	5
13 Oct. '78	0.5	87	68	72	86
	1	52	64	55	62
	2	6	17	6	9

* 8-micron filters
‡ Aphanizomenon bloom in progress

meters. This latter condition may have been a result of the relative clarity of the water and the high surface illumination combining to produce an optimum light level for primary productivity at one meter rather an at shallower depths. The mean value of surface illumination on May 19th was 4875 foot-candles, while on August 5th, it was 8430 foot-candles. The Secchi depth for all three stations sampled on August 5th was one meter, compared to 0.3 meters on May 19th. It should be noted that the Secchi depth inside the bouy for station 13 was only 0.6 meters, measured where some turbulance was observed, presumably from operation of the plant's discharge pumps. The productivity measured at this station was about 20 percent less than for Station 3, the control station. This 20 percent reduction is within the mean deviation from the mean for the Station 3/Station 13 comparison for the entire sampling year.

Recommendations

Computerization of the data should continue. During this, the final year of the study, no changes should be made in the sampling program. Advantage should be taken of the fact that the plant did not operate continuously during the first two years of operational monitoring by attempting to correlate physical and biological conditions observed in the lake with the operational status of the plant. This could allow further recommendations concerning plant operating procedures which could further reduce environmental impact.

STUDY ANALYSIS

Plankton

Phytoplankton. The Center for Lake Erie Area Research has monitored phytoplankton populations at Locust Point since 1974 (Figure 3). Radical

differences were noted between populations in 1974 and 1975, but 77 percent of the variation was explainable by variation in physical and chemical parameters of water quality (Reutter, 1976). Bacillariophycean and Chlorophycean populations observed in 1974 and 1975 were quite comparable (Figures 5 and 6). The Myxophycean component of the populations accounted for the differences between the two years. No Myxophycean bloom occurred in 1974, whereas a huge Aphanizomenon sp. bloom occurred in August 1975. This bloom was highly correlated with increased transparency (80 percent greater than in 1974) and decreased turbidity (20 percent of that observed in 1974) (Reutter, 1976). A correlation of this type was first hypothesized by Chandler and Weeks (1945).

Bacillariophyceae and Chlorophyceae populations in 1976 were similar in size and composition to those observed in 1974 and 1975 (Figures 5, 6, and 7). The diatom population, especially, was strikingly similar from year to year, with 1976 most resembling 1974. Populations were always greatest in spring and fall, and pulses which began and ended abruptly were commonplace. Chlorophycean populations tended to increase in the fall. A very small pulse was observed in June 1975 which was not observed in 1974 or 1976.

The 1976 Myxophycean population was between the extremes set forth in 1974 and 1975. A bloom of Aphanizomenon sp. occurred in July and August which corresponded well in time of occurrence with the 1975 August bloom, but, though it was slightly longer in peak duration, it was only one third the magnitude of the 1975 bloom and started and ended much more abruptly. Again, these pulses appear to be explainable by variation in

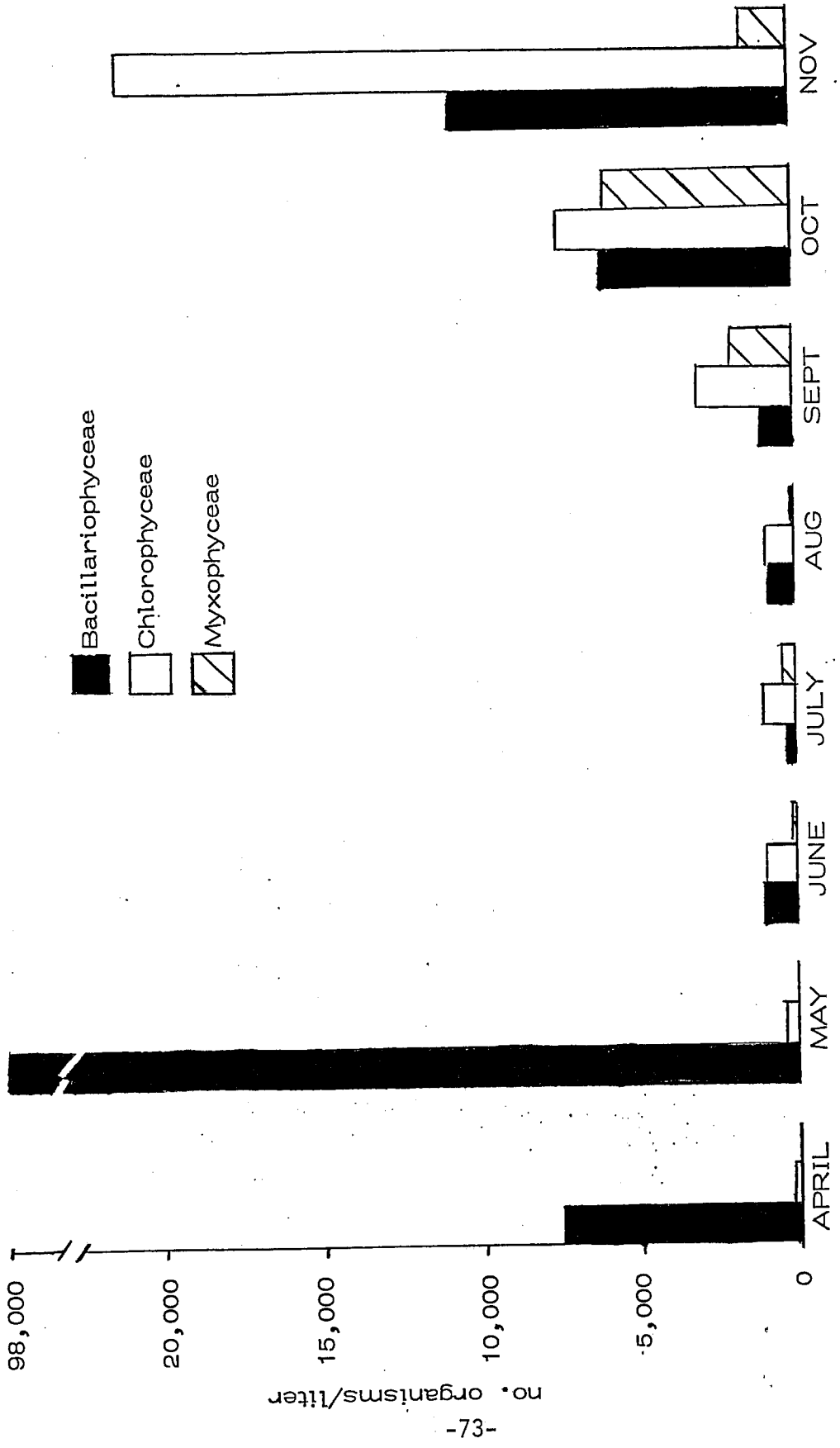


FIGURE 5. MONTHLY MEAN BACILLARIOPHYCEAE, CHLOROPHYCEAE, AND MYXOPHYCEAE POPULATIONS FOR LAKE ERIE AT LOCUST POINT - 1974.

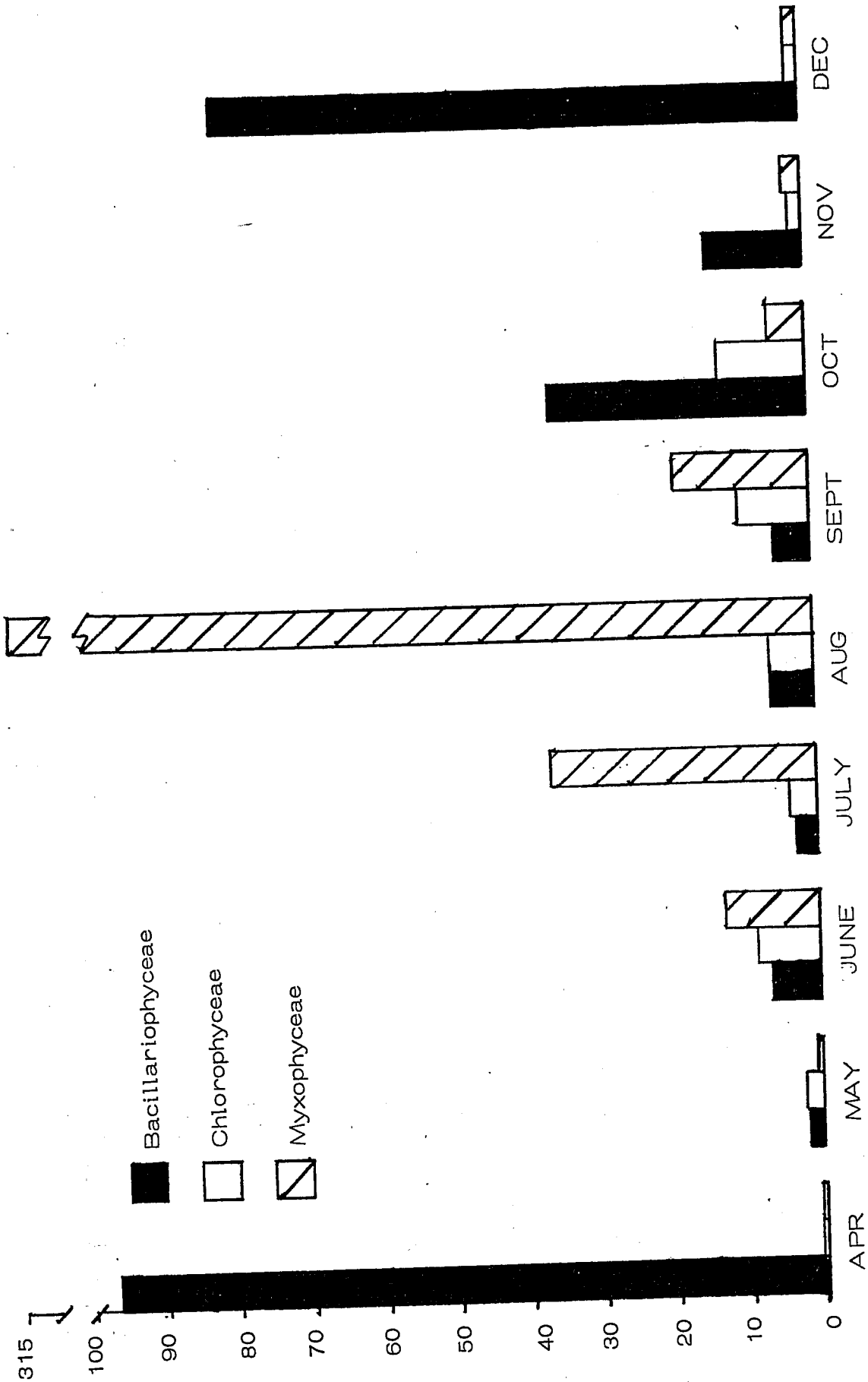
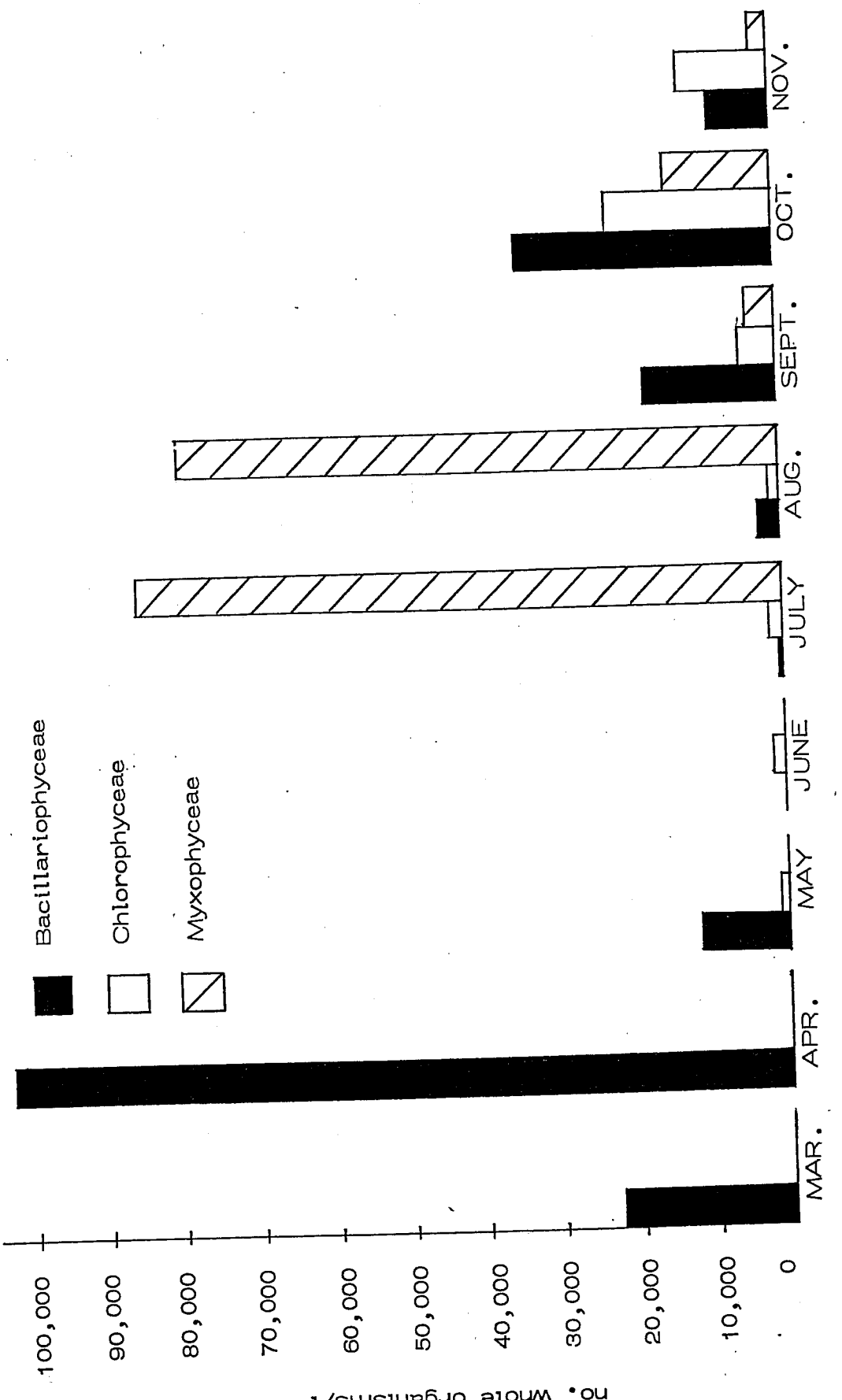


FIGURE 6. MONTHLY MEAN BACILLARIOPHYCEAE, CHLOROPHYCEAE, AND MYXOPHYCEAE POPULATIONS FOR LAKE ERIE AT LOCUST POINT - 1975.

FIGURE 7. MONTHLY MEAN BACILLARIOPHYCEAE, CHLOROPHYCEAE, AND MYXOPHYCEAE POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1976.



transparency and turbidity. Transparency in 1976 was similar to 1975 and much greater than 1974, while turbidity, though more variable than in 1974 or 1975, reached a low in July similar to that observed in 1975 and below that of 1974 (Reutter and Herdendorf, 1977).

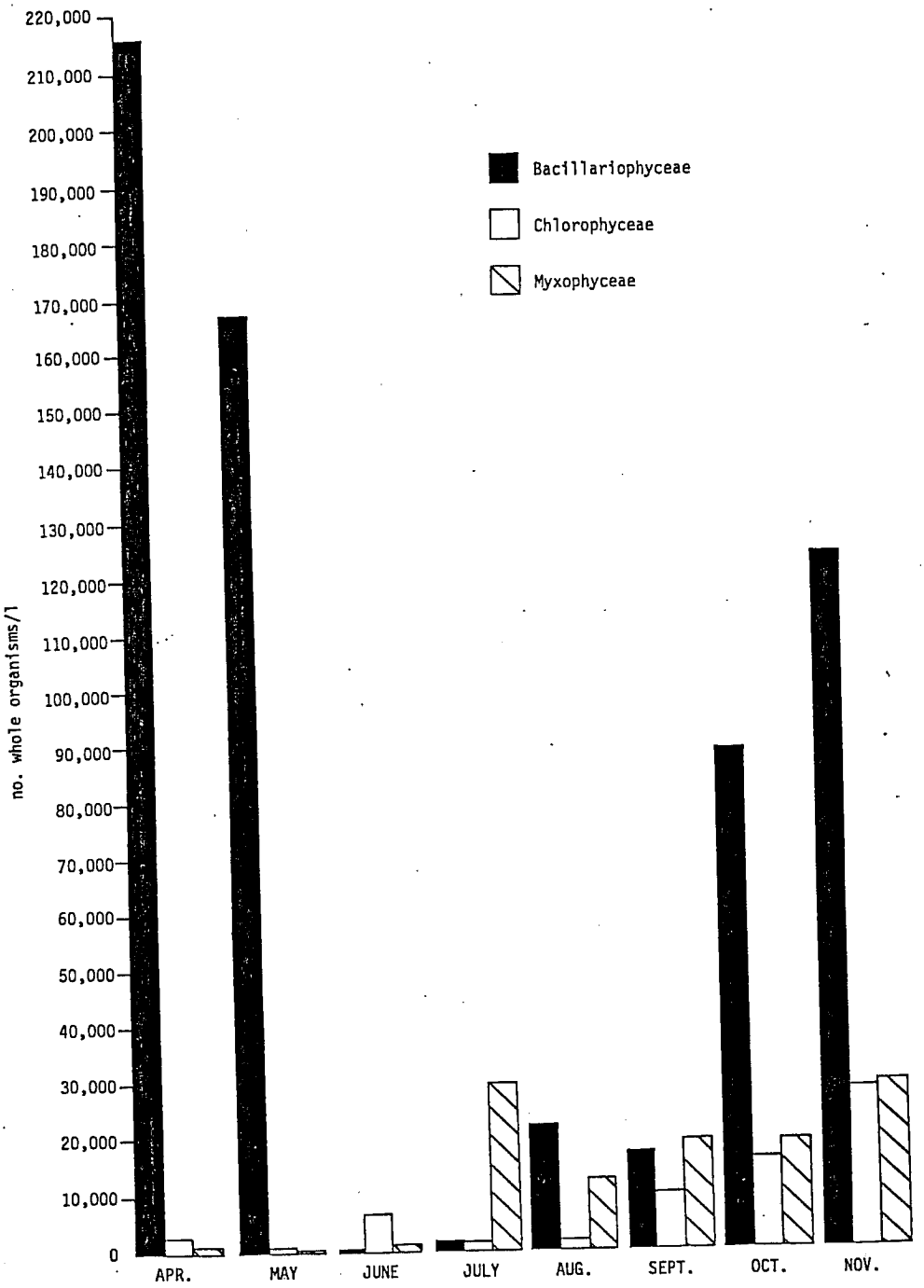
The 1977 phytoplankton population exhibited diatom blooms in fall and spring as in preceding years, however, the spring bloom was approximately twice as large as those observed from 1974-1976 (Figure 8). The myxophycean population showed pulses in summer as in 1975 and 1976, but blue-greens also increased in the fall which was only hinted at in previous years. Chlorophycean populations were generally low and were very similar to those observed in 1974 and 1976.

The major differences between 1977 and previous years were in the size of the spring and fall diatom pulses and the summer myxophycean pulse. However, lack of a large summer blue-green bloom was not unusual (1974) and the unusually long and cold winters of 1976-1977 and 1977-1978 undoubtedly had a large influence on diatom densities as they are cold water forms. Furthermore, the increase in the myxophycean densities in the fall of 1977 was due to Oscillatoria sp. which is also a cold water form.

The 1978 phytoplankton population exhibited spring and fall blooms and was very nearly a mirror image of the 1977 population (Figure 3). However, the composition of this population was quite different from the 1977 population. All three major components of the phytoplankton, diatoms, greens, and blue-greens, exhibited relatively large blooms during 1978.

FIGURE 8

MONTHLY MEAN BACILLARIOPHYCEAE, CHLOROPHYCEAE, AND MYXOPHYCEAE POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1977.



The spring diatom bloom was the largest recorded to date, and its composition would indicate that it was probably much larger. The rationale for this statement is that approximately half the bloom was composed of Sceletonema subsalsa which is generally too small to be collected with an 80u plankton net. Therefore, although large numbers appeared in the sample, even greater numbers were probably present but passed through the net. Consequently, this should not be viewed as a new species in the area, but rather a species which normally is not sampled by these methods. Its presence at this time is probably due to clogging of the plankton bucket with the large Melosira sp. population and suspended sediments.

The chlorophycean population was very similar to that observed in 1974 and 1977. However, the maximum which occurred in November was the highest observed for this group. This peak was almost entirely due to a bloom of Binuclearia tatrana. It should be pointed out that a monthly sampling frequency for plankton can lead to this type occurrence. It is also worth noting that Mougeotia sp. was absent. Although never an extremely abundant taxon, it is usually common. Recounting several samples indicated that although it was present, the numbers were so low that it was most often missed when counting 25 random Whipple Disk fields of view. A check of similar samples collected throughout the Western Basin of Lake Erie for the USEPA by the Center for Lake Erie Area Research, revealed a similar trend.

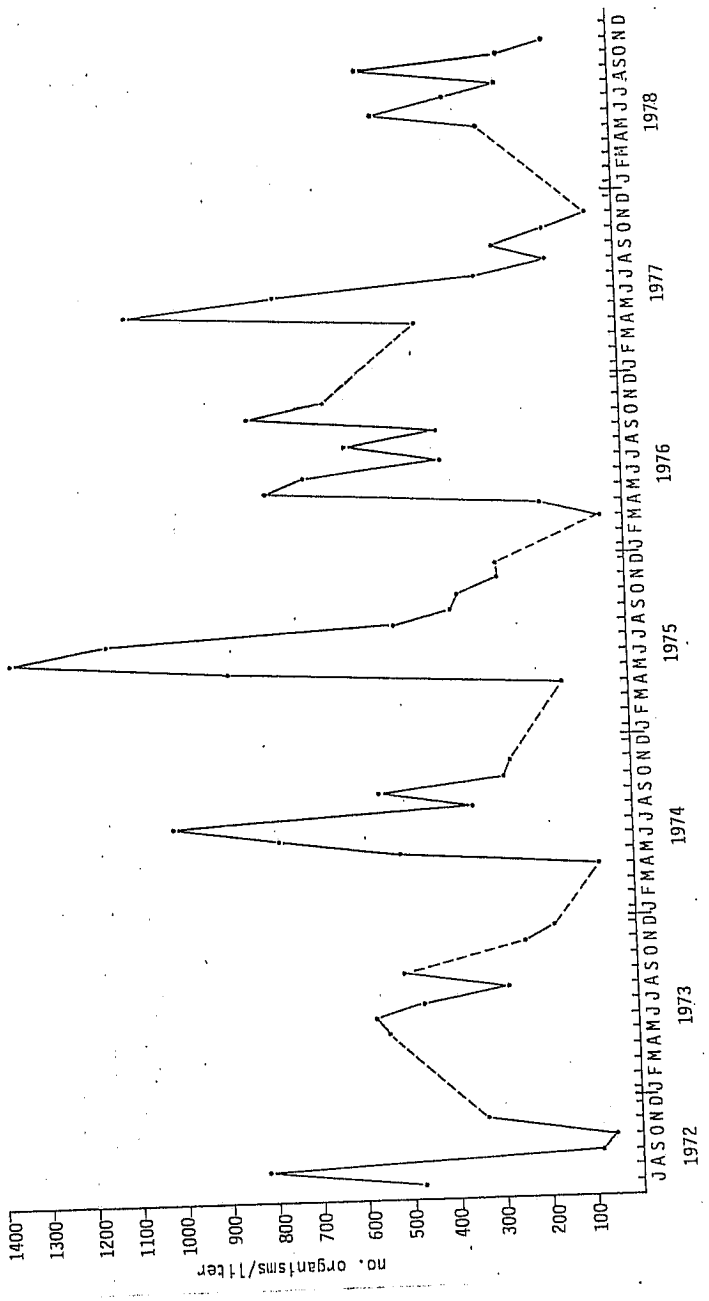
Myxophycean populations in 1978 were most like those from 1975 and 1976. As usual, the dominant taxa were Aphanizomenon and Oscillatoria.

In summary, phytoplankton populations observed at Locust Point during 1978 are similar to those of previous years and appear typical for those occurring in the nearshore waters of the Western Basin of Lake Erie.

Zooplankton. Zooplankton populations at Locust Point have been monitored since 1972. In 1978, two new monthly lows were established for total zooplankton density. Zooplankton densities observed during May and June were the lowest recorded to date although the June density was very similar to that observed in 1973 (Figure 9). Results from other months of 1978 fell within the ranges established from 1972-1977. Densities in July were slightly larger than 1977, slightly less than 1976, and less than those observed from 1972-1975. Densities observed in August were slightly larger than those observed in 1977, similar to those of 1973, and smaller than those of 1972 and 1974-1976. Densities observed in September of 1978 were greater than those observed during September of 1972 and 1975-1977 and virtually equal to those observed during September of 1973 and 1974. October densities were greater than those of 1972 and 1977 and less than those from October of 1974-1976. November densities were greater than 1977 and less than 1972-1976.

There are several plausible explanations for the variation which has occurred. Samples in 1972 were collected with a 3-liter Kemmerer water bottle at the surface. From 1973-1978 samples were collected by a vertical tow, bottom to surface, with a Wisconsin plankton net. A brief comparison study in 1973 showed that the vertical tow captured approximately 50 percent more taxa than a 3-liter grab (Reutter and Herdendorf, 1974). The actual stations sampled have varied from year to year. In 1973 the intake and discharge pipelines were being dredged, and

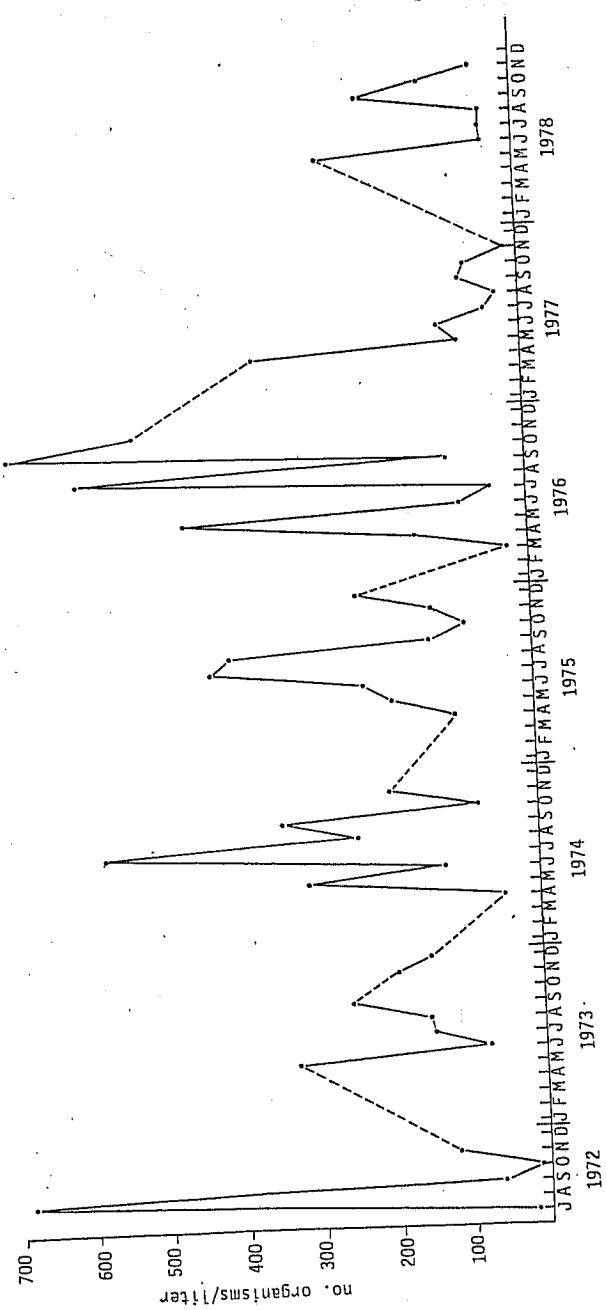
FIGURE 9. MONTHLY MEAN ZOOPLANKTON POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1972 - 1978.



in 1972, tropical storm Agnes affected the weather. Due to the weather, samples were neither collected on the same day of the month each year nor spaced exactly one month apart. Hubschman (1960) pointed out the tremendous differences which occurred between daily samples, and these samples were taken monthly, while Wieber and Holland (1968) showed that even with replication, wide variation can occur due to patchiness in population densities. The high spring populations from 1975 were undoubtedly largely due to early warming and lower turbidity as the total zooplankton population was significantly correlated with both temperature and turbidity ($r = 0.587$ and -0.328, respectively) (Reutter, 1976). Finally, operation of station circulating pumps was common in 1976, 1977, and 1978.

Of the three main components of the zooplankton population, rotifer densities are by far the most erratic and unpredictable (Figure 10). However, densities observed in 1978 were generally within the bounds described by populations from 1972-1977. The one exception was July when the densities observed were the lowest during the seven year sampling period. Rotifer densities observed during May 1978 were greater than those observed during May of 1975 and 1977 and less than those observed during May of 1973, 1974, and 1976. July densities were greater than 1972, approximately equal to 1976 and 1977, and less than 1973-1975. August densities were greater than 1977 and less than 1972-1976. September densities were greater than those observed in 1972 and 1975-1977 and less than those of 1973 and 1974. October densities were greater than those from 1972, 1974, 1975, and 1977, but less than those from 1976. November densities were greater than 1977 and less than 1972-1976.

FIGURE 10. MONTHLY MEAN ROTIFER POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1972 - 1978.



Copepod populations are much more regular and predictable than rotifer populations (Figure 11). They generally exhibit one peak per year and this usually occurs in the May/June period. In 1978, one peak was observed, however, it occurred about two months later, July/August, and was smaller than those from previous years. However, due to the frequency of sampling and the fact that peaks are always controlled by pulses of immature forms, this lower density in 1978 should not be considered too unusual as the peak may have been missed.

As with the copepod densities, cladoceran densities are quite regular and predictable. They often exhibit two peaks, one in the spring and one in the fall (Figure 12). This was the case in 1978 which was extremely similar to 1975 and 1976. In general these three years exhibited the greatest cladoceran densities followed by 1974 and 1977, which were very similar, and 1973 which was a poor year for cladocerans.

In summary, due to the large variability observed in previous years, zooplankton populations observed in 1978 should be considered typical for the south shore of the Western Basin of Lake Erie.

Benthos. Benthic macroinvertebrate populations collected at Locust Point during 1978 were typical for populations along the south shore of western Lake Erie and similar to those observed during preceding years (Figure 13). Species composition, mainly immature oligochaetes and chironomids, was also similar to that observed from 1972-1977.

It is becoming more apparent each year that substrate is the controlling factor of benthic macroinvertebrate populations at Locust Point. Reutter and Herdendorf (1977) observed that densities increased with distance from shore except over the intake and discharge pipelines.

FIGURE 11. MONTHLY MEAN COPEPOD POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1972 - 1978.

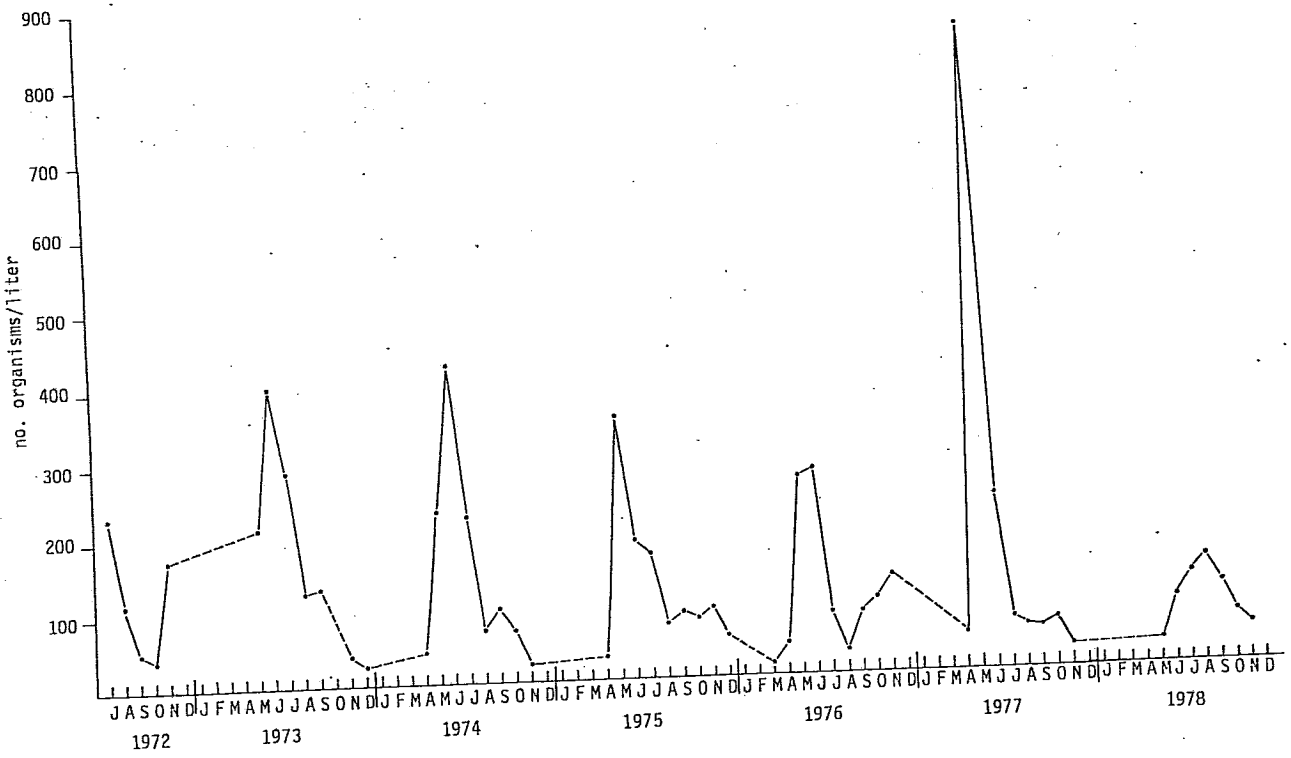


FIGURE 12. MONTHLY MEAN CLADOCERAN POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1972 - 1978.

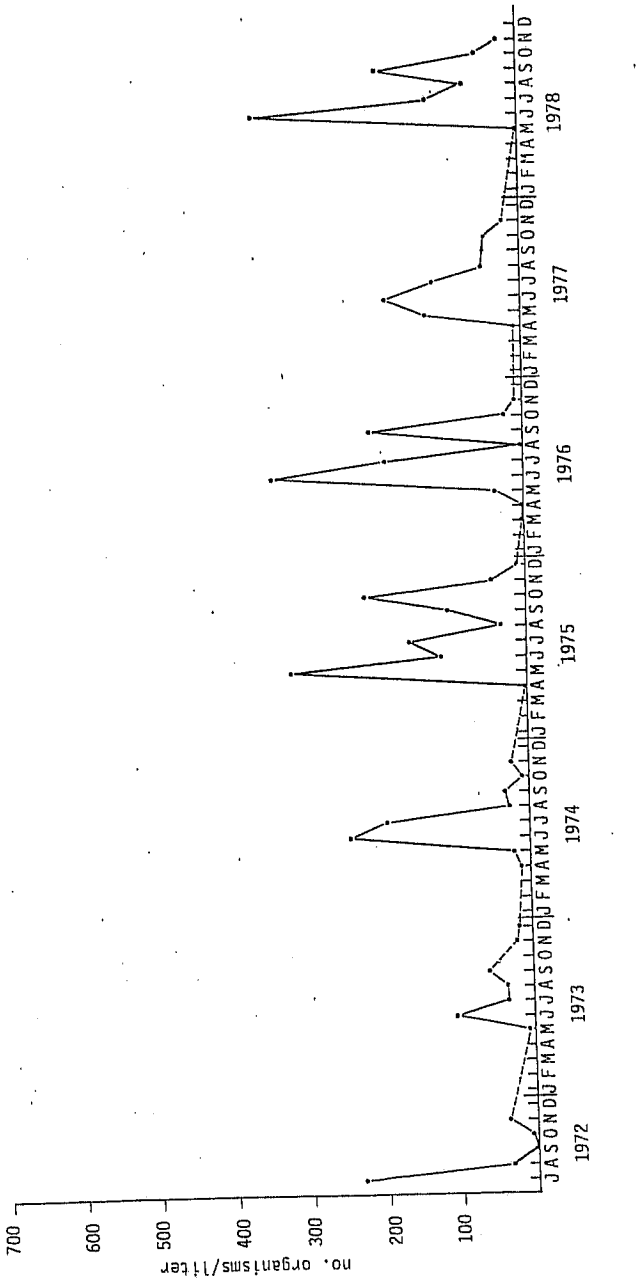
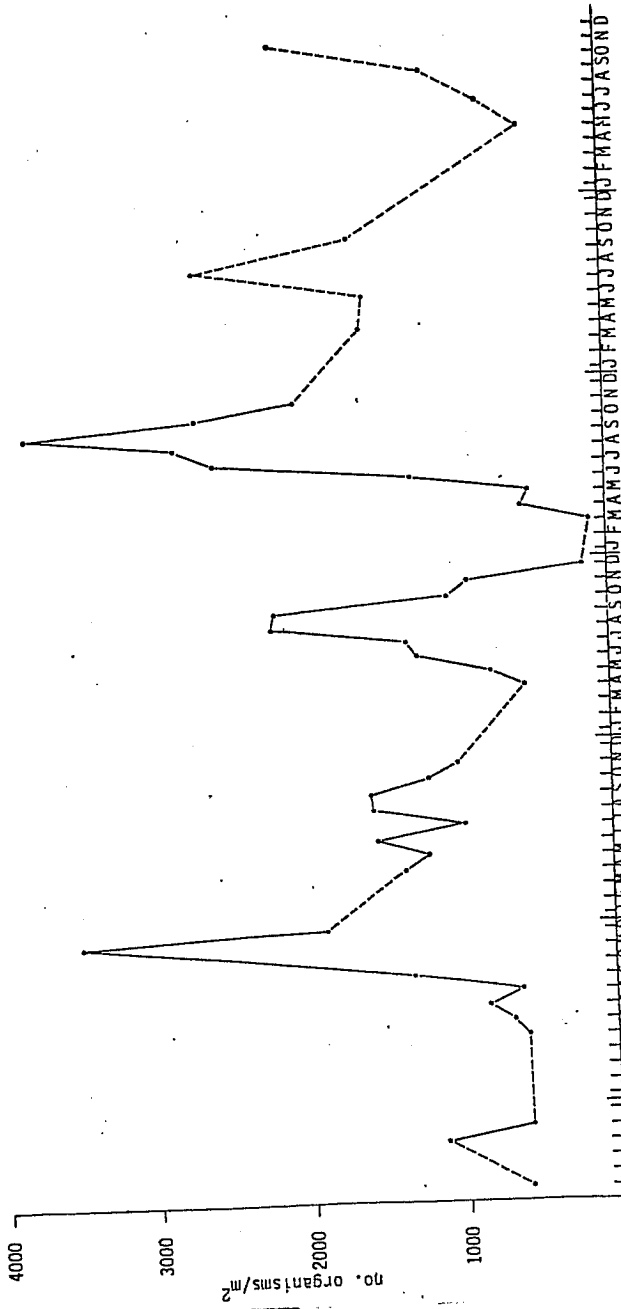


FIGURE 13. MONTHLY MEAN BENTHIC MACROINVERTEBRATE POPULATIONS FOR LAKE ERIE AT LOCUST POINT, 1972 - 1978.



This trend of increasing population with distance from shore is probably due to reduced wave effect as the water gets deeper and, therefore, a more stable substrate. Densities over the pipelines would be reduced due to an exposed substrate of hard-pan clay. Today a thin layer of sand, gravel, snail shells, and silt exists on top of the hard-pan clay. Currents and wave action move this layer around so that it is difficult to determine exactly what substrate will be found at any one station on a particular day. Since the density of benthic macroinvertebrates generally is directly related to the quantity of suitable substrate, densities at a given station can vary radically with time and trends become difficult to determine. For example, the annual mean density at Station 8, 742/m^2, is greater than that found at its control, Station 26 (576/m^2), but less than that found at control Station 3, 1,359/m^2, which is closer to shore (Table 8). However, Station 3 exhibited the lowest density observed during 1978, 19/m^2 in July, and Station 1, the closest to shore, had the lowest annual mean density, 135/m^2.

In summary, benthic macroinvertebrate populations found at Locust Point during 1978 must be considered typical for those of the nearshore waters of the Western Basin of Lake Erie.

Fish

Adults. The Lake Erie fish community at Locust Point in previous years has been dominated by gizzard shad, yellow perch, freshwater drum, spottail shiner, emerald shiner, white bass, and alewife. Percentages and absolute numbers of these species have varied from year to year, but the same species have predominated. During 1978, fish sampling at Locust

Point yielded similar results. A large percentage of the numbers of dominant species collected consisted of young-of-the-year taken in shore seines, but yearling-size and larger individuals of these species were also numerically more abundant than other species collected during 1978. The open, wave-swept nature of the nearshore zone at Locust Point precludes the establishment of large populations of species which require more sheltered or quiescent conditions (i.e., carp, goldfish, goldenshiner, quillback, white sucker, brook silverside, black bullhead, brown bullhead, yellow bullhead, smallmouth bass, white crappie, black crappie, and logperch, all collected but not abundant during 1978), although small populations or transient individuals of such species do occur in the area. Of the approximately 83 species present or formerly present in the coastal waters of Lake Erie, the majority are abundant only in bays, marshes, or estuaries or around islands, bars, points, and reefs. The less abundant species captured at Locust Point during 1978 were generally of this type. Pelagic and benthipelagic schooling species consisting of intermediate predators and benthic foragers (i.e., white bass, freshwater drum, yellow perch) and forage fish (i.e., alewife, gizzard shad, spottail shiner, and emerald shiner) make up the bulk of the community. Larger predators (i.e., walleye, sauger, and channel catfish) are consistently common but less abundant than these dominant species. This type of community, consisting of highly mobile groups of fishes, is typical of such nearshore habitats.

The total number of fish captured at Locust Point during 1978 was greater than in 1977 but less than in 1976 (Reutter and Herdendorf, 1977). Variability in catch from year to year at Locust Point is a function of

both sample timing and actual density of fish in the area. The largest component of variability is found in shore seine catch, which consists primarily of young-of-the-year. Time of day and wave action, as well as season and actual population densities, can affect the abundance of small fishes within range of shore seining on any given day. Such variability in CPE of all gear is typical of areas dominated by schooling species, which are generally not uniformly distributed over a given area, with variability increasing as sampling frequency decreases.

In the past, analysis of gill netting results at individual stations indicated that fish densities were generally greatest closer to shore. This pattern was not highly evident during 1978 except during May and June. Abundance trends at control stations (3, 26, 28, and 29) were not markedly different from trends at test stations (8 and 13). Analysis of direction of fish movements at Locust Point based on gill netting results indicated no consistent trends. It is evident that fishes in the nearshore zone at Locust Point are not involved in long-term unidirectional movements, and the area is probably not part of a major migration route. Rather, transient groups of fishes move randomly through the area in response to food abundance, wave action, and change of season. Fish densities are greatest during the summer, due probably to greater food abundance and ambient water temperature, as well as the general movement of most species to inshore spawning areas during spring and summer. No trend of attraction to or repulsion from the plume area (Station 13) or the intake area (Station 8) was evident.

The major fish food resources in the Locust Point vicinity were zooplankton, benthic oligochaetes and chironomid larvae, and small forage

fish. Analysis of feeding habits of yellow perch, white bass, freshwater drum, spottail shiner, and emerald shiner indicated no marked differences in feeding habits between Transect 8-13 (test) and Transect 3-26 (control). White bass were primarily piscivorous, and the remaining four species relied on zooplankton and chironomid larvae.

In conclusion, fish populations at Locust Point during 1978 were similar to those observed in the past.

Ichthyoplankton. Ichthyoplankton populations have shown tremendous variations since 1974. Emerald shiners constituted 81 percent of the 1974 larvae, one percent of the 1975 larvae, 60 percent of the 1976 larvae, four percent of the 1977 larvae, and 15 percent of the 1978 larvae. Yellow perch constituted five percent of the 1974 larvae, 70 percent of the 1975 larvae, four percent of the 1976 larvae, 29 percent of the 1977 larvae, and two percent of the 1978 larvae. Gizzard shad appear to have increased significantly reaching 34 percent of the 1976 larvae, 51 percent of the 1977 larvae, and 67 percent of the 1978 larvae. It is felt that the above described variability is largely due to the fact that we are sampling schooling specimens. Consequently, when the net is drawn through a school the density appears quite high. This is also quite dependent on the seasonal frequency of sampling. For example, if the weather allows more frequent spring sampling but prohibits summer sampling, then spring species such as perch and walleye appear relatively more abundant. However, it should be noted, that gizzard shad populations do appear to be increasing in Lake Erie, and the Ohio Division of Wildlife (1979) found 1978 year class for yellow perch to be the lowest in the last ten years.

This is the third year that walleye have constituted a significant portion of the catch. However, as noted last year, adult populations throughout the Western Basin are increasing greatly and, consequently, greater larval populations are to be expected (Scholl, 1978). These walleye larvae contributed to the 52 percent increase observed in larval densities from 1977 (mean density = 27.3/100 m^3) to 1978 (mean density = 41.6/100 m^3). However, gizzard shad were the major source of this increase as their mean densities increased from 13.9/100 m^3 in 1977 to 28.0/100 m^3 in 1978. Yellow perch densities decreased significantly from 8.0/100 m^3 in 1977 to 1.0/100 m^3 in 1978. This decrease is similar to that observed by the Ohio Division of Wildlife for the adult population (Ohio Division of Wildlife, 1979).

In 1976, control stations (3, 26, 28, and 29) were established on either side of the intake (Station 8)/discharge complex (Station 13) to determine if unusually large fish larvae populations were occurring due to possible spawning in the rip-rap material around these structures. This does not appear to be occurring to any significant degree as Station 13 (plume area) exhibited densities similar to Station 3 (control), and densities at Station 8 (intake), though greater than those at Stations 26 and 28, were similar to those at 29. This indicates that populations occurring in the vicinity of the intake and the discharge complex were not unusual for the shore of Lake Erie near Locust Point.

Water Quality

Seasonal Variations. The quality of the water in the vicinity of the Davis-Besse Nuclear Power Station during the period May through July 1978 was typical for the south shore of western Lake Erie and showed normal

seasonal trends. Average temperature rose nearly 15°C from early May to late June, then varied only 3°C until mid-September, and finally dropped over 10°C by mid-October (Figure 14). Average dissolved oxygen concentrations fell from over 12 ppm in May to a low of 7.4 ppm in late June, then rose again to over 12 ppm in early November (Figure 14). Hydrogen-ion concentrations remained fairly stable throughout the year with the average pH varying only 0.6 units. A slight rise in pH was noted during June and the late summer months corresponding to higher levels of primary production by phytoplankton species (Figure 14).

Mild turbulence in late spring and early fall is reflected by the higher turbidity and suspended solids measurements for these periods (Figure 15). The decreased sediment load during the summer months accounts for the higher transparency readings in June and July (Figure 15). A 3-fold improvement in the water clarity was noted between May and August and a corresponding 2-fold decrease in clarity was observed from August to November. Biochemical oxygen demand levels were relatively low during the year, even during periods of high turbidity, indicating that the suspended material was largely of an inorganic nature. Slightly elevated BOD values in October correspond with the fall plankton pulse. Major dissolved ions, including calcium, chloride, and sulfate yielded the highest concentrations in the spring with a gradual decrease through the summer and early fall (Figure 16). Sulfate showed a significant increase in November but the other major ions remained fairly stable. In a like manner, biological nutrients, such as phosphorus, nitrate and silica, had their highest concentrations in the spring, but they decreased markedly through the summer and early fall. This decrease is

FIGURE 14. MEAN MONTHLY HYDROGEN ION, TEMPERATURE AND DISSOLVED OXYGEN MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT DURING 1978.

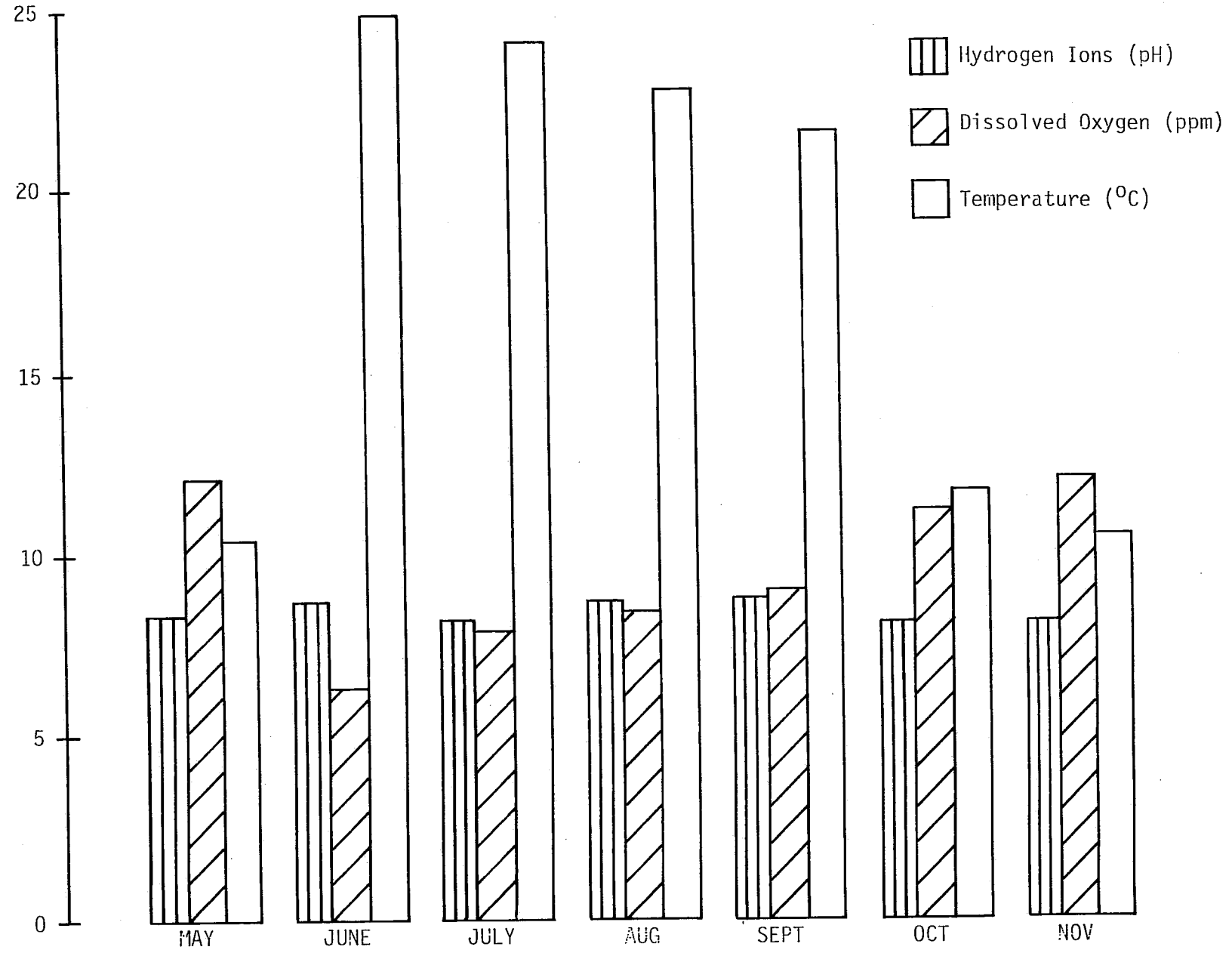


FIGURE 15. MEAN MONTHLY TURBIDITY, SUSPENDED SOLIDS, AND TRANSPARENCY MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT DURING 1978.

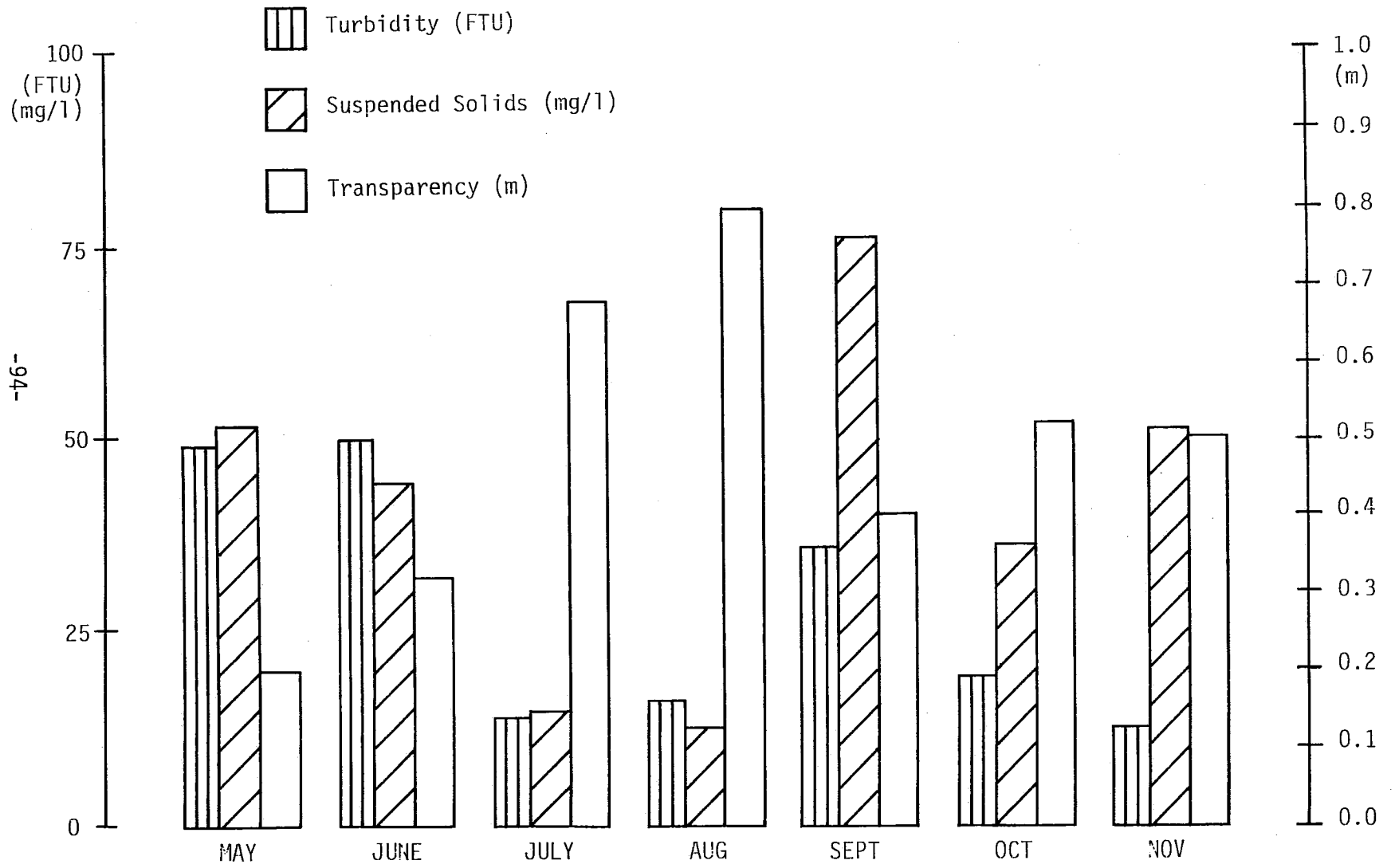
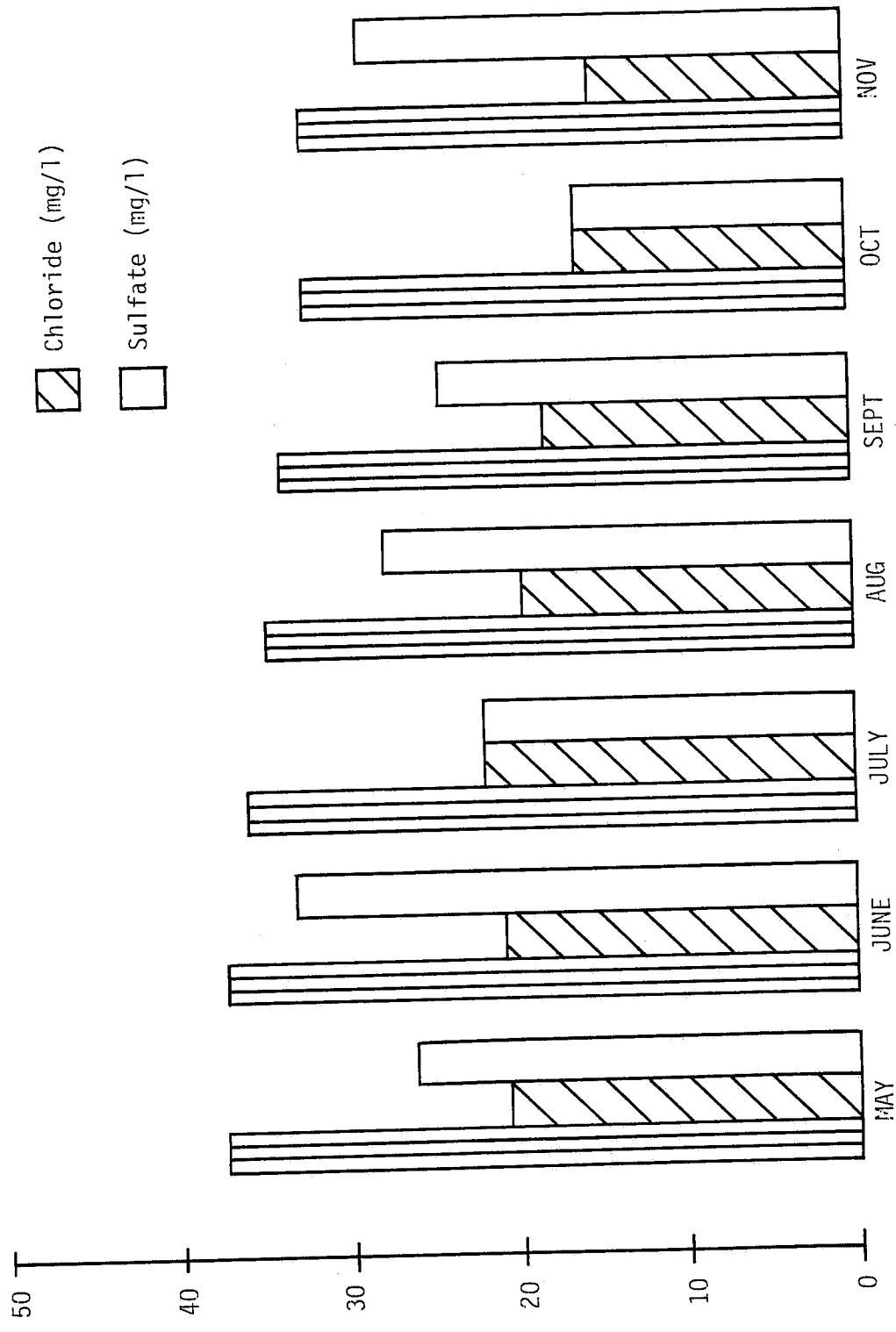


FIGURE 16. MEAN MONTHLY CALCIUM, CHLORIDE AND SULFATE CONCENTRATIONS IN LAKE ERIE AT LOCUST POINT DURING 1978.



attributed to the utilization of these nutrients by photosynthesizing plankton. In November, when primary production was at a lower rate, nitrate concentration rose to much higher levels (Figure 17). Alkalinity, largely due to bicarbonate ions, total dissolved solids, and conductivity, all of which are measures of dissolved materials in the water, was relatively stable through the year, showing slightly higher values in the spring and slightly lower in the fall (Figure 18).

In June 1978, the dissolved oxygen concentration dropped to 5.7 ppm (Station 13), the lowest value recorded during the 1978 monitoring program. This represents improvement over the lowest concentration observed in 1977 and is consistent with concentration measured earlier in the program:

Year	DO Range
1974	5.7-14.1 ppm
1975	7.2-13.6
1976	5.0-12.5
1977	3.0-12.2
1978	5.7-12.5

The International Joint Commission recommends a minimum DO level of 6.0 ppm for Lake Erie water (U.S.-Canada Water Quality Agreement of 1978). However, Ohio EPA (1978) has established a minimum DO standard of 4.0 ppm for the nearshore waters of Lake Erie within the vicinity of the Davis-Besse Nuclear Power Station.

Station Variations. Stations 1, 8, and 13 are located approximately 500, 3,000, and 1,500 feet offshore, respectively. In general, no consistent significant difference in water quality was noted between stations. A slight depression in the dissolved oxygen concentration was noted at Station 13 for June in comparison to the other stations. Conductivity values were also slightly higher at this station for a few months.

FIGURE 17 . MEAN MONTHLY NITRATE, PHOSPHORUS, AND SILICA CONCENTRATIONS IN LAKE ERIE AT LOCUST POINT DURING 1973.

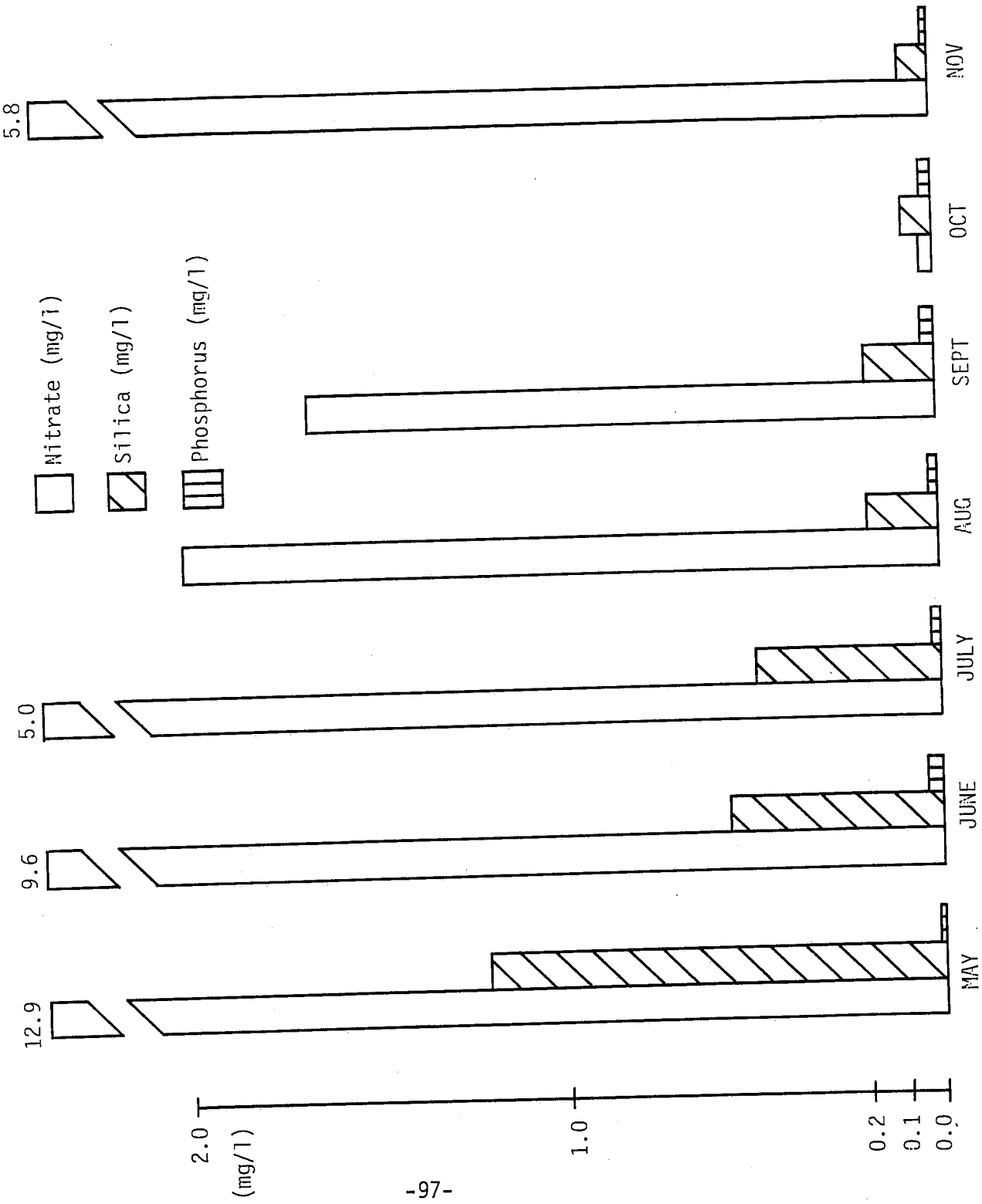
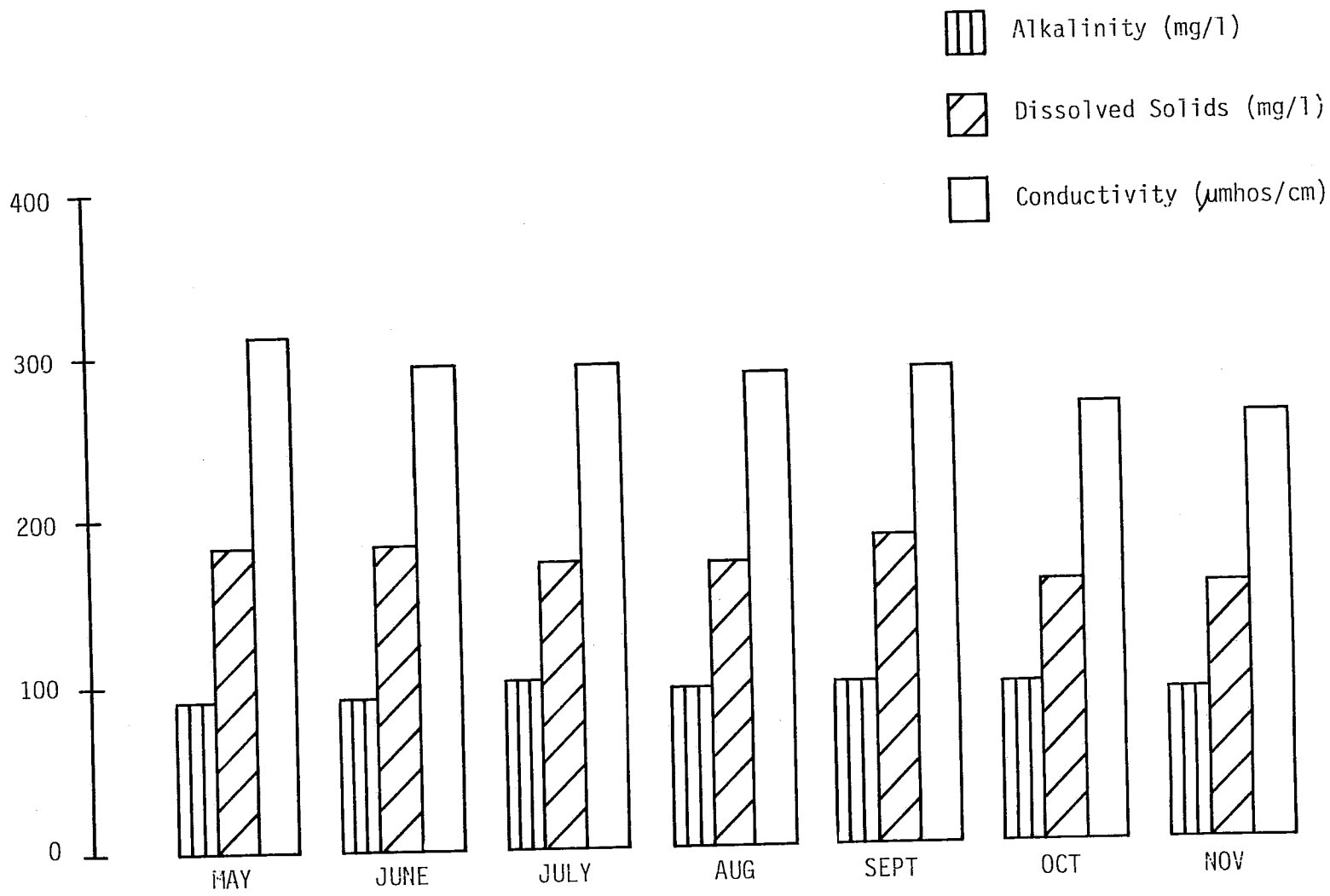


FIGURE 18. MEAN MONTHLY ALKALINITY, DISSOLVED SOLIDS AND CONDUCTIVITY MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT DURING 1978.



This may be related to the proximity of the power station discharge. However, no elevation in water temperature was noted at Station 13 in relation to the other stations. Solar radiation, suspended solids and turbidity measurements indicated a general increase in water clarity from the most inshore station (1) to the most offshore station (8), but differences are normally small.

Differences between the surface and bottom water quality were also slight because of the shallowness of this portion of Lake Erie (2.0-4.5 meters). Some depression in the level of DO and small increases in the concentrations of suspended and dissolved materials were noted near the bottom. This may be due to the high oxygen demands of the sediments and the disturbance of these sediments by currents and wave action.

Water Quality Trends. The Ohio State University, Center for Lake Erie Area Research initiated water quality studies at Locust Point in July 1972. Over the past seven years most parameters have shown typical seasonal trends with only small variations from year to year. Trends for eight water quality parameters from July 1972 through November 1978 are shown on Figures 19, 20, and 21. Temperature and dissolved oxygen show normal seasonal trends for each year with only minor variations from one year to the next or over the entire period. DO appears to have undergone more depletion in 1976 and 1977 than in previous years or in 1978. Hydrogen-ion concentration (pH) and alkalinity remained fairly stable over the period. Transparency, turbidity, phosphorus, and conductivity have shown some radical variations which are probably due to storms and dredging activities that have disturbed the bottom sediments. Phosphorus levels were low in 1977 and 1978, compared to earlier years. In general

FIGURE 19. TRENDS IN MEAN MONTHLY TEMPERATURE, DISSOLVED OXYGEN, AND HYDROGEN ION MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT FOR THE PERIOD 1972-1978.

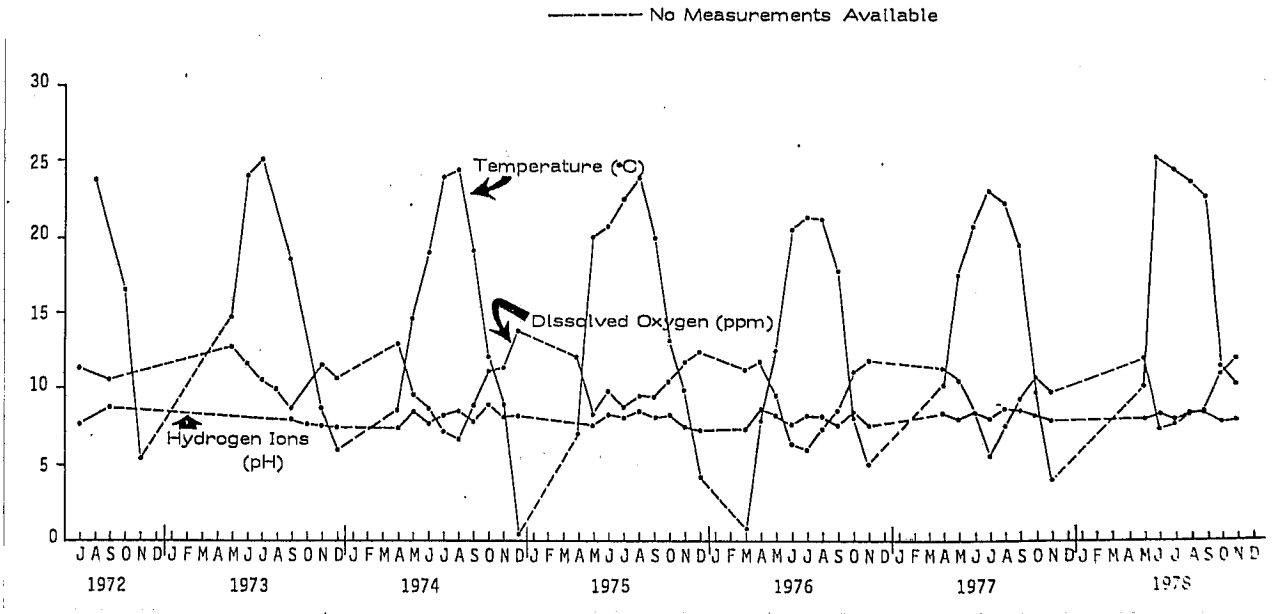


FIGURE 20. TRENDS IN MEAN MONTHLY CONDUCTIVITY, ALKALINITY AND TURBIDITY MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT FOR THE PERIOD 1972-1978.

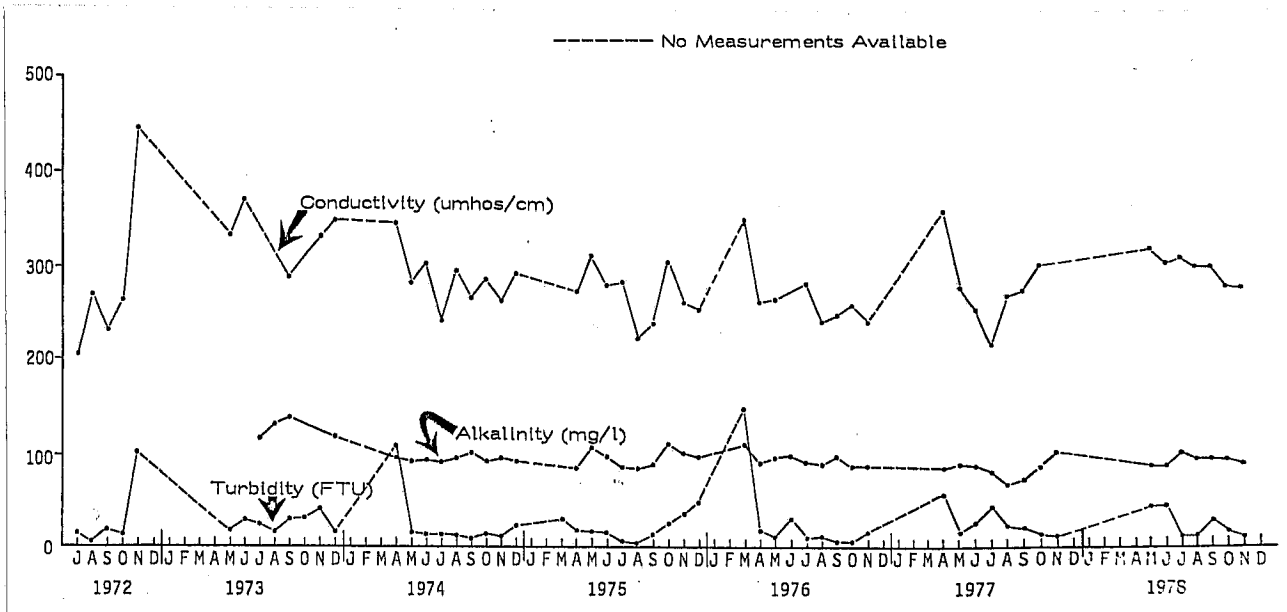
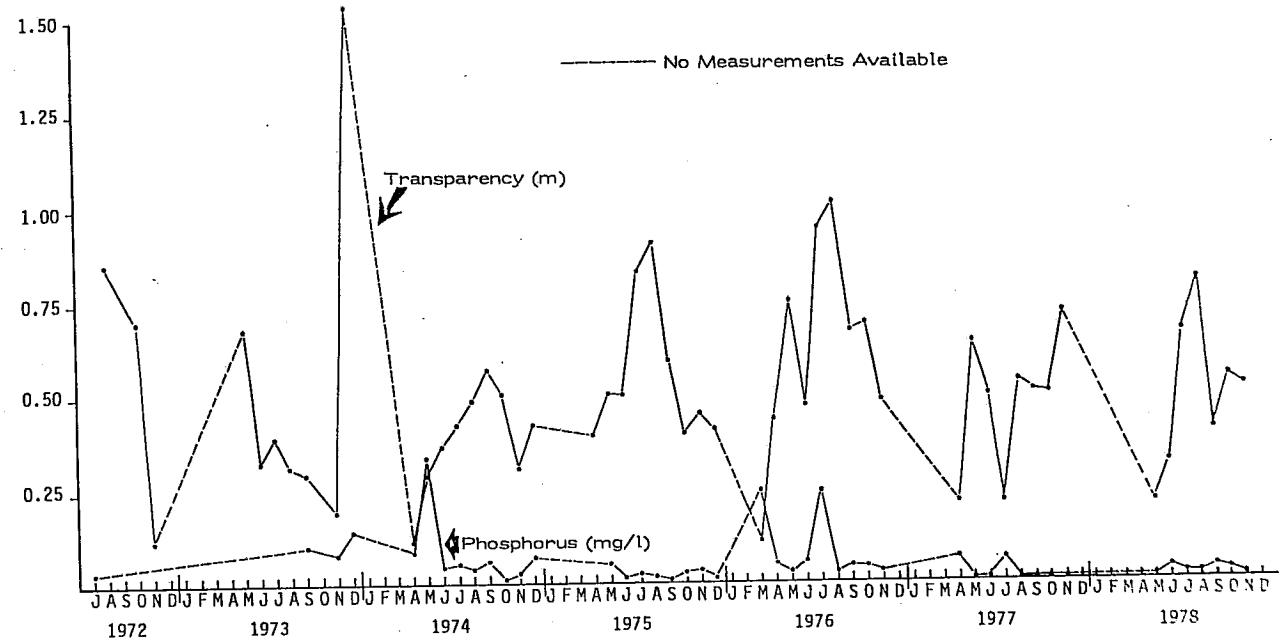


FIGURE 21. TRENDS IN MEAN MONTHLY TRANSPARENCY AND PHOSPHORUS MEASUREMENTS FOR LAKE ERIE AT LOCUST POINT FOR THE PERIOD 1972-1978.



however, no significant deviations from the normal quality of the water in this part of western Lake Erie have been observed during the past seven years.

Primary Productivity

Table 27 summarizes the comparisons between Station 3 and the other three stations for the mean productivity values at 0.5 and one meters. The results do not vary greatly from similar results obtained in 1977. The data in Table 27 suggests that the productivity is similar at Stations 13 and 14. Table 28 shows a direct comparison of these stations for the three cruise dates when both stations were sampled. These results indicate that any impact of plant discharge on productivity is either too localized to be measured at Station 13 or so extensive that it extends beyond Station 14. The comparison between Station 13 and Station 3, as shown in Table 27, suggests that any impact is highly localized.

Table 29 summarizes the illumination/depth profiles that were obtained with a submersible photometer during each cruise, and Table 30 lists the Secchi depths measured throughout the season. These are indicators of water clarity which strongly affects productivity.

Secchi depths at Stations 3 and 13 tended to agree, probably because of their inshore location. Station 8 generally had larger Secchi depths, as might be expected from its location farther offshore. Station 14, also offshore, had larger Secchi depths than Stations 3 and 13 on two of the three days that Station 14 was measured.

While the results of these six surveillance cruises do not indicate any major impact, it should be noted that the plant was not operational during four of the six cruises. The station was operating at 39 percent

TABLE 27

1978 RATIOS OF PRIMARY PRODUCTIVITY AT STATIONS 8, 13, AND 14 TO PRODUCTIVITY AT STATION 3 (MEAN OF 0.5-METER AND 1-METER DEPTHS)

Date	Station		
	8	13	14
19 May '78	0.99	0.77	0.65
29 June '78	1.28	1.22	-
5 Aug. '78	1.52	0.81	-
22 Aug. '78	0.52	0.81	-
11 Sept. '78	1.55	1.23	1.15
13 Oct '78	0.94	0.91	1.06
Mean of All Cruises:	1.13±0.32	0.96±0.18	0.95±0.20

TABLE 28

1978 RATIOS OF PRIMARY PRODUCTIVITY
AT STATION 13 TO PRODUCTIVITY AT STATION 14

Date	Depth (meters)	Ratio of Station 13 Productivity to Station 14 Productivity
19 May '78	0.5 1.0 3.0	1.21 1.0 0.64
11 Sept. '78	0.5 1.0 2.0	1.14 0.94 1.61
13 Oct. '78	0.5 1.0 2.0	0.84 0.89 0.60
Mean of all dates and all depths		0.99±0.23

TABLE 29

SUMMARY OF 1978 ILLUMINATION VS. DEPTH PROFILES
AT LOCUST POINT (ILLUMINATION IS GIVEN IN FOOT-CANDLES)

Date	Depth (m)	Station			
		3	8	13	14
19 May	surface	6,000	4,500	4,100	4,900
	0.5	900	850	850	720
	1	140	140	120	140
	1.5	15	30	17	21
	2	2.5	5	2.3	3.3
	2.5	0.4	0.6	0.3	0.5
24 June	surface	4,500	800	6,000	-
	0.5	2,000	450	2,000	-
	1	550	250	400	-
	1.5	200	130	120	-
	2	50	45	30	-
	2.5	20	25	10	-
	3	-	20	3	-
5 August	surface	10,000	8,100	7,200	-
	0.5	3,000	2,600	1,800	-
	1	1,500	1,000	480	-
	1.5	500	300	190	-
	2	225	110	55	-
	2.5	75	46	17	-
	3	30	27	4	-

TABLE 29 (continued)

SUMMARY OF 1978 ILLUMINATION VS. DEPTH PROFILES
AT LOCUST POINT (ILLUMINATION IS GIVEN IN FOOT-CANDLES)

Date	Depth (m)	Station			
		3	8	13	14
22 August	surface	5,800	4,800	4,300	-
	0.5	3,100	2,900	2,200	-
	1	1,500	1,600	810	-
	1.5	600	670	310	-
	2	220	280	150	-
	2.5	68	140	51	-
	3	21	62	32	-
11 Sept.	surface	2,300	3,000	2,900	3,400
	0.5	540	1,500	1,200	1,600
	1	200	490	460	400
	1.5	120	280	200	210
	2	43	170	48	63
	2.5	16	85	27	43
	3	5.7	53	13	18
	3.5	3.1	29	6	14
13 Oct.	surface	1,500	1,000	1,100	725
	0.5	550	580	400	350
	1	190	210	160	150
	1.5	65	100	55	67
	2	28	45	25	33
	2.5	12	25	13	15
	3	4.8	12	5.0	5.5
	3.5	-	6.3	-	3.0

TABLE 30

SUMMARY OF 1978 SECCHI
DEPTHS (IN METERS) AT LOCUST POINT

Date	Station			
	3	8	13	14
19 May	0.3	0.3	0.3	0.3
24 June	0.4	0.6	0.4	-
5 Aug.	1.0	1.0	1.0 (0.6*)	-
22 Aug.	0.6	0.7	0.7	-
11 Sept.	0.5	0.7	0.5	0.7
13 Oct.	0.5	0.7	0.5	0.6

* measured inside station bouy where surface turbulance and water discoloration were noted

of full power on August 5th and 75 percent of full power on September 11th.

STUDY RECOMMENDATIONS

All phases of the sampling program should continue at least for the remainder of 1979. This will assure two years of data gathered after the plant first became operational. However, the plant has not operated continuously during this period due to the "Three Mile Island Incident" and the normal problems associated with the start up of a nuclear power station. In fact, data recently received from Toledo Edison indicated that the plant was operating at 50 percent or more of its capacity on the dates of our sampling during only two of the 16 months from September 1977 through December 1978. Furthermore, due to the "Three Mile Island Incident," it appears that after completion of the 1979 field season we will have collections from only six months during the 28 month period (September 1977 through December 1979) during times when the plant was operating at 50 percent or more of its capacity. With these limitations in mind, strong consideration should be given to extending the sampling program through 1980 to allow an adequate evaluation of the environmental effects of unit operation.

The results appear to show the value of cooling towers and off-shore intakes on Lake Erie. This information should be published and made available to user groups or utilities and regulatory agencies. This is extremely critical at this time as many 316(a) demonstrations (thermal effects studies) and 316(b) demonstrations (entrainment and impingement) from Lake Erie are currently being evaluated.

Following completion of this project, consideration should be given to continuing an abbreviated sampling effort at this location since the volume of data collected at this location makes it a very valuable index station.

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APPENDIX

TABLE 31

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
18-19 MAY 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
3	Freshwater Drum	5	248.6	167.0-340.0	188.8	1	180.0	-	44.0					6	237.2	164.7	988.0
	Channel Catfish					1	211.0	-	78.0					1	211.0	78.0	78.0
	Walleye	3	214.7	196.0-237.0	81.7	1	230.0	-	100.0					4	218.5	86.3	345.0
	Yellow Perch	41	182.9	145.0-204.0	68.5	15	180.7	151.0-233.0	68.7	5	180.2	172.0-193.0	61.4	61	182.1	68.0	4145.0
	Spottail Shiner	145	110.4	105.0-118.0	12.1	35	109.4	90.0-120.0	12.7	66	113.1	100.0-125.0	14.0	246	111.0	12.7	3119.0
	Sauger	1	205.0	-	69.0									1	205.0	69.0	69.0
	Subtotal	195				53				71				319			8744.0
26	Freshwater Drum					3	256.7	240.0-265.0	178.0	1	240.0	-	165.0	4	252.5	174.8	699.0
	Walleye	2	219.0	213.0-225.0	93.5									2	219.0	93.5	187.0
	Yellow Perch	14	182.4	162.0-194.0	67.2	4	177.3	175.0-182.0	61.8					18	181.3	66.0	1188.0
	Spottail Shiner	2	113.0	107.0-119.0	11.0	6	113.8	106.0-126.0	13.8	1	116.0	-	15.0	9	113.9	13.3	120.0
	Troutperch					1	113.0	-	15.0					1	113.0	15.0	15.0
	Subtotal	18				14				2				34			2209.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 31 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
18-19 MAY 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
8	Freshwater Drum	2	254.0	243.0-265.0	121.0	7	266.9	171.0-360.0	248.4					9	264.0	220.1	1981.0
	Channel Catfish	1	197.0	-	57.0									1	197.0	57.0	57.0
	Walleye	2	217.5	210.0-225.0	90.0									2	217.5	90.0	180.0
	Yellow Perch	4	183.5	180.0-190.0	67.3	1	200.0	-	176.0	1	185.0	-	69.0	6	186.5	85.7	514.0
	Spottail Shiner	2	113.0	110.0-115.0	10.0									2	113.0	10.0	20.0
	Subtotal	11				8				1				20			2752.0
13	Freshwater Drum	1	147.0	-	25.0									1	147.0	25.0	25.0
	Walleye	1	215.0	-	83.0									1	215.0	83.0	83.0
	Yellow Perch	21	183.7	166.0-195.0	69.3	17	185.6	165.0-208.0	69.8	2	183.5	170.0-197.0	64.0	40	184.5	69.3	2771.0
	Spottail Shiner	123	111.2	103.0-125.0	12.6	41	113.5	105.0-128.0	12.7	60	115.0	105.0-125.0	14.4	224	113.2	13.1	2936.0
	Gizzard Shad	1	400.0	-	630.0									1	400.0	630.0	630.0
	Troutperch	1	110.0	-	12.0									1	110.0	12.0	12.0
	Sauger					1	218.0	-	96.0					1	218.0	96.0	96.0
	Silver Chub									1	200.0	-	80.0	1	200.0	80.0	80.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 31 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
18-19 MAY 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
13	Subtotal	148				59				63				270			6633.0
(cont'd.)																	
28	Freshwater Drum	4	254.8	183.0-300.0	201.8	4	182.3	114.0-303.0	99.5	3	291.7	250.0-315.0	273.3	11	238.5	184.1	2025.0
	Yellow Perch	3	188.7	183.0-197.0	71.7					1	187.0	-	72.0	4	188.3	71.8	287.0
	Spottail Shiner	6	119.7	115.0-126.0	16.0					2	113.5	102.0-125.0	15.0	8	118.1	15.8	126.0
	Troutperch	1	110.0	-	10.0									1	110.0	10.0	10.0
	Subtotal	14				4				6				24			2448.0
29	Freshwater Drum	4	252.5	130.0-356.0	275.8	2	194.0	142.0-246.0	74.0	2	165.0	104.0-226.0	65.0	8	216.0	172.6	1381.0
	Channel Catfish	1	228.0	-	97.0									1	228.0	97.0	97.0
	Walleye	4	224.8	204.0-237.0	93.3	5	227.4	197.0-251.0	96.4	1	505.0	-	121.4	10	254.1	97.6	976.4
	Yellow Perch	29	187.8	152.0-224.0	73.1	13	185.6	157.0-205.0	68.7	4	189.5	162.0-202.0	73.5	46	187.3	71.9	3308.0
	Spottail Shiner	22	114.0	106.0-135.0	13.5	6	112.2	105.0-120.0	15.0	4	112.8	107.0-118.0	15.5	32	113.5	14.0	448.0
	Sauger					1	390.0	-	620.0					1	390.0	620.0	620.0
	Troutperch	3	105.0	97.0-114.0	11.7									3	105.0	11.7	35.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 31 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
18-19 MAY 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
(cont'd.) 29	Subtotal	63				27				11				101			6865.4
	Total	449				165				144				768			29651.4

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 32

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
29-30 June 1978

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
3	Gizzard Shad	10	330.9	230.0-400.0	414.9	21	333.9	244.0-392.0	426.0	2	341.5	335.0-348.0	402.0	33	333.4	421.2	13899.0
	Freshwater Drum	46	186.5	125.0-300.0	85.0	45	190.5	96.0-326.0	108.4	29	158.6	87.0-280.0	50.1	120	181.3	85.4	10244.0
	White Bass	13	166.5	139.0-189.0	54.2	14	172.6	138.0-190.0	62.1	10	162.4	141.0-181.0	50.7	37	167.7	56.2	2080.0
	Spottail Shiner	6	112.5	106.0-120.0	11.8	8	114.6	107.0-122.0	11.6					14	113.7	11.7	164.0
	Yellow Perch	3	127.0	91.0-150.0	26.0					5	139.6	103.0-195.0	38.8	8	134.9	34.0	272.0
	Carp					2	363.5	363.0-364.0	685.0	2	406.0	367.0-445.0	879.0	4	384.8	782.0	3128.0
	Walleye	5	208.2	157.0-240.0	93.8	2	229.5	214.0-245.0	86.0					7	214.3	91.6	641.0
	Alewife									1	170.0	-	30.0	1	170.0	30.0	30.0
	Channel Catfish	10	228.7	198.0-251.0		3	229.7	188.0-260.0	102.7					13	228.9	99.8	1298.0
	Quillback									1	254.0	-	178.0	1	254.0	178.0	178.0
	Emerald Shiner	1	117.0	-	16.0									1	117.0	16.0	16.0
	Subtotal	94				95				50				239			31950.0
26	Gizzard Shad	4	331.5	235.0-391.0	551.0	17	345.9	307.0-415.0	478.1	16	355.2	232.0-420.0	544.5	37	348.4	514.7	19044.6
	Freshwater Drum	8	216.1	142.0-274.0	122.1	23	199.9	101.0-324.0	118.4	22	191.3	110.0-310.0	102.2	53	198.8	112.3	5950.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 32 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT

29-30 June 1978

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
26	White Bass	12	169.3	142.0-200.0	61.8	15	149.3	132.0-180.0	43.1	11	154.1	137.0-181.0	44.5	38	157.0	49.4	1877.0
	Spottail Shiner	1	122.0	-	19.0	3	112.3	112.0-113.0	13.0	1	120.0	-	11.0	5	115.8	13.8	69.0
	Yellow Perch	4	163.8	106.0-279.0	81.0	15	114.5	96.0-179.0	18.9	8	123.6	100.0-173.0	24.5	27	124.5	29.7	803.0
	Carp	1	227.0	-	168.0					1	432.0	-	1135.6	2	329.5	651.8	1303.6
	Sauger	1	284.0	-	193.0									1	284.0	193.0	193.0
	Walleye	4	233.8	206.0-251.0	104.0	2	219.5	215.0-224.0	85.0	1	237.0	-	96.0	7	230.1	97.4	682.0
	Channel Catfish					3	269.3	241.0-322.0	195.0	2	187.0	184.0-190.0	58.5	5	236.4	140.0	702.0
	Subtotal	35				78				62				175			30623.6
8	Gizzard Shad									13	353.2	320.0-416.0	520.9	13	353.2	520.9	6772.0
	Freshwater Drum									16	243.3	128.0-340.0	203.3	16	243.3	203.3	3253.0
	White Bass									3	224.7	152.0-352.0	225.0	3	224.7	225.0	675.0
	Spottail Shiner									3	118.7	107.0-132.0	14.0	3	118.7	14.0	42.0
	Rainbow Smelt									1	162.0	-	21.0	1	162.0	21.0	21.0
	Yellow Perch									27	153.0	100.0-211.0	48.9	27	153.0	48.9	1319.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 32 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT

29-30 June 1978

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
8	Carp									2	363.5	352.0-375.0	682.5	2	363.5	682.5	1365.0
	Sauger									2	391.0	381.0-401.0	616.5	2	391.0	616.5	1233.0
	Walleye									2	222.5	210.0-235.0	85.5	2	222.5	85.5	171.0
	Subtotal	0				0				69				69			14851.0
13	Gizzard Shad	3	311.3	246.0-349.0	351.7	2	347.0	311.0-383/0	535.5	4	343.8	334.0-351.0	415.8	9	333.7	421.0	3789.0
	Freshwater Drum	28	153.1	108.0-268.0	45.1	28	176.0	120.0-375.0	78.0	19	181.1	112.0-268.0	84.4	75	168.7	67.3	5048.9
	White Bass	5	167.6	165.0-169.0	55.8	3	153.0	135.0-165.0	44.3					8	162.1	51.5	412.0
	Yellow Perch	2	148.0	146.0-150.0	34.5									2	148.0	34.5	69.0
	Walleye	1	192.0	-	49.0									1	192.0	49.0	49.0
	Alewife	1	165.0	-	40.0									1	165.0	40.0	40.0
	Channel Catfish	3	240.7	155.0-294.0	167.3	3	188.3	165.0-205.0	56.7					6	214.5	112.0	672.0
	Quillback	4	242.0	175.0-335.0	230.5	2	247.5	150.0-345.0	296.5	4	187.3	158.0-229.0	73.3	10	221.2	180.8	1808.0
	Subtotal	47				38				27				112			11887.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 32 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
29-30 June 1978

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
28	Gizzard Shad									17	365.9	310.0-441.0	563.7	17	365.9	563.7	9583.0
	Freshwater Drum									51	238.6	116.0-361.0	167.8	51	238.6	167.8	8556.0
	White Bass									10	169.5	145.0-194.0	60.7	10	169.5	60.7	607.0
	Spottail Shiner									1	113.0	-	11.0	1	113.0	11.0	11.0
	Yellow Perch									13	123.4	98.0-179.0	24.5	13	123.4	24.5	318.0
	Walleye									4	233.3	216.0-26.0	100.3	4	233.3	100.3	401.0
	Channel Catfish									1	277.0	-	202.0	1	277.0	202.0	202.0
	Subtotal	0				0				97				97			19678.0
29	Gizzard Shad	5	341.0	319.0-376.0	407.4	3	297.3	250.0-330.0	297.0	1	380.0	-	668.0	9	330.8	399.6	3596.0
	Freshwater Drum	28	189.3	115.0-372.0	93.0	38	180.7	116.0-354.0	75.9	16	220.8	100.0-380.0	159.1	82	191.5	98.0	8033.0
	White Bass	1	187.0	-	80.0	1	195.0	-	92.0	3	165.7	162.0-170.0	53.0	5	175.8	66.2	331.0
	Spottail Shiner	1	114.0	-	4.0	3	116.3	108.0-121.0	12.7					4	115.8	10.5	42.0
	Yellow Perch	3	134.3	107.0-187.0	25.7	2	172.0	163.0-181.0	58.0	1	105.0	-	112.0	6	142.0	50.8	305.0
	Carp					2	377.5	325.0-430.0	743.0	2	370.0	355.0-385.0	682.5	4	373.8	712.8	2851.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 32 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT

29-30 June 1978

Station	SPECIES	DIRECTION OF TRAVEL												TOTALS			
		NORTHWEST				SOUTHEAST				UNKNOWN							
		No.	Length (mm)		Mean Weight(g)	No.	Length (mm)		Mean Weight(g)	No.	Length (mm)		Mean Weight(g)	No.	Mean Length	Weight (g)	
			Mean	Range			Mean	Range			Mean	Range				Mean	Total
29	Walleye					1	250.0	-	112.0					4	250.0	112.0	112.0
	Channel Catfish	4	275.8	207.0-367.0	243.3	2	231.0	202.0-260.0	111.0					6	260.8	199.2	1195.0
	Subtotal	42				52				23				117			16465.0
	Total	218				263				328				809			125454.6

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 33

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT

24-25 July 1978

Station	SPECIES	DIRECTION OF TRAVEL												TOTALS			
		NORTHWEST				SOUTHEAST				UNKNOWN							
		No.	Length (mm) Mean	Length (mm) Range	Mean Weight(g)	No.	Length (mm) Mean	Length (mm) Range	Mean Weight(g)	No.	Length (mm) Mean	Length (mm) Range	Mean Weight(g)	No.	Mean Length	Weight (g) Mean	Weight (g) Total
3	Gizzard Shad					2	415.0	385.0-445.0	843.6	2	357.5	340.0-375.0	514.5	4	386.3	679.0	2716.1
	Channel Catfish									2	139.5	139.0-140.0	21.0	2	139.5	21.0	42.0
	Freshwater Drum	9	162.9	140.0-232.0	47.3	2	138.5	130.0-147.0	25.0	10	173.2	147.0-245.0	56.0	21	165.5	49.3	1036.0
	White Bass	2	152.5	150.0-155.0	50.0					1	170.0	-	58.0	3	158.3	52.7	158.0
	Yellow Perch	11	158.5	110.0-215.0	51.2	14	167.5	115.0-282.0	53.8	5	135.4	117.0-151.0	30.4	30	158.9	48.9	1468.0
	Spottail Shiner	2	115.0	-	13.0	1	115.0	-	16.0					3	115.0	14.0	42.0
	Carp	2	386.0	385.0-387.0	810.0					1	390.0	-	820.0	3	387.3	813.3	2440.0
	Black Bullhead	1	180.0	-	72.0									1	180.0	72.0	72.0
	Goldfish	2	291.5	230.0-353.0	383.0					1	265.0	-	300.0	3	282.7	355.3	1066.0
	White Crappie					1	120.0	-	20.0					1	120.0	20.0	20.0
	Subtotal	29				20				22				71			9060.1
26	Gizzard Shad	3	264.0	112.0-350.0	364.7	2	231.0	91.0-371.0	303.8					5	250.8	340.3	1701.7
	Channel Catfish	1	120.0	-	18.0	1	141.0	-	21.2					2	130.5	19.6	39.2
	Freshwater Drum	20	164.0	130.0-250.0	39.3	6	171.3	140.0-261.0	64.5	7	153.7	114.0-222.0	29.1	33	163.2	41.7	1376.8

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ¼ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 33 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT

24-25 July 1978

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
26	White Bass	3	156.7	85.0-200.0	51.0									3	156.7	51.0	153.0
	Yellow Perch	16	171.6	120.0-200.0	48.4	31	163.9	160.0-208.0	62.3	2	165.0	100.0-170.0	45.0	49	166.5	57.1	2795.8
	Spottail Shiner	9	110.0	100.0-120.0	13.7	5	107.2	100.0-120.0	12.3					14	109.0	13.2	184.6
	Walleye	3	220.0	180.0-240.0	114.3									3	220.0	114.3	343.0
	Carp					2	370.0	350.0-390.0	688.6					2	370.0	688.6	1377.1
	Black Bullhead	1	180.0	-	53.0									1	180.0	53.0	53.0
	Goldfish	1	165.0	-	261.0	1	330.0	-	531.9	2	499.5	445.0-554.0	1262.7	4	373.5	829.6	3318.3
	Quillback	1	210.0	-	120.0									1	210.0	120.0	120.0
	Smallmouth Bass					1	46.0	-	1.1					1	46.0	1.1	1.1
	Subtotal	58				49				11				118			11463.6
8	Gizzard Shad	2	255.5	250.0-261.0	197.0	4	272.3	235.0-340.0	259.8	3	239.3	85.0-368.0	295.3	9	257.6	257.7	2319.0
	Channel Catfish	3	218.7	128.0-310.0	134.0	1	116.0	-	14.0	2	241.0	137.0-345.0	194.0	6	209.0	134.0	804.0
	Freshwater Drum	14	148.5	132.0-194.0	30.4	8	147.4	120.0-170.0	29.5	1	118.0	-	24.0	23	146.8	29.8	686.0
	White Bass	5	185.8	159.0-213.0	88.0	1	203.0	-	110.0	2	162.5	125.0-200.0	71.0	8	182.1	86.5	692.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 33 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT

24-25 July 1978

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
8	Yellow Perch	10	165.1	137.0-195.0	52.4	16	153.5	113.0-198.0	48.0					26	158.0	49.7	1292.0
	Spottail Shiner	2	114.0	110.0-118.0	11.0	3	104.3	95.0-120.0	12.7	4	110.0	100.0-120.0	19.0	9	109.0	15.1	136.0
	Walleye	1	268.0	-	153.0					1	265.0	-	154.0	2	266.5	153.5	307.0
	Carp					2	341.0	310.0-372.0	600.0	1	370.0	-	650.0	3	350.7	616.7	1850.0
	Subtotal	37				35				14				86			8086.0
13	Gizzard Shad	1	340.0	-	363.1	1	330.0	-	360.0	1	250.0	-	179.9	3	306.7	301.0	903.0
	Channel Catfish	1	248.0	-	121.8	1	153.0	-	30.0	1	107.0	-		3	169.3	53.3	159.8
	Freshwater Drum	4	150.5	139.0-175.0	35.5	1	265.0	-	184.0	9	148.9	131.0-176.0	32.4	14	157.6	44.1	617.3
	White Bass	2	171.5	162.0-181.0	70.7					2	179.0	162.0-196.0	82.0	4	175.3	76.3	305.4
	Yellow Perch	10	186.9	154.0-250.0	90.2	12	157.4	105.0-191.0	48.5	13	157.7	109.0-183.0	57.2	35	165.9	63.7	2228.2
	Spottail Shiner	12	109.9	100.0-125.0	16.4	1	121.0	-	20.0	1	117.0	-	14.1	14	111.2	16.5	230.5
	Walleye	1	268.0	-	168.3	1	135.0	-	108.0	2	264.0	260.0-268.0	147.8	4	232.8	142.9	571.8
	Carp					6	339.5	230.0-395.0	601.0					6	339.5	601.0	3606.0
	Black Bullhead					1	165.0	-	60.0	1	242.0	-	212.9	2	203.5	136.4	272.9

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ¼ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 33 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT

24-25 July 1978

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
13	Subtotal	31				24				30				85			8894.9
28	Gizzard Shad	6	317.3	230.0-402.0	418.0	5	281.0	230.0-423.0	318.8	7	323.0	244.0-405.0	444.0	18	309.4	400.6	7210.0
	Channel Catfish	4	141.5	120.0-190.0	31.5	1	238.0	-	112.0	1	234.0	-	192.0	6	173.0	71.7	430.0
	Freshwater Drum	35	158.3	132.0-280.0	47.1	22	151.1	130.0-262.0	41.4	12	159.8	135.0-266.0	47.8	69	156.3	45.4	3135.0
	White Bass	3	146.3	105.0-202.0	47.3	1	175.0	-	80.0	1	167.0	-	60.0	5	156.2	56.4	282.0
	Yellow Perch	42	165.9	108.0-195.0	64.3	26	158.2	97.0-210.0	53.8	11	138.1	101.0-175.0	37.3	79	159.5	57.1	4509.0
	Spottail Shiner					2	121.0	110.0-132.0	11.0	2	116.0	105.0-127.0	16.0	4	118.5	13.5	54.0
	Walleye	6	284.8	240.0-465.0		4	252.5	203.0-280.0	137.5					10	271.9	209.4	2094.0
	Carp	2	352.5	345.0-360.0	524.9	2	395.5	390.0-401.0	822.9	2	343.5	292.0-395.0	737.8	6	363.8	695.2	4171.2
	Black Bullhead					1	175.0	-	78.0					1	175.0	78.0	78.0
	Subtotal	98				64				36				198			21963.2
29	Gizzard Shad	1	245.0	-	184.1	2	295.0	230.0-360.0	372.0	1	410.0	-	790.5	4	311.3	429.6	1718.6
	Channel Catfish	1	171.0	-	207.1	1	146.0	-	24.6	1	338.0	-	584.1	3	218.3	271.9	815.8

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 33 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT

24-25 July 1978

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
29	Freshwater Drum	23	182.0	130.0-275.0	78.8	9	207.9	135.0-360.0	161.5	11	186.2	130.0-256.0	82.0	43	188.5	96.9	4167.2
	White Bass	4	172.0	165.0-180.0	73.8	4	162.5	135.0-180.0	64.7	2	207.5	185.0-230.0	126.8	10	175.3	80.7	807.2
	Yellow Perch	22	163.4	105.0-196.0	58.6	9	159.3	111.0-180.0	54.3	12	149.4	105.0-107.0	40.6	43	158.6	52.7	2265.2
	Spottail Shiner	2	117.5	105.0-130.0	16.3	1	125.0	-	22.7					3	120.0	18.4	55.2
	Walleye	1	255.0	-	130.5									1	255.0	130.5	130.5
	Carp	7	345.1	243 -399.0	558.8					2	418.5	375.0-462.0	774.9	9	361.4	606.8	5461.2
	Subtotal	61				26				29				116			15420.9
	Total	314				218				142				674			74888.7

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 34

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
17-18 AUGUST 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
3	Gizzard Shad	19	185.5	117.0-390.0	123.6	20	166.6	121.0-380.0	99.3	132	132.8	85.0-390.0	28.1	171	142.6	47.0	8041.0
	Yellow Perch	19	168.2	135.0-212.0	57.6	19	171.4	140.0-198.0	57.5	10	171.7	135.0-210.0	68.5	48	170.2	59.8	2872.0
	Spottail Shiner					4	108.3	103.0-112.0		2	107.5	107.0-108.0	12.0	6	108.0	9.7	58.0
	White Bass									1	94.0	-	11.0	1	94.0	11.0	11.0
	Brown Bullhead					1	276.0	-	284.0					1	276.0	284.0	284.0
	Channel Catfish									2	246.5	163.0-330.0	216.5	2	246.5	216.5	433.0
	Carp	2	407.5	385.0-430.0	1000.0	1	332.0	-	554.0	3	359.7	297.0-457.0	791.3	6	371.0	821.3	4928.0
	Goldfish	2	359.5	314.0-405.0	683.0									2	359.5	683.0	1366.0
	Walleye					2	264.5	262.0-267.0	142.0	1				3	268.7	158.0	474.0
	Freshwater Drum	1	95.0	-	8.0									1	95.0	8.0	8.0
	Subtotal	43				47				151				241			18475.0
26	Gizzard Shad	37	164.2	120.0-323.0	75.8	61	175.8	82.0-411.0	134.8	128	152.1	81.0-365.0	72.3	226	160.5	89.7	20282.0
	Yellow Perch	45	170.5	68.0-208.0	65.8	35	175.0	85.0-285.0	71.9	9	161.6	120.0-190.0	57.3	89	171.4	67.4	5996.0
	Spottail Shiner	1	102.0	-	14.0	13	117.3	100.0-215.0	12.3	12	112.0	103.0-125.0	14.4	26	114.3	13.3	347.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 34 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
17-18 AUGUST 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
26	White Bass					1	87.0	-	8.0					1	87.0	8.0	8.0
	Carp	1	341.0	-	573.0	1	290.0	-	348.0					2	315.5	460.5	921.0
	Walleye	1	328.0	-	332.0									1	328.0	332.0	332.0
	Freshwater Drum									3	194.7	93.0-319.0	137.7	3	194.7	137.7	413.0
	Subtotal	85				111				152				348			28299.0
8	Gizzard Shad	8	199.6	123.0-377.0	152.8	6	220.0	96.0-400.0	241.0	13	166.7	125.0-345.0	91.1	27	188.3	142.7	3852.0
	Yellow Perch	32	182.1	142.0-245.0	73.8	24	182.7	138.0-220.0	75.5	10	170.4	138.0-195.0	62.7	66	180.6	72.7	4800.0
	Spottail Shiner	2	106.0	101.0-111.0	13.0	2	105.5	101.0-110.0	12.0	1	135.0	-	19.0	5	111.6	13.8	69.0
	White Bass	7	253.4	240.0-315.0	228.9	4	250.0	178.0-335.0	238.0	6	238.3	223.0-247.0	189.0	17	247.3	216.9	3688.0
	Brown Bullhead									1	230.0	-	234.0	1	230.0	234.0	234.0
	Channel Catfish									1	232.0	-	121.0	1	232.0	121.0	121.0
	Carp									3	393.7	338.0-471.0	746.7	3	393.7	746.7	2240.0
	Goldfish									2	303.0	288.0-318.0	412.0	2	303.0	412.0	824.0
	Subtotal	49				36				37				122			15828.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 34 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
17-18 AUGUST 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
13	Gizzard Shad	8	246.8	84.0-402.0	335.0	23	153.2	88.0-366.0	79.3	78	139.1	19.0-370.0	48.2	109	150.0	75.8	8260.0
	Yellow Perch	22	181.9	114.0-213.0	70.2	11	165.8	120.0-187.0	57.0	10	172.5	126.0-202.0	59.1	43	175.6	64.2	2762.0
	Spottail Shiner	2	121.5	113.0-130.0	18.0	1	111.0	-	9.0	1	106.0	-	6.0	4	115.0	12.8	51.0
	White Bass	7	209.6	85.0-254.0	131.4									7	209.6	131.4	920.0
	Carp	2	302.5	220.0-385.0	564.0									2	302.5	564.0	1128.0
	Goldfish	3	304.3	298.0-314.0	387.3	2	344.5	317.0-372.0	584.0	1	413.0	-	1010.0	6	335.8	556.7	3340.0
	Walleye	7	263.3	157.0-357.0	187.0	1	533.0	-	1000.0					8	297.0	288.9	2311.0
	Freshwater Drum					3	218.7	168.0-250.0	86.7	3	189.3	157.0-243.0	83.0	6	204.0	84.8	509.0
	Quillback									1	270.0	-	248.0	1	270.0	248.0	248.0
	Subtotal	51				41				94				186			19529.0
28	Gizzard Shad	12	235.5	90.0-427.0	350.7	18	158.5	117.0-360.0	93.4	26	129.7	82.0-297.0	49.8	56	161.6	128.3	7186.0
	Yellow Perch	44	176.2	123.0-240.0	72.7	141	190.5	68.0-411.0	112.1	21	164.7	118.0-200.0	59.6	206	184.8	98.4	20265.0
	Spottail Shiner	2	109.0	108.0-110.0	14.5	1	120.0	-	15.0	1	127.0	-	21.0	4	116.3	16.3	65.0
	White Bass									1	82.0	-	7.0	1	82.0	7.0	7.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ¼ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 34 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
17-18 AUGUST 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
28	Carp	2	250.5	245.0-256.0	227.5	1	344.0	-	521.0	2	400.0	-	1007.0	5	329.0	598.0	2990.0
	Goldfish									1	140.0	-	22.0	1	140.0	22.0	22.0
	Subtotal	60				161				52				273			30535.0
29	Gizzard Shad	12	168.4	120.0-402.0	133.2	19	264.4	117.0-525.0	356.5	21	184.1	90.0-465.0	157.7	52	209.8	224.7	11684.0
	Yellow Perch	38	175.7	147.0-215.0	57.9	24	177.9	145.0-196.0	65.0	8	183.5	155.0-200.0	79.3	70	177.3	62.8	4396.0
	Spottail Shiner	1	110.0	-	10.0									1	110.0	10.0	10.0
	White Bass	2	159.0	138.0-180.0	50.0	4	121.3	85.0-230.0	20.5	3	200.3	189.0-212.0	109.3	9	156.0	56.7	510.0
	Brown Bullhead									1	266.0	-	274.0	1	266.0	274.0	274.0
	Channel Catfish	1	162.0	-	32.0									1	162.0	32.0	32.0
	Carp	3	306.3	250.0-409.0	432.7	3	256.3	234.0-280.0	237.3	2	306.0	274.0-338.0	399.0	8	287.5	351.0	2808.0
	Walleye									3	320.7	268.0-411.0	302.7	3	320.7	302.7	908.0
	Freshwater Drum	2	137.5	81.0-194.0	6.0	2	105.0	104.0-106.0	4.0	2	170.5	161.0-180.0	50.0	6	137.7	20.0	120.0
	Subtotal	59				52				40				151			20742.0
	TOTAL	347				448				525				1321			133408.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 35

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT

24-25 September 1978

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
3	Gizzard Shad	7	119.9	35.0-170.0	25.3	12	131.3	50.0-165.0	19.3	69	117.7	52.0-182.0	14.7	88	119.7	16.2	1423.0
	Alewife	20	98.0	82.0-130.0	6.8	21	95.6	72.0-112.0	4.8	89	99.4	73.0-115.0	5.9	130	98.5	5.9	761.0
	Spottail Shiner	15	106.6	87.0-129.0	10.1	29	110.3	90.0-130.0	9.7	9	112.6	99.0-129.0	10.3	53	109.7	9.9	524.0
	Yellow Perch	30	152.4	48.0-192.0	34.8	14	164.9	142.0-197.0	41.6	3	169.7	144.0-185.0	41.7	47	157.2	37.3	1753.0
	Walleye									1	156.0	-	18.0	1	156.0	18.0	18.0
	Freshwater Drum	2	89.0	86.0- 92.0	4.5	3	115.0	90.0-165.0	13.0	1	167.0	-	38.0	6	115.0	14.3	86.0
	White Sucker					1	432.0	-	1000.0					1	432.0	1000.0	1000.0
	Emerald Shiner	4	106.5	97.0-125.0	6.3	1	115.0	-	8.0	4	110.3	98.0-121.0	8.3	9	109.1	7.3	66.0
	Subtotal	78				81				176				335			5631.0
26	Gizzard Shad	26	161.8	79.0-407.0	85.1	11	139.4	87.0-185.0	28.5	173	125.2	72.0-190.0	24.5	210	137.7	32.2	6758.0
	Alewife	43	97.0	82.0-112.0	7.4	4	99.0	96.0-101.0	8.0	173	101.4	82.0-119.0	8.0	220	99.3	7.9	1729.6
	Spottail Shiner	29	110.4	95.0-122.0	11.3	38	107.8	84.0-125.0	10.2	5	118.0	100.0-124.0	11.4	72	109.6	10.7	772.0
	Yellow Perch	49	178.3	141.0-207.0	71.1	58	165.8	124.0-209.0	55.5	19	155.1	21.0-205.0	45.4	126	169.0	60.0	7566.0
	Walleye					1	125.0	-	65.0					1	125.0	65.0	65.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 35 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT

24-25 September 1978

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
26	Freshwater Drum	2	173.0	95.0-251.0	109.0	3	231.3	219.0-241.0	135.0	1	286.0	-	223.0	6	221.0	141.0	846.0
	Emerald Shiner									2	121.0	115.0-127.0	12.5	2	121.0	12.5	25.0
	Subtotal	149				115				373				637			17761.6
8	Carp	1	355.0	-	450.0					1	345.0	-	600.0	2	350.0	525.0	1050.0
	White Bass	3	242.0	237.0-252.0	190.3	1	91.0	-	10.0	1	90.0	-	9.0	5	181.4	118.0	590.0
	Gizzard Shad	6	128.8	87.0-149.0	23.3	8	130.1	95.0-157.0	22.9	22	135.0	85.0-170.0	27.9	36	132.9	26.0	937.0
	Alewife	13	102.8	89.0-120.0	8.9	7	90.1	80.0-104.0	6.7	23	99.2	85.0-112.0	8.4	43	98.8	8.3	357.0
	Spottail Shiner	20	113.6	97.0-134.0	13.9	6	112.2	107.0-120.0	12.8	22	113.8	96.0-125.0	12.4	48	113.5	13.1	628.0
	Yellow Perch	16	165.0	140.0-215.0	50.0	11	161.7	141.0-185.0	51.9	10	158.9	134.0-200.0	48.9	37	162.4	50.3	1860.5
	Walleye					2	377.5	305.0-450.0	563.0					2	377.5	563.0	1126.0
	Black Bullhead					1	231.0	-	188.0	1	230.0	-	194.0	2	230.5	191.0	382.0
	Freshwater Drum			-		1	166.0	-	45.0					1	166.0	45.0	45.0
	Goldfish									1	299.0	-	374.0	1	299.0	374.0	374.0
	White Sucker									1	360.0	-	300.0	1	360.0	300.0	300.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 35 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
24-25 SEPTEMBER 1978.

Station	SPECIES	DIRECTION OF TRAVEL												TOTALS			
		NORTHWEST				SOUTHEAST				UNKNOWN							
		No.	Length (mm) Mean	Range	Mean Weight(g)	No.	Length (mm) Mean	Range	Mean Weight(g)	No.	Length (mm) Mean	Range	Mean Weight(g)	No.	Mean Length	Weight (g) Mean	Total
8	Subtotal	59				37				82				178			7649.5
13	White Bass					2	135.0	130.0-140.0	31.5					2	135.0	31.5	63.0
	Gizzard Shad	12	133.8	80.0-159.0	24.2	32	130.5	80.0-177.0	27.3	70	112.3	76.0-170.0	17.0	114	119.7	20.6	2350.0
	Alewife	18	97.7	84.0-104.0	7.3	41	97.2	76.0-107.0	7.4	77	102.9	87.0-117.0	9.3	136	100.5	8.5	1151.0
	Spottail Shiner	10	108.6	101.0-120.0	9.8	18	109.9	98.0-126.0	12.6	10	116.7	102.0-129.0	14.9	38	111.4	12.4	473.0
	Yellow Perch	51	169.4	131.0-210.0	59.2	17	164.4	130.0-200.0	57.1	3	154.7	145.0-169.0	61.7	71	167.5	58.8	4175.0
	Walleye	1	179.0	-	46.0									1	179.0	46.0	46.0
	Freshwater Drum					1	95.0	-	8.0	2	87.0	84.0-90.0	6.0	3	89.0	6.7	20.0
	White Sucker					1	350.0	-	475.0					1	350.0	475.0	475.0
	Subtotal	92				112				162				366			8753.0
28	Carp									1	221.0	-	140.0	1	221.0	140.0	140.0
	Gizzard Shad	21	147.1	89.0-360.0	48.7	23	159.3	88.0-390.0	90.9	45	125.6	75.0-170.0	22.8	89	139.4	46.5	4137.0
	Alewife	6	96.5	82.0-140.0	10.0	14	96.7	89.0-105.0	6.6	13	96.5	76.0-120.0	7.5	33	96.6	7.6	251.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 35 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
24-25 SEPTEMBER 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
28	Spottail Shiner	25	109.6	100.0-126.0	11.6	18	110.4	95.0-123.0	11.5	20	110.3	82.0-130.0	11.4	63	110.0	11.5	725.0
	Yellow Perch	41	168.2	132.0-212.0	61.1	41	176.2	136.0-206.0	66.9	3	169.3	151.0-185.0	59.3	85	172.1	63.8	5426.0
	Walleye					1	371.0	-	2000.0					1	371.0	2000.0	2000.0
	Freshwater Drum	6	224.8	90.0-315.0	172.7									6	224.8	172.7	1036.0
	White Sucker	1	321.0	-	427.0									1	321.0	427.0	427.0
	Sauger	1	330.0	-	343.0									1	330.0	343.0	343.0
	Subtotal	101				97				82				280			14485.0
29	Carp					3	316.0	294.0-340.0	250.0					3	316.0	250.0	750.0
	Gizzard Shad	16	134.6	80.0-158.0	27.4	6	174.5	121.0-361.0	71.5	53	124.3	67.0-166.0	22.6	75	130.5	27.6	2068.0
	Alewife	4	91.8	83.0-98.0	5.8	13	94.8	85.0-104.0	6.3	27	95.4	71.0-109.0	6.7	44	94.9	6.5	286.0
	Spottail Shiner	14	107.6	96.0-118.0	11.4	7	106.1	98.0-119.0	9.9	15	107.7	87.0-145.0	11.1	36	107.4	11.0	395.0
	Yellow Perch	22	168.0	142.0-202.0	58.7	24	176.5	145.0-210.0	65.6	12	165.5	126.0-212.0	57.7	58	171.0	61.4	3559.0
	Freshwater Drum	3	102.3	91.0-121.0	10.3	5	147.6	89.0-240.0	28.6	5	93.2	85.0-100.0	6.2	13	116.2	15.8	205.0
	White Sucker					1	420.0	-	400.0					1	420.0	400.0	400.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 35 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
24-25 SEPTEMBER 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
29	Subtotal	59				59				112				230			7663.0
	TOTAL	538				501				987				2026			61943.1

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 36

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
17-18 OCTOBER 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
														11	163.6	53.5	589.0
3	Yellow Perch	5	174.8	157.0-190.0	65.0	6	154.3	141.0-167.0	44.0								
	Alewife	37	106.1	87.0-128.0	9.2	15	102.2	90.0-118.0	7.5	5	106.0	99.0-114.0	8.8	57	105.0	8.7	498.0
	Gizzard Shad	3	108.7	87.0-150.0	15.7	9	119.0	87.0-135.0	15.2	1	86.0	-	5.0	13	114.1	14.5	189.0
	Spottail Shiner	18	113.4	106.0-124.0	11.5	13	108.2	100.0-120.0	10.1	1	118.0	-	13.0	32	111.5	11.0	351.0
	White Bass	1	137.0	-	31.0									1	137.0	31.0	31.0
	Subtotal	64				43				7				114			1658.0
26	Freshwater Drum	1	245.0	-	131.0	2	237.5	161.0-314.0	184.5					3	240.0	166.7	500.0
	Yellow Perch	2	173.0	156.0-190.0	51.0	12	170.0	91.0-210.0	73.3					14	170.4	70.1	981.0
	Alewife	1	104.0	-	7.0	7	104.0	96.0-124.0	9.0					8	104.0	8.8	70.0
	Gizzard Shad	2	144.5	127.0-162.0	22.0					1	156.0	-	28.0	3	148.3	24.0	72.0
	Spottail Shiner	8	109.1	100.0-115.0	6.4	16	112.0	99.0-125.0	13.2	1	118.0	-	11.0	25	111.3	10.9	273.0
	White Bass					1	243.0	-	96.0					1	243.0	96.0	96.0
	Subtotal	14				38				2				54			1992.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 36 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
17-18 OCTOBER 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
8	Goldfish	1	318.0	-	470.0									1	318.0	470.0	470.0
	Freshwater Drum	1	256.0	-	144.0									1	256.0	144.0	144.0
	Yellow Perch	3	192.3	184.0-202.0	74.0	2	157.5	142.0-173.0	38.0	2	181.0	178.0-184.0	57.5	7	179.1	59.0	413.0
	Alewife	13	107.8	93.0-113.0	10.3	5	107.2	100.0-120.0	10.0	9	113.1	105.0-145.0	10.8	27	109.5	10.4	281.0
	Gizzard Shad	1	130.0	-	18.0	1	126.0	-	17.0	1	126.0	-	16.0	3	127.3	17.0	51.0
	Spottail Shiner	8	113.3	109.0-122.0	13.0	5	108.2	103.0-111.0	11.2	2	113.5	112.0-115.0	13.0	15	111.6	12.4	186.0
	Subtotal	27				13				14				54			1545.0
13	Yellow Perch	3	171.7	157.0-189.0	55.0	6	186.0	178.0-192.0	84.8	1	135.0	-	30.0	10	176.6	70.4	704.0
	Alewife	18	106.2	93.0-135.0	9.7	7	104.7	95.0-112.0	8.4	11	105.5	85.0-122.0	10.3	36	105.7	9.6	346.0
	Gizzard Shad	3	150.7	150.0-152.0	34.7	13	122.5	77.0-168.0	21.2	3	122.7	121.0-124.0	18.7	19	127.0	22.9	435.0
	Spottail Shiner	7	108.7	105.0-116.0	11.6	16	108.9	100.0-119.0	10.4	4	116.5	110.0-125.0	14.0	27	110.0	11.2	303.0
	White Sucker					1	270.0	-	244.0					1	270.0	244.0	244.0
	Subtotal	31				43				19				93			2032.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ¼ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 36 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
17-18 OCTOBER 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
28	Yellow Perch	19	191.3	158.0-234.0	77.3	34	188.4	152.0-235.0	70.4	6	195.5	176.0-218.0	79.3	59	190.1	73.5	4338.0
	Gizzard Shad	18	133.6	92.0-153.0	21.0	7	122.4	92.0-133.0	11.6	8	122.8	88.0-139.0	14.6	33	128.6	17.5	576.0
	Spottail Shiner	11	112.4	104.0-120.0	13.4	20	110.4	100.0-120.0	8.4	9	112.0	107.0-124.0	9.8	40	111.3	10.1	404.0
	White Sucker					1	294.0	-	291.0					1	294.0	291.0	291.0
	Emerald Shiner					2	109.5	105.0-114.0	9.5					2	109.5	9.5	19.0
	Subtotal	48				64				23				135			5628.0
29	Freshwater Drum					1	302.0	-	293.0					1	302.0	293.0	293.0
	Yellow Perch	6	179.7	142.0-202.0	77.3	5	177.2	167.0-190.0	55.2	2	162.5	162.0-163.0	50.5	13	176.1	64.7	841.0
	Alewife	46	105.5	84.0-119.0	9.7	6	108.2	96.0-119.0	8.8	20	107.8	91.0-120.0	10.0	72	106.3	9.7	700.0
	Gizzard Shad	65	100.4	75.0-149.0	11.0	30	118.8	89.0-158.0	12.9	35	101.7	77.0-157.0	10.5	130	105.0	11.3	1469.0
	Spottail Shiner	10	107.4	101.0-114.0	10.9	16	112.6	103.0-125.0	11.4	3	117.7	110.0-122.0	15.7	29	111.3	11.7	339.0
	Carp					1	390.0	-	900.0					1	390.0	900.0	900.0
	Walleye					1	218.0	-	81.0					1	218.0	81.0	81.0
	Subtotal	127				60				60				247			4623.0
	TOTAL	311				261				125				697			17478.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ¼ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 37

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
1-2 NOVEMBER 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
3	Gizzard Shad	3	132.0	127.0-140.0	22.3	7	122.6	87.0-140.0	19.9	1	152.0	-	39.0	11	127.8	22.3	245.0
	Yellow Perch	2	181.5	173.0-190.0	71.5	5	169.2	160.0-182.0	59.2	1	221.0	-	142.0	8	178.8	72.6	581.0
	White Bass	1	130.0	-	26.0	1	125.0	-	26.0					2	127.5	26.0	52.0
	Alewife	40	106.8	97.0-115.0	7.3	16	107.1	92.0-143.0	12.6	65	101.3	80.0-115.0	10.4	121	103.9	9.7	1173.0
	Spottail Shiner	7	114.9	104.0-132.0	12.3	9	111.1	102.0-126.0	16.1	2	108.0	107.0-109.0	15.0	18	112.2	14.5	261.0
	Sauger	1	345.0	-	405.0									1	345.0	405.0	405.0
	White Sucker					1	377.0	-	720.0					1	377.0	720.0	720.0
	Subtotal	54				39				69				162			3437.0
26	Rainbow Smelt					1	156.0	-	19.0					1	156.0	19.0	19.0
	Gizzard Shad	1	165.0	-	50.0									1	165.0	50.0	50.0
	Yellow Perch	2	163.0	146.0-180.0	50.5	14	157.6	130.0-190.0	53.3					16	158.3	52.9	847.0
	Spottail Shiner	4	112.5	108.0-120.0	11.8	4	107.5	102.0-113.0	10.5					8	110.0	11.1	89.0
	Logperch	1	112.0	-	15.0									1	112.0	15.0	15.0
	Walleye	1	492.0	-	1625.0									1	492.0	1625.0	1625.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 37 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
1-2 NOVEMBER 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
														28			2645.0
26	Subtotal	9				19				0							
8	Rainbow Smelt									1	148.0	-	21.0	1	148.0	21.0	21.0
	Gizzard Shad	2	156.0	137.0-175.0	38.0					1	135.0	-	22.0	3	149.0	32.7	98.0
	Yellow Perch	3	123.7	20.0-180.0	72.3	21	172.2	138.0-211.0	64.1	1	180.0	-	61.0	25	166.7	65.0	1625.0
	White Bass	1	259.0	-	224.0									1	259.0	224.0	224.0
	Alewife	3	108.7	106.0-110.0	6.3									3	108.7	6.3	19.0
	Spottail Shiner					2	102.5	90.0-115.0	14.0					2	102.5	14.0	28.0
	Subtotal	9				23				3				35			2015.0
13	Gizzard Shad	2	129.5	122.0-137.0	22.0	6	135.0	122.0-156.0	26.3	1	132.0	-	22.0	9	133.4	24.9	224.0
	Yellow Perch	2	182.5	182.0-183.0	74.5	5	176.8	157.0-195.0	67.2					7	178.4	69.3	485.0
	White Bass	1	131.0	- -	32.0									1	131.0	32.0	32.0
	Alewife	8	104.5	95.0-110.0	9.1	10	106.3	99.0-115.0	9.9	23	102.0	85.0-132.0	8.7	41	103.5	9.1	372.0
	Spottail Shiner	11	105.1	96.0-111.0	10.5	12	111.8	105.0-128.0	11.8	3				26	109.2	11.9	310.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ¼ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 37 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
1-2 NOVEMBER 1978.

Station	SPECIES	DIRECTION OF TRAVEL: NORTHWEST No.	NORTHWEST Length (mm) Mean	NORTHWEST Length (mm) Range	NORTHWEST Mean Weight(g)	SOUTHEAST No.	SOUTHEAST Length (mm) Mean	SOUTHEAST Length (mm) Range	SOUTHEAST Mean Weight(g)	UNKNOWN No.	UNKNOWN Length (mm) Mean	UNKNOWN Length (mm) Range	UNKNOWN Mean Weight(g)	TOTALS No.	TOTALS Mean Length	TOTALS Weight (g) Mean	TOTALS Weight (g) Total
13	Carp					1	297.0	-	378.0					1	297.0	378.0	378.0
	Subtotal	24				34				27				85			1801.0
28	Rainbow Smelt					1	168.0	-	26.0					1	168.0	26.0	26.0
	Gizzard Shad	3	143.7	125.0-155.0	31.3									3	143.7	31.3	94.0
	Yellow Perch	2	173.5	164.0-183.0	72.5	55	174.4	135.0-208.0	71.5					57	174.4	71.5	4075.0
	Alewife	3	103.0	99.0-110.0	9.3	1	102.0	-	9.0					4	102.8	9.3	37.0
	Spottail Shiner	20	106.1	99.0-119.0	11.8	18	110.5	100.0-126.0	12.5					38	108.2	12.2	462.0
	Carp					1	285.0	-	400.0					1	285.0	400.0	400.0
	Walleye					1	324.0	-	380.0					1	324.0	380.0	380.0
	Freshwater Drum									1	350.0	-	470.0	1	350.0	470.0	470.0
	Subtotal	28				77				1				106			5944.0
29	Rainbow Smelt					1	147.0	-	25.0					1	147.0	25.0	25.0
	Gizzard Shad	7	126.0	108.0-144.0	19.4	38	131.0	117.0-155.0	26.5	26	129.7	116.0-155.0	22.0	71	130.0	24.2	1716.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 37 (Cont'd.)

GILL NET CATCH PER UNIT EFFORT* AT LOCUST POINT
1-2 NOVEMBER 1978.

Station	SPECIES	DIRECTION OF TRAVEL												TOTALS			
		NORTHWEST				SOUTHEAST				UNKNOWN							
		No.	Length (mm) Mean	Length (mm) Range	Mean Weight(g)	No.	Length (mm) Mean	Length (mm) Range	Mean Weight(g)	No.	Length (mm) Mean	Length (mm) Range	Mean Weight(g)	No.	Mean Length	Weight (g) Mean	Weight (g) Total
29	Yellow Perch	7	181.0	143.0-210.0	78.0	13	158.8	135.0-187.0	52.2	2	159.0	158.0-160.0	56.5	22	165.9	60.8	1337.0
	White Bass					1	123.0	-	9.0					1	123.0	9.0	9.0
	Alewife	7	99.4	89.0-108.0	7.6	7	98.7	80.0-104.0	9.7	20	104.0	90.0-116.0	9.3	34	102.0	9.0	306.0
	Spottail Shiner	29	104.1	88.0-113.0	10.1	29	104.9	95.0-119.0	12.8	10	109.0	97.0-115.0	11.7	68	105.2	11.5	783.0
	Walleye									1	335.0	-	348.0	1	335.0	348.0	348.0
	Freshwater Drum					1	295.0	-	332.0					1	295.0	332.0	332.0
	Subtotal	50				90				59				199			4856.0
	TOTAL	174				282				159				615			20698.0

* One 24-hr bottom set with a 125-ft. experimental gill net consisting of five 25-ft x 6-ft contiguous panels of ½ in, 3/4 in, 1 in, 1½ in, and 2 inch bar mesh.

TABLE 38

TRAWL CATCH PER UNIT EFFORT[a] AT LOCUST POINT
12 MAY 1978

TRANSECT	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
3-26	Freshwater Drum	2	303.5	132.0 - 275.0	130.6	261.3
	Spottail Shiner	13	93.9	70.0 - 130.0	13.0	168.4
	Trout-perch	1	75.0	-	5.2	5.2
	Walleye	1	181.0	-	50.0	50.0
	White Bass	4	144.3	122.0 - 163.0	39.3	157.4
	Yellow Perch	5	161.0	88.0 - 190.0	58.9	294.5
	Subtotal	26				936.8
8-13	Channel Catfish	1	410.0	-	860.0	860.0
	Freshwater Drum	1	175.0	-	54.9	54.9
	Rainbow Smelt	1	130.0	-	11.2	11.2
	Spottail Shiner	5	88.6	75.0 - 127.0	9.6	48.0
	Trout-perch	2	86.0	84.0 - 88.0	7.2	14.4
	Walleye	2	225.0	200.0 - 250.0	105.0	210.0
	White Bass	2	151.5	148.0 - 155.0	45.9	91.8
	Yellow Perch	1	185.0	-	86.2	86.2
	Subtotal	15				1376.5
28-29	Black Crappie	1	276.0	-	358.0	358.0
	Carp	8	437.3	89.0 - 645.0	1665.2	13321.9
	Channel Catfish	2	84.0	80.0 - 88.0	8.0	16.0
	Emerald Shiner	2	33.0	30.0 - 36.0	0.5	1.0
	Freshwater Drum	4	207.8	125.0 - 270.0	96.0	384.0
	Goldfish	2	297.0	272.0 - 286.0	512.5	1025.0
	Spottail Shiner	3	86.7	84.0 - 88.0	5.7	17.0
	Trout-perch	3	75.0	71.0 - 81.0	4.7	14.0
	White Bass	1	135.0	-	36.0	36.0
	Yellow Perch	3	125.3	93.0 - 185.0	18.3	55.0
	Subtotal	29				15227.9
	TOTAL	70				17541.2

[a] Four 5-minute tows with a 16-ft trawl (1/8 in bag mesh) at each transect.

TABLE 39

TRAWL CATCH PER UNIT EFFORT[a] AT LOCUST POINT
30 JUNE 1978

TRANSECT	SPECIES	NUMBER	LENGTH (mm) Mean	LENGTH (mm) Range	WEIGHT (g) Mean	WEIGHT (g) Total
3-26	Brown Bullhead	2	196.0	161.0 - 231.0	100.0	200.0
	Carp	3	453.0	440.0 - 479.0	1116.1	3348.3
	Channel Catfish	8	235.0	210.0 - 256.0	121.9	975.0
	Freshwater Drum	6	189.8	120.0 - 325.0	134.2	805.2
	Spottail Shiner	1	25.0	-	0.5	0.5
	Walleye	2	136.5	43.0 - 230.0	51.9	103.8
	White Bass	2	92.0	27.0 - 157.0	29.8	59.5
	Subtotal	24				5492.3
8-13	Carp	4	428.8	365.0 - 455.0	1099.7	4398.9
	Channel Catfish	14	250.5	188.0 - 373.0	145.8	2041.0
	Freshwater Drum	16	180.5	113.0 - 277.0	88.1	1409.2
	Quillback	3	204.7	198.0 - 208.0	117.7	353.0
	Spottail Shiner	3	43.7	29.0 - 72.0	2.0	5.9
	White Bass	5	54.0	22.0 - 163.0	13.6	68.2
	Yellow Perch	1	175.0	-	67.4	67.4
	Subtotal	46				8343.6
28-29	Brown Bullhead	1	230.0	-	140.0	140.0
	Carp	1	410.0	-	840.0	840.0
	Channel Catfish	7	270.7	198.0 - 420.0	217.4	1522.0
	Freshwater Drum	19	214.1	127.0 - 348.0	122.8	2334.0
	Gizzard Shad	1	35.0	-	0.5	0.5
	Rainbow Smelt	1	33.0	-	0.5	0.5
	Walleye	1	235.0	-	90.0	90.0
	Yellow Perch	2	93.0	36.0 - 150.0	20.3	40.5
	Subtotal	33				4967.5
	TOTAL	103				18803.4

[a] Four 5-minute tows with a 16-ft trawl (1/8 in bag mesh) at each transect.

TABLE 40

TRAWL CATCH PER UNIT EFFORT[a] AT LOCUST POINT
25 JULY 1978

TRANSECT	SPECIES	NUMBER	LENGTH (mm) Mean	LENGTH (mm) Range	WEIGHT (g) Mean	WEIGHT (g) Total
3-26	Carp	1	446.0	-	1645.8	1645.8
	Gizzard Shad	1	34.0	-	0.5	0.5
	Rainbow Smelt	2	39.5	37.0 - 42.0	0.5	1.0
	Spottail Shiner	8	45.3	38.0 - 52.0	0.8	6.5
	White Bass	54	42.6	29.0 - 57.0	1.1	59.5
	Subtotal	66				1713.3
8-13	Black Bullhead	13	166.2	155.0 - 187.0	61.6	801.0
	Carp	1	449.0	-	1532.3	1532.3
	Channel Catfish	1	105.0	-	12.0	12.0
	Gizzard Shad	2	96.5	90.0 - 103.0	10.0	20.0
	Rainbow Smelt	1	36.0	-	0.5	0.5
	Spottail Shiner	2	43.5	43.0 - 44.0	1.0	2.0
	White Bass	102	43.5	22.0 - 212.0	2.1	213.3
	Subtotal	122				2581.1
28-29	Black Bullhead	4	201.8	145.0 - 260.0	122.0	488.0
	Carp	1	472.0	-	1702.5	1702.5
	Freshwater Drum	3	66.3	28.0 - 131.0	7.0	21.0
	Gizzard Shad	4	40.5	30.0 - 52.0	0.5	2.0
	Rainbow Smelt	11	32.5	22.0 - 42.0	0.2	2.4
	Walleye	1	125.0	-	130.0	130.0
	White Bass	212	35.6	20.0 - 205.0	1.3	269.5
	Yellow Perch	3	129.3	111.0 - 155.0	31.3	94.0
	Subtotal	239				2709.4
	TOTAL	427				7003.8

[a] Four 5-minute tows with a 16-ft trawl (1/8 in bag mesh) at each transect.

TABLE 41

TRAWL CATCH PER UNIT EFFORT[a] AT LOCUST POINT
18 AUGUST 1978

TRANSECT	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
3-26	Alewife	20	58.6	38.0 - 75.0	1.9	39.0
	Carp	7	432.9	360.0 - 500.0	924.6	6472.0
	Gizzard Shad	32	94.4	15.0 - 127.0	12.2	389.5
	Rainbow Smelt	12	35.7	28.0 - 56.0	1.2	14.7
	Spottail Shiner	1	58.0	-	0.5	0.5
	White Bass	49	45.1	24.0 - 82.0	1.5	74.4
	Subtotal	121				6990.1
8-13	Alewife	17	66.4	55.0 - 76.0	1.7	28.9
	Carp	2	432.0	429.0 - 435.0	1000.0	2000.0
	Gizzard Shad	109	87.1	27.0 - 132.0	6.9	749.4
	Rainbow Smelt	47	36.4	22.0 - 49.0	6.3	10.6
	Walleye	3	169.0	115.0 - 275.0	61.3	184.0
	White Bass	41	46.3	24.0 - 86.0	1.4	56.6
	Subtotal	219				3029.5
28-29	Brown Bullhead	7	179.1	169.0 - 210.0	74.1	519.0
	Carp	1	280.0	-	330.0	330.0
	Channel Catfish	5	141.8	132.0 - 161.0	19.0	95.0
	Freshwater Drum	4	110.0	66.0 - 155.0	16.5	66.0
	Gizzard Shad	53	99.7	71.0 - 125.0	9.3	491.2
	Rainbow Smelt	41	34.5	28.0 - 45.0	0.3	10.7
	Spottail Shiner	6	68.2	47.0 - 115.0	3.4	20.5
	White Bass	162	49.2	21.0 - 100.0	1.5	170.5
	Yellow Perch	5	142.8	129.0 - 177.0	34.0	170.0
	Subtotal	284				1872.9
	TOTAL	624				11892.5

[a] Four 5-minute tows with a 16-ft trawl (1/8 in bag mesh) at each transect.

TABLE 42

TRAWL CATCH PER UNIT EFFORT[a] AT LOCUST POINT
15 SEPTEMBER 1978

TRANSECT	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
3-26	Alewife	19	97.6	87.0 - 108.0	5.7	109.0
	Black Bullhead	1	255.0	-	218.0	218.0
	Carp	3	363.3	302.0 - 450.0	556.3	1669.0
	Gizzard Shad	6	107.5	60.0 - 155.0	13.2	79.0
	Rainbow Smelt	2	44.5	42.0 - 47.0	0.5	1.0
	Spottail Shiner	8	85.0	55.0 - 117.0	6.6	53.0
	Walleye	1	191.0	-	65.0	65.0
	White Bass	7	59.1	40.0 - 74.0	2.3	16.0
	White Crappie	1	57.0	-	1.0	1.0
	Yellow Perch	1	150.0	-	30.0	30.0
	Subtotal	49				2241.0
8-13	Alewife	39	101.1	89.0 - 117.0	8.4	326.0
	Black Bullhead	1	202.0	-	8.6	8.6
	Emerald Shiner	2	82.5	80.0 - 85.0	2.5	5.0
	Gizzard Shad	1	114.0	-	10.0	10.0
	Rainbow Smelt	1	39.0	-	1.0	1.0
	Spottail Shiner	5	100.2	73.0 - 127.0	8.2	41.0
	White Bass	5	74.0	46.0 - 140.0	6.0	33.5
	Yellow Perch	3	131.7	59.0 - 205.0	46.0	138.0
	Subtotal	57				563.1
28-29	Alewife	13	105.4	90.0 - 118.0	8.9	116.0
	Black Bullhead	2	194.0	190.0 - 198.0	85.0	170.0
	Carp	1	297.0	-	350.0	350.0
	Freshwater Drum	3	91.7	75.0 - 111.0	30.7	92.0
	Gizzard Shad	12	105.3	52.0 - 162.0	15.1	181.0
	Goldfish	1	237.0	-	264.0	264.0
	Spottail Shiner	1	77.0	-	2.0	2.0
	White Bass	4	66.3	62.0 - 70.0	0.8	3.0
	White Crappie	1	60.0	-	1.0	1.0
	Yellow Perch	3	150.3	124.0 - 182.0	39.3	118.0
	Subtotal	41				1297.0
	TOTAL	147				4101.1

[a] Four 5-minute tows with a 16-ft trawl (1/8 in bag mesh) at each transect.

TABLE 43

TRAWL CATCH PER UNIT EFFORT[a] AT LOCUST POINT
19 OCTOBER 1978

TRANSECT	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
3-26	Alewife	4	83.0	63.0 - 105.0	4.0	16.0
	Gizzard Shad	79	92.9	50.0 - 117.0	6.9	548.0
	Spottail Shiner	92	97.1	30.0 - 135.0	9.3	860.0
	White Bass	6	126.8	110.0 - 142.0	26.5	159.0
	Yellow Perch	12	142.9	132.0 - 162.0	32.1	385.0
	Subtotal	193				1968.0
8-13	Alewife	18	108.1	91.0 - 127.0	8.6	154.0
	Black Bullhead	1	227.0	-	130.0	130.0
	Gizzard Shad	26	96.8	75.0 - 128.0	7.5	196.0
	Logperch	1	60.0	-	1.0	1.0
	Spottail Shiner	43	104.3	72.0 - 140.0	9.4	404.0
	Trout-perch	1	67.0	-	1.0	1.0
	White Bass	2	125.5	123.0 - 128.0	24.0	48.0
	White Crappie	1	60.0	-	1.0	1.0
	Yellow Bullhead	1	221.0	-	136.0	136.0
	Yellow Perch	16	141.1	62.0 - 185.0	29.8	476.0
	Subtotal	110				1547.0
28-29	Alewife	21	113.9	66.0 - 138.0	8.5	179.0
	Gizzard Shad	98	94.2	56.0 - 135.0	5.7	558.0
	Rainbow Smelt	1	57.0	-	1.0	1.0
	Spottail Shiner	46	97.7	65.0 - 135.0	7.1	325.0
	Yellow Perch	4	169.0	65.0 - 220.0	76.8	307.0
	Subtotal	170				1370.0
	TOTAL	473				4885.0

[a] Four 5-minute tows with a 16-ft trawl (1/8 in bag mesh) at each transect.

TABLE 44

TRAWL CATCH PER UNIT EFFORT[a] AT LOCUST POINT
1 NOVEMBER 1978

TRANSECT	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
3-26	Black Bullhead	1	210.0	-	105.0	105.0
	Emerald Shiner	1	82.0	-	2.0	2.0
	Gizzard Shad	18	111.4	70.0 - 180.0	17.5	315.0
	Spottail Shiner	15	103.5	68.0 - 135.0	11.7	175.0
	Yellow Bullhead	1	207.0	-	110.0	110.0
	Yellow Perch	8	143.4	136.0 - 150.0	35.5	284.0
	Subtotal	44				991.0
8-13	Gizzard Shad	57	104.9	66.0 - 190.0	16.1	918.3
	Spottail Shiner	42	103.8	72.0 - 135.0	12.8	537.0
	Yellow Perch	17	174.2	125.0 - 205.0	74.2	1262.0
	Subtotal	116				2717.3
28-29	Alewife	2	111.5	108.0 - 115.0	17.0	34.0
	Gizzard Shad	74	88.7	60.0 - 120.0	7.8	574.4
	Goldfish	1	222.0	-	180.0	180.0
	Spottail Shiner	15	112.9	80.0 - 127.0	14.5	218.0
	White Bass	2	126.0	125.0 - 127.0	29.0	58.0
	White Crappie	1	67.0	-	2.0	2.0
	Yellow Perch	5	188.8	160.0 - 212.0	80.8	404.0
	Subtotal	100				1470.4
	TOTAL	260				5178.7

[a] Four 5-minute tows with a 16-ft trawl (1/8 in bag mesh) at each transect.

TABLE 45

SHORE SEINE CATCH PER UNIT EFFORT[a] AT LOCUST POINT
10 MAY 1978

STATION[b]	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
23	Carp	3	491.3	438.0 - 546.0	1768.7	5306.2
	Emerald Shiner	7	78.9	63.0 - 113.0	5.0	35.0
	Gizzard Shad	3	281.0	135.0 - 403.0	280.0	840.0
	Logperch	1	71.0	-	4.0	4.0
	Spottail Shiner	40	92.4	66.0 - 121.0	10.6	426.0
	White Bass	3	141.3	124.0 - 159.0	35.7	107.0
	Subtotal	57				6718.20
24	Brown Bullhead	1	148.0	-	51.0	51.0
	Emerald Shiner	4	54.0	50.0 - 58.0	3.3	13.0
	Freshwater Drum	1	341.0	-	450.0	450.0
	Logperch	2	58.5	42.0 - 75.0	4.0	8.0
	Rainbow Smelt	1	135.0	-	14.0	14.0
	Spottail Shiner	17	94.2	76.0 - 117.0	11.7	199.0
	Subtotal	26				735.0
	TOTAL	83				7453.20

[a] Two hauls through a 90° arc with a 100-ft bag seine (¼ in bar mesh) at each station.
[b] Due to inclement weather, only Stations 23 and 24 were sampled.

TABLE 46

SHORE SEINE CATCH PER UNIT EFFORT[a] AT LOCUST POINT
29 JUNE 1978

STATION	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
23	Carp	3	497.7	425.0 - 605.0	1687.3	5062.0
	Channel Catfish	2	112.0	110.0 - 114.0	9.0	18.0
	Emerald Shiner	17	68.2	55.0 - 76.0	2.4	40.0
	Gizzard Shad	4702	39.6	29.0 - 64.0	0.3	1322.7
	Spottail Shiner	9	92.7	84.0 - 108.0	7.2	65.0
	White Bass	47	45.1	22.0 - 180.0	5.7	269.8
	Subtotal	4780				6777.5
24	Emerald Shiner	19	76.7	45.0 - 104.0	4.6	87.0
	Gizzard Shad	186	37.9	25.0 - 196.0	1.7	310.8
	White Bass	42	30.6	25.0 - 37.0	0.4	16.8
	Subtotal	247				414.6
25	Carp	1	28.0	-	0.3	0.3
	Emerald Shiner	65	70.5	35.0 - 110.0	2.1	136.0
	Freshwater Drum	1	117.0	-	12.0	12.0
	Gizzard Shad	684	36.0	21.0 - 205.0	0.6	397.7
	White Bass	91	29.1	18.0 - 188.0	1.1	100.0
	Subtotal	842				646.0
	TOTAL	5869				7838.1

[a] Two hauls through a 90° arc with a 100-ft bag seine (¼ in bar mesh) at each station.

TABLE 47

SHORE SEINE CATCH PER UNIT EFFORT[a] AT LOCUST POINT
24 JULY 1978

STATION	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
23	Gizzard Shad	24	42.2	33.0 - 61.0	0.6	15.0
	White Bass	13	40.3	30.0 - 59.0	0.7	9.0
	Subtotal	37				24.0
24	Gizzard Shad	503	42.3	30.0 - 75.0	1.3	662.8
	Spottail Shiner	2	32.5	30.0 - 35.0	0.5	1.0
	White Bass	8	37.1	32.0 - 42.0	0.5	4.0
	Subtotal	513				667.8
25	Emerald Shiner	1	67.0	-	2.0	2.0
	Gizzard Shad	3906	42.0	34.0 - 72.0	1.0	3937.5
	Spottail Shiner	2	46.0	43.0 - 49.0	0.8	1.5
	White Bass	1	190.0	-	100.0	100.0
	Subtotal	3910				4041.0
	TOTAL	4460				4732.8

[a]Two hauls through a 90° arc with a 100-ft bag seine (¼ in bar mesh) at each station.

TABLE 48

SHORE SEINE CATCH PER UNIT EFFORT[a] AT LOCUST POINT
17 AUGUST 1978

STATION	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
23	Alewife	82	57.3	35.0 - 67.0	1.1	87.0
	Brook Silverside	5	27.2	22.0 - 34.0	0.3	1.5
	Emerald Shiner	347	44.2	30.0 - 90.0	0.4	135.9
	Gizzard Shad	170	46.8	20.0 - 107.0	1.2	202.0
	Spottail Shiner	4	59.0	52.0 - 65.0	0.9	3.5
	White Bass	22	74.3	32.0 - 105.0	2.4	52.0
	Subtotal	630				481.9
24	Alewife	13	56.2	52.0 - 63.0	0.8	10.1
	Channel Catfish	2	56.0	52.0 - 60.0	0.5	1.0
	Emerald Shiner	51	45.1	24.0 - 92.0	0.8	42.8
	Gizzard Shad	109	77.6	27.0 - 130.0	3.5	380.5
	Spottail Shiner	3	55.7	52.0 - 62.0	0.5	1.5
	White Bass	12	77.8	52.0 - 91.0	3.2	38.5
	Subtotal	190				474.4
25	Alewife	69	54.5	33.0 - 62.0	1.1	77.5
	Emerald Shiner	8	71.6	30.0 - 91.0	1.4	11.0
	Gizzard Shad	139	69.7	20.0 - 112.0	2.5	342.5
	White Bass	13	72.1	34.0 - 210.0	36.7	110.0
	Subtotal	229				541.0
	TOTAL	1049.0				1497.3

[a] Two hauls through a 90^{o} arc with a 100-ft bag seine (¼ in bar mesh) at each station.

TABLE 49

SHORE SEINE CATCH PER UNIT EFFORT[a] AT LOCUST POINT
15 SEPTEMBER 1978

STATION	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
23	Carp	1	542.0	-	[b]	[b]
	Channel Catfish	1	66.0	-	3.0	3.0
	Emerald Shiner	140	57.3	39.0 - 92.0	5.6	45.0
	Gizzard Shad	291	90.1	38.0 - 137.0	9.5	2596.0
	Goldenshiner	2	64.5	45.0 - 84.0	5.0	10.0
	Spottail Shiner	21	71.1	53.0 - 106.0	8.7[b]	78.0[b]
	White Bass	30	60.8	37.0 - 84.0		
	Subtotal	486				2732.0
24	Carp	1	83.0	-	7.0	7.0
	Channel Catfish	1	53.0	-	3.0	3.0
	Emerald Shiner	15	55.5	34.0 - 98.0	5.0	10.0
	Gizzard Shad	211	94.8	41.0 - 139.0	7.9	1660.0
	Rainbow Smelt	1	46.0	-	0.5	0.5
	Spottail Shiner	26	61.0	51.0 - 79.0	4.0	8.0
	White Bass	20	62.8	35.0 - 86.0	3.2	38.5
	Subtotal	275				1727.0
25	Alewife	12	66.7	36.0 - 113.0	3.8	46.0
	Emerald Shiner	32	63.8	41.0 - 92.0	1.9	21.0
	Gizzard Shad	221	95.6	43.0 - 404.0	7.7[b]	1703.0[b]
	Goldenshiner	3	72.7	70.0 - 76.0		
	Spottail Shiner	5	66.2	46.0 - 76.0	1.5	3.0
	White Bass	18	68.6	51.0 - 98.0	3.2	58.0
	Subtotal	291				1831.0
	TOTAL	1052				6290.0

[a] Two hauls through a 90° arc with a 100-ft bag seine (¼ in bar mesh) at each station.
[b] Only individual lengths were taken.

TABLE 50

SHORE SEINE CATCH PER UNIT EFFORT[a] AT LOCUST POINT
18 OCTOBER 1978

STATION	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
23	Emerald Shiner	22	49.5	41.0 - 59.0	0.9	19.5
	Gizzard Shad	18	59.7	50.0 - 69.0	1.0	18.5
	Subtotal	40				38.0
24	Gizzard Shad	3	53.7	48.0 - 61.0	1.0	3.0
	Subtotal	3				3.0
25	Gizzard Shad	1	39.0	-	1.0	1.0
	Subtotal	1				1.0
	TOTAL	44				42.0

[a] Two hauls through a 90° arc with a 100-ft bag seine (¼ in bar mesh) at each station.

TABLE 51

SHORE SEINE CATCH PER UNIT EFFORT[a] AT LOCUST POINT
2 NOVEMBER 1978

STATION	SPECIES	NUMBER	LENGTH (mm)		WEIGHT (g)	
			Mean	Range	Mean	Total
23	Emerald Shiner	15	50.8	45.0 - 66.0	0.5	8.0
	Gizzard Shad	20	76.6	57.0 - 101.0	3.7	74.0
	Subtotal	35				82.0
24	Emerald Shiner	131	49.7	38.0 - 91.0	1.3	176.1
	Gizzard Shad	9	60.6	48.0 - 120.0	3.7	33.0
	Subtotal	140				209.1
25	Emerald Shiner	393	51.9	35.0 - 112.0	1.4	558.1
	Gizzard Shad	52	67.2	50.0 - 115.0	4.0	208.0
	Subtotal	445				766.1
	TOTAL	620				1057.2

[a] Two hauls through a 90^{o} arc with a 100-ft bag seine (¼ in bar mesh) at each station.

TABLE 52

SUMMARY OF FOOD HABITS DATA OF FISH COLLECTED AT LOCUST POINT WITH A 16-FT TRAWL[a]

12 May 1978

TRANSECT	SPECIES	NUMBER IN SAMPLE	PERCENT CONTAINING FOOD	LENGTH(mm)		FOOD ITEMS											
				MEAN	RANGE	Copepoda	Cyclopoid	Cladocera	Leptodora kindtii	Insecta(Larvae)	Chironomidae	Hydracarina	Oligochaeta	Fish	Animal Debris[b]	Plant Debris[b]
3-26	Emerald Shiner	0	-	-	-											
	Freshwater Drum	2	50	303.5	132.0-275.0						15.0					
	Spottail Shiner	13	62	93.9	70.0-130.0						0.2	2.4	0.4		X	X
	White Bass	4	50	144.3	122.0-163.0									0.5		X
	Yellow Perch	5	0	161.0	88.0-190.0											
	Subtotal	24	46													
8-13	Emerald Shiner	0	-	-	-											
	Freshwater Drum	1	100	175.0	-						2.0					
	Spottail Shiner	5	80	88.6	75.0-127.0						4.4	1.4	0.2		X	X
	White Bass	2	50	151.5	148.0-155.0									0.5		
	Yellow Perch	1	0	185.0	-											
	Subtotal	9	67													

[a] Presented as mean number of food items per fish

[b] Item present but not numerically quantifiable (indicated by X)

TABLE 53

SUMMARY OF FOOD HABITS DATA OF FISH COLLECTED AT LOCUST POINT WITH A 16-FT TRAWL[a]

30 June 1978

TRANSECT	SPECIES	NUMBER IN SAMPLE	PERCENT CONTAINING FOOD	LENGTH(mm)		FOOD ITEMS										
				MEAN	RANGE	Copepoda	Cyclopoid	Cladocera	Leptodora kindtii	Insecta(Larvae)	Chironomidae	Hydracarina	Oligochaeta	Fish	Animal Debris[b]	Plant Debris[b]
3-26	Emerald Shiner	0	-	-	-											
	Freshwater Drum	6	17	189.8	120.0-325.0				8.3							X
	Spottail Shiner	0	-	-	-											
	White Bass	1	100	157.0	-	1.0										
	Yellow Perch	0	-	-	-											
	Subtotal	7	28													
8-13	Emerald Shiner	0	-	-	-											
	Freshwater Drum	8	75	212.1	135.0-277.0				6.5						X	X
	Spottail Shiner	1	0	72.0	-											
	White Bass	5	0	54.0	22.0-163.0											
	Yellow Perch	1	0	175.0	-											
	Subtotal	15	40													

[a] Presented as mean number of food items per fish

[b] Item present but not numerically quantifiable (indicated by X)

TABLE 54

SUMMARY OF FOOD HABITS DATA OF FISH COLLECTED AT LOCUST POINT WITH A 16-FT TRAWL[a]

25 July 1978

TRANSECT	SPECIES	NUMBER IN SAMPLE	PERCENT CONTAINING FOOD	LENGTH(mm)		FOOD ITEMS										
				MEAN	RANGE	Copepoda	Cyclopoid	Cladocera	Leptodora kindtii	Insecta(Larvae)	Chironomidae	Hydracarina	Oligochaeta	Fish	Animal Debris[b]	Plant Debris[b]
3-26	Emerald Shiner	0	-	-	-											
	Freshwater Drum	0	-	-	-											
	Spottail Shiner	8	12	45.3							0.2					
	White Bass	20	5	47.6	44.0- 51.0						0.1					
	Yellow Perch	0	-	-	-											
	Subtotal	28	7													
8-13	Emerald Shiner	0	-	-	-											
	Freshwater Drum	0	-	-	-											
	Spottail Shiner	2	0	43.5	43.0- 44.0											
	White Bass	20	25	49.4	31.0-212.0		0.8							0.1		
	Yellow Perch	0	-	-	-											
	Subtotal	22	23													

[a] Presented as mean number of food items per fish

[b] Item present but not numerically quantifiable (indicated by X)

TABLE 55

SUMMARY OF FOOD HABITS DATA OF FISH COLLECTED AT LOCUST POINT WITH A 16-FT TRAWL[a]

18 August 1978[c]

TRANSECT	SPECIES	NUMBER IN SAMPLE	PERCENT CONTAINING FOOD	LENGTH(mm)		FOOD ITEMS										
				MEAN	RANGE	Copepoda	Cyclopoid	Cladocera	Leptodora kindtii	Insecta(Larvae)	Chironomidae	Hydracarina	Oligochaeta	Fish	Animal Debris[b]	Plant Debris[b]
3-26	Emerald Shiner	0	-	-	-											
	Freshwater Drum	0	-	-	-											
	Spottail Shiner	0	-	-	-											
	White Bass	0	-	-	-											
	Yellow Perch	0	-	-	-											
	Subtotal	0	-	-	-											
8-13	Emerald Shiner	0	-	-	-											
	Freshwater Drum	0	-	-	-											
	Spottail Shiner	0	-	-	-											
	White Bass	0	-	-	-											
	Yellow Perch	0	-	-	-											
	Subtotal	0	-	-	-											

[a] Presented as mean number of food items per fish

[b] Item present but not numerically quantifiable

[c] Stomach samples not collected

TABLE 56

SUMMARY OF FOOD HABITS DATA OF FISH COLLECTED AT LOCUST POINT WITH A 16-FT TRAWL[a]

15 September 1978

TRANSECT	SPECIES	NUMBER IN SAMPLE	PERCENT CONTAINING FOOD	LENGTH(mm)		FOOD ITEMS										
				MEAN	RANGE	Copepoda	Cyclopoid	Cladocera	Leptodora kindtii	Insecta(Larvae)	Chironomidae	Hydracarina	Oligochaeta	Fish	Animal Debris[b]	Plant Debris[b]
3-26	Emerald Shiner	0	-	-	-											
	Freshwater Drum	0	-	-	-											
	Spottail Shiner	8	75	85.0	55.0-117.0						0.1		0.5			X
	White Bass	7	43	59.1	40.0- 74.0									0.4		
	Yellow Perch	1	100	150.0	-		30								X	X
	Subtotal	16	62													
8-13	Emerald Shiner	2	100	82.5	80.0- 85.0											X
	Freshwater Drum	0	-	-	-											
	Spottail Shiner	5	60	100.2	73.0-127.0						0.8					
	White Bass	5	20	74.0	46.0-140.0									0.2		
	Yellow Perch	3	67	131.7	59.0-205.0		67									X
	Subtotal	15	53													

[a] Presented as mean number of food items per fish

[b] Item present but not numerically quantifiable (indicated by X)

TABLE 57

SUMMARY OF FOOD HABITS DATA OF FISH COLLECTED AT LOCUST POINT WITH A 16-FT TRAWL[a]

18 October 1978

TRANSECT	SPECIES	NUMBER IN SAMPLE	PERCENT CONTAINING FOOD	LENGTH(mm)		FOOD ITEMS										
				MEAN	RANGE	Copepoda	Cyclopoid	Cladocera	Chydorus sphaericus	Insecta(Larvae)	Chironomidae	Hydracarina	Oligochaeta	Fish	Animal Debris[b]	Plant Debris[b]
3-26	Emerald Shiner	0	-	-	-											
	Freshwater Drum	0	-	-	-											
	Spottail Shiner	20	5	93.3	30.0-135.0										X	X
	White Bass	6	17	126.8	110.0-142.0									0.2		
	Yellow Perch	12	0	142.9	132.0-162.0											
	Subtotal	38	5													
8-13	Emerald Shiner	0	-	-	-											
	Freshwater Drum	0	-	-	-											
	Spottail Shiner	20	5	108.1	72.0-140.0				0.1							
	White Bass	2	50	125.5	123.0-128.0									0.5		
	Yellow Perch	16	12	141.1	62.0-185.0						0.1					X
	Subtotal	38	10													

[a] Presented as mean number of food items per fish

[b] Item present but not numerically quantifiable (indicated by X)

TABLE 58

SUMMARY OF FOOD HABITS DATA OF FISH COLLECTED AT LOCUST POINT WITH A 16-FT TRAWL[a]

1 November 1978

TRANSECT	SPECIES	NUMBER IN SAMPLE	PERCENT CONTAINING FOOD	LENGTH(mm)		FOOD ITEMS										
				MEAN	RANGE	Copepoda	Cyclopoid	Cladocera	Leptodora kindtii	Insecta(Larvae)	Chironomidae	Hydracarina	Oligochaeta	Fish	Animal Debris[b]	Plant Debris[b]
3-26	Emerald Shiner	1		82.0	-											
	Freshwater Drum	0	-	-	-										X	X
	Spottail Shiner	15	47	103.5	68.0-135.0											
	White Bass	0	-	-	-											
	Yellow Perch	8	0	143.4	136.0-150.0											
	Subtotal	24	29													
8-13	Emerald Shiner	0	-	-	-											
	Freshwater Drum	0	-	-	-											X
	Spottail Shiner	20	10	108.6	75.0-135.0											
	White Bass	0	-	-	-											
	Yellow Perch	17	12	174.2	125.0-205.0									0.1		X
	Subtotal	37	11													

[a] Presented as mean number of food items per fish

[b] Item present but not numerically quantifiable (indicated by X)

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