MINNESOTA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH AND WILDLIFE
ENVIRONMENT SECTION

1975 Progress Report on the Prairie Island Fish Population Study

By:
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2.5.2.1 Introduction

This study is part of a continuing comprehensive investigation by various consultants to determine environmental effects of the Prairie Island Nuclear Generating Plant near Red Wing, Minnesota. The purpose of this study is to determine effects of the plant on fish populations in the Mississippi River and its backwaters near Red Wing, Minnesota.

Several parameters were used to measure changes in the population which might be related to plant operation. These parameters include population structure (e.g., abundance, species composition), fish movements, condition, and growth. Changes in environmental conditions should be reflected in these parameters.

2.5.2.1.1 Scope

The total study includes a fish population study and a creel survey; this progress report deals only with the fish population study. The report describes field work carried out in 1975 and analyzes data collected. This report also includes some analysis of scale samples collected during 1974 field work. The regular sampling seasons in 1975 were: spring, May 28 - July 11; Summer, July 21 - August 27; Fall, September 8 - October 31.

2.5.2.1.2 Study Area

The five sections of the study area (Figure 2.5.2-1) are described by Hawkinson (1974). Each section or area consists

of 10 numbered stations beginning with zero at the upstream end and ending with nine at the downstream station.

2.5.2.2 Materials and Methods

2.5.2.2.1 Gear

Fish were collected using five types of sampling gear: trap net, gill net, electro-fisher (boom shocker), trawl, and seine in order to monitor the abundance, condition, age, and growth of fish in the vicinity of the Prairie Island Plant. An illustration of each type of gear can be found in Naplin and Geis (1975). A list of common and scientific names and methods of capture of fish in the area of Prairie Island Nuclear Generating Plant in 1975 is presented in Table 2.5.2-1.

2.5.2.2.1.1 Trap Netting

River trap nets, described by Krosch (1967), were set for four nominal 24-hour sets at four stations in Sections 0 and 4 and five stations in Sections 1 and 3. As in 1974, no trap nets were set in Section 2 because of swift currents and frequent barge traffic. A 10-pound anchor was attached to the front frame of trap nets set in the main channel in Sections 3 and 4 to reduce the incidence of net-rolling.

The most productive stations in 1974, in terms of variety and number of species, were picked from the ten stations trap netted in each section in 1974. During each of three seasons, these stations were trap netted four consecutive nominal 24-hour periods. The procedure of netting fewer stations with

more sets per station was adopted in 1975 to reduce catch bias that may result from weather or water conditions when only one nominal 24-hour set was made at each station during each season as was done in 1973 and 1974. This procedure also increased the number of net sets per section per season from 10 in Sections 0, 1, 3, and 4 in 1974, to 16 in Sections 0 and 4, and to 20 in Sections 1 and 3 in 1975.

2.5.2.2.1.2 Gill Netting

Standard 250 x 6 foot experimental gill nets were used in Sections 0, 1, and 3. A total of eight nominal 24-hour sets was made in each section by making two nominal 24-hour sets at four stations. As with trap nets, the number of stations netted was reduced with multiple settings at each station so more reliable data could be obtained. With gill nets, this procedure resulted in reducing the total number of net sets per section from 10 in 1974 to eight in 1975. Gill nets were used only during the spring and fall sampling season.

2.5.2.2.1.3 Electro-fishing

Daylight shocking was done at all stations in all sections during three seasons. Night shocking was done at five selected stations in Sections 0, 1, 3, and 4 and at all 10 stations in Section 2. One 15-minute run was made in each station that was shocked.

The electro-fishing unit used in 1975 was the same used in 1974. Electrical output was regulated by adjusting engine r.p.m. An output range from 5.5 to 7.0 amperes was most productive, and

an attempt was made to maintain an output of 6.5 amperes.

2.5.2.2.1.4 Trawling

Trawling was done in the plant intake area, discharge canal, and two stations in North Lake as in 1974. A minimum of 14 minutes of trawling, two 7-minute runs, if possible, was completed in each station using the same trawl used in 1974.

2.5.2.2.1.5 Seining

Shoreline seining was done in all five sections and was restricted to areas with water depths of less than six feet using the same seine as in 1974. The seine is 1/4-inch knotless nylon, 50 feet long by four feet deep, with a 4 x 4 x 4 foot bag. Each seine haul in 1975 covered approximately 310 square meters.

2.5.2.2.2 Tagging

The tagging program initiated in 1974 was continued in 1975. Fish were tagged with Floy tags, a length of yellow vinyl tubing of approximately 1/16-inch diameter with a molded "T" shaped nylon anchor attached to one end. Tags are imprinted with the legend, MINN DNR ST PAUL F___and serially numbered. Tags are applied with a special gun as described by Naplin and Geis (1975).

2.5.2.2.3 Scale Samples

Scale samples were taken during summer and fall sampling periods

of 1975. Age and growth data from scales collected in 1974 and 1975 were analyzed using the Iowa FORTRAN SHAD program of Mayhew (1973). Calculations made by this program are described by Naplin and Geis (1975).

2.5.2.2.4 Spawning studies

Several studies were done in an effort to learn more about spawning activity and larval fish in the Prairie Island vicinity. These included temperature monitoring, early trap netting, and larval fish towing.

2.5.2.2.4.1 Temperature monitoring

Water temperatures for Sturgeon Lake were recorded with a Tempscribe recording thermograph placed along the northeast shore, Section 1, Station 4, April 23 - June 30 and September 22 - October 24, 1975. A malfunction in the Tempscribe resulted in the large gap in temperature data. The temperature sensor was placed approximately 15 feet offshore. The rise in water level in April and early May because of spring thaw required movement of the Tempscribe a number of times, but it was always in the same general locality.

2.5.2.2.4.2 Early Trap Netting

Trap netting was done April 22 - May 23, 1975, prior to the regular sampling season in an attempt to locate spawning concentrations of fish and obtain fish to tag. Trap nets were set at various locations in the lower end of North Lake, in

Sturgeon Lake, and in the immediate plant area. Nets were checked daily. Fish were measured and totals recorded. Notes on the spawning condition of fish were recorded. Fish which could be included in the tagging study were tagged.

2.5.2.2.4.3 Larval Fish Study

The larval fish study was expanded in 1975. Five new stations were added to the four stations established in 1974 (Figures 2.5.2-2A and 2B). Surface tows were taken weekly between May 16 and August 15 and during the week of September 1 - 5, 1975. A general Oceanics digital flow meter with the large low speed rotor was used to determine the volume of water filtered in each tow.

From May 16 to June 30, 1975, a conical net with one square meter frontal area and a mesh size of 787 microns was used. This net required constant repair so a replacement was obtained. The net used from July 3 to September 4, 1975 was a conical net of 560 micron Nitex nylon mesh with a mouth diameter of one meter.

Contents of the net were removed at the end of each run in the same manner as done when sampling plankton. A concentrating cup was used to concentrate the sample. Samples were preserved in five-percent formalin solution and counted at a later date. No attempt has been made to identify the larval fish.

2.5.2.3 Results

2.5.2.3.1 Trap Netting

A total of 3,411 fish was caught in 216 nominal 24-hour trap net sets during the three regular sampling seasons of 1975. The numbers of fish caught during the spring and fall were 995 and 1,053, respectively. The catch during the summer was slightly higher at 1,363. Seventy-two sets were made during each season: 36 above the plant, 20 in the plant area, and 16 below Lock and Dam 3.

Carp and white bass were the two most abundant fish caught in trap nets, accounting for 21.1 and 20.9 percent, respectively, of the total trap net catch. The highest catch rate for carp was 7.31 carp per lift below Lock and Dam 3 in the spring. Carp comprised between 9.4 and 34.2 percent of the total catch in each area in each season. The highest catch rate for white bass was 9.47 fish per lift above the plant in the fall. They made up almost 45 percent of all fish caught in this area during the fall. White bass comprised between 4.5 and 44.9 percent of the total fish caught in each area during each season.

Freshwater drum totalled 13.7 percent of all fish caught with trap nets in 1975. The highest catch rate was 9.13 fish per lift below Lock and Dam 3 in the spring and the low was 0.00 in the same area in the fall. Catch rates in the other areas ranged from 0.97 - 2.85 freshwater drum per lift.

Black crappies amounted to 11.8 percent of all fish caught in trap nets during the spring, summer, and fall in 1975. The highest catch rates for black crappies were 4.83 fish per lift

above the plant during the summer and 4.88 fish per lift below Lock and Dam 3 in the fall; 50.0 percent of all fish caught with trap nets in that area in the fall.

Northern pike comprised 5.0 percent of the total trap net catch; 171 were caught in 1975. During each season, the highest catch rate was above the plant, the next highest below Lock and Dam 3, and the lowest in the plant area. Catch rates for northern pike ranged from a low of 0.05 fish per lift in the plant area during the summer to a high of 2.17 fish per lift in the summer above the plant.

A total of 81 saugers (2.4 percent of the total trap net catch) was caught in trap nets in 1975. The catch rates were between 0.25 - 0.31 fish per lift in the spring, 0.13 - 0.42 fish per lift in the summer, and 0.30 - 0.75 fish per lift in the fall. The highest catch rate for saugers (0.75 fish per lift) was in the fall above the plant.

A total of 45 walleyes, 1.3 percent of the total trap net catch, was caught in trap nets in 1975. The highest catch rates were 0.44 and 0.38 fish per lift below Lock and Dam 3 in the spring and summer, respectively, and 0.42 fish per lift above the plant in the fall. No walleyes were caught in trap nets in the plant area in the summer or below Lock and Dam 3 in the fall.

A summary of trap net catches by area and season is listed in Tables 2.5.2-2 through 2.5.2-4. A summary of the length frequencies of all fish caught trap netting is presented in Table 2.5.2.-5.

2.5.2.3.2 Gill Nets

A total of 2,784 fish representing 28 species was caught in 48 nominal 24-hour gill net sets during 1975. Over 73 percent of the fish were caught during the fall season. Gizzard shad comprised 54.1 percent of all fish caught with gill nets.

The catch rates for gizzard shad were low in the spring, 2.81 and 3.00 fish per lift above the plant and in the plant area, respectively. These were all adult or juvenile fish. The catch rates in the fall were much higher, 54.63 and 70.25 fish per lift above the plant and in the plant area, respectively. Most of these were young-of-the-year fish. Young-of-the-year gizzard shad are quite vulnerable to gill netting in the fall.

Carp comprised over 23 percent of all fish caught in the spring both above the plant and in the plant area with catch rates of 6.75 and 8.25 fish per lift, respectively. In fall gill netting, carp comprised less than three percent of all fish in either area with a catch rate of 2.25 fish per lift in both areas.

Saugers accounted for 12 percent of all fish caught in 1975 gill netting. They represented from 10.6 to 15.6 percent of the gill net catch in each area during spring and fall. The highest catch rate for both areas was in the fall in the plant area (13.13 fish per lift).

White bass made up five percent of all fish caught with gill nets in 1975. The catch rate was the same in spring and fall in the area above the plant and higher in the fall in the plant area. White bass comprised from 3.4 to 10.4 percent of the

total catch in each area during each season.

Walleyes totalled 2.3 percent of all gill net-caught fish in 1975. Catch rates in both areas were highest in the fall. Catch rates ranged from 0.25 to 1.88 fish per lift. Walleyes comprised 4.8 percent of the spring gill net catch above the plant and two percent of the fall catch above the plant.

A summary of fish caught with gill nets by area and season is listed in Table 2.5.2-6. A length-frequency of all fish caught with gill nets in 1975 is presented in Table 2.5.2-7.

2.5.2.3.3 Electro-Fishing

2.5.2.3.3.1 Day Electro-Fishing

A total of 4,163 fish was caught in 37.5 hours of day electro-fishing during 1975. A total of 46 species was collected. Ten species comprised 83 percent of the total fish caught. Gizzard shad (22.3 percent), carp (13.3 percent), and emerald shiner (12.1 percent) were the three most abundant fish caught.

Only five gizzard shad were caught during spring day electro-fishing. They were all juvenile or adult fish and were caught above the plant. Gizzard shad comprised 35 percent of the fall day electro-fishing catch. They made up over 42 percent of the catch in the area above the plant, but this area had the lowest catch rate, 43.33 fish per hour, of the three areas in fall. The area below Lock and Dam 3 had the highest catch rate, 66.00 fish per hour, but gizzard shad

only comprised about 27 percent of the catch. Most of the gizzard shad caught during the summer and fall were young-of-the-year fish.

Carp represented 13.3 percent of all fish caught day electro-fishing in 1975. Catch rates for carp for the area above the plant showed a steady decrease from 19.60 fish per hour in the spring to 8.13 fish per hour in the fall. Catch rates of carp in the plant area and below Lock and Dam 3 showed a steady increase from 11.20 and 12.00 fish per hour in spring to 18.80 and 25.20 fish per hour in fall, respectively. The highest catch rate in the spring was above the plant; during the summer it was in the plant area. During the fall the highest catch rate occurred below Lock and Dam 3.

Emerald shiners comprised 12.1 percent of the electro-fishing catch. The plant area had the lowest catch rate of emerald shiners during each season and below Lock and Dam 3 had the highest. The catch rates for the three seasons ranged from 6.93 to 16.13 fish per hour above the plant, from 0.80 to 12.40 fish per hour in the plant area, and from 19.20 to 42.40 fish per hour in fall.

White bass comprised over 8 percent of all fish caught day electro-fishing in 1975. White bass made up almost 22 percent of the fish caught below Lock and Dam 3 in the summer when 45.60 fish per hour were caught. The catch rates for the other areas and seasons ranged from 2.27 to 17.60 fish per hour. The area above the plant had the lowest catch rate of white bass during all seasons and the area below Lock and Dam 3 had the highest.

Smallmouth bass comprised 4.4 percent of the fish caught day electro-fishing in 1975. The plant area had the highest catch rate of smallmouth bass in the spring and the area below Lock and Dam 3 had the highest catch rate during the summer and fall. The lowest catch rate for small mouth bass was 2.00 fish per hour both in the spring below Lock and Dam 3 and in the fall above the plant. The highest was 22.00 fish per hour in the summer below Lock and Dam 3.

Walleyes totalled 3.9 percent of the day electro-fishing catch in 1975. During the spring and summer, the lowest catch rate for walleyes was in the plant area and the highest was below Lock and Dam 3. During the fall, the lowest catch rate for walleyes was above the plant and the highest was below Lock and Dam 3.

Saugers comprised 3.3 percent of the fish caught day electro-fishing in 1975. The highest catch rates were above the plant in spring and summer and below Lock and Dam 3 in the fall. The lowest catch rates were in the plant area during all three seasons.

A summary of day electro-fishing catches by area and season is listed in Tables 2.5.2-8 through 2.5.2-10. A summary of the length frequency of fish caught electro-fishing is presented in Table 2.5.2-11.

2.5.2.3.3.2 Night Electro-Fishing

Night electro-fishing was conducted in selected stations during summer and fall of 1975. A total of 15 hours of night electro-fishing, 7.5 hours during each season, produced 888 fish representing 37 species. Eleven species freshwater drum (11.7 per-

cent), white bass (11.3 percent), gizzard shad (11.0 percent), sauger (10.2 percent), carp (8.2 percent), shorthead redhorse (7.8 percent), walleye (6.9 percent), silver chub (6.2 percent), emerald shiner (5.1 percent), bluegill (4.1 percent), and smallmouth bass (3.6 percent) comprised 86.1 percent of all fish caught night electro-fishing.

Catches of freshwater drum were higher in all areas during summer sampling than during fall. During each season, the catch rate for freshwater drum was highest below Lock and Dam 3, next highest above the plant, and lowest in the plant area. Catch rates ranged from 5.60 to 43.20 fish per hour.

White bass comprised 11.3 percent of the total catch. The catch rate above the plant was fairly constant during the two seasons. In the plant area and below Lock and Dam 3, the catch rate for white bass in the fall was almost twice as high as in the spring. Catch rates ranged from 8.80 to 16.00 fish per hour.

Gizzard shad represented 11.0 percent of the total catch. All of these were young-of-the-year fish. The catch rate of gizzard shad above the plant was considerably higher in summer than in fall. The catch rate in the fall in the plant area was almost five times higher than during the summer. Below Lock and Dam 3, the fall catch rate was three times higher than the summer catch rate.

Saugers, 10.2 percent of the total catch, comprised 21.0 percent of all fish caught night electro-fishing below Lock and Dam 3 during the fall. The catch rate for this area was 39.20

fish per hour in the fall, but only 4.80 fish per hour during the summer. In the other areas during both seasons, catch rates of saugers ranged from 7.20 to 12.80 fish per hour.

The catch rate of carp was almost constant above the plant and below Lock and Dam 3 during the two seasons with the catch rate below Lock and Dam 3 almost three times as high as the area above the plant. The catch rate in the plant area was 1.5 times higher in fall than in summer. The highest catch rate for carp, 20.00 fish per hour, was in the fall in the plant area.

During both seasons, the catch rate for shorthead redhorse was highest below Lock and Dam 3 and lowest in the plant area. No shorthead redhorse were taken by night electro-fishing in the plant area in the fall.

Walleyes comprised 6.5 percent of the total night electro-fishing catch. The highest catch rate (29.60 fish per hour) was in the fall below Lock and Dam 3. This is over four times the catch rate for the same area during the summer. The catch rate for the plant area in the fall, 8.00 fish per hour, was more than double for the same area during summer. The catch rate for walleyes in the area above the plant was higher in summer than in fall, 7.80 and 4.20 fish per hour, respectively.

A summary of night electro-fishing by area and season is listed in Tables 2.5.2-11 and 2.5.2-12. A length frequency of all fish caught in all areas during both seasons is presented in Table 2.5.2-14.

2.5.2.3.4 Trawling

Approximately two hours of trawling completed the 1975 sampling with a total catch of 1,443 fish (19 species). The spring sampling was composed of 11 minutes of trawling in the intake area, 16 minutes in the discharge canal, and a total of 28 minutes at the two stations in North Lake. Fall trawling consisted of 15 minutes in the intake and discharge. Fifteen minutes were spent trawling at each station in North Lake for a total of 30 minutes.

Although almost equal amounts of time were spent trawling in the plant area and North Lake, trawling in North Lake produced 94 percent of the total trawl catch. Fall catches in North Lake were considerably higher than spring catches.

Young-of-the-year gizzard shad (58.6 percent) and white bass (31.0 percent) accounted for 89.6 percent of the 490 fish caught trawling in North Lake during spring. Young-of-the-year gizzard shad (79.1 percent) and both black and white crappies (10.7 percent) made up 89.8 percent of the fish caught during fall trawling in North Lake. In the plant area, catches of gizzard shad, white bass, and crappies were either non-existent or negligible during both seasons. Table 2.5.2-15 summarizes trawling catches by area and season. A length-frequency distribution for fish caught by trawling is presented in Table 2.5.2-16.

A comparison of catches during 1974 and 1975 shows that high catches were gizzard shad and white crappies in North Lake during spring 1975. Catches of drum and white crappies in North Lake and gizzard shad and drum in the plant area were higher in fall 1974, than fall 1975.

2.5.2.3.5 Shoreline Seining

During the spring seining in 1975, two stations could not be seined due to high water resulting in a total of 44 seine hauls comprising 1.38 surface hectares of water. This closely compares with 1974 when 47 stations were seined totalling 1.41 surface hectares (Table 2.5.2.-17). A total of 2,254 fish was collected during 1975 shoreline seining.

To provide more useful data for assessing natural reproduction in future years, most fish caught by seining were separated into adult and young-of-the-year categories (Table 2.5.2-18). Minnows and darters were not separated in this manner. The seining length-frequency distributions (Table 2.5.2-19) were used to estimate how many of the fish were young-of-the-year. During both 1974 and 1975, catches were largest for minnows and darters, gizzard shad, and white bass. Seine catches from 1973 are not directly comparable with 1974 and 1975 because:

1. Most of the 1973 seining was done in late August with a few additional hauls in late October, while 1974 and 1975 seining was done in July, August, and October.
2. The seine used in 1973 was twice as deep and twice as long as that used in 1974 and 1975.

Gizzard shad comprised about one-third of the total number of fish caught by seining in 1975 (Table 2.5.2-20). Emerald shiners comprised one-quarter of the total number of fish seined. Emerald shiners were most abundant in the areas below Lock and Dam 3 where they accounted for 38.7 percent of the seine catch.

Seining, like other fishing gear, is selective toward some species and sizes of fish. In future years, seining data may be useful in measuring reproductive success of some species, but any overall assessment of natural reproduction should include electro-fishing data also.

Catches per hectare in the Prairie Island vicinity were compared with catches per hectare in Lake St. Croix for several groups of species. White bass young-of-the-year catches in Lake St. Croix were 172.8/ha in 1970 and 332.7/ha in 1969. In the Prairie Island vicinity, catch rates were 163.1 fish/ha in 1974 and 145.6/ha in 1975 for white bass young-of-the-year. Catches of minnows and shiners in Lake St. Croix during 1970 were 847.8/ha, compared with 489.9/ha in 1975 and 922.0/ha in 1974 in the Prairie Island area.

2.5.2.3.6 Tagging

Results of the tagging study indicate that adult game fish in the Prairie Island vicinity are very mobile. Through the end of the 1975 sampling, a total of 3,737 fish have been tagged, 2,022 of them during 1975 (Table 2.5.2-21). Species tagged were northern pike, white bass, sauger, walleye, large and smallmouth bass, and channel and flathead catfish. White bass, sauger, and walleye represent 87 percent of fish tagged. A return rate of 6.8 percent overall has been found.

An attempt was made to analyze movements of fish species by considering where and when they were tagged during 1974 and 1975. Fish tagged in 1974 and returned in 1975 were not included in this analysis because this was an attempt to determine seasonal

movements of fishes. Table 2.5.2-22 indicates the location where fish were recovered relative to where they were originally tagged and the average distance travelled by each fish.

Regardless of where the fish were tagged, very few were recaptured in the plant area. There is very slight angling pressure here, but it is surprising that more tagged fish have not been recovered given the extent of the sampling in this area.

2.5.2.3.7 Fish Condition and Growth

Condition factors (K) were calculated for white bass, smallmouth bass, saugers, and walleyes from the Prairie Island vicinity 1973 - 1975 (Table 2.5.2-23) using the Iowa SHAD program (Mayhew 1973). "K" was determined for each length group for each species and a weighted mean condition factor was calculated. Young-of-the-year fish were included in the condition factor calculations for 1975. This group was not included in condition factor calculations for 1973.

Table 2.5.2-24 indicates mean expected weights of fish having specified lengths. These were calculated using the length-weight relationships of Figures 2.5.2-3 through 2.5.2-6 and length-weight relationships from Naplin and Geis (1975).

Using measurements from the scale samples, the Iowa SHAD program was also used to determine total length at annulus formation. Growth increments for each year were also calculated. Average total lengths at each annulus and growth increments for white bass, smallmouth bass, saugers, and walleyes are

listed in Tables 2.5.2-25 through 2.5.2-32.

2.5.2.3.8 Spawning Studies

2.5.2.3.8.1 Temperature Monitoring

Water temperatures in Sturgeon Lake during the recording period ranged from 4.4°C on midnight of April 23 to 28.3°C on midnight of June 28 (Figure 2.5.2-7). Midnight temperatures were used to eliminate the effects of direct sunlight upon the temperature recorder.

2.5.2.3.8.2 Early Trap Netting

Early trap netting proved to be an effective method of capturing fish for tagging from North Lake, Sturgeon Lake, and plant area. Approximately 950 were tagged from these sets between April 22 and May 23, 1975.

Trap netting catches of fish during this early trap netting season were grouped into six general areas of Sturgeon Lake, North Lake, and the immediate plant area. Catch rates for nine species (carp, northern pike, shorthead redhorse, channel catfish, white bass, crappies, saugers, walleyes, and freshwater drum) were calculated and compared with catch rates during other seasons of the year. Only two species, carp and freshwater drum, occasionally had higher catch rates during this early trap netting period than they had during the later months of the year. Early season catch rates for freshwater drum, were twice as high at the southeastern end of North Lake and midway along the southwestern shore of Sturgeon Lake as

they were in those areas during other times of the year. At the southeastern end of North Lake, in the area south of the discharge canal dike and in the discharge area, carp were caught at 1.5 to 5 times the rates usually found at these stations later in the year.

Gravid individuals of several species, including northern pike, smallmouth buffalo, bigmouth buffalo, sauger, and walleye were captured during the April and May trap netting, but not in above average numbers. Gravid fish were captured at most of the stations which were netted, but did not appear to concentrate in any particular area.

2.5.2.3.8.3 Larval Fish Tows

Larval fish were present in samples during the first week of sampling, May 19 - 23, 1975 and were noted at six of eight stations during the week of August 11 - 15. No samples were taken during the weeks of August 18 - 22 and August 25 - 29. Larval fish were found in only one of four stations sampled during the last week of towing, September 1 - 5, 1975 and were present at a rate of only 0.02 fish/m^3.

Fish were caught during each week of the sampling. Abundance of larval fish varied from week to week, with several "peaks" occurring through the sampling season (Table 2.5.2-33). Eggs were rarely caught so only larval fish are dealt with here. Each tow strained from 30 to 286 m^3 of water.

Catches from Stations 1, 2, and 3 were combined and weekly mean numbers of fish/m^3 were calculated. These means were plotted

against time (Figure 2.5.2-8). Maximum numbers of larval fish were caught during the week of June 2 through 6, 1975. Mean catches for these three stations remained highest through the week of June 30 through July 4, after which they dropped below 0.20 fish/m^3.

2.5.2.4 Discussion

Data obtained from the sampling programs were used to measure changes in fish population structure as well as to monitor fish movement, condition, growth, and reproduction in the Prairie Island area. Changes in population structure were measured using abundance indices, species composition, and species diversity. Fish movements were examined in a tagging study. Length and weight data were used in calculating expected weights and condition factors. Scale samples were used to determine growth rates. Reproduction was studied using temperature, trap net, and larval tow data.

2.5.2.4.1 Population Structure

2.5.2.4.1.1 Abundance Indices

The abundance index was calculated to compare the abundance of major species of fish in each year, relative to a base period. This method of handling catch data was devised by Hile (1962) and the calculations and their application to the Prairie Island fish study are explained by Naplin and Geis (1974).

A base period was calculated for the years 1973, 1974, and 1975 using fall and summer trap netting catches and fall gill net

catches to allow for a good comparison. Spring trap net and gill net catches were not used for calculations, because catch rates resulting from seasonal spawning movements of fish might bias fish species abundance. Electro-fishing, seining, and trawling were used to measure various other parameters of the fish population.

Twelve species were selected for abundance comparisons: carp, smallmouth bass, gizzard shad, shorthead redhorse, freshwater drum, walleye, channel catfish, rock bass, white bass, carpsucker spp., green sunfish, and sauger. Selection of fish species was based on electro-fishing data. All species except sauger comprised at least one percent of the catch from the Mississippi River near Prairie Island (Peterson 1975). Saugers were included as they are a major species in areas adjacent to the study area.

Abundance indices for the 12 species combined are relatively constant for 1973 and 1974, but a slight overall decline was noted in 1975. Although the observed catches are significantly different from the expected catches for all three years, additional data are required to indicate any trend in the combined indices.

Abundance indices in Table 2.5.2-34 marked by asterisks indicate a significant difference between the expected and the observed catch. A chi-square test revealed that there is less than a five percent chance of these catches being similar.

Table 2.5.2-34 Abundance indices for 12 major fish species in the Prairie Island vicinity, 1973-1975.

Species	Year			Trend	No Trend
	1973	1974	1975		
Gizzard shad	0.97	0.66*	1.38*		X
Carp	0.94	1.48*	0.70*		X
Carpsucker spp.	1.47*	0.79	0.85		X
Shorthead redhorse	1.07	1.78*	0.49*		X
Channel catfish	1.20	0.93	0.92	X	
White bass	0.89*	1.52*	0.72*		X
Rock bass	1.71*	1.47*	0.30*	X	
Green sunfish	- **	-	-		
Smallmouth bass	-	2.50	0.69	X	
Sauger	1.44*	0.81*	0.86*		X
Walleye	1.50*	0.91	0.76*	X	
Freshwater drum	1.31*	1.43*	0.58*		X
All Species	1.05*	1.09*	0.89*		X

* Significant difference between expected catch and observed catch shown by a chi-square test.

** Hyphen (-) indicates no fish were caught.

Some factors which may contribute to significant differences between observed and expected catches are:

1. small sample size
2. seasonal movements of certain species
3. variable spawning success
4. changes in vulnerability to certain types of gear
5. unfavorable habitat

Populations of most species exhibited fluctuations. These fluctuations are common in nature and may be caused by variable environmental condition such as weather or water levels.

Using data from summer and fall trap netting and fall gill netting, catches of carpsuckers, rock bass, smallmouth bass, channel catfish, and walleye were found to be low.

Some species and sizes of fish are seasonally quite vulnerable to certain types of gear. For example, gill net catch rates for gizzard shad and saugers were two to twenty times higher during the fall than during spring (Table 2.5.2-6). Young-of-the-year gizzard shad which were not vulnerable to gill nets during the spring comprised a large portion of the fall gill net catch. Only half as many carp and freshwater drum was taken during fall trap netting as during summer trap netting. Large summer catches of carp and freshwater drum may represent fish which were spawning or had recently finished spawning.

Populations of carp, gizzard shad, shorthead redhorse, carpsuckers, white bass, saugers, and freshwater drum revealed no tendency to either increase or decrease during the three-year period. About one-half of the observed catches is significantly different from expected catches; this is probably because of variable spawning success.

Length frequency data for gizzard shad indicate a good year class for 1975 (Table 2.5.2-7). Fall gill net catches in 1975 were 80 percent higher than the 1973 fall catch and 100 percent above the 1974 fall gill net catch (Tables 2.5.2-35 through 2.5.2-37).

Walleye populations indicate a downward tendency. Length-frequency data indicate that young-of-the-year walleyes are

absent from fall gill net catches in 1974 and 1975. This suggests poor year classes for those years.

2.5.2.4.1.2 Species Composition

Changes in species composition can be useful in monitoring environmental changes. Species composition of fish caught by each type of gear has been discussed previously. Here, a brief comparison will be made between species composition in the Prairie Island area and in other areas of Minnesota.

The fish were collected by electro-fishing during daylight hours in the Mississippi River main channel above Lock and Dam 3 (Section 2). The numbers and percentages of fish are totals of spring, summer, and fall sampling. Fish were grouped into five categories: large rough fish, game fish, pan fish, minnows and darters, and other fish (Table 2.5.2-38). When minnows and darters were included in the calculations, they were the most abundant group, totalling 30.92 percent of the sample. Large rough fish comprised 24.56 percent of the sample, game fish 20.67 percent, and other fish 22.08 percent. When minnows and darters were excluded from species composition calculations, large rough fish, game fish, and other fish each made up about one-third of the sample, with panfish accounting for only 2.50 percent of the catch. In 1973 species composition was as follows in Section 2: large rough fish 35 percent, game fish 31 percent, other fish 27 percent, and panfish 7 percent. The 1973 data includes only summer and fall electro-fishing, but species composition in 1975 appears to be very similar to that of 1973 in Section 2.

Peterson (1975) compared the species compositions of 16 warm water rivers in Minnesota. Most of these rivers had lower percentages of game fish and higher percentages of large rough fish than were found in the Mississippi River in the Prairie Island vicinity. When species composition in the Prairie Island vicinity was compared with sections of the Mississippi River from Lake Winnibigoshish in northern Minnesota to Lock and Dam 2, only one of eight sections had a higher percentage of game fish than the section near the Prairie Island Plant. Three years of data from an additional section reveal one year with a slightly lower percentage, the second year with a considerably higher percentage, and the third year with an almost equal percentage of game fish as in the Prairie Island vicinity. Seven of the nine sections had higher percentages of large rough fish than were found in the main channel near Prairie Island.

The major species caught by electro-fishing in 1975 were similar to those of 1974. Again, excluding minnows and darters, carp were the most abundant species caught by day electro-fishing in Section 2, accounting for 26.3 percent of the total (Figure 2.5.2-3). Following carp in abundance were gizzard shad (20.2 percent), smallmouth bass (12.3 percent), and freshwater drum (11.0 percent). The most abundant game fish were smallmouth bass (12.3 percent), white bass (6.6 percent), walleye (5.4 percent), and sauger (3.6 percent).

From the anglers' viewpoint, game and sport fish are considered most desirable while large rough fish and other fish are considered less desirable. The species composition in the Prairie Island vicinity appears to be more desirable than that found in most other sections of the Mississippi River thus, species

composition in the Prairie Island vicinity compares favorably with other sections of the Mississippi River further upstream.

2.5.2.4.1.3 Diversity

2.5.2.4.1.3.1 Overall Diversity

The species composition of fish populations in the Prairie Island vicinity was also evaluated using the diversity index $\bar{d}$. Diversity indices are helpful in measuring the quality of the environment and measuring the effect of stress on the structure of a biological community. According to Weber (1973), it is often observed that environments having relatively low stress do not tend to be dominated by an individual species. A low index (less than 1.0) will show dominance (90 percent or more) by one or two species, and a high index (greater than 3.5) indicates a diverse population with one or two species, comprising less than 47 percent of the total catch (Peterson 1975).

The two components of species diversity are: a) richness of species, and b) distribution of individuals among the species. The formula used for calculating the mean diversity ($\bar{d}$) is:

$$\bar{d} = \frac{C}{N} (N \log_{10} N - \Sigma n_i \log_{10} n_i)$$

where C equals 3.321928 (converts base 10 logs to base 2 logs), N equals total number of individuals, and n_i equals total number of individuals in the i^{th} species (Lloyd, Zar, and Karr 1968, as cited by Weber 1973).

Diversity indices for the main channel of the Mississippi

River above Lock and Dam 3 (Section 2) were calculated from daytime electro-fishing data from spring, summer, and fall. Diversity indices can be compared with those from other Minnesota rivers, because backwater areas off the main channel (Sections 0, 1, and 3) were not included in diversity calculations. When calculating diversity indices for large rivers, Peterson (1975) excluded minnows and darters from his calculations for large rivers. Minnows and darters were also excluded from diversity calculations in this report.

Diversity indices from electro-fishing data were virtually the same during 1973, 1974, and 1975 (Table 2.5.2-39). The index for 1975 was 3.08. These values are slightly higher than those of other large Minnesota rivers, most of which have a $\bar{d}$ of 1.8 to 2.8 (Peterson 1975). These calculations indicate that the fish population of the Mississippi River is quite diverse. A total of 60 species of fish have been collected during this study from the Mississippi River and backwaters near the Prairie Island Plant (Table 2.5.2-1). Large numbers of one species do not dominate electro-fishing catches. Rough fish (carp and catostomids) might be expected to comprise upwards of 70 percent of the catch in other large warm water Minnesota rivers (Peterson 1975).

Diversity indices were calculated from seining data using similar methods. These $\bar{d}$ values were lower than those from electro-fishing data (Table 2.5.2-39). (Diversity calculations for seining included all sections, not just Section 2.) Excluding minnows and darters, $\bar{d}$'s from seining data ranged from 1.57 in 1973 to 2.54 in 1974. The low value in 1973 is because of large numbers of young-of-the-year gizzard shad and white bass.

Seining data also indicate a diverse population, but $\bar{d}$ varies more than the $\bar{d}$ calculated from electro-fishing data.

2.5.2.4.1.3.2 Diversity in the Intake and Discharge Area

Diversity indices were calculated for four electro-fishing stations (3-0, 3-1, 3-2, and 3-3) adjacent to the plant. Stations 3-0 and 3-1 are warmed by the discharge only when wind blows warm surface water from the discharge upstream to the intake. Stations 3-2 and 3-3 are in the discharge canal.

For the spring, summer, and fall seasons, diversity indices at each station were compared with surface water temperatures at each station. Results are listed in Table 2.5.2-41. All of the diversity index values were low when compared with the main channel ($\bar{d}$ = 3.08).

The lowest diversity indices were found at Stations 3-1 (0-200 m upstream from discharge structure) and 3-2 (discharge canal). The lowest diversity index (1.00) occurred when the surface water temperature was 34.0°C, the highest temperature recorded in Table 2.5.2-41. In warm water streams, a diversity index below 1.8 usually indicates a considerable amount of stress (Peterson 1975). This stress can be caused by factors such as unfavorable temperatures, poor habitat, pollution, etc. In these four electro-fishing stations, there is evidence of low diversity being related to high water temperatures, especially water temperature of 34.0°C and above. It is also possible that a large fluctuation in temperature may stress fish and cause a lower diversity index. The mean diversity index for these four stations was lowest during the summer (2.09). A more detailed study of diversity and temperature will be conducted in 1976 in the plant discharge area.

2.5.2.4.2 Fish Movements

The tag returns from walleyes, saugers, and white bass indicate that many of these fish moved a considerable distance during a year (Table 2.5.2-22). For example, the average downstream distance travelled for 14 white bass tagged above the plant area was 39.7 miles. Note that this is a minimum straight-line distance between the area where the fish was tagged and the area where it was recaptured. For white bass, saugers, and walleyes there was a tendency for fish to be recaptured downstream from the location where they were tagged (Figures 2.5.2-10 and 2.5.2-11). This may indicate: 1) fish were more susceptible to recapture in downstream areas (e.g., Lake Pepin) than in areas upstream, 2) there actually was a trend to travel downstream, possibly caused by seasonal migrations, or 3) some combination of 1) and 2) may be occurring.

Roughly, one-third of tag returns from white bass and saugers and two-thirds of tag returns from walleyes were during the spring season. This indicates that these fish are moving an appreciable distance in a short period of time.

One white bass recorded in Table 2.5.2-22 travelled downstream 110 miles from the location tagged during a 3.5-month period. Most northern pike returns were made by the survey crew in the study area. This indicates a somewhat sessile fish population. Not enough tag return information is available on other species from this project.

Fish probably move to find suitable spawning areas, food, preferred water temperatures, or for reasons which might be called instinctual. Fish may be moving to the discharge or attracted

by forage fish congregating in the discharge, especially during winter. There is a need for more information on the movement of fish into and out of the discharge and intake areas of the plant, especially during fall, winter, and spring.

2.5.2.4.3 Fish Condition and Growth

The condition factor "K" is an expression of the relative "plumpness" or "leanness" of a fish. The value of "K" tends to increase for older fish, because as fish grow older, they usually put on weight proportionately faster than length. An important use of condition factors is for making comparisons of the relative well being of fish (Rounsefell and Everhart 1953).

Compared with 1973, weighted mean condition factors were slightly lower in 1975. Growth rates calculated from the 1975 scale samples were generally similar to those from the 1973 scale samples (Naplin and Geis, 1975). For example, the grand average calculated length of four-year old white bass was 332 mm compared with 334 mm in 1973 (Tables 2.5.2-25 and 2.5.2-26). More of a difference was noted between smallmouth bass from the 1973 and the 1975 sample (Tables 2.5.2-27 and 2.5.2-28). Saugers from the 1975 sample appear to have grown slightly slower than those from the 1973 sample (Tables 2.5.2-29 and 2.5.2-30). This difference shows up more in the younger fish. Walleys from the 1975 sample had growth rates quite similar to those of the 1973 sample (Tables 2.5.2-31 and 2.5.2-32). Time did not permit further analysis of fish growth rates; a more in-depth analysis will be included in next year's report.

2.5.2.4.4 Spawning Studies

The temperature monitoring, early season trap netting, and larval towing studies were intended to answer the following questions:

1. When might fish be expected to spawn in the Prairie Island vicinity?

2. When were larval fish and eggs present and when were they most abundant?

3. Where does most of the spawning occur? Is Sturgeon Lake, directly upstream from the generating plant, an important spawning area? Are there particular areas in Sturgeon Lake where spawning fish of selected species tend to concentrate?

4. Where was the major source of ichthyoplankton? Did much of it originate in Sturgeon Lake or elsewhere?

Temperature data provided information which could be used in analyzing early season trap netting and larval towing data. Most fish species are known to spawn only within certain water temperature limits (Rounsefell and Everhart 1953). Water temperature is also an important factor in determining the amount of time required for fish eggs to hatch (Royce 1972).

Sauger and walleye are early spawners in the study area, spawning at temperatures of 3.9°C to 6.1°C. In a temperature range of 4.5-12.8°C, hatching takes approximately 25-29 days

for saugers and 12-18 days for walleyes (Scott and Crossman 1973). Based on water temperature data and examination of adult fish, sauger and walleye spawning probably occurred during the last two weeks of April, and larval sauger and walleye would start to appear around mid-May. According to preliminary data from the NSP entrainment study at Prairie Island, sauger and walleye fry first appeared in the May 15-16 sample. Entrainment samples were collected one day per week. Highest numbers of saugers and walleyes were found in the May 21-22 sample, and these species were present in samples for several weeks after they first appeared in the samples.[1] Thus preliminary entrainment data seem to confirm the late-April spawning prediction.

Larval fish tows were made in an effort to determine when and where larval fish and eggs were most abundant. Abundance of larval fish in tow samples varied from week to week. High numbers of ichthyoplankton probably indicate that certain species had good spawning success. High numbers of larval fish in early June suggest that perhaps early spawners enjoyed good spawning and hatching success in comparison with other species. In 1974, when peak larval fish numbers occurred in late July (Naplin and Geis 1975), late spawning fish probably experienced good spawning and hatching success.

It would be useful to know where fish are spawning in relation to the Prairie Island Plant. Certain areas of Sturgeon Lake and North Lake appear to have suitable spawning habitat for walleyes and saugers. Catch rates and sexual condition of fish were recorded to determine the following: 1) whether fish of any given species were present in unusually large numbers; and 2) whether the fish were ready to spawn. The occurrence of above-

[1] Personal communication from Kenneth Mueller, Prairie Island Environmental Laboratory, May 14, 1976.

average numbers of a species along with high percentages of gravid individuals could indicate a concentration of spawning fish.

After examining the temperatures at which the above-average catches of carp were found, they seemed too low for spawning. It seems unlikely that the above-normal catches indicate spawning concentrations. Highest catches did not occur during the times when the water temperature was high enough for carp spawning. In areas where above-normal numbers of carp were caught, catch rates did not appear to have any direct relationship with water temperature. Carp generally do not spawn until the water temperature reaches at least 17°C (Swee 1966, as cited by Scott and Crossman 1973). Water temperature was below this level when highest catches were obtained. Eddy and Underhill (1974) report that freshwater drum spawn in May and June, but none of the freshwater drum caught during early trap netting appeared ready to spawn. Though freshwater drum or carp may have been spawning toward the end of the early trap netting period, there is no indication that spawning concentrations of these species were located. There is abundant spawning habitat for major Mississippi River fish species. It is likely that spawning fish do not concentrate in a few main areas to spawn, but rather use much of the habitat which is available to them.

Highest numbers of larval fish were captured at Stations 1, 2, and 3 near the outlet of Sturgeon Lake. Larval fish were also collected in a cut flowing from North Lake (Station 6) and in a cut coming from the Mississippi River main channel (Station 7). The number of larval fish per m^3 of water increases between

the time that the water flows into Sturgeon Lake and the time that it leaves the lake (Table 2.5.2-23). This seems to indicate that Sturgeon Lake serves as a source of larval fish.

2.5.2.5 Summary

A third season of sampling was conducted in 1975 to determine the effects of the Prairie Island Generating Plant (Red Wing, Minnesota) on the fish population of the Mississippi River. Fish were collected with five types of gear to monitor changes in the population. Three major parameters were used to detect these changes: population structure, fish movements, and condition.

Population structure was examined using abundance indices, species composition, and diversity indices. Abundance indices for 12 species combined are relatively constant for 1973 and 1974, but 1975 shows a slight overall decline. Indices for carp, gizzard shad, shorthead redhorse, carpsuckers, white bass, sauger, and freshwater drum showed no tendency to either increase or decrease for the period 1973-1975. Fall gill net catches indicate a decreasing abundance of walleyes and increasing abundance of gizzard shad. Future years of data will indicate whether any longer-term trends exist.

Species composition of the fish population in the Prairie Island area reveals a population which had roughly equal proportions of game fish, large rough fish, and other fish. When minnows and darters are included in the calculations, they account for about 30 percent of the fish population as determined from electro-fishing data. From the anglers'

viewpoint, the species composition appears to be more desirable than that found in most other upstream sections of the Mississippi.

Diversity of the population as determined from electro-fishing has remained virtually the same from 1973 to 1975. The diversity index $\bar{d}$ for 1975 was 3.08, higher than that of most other large Minnesota rivers. Although fish population is diverse and is not dominated by any one species in the areas affected by the plant's heated discharge, there was some indication of decreased diversity with higher temperatures. Tagging data indicate a highly mobile fish population in the Prairie Island vicinity. It is common for adult fish to travel over 20 miles upstream or downstream within less than one year. Thus, effects of the plant may be masked by the mobility of adult fish. More data are needed on local distribution of fish in the immediate area of the generating plant.

Condition factors revealed that fish were slightly leaner in 1975 than in previous years. More data are needed to determine whether or not a trend exists.

2.5.2.6 Acknowledgements

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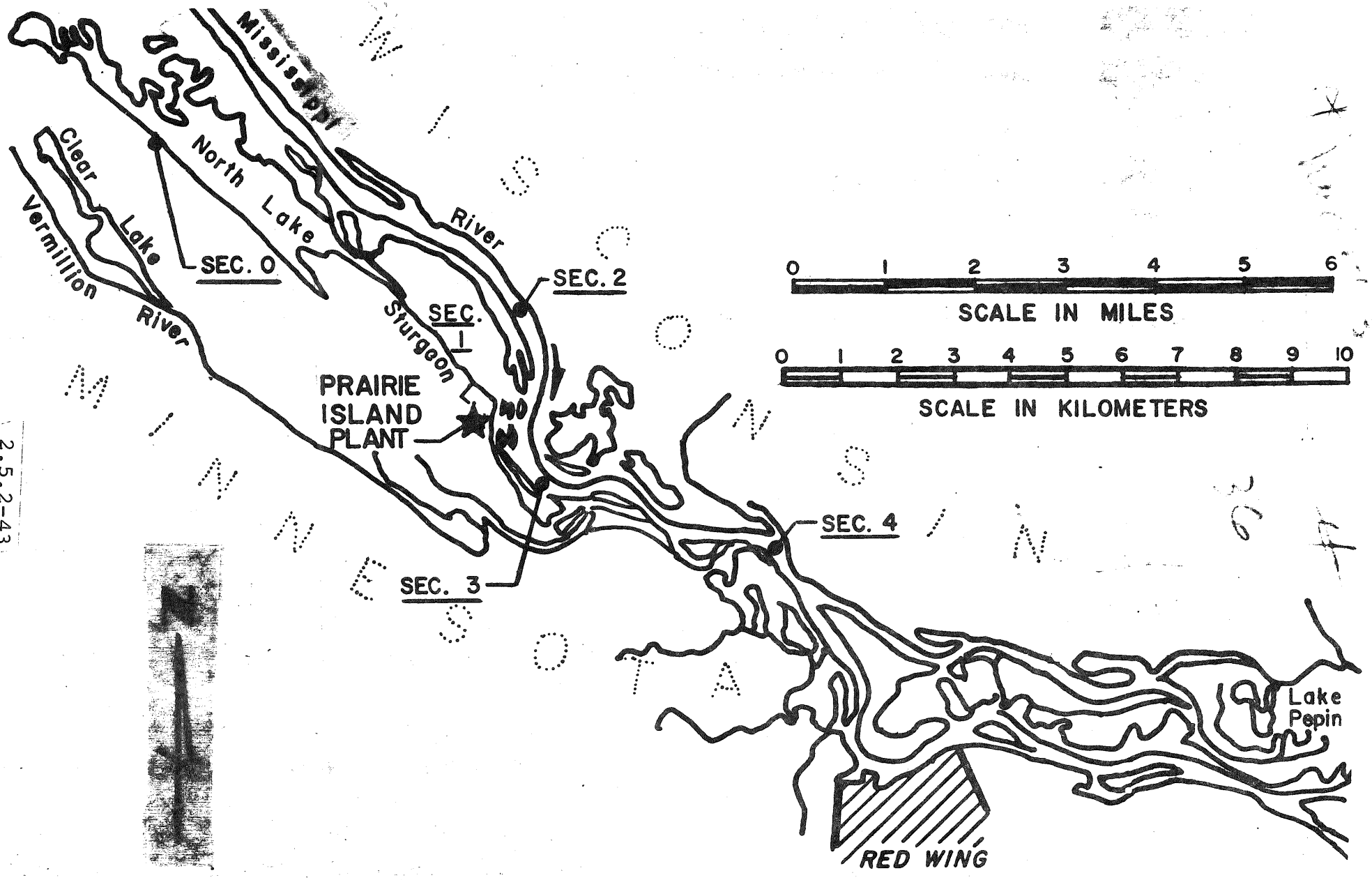

2.5.2-43

FIGURE 2.5.2-1. THE FISH POPULATION STUDY SECTIONS USED IN THE PRAIRIE ISLAND GENERATING PLANT AREA

FIGURE 2.5.2 - 2A LOCATION OF LARVAL FISH TOWING STATIONS AT PRAIRIE ISLAND, 1975.

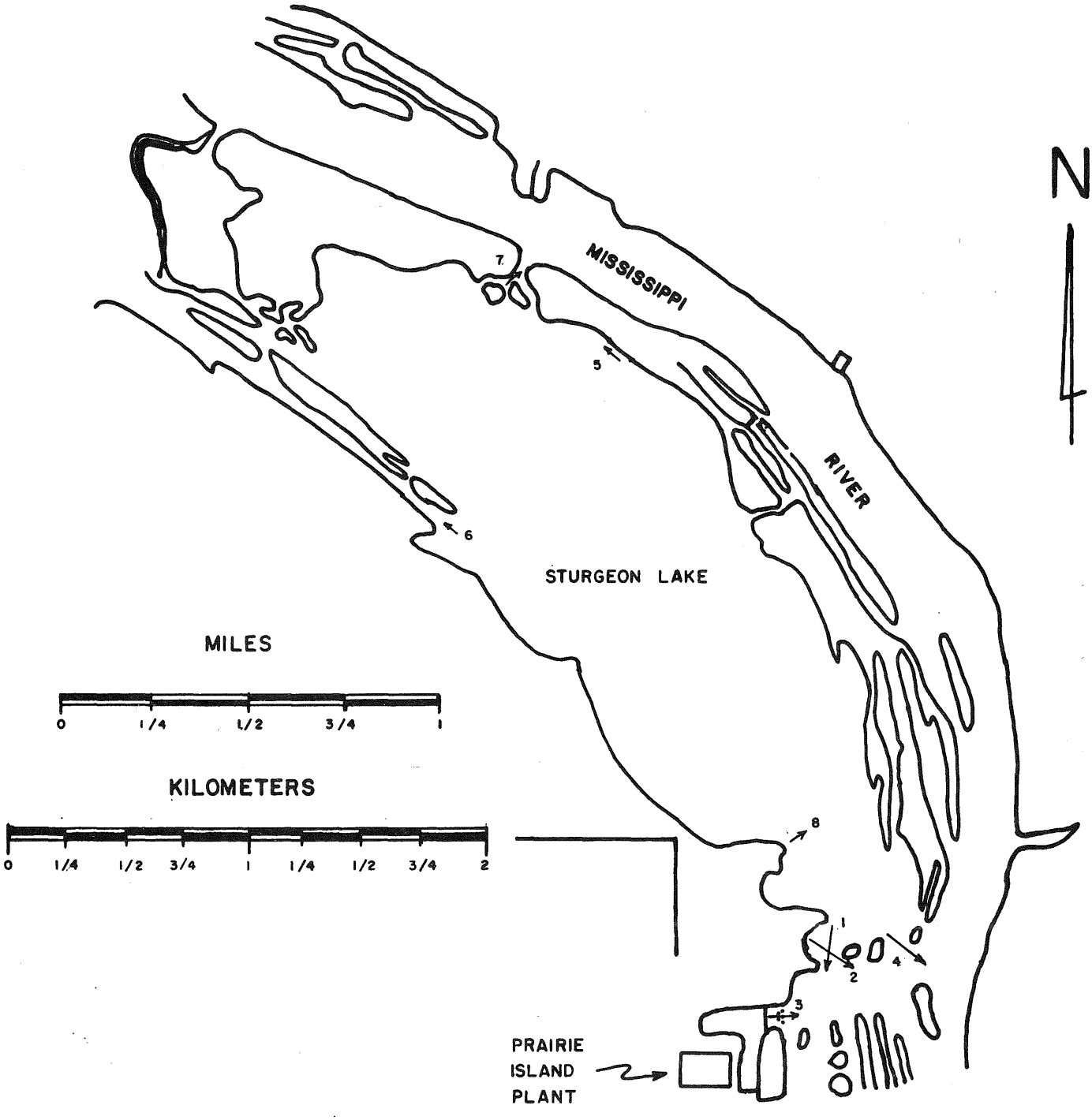

FIGURE 2.5.2 - 2B DETAIL MAP OF LARVAL FISH TOWING STATIONS AT PRAIRIE ISLAND, 1975.

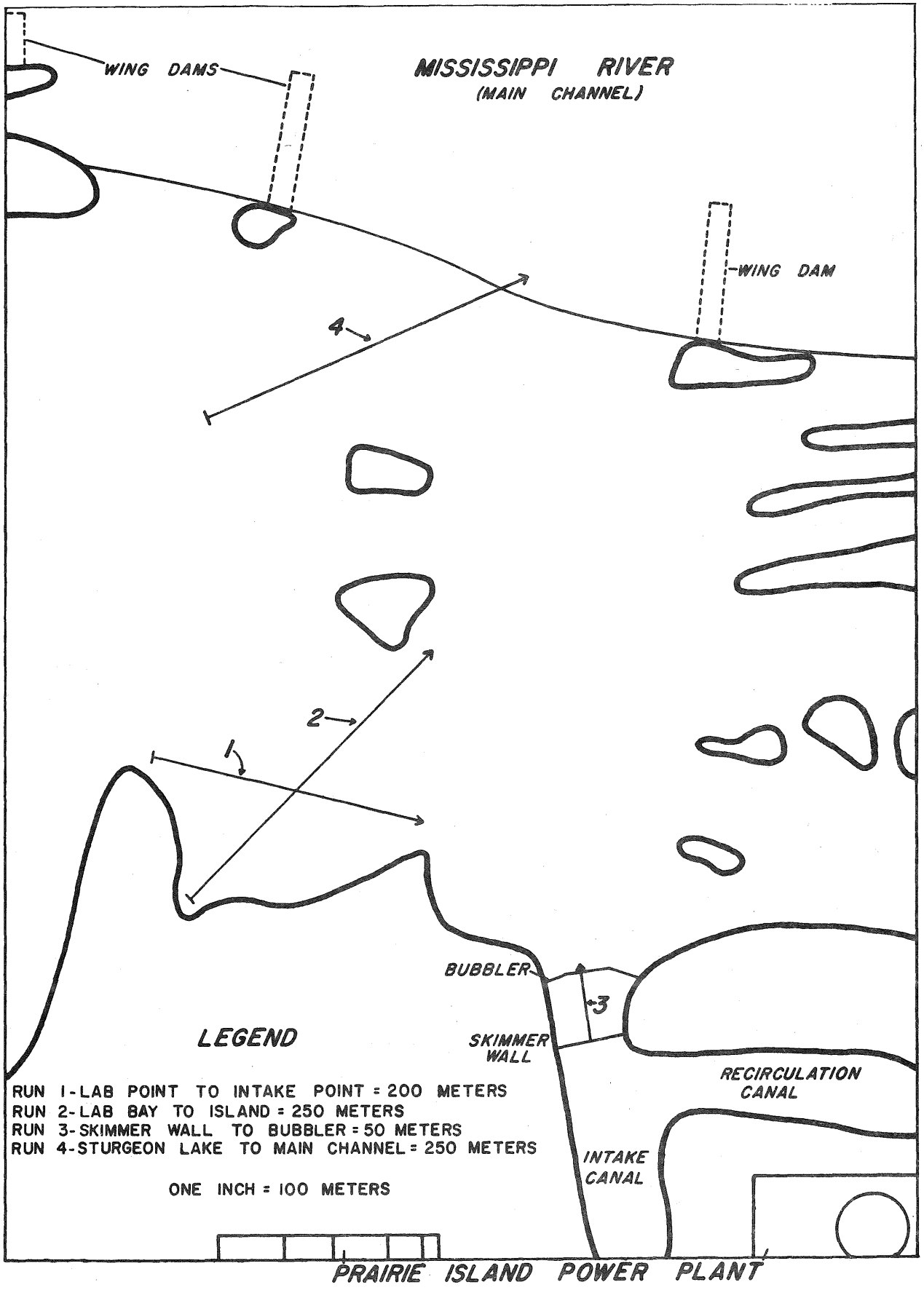

FIGURE 2.5.2-3 LENGTH-WEIGHT RELATIONSHIP OF GROUPED MEANS FOR WHITE BASS, SUMMER AND FALL SAMPLING SEASONS, 1975. (all stations)

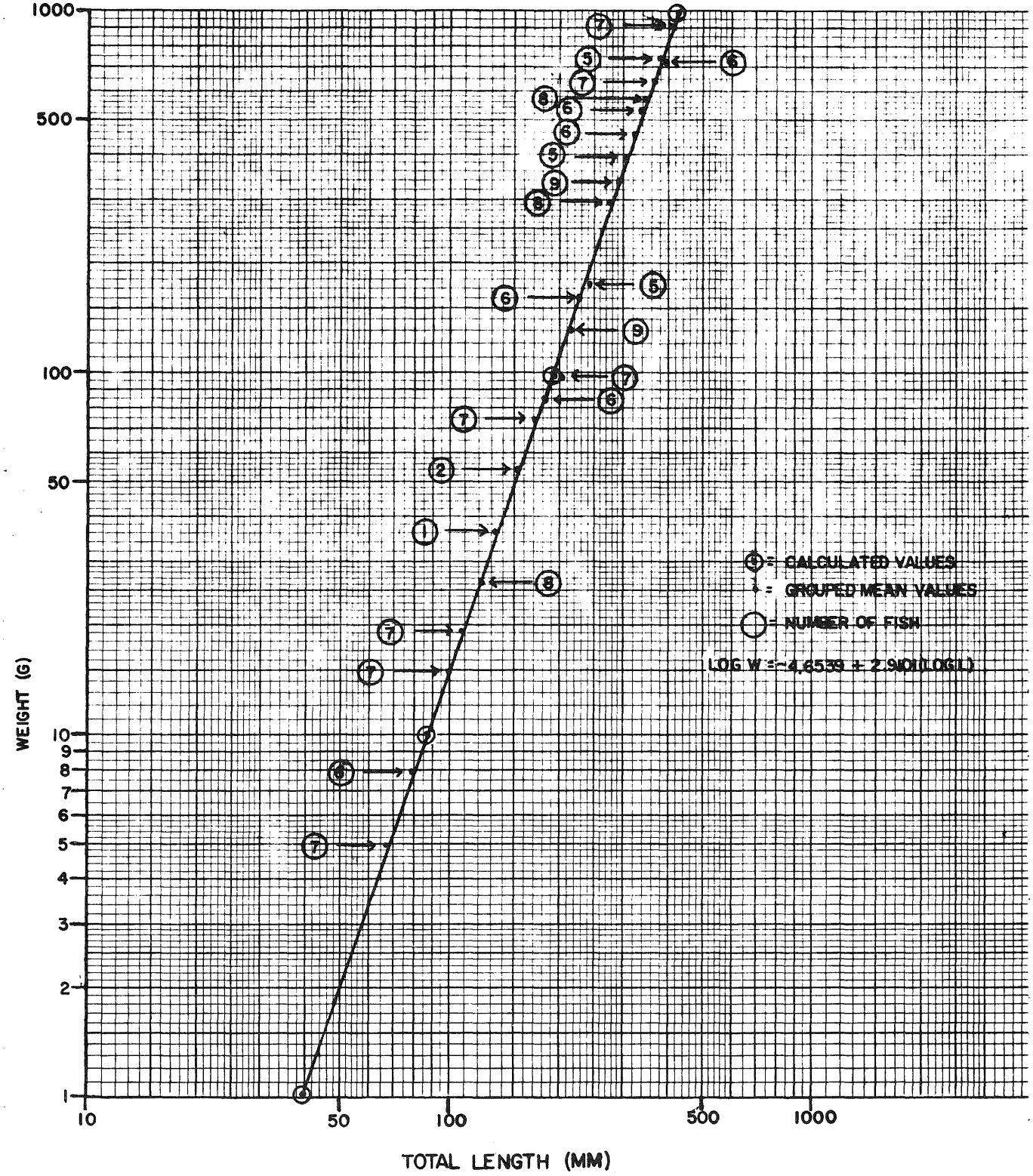

FIGURE 2.5.2-4 LENGTH-WEIGHT RELATIONSHIP OF GROUPED MEANS FOR SMALLMOUTH BASS, SUMMER AND FALL SAMPLING SEASONS, 1975. (all stations)

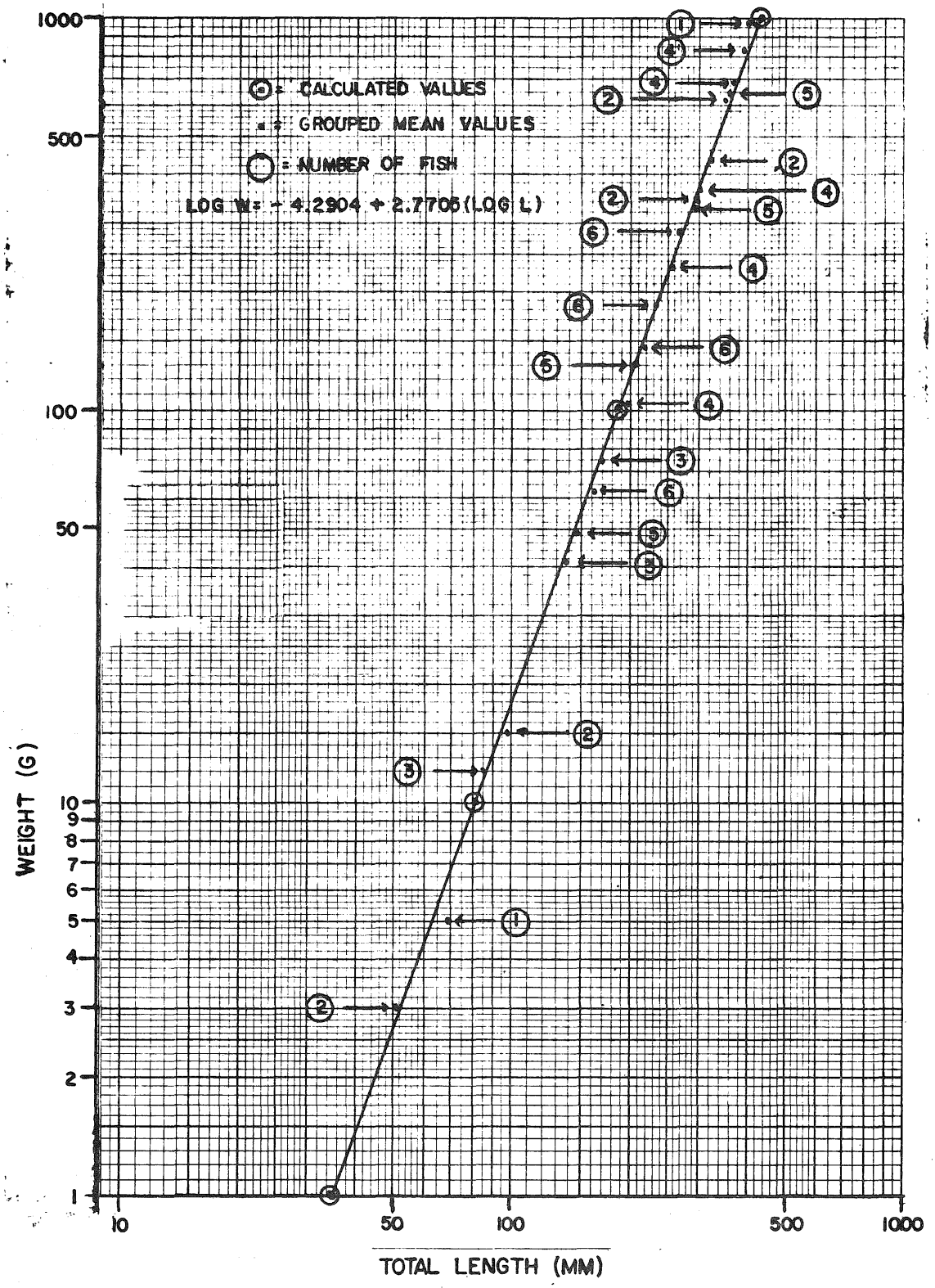

FIGURE 2.5.2-5 LENGTH-WEIGHT RELATIONSHIP OF GROUPED MEANS FOR SAUGER, SUMMER AND FALL SAMPLING SEASONS, 1975. (all stations)

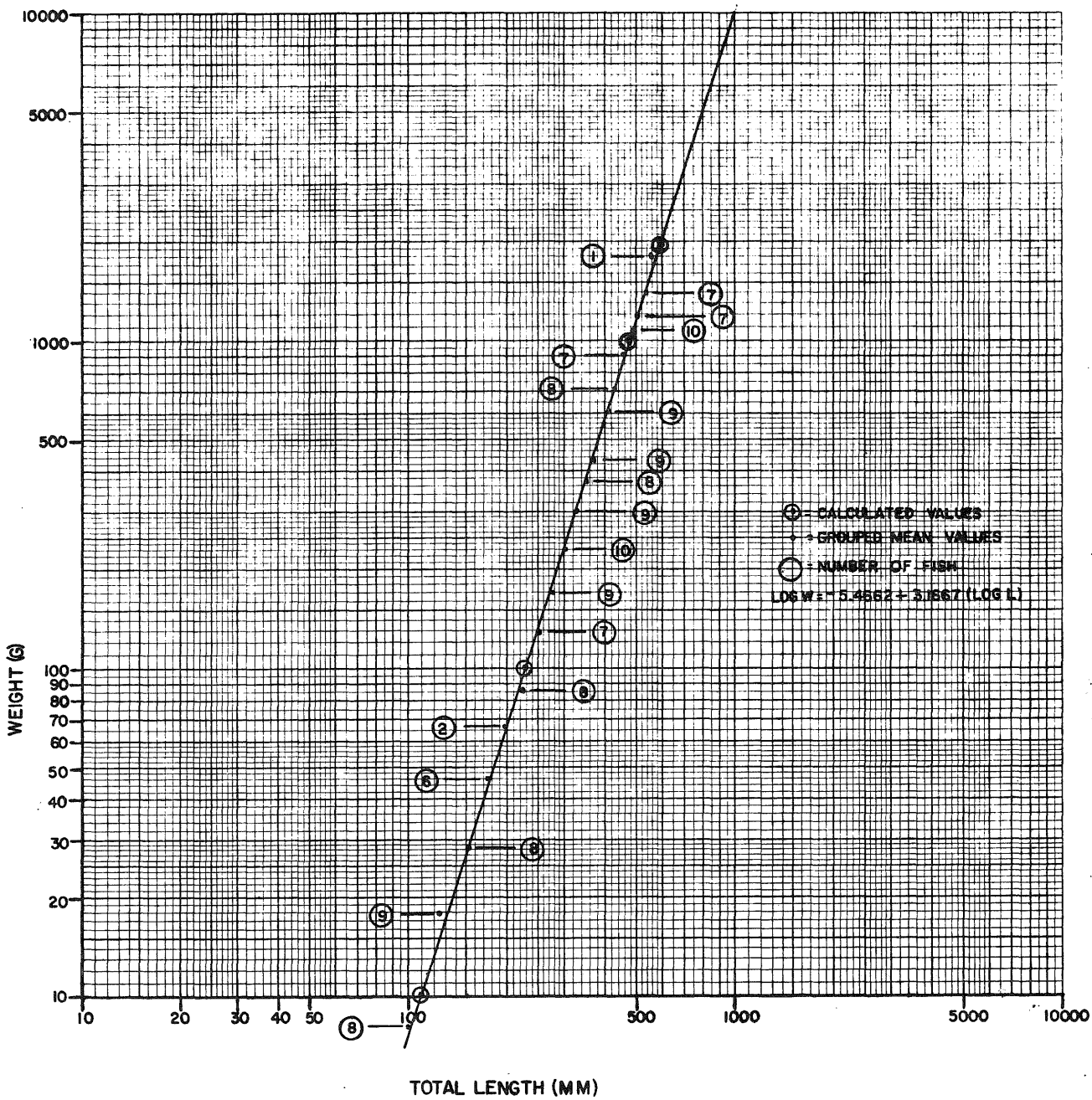

FIGURE 2.5.2-6 LENGTH-WEIGHT RELATIONSHIP OF GROUPED MEANS FOR WALLEYE, SUMMER AND FALL SAMPLING SEASONS, 1975. (all stations)

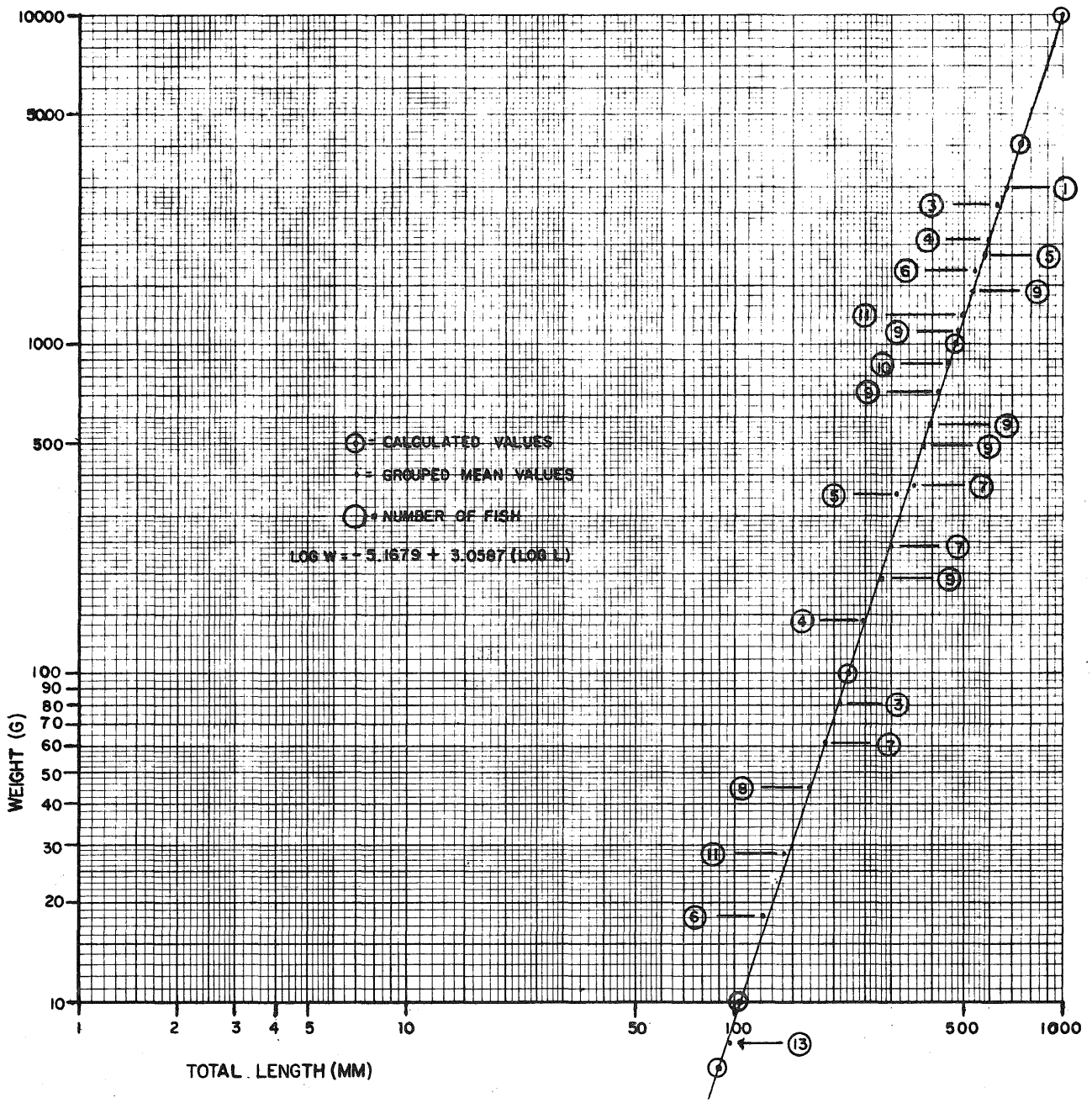

FIGURE 2.5.2-7 WATER TEMPERATURE IN STURGEON LAKE, APRIL 23 - OCTOBER 24, 1975.

(All temperatures taken at midnight at approx. 1 m. depth.)

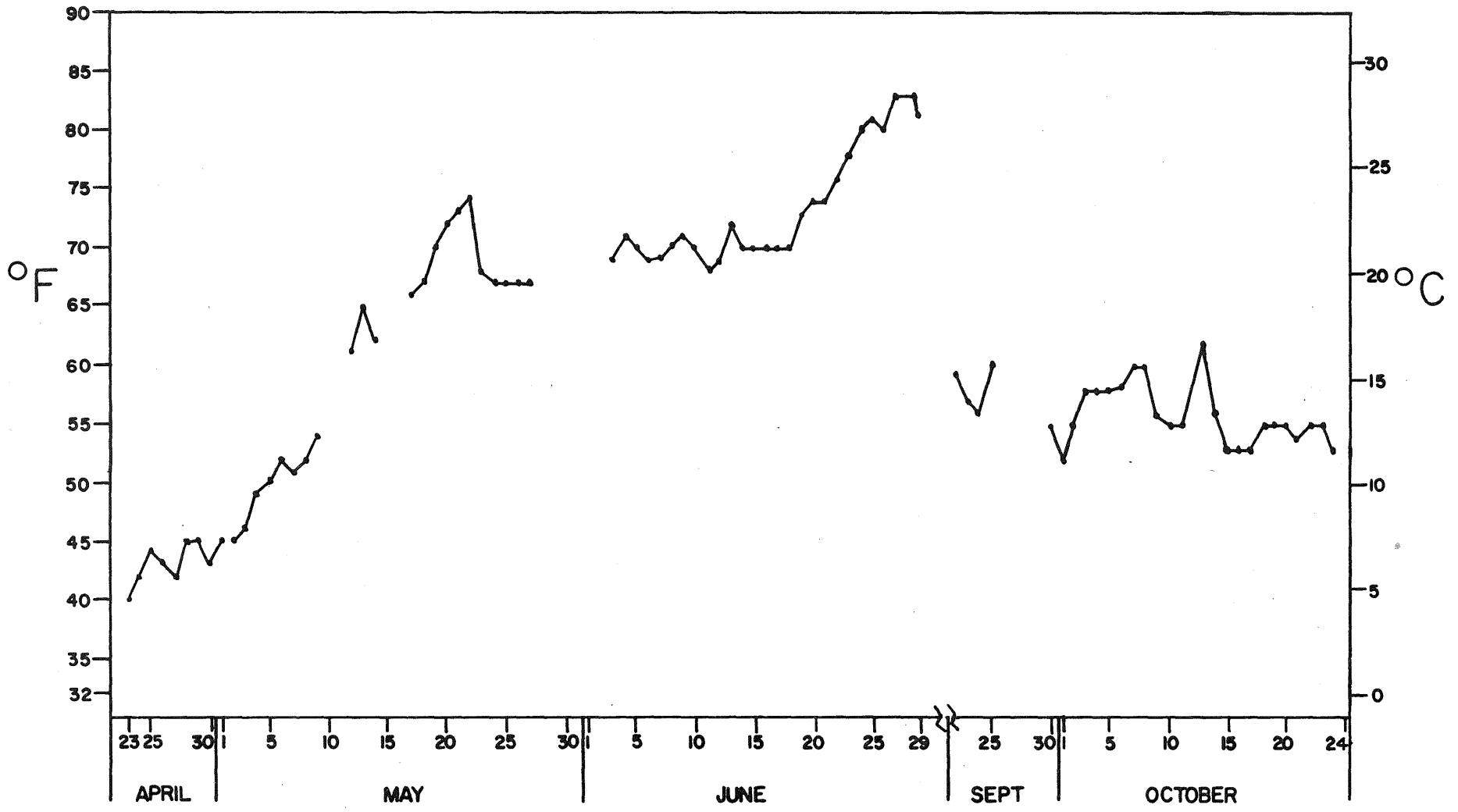

FIGURE 2.5.2-8 MEAN NUMBERS OF LARVAL FISH/M^3 IN TOWS 1, 2, AND 3 (combined) EACH WEEK.

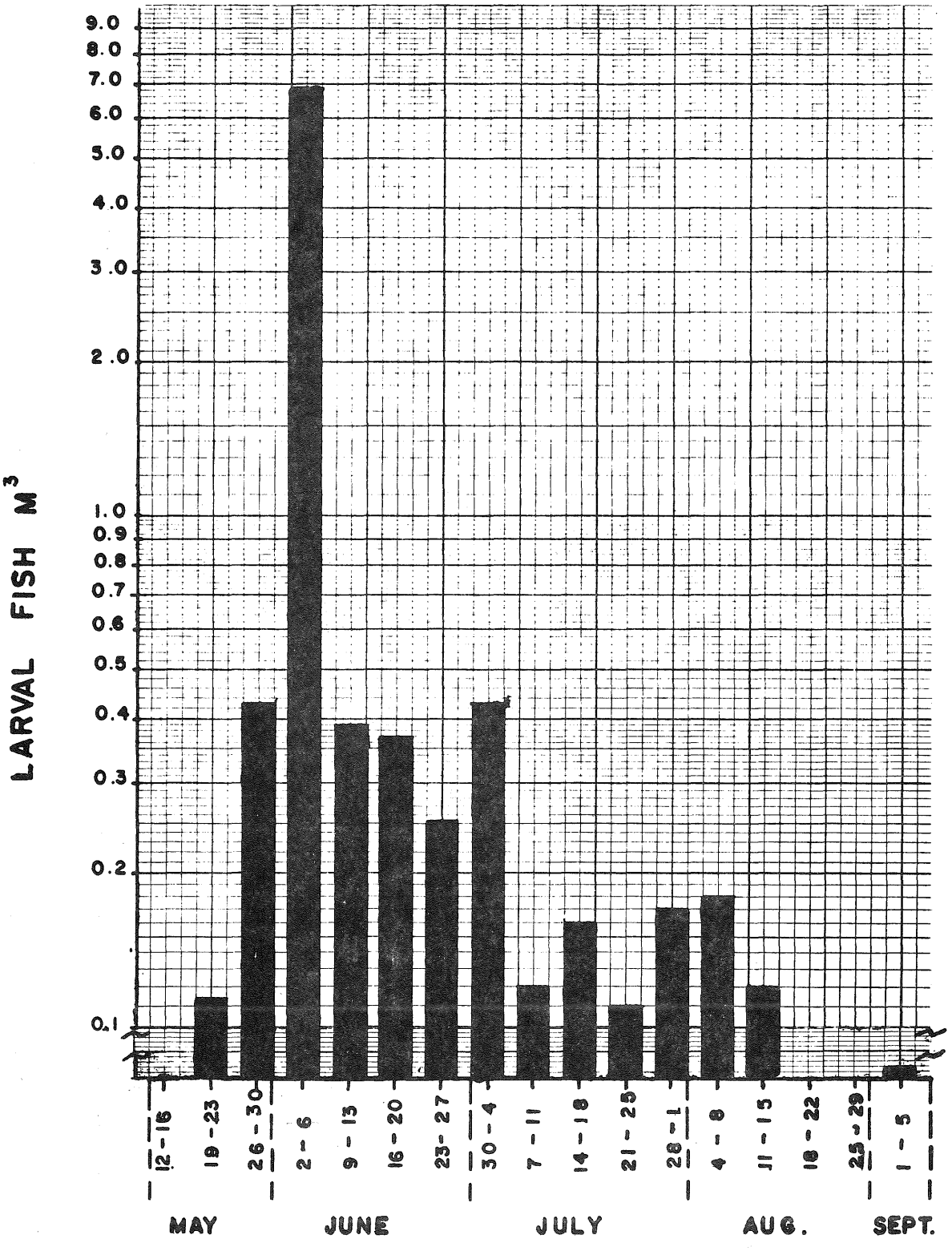

FIGURE 2.5.2-9 MOVEMENT OF WHITE BASS TAGGED IN THE PRAIRIE ISLAND VICINITY 1974-1975 AND RETURNED WITHIN CALENDAR YEAR TAGGED.

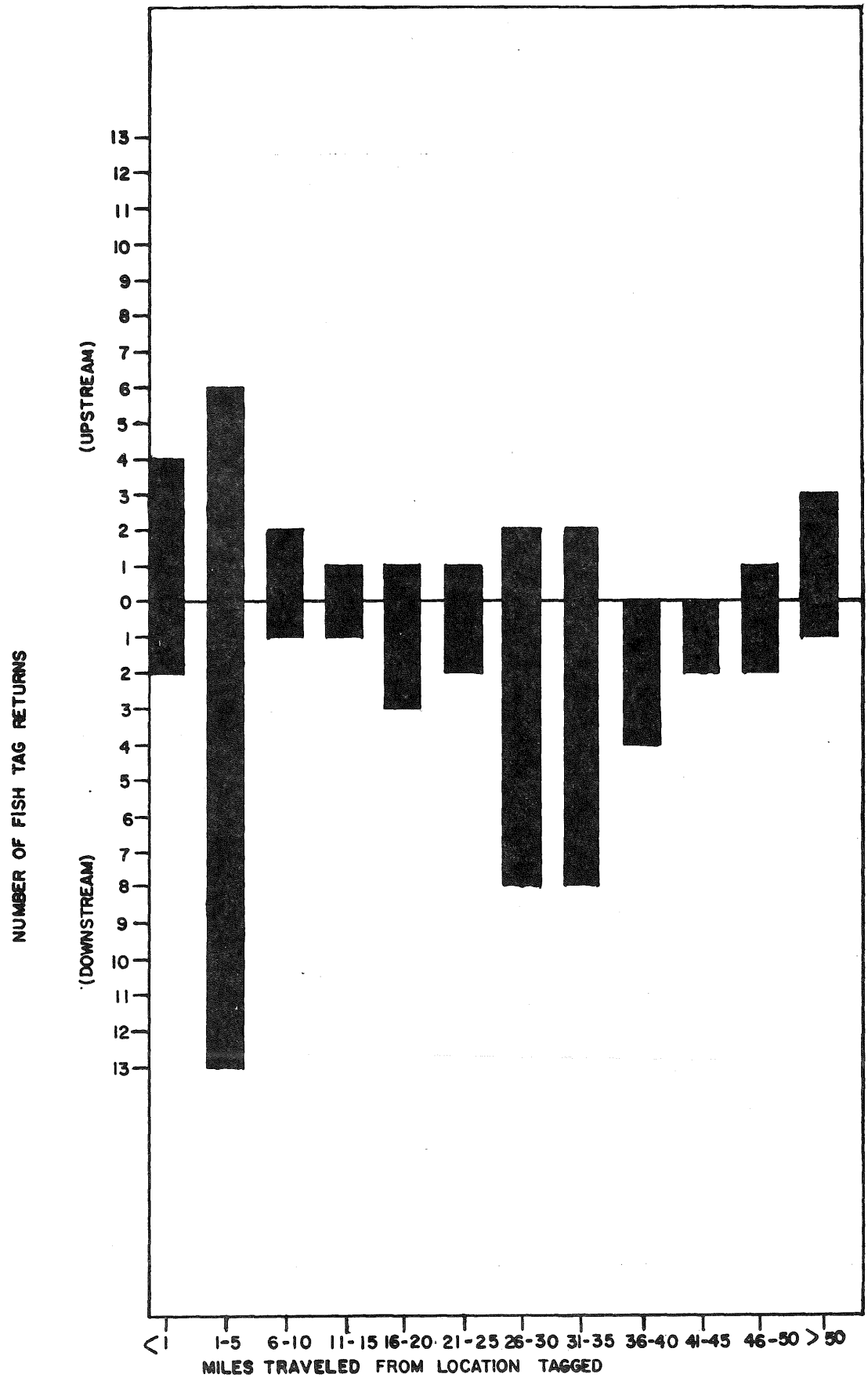

FIGURE 2.5.2.-10 MOVEMENTS OF SAUGER AND WALLEYE TAGGED IN THE PRAIRIE ISLAND VICINITY 1974-1975 AND RETURNED WITHIN CALENDAR YEAR TAGGED.

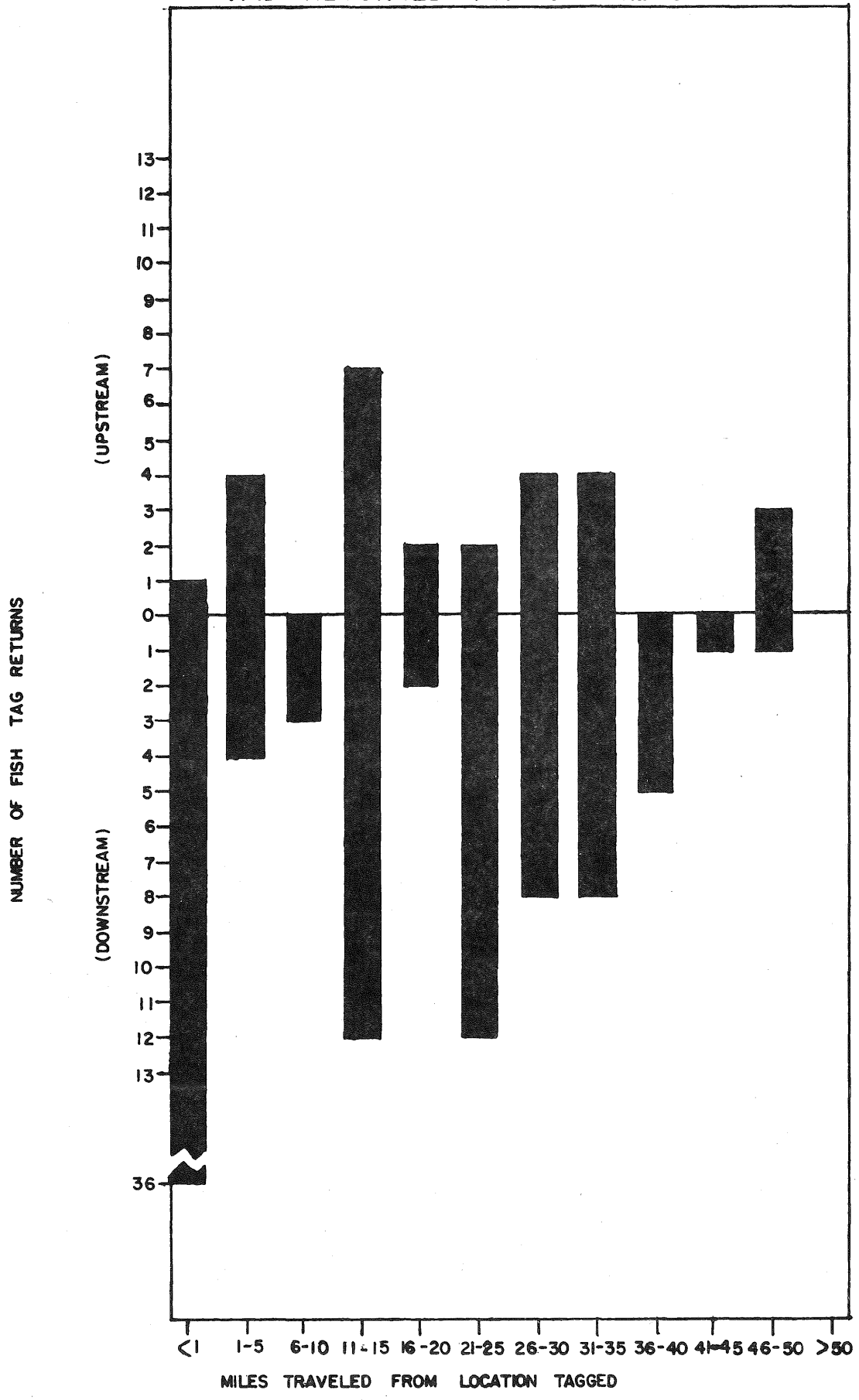

Table 2.5.2-1. Common and scientific names and methods of capture of fish in the Prairie Island area, 1975

Common Name	Scientific Name	Method of Capture						
		Trapnet	Gillnet	Trawl	Electro-Fishing	Seine	1973	1974
Chestnut lamprey	*Ichthyomyzon castaneus*							x
Silver lamprey	*Ichthyomyzon unicuspis*				x			x
Longnose gar	*Lepisosteus osseus*	x	x		x	x	x	x
Shortnose gar	*Lepisosteus platostomus*	x	x		x	x	x	x
Bowfin	*Amia calva*	x	x			x	x	x
American eel	*Anquilla rostrata*						x	x
Gizzard shad	*Dorosoma cepedianum*	x	x	x	x	x	x	x
Goldeye	*Hiodon alosiodes*		x				x	x
Mooneye	*Hiodon tergisus*	x	x		x		x	x
Northern pike	*Esox lucius*	x	x		x	x	x	x
Carp	*Cyprinus carpio*	x	x	x	x	x	x	x
Brassy minnow	*Hybognathus hankonsoni*					x		x
Silvery minnow	*Hybognathus nuchalis*							x
Silver chub	*Hybopsis storeriana*		x	x	x	x		x
Golden shiner	*Notemigonus crysoleucas*							x
Emerald shiner	*Notropus atherinoides*			x	x	x		x
River shiner	*Notropus biennius*			x	x	x		x
Common shiner	*Notropis cornutus*					x		x
Pugnose minnow	*Notropis emiliae*				x	x		x
Blacknose shiner	*Notropis heterolepis*							x
Spottail shiner	*Notropis hudsonius*			x	x	x		x
Red shiner	*Notropis lutrensis*				x	x		
Rosyface shiner	*Notropis rubellus*				x	x		x
Spotfin shiner	*Notropis spilopterus*				x	x		x
Redfin shiner	*Notropis umbratilis*				x	x		
Mimic shiner	*Notropis volucellus*					x		x
Bluntnose minnow	*Pimephales notatus*				x	x		x
Fathead minnow	*Pimephales promelas*							x

Table 2.5.2-1. Common and scientific names and methods of capture of fish in the Prairie Island area, 1975 (Continued)

Common Name	Scientific Name	Method of Capture						
		Trapnet	Gillnet	Trawl	Electro-Fishing	Seine	1973	1974
Bullhead minnow	*Pimephales vigilax*				x	x		x
Carpsucker species	*Carpiodes* species	x	x	x	x	x	x	x
White sucker	*Catostomus commersoni*	x				x		x
Smallmouth buffalo	*Ictiobus bubalus*	x	x	x	x	x	x	x
Bigmouth buffalo	*Ictiobus cypinellus*	x	x	x	x	x	x	x
Spotted sucker	*Minytrema melanops*							x
Silver redhorse	*Moxostoma anisurum*	x	x		x		x	x
River redhorse	*Moxostoma carinatum*							x
Shorthead redhorse	*Moxostoma macrolepidotum*	x	x	x	x	x	x	x
Black bullhead	*Ictalurus melis*	x	x					x
Yellow bullhead	*Ictalurus natalis*						x	x
Brown bullhead	*Ictalurus nebulosus*	x	x				x	x
Channel catfish	*Ictalurus punctatus*	x	x	x	x	x	x	x
Tadpole madtom	*Noturus gyrinus*					x		
Flathead catfish	*Pylodictis olivaris*	x			x		x	x
Trout perch	*Percopsis omiscomaycus*			x	x	x		x
Burbot	*Lota lota*		x		x			x
White bass	*Morone chrysops*	x	x	x	x	x	x	x
Rock bass	*Ambloplites rupestris*	x	x		x	x	x	x
Green sunfish	*Lepomis cyanellus*				x	x	x	x
Pumpkinseed	*Lepomis gibbosus*				x		x	x
Bluegill	*Lepomis macrochirus*	x	x	x	x	x	x	x
Hybrid sunfish	*Lepomis macrochirus X?*							x
Smallmouth bass	*Micropterus dolomieui*	x	x		x	x	x	x
Largemouth bass	*Micropterus salmoides*						x	x
White crappie	*Pomoxis annularis*	x	x	x	x	x	x	x
Black crappie	*Pomoxis nigromaculatus*	x	x	x	x		x	x
Johnny darter	*Etheostoma nigrum*					x		x

Table 2.5.2-1. Common and scientific names and methods of capture of fish in the Prairie Island area, 1975 (Continued)

Common Name	Scientific Name	Method of Capture						
		Trapnet	Gillnet	Trawl	Electro-Fishing	Seine	1973	1974
Yellow perch	*Perca flavescens*	x			x	x	x	x
Log perch	*Percina caprodes*				x	x		x
Sauger	*Stizostedion canadense*	x	x	x	x	x	x	x
Walleye	*Stizostedion vitreum vitreum*	x	x	x	x	x	x	x
Freshwater drum	*Aplodinotus grunniens*	x	x	x	x	x	x	x

Table 2.5.2-2. Summary of trap net catches by areas, Spring 1975

Species	Above Plant		Plant Area		Below Lock & Dam 3	
	No.	Catch/lift 36 lifts	No.	Catch/lift 20 lifts	No.	Catch/lift 16 lifts
Longnose gar	2	0.06	-	-	-	-
Shortnose gar	22	0.61	7	0.35	-	-
Bowfin	8	0.22	-	-	3	0.19
Gizzard shad	1	0.03	-	-	-	-
Mooneye	-*	-	-	-	-	-
Northern pike	36	1.00	3	0.15	4	0.25
Carp	123	3.42	68	3.40	117	7.31
Carpsucker	6	0.17	3	0.15	-	-
White sucker	3	0.08	1	0.05	2	0.13
Smallmouth buffalo	1	0.03	-	-	-	-
Bigmouth buffalo	-	-	2	0.10	-	-
Silver redhorse	-	-	-	-	-	-
Shorthead redhorse	33	0.95	10	0.50	6	0.38
Black bullhead	2	0.06	1	0.05	6	0.38
Brown bullhead	-	-	-	-	-	-
Channel catfish	2	0.06	3	0.15	-	-
Flathead catfish	-	-	-	-	-	-
White bass	106	2.94	15	0.75	37	2.31
Rock bass	4	0.11	2	0.10	3	0.19
Bluegill	9	0.25	7	0.35	1	0.06
Smallmouth bass	-	-	-	-	-	-
White crappie	5	0.14	7	0.35	2	0.13
Black crappie	31	0.86	5	0.25	9	0.56
Yellow perch	-	-	-	-	1	0.06
Sauger	11	0.31	6	0.30	4	0.25
Walleye	8	0.22	2	0.10	7	0.44
Drum	35	0.97	57	2.85	146	9.13

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-3. Summary of trap net catches by areas, Summer 1975

Species	Above Plant		Plant Area		Below Lock & Dam 3	
	No.	Catch/lift 36 lifts	No.	Catch/lift 20 lifts	No.	Catch/lift 16 lifts
Longnose gar	13	0.36	4	0.20	-	-
Shortnose gar	64	1.78	9	0.45	3	0.19
Bowfin	22	0.61	-	-	3	0.19
Gizzard shad	-*	-	-	-	-	-
Mooneye	7	0.19	-	-	2	0.13
Northern pike	78	2.17	1	0.05	22	1.38
Carp	168	4.67	52	2.60	75	4.69
Carpsucker	15	0.42	3	0.15	-	-
White sucker	1	0.03	-	-	4	0.25
Smallmouth buffalo	18	0.50	3	0.15	-	-
Bigmouth buffalo	32	0.89	1	0.05	-	-
Silver redhorse	5	0.14	-	-	2	0.13
Shorthead redhorse	44	1.22	4	0.20	2	0.13
Black bullhead	-	-	4	0.20	1	0.06
Brown bullhead	-	-	-	-	1	0.06
Channel catfish	1	0.03	-	-	-	-
Flathead catfish	2	0.06	6	0.30	1	0.06
White bass	138	3.83	28	1.40	13	0.81
Rock bass	-	-	1	0.05	1	0.06
Bluegill	13	0.36	1	0.05	4	0.25
Smallmouth bass	1	0.03	-	-	-	-
White crappie	9	0.25	10	0.50	10	0.63
Black Crappie	174	4.83	19	0.95	19	1.19
Yellow perch	1	0.03	1	0.05	-	-
Sauger	15	0.42	3	0.15	2	0.13
Walleye	5	0.14	-	-	6	0.38
Drum	47	1.31	53	2.65	36	2.25

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-4. Summary of trap net catches by areas, Fall 1975

Species	Above Plant		Plant Area		Below Lock & Dam 3	
	No.	Catch/lift 36 lifts	No.	Catch/lift 20 lifts	No.	Catch/lift 16 lifts
Longnose gar	-*	-	1	0.05	-	-
Shortnose gar	34	0.94	-	-	-	-
Bowfin	7	0.19	-	-	3	0.19
Gizzard shad	27	0.75	4	0.20	2	0.13
Mooneye	-	-	-	-	1	0.06
Northern pike	17	0.47	3	0.15	7	0.44
Carp	83	2.31	13	0.65	22	1.38
Carpsucker	8	0.22	-	-	-	-
White sucker	1	0.03	-	-	1	0.06
Smallmouth buffalo	2	0.06	2	0.10	-	-
Bigmouth buffalo	1	0.03	-	-	-	-
Silver redhorse	11	0.31	1	0.05	-	-
Shorthead redhorse	31	0.81	10	0.50	-	-
Black bullhead	-	-	-	-	-	-
Brown bullhead	-	-	-	-	-	-
Channel catfish	-	-	-	-	-	-
Flathead catfish	-	-	1	0.05	-	-
White bass	341	9.47	21	1.05	15	0.94
Rock bass	1	0.03	-	-	2	0.13
Bluegill	15	0.42	15	0.75	10	0.63
Smallmouth bass	-	-	-	-	-	-
White crappie	7	0.19	22	1.10	8	0.50
Black crappie	52	1.44	14	0.70	78	4.88
Yellow perch	6	0.17	2	0.10	-	-
Sauger	27	0.75	6	0.30	7	0.44
Walleye	15	0.42	2	0.10	-	-
Drum	73	2.03	21	1.05	-	-

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-5. Length-frequency of fishes caught in trap nets in all areas (Sections 0, 1, 3, and 4) during spring, summer and fall, 1975

Total Length in Centimeters	Longnose gar	Shortnose gar	Bowfin	Gizzard shad	Mooneye	Northern pike	Carp	Carpsucker spp.	White sucker
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9									
6.0 - 7.9									
8.0 - 9.9									
10.0 - 11.9									
12.0 - 13.9				2					
14.0 - 15.9				14					
16.0 - 17.9				13					
18.0 - 19.9				3					
20.0 - 21.9							1		
22.0 - 23.9									
24.0 - 25.9							1		
26.0 - 27.9							3	2	
28.0 - 29.9					1		9	1	
30.0 - 31.9					5		16		
32.0 - 33.9				1	4		20	3	
34.0 - 35.9						2	25		
36.0 - 37.9						1	45	3	
38.0 - 39.9						2	41	3	
40.0 - 44.9		1				2	151	8	5
45.0 - 49.9		6	4			2	149	12	6
50.0 - 54.9		17	13			15	114	2	2
55.0 - 59.9	1	46	9			14	85		
60.0 - 64.9		48	13			31	43		
65.0 - 69.9	3	12	4			31	12		
70.0 - 74.9	2	3	3			21	3		
75.0 - 79.9	6					20			
80.0 - 84.9	3					11			
85.0 - 89.9						9			
90.0 - 94.9	3					3			
95.0 - 99.9						1			
100.0 - +	1					2			
unmeasured fish	1	6		1		7	3	1	
Total = Y/Y+A	20	139	46	34	10	174	721	35	13

Table 2.5.2-5. Length-frequency of fishes caught in trap nets in all areas (Sections 0, 1, 3 and 4) during spring, summer, and fall, 1975 (continued)

Total Length in Centimeters	Small-mouth buffalo	Big-mouth buffalo	Silver redhorse	Short-head redhorse	Black bullhead	Brown bullhead	Channel catfish	Flathead catfish	White bass
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9									
6.0 - 7.9									
8.0 - 9.9									
10.0 - 11.9									
12.0 - 13.9									
14.0 - 15.9									
16.0 - 17.9									5
18.0 - 19.9					7				12
20.0 - 21.9					2				18
22.0 - 23.9					2				16
24.0 - 25.9					1	1			20
26.0 - 27.9	1			1					50
28.0 - 29.9	2			1	1				29
30.0 - 31.9	3			3					27
32.0 - 33.9	8				1				71
34.0 - 35.9	2			6					181
36.0 - 37.9				12			2	1	179
38.0 - 39.9				24			2		92
40.0 - 44.9	3	6		54				1	12
45.0 - 49.9	5	16	3	34			2	2	
50.0 - 54.9	2	12	9	3				1	
55.0 - 59.9			6	1				2	
60.0 - 64.9									
65.0 - 69.9								1	
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9								1	
100.0 - +								1	
unmeasured fish			1	1					2
Total = Y/Y+A	26	34	19	140	14	1	6	10	714

Table 2.5.2-5. Length-frequency of fishes caught in trap nets in all areas (Sections 0, 1, 3 and 4) during spring, summer and fall, 1975 (continued)

Total Length in Centimeters	Rock bass	Bluegill	Small-mouth bass	White crappie	Black crappie	Yellow perch	Sauger	Walleye	Fresh-water drum
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9									
6.0 - 7.9									
8.0 - 9.9		2			1				
10.0 - 11.9		2			3				
12.0 - 13.9		8		1	25	2			
14.0 - 15.9	4	35		4	22	3			1
16.0 - 17.9	4	21		3	29				
18.0 - 19.9	4	4		3	73	1			21
20.0 - 21.9	1	3		7	71	2	1		40
22.0 - 23.9	1			24	92	2			39
24.0 - 25.9				19	51		1		38
26.0 - 27.9				15	15		2		34
28.0 - 29.9				2	14		2	2	68
30.0 - 31.9			1	1	4		13		52
32.0 - 33.9				1			18		56
34.0 - 35.9							13	2	50
36.0 - 37.9							8		31
38.0 - 39.9					1		7	2	21
40.0 - 44.9							6	9	13
45.0 - 49.9							5	6	
50.0 - 54.9							4	8	1
55.0 - 59.9								8	
60.0 - 64.9								5	
65.0 - 69.9								2	
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish						1	1	1	3
Total = Y/Y+A	14	25	1	80	401	11	81	45	468

Table 2.5.2-6. Summary of gill net catches by season and area, 1975

	SPRING				FALL			
	Above Plant		Plant Area		Above Plant		Plant Area	
	No.	Catch/lift 16 lifts	No.	Catch/lift 8 lifts	No.	Catch/lift 16 lifts	No.	Catch/lift 8 lifts
Shortnose gar	48	3.00	29	3.63	-	-	1	0.13
Longnose gar	26	1.63	-	-	-	-	-	-
Bowfin	6	0.38	-	-	14	0.88	-	-
Gizzard shad	45	2.81	24	3.00	874	54.63	562	70.25
Goldeye	1	0.06	2	0.25	12	0.75	-	-
Mooneye	5	0.31	-	-	5	0.31	2	0.25
Northern pike	26	1.63	5	0.63	30	0.31	2	0.25
Carp	108	6.75	66	8.25	36	2.25	18	2.25
Silver chub	1	0.06	-	-	-	-	-	-
Carpsucker	5	0.31	1	0.13	2	0.13	8	1.00
Smallmouth buffalo	2	0.13	2	0.25	4	0.25	5	0.63
Bigmouth buffalo	-*	-	-	-	1	0.06	1	0.13
Silver redhorse	1	0.06	-	-	-	-	-	-
Shorthead redhorse	23	1.43	29	3.63	14	0.88	10	1.25
Black bullhead	2	0.13	22	2.75	1	0.06	4	0.50
Brown bullhead	-	-	-	-	-	-	1	0.13
Channel catfish	14	0.88	13	1.63	20	1.25	6	0.75
Burbot	-	-	-	-	1	0.06	-	-
White bass	48	3.00	16	2.00	48	3.00	27	3.38
Rock bass	3	0.19	1	0.13	1	0.06	-	-
Bluegill	1	0.06	-	-	2	0.13	1	0.13
Smallmouth bass	1	0.06	-	-	-	-	-	-
White crappie	2	0.13	9	1.13	9	0.56	5	0.63
Black crappie	3	0.19	4	0.50	19	1.19	2	0.25
Yellow perch	3	0.19	1	0.13	1	0.06	4	0.50
Sauger	49	3.06	43	5.38	136	8.50	105	13.13
Walleye	22	1.38	2	0.25	25	1.56	15	1.88
Drum	17	1.06	8	0.50	5	0.31	6	0.75

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-7. Length-frequency of fish caught in gill nets in all areas (Sections 0, 1, 2 and 3) during spring and fall, 1975

Total Length in Centimeters	Longnose gar	Short-nose gar	Bowfin	Gizzard shad	Goldeye	Mooneye	Northern pike	Carp	Silver chub
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9									
6.0 - 7.9									
8.0 - 9.9									
10.0 - 11.9				1					
12.0 - 13.9				44					1
14.0 - 15.9				66					
16.0 - 17.9				131					
18.0 - 19.9				51					
20.0 - 21.9				11					
22.0 - 23.9				5				1	
24.0 - 25.9					1		1	1	
26.0 - 27.9				2				2	
28.0 - 29.9				2	3	4		2	
30.0 - 31.9				14		3		8	
32.0 - 33.9				26	1	4		35	
34.0 - 35.9				3	2	1		43	
36.0 - 37.9		1		1	4	1		27	
38.0 - 39.9				2	2			15	
40.0 - 44.9		1			2		1	41	
45.0 - 49.9			2				1	25	
50.0 - 54.9		10						14	
55.0 - 59.9		25	6				9	8	
60.0 - 64.9		32	2				17	4	
65.0 - 69.9	3	7	2				15		
70.0 - 74.9	7	1	3				12		
75.0 - 79.9	6						2		
80.0 - 84.9	3						2		
85.0 - 89.9	1						2		
90.0 - 94.9	1	1					1		
95.0 - 99.9	1								
100.0 - +	4								
unmeasured fish			5	1146				2	
Total = Y/Y+A	26	78	20	1505	15	12	63	228	1

Table 2.5.2-7. Length-frequency of fish caught in gill nets in all areas (Sections 0, 1, 2 and 3) during spring and fall, 1975 (continued)

Total Length in Centimeters	Carp-sucker spp.	Small-mouth buffalo	Big-mouth buffalo	Silver redhorse	Short-head redhorse	Black bullhead	Brown bullhead	Channel catfish	Burbot
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9									
6.0 - 7.9									
8.0 - 9.9									
10.0 - 11.9									
12.0 - 13.9		1							
14.0 - 15.9	2	3				2			
16.0 - 17.9	3					1			
18.0 - 19.9		1				12			
20.0 - 21.9			1		1	7			
22.0 - 23.9	4				1	3			
24.0 - 25.9		3			1	3			
26.0 - 27.9	1	3				1	1	1	
28.0 - 29.9		1	1					1	
30.0 - 31.9	2				4			1	
32.0 - 33.9					4				
34.0 - 35.9	1	1			5			6	
36.0 - 37.9					8			9	1
38.0 - 39.9	1				14			12	
40.0 - 44.9	1				25			13	
45.0 - 49.9	1				11			7	
50.0 - 54.9					2			3	
55.0 - 59.9									
60.0 - 64.9				1					
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
Total = Y/Y+A	16	13	2	1	76	29	1	53	1

Table 2.5.2-7. Length-frequency of fish caught in gill nets in all areas (Sections 0, 1, 2 and 3) during spring and fall, 1975 (continued)

Total Length in Centimeters	White bass	Rock bass	Bluegill	Small-mouth bass	White crappie	Black crappie	Yellow perch	Sauger	Walleye
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9									
6.0 - 7.9									
8.0 - 9.9		1							
10.0 - 11.9					1				
12.0 - 13.9	12					5			
14.0 - 15.9	4	1	2		3	7	3		
16.0 - 17.9	1	3			5	3	3		
18.0 - 19.9			1	1	4	3	1	1	
20.0 - 21.9	5		1		2	5	1		3
22.0 - 23.9	13						1	7	
24.0 - 25.9	5				4	3		8	
26.0 - 27.9	7				3	2		29	
28.0 - 29.9	8				1			27	3
30.0 - 31.9	7							39	2
32.0 - 33.9	12				2			36	
34.0 - 35.9	32							40	2
36.0 - 37.9	21							37	4
38.0 - 39.9	8							21	6
40.0 - 44.9	1							36	18
45.0 - 49.9								38	19
50.0 - 54.9								13	6
55.0 - 59.9									1
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish	3							1	
Total = Y/Y+A	139	5	4	1	25	28	9	333	64

Table 2.5.2-7. Length-frequency of fish caught in gill nets in all areas (Sections 0, 1, 2 and 3) during spring and fall, 1975 (continued)

Total Length in Centimeters	Fresh-water drum								
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9									
6.0 - 7.9									
8.0 - 9.9									
10.0 - 11.9									
12.0 - 13.9	8								
14.0 - 15.9	1								
16.0 - 17.9	1								
18.0 - 19.9	2								
20.0 - 21.9	2								
22.0 - 23.9	3								
24.0 - 25.9	6								
26.0 - 27.9	3								
28.0 - 29.9	3								
30.0 - 31.9	3								
32.0 - 33.9	1								
34.0 - 35.9	2								
36.0 - 37.9									
38.0 - 39.9	1								
40.0 - 44.9									
45.0 - 49.9									
50.0 - 54.9									
55.0 - 59.9									
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
Total = Y/Y+A	36								

Table 2.5.2-8. Summary of day electro-fishing catches by area, spring 1975

Species	Above Plant		Plant Area		Below Lock & Dam 3	
	No.	Catch/Hour (7.5 Hrs.)	No.	Catch/Hour (2.5 Hours)	No.	Catch/Hour (2.5 Hours)
Longnose gar	1	0.13	-	-	-	-
Shortnose gar	1	0.13	-	-	-	-
Gizzard shad	5	0.67	-	-	-	-
Mooneye	1	0.13	-	-	-	-
Northern pike	1	0.13	2	0.80	1	0.40
Carp	147	19.60	28	11.20	30	12.00
Silver chub	12	1.60	1	0.40	-	-
Emerald shiner	61	8.13	7	2.80	48	19.20
River shiner	-*	-	4	1.60	-	-
Pugnose minnow	4	0.53	-	-	-	-
Spottail shiner	3	0.40	1	0.40	-	-
Red shiner	1	0.13	2	0.80	-	-
Rosyface shiner	4	0.53	-	-	-	-
Spotfin shiner	-	-	4	1.60	-	-
Redfin shiner	1	0.13	-	-	-	-
Bluntnose minnow	2	0.27	1	0.40	-	-
Bullhead minnow	1	0.13	12	4.80	-	-
Carpsucker spp.	8	1.07	2	0.80	1	0.40
Smallmouth buffalo	2	0.27	1	0.40	1	0.40
Bigmouth buffalo	1	0.13	1	0.40	-	-
Silver redhorse	-	-	-	-	1	0.40
Shorthead redhorse	31	4.13	22	8.80	3	1.20
Channel catfish	8	1.07	4	1.60	-	-
Flathead catfish	-	-	2	0.80	1	0.40
White bass	35	4.67	16	6.40	20	8.00
Rock bass	7	0.93	10	4.00	6	2.40
Green sunfish	-	-	6	2.40	-	-
Pumpkinseed	-	-	3	1.20	-	-
Bluegill	6	0.80	5	2.00	2	0.80
Smallmouth bass	20	2.67	17	6.80	5	2.00
White crappie	2	0.27	-	-	-	-
Black crappie	3	0.40	1	0.40	3	1.20
Yellow perch	1	0.13	1	0.40	-	-
Logperch	-	-	-	-	1	0.40
Sauger	32	4.27	4	1.60	8	3.20
Walleye	19	2.53	2	0.80	14	5.60
Freshwater drum	63	8.40	7	2.80	17	6.80
Total	482	64.27	167	66.80	162	64.80

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-9. Summary of day electro-fishing catches by area, summer 1975

Species	Above Plant		Plant Area		Below Lock & Dam 3	
	No.	Catch/Hour (7.5 Hours)	No.	Catch/Hour (2.5 Hours)	No.	Catch/Hour (2.5 Hours)
Silver lamprey	-*	-	-	-	1	0.40
Longnose gar	1	0.13	-	-	-	-
Bowfin	1	0.13	-	-	-	-
Gizzard shad	226	30.13	57	22.80	29	11.60
Mooneye	-	-	-	-	1	0.40
Northern pike	4	0.53	-	-	1	0.40
Carp	97	12.93	44	17.60	38	15.20
Silver chub	20	2.67	4	1.60	2	0.80
Emerald shiner	52	6.93	2	0.80	75	30.00
Spottail shiner	6	0.80	1	0.40	-	-
Rosyface shiner	33	0.40	1	0.40	14	5.60
Spotfin shiner	2	0.27	-	-	-	-
Redfin shiner	3	0.40	-	-	1	0.40
Bluntnose minnow	4	0.53	4	1.60	2	0.80
Fathead minnow	-	-	1	0.40	-	-
Bullhead minnow	9	1.20	10	4.00	-	-
Carpsucker ssp.	27	3.60	3	1.20	4	1.60
Smallmouth buffalo	6	0.80	12	4.80	-	-
Bigmouth buffalo	-	-	1	0.40	-	-
Silver redhorse	1	0.13	-	-	1	0.40
Shorthead redhorse	25	3.33	-	-	18	7.20
Black bullhead	1	0.13	2	0.80	17	6.80
Channel catfish	5	0.67	3	1.20	4	1.60
Flathead catfish	3	0.40	1	0.40	3	1.20
Burbot	-	-	-	-	1	0.40
White bass	37	4.93	17	6.80	114	45.60
Rock bass	11	1.47	11	4.40	21	8.40
Green sunfish	3	0.40	16	6.40	6	2.40
Pumpkinseed	2	0.27	-	-	1	0.40
Bluegill	22	2.93	37	14.80	71	28.40
Smallmouth bass	28	3.73	14	5.60	55	22.00
Largemouth bass	-	-	-	-	4	1.60
White crappie	-	-	2	0.80	-	-
Black crappie	4	0.53	2	0.80	4	1.60
Johnny darter	1	0.13	-	-	-	-
Yellow perch	32	4.27	3	1.20	1	0.40
Log perch	17	2.27	1	0.40	4	1.60
Sauger	38	5.07	3	1.20	6	2.40
Walleye	22	2.93	4	1.60	20	8.00
Drum	66	8.80	8	3.20	5	2.00
Total	809	107.87	274	109.60	524	209.60

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-10. Summary of day electro-fishing by area, fall 1975

Species	Above Plant No.	Above Plant Catch/Hour (7.5 Hours)	Plant Area No.	Plant Area Catch/Hour (2.5 Hours)	Below Lock & Dam 3 No.	Below Lock & Dam 3 Catch/Hour (2.5 Hours)
Silver lamprey	1	0.13	-	-	1	0.40
Longnose gar	- *	-	2	0.80	-	-
Gizzard shad	325	4.33	121	48.40	165	66.00
Mooneye	1	0.13	-	-	3	1.20
Northern pike	2	0.27	-	-	2	0.80
Carp	61	8.13	47	18.80	63	25.20
Silver chub	15	2.00	-	-	2	0.80
Emerald shiner	121	16.13	31	12.40	106	42.40
Spottail shiner	5	0.67	-	-	-	-
Bullhead minnow	13	1.73	18	7.20	-	-
Carpsucker spp.	3	0.40	3	1.20	-	-
Smallmouth buffalo	2	0.27	3	1.20	-	-
Silver redhorse	-	-	-	-	2	0.80
Shorthead redhorse	9	1.20	4	1.60	31	12.40
Yellow bullhead	-	-	-	-	1	0.40
Channel catfish	-	-	6	2.40	5	2.00
Trout perch	3	0.40	-	-	-	-
Burbot	-	-	-	-	1	0.40
White bass	17	2.27	36	14.40	44	17.60
Rock bass	4	0.53	12	4.80	28	11.20
Green sunfish	2	0.27	2	0.80	6	2.40
Bluegill	71	9.47	30	12.00	70	28.00
Smallmouth bass	15	2.00	14	5.60	17	6.80
Largemouth bass	1	0.13	3	1.20	2	0.80
White crappie	-	-	3	1.20	-	-
Black crappie	17	2.27	2	0.80	8	3.20
Johnny darter	1	0.13	-	-	-	-
Yellow perch	6	0.80	2	0.80	-	-
Log perch	2	0.27	3	1.20	-	-
Sauger	24	3.20	5	2.00	18	7.20
Walleye	28	3.73	17	6.80	37	14.80
Drum	22	2.93	6	2.40	3	1.20
Total	771	102.80	360	144.00	615 ~~614~~	245.60

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-11. Length-frequency of fish caught by day electro-fishing in all areas (Sections 0, 1, 2, 3 and 4) during spring, summer and fall, 1975

Total Length in Centimeters	Silver Lamprey	Longnose gar	Short-nose gar	Bowfin	Gizzard shad	Mooneye	Northern pike	Carp	Silver chub
Y/Y not meas.					251				
0.1 - 1.9									
2.0 - 3.9					9				
4.0 - 5.9					15				3
6.0 - 7.9					15				4
8.0 - 9.9					61				6
10.0 - 11.9					169	1		1	18
12.0 - 13.9					160				12
14.0 - 15.9					162				
16.0 - 17.9					63		1		
18.0 - 19.9		1			13		1		
20.0 - 21.9							1		
22.0 - 23.9									
24.0 - 25.9	1						1	1	
26.0 - 27.9	1							1	
28.0 - 29.9					1			2	
30.0 - 31.9					4	1		5	
32.0 - 33.9					1	1		9	
34.0 - 35.9					2	2	1	17	
36.0 - 37.9							1	20	
38.0 - 39.9					1			23	
40.0 - 44.9		2		1	1	1		120	
45.0 - 49.9								169	
50.0 - 54.9							2	103	
55.0 - 59.9		1	1				2	50	
60.0 - 64.9							2	12	
65.0 - 69.9							1	5	
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9								1	
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish	1							16	13
Total = Y/Y+A	3	4	1	1	928	6	13	555	56

Table 2.5.2-11. Length-frequency of fish caught by day electro-fishing in all areas (Sections 0, 1, 2, 3 and 4) during spring, summer and fall, 1975 (continued)

Total Length in Centimeters	Emerald shiner	River shiner	Pugnose minnow	Spottail shiner	Red shiner	Rosyface shiner	Spotfin shiner	Redfin shiner	Blunt-nose minnow
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9	111			1		2			
4.0 - 5.9	149			2		38	2		8
6.0 - 7.9	61			4		8		4	2
8.0 - 9.9	13			5					
10.0 - 11.9									
12.0 - 13.9									
14.0 - 15.9									
16.0 - 17.9									
18.0 - 19.9									
20.0 - 21.9									
22.0 - 23.9									
24.0 - 25.9									
26.0 - 27.9									
28.0 - 29.9									
30.0 - 31.9									
32.0 - 33.9									
34.0 - 35.9									
36.0 - 37.9									
38.0 - 39.9									
40.0 - 44.9									
45.0 - 49.9									
50.0 - 54.9									
55.0 - 59.9									
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish	169	4	4	4	3	4	4	1	3
Total = Y/Y+A	503	4	4	16	3	52	6	5	13

Table 2.5.2-11. Length-frequency of fish caught by day electro-fishing in all areas (Sections 0, 1, 2, 3 and 4) during spring, summer and fall, 1975 (continued)

Total Length in Centimeters	Fathead minnow	Bullhead minnow	Carp-sucker spp.	Small-mouth buffalo	Big-mouth buffalo	Silver red-horse	Short-head redhorse	Black bullhead	Yellow bullhead
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9		5						6	
4.0 - 5.9		28					1	10	
6.0 - 7.9	1	17	3	4			2		
8.0 - 9.9			17	11			5		
10.0 - 11.9			3	1			2		
12.0 - 13.9			1	2			5		
14.0 - 15.9			2				3		
16.0 - 17.9			3	1			2		
18.0 - 19.9			1				3	1	1
20.0 - 21.9			2				4		
22.0 - 23.9							6	1	
24.0 - 25.9			2				5	1	
26.0 - 27.9				2			10		
28.0 - 29.9			3	1			10		
30.0 - 31.9			1	1			8		
32.0 - 33.9			1	1			5		
34.0 - 35.9			1	1			12		
36.0 - 37.9				1			16		
38.0 - 39.9							16		
40.0 - 44.9			2	1	1		18		
45.0 - 49.9			4		1	1	9		
50.0 - 54.9			2		1	1	1		
55.0 - 59.9			1			3			
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish	13	13	2					1	
Total = Y/Y+A	14	63	51	27	3	5	143	20	1

Table 2.5.2-11. Length-frequency of fish caught by day electro-fishing in all areas (Sections 0, 1, 2, 3 and 4) during spring, summer and fall, 1975 (continued)

Total Length in Centimeters	Channel catfish	Flathead catfish	Trout Perch	Burbot	White bass	Rock bass	Green Sunfish	Pumpkin-seed	Bluegill
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9					7		1		3
4.0 - 5.9	1				1		?		7
6.0 - 7.9			3		21	2	10	?	11
8.0 - 9.9					25	6	11	1	40
10.0 - 11.9					34	14	8	1	40
12.0 - 13.9					26	30	8	1	69
14.0 - 15.9					8	19	1	1	81
16.0 - 17.9					6	18			39
18.0 - 19.9				1	9	14			11
20.0 - 21.9		1		1	19	2			4
22.0 - 23.9					22	3			1
24.0 - 25.9					13	1			
26.0 - 27.9					27				
28.0 - 29.9					11				
30.0 - 31.9		1			2				
32.0 - 33.9					11				
34.0 - 35.9		1			15				
36.0 - 37.9	2				17				
38.0 - 39.9	5				3				
40.0 - 44.9	11	2			1				
45.0 - 49.9	8	2							
50.0 - 54.9	6								
55.0 - 59.9	2								
60.0 - 64.9		1							
65.0 - 69.9		1							
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +		1							
unmeasured fish					58	1			8
Total = Y/Y+A	35	10	3	2	336	110	41	6	314

Table 2.5.2-11. Length-frequency of fish caught by day electro-fishing in all areas (Sections 0, 1, 2, 3 and 4) during spring, summer and fall, 1975 (continued)

Total Length in Centimeters	Small-mouth bass	Large-mouth bass	White crappie	Black crappie	Johnny darter	Yellow perch	Logperch	Sauger	Walleye
Y/Y not meas.	2								
0.1 - 1.9									
2.0 - 3.9				2	1	1			
4.0 - 5.9	1				1	3	8		
6.0 - 7.9			1	9		26	17		1
8.0 - 9.9	5	1		7		3	2	7	5
10.0 - 11.9	3	1		1				21	16
12.0 - 13.9	3	1		3		11		8	19
14.0 - 15.9	7		1					13	15
16.0 - 17.9	7			1		1		16	8
18.0 - 19.9	18		1	3		1		5	9
20.0 - 21.9	33		1	6				4	3
22.0 - 23.9	34		1	5				6	1
24.0 - 25.9	29	2	2	3				8	1
26.0 - 27.9	16			2				13	
28.0 - 29.9	8	1		2				12	5
30.0 - 31.9	2	1						11	1
32.0 - 33.9	2	1						5	6
34.0 - 35.9	8	1							1
36.0 - 37.9	5	1						1	7
38.0 - 39.9	2							2	3
40.0 - 44.9								1	15
45.0 - 49.9								2	27
50.0 - 54.9								1	10
55.0 - 59.9								1	6
60.0 - 64.9								1	1
65.0 - 69.9									2
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish							1		1
Total = Y/Y+A	185	10	7	44	2	46	28	138	163

Table 2.5.2-11. Length-frequency of fish caught by day electro-fishing in all areas (Sections 0, 1, 2, 3 and 4) during spring, summer and fall, 1975 (continued)

Total Length in Centimeters	Fresh-water drum								
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9	1								
6.0 - 7.9	7								
8.0 - 9.9	40								
10.0 - 11.9	17								
12.0 - 13.9	12								
14.0 - 15.9	4								
16.0 - 17.9	5								
18.0 - 19.9	10								
20.0 - 21.9	11								
22.0 - 23.9	7								
24.0 - 25.9	8								
26.0 - 27.9	14								
28.0 - 29.9	16								
30.0 - 31.9	12								
32.0 - 33.9	7								
34.0 - 35.9	8								
36.0 - 37.9	4								
38.0 - 39.9	6								
40.0 - 44.9	5								
45.0 - 49.9	3								
50.0 - 54.9									
55.0 - 59.9									
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish									
Total = Y/Y+A	197								

Table 2.5.2-12. Summary of night electro-fishing catches by area, summer 1975

Species	Above Plant No.	Above Plant Catch/Hour (5 Hours)	Plant Area No.	Plant Area Catch/Hour (1.25 Hours)	Below Lock & Dam 3 No.	Below Lock & Dam 3 Catch/Hour (1.25 Hours)
Longnose gar	1	0.20	1	0.80	-	-
Shortnose gar	-*	-	1	0.80	1	0.80
Gizzard shad	71	14.20	12	9.60	2	1.60
Carp	30	6.00	17	13.60	20	16.00
Silver chub	33	6.60	2	1.60	1	0.80
Emerald shiner	20	4.00	7	5.60	-	-
Spottail shiner	10	2.00	2	1.60	-	-
Rosyface shiner	6	1.20	22	17.60	-	-
Bluntnose minnow	2	0.40	-	-	-	-
Bullhead minnow	1	0.20	1	0.80	-	-
Carpsucker spp.	7	1.40	1	0.80	-	-
Smallmouth buffalo	14	2.80	8	6.40	-	-
Bigmouth buffalo	-	-	-	-	1	0.80
Silver redhorse	4	0.80	-	-	-	-
Shorthead redhorse	65	13.00	6	4.80	21	16.80
Channel catfish	5	1.00	1	0.80	-	-
Flathead catfish	3	0.60	1	0.80	5	4.00
Trout perch	5	1.00	-	-	-	-
Burbot	-	-	-	-	1	0.80
White bass	71	14.20	11	8.80	12	9.60
Rock bass	10	2.00	4	3.20	1	0.80
Green sunfish	-	-	6	4.80	-	-
Pumpkinseed	-	-	2	1.60	-	-
Bluegill	18	3.60	27	21.60	6	4.80
Smallmouth bass	19	3.80	7	5.60	2	1.60
White crappie	-	-	1	0.80	-	-
Black crappie	2	0.40	2	1.60	5	4.00
Yellow perch	13	2.60	2	1.60	-	-
Log perch	7	1.40	-	-	-	-
Sauger	58	11.60	9	7.20	6	4.80
Walleye	39	7.80	4	3.20	9	7.20
Freshwater drum	65	13.00	11	8.80	54	43.20
Total	579	114.20	167	132.00	147	121.60

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-13. Summary of night electro-fishing catches by area, fall 1975

Species	Above Plant No.	Above Plant Catch/Hour (5 Hours)	Plant Area No.	Plant Area Catch/Hour (1.25 Hours)	Below Lock & Dam 3 No.	Below Lock & Dam 3 Catch/Hour (1.25 Hours)
Silver lamprey	-*	-	1	0.80	-	-
Longnose gar	-	-	2	1.60	-	-
Shortnose gar	-	-	2	1.60	-	-
Bowfin	1	0.20	-	-	-	-
Gizzard shad	43	8.60	57	45.60	6	4.80
Mooneye	6	1.20	-	-	4	3.20
Northern pike	1	0.20	-	-	-	-
Carp	29	5.80	25	20.00	22	17.60
Silver chub	56	11.20	7	5.60	8	6.40
Emerald shiner	38	7.60	3	2.40	21	16.80
Spottail shiner	11	2.20	-	-	-	-
Bullhead minnow	5	1.00	1	0.80	-	-
Carpsucker spp.	9	1.80	5	4.00	5	4.00
Smallmouth buffalo	2	0.40	2	1.60	-	-
Shorthead redhorse	26	5.20	-	-	17	13.60
Black bullhead	-	-	-	-	-	-
Channel catfish	-	-	1	0.80	-	-
Trout perch	4	0.80	-	-	-	-
White bass	63	12.60	19	15.20	20	16.00
Rock bass	9	1.80	-	-	1	0.80
Green sunfish	1	0.20	4	3.20	1	0.80
Bluegill	8	1.60	6	4.80	7	5.60
Smallmouth bass	21	4.20	5	4.00	8	6.40
White crappie	1	0.20	1	0.80	-	-
Black crappie	1	0.20	-	-	3	2.40
Yellow perch	4	0.80	-	-	-	-
Log perch	1	0.20	-	-	-	-
Sauger	39	7.80	16	12.80	49	39.20
Walleye	21	4.20	10	8.00	37	29.60
Freshwater drum	42	8.40	7	5.60	25	20.00
Total	442	88.40	174	139.20	233	186.40

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-14. Length-frequency of fish caught by night electro-fishing at selected stations in Sections 0, 1, 2, 3 and 4 during summer and fall, 1975

Total Length in Centimeters	Silver Lamprey	Longnose gar	Short-nose gar	Bowfin	Gizzard shad	Mooneye	Northern pike	Carp	Silver chub
Y/Y not meas.					16				
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9									2
6.0 - 7.9					1				10
8.0 - 9.9					9				8
10.0 - 11.9					41				27
12.0 - 13.9					57				54
14.0 - 15.9					43	10			5
16.0 - 17.9					18				1
18.0 - 19.9					6				
20.0 - 21.9									
22.0 - 23.9	1								
24.0 - 25.9									
26.0 - 27.9								1	
28.0 - 29.9								1	
30.0 - 31.9		1	1					2	
32.0 - 33.9								2	
34.0 - 35.9		1						7	
36.0 - 37.9		2	1					8	
38.0 - 39.9								9	
40.0 - 44.9								24	
45.0 - 49.9								41	
50.0 - 54.9								25	
55.0 - 59.9								16	
60.0 - 64.9			2	1				4	
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9							1		
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish								3	
Total = Y/Y+A	1	4	4	1	191	10	1	143	107

Table 2.5.2-14. Length-frequency of fish caught by night electro-fishing at selected stations in Sections 0, 1, 2, 3 and 4 during summer and fall, 1975 (continued)

Total Length in Centimeters	Emerald shiner	Spottail shiner	Rosyface shiner	Blunt-nose minnow	Bull-head minnow	Carp-sucker spp.	Small-mouth buffalo	Big-mouth buffalo	Silver redhorse
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9	21				1				
4.0 - 5.9	45	2	17	1	3				
6.0 - 7.9	16	13	3	1	2		1		
8.0 - 9.9	7	8				1	4		
10.0 - 11.9			1				10		
12.0 - 13.9						1	1		
14.0 - 15.9						4	1		
16.0 - 17.9						3	1		
18.0 - 19.9									1
20.0 - 21.9						1			
22.0 - 23.9									
24.0 - 25.9									
26.0 - 27.9									
28.0 - 29.9									
30.0 - 31.9						1			
32.0 - 33.9						5	2		
34.0 - 35.9						2	2		
36.0 - 37.9						2	1		
38.0 - 39.9									
40.0 - 44.9						1	1	1	
45.0 - 49.9						5	1		2
50.0 - 54.9							1		1
55.0 - 59.9						2			
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish			7		2				
Total = Y/Y+A	89	23	28	2	8	27	26	1	4

Table 2.5.2-14. Length-frequency of fish caught by night electro-fishing at selected stations in Sections 0, 1, 2, 3 and 4 during summer and fall, 1975 (continued)

Total Length in Centimeters	Short-head redhorse	Black bullhead	Channel catfish	Flathead catfish	Trout perch	Burbot	White bass	Rock bass	Green sunfish
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9					5				
6.0 - 7.9					3		5	2	5
8.0 - 9.9	1				1		36		3
10.0 - 11.9							63	2	4
12.0 - 13.9							38	5	
14.0 - 15.9	1						5	7	
16.0 - 17.9	8					1		2	
18.0 - 19.9	20						8	5	
20.0 - 21.9	12		1				11	1	
22.0 - 23.9	7	1					4		
24.0 - 25.9	9						1		
26.0 - 27.9	14			1			6		
28.0 - 29.9	9			2			6	1	
30.0 - 31.9	6			2			1		
32.0 - 33.9	4								
34.0 - 35.9	4						2		
36.0 - 37.9	9			2			4		
38.0 - 39.9	9		1				2		
40.0 - 44.9	14		2	1					
45.0 - 49.9	7		1	1					
50.0 - 54.9	1		1						
55.0 - 59.9			1						
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish							4		
Total = Y/Y+A	135	1	7	9	9	1	196	25	12

Table 2.5.2-14. Length-frequency of fish caught by night electro-fishing at selected stations in Sections 0, 1, 2, 3 and 4 during summer and fall, 1975 (continued)

Total Length in Centimeters	Pumpkin-seed	Bluegill	Small-mouth bass	White crappie	Black crappie	Yellow perch	Log perch	Sauger	Walleye
Y/Y not meas.		2							
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9		10	1	1					
6.0 - 7.9			1	1	1	9	8		
8.0 - 9.9	1	11		1	1	3		2	7
10.0 - 11.9	1	5	4					8	9
12.0 - 13.9		7	8		4	3		13	6
14.0 - 15.9		23	1		1	2		12	9
16.0 - 17.9		11	3		1	1		9	15
18.0 - 19.9		3			3	1			13
20.0 - 21.9			8					3	1
22.0 - 23.9			11		1			5	1
24.0 - 25.9			7		1			14	5
26.0 - 27.9			5					20	6
28.0 - 29.9			4					19	3
30.0 - 31.9			2					29	4
32.0 - 33.9			2					12	3
34.0 - 35.9			1					14	3
36.0 - 37.9			2					8	8
38.0 - 39.9			1					3	4
40.0 - 44.9			1					5	8
45.0 - 49.9									6
50.0 - 54.9									7
55.0 - 59.9									1
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish								1	1
Total = Y/Y+A	2	72	62	3	13	19	8	177	120

Table 2.5.2-14. Length-frequency of fish caught by night electro-fishing at selected stations in Sections 0, 1, 2, 3 and 4 during summer and fall, 1975 (continued)

Total Length in Centimeters	Fresh-water drum								
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9									
4.0 - 5.9									
6.0 - 7.9	1								
8.0 - 9.9	10								
10.0 - 11.9	27								
12.0 - 13.9	38								
14.0 - 15.9	15								
16.0 - 17.9	8								
18.0 - 19.9	9								
20.0 - 21.9	35								
22.0 - 23.9	31								
24.0 - 25.9	6								
26.0 - 27.9	8								
28.0 - 29.9	2								
30.0 - 31.9	3								
32.0 - 33.9	1								
34.0 - 35.9									
36.0 - 37.9	3								
38.0 - 39.9	1								
40.0 - 44.9	5								
45.0 - 49.9	1								
50.0 - 54.9									
55.0 - 59.9									
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
Total = Y/Y+A	204								

Table 2.5.2-15. Summary of trawl catches by season and area, 1975

Species	SPRING				FALL			
	North Lake		Plant Area		North Lake		Plant area	
	No.	Catch/Hr. (28 min.)	No.	Catch/Hr. (28 min. 8 sec.)	No.	Catch/Hr. (30 min.)	No.	Catch/Hr. (30 min.)
Gizzard shad	287	610.64	1	2.13	687	1374.00	-	-
Carp	2	4.26	5	10.64	12	24.00	8	16.00
Silver chub	1	2.13	1	2.13	-	-	3	6.00
Emerald shiner	1	2.13	-	-	3	6.00	-	-
River shiner	-*	-	2	4.26	-	-	-	-
Spottail shiner	18	38.30	-	-	47	94.00	-	-
Carpsucker spp.	2	4.26	2	4.26	-	-	-	-
Smallmouth buffalo	1	2.13	1	2.13	-	-	-	-
Bigmouth buffalo	3	6.38	-	-	-	-	3	6.00
Shorthead redhorse	1	2.13	-	-	-	-	-	-
Channel catfish	-	-	-	-	-	-	3	6.00
Trout perch	6	12.77	11	23.40	7	14.00	2	4.00
White bass	152	323.40	6	12.77	6	12.00	-	-
Bluegill	-	-	-	-	1	2.00	-	-
White crappie	11	23.40	-	-	54	108.00	2	4.00
Black crappie	3	6.38	4	8.51	39	78.00	-	-
Sauger	-	-	4	8.51	-	-	-	-
Walleye	-	-	3	6.38	3	6.00	-	-
Freshwater drum	2	4.26	11	23.40	10	20.00	12	24.00

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-16. Length-frequency of fish caught by trawling at all trawling stations during spring and fall, 1975

Total Length in Centimeters	Gizzard shad	Carp	Silver chub	Emerald shiner	River shiner	Spottail shiner	Carp-sucker spp.	Small-mouth buffalo	Big-mouth buffalo
Y/Y not meas.	905								
0.1 - 1.9									
2.0 - 3.9	2	1							
4.0 - 5.9	30		1	4				1	2
6.0 - 7.9	3		1			32			
8.0 - 9.9	2		1			14			
10.0 - 11.9	6	1	1						
12.0 - 13.9	8								
14.0 - 15.9	15								
16.0 - 17.9	3								
18.0 - 19.9	1								
20.0 - 21.9									
22.0 - 23.9									
24.0 - 25.9									
26.0 - 27.9								1	
28.0 - 29.9							1		
30.0 - 31.9									
32.0 - 33.9		1							
34.0 - 35.9		2							
36.0 - 37.9		1							
38.0 - 39.9		3							
40.0 - 44.9		9					2		2
45.0 - 49.9		6					1		1
50.0 - 54.9		2							
55.0 - 59.9									1
60.0 - 64.9									
65.0 - 69.9		1							
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish			1		2	19			
Total = Y/Y+A	975	27	5	4	2	65	4	2	6

Table 2.5.2-16. Length-frequency of fish caught by trawling at all trawling stations during spring and fall, 1975 (continued)

Total Length in Centimeters	Shorthead redhorse	Channel catfish	Trout perch	White bass	Bluegill	White crappie	Black crappie	Sauger	Walleye
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9	1		10	2		1			
4.0 - 5.9				36		4	1		
6.0 - 7.9		1	7	7		4	14		1
8.0 - 9.9			2			19	7		
10.0 - 11.9				5		5	4		
12.0 - 13.9				1					
14.0 - 15.9						5	1		1
16.0 - 17.9		1		1		1			
18.0 - 19.9					1		1		
20.0 - 21.9						1	1		
22.0 - 23.9									
24.0 - 25.9								1	
26.0 - 27.9						1		1	1
28.0 - 29.9				1					
30.0 - 31.9									
32.0 - 33.9									1
34.0 - 35.9									
36.0 - 37.9									
38.0 - 39.9		1							1
40.0 - 44.9								1	
45.0 - 49.9								1	
50.0 - 54.9									1
55.0 - 59.9									
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish			7	111		26	17		
Total = Y/Y+A	1	3	26	164	1	67	46	4	6

Table 2.5.2-16. Length-frequency of fish caught by trawling at all trawling stations during spring and fall, 1975 (continued)

Total Length in Centimeters	Fresh-water drum								
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9	3								
4.0 - 5.9	9								
6.0 - 7.9									
8.0 - 9.9	1								
10.0 - 11.9	2								
12.0 - 13.9	10								
14.0 - 15.9	6								
16.0 - 17.9									
18.0 - 19.9									
20.0 - 21.9									
22.0 - 23.9	1								
24.0 - 25.9									
26.0 - 27.9	2								
28.0 - 29.9									
30.0 - 31.9									
32.0 - 33.9									
34.0 - 35.9									
36.0 - 37.9									
38.0 - 39.9									
40.0 - 44.9									
45.0 - 49.9									
50.0 - 54.9									
55.0 - 59.9									
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish	1								
Total = Y/Y+A	35								

Table 2.5.2-17. Numbers of seine hauls and total area seined (hectares) in the Prairie Island fish study, 1973-75

Year	Above plant		Plant area		Below plant		Total	
	No. of Stations	Total area seined	No. of Stations	Total area seined	No. of Stations	Total area seined	No. of Stations	Total area seined
1973	6	0.18	1	0.03	4	0.12	11	0.33
1974	27	0.81	9	0.27	11	0.33	47	1.41
1975	24	0.85	9	0.17	11	0.26	44	1.38
Total	57	1.84	19	0.47	26	0.71	102	3.02

Table 2.5.2-18. Total numbers of young-of-the-year fish collected by seining 1973-75 in the Prairie Island vicinity

Catches expeessed as total numbers and numbers per hectare (ha) seined.

Species	1973		1974		1975	
	0.33 ha seined		1.41 ha seined		1.38 ha seined*	
	Number	No./ha	Number	No./ha	Number	No./ha
Longnose gar	-**	-	-	-	1	0.72
Shortnose gar	-	-	2	1.42	-	-
Bowfin	-	-	-	-	1	0.72
Gizzard shad	1729	5239.39	329	233.33	755	547.10
Northern pike	-	-	1	0.71	-	-
Carp	4	12.12	2	1.42	-	-
Minnows & darters	504	1527.27	1300	921.99	676	489.86
Smallmouth buffalo	-	-	3	2.13	17	12.32
Bigmouth buffalo	-	-	-	-	41	29.71
Carpsucker	98	296.97	9	6.38	77	55.80
White sucker	-	-	-	-	1	0.72
Shorthead redhorse	-	-	7	4.96	8	5.80
Bullheads	-	-	1	0.71	2	1.45
Channel catfish	-	-	9	6.38	-	-
Tadpole madtom	-	-	-	-	3	2.17
White bass	1523	4615.15	230	163.12	201	145.65
Sunfish	13	39.39	23	16.31	26	18.84
Crappies	22	66.67	39	27.66	72	52.17
Smallmouth bass	-	-	1	0.71	1	0.72
Yellow perch	-	-	8	5.67	6	4.35
Sauger	26	78.79	9	6.38	14	10.14
Walleye	-	-	-	-	2	1.45
Freshwater drum	100	303.03	39	27.66	10	7.25
Total	4019	12,178.79	2012	1426.95	1914	1386.96

* 1975 area is an estimate.

** Hyphen (-) indicates no fish were caught.

Table 2.5.2-19. Length-frequency of fish caught by seining at all seining stations during spring, summer and fall, 1975

Total Length in Centimeters	Longnose gar	Short-nose gar	Bowfin	Gizzard shad	Northern pike	Carp	Brassy minnow	Silver chub	Emerald shiner
Y/Y not meas.				423					
0.1 - 1.9									
2.0 - 3.9				63		9			12
4.0 - 5.9	1			87				3	62
6.0 - 7.9				36		2	1	3	80
8.0 - 9.9				39					15
10.0 - 11.9				48	2				
12.0 - 13.9				50				1	
14.0 - 15.9				8	1				
16.0 - 17.9					1				
18.0 - 19.9			1						
20.0 - 21.9				1					
22.0 - 23.9									
24.0 - 25.9									
26.0 - 27.9									
28.0 - 29.9									
30.0 - 31.9									
32.0 - 33.9									
34.0 - 35.9									
36.0 - 37.9						1			
38.0 - 39.9									
40.0 - 44.9						1			
45.0 - 49.9						2			
50.0 - 54.9									
55.0 - 59.9		1							
60.0 - 64.9		1							
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish									410
Total = Y/Y+A	1	2	1	755	4	15	1	7	579

Table 2.5.2-19. Length-frequency of fish caught by seining at all seining stations during spring, summer and fall, 1975 (continued)

Total Length in Centimeters	River shiner	Common shiner	Big-mouth shiner	Pugnose minnow	Spottail shiner	Red shiner	Rosyface shiner	Spotfin shiner	Redfin shiner
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9		1		1	1		1		
4.0 - 5.9	6			1	16	2	10	19	2
6.0 - 7.9	5				39	2	8	5	2
8.0 - 9.9			1		12				
10.0 - 11.9									
12.0 - 13.9									
14.0 - 15.9									
16.0 - 17.9									
18.0 - 19.9									
20.0 - 21.9									
22.0 - 23.9									
24.0 - 25.9									
26.0 - 27.9									
28.0 - 29.9									
30.0 - 31.9									
32.0 - 33.9									
34.0 - 35.9									
36.0 - 37.9									
38.0 - 39.9									
40.0 - 44.9									
45.0 - 49.9									
50.0 - 54.9									
55.0 - 59.9									
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish					28		1	10	
Total = Y/Y+A	11	1	1	2	96	4	20	34	4

Table 2.5.2-19. Length-frequency of fish caught by seining at all seining stations during spring, summer and fall, 1975 (continued)

Total Length in Centimeters	Mimic shiner	Blunt-nose minnow	Bullhead minnow	Carp-sucker spp.	White sucker	Small-mouth buffalo	Big-mouth buffalo	Short-head redhorse	Bullhead spp.
Y/Y not meas.				48			13		
0.1 - 1.9									
2.0 - 3.9		4	8	10		3	5		1
4.0 - 5.9	1	14	21	8	1	2	23		1
6.0 - 7.9			12	3				6	
8.0 - 9.9				6		1		2	
10.0 - 11.9				2		7			
12.0 - 13.9						1			
14.0 - 15.9									
16.0 - 17.9									
18.0 - 19.9									
20.0 - 21.9									
22.0 - 23.9									
24.0 - 25.9									
26.0 - 27.9									
28.0 - 29.9									
30.0 - 31.9									
32.0 - 33.9									
34.0 - 35.9									
36.0 - 37.9									
38.0 - 39.9									
40.0 - 44.9									
45.0 - 49.9									
50.0 - 54.9									
55.0 - 59.9									
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish		1				3			
Total = Y/Y+A	1	19	41	77	1	17	41	8	2

Table 2.5.2-19. Length-frequency of fish caught by seining at all seining stations during spring, summer and fall, 1975 (continued)

Total Length in Centimeters	Channel catfish	Tadpole madtom	Trout perch	White bass	Rock bass	Green sunfish	Bluegill	Small-mouth bass	White crappie
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9		2		51			7		9
4.0 - 5.9		1		62		1	18		5
6.0 - 7.9	7		6	10			1		2
8.0 - 9.9	2		1	22		2		1	
10.0 - 11.9				23	1				
12.0 - 13.9				5		1			
14.0 - 15.9				7	1				
16.0 - 17.9				11					
18.0 - 19.9				4				1	
20.0 - 21.9				1					
22.0 - 23.9				17				3	
24.0 - 25.9				17					1
26.0 - 27.9				15					
28.0 - 29.9				6					
30.0 - 31.9				3					
32.0 - 33.9				5					
34.0 - 35.9				17					
36.0 - 37.9				8					
38.0 - 39.9				5					
40.0 - 44.9				2					
45.0 - 49.9									
50.0 - 54.9									
55.0 - 59.9									
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
unmeasured fish				68					8
Total = Y/Y+A	9	3	7	359	2	4	26	5	35

Table 2.5.2-19. Length-frequency of fish caught by seining at all seining stations during spring, summer and fall, 1975 (continued)

Total Length in Centimeters	Black crappie	Johnny darter	Yellow perch	Log perch	Sauger	Walleye	Fresh-water drum		
Y/Y not meas.									
0.1 - 1.9									
2.0 - 3.9			1						
4.0 - 5.9	3	9	1	1					
6.0 - 7.9	11		4	16	10		1		
8.0 - 9.9	2			3	1		3		
10.0 - 11.9				1	2	1	6		
12.0 - 13.9					1	1			
14.0 - 15.9									
16.0 - 17.9									
18.0 - 19.9	1								
20.0 - 21.9									
22.0 - 23.9									
24.0 - 25.9									
26.0 - 27.9									
28.0 - 29.9									
30.0 - 31.9									
32.0 - 33.9									
34.0 - 35.9									
36.0 - 37.9									
38.0 - 39.9									
40.0 - 44.9									
45.0 - 49.9									
50.0 - 54.9									
55.0 - 59.9									
60.0 - 64.9									
65.0 - 69.9									
70.0 - 74.9									
75.0 - 79.9									
80.0 - 84.9									
85.0 - 89.9									
90.0 - 94.9									
95.0 - 99.9									
100.0 - +									
Total = Y/Y+A	17	9	6	21	14	2	10		

Table 2.5.2-20. Summary of seining catches by area, spring, summer, and fall 1975

Species	Above plant		Plant area		Below Lock & Dam #3		Total	
	Number of fish	Percent of total	Number of fish	Percent of total	Number of fish	Percent of total	Number of fish	Percent of total
Longnose gar	1	0.08	-	-	-	-	1	0.04
Shortnose gar	2	0.16	-	-	-	-	2	0.09
Gar (unidentified)	-*	-	1	0.4	-	-	1	0.04
Bowfin	1	0.08	-	-	-	-	1	0.04
Gizzard shad	354	28.99	110	37.9	291	37.3	755	32.89
Northern pike	-	-	-	-	-	0.5	4	0.17
Carp	9	0.74	6	2.1	-	-	15	0.65
Brassy minnow	-	-	-	-	1	0.1	1	0.04
Silver chub	3	0.25	3	1.1	1	0.1	7	0.30
Emerald shiner	233	19.08	45	15.5	301	38.6	579	25.22
River shiner	11	0.90	-	-	-	-	11	0.47
Common shiner	1	0.08	-	-	-	-	1	0.04
Bigmouth shiner	1	0.08	-	-	-	-	1	0.04
Pugnose minnow	-	-	1	0.4	1	0.1	2	0.09
Spottail shiner	46	3.66	20	6.9	30	3.8	96	4.18
Red shiner	1	0.08	1	0.4	2	0.3	4	0.17
Rosyface shiner	17	1.47	1	0.4	2	0.3	20	0.87
Spotfin shiner	34	2.78	-	-	-	-	34	1.48
Redfin shiner	4	0.33	-	-	-	-	4	0.17
Mimic shiner	1	0.08	-	-	-	-	1	0.04
Bluntnose minnow	19	1.47	-	-	-	-	19	0.82
Bullhead minnow	22	1.80	11	3.8	8	1.0	41	1.78
Carpsucker spp.	77	6.14	-	-	-	-	77	3.35
Whitesucker	1	0.08	-	-	-	-	1	0.04
Smallmouth buffalo	15	1.23	2	0.7	-	-	17	0.74
Bigmouth buffalo	33	2.70	7	2.4	1	0.1	41	1.78
Shorthead redhorse	4	0.33	4	1.4	-	-	8	0.34
Bullhead spp.	-	-	2	0.7	-	-	2	0.09
Channel catfish	8	0.66	-	-	1	0.1	9	0.39

Table 2.5.2-20. Summary of seining catches by area, spring, summer, and fall 1975 (continued)

Species	Above plant		Plant area		Below Lock & Dam #3		Total	
	Number of fish	Percent of total	Number of fish	Percent of total	Number of fish	Percent of total	Number of fish	Percent of total
Tadpole madtom	3	0.25	-	-	-	-	3	0.13
Troutperch	-	-	-	-	7	0.9	7	0.30
White bass	223	18.26	29	10.0	107	13.8	359	15.65
Rock bass	-	-	2	0.7	-	-	2	0.09
Green sunfish	2	0.16	2	0.7	-	-	4	0.17
Bluegill	17	1.39	8	2.8	-	-	25	1.09
Smallmouth bass	5	0.41	-	-	-	-	5	0.21
White crappie	25	2.05	9	3.1	1	0.1	35	1.52
Black crappie	12	0.98	-	-	4	0.5	16	0.74
Crappie spp.	-	-	21	7.2	-	-	21 n.c.	0.91
Johnny darter	5	0.41	2	0.7	2	0.3	9	0.39
Yellow perch	4	0.33	2	0.7	-	-	6	0.26
Logperch	15	1.23	-	-	6	0.8	21	0.91
Sauger	11	0.90	-	-	3	0.4	14	0.61
Walleye	1	0.08	-	-	1	0.1	2	0.09
Freshwater drum	2	0.16	1	0.3	7	0.9	10	0.43
Total	1223	100.00	290	100.00	781	100.00	2294	100.00

* Hyphen (-) indicates no fish were caught.

Table 2.5.2-21. Total numbers and percentages of fish tagged and returned 1974-1975

Species	No. tagged above Lock & Dam 3	No. tagged below Lock & Dam 3	Total	Total no. of tags returned	% returned of total tagged for each species	% of total tag returns for all species
Northern pike	219	19	236	27	11.4	10.7
Channel catfish	1110	20	130	4	3.0	1.6
Flathead catfish	9	1	10	0	-	-
White bass	1228	440	1668	89	5.3	35.2
Smallmouth bass	44	32	76	4	5.2	1.6
Largemouth bass	8	8	16	2	12.5	0.8
Sauger	191	720	911	85	9.3	33.6
Walleye	289	401	690	42	6.0	16.6
Total	2096	1641	3737	253	6.8	100

Table 2.5.2 - 22. Fish tag returns and distance travelled 1974 and 1975 in relation to location tagged

Location Tagged	Species	Location of Tag Return: Above Plant No.* Rtrns.	Above Plant Mean** Dist. Trav. (Mi)	Above Plant Spr.*** Rtrns.	Plant Area No.* Rtrns.	Plant Area Mean** Dist. Trav. (Mi)	Plant Area Spr.*** Rtrns.	Below Lock & Dam 3 No.* Rtrns.	Below Lock & Dam 3 Mean** Dist. Trav. (Mi)	Below Lock & Dam 3 Spr.*** Rtrns.
Above Plant	Walleye	7	6.8	2	0	--	--	3	17.6	1
	Sauger	5	7.0	0	1	1.2	0	7	26.0	2
	White Bass	14	3.5	5	7	1.8	7	14	39.7	0
Plant Area	Walleye	2	22.8	1	0	--	--	1	12.0	1
	Sauger	0	--	--	0	--	--	2	13.0	1
	White Bass	5	27.0	5	2	0.5	2	8	22.3	1
Below Lock & Dam 3	Walleye	9	22.7	8	0	--	--	13	18.2	10
	Sauger	8	19.2	2	0	--	--	42	12.5	18
	White Bass	6	35.7	3	0	--	--	21	16.9	6

*Number tagged and returned within 1974 and number tagged and returned within 1975

**Mean distance travelled by fish of column headed "No. Rtrns."

***Number of fish tagged and recaptured during the spring season, March 21 - June 20

Table 2.5.2-23. A comparison of K-factors, Prairie Island, 1973-1975

Year	Species	Length-range (mm)	Weighed mean K-factor	Range of K
1975	Sauger	213.0-538.0	0.88	0.75-0.98
1974	Sauger	215.0-485.0	0.85	0.74-1.08
1973	Sauger	212.0-537.0	0.95	0.84-1.01
1975	Walleye	257.0-657.0	0.97	0.88-1.04
1974	Walleye	260.0-660.0	0.97	0.79-1.02
1973	Walleye	264.0-664.0	1.00	0.91-1.05
1975	White bass	193.0-418.0	1.32	1.15-1.39
1974	White bass	92.0-422.0	1.37	1.21-1.54
1973	White bass	201.0-471.0	1.42	0.62-1.49
1975	Smallmouth bass	152.0-407.0	1.39	1.29-1.54
1974	Smallmouth bass	153.0-363.0	1.46	1.33-1.83
1973	Smallmouth bass	166.0-391.0	1.58	1.17-1.72

Table 2.5.2-24. Expected weights for fish of various lengths in the Prairie Island vicinity

SMALLMOUTH BASS

Length		Year			
		1973		1975	
cm.	in.	g.	lb.	g.	lb.
200	7.9	125	0.28	121	0.27
300	11.8	428	0.94	374	0.82
400	15.8	1020	2.25	829	1.83
500	19.7			1540	3.40
600	23.6				

WHITE BASS

Length		Year			
		1973		1975	
cm.	in.	g.	lb.	g.	lb.
150	5.9	60	0.13	48	0.11
200	7.9	131	0.29	110	0.24
250	9.8	240	0.53	211	0.47
300	11.8	394	0.87	359	0.79
380	15.0	747	1.65	714	1.57

SAUGER

Length		Year			
		1973		1975	
cm.	in.	g.	lb.	g.	lb.
200	7.9	71	0.16	67	0.15
300	11.8	250	0.55	241	0.53
400	15.8	611	1.35	600	1.32
500	19.7	1220	2.69	1220	2.69

WALLEYE

Length		Year					
		1973		1974		1975	
cm.	in.	g.	lb.	g.	lb.	g.	lb.
150	5.9	36	0.08	30	0.07	31	0.07
300	11.8	275	0.61	253	0.56	256	0.56
450	17.7	908	2.00	875	1.93	886	1.95
550	21.6	1640	3.62	1620	3.57	1640	3.62
650	25.6	2670	5.91	2700	5.95	2730	6.02

Table 2.5.2-25. Linear estimated body length (mm.) at annulus formation for white bass, 1975 sample

Age	No.	Annulus Number I	II	III	IV	V	VI	VII	VIII
1	34	106.2							
2	32	111.0	215.0						
3	10	108.3	226.2	314.6					
4	14	112.4	217.6	286.0	322.3				
5	11	122.7	243.3	283.6	333.9	357.8			
6	5	113.5	244.0	294.5	332.4	355.0	371.5		
7	5	129.6	241.3	299.2	327.7	345.3	364.5	374.4	
8	3	132.8	241.5	310.6	341.9	360.5	377.7	396.3	412.5
Grand ave. length		117.1	232.7	298.1	331.6	354.7	371.2	385.3	412.5

Table 2.5.2-26. Linear estimated increments of growth (mm.) for white bass, 1975 sample

Age	No.	Year of Growth 1	2	3	4	5	6	7	8
1	34	106.2							
2	32	111.0	104.0						
3	10	108.3	117.9	88.5					
4	14	112.4	105.2	68.4	36.2				
5	11	122.7	120.6	40.3	50.2	23.9			
6	5	113.5	130.5	50.5	37.9	22.6	16.5		
7	5	129.6	111.7	57.9	28.5	17.6	19.1	9.9	
8	3	132.8	108.7	69.1	31.3	18.6	17.1	18.6	16.2
Grand average growth increment		117.1	114.1	62.5	36.8	20.7	17.6	14.3	16.2

Table 2.5.2-27. Linear estimated body length (mm.) at annulus formation for smallmouth bass, 1975 sample

		Annulus Number					
Age	No.	I	II	III	IV	V	VI
1	17	85.5					
2	26	97.8	162.3				
3	10	100.4	169.5	218.9			
4	5	91.3	150.6	194.4	244.0		
5	15	96.0	151.1	208.0	259.2	305.4	
6	4	102.5	147.2	204.2	269.7	318.8	351.4
Grand ave. length		95.7	156.1	206.4	257.7	312.1	351.4

Table 2.5.2-28. Linear estimated increments of growth (mm.) for smallmouth bass, 1975 sample

		Year of Growth					
Age	No..	1	2	3	4	5	6
1	17	85.5					
2	26	97.8	64.5				
3	10	100.4	69.1	49.4			
4	5	91.3	59.3	43.8	49.6		
5	15	97.0	54.1	56.9	51.2	46.2	
6	4	102.5	44.8	57.0	65.6	49.1	32.6
Grand average growth increment		95.7	58.3	51.8	55.4	47.7	32.6

Table 2.5.2-29. Linear estimated body length (mm.) at annulus formation for sauger, 1975 sample

		Annulus Number							
Age	No.	I	II	III	IV	V	VI	VII	VIII
1	17	155.1							
2	36	148.6	254.1						
3	19	135.7	284.3	354.9					
4	10	161.1	274.1	355.1	389.0				
5	14	159.8	287.9	365.9	419.4	449.3			
6	9	158.9	295.8	338.1	389.5	425.2	449.2		
7	3	203.5	288.4	335.8	371.7	403.0	425.2	451.2	
8	2	213.8	315.9	380.1	429.4	456.9	477.6	497.1	516.6
Grand ave. length		167.1	285.5	355.0	399.9	433.6	450.7	474.1	516.6

Table 2.5.2-30. Linear estimated increments of growth (mm.) for sauger, 1975 sample

		Year of Growth							
Age	No.	1	2	3	4	5	6	7	8
1	17	155.1							
2	36	148.6	105.4						
3	19	135.7	148.6	70.6					
4	10	161.1	113.1	81.0	33.9				
5	14	159.8	128.1	78.0	53.6	29.8			
6	9	158.9	136.9	42.3	51.5	35.7	24.0		
7	3	203.5	84.9	47.4	35.9	31.3	22.2	26.0	
8	2	213.8	102.1	64.2	49.3	27.5	20.6	19.5	19.5
Grand average growth increment		167.1	117.0	63.9	44.8	31.1	22.3	22.7	19.5

Table 2.5.2-31. Linear estimated body length (mm.) at annulus formation for walleye, 1975 sample

		Annulus Number								
Age	No.	I	II	III	IV	V	VI	VII	VIII	IX
1	25	140.0								
2	27	152.8	284.5							
3	22	134.6	300.9	393.9						
4	23	156.7	318.1	427.4	492.8					
5	8	130.9	299.0	393.9	459.2	499.4				
6	8	145.7	261.6	352.6	436.1	485.8	519.8			
7	2	147.1	347.0	405.1	476.5	523.5	546.9	568.1		
8	1	180.6	267.7	379.4	446.4	544.7	591.6	638.5	660.8	
9	1	160.5	272.2	383.9	495.5	546.9	575.9	607.2	638.5	658.6
Grand ave. length		149.9	293.8	390.8	467.8	520.0	558.6	604.6	649.7	658.6

Table 2.5.2-32. Linear estimated increments of growth (mm.) for walleye, 1975 sample

		Year of Growth								
Age	No.	1	2	3	4	5	6	7	8	9
1	25	140.0								
2	27	152.8	131.7							
3	22	134.6	166.3	92.3						
4	23	156.7	161.4	109.3	65.5					
5	8	130.9	168.1	94.9	65.6	39.9				
6	8	145.7	115.9	91.0	83.5	49.7	34.1			
7	2	147.1	199.9	58.1	71.5	46.9	23.5	21.2		
8	1	180.6	87.1	111.7	67.0	98.3	46.9	46.9	22.3	
9	1	160.5	111.7	111.7	111.7	51.4	29.6	31.3	31.3	20.1
Grand average growth increment		149.9	142.8	95.6	77.5	57.2	33.4	33.1	26.8	20.1

Table 2.5.2 - 33. Larval fish caught in each station by week in the Prairie Island vicinity, 1975

Numbers of Larval Fish Per m^3

Date	Station Number 1	2	3	4	5	6	7	8	Mean Number of Larval Fish per m^3
May									
19-23	0.11	0.18	0.05	0.02	0.03	0.19	-	-	0.07
26-30	0.36	0.92	0.02	0.00	0.02	0.00	-	-	0.22
June									
02-06	3.40	12.21	4.96	0.36	0.08	0.04	0.84	0.07	1.83
09-13	0.27	0.74	0.18	0.02	0.11	0.10	0.16	0.04	0.20
16-20	0.55	0.52	0.04	0.00	0.03	0.04	0.12	0.01	0.16
23-27	0.14	0.35	0.28	0.02	0.06	-	0.01	-	0.10
July									
30-04	0.79	0.46	0.06	0.06	0.16	0.00	-	-	0.25
07-11	0.15	0.09	0.12	0.00	0.11	0.22	0.06	0.13	0.11
14-18	0.10	0.38	0.02	0.00	0.00	0.01	0.10	0.02	0.08
21-25	0.19	0.01	0.14	0.04	0.08	0.26	0.04	0.02	0.10
28-01	0.30	0.22	0.02	0.07	0.20	0.21	0.03	0.29	0.16
August									
04-08	0.34	0.08	0.14	0.05	0.08	0.00	0.03	0.01	0.09
11-15	0.11	0.19	0.06	0.00	0.19	0.03	-	0.10	0.08
18-22	-	-	-	-	-	-	-	-	-
25-29	-	-	-	-	-	-	-	-	-
September									
01-05	0.00	0.02	0.00	0.00	-	-	-	-	0.00

(-) Hyphen indicates no samples taken

Note:

Table 2.5.2-34 Abundance indices for 12 major fish species in the Prairie Island vicinity, 1973-1975.

appears on page 2.5.2-27 of this report.

Table 2.5.2-35. Abundance index calculations for 12 major fish species in the Prairie Island vicinity, 1973

Year 1973	EXPECTED				OBSERVED				Abundance Index	Chi-Square
	Summer Trapnet	Fall Trapnet	Fall Gillnet	Total	Summer Trapnet	Fall Trapnet	Fall Gillnet	Total		
G. shad	2.00	7.83	822.32	832.15	7	4	795	806	0.97	0.82
Carp	225.60	78.30	54.15	385.05	262	82	18	362	0.94	1.38
Carpsucker	13.20	5.22	4.75	23.17	16	12	6	34	1.47*	5.06
Sh. redhorse	78.00	27.84	19.76	125.60	110	14	11	135	1.07	1.07
Ch. catfish	1.60	0	20.90	22.50	2	0	25	27	1.20	0.90
White bass	155.20	172.26	132.24	459.70	228	77	104	409	0.89*	5.59
Rock bass	5.60	3.19	1.71	10.50	10	5	3	18	1.71*	5.36
Gr. sunfish	0	0	0	0	0	0	0	0	----	----
S.M. bass	0.40	0.29	0	0.69	0	0	0	0	----	----
Walleye	12.80	9.28	34.58	56.66	24	16	45	85	1.50*	14.18
Sauger	44.80	31.61	153.90	230.31	123	70	139	332	1.44*	44.90
Freshwater drum	153.60	44.08	21.28	218.96	202	41	43	286	1.31*	20.53
				2365.29				2494	1.05*	7.00

*Indicates significant differences between expected and observed catches for a chi-square test where there is less than a five percent chance of these catches being similar.

Table 2.5.2-36. Abundance index calculations for 12 major fish species in the Prairie Island vicinity, 1974

Year 1974	EXPECTED				OBSERVED				Abundance Index	Chi-Square
	Summer Trapnet	Fall Trapnet	Fall Gillnet	Total	Summer Trapnet	Fall Trapnet	Fall Gillnet	Total		
G. shad	2.00	10.80	1082.00	1094.80	1	1	719	721	0.66*	127.63
Carp	225.60	108.00	71.25	404.85	298	178	122	598	1.48*	92.15
Carpsucker	13.20	7.20	6.25	26.65	15	5	1	21	0.79	1.20
Sh. redhorse	78.00	38.40	26.00	142.40	137	80	36	253	1.78*	85.90
Ch. catfish	1.60	0	27.50	29.10	3	0	24	27	0.93	0.15
White bass	155.20	237.60	174.00	566.80	182	385	294	861	1.52*	152.71
Rock bass	5.60	4.40	2.25	12.25	9	7	2	18	1.47*	2.70
Gr. sunfish	0	0	0	0	0	0	0	0	----	----
S.M. bass	0.40	0.40	0	0.80	1	1	0	2	2.50	1.80
Walleye	12.80	12.80	45.50	71.10	14	12	39	65	0.91	0.52
Sauger	44.80	42.00	202.50	289.30	26	38	171	235	0.81*	10.19
Freshwater drum	153.60	60.80	28.00	242.40	244	80	22	346	1.43*	44.28
				2080.45				3147	1.09*	24.67

*Indicates significant differences between expected and observed catches for a chi-square test where there is less than a five percent chance of these catches being similar.

Table 2.5.2-37. Abundance index calculations for 12 major fish species in the Prairie Island vicinity, 1975

Year 1975	EXPECTED Summer Trapnet	Fall Trapnet	Fall Gillnet	Total	OBSERVED Summer Trapnet	Fall Trapnet	Fall Gillnet	Total	Abundance Index	Chi-Square
Gizzard shad	3.60	19.44	1041.18	1064.22	0	33	1436	1469	1.38*	153.96
Carp	405.00	193.02	68.40	666.42	295	118	54	467	0.70*	59.67
Carpsucker	23.21	12.96	6.00	42.17	18	8	10	36	0.85	0.90
Sh. redhorse	140.40	69.12	24.96	234.48	50	41	24	115	0.49*	60.88
Ch. catfish	2.88	0	26.40	29.28	1	0	26	27	0.92	0.18
White bass	279.36	428.43	167.04	873.33	179	377	75	631	0.72*	67.24
Rock bass	10.08	7.92	2.16	20.16	2	3	1	6	0.30*	9.95
Gr. sunfish	0	0	0	0	0	0	0	0	--	--
S.M. bass	0.72	0.72	0	1.44	1	0	0	1	0.69	0.13
Walleye	23.04	23.04	43.68	89.76	11	17	40	68	0.76*	5.28
Sauger	80.05	75.60	194.40	350.64	20	40	241	301	0.86*	7.02
Freshwater drum	275.68	109.44	26.88	412.00	136	94	11	241	0.58*	70.97
				3783.90				3362	0.89*	46.93

*Indicates significant differences between expected and observed catches for a chi-square test where there is less than a five percent chance of these catches being similar.

Table 2.5.2-38 Species composition determined by day electro-fishing in Section 2 (Mississippi River main channel above Lock and Dam 3) 1975

Spring, summer and fall seasons combined

Species group and species	Including minnows and darters		Excluding minnows and darters	
	No.	Percent	No.	Percent
Large rough fish	139	24.56	139	35.5
Carp	103	18.20	103	26.3
Carpsucker spp.	7	0.01	7	1.8
Shorthead redhorse	29	5.12	29	7.4
Game fishes	117	20.67	117	29.7
Channel catfish	7	1.24	7	1.8
Smallmouth bass	48	8.48	48	12.3
Walleye	21	3.71	21	5.4
Sauger	14	2.47	14	3.6
White bass	26	4.59	26	6.6
Northern pike	1	0.18	1	
Panfish	10	1.77	10	2.5
Rock bass	8	1.41	8	2.0
Bluegill	2	0.35	2	0.5
Minnows & Darters	175	30.92	---	---
Other fishes	125	22.08	125	31.9
Gizzard shad	79	13.96	79	20.2
Mooneye	2	.35	2	0.5
Black bullhead	1	.18	1	0.2
Freshwater drum	43	7.60	43	11.0
Total	566	100	391	100

Table 2.5.2-39. Diversity indices for the fish population of the Mississippi River main channel in the Prairie Island vicinity, 1973-1975

Day electrofishing data. Only Section 2 (main channel above Lock and Dam 3) included.

	Numbers caught			
Species	1973	1974	1975	Total
Large rough fish:				
Carpsuckers	3	17	7	27
Short redhorse	13	33	29	71
Carp	28	108	103	239
White sucker		1		1
Game fishes:				
Channel catfish	5	3	7	15
Smallmouth bass	25	68	48	141
Walleye	6	11	21	38
Sauger		12	14	26
White bass	4	38	26	68
Northern pike		1	1	2
Flathead catfish				
Largemouth bass				
Panfish:				
Rock bass	5	11	8	24
Bluegill		12	2	14
Green sunfish	3	2		5
Black crappie		3		3
Pumpkinseed	1			1
Minnows & darters	9	78	176	263
Others:				
Gizzard shad	25	158	79	262
Mooneye	1	1	2	4
Black bullhead			1	1
Drum	11	47	43	101
Yellow perch		2		2
Shortnose gar		2		2
Total:	130	530	391	1,051.00
Diversity index	3.11	3.12	3.08	3.16

* Minnows and darters excluded from diversity calculations.

Table 2.5.2-40. Diversity indices for the fish population of the Mississippi River in the Prairie Island vicinity 1973-1975 from shoreline seining data.

Seining data for all seasons (spring, summer, and fall) and all areas. (Sections 0 through 4.)

	1973	1974	1975
With minnows and darters*	2.33	3.48	3.37
Without minnows and darters**	1.57	2.54	2.37

* Minnows and darters included in calculations.

** Minnows and darters excluded from calculations.

Table 2.5.2-41. Diversity indices determined from electro-fishing near the intake and discharge areas of the Prairie Island Generating Plant

Station No.	Location	Diversity Index: Season			Diversity Index: All Seasons	
		Spring	Summer	Fall	Mean	Range
3-0	Intake ≈350 m upstream from discharge	2.73 (25.5)	3.07 (30.5)	2.66 (15.0)	2.82 (23.7)	2.66 - 3.07 (15.0 -30.5)
3-1	0-200 m upstream from discharge canal	1.95 (24.0)	1.00 (34.0)	1.67 (22.0)	1.54 (26.7)	1.00 - 1.95 (22.0 -34.0)
3-2	0-100 m below discharge structure	3.01 (26.0)	1.52 (32.5)	2.79 (27.5)	2.44 (28.7)	1.52 - 3.01 (26.0 -32.5)
3-3	Discharge canal 300-500 m below discharge structure	2.63 (24.3)	2.77 (32.0)	2.52 (25.5)	2.64 (27.3)	2.52 - 2.77 (24.3 -32.0)
Mean		2.58 (25.0)	2.09 (32.2)	2.41 (22.5)	2.36 (26.6)	1.00 - 3.07 (15.0 -34.0)

Note: Surface temperature during sampling is given in parentheses