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PROGRESS REPORT ON THE ABBREVIATED LAKE ST CROIX FISH POPULATION STUDY AUGUST 18, 1975 TO SEPTEMBER 29, 1975

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and

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February, 1976

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3.2 FISH POPULATION STUDY

3.2.1 INTRODUCTION

A comprehensive fish population study of Lake St Croix in the vicinity of the Allen S King Plant was initiated by the Minnesota Department of Natural Resources in 1966 and completed in 1971. Although fish populations appeared stable during the study and year class strengths appeared to be within normal fluctuations during the six years, continued sampling was necessary because not enough data were collected to determine long-term trends in the fishery. Sampling in alternate years was deemed acceptable, because it may take a number of years before long-term trends in the fishery become apparent. Declining populations of fish might be present in the fishery for a number of years after an additional amount of environmental stress has been added to the fishery.

This report covers the sampling done on Lake St Croix in 1975, the second year of assessment sampling. The report describes the sampling and analyzes the data. It includes some comparisons with the 1973 assessment sampling and the comprehensive fish population study (1966-1971).

3.2.2 MATERIALS AND METHODS

Four types of sampling gear were utilized during the 1975 assessment sampling: trap nets, gill nets, electro-fishing, and minnow seine. Trap nets and gill nets were used during 1973 only.

3.2.2.1 Trap nets

A total of 93 trap net sets were completed successfully in 97 attempts. The other sets were not counted because the nets were vandalized or mis-set.

Trap netting was initiated on August 18 and continued through August 29, 1975 using river trap nets at stations described by Krosch (1968). Nets were set at a minimum of two of the three substations in each station. Table 3.2-1 shows the substations netted successfully. Stations 10, 1, 2, and 3 are the stations closest to the plant. In addition, a set was made on the north side of the canal where it enters the river. Four overnight sets were attempted at each of these substations, except 1-B, Tower Point, where only one overnight set was made because of vandalism.

3.2.2.2 Electro-fishing

A total of 5.38 hours of day-shocking was done between September 3 and September 9, 1975. Two fifteen-minute runs in each of the 10 stations plus an extra eight-minute run in Station 6 and one fifteen-minute run in the discharge canal.

The electro-fishing gear consisted of a 230 volt Onan gaspowered DC generator mounted in a fourteen-foot Monarck boat. A Smith-Root type VI pulse DC unit was used to regulate the electric field. The electrode arrangement consisted of a bowmounted anode, two concentric rings of one-half inch stainless steel, and two stern cathodes trailing the boat. Each cathode consisted of a five-and a seven-foot length of flexible conduit tubing with lead in the bottom. The Smith-Root control unit was operated at a 60 pulse per second DC setting using a maximum pulse width and about five amperes.

3.2.2.3 Gill nets

A total of 43 gill net sets were completed successfully in 44 attempted sets from September 11-26, 1975 using experimental gill nets as described by Krosch (1968).

Nets were set at two of three substations in each station with two overnight sets attempted at each substation except 5-A and 8-C. The gill net set at Substation 5-A disappeared the second night, so an additional overnight set was made. Only one overnight set was attempted at Substation 8-C. One of the other gill nets was tampered with; the marker buoy and anchor were stolen; but the net contained a large number of fish, so data from that set are included in the results.

3.2.2.4 Shoreline Seine

A total of eleven seine hauls for young-of-the-year (yy) fish were made on three days: September 15, 22, and 29, 1975.

Nine of the seine hauls were made at locations described by Krosch (1971). The shoreline seining stations are listed in Table E-3.2-1.

3.2.2.5 Scale Samples

Scale samples were taken from eight species of fish including walleye, sauger, northern pike, muskellunge, white bass, smallmouth bass, black crappie, and white crappie. Scale impressions were aged independently by two workers and then verified by one of them.

3.2.2.6 Length-Weight Data

Length-weight data were collected on thirteen species of fish: walleye, sauger, northern pike, muskellunge, white bass, smallmouth bass, black crappie, white crappie, carp, silver redhorse, golden redhorse, and shorthead redhorse. The lengthweight data and analysis will be presented in a later report because of problems in getting computer time for analysis of these data.

3.2.3 RESULTS

3.2.3.1 Composite Catch

A total of 48 species (5,786 fish) were collected during 1975 sampling. Seven species each comprised more than 5 percent of the total catch: carp (15.3 percent), gizzard shad (13.3 percent), black crappie (10.2 percent), white bass (9.0 percent), emerald shiner (8.5 percent), log perch (7.0 percent), and smallmouth bass (5.3 percent). An additional eight species each comprised more than one percent of the total catch: sauger (4.9 percent), shorthead redhorse (4.1 percent), white crappie (4.1 percent), silver redhorse (3.9 percent), drum (3.9 percent), bluegill (1.5 percent), yellow perch (1.4 percent), and channel catfish (1.3 percent). These fifteen species comprised 93.7 percent of all fish collected in the 1975 sampling.

Table A-3.2-1 is a composite of all fish caught by all methods during 1975 sampling. It lists the total number of each species caught and percent of total catch comprised by each species. Table A-3.2-2 is a composite length-frequency for all fish collected in the 1975 sampling.

A list of common and scientific names according to the American Fisheries Society (1970) and methods of capture of each species is found in Table A-3.2-3. This list also includes the years each species was captured during previous sampling.

3.2.3.2 Trap netting

A total of 25 species (1,712 fish) were caught in 93 successful trap net lifts. Two species, carp (36.0 percent) and black crappie (28.4 percent), comprised 64.4 percent of the total catch. White bass (11.9 percent) and white crappie

(7.2 percent) comprise an additional 19.1 percent of the total catch. Nine species: silver redhorse (3.3 percent), shorthead redhorse (3.0 percent), Freshwater drum (2.7 percent), bluegill (1.8 percent), sauger (1.0 percent), white sucker (0.9 percent), northern pike (0.9 percent), muskellunge (0.8 percent), and rock bass (0.8 percent) comprised an additional 15.2 percent of the total catch. These thirteen species comprised 98.7 percent of the total trap net catch. The silver lamprey was attached to the head of a northern pike caught in a trap net.

A summary of trap net catches for 1975 is shown in Table B-3.2-2. It includes the total number, percent composition, and catch per effort for each species of fish caught in 93 successful lifts. The length-frequency of fish caught trap netting is presented by species in Table B-3.2-3.

3.2.3.3 Gill netting

A total of 30 species (2,168 fish) were caught in 43 successful gill net sets. Twelve species comprised 94.8 percent of the total catch.

Gizzard shad, 28.2 percent of total catch, were the most abundant fish caught, almost twice the number of the next most abundant species, white bass, 14.3 percent of total catch. Sauger (12.0 percent), gizzard shad and white bass collectively comprised over one-half of the total gill net catch, 54.5 percent. Four species: Freshwater drum (8.3 percent), carp (6.5 percent), silver redhorse (5.9 percent), and white crappie (5.3 percent) comprised an additional 26.0 percent of the total catch. The above seven species, plus black crappie (4.4 percent), shorthead redhorse (3.3 percent), channel catfish (3.3 percent), walleye (1.6 percent), and yellow perch (1.6 percent) comprised 94.7 percent of the total gill net catch for 1975. A summary of gill net catches is presented in Table C-3.2.2. It includes total number, percent composition, and catch per effort for each species caught in 43 successful gill net sets. The length-frequency for all fish caught with gill nets is presented in Table C-3.2-3.

3.2.3.4 Electro-fishing

A total of 37 species (1,344 fish) were collected in 5.38 hours of electro-fishing during 1975 sampling. Two species of darters, which had not been collected by any type of gear during the comprehensive study, were collected by electrofishing in 1975. One individual of each species, slenderhead darter and striped fantail darter were collected.

Only twelve of 37 species collected by electro-fishing represented more than a trace, greater than 0.5 percent of the total catch. Three of these: log perch (26.6 percent), smallmouth bass (19.6 percent), and emerald shiner (14.7 percent) represented over 60 percent of the total catch. Gizzard shad (9.3 percent), carp (9.1 percent), shorthead redhorse (7.4 percent), and bluegill (4.1 percent) comprised an additional 29.9 percent of the catch for a total of over 90 percent of the total electro-fishing catch. Five other species that comprised more than a trace of the catch are: silver redhorse (2.2 percent), yellow perch (1.1 percent), largemouth bass (0.8 percent), rock bass (0.7 percent), and black crappie (0.6 percent). Chestnut and silver lampreys were attached to fish collected while electro-fishing.

Results of 5.38 hours of electro-fishing are presented in Table D-3.2-1, including the total number, percent of catch, and the catch per hour for each species. The length-frequency of all fish collected during electro-fishing is presented in Table D-3.2-2.

3.2.3.5 Shoreline Seining

A total of 26 species (562 fish) were collected in eleven seine hauls. Eleven species comprised 94.2 percent of the total catch. Mimic shiners and gilt darter, two species not previously collected by any method during the previous study, were collected during shoreline seining in 1975.

Emerald shiners were by far the most abundant species, comprising 51.9 percent of the total shoreline seine catch. Ten species: log perch (7.4 percent), smallmouth bass (6.4 percent), gizzard shad (5.7 percent), spottail shiner (5.5 percent), yellow perch (5.3 percent), silver redhorse (3.2 percent), shorthead redhorse (2.5 percent), western sand darter (2.3 percent), white bass (1.4 percent), and mimic shiner (1.1 percent) comprised an additional 40.8 percent of the catch.

Table E-3.2-2 is a summary of shoreline seining including the total number collected and percent composition. Length-frequency of fish from shoreline seining is presented in Table E-3.2-3.

3.2.3.6 Tag Returns

A total of thirteen tags from tagging done during the comprehensive study were returned since the report for the 1973 sampling was written. Tagged fish included nine white bass, two walleyes, one sauger, and one channel catfish. All were caught in Lake St Croix except one white bass, which was caught near Marine-on-St Croix and the channel catfish which was caught in Pool 7 of the Mississippi River. One walleye tagged on April 25, 1966 in Anderson Bay was caught and released by an angler on June 28, 1966 near Bayport and caught again by an angler on October 4, 1974.

3.2.4 DISCUSSION

3.2.4.1 Muskellunge

A total of 28 muskies were collected during the 1975 sampling. Scale samples from 27 of these fish included at least one fish from each of the four year classes represented by the four stockings.

Examination of Minnesota Department of Natural Resources stocking records shows that muskies were stocked in Lake St Croix during 1972 through 1975. All were September fingerling stockings, with fish averaging ten or eleven inches in length and ranging from seven per pound in 1972 to four per pound in 1974 and 1975. The muskie stockings included 720 in 1972, 1,818 in 1973, 500 in 1974, and 700 in 1975 for a total of 3,738 muskie fingerlings during the four years.

Scale samples from 27 muskies included four fish from the 1975 year class, seven fish from the 1974 year class, fifteen fish from the 1973 year class, and one fish from the 1972 year class. A summary of the 27 aged muskies and information on the muskie stockings is presented in Table 3.2-1.

Number Aged	Age Class	Year Class	Av. Total Length (in.)	Length Range (in.)	Av. Total Length at Stocking (in.)	Av. Weight at Stocking (1b.)
4	+	1975	10.9	9.9-11.7	10.4	0.25
7	I+	1974	17.3	15.7-18.5	10.6	0.25
15	II+	1973	23.2	19 9-25 7	11.2	0.20
1	III+	1972	23.2	23.2	10.3	0.14

Table 3.2-1 Summary of age and growth data and stocking data for muskellunge collected in Lake St Croix in 1975

It appears that the stockings have been successful: fish from all stockings are present. Muskies were sampled in all six stations between Stillwater and the Hudson Railroad bridge. Only one muskie was taken in all of the sampling done below the Hudson Railroad bridge. It was a 24.6-inch muskie taken in a seine haul at Station 8-A, Canning Factory Point. Muskies appear to be well dispersed throughout the study area between Stillwater and the Hudson Railroad bridge and apparently disperse rapidly after being stocked. One of the fingerling muskies stocked on September 16, 1975 above the Stillwater bridge, was caught at Station f-C, just above the Hudson Railroad on September 29, 1975. The other three fingerling muskies collected in the 1975 sampling were collected in Station 10 near 10-A on September 22, and the other two at 10-B on September 29, 1975.

The one muskie collected from the 1972 year class was the same length as the average length of muskies from the 1973 year class. This fish could be one of the slower growing makes from the 1972 year class. Based on the growth rate of the other year classes, the larger fish from the 1972 class could be expected to be recruited into the fishery during the summer of 1976 and 1973 year class during the summer of 1977.

3.2.4.2 Northern Pike

A total of 31 northern pike were collected during the 1975 sampling. Scales samples from all 31 of these fish included fish from seven year classes.

As stated by Krosch (1970 and 1971), northern pike are present in Lake St Croix, but are not abundant probably due to lack of good spawning habitat. Although many individuals are of large size, the northern pike is of minor importance as gamefish in Lake St Croix.

The 1972 and 1974 year classes were the strongest year classes collected. Northern pike spawned successfully in 1975 because yy fish were collected, but they appeared to be scarce. Table 3.2-2 is a summary of the 31 northern pike that were aged.

No. of Fish	Age Group	Year Class	Average Total Length (in.)	Range in Total Length (in.)
2	+	1975	10.2	8.9-11.5
11	I+	1974	15.9	13.2-18.0
2	II+	1973	19.8	17.6-22.0
10	III+	1972	27.2	19.5-33.4
3	IV+	1971	32.0	30.0-34.2
1	V+	1970	34.5	34.5
1	VI+	1969	34.9	34.9

Table 3.2-2 Summary of age and growth data from northern pike collected in Lake St Croix in 1975

3.2.4.3 Walleye

A total of 42 walleyes were collected by all methods during the 1975 sampling. Scale samples from 41 of these fish included walleyes from six year classes.

The small sample size of walleyes makes it difficult to make positive statements about this species. Walleyes spawned successfully in 1975 because yy walleyes were collected, but not in large numbers. The average length and range in lengths of walleyes comprising each age group (Table 3) indicates the year class is small and probably competing with the slower growing members of the 1973 year class. It appears that the 1972 year class is overlapping and competing with the 1971 year class, which is either small or was inadequately sampled. Table 3.2-3 is a summary of the 41 walleyes that were aged.

<u>No. of Fish</u>	Age Group	Year Class	Average Total Length (in.)	Range in Total Length (in.)
7	+	1975	6.8	5.7- 8.1
2	I +	1974	11.1	10.2-12.0
23	II+	1973	13.2	10.8-16.4
6	III+	1972	16.1	14.6-17.9
1	IV+	1971	17.5	17.5
2	V+	1970	23.1	23.0-23.3

Table 3.2-3 Summary of the age growth data from walleyes collected in Lake St Croix in 1975

3.2.4.4 Sauger

A total of 286 saugers were collected by all methods during 1975 sampling. Scale samples from 284 of these fish included saugers from seven year classes. Saugers collected in the 1975 sampling were from a number of strong year classes, which should be able to support a good harvest.

Saugers comprised 12 percent of total gill net catch in 1975 compared to 50 percent of gill net catch in 1973 (Hawkinson, 1974). Krosch (1972) reported saugers as 11.5 percent of the fall gill net catch. Gill netting in 1973 started a month later than in either the 1971 or 1975 sampling periods. The water temperature would have been cooler during the 1973 sampling, because it was done later in fall. Consequently, saugers were probably in shallower water, which made them more susceptible to gill nets. This could account, at least in part, for the considerably higher catches of saugers in 1973.

Saugers appear to have had poor spawning success in 1975 because only two yy fish were collected. The 1974 year class of saugers also appears somewhat weak compared to the other year classes. The 1973 year class is strong with some of the larger members of the 1973 year class probably recruited into the fishery in the fall of 1975. The other will be recruited into the fishery during 1976. The 1972 and 1971 year classes still appear to be present in fairly large numbers and should be capable of supplying some good catches to anglers. Table 3.2-4 is a summary of the age and growth data from saugers collected in 1975.

No. of Fish	Age Group	Year Class	Average Total Length (in.)	Range in Total Length (in.)
2	+	1975	5.1	5.1- 5.2
30	I+	1974	10.2	8.2-11.3
120	II+	1973	12.8	11.0-15.1
59	III+	1972	14.7	13.2-16.4
50	IV+	1971	16.1	14.1-18.8
21	V+	1970	17.5	16.0-20.4
2	VI+	1969	19.5	19.0-19.9

Table 3.2-4 Summary of age and growth data from saugers collected in Lake St Croix in 1975

3.2.4.5 Smallmouth Bass

A total of 304 smallmouth bass were collected during 1975 sampling. Scale samples from 76 of these fish included smallmouth bass from five year classes.

The smallmouth bass had another excellent hatch in 1975. Not many scale samples were taken from yy smallmouths, but comparison of average length of yy smallmouth bass with the composite length-frequency table (Appendix A-2) indicates they were present in large numbers. Smallmouth bass yy were sampled in most areas; they were collected in 8 of 12 seine hauls and in all electro-fishing runs. Krosch (1972) collected yy smallmouth bass at all seine stations and collected fair numbers during fall night shocking.

Examination of the composite length-frequency table seems to indicate three year classes were collected, but Table 5 shows that five year classes were sampled. The 1974 year class appears to overlap with the smaller members of the 1973 year class. The larger members of the 1973 year class overlap the 1972 and 1971 year classes, which appear to be weak or

were poorly represented in our sampling.

Krosch (1971 and 1972) reported low numbers of smallmouth bass 11 inches or larger, which was also true during 1975. Table 3.2-5 is a summary of the age and growth data of smallmouth bass collected in 1975 sampling.

Table 3.2-5 Summary of age and growth data of smallmouth bass collected in Lake St Croix in 1975

No. of Fish	Age Group	Year Class	Average Total Length (in.)	Range in Total Length (in.)
7	+	1975	3.9	2.8- 6.0
34	I+	1974	7.0	6.1- 8.0
30	II+	1973	9.2	6.8-10.4
3	III+	1972	10.4	10.2-10.6
2	IV+	1971	10.7	10.4-11.0

3.2.4.6 Crappies

Black and white crappies should be able to produce some excellent catches for sport fishermen in the next two or three years, with black crappies probably dominating the catch. Both species of crappies were abundant, but more than twice as many black crappies were sampled as were white crappies. Scale samples from 143 black crappies included fish from six year classes, and scale samples from 78 white crappies included fish from seven year classes. A total of 591 black crappies were collected during 1975 sampling. The 143 fish that were aged (Table 6) included 10 yy black crappies but only two I+ fish. The black crappies appear to have spawned successfully in 1975, but may have had poor spawning success in 1974. Fish from the 1974 year class appear to have grown fast, probably due to a lack of competition because of low numbers and are competing with the smaller members of the 1973 year class. The 1973 year class appeared to be strong and overlapped most of the 1972 year class. The 1971 and 1970 year classes completely overlap and probably compete with each other. Table 3.2-6 is a summary of the age and growth data for black crappies collected in 1975.

Table 3.2-6	Summary of age and growth data of black	crappies
	collected in Lake St Croix in 1975	

No. of Fish	Age Group	Year Class	Average Total Length (in.)	Range in Total Length (in.)
10	+	1975	4.1	3.9- 4.4
2	I+	1974	6.0	6.0- 6.1
62	II+	1973	7.4	5.7- 9.0
22	III+	1972	8.8	6.7-11.0
23	IV+	1971	10.5	9.2-11.5
24	• • • V+ • • •	1970	10.7	9.8-11.6

A total of 239 white crappies were collected during the 1975 sampling. White crappies appear to have spawned successfully in 1975, but were present in low numbers. The 1974 year class of white crappies appears to be poor as did that year class of black crappies. The 1973 year class of white crappies is present, but weak compared to the 1973 year class of black crappies. The 1972 year class of white crappies is strong and

appears to be competing with the 1971 year class which is weak. The 1970, 1969, and 1968 year classes are all present, but in low numbers. All three of these year classes are probably competing with each other. Table 3.2-7 is a summary of the age and growth data of white crappies collected in 1975.

Table 3.2-7 Summary of age and growth data of white crappies collected in Lake St Croix in 1975

No. of Fish	Age Group	Year Class	Average Total Length (in.)	Range in Total Length (in.)
2	+	1975	4.7	4.5- 4.9
3	I+	1974	6.1	5.9- 6.3
12	II+	1973	6.9	6.2- 8.6
49	III+	1972	8.6	7.2- 9.6
4	IV+	1971	9.3 .	8.4-10.0
3	V+	1970	11.1	10.3-11.6
4	VI+	1969	12.0	10.1-13.2
1	VII+	1968	12.0	12.0

3.2.4.7 White Bass

White bass are abundant and should support a heavy harvest for the next few years. A total of 521 white bass were collected by all methods during the 1975 sampling. Scale samples from 185 of these white bass included fish from seven year classes.

Spawning success appeared good in 1975 because yy white bass were abundant. They appear to have grown fast possibly because the 1974 year class is variable and overlapped by 1975 and 1973 year classes. The 1973 year class is strong and should support some good fishing in the next few years. The larger members of the 1972 year class appear to be competing with the smaller members of the 1971 year class and the larger members of the 1971 year class appear to be competing with the 1970 year class. The 1972, 1971, and 1970 year class should be producing some good catches for anglers. The 1969 year class is present but numbers are low. Table 3.2-8 is a summary of the age and growth data from white bass collected in 1975.

No. of Fish	Age Group	Year Class	Average Total Length (in.)	Range in Total Length (in.)
18	+	1975	5.4	5.0- 5.9
7	I+	1974	8.1	5.5- 9.1
84	II+	1973	10.1	8.1-12.0
25	III+	1972	13.0	12.0-13.9
26	IV+	1971	13.8	12.7-14.5
21	V+	1970	14.5	13.1-15.3
4	VI+	1969	15.2	14.6-15.7

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3.2.4.8 Abundance Index

Any increases or decreases in abundance may indicate a change in the aquatic environment which could be caused by operation of the Allen S King Plant. Since the purpose of this study is to monitor the effects of the King Plant upon Lake St Croix, abundance trends are an important result of this study. Comparable catch data covering a nine-year period are available for Lake St Croix, so it is possible to look for any overall trends in abundance of fish in Lake St Croix.

In an effort to determine trends in abundance of fish in Lake St Croix, abundance indices (Hile, 1962) were calculated from gill net and trap net data. Catch data from fall gill netting and late summer trap netting were used to establish average catch rates for the period 1966-1975. Data from this period were used to coincide with the period of the biennial maintenance sampling of 1973 and 1975. This average catch rate for each year was used to calculate an expected catch for each species, each gear, and each year of sampling. The observed catch was divided by expected catch to yield the abundance index. Abundance indices for gill net catches, trap net catches, and combined gill net and trap net catches were calculated and are listed in Table F-3.2-1.

The number of fish present in Lake St Croix, as measured by gill net and trap net catches, vary widely from year to year. For example, abundance indices for all species in the trap nets varied from 0.47 to 1.40, and in gill nets the indices varied from 0.52 to 1.49. Such fluctuations are common in fish populations in Minnesota lakes (Peterson, 1973). Fluctuations of a similar magnitude were reported from Lake of the Woods by Heyerdahl and Smith (1972).

Regression lines were calculated from gill net, trap net, and combined abundance indices to determine if any long-term changes in abundance were present. A correlation coefficient was calculated for each regression line to determine if the lines indicated any real trends. The correlation coefficients

for the regression lines for all species indicate that in each case (gill net, trap net, and combined catches) one can be confident (95 times in 100) that for all species there was no overall trend in abundance between 1966 and 1975.

By adding the observed and expected gill net and trap net catches for each species and then combining these figures for a group of species, abundance indices for four groups of species were calculated (Table F-3.2-2). These four groups were as follows:

Gamefish

northern pike channel catfish white bass saugers walleye

Panfish

rock bass bluegill white crappie black crappie

Large rough fish

carp white sucker silver redhorse shorthead redhorse

Other Fish

longnose gar shortnose gar gizzard shad mooneye yellow perch freshwater drum

Regression lines and correlation coefficients were calculated for each species group. Again, there was no significant trend in abundance at the five-percent level. Thus, for the period 1966-1975, there was no significant overall trend in numbers of fish in Lake St Croix. Table F-3.2-3 is a summary of the equations of the lines and correlation coefficients for abundance index calculations.

Considering all stations, there is no indication at this time of any overall changes in fish abundance, but it is known that locally the plant affects fish concentrations. Fish are known to concentrate in water discharge from the plant at various times of the year and species may vary from time to time. Since one of the correlation coefficients was high enough to be significant at the five-percent level with two or three years more data, it should be determined by further sampling whether this correlation coefficient is actually that high. Efforts should be made to quantify the effect of the plant on local distribution of fish.

The abundance index for some species is highly variable from year to year, so an effort was made to determine the cause of these fluctuations. Often the size of an adult fish population is directly related to abundance of young fish of that species a few years earlier. In other populations, some environmental stress may cause high mortality among adult fish.

Preliminary calculations using length-frequency distributions from the entire period of the Lake St Croix fish study, in conjunction with available age and growth data from the study, indicate a relationship between the number of yy, recruits, and adult fish of that species. This may help to explain that variation in abundance indices.

The preliminary calculations show promise, so this approach will be pursued and findings presented in a later report.

3.2.4.9 New Species

The mimic shiner (Notropis volucellus), striped fantail darter (Etheostoma flabellare lineolatum), gilt darter (Percina evides), and slenderhead darter (Percina phoxocephala) are four species not previously collected by any method during the King Plant study. Six mimic shiners were collected in a seine haul east of sampling Station 1-B on September 22, 1975. Eddy and Underhill (1974) report that the mimic shiner "is locally abundant in the St Croix River just below Taylors Falls. Mimic shiners are usually pelagic during the day and move into the littoral region at night, avoiding areas with heavy vegetation."

A single striped fantail darter was collected on September 3, 1975 during a shocking run in Station 6 along the Minnesota shore just below the Hudson Railroad bridge. Eddy and Underhill (1974) report the striped fantail darter as rare in the St Croix River below Taylors Falls. It prefers cold, swift water. This fish may have been in transit because the habitat this species prefers was not present where it was collected.

A single gilt darter was collected on September 9, 1975 in a seine haul north of sampling Station 5-A. Eddy and Underhill report that the gilt darter is common in the St Croix River between Taylors Falls and Lake St Croix preferring a clear water habitat.

A single slenderhead darter was collected on September 8, 1975 during a shocking run in Anderson Bay. Eddy and Underhill (1974) report that considerable numbers of this species have been collected in the St Croix River and its tributaries.

SUMMARY

The correlation coefficient for the regression lines of abundance indices for all species caught in gill nets, trap nets, and their combined catch indicate there was no significant overall trend in abundance for all species of fish in Lake St Croix between 1966 and 1975. Additional sampling is necessary, because it may take several years before long-term trends in the fishery are apparent. To date, fluctuation in abundance indices appear to be related to variation in spawning success and recruitment.

A total of 48 species (5,786 fish) were caught by all methods from August 18 to September 29, 1975. Fifteen species: carp, gizzard shad, black crappie, white bass, emerald shiner, log perch, smallmouth bass, sauger, shorthead redhorse, white crappie, silver redhorse, drum, bluegill, yellow perch, and channel catfish (in order of abundance) comprised 93.7 percent of all fish collected in the 1975 sampling.

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APPENDIX A-3.2

TABLE A-3.2-1

COMPOSITE CATCH OF ALL METHODS OF SAMPLING, LAKE ST CROIX August 18 to September 29, 1975

Species		No. Caught	% of Catch
Chestnut lamprey	n an	1	*
Silver lamprey		6	*
Lake sturgeon		6	*
Longnose gar		8	*
Shortnose gar		14	- *
Gizzard shad		767	13.3
Goldeye		5	*
Mooneye		15	*
Northern pike		31	0.5
Muskellunge		28	0.5
Carp		883	15.3
Emerald shiner		491	8.5
Pugnose minnow		6	*
Spottail shiner		34	0.6
Fathead minnow		1	*
Carpsucker		15	*
White sucker		24	*
Smallmouth buffalo		10	*
Bigmouth buffalo		3	*
Spotted sucker		6	*
Silver redhorse		228	3.9
River redhorse		7	*
Golden redhorse		18	*
Shorthead redhorse	·	236	4.1
Black bullhead		3	*
Yellow bullhead		1	*
Channel catfish		74	1.3
Burbot		5	*
Brook silversides		2	*
White bass		521	9.0
Rock bass		35	0.6
Green sunfish		1	*
Bluegill		88	1.5
Smallmouth bass	·	304	5 <u>•</u> 3
Largemouth bass		11	*
White crappie		239	4.1
Black crappie		591	10.2
W. Sand darter		14	*

TABLE A-3.2-1 (Con't)

Species	No. Caught	% of Catch
Fantail darter	1	*
Joh nn y darter	3	*
Yellow perch	80	1.4
Log perch	400	7.0
Gilt darter	1	*
Slenderhead darter	1	*
River darter	13	*
Sauger	281	4.9
Walleye	42	0.7
Freshwater drum	228	3.9
Total	5782	

* <0.5%
TABLE A-3.2-2

LENGTH-FREQUENCY DISTRIBUTION OF FISH CAUGHT BY ALL METHODS IN LAKE ST CROIX

August 18 to September 29, 1975

Contractor and a second se				-		-		/	
. Total	Chestnut	Silver	Lake	Long-	Short-	Gizzard	Goldeve	Mooneye	Northern
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TOTALS	1	6	6	8	14	767	5	15	31

TABLE A-3.2-2 (Con't)

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TOTALS	28	883	491		6	1	15	24	10

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Total Length in Inches	Bigmouth buffalo	Spotted sucker	Silver red- horse	River red- horse	Golden red - horse	Short- red- horse	Black bullhead	Yellow bullhead	Channel catfish
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TOTALS	3	6	228	7	18	236	3	1	74

Total Length in Inches	Burbot	Brook silver- sides	White bass	Rock bass	Green sunfish	Blue- gill	Small- mouth bass	Large- mouth bass	White crappie
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TOTALS	5	2	521	35	1	88	304	11	239

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Total Length in Inches	Black crappie	Western sand darter	Fantail darter	Johnny darter	Yellow perch	Log perch	Gilt darter	Slender head darter	River darter
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10.0 - 10.9	35		Sector - and the				<u></u>	<u>}</u>	
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11.00 - 11.0/				l			J		
12.0 - 12.9	r)		Contraction of the local diversion of the local diversion of the local diversion of the local diversion of the		1		
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18.0 - 18.9	and the second second second second second second second second second second second second second second secon		ta _{n a} n de la contra de la contra de la contra de la contra de la contra de la contra de la contra de la contra de				a and a second second second second second second second second second second second second second second second		
19.0 - 19.9			al and in a second second second second second second second second second second second second second second s	Nagania na si ti Majadakati Ujum di ^{na} si pa					
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21.0 - 21.9			01000000000000000000000000000000000000						
22.0 - 22.9					and the second second second second second second second second second second second second second second secon				
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24.0 - 24.9							a a construction of the second second second second second second second second second second second second se		
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28.0 - 28.9			and and a second second second second second second second second second second second second second second se		Yananin Tiyacan amana di kale d				
29.0 - 29.9		·	*****						and a subscription of the second system of the second system of the second system of the second system of the s
30.0 - 30.9	and the second second second second second second second second second second second second second second second			Protection and the Party of Pa	Personangan di secara dan serangan di secara di secara di secara di secara di secara di secara di secara di se				
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34.0 - 34.9				an an an an an an an an an an an an an a	an an an an an an an an an an an an an a				
35.0 - 35.9							1		
$36_{0} - 36_{9}$					an a faith an a faith an an an an an an an an an an an an an		1		
2					in a supplier in some integration in the supplier in the supplice in the supplice in the supplise in the supplice in the supplice in the suppl	100 0000000000000000000000000000000000		<u> </u>	
IInmeasured	3	14		3	1	288			13
Junioupur ou	•				and the second sec				
TOTALS	591	14	1	3	80 ^s	400	1	1	13

Total Length in Inches	Sauger	Walleye	Fresh- water drum						
	1			1	1	1			
0.0 = 0.9									
1.0 = 1.9				<u> </u>		<u> </u>	1.		
$\frac{100 - 10}{20 - 20}$					t			h	
30 - 30									
1.0 1.0				<u> </u>	<u> </u>		<u> </u>		
4.0 = 4.9			3			<u> </u>	<u> </u>		
2.0 - 2.9	2	3	22		+	h			
0.0 = 0.9			6		<u> </u>	<u> </u>		<u> </u>	
7.0 - 7.9		3	33						
8.0 - 8.9	<u> </u>	1	92		ļ		a and a construction of the second second second second second second second second second second second second		
9.0 = 9.9	6		13						
10.0 - 10.9	16	3	24		L				
11.0 - 11.9	15	3	16			J	L	L	
			en ant distance against the star of provident				-		
12.0 - 12.9	54	8	6	-	ļ				
13.0 - 17.9	51	2	8	۱ ۱	1 	<u> </u>	۱ ــــــــــــــــــــــــــــــــــــ		
14.0 - 14.9	51	6	1						
15.0 - 15.9	24	3							
16.0 - 16.9	36	4		1	1				
17.0 - 17.9	10	3	1				and the second s		
18.0 - 18.9	7								
19.0 - 19.9	3					1			
20.0 - 20.9	2			1		1			
21.0 - 21.9			and the second second second	1					Concernant Name of Street
22.0 - 22.9	ana ang ang ang ang ang ang ang ang ang		and the second second second second second second second second second second second second second second secon			and an and the second second second second second second second second second second second second second secon			
23.0 - 23.9		2	a anta a ten a constanta da partena a						
24.0 - 24.9					h				
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<u>79.0 - 79.9</u>						ļ		L	
30.0 - 30.9									
<u>1.0 - 51.9</u>									
32.0 - 32.9							Ļ		
33.0 - 33.9									
34.0 - 34.9									
35.0 - 35.9									
36.0 - 36.9									
				-					
Unmeasured	1		2						
TOTALS	279	42	228						

TABLE A-3.2-3

COMMON AND SCIENTIFIC NAMES, METHODS AND YEARS OF CAPTURE OF FISH IN LAKE ST CROIX

		Metho	d of Captu	Method of Capture in 1975					
		an an an an an an an an an an an an an a	Electro-		Minnow	in previous			
Common Name	Scientific Name** Tra	ap net	fishing	Gill net	seine	study*			
Chestnut lamprev	Ichthyomyzon castaneus		Х	ŔĸġĸĸŎĸĸĸţŶŴĨĊŢŔŔŎĊĬĸĸŎĸĸĸĊĸĸĸĸŔŎĸŔŢĿĿŔĸĸĸŎĬŔĸĸĸŢŎĿĸ	999) haang ong 200 ang ang 200 pinang ang 200 pina	73			
Silver lamprev	Ichthyomyzon unicuspis	х	X	X		66-71, 73			
American brook									
lamprev	Lampetra lamottei					69			
Lake sturgeon	Acipenser fulvescens			х		66-71, 73			
Paddlefish	Polvodon spathula					66-70			
Longnose gar	Lepisosteus osseus	Х	X	Х		66-71, 73			
Shortnose gar	Lepisosteus platostomus	Х	Х	Х		66-71, 73			
Bowfin	Amia calva					66-70			
American eel	Anguilla rostrata					66-71, 73			
Gizzard shad	Dorosoma cepedianum	Х	Х	Х	Х	66-71, 73			
Goldeye	Hiodon alosiodes			Х		67-71, 73			
Mooneye	Hiodon tergisus	Х	X	Х	Х	66-71, 73			
Lake whitefish	Coregonus clupeaformis					67			
Brown trout	Salmo trutta					66,67, 69			
Brook trout	Salvelinus fontinalis					66			
Northern pike	Esox lucius	Х	Х	Х	Х	66-71, 73			
Muskellunge	Esox masquinongy	Х	X	Х	Х	71, 73			
Carp	Cyprinus carpio	Х	Х	Х	X	66 - 71, 73			
Silver chub	Hybopsis storeriana					67-71, 73			
Golden shiner	Notemigonus crysoleucas				I	69			
Emerald shiner	Notropis atherinoides		Х		Х	67, 68, 70, 71, 73			
Blacknose shiner	Notropis heterolepis		1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -		Х	67, 71			
Spottail shiner	Notropis hudsonius		Х		Х	67-71			
Mimic shiner	Notropis volucellus				Х				
Flathead minnow	Pimephales promelas				Х				
Carpsucker species	Carpoides sp.		Х	Х	Х	66-71, 73			
White sucker	Catostomus commersoni	X	Х	Х		66-71, 73			
Smallmouth buffalo	Ictiobus bubalus	Х		X		66-71, 73			

* Abbreviations: 66=1966; 67=1967; 68=1968; 69=1969; 70=1970; 71=1971; 73=1973.

		Metho	od of Captu	re in 1975		Years collected	
			Electro-	•	Minnow	in previous	
Common Name	Scientific Name** Tra	p net	fishing	Gill net	seine	study*	
Bigmouth buffalo	Ictiobus cypinellus	X	in a sea a tao 2011 na 2014 na amin' na Galaine ao Frantsa.	X	an a gun dhan an 66,67,69,70,73		
Spotted sucker	Minytrema melanops		Х	Х		66–71	
Silver redhorse	Moxostoma anisurum	X	Х	Х	Х	66-71, 73	
River redhorse	Moxostoma carinatum	Х	Х			67-71, 73	
Golden redhorse	Moxostoma erythrurum		X	Х	Х	66-71, 73	
Shorthead redhorse	Moxostoma macrolepidotu	um X	Х		Х	66-71, 73	
Black bullhead	Ictalurus melis	Х		Х		66 - 71, 73	
Yellow bullhead	Ictalurus natalis		Х			66-68, 70, 71	
Brown bullhead	Ictalurus nebulosus					66	
Channel catfish	Ictalurus punctatus	X		Х		66 - 71, 73	
Flathead catfish	Pylodictis olivaris					66-71, 73	
Trout perch	Percopsis omiscomaycus					6771	
Burbot	Lota lota		Х			66,67,70,73	
Brook silverside	Labidesthes sicculus		Х			71	
White bass	Morone chrysops	Х	Х	Х	Х	66-71, 73	
Rock bass	Ambloplites rupestris	Х	Х	Х		66-71, 73	
Green sunfish	Lepomis cyanellus		Х			66,69,70,71,73	
Hybrid sunfish						66, 69	
(green x pumpkinsee	d)						
Pumpkinseed	Lepomis cibbosus					66-71	
Hybrid sunfish	_					66 - 70	
(pumpkinseed & blue	gill)						
Bluegill	Lepomis macrochirus	Х	Х	Х	Х	66-71, 73	
Smallmouth bass	Micropterus dolomieui	Х	Х	Х	Х	66-71, 73	
Largemouth bass	Micropterus salmoides		Х			66-71, 73	
White crappie	Pomoxis annularis	Х	Х	X		66-71, 73	
Black crappie	Pomoxis nigromaculatus	Х	Х	Х	Х	66-71, 73	
Western sand darter	Ammocrypta clara				Х	70-73	
Iowa darter	Etheostoma exile					68, 70, 71	

* Abbreviations: 66=1966; 67=1967; 68=1968; 69=1969; 70=1970; 71=1971; 73=1973.

	Own monitored	Metho	<u>d of Captu</u>		Years collected		
			Electro-	3	Minnow	in previous	
Common Name	Scientific Name** Tra	ap net	fishing	Gill net	seine	study*	
Fantail darter	Etheostoma flabellare	nger geschen werten offensen an einige op geschen offensen.	X	nin da 20 milionario (no miliono da 20 miliono da 20 milionario da 20 miliono da 20 miliono da 20 miliono da 20	anna, an air a chuir a chuir an ann an ann an ann an ann ann ann an	an a succession of the succession of the succession of the succession of the succession of the succession of the	
Johnny darter	Etheostoma nigrum		Х		Х	66, 70, 71	
Yellow perch	Perca flavescens		Х	Х	Х	66-71, 73	
Log perch	Percina caprodes		Х		Х	66-71	
Gilt darter	Percina evides				Х		
Slenderhead darter	Percina phoxocephala		X				
River darter	Percina shumardi		Х			67-70	
Sauger	Stizostedion canadense	Х		Х	Х	66-71, 73	
Walleye	Stizostedion vitreum vitreum	Х	Х	Х	Х	66-71, 73	
Freshwater drum	Aplodinotus grunniens	Х		Х	Х	66-71, 73	

TABLE A-3.2-3 (Con't)

*Abbreviations: 66=1966; 67=1967; 68=1968; 69=1969; 70=1970; 71=1971; 73=1973.

**Scientific names are taken from the American Fisheries Scoiety, Special Publication No. 6, A List of Common and Scientific Names of Fishes from the United States and Canada, Third Edition, 1970

42)

APPENDIX B-3.2

TABLE B-3.2-1

NUMBERS OF SUCCESSFUL TRAP NET SETS AT EACH SAMPLING STATION IN LAKE ST CROIX, 1975

•

Sampling station	Number of sets
· ·	
10-A	4
10-B	4
10-C	4
1-A	4
1-в	0
1-C	4
2-A	4
2-B	4
2-C	4
3-A	4 4
3-в	4
3-C	4
4-A	4
4-B	0
4-C	4
5-A	4
5-B	0
5-C	4
6-A	0
6-B	4
6-C	3
7-A	, 3
7-в	0
7-C	4
8-A	4
8-B	3
8-C	0
9-A	4
9-в	0
9-C	4
End of King Plant discharge	e canal, north side 4

TABLE B-3.2-2

Species	No. Caught	% of Total Catch	CPE (catch/effort)
Silver lamprey	1	*	0.011
Longnose gar	1	*	0.011
Shortnose gar	1	*	0.011
Gizzard shad	2	*	0.022
Mooneye	3	*	0.032
Northern pike	16	0.9	0.172
Muskellunge	14	0.8	0.151
Carp	618	36.0	6.645
White sucker	15	0.9	0.161
Smallmouth buffalo	3	*	0.032
Bigmouth buffalo	2	*	0.022
Silver redhorse	54	3.3	0.581
River redhorse	2	*	0.022
Shorthead redhorse	51	3.0	0.548
Black bullhead	1	*	0.011
Channel catfish	2	*	0.022
White bass	202	11.9	2.172
Rock bass	14	0.8	0.151
Bluegill	31	1.8	0.333
Smallmouth bass	2	*	0.022
White crappie	123	7.2	1.323
Black crappie	488	28.4	5.247
Sauger	17	1.0	0.204
Walleye	2	*	0.022
Freshwater drum	47	2.7	0.505
Total	1712		

SUMMARY OF LAKE ST CROIX TRAP NETTING, August 18-29, 1975 (93 lifts)

* <0.5%

1 1

TABLE B-3.2-3

LENGTH-FREQUENCY DISTRIBUTION OF FISH CAUGHT BY TRAP NETTING IN LAKE ST CROIX,

August 18-29, 1975 (93 lifts)

Total Length in Inches	Silver lamprey	Longnose gar	Short- nose gar	Gizzard shad	Mooneye	Northern pike	Muskel- lunge	Carp	White sucker
0.0 - 0.9	a a superior de la constitución de la constitución de la constitución de la constitución de la constitución de		*******				alaan ahaa sa ka ka ahaa ka		
1.0 - 1.9		1		ar na Carrow and a finite state of the second films	alana <u>ana an</u> a ang ang ang ang ang ang ang ang ang an		an an an an an an an an an an an an an a		and a subsection of the subsection of the subsection of the subsection of the subsection of the subsection of t
2.0 = 2.9		h		nagen falst fils finst gassigages					
3.0 - 3.9		††							
4.0 - 4.9			****		argantatan para kana kana ka		an <mark>ter ander and and and and and and and and and and</mark>	n ng Kolong ng Kangga palipinan ng Kalilika ng Ka	
5.0 - 5.9		1							
6.0 - 6.9		h		9					
7.0 - 7.9		h	and have been also also a subserve also	a management of the second second second second second second second second second second second second second					
$8_{-0} = 8_{-9}$			a Calmon of Long Control Sub-Sub-Sub-Sub-Sub-Sub-Sub-Sub-Sub-Sub-	an an an an an an an an an an an an an a				a na ana ang ang ang ang ang ang ang ang	
9.0 - 9.9	and an an an an an an an an an an an an an		ىرىپتارىڭ ئۆرۈللىكى ^ر ىيىرۇچىتىن دارىك				ana ang ang ang ang ang ang ang ang ang		an an an an an an an an an an an an an a
10.0 - 10.9						Contractor and the second second second	an an an an an an an an an an an an an a		
11.0 - 11.9	an an an an an an an an an an an an an a		ang the substant of the substant of the substant of the substant of the substant of the substant of the substant	an a chuide ann an taraichte ann an taraichte ann an taraichte ann an taraichte ann ann an taraichte ann an tar	an an an an an an an an an an an an an a			1	
		land and a second second second second second second second second second second second second second second s			and the second second second second second second second second second second second second second second second	- and the second second second second second second second second second second second second second second se	1.5	ana ang ang ang ang ang ang ang ang ang	
12.0 - 12.9					2			na ana ao amin'ny fanisa amin'ny fanisa amin'ny fanisa amin'ny fanisa amin'ny fanisa amin'ny fanisa amin'ny fa	
13.0 - 13.9			na fagaan gaan data gaala ka a	1	and the second second second second second second second second second second second second second second second	alling and a straight of the second second second second second second second second second second second secon		22	1
14.0 - 14.9			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	angeneran and and the second state	1	1		94	4
15.0 - 15.9				an an an an an an an an an an an an an a	and a second second second second second second second second second second second second second second second	3	1	167	4
16.0 - 16.9				nan an		1	1	167	5
17.0 - 17.9			and the second second second second second second second second second second second second second second secon	annajana mangkara ng kanalang mangkarang	ana ang ang ang ang ang ang ang ang ang	3	1	97	1
18.0 - 18.9				, and the state of the second s		and a second second second second second second second second second second second second second second second		32	
19.0 - 19.9				and the second second second second second second second second second second second second second second secon	annearanna b _{lean} gantarannaidh		1	17	
20.0 - 20.9			1	a yer an an an an an an an an an an an an an			Construction of the Constr	7	
21.0 - 21.9			andra and a second second second second second second second second second second second second second second s				2	3	
22.0 - 22.9				and the state of the state of the state of the state of the state of the state of the state of the state of the			2	1	
23.0 - 23.9	and the second se						3	3	
24.0 - 24.9				yan di kang bahar dalam di Kang di Kang dalam di Kang di			1	1	
25.0 - 25.9			an da kawa <u>n ka</u> na kata biling	ang panalakan sa pangan sa pan			1	1	
26.0 - 26.9						1		2	ang mananang mang ang ang ang ang ang ang ang ang ang
27.0 - 27.9		1				1			
28.0 - 28.9						1			
29.0 - 29.9			and the second second second second second second second second second second second second second second second						
30.0 - 30.9						3			
31.0 - 31.9						No. of Concession, Name			
32.0 - 32.9			a an an an an an an an an an an an an an	and the second second second second second second second second second second second second second second second					
33.0 - 33.9									
34.0 - 34.9						2		-	
35.0 - 35.9									
36.0 - 36.9					and A Deleter Street				
and the second second second second second second second second second second second second second second second		n and and a state of the state				an an an an an an an an an an an an an a			
	and the second second second second second second second second second second second second second second secon				1				
Unmeasured	1						1	3	
TOTALS	1	1	1	2	3	16	14	618	15

TABLE B-3.2-3 (Con't)

(Pata)	Small-	Big-	Silver	River	Short-	Black	T	<u> </u>	
Length	mouth	mouth	rod-	rod-	head	bull-	Channel	White	Rock
in Inches	buffalo	buffalo	horee	horee	red-	head	catfish	hace	hace
TH THCHER	Duriuro	Durraro	norse	liorae	norse	licau		0433	Dass
$0_{0}0 = 0_{0}9$				<u> </u>				+	
1.0 - 1.9			and the second second second second second second second second second second second second second second secon	No. of Concession, Name	an and the second second second second second second second second second second second second second second s	a a subsection of the second se	1		
2.0 - 2.9		h			<u>†</u>		1	1	
3.0 - 3.9		1		<u> </u>			1	<u> </u>	
4.0 - 4.9		1	an an an an an an an an an an an an an a	and the second diversion of th	and the subscription of the local distance o			an de la section de la constante de la constante de la constante de la constante de la constante de la constant	
5.0 - 5.9		1	no analysis on organizations	and the second second second second second second second second second second second second second second second	an an an an an an an an an an an an an a		1		2
6.0 - 6.9	1	1	وسيغلون المربي فاستستناط المنبغ		and the second se	1	Î		9
7.0 - 7.9		1		1			1	1	2
8.0 - 8.9					1		1	41	1
9.0 - 9.9			2		7	1		4	
10.0 - 10.9				1	6			36	
11.0 - 11.9					1	1		28	
12.0 - 12.9			1		6		1	19	
13.0 - 13.9			1		5	1		41	
14.0 - 14.9					7			27	
15.0 - 15.9			3		7			2	
16.0 - 16.9		1	8		8		1		
17.0 - 17.9	1	1	9		1				
18.0 - 18.9	and the statistic states and the		14		2				
19.0 - 19.9	1		8				1		
20.0 - 20.9		1	6				1		
21.0 - 21.9			1	1	L				L
22.0 - 22.9	1			<u>.</u>		L	Ļ		L
23.0 - 23.9				1		· · · · · · · · · · · · · · · · · · ·	L		
24.0 - 24.9			242060 K		ļ	<u></u>			
25.0 - 25.9	and the second second second second second second second second second second second second second second second				-	<u></u>			
20.0 - 20.9	and the second second second second second second second second second second second second second second secon							<u> </u>	<u> </u>
27.0 - 27.9			gentin Talmania da angangan	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	
20.0 - 20.9			and the second diversion of the second second	<u> </u>	+	<u> </u>		<u> </u>	
29.0 = 29.9	and the second second second second second second second second second second second second second second secon			<u> </u>	+	<u> </u>	+	<u> </u>	
50.0 = 50.9			ىمىن مى <u>لىدى بىرىن بىرى بىرى بىر</u> بىرى مىلىمى	<u> </u>	<u> </u>			<u> </u>	<u> </u>
51.0 - 51.9	a a successive de la compacta de la compacta de la compacta de la compacta de la compacta de la compacta de la						<u> </u>	<u> </u>	├
$\frac{22.00}{37.0} = \frac{52.9}{77.0}$	99-17 - 502 (D				+			<u> </u>	<u> </u>
$\frac{2}{2} = \frac{2}{2} = \frac{2}$	- College			<u> </u>	<u> </u>		<u> </u>		<u> </u>
77.0 - 54.9				<u> </u>			+		<u>├</u>
$\frac{22.0}{36} = \frac{27.9}{36}$				ļ	<u> </u>		<u> </u>		┼────┤
20.0 - 20.9				<u> </u>		<u> </u>	<u> </u>		<u> </u>]
			an in the state of	<u> </u>	+		<u> </u>	<u> </u>	<u> </u>
Timmer average 1	a for the second second second second second second second second second second second second second second se		4		<u> </u>		+	<u> </u>	
TOTALS	3		<u> </u>		51	<u>↓</u>		202	1/
TAUT I	5 1		J4	r 4	1 11	, <u> </u>	1 4	1 202	1 14 1

TABLE	в-3.	.2-3	(Con	't)
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Total Length in Inches	Bluegill	Small- mouth bass	White crappie	Black crappie	Sauger	Walleye	Drum		
0.0 - 0.9									
1.0 - 1.9									·
2.0 - 2.9					a and a second se				
3.0 - 3.9									
4.0 - 4.9									
5.0 - 5.9	2			3					
6.0 - 6.9	17		5	39					
7.0 - 7.9	10		8	119	1		4		
8.0 - 8.9	2	1	71	188			14		
9.0 - 9.9		1	30	79					
10.0 - 10.9			3	34			6		
11.0 - 11.9			2	23		1	11		
							of the second second second second second		Statute and a statute of the statute
12.0 - 12.9			2	Territori di composi pagaini arra	2		2		
13.0 - 13.9					3	1	6		
14.0 - 14.9					- 7		1		
15.0 - 15.9					2				
16.0 - 16.9									
17.0 - 17.9					1		1		
18.0 - 18.9					1				
19.0 - 19.9			·						
20.0 - 20.9							,		
21.0 - 21.9								1	
22.0 - 22.9									
23.0 - 23.9									
24.0 - 24.9									
25.0 - 25.9									
26.0 - 26.9				and a second state of the					
27.0 - 27.9									
28.0 - 28.9					******				
29.0 - 29.9				and the second second second second second second second second second second second second second second secon			• •	1999-1999-1999-1999-1999-1999-1999-199	
30.0 - 30.9		an an an an an an an an an an an an an a		1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 -			na wite finite and a second second second		
31.0 - 31.9				in California and Decomposition			an an an an an an an an an an an an an a		
32.0 - 32.9							and the second second second second second second second second second second second second second second secon		
33.0 - 33.9		Contract of the local division of the local			ara manga ing kanang			and the second second second second second second second second second second second second second second second	1
34.0 - 34.9		-6					and the second second second second second second second second second second second second second second secon	N COLORING COLORING COLORING	
35.0 - 35.9							ngar ta Angar San San San San San San San San San San		
36.0 - 36.9									
							and the second second second second second second second second second second second second second second second		
and the second designed of the second designed of the second designed des	and the second second second second second second second second second second second second second second second				an an an an an an an an an an an an an a		an generation of the second second		
Unmeasured	1		.2	3	1		2		
TOTALS	31	2	123	488	17	2	47		



APPENDIX C-3.2

TABLE C-3.2-1

NUMBERS OF SUCCESSFUL GILL NET SETS IN EACH SAMPLING STATION IN LAKE ST CROIX, 1975

Sampling Station			Number of Sets
10-A 10-C 1-A 1-C 2-A 2-C 3-B 3-C 4-A 4-C 5-A 5-C 6-B 6-C 7-A 7-C 8-A			2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
8-C 9-A 9-C			1 2 2
End of King plant north side	discharge	canal,	2
End of King plant south side	discharge	cana⊥,	2
Total			43

TABLE C-3.2-2

Species	No. Caught	% of Total Catch	CPE (catch/effort)
Silver lamprev	3	 *	.070
Lake sturgeon	6	*	.140
Longnose gar	4	*	.093
Shortnose gar	12	0.6	•279
Gizzard shad	608	28.2	14.140
Goldeye	5	*	.116
Mooneye	8	*	. 186
Northern pike	11	0.5	• 256
Muskellunge	8	*	. 186
Carp	140	6.5	3.256
Carpsucker	11	0.5	. 2 5 6
White sucker	7	*	• 163
Smallmouth buffalo	7	*	•163
Bigmouth buffalo	1	*	.023
Spotted sucker	2	*	•047
Silver redhorse	127	5.9	2•953
Golden redhorse	12	0.6	•279
Shorthead redhorse	72	3.3	1.674
Black bullhead	2	*	<u>.</u> 047
Channel catfish	72	3.3	1.674
White bass	308	14.3	7.163
Rock bass	12	0.6	•279
Bluegill	1	*	.023
Smallmouth bass	3	*	.070
White crappie	114	5.3	2.651
Black crappie	94	4.4	2.186
Yellow perch	35	1.6	.814
Sauger	260	12.0	6.047
Walleye	34	1.6	•791
Freshwater drum	180	8.3	4.186
Total	2159		

SUMMARY OF LAKE ST CROIX GILL NETTING, September 11-26, 1975 (43 lifts)

* <0.5%

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TABLE C-3.2-3

LENGTH-FREQUENCY DISTRIBUTION OF FISH CAUGHT BY GILL NETTING, LAKE ST CROIX,

September 11-26, 1975 (43 lifts)

Total Length in Inches	Silver lamprey	Lake sturgeor	Long- nose gar	Short- nose gar	Gizzard shad	Goldeye	Mooneye	Northern pike	Muskel- lunge
0.0 - 0.9	,	1		Ĩ	T	ĺ	[1	and a second second second second second second second second second second second second second second second
1.0 - 1.9	,			1	İ				and and a second second second second second second second second second second second second second second se
2.0 - 2.9		1		[1		1		
3.0 - 3.9						an an an an an an an an an an an an an a	1		
4.0 - 4.9	and a second second second second second second second second second second second second second second second				1 1	t	and the second se	1	
5.0 - 5.9				1	24			1	
6.0 - 6.9	and and a second state of the second se		and the second second second second second second second second second second second second second second second	Contraction of the Owner of the	102			1	
7.0 - 7.9				and the second se	32		and the second second second second second second second second second second second second second second secon		
8.0 - 8.9	and the second second second second second second second second second second second second second second secon				2				
9.0 - 9.9	. 1			And a state of the					
10.0 - 10.9	2				1	Stationers of Southers State	and the second second second second second second second second second second second second second second secon	7	
11.0 - 11.9								1	an an an an an an an an an an an an an a
			aller annälligge av faire an faire i a	**************************************	and the second se			Contra de la contr	
12.0 - 12.9		and the state of the state of the state of the state of the state of the state of the state of the state of the			5		8		
1 12.0 - 12.71		1			10			1	
14.0 - 14.91				·	22	1 1			
15.0 - 15.9		1	and the second descent descent descent descent descent descent descent descent descent descent descent descent		4	3			
16.0 - 16.9	and an and a state of the state		i di tang mangan dan pang pang pang pang pang pang pang pa		1	1		1 . 1	and the second designed and the second designed and the second designed and the second designed and the second
17.0 - 17.9		1							1
18.0 - 18.9		1	CONTRACTOR OF CONTRACTOR		1			1	3
19.0 - 19.9		1		2				1	
20.0 - 20.9		2	and the second second second second second second second second second second second second second second secon	and the second second second second second second second second second second second second second second secon	1			1	
21.0 - 21.9			an an an an an an an an an an an an an a	2				1	
22.0 - 22.9			an an an an an an an an an an an an an a	3		an an an an an an an an an an an an an a		1	1
23.0 - 23.9	المالي الحياة المحجم وحي المح <u>ومة من وا</u> حداث الأمثلة الع		and the second second second second second second second second second second second second second second second	3					2
24.0 - 24.91			a ang mang mang mang mang mang mang mang	1					
25.0 - 25.9								1	1
26.0 - 26.9						and the second second second second second second second second second second second second second second second			
27.0 - 27.9									
28.0 - 28.9			and and the state of the state of the state of the state of the state of the state of the state of the state of	1				1	
29.0 - 29.9			1				·		
30.0 - 30.9	and a second second second second second second second second second second second second second second second		an and a state of the state of the state of the state of the state of the state of the state of the state of the		İ		an are the state of the second state of the se	1	
31.0 - 31.9							and the second second second second second second second second second second second second second second second		
32.0 - 32.9			1			ىرى ئەرىكە ئەتىرىكە تەتىرىكە تەتىرىكە ئەتىرىكە تەتىرىكە تەتىرىكە تەتىرىكە تەتىرىكە تەتىرىكە تەتىرىكە يەترىكە ئەترىكە تەتىرىكە			
33.0 - 33.9				New management and a fille of the second state					
34.0 - 34.9			and the second second second second second second second second second second second second second second secon	an an an an an an an an an an an an an a		na na mangangang mangan di kana na mangang mangang mangang mangang mangang mangang mangang mangang mangang man			
35.0 - 35.91	والمحود المحمد مريد والمسير المحمد المحمد								1
36.0 - 36.9			1						
40.0 - 40.9	*******************************		1						
43.0 - 43.9		1		Franker-antika2=1-100121-00022-0102					
Unmeasured			•		403				
TOTALS	3	6	4	12	608	5	8	11	8
				مسیا ۱ است. دورونانیک مادن سوده میزود و برورون	i				<u> </u>

TABLE C-3.2-3 (Con't)

Total Length in Inches	Carp	Carp- sucker	White sucker	Small- mouth buffalo	Big- mouth buffalo	Spotted sucker	Silver redhorse	Golden redhorse	Short- head redhorse
0.0 - 0.9			and and a state of the state of		ļ				
1.0 - 1.9			and an and a standard stands		<u> </u>	ļ			
7.0 = 2.9			and the state of the state of the state of the state of the state of the state of the state of the state of the		<u> </u>	<u> </u>			
<u> </u>									
4.0 = 4.9					<u> </u>				
$\frac{5.0 - 5.9}{6.0}$			an chi ang ang ang ang ang ang ang ang ang ang	- 					
0.0 = 0.9			an an an an an an an an an an an an an a					and the second sec	
1.0 = 7.9				and the state of the second second second second second second second second second second second second second			1		2
0.0 = 0.9				<u> </u>		<u> </u>	11	'	15
$\frac{9.0}{10.0} = \frac{9.9}{10.9}$			1				25		12
10.0 = 10.9			1			1	5		
11.00 - 11.07	1		r Ch aracter and Christennik (C)	L					
12.0 - 12.9		2	1				2	1	8
1 17.0 - 17.7	2	2	1	1			1		
14.0 - 14.9	26		1					(<u> </u>
15.0 - 15.9	36		1	and the second second second second second second second second second second second second second second second	and an an an an an an an an an an an an an		15	2	7
16.0 - 16.9	23	2	an and a sub-line line and the line of the			1	18	4	
17.0 - 17.9	10	2	1	2	1		22	2	1
18.0 - 18.9	13		,		-		14		
19.0 - 19.9	10	3		2			7	an an an an an an an an an an an an an a	
20.0 - 20.9	7			2			3		
21.0 - 21.9	9								
22.0 - 22.9	1								
23.0 - 23.9	1								
24.0 - 24.9	1								
25.0 - 25.9									
26.0 - 26.9			and the second second second second second second second second second second second second second second second	and the second second second second second second second second second second second second second second second	والمراجع والمحاصر والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع وا				
27.0 - 27.9									
28.0 - 28.9	11				and the second second second second second second second second second second second second second second secon				
29.0 - 29.9			- a first in the state of the s		Anna Maria Mandala ang Panganang ang Panganang ang Panganang ang Panganang ang Panganang ang Panganang ang Pang				and the second second second second second second second second second second second second second second second
30.0 - 30.9						aliantes and ^{and} and the office and the other states and the states of			
31.0 - 31.9				www.compare.com/pare.com					·
32.0 - 32.9				- Warden and a subscription of the					
33.0 - 33.9						and a second second second second second second second second second second second second second second second		-	
34.0 - 34.9									
$\frac{55.0}{7} = \frac{35.9}{7}$	and the second second second second second second second second second second second second second second second					•			
20.0 - 30.9								·····	
									
TOTALS	140				1		100	40	72

TABLE C-3.2-3 (Con't)

Total Length in Inches	Black bullhead	Channel catfish	White bass	Rock bass	Blue- gill	Small- mouth bass	White crappie	Black crappie	Yellow perch
0.0 - 0.9		andrinalifying	an a statement of the stat					a an an an an an an an an an an an an an	
1.0 - 1.9						a an an an an an an an an an an an an an			1999 - The second second second second second second second second second second second second second second s
2.0 = 2.9			a and a state of the state of the state of the state of the state of the state of the state of the state of the			<u> </u>			
3.0 - 3.9			an an an an an an an an an an an an an a				[3	
4.0 - 4.9			A-and another and a state of the second second second second second second second second second second second s	1	and a second second second second second second second second second second second second second second second	a an an an an an an an an an an an an an	8	18	
5.0 - 5.9			63	2	1	1	1		3
6.0 - 6.9			3	6	an an an an an an an an an an an an an a		25	8	9
7.0 - 7.9	and managements		3	2	and the second second second second second second second second second second second second second second second	2	9	39	15
8.0 - 8.9			29	1		1	37	26	4
9.0 - 9.9	2	1	24	and the second second second second second second second second second second second second second second second		Constantine and the second second	30		4
10.0 - 10.9			30				1		nandreitä andinuorunarin-durintee
11.0 - 11.9			56				· 1		
·								1	
12.0 - 12.9		3	5				1	1	
13.0 - 13.y		4.	58			L	i1	1	
14.0 - 14.9		12	32		Name of Concession of Concession of Concession of Concession of Concession of Concession of Concession of Conce	L			
15.0 - 15.9		14	5						
16.0 - 16.9		14			ana attalia anisa da ana anisa da Anisa				
17.0 - 17.9		9				L			
18.0 - 18.9		8							
19.0 - 19.9		3	ويستخدمون						
20.0 - 20.9		2		and the second second second second second second second second second second second second second second secon	t water was a communited to a set of the				
21.0 - 21.9			and the second second second second second second second second second second second second second second second	No. of Concession, Name	a haran da ak taran sandara Daraha iy				
22.0 - 22.9		1							
23.0 - 23.9		1			a a construction of the second second second second second second second second second second second second se				
24.0 - 24.9			and the standard standard standard standard standard standard standard standard standard standard standard stan	and the second division of the second divisio		an an an an an an an an an an an an an a		ayuna sung panjangang pangangangan	
25.0 - 25.9		•							
26.0 - 26.9									
27.0 - 27.9					n managalana an managalan s				
28.0 - 28.9									
<u>79.0 - 29.9</u>			e en antilitik kurden an antilitik						
50.0 = 50.9							n gan jan jana se segun da da Manasad		
$\frac{51.0}{70.0} = \frac{51.9}{70.0}$			and the state of the state of the state of the state of the state of the state of the state of the state of the						
22.0 = 22.9							lana far-sh <u>a mayatiyi i Tulishawa</u> Mila		
$\frac{55.0}{30.0} = \frac{55.9}{20.0}$								NUMBER OF THE OWNER	
35 0 25 0					· · · · · · · · · · · · · · · · · · ·		a		
$\frac{39.0}{36.0} = \frac{39.9}{26.0}$						and the second second second second second second second second second second second second second second secon	na dana menangan dikin meninga		
<u> </u>							an an an an an an an an an an an an an a		
				and the second second second second second second second second second second second second second second secon		ale di fananta da Constitució de la Ganació de	an an an an an an an an an an an an an a	en en en en en en en en en en en en en e	
							an an air air air an an an an an an an an an an an an an		
TOTALS	2	72	308	12	1	3	114	94	35

TABLE C-3.2-3 (Con't)

Provide and the second s	I		a a a a a a a a a a a a a a a a a a a	Sector se		Proceeding of the second second			
Total						1	ł		
T									
Length				1					
in Inches	Sauger	Walleye	Drum		1	ł			
	[T		1					
			e e construction de la construcción de la construcción de la construcción de la construcción de la construcción				alan ang sa ilina ang sa ini sa <u>sa sa a</u> ga apanalan		an a sugar tanan a san ta Chanaisa.
0.0 - 0.9									
1.0 - 1.9									
2.0 - 2.9									
3.0 - 30			1		and the second second second second second second second second second second second second second second second	The second second second second second second second second second second second second second second second s	and the statement of th	and the second se	an ala ana ana ang ang ang ang ang ang ang an
1.0 1.0									
4.0 - 4.9									-
5.0 - 5.9			22		ľ				
6.0 - 6.9			6						
7.0 = 7.9		3	29	1					
80 80		<u> </u>	78	<u> </u>	[and the same sign of the same state of the same		
0.0 0.9			12	<u> </u>	<u> </u>	<u> </u>			
9.0 - 9.9	6		כו						
10.0 - 10.9	16	3	18			l			
11.0 - 11.9	15	2	4						
							A contract of the second second second second second second second second second second second second second s		
120 100		<u> </u>) 	1		ſ	r i		1
12.0 - 12.9	52		4		L			and the second second second second second second second second second second second second second second second	and the second s
12.0 - 12.7	48	1	2	L	1	I		İ	L
14.0 - 14.9	44	6		1	1			1	}
15.0 = 15.9	22	3	antanya ang ang ang ang ang ang ang ang ang an			and the second sec			
160 160			and the second second second second second second second second second second second second second second secon						a a superior and the second second second second second second second second second second second second second
10.0 - 10.9	20	4		<u> </u>					
17.0 - 17.9	9	1 3 1		<u></u>					
18.0 - 18.9	6								
19.0 - 19.9	3								
20.0 - 20.0	2			<u> </u>					-
20.0 - 20.9	<u> </u>			<u> </u>					
21.0 = 21.9					· · · · ·			L	
22.0 - 22.9									
23.0 - 23.9									
24.0 - 24.9	an tain tain a su an an an an an an an an an an an an an			Contraction of the local distance of the loc	and an other states of the local distance of the local distance of the local distance of the local distance of		annen e constituente de la constituente de la constituente de la constituente de la constituente de la constitu		and the second second second second second second second second second second second second second second second
25.0 25.0			and the second second second second second second second second second second second second second second second				and the second second second second second second second second second second second second second second second		
19.0 = 19.9		ļ							
20.0 = 26.9		1							
27.0 - 27.9					• *	•			
28.0 - 28.9									
29 0 - 20 0			- 3. دۇسىرى ، 1 مامىيى ئىسى يەرەى						
70 0 70 0		<u> </u>		<u> </u>					
20.0 - 20.9		h		L					
31.0 - 31.9		· 1							
32.0 - 32.9									
33.0 - 33.0							a second second second second second second second second second second second second second second second seco		and the second second second second second second second second second second second second second second secon
710 710		 							
24.U = 24.9				L					
<u> 35.0 - 35.9</u>									
36.0 - 36.9									
		·				- 1999			
		<u>├</u>		h					
		· ·			·			h	
	· · · · · · · · · · · · · · · · · · ·								
TOTALS	260	34	180						

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APPENDIX D-3.2

TABLE D-3.2-1

SUMMARY OF LAKE ST CROIX DAY ELECTRO-FISHING, September 4-9, 1975 (5.38 hours)

	•		
Species	Number Caught	% of Total Catch	CPE (catch/effort)
Chestnut lamprey	1	x	0.19
Silver lamprey	2	x	0.37
Longnose gar	3	x	0.56
Shortnose gar	í	x	0.19
Gizzard shad	125	9.3	23.23
Mooneve	1	x	0,19
Northern pike	3	x	0,56
Muskellunge	í	x	0,19
Carp	123	9,1	22-86
Emerald shiner	198	14.7	36,80
Spottail shiner	3	x	0,56
Carpsucker spp.	2	x	0.37
White sucker	2	×	0.37
Spotted sucker	4	x	0.74
Silver redhorse	29	2.2	5,39
River redhorse	5	x	0,93
Golden redhorse	ĺ	x	0,19
Shorthead redhorse	99	7.4	18,40
Yellow bullhead	1	x	0.19
Burbot	5	x	0.93
Brook silversides	2	x	0,19
White bass	- 3	x	0,56
Rock bass	9	0.7	1.67
Green sunfish	1	x	0,19
Bluegill	55	4.1	10.22
Smallmouth bass	263	19.6	48.88
Largemouth bass	11	0.8	2.04
White crappie	2	x	0.37
Black crappie	8	0.6	1.49
Western sand darter	1	x	0.19
Fantail darter	-	x	0.19
Johnny darter	2	x	0.37
Yellow perch	15	1.1	2.79
Log perch	358	26.6	66, 54
Slenderhead darter	1	x	0.19
River darter	. <u> </u>	x	0,19
Sauger	2	x	0.37
Walleye	2	x	0.37
Total	1346		

x <0.5%

TABLE D-3.2-2

LENGHT-FREQUENCY DISTRIBUTION OF FISHES CAUGHT BY DAY ELECTRO-FISHING IN LAKE ST CROIX

September 4-9, 1975

Total			1	Short-					
Length	Chestnut	Silver	Longnose	nose	Gizzard	Mooneye	Northern	Muskel-	Carp
in Inches	lamprey	lamprey	gar	gar	shad		pike	lunge	
	<u> </u>								an an an an an an an an an an an an an a
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11.0 - 11.9				all and a superson of the superson		and the state of the second second second second second second second second second second second second second			2
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12.0 - 12.9						1			3
13.0 - 13.9			1	1			1		8
14.0 - 14.9			1		2				21
15.0 - 15.9		and the second second second second second second second second second second second second second second second			an air an an an an an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an A				18
16.0 - 16.9				and the second second second second second second second second second second second second second second secon			1		17
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27.0 - 27.9									
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30.0 - 30.9									
31.0 - 31.9									
32.0 - 32.9									
<u> 33.0 - 33.9</u>									
34.0 - 34.9									
35.0 - 35.9			I						
36.0 - 36.9			• •						
Unmeasured					37				
TOTALS	1	2	3	1	125	1	3	1	123

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TABLE D-3.2-2 (Con't)

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	I	1	1	1	1	1	5	1	5
Total		Spot-	Carp-			Silver	River	Golden	
Length	Emerald	tail	sucker	White	Spotted	red-	red-	red-	Shorthead
in Inches	shiner	shiner	spp.	sucker	sucker	horse	horse	horse	redhorse
		1	1	1			1		
0.0 - 0.9	h		an an an an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an Anna an An Anna an Anna			· · ·			
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2.0 - 2.9	17	3				· ··			
3.0 - 3.9	23								-2
4.0 - 4.9									·
5.0 - 5.9							-		[
6.0 - 6.9					1				7
7.0 - 7.9									13
8.0 - 8.9						4			10
9.0 - 9.9						3			28
10.0 - 10.9						8,			23
11.0 - 11.9						1			5
			-	and the second se		cities an annual constraining and			
12.0 - 12.9									1
13.0 - 13.9				1	1	1			1
14.0 - 14.9					1	2		• ••	1
15.0 - 15.9				1	1		·		3
16.0 - 16.9						3 `			5
17.0 - 17.9			1				1		
18.0 - 18.9				[3			
19.0 - 19.9						3			
20.0 - 20.9						1			
21.0 - 21.9							1	1	
22.0 - 22.9							2		
23.0 - 23.9							1	Γ	
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25.0 - 25.9:	-						· · ·		
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27.0 - 27.9									
28.0 - 28.9							-		
29.0 - 29.9						•			
30.0 - 30.9									
31.0 - 31.9		1			are and a composition of the state of the st				
32.0 - 32.9							المادية موريد ة ميتوعد الجوريدي الأكتاب	1	
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34.0 - 34.9								1	
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TOTALS	198	3	2	2	4	29	5		99

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TABLE D-3.2-2 (Con't)

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Length	Yellow	Burbot	silver-	White	Rock	Green	Bluegill	Touth	mouth
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<u>In Inches</u>	Pullieau		side	Dass	Dass	sunrisn		bass	bass
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3.0 - 3.9							4	118	3
4.0 - 4.9				1	2		6	33	
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6.0 - 6.9			1		3	}	2	14	The second second second second second second second second second second second second second second second se
7.0 - 7.9		1				1	1	18	
8.0 - 8.9	1	1		1	1	1	1	2	
9.0 - 9.9			1	1		}		17	1 1
10.0 = 10.9		1				and the second second second second second second second second second second second second second second secon		13	1
11.0 = 11.9								2	1 1
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13.0 - 13.0							ing and a second second second second second second second second second second second second second second se	[+
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	1 1								

TABLE D-3.2-2 (Con't)

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Total			Western	1		4	1	Slender-	
Length	White	Black	sand-	Fantail	Johnny	Yellow	Log	head	River
in Inches	crappie	crappie	Harter	darter	darter	perch	perch	darter	darter
IN INCHES			F			+	<u> </u>	+	
	-	+							
0.0 - 0.9		+							
1.0 - 1.9					L	1			and the second second second second second second second second second second second second second second second
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6.0 - 6.9		1	1		1	1		1	
7.4 - 7.9						1		1	an manakan kasa kang panana
8.0 - 8.9				+		$\frac{1}{1}$			
9.0 - 9.9									
10.0 - 10.9		1		+		<u> </u>			
10.0 - 10.9		<u>├</u>		<u> </u>		<u> </u>			
11.0 - 11.9		1]		L	1			
10.0. 10.0		+		Y		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1		
12.0 - 12.9		<u> </u>			ļ	<u> </u>			
12.0 - 12.7		L	1	1	1	1	L	1	I
14.0 - 14.9					L		-		
15.0 - 15.9									
16.0 - 16.9									
17.0 - 17.9	·.	I		1					
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19.0 - 19.9									
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21.0 - 21.0				<u> </u>					
24.0 - 24.9		ļ							
25.0 - 25.9									
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27.0 - 27.9									
28.0 - 28.9									
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32.0 - 32.9									
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26 0 26 0			and and a subscription of the subscription of						
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	and a second second second second second second second second second second second second second second second	ne elementaria de la comunicación de la comunicación de la comunicación de la comunicación de la comunicación d							
Unmeasured		-	•1	1	2	1	259		1
TOTALS	2	8	1	1	2	15	358		1

TABLE D-3.2-2 (Con't)

Total Length in Inches	Sauger	Walleye							
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5.0 - 5.9									
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7.0 - 7.9					:				
8.0 - 8.9									
9.0 - 9.9	1						į		
10.0 - 10.9									
11.0 - 11.9		1		<u>l</u>					
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21.0 = 21.9			and the second second second second second second second second second second second second second second secon						an ya mana a sa a sa a sa a sa a sa a sa a s
22.0 - 22.0	- Contraction Contraction							ananyang mang Salah manang salah	
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36.0 - 36.9		in the second second second second second second second second second second second second second second second							
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TOTALS	2	2							

APPENDIX E-3.2

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TABLE E-3.2-1

SHORELINE SEINING STATIONS IN LAKE ST CROIX, 1975

Station No.	Description	Location number used by Krosch (1970)		
1	Sampling station 10-B	-		
2	Wisconsin side just below Hi 64 at Stillwater (east of ling Station 10-A)	ghway samp- / 11		
3	Sampling Station least of ling Station l-B	samp-		
4	North of sampling Station 5-	-A 2		
5	Minnesota side north of Huds railroad bridge	son 3		
6	East of sand island in sampl Station 6	ing 4		
7	NE of dredge spoil bank at e old toll bridge at Hudson	end of 9 & 10		
8	Sampling Station 6, south sh of sand island	nore 4		
9	Sampling Station 7-B	5		
10	Sampling Station 8-A	6		
11	Minnesota side about three h below discharge canal	olocks		

TABLE E-3.2-2

SUMMARY OF LAKE ST CROIX SHORELINE SEINING September 15, 22 and 29, 1975 (11 seine hauls)

Species	Number Caught	% of Catch
Gizzard shad Mooneye Northern pike Muskellunge Carp Emerald shiner Spottail shiner Mimic shiner Fathead minnow Carpsucker spp. Silver redhorse Golden redhorse Shorthead redhorse Shorthead redhorse White bass Bluegill Smallmouth bass Black crappie Western sand darter Johnny darter Yellow perch Log perch Gilt darter River darter Sauger Walleye Freshwater drum	32 3 1 5 2 293 31 6 1 2 18 5 14 8 1 36 1 30 42 1 30 42 1 30 42 1 2 4 1 30 42 1 31 30 42 1 31 30 42 1 31 30 42 1 1 30 42 1 1 30 42 1 1 30 42 1 1 30 42 1 1 30 42 1	5.7 0.5 x 0.9 x 51.9 5.5 1.1 x x 3.2 0.9 2.5 1.4 x 6.4 x 2.3 x 5.3 7.4 x 2.1 x 0.7 x
Total	565	

x <0.5%

TABLE E-3.2-3

LENGTH-FREQUENCY DISTRIBUTION OF FISHES CAUGHT IN MINNOW SEINES, LAKE ST CROIX,

September 15, 22 and 29, 1975

Total		1							
Length	Gizzard		Northorn	Muchal	Corn	Emoral d	Engenal 1	Mimia	Fathead
in Inches	ehad	nooneye	nor chern	lungo	earp	chineratu	chiner	shiner	minnow
	Shad		I DIKE	Lunge		Isniner_	Burner	SUTUCI	
0.0 = 0.9		1	and the second second second second second second second second second second second second second second secon						
1.0 - 1.9	1	†			in a sub-				
2.0 - 2.9			<u> </u>		and the second second second second second second second second second second second second second second secon	Andrew Contractor Contractor			
3.0 - 3.9	1	1				Constantingues - or georgenetic light ray	and the second particular second		
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5.0 - 5.9	1	†			- The second second second second second second second second second second second second second second second		1		
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7.0 - 7.9	9	1	1			and the second second second second second second second second second second second second second second second			
8.0 - 8.9		1							l
9.0 - 9.9		{		1				i -	
10.0 - 10.9				1					
11.0 - 11.9	1		1	2					
			·						
12.0 - 12.9		2							
13.0 - 13.9	1	1							
14.0 - 14.9									
15.0 - 15.9									
16.0 - 16.9					provide Station (Sector 2011				
17.0 - 17.9								a and a sublicity of the sublicity of the sub-	
18.0 - 18.9		L			2				
19.0 - 19.9									
20.0 - 20.9								an da lan an da china an an	
21.0 - 21.9									and an and the state of the sta
22.0 - 22.9									genetical film despite to a successful distances
23.0 - 23.9) 			-				and the second second second second second second second second second second second second second second second
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25.0 - 25.9		ļ			Statement a balls Till				
26.0 - 26.9						كالمرسسين اجترزه سيرسيرا الأقام فستنبع			
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29.0 - 29.9						and the second second second second second second second second second second second second second second second			
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TABLE E-3.2-3 (Con't)

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Total				Short-		{	Small-	Black	Western
Length	Carp-	Silver	Golden	hond	White	Blue-	mouth	Francia	nestern
in Inches	sucker	orrer.	Gorden	nead	willte	brue-	mouch	rappie	sano-
LI INCHES	Joucker	reanorse	reanorse	reanorse	bass		Dass		darter
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TABLE E-3.2-3 (Con't)

Total Length in Inches	Johnny darter	Yellow perch	Log- perch	Gilt dart e r	River darter	Sauger	Walleye	Drum	
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2.0 - 2.9		1	11	<u> </u>				and a constant of the local data	
3.0 - 3.9		à	2	<u> </u>	<u>†</u>	f			
4.0 - 4.9					<u> </u>	[Carrier of the second second second second second second second second second second second second second secon	a a se de la companya de la companya de la companya de la companya de la companya de la companya de la companya
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6.0 - 6.9		1		<u> </u>	<u>}</u>	£	1	a and a subscription of the local distance of the local distance of the local distance of the local distance of	
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8.0 - 8.9				t	<u>}</u>	and the second second second second second second second second second second second second second second second		and the second second second second second second second second second second second second second second secon	
9.0 - 9.9				1	<u> </u>				
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11.0 - 11.9				†	<u> </u>			1	
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<u>,,,,,</u>				<u> </u>		-	7		
			الماركين والشكار فيمال والمراجع		-				
Unmeasured	1		. 29	1	12				
TOTALS		30	42		12	2	4	1	
	1		T for						L



APPENDIX F-3.2

TABLE F-3.2-1

ABUNDANCE INDICES (Ab) FROM LAKE ST CROIX Trap net and Gill net Catches 1966-1975

Trap net Catches				Gill net Catches				Combi Gil	bined Trap nets & Sill net Catches		
Year	Obs.*	Expec.*	Ab	 Obs.	Expec.	Ab	Manufacture (141-19-10-19-10-19-10-19-10-19-10-19-10-19-10-19-10-19-10-19-10-19-10-19-10-19-10-19-10-19-10-19-	Obs.	Expec.	Ab	
1966	2593	1853.00	1.40					2593	1853.00	1.40	
1967	1920	2786.67	0.69	605	936.88	0.65		2525	3723.55	0.68	
1968	2265	2962.50	0.76	134	255.59	0.52		2399	3218.09	0.75	
1969	4222	3016.50	1.40	898	1022.38	0.88		5120	4038.88	1.27	
1970	3952	2962.50	1.33	1455	979.78	1.49		5407	3942.28	1.37	
1971	3441	2995.84	1.15	1594	1874.36	0.85	ý,	5035	4870.20	1.03	
1973	1146	2420.48	0.47	1018	851.98	1.19		2164	3272.46	0.66	
1975	1636	1845.12	0.89	1994	1931.49	1.09	-	3630	3676.88	0.99	
Total	21175	20788.61	1.02	7968	7752.46	0.99		28873	28595.34	1.01	

*Obs. = Observed Catch

*Expec. = Expected Catch

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TABLE F-3.2-2

ABUNDANCE INDICES (Ab) OF SEVERAL SPECIES GROUPS IN LAKE ST CROIX From Combined Trap net and Gill net Catches, 1967-1975

Game fish		_	Pan fish		Lar	ge rough		<u>Other fish</u>				
Year	Obs.*	Expec.*	Ab	Obs	. Expec.	Ab	Obs.	Expec.	Ab	Obs	Expec.	Ab
1966	268	276.00	0.97	938	797.00	1.18	1387	713.00	1.95	0	67.00	0
1967	345	712.63	0.48	1304	1431.56	0.91	662	1123.44	0.59	214	455.92	0.47
1968	292	537.36	0.54	1069	1394.75	0.77	951	1088.10	0.87	87	197.88	0.44
1969	545	907.44	0.60	2972	1443.52	2.06	1130	1197.90	0.94	473	490.02	0.97
1970	2015	886.38	2.27	· 1307	1441.31	0.91	1097	1140.80	0.94	988	473.79	2.09
1971	1332	1321.40	1.00	1232	1520.48	0.81	1637	1213.03	1.35	834	815.29	1.02
1973	985	747.92	1.32	698	1186.34	0.59	277	931.86	0.30	204	406.34	0.50
1975	895	1140.76	0.78	850	979.53	0.87	1015	796.39	1.27	870	760.20	1.14
Total	6677	6529.89	1.10	10370	10194.49	1.02	8156	8204.52	0.99	3670	3666.44	1.00
										<u> </u>		

*Obs.	-	Observed	Catch
*Expec.	=	Expected	Catch
Item	Correlation Coefficient	Gear*	Equation of Line
------------------	----------------------------	-------	-----------------------
All fish	0.53	G	y' = -3.90 + 0.07 (x)
Other fish	0.43	G & T	y' = -5.48 + 0.09(x)
Game fish	0.36	G & T	y' = -3.87 + 0.07 (x)
Sportfish	0.27	G & T	y' = 3.81 + 0.04(x)
Large rough fish	-0.20	G & T	y' = 3.03 - 0.03(x)
All fish	-0.25	G & T	y' = 2.42 - 0.02(x)
All fish	-0.33	т	y' = 3.81 - 0.04(x)

EQUATIONS OF THE LINES AND CORRELATION COEFFICIENTS For the Abundance Index Calculations

TABLE F-3.2-3

*G (gill net) based on 7 years' data. G & T (gill net and trap net) and T (trap net) based on 8 years' data.

