Art Peterson

PRAIRIE ISLAND NUCLEAR GENERATING PLANT

ENVIRONMENTAL MONITORING PROGRAM

1976 ANNUAL REPORT

ECOLOGICAL STUDIES

PROGRESS REPORT ON THE PRAIRIE ISLAND CREEL SURVEY MARCH 6 - NOVEMBER 21, 1976

(2.5.3)

Prepared for

Northern States Power Company
Minneapolis, Minnesota

by

Joseph L. Geis

and

Scott P. Gustafson

Minnesota Department of Natural Resources
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2.5.3.1 Introduction

2.5.3.1.1 Scope

This report includes results of the fourth season of creel survey on a portion of the Mississippi River near Red Wing, Minnesota, in the vicinity of the Prairie Island Nuclear Generating Plant. This creel survey is designed to monitor the sport fishery in the Prairie Island area and is part of a study to determine effects of the plant on fish and fishing.

2.5.3.1.2 General

Data collected include information on sport fishing success, pressure, and harvest, as well as information about characteristics of anglers and fishing trips. Fishing regulations in 1976 were essentially the same as described by Naplin and Gustafson (1975). Angling for most species is open year-round on the Minnesota-Wisconsin boundary waters of the Mississippi River and intensive fishing occurs in the tailwaters of Lock and Dam 3 during March and April.

2.5.3.2 Materials and Methods

2.5.3.2.1 Study Area

The study area for this creel survey is a portion of the Mississippi River and its backwaters in the vicinity of the Prairie Island Nuclear Generating Plant. On the navigation channel of the river the study area extends from the Brewer Lake cut (river mile 801.7) to the head of Lake Pepin (river

mile 785.4), a distance of 26.3 km (16.3 mi). The study area covers 1,601 hectares (3,954 acres) and is divided into six sections. These sections are described in Table 2.5.3-1 and illustrated in Figure 2.5.3-1.

2.5.3.2.2 Sampling Schedule

The 1976 creel survey was conducted between March 6 and November 21, 1976, inclusive. Only Section 3 (including the Prairie Island Plant discharge area) and Section 4 (downstream from Lock and Dam 3) were surveyed during the entire period (see Table 2.5.3-1 for sampling dates of each section).

Previous creel survey data indicated that most of the spring angling in the study area occurs in Section 4. During March and April, 1976, the survey schedule was designed to allow the survey clerk to spend a large share of his time in Section 4. It was also known that some angling occurs during March and April in the heated discharge portion of Section 3. This section was surveyed during March and April to determine the fishing pressure in the heated discharge of the Prairie Island Plant, which often attracts large numbers of game fish during winter months.

The survey of Sections 1, 2, 5, and 6 began during April and May and ended in November, 1976 (Table 2.5.3-1). On the basis of ice conditions, the survey of all of these sections could have been started during early April. Previous survey information indicated little or no fishing pressure in these sections during March and early April, so most of the survey time was spent in Sections 3 and 4 where most of the angling was occurring.

During the period March 6 through May 7, the survey clerk worked from 8:00 a.m. until 4:30 p.m. This schedule did not cover all the daylight hours on the days the clerk worked, which may cause the estimated fishing pressure during that period to be slightly higher than it actually was.

After May 7, the creel survey schedule covered all of the daylight hours on the days that the clerk was working. From May 8 through October 22, this was done using "early" and "late" eight-hour working days. On the early days, counts and interviews were conducted from sunrise through mid-day. On late days, they were done from mid-day until sunset. This method was used to avoid having a disproportionate number of counts and/or interviews lumped during the middle of the day. Early days and late days were assigned using a random number table. On October 23, the clerk began working sunrise to sunset each working day and continued this schedule until the end of the survey.

Previous creel surveys have noted that about one-half of the fishing pressure in the Prairie Island vicinity occurs on weekends or major holidays (Naplin and Gustafson 1975, Gustafson and Diedrich 1976). To achieve a more accurate estimate of fishing pressure, the sampling schedule for the creel survey was designed to include every weekend day and holiday. Only about five percent of the weekend days or holidays were not sampled due to scheduling problems or equipment problems. The survey clerk's "days off" during the week were determined using a random number table so each weekday would have the same probability of being sampled.

From April 1 through May 7, Sections 5 and 6 were not visited in a strict rotation with Sections 3 and 4, but they were visited at

least once per week. This schedule allowed more time to be spent in Section 4. Starting May 8, all sections were visited in rotation by section number. For example, if the clerk's last section surveyed on a given day was Section 4, he would start his survey in Section 5 on the next working day. The clerk took care to avoid creating a pattern in the times that sections were surveyed. This was done to avoid creating a bias that might result from making a count at about the same time in the same section two days in a row. When this situation occurred, the clerk would skip that section and go on the next section. For example, the clerk started in Section 1 at 6:00 a.m. on Monday and ended with Section 6. He was scheduled to start work Tuesday morning at 6:00 a.m. According to section rotation the clerk would normally start on Tuesday in Section 1. However, to avoid making a count in Section 1 at the same time he did on the previous day, he would skip Section 1 and start with Section 2. He would then continue through the rest of the sections in rotation.

Anglers were counted and interviewed as described by Krosch (1967). "Instantaneous" counts of fishing boats, boat anglers, bank anglers, runabouts, sailboats, canoes, water-skiers, overnight camps, wind, weather, and water and air temperature were recorded for each section.

In most sections it was impossible to view the whole section from one location, so the clerk proceeded through the section by boat. Angler counts were made in conjunction with angler interviews; boats entering or leaving the section were not counted. These counts took a period of time to complete, but were still considered "instantaneous" counts (Daley and Skrypek 1964).

If anglers were present, as many as possible were interviewed in the time allotted for each sector. Data recorded from interviews included species of fish sought, time spent fishing, number and species of fish caught, trip status (complete or incomplete at time of contact), residence, distance travelled, age, sex, fishing method, and type of lure or bait used by the interviewed anglers.

If no anglers were present, the clerk waited at least one hour before making a count in the next section to avoid the bias which might be created by making a large number of counts during periods when few or no anglers were present.

If many anglers were present, no more than four hours were spent in any one section, insuring that data were collected from at least two sections each day during periods of heavy fishing pressure.

2.5.3.2.3 Calculations

2.5.3.2.3.1 Fishing Pressure

As stated by Krosch (1967), "it is assumed that conditions observed in a section at the time an instantaneous count is made are representative of conditions in that section for one hour." Each angler counted, therefore, represents one man-hour of fishing. Similarly, the number of counts is expressed as hours.

It is also assumed that the mean number of man-hours per random count are representative of conditions existing during all fishing hours (Krosch 1967).

Based on these assumptions, estimates of fishing pressure in each section in man-hours are made in the following manner:

$$\frac{\text{Number of anglers counted on weekend days} \times \text{daylight hours in weekends}}{\text{Number of weekend counts}} = \text{Estimated man-hrs fished} = A \text{ during weekends}$$

$$\frac{\text{Number of anglers counted on weekdays} \times \text{daylight hours in weekdays}}{\text{Number of weekday counts}} = \text{Estimated man hrs fished} = B$$

A + B = total estimated man-hours fished during survey period.

Night fishing pressure was assumed to be zero (Hawkinson 1974).

2.5.3.2.3.2 Fishing Success

Fishing success is measured as fish caught per man-hour of angling. Information from angler interviews is used to determine fishing success.

Two types of catch rates were calculated. The "overall catch rate" is defined as:

$$\text{Overall catch rate} = \frac{\text{Number of fish caught by interviewed anglers}}{\text{Man-hrs spent fishing by interviewed anglers}}$$

This method does not account for differences in catch rates regarding species of fish the anglers are seeking. A second method is used to account for this bias. "Preference species catch rate" or "sought catch rate" is defined as:

$$\text{Preferred species catch rate} = \frac{\text{Number of fish of a species caught by interviewed anglers fishing for that species}}{\text{Man-hours spent fishing for that particular species or group of species by the interviewed anglers}}$$

The "goodness of fishing" is best measured using the preferred species catch rate rather than the overall catch rate (Hawkinson and Krosch 1972).

2.5.3.3 Results and Discussion

2.5.3.3.1 Fishing Pressure

Total estimated fishing pressure for the 1,601 hectares surveyed in 1976 was 141,015 ± 27,343 man-hours at the 90 percent confidence level (Table 2.5.3-2). All confidence limits in this report were calculated for the 90 percent confidence level. Total estimated man-hours of fishing pressure in 1975, 1974, and 1973 were 111,717, 163,706, and 162,440, respectively. Confidence intervals were not calculated for these estimates.

As in other years, most of the estimated fishing pressure was by boat anglers. Weekend days generally received higher pressure (man-hours/day) than weekdays (Tables 2.5.3-3 through 2.5.3-5). The most heavily fished area was Section 4 (Lock and Dam 3 to Red Wing). The next most heavily fished areas were Section 5 (the Wisconsin channel and backwaters from the Highway 63 bridge to Lake Pepin) and Section 6 (the navigation channel from Red Wing to the head of Lake Pepin). Sections 1, 2, and 3 received minimal pressure.

Estimated fishing pressure for Section 4 for the 1976 survey period was 109,541 ± 18,658 man-hours. This is intermediate between the estimated pressure in 1975 (88,855 man-hours), the lowest of the four years sampled, and 1974 (139,708 man-hours), the highest year (Gustafson and Diedrich 1976). Of the 109,541 estimated man-hours, an estimated 73,877 occurred during March and April, and an estimated 35,644 man-hours occurred during the period from May 1 through November 21, 1976.

Estimated fishing pressure in March and April in Section 4 (73,877 ± 18,784 man-hours) comprised about one-half of the total estimated fishing pressure for the entire survey area during the 1976 survey. There are a number of reasons for the popularity of spring fishing below Lock and Dam 3:

1. Fishing is good and is highly publicized
2. The area is accessible and easy to fish
3. Migratory fishes such as saugers, walleyes, and white bass concentrate in the tailwaters below the dam

Fishing pressure in March and April in Section 4 increased from 1968 through 1974, except that fishing pressure was very low in 1969 because of flooding that spring. Also, pressure was considerably lower in 1971 than either 1970 or 1972. Pressure decreased from an estimated 93,594 man-hours in 1974 to 63,737 in 1975. Pressure in 1976 appears to have increased over 1975 (Figure 2.5.3-2). The 1968-1970 data are from Sternberg (1974); they cover the period from March 1 until the Saturday closest to May 1 each year. The 1971-1974 estimates were calculated for March 1 through April 30 using raw data from Sternberg's field work.

The May through November estimated fishing pressure in Section 4 in 1976 was one-third higher than the pressure during this period in 1975 (25,118 man-hours). Estimated fishing pressure in May through November of 1974 (46,112 man-hours) was about one-third higher than the 1976 pressure. Estimated pressure in 1973 was about midway between the 1976 and 1973 estimated pressure.

As in previous years, Section 5 had the second highest angling pressure of the six sections surveyed in 1976 (21,027 $\pm$ 3,950 man-hours). This is midway between 1974 and 1975 estimates (17,114 and 17,513 man-hours, respectively), and the 1973 estimate of 26,880 man-hours.

Estimated pressure for Section 5 in April was 10,559 man-hours in 1976 compared with only 162 man-hours in 1975. Earlier stabilization of water levels due to low runoff may have resulted in better fishing conditions in Section 5 in 1976 than in 1975.

Estimated man-hours of fishing pressure in Section 6 in 1976 was 6,130 $\pm$ 1,407 man-hours. Considering the width of the confidence interval, estimated pressure in Section 6 in 1976 is probably similar to, or slightly higher than, the pressure in Section 6 in 1974 (5,225 man-hours), and a little higher than the pressure in 1975 (4,556 man-hours). Estimated pressure in this section in 1976 was about one-half the pressure in 1973.

Section 2 (navigation channel upstream from the Prairie Island Plant) ranked fourth in fishing pressure among the six sections surveyed. Estimated pressure in 1976 was 1,983 $\pm$ 604 man-hours. This is considerably higher than the estimated pressure in this section in any

of the previous years (124 man-hours in 1974, 187 man-hours in 1975, and 870 man-hours in 1973.

Sections 1 and 3 had the lowest estimated pressure of the sections surveyed. Section 3 (plant area, which includes the heated discharge) was lowest with 1,126 $\pm$ 535 man-hours. Section 1 (Sturgeon Lake) was slightly higher with 1,208 $\pm$ 730 man-hours. About one-half of the estimated pressure in Section 3 was during March and April. Fishing during this period was concentrated in the heated discharge. Most angling in this section during the rest of the year occurred during May and July, with July having almost three times the estimated man-hours of May.

Fishing pressure in 1976 was highest in the spring with secondary peaks in July and during the fall. The highest estimated pressure of any month during the survey period occurred in April (Figures 2.5.3-2 and 2.5.3-3).

Fishing pressure during September through November for all sections combined (18,843 man-hours) was about one-eighth of the total estimated pressure for the whole year. Pressure in Section 4 comprised 83.3 percent of the pressure during this period. October had the highest pressure of these three months with about one and one-half times as much pressure as in September and about three times as much pressure as in November. Section 5 comprised 10.9 percent of the total pressure during this period. Pressure was about equal in Section 5 during September and October and almost zero in November.

2.5.3.3.2 Fishing Success

Catch rates are perhaps some of the most important indicators of the quality of a fishery. Overall catch rates indicate what species are being caught and how fast they are being caught regardless of anglers' preferences. These catch rates may be calculated for boat anglers and bank anglers separately or combined. Unless otherwise specified, the boat and bank angler data will be combined for the overall catch rates. Catch rates are presented in Tables 2.5.3-6 to 2.5.3-10.

The 1976 overall catch rate for walleyes during March and April in Section 4 was 0.030 fish/man-hour. This is the lowest walleye catch rate since the March and April creel survey began in 1968 (Figure 2.5.3-4). The March and April walleye catch rate was highest in 1968 (0.186 fish/man-hour), decreased in 1969 to 0.083 fish/man-hour, and increased to 0.156 fish/man-hour in 1970. There was a steady decline from 1970 through 1973; in 1973 the catch rate was 0.055 fish/man-hour. The 1974 catch rate increased slightly to 0.060 fish/man-hour and then decreased through 1976.

The 1976 overall March and April catch rate in Section 4 for saugers was the highest since the survey began in 1968. The sauger catch rate in 1976 was 0.445 fish/man-hour, which is slightly higher than the 1972 and 1973 catch rates, 0.436 and 0.437 fish/man-hour, respectively. The sauger catch rate has fluctuated annually with the lowest and highest catch rates occurring in successive years. The 1975 catch rate was 0.236 fish/man-hour.

The March and April catch rate for white bass also increased from less than 0.001 fish/man-hour in 1975 to 0.085 fish/man-hour in 1976 (Table 2.5.3-8).

The 1976 catch rate for walleyes in all sections combined was 0.071 fish/man-hour, compared with 0.067 fish/man-hour in 1975. The sauger catch rate for all sections during this period was 0.249 fish/man-hour in 1976 compared with 0.228 fish/man-hour in 1975. The white bass catch rate increased substantially in 1976 over 1975, as did the overall catch rate for bluegills, crappies, and freshwater drum. For all sections combined, the 1976 catch rates of other species generally increased slightly or stayed constant compared with 1975.

Considering all the sections surveyed during March and April of 1976, 92 percent of the interviewed man-hours in these sections were spent fishing for saugers or walleyes (Table 2.5.3-11). Catch Rate for anglers seeking saugers or walleyes during this period was 0.48 fish/man-hour. This is higher than the preferred catch rate for saugers or walleyes during the rest of the survey period (0.34 fish/man-hour), when about 58 percent of the anglers said they were fishing for saugers or walleyes. The March and April preferred catch rate for saugers or walleyes was higher in 1976 than 1975. Preferred catch rates for March and April 1968 through 1974 were not available from Sternberg (1974). For the rest of the survey period the 1976 catch rate is the lowest since the survey was initiated in 1973.

During the May to November portion of the survey, about 22 percent of the fishermen were seeking a mixed creel, i.e., "anything that will bite." Catch rate for this group was 0.60 fish/man-hour. The preferred species catch rate for mixed species has been rather constant, varying from 0.58 in 1973 to 0.68 in 1975 (Gustafson and Diedrich 1976). Catch rate for white bass has declined each year since 1973, whereas sunfish and crappie catch rates have shown no consistent trend.

2.5.3.3.3 Angling Harvest

The number of fish harvested by anglers is estimated from overall catch rates and estimated fishing pressure (Naplin and Gustafson 1975). Estimates of the weight of fish harvested in 1976 were computed from mean weights given in Table 2.5.3-12. Roughly one-half of the estimated number of fish caught and kept in the study area during the survey period were caught in Section 4 during March and April. Saugers were the most abundant fish caught by anglers. White bass were the second most abundant species in anglers' creels, and walleyes were third. Bluegills and black crappies ranked fourth and fifth, respectively.

During March and April, 1976, there was a productive sauger and white bass fishery in Section 4. An estimated 33,156 saugers were harvested in Section 4 during this period (Table 2.5.3-13). This is over twice the estimated number harvested in this area during March and April of 1975 (Gustafson and Diedrich 1976), but slightly less than the estimated number harvested in 1973 and 1974, 35,755 and 36,514, respectively (Sternberg 1974). In the nine years of March-April creel survey in Section 4, only two years, 1973 and 1974, had higher estimated sauger harvests than 1976. Estimated harvest in other years ranged from 1,323 saugers in 1969 to 21,103 saugers in 1972 (Table 2.5.3-14).

The total weight of saugers harvested in Section 4, March 6 through April 30, 1976, was 18,236 kg or 70.96 kg/ha. This total weight is the second largest sauger harvest of the nine years surveyed and is exceeded only by the 1974 harvest, when 21,543 kg of saugers were taken. In other years, the March and April harvest ranged from 463 kg in 1969 to 13,945 kg in 1973.

The harvest of white bass in Section 4 during March and April of 1976 was estimated at 7,675 fish weighing an estimated total of 3,914 kg (15.23 kg/ha). In 1975 only one white bass was reported by all of the anglers interviewed during March and April. This difference in catch may be due to the early stabilization of water levels resulting from the low run-off in 1976.

The estimated harvest of walleyes in Section 4 during March and April 1976 was 2,262 fish. Since the March and April survey began in 1968, only two years, 1969 (297 fish) and 1971 (1,835 fish), have had estimated walleye catches lower than the 1976 catch. In other years the estimated walleye harvest ranged from 3,187 to 6,049 fish. The estimated total weight of walleyes harvested in 1976 was 2,172 kg. Only 1969 and 1971 had lower total estimated weights of walleyes harvested during this period.

During March 6 through April 30, 1976, an estimated 902 white bass were taken from the heated discharge of the Prairie Island Plant (Section 3). Bluegills were the second most abundant fish taken from this area in March and April 1976. The area of Section 3 is 83 hectares, but during March and April, the fishing pressure is concentrated in the area most affected by the heated discharge of the Prairie Island Plant — the discharge canal. This area extends from the discharge gates of the plant about 680 m downstream to the temperature sensors near Barney's Point. This area, described in Gustafson and Geis (1977) as Stations 3-2 and 3-3, has a surface area of approximately 6.30 hectares. Using this latter figure for the area, the harvest near the Prairie Island Plant was 73.02 kg/ha (1.404 kg/ha/day) from March 6 through April 30.

Sections 5 and 6 were not surveyed in March, but April fishing accounted for over one-quarter of the fish taken in these two sections in the 1976 survey period. In Section 5, almost one-half of the total estimated number of fish harvested during the 1976 survey were harvested in April. An estimated 3,784 fish were taken from Section 5 during April, 1976. Included in this total were 1,862 bluegills, 645 walleyes, 417 saugers, 292 black crappies, and 266 white bass.

The harvest for Section 6 during April 1976 was estimated at 510 fish. Almost one-half of these fish (239) were saugers. An estimated 95 walleyes and 77 white bass were also taken during this period.

White bass were the most abundant species caught during the May through November 1976 survey period. Combining all sections, this species accounted for over one-third of the estimated 38,496 fish caught during this period (Table 2.5.3-15). During three of the last four years, the estimated numbers of white bass harvested during May through November have exceeded 10,000 fish (Gustafson and Diedrich 1976). The lowest year was 1975, when 6,876 white bass were harvested.

Saugers comprised close to one-sixth of the fish taken from the study area May 1 through November 21, 1976. An estimated 6,189 saugers were harvested during this period. This number is lower than the numbers harvested during similar periods within the last four years. The total weight (kg/ha) of saugers harvested has declined since 1974.

From May 1 through November 21, 1976, an estimated 5,661 walleyes

were harvested in the study area. This is very similar to the numbers harvested in 1974 and 1975. The harvest in kg/ha was higher in 1976 than during the three previous years. This larger harvest of walleyes is partly because the mean weight of angler-caught walleyes was higher in 1976 than in 1973, 1974, or 1975.

During May 1 through November 21, 1976, about two-thirds of the total number of fish harvested were taken from Section 4. Almost one-half of the 25,895 fish harvested in Section 4 at this time were white bass. Saugers and walleyes ranked second and third, respectively. An estimated 1,715 black crappies and 1,740 freshwater drum were creeled in this section.

Bluegills were the most abundant species creeled in Section 5 May 1 through November 21, 1976. During this period an estimated 3,337 bluegills were taken. Walleyes ranked second in abundance with 1,710 fish, and black crappies were third with 1,224 fish.

Harvest data from the Prairie Island creel survey were combined with data from Sternberg (1974) to estimate March through November sauger and walleye harvests (Figures 2.5.3-5 and 2.5.3-6). The purpose for combining estimates is to determine if there are trends in sauger or walleye harvests from 1973-1976. The combined estimates consist of March and April harvest from Section 4 as well as May through November harvest estimates for Sections 1 through 6. March and April 1973 and 1974 estimates were calculated from the raw data used by Sternberg (1974).

These harvest estimates are not exactly comparable, because the ending dates for the creel survey were not the same each year. In 1973 the creel survey was scheduled to end on November 5.

In analyzing the data from 1973, it appeared that some angling was occurring during November, so the 1974, 1975, and 1976 surveys were scheduled to end about December 3. During two years, however, the survey ended early because some of the sections were ice covered before December 3, thus limiting boat travel and ending open-water fishing in these sections. The survey ending dates in 1974 through 1976 ranged from November 21 through December 3. Since open-water fishing had ended in the ice covered sections and fishing pressure was very low in the other sections, ending the survey on November 21 or December 3 probably had little effect on the estimated fishing pressure for this period. Thus the 1974, 1975, and 1976 data are considered to be comparable. Since the 1973 survey ended on November 5, the 1973 estimated pressure is slightly underestimated; this factor should be considered when comparing the data for 1973 through 1976. For Figures 2.5.3-4 and 2.5.3-5, the 1976 estimates excluded March and April data from Sections 3, 5, and 6. These data were excluded to make the 1976 estimates more comparable with 1973-75 estimates.

The creel survey period does not cover the whole open-water fishing period in Section 4. From December through February it is possible (at times) for boats to reach the tailwaters of Lock and Dam 3. Hawkinson (1977) noted three boats with a total of seven fishermen in the tailwaters of Dam 3 on February 9, 1977. Later in February, particularly on unseasonably warm days, the number of fishermen in Section 4 may equal the number of fishermen there on mild March days. It is possible that the heated discharge could indirectly increase angling harvest by reducing the ice cover on the river below the dam, thus increasing the number of days that boat fishermen can reach the tailwaters during the winter. Also, in recent years, the early fishing below Lock and Dam 3 has been highly pub-

licized. This publicity has probably been a major factor in the increase in fishing pressure since the March and April survey began in 1968.

Although 1973 pressure is slightly underestimated for comparison with 1974 through 1976, considering the whole survey period each year, there may have been an overall declining trend in the numbers of sauger harvested (Figure 2.5.3-5). There appears, however, to be no trend in total weight of sauger harvested (Figure 2.5.3-6).

The overall number of walleyes harvested may have declined slightly, but differences between harvests are not large enough or consistent enough to be called a trend (Figure 2.5.3-5). No trend is apparent in total weight of walleyes harvested.

2.5.3.3.4 Species Composition

As in 1975, the March 6 through April 30, 1976 catch in Section 4 was dominated by sauger (70.82 percent), but there was an unusual increase in the white bass catch. In 1976, white bass accounted for 17.17 percent of the March and April catch. White bass comprised only 0.04 percent of the 1975 March and April catch in Section 4 (Gustafson and Diedrich 1976). This difference might be explained by the fact that the 1976 river flow crested lower and earlier than in 1975.

During the period May 1 through November 21, 1976, white bass were the most abundant species caught by anglers (Tables 2.5.3-16 through 2.5.3-18). In the three previous years, white bass ranked second in abundance. Saugers, which had been the most abundant species caught from 1973 through 1975, declined to second place in

Table 2.5.3-18. Major species caught by sport fishermen in the Prairie Island vicinity May through November, 1973 - 1976. Ranked in order of importance during 1976

	1973		1974		1975		1976	
	%	Rank	%	Rank	%	Rank	%	Rank
White bass	30.38	2	24.02	2	29.61	2	36.59	1
Sauger	39.38	1	49.54	1	33.31	1	18.34	2
Walleye	15.86	3	14.38	3	15.74	3	15.40	3
Sunfish	3.23	5	2.01	5	5.08	5	10.03	4
Crappies	1.90	7	0.46	9	9.11	4	9.46	5
Freshwater drum	4.04	4	4.61	4	2.36	6	5.78	6
Totals for the above six species	94.79		95.02		95.21		95.60	

1976. Walleyes were the third most commonly caught species May through November, 1976 and were followed in abundance by bluegills, crappies, and freshwater drum.

2.5.3.3.5 The Angler

A typical angler in the study area in 1976 was a man 25 years of age or older who travelled less than 50 miles to fish for sauger and walleye. During the period May 1 through November 21, 1976, 88.54 percent of the anglers were males, but during March and April 96.17 percent of the anglers were males (Table 2.5.3-19). Most anglers (55.57 percent) in the Prairie Island vicinity May 1 through November 21, 1976, travelled 25 miles or less to fish (Table 2.5.3-20).

This compares with 58.19 percent local anglers during the same period of 1975. Sauger and walleye were the most sought-after species. During the period May 1 through November 21, 1976, 54.43 percent of interviewed anglers were seeking sauger or walleye (Table 2.5.3-21). Fishermen seeking mixed creel ("anything that will bite") comprised 26.35 percent of the anglers. During this period only 8.38 percent of anglers were seeking white bass, yet white bass comprised 36.59 percent of fish harvested during this time.

As in 1975, fishing style used most often by anglers in the study area was still fishing with natural bait (Table 2.5.3-22). The second most popular method was trolling with natural bait. Table 2.5.3-23 is a summary of fishing methods by section.

2.5.3.4 Summary

A creel survey was conducted on the Mississippi River and its backwaters in the Prairie Island vicinity March 6 through November 21, 1976. The purpose of this survey was to monitor the sport fishery in this area. Estimated fishing pressure from March 6 through November 21, 1976 totaled 141,015 $\pm$ 27,343 man-hours for the six sections surveyed.

As in other years, fishing pressure in Sections 1, 2, and 3 during 1976 was low compared with the other sections. However, in 1976 the estimated pressure in Sections 1, 2, and 3 was higher in each section than during 1973 through 1975. Estimated fishing pressure in March and April in Section 4 was 73,877 $\pm$ 18,784 man-hours, over one-half the estimated pressure for all six sections for the whole survey period. In 1976, Section 5 again had the second highest

estimated fishing pressure (21,027 ± 3,950 man-hours) of the six sections. Section 6 had the third highest estimated pressure with 6,130 ± 1,407 man-hours.

The 1976 sauger catch rate was the highest in the nine years of the March and April survey. The estimated number of saugers harvested in Section 4 during March and April of 1976 was lower than the 1973 and 1974 estimated harvest, but higher than the March and April harvest during the other six years surveyed. Estimated March and April harvest of saugers in kg/ha was higher in 1976 than past years, except 1974, which had the highest estimated kg/ha harvest of saugers of the nine years surveyed.

Except for 1969 and 1974, the catch rate for walleyes in Section 4 during March and April has shown a continuous decrease from 0.186 fish per hour in 1968 to 0.030 fish per hour in 1976. Both the total number and the total weight of walleyes harvested in Section 4 during March and April 1976 were lower than in six of the eight previous years.

During March and April 1976, saugers comprised 70.8 percent, white bass 17.2 percent, and walleyes 6.0 percent of all fish caught in the study area. From May through November 1976, white bass comprised 36.6 percent, saugers 18.3 percent, walleyes 15.4 percent, bluegills 10.0 percent, and black crappies 8.9 percent of all fish caught in the survey area.

2.5.3.5 Acknowledgements

The authors wish to thank Jeff Dittrich, Dave Magnus, Steve Wall, and George Clymer for their work in collecting and compiling the

data for this report. Thanks are due to Howard Krosch and Arthur Peterson for their valuable advice on the statistical treatment and presentation of the data. Leonard Wroblewski and Katherine Macken were helpful in giving direction and advice on statistical matters. The authors are indebted to Debra Nelson, Marcia Helmberger, Lillian Jelinek, and Lana Sexe for their work in typing the tables and manuscript of this report.

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FIGURE 2.5.3-1 CREEL SURVEY AREAS IN THE PRAIRIE ISLAND GENERATING PLANT AREA

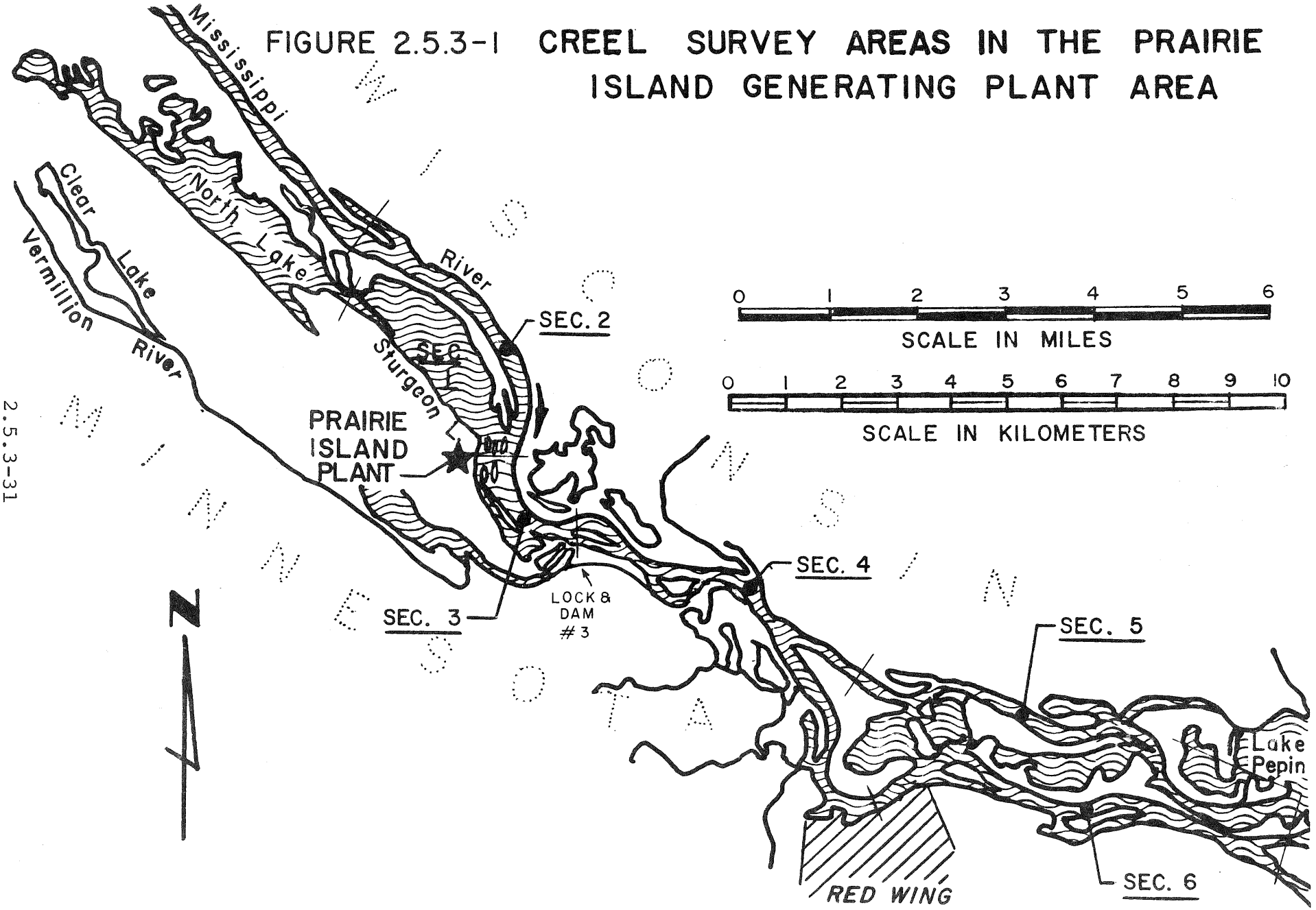
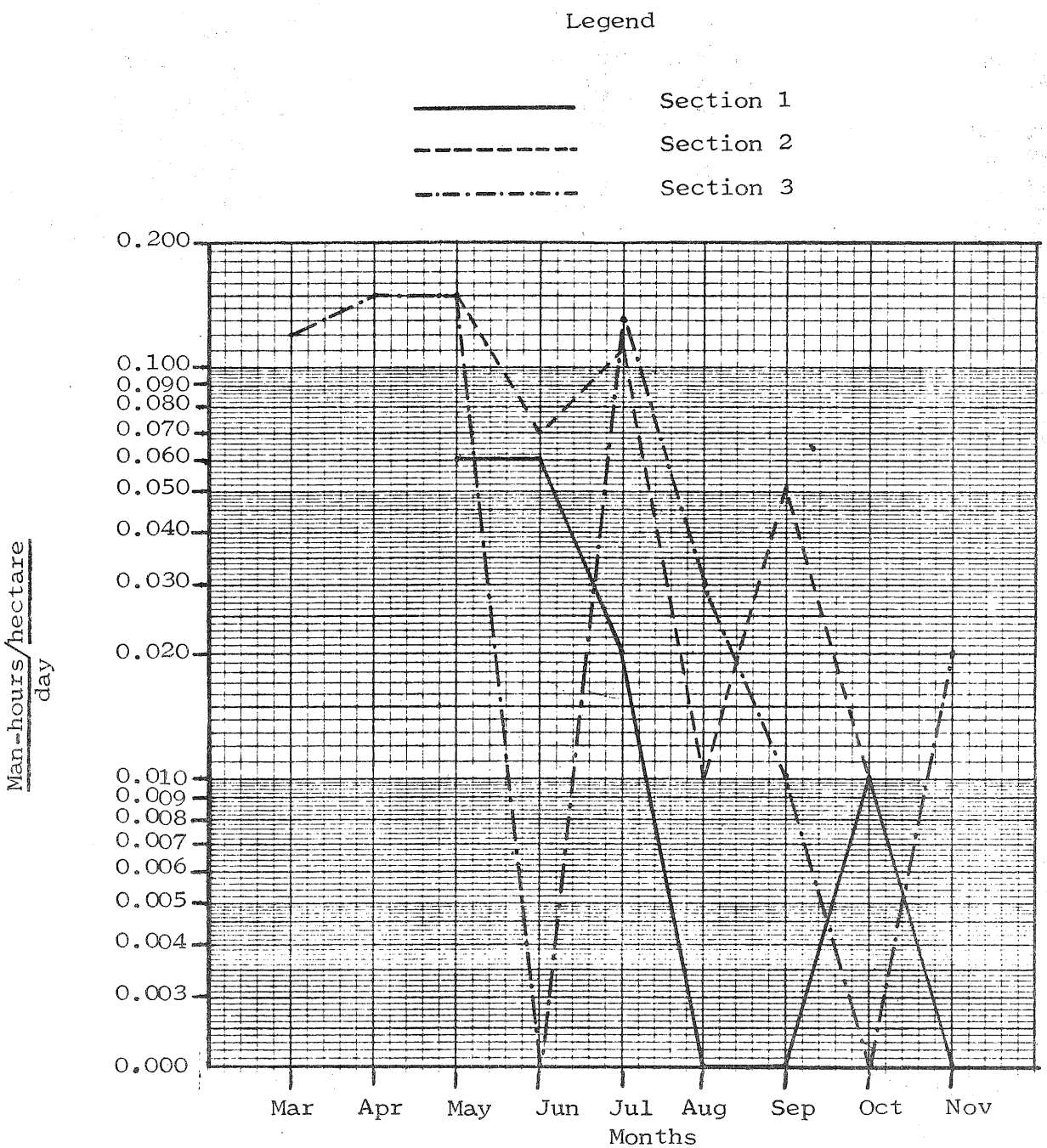


Figure 2.5.3-2 Estimated fishing pressure for each month in Sections 1,2, and 3, expressed in $\frac{\text{man-hours/hectare}}{\text{day}}$.



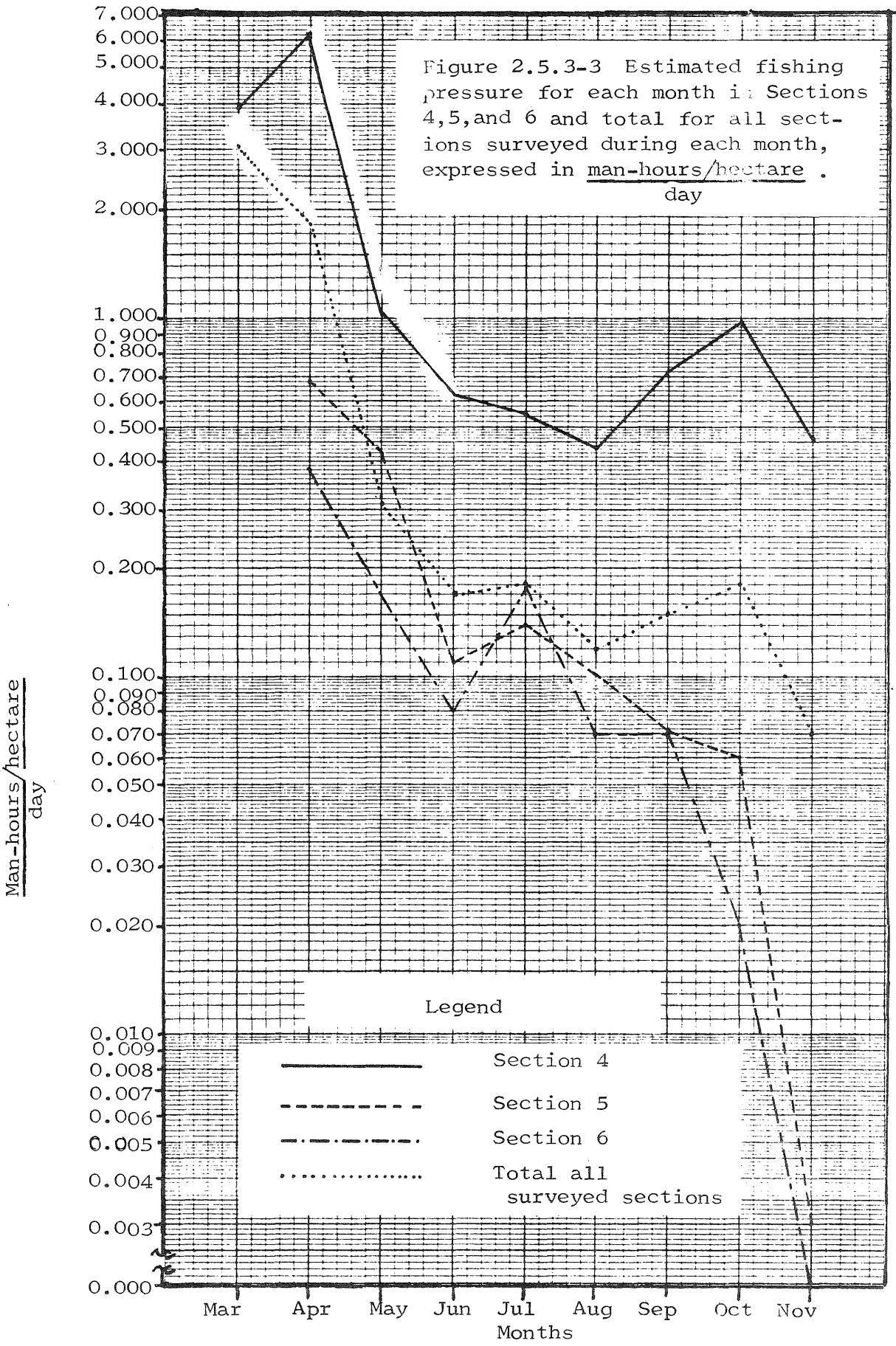


Figure 2.5.3-3 Estimated fishing pressure for each month in Sections 4,5,and 6 and total for all sections surveyed during each month, expressed in man-hours/hectare / day .
Man-hours/hectare / day
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.900
0.800
0.700
0.600
0.500
0.400
0.300
0.200
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.009
0.008
0.007
0.006
0.005
0.004
0.003
0.000
Legend
Section 4
Section 5
Section 6
Total all surveyed sections
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Months

Figure 2.5.3-4. Overall catch rates for sauger and walleye during March and April in Section 4 1968 through 1976 (boat and bank anglers combined)

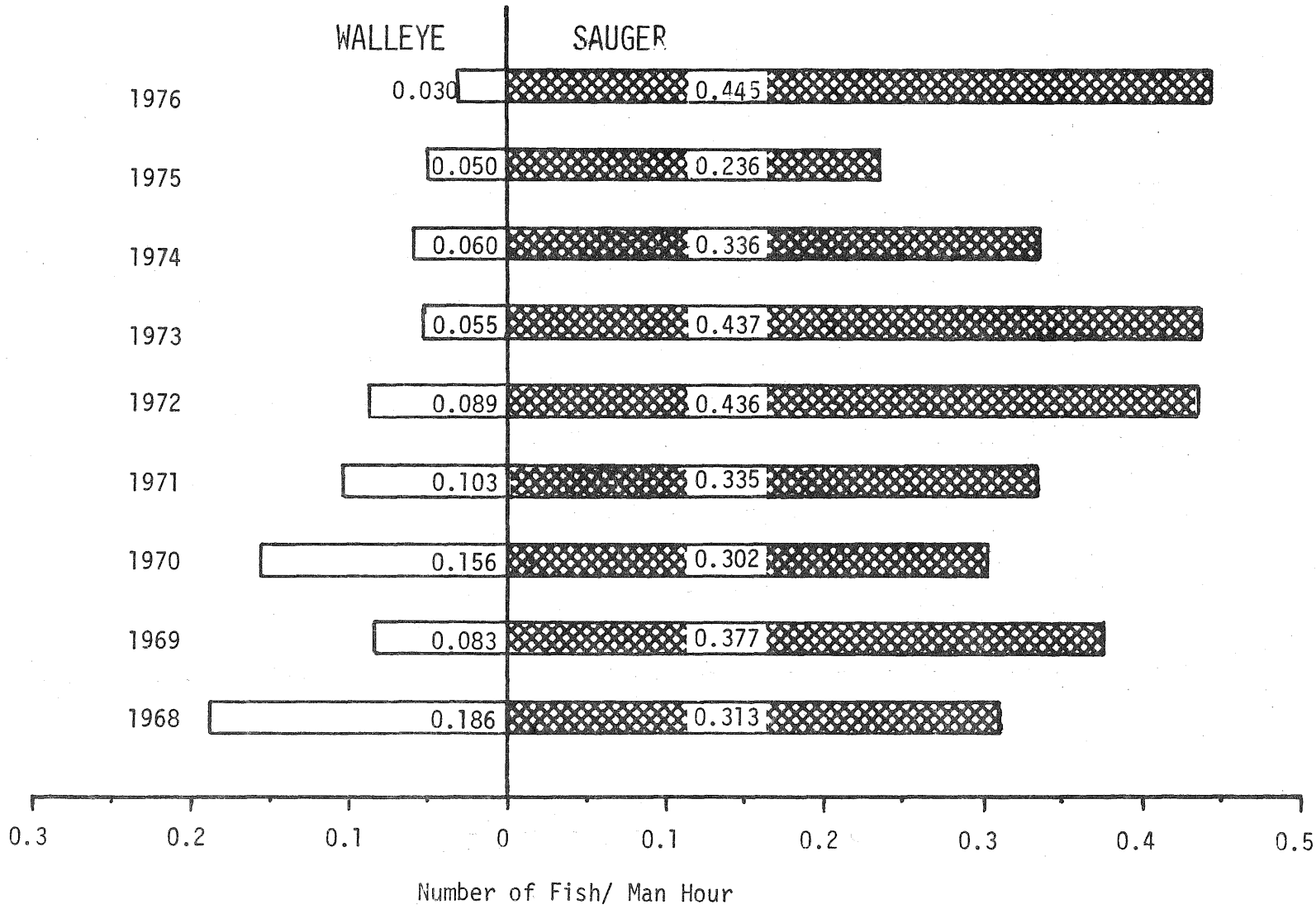


Figure 2.5.3-5. Estimated numbers of saugers and walleyes harvested March - November, 1973-1976 (See text for explanation of dates and sections included.)

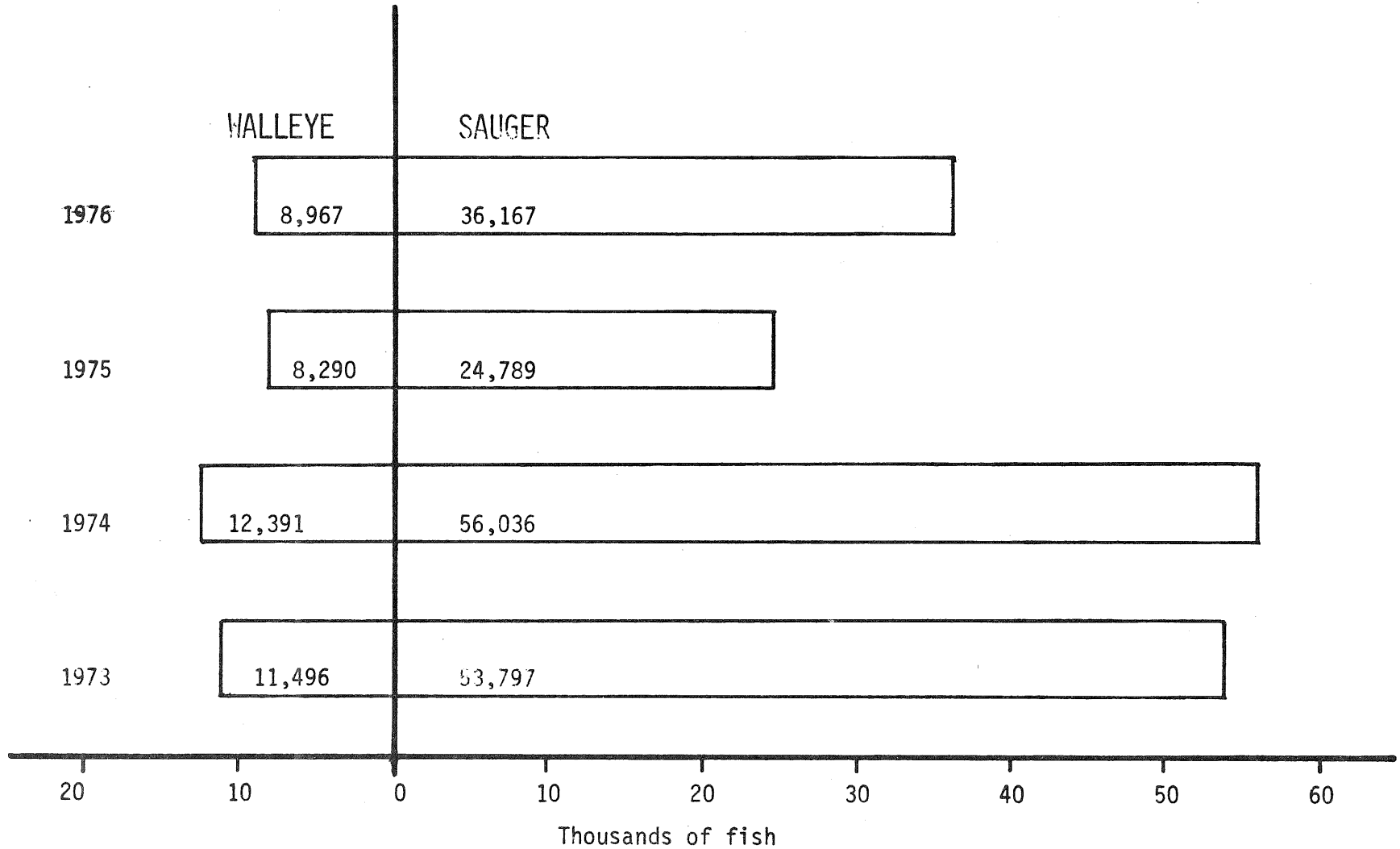


Figure 2.5.3-6. Estimated harvest of saugers and walleyes during entire survey period, March - November, 1973 - 1976 (See text for explanation of dates and sections included)

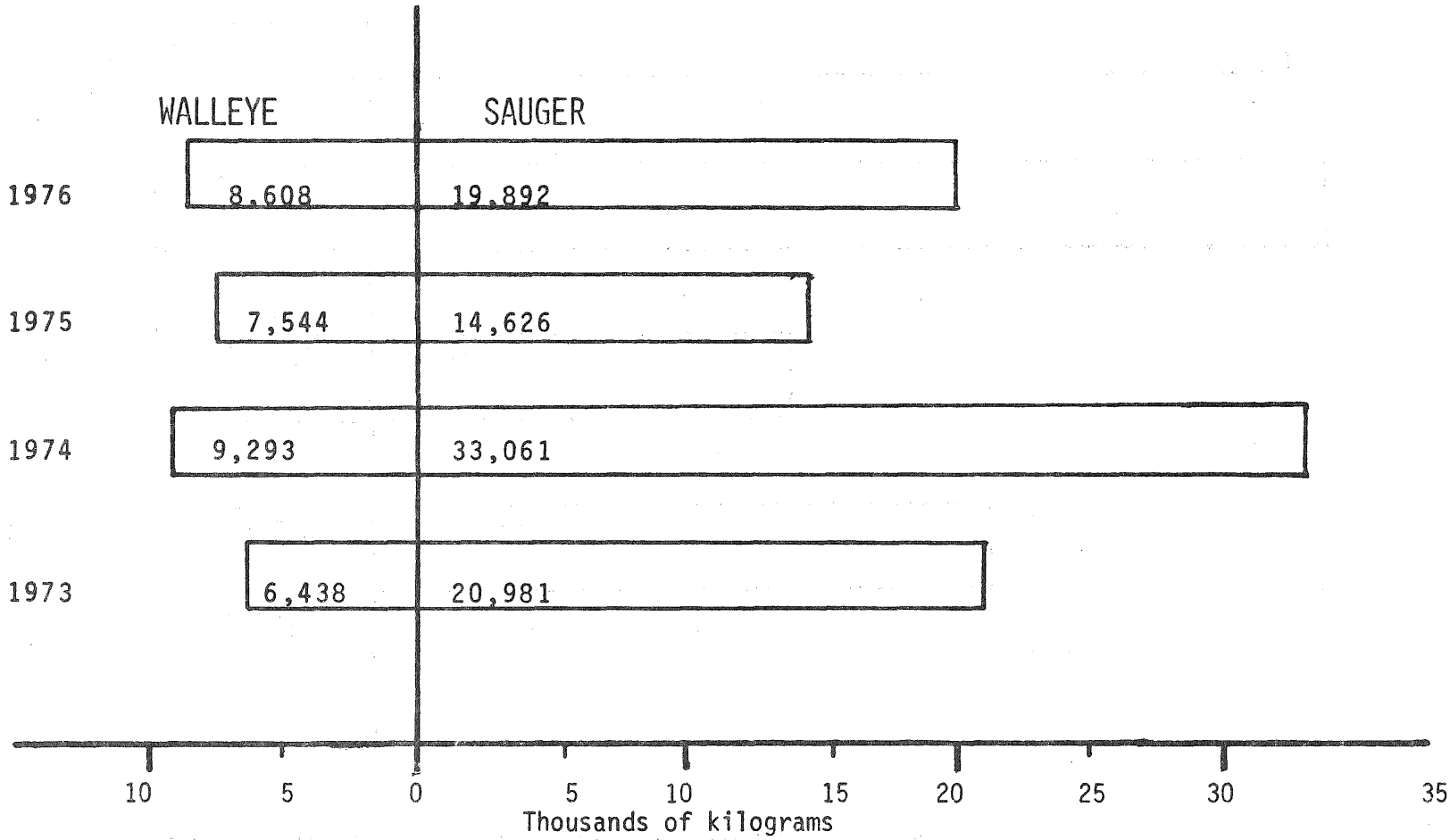


Table 2.5.3.-1. Descriptions of sections and sampling dates for each section in the study area of the Prairie Island creel survey, 1976

Section No.	Description	Dates surveyed during 1976 (inclusive)	Comments
1	Sturgeon Lake	May 8 - November 14	Ice covered November 15
2	Navigation channel from Brewer Lake cut downstream to the plant intake	May 8 - November 21	
3	Navigation channel and backwaters from the plant intake downstream to Lock and Dam 3	March 6 - November 21	
4	Tailwaters of Lock and Dam 3 downstream to Highway 63 bridges on the navigation channel (at Red Wing) and the back channel (Wisconsin channel)	March 6 - November 21	Some ice fishing (2-5 fishermen per count in this section through March 11, 1976
5	Wisconsin channel and all backwaters from Highway 63 downstream to Bay City Flats (head of Lake Pepin)	March 31 - November 14	Ice covered November 15
6	Navigation channel from Highway 63 downstream to the head of Lake Pepin	April 10 - November 21	

Table 2.5.3-2 Estimated man-hours of fishing pressure (with confidence limits) in the Prairie Island vicinity, 1976

Section No.	Dates (Inclusive)	Estimated Man-hours Fished by Boat Anglers	Estimated Man-hours Fished by Bank Anglers	Total Estimated Man-hours (Boat + Bank)	90% confidence Limits on Total Estimated Man-hours
1	May 1 - Nov. 14	1,122	86	1,208	± 730
2	May 1 - Nov. 21	1,493	490	1,983	± 604
3	Mar. 6 - Nov. 21	873	253	1,126	± 535
4	Mar. 6 - Apr. 30	72,326	1,551	73,887	± 18,784
4	May 1 - Nov. 21	31,188	4,476	35,664	± 4,374
4	Mar. 6 - Nov. 21	103,514	6,027	109,541	± 18,658
5	Apr. 1 - Nov. 14	17,802	3,225	21,027	± 3,950
6	Apr. 1 - Nov. 21	5,164	966	6,130	± 1,407
All Sections Combined	Mar. 6 - Nov. 21	129,968	11,047	141,015	± 27,343

Table 2.5.3-3. Estimated fishing pressure for all anglers by section in the Prairie Island vicinity, March 6-April 30, 1976

		Estimated Man-Hours																			
Section		3				4				5				6				Total			
Area (hectares)		83				257				516				241				1097			
		Boat	Bank	Total	m-hr/ha/day	Boat	Bank	Total	m-hr/ha/day	Boat	Bank	Total	m-hr/ha/day	Boat	Bank	Total	m-hr/ha/day	Boat	Bank	Total	m-hr/ha/day
MARCH	Weekend	120	36	156	0.23	14965	112	15077	7.33	*	*	*	*	**	**	**	**	15085	148	15233	5.60
	Weekday	0	93	93	0.06	11188	305	11493	2.48	*	*	*	*	**	**	**	**	11188	398	11586	1.89
	Total	120	129	249	0.12	26153	417	26570	3.98	*	*	*	*	**	**	**	**	26273	546	26819	3.03
APRIL	Weekend	188	134	322	0.48	26029	875	26904	13.09	3044	967	4011	0.97	698	54	752	0.39	29959	2030	31989	3.65
	Weekday	50	0	50	0.03	19345	268	19613	3.47	4241	2307	6548	0.58	1667	298	1965	0.37	25303	2873	28176	1.17
	Total	238	134	372	0.15	45374	1143	46517	6.03	7285	3274	10559	0.68	2365	352	2717	0.38	55262	4903	60165	1.83
MAR.-APRIL	Weekend	308	170	478	0.36	40994	987	41981	10.21	3044	967	4011	0.97	698	54	752	0.39	45044	2178	47222	2.69
	Weekday	50	93	143	0.04	30533	573	31106	3.03	4241	2307	6548	0.58	1667	298	1965	0.37	36491	3271	39762	0.91
	Total	358	263	621	0.13	71527	1560	73087	5.08	7285	3274	10559	0.68	2365	352	2717	0.38	81535	5449	86984	1.42

* No estimate was made in Section 5 for March because only one count was made in that section during March.

** No estimate was made for Section 6 for March because no counts were made in that section during March.

Table 2.5.3-4. Estimated fishing pressure for all anglers by section in the Prairie Island vicinity, May 1- August 31, 1976

		Estimated Man-Hours															
Section		1				2				3				4			
Area (hectares)		324				180				83				257			
		Boat	Bank	Total	m-hr/ha/day *	Boat	Bank	Total	m-hr/ha/day	Boat	Bank	Total	m-hr/ha/day	Boat	Bank	Total	m-hr/ha/day
MAY	Weekend	184	0	184	0.06	94	538	632	0.32	18	0	18	0.02	3401	746	4147	1.47
	Weekday	416	30	446	0.06	165	66	231	0.06	74	25	99	0.06	3265	809	4074	0.79
	Total	600	30	630	0.06	259	604	863	0.15	92	25	117	0.05	6666	1555	8221	1.03
JUNE	Weekend	140	12	152	0.06	218	0	218	0.15	0	0	0	0.00	1017	477	1494	0.73
	Weekday	479	0	479	0.07	171	0	171	0.04	0	0	0	0.00	2531	718	3249	0.57
	Total	619	12	631	0.06	389	0	389	0.07	0	0	0	0.00	3548	1195	4743	0.62
JULY	Weekend	152	0	152	0.05	373	0	373	0.21	51	0	51	0.06	2236	229	2465	0.96
	Weekday	71	0	71	0.01	248	0	248	0.07	284	0	284	0.16	1788	96	1884	0.35
	Total	223	0	223	0.02	621	0	621	0.11	335	0	335	0.13	4024	325	4349	0.55
AUGUST	Weekend	0	0	0	0.00	13	38	51	0.03	84	0	84	0.11	814	281	1095	0.47
	Weekday	0	0	0	0.00	26	0	26	0.01	0	0	0	0.00	1545	824	2369	0.42
	Total	0	0	0	0.00	39	38	77	0.01	84	0	84	0.03	2359	1105	3464	0.43
MAY-AUGUST TOTAL	Weekend	476	12	488	0.03	698	576	1274	0.18	153	0	153	0.04	7468	1733	9201	0.94
	Weekday	966	30	996	0.03	610	66	676	0.04	358	25	383	0.05	9129	2447	11576	0.52
	Total	1442	42	1484	0.03	1308	642	1950	0.08	511	25	536	0.05	16597	4180	20777	0.65

* Man-hours per hectare per day.

Table 2.5.3-4. cont. Est'd. fishing pressure for all anglers by section in the Prairie Island vicinity, May 1-August 31, 1976

		Estimated Man-Hours											
Section		5				6				Total			
Area (hectares)		516				241				1601			
		Boat	Bank	Total	m-hr/ha/day *	Boat	Bank	Total	m-hr/ha/day	Boat	Bank	Total	m-hr/ha/day
MAY	Weekend	3314	716	4030	0.71	368	225	593	0.22	7379	2225	9604	0.55
	Weekday	2617	270	2887	0.28	513	162	675	0.14	7050	1362	8412	0.26
	Total	5931	986	6917	0.43	881	378	1259	0.17	14429	3587	18016	0.36
JUNE	Weekend	996	0	996	0.24	213	53	266	0.14	2584	542	3126	0.24
	Weekday	760	0	760	0.07	190	114	304	0.06	4131	832	4963	0.14
	Total	1756	0	1756	0.11	403	167	570	0.08	6715	1374	8089	0.17
JULY	Weekend	1568	44	1612	0.31	515	0	515	0.21	4895	273	5168	0.32
	Weekday	670	0	670	0.06	816	0	816	0.16	3877	96	3973	0.12
	Total	2238	44	2282	0.14	1331	0	1331	0.18	8772	369	9141	0.18
AUGUST	Weekend	363	268	631	0.14	126	14	140	0.06	1400	601	2001	0.14
	Weekday	849	154	1003	0.09	337	28	365	0.07	2757	1006	3763	0.11
	Total	1212	422	1634	0.10	463	42	505	0.07	4157	1607	5764	0.12
MAY-AUGUST TOTAL	Weekend	6241	1028	7269	0.37	1222	292	1514	0.16	16258	3641	19899	0.32
	Weekday	4896	424	5320	0.12	1856	304	2160	0.10	17815	3296	21111	0.15
	Total	11137	1452	12589	0.19	3078	596	3674	0.12	34073	6937	41010	0.20

* Man-hours per hectare per day

Table 2.5.3-5. Estimated fishing pressure for all anglers by month and section in the Prairie Island vicinity, September 1-November 21, 1976

		Estimated Man-Hours															
Section		1				2				3				4			
Area (hectares)		324				180				83				257			
		Boat	Bank	Total	m-hr* / ha / day	Boat	Bank	Total	m-hr / ha / day	Boat	Bank	Total	m-hr / ha / day	Boat	Bank	Total	m-hr / ha / day
SEPTEMBER	Weekend	0	0	0	0.00	184	0	184	0.11	28	0	28	0.04	1971	0	1971	0.85
	Weekday	0	0	0	0.00	75	0	75	0.02	0	0	0	0.00	3608	66	3674	0.68
	Total	0	0	0	0.00	259	0	259	0.05	28	0	28	0.01	5579	66	5645	0.73
OCTOBER	Weekend	73	0	73	0.02	78	0	78	0.04	0	0	0	0.00	3370	109	3479	1.35
	Weekday	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	4033	115	4148	0.77
	Total	73	0	73	0.01	78	0	78	0.01	0	0	0	0.00	7403	224	7627	0.96
NOVEMBER	Weekend	0	0	0	0.00	0	0	0	0.00	0	0	0	0.00	849	10	859	0.56
	Weekday	0	0	0	0.00	0	0	0	0.00	29	0	29	0.02	1573	0	1573	0.41
	Total	0	0	0	0.00	0	0	0	0.00	29	0	29	0.02	2422	10	2432	0.45
SEPT.-NOV.	Weekend	73	0	73	0.01	262	0	262	0.05	28	0	28	0.01	6190	119	7023	1.09
	Weekday	0	0	0	0.00	75	0	75	0.01	29	0	29	0.01	9214	181	9395	0.64
	Total	73	0	73	0.002	337	0	337	0.02	57	0	57	0.01	15404	300	15704	0.74

* Man-hours per hectare per day

Table 2.5.3-5 cont. Estimated fishing pressure for all anglers by sections in the Prairie Island vicinity, September 1- November 21, 1976

		Estimated Man-Hours											
Section		5				6				Total			
Area (hectares)		516				241				1601			
		Boat	Bank	Total	m-hr* / ha / day	Boat	Bank	Total	m-hr / ha / day	Boat	Bank	Total	m-hr / ha / day
SEPTEMBER	Weekend	780	14	794	0.17	284	0	284	0.13	3247	14	3261	0.23
	Weekday	219	0	219	0.02	197	0	197	0.04	4099	66	4165	0.12
	Total	999	14	1013	0.07	481	0	481	0.07	7341	80	7421	0.15
OCTOBER	Weekend	700	0	700	0.14	140	16	156	0.06	4361	125	4486	0.09
	Weekday	307	0	307	0.03	0	0	0	0	4340	115	4455	0.09
	Total	1007	0	1007	0.06	140	16	156	0.02	8701	240	8941	0.18
NOVEMBER	Weekend	29	0	29	0.01	0	0	0	0	878	10	888	0.09
	Weekday	0	0	0	0	0	0	0	0	1588	0	1598	0.07
	Total	29	0	29	0.003	0	0	0	0	2480	10	2490	0.07
SEPT.-NOV.	Weekend	1509	14	1523	0.11	424	16	440	0.07	8486	149	8635	0.21
	Weekday	526	0	526	0.01	197	0	197	0.01	10027	181	10208	0.11
	Total	2035	14	2049	0.04	621	16	637	0.03	18513	330	18843	0.14

* Man-hours per hectare per day

Table 2.5.3-6. Overall catch rates for interviewed anglers in the Prairie Island vicinity, 1976. Catch/man-hour with number caught by interviewed anglers in parentheses. (Boat and bank anglers combined.)

Section	Mar. 6-April Only	March 6 - November 21, 1976						
	4	1	2	3	4	5	6	Total
Hrs. surveyed	4071.9	80.2	153.1	122.1	7516.6	1824.6	495.4	10192.0
Tot. est. man-hrs.	46849	744	1438	682	68303	12205	3344	86716
Species:								
Lake sturgeon	-- *(0)	-- (0)	-- (0)	-- (0)	tr. (2)	0.001 (1)	-- (0)	tr. (3)
Bowfin	-- (0)	-- (0)	-- (0)	-- (0)	tr. (1)	-- (0)	0.002 (1)	tr. (2)
Mooneye/goldeye	**tr. (1)	0.012 (1)	-- (0)	-- (0)	tr. (1)	-- (0)	-- (0)	tr. (2)
Northern pike	0.001 (4)	0.025 (2)	-- (0)	0.057 (7)	0.002 (15)	0.005 (10)	0.006 (3)	0.004 (37)
Carp	tr. (1)	-- (0)	0.046 (7)	0.008 (1)	0.003 (23)	0.003 (5)	-- (0)	0.004 (37)
Black bullhead	-- (0)	-- (0)	-- (0)	-- (0)	0.002 (13)	0.005 (10)	-- (0)	0.002 (23)
Channel catfish	-- (0)	0.012 (1)	-- (0)	0.066 (8)	0.003 (26)	0.005 (9)	-- (0)	0.004 (44)
Flathead catfish	-- (0)	-- (0)	-- (0)	-- (0)	0.001 (8)	0.001 (2)	-- (0)	0.001 (10)
White bass	0.085 (346)	0.175 (14)	0.451 (69)	0.786 (96)	0.200 (1505)	0.047 (85)	0.052 (26)	0.176 (1795)
Rock bass	tr. (1)	-- (0)	-- (0)	-- (0)	0.001 (6)	0.002 (3)	-- (0)	0.001 (9)
Bluegill	-- (0)	-- (0)	-- (0)	0.147 (18)	0.002 (13)	0.245 (447)	0.014 (7)	0.048 (485)
Smallmouth bass	-- (0)	-- (0)	0.033 (5)	-- (0)	0.001 (7)	0.002 (4)	-- (0)	0.002 (16)
Largemouth bass	-- (0)	-- (0)	-- (0)	-- (0)	-- (0)	0.002 (4)	-- (0)	tr. (4)
White crappie	0.001 (3)	-- (0)	-- (0)	-- (0)	0.001 (5)	0.011 (20)	-- (0)	0.002 (25)
Black crappie	0.001 (3)	-- (0)	-- (0)	-- (0)	0.026 (192)	0.077 (141)	-- (0)	0.033 (333)
Yellow perch	-- (0)	-- (0)	-- (0)	-- (0)	-- (0)	0.002 (3)	0.002 (1)	tr. (4)
Sauger	0.445 (1812)	0.100 (8)	0.020 (3)	0.057 (7)	0.319 (2399)	0.034 (62)	0.117 (58)	0.249 (2537)
Walleye	0.030 (121)	0.411 (33)	0.157 (24)	0.041 (5)	0.054 (406)	0.120 (219)	0.071 (35)	0.071 (722)
Freshwater drum	-- (0)	-- (0)	0.255 (39)	0.008 (1)	0.018 (137)	0.013 (24)	0.026 (13)	0.021 (214)
Overall estimated harvest:	0.563 (2292)	0.736 (59)	0.960 (147)	1.171 (143)	0.633 (4759)	0.575 (1049)	0.293 (145)	0.618 (10192)

* (0) None were caught by interviewed anglers

** tr. Overall catch rate < 0.001

Table 2.5.3-7. Catch rates for interviewed boat anglers in the Prairie Island vicinity March 6-November 21, 1977. Catch per man-hour with number of fish caught by interviewed anglers in parentheses

Section	March 6-November 21, 1976						
Hrs. Fished by interviewed anglers	1 77.9	2 126.7	3 79.8	4 7035.9	5 1577.7	6 452.2	Total 9350.2
Species:							
Lake sturgeon	-- (0)	-- (0)	-- (0)	tr.* (2)	0.001 (1)	-- (0)	tr. (3)
Bowfin	-- (0)	-- (0)	-- (0)	tr. (1)	-- (0)	0.002 (1)	tr. (2)
Mooneye/goldeye	0.013 (1)	-- (0)	-- (0)	tr. (1)	-- (0)	-- (0)	tr. (2)
Northern pike	0.026 (2)	-- (0)	0.013 (1)	0.002 (11)	0.004 (6)	0.007 (3)	0.002 (23)
Carp	-- (0)	-- (0)	0.013 (1)	0.003 (20)	-- (0)	-- (0)	0.002 (21)
Black bullhead	-- (0)	-- (0)	-- (0)	0.001 (10)	0.002 (3)	-- (0)	0.001 (13)
Channel catfish	0.013 (1)	-- (0)	0.075 (6)	0.002 (17)	0.004 (7)	-- (0)	0.003 (31)
Flathead catfish	-- (0)	-- (0)	-- (0)	0.001 (8)	0.001 (2)	-- (0)	0.001 (10)
White bass	0.180 (14)	0.513 (65)	1.040 (83)	0.171 (1203)	0.049 (78)	0.053 (24)	0.157 (1467)
Rock bass	-- (0)	-- (0)	-- (0)	0.001 (4)	0.002 (3)	-- (0)	0.001 (7)
Bluegill	-- (0)	-- (0)	-- (0)	0.001 (10)	0.207 (326)	-- (0)	0.036 (336)
Smallmouth bass	-- (0)	0.039 (5)	-- (0)	tr. (2)	0.003 (4)	-- (0)	0.001 (11)
Largemouth bass	-- (0)	-- (0)	-- (0)	-- (0)	0.002 (3)	-- (0)	tr. (3)
White crappie	-- (0)	-- (0)	-- (0)	0.001 (5)	0.013 (20)	-- (0)	0.003 (25)
Black crappie	-- (0)	-- (0)	-- (0)	0.022 (152)	0.086 (135)	-- (0)	0.031 (287)
Yellow perch	-- (0)	-- (0)	-- (0)	-- (0)	-- (0)	0.002 (1)	tr. (1)
Sauger	0.103 (8)	0.024 (3)	0.025 (2)	0.340 (2393)	0.039 (61)	0.128 (58)	0.270 (2525)
Walleye	0.424 (33)	0.189 (24)	0.013 (1)	0.054 (379)	0.136 (215)	0.075 (34)	0.073 (686)
Freshwater drum	-- (0)	0.110 (14)	0.013 (1)	0.014 (97)	0.011 (18)	0.011 (5)	0.014 (135)
Total no. caught by interviewed anglers	(59)	(111)	(95)	(4315)	(884)	(126)	(5590)
Total catch/man-hours	0.757	0.876	1.190	0.613	0.560	0.279	0.598

* $0 < TR < 0.001$

Table 2.5.3 - 8. Catch rates for interviewed bank anglers in the Prairie Island vicinity, March 6-November 21, 1976. Catch per man-hour with number of fish caught by interviewed anglers in parentheses.

Section	March 6-November 21, 1976													
	1		2		3		4		5		6		Total	
Hrs. fished by interviewed anglers	2.3		26.4		42.3		413.7		246.9		43.2		774.8	
Species:														
Lake sturgeon	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Bowfin	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Mooneye/goldeye	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Northern pike	--	(0)	--	(0)	0.142	(6)	0.005	(2)	0.016	(4)	--	(0)	0.015	(12)
Carp	--	(0)	0.265	(7)	--	(0)	0.007	(3)	0.020	(5)	0.023	(1)	0.021	(16)
Black bullhead	--	(0)	--	(0)	--	(0)	0.007	(3)	0.028	(7)	--	(0)	0.013	(10)
Channel catfish	--	(0)	--	(0)	0.047	(2)	0.022	(9)	--	(0)	--	(0)	0.014	(11)
Flathead catfsih	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
White bass	--	(0)	0.152	(4)	0.307	(13)	0.730	(302)	0.028	(7)	0.046	(2)	0.423	(328)
Rock bass	--	(0)	--	(0)	--	(0)	0.005	(2)	--	(0)	--	(0)	0.003	(2)
Bluegill	--	(0)	--	(0)	0.426	(18)	0.007	(3)	0.490	(121)	0.162	(7)	0.192	(149)
Smallmouth bass	--	(0)	--	(0)	--	(0)	0.012	(5)	--	(0)	--	(0)	0.006	(5)
Largemouth bass	--	(0)	--	(0)	--	(0)	--	(0)	0.004	(1)	--	(0)	0.001	(1)
White crappie	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Black crappie	--	(0)	--	(0)	--	(0)	0.097	(40)	0.024	(6)	--	(0)	0.059	(46)
Yellow perch	--	(0)	--	(0)	--	(0)	--	(0)	0.012	(3)	--	(0)	0.004	(3)
Sauger	--	(0)	--	(0)	0.118	(5)	0.015	(6)	0.004	(1)	--	(0)	0.015	(12)
Walleye	--	(0)	--	(0)	0.095	(4)	0.065	(27)	0.016	(4)	0.023	(1)	0.046	(36)
Freshwater drum	--	(0)	0.947	(25)	--	(0)	0.097	(40)	0.024	(6)	0.185	(8)	0.102	(79)
Total No caught by interviewed anglers		(0)		(36)		(48)		(442)		(165)		(19)		(710)
Total catch man-hour			1.364		1.135		1.068		0.668		0.440		0.916	

Table 2.5.3- 9. Catch rates for interviewed boat anglers in the Prairie Island vicinity March 6 - April 30, 1976. Catch per man-hour with number of fish caught by interviewed anglers in parentheses

Section	March 6 - April 30, 1976								Total	
	3		4		5		6			
Hrs. fished by interviewed anglers	47.8		3954.2		206.6		67.5		4276.1	
Species:										
Lake sturgeon	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Bowfin	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Mooneye/goldeye	--	(0)	Tr	(1)	--	(0)	--	(0)	Tr	(1)
Northern pike	0.021	(1)	0.001	(2)	--	(0)	--	(0)	0.001	(3)
Carp	0.021	(1)	Tr	(1)	--	(0)	--	(0)	Tr	(2)
Black bullhead	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Channel catfish	0.126	(6)	--	(0)	--	(0)	--	(0)	0.001	(6)
Flathead catfish	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
White bass	1.632	(78)	0.060	(237)	.034	(7)	0.015	(1)	0.076	(323)
Rock bass	--	(0)	Tr	(1)	--	(0)	--	(0)	Tr	(1)
Bluegill	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Smallmouth bass	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Largemouth bass	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
White crappie	--	(0)	0.001	(3)	--	(0)	--	(0)	0.001	(3)
Black crappie	--	(0)	0.001	(3)	.005	(1)	--	(0)	0.001	(3)
Yellow perch	--	(0)	--	(0)	--	(0)	0.015	(1)	Tr	(1)
Sauger	0.021	(1)	0.458	(1811)	.150	(31)	0.207	(14)	0.434	(1857)
Walleye	--	(0)	0.030	(118)	.140	(29)	0.015	(1)	0.035	(148)
Freshwater drum	--	(0)	--	(0)	--	(0)	0.015	(1)	Tr	(1)
Total No. caught by interviewed anglers		(87)		(2177)		(68)		(18)		(2350)
Total catch/man-hour	1.820		0.551		0.329		0.267		0.550	

Tr. <0.001

Table 2.5.3-10. Catch rates for interviewed bank anglers in the Prairie Island vicinity March 6 - April 30, 1976. Catch per man-hour with number of fish caught by interviewed anglers in parentheses

Section	March 6 - April 30, 1976								Total	
	3		4		5		6			
Hrs. fished by interviewed anglers	41.5		50.7		126.6		12.0		230.8	
Species:										
Lake sturgeon	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Bowfin	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Mooneye/goldeye	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Northern pike	0.145	(6)	--	(0)	0.024	(3)	--	(0)	0.039	(9)
Carp	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Black bullhead	--	(0)	--	(0)	0.008	(1)	--	(0)	0.004	(1)
Channel catfish	0.048	(2)	--	(0)	--	(0)	--	(0)	0.009	(2)
Flathead catfish	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
White bass	0.313	(13)	2.150	(109)	0.047	(6)	0.083	(1)	0.559	(129)
Rock bass	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Bluegill	0.434	(18)	--	(0)	0.782		--	(0)	0.507	(117)
Smallmouth bass	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Largemouth bass	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
White crappie	--	(0)	--	(0)	--	(0)	--	(0)	--	(0)
Black crappie	--	(0)	--	(0)	0.032	(4)	--	(0)	0.017	(4)
Yellow perch	--	(0)	--	(0)	0.008	(1)	--	(0)	0.004	(1)
Sauger	0.120	(5)	0.020	(1)	0.008	(1)	--	(0)	0.030	(7)
Walleye	0.096	(4)	0.059	(3)	0.008	(1)	0.083	(1)	0.039	(9)
Freshwater drum	--	(0)	--	(0)	--	(0)	0.083	(1)	0.004	(1)
Total No. caught by interviewed anglers		(48)		(113)		(116)		(3)		(280)
Total catch/man-hour	1.157		2.229		0.916		0.250		1.213	

Table 2.5.3-11. Catch rates of preferred species for interviewed anglers in the Prairie Island vicinity, 1976 (All sections combined)

Species sought	Fish per man-hour (hours spent seeking by interviewed fishermen)					
	Mar. 6-Apr. 30		May 1-Nov. 21		Mar. 6-Nov. 21	
Northern pike	0.04	(112.5)	0.02	(51.5)	0.04	(164.0)
Catfish	--	(0)	0.04	(23.0)	0.04	(23.0)
White bass	4.35	(40.5)	1.03	(440.7)	1.31	(481.2)
Sunfish	2.20	(44.5)	0.76	(336.1)	0.93	(380.6)
Smallmouth bass	--	(0)	1.00	(1.0)	1.00	(1.0)
Largemouth bass	--	(0)	0	(5.0)	0	(5.0)
Crappies	0	(9.0)	0.53	(216.7)	0.51	(225.7)
Panfish	--	(0)	0.23	(13.3)	0.23	(13.3)
Sauger/Walleye	0.48	(4201.1)	0.34	(3278.1)	0.42	(7479.2)
Mixed	0.39	(166.3)	0.60	(1252.7)	0.57	(1419.0)
Total	1.00	(4573.9)	1.00	(5618.1)	1.00	(10192.0)

Table 2.5.3- 12. Mean weights of angler-caught fish of three major game species in the Prairie Island vicinity, 1968-1976*. Mean weight in kilograms with number weighed in parentheses.

	YEAR								
Species:	1968	1969	1970	1971	1972	1973	1974	1975	1976
White bass	-**	--	--	--	--	0.54 (26)	0.62 (56)	0.53(122)	0.51 (20)
Sauger	0.40(592)	0.35(342)	0.41(1,246)	0.58(663)	0.44(988)	0.39(414)	0.59(1,431)	0.59(811)	0.55(161)
Walleye	0.99(360)	0.83(81)	0.95 (646)	0.89(205)	1.29(193)	0.56(693)	0.75 (375)	0.91(217)	0.96 (44)

*1968-1974 data on saugers and walleyes is from Sternberg (1974) and includes only fish caught during March and April

**Hyphen (-) indicates no fish weighed

Table 2.5.3-13. Estimated numbers of fish harvested in the Prairie Island vicinity by season and section, March - April, 1976.*

	March - April 1976				
Section	3	4	5	6	Total
Estimated man-hours	621 **	73,887 ***	10,559 **	2,717 **	87,784 **
Species:					
Lake sturgeon	0	0	0	0	0
Bowfin	0	0	0	0	0
Mooneye/goldeye	0	0	0	0	0
Northern pike	46	72	79	0	197
Carp	8	18	0	0	26
Black bullhead	0	0	26	0	26
Channel catfish	58	0	0	0	58
Flathead catfish	0	0	0	0	0
White bass	666	7,675	402	65	8,808
Rock bass	114	18	0	0	132
Bluegill	0	0	2,560	0	2,560
Smallmouth bass	0	0	0	0	0
Largemouth bass	0	0	0	0	0
White crappie	0	72	0	0	72
Black crappie	0	72	141	0	213
Yellow perch	0	0	26	36	62
Sauger	40	33,156	1,093	490	34,779
Walleye	25	2,262	1,046	65	3,398
Freshwater drum	0	0	0	65	65
Overall estimated harvest	957	43,345	5,373	721	50,396

* Harvest estimates on this table are the sums of estimated harvests by boat anglers and estimated harvests by bank anglers during the periods shown above. These estimates are based on overall catch rates, Tables 2.5.3-9 and 2.5.3-10

** These estimated man-hours are taken from Table 2.5.3-3.

*** These estimated man-hours are taken from Table 2.5.3-2.

Table 2.5.3-14. Summary of Section 4 March and April sauger and walleye harvests 1968 through 1976

Year	Sauger				Walleye			
	Mean Wt. Kg. (# fish)	Catch Rate	Estimated # Harvested	Estimated Harvest Kg.	Mean Wt. Kg. (# fish)	Catch Rate	Estimated # Harvested	Estimated Harvest Kg.
1968	0.40 (592)	0.313	6,995	2,782.0	0.99 (360)	0.186	4,389	4,345.1
1969	0.35 (342)	0.377	1,323	463.1	0.83 (81)	0.083	297	246.5
1970	0.41 (1,246)	0.302	13,332	5,466.1	0.95 (646)	0.156	5,874	5,580.3
1971	0.58 (663)	0.335	6,629	3,844.8	0.89 (205)	0.103	1,835	1,633.2
1972	0.44 (988)	0.436	21,103	9,285.3	1.29 (193)	0.089	3,048	3,931.9
1973	0.39 (414)	0.437	35,755	13,944.5	0.56 (693)	0.055	4.115	2,304.4
1974	0.59 (1,431)	0.336	36,514	21,543.3	0.75 (375)	0.060	6,049	4,536.8
1975	0.59 (811)	0.236	15,042	8,874.8	0.91 (219)	0.050	3,187	2,900.2
1976	0.55 (161)	0.455	33,156	18,235.8	0.96 (44)	0.030	2,262	2,171.5

Table 2.5.3-15. Estimated numbers of fish harvested in the Prairie Island vicinity by section May 1 through November 21, 1976*

Section	1**	2**	3***	4**	5***	6***	Total
Estimated man-hours	1,208	1,983	593	35,664	14,638	4,311	58,397
Species:							
Lake sturgeon	0	0	0	31	13	0	44
Bowfin	0	0	0	0	0	7	7
Mooneye/goldeye	15	0	0	0	0	0	15
Northern pike	29	0	0	121	78	26	254
Carp	0	130	0	220	102	27	479
Black bullhead	0	0	0	160	152	0	312
Channel catfish	15	0	0	362	79	0	456
Flathead catfish	0	0	0	62	13	0	75
White bass	202	839	86	12,860	644	235	14,866
Rock bass	0	0	0	58	26	0	84
Bluegill	0	0	0	161	3,337	200	3,698
Smallmouth bass	0	58	0	125	40	0	223
Largemouth bass	0	0	0	0	52	0	52
White crappie	0	0	0	31	171	0	202
Black crappie	0	0	0	1,715	1,224	0	2,939
Yellow perch	0	0	0	0	38	0	38
Sauger	116	36	17	5,365	263	392	6,189
Walleye	476	282	17	2,884	1,710	292	5,661
Freshwater drum	0	628	17	1,740	284	233	2,902
Overall estimated harvest	853	1,973	137	25,895	8,226	1,412	38,496

*Harvest estimates on this table were calculated using May through November catch rates (these catch rates were not published.) Harvests by boat anglers and by bank anglers were calculated separately, then summed on this table.

**Estimated man-hours are taken from Table 2.5.3-2.

***Estimated man-hours are taken from Tables 2.5.3-4 through 2.5.3-5

Table 2.5.3-16. Estimated numbers of fish harvested in the Prairie Island vicinity by season and section, 1976*

	Mar.6-Apr.30 only	March 6 - November 21, 1976						
Section	4	1	2	3	4	5	6	Total
Estimated man hours **	73,877	1,208	1,983	1,126	109,541	21,027	6,130	141,015
Species:								
Lake sturgeon	0	0	0	0	29	18	0	47
Bowfin	0	0	0	0	15	0	11	26
Mooneye/goldeye	0	15	0	0	15	0	0	30
Northern pike	72	29	0	47	237	123	36	472
Carp	18	0	130	11	353	65	22	581
Black bullhead	0	0	0	0	146	126	0	272
Channel catfish	0	15	0	78	340	107	0	540
Flathead catfish	0	0	0	0	104	18	0	122
White bass	7,675	202	839	991	22,100	962	318	25,412
Rock bass	18	0	0	0	134	36	0	170
Bluegill	0	0	0	108	146	5,265	156	5,675
Smallmouth bass	0	0	58	0	101	53	0	212
Largemouth bass	0	0	0	0	0	49	0	49
White crappie	72	0	0	0	104	231	0	335
Black crappie	72	0	0	0	2,862	1,608	0	4,470
Yellow perch	0	0	0	0	0	39	10	49
Sauger	33,156	116	36	52	35,285	707	661	36,857
Walleye	2,262	476	282	35	5,982	2,473	409	9,657
Freshwater drum	0	0	628	11	2,034	273	236	3,182
Overall estimated harvest	43,345	853	1,973	1,333	69,987	12,153	1,859	88,158

* Harvest estimates on this table are the sums of estimated harvests by boat anglers and estimated harvests by bank anglers during the periods shown above. These estimates are based on overall catch rates, Tables 2.5.3-7 and 2.5.3-8

** Estimated man-hours are taken from Table 2.5.3-2.

Table 2.5.3-17. Species composition of fish harvested in the Prairie Island vicinity, 1976

Species	Percentages (with numbers of each species given in parenthesis) Mar. 6-Apr. 30, 1976	May 1-Nov. 21, 1976	Mar. 6-Nov. 30, 1976
Lake sturgeon	0.00 (0)	0.08 (3)	0.05 (3)
Bowfin	0.00 (0)	0.05 (2)	0.03 (2)
Mooneye/goldeye	0.04 (1)	0.03 (1)	0.03 (2)
Northern pike	0.53 (14)	0.63 (23)	0.59 (37)
Carp	0.08 (2)	0.95 (35)	0.59 (37)
Channel catfish	0.30 (8)	0.98 (36)	0.70 (44)
Black bullhead	0.04 (1)	0.60 (22)	0.36 (23)
Flathead catfish	0.00 (0)	0.27 (10)	0.16 (10)
White bass	17.17 (452)	36.59 (1343)	28.48 (1795)
Rock bass	0.04 (1)	0.22 (8)	0.14 (9)
Bluegill	4.45 (117)	10.03 (368)	7.70 (485)
Smallmouth bass	0.00 (0)	0.44 (16)	0.25 (16)
Largemouth bass	0.00 (0)	0.11 (4)	0.06 (4)
White crappie	0.11 (3)	0.60 (22)	0.40 (25)
Black crappie	0.30 (8)	8.86 (325)	5.28 (333)
Yellow perch	0.08 (2)	0.05 (2)	0.06 (4)
Sauger	70.82 (1864)	18.34 (673)	40.26 (2537)
Walleye	5.97 (157)	15.40 (565)	11.46 (722)
Freshwater drum	0.08 (2)	5.78 (212)	3.40 (214)
Total:	100.00 (2632)	100.00 (3670)	100.00 (6302)

Table 2.5.3-19. Fishermen of each age group and sex fishing in the Prairie Island vicinity 1976

Dates	Group	Ages 0-12	13-15	16-17	18-24	25-34	35-44	45-64	65+	Total	No. Interviewed
Mar. 6-Nov. 21 1976	% Male	6.60	3.37	1.31	6.82	17.62	19.20	28.21	8.29	91.42	3419
	% Female	0.78	0.40	0.05	0.37	1.55	1.76	2.97	0.70	8.58	321
	% Total	7.38	3.77	1.36	7.19	19.17	20.96	31.18	8.99	100.00	3740
May 1-Nov. 21, 1976	% Male	7.04	3.95	0.82	4.85	13.91	17.00	32.83	8.15	88.54	2063
	% Female	1.12	0.52	0.04	0.52	2.02	2.19	4.08	0.99	11.46	267
	% Total	8.16	4.47	0.86	5.37	15.93	19.19	36.91	9.14	100.00	2330
Mar. 6-Apr. 30, 1976	% Male	5.89	2.41	2.13	10.07	23.76	22.84	20.57	8.51	96.17	1356
	% Female	0.21	0.21	0.07	0.14	0.78	1.06	1.13	0.21	3.83	54
	% Total	6.10	2.62	2.20	10.21	24.54	23.90	21.70	8.72	100.00	1410

Table 2.5.3-20. Distance travelled by anglers fishing in the Prairie Island vicinity, 1976

Distance Travelled (miles)	Percentage of anglers May 1-November 30, 1976 Sections						Total	Mar. 6-Nov. 30, 1976 All sections total	Mar. 6-Apr. 30, 1976 Section 4 only
	1	2	3	4	5	6			
0-25	79.37	84.35	60.00	46.22	65.58	73.84	55.57	51.70	38.26
26-50	1.59	5.44	16.67	5.18	15.64	10.39	8.20	7.61	6.99
51-75	19.05	2.72	20.00	9.50	7.34	5.73	8.64	17.51	36.95
76-100	---	---	---	2.08	0.48	1.43	1.49	2.50	4.68
101-150	---	2.04	---	10.08	5.29	2.15	7.64	6.68	5.68
151-200	---	---	---	11.19	3.01	2.87	7.73	6.10	4.00
200^{-+}	---	5.44	3.33	15.75	2.65	3.58	10.72	7.90	3.43
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 2.5.3-21. Percentage of fishermen and number (in parentheses) seeking each species of fish in the Prairie Island area, 1976

Species	Mar. 6-Apr. 30 1976 Section 4 only	Total							Mar. 6-Nov. 30 1976 All sections Total
		1	2	3	4	5	6	Total	
Northern pike	1.80 (21)	--*	--	--	0.43 (6)	0.69 (4)	2.38 (4)	0.60 (14)	1.69 (63)
Catfish	--	4.35 (2)	--	28.57 (6)	0.36 (5)	0.52 (3)	--	0.69 (16)	0.43 (16)
White bass	1.29 (15)	--	--	--	13.29 (187)	1.37 (8)	--	8.38 (195)	5.68 (212)
Sunfish	--	--	2.94 (3)	--	5.83 (82)	8.76 (51)	--	5.85 (136)	3.91 (146)
Smallmouth bass	--	--	1.96 (2)	--	--	--	--	0.09 (2)	0.05 (2)
Largemouth bass	--	0.00	--	--	--	0.34 (2)	--	0.09 (2)	0.05 (2)
Crappies	0.17 (2)	--	1.96 (2)	--	1.49 (21)	7.56 (44)	2.38 (4)	3.05 (71)	2.01 (75)
Panfish	--	--	--	--	0.28 (4)	1.20 (7)	--	0.47 (11)	0.29 (11)
Sauger/walleye	94.94 (1106)	84.78 (39)	53.92 (55)	33.33 (7)	52.95 (745)	55.15 (321)	58.93 (99)	54.43 (1266)	67.29 (2512)

Table 2.5.3-21 cont.

Species	Mar. 6-Apr. 30 1976 Section 4 only	Percentage							Mar. 6-Nov. 30 1976 All sections Total
		1	2	3	4	5	6	Total	
Mixed	1.80 (21)	10.87 (5)	39.22 (40)	38.10 (8)	25.37 (357)	24.40 (142)	36.31 (61)	26.35 (613)	18.59 (694)
Total	100.00 (1165)	100.00 (46)	100.00 (102)	100.00 (21)	100.00 (1407)	100.00 (582)	100.00 (168)	100.00 (2326)	100.00 (3733)

* Hyphen (-) indicates no interviewed anglers were seeking these species.

Table 2.5.3-22. Percentages of anglers in the Prairie Island vicinity using each combination of bait and method, March 6-November 30, 1976

Bait type	Method					
	Still	Trolling	Casting	Jigging	Mixed	Ice Fishing
Artificial	0.51	5.73	8.36	2.20	0.03	---
Natural	40.10	12.78	9.16	0.21	0.08	0.54
Prepared	0.11	---	---	---	---	---
Mixed	6.43	5.44	5.79	2.06	0.48	---
Total	47.15	23.95	23.30	4.47	0.59	0.54

Table 2.5.3-23. Percentages of fishermen utilizing various fishing methods in the Prairie Island vicinity, March 6-November 30, 1976

Method	Section						
	1	2	3	4	5	6	Total
Still	15.22	42.16	19.23	50.04	53.22	16.74	47.68
Trolling	73.91	33.33	---	15.79	36.60	68.37	23.95
Casting	10.87	21.57	69.23	27.53	9.12	14.42	23.31
Jigging	---	2.94	---	6.18	0.54	0.47	4.47
Mixed	---	---	11.54	0.47	0.54	---	0.59