

Minnesota
F-29-R(P)-27
Area F317
Study 4
Job 765
March 26, 2008

MINNESOTA DEPARTMENT OF NATURAL RESOURCES
SECTION OF FISHERIES

Completion Report

Angler Survey of Lake Pepin and Pool 4 of the
Mississippi River, from 2005 to 2007

by

Jonathan R. Meerbeek

Large Lake Specialist

Funded Under Federal Aid by the Sport Fish Restoration Act,
F-29-R(P)-27

TABLE OF CONTENTS

	Page
LIST OF FIGURES	iii
LIST OF TABLES	iv
LIST OF APPENDICIES.....	vi
ABSTRACT.....	1
INTRODUCTION	2
METHODS	3
RESULTS AND DISCUSSION	6
MANAGEMENT RECOMMENDATIONS	11
ACKNOWLEDGMENTS	12
LITERATURE CITED	13

LIST OF FIGURES

	Page
Figure 1. Lake Pepin and Pool 4, Mississippi River.	15
Figure 2. Locations and boundaries of clusters 1-6 used in the 2005-07 Lake Pepin/Pool 4 creel survey.	16
Figure 3. Access area names and locations used for Cluster 1 during the 2005-07 Lake Pepin/Pool 4 creel survey.	17
Figure 4. Access area names and locations used for Cluster 2 during the 2005-07 Lake Pepin/Pool 4 creel survey.	18
Figure 5. Access area names and locations used for Cluster 3 during the 2005-07 Lake Pepin/Pool 4 creel survey.	19
Figure 6. Access area names and locations used for Cluster 4 during the 2005-07 Lake Pepin/Pool 4 creel survey.	20
Figure 7. Access area names and locations used for Cluster 5 during the 2005-07 Lake Pepin/Pool 4 creel survey.	21
Figure 8. Access area names and locations used for Cluster 6 during the 2005-07 Lake Pepin/Pool 4 creel survey.	22

LIST OF TABLES

		Page
Table 1.	Selected characteristics of Lake Pepin and Pool 4 of the Mississippi River. Water chemistry data was obtained from the Long Term Resource Monitoring Program and represents summer (June-August) means (\pm SE) from 1991 through 2006. Water samples were collected 0.2 m below the water surface.	23
Table 2.	Length – weight factors (a and b) for the relationship $W=10^aL^b$ (W = weight in grams, L = length in millimeters) used to estimate weights of fish harvested from Lake Pepin/Pool 4 during the 2005-07 creel survey.	23
Table 3.	Annual angler effort (hours) and harvest (N) for Pool 4 of the Mississippi River divided into three strata. Year 2006 is from November 2005 through October 2006 and year 2007 is from November 2006 through October 2007.	24
Table 4.	Open water catch and harvest statistics (mean \pm SE) for Pool 4 of the Mississippi River from November 2005 through October 2006.	25
Table 5.	Open water catch and harvest statistics (mean \pm SE) for Pool 4 of the Mississippi River from November 2006 through October 2007.	26
Table 6.	Open water length frequency (TL, inches) of the 11 most commonly caught and harvested fish species in Pool 4 from November 2005 through October 2006.	27
Table 7.	Open water length frequency (TL, inches) of the 11 most commonly caught and harvested fish species in Pool 4 from November 2006 through October 2007.	29
Table 8.	Backwater ice catch and harvest statistics (mean \pm SE) for Pool 4 of the Mississippi River from December 2005 through March 2006.	31
Table 9.	Backwater ice catch and harvest statistics (mean \pm SE) for Pool 4 of the Mississippi River from December 2006 through March 2007.	31
Table 10.	Ice fishing catch and harvest statistics (mean \pm SE) for Lake Pepin, not including backwaters of Pool 4, from January through March 2007.	32

Table 11.	Length frequency (TL, inches) of the 6 most commonly caught and harvested fish species during the backwater ice creel from December 2005 through March 2006.	33
Table 12.	Length frequency (TL, inches) of the 6 most commonly caught and harvested fish species during the backwater ice creel from December 2006 through March 2007.	34
Table 13.	Length frequency (TL, inches) of the 6 most commonly caught and harvested fish species during the Lake Pepin ice creel from January through March 2007.	35
Table 14.	Walleye hooking mortality estimates by size group for the 2006 and 2007 open water Lake Pepin/Pool 4 creel survey. Year 2006 is from November 2005 through October 2006 and year 2007 is from November 2006 through October 2007.	36

LIST OF APPENDICIES

	Page
Appendix A Open water summary stratum statistics for Pool 4 creel survey from November 2005 through October 2007. Standard errors are reported in parentheses.	37
Appendix B Backwater ice summary stratum statistics for Pool 4 creel survey from December 2005 through March 2006. Standard errors are reported in parentheses.	41
Appendix C Backwater ice summary stratum statistics for Pool 4 creel survey from December 2006 through March 2007. Standard errors are reported in parentheses.	42
Appendix D Upper and lower Lake Pepin ice summary stratum statistics for Pool 4 creel survey from January 2007 through March 2007. Standard errors are reported in parentheses.	43
Appendix E Open water effort, catch, and harvest statistics for angler caught fish on Pool 4 of the Mississippi River from November 2005 through October 2007. Effort is reported as total angler effort.	44
Appendix F Open water angling effort for Pool 4 of the Mississippi River from November 2005 through October 2007. Standard errors are reported in parentheses.	45
Appendix G Annual open water effort, catch, and success for Pool 4, Mississippi River, 1962-2007. Species list includes only commonly harvested fish.	49
Appendix H Ice angling effort for Lake Pepin, backwaters of Pool 4, and a total for Pool 4. Standard errors are in parentheses.	50
Appendix I Estimated ice angling pressure (all angler types) for Lake Pepin and backwaters of Pool 4, Mississippi River, combined, 1962-2007.	51
Appendix J Estimated angler catch (fish per angler hour) for targeting anglers in the open water of Pool 4 from November 2005 through October 2006.	52
Appendix K Estimated angler catch (fish per angler hour) for all anglers in the open water of Pool 4 from November 2005 through October 2006.	53

Appendix L	Estimated angler catch (fish per angler hour) for targeting anglers in the open water of Pool 4 from November 2006 through October 2007.	54
Appendix M	Estimated angler catch (fish per angler hour) for all anglers in the open water of Pool 4 from November 2006 through October 2007.	55
Appendix N	Estimated angler catch (fish per angler hour) for all anglers in the backwaters of Pool 4 from December 2005 through March 2006.	56
Appendix O	Estimated angler catch (fish per angler hour) for all anglers in the backwaters of Pool 4 from December 2006 through March 2007.	56
Appendix P	Estimated angler catch (fish per angler hour) for all anglers in Lake Pepin from January 2007 through March 2007.	57
Appendix Q	Harvest in pounds of commonly caught fish species from the open water of Pool 4 in 2006 and 2007. Year 2006 is from November 2005 through October 2006 and year 2007 is from November 2006 through October 2007. SE = Standard Error.	58

ABSTRACT

Creel surveys are conducted every six years on Pool 4 of the Mississippi River as part of the Large Lake sampling Program. This report presents the results of a creel survey conducted from November 2005 through October 2007 on Lake Pepin and Pool 4. Annual angling effort was within the range of previously reported values for Pool 4; however, there was a noticeable decline in pressure in May and June of 2007 when gasoline prices increased to more than \$3.00/gallon. Walleye and sauger were the most sought after species during both years of the creel. Harvest (pounds) of walleye was above the target harvest for Lake Pepin in 2005-06 and below in 2006-07; whereas target harvest levels for sauger were exceeded both years. Pounds of white bass harvested were above target harvest levels in 2005-06, but below in 2006-07, mostly due to small sizes of fish in 2006-07. Backwater areas comprised the largest portion of ice angling. Bluegill were the most sought after species during the backwater ice creel. Continuation of the creel program is necessary to follow trends in the use and quality of the fishery in Pool 4.

INTRODUCTION

Lake Pepin, located within Pool 4 of the Mississippi River, was added to the Minnesota Department of Natural Resources (MN DNR) Large Lake Program in 1986. This program was developed to improve consistency among large lakes (>25,000 acres) and enhance management and research efforts for Minnesota's largest walleye/sauger fisheries (Wingate and Schupp 1985). More specifically, managers were interested in documenting long-term trends in fish population dynamics (i.e., recruitment, population stability, age distribution) and angling statistics (i.e., harvest and catch rates). Therefore, as part of this program, Lake Pepin is scheduled to have a two-year long angler survey out of every six years so catch and harvest trends can be documented. These creel surveys are integral to the management of fisheries resources in Lake Pepin.

Lake Pepin is a naturally formed impoundment on the Mississippi River created by a sediment dam from the Chippewa River. A series of navigational lock and dams along the upper portion of the Mississippi River has created 29 pools from Minneapolis, Minnesota to St. Louis, Missouri. Pool 4 is bounded by lock and dam number 4 (LD4), at Alma, Wisconsin and lock and dam number 3 (LD3, near Red Wing, Minnesota (Figure 1). Because of the continuity between Lake Pepin and the rest of Pool 4, this creel survey incorporated all of Pool 4 as opposed to exclusively surveying Lake Pepin. Selected characteristics of Lake Pepin and Pool 4 are found in Table 1. A detailed description of Pool 4's physical, chemical, and biological characteristics, as well as management history, is found in the Lake Pepin Lake Management Plan (1994; Lake City Management files).

The angler survey monitored open water and ice angling seasons. Open water is available year-round in the river above Red Wing, mainly due to thermal effluent to the Mississippi River just upstream of LD3 from Xcel Energy's Prairie Island Nuclear Generating Plant. Ice angling occurs in Lake Pepin and the backwaters and boat harbors off the river's main navigational channel, above and below Lake Pepin.

Previous surveys

Quantitative (estimates of total annual angling hours and catch) angler surveys of Pool 4 were conducted in 1962-63 (Daley and Skrypek 1964), 1967-68 (Sternberg 1969), 1972-73 (Sternberg 1974a), 1977-81 (Thorn 1984), 1987-89 (Stevens 1990), 1993-95 (Stevens 1996), and 1999-2001 (Hoxmeier 2002). The spring (March-April) open water fishery near LD3 tailwaters was surveyed annually from 1968 to 1989: 1968-1974 (Sternberg 1974b), 1975-76 and 1982-87 by personnel from Northern States Power (Gustafson and Diedrich 1976, Geis and Gustafson 1977, Gustafson 1983, Donkers et al. 1984, Donkers 1985, Haroldson et al. 1986, Donkers 1987, and Hanson and Donkers 1988), 1977-81 (Thorn 1984), and 1988-89 (Stevens 1990). A three-year survey of winter catfish angling on Lake Pepin was conducted in 1962-65 (Skrypek 1965). Qualitative angler surveys (usually catch rates and length-frequency data only) for Pool 4 were conducted in 1944-46 (Greenbank 1957), April-October 1956 (Daley and Kuehn 1956), December 1956-November 1957 (Upper Mississippi River Conservation Committee 1958), 1958 in conjunction with smallmouth bass tagging (Kuehn 1959), winter of 1960-61 (Lake City Management files), and May and June 1965 (Lake City Management files). Aerial boat counts (or ice fishing) are available for winters of 1944-49, 1956-66, and 1989 (Lake City Management files).

METHODS

The survey was conducted from November 1, 2005 through October 31, 2007. Because of differences in location, accessibility, and habitat type, three separate surveys were conducted in parallel; open-water, backwater-ice, and Lake Pepin-ice. (1) Open-water angling was sampled over the full, 24-month period and each calendar year consisted of the months November through October. The section of the Mississippi River above Lake Pepin (LD3 to river mile 786) was sampled every month, and was usually the only area with open water accessible from December through early April. That area also receives most of the spring (March/April) angling effort. Summer and fall angling effort was spread between Lake Pepin and the remainder of Pool 4. Survey design for open-water was based on completed

trip, non-uniform probability sampling common to Large Lake angler surveys. (2) Backwaters were sampled during ice cover (BW Ice) from December through March of both winters. BW Ice also utilized the completed trip, non-uniform probability design. (3) Lake Pepin was intended to be sampled during the 2005-06 ice fishing season, but poor ice conditions considerably limited fishing activity; therefore, no angler survey was conducted. Periodic pressure counts for the 2005-06 Lake Pepin ice strata were conducted to confirm fishing activity. Lake Pepin was sampled from January through March 2007 (Pepin Ice) with a roving, two-stage random stratified creel survey design.

Design for open-water and BW Ice were similar. Clusters based on geographical area were established with three to seven access sites per cluster (Figures 2-8). Open-water consisted of all six clusters, while BW Ice was limited to clusters 1, 4, 5, and 6. One cluster was sampled per day, with days randomly chosen within day type strata (weekday or weekend day). Probabilities were assigned monthly (bimonthly in April) within and among clusters. Monthly and bimonthly probabilities were assigned based on observed access/cluster usage and by estimating usage probabilities based on previous creel surveys activity count data. Four access sites, randomly chosen with replacement, were sampled from the chosen cluster each day. Open-water had two angler types, boat and bank, while BW Ice had one. Counts for each angler type were recorded, and then expanded with cluster probabilities to the whole area. Number of hours sampled per day varied by month strata, ranging from eight, during November through March, up to 14 from June through August. All schedules are on file (Lake City Management files). Data was entered using a Microsoft Access database and later converted into a database compatible with Creel Application Software (CAS; Soupier and Brown 2002). All data analysis was performed with CAS. The current version of CAS analyzes roving-access, aerial-access and bus route surveys, and not non-uniform probability access-based surveys. Thus, count data from the access-based surveys had to be manipulated prior to data entry. This was done by taking count data, already expanded by probabilities to the whole, and dividing it by the number of hours sampled, resulting in a value representing an instantaneous count. The instantaneous count was then multiplied by the stratum mean trip length to

obtain mean angler hours per hour. That value could then be entered into a CAS database and analyzed as though it were obtained from a roving survey. The output is in angler hours. Summary stratum statistics are presented in Appendix A for open water, and Appendix B and C for backwater ice.

Pepin Ice during the 2006-07 season was roved from along the highways that parallel both sides of the lake. Lake Pepin was divided into two stations: upper Lake Pepin (RM 777.6- Long Point to RM 786-Bay City) and lower Lake Pepin (RM 777.6-Long Point to RM 764.7-foot of the lake). One station was sampled per randomly chosen day. Work shifts were stratified into early (AM), mid-day (MD), and late afternoon (PM) and were randomly selected. One to two shifts were done on all weekend days and one shift was conducted two to three weekdays per week from January 23, 2007 to March 21, 2007. During each shift, the clerk conducted an instantaneous count of two angler types (open ice and fish house). The start time of each instantaneous count was randomly selected. All data was entered and analyzed using the CAS software program. Summary stratum statistics are found in Appendix D.

Mean length of harvested fish was obtained from a randomly obtained sample of fish lengths. Weight was not measured in the field. Mean weight harvested was estimated using length-weight relationships developed using pooled 2005-2007 data from the MN DNR Lake Pepin Large Lake Program and the Long-term Resource Monitoring Program (LTRMP). Length-weight parameters used for the creel survey are provided in Table 2.

Walleye hooking mortality for each open water season was calculated using a spreadsheet developed by the MN DNR for Mille Lacs Lake (Reeves 2006). Parameters used to estimate hooking mortality were derived from a hooking mortality study conducted by the 1837 Treaty Office on Mille Lacs Lake in 2003-2004.

RESULTS AND DISCUSSION

Overall angling statistics

Estimated angling hours in 2005-06 (623,349 h; Table 3) was 18% more than that observed in 2006-07 (531,820 h). Most of the angling effort difference between fishing seasons occurred in May and June (Appendix F) and during the BW Ice season (Table 3). Coincidentally, the U.S. city average unleaded gasoline price in May 2007 increased to \$3.13/gallon, exceeding record highs. Average gasoline prices in June 2007 were also above the \$3.00/gallon mark, the second highest in U.S. history, and by July 2007, average gasoline prices decreased to below \$3.00/gallon (Energy Administration Association data). Gasoline prices may have been the most influential factor limiting angling effort during the two-year creel survey since flow and environmental conditions were very similar (USACOE data). Additionally, based on angler interview residence data, local trips constituted 32% of the effort in May 2007 as opposed to only 23% of the effort in May 2006. Although angling effort may have been influenced by gasoline prices, open water angling effort during both years of the creel survey was above the 1962 to 2001 average for Pool 4 (468,572 h). Total angling effort per acre was 15.9 in 2005-06 and 13.5 in 2006-07. Compared to other large lakes in Minnesota, angling effort in Pool 4 was average. The mean effort per acre was 13.5 for 8 lakes in the Large Lake Program during the mid-1990's (MN DNR 1997).

Species preference was dependent largely on season and location. Walleye and sauger were the most sought after game fish in Pool 4 for both years in open water. White bass, black crappie, and smallmouth bass were also highly sought after in the open water creel, ranking third, fourth, or fifth, depending on the time of year. In contrast, bluegill, black crappie, and yellow perch were the most sought after species in the backwaters of Pool 4 during ice angling.

Total catch during 2005-06 was 1,099,808 fish, of which 300,215 were harvested. Bluegill ranked first in catch and harvest, while sauger and white bass ranked either second or third. During 2006-07 a total of 846,977 fish were caught and 225,216 harvested. Bluegill, sauger, and black crappie were the most commonly caught fish, whereas, white bass, bluegill, and black crappie were the most harvested

fish species. Bluegill, black crappie, and white bass harvest has increased substantially since the 1999-01 creel survey and currently represent more historic numbers (Appendix G and I). Walleye and sauger harvest was below long-term averages (25,723 and 61,687, respectively), however, annual gillnetting data collected by the MN DNR has shown no decline in either of these populations (Meerbeek 2007). In fact, walleye gillnet catch rates in 2005 and 2006 were among the highest recorded since 1965. A large percentage of anglers in the 2005-07 creel practiced catch and release for both walleye and sauger (released 48% of 13-21 inch sauger and 52% of 15-25 inch walleye), thus possibly influencing harvest.

Open-water

Open-water angling made up 92 and 95% of the total effort in 2005-06 and 2006-07, respectively. The open water catch was 78% of the total catch in 2005-06 and 79% in 2006-07. Sauger made up the largest catch, while harvest was chiefly white bass or sauger for both years of the creel (Table 4 and 5). Target harvest levels for walleye are 29,000 pounds and 53,000 pounds for sauger (MNDNR 1997). Harvest (pounds) of walleye was above target harvest levels in 2005-06 and below target harvest levels in 2006-07; whereas, sauger harvest exceeded target harvest levels in both years for Lake Pepin (Appendix Q). The large average weight of sauger harvested most likely contributed to higher harvest weight. In addition, pound of sauger harvested in either year were within the normal range for Pool 4 (Appendix G). Walleye hooking mortality was estimated at 4,893 pounds in 2005-06 and 3,752 pounds in 2006-07 (Table 14). Including walleye hooking mortality in the walleye harvest estimate yielded 47,123 pounds in 2005-06 and 24,922 pounds in 2006-07 and remained within the normal range for Pool 4 (Appendix G).

Total catch and catch rates for walleye and sauger varied temporally and spatially. The highest catch in total numbers for sauger was in May during 2005-06 and in November for 2006-07 (Appendix E). However, catch rates were highest for sauger in December of both years, similar to previous estimates for Pool 4 (Stevens 1996; Hoxmeier 2002). The highest catch in total numbers for walleye was in May of both years; whereas the highest catch rates occurred in October during 2005-06 and in December for

2006-07. Catch rates for targeting anglers during both years ranged from 0.45-0.64/h for sauger and 0.09-0.16/h for walleye (Appendix J and L). These catch rates were similar to those that Stevens (1996) reported, but below those reported by Hoxmeier (2002). The MN DNR documented excellent year classes for both walleye and sauger in 1997 and 1998, which may have increased catch rates for anglers during the 1999-01 creel survey period (Meerbeek 2007). There has not been an excellent year class documented for sauger since 1998, however, a strong 2001 walleye year class was documented.

Extremely fast growth rates and short life span have considerably limited the availability of these fish during the most recent creel. Catch rates were highest below LD3 for both species. The average length of sauger and walleye decreased from 2005-06 to 2006-07 (Table 6 and 7). This is most likely due to a moderately strong 2006-year class and a very strong 2007-year class. However, the average weight of walleye and sauger harvested has increased substantially since the 1999-01 creel survey and was the highest ever recorded for both species during the 2006-07 creel (2.3 lbs for walleye and 1.6 lbs for sauger).

White bass ranked second or third in the total number caught, but first in the number harvested for both years (Table 4 and 5). Harvest in pounds was over the target harvest level of 50,000 pounds in 2005-06, but below in 2006-07 (MNDNR 1997). Gillnet catches of white bass indicated strong 2005 and 2006 year classes and anglers reported catching many small fish, especially in 2006-07, thus reducing average size harvested and total pounds harvested. The average size of white bass harvested was nearly 2-5 inches greater in the 1993-95 surveys, which resulted in much higher harvest in pounds (Stevens 1996). White bass catch rates have rebounded since the absence of strong year-classes between 1990 and 2004 (except 1994) and harvest in pounds should continue to increase as these fish grow to more desirable sizes. Total catch and catch rates were highest for white bass in August of both years. The average size of white bass caught was 12.0 inches across both years (Table 6 and 7). White bass have been highly sought after in the past, ranking either first or second in harvest in six of the past nine creel surveys

(Appendix G). The white bass fishery on Lake Pepin is valued by many anglers and should remain a top priority in future management plans.

Bluegill ranked second in catch and third in harvest in 2005-06 and fifth in catch and fourth in harvest in 2006-07 (Table 4 and 5). The number of bluegill harvested in 2005-06 was the highest ever recorded and was 2-12 times more than any creel survey since 1967 (Appendix G). According to Pool 4 young-of-the-year seining data, catch rates for bluegill have been increasing since 2000 (Meerbeek 2007). Most of this increase has occurred in backwater habitats, possibly as a result of increased vegetation and steady flows during the spawn. The Long Term Resource Monitoring Program (LTRMP) has also observed these increases in bluegill population density in Pool 4 (Bartels et al. 2007; DeLain 2006). The average size of bluegill caught was around 5.6 inches in 2005-06 and 6.0 inches in 2006-07, while harvested fish averaged about 7.0 inches for both years (Table 6 and 7). Although bluegill are not generally a highly sought after fish species in Pool 4, they are becoming an important component of the creel and harvest patterns should be closely documented in the future.

Freshwater drum ranked third or fourth in total number caught, however, few of these fish were harvested (Table 4 and 5). Freshwater drum most likely are caught incidentally when targeting other fish species. There was no targeted effort for freshwater drum.

Black crappie ranked either fourth or fifth in catch and either third or fourth in harvest in both years of the creel. Black crappie catch and harvest in both years was the highest since 1967 (Appendix G). Black crappie were the fourth most sought after fish species in Pool 4 for both years (Appendix J and L). The average size of black crappie caught was 8.8 inches in 2005-06 and 9.3 inches in 2006-07, while harvested fish averaged about 10.0 inches for both years (Table 6 and 7).

Smallmouth bass ranked either seventh or eighth in catch and were the fifth most sought after species in Pool 4 (Appendix J and L). Although nearly 100,000 smallmouth bass were caught over the two years, only 2,503 (2.5%) of those were harvested (Table 4 and 5). A 14-inch minimum size limit was put on smallmouth bass in the spring of 1990. Before the regulation, harvest averaged 1,978 fish per year;

after the regulation, harvest has averaged 1,032 fish per year. Although the regulation appears to have lowered harvest, a change in the smallmouth fishery is not expected given that the harvest was negligible before the regulation was put in place.

Other fish species significantly represented in the catch during 2005 to 2007 were yellow perch, largemouth bass, channel catfish, and northern pike (Table 4 and 5). Yellow perch and channel catfish were the most harvested of these remaining species. Although channel catfish and northern pike have comprised a substantial part of the total harvest in the past, neither of these two species were harvested to a large extent since the late 1980's and 1990's (Appendix G). Largemouth bass catch has increased three-fold since the late 1980's, however, harvest remains low.

Pepin Ice angling

Open water and poor ice conditions prevented most anglers from fishing Lake Pepin during the 2005-06 ice season. From December 30, 2005 to January 19, 2006, thirty-four angler counts were conducted in order to confirm fishing activity and a total of fifteen anglers and five portable houses were observed. Angling pressure and harvest was insignificant on Lake Pepin during the 2005-06 ice season; therefore no creel survey was conducted.

During the 2006-07 winter, ice formation on Lake Pepin did not occur until January 13, 2007 and first angling activity was observed on January 23, 2007. Ice conditions were conducive for ice angling until March 21, 2007; however, fishing pressure was still less than 1% of the total pressure for that year. Bluegill, black crappie, and sauger dominated the catch and harvest on the open ice of Lake Pepin in 2006-07 (Table 10).

Backwater Ice angling

There was substantially more ice angling effort on the backwaters of Pool 4 as compared to Lake Pepin (Table 3), and over twice as much BW Ice angling occurred during the 2005-06 season than in the 2006-07 season. Unseasonably warm ambient temperature during December 2006 reduced ice coverage/safety and likely influenced fishing pressure during the early 2006-07 season.

Bluegill comprised 84% of the total backwater ice catch in 2005-06 and 78% in 2006-07 (Table 8 and 9). Similarly, 75-85 percent of the backwater ice harvest was bluegill. Bluegill harvest in 2005-06 was the second highest recorded since 1962. Released sunfish that were not identified by the creel clerk were assumed to be bluegill given that 99.1% of the sunfish measured by the creel clerk were bluegill. Although green sunfish and pumpkinseeds are present in the backwaters, no green sunfish were observed and only 13 pumpkinseeds were observed during the two-year creel. Black crappie and yellow perch were the only other two species that contributed significantly to the total catch and harvest (Table 8 and 9).

MANAGEMENT RECOMMENDATIONS

Angling success on Pool 4 during 2006 and 2007 was above average for bluegill, black crappie, largemouth bass, and yellow perch, and average for walleye, sauger, white bass, and smallmouth bass. Good catch rates and healthy average size for these species contributed to good angling success. White bass catch and harvest doubled since the 1999-01 creel and are now near historic averages. The 2005 and 2006 white bass year classes constituted a large proportion of the white bass catch, which resulted in small average size. Most of these fish should be approaching 15 inches in the near future and should produce some excellent angling opportunities. Largemouth bass catch numbers continued to increase, while smallmouth bass numbers were stable. Evaluation of the minimum size limits for walleye and bass would be desirable, and would make use of angler survey data.

ACKNOWLEDGMENTS

Derrick Casper, Dan Fetting, and James Hofmann were instrumental in conducting this creel survey. Special thanks are extended to Dean Marshall at Evert's Resort for allowing us to interview anglers at the resort. I would like to thank Craig Soupir, Andy Thompson, Tony Strandera, and Eric Jensen for help with creel design and data analysis. I would also like to thank the staff at the Lake City Fisheries office for help in the field and in the office. Kevin Stauffer, Dan Dieterman, and Jeffrey Weiss also provided editorial comments that improved the manuscript.

LITERATURE CITED

- Bartels, A., M. C. Bowler, S. DeLain, E. Gittinger, D. Herzog, K. Irons, K. Mauel, T. M. O'Hara, E. Ratcliff, and J. Ridings. 2007. 2006 Annual Status Report: A summary of fish data in six reaches of the Upper Mississippi River System. U.S. Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin.
- Daley, S. A., and J. Keuhn. 1956. Report on activities of Minnesota section, Fish Technical Committee, Upper Mississippi River Conservation Committee for the period April 28 to Oct 31 1956. Upper Mississippi River Conservation Committee, Rock Island, IL.
- Daley, S. A., and J. Skrypek. 1964. Angler creel census of Pools 4 and 5 of the Mississippi River, Goodhue and Wabasha Counties, Minnesota, in 1962-63. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Invest. Rep. No 277. 49 pp.
- DeLain, S. 2006. Ten year summary of LTRMP fish data on Pool 4 of the Upper Mississippi River, 1993-2002. Minnesota Department of Natural Resources, Lake City LTRMP Field Station. U.S. Geological Survey, upper Midwest Environmental Services Center, La Crosse, Wisconsin, December 2006.
- Donkers, C. A. 1985. 1984 progress report on the Prairie Island creel survey. Pages 145-194 in Prairie Island Nuclear Generating Plant Environmental Monitoring Program 1984 Annual Report, Northern States Power Co., Minneapolis, MN.
- Donkers, C. A. 1987. 1986 progress report on the Prairie Island creel survey. Pages 92--124 in Prairie Island Nuclear Generating Plant Environmental Monitoring Program 1986 Annual Report, Northern States Power Co., Minneapolis, MN.
- Donkers, C. A., Orr, D. J., and K. N. Mueller. 1984. 1983 progress report on the Prairie Island creel survey. Pages 151-210 in Prairie Island Nuclear Generating Plant Environmental Monitoring Program 1983 Annual Report, Northern States Power Co., Minneapolis, MN.
- Geis, J. L., and S. P. Gustafson. 1977. Progress report on the Prairie Island creel survey March 6-November 21, 1976. Pages 2.5.3-1 – 2.5.3-60 in Prairie Island Nuclear Generating Plant Environmental Monitoring Program 1976 Annual Report, Vol. II. Northern States Power Co., Minneapolis, MN.
- Greenbank, J. 1957. Creel census on the Upper Mississippi River. U.S. Dept. Int., Fish. Wildl. Serv., Spec. Sci. Rep., Fish. No. 202. 59 pp. Washington DC.
- Gustafson, S. P. 1983. 1982 progress report on the Prairie Island creel survey. Pages 149-226 in Prairie Island Nuclear Generating Plant Environmental Monitoring Program 1982 Annual Report, Northern States Power Co., Minneapolis, MN.
- Gustafson, S. P. and P. J. Diedrich. 1976. Progress report on the Prairie Island creel survey March 1-November 23, 1975. Pages 1.5.3-1 – 2.5.3-35 in Prairie Island Nuclear Generating Plant Environmental Monitoring Program 1975 Annual Report, Vol. II. Northern States Power Co., Minneapolis, MN.
- Hanson, K. L., and C. A. Donkers. 1988. 1987 progress report on the Prairie Island creel survey. Pages 65-92 in Prairie Island Nuclear Generating Plant Environmental Monitoring Program 1987 Annual Report, Northern States Power Co., Minneapolis, MN.
- Haroldson, B. S., C. A. Donkers, and R. Binder. 1986. 1985 progress report on the Prairie Island creel survey. Pages 149-226 in Prairie Island Nuclear Generating Plant Environmental Monitoring Program 1985 Annual Report, Northern States Power Co., Minneapolis, MN.
- Hoxmeier J. H. 2002. Angler survey of Lake Pepin and Pool 4 of the Mississippi River, from 1999 to 2001. Minnesota Department of Natural Resources, Division of Fish and Wildlife, Section of Fisheries, Completion Report F29-R(P)-21, Job 586.
- Kuehn, J. 1959. Mississippi River fisheries survey – Bass study. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Comp. Rep. F-15-R-3 Job 1. 10 pp. St Paul.

- Meerbeek, J. R. 2007. Large Lake Monitoring Program Annual Completion Report: Lake Pepin, 2006. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Comp. Rep. F-29-R(P)-26. 67 pp.
- Minnesota Department of Natural Resources. 1997. Potential, target, and current yields for Minnesota's 10 large walleye lakes. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Spec. Pub. No. 151. 69 pp. St Paul.
- Reeves, K. A. 2006. Worksheet for estimating walleye hooking mortality in Minnesota Lakes, Version 1. Minnesota Department of Natural Resources, St Paul.
- Skrypek, J. 1965. Three years of winter catfish angling on Lake Pepin, 1962-65. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Invest. Rep. No. 286. 7 pp.
- Soupir, C. A., and M. L. Brown. 2002. Comprehensive evaluation and modification of the South Dakota angler creel program. South Dakota Game, Fish and Parks, Federal Aid in Sport Fish Restoration, D-J Project F-15-R, Study 1575, Completion Report, Pierre.
- Sternberg, R. B. 1969. Angler creel census of Pools 4 and 5 of the Mississippi River, Goodhue and Wabasha Counties, Minnesota, in 1967-68. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Invest. Rep. No. 306. 53 pp.
- Sternberg, R. B. 1974a. Angler creel census of Pools 4 and 5 of the Mississippi River, Goodhue and Wabasha Counties, Minnesota, in 1972-73. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Invest. Rep. No. 331. 48 pp.
- Sternberg, R. B. 1974b. Assessment of continuous walleye-sauger fishing at Lock and Dam No. 3 and 4 of the Mississippi River, 1968-74. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Invest. Rep. No. 332. 25 pp.
- Stevens, A. G. 1990. Angler creel survey of Pool 4 Mississippi River, Nov. 1, 1987 to 31 Oct. 1989. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Comp. Rep. F-29-R(P)-9 Study 4 Job 107. 62 pp.
- Stevens, A. G. 1996. Angler Survey of Pool 4 Mississippi River, Nov. 1, 1993 to Oct. 31, 1995. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Comp. Rep. F-29-R(P)-17. 84 pp.
- Stevens, A. G. 1996. Lake Pepin 1995. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Comp. Rep. F-29-R(P)-15. 75 pp.
- Thorn, W. C. 1984. Effects of continuous fishing on the walleye and sauger population in Pool 4, Mississippi River. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Invest. Rep. No. 378. 52 pp. St Paul.
- Upper Mississippi River Conservation Committee Annual Report 1958. *in*, Proceedings of the 14th Annual Meeting of the Upper Mississippi River Conservation Committee. Rock Island, IL.
- Wingate, P. J. and D. H. Schupp. 1985. Large Lake Sampling Guide. Minn. Dept. Nat. Res., Div. Fish. Wildl., Sect. Fish. Spec. Pub. No. 140. 27 pp. St Paul.

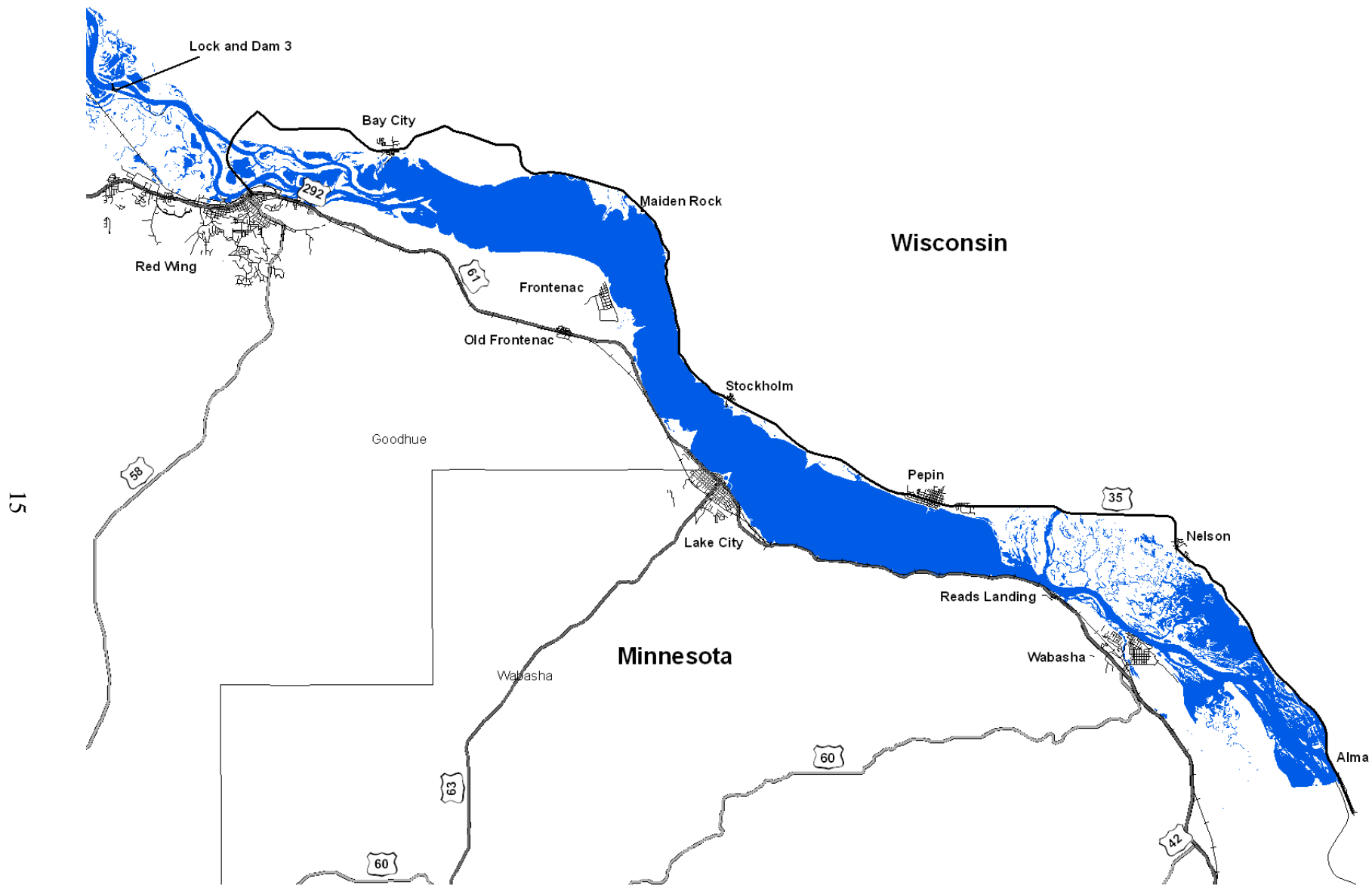


Figure 1. Lake Pepin and Pool 4, Mississippi River.

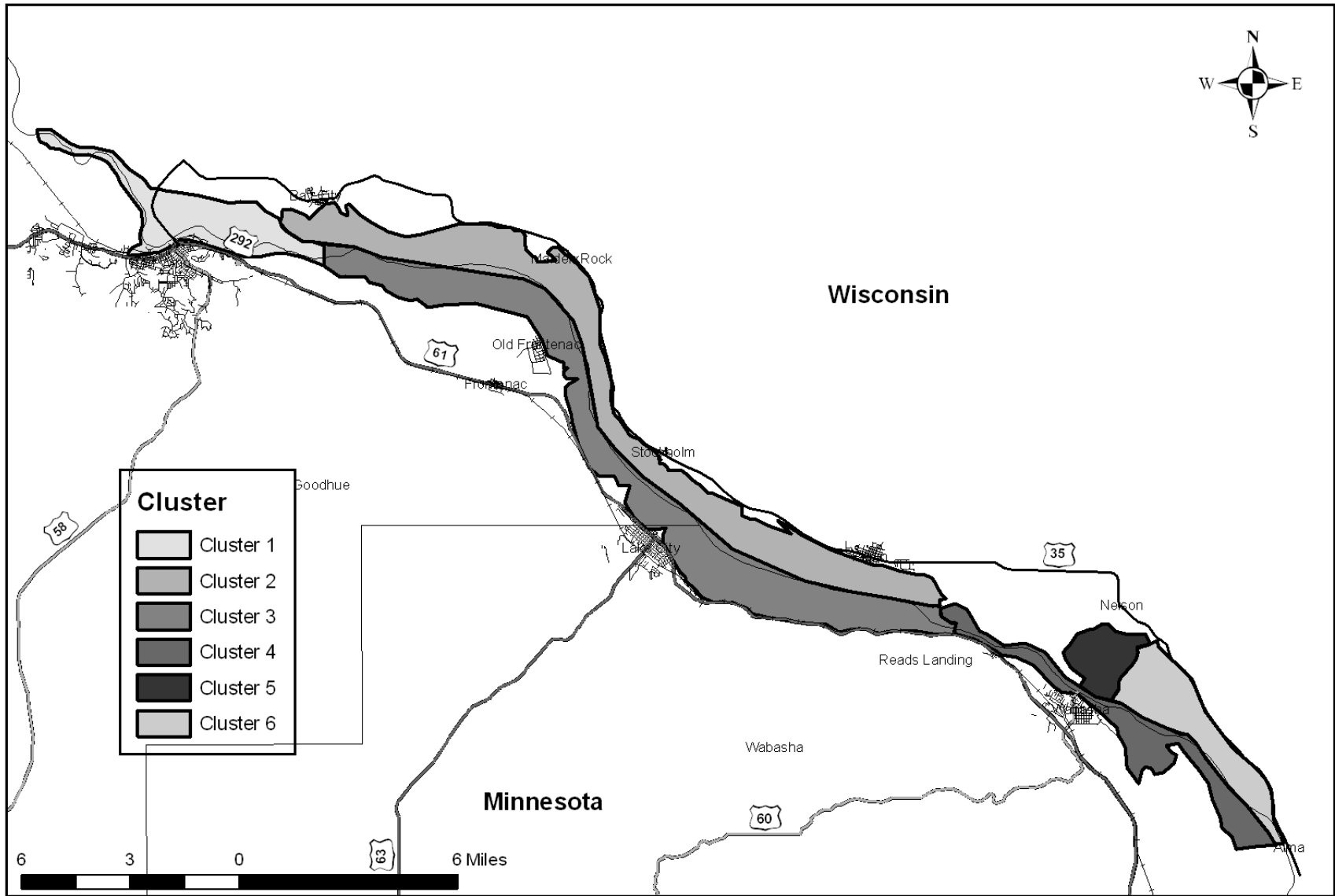


Figure 2. Location and boundaries of clusters 1-6 used in the 2005-07 Lake Pepin/Pool 4 creel survey.

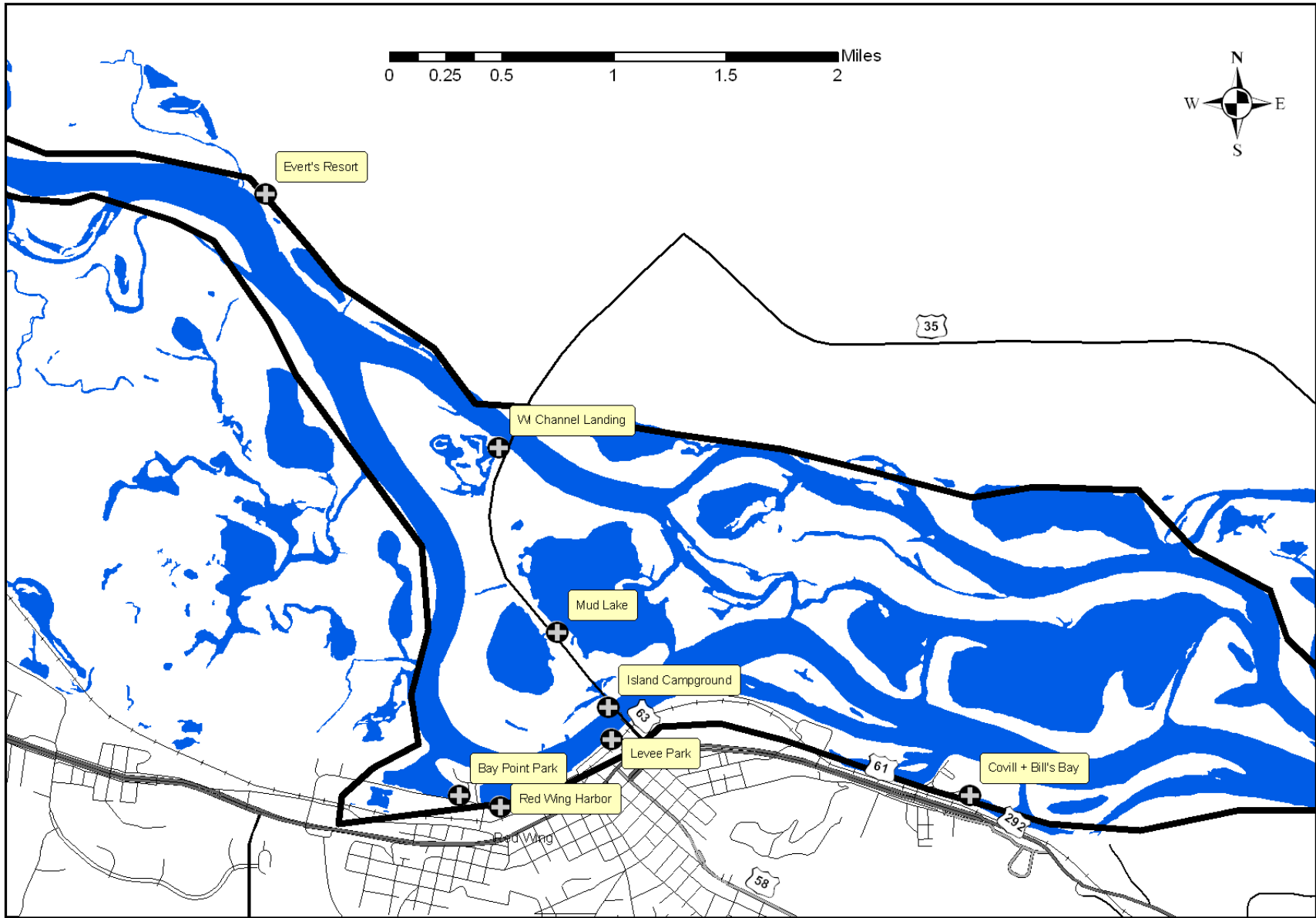


Figure 3. Access area names and locations used for Cluster 1 during the 2005-07 Lake Pepin/Pool 4 creel survey.

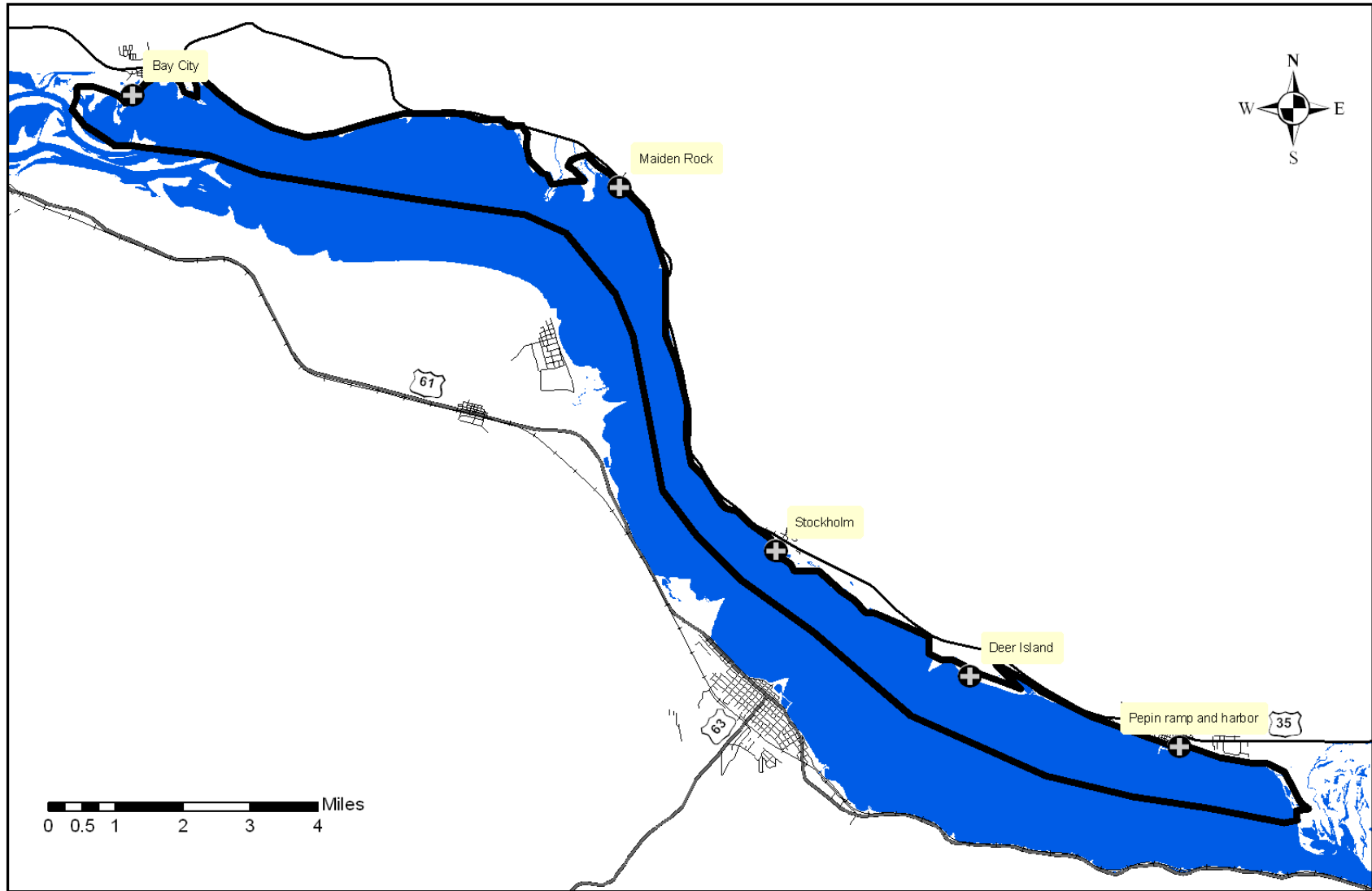


Figure 4. Access area names and locations used for Cluster 2 during the 2005-07 Lake Pepin/Pool 4 creel survey.

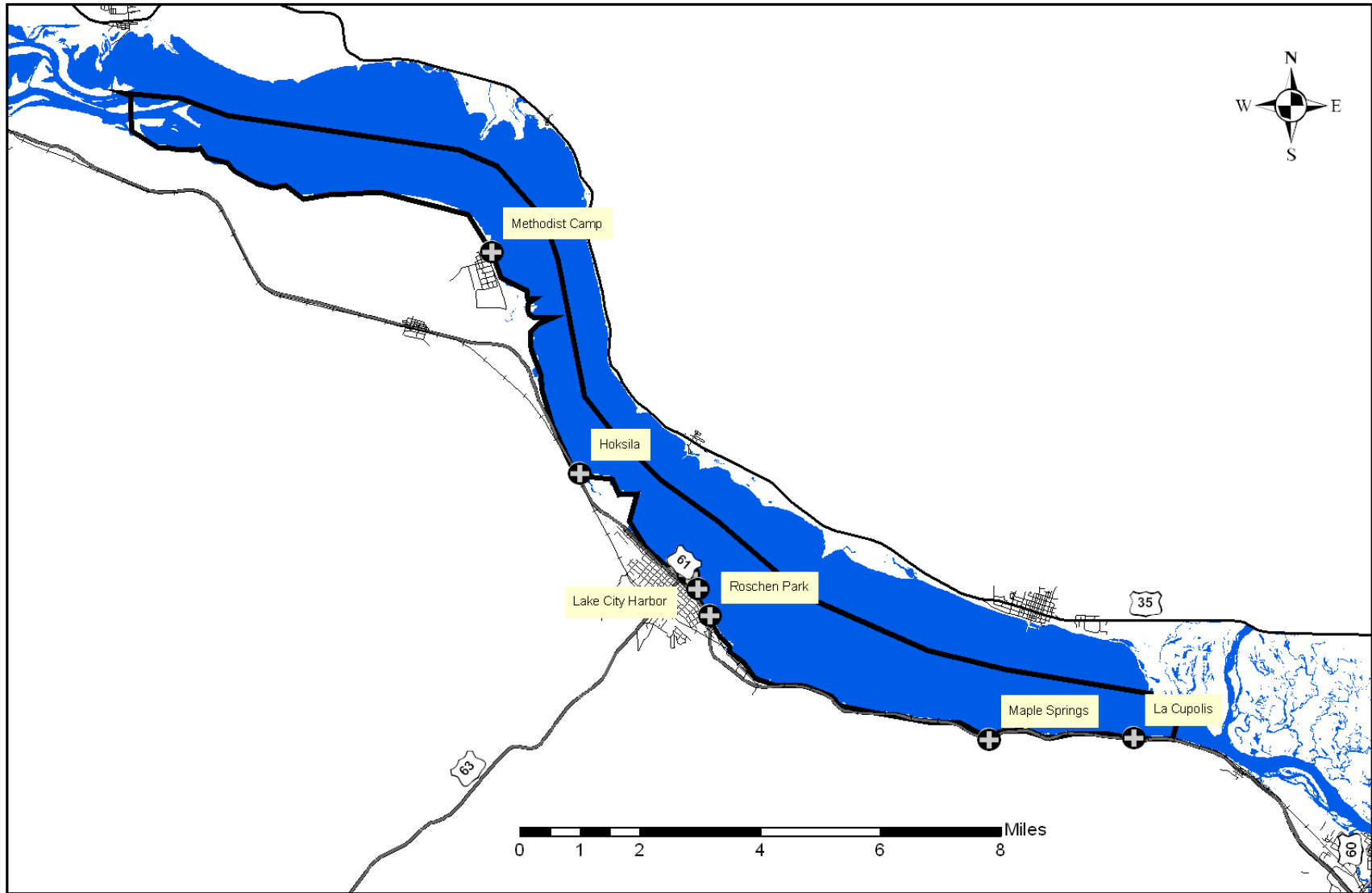


Figure 5. Access area names and locations used for Cluster 3 during the 2005-07 Lake Pepin/Pool 4 creel survey.

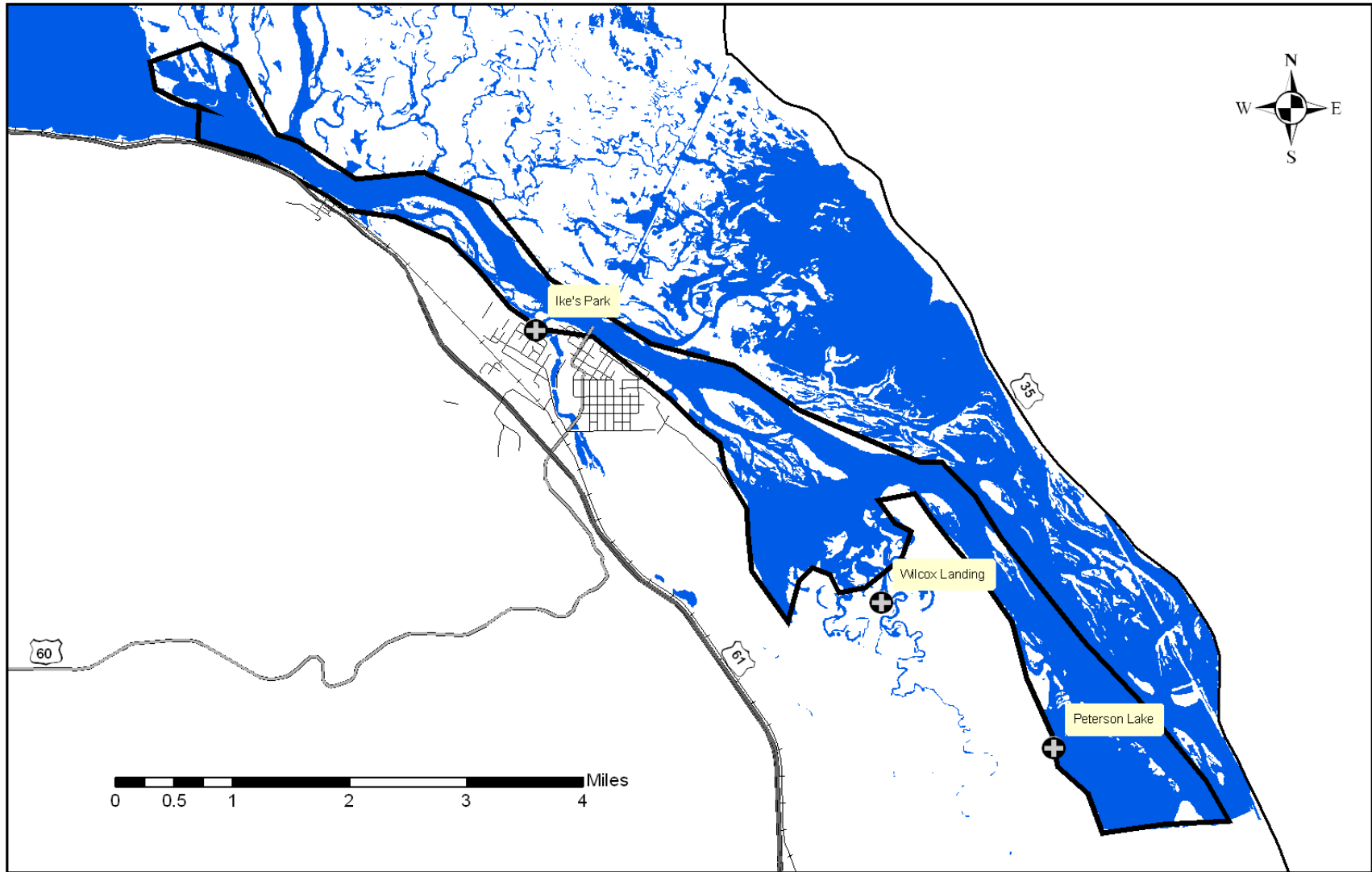


Figure 6. Access area names and locations used for Cluster 4 during the 2005-07 Lake Pepin/Pool 4 creel survey.

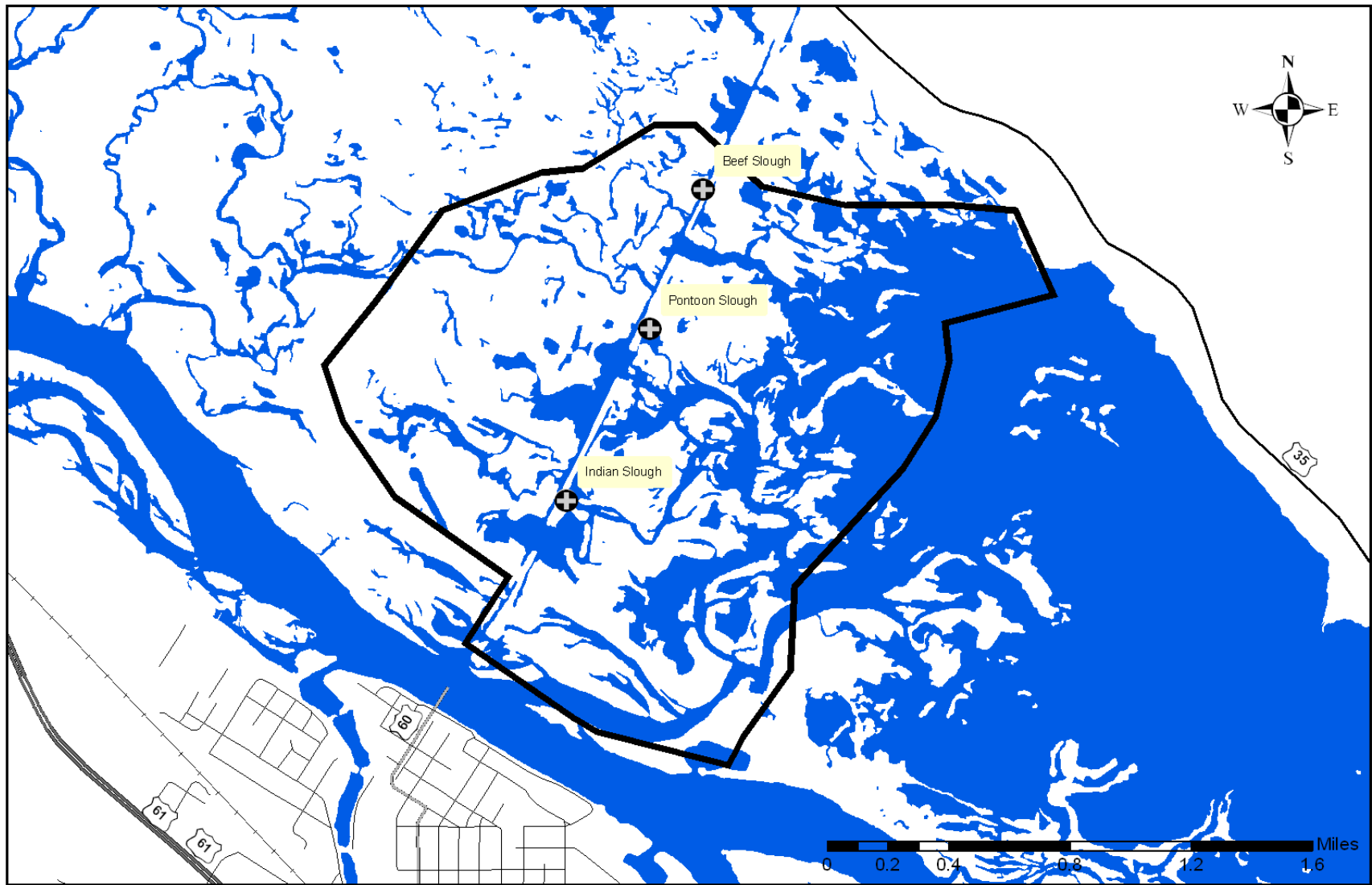


Figure 7. Access area names and locations used for Cluster 5 during the 2005-07 Lake Pepin/Pool 4 creel survey.

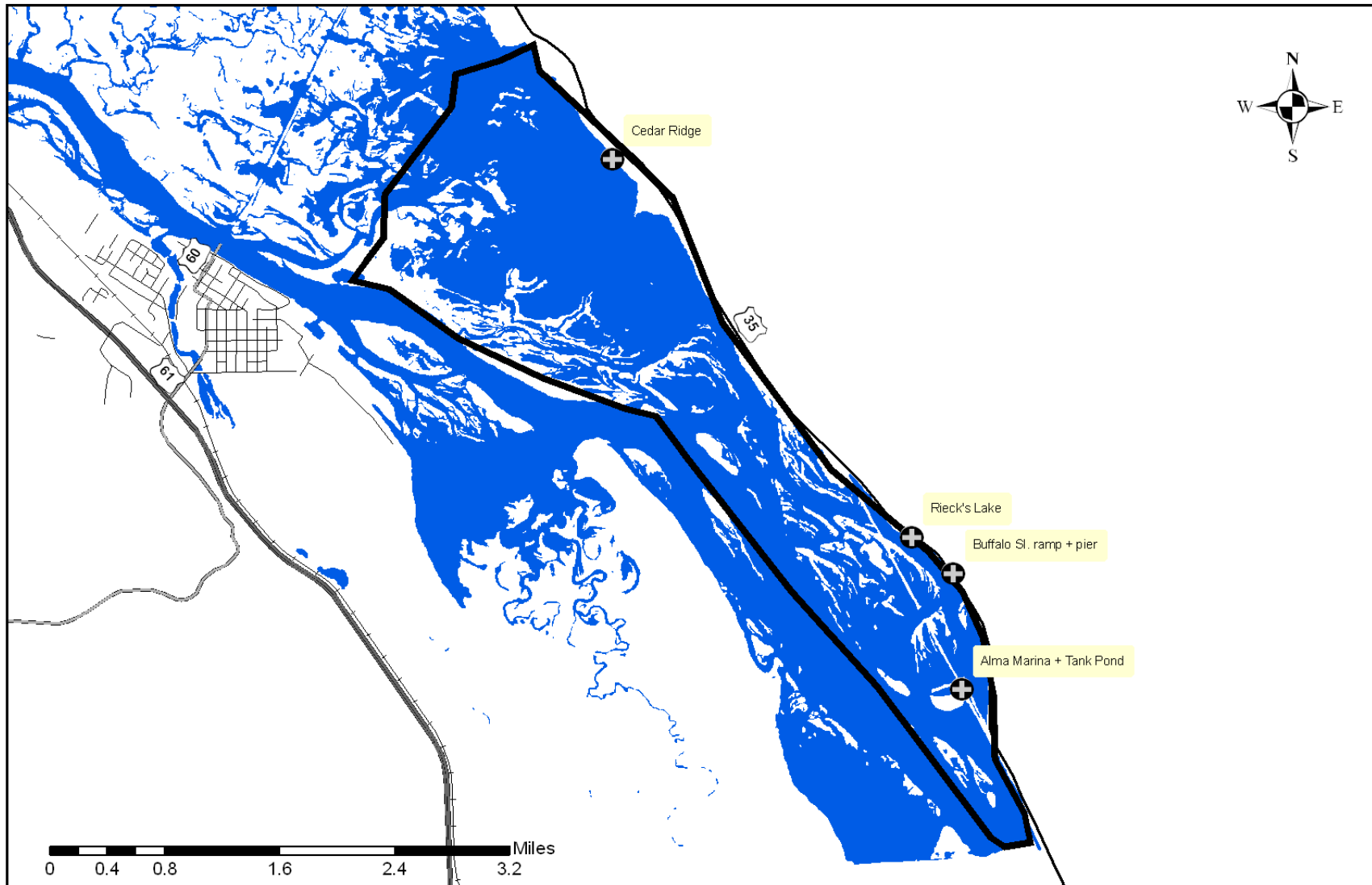


Figure 8. Access area names and locations used for Cluster 6 during the 2005-07 Lake Pepin/Pool 4 creel survey.

Table 1. Selected characteristics of Lake Pepin and Pool 4 of the Mississippi River. Water chemistry data was obtained from the Long Term Resource Monitoring Program and represents summer (June-August) means (\pm SE) from 1991 through 2006. Water samples were collected 0.2 m below the water surface.

Characteristic	Lake	
	Pepin	Pool 4
DOW number	25-1	79-5
Minnesota lake class	26	--
Total surface acres	25,295	39,255
Percent littoral area	32	--
Maximum depth	60	75
Mean depth	21	--
Secchi depth (cm)	67.5 (1.4)	--
Conductivity (μ S)	515.2 (2.5)	--
Chlorophyll- <i>a</i> (μ g/L)	23.1 (0.7)	--
Total phosphorus (mg/L)	0.16 (0.003)	--
Shoreline development index	2.03	--

Table 2. Length – weight factors (a and b) for the relationship $W=10^{aL^b}$ (W = weight in grams, L = length in millimeters) used to estimate weights of fish harvested from Lake Pepin/Pool 4 during the 2005-07 creel survey.

Species	Factor a	Factor b
Black crappie	-5.0796	3.1185
Bluegill	-5.1521	3.2203
Common carp	-4.7733	2.9704
Channel catfish	-5.9664	3.3485
Freshwater drum	-5.5288	3.2375
Gizzard shad	-5.9128	3.3765
Largemouth bass	-5.2814	3.1966
Mooneye	-4.4239	2.7782
Northern pike	-4.9535	2.9241
Rock bass	-5.3552	3.3051
Sauger	-5.9228	3.3561
Smallmouth bass	-5.2390	3.1549
Walleye	-5.4439	3.1670
White bass	-5.2361	3.1552
White crappie	-5.0429	3.0970
Yellow perch	-5.4965	3.2724

Table 3. Annual angler effort (hours) and harvest (N) for Pool 4 of the Mississippi River divided into three strata. Year 2006 is from November 2005 through October 2006 and year 2007 is from November 2006 through October 2007.

	<u>Angler Effort (h)</u>		<u>Total Harvest (N)</u>	
	2006	2007	2006	2007
Open Water	571,048	502,884	228,340	182,939
Lake Pepin Ice	--	3,388	--	2,215
Backwater Ice	52,301	25,548	71,875	40,062
Total	623,349	531,820	300,215	225,216

Table 4. Open water catch and harvest statistics (mean \pm SE) for Pool 4 of the Mississippi River from November 2005 through October 2006.

Species	Catch	Catch per acre	Harvest	Harvest per acre
American eel	27 (30)	0.00 (0.00)	0 (0)	0.00 (0.00)
Black crappie	57,178 (10678)	1.61 (0.30)	30,894 (6469)	0.79 (0.16)
Bluegill	130,967 (38612)	3.68 (1.08)	42,193 (10616)	1.07 (0.27)
Bowfin	706 (363)	0.02 (0.01)	0 (0)	0.00 (0.00)
Brook trout	4 (3)	0.00 (0.00)	0 (0)	0.00 (0.00)
Channel catfish	15,062 (2860)	0.42 (0.08)	4,230 (1380)	0.11 (0.04)
Common carp	1,373 (344)	0.04 (0.01)	170 (162)	0.00 (0.00)
Flathead catfish	2,133 (513)	0.06 (0.01)	66 (42)	0.00 (0.00)
Freshwater drum	113,098 (17691)	3.18 (0.50)	4,356 (3792)	0.11 (0.10)
Gizzard shad	285 (161)	0.01 (0.00)	0 (0)	0.00 (0.00)
Lake sturgeon	286 (131)	0.01 (0.00)	0 (0)	0.00 (0.00)
Largemouth bass	28,476 (8646)	0.80 (0.24)	648 (254)	0.02 (0.01)
Longnose gar	491 (383)	0.01 (0.01)	0 (0)	0.00 (0.00)
Mooneye	1,723 (580)	0.05 (0.02)	101 (98)	0.00 (0.00)
Northern pike	11,189 (2438)	0.31 (0.07)	1,626 (541)	0.04 (0.01)
Paddlefish	23 (18)	0.00 (0.00)	0 (0)	0.00 (0.00)
Pumpkinseed	102 (97)	0.00 (0.00)	102 (97)	0.00 (0.00)
Rock bass	4,864 (1233)	0.14 (0.03)	806 (147)	0.02 (0.00)
Sauger	204,065 (35407)	5.73 (0.99)	51,523 (7153)	1.31 (0.18)
Shovelnose sturgeon	1,575 (413)	0.04 (0.01)	0 (0)	0.00 (0.00)
Silver chub	4 (4)	0.00 (0.00)	4 (4)	0.00 (0.00)
Smallmouth bass	48,882 (10397)	1.37 (0.29)	1,523 (510)	0.04 (0.01)
Unidentified buffalo	67 (58)	0.00 (0.00)	0 (0)	0.00 (0.00)
Unidentified redhorse	1,246 (445)	0.04 (0.01)	0 (0)	0.00 (0.00)
Unidentified sturgeon	87 (43)	0.00 (0.00)	0 (0)	0.00 (0.00)
Unidentified sucker	226 (68)	0.01 (0.00)	8 (6)	0.00 (0.00)
Walleye	68,562 (7696)	1.93 (0.22)	20,046 (2414)	0.51 (0.06)
White bass	113,210 (26166)	3.18 (0.73)	57,282 (16024)	1.46 (0.41)
White crappie	2,100 (716)	0.06 (0.02)	1,203 (515)	0.03 (0.01)
Yellow perch	49,398 (33870)	1.39 (0.95)	11,559 (5592)	0.29 (0.14)
Total	857,410 (97268)	24.08 (2.73)	228,340 (28844)	5.82 (0.73)

Table 5. Open water catch and harvest statistics (mean \pm SE) for Pool 4 of the Mississippi River from November 2006 through October 2007.

Species	Catch	Catch per acre	Harvest	Harvest per acre
Black crappie	78,215 (19125)	2.20 (0.54)	38,026 (15439)	0.97 (0.39)
Bluegill	73,186 (16205)	2.06 (0.46)	19,643 (5842)	0.50 (0.15)
Bowfin	107 (77)	0.00 (0.00)	0 (0)	0.00 (0.00)
Burbot	13 (10)	0.00 (0.00)	0 (0)	0.00 (0.00)
Channel catfish	13,212 (6428)	0.37 (0.18)	1,665 (440)	0.04 (0.01)
Common carp	1,996 (557)	0.06 (0.02)	7 (7)	0.00 (0.00)
Flathead catfish	1,718 (524)	0.05 (0.01)	105 (67)	0.00 (0.00)
Freshwater drum	83,992 (12995)	2.36 (0.36)	1,589 (1370)	0.04 (0.03)
Gizzard shad	1,870 (1619)	0.05 (0.05)	0 (0)	0.00 (0.00)
Lake sturgeon	274 (117)	0.01 (0.00)	0 (0)	0.00 (0.00)
Largemouth bass	21,329 (4386)	0.60 (0.12)	441 (315)	0.01 (0.01)
Longnose gar	139 (80)	0.00 (0.00)	0 (0)	0.00 (0.00)
Mooneye	458 (148)	0.01 (0.00)	68 (56)	0.00 (0.00)
Northern pike	9,713 (2115)	0.27 (0.06)	1,588 (464)	0.04 (0.01)
Paddlefish	64 (41)	0.00 (0.00)	0 (0)	0.00 (0.00)
Rock bass	5,130 (2356)	0.14 (0.07)	96 (80)	0.00 (0.00)
Sauger	135,399 (16856)	3.80 (0.47)	45,295 (5812)	1.15 (0.15)
Shovelnose sturgeon	810 (168)	0.02 (0.00)	0 (0)	0.00 (0.00)
Silver chub	18 (20)	0.00 (0.00)	0 (0)	0.00 (0.00)
Smallmouth bass	49,655 (9746)	1.39 (0.27)	980 (300)	0.02 (0.01)
Unidentified buffalo	178 (111)	0.01 (0.00)	0 (0)	0.00 (0.00)
Unidentified redhorse	843 (270)	0.02 (0.01)	25 (23)	0.00 (0.00)
Unidentified sucker	141 (119)	0.00 (0.00)	0 (0)	0.00 (0.00)
Walleye	57,465 (9065)	1.61 (0.25)	9,186 (1427)	0.23 (0.04)
White bass	105,252 (19990)	2.96 (0.56)	53,989 (18829)	1.38 (0.48)
White crappie	1,088 (520)	0.03 (0.01)	872 (431)	0.02 (0.01)
White sucker	78 (55)	0.00 (0.00)	0 (0)	0.00 (0.00)
Yellow perch	22,651 (16697)	0.64 (0.47)	9,365 (8057)	0.24 (0.21)
	664,994 (70423)	18.68 (1.98)	182,939 (23929)	4.66 (0.61)

Table 6. Open water length frequency (TL, inches) of the 11 most commonly caught and harvested fish species in Pool 4 from November 2005 through October 2006.

Total Length	Black crappie		Bluegill		Channel catfish		Flathead catfish		Largemouth bass		Northern pike	
	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest
3.0-3.4			23						2			
3.5-3.9	1		139									
4.0-4.4	50		190		4				1			
4.5-4.9	38		152						1			
5.0-5.4	11	1	225	10					3			
5.5-5.9	15		90	15								
6.0-6.4	101	1	139	95	1				12		2	
6.5-6.9	7	5	87	82								
7.0-7.4	74	1	219	143	2				8			
7.5-7.9	13	13	143	124					7			
8.0-8.4	35	21	64	27	7		1		25		1	
8.5-8.9	38	30	7	5					2			
9.0-9.4	128	75	2	1	2				17			
9.5-9.9	75	70	1	1					1			
10.0-10.4	118	74	8	2	5		1		24		2	
10.5-10.9	74	70										
11.0-11.4	80	73			13				9			
11.5-11.9	30	28							3			
12.0-12.9	85	43			19	1			114		9	
13.0-13.9	8	6			21	2	2		65		9	
14.0-14.9	1				8		3		54	3	4	
15.0-15.9	1				24	18	1		74	5	5	
16.0-16.9					30	16	4		21	1	2	
17.0-17.9					10	3	1		16	2		
18.0-18.9					32	4	3	1	7		12	1
19.0-19.9					10	7	3		6		2	
20.0-20.9					20	3	6				26	
21.0-21.9					3	1					7	4
22.0-22.9					13	1	3	1			3	1
23.0-23.9					0		5				3	2
24.0-24.9					8	3	8	2			56	3
25.0-25.9					4	1	5				4	1
26.0-26.9					3	2	1	1			8	1
27.0-27.9							3	1			3	
28.0-28.9					1						10	3
29.0-29.9					1						3	
30.0-30.9					5		8				4	1
31.0-31.9											1	1
32.0-32.9							2				3	
33.0-33.9											1	
34.0-34.9											2	2
35.0-35.9											2	1
36.0-36.9							3	1			2	1
37.0-37.9											2	2
38.0-38.9												
39.0-39.9												
40.0 and up											1	
Total	983	511	1,489	505	246	62	77	7	472	11	189	24
Min. Length	3.5	5.0	2.5	5.4	4.0	12.7	8.0	18.1	3.0	14.5	6.0	18.0
Max. Length	15.0	13.7	10.0	10.0	30.0	26.0	50.0	36.0	19.0	17.4	40.0	37.0
Mean Length	8.8	10.1	5.6	6.9	16.4	17.2	26.3	25.6	12.6	15.6	22.2	25.7

table continued on next page

Table 6. Continued.

Total Length	Sauger		Smallmouth bass		Walleye		White bass		Yellow perch	
	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest
3.0-3.4	5		4				4		2	
3.5-3.9							3		5	
4.0-4.4	10		1		1		66		21	
4.5-4.9										
5.0-5.4	22		3		4		1		132	2
5.5-5.9									9	6
6.0-6.4	151		30		42		53		66	9
6.5-6.9			5						3	3
7.0-7.4	61		34		8		43		22	8
7.5-7.9	1		11		2				13	13
8.0-8.4	246	1	60		82		111	27	34	12
8.5-8.9			5				4	4	18	18
9.0-9.4	174		14		28		38	16	11	10
9.5-9.9	203				1		16	4	14	10
10.0-10.4	1506	23	121	1	205		119	56	52	26
10.5-10.9	31	7	14		1	1	20	17	3	3
11.0-11.4	356	31	90		29		33	14	11	8
11.5-11.9	120	35	4		10		13	10	1	
12.0-12.9	1659	185	130		261		421	193	2	2
13.0-13.9	1009	353	131	1	284	6	275	165	3	1
14.0-14.9	1485	641	51	9	620	14	349	179		
15.0-15.9	1218	654	66	8	309	133	174	77		
16.0-16.9	997	543	53	1	417	195	53	31		
17.0-17.9	606	371	13		271	188	1			
18.0-18.9	442	231	17		241	104	3			
19.0-19.9	136	67	1		95	52	6			
20.0-20.9	62	35	1		93	40	3			
21.0-21.9	45	13			65	16				
22.0-22.9	25	5			31	10				
23.0-23.9	9	1			15	4				
24.0-24.9	4				17	2				
25.0-25.9					9	2				
26.0-26.9					11	2				
27.0-27.9					3					
28.0-28.9					7					
29.0-29.9					4	3				
30.0-30.9					1	1				
31.0-31.9										
32.0-32.9										
33.0-33.9										
34.0-34.9					1					
35.0-35.9										
36.0-36.9										
37.0-37.9										
38.0-38.9										
39.0-39.9										
40.0 and up										
Total	10,583	3,196	859	20	3,168	773	1,809	793	422	131
Min. Length	3.0	8.0	3	10	4.0	10.6	3.0	8.0	3.0	5.2
Max. Length	24.0	23.6	20.0	16.0	34.0	30.3	20.0	16.8	13.0	13.0
Mean Length	13.3	15.5	11.7	14.8	14.9	17.2	12.0	13.4	6.9	8.6

Table 7. Open water length frequency (TL, inches) of the 11 most commonly caught and harvested fish species in Pool 4 from November 2006 through October 2007.

Total Length	Black crappie		Bluegill		Channel catfish		Flathead catfish		Largemouth bass		Northern pike	
	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest
3.0-3.4	14		15						1			
3.5-3.9												
4.0-4.4	5		119	10	4							
4.5-4.9			55	12					1			
5.0-5.4	25		269	4								
5.5-5.9	15		42									
6.0-6.4	75	2	149	36	4				9			
6.5-6.9	49	3	81	44	1							
7.0-7.4	54	7	123	96	2	1			28			
7.5-7.9	31	15	47	45								
8.0-8.4	176	24	160	81	8				9			
8.5-8.9	13	12	4	2	1				1			
9.0-9.4	69	38	8	3	6		1		27			
9.5-9.9	77	77	1	1								
10.0-10.4	326	153			54		3		29			
10.5-10.9	120	113			1				2			
11.0-11.4	115	115			4				8			
11.5-11.9	35	19										
12.0-12.9	138	65			32	2	3		42		2	
13.0-13.9	6	1			2		1		17		3	
14.0-14.9	1				5	1	1		100	1	1	
15.0-15.9					10	3	1	1	144	4	3	
16.0-16.9					6	4			33	2	5	
17.0-17.9					9	2	1		28	3	10	
18.0-18.9					15	3	3		3		11	
19.0-19.9					3	3	1		1		5	1
20.0-20.9					32	15	3	1			32	
21.0-21.9					5						3	1
22.0-22.9					16	1	1		1		18	3
23.0-23.9					3		1	1			9	6
24.0-24.9					13		10				26	2
25.0-25.9					2		2				10	3
26.0-26.9					5	1	1				6	3
27.0-27.9					1		2				3	1
28.0-28.9					1		5				12	1
29.0-29.9											5	2
30.0-30.9					2		6				19	3
31.0-31.9												
32.0-32.9					1		2				9	1
33.0-33.9												
34.0-34.9							1				2	1
35.0-35.9							1				8	1
36.0-36.9							1				12	5
37.0-37.9												
38.0-38.9											2	2
39.0-39.9											1	1
40.0 and up							4					
Total	1,344	644	1,073	334	248	36	55	3	484	10	217	37
Min. Length	3.0	6.0	3	4	4.0	7.0	9.0	15.7	3.0	14.5	12.0	19.4
Max. Length	14.0	13.4	9.6	9.6	32.0	26.0	54.0	23.0	22.0	17.9	39.8	39.8
Mean Length	9.3	10.0	6.0	7.0	15.2	18.4	24.7	19.6	9.3	16.7	24.5	27.8

table continued on next page

Table 7. Continued.

Total Length	Sauger		Smallmouth bass		Walleye		White bass		Yellow perch	
	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest
3.0-3.4			2				3			
3.5-3.9									5	
4.0-4.4	1		3		1		22			
4.5-4.9	2		1						2	
5.0-5.4	4		5		20		11	1	19	
5.5-5.9										
6.0-6.4	90		41		66		22	4	53	5
6.5-6.9	5				39		6	4	24	
7.0-7.4	205		8		84		17	3	9	3
7.5-7.9	5				4		1	1	12	3
8.0-8.4	811		58		396		126	4	23	18
8.5-8.9	74		1		60		5	1	23	23
9.0-9.4	393		63		163		156	114	21	19
9.5-9.9	50				12		16	16	18	17
10.0-10.4	947	5	86		220		263	182	58	19
10.5-10.9	7	1	6		8		25	22	69	3
11.0-11.4	214	2	10	1	45		146	101	4	4
11.5-11.9	67	13	3		3		13	9	1	1
12.0-12.9	629	66	152		246		227	110	1	
13.0-13.9	414	82	158	1	87	2	188	34		
14.0-14.9	469	240	130	6	192	4	316	97		
15.0-15.9	780	525	123	6	123	66	154	42		
16.0-16.9	735	507	124	6	114	54	161	119		
17.0-17.9	567	402	17		83	50	59	8		
18.0-18.9	216	127	8		85	29	9			
19.0-19.9	125	59			36	19				
20.0-20.9	61	14			39	23				
21.0-21.9	17	10	1		23	15				
22.0-22.9	17	4			25	9				
23.0-23.9	3	2			20	7				
24.0-24.9					10	2				
25.0-25.9	1				7	1				
26.0-26.9					19	2				
27.0-27.9					10	3				
28.0-28.9					6	2				
29.0-29.9					5	1				
30.0-30.9					2					
31.0-31.9					1					
32.0-32.9										
33.0-33.9										
34.0-34.9										
35.0-35.9										
36.0-36.9										
37.0-37.9										
38.0-38.9										
39.0-39.9										
40.0 and up										
Total	6,909	2,060	1,000	20	2,254	289	1,946	872	342	115
Min. Length	4.0	6.0	3	11	4.0	13.2	3.0	5.0	3.5	6.0
Max. Length	25.0	23.3	21.5	16.4	31.5	29.5	18.0	17.0	12.0	11.8
Mean Length	12.7	16.0	12.4	14.3	12.2	18.0	12.0	11.9	8.4	9.2

Table 8. Backwater ice catch and harvest statistics (mean \pm SE) for Pool 4 of the Mississippi River from December 2005 through March 2006.

Species	Catch	Harvest
Black crappie	20,454 (4633)	7,282 (1618)
Bluegill	202,922 (45501)	61,149 (15003)
Largemouth bass	2,043 (421)	30 (38)
Northern pike	1,154 (946)	619 (516)
Pumpkinseed	1,036 (742)	694 (651)
Rock bass	1,516 (819)	110 (96)
Smallmouth bass	211 (87)	0 (0)
White crappie	59 (53)	59 (53)
Yellow perch	13,004 (2473)	1,933 (1484)
Total	242,398 (49212)	71,875 (16458)

Table 9. Backwater ice catch and harvest statistics (mean \pm SE) for Pool 4 of the Mississippi River from December 2006 through March 2007.

Species	Catch	Harvest
Black crappie	26,062 (9176)	7,048 (3163)
Bluegill	136,271 (45083)	30,077 (11775)
Largemouth bass	1,992 (761)	0 (0)
Northern pike	31 (28)	0 (0)
Pumpkinseed	85 (94)	85 (94)
Rock bass	443 (198)	52 (45)
Smallmouth bass	153 (95)	0 (0)
Walleye	31 (28)	0 (0)
White crappie	25 (21)	25 (21)
Yellow perch	10,715 (3283)	2,774 (1146)
Total	175,808 (53807)	40,062 (15026)

Table 10. Ice fishing catch and harvest statistics (mean \pm SE) for Lake Pepin, not including backwaters of Pool 4, from January through March 2007.

Species	Catch	Harvest
Black crappie	1,658 (462)	878 (289)
Bluegill	1,996 (1241)	620 (391)
Channel catfish	17 (15)	0 (0)
Freshwater drum	155 (87)	59 (70)
Largemouth bass	217 (259)	20 (21)
Mooneye	59 (33)	0 (0)
Sauger	1,156 (554)	359 (235)
Smallmouth bass	215 (151)	17 (16)
Walleye	424 (15)	96 (15)
White bass	27 (25)	0 (0)
Yellow perch	251 (118)	166 (108)
Total	6,175 (1026)	2,215 (385)

Table 11. Length frequency (TL, inches) of the 6 most commonly caught and harvested fish species during the backwater ice creel from December 2005 through March 2006.

Total Length	Black crappie		Bluegill		Largemouth bass		Northern pike		Rock bass		Yellow perch	
	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest
3.0-3.4	31		656						21		43	
3.5-3.9			28								5	
4.0-4.4	45		1243		6				22		32	
4.5-4.9	2		22								19	
5.0-5.4	150		1406	6	2				4		117	
5.5-5.9			25	20							10	
6.0-6.4	98	5	1299	168	16				1	1	55	4
6.5-6.9	6	6	302	242							16	11
7.0-7.4	68	11	1062	527	7				2	1	46	10
7.5-7.9	16	12	739	734					3	3	3	3
8.0-8.4	147	90	384	354	4						10	5
8.5-8.9	28	28	53	53							2	2
9.0-9.4	55	36	25	23	7						6	5
9.5-9.9	10	10	1	1	1						3	3
10.0-10.4	28	26			6						5	5
10.5-10.9	19	19									6	6
11.0-11.4	6	6			2						2	2
11.5-11.9	2	1										
12.0-12.9	4	3			9							
13.0-13.9												
14.0-14.9					1							
15.0-15.9					3							
16.0-16.9					1	1	1					
17.0-17.9												
18.0-18.9												
19.0-19.9					1		1					
20.0-20.9							1					
21.0-21.9												
22.0-22.9												
23.0-23.9							1					
24.0-24.9							2					
25.0-25.9							1	1				
26.0-26.9												
27.0-27.9							2	2				
28.0-28.9												
29.0-29.9							1	1				
30.0-30.9							1	1				
31.0-31.9												
32.0-32.9												
33.0-33.9												
34.0-34.9												
35.0-35.9												
36.0-36.9							1	1				
37.0-37.9												
38.0-38.9												
39.0-39.9												
40.0 and up												
Total	715	253	7,245	2,128	66	1	12	6	53	5	380	56
Min. Length	3.0	6.0	2	5	4.0	16.5	16.0	25.0	3.0	6.4	3.0	6.1
Max. Length	12.5	12.5	9.5	9.5	19.0	16.5	36.0	36.0	7.5	7.5	11.2	11.2
Mean Length	6.8	8.5	5.7	7.3	8.6	16.5	25.0	29.0	4.0	7.0	5.5	8.2

Table 12. Length frequency (TL, inches) of the 6 most commonly caught and harvested fish species during the backwater ice creel from December 2006 through March 2007.

Total Length	Black crappie		Bluegill		Largemouth bass		Rock bass		Smallmouth bass		Yellow perch	
	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest
3.0-3.4	3		178		1						10	
3.5-3.9	3		1265		4		4				3	
4.0-4.4	32		753		2		3				88	
4.5-4.9	50		525		1						9	
5.0-5.4	134		140		2		1				48	
5.5-5.9	22		10	5							15	
6.0-6.4	151		221	155	3		3				11	
6.5-6.9	48	1	122	112			1				2	
7.0-7.4	19	3	315	314			2	2			31	6
7.5-7.9	11	10	109	109							6	2
8.0-8.4	45	29	43	38	26						31	20
8.5-8.9	24	21	11	10							7	7
9.0-9.4	59	49	1	1	16						12	12
9.5-9.9	9	9	1	1	2						5	5
10.0-10.4	25	25			2				2		13	12
10.5-10.9	31	24							2		1	1
11.0-11.4	4	3			1						3	1
11.5-11.9	1	1										
12.0-12.9	1	1			3						5	5
13.0-13.9												
14.0-14.9												
15.0-15.9												
16.0-16.9												
17.0-17.9												
18.0-18.9												
19.0-19.9												
20.0-20.9												
21.0-21.9												
22.0-22.9												
23.0-23.9												
24.0-24.9												
25.0-25.9												
26.0-26.9												
27.0-27.9												
28.0-28.9												
29.0-29.9												
30.0-30.9												
31.0-31.9												
32.0-32.9												
33.0-33.9												
34.0-34.9												
35.0-35.9												
36.0-36.9												
37.0-37.9												
38.0-38.9												
39.0-39.9												
40.0 and up												
Total	672	176	3,694	745	63	--	14	2	4	--	300	71
Min. Length	3.0	6.6	2.5	5.5	3.0	--	3.5	7.3	10.0	--	3.0	7.0
Max. Length	12.0	12.0	9.5	9.5	12.5	--	7.4	7.4	10.5	--	12.5	12.5
Mean Length	6.6	9.0	4.5	7.2	7.8	--	5.1	7.4	10.3	--	6.0	8.7

Table 13. Length frequency (TL, inches) of the 6 most commonly caught and harvested fish species during the Lake Pepin ice creel from January through March 2007.

Total Length	Black crappie		Bluegill		Smallmouth bass		Sauger		Walleye		Yellow perch	
	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest	catch	harvest
3.0-3.4			1									
3.5-3.9												
4.0-4.4			55									
4.5-4.9	2		23									
5.0-5.4	5										2	
5.5-5.9			5									
6.0-6.4	26	6	14	8			8				3	
6.5-6.9	3		9	9							3	3
7.0-7.4	13		5	5			10				1	1
7.5-7.9	3	1	6	6			1				2	2
8.0-8.4	15	14	5	5			4		3			
8.5-8.9	11	9	6	4								
9.0-9.4	15	14	1	1			6		11			
9.5-9.9	13	11										
10.0-10.4	11	11					4		3		2	2
10.5-10.9	8	6										
11.0-11.4	9	9										
11.5-11.9	2	2					1	1				
12.0-12.9	5	5			2		9	9				
13.0-13.9	2	2					1	1				
14.0-14.9							6	6	1			
15.0-15.9					1	1	7	7	4	4		
16.0-16.9					1		2	2	4	4		
17.0-17.9							1	1				
18.0-18.9							1	1				
19.0-19.9					1							
20.0-20.9												
21.0-21.9												
22.0-22.9												
23.0-23.9												
24.0-24.9												
25.0-25.9												
26.0-26.9												
27.0-27.9												
28.0-28.9												
29.0-29.9												
30.0-30.9												
31.0-31.9												
32.0-32.9												
33.0-33.9												
34.0-34.9												
35.0-35.9												
36.0-36.9												
37.0-37.9												
38.0-38.9												
39.0-39.9												
40.0 and up												
Total	143	90	130	38	5	1	61	28	26	8	13	8
Min. Length	4.5	7.7	2.5	6.0	12.0	15.8	6.0	11.8	8.0	15.0	5.0	6.6
Max. Length	13.3	13.3	9.2	9.2	19.0	15.8	18.3	18.3	16.9	16.9	10.2	10.2
Mean Length	8.7	9.9	5.2	7.3	15.5	15.8	10.6	14.5	11.2	15.7	7.0	7.8

Table 14. Walleye hooking mortality estimates by size group for the 2006 and 2007 open water Lake Pepin/Pool 4 creel survey. Year 2006 is from November 2005 through October 2006 and year 2007 is from November 2006 through October 2007.

Total Length	2006 Open Water		2007 Open Water	
	Number	weight (lb)	Number	weight (lb)
4.0-4.9	0	0	7	0
5.0-5.9	26	1	5	0
6.0-6.9	55	5	129	11
7.0-7.9	0	0	106	14
8.0-8.9	57	11	327	64
9.0-9.9	89	25	355	99
10.0-10.9	20	7	209	80
11.0-11.9	119	60	130	66
12.0-12.9	153	101	1,073	713
13.0-13.9	459	389	159	134
14.0-14.9	604	642	445	472
15.0-15.9	116	152	164	215
16.0-16.9	163	261	185	296
17.0-17.9	122	235	175	337
18.0-18.9	64	147	49	113
19.0-19.9	21	56	45	122
20.0-20.9	111	353	69	220
21.0-21.9	170	628	1	3
22.0-22.9	68	289	8	34
23.0-23.9	2	10	15	74
24.0-24.9	65	364	0	1
25.0-25.9	66	420	25	160
26.0-26.9	65	465	1	9
27.0-27.9	6	49	15	118
28.0-28.9	24	221	39	354
29.0-29.9	0	0	4	41
30.0-30.9	0	0	0	1
31.0-31.9	0	0	0	1
32.0-32.9	0	0	0	0
Total	2,645	4,893	3,741	3,752

Appendix A. Open water summary stratum statistics for Pool 4 creel survey from November 2005 through October 2007. Standard errors are reported in parentheses.

Statistic	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06
Start date	1	1	1	1	1	1
End date	30	31	31	28	31	30
Hours covered	0900-1700	0900-1700	0900-1700	0900-1700	1045-1845	0700-2100
Day length (hr)	9.7	8.9	9.3	10.5	11.9	13.4
Days in stratum	30	31	31	28	31	30
Weekend days sampled	8	6	4	5	5	9
Weekdays sampled	9	8	6	5	13	11
Angler counts	17	14	10	10	18	20
Number of interviews:						
Weekend boat	74	23	77	10	292	97
Weekday boat	51	46	26	11	286	32
Weekend bank	1	0	0	0	0	9
Weekday bank	6	1	0	0	0	9
Total	132	70	103	21	578	147
Number of anglers per:						
Weekend boat	2.08 (0.72)	2.35 (0.79)	2.25 (0.73)	1.80 (0.75)	2.24 (0.38)	2.23 (0.48)
Weekday boat	1.88 (0.65)	1.92 (0.55)	1.88 (0.37)	1.91 (0.56)	2.04 (0.52)	1.94 (0.51)
Weekend bank party	2.00 (--)	-- (--)	-- (--)	-- (--)	-- (--)	2.89 (0.59)
Weekday bank party	1.33 (0.60)	4.00 (--)	-- (--)	-- (--)	-- (--)	1.89 (0.96)
All anglers	1.97 (0.49)	2.08 (0.47)	2.16 (0.72)	1.86 (0.44)	2.14 (0.42)	2.19 (0.44)
Completed trip length:						
Weekend boat	5.87 (2.01)	4.38 (1.43)	5.32 (1.82)	4.12 (1.54)	6.51 (1.14)	5.25 (1.16)
Weekday boat	4.84 (1.65)	3.97 (1.00)	4.82 (1.27)	4.41 (1.54)	5.86 (1.51)	5.94 (1.88)
Weekend bank	0.75 (--)	-- (--)	-- (--)	-- (--)	-- (--)	2.80 (1.23)
Weekday bank	1.75 (0.73)	2.00 (--)	-- (--)	-- (--)	-- (--)	2.68 (1.32)
All trips	5.25 (1.37)	4.07 (0.79)	5.19 (1.75)	4.27 (1.04)	6.19 (1.25)	5.09 (1.10)

Appendix A. Continued.

Statistic	May-06	Jun-06	Jul-06	Aug-06	Sep-06	Oct-06
Start date	1	1	1	1	1	1
End date	31	30	31	31	30	31
Hours covered	0700-2100	0700-2100	0800-2200	0800-2200	0800-2030	0900-1900
Day length (hr)	14.8	15.5	15.2	14.0	12.5	11.0
Days in stratum	31	30	31	31	30	31
Weekend days sampled	8	8	10	8	9	9
Weekdays sampled	12	13	11	14	12	14
Angler counts	20	21	21	22	21	23
Number of interviews:						
Weekend boat	54	81	74	44	55	33
Weekday boat	54	95	50	68	55	36
Weekend bank	21	7	2	20	4	10
Weekday bank	11	8	7	9	11	3
Total	140	191	133	141	125	82
Number of anglers per:						
Weekend boat	2.15 (0.62)	2.31 (0.45)	2.41 (0.39)	2.09 (0.51)	2.24 (0.59)	1.82 (0.84)
Weekday boat	1.85 (0.45)	1.96 (0.49)	2.06 (0.43)	1.87 (0.40)	1.73 (0.58)	1.94 (0.47)
Weekend bank party	2.57 (0.81)	2.29 (1.09)	2.50 (1.50)	2.45 (0.68)	1.50 (0.29)	2.60 (1.32)
Weekday bank party	1.36 (0.35)	1.25 (0.34)	2.43 (0.70)	2.22 (0.28)	1.64 (0.39)	1.33 (0.33)
All anglers	2.04 (0.36)	2.09 (0.35)	2.28 (0.32)	2.04 (0.30)	1.94 (0.37)	1.95 (0.40)
Completed trip length:						
Weekend boat	5.19 (1.48)	4.61 (1.07)	4.08 (0.66)	4.24 (1.12)	4.87 (1.65)	5.41 (2.92)
Weekday boat	3.95 (0.95)	4.84 (1.25)	4.35 (1.28)	3.83 (1.14)	5.46 (2.00)	4.45 (1.27)
Weekend bank	2.18 (0.52)	1.69 (0.65)	1.50 (0.50)	2.94 (0.93)	1.98 (0.62)	3.58 (1.64)
Weekday bank	1.68 (0.29)	3.36 (1.45)	2.40 (0.90)	2.05 (0.68)	2.16 (0.73)	1.00 (0.17)
All trips	3.99 (0.73)	4.57 (0.83)	4.05 (0.63)	3.72 (0.67)	4.80 (1.13)	4.61 (1.27)

Appendix A. Continued.

Statistic	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07
Start date	1	1	1	1	1	1
End date	30	31	31	28	31	30
Hours covered	0900-1700	0900-1700	0900-1700	0900-1700	1045-1845	0700-2100
Day length (hr)	9.7	8.9	9.3	10.5	11.9	13.4
Days in stratum	30	31	31	28	31	30
Weekend days sampled	8	7	4	5	7	9
Weekdays sampled	11	6	8	6	8	13
Angler counts	19	13	12	11	15	22
Number of interviews:						
Weekend boat	28	64	18	5	157	80
Weekday boat	67	40	30	19	123	65
Weekend bank	6	0	0	0	0	7
Weekday bank	2	0	0	0	0	2
Total	103	104	48	24	280	154
Number of anglers per:						
Weekend boat	2.14 (1.15)	2.02 (0.54)	1.83 (1.08)	2.60 (1.40)	2.35 (0.71)	2.23 (1.40)
Weekday boat	2.07 (0.60)	1.90 (0.38)	1.87 (0.51)	2.00 (1.47)	2.11 (0.90)	1.86 (0.72)
Weekend bank party	1.83 (1.09)	-- (--)	-- (--)	-- (--)	-- (--)	2.43 (0.52)
Weekday bank party	1.00 (--)	-- (--)	-- (--)	-- (--)	-- (--)	2.00 (--)
All anglers	2.06 (0.56)	1.97 (0.36)	1.85 (0.47)	2.13 (1.15)	2.24 (0.57)	2.08 (0.80)
Completed trip length:						
Weekend boat	6.47 (3.22)	5.04 (1.50)	4.37 (2.29)	3.82 (3.22)	6.10 (1.97)	6.32 (4.36)
Weekday boat	5.59 (1.61)	4.68 (1.40)	5.20 (1.60)	6.07 (4.14)	5.75 (2.55)	6.09 (2.64)
Weekend bank	2.17 (1.71)	-- (--)	-- (--)	-- (--)	-- (--)	2.79 (0.59)
Weekday bank	1.54 (0.54)	-- (--)	-- (--)	-- (--)	-- (--)	1.33 (0.50)
All trips	5.55 (1.57)	4.90 (1.06)	4.89 (1.23)	5.60 (3.58)	5.95 (1.58)	6.00 (2.52)

Appendix A. Continued.

Statistic	May-07	Jun-07	Jul-07	Aug-07	Sep-07	Oct-07
Start date	1	1	1	1	1	1
End date	31	30	31	31	30	31
Hours covered	0700-2100	0700-2100	0800-2200	0800-2200	0800-2030	0900-1900
Day length (hr)	14.8	15.5	15.2	14.0	12.5	11.0
Days in stratum	31	30	31	31	30	31
Weekend days sampled	8	9	9	8	10	8
Weekdays sampled	14	12	11	13	12	14
Angler counts	22	21	20	21	22	22
Number of interviews:						
Weekend boat	43	101	74	50	51	31
Weekday boat	60	62	32	61	32	22
Weekend bank	2	2	16	5	21	10
Weekday bank	1	10	19	20	7	8
Total	106	175	141	136	111	71
Number of anglers per:						
Weekend boat	2.42 (0.57)	2.21 (0.54)	2.49 (0.50)	2.32 (0.49)	2.06 (0.73)	2.16 (0.95)
Weekday boat	1.68 (0.39)	2.13 (0.47)	2.22 (0.78)	2.16 (0.54)	1.97 (0.69)	1.83 (0.58)
Weekend bank party	3.00 (2.00)	1.50 (0.50)	2.94 (1.09)	2.60 (0.89)	2.10 (0.89)	1.90 (0.57)
Weekday bank party	3.00 (--)	1.70 (0.49)	1.95 (0.46)	2.45 (1.05)	1.43 (1.00)	2.00 (0.74)
All anglers	2.02 (0.31)	2.14 (0.38)	2.40 (0.48)	2.28 (0.43)	2.00 (0.45)	2.00 (0.49)
Completed trip length:						
Weekend boat	4.57 (1.25)	4.81 (1.15)	4.77 (0.84)	4.95 (1.79)	4.51 (1.67)	4.57 (2.19)
Weekday boat	4.99 (1.44)	4.69 (1.45)	4.18 (1.38)	5.29 (1.73)	4.49 (1.71)	5.76 (2.13)
Weekend bank	0.50 (--)	0.75 (0.25)	2.40 (1.11)	1.35 (0.22)	3.58 (1.95)	2.33 (1.33)
Weekday bank	1.42 (--)	2.53 (0.79)	1.96 (0.49)	2.29 (0.86)	2.39 (1.85)	2.92 (1.57)
All trips	4.70 (0.93)	4.59 (0.88)	3.99 (0.77)	4.58 (1.11)	4.20 (1.01)	4.45 (1.17)

Appendix B. Backwater ice summary stratum statistics for Pool 4 creel survey from December 2005 through March 2006. Standard errors are reported in parentheses.

Statistic	Dec-05	Jan-06	Feb-06	Mar-06
Start date	4	1	1	1
End date	31	31	28	26
Hours covered	0900-1700	0900-1700	0900-1700	1045-1845
Day length (hr)	8.9	9.3	10.5	11.9
Days in stratum	28	31	28	26
Weekend days sampled	3	4	2	3
Weekdays sampled	5	5	3	2
Angler counts	8	9	5	5
Number of interviews:				
Weekend	65	37	18	17
Weekday	64	23	10	21
Total	129	60	28	38
Number of anglers per:				
Weekend party	2.10 (0.05)	1.70 (0.31)	1.72 (1.39)	1.76 (0.31)
Weekday party	1.62 (0.88)	1.26 (0.27)	1.40 (--)	1.57 (1.10)
All anglers	1.86 (0.50)	1.53 (0.53)	1.61 (0.78)	1.66 (0.54)
Completed trip length:				
Weekend	3.28 (0.99)	3.16 (0.76)	2.95 (2.38)	3.20 (0.50)
Weekday	3.43 (2.36)	2.58 (0.71)	2.57 (--)	4.69 (4.05)
All trips	3.36 (1.24)	2.94 (0.68)	2.81 (1.33)	4.02 (2.04)

Appendix C. Backwater ice summary stratum statistics for Pool 4 creel survey from December 2006 through March 2007. Standard errors are reported in parentheses.

Statistic	Dec-06	Jan-07	Feb-07	Mar-07
Start date	7	1	1	1
End date	31	31	28	23
Hours covered	0900-1700	0900-1700	0900-1700	1045-1845
Day length (hr)	8.9	9.3	10.5	11.9
Days in stratum	25	31	28	23
Weekend days sampled	3	4	2	2
Weekdays sampled	4	5	5	5
Angler counts	7	9	7	7
Number of interviews:				
Weekend	20	15	3	22
Weekday	16	35	4	32
Total	36	50	7	54
Number of anglers per:				
Weekend party	1.70 (0.87)	1.53 (0.62)	2.33 (--)	2.09 (1.09)
Weekday party	1.44 (0.37)	1.80 (0.85)	1.75 (1.00)	1.59 (0.28)
All anglers	1.58 (0.50)	1.72 (0.63)	2.00 (0.86)	1.80 (0.48)
Completed trip length:				
Weekend	1.99 (0.61)	2.17 (1.30)	2.28 (--)	3.02 (2.05)
Weekday	3.03 (1.33)	2.87 (1.11)	3.02 (0.22)	2.42 (0.66)
All trips	2.45 (0.63)	2.66 (0.90)	2.70 (0.42)	2.66 (0.85)

Appendix D. Upper and lower Lake Pepin ice summary stratum statistics for Pool 4 creel survey from January 2007 through March 2007. Standard errors are reported in parentheses.

Statistic	Upper Lake Pepin	Lower Lake Pepin
Start Date	1/23/07	1/23/07
End Date	3/21/07	3/21/07
Days in stratum	58	58
Weekend days in stratum	17	17
Weekdays in stratum	41	41
Weekend days sampled	12	11
Weekdays sampled	13	13
Angler counts	25	24
Number of interviews:		
Weekend	11	44
Weekday	4	41
Total	15	85
Number of anglers per:		
Weekend party	2.45 (3.05)	2.05 (1.03)
Weekday party	1.50 (0.25)	1.39 (1.15)
All anglers	1.80 (0.97)	1.59 (0.85)
Completed trip length:		
Weekend	1.00 (--)	3.27 (--)
Weekday	3.00 (--)	1.92 (--)
All trips	2.38 (--)	2.34 (--)

Appendix E. Open water effort, catch, and harvest statistics for angler caught fish on Pool 4 of the Mississippi River from November 2005 through October 2007. Effort is reported as total angler effort.

Date	Effort (hours)	Catch			Harvest		
		SAR	WAE	WHB	SAR	WAE	WHB
November-05	22,199	18,230	4,705	562	7,672	1,555	27
December-05	3,091	3,035	495	0	1,501	74	0
January-06	6,213	4,053	694	0	1,495	152	0
February-06	1,774	800	134	0	346	40	0
March-06	29,641	21,034	6,401	314	5,772	1,320	30
April-06	52,700	17,407	4,508	7,298	3,720	868	1,227
May-06	88,051	59,276	19,140	14,717	9,593	6,152	9,056
June-06	93,911	26,759	14,012	10,096	8,965	5,498	3,803
July-06	71,146	14,457	3,337	13,899	3,237	1,490	4,277
August-06	93,251	1,330	2,299	40,996	410	410	26,577
September-06	65,021	2,672	3,255	22,221	210	424	12,284
October-06	44,050	35,011	9,581	3,107	8,602	2,063	0
Annual Total	571,048	204,065	68,562	113,210	51,523	20,046	57,282
November-06	27,276	31,667	5,405	675	10,950	731	65
December-06	10,356	21,052	2,631	67	5,433	311	0
January-07	2,443	2,931	352	29	790	30	0
February-07	4,212	3,086	776	0	586	54	0
March-07	37,965	8,841	5,809	64	1,920	263	0
April-07	52,298	20,080	8,689	2,066	6,887	742	189
May-07	51,934	8,213	9,781	9,775	3,519	2,344	1,828
June-07	69,531	18,487	8,535	7,999	9,114	2,065	775
July-07	72,385	4,927	3,043	15,425	2,344	748	11,770
August-07	91,209	4,439	7,696	51,131	1,115	909	30,336
September-07	47,935	2,662	1,311	16,032	379	262	8,961
October-07	35,339	9,014	3,436	1,989	2,259	729	63
Annual Total	502,884	135,399	57,465	105,252	45,295	9,186	53,989

Appendix F. Open water angling effort for Pool 4 of the Mississippi River from November 2005 through October 2007. Standard errors are reported in parentheses.

Statistic	Nov-05	Dec-05	Jan-06	Feb-06	Mar-06	Apr-06
Angler hours:						
Weekend boat	12,716 (3752)	760 (382)	4,906 (1471)	346 (212)	15,898 (2791)	24,503 (6283)
Weekday boat	9,238 (3769)	2,289 (1137)	1,307 (472)	1,429 (980)	13,743 (3745)	14,630 (4522)
Weekend bank	143 (143)	0 (0)	0 (0)	0 (0)	0 (0)	3,217 (1809)
Weekday bank	101 (72)	42 (42)	0 (0)	0 (0)	0 (0)	10,350 (7704)
Total	22,199 (5358)	3,091 (1238)	6,213 (1545)	1,774 (1002)	29,641 (4670)	52,700 (9835)
Angler hours per acre:						
Weekend boat	0.32 (0.10)	0.02 (0.01)	0.12 (0.04)	0.01 (0.01)	0.40 (0.07)	0.62 (0.16)
Weekday boat	0.24 (0.10)	0.06 (0.03)	0.03 (0.01)	0.04 (0.02)	0.35 (0.10)	0.37 (0.12)
Weekend bank party	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.08 (0.05)
Weekday bank party	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.26 (0.20)
Total	0.57 (0.14)	0.08 (0.03)	0.16 (0.04)	0.05 (0.03)	0.76 (0.12)	1.34 (0.25)

Appendix F. Continued.

Statistic	May-06	Jun-06	July-06	Aug-06	Sep-06	Oct-06
Angler hours:						
Weekend boat	30,020 (6560)	29,610 (6042)	33,172 (8220)	35,140 (23459)	20,764 (5185)	13,420 (4532)
Weekday boat	44,994 (15123)	55,487 (14394)	32,862 (7315)	30,038 (6969)	32,646 (17665)	24,404 (7796)
Weekend bank	9,214 (3282)	3,080 (1847)	1,448 (506)	21,196 (7185)	944 (403)	5,550 (2859)
Weekday bank	3,824 (1540)	5,734 (1644)	3,665 (1378)	6,877 (2589)	10,667 (6487)	676 (308)
Total	88,051 (17394)	93,911 (16972)	71,146 (10893)	93,251 (30604)	65,021 (18719)	44,050 (8804)
Angler hours per acre:						
Weekend boat	0.76 (0.17)	0.75 (0.15)	0.85 (0.21)	0.90 (0.60)	0.53 (0.13)	0.34 (0.12)
Weekday boat	1.15 (0.39)	1.41 (0.37)	0.84 (0.19)	0.77 (0.18)	0.83 (0.45)	0.62 (0.20)
Weekend bank party	0.23 (0.08)	0.08 (0.05)	0.04 (0.01)	0.54 (0.18)	0.02 (0.01)	0.14 (0.07)
Weekday bank party	0.10 (0.04)	0.15 (0.04)	0.09 (0.04)	0.18 (0.07)	0.27 (0.17)	0.02 (0.01)
Total	2.24 (0.44)	2.39 (0.43)	1.81 (0.28)	2.38 (0.78)	1.66 (0.48)	1.12 (0.22)

Appendix F. Continued.

Statistic	Nov-06	Dec-06	Jan-07	Feb-07	Mar-07	Apr-07
Angler hours:						
Weekend boat	7,678 (5273)	4,438 (1283)	700 (383)	58 (58)	18,957 (3651)	24,376 (14236)
Weekday boat	16,983 (6527)	5,893 (1394)	1,743 (663)	4,155 (3444)	19,008 (7241)	18,631 (8040)
Weekend bank	1,980 (1331)	25 (25)	0 (0)	0 (0)	0 (0)	7,762 (6466)
Weekday bank	636 (293)	0 (0)	0 (0)	0 (0)	0 (0)	1,529 (1123)
Total	27,276 (8161)	10,356 (1889)	2,443 (765)	4,212 (3445)	37,965 (8109)	52,298 (16394)
Angler hours per acre:						
Weekend boat	0.20 (0.13)	0.11 (0.03)	0.02 (0.01)	0.00 (0.00)	0.48 (0.09)	0.62 (0.36)
Weekday boat	0.43 (0.17)	0.15 (0.04)	0.04 (0.02)	0.11 (0.09)	0.48 (0.18)	0.47 (0.20)
Weekend bank party	0.05 (0.03)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.20 (0.16)
Weekday bank party	0.02 (0.01)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.04 (0.03)
Total	0.69 (0.21)	0.26 (0.05)	0.06 (0.02)	0.11 (0.09)	0.97 (0.21)	1.33 (0.42)

Appendix F. Continued.

Statistic	May-07	Jun-07	July-07	Aug-07	Sep-07	Oct-07
Angler hours:						
Weekend boat	19,215 (6133)	34,482 (6822)	41,253 (7411)	55,440 (43809)	18,301 (7318)	9,560 (4890)
Weekday boat	26,158 (7696)	28,126 (6221)	16,758 (6363)	25,190 (7229)	17,140 (7413)	18,055 (6605)
Weekend bank	4,977 (4329)	1,680 (520)	6,222 (2389)	1,092 (683)	9,941 (4567)	3,880 (2060)
Weekday bank	1,584 (724)	5,243 (1933)	8,152 (2832)	9,487 (4001)	2,553 (1788)	3,844 (1939)
Total	51,934 (9665)	69,531 (9254)	72,385 (9193)	91,209 (44658)	47,935 (11242)	35,339 (8491)
Angler hours per acre:						
Weekend boat	0.49 (0.16)	0.88 (0.17)	1.05 (0.19)	1.41 (1.12)	0.47 (0.19)	0.24 (0.12)
Weekday boat	0.67 (0.20)	0.72 (0.16)	0.43 (0.16)	0.64 (0.18)	0.44 (0.19)	0.46 (0.17)
Weekend bank party	0.13 (0.11)	0.04 (0.01)	0.16 (0.06)	0.03 (0.02)	0.25 (0.12)	0.10 (0.05)
Weekday bank party	0.04 (0.02)	0.13 (0.05)	0.21 (0.07)	0.24 (0.10)	0.07 (0.05)	0.10 (0.05)
Total	1.32 (0.25)	1.77 (0.24)	1.84 (0.23)	2.32 (1.14)	1.22 (0.29)	0.90 (0.22)

Appendix G. Annual open water effort, catch, and success for Pool 4, Mississippi River, 1962-2007. Species list includes only commonly harvested fish.

	2007	2006	2001	2000	1995	1994	1989	1988	1981**	1980**	1979**	1978**	1977**	1972	1967	1962
	11/06-10/07	11/05-10/06	11/00-10/01	11/99-10/00	11/94-10/95	11/93-10/94	11/88-10/89	11/87-10/88	03/81-02/82	03/80-02/81	03/79-02/80	03/78-02/79	03/77-02/78	04/72-03/73	04/67-03/65	05/62-03/63
Total angler-hours	502,884	571,048	417,949	629,742	467,592	645,453	383,452	389,117	462,109	370,024	418,396	507,975	705,652	369,863	431,078	361,608
Total harvest																
Northern pike	1,588	1,626	1,266	718	230	2,961	2,357	2,573						2,986	9,053	3,859
Channel catfish	1,665	4,230	990	2,639	7,423	4,982	1,187	1,251						1,399	3,845	938
Flathead catfish	105	66	200	443	16	83	183	300						67	151	147
White bass	53,989	57,282	19,042	22,853	59,940	69,745	57,830	52,231						72,192	34,395	78,092
Bluegill	19,643	42,193	4,134	23,861	3,449	14,374	10,796	11,824						5,359	32,829	32,280
Rock bass	96	806	294	684		199	444	427						161	1,249	579
Smallmouth bass	980	1,523	1,393	1,324	508	464	1,810	1,611						2,139	3,196	1,136
Largemouth bass	441	648	402	125		383	1,145	701						826	4,045	817
Black crappie	38,026	30,894	5,115	17,257	2,815	4,952	14,491	18,376						8,205	36,417	66,685
Yellow perch	9,365	11,559	839	5,608	35	938	2,271	4,442						2,034	5,556	3,810
Sauger	45,295	51,523	64,430	52,835	24,281	36,903	55,452	55,493	42,781	44,107	31,523	64,192	86,470	99,156	61,864	37,709
Walleye	9,186	20,046	23,471	25,601	8,460	17,388	24,457	24,536	18,061	13,858	16,970	28,336	33,035	32,586	49,829	19,561
Freshwater drum	1,589	4,356	1,288	707	1,119	2,257	790	2,374						5,984	8,490	15,220
Total harvest (lbs)																
Northern pike	9,176	7,451	4,098	2,150	2,652	13,573	12,610	8,079						8,749	35,578	
Channel catfish	2,983	6,812	2,437	6,217	9,796	11,110	1,767	2,877						1,665	5,768	1,188
Flathead catfish							523	1,170						214		
White bass	38,886	70,913	21,843	23,744	32,971	64,803	47,421	48,575						74,425	30,268	74,187
Bluegill	5,788	11,970	1,142	7,133	1,138	4,456	4,534	5,203							14,445	11,944
Rock bass	33	243														
Smallmouth bass	1,710	2,561	2,588	2,220	806	631	1,955	1,820						1,561	3,164	
Largemouth bass	1,104	1,724					1,660	876						1,239	5,137	
Black crappie	27,017	19,456	2,660	8,781	1,802	2,724	6,521	11,761						6,482	27,677	42,012
Yellow perch	3,688	3,670		4	169	669	1,510								1,945	1,524
Sauger	73,876	75,998	76,954	53,646	29,137	44,264	57,116	67,701	39,786	42,784	27,110	56,489	96,846	84,291	62,483	32,807
Walleye	21,170	42,230	43,551	46,322	16,074	38,254	29,593	32,142	26,369	24,390	24,010	46,754	58,142	51,812	88,197	
Freshwater drum	6,245	3,771					616	2,279						6,164	12,735	18,568
Harvest/angler-hour																
Northern pike	tr*	tr	tr	tr	tr	tr	0.01	0.01						0.01	0.02	0.01
Channel catfish	tr	0.01	tr	tr	0.02	0.01	tr	tr						tr	0.01	tr
Flathead catfish	tr	tr	tr	tr	tr	tr	tr	tr						tr	tr	tr
White bass	0.11	0.10	0.05	0.04	0.13	0.11	0.15	0.13						0.20	0.07	0.22
Bluegill	0.04	0.07	0.01	0.04	0.01	0.02	0.03	0.03						0.01	0.06	0.12
Rock bass	tr	tr	tr	tr	tr	tr	tr	tr						tr	tr	tr
Smallmouth bass	tr	tr	tr	tr	tr	tr	tr	tr						0.01	0.01	0.10
Largemouth bass	tr	tr	tr	tr	tr	tr	tr	tr						tr	0.01	tr
Black crappie	0.08	0.05	0.01	0.03	0.01	0.01	0.04	0.05						0.02	0.06	0.16
Yellow perch	0.02	0.02	tr	0.01	tr	tr	0.01	0.01						0.01	0.01	0.02
Sauger	0.09	0.09	0.15	0.08	0.05	0.06	0.14	0.14	0.09	0.12	0.08	0.13	0.12	0.27	0.14	0.10
Walleye	0.02	0.04	0.06	0.04	0.02	0.03	0.06	0.06	0.04	0.04	0.04	0.06	0.05	0.09	0.12	0.05
Freshwater drum	tr	0.01	tr	tr	tr	tr	tr	0.01						0.02	0.02	0.04

*tr = trace

** 1977-81 creel survey (Thorn 1984) targeted sauger and walleye only.

Appendix H. Ice angling effort for Lake Pepin, backwaters of Pool 4, and a total for Pool 4. Standard errors are in parentheses.

Month/Year	Effort (hours)		
	Lake Pepin	Backwaters	Total
December 2005	-- (--)	17,189 (3417)	17,189
January 2006	-- (--)	8,990 (1706)	8,990
February 2006	-- (--)	7,163 (4373)	7,163
March 2006	-- (--)	18,960 (12841)	18,960
Winter 05-06	-- (--)	52,301 (14093)	52,301
December 2006	-- (--)	4,272 (1096)	4,272
January 2007	-- (--)	12,393 (6894)	12,393
February 2007	-- (--)	1,670 (872)	1,670
March 2007	-- (--)	7,213 (2611)	7,213
Winter 06-07	3,388 (720)	25,548 (7504)	28,936

Appendix I. Estimated ice angling pressure (all angler types) for Lake Pepin and backwaters of Pool 4, Mississippi River, combined, 1962-2007.

	2007	2006	2001	2000	1995	1994	1989	1988	1972	1967	1962
Total angler-hours	28,936	52,301	27,392	35,137	71,630	131,920	61,602	54,010	107,821	144,152	62,635
Total harvest											
Bluegill	30,697	61,149	6,371	27,276	5,603	11,693	33,820	42,577	11,801	64,463	22,995
Channel catfish	0	0	0	0	0	0	0	0	12,090	14,417	7,346
Crappie sp.	7,951	7,341	3,200	2,149	7,867	17,219	6,434	8,425	18,745	24,902	28,928
Freshwater drum	59	0	4	27	0	693	0	0	161	3,107	163
Largemouth bass	20	30	0	31	0	130	689	255	260	1,202	324
Northern pike	0	619	0	122	503	2,824	738	30	344	1,046	245
Smallmouth bass	17	0	0	0	0	0	0	37	30	34	0
Rock bass	52	110	4	53	0	0	111	20	246	207	12
Sauger	359	0	1,112	1,002	0	9,915	275	568	30,429	21,842	1,915
Walleye	96	0	253	117	0	736	85	63	796	3,340	230
White bass	0	0	53	34	0	1,347	141	1,017	624	1,977	322
Yellow perch	2,940	1,933	687	489	1,461	881	3,018	1,621	1,695	1,246	811
Total	42,191	71,181	11,684	31,300	15,434	45,438	45,311	54,613	77,221	137,783	63,291

Appendix J. Estimated angler catch (fish per angler hour) for targeting anglers in the open water of Pool 4 from November 2005 through October 2006.

	Number per angler hour			Angler Hours	No. Anglers
	Catch	Harvest	Release		
Black crappie	0.998	0.693	0.305	2,265	230
Bluegill	2.032	0.970	1.062	1,813	180
Channel catfish	0.102	0.102	0.000	28	2
Common carp	0.353	0.353	0.000	123	11
Largemouth bass	0.761	0.007	0.754	910	96
Northern pike	0.155	0.023	0.131	723	79
Rock bass	4.000	4.000	0.000	3	2
Sauger	0.445	0.143	0.302	949	72
Smallmouth bass	1.069	0.005	1.064	1,115	109
Walleye	0.161	0.052	0.109	2,991	277
Walleye/Sauger	--	--	--	37,159	2782
White bass	1.011	0.799	0.212	3,259	278
Yellow perch	4.928	0.724	4.204	202	18

Appendix K. Estimated angler catch (fish per angler hour) for all anglers in the open water of Pool 4 from November 2005 through October 2006.

	Number per angler hour					
	Catch	SE	Harvest	SE	Release	SE
American eel	0.0000	0.0001	0.0000	0.0000	0.0000	0.0001
Black crappie	0.1001	0.0248	0.0541	0.0143	0.0460	0.0123
Bluegill	0.2293	0.0975	0.0739	0.0275	0.1555	0.0730
Bowfin	0.0012	0.0016	0.0000	0.0000	0.0012	0.0016
Channel catfish	0.0264	0.0108	0.0074	0.0034	0.0190	0.0081
Common carp	0.0024	0.0008	0.0003	0.0003	0.0021	0.0007
Flathead catfish	0.0037	0.0031	0.0001	0.0001	0.0036	0.0030
Freshwater drum	0.1981	0.0475	0.0076	0.0064	0.1904	0.0458
Gizzard shad	0.0005	0.0002	0.0000	0.0000	0.0005	0.0002
Lake sturgeon	0.0005	0.0002	0.0000	0.0000	0.0005	0.0002
Largemouth bass	0.0499	0.0188	0.0011	0.0003	0.0487	0.0188
Longnose gar	0.0009	0.0007	0.0000	0.0000	0.0009	0.0007
Mooneye	0.0030	0.0023	0.0002	0.0002	0.0028	0.0023
Northern pike	0.0196	0.0063	0.0028	0.0016	0.0167	0.0051
Pumpkinseed	0.0002	0.0002	0.0002	0.0002	0.0000	0.0000
Rock bass	0.0085	0.0038	0.0014	0.0002	0.0071	0.0035
Sauger	0.3574	0.0939	0.0902	0.0187	0.2671	0.0775
Shovelnose sturgeon	0.0028	---	0.0000	0.0000	0.0028	---
Smallmouth bass	0.0856	0.0231	0.0027	0.0007	0.0829	0.0231
Unidentified buffalo	0.0001	0.0001	0.0000	0.0000	0.0001	0.0001
Unidentified redhorse	0.0022	0.0008	0.0000	0.0000	0.0022	0.0008
Unidentified sturgeon	0.0002	0.0001	0.0000	0.0000	0.0002	0.0001
Unidentified sucker	0.0004	0.0001	0.0000	0.0000	0.0004	0.0001
Walleye	0.1201	0.0242	0.0351	0.0065	0.0850	0.0189
White bass	0.1982	0.0486	0.1003	0.0296	0.0979	0.0175
White crappie	0.0037	0.0009	0.0021	0.0007	0.0016	0.0007
Yellow perch	0.0865	0.0604	0.0202	0.0069	0.0663	0.0506
Total	1.5015	0.2905	0.3999	0.0749	1.1016	0.2211

Appendix L. Estimated angler catch (fish per angler hour) for targeting anglers in the open water of Pool 4 from November 2006 through October 2007.

	Number per angler hour			Angler Hours	No. Anglers
	Catch	Harvest	Release		
Black crappie	1.064	0.488	0.576	2,257	252
Bluegill	2.681	0.620	2.061	1,138	126
Channel catfish	0.301	0.086	0.215	340	19
Common carp	0.000	0.000	0.000	2	1
Flathead catfish	0.105	0.000	0.105	19	2
Largemouth bass	0.522	0.015	0.507	954	101
Northern pike	0.363	0.068	0.294	695	55
Sauger	0.637	0.113	0.524	173	15
Smallmouth bass	0.791	0.003	0.788	1,173	120
Walleye	0.085	0.009	0.076	4,568	360
Walleye/Sauger	--	--	--	25,785	1885
White bass	1.513	1.231	0.282	3,336	196
Yellow perch	0.935	0.569	0.366	194	18

Appendix M. Estimated angler catch (fish per angler hour) for all anglers in the open water of Pool 4 from November 2006 through October 2007.

	Number per angler hour					
	Catch	SE	Harvest	SE	Release	SE
Black crappie	0.1555	0.0538	0.0756	0.0354	0.0799	0.0260
Bluegill	0.1455	0.0524	0.0391	0.0144	0.1065	0.0415
Bowfin	0.0002	0.0002	0.0000	0.0000	0.0002	0.0002
Channel catfish	0.0263	0.0195	0.0033	0.0007	0.0230	0.0188
Common carp	0.0040	0.0010	0.0000	0.0000	0.0040	0.0010
Flathead catfish	0.0034	0.0032	0.0002	0.0002	0.0032	0.0030
Freshwater drum	0.1670	0.0495	0.0032	0.0026	0.1639	0.0498
Gizzard shad	0.0037	0.0033	0.0000	0.0000	0.0037	0.0033
Lake sturgeon	0.0005	0.0004	0.0000	0.0000	0.0005	0.0004
Largemouth bass	0.0424	0.0191	0.0009	0.0006	0.0415	0.0189
Longnose gar	0.0003	0.0002	0.0000	0.0000	0.0003	0.0002
Mooneye	0.0009	0.0003	0.0001	0.0001	0.0008	0.0003
Northern pike	0.0193	0.0045	0.0032	0.0010	0.0162	0.0038
Paddlefish	0.0001	0.0001	0.0000	0.0000	0.0001	0.0001
Rock bass	0.0102	0.0048	0.0002	0.0002	0.0100	0.0047
Sauger	0.2692	0.0677	0.0901	0.0215	0.1792	0.0473
Shovelnose sturgeon	0.0016	0.0004	0.0000	0.0000	0.0016	0.0004
Smallmouth bass	0.0987	0.0258	0.0019	0.0008	0.0968	0.0253
Unidentified buffalo	0.0004	0.0002	0.0000	0.0000	0.0004	0.0002
Unidentified redhorse	0.0017	0.0006	0.0000	0.0001	0.0016	0.0005
Unidentified sucker	0.0003	0.0002	0.0000	0.0000	0.0003	0.0002
Walleye	0.1143	0.0364	0.0183	0.0047	0.0960	0.0320
White bass	0.2093	0.0426	0.1074	0.0261	0.1019	0.0380
White crappie	0.0022	---	0.0017	---	0.0004	---
White sucker	0.0002	0.0001	0.0000	0.0000	0.0002	0.0001
Yellow perch	0.0450	0.0422	0.0186	0.0221	0.0264	0.0198
Total	1.3224	0.2754	0.3638	0.0807	0.9586	0.2072

Appendix N. Estimated angler catch (fish per angler hour) for all anglers in the backwaters of Pool 4 from December 2005 through March 2006.

	Number per angler hour					
	Catch	SE	Harvest	SE	Release	SE
Black crappie	0.3911	0.1378	0.1392	0.0491	0.2518	0.0901
Bluegill	3.8799	1.6540	1.1692	0.5480	2.7107	1.1097
Largemouth bass	0.0391	0.0137	0.0006	0.0008	0.0385	0.0133
Northern pike	0.0221	0.0190	0.0118	0.0104	0.0102	0.0087
Pumpkinseed	0.0198	0.0112	0.0133	0.0099	0.0065	0.0070
Rock bass	0.0290	0.0175	0.0021	0.0019	0.0269	0.0177
Smallmouth bass	0.0040	0.0020	0.0000	0.0000	0.0040	0.0020
White crappie	0.0011	0.0011	0.0011	0.0011	0.0000	0.0000
Yellow perch	0.2486	0.0617	0.0370	0.0198	0.2117	0.0677
Total	4.6346	1.9026	1.3743	0.6106	3.2604	1.2984

Appendix O. Estimated angler catch (fish per angler hour) for all anglers in the backwaters of Pool 4 from December 2006 through March 2007.

	Number per angler hour					
	Catch	SE	Harvest	SE	Release	SE
Black crappie	1.0201	0.5514	0.2759	0.1765	0.7443	0.3846
Bluegill	5.3339	2.7493	1.1773	0.6661	4.1566	2.0936
Largemouth bass	0.0780	0.0364	0.0000	0.0000	0.0780	0.0364
Northern pike	0.0012	0.0011	0.0000	0.0000	0.0012	0.0011
Pumpkinseed	0.0033	0.0038	0.0033	0.0038	0.0000	0.0000
Rock bass	0.0173	0.0093	0.0020	0.0019	0.0153	0.0081
Smallmouth bass	0.0060	0.0041	0.0000	0.0000	0.0060	0.0041
Walleye	0.0012	0.0011	0.0000	0.0000	0.0012	0.0011
White crappie	0.0010	0.0009	0.0010	0.0009	0.0000	0.0000
Yellow perch	0.4194	0.1815	0.1086	0.0444	0.3108	0.1449
Total	6.8815	3.3840	1.5681	0.8562	5.3134	2.5436

Appendix P. Estimated angler catch (fish per angler hour) for all anglers in Lake Pepin from January 2007 through March 2007.

	Number per angler hour					
	Catch	SE	Harvest	SE	Release	SE
Black crappie	0.4895	0.2403	0.2593	0.0841	0.2303	0.2063
Bluegill	0.5892	---	0.1829	0.2986	0.4063	---
Channel catfish	0.0049	0.0046	0.0000	0.0000	0.0049	0.0046
Freshwater drum	0.0459	0.0454	0.0174	0.0322	0.0284	0.0114
Largemouth bass	0.0639	---	0.0058	0.0192	0.0581	---
Mooneye	0.0174	---	0.0000	0.0000	0.0174	---
Sauger	0.3412	0.2732	0.1061	0.1061	0.2351	0.1598
Smallmouth bass	0.0634	0.0466	0.0049	0.0048	0.0585	0.0456
Walleye	0.1252	0.0308	0.0283	0.0164	0.0969	0.0417
White bass	0.0079	0.0074	0.0000	0.0000	0.0079	0.0074
Yellow perch	0.0742	0.0409	0.0490	0.0424	0.0252	0.0017
Total	1.8227	1.0486	0.6538	0.4000	1.1689	0.7277

Appendix Q. Harvest in pounds of commonly caught fish species from the open water of Pool 4 in 2006 and 2007. Year 2006 is from November 2005 through October 2006 and year 2007 is from November 2006 through October 2007. SE = Standard Error.

	<u>2006 Open Water</u>				<u>2007 Open Water</u>			
	Harvest		Harvest		Harvest		Harvest	
	lbs	SE	lbs per Acre	SE	lbs	SE	lbs per Acre	SE
Black crappie	19,456	6589	0.50	0.20	27,017	12229	0.69	0.38
Bluegill	11,970	2932	0.30	0.09	5,788	5142	0.15	0.16
Channel catfish	6,812	2111	0.17	0.07	2,983	1139	0.08	0.04
Freshwater drum	3,771	320	0.10	0.01	6,245	5492	0.16	0.17
Largemouth bass	1,724	576	0.04	0.02	1,104		0.03	
Northern pike	7,451	3143	0.19	0.10	9,176	3823	0.23	0.12
Rock bass	243	91	0.01	0.00	33		0.00	
Sauger	75,998	28345	1.94	0.88	73,876	15704	1.88	0.49
Smallmouth bass	2,561	914	0.07	0.03	1,710	799	0.04	0.02
Walleye	42,230	11899	1.08	0.37	21,170	6998	0.54	0.22
White bass	70,913	33755	1.81	1.05	38,886	14497	0.99	0.45
White crappie	917	258	0.02	0.01	529	21	0.01	0.00
Yellow perch	3,670	2372	0.09	0.07	3,688	6288	0.09	0.19
Total	247,715		6.31		192,205		4.90	

Minnesota
F-29-R (P)-27
Area F317
Study 4
Job 765
April XX, 2007

MINNESOTA DEPARTMENT OF NATURAL RESOURCES
SECTION OF FISHERIES

Completion Report

Angler Survey of Lake Pepin and Pool 4 of the
Mississippi River, from 2005 to 2007

by

Jonathan R. Meerbeek

Prepared by: Jonathan Meerbeek

Approved by:


Area Supervisor

3-26-08
Date

Approved by:


Regional Supervisor

05/02/08
Date

Funded Under Federal Aid by the Sport Fish Restoration Act,
F-29-R(P)-27