

Minnesota  
F15AF00162  
R29G60F29RP32  
Segment 32-2  
Study 4  
Job 1008b  
August 2016

**Minnesota Department of Natural Resources  
Division of Fish and Wildlife**

**Sauk River Chain of Lakes  
Open Water Creel Survey  
April 4, 2015 to October 31, 2015**

**By**

**Ryan T. Andvik**

**Sauk Rapids Area Fisheries Office**



Funded under Federal Aid  
by the Sport Fish Restoration Act

## TABLE OF CONTENTS

List of Figures.....	2
List of Tables .....	3
Addendum.....	3
Abstract.....	4
Introduction.....	5
Study Area .....	5
Methods .....	6
Results .....	7
Discussion.....	9
Acknowledgements.....	12
References.....	13

## LIST OF FIGURES

Figure 1. 2015 Creel survey zones for Sauk River Chain of Lakes, Stearns County, Minnesota. ...	14
Figure 2. Density distribution based on zip code data received from all anglers fishing the Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. County boundaries outlined in thick black lines.....	15
Figure 3. Response to question 1: “Based on the size and number of fish you caught, would you rate your fishing success today as good, moderate or poor?” .....	16
Figure 4. Response to question 2: “Which access did you use today Public, Resort, or Private?” ..	16
Figure 5. Response to question 3: “Have you been interviewed before?” .....	17
Figure 6. Response to question 4: “How do you feel about Channel Catfish in the Sauk River Chain of Lakes?” .....	17
Figure 7. Response to question 5: “Do you fish for Channel Catfish in the Sauk River Chain of Lakes?” .....	18
Figure 8. Response to question 5a: If no (question 5) “How do you feel about catching Channel Catfish while fishing for other species? .....	18
Figure 9. Response to question 5b: If yes (question 5) “Do you fish for Channel Catfish with the intent to harvest? .....	19

## LIST OF TABLES

Table 1. Angling effort estimated for the Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors are in parentheses.....	20
Table 2. Angling effort estimated by zone for the Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors are in parentheses. ....	20
Table 3. Percentage <sup>1</sup> of anglers targeting species, Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. ....	21
Table 4. Catch and harvest estimates, Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors are in parentheses.....	22
Table 5. Harvest, release, and catch rate estimates, Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors appear in parentheses. Bowfin (Dogfish), Rock Bass, Bullhead, Common Carp, White Sucker, Redhorse species, and Muskellunge were caught so infrequently that catch, harvest, and release rates were less than 0.01.....	23
Table 6. Catch and harvest estimates per acre, Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors are in parentheses. ....	24
Table 7. Length frequency of harvested Black Crappie, Sunfish species, and Yellow Perch from the Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Actual number of fish measured, not estimated. ....	25
Table 8. Length frequency distribution of harvested Channel Catfish, Northern Pike, and Walleye from the Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Actual number of fish measured, not estimated. ....	26
Table 9. Yield estimates in pounds, Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors are in parentheses.....	26
Table 10. Responses to human dimension questions 2 through 5a. One response was collected from each party, regardless of party size. Previously interviewed anglers were not asked further questions after Question 3. Only anglers who responded “no” to question 4 were asked question 5. Some interviews had no response. ....	27

## ADDENDUM

Addendum 1. DNR Fisheries Creel Survey SRCL 2015 Pressure Form.....	28
Addendum 2. DNR Fisheries Creel Survey SRCL 2015 Interview Form .....	29
Addendum 3. Creel Summary Form.....	31

## **Abstract**

An open-water creel survey was conducted from April 4, 2015 through October 31, 2015 on the Sauk River Chain of Lakes. This survey combined with the winter creel (December 3, 2014 through March 22, 2015) documents year-round pressure and angling effort. The objective of this survey was to document angling effort, harvest, provide baseline data before Muskellunge recruit to the fishery, and assess angler attitudes toward Channel Catfish. A total of 1,362 interviews were conducted, of which eight individuals declined. Approximately 38% of anglers interviewed traveled less than ten miles to fish. The vast majority of anglers came from central and east central Minnesota. Out of state anglers made up less than 5% of the interviews. Anglers rated their fishing success as 'Poor' (45%) followed by 'Moderate' (28%) and 'Good' (26%). The SRCL had an estimated 85,802 angling hrs or 31.5 angler hrs/acre. Public accesses were utilized by the majority of anglers (49%). The average number of anglers per party was 1.63. Most of the anglers interviewed (31.3%) were targeting sunfish species, followed by Walleye (21.7%), and Channel Catfish (16.8%). An estimated 151,411 fish were caught for a rate of 1.51 fish per angler hour or 22.61 fish per acre. Anglers harvested more than 40% of the Black Crappie, Channel Catfish, and sunfish species they caught. Conversely, anglers released more than 80% of the Largemouth and Smallmouth Bass, Walleye, and Yellow Perch they caught. An estimated 46,800 pounds of fish were harvested, with Channel Catfish contributing 40% of this estimate. Although the Sauk Rapids Fisheries Office received reports of anglers catching Muskellunge very few were reported in the creel and no anglers reported targeting them. Opinions varied widely about Channel Catfish, but overall anglers' perception of them was positive. This range of opinions was distributed evenly across central and east central Minnesota. As of March 1, 2015 the daily bag limit for Channel Catfish was raised from five to ten fish. It is difficult to determine what impact this had on anglers' attitudes and on the fishery.

## **Introduction**

The Sauk River Chain of Lakes (SRCL) is one of the largest waterbodies in the Sauk Rapids Fisheries Management Area. The chain was formed by a dam built on the Sauk River in the City of Cold Spring in 1854. It has a multi-species fishery, has heavy recreational use, and includes a mix of vacation and permanent dwellings. Fishing pressure is high in the chain (62.6 angler hrs/acre; Altena 1999), and is likely due to its proximity to the Twin Cities (approximately 70 miles) and St. Cloud Metropolitan Areas (approximately 30 miles).

The chain has unique angling opportunities, especially considering the introduced species. Channel Catfish were introduced starting in the 1970s through 1988. Since their introduction, the Channel Catfish population has expanded exponentially. An open-water creel survey conducted in 1999 found that many lakeshore residents and local anglers had a negative opinion of Channel Catfish, whereas resort anglers and other non-local anglers had a more favorable opinion (Altena 1999). Further, in 2011 Muskellunge were stocked in an effort to establish a new fishery in the area. The initial stockings were controversial, and the full impact to establish this fishery remains to be seen. Baseline information about the fishery is needed before, during, and after this Muskellunge population becomes established.

Creel surveys are important tools to gather biological information, monitor trends, and assess angler satisfaction (Malvestuto 1996). They are used to estimate the number and size of fish caught by species, and can determine the total harvest in terms of yield. These surveys are vital in monitoring and gauging the health of recreational fisheries.

More recently a creel survey was conducted on the SRCL from December 2014 through October 2015. This survey was split into two distinct periods; winter (December 3, 2014 through March 22, 2015) and open-water (April 4 through October 31, 2015). The primary objectives were to document angling effort, harvest, provide baseline data before Muskellunge recruit to the fishery, and assess angler attitudes toward Channel Catfish.

## **Study Area**

The SRCL is located near the towns of Richmond, and Cold Spring in Stearns County, MN. It is one of the largest waterbodies in the Sauk Rapids Fisheries

Management Area (2,389 acres) and was impounded in Cold Spring in 1854. The watershed is large (approximately 700,000 acres) and dominated by agricultural practices, with a small mix of grassland and forests.

Individual basins are well-connected, and are managed as one lake. The SRCL has a complex morphometry, with more than 30 islands and 76 miles of shoreline. The shoreline varies from highly developed cabins and permanent dwellings to completely undeveloped. The maximum depth in the chain is 75 feet (Cedar Island Lake). Water quality varies; however, it is considered moderately eutrophic. The SRCL is very accessible with three public boat ramps, several resorts, and over 2.5 miles of shoreline angling opportunity.

## **Methods**

A stratified random sampling design was used to survey the SRCL from April 4, 2015 through October 31, 2015. All weekends and holidays were sampled as well as three randomly chosen weekdays during each week<sup>1</sup>. Unlike the 1999 survey, all basins were sampled, with the exception of Long Lake. Little Cedar Island and the Sauk River to Highway 23 were added to what was done during the winter creel survey. Strata included day type (weekday, weekend, and holiday), month, angler types (bank angler and boat angler(s)) and zone. The SRCL was divided into three comparable zones: Zone 1 included the Sauk River up to the Highway 23 bridge, Becker, and Horseshoe Lakes (~879 acres), Zone 2 included Cedar Island, Mud, and Little Cedar Island Lakes (~824 acres), and Zone 3 included Koetter, Zumwalde, Schneider, Great Northern, Krays, Knaus, Bolfling, and the Sauk River up to the dam in Cold Spring, MN (~1,023 Acres; Figure 1).

The eight hour sampling day was divided into two equal, non-overlapping shifts, which included early (0600 to 1400) and late (1400 to 2200) shifts. Two zones were sampled per day, of which, the clerk spent half of each shift in each zone. Each zone was split into sub-zones (A, B, and C) to help keep the clerk moving at a constant rate of speed throughout the shift. Weekdays, time period (i.e early or late shift), zones, and sub-zones were randomly selected without replacement.

---

<sup>1</sup> Only two randomly selected weekdays and both weekend days were sampled from April 4 through May 9, 2015 due to limited staff availability.

Progressive counts were made in each zone where the clerk spent approximately 75 minutes per sub-zone. Counts were totaled from each sub-zone and summed to get a total count for each zone. Interviews were conducted simultaneously with counts. Thus, two zones were sampled with one count each for a given sampling day. Bank anglers were counted and interviewed individually even if they were fishing in a group, whereas a boat (regardless of party size) was counted as one (see Addendum 1 for pressure data sheet format).

The creel clerk traveled the SRCL via boat counting all boat and bank anglers for each zone. During the counts the clerk was instructed to interview all anglers (see Addendum 2 for interview sheets). Prior to any interview the clerk would record the date, interview number, work period, access site, and interview time. During the interview they would record time the angler(s) started fishing, if it was a completed fishing trip, angling type (boat or bank), species sought, party size, and a zip code from one angler if there were more than one. Clerks asked how many fish by species and length the angler had harvested and released. Several additional human dimensions question were asked to gauge the angler's attitudes. When possible, harvested fish were measured to the nearest 0.1 inch total length. If an angler was not willing to let a measurement be taken the given length was recorded as not measured.

Creel data was entered and analyzed with Creel Application Software Program (CAS, version 2.2; Soupir 2008). Human dimension question were analyzed using Microsoft Excel. ARC GIS version 10.21 was used to determine distance traveled by anglers based on zip codes. A regression equation was created using transformed length and weight data from the previous SRCL lake surveys (MN DNR 2000, 2012, & 2014) to estimate the yield harvested per species. Yield estimates were compared to standard weight and length metrics (Anderson & Neumann 1996) to determine realistic estimates.

## **Results**

The open-water creel survey spanned 214 days with a total of 142 days surveyed, comprised of 84 weekdays and 58 weekends. In total, 284 counts were made and 1,362 interviews attempted (Table 1). Over the course of this survey only eight individuals refused to be interviewed. Four hundred and twenty-three interviews came from bank

anglers, whereas 940 came from boat anglers. Completed trips (n=153) accounted for 11% of all interviews. The number of interviews per zone was fairly even with 450, 437, and 475 for Zones 1, 2, and 3, respectively (Table 2). The average party size for boat angler was 1.94 and 1.63 for all anglers. The mean boat and bank trip lengths were 2.47 and 2.25 hrs, respectively.

Angling effort was estimated at 85,802 angler hrs, or 31.5 angler hrs/acre (Table 1). Zone 3 had the largest number of angler hrs (35,547 hr); however, the angler hrs/acre was similar for all three zones which ranged from 28.68 hrs (Zone 2) to 34.78 hrs (Zone 3). Zones 1 (26,652 hrs) and 2 (23,603 hrs) had similar amounts of pressure (Table 2).

The month of May had the largest number of angler hrs (17,132 hrs; Table 1). May through September had relatively high and similar angling pressure. The Spring and October strata had the lowest amounts of pressure with 5,228 and 7,000 angler hrs, respectively (Table 1).

Overall sunfish species were the most targeted followed by Walleye, Channel Catfish, and Black Crappie (Table 3). Black Crappies were the most popular secondary species targeted. Only 362 interviews indicated that anglers were targeting a secondary species. The most popular multi-species trip was sunfish species and Black Crappies, followed by Black Crappies and sunfish species, and Largemouth and Smallmouth Bass.

The estimated number of fish caught, harvested, and released, the rates per hour, and rates per acre by species are summarized in Tables 4, 5, and 6. Sunfish species had the highest catch estimated at 76,535 fish, of which 41% caught were harvested. Channel Catfish were the second most caught fish at 21,250 fish. Anglers harvested 52% of the Channel Catfish they caught. An estimated 18,192 Walleye were caught, of which, 82% of them were released. Multiple species had catch rates greater than 1.0 fish per hour. Sunfish species had the highest catch rate at 4.16 fish/hr followed by Black Crappie (1.30 fish/hr), Walleye (1.09 fish/hr), and Channel Catfish (1.04 fish/hr). Length frequencies of fish harvested are described in Tables 7 and 8.

Approximately 46,800 pounds of fish were harvested from the SRCL (Table 9). Channel Catfish contributed 40% of the total yield harvested (18,906 pounds), followed by sunfish species (32%), and Black Crappie (14%). All other species combined contributed 14%.



The majority of anglers came from central and east central Minnesota (Figure 2). Very few (4.9%) anglers came from another state. Approximately 38% of all anglers interviewed traveled less than 10 miles to fish. The number of anglers traveling greater than 35 miles (45%) was similar to that of anglers traveling less than 35 miles.

Anglers rated their fishing success with some consistency across the season. Overall, 45% of anglers rated their fishing success as 'Poor' followed by 'Moderate' (28%) and 'Good' (26%; Figure 3). The majority of anglers used a public access (49%); however, the use of resort (20%) and private (31%) accesses proved to be seasonally important (Figure 4). Over the course of this survey 30% of anglers indicated that they had previously been interviewed this open-water season (Table 10; Figure 5).

Anglers had mixed feelings about Channel Catfish; overall, 40% indicated that they were good, but 37% said they were bad, and 23% of interviewed anglers had no opinion (Table 10). There were major differences in the value of Channel Catfish by season (Figure 6). A total of 578 (61%) people indicated that they do not fish for Channel Catfish (Figure 7). Further these individuals were split fairly evenly if catching Channel Catfish incidentally while fishing for other species added to their experience (40%) or detracted from their experience (37%; Figure 8). Each interview question was examined by zip code; however, no distinguishable patterns emerged. Supplemental questions indicate that anglers are very harvest oriented towards Channel Catfish (Table 10). Two hundred and ninety-nine of 368 anglers indicated that they fish for Channel Catfish with the intent to harvest (81%; Figure 9).

## **Discussion**

The SRCL is heavily used by both boat and bank anglers. Bank anglers contributed over 30% of the angling pressure. This is likely due to the fact that there are many road crossings, public accesses, and publicly available land for bank anglers to access the SRCL. The 2.5 miles of accessible shoreline angling opportunities is unique to the Sauk Rapids Fisheries Area. Overall fishing pressure for all anglers was evenly spread across the three zones and most of the open-water season.

Angling effort and pressure per acre were lower than the previous creel survey; however, this is still considered high. This difference is due to 1) including more of the SRCL than previously done before and 2) creeling prior to the fishing opener. Effort was

noticeably lower in April and September. This is likely due to a closed season for select fish species and less favorable weather conditions. The month of May had the largest number of angling hrs, which is the result of Minnesota's longstanding tradition of the fishing opener. This year's opener did not have favorable weather conditions; however, that did not slow anglers down on opening day.

Sunfish species were the most popular species. It is interesting to note, sunfish species were not the most targeted species until the month of June. Their high catch rates and size distribution paired with the relatively simple equipment required to target them makes it easy to understand their desirability. Not surprisingly, Walleye proved to be another popular species to target. The Sauk Rapids Fisheries Office received reports of anglers catching Muskellunge; however, very few were reported in the creel and no anglers reported targeting them.

The popularity of Channel Catfish makes the SRCL a unique fishery in Minnesota. Channel Catfish had high catch rates and many fish large enough to keep. It is difficult to determine if the increased daily bag limit on Channel Catfish from March 2015 has had any impact on the fishery. Very few anglers harvested more than five Channel Catfish (previous daily bag limit). However, it is unknown how many more angler trips were made because of this special regulation.

Prior to this creel survey the Sauk Rapids Fisheries Office received many complaints about the large number of Channel Catfish. The previous and most recent creel surveys both indicated an overall perception of Channel Catfish as positive. The previous creel suggested that Channel Catfish were less favorable to local anglers; however, zip code data collected in this creel survey suggested this range of opinions was distributed evenly across central and east central Minnesota in 2015.

The fishery on the SRCL is very harvest oriented. The combination of multiple species with good size structures and numbers likely helps keep pressure spread out across species.

### **Management Recommendations**

Additional creel surveys will help understand the impacts of the increased bag limit on Channel Catfish and the establishment of the Muskellunge fishery. Future creel surveys

should include all navigable waters (i.e. Long Lake), and possibly expanding hours into the evening when Muskellunge become well established.

There are many unknowns when it comes to Channel Catfish in the SRCL. Diets should be examined to start to determine direct or indirect impacts to other fish species. Further, this would acknowledge anglers' concerns about Channel Catfish. Sex-specific growth rates should be examined to assess the health of this population. Finally, movement studies would provide additional information on the habits and life histories of Channel Catfish. Having a better understanding of the population dynamics and life history of Channel Catfish in the SRCL will aid in better management and public relations.

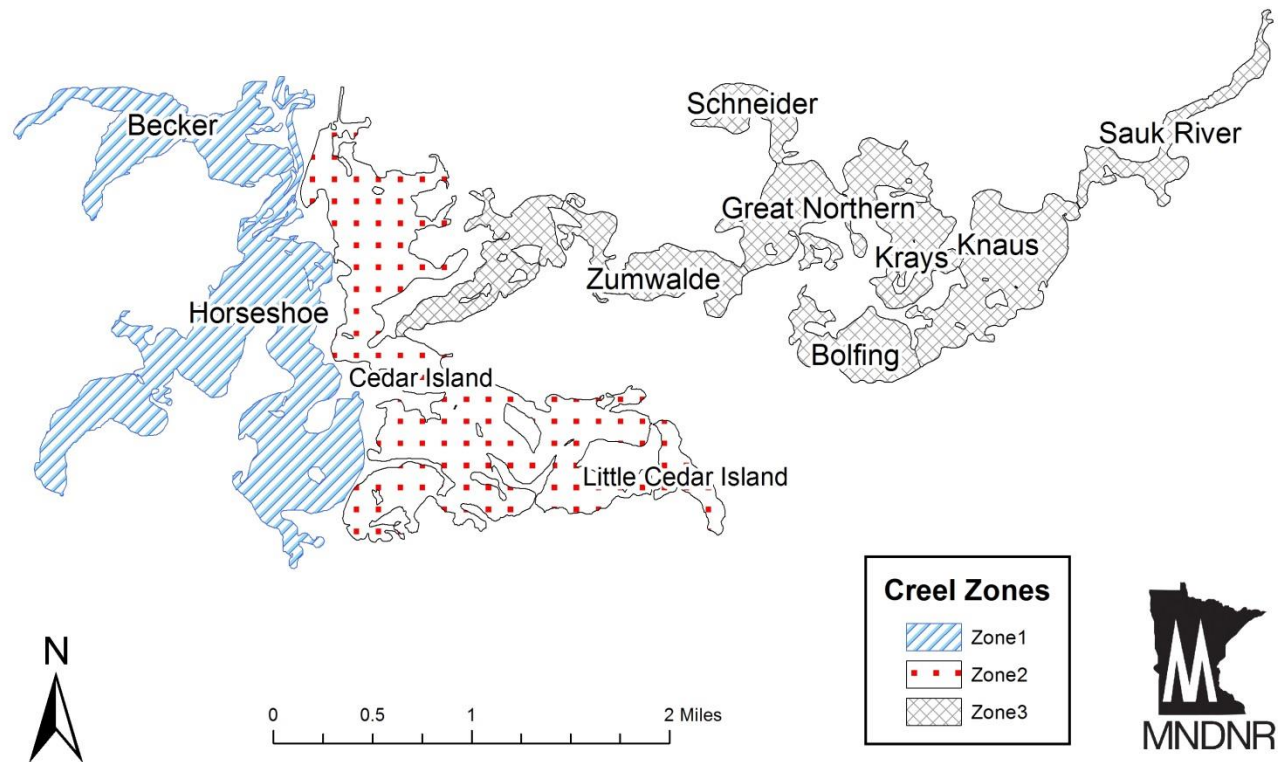
### **Acknowledgments**

We would like to acknowledge and thank Ryan Henry and Adam Liestman for their service as creel clerks often during inclement weather, working weekends, mornings, and evenings, and dealing with a wide variety of anglers (occasionally disgruntled ones). We would also like to express our gratitude to the East Metro Area Fishers Office for the use of their boat and City of Cold Spring for the storage of our equipment during this survey.

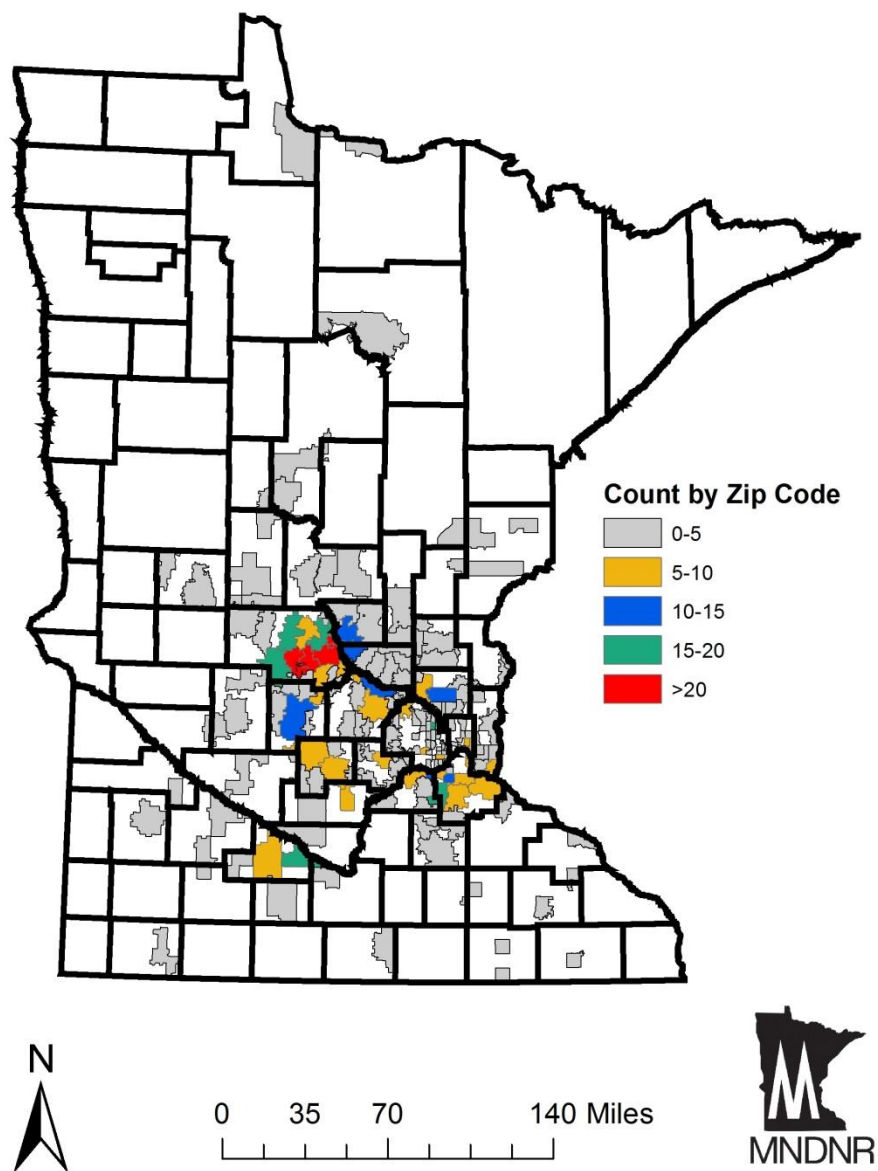
## References

- Altena, E.R. 1999. Horseshoe/Becker and Cedar Island Lakes Creel Survey with reference to an expanding channel catfish population May 8 to October 31, 1999. Minnesota Department of Natural Resources Division of Fisheries. St. Paul, Minnesota.
- Anderson, R. O. and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-482 in B. R. Murphy and D. W. Willis, editors. Fisheries Techniques. American Fisheries Society, Bethesda, Maryland.
- Malvestuto, S.P. 1996. Sampling the recreational creel. Pages 591-623 in B. R. Murphy and D. W. Willis, editors. Fisheries Techniques. American Fisheries Society, Bethesda, Maryland.
- Minnesota Department of Natural Resources. 2000. Horseshoe/Becker and Cedar Island Lakes Creel Survey. Division of Fisheries. St. Paul, Minnesota.
- Minnesota Department of Natural Resources. 2012. Cedar Island Lake and Horseshoe Lake Population Assessments. Division of Fisheries. St. Paul, Minnesota.
- Minnesota Department of Natural Resources. 2014. Bolting, Great Northern, Knaus, Krays and Schneider Lake Population Assessments. Division of Fisheries. St. Paul, Minnesota.
- Soupir, C. 2008. CAS version 2.2—Creel Application Software creel analysis program. Minnesota Department of Natural Resources, Division of Fish and Wildlife. St. Paul, Minnesota.

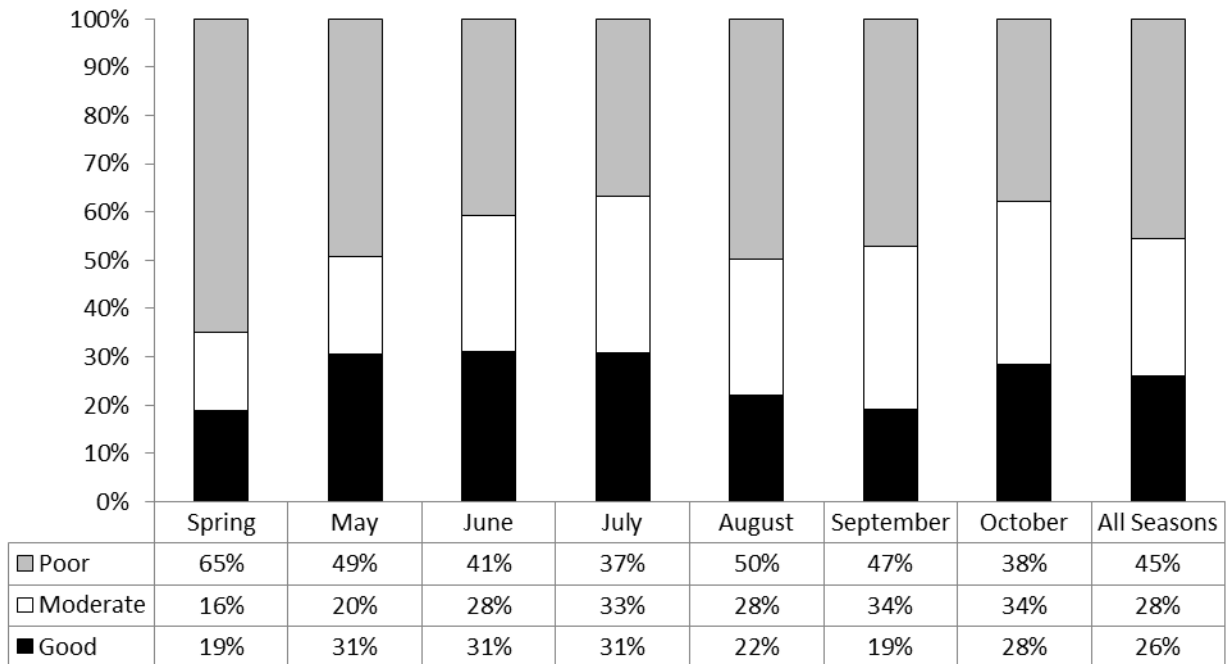
## Sauk River Chain of Lakes Creel Zones



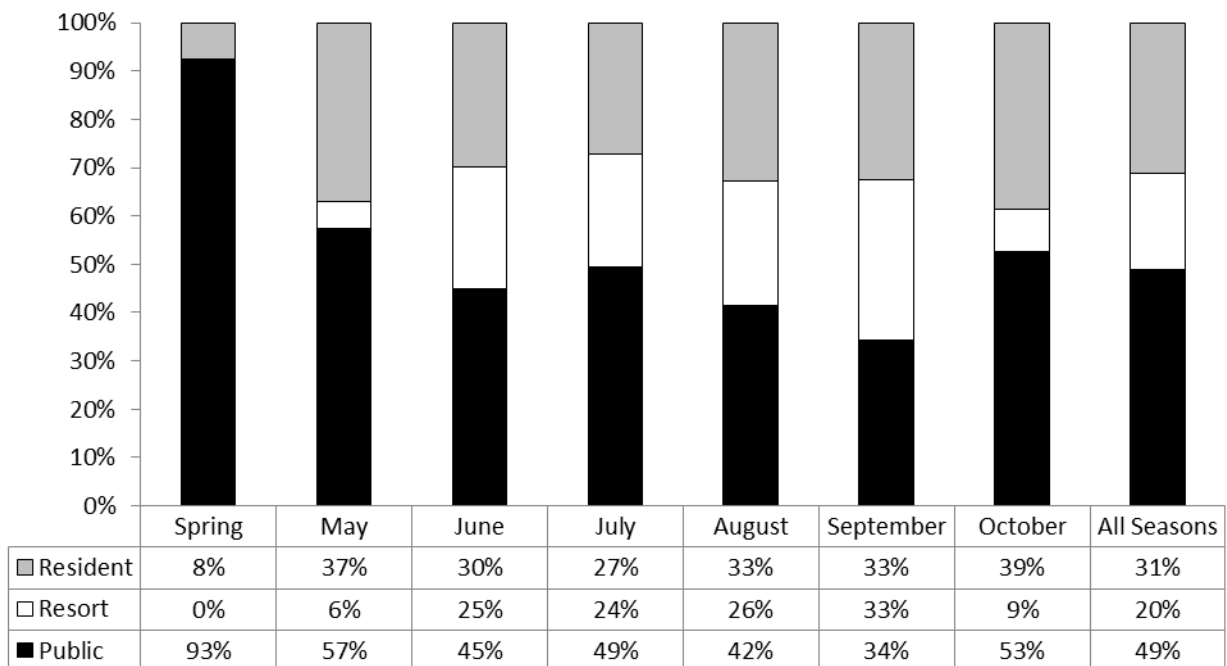
**Figure 1.** 2015 Creel survey zones for Sauk River Chain of Lakes, Stearns County, Minnesota.



**Figure 2.** Density distribution based on zip code data received from all anglers fishing the Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. County boundaries outlined in thick black lines.

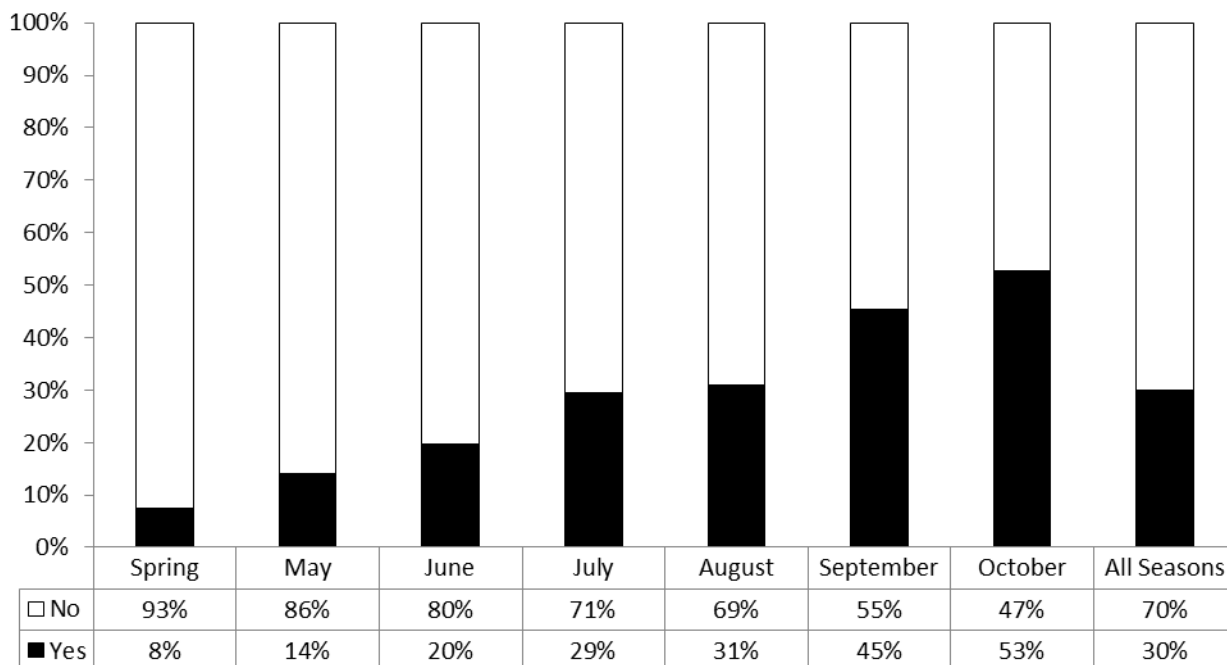


**Figure 3.** Response to question 1: “Based on the size and number of fish you caught, would you rate your fishing success today as good, moderate or poor?”

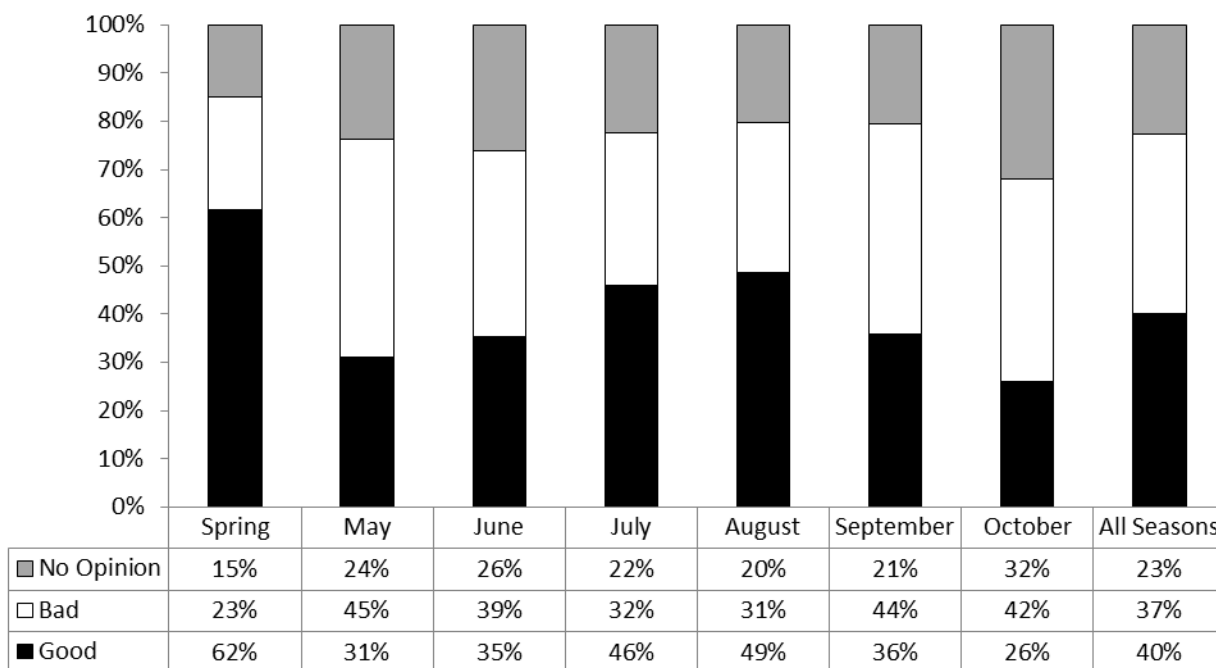


**Figure 4.** Response to question 2: “Which access did you use today Public, Resort, or Private?”

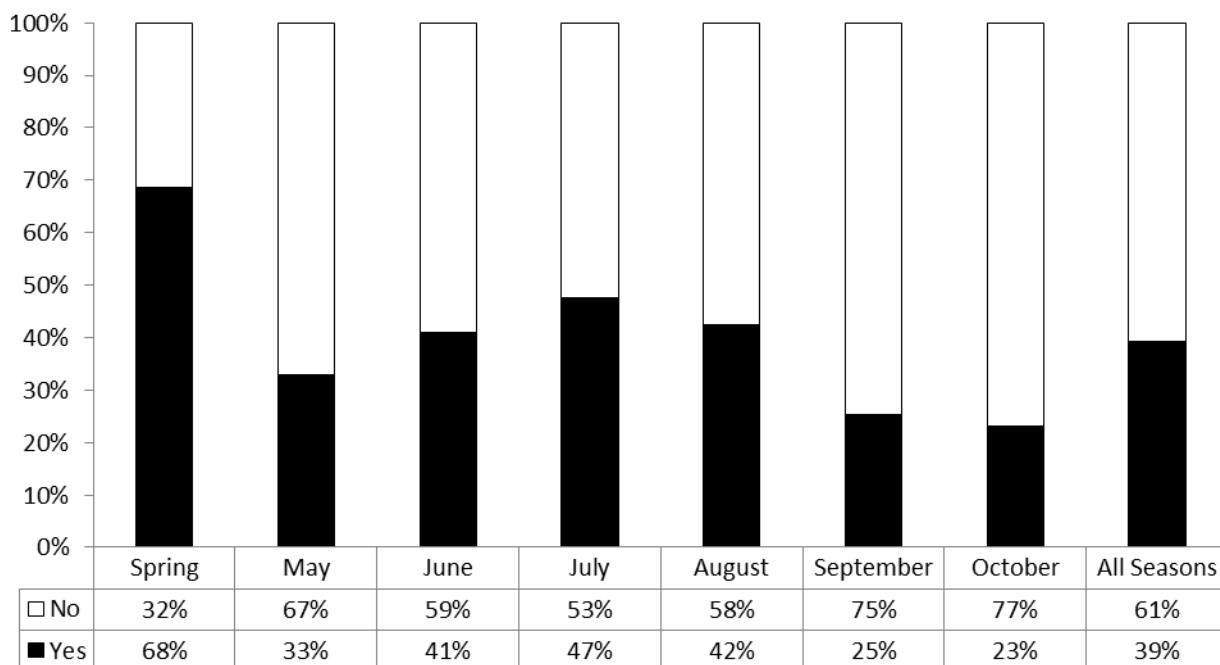




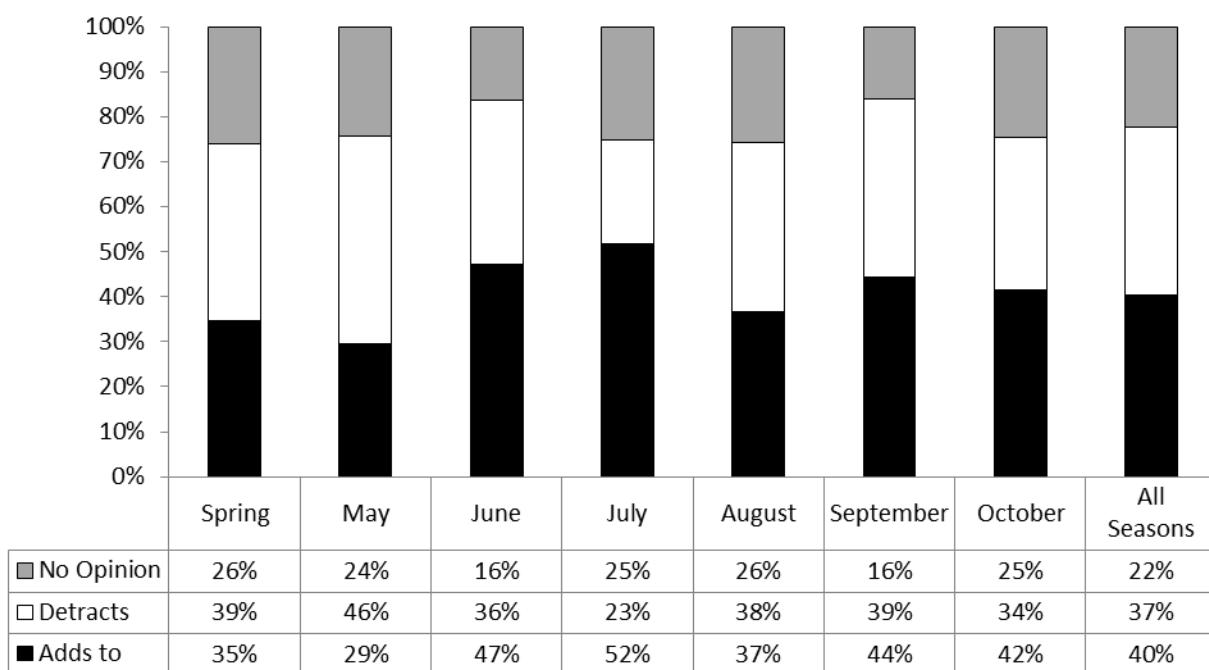
**Figure 5.** Response to question 3: “Have you been interviewed before?”



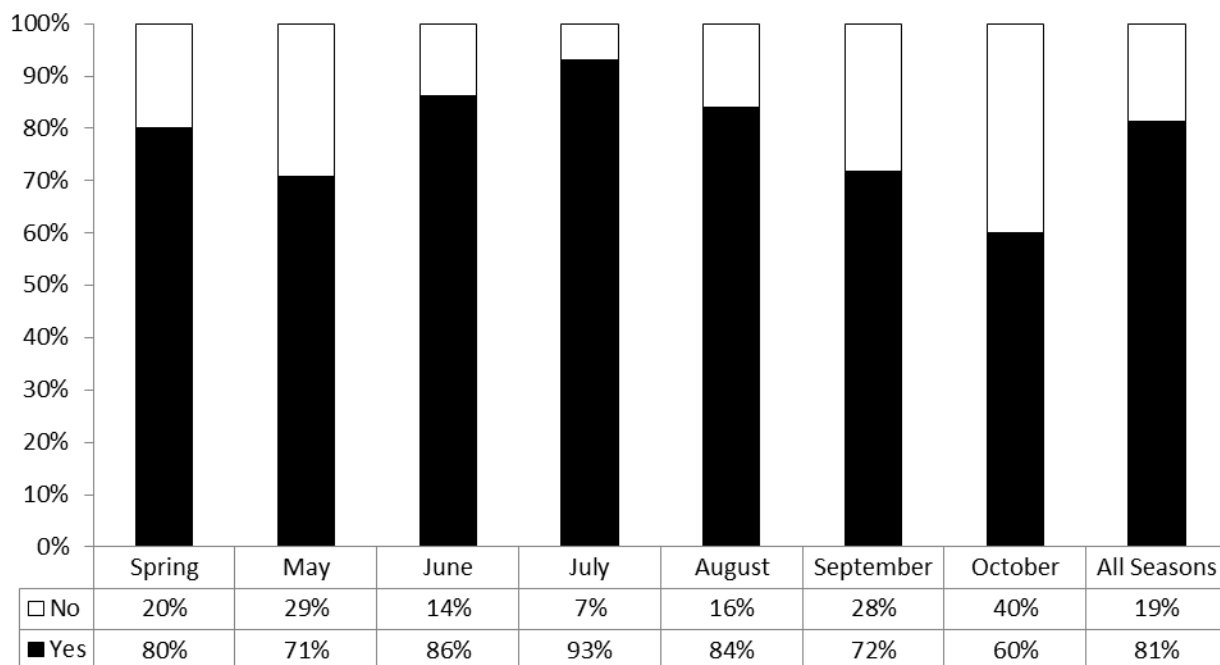
**Figure 6.** Response to question 4: “How do you feel about Channel Catfish in the Sauk River Chain of Lakes?”



**Figure 7.** Response to question 5: “Do you fish for Channel Catfish in the Sauk River Chain of Lakes?”



**Figure 8.** Response to question 5a: If no (question 5) “How do you feel about catching Channel Catfish while fishing for other species?”



**Figure 9.** Response to question 5b: If yes (question 5) “Do you fish for Channel Catfish with the intent to harvest?”

**Table 1.** Angling effort estimated for the Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors are in parentheses.

	Month							Entire
	Spring	May	June	July	August	September	October	Season
Angler hours	5,228 (718)	17,132 (3,067)	15,244 (1,751)	13,660 (920)	14,221 (1,072)	13,318 (1,220)	7,000 (1,052)	85,803 (4,193)
Angler hours/acre	1.92 (0.26)	6.29 (1.13)	5.60 (0.64)	5.02 (0.34)	5.22 (0.39)	4.89 (0.45)	2.57 (0.39)	31.51 (1.54)
Party size	1.28 (0.41)	1.65 (0.49)	1.62 (0.57)	1.55 (0.48)	1.75 (0.67)	1.84 (0.56)	1.71 (0.29)	1.63 (0.02)
Avg trip length (hrs)	2.29 (0.32)	3.21 (0.03)	2.67 (-)	2.61 (-)	2.50 (0.29)	5.01 (0.15)	3.97 (0.19)	3.16 (0.07)
Number of interviews	81	236	177	222	255	243	148	1,362

**Table 2.** Angling effort estimated by zone for the Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors are in parentheses.

	Zone		
	1	2	3
Angler hours	26,652 (2,235)	23,603 (1,980)	35,547 (2,944)
Angler hours/acre	30.32 (2.54)	28.68 (2.41)	34.78 (2.88)
Number of interviews	450	437	475

**Table 3.** Percentage<sup>1</sup> of anglers targeting species, Sauk River Chain of Lakes, April 4, 2015-October 31, 2015.

Target Species	Spring	May	June	July	August	September	October	All seasons
Anything	7%	6%	11%	10%	8%	1%	0%	6.3%
Black Crappie	30%	6%	7%	10%	8%	28%	8%	13.4%
Channel Catfish	43%	10%	19%	26%	17%	7%	1%	16.8%
Largemouth Bass	0%	8%	9%	9%	8%	11%	5%	7.6%
Northern Pike	1%	1%	3%	4%	4%	2%	1%	2.4%
Smallmouth Bass	0%	1%	0%	0%	0%	0%	0%	0.3%
Sunfish spp.	19%	12%	29%	31%	45%	35%	41%	31.3%
Walleye	0%	56%	21%	9%	10%	16%	43%	21.7%
Yellow Perch	0%	1%	0%	0%	0%	0%	1%	0.2%

<sup>1</sup>Percentages do not total to 100 because anglers could target up to two species.

**Table 4.** Catch and harvest estimates, Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors are in parentheses.

Species	Number Harvested		Number Released		Number Caught	
All species	61,579	(4,448)	89,832	(5,742)	151,411	(9,160)
Black Crappie	11,393	(1,425)	5,559	(980)	16,952	(2,076)
Bowfin (Dogfish)	0	(0)	64	(44)	64	(44)
Bullhead species	19	(19)	215	(163)	234	(164)
Channel Catfish	11,023	(1,379)	10,227	(831)	21,250	(1,646)
Common Carp	0	(0)	41	(28)	41	(28)
Largemouth Bass	585	(133)	6,002	(936)	6,587	(1,004)
Muskellunge	0	(0)	10	(7)	10	(7)
Northern Pike	688	(177)	3,234	(507)	3,921	(584)
Smallmouth Bass	117	(64)	1,725	(379)	1,842	(385)
Sunfish <sup>1</sup>	33,912	(3,519)	42,624	(4,352)	76,535	(7,003)
Redhorse species	0	(0)	45	(34)	45	(34)
Rock Bass	18	(14)	165	(79)	183	(82)
Walleye	3,264	(400)	14,927	(1,882)	18,192	(1,735)
White Sucker	100	(61)	208	(87)	309	(107)
Yellow Perch	460	(169)	4,733	(1,147)	5,194	(1,197)

<sup>1</sup>Includes Bluegill, Pumpkinseed, Hybrid and Green Sunfish.

**Table 5.** Harvest, release, and catch rate estimates, Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors appear in parentheses. Bowfin (Dogfish), Rock Bass, Bullhead, Common Carp, White Sucker, Redhorse species, and Muskellunge were caught so infrequently that catch, harvest, and release rates were less than 0.01.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
Targeting Anglers						
Anything	0.63	(0.22)	0.88	(0.14)	1.51	(0.27)
Black Crappie	0.87	(0.15)	0.43	(0.10)	1.30	(0.20)
Channel Catfish	0.88	(0.10)	0.16	(0.03)	1.04	(0.09)
Largemouth Bass	0.05	(0.05)	0.73	(0.27)	0.78	(0.28)
Northern Pike	0.24	(0.04)	0.26	(0.09)	0.50	(0.08)
Smallmouth Bass	0.00	(<0.01)	0.47	(0.15)	0.47	(0.15)
Sunfish <sup>1</sup>	1.82	(0.26)	2.33	(0.27)	4.16	(0.43)
Walleye	0.22	(0.06)	0.86	(0.16)	1.09	(0.18)
All Anglers						
All species	0.72	(0.08)	1.05	(0.11)	1.77	(0.17)
Black Crappie	0.13	(0.02)	0.07	(0.01)	0.20	(0.03)
Channel Catfish	0.13	(0.02)	0.12	(0.01)	0.25	(0.03)
Largemouth Bass	0.01	(<0.01)	0.07	(0.01)	0.08	(0.01)
Northern Pike	0.01	(<0.01)	0.04	(0.01)	0.05	(0.01)
Smallmouth Bass	<0.01	(<0.01)	0.02	(<0.01)	0.02	(<0.01)
Sunfish <sup>1</sup>	0.40	(0.06)	0.50	(0.7)	0.89	(0.12)
Walleye	0.04	(<0.01)	0.17	(0.02)	0.21	(0.2)
Yellow Perch	0.01	(<0.01)	0.06	(0.01)	0.06	(0.02)

<sup>1</sup>Includes Bluegill, Pumpkinseed, Hybrid and Green Sunfish.

**Table 6.** Catch and harvest estimates per acre, Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors are in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
All species	22.61	(1.63)	32.98	(2.11)	55.58	(3.36)
Black Crappie	4.18	(0.52)	2.04	(0.36)	6.22	(0.76)
Bowfin (Dogfish)	<0.01	(<0.01)	0.02	(0.02)	0.02	(0.02)
Bullhead species	0.01	(0.01)	0.07	(0.06)	0.09	(0.06)
Channel Catfish	4.05	(0.51)	3.75	(0.31)	7.80	(0.60)
Common Carp	<0.01	(<0.01)	0.02	(0.01)	0.02	(0.01)
Largemouth Bass	0.22	(0.05)	2.20	(0.34)	2.42	(0.37)
Muskellunge	<0.01	(<0.01)	<0.01	(<0.01)	<0.01	(<0.01)
Northern Pike	0.25	(0.07)	1.19	(0.19)	1.44	(0.21)
Redhorse species	<0.01	(<0.01)	0.02	(0.01)	0.02	(0.01)
Rock Bass	0.01	(0.01)	0.06	(0.03)	0.07	(0.03)
Smallmouth Bass	0.04	(0.02)	0.63	(0.14)	0.68	(0.14)
Sunfish <sup>1</sup>	12.45	(1.29)	15.65	(1.60)	28.10	(2.57)
Walleye	1.20	(0.15)	5.48	(0.69)	6.68	(0.64)
White Sucker	0.04	(0.02)	0.08	(0.03)	0.11	(0.04)
Yellow Perch	0.17	(0.06)	1.74	(0.42)	1.91	(0.44)

<sup>1</sup>Includes Bluegill, Pumpkinseed, Hybrid and Green Sunfish.



**Table 7.** Length frequency of harvested Black Crappie, Sunfish species, and Yellow Perch from the Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Actual number of fish measured, not estimated.

Total Length (in.)	Black Crappie	Sunfish <sup>2</sup>	Yellow Perch
<4.0	—	—	—
4.0-4.4	—	—	—
4.5-4.9	—	—	—
5.0-5.4	—	—	1
5.5-5.9	—	1	—
6.0-6.4	—	39	1
6.5-6.9	1	106	1
7.0-7.4	2	327	4
7.5-7.9	10	509	2
8.0-8.4	25	494	6
8.5-8.9	54	195	3
9.0-9.4	82	41	2
9.5-9.9	134	8	1
10.0-10.4	157	4	1
10.5-10.9	135	—	—
11.0-11.4	69	—	—
11.5-12.0	19	—	—
>12.0	7	—	—
Total (N)	695	1,724	22
Mean TL	10.0	7.8	8.0
Min. TL	6.8	5.9	5.4
Max. TL	13.1	10.6	10.7

<sup>1</sup>Includes Bluegill, Pumpkinseed, Hybrid and Green Sunfish.

**Table 8.** Length frequency distribution of harvested Channel Catfish, Northern Pike, and Walleye from the Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Actual number of fish measured, not estimated.

Total Length (in)	Channel Catfish	Northern Pike	Walleye
<10.0	—	—	2
10.0–10.9	3	—	3
11.0–11.9	4	—	14
12.0–12.9	3	—	25
13.0–13.9	5	—	18
14.0–14.9	5	—	28
15.0–15.9	29	—	28
16.0–16.9	59	—	17
17.0–17.9	133	1	10
18.0–18.9	121	3	12
19.0–19.9	69	1	9
20.0–20.9	37	3	3
21.0–21.9	9	9	—
22.0–22.9	2	3	3
23.0–23.9	7	6	1
24.0–24.9	6	2	1
25.0–25.9	1	4	—
26.0–26.9	1	—	—
27.0–27.9	—	1	1
28.0–28.9	—	—	—
29.0–29.9	—	—	—
30.0–30.9	—	—	—
31.0–31.9	—	1	—
32.0–32.9	—	1	—
33.0–33.9	—	—	—
34.0–35.0	—	—	—
>35.0	—	—	—
Total N	492	35	175
Mean TL	18.1	22.5	15.1
Min. TL	10.3	17.8	9.3
Max. TL	26.5	32	27.6

**Table 9.** Yield estimates in pounds, Sauk River Chain of Lakes, April 4, 2015-October 31, 2015. Standard errors are in parentheses.

	Harvest		Harvest per Acre	
All species	46,800	(—)	17.18	(—)
Black Crappie	6,772	(—)	2.49	(—)
Channel Catfish	18,906	(—)	6.94	(—)
Largemouth Bass	1,002	(—)	0.37	(—)
Northern Pike	1,541	(—)	0.57	(—)
Smallmouth Bass	159	(—)	0.06	(—)
Sunfish <sup>1</sup>	14,869	(—)	5.46	(—)
Walleye	3,441	(—)	1.26	(—)
Yellow Perch	108	(—)	0.04	(—)

<sup>1</sup>Includes Bluegill, Pumpkinseed, Hybrid and Green Sunfish.

**Table 10.** Responses to human dimension questions 2 through 5a. One response was collected from each party, regardless of party size. Previously interviewed anglers were not asked further questions after Question 3. Only anglers who responded “no” to question 4 were asked question 5. Some interviews had no response.

Question 1: “Based on the size and number of fish you caught, would you rate your fishing success today as: Good, Moderate, or Poor?”

	Good	Moderate	Poor	Total
Number	354	384	646	1354
Percent	26%	28%	45%	

Question 2: “Which access did you use today?”

	Public	Resort	Private	Total
Number	661	267	423	1,351
Percent	49%	20%	31%	

Question 3: “Have you been interviewed before?”

	Yes	No	No Response	Total
Number	950	404	8	1,354
Percent	30%	70%	<1%	

Question 4: “How do you feel about Channel Catfish in the SRCL: good, bad or no opinion?”

	Good	Bad	No Opinion	Total
Number	381	355	216	952
Percent	40%	37%	23%	

Question 5: “Do you fish for Channel Catfish in the SRCL?”

	Yes	No	Total
Number	374	578	952
Percent	39%	61%	

Question 5a: “If no, how do you feel about catching Channel Catfish incidentally? Does it add to your experience, detract from your experience, or no opinion?”

	Add to	Detract From	No Opinion	Total
Number	234	217	129	580
Percent	40%	37%	22%	

Question 5b: “If yes, do you fish for Channel Catfish in The SRCL with the intent to harvest?”

	Yes	No	Total
Number	299	69	368
Percent	81%	19%	

**Addendum 1.** DNR Fisheries Creel Survey SRCL 2015 Pressure Form

<b>Name</b>	Sauk River Chain of Lakes	<b>Shift</b>	Early or Late
<b>Month/Day/Year</b>	<u>    </u> / <u>    </u> / <u>2015</u>	<b>Clerk</b>	
<b>Zone</b>		<b>Subzone</b>	

Fishing Pressure				
Total	Type	Tally		
		A	B	C
	Boat			
	Bank			

**Comments:**

## Addendum 2. DNR Fisheries Creel Survey SRCL 2015 Interview Form

<b>Waterbody code</b>	SRCL
<b>Date</b>	__/__/2015
<b>Interview #</b>	
<b>Work Period</b>	Default
<b>Day Type</b>	Default
<b>Work shift</b>	1-early or 2-late
<b>Arrival Time</b>	Default
<b>Departure Time</b>	Default
<b>Access Site</b>	1, 2, or 3
<b>Creel Clerk</b>	

<b>Interview time</b>	
<b>Time started fishing</b>	
<b>Time fished</b>	Computed in CAS
<b>Time fished (given)</b>	
<b>Completed fishing?</b>	Yes or No
<b>Type of fishing</b>	1-Boat or 2-Bank
<b>Species sought (primary)</b>	
<b>Species sought (secondary)</b>	
<b>Party Size</b>	

<b>Zip code</b>	
-----------------	--

<b>Question 1</b>	<p>“Based on the size and number of fish you caught, would you rate your fishing success today as:</p> <p>1-Good                      2-Moderate                      3-poor</p>
-------------------	--

<b>Question 2</b>	<p>“Which access did you use today?”</p> <p>1-public (ask which one specifically)                      2-Resort (Riverside Resort, Ruegerner’s, or Cozy Corners)                      3-Lake resident dock</p>
-------------------	--

<b>Question 3</b>	<p>“Have you been interviewed before?”</p> <p>1-yes                      2-No</p>
-------------------	---

<b>Question 4</b>	<p>“How do you feel about Channel Catfish in the SRCL?”:</p> <p>1-Good                      2-Bad                      3-No opinion</p>
-------------------	---

<b>Question 5</b>	<p>“Do you fish for Channel Catfish in the SRCL?”</p> <p>1=yes                      2=No</p>
-------------------	--

<b>Question 5a</b>	<p><b>If no,</b></p> <p>“How do you feel about catching Channel Catfish while fishing for other species? Does it:</p> <p>1-Add to your experience                      2-Detract from your experience                      3-No opinion</p>
--------------------	---

<b>Question 5b</b>	<p><b>If yes,</b></p> <p>“Do you fish for Channel Catfish in the SRCL with the intent to harvest?” 1-Yes 2-No</p>
--------------------	---

<b>Question 5b<sup>1</sup></b>	<p><b>If no,</b></p> <p>“Why don’t you harvest Channel Catfish?”</p> <p>1- I don’t eat fish I catch</p> <p>2- They don’t taste good</p> <p>3- They are difficult to clean</p> <p>4- I practice catch and release</p> <p>5- No specific reason</p> <p>6- Other _____.</p>
--------------------------------	--

	Species			M/N/R	Number	Length
1						____. __
2						____. __
3						____. __
4						____. __
5						____. __
6						____. __
7						____. __
8						____. __
9						____. __
10						____. __
11						____. __
12						____. __
13						____. __
14						____. __
15						____. __
16						____. __
17						____. __
18						____. __
19						____. __
20						____. __

Comments

### Addendum 3. Creel Summary Form

MINNESOTA DEPARTMENT OF NATURAL RESOURCES DIVISION OF FISH & WILDLIFE			
Creel Survey Harvest Summary For Sauk River Chain, Open-water 2015			

Survey dates	4/4-10/31/15	Combined lake area (acres)	2,724
Fishing pressure (angler hours)	85,802	Number of days surveyed	142
Angler hours per acre	31.5	Average trip length (hours)	3.16
Average party size	1.63	Number of interviews	1,362
Distance traveled ≤10 miles	38%	Distance traveled ≥35 miles	45%

Species	Length Frequency for Harvested & Measured Fish (Inch Groups)													
	5	6	7	8	9	10	11	12-14	15-17	18-20	21-23	24-26	27-29	30+
Black crappie	—	65	12	79	216	292	88	6	1	—	—	—	—	—
Channel Catfish	—	—	—	—	—	3	4	11	221	227	18	8	—	—
Northern Pike	—	—	—	—	—	—	—	—	1	9	18	6	1	2
Sunfish <sup>1</sup>	1	145	836	689	49	4	—	—	—	—	—	—	—	—
Walleye	—	—	—	—	2	3	14	71	55	24	4	1	1	—

<sup>1</sup>Includes bluegill, pumpkinseed, hybrid and green sunfish.

Species	Estimated Total Harvest				Catch Rate
	Number	Mean Length (in)	Largest (in)	Number/Acre	Number/Hour <sup>1</sup>
Black crappie	11,939	10.00	13.1	4.18 (0.52)	1.30 (0.20)
Channel Catfish	11,023	18.05	26.5	4.05 (0.51)	1.04 (0.20)
Northern pike angle	688	22.50	32.00	0.25 (0.07)	0.50 (0.08)
Northern pike spear	460	8.02	10.7	0.17 (0.06)	—
Sunfish	33,912	7.81	10.6	12.45 (1.29)	4.16 (0.43)
Walleye	3,264	15.13	27.6	1.20 (0.15)	1.09 (0.18)
All species	61,579	—	—	22.61 (1.63)	1.51 (0.27)

<sup>1</sup>For anglers targeting each species

Sauk Rapids Area Fisheries Office: (763) 675-3301  
Minnesota DNR website: [www.dnr.state.mn.us](http://www.dnr.state.mn.us)

**Minnesota Department of Natural Resources  
Division of Fish and Wildlife**

**Sauk River Chain of Lakes  
Open Water Creel Survey  
April 4, 2014 to December 31, 2015**

**By**

**Ryan T. Andvik**

**Sauk Rapids Area Fisheries Office**

  
\_\_\_\_\_  
Author

8/24/16

Date

  
\_\_\_\_\_  
Area Fisheries Supervisor

8/24/16

Date

  
\_\_\_\_\_  
Regional Fisheries Supervisor

8-25-16

Date

Copyright 2015 State of Minnesota, Department of Natural Resources

Reproduction of this material without the express written authorization  
of the Department of Natural Resources is prohibited