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Sauk River Chain of Lakes
Winter Creel Survey
December 3, 2014 to March 22, 2015

By

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Abstract

A winter creel survey was conducted on the Sauk River Chain of Lakes (SRCL) near Richmond, MN from December 3, 2014 to March 22, 2015. The objectives of the survey were to provide information on angling effort, catch and harvest, angler demographics, and angler attitudes toward Channel Catfish in the SRCL. The winter creel survey, recent summer fish population assessments and the upcoming 2015 summer creel survey will provide baseline data before Muskellunge recruit into the fishery; Muskellunge management and stocking began in 2011. Total angling effort was estimated to be 52,224 hours and 23.1 hours per acre. A total of 1,165 anglers were interviewed and 42% were from the adjacent towns of Cold Spring and Richmond. The mean distance traveled from home to the lake was 32 miles. When asked to rate their fishing success that day, only 20% said it was good, versus 58% who rated their success as poor. Black Crappie was the most sought after species; overall, 62% of anglers targeted Black Crappie, followed by Walleye (21%) and sunfish (17%). Sunfish had the highest catch (2.98/hr) and harvest (1.24/hr) rates for targeting anglers, followed by Black Crappie (0.81, 0.45/hr, respectively). Black Crappie had the highest number caught and harvested per acre (11.6 caught/acre, 7.4 harvested/acre), followed by sunfish (8.2 caught/acre, 2.9 harvested/acre). Many small Walleye were caught and released; only 17% were harvested. Relatively few Northern Pike were speared or angled and most angled pike were released. Some anglers have been concerned that Channel Catfish are harming the fishery for panfish, but these results indicate a healthy fishery for Black Crappie and sunfish. Northern Pike abundance is probably low, based on this creel survey and previous summer netting results. Channel Catfish harvest and catch rates were higher than for Walleye or Northern Pike, but lower than rates for sunfish and Black Crappie. The catfish possession limit increased from five to ten on March 1, 2015 but many anglers were unaware of the change. As this becomes more widely known, catfish harvest may increase. Future creel and netting surveys will be used to assess whether or not the increased limit will have an effect on catfish abundance. Attitudes regarding Channel Catfish were mixed; 34% of parties said they fish for catfish in the SRCL and 31% had a good opinion of catfish (40% had a bad opinion).

Introduction

Horseshoe and Cedar Island Lakes are the largest lakes in the Sauk River Chain of Lakes (SRCL), located adjacent to the towns of Cold Spring and Richmond in Stearns County, Minnesota. The SRCL is one of the largest bodies of water in the Montrose Fisheries Management Area and has a popular, multi-species fishery. Walleye fingerlings were stocked for many years before switching to fry stocking in 2001; currently Horseshoe and Cedar Island Lakes are stocked every other year by the DNR and the lake association has stocked Walleye fry in other lakes in the chain. Fall electrofishing results have shown high fry to fingerling survival and recent gill net catches have been favorable (Minnesota Department of Natural Resources 2012).

Channel Catfish were introduced into the SRCL in the 1970s and have dispersed throughout the chain and into other connected lakes. Summer gill net surveys have shown increasing numbers of Channel Catfish; surveys in 2011 and 2013 had very high net catches and lower mean lengths and weights (Minnesota Department of Natural Resources 2012, 2014). Muskellunge management began in 2011 when adult and fingerling muskellunge were stocked into Horseshoe and Cedar Island Lakes. Muskellunge fingerling stocking continues in these lakes in odd numbered years.

A winter creel survey was conducted on the SRCL from December 3, 2014 to March 22, 2015. The objectives of the survey were to provide information on angling effort, catch and harvest, angler demographics and satisfaction, and angler attitudes toward Channel Catfish in the SRCL. Along with the winter creel survey, a summer creel survey in 2015 will help provide a clearer picture of the year-round fishery. A summer creel survey was conducted in 1999 on the Horseshoe, Becker and Cedar Island Lakes (Minnesota Department of Natural Resources 2000). The 1999 survey found very high angling pressure (62.6 hours/acre) and mixed attitudes towards the Channel Catfish fishery. Channel Catfish and Muskellunge have been controversial additions to the fishery. Some anglers dislike catfish and fear that they are detrimental to panfish populations; others believe that muskies will harm the Walleye fishery. The winter creel survey, recent summer population assessments and the 2015 summer creel survey will provide baseline data on the SRCL fishery before Muskellunge recruit into the fishery.

Study Area

The Sauk River Chain of Lakes has a total surface area of 2,261 acres and is composed of 9 interconnected basins, ranging in size from 54 to over 900 acres. The lakes are located in Stearns County and were formed by the impoundment of the Sauk River at the Cold Spring dam. Maximum depth ranges from less than 9 feet (Great Northern Lake) to 75 feet (Cedar Island Lake). The two largest lakes are Cedar Island (998 acres, Lake Class 36) and Horseshoe (550 acres, Lake Class 25; Shupp 1992). The watershed is large, encompassing nearly 700,000 acres; water quality varies somewhat among basins, but is moderately eutrophic overall. The morphometry of the chain is complex, with numerous islands and a large amount of shoreline. Three public accesses serve the lake along with ramps at several resorts and numerous winter access points during ice cover.

Methods

A stratified, random, roving creel survey was conducted from December 3, 2014 through March 22, 2015 using a full-time creel clerk. The survey was stratified by month, day type (weekday, weekend/holiday), angler type, and zone. Angler type was recorded as one of four strata: using a shelter of any kind (fish house), angling without a shelter (open ice), spearing, or a combination of spearing and angling from a shelter. The chain of lakes was divided into three zones (Figure 1): Zone 1 included Becker and Horseshoe Lakes (726 acres), Zone 2 included most of Cedar Island Lake (820 acres), and Zone 3 included Koetter Lake (part of Cedar Island Lake) and all lakes to the East up to the Highway 49 bridge (Zumwalde, Great Northern, Schneider, Krays, Bolfing and Knaus Lakes, 715 acres).

For individual sampling days, one of two non-overlapping, eight hour sampling periods (6 AM to 2 PM, 2 PM to 10 PM) was used and divided equally between two of the three zones. Each zone was divided into three sub-zones (A, B, C) and all sub-zones were sampled. A progressive count was made in each zone by the clerk moving among the subzones and spending equal time in each. The clerk spent approximately 75 minutes in a sub-zone interviewing anglers and making a count; the counts for each sub-zone were added for a total zone count. Thus, two zones were sampled with one count each for a given sampling day. Three weekdays and all weekend days were sampled during each week. All holidays, with the exception of Christmas Day, were sampled and were treated

as weekend days for analysis; Christmas Day was not sampled, but was included as a weekend day. All weekdays, sampling periods, zones and the order of sub-zone travel were randomly chosen.

The creel clerk roved the lakes by foot, truck, ATV or snowmobile and interviewed as many anglers as possible. During the interview, the clerk recorded the number of anglers in the party, start and end times, angler demographics, and catch information. Harvested fish were measured to the nearest 0.1 inch (total length). An effort was made to record complete trip interviews when anglers were seen leaving the lake. Angler demographics were recorded individually, whereas all other data were recorded for the party. Open ice anglers were always interviewed individually. Data were analyzed with the Creel Application Software program (CAS, version 2.2; Soupir 2008). Regression equations were developed from SRCL lake survey results to estimate weight and yield.

Anglers were also asked a series of questions:

1.) "Based on the size and number of fish you caught, would you rate your fishing success today as good, moderate or poor?"

2.) "Have you been interviewed before on SRCL?"

3.) "How do you feel about Channel Catfish in the SRCL: good, bad, or no opinion?"

4.) "Do you fish for Channel Catfish on the SRCL?"

5.) "If no, how do you feel about catching Channel Catfish incidentally? Does it add to your experience, detract from your experience, or no opinion?"

All anglers were asked questions 1 and 2, but previously interviewed anglers were not asked any further questions. Anglers who responded "yes" to question 4 were not asked question 5.

Results and Discussion

Fishing Pressure

The creel survey covered a period of 110 days and a total of 78 days were sampled, including 44 weekdays and 34 weekend/holiday days. A total of 156 activity counts and 747 interviews were recorded. Completed trips (202) represented 27% of all interviews. Most interviews were conducted in Zone 1 (412) or Zone 2 (258); only 77 interviews were done in Zone 3. Mean party size was 1.5 anglers and mean trip length was 3.3 hours.

Angling effort was estimated to be 52,224 hours and 23.1 hours per acre (Table 1). Pressure varied widely among zones, from a high of 39.8 hrs/acre in Zone 1 to a low of 7.7 hrs/acre in Zone 3 (Table 2). Pressure in Zone 1 was high; historical data for Lake Class 25 (Horseshoe Lake) winter creel surveys shows a median pressure estimate of 4.9 hrs/acre and a maximum of 37.4 hrs/acre (unpublished data, Minnesota Department of Natural Resources). Too few winter creel surveys have been conducted on Lake Class 36 lakes (Cedar Island, Zone 2) to compare. Monthly pressure was highest in January (9.4 hrs/acre; Table 1). Fish house anglers accounted for most of the angling pressure (40,044 hrs), followed by open ice anglers (8,773 hrs), spearers (2,597 hrs) and spearing/angling (810 hours).

Angler Demographics and Interview Questions

A total of 1,165 anglers (747 parties) were interviewed, of which 94.0% were male and 6.0% were female. Home zip codes were recorded for 1,162 anglers and 42% were from Cold Spring or Richmond (Table 3). These were considered "local" anglers with minimal travel distance to the lakes. The average distance traveled from home to the lake was 32 miles and many anglers came from much farther away. Anglers from Minneapolis (4%) and St. Paul (3%) traveled an average distance of 81 and 95 miles, respectively. St. Cloud anglers (14%) drove an average distance of 25 miles. In contrast, during the 2010 Maple Lake creel survey in Wright County, the average distance traveled was 6 miles and more than two-thirds of anglers traveled 10 miles or less (Minnesota Department of Natural Resources 2011). The Sauk River Chain of Lakes may have a wider reputation (with several resorts/trailer communities and far more lake homes) than smaller lakes like Maple Lake (777 acres).

Black Crappie was by far the most sought after species; overall, 62% of anglers targeted Black Crappie with the highest percentage (72%) in February (Table 4). Walleye (21%) and sunfish (17%) were the next most targeted species. The Walleye and Northern Pike season closed at the end of February; panfish and catfish have no closed season. In March, sunfish species (51%) and Channel Catfish (17%) were targeted more often than in other months.

Each party was asked a series of questions during the interview. When asked to rate their fishing success that day, only 20% said it was good, versus 58% who rated their

success as poor (Table 5). Many anglers were interviewed more than once; 40% of all parties indicated that they had been previously interviewed (Table 6). Attitudes regarding Channel Catfish were slightly more negative than positive; 34% of parties said they fish for catfish in the SRCL and 31% had a good opinion of catfish (40% had a bad opinion). However, among parties who do not fish for Channel Catfish, 40% felt that catching them incidentally would add to their angling experience and 40% said it would detract from their experience. By combining anglers who fish for catfish with those who enjoy catching them incidentally, 37% of anglers can be said to enjoy catching Channel Catfish in the SRCL.

Catch and Harvest

For all species combined, 1.16 fish were caught and 0.55 harvested per angler-hour (Table 7). Among species, sunfish had the highest catch (2.98/hr) and harvest (1.24/hr) rates for targeting anglers, followed by Black Crappie (0.81, 0.45/hr, respectively). Channel Catfish harvest (0.45/hr) was just over half of the catch rate (0.81), whereas most Walleye were released (0.50 release/hr, 0.08 harvest/hr). Northern Pike spearers had a higher harvest rate (0.17/hr) than anglers targeting pike (0.05/hr). Using historical winter creel data from Lake Class 25 lakes (Horseshoe Lake, Zone 1), SRCL results are relatively high (unpublished data, Minnesota Department of Natural Resources). SRCL Black Crappie harvest per acre and harvest per hour were in the fourth quartile, sunfish were in the third and fourth quartiles, respectively, and Northern Pike were in the fourth quartiles. Walleye were in the fourth quartile for both harvest per acre and per hour, although lakes in the historical results may not have been stocked.

Black Crappie was the most numerous species caught (26,122) and harvested (16,770), followed by sunfish (18,535 caught, 6,592 harvested; Table 8). Only 36% of sunfish were harvested, compared with 64% of Black Crappie and 54% of Channel Catfish; anglers reported releasing many small sunfish. Many small Walleye were also caught and released; of 4,689 Walleye caught, only 789 (17%) were harvested. Relatively few Northern Pike were caught by spearing (586) or angling (360) and most angled pike were released (229, 64%). Only nine anglers targeted Yellow Perch, but 2,685 were caught and only 253 (9%) were harvested. Black Crappie had the highest number caught and harvested per acre (11.6 caught/acre, 7.4 harvested/acre), followed by sunfish (8.2

caught/acre, 2.9 harvested/acre; Table 9). Black Crappie also had the highest yield (3.6 lbs/acre; Table 10), followed by Channel Catfish (2.8 lbs/acre).

Length frequencies for harvested fish (measured by clerk) are shown in Table 11. Black Crappie ranged in length from 6.2 to 13.5 inches with a mean length of 9.4 inches. Sunfish ranged in length from 5.0 to 9.9 inches with a mean length of 7.4 inches; 29.5% were 8 inches or longer. In contrast, in the Clearwater and Maple Lake winter creel surveys, only 3.9% and 2.3% of sunfish, respectively, were 8 inches or longer (Minnesota Department of Natural Resources 2005, 2011). Channel Catfish ranged in length from 12.0 to 23.1 inches with a mean length of 18.5 inches. Northern Pike ranged in length from 15.2 to 34.2 inches and mean length of speared pike (25.8 inches) was longer than angled pike (22.2 inches); 50% of all harvested Northern Pike were 24 inches or longer. These results are similar to the Clearwater Lake survey (56% $\geq$ 24 inches), but exceed results from the Maple Lake survey (16% $\geq$ 24 inches; Minnesota Department of Natural Resources 2005, 2011). Walleye ranged in length from 6.1 to 24.5 inches with a mean length of 13.1 inches.

Discussion and Management Implications

Angling pressure was relatively high, but varied widely among zones. Higher angling pressure on Horseshoe and Becker Lakes (Zone 1) may be due to better access and the same is true for Cedar Island and associated lakes (Zone 2). Low pressure on the lakes in Zone 3 is likely due to the lack of public access and the difficulty of travel between lakes due to current in the former river channel; several areas in Zone 3 had open water throughout the winter. Most interviews in Zone 3 were conducted on Schneider Lake, where the golf course allowed access by foot or ATV. Schneider Lake is located well off the old river channel and ice conditions were favorable throughout the season. The upcoming summer creel survey may find different results given the ease of boating between lakes and the availability of the Highway 23 public access in Cold Spring. This access is unusable in winter due to poor ice conditions.

Black Crappie was the most targeted and caught species, followed by sunfish. However, anglers targeting sunfish had higher catch and harvest rates than those targeting Black Crappie. The 1999 SRCL summer creel survey (Minnesota Department of Natural Resources 2000) found higher catch and harvest rates for both sunfish and Black Crappie, but the 2015 summer creel survey will provide better data for comparison. Clearwater Lake

is also a large system where Black Crappie and sunfish are a substantial component of the fishery. The 2005 winter creel survey on Clearwater Lake found lower catch and harvest rates for Black Crappie, but a similar harvest rate and a higher catch rate for sunfish (Minnesota Department of Natural Resources 2005). The mean length of harvested sunfish was lower on Clearwater Lake, likely lowering the harvest rate, but the mean length of harvested Black Crappie was higher. Some anglers have been concerned that Channel Catfish are harming the SRCL panfish fishery, but these results indicate a healthy fishery for Black Crappie and sunfish.

Walleye are a primary management species and were frequently targeted, but made up a small fraction of the catch. Most Walleye caught were small and were released. Walleye fry stocking has been very successful based on fall electrofishing results and recent age classes likely account for the small sizes seen in the creel. However, summer population assessments in 2011 for Cedar Island and Horseshoe Lakes (Minnesota Department of Natural Resources 2012) showed average or better catches of adult Walleye in gill nets. One possible explanation for the lack of adult Walleye in the winter creel is an abundance of forage. Yellow Perch were caught more often than expected, given that very few anglers targeted them, and perch may be more abundant than the 2011 survey results indicated. Also, the lakes are highly productive and contain good numbers of sucker and minnow species; abundant forage could increase Walleye satiation and reduce the need to search for food.

Northern Pike abundance is probably low, based on this creel survey and summer netting results. The highest number of anglers/spearers targeted pike in January, but this was only nine percent. Unlike many other area lakes, Northern Pike likely do not play a large role in Walleye fingerling survival, due to lower abundance. This may account for the high Walleye fingerling catches from fall electrofishing. The Clearwater Lake winter creel survey found a much higher percentage of anglers targeting Northern Pike and summer netting results indicated higher pike abundance.

Channel Catfish were most sought after in March, following the season closure for Walleye and Northern Pike. Channel Catfish harvest and catch rates were higher than for Walleye or Northern Pike, but lower than rates for sunfish and Black Crappie. Approximately half of the catch was harvested. The Channel Catfish possession limit

increased from five to ten on March 1, 2015 but many anglers were unaware of the change. As this becomes more widely known, catfish harvest may increase during the 2015 open water season. Many anglers are already willing to travel outside their local areas to fish the SRCL; the ability to harvest more catfish could encourage more anglers to travel to the lakes. Future creel and netting surveys will be used to assess whether or not the increased limit will have an effect on catfish abundance. Some anglers have expressed a strong dislike for Channel Catfish and feel that they are detrimental to the fishery, particularly for panfish. Black Crappie and sunfish data from the current creel survey indicate a healthy fishery, but research would be needed to determine what effect catfish have, if any. Angler attitudes about catfish are divided and 37% indicated that they enjoy catching them.

Muskellunge abundance will be controlled by the number stocked and the population density is expected to be low as in other Muskellunge fisheries. Low numbers and an abundance of sucker species for forage make it unlikely that Muskellunge will be detrimental to the Walleye fishery, as some anglers fear. The summer creel survey will provide a useful snapshot of the fishery before muskies become established. Future creel surveys will be conducted after Muskellunge fully recruit to the fishery to assess any changes.

Acknowledgments

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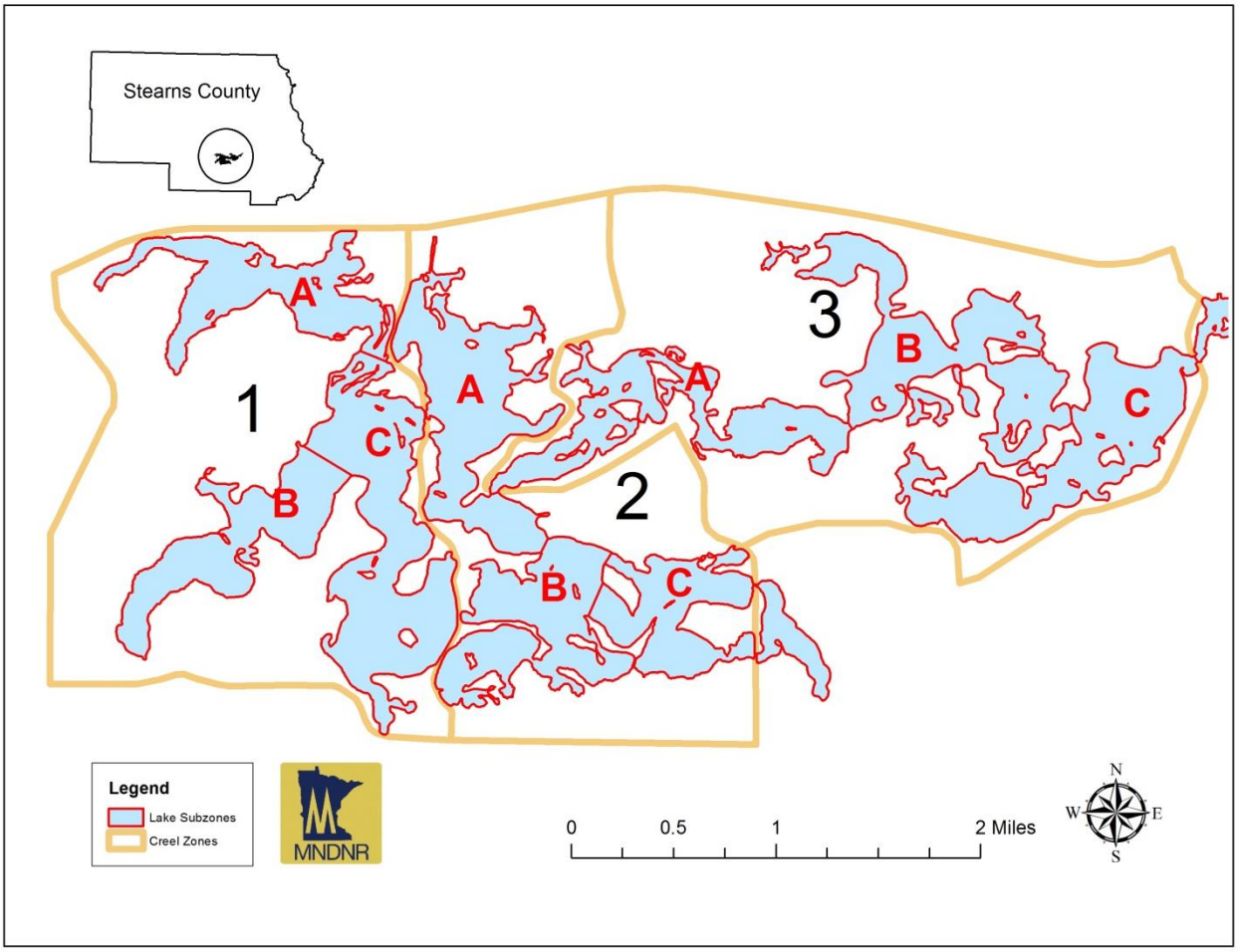

Figure 1. Sauk River Chain of Lakes, Stearns County, Minnesota.

Table 1. Angling effort estimated for the Sauk River Chain, December 3, 2014-March 22, 2015. Standard errors are in parentheses.

	Month				Entire
	December	January	February	March	Season
Angler hours	12,515 (2,074)	21,220 (2,763)	13,666 (1,621)	4,822 (1,151)	52,224 (3,986)
Angler hours/acre	5.54 (0.92)	9.39 (1.22)	6.04 (0.72)	2.13 (0.51)	23.10 (1.76)
Party size	1.27 (0.26)	1.62 (0.33)	1.85 (0.23)	1.13 (0.15)	1.46 (0.13)
Avg trip length (hrs)	3.32 (0.45)	3.41 (0.30)	2.99 (0.11)	3.42 (0.38)	3.29 (0.17)
Number of interviews	197	280	187	83	747

Table 2. Angling effort estimated by zone for the Sauk River Chain, December 3, 2014-March 22, 2015. Standard errors are in parentheses.

	Zone		
	1	2	3
Angler hours	28,892 (3,024)	17,803 (2,477)	5,529 (999)
Angler hours/acre	39.80 (4.16)	21.71 (3.02)	7.73 (1.09)
Number of interviews	412	258	77

Table 3. Approximate one-way distance[1] traveled by interviewed anglers, Sauk River Chain, December 3, 2014-March 22, 2015.

Most Frequent Home Zipcodes	Number of Anglers	Percent of Anglers	Distance To Lake (miles)
Cold Spring	272	23.3	0
Richmond	214	18.3	0
St. Cloud[2]	161	13.8	25.3
Minneapolis[2]	51	4.4	81.4
Sartell	50	4.3	28
St. Paul[2]	29	2.5	94.7
Total	777	66.6	Mean = 15.1
All zip codes total:	1,162	100.0	Mean = 32.0

[1]Shortest driving distance from center of zip code area. [2]Average distance from multiple zip codes.

Table 4. Percentage[1] of anglers targeting species, Sauk River Chain, December 3, 2014-March 22, 2015.

Target Species	December	January	February	March	Total
Anything	2.2	7.3	2.1	1.0	4.1
Black Crappie	61.9	55.2	72.2	63.4	62.3
Channel Catfish	4.8	15.5	11.2	16.8	11.9
Northern Pike	9.2	9.1	8.2	0.0	8.0
Sunfish spp.	12.5	15.7	10.6	50.5	16.5
Walleye	42.1	17.7	16.0	0.0	21.4

[1]Percentages do not total to 100 because anglers could target up to two species.

Table 5. 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?"

Response	Number of Parties[1]	Percent of Parties
Good	149	20.0
Moderate	161	21.7
Poor	433	58.3
No response	4	NA
Total	747	100.0

[1]One response was collected from each party, regardless of party size.

Table 6. Responses to questions 2 through 5. One response was collected from each party, regardless of party size. Previously interviewed anglers were not asked further questions. Only anglers who responded "no" to question 4 were asked question 5. Some interviews had no response.

Question 2: "Have you been interviewed before?"

	Yes	No	No Response	Total
Number	291	448	8	739
Percent	39.4	60.6	NA	100.0

Question 3: "How do you feel about Channel Catfish in the SRCL: good, bad or no opinion?"

	Good	Bad	No Opinion	No Response	Total
Number	140	180	127	1	448
Percent	31.3	40.3	28.4	0.2	100.0

Question 4: "Do you fish for Channel Catfish in the SRCL?"

	Yes	No	No Response	Total
Number	154	293	1	448
Percent	34.4	65.4	0.2	100.0

Question 5: "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	No Response	Total
Number	116	117	57	3	293
Percent	39.6	39.9	19.5	1.0	100.0

Table 7. Harvest, release, and catch rate estimates, Sauk River Chain, December 3, 2014–March 22, 2015. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Anything	0.20	(0.21)	0.73	(0.22)	0.93	(0.27)
Black Crappie	0.86	(0.21)	0.49	(0.12)	1.35	(0.28)
Channel Catfish	0.45	(0.13)	0.36	(0.20)	0.81	(0.26)
Northern Pike angling	0.05	(0.05)	0.04	(0.02)	0.09	(0.09)
Northern Pike spearing	0.17	(0.05)	0.00	(0.00)	0.17	(0.05)
Sunfish[1]	1.24	(0.27)	1.74	(0.26)	2.98	(0.45)
Walleye	0.08	(0.05)	0.50	(0.21)	0.58	(0.23)
			All Anglers			
Black Crappie	0.32	(0.08)	0.18	(0.045)	0.50	(0.12)
Channel Catfish	0.07	(0.02)	0.06	(0.019)	0.13	(0.03)
Northern Pike	0.01	(0.00)	0.00	(0.001)	0.02	(0.00)
Sunfish[1]	0.13	(0.01)	0.23	(0.060)	0.36	(0.07)
Walleye	0.02	(0.01)	0.08	(0.022)	0.09	(0.03)
Yellow Perch	0.01	(0.00)	0.05	(0.020)	0.05	(0.02)
All species	0.55	(0.10)	0.61	(0.141)	1.16	(0.23)

[1]Includes Bluegill, Pumpkinseed, Hybrid and Green Sunfish.

Table 8. Catch and harvest estimates, Sauk River Chain, December 3, 2014–March 22, 2015. Standard errors are in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black Crappie	16,770	(2,244)	9,353	(1,662)	26,123	(3,467)
Channel Catfish	3,543	(935)	3,039	(851)	6,582	(1,552)
Largemouth Bass	36	(27)	135	(51)	171	(62)
Northern Pike angled	132	(63)	229	(77)	361	(100)
Northern Pike speared	586	(126)	0	(0)	586	(126)
Smallmouth Bass	4	(6)	100	(51)	104	(52)
Rock Bass	132	(52)	460	(183)	592	(192)
Sunfish[1]	6,592	(1,102)	11,943	(2,879)	18,535	(3,745)
Walleye	789	(157)	3,899	(703)	4,688	(803)
Yellow Perch	253	(69)	2,442	(1,053)	2,695	(1,072)
All species	28,838	(3,593)	31,600	(5,933)	60,438	(8,183)

[1]Includes Bluegill, Pumpkinseed, Hybrid and Green Sunfish.

Table 9. Catch and harvest estimates per acre, Sauk River Chain, December 3, 2014–March 22, 2015. Standard errors are in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black Crappie	7.42	(0.99)	4.14	(0.73)	11.55	(1.53)
Channel Catfish	1.57	(0.41)	1.34	(0.38)	2.91	(0.69)
Northern Pike angled	0.06	(0.03)	0.10	(0.03)	0.16	(0.04)
Northern Pike speared	0.26	(0.06)	0.00	(0.00)	0.26	(0.06)
Sunfish[1]	2.92	(0.49)	5.28	(1.27)	8.20	(1.66)
Walleye	0.35	(0.07)	1.72	(0.31)	2.07	(0.36)
Yellow Perch	0.11	(0.03)	1.08	(0.47)	1.19	(0.47)
All species	12.75	(1.59)	13.98	(2.38)	26.73	(3.62)

[1]Includes Bluegill, Pumpkinseed, Hybrid and Green Sunfish.

Table 10. Yield estimates in pounds, Sauk River Chain, December 3, 2014–March 22, 2015. Standard errors are in parentheses.

	Harvest		Harvest per Acre	
Black Crappie	8,198	(—)	3.63	(—)
Channel Catfish	6,407	(—)	2.83	(—)
Northern Pike	2,282	(—)	1.01	(—)
Sunfish[1]	2,482	(—)	1.10	(—)
Walleye	556	(—)	0.25	(—)
Yellow Perch	68	(—)	0.03	(—)
All species	20,074	(—)	8.88	(—)

[1]Includes Bluegill, Pumpkinseed, Hybrid and Green Sunfish.

Table 11. Length frequency of harvested fish, Sauk River Chain, December 3, 2014–March 22, 2015. SE is standard error.

Total Length (in.)	Black Crappie	Sunfish[1]	Yellow Perch
<4.0	—	—	—
4.0-4.4	—	—	1
4.5-4.9	—	—	—
5.0-5.4	—	1	—
5.5-5.9	—	6	—
6.0-6.4	3	30	—
6.5-6.9	3	38	5
7.0-7.4	2	60	1
7.5-7.9	18	97	2
8.0-8.4	125	87	4
8.5-8.9	370	9	5
9.0-9.4	499	—	8
9.5-9.9	455	1	—
10.0-10.4	403	—	2
10.5-10.9	115	—	—
11.0-11.4	35	—	—
11.5-12.0	3	—	—
>12.0	3	—	—
Total (N)	2,034	329	28
Mean TL	9.4	7.4	8.2
Min. TL	6.2	5.0	4.0
Max. TL	13.5	9.9	10.0

[1]Includes Bluegill, Pumpkinseed, Hybrid and Green Sunfish.

Table 11 (continued). Length frequency distribution of harvested fish, Sauk River Chain, December 3, 2014–March 22, 2015.

Total Length (in)	Channel Catfish	Northern Pike Angled	Northern Pike Speared	Walleye
<10.0	—	—	—	4
10.0–10.9	—	—	—	5
11.0–11.9	—	—	—	14
12.0–12.9	1	—	—	14
13.0–13.9	—	—	—	4
14.0–14.9	3	—	—	2
15.0–15.9	9	—	1	6
16.0–16.9	41	—	—	—
17.0–17.9	88	—	—	3
18.0–18.9	69	1	3	2
19.0–19.9	51	1	—	1
20.0–20.9	30	1	—	1
21.0–21.9	33	1	2	1
22.0–22.9	6	1	2	1
23.0–23.9	4	1	1	—
24.0–24.9	—	—	1	1
25.0–25.9	—	2	1	—
26.0–26.9	—	2	2	—
27.0–27.9	—	—	3	—
28.0–28.9	—	1	—	—
29.0–29.9	—	—	1	—
30.0–30.9	—	—	4	—
31.0–31.9	—	—	2	—
32.0–32.9	—	—	1	—
33.0–33.9	—	—	—	—
34.0–35.0	—	—	1	—
>35.0	—	—	—	—
Total N	216	17	25	59
Mean TL	18.5	22.2	25.8	13.1
Min. TL	12.0	18.2	15.2	6.1
Max. TL	23.1	28.5	34.2	24.5

Addendum: Creel Summary Form

MINNESOTA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF FISH & WILDLIFE

Creel Survey Harvest Summary For Sauk River Chain, Winter 2014

Survey dates	12/3/1–3/22/15	Combined lake area (acres)	2,261
Fishing pressure (angler hours)	52,224	Number of days surveyed	78
Angler hours per acre	23.1	Average trip length (hours)	3.3
Average party size	1.5 anglers	Number of interviews	747
Distance traveled ≤10 miles	42 %	Distance traveled ≥35 miles	26%

	Length Frequency for Harvested & Measured Fish (Inch Groups)													
Species	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12-14**	**15-17**	**18-20**	**21-23**	**24-26**	**27-29**	**30+**
Black crappie	—	6	20	495	954	518	38	3	—	—	—	—	—	—
Channel Catfish	—	—	—	—	—	—	—	4	138	150	43	—	—	—
Northern Pike	—	—	—	—	—	—	—	—	1	6	8	8	5	8
Sunfish[1]	7	68	157	96	1	—	—	—	—	—	—	—	—	—
Walleye	—	—	—	—	—	9	5	20	9	4	2	1	—	—

[1]Includes bluegill, pumpkinseed, hybrid and green sunfish.

	Estimated Total Harvest				Catch Rate
Species	**Number**	**Mean Length (in)**	**Largest (in)**	**Number/ Acre**	**Number/ Hour[1]**
Black crappie	16,770	9.4	13.5	7.4	1.3
Channel Catfish	3,543	18.5	23.1	1.6	0.8
Northern pike angle	132	22.2	28.5	0.1	0.1
Northern pike spear	586	25.8	34.2	0.3	0.2
Sunfish	6,592	7.4	9.9	2.9	3.0
Walleye	789	13.1	24.5	0.3	0.6
All species	28,838	—	—	12.8	—

[1]For anglers targeting each species

Montrose Area Fisheries Office: (763) 675-3301
Minnesota DNR website: www.dnr.state.mn.us

Minnesota Department of Natural Resources

Division of Fish and Wildlife

Sauk River Chain of Lakes
Winter Creel Survey
December 3, 2014 to March 22, 2015

By

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Montrose Area Fisheries Office

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