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**Completion Report**

**Buffalo Lake Winter Creel Survey  
December 6, 2002 to March 10, 2003**

**By**

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## Abstract

A winter creel survey was conducted on Buffalo Lake from December 6, 2002 through March 10, 2003 using a full-time creel clerk. The objectives of the survey were to provide information on fishing pressure, angler demographics, catch and harvest, and angler satisfaction with the fishery. Angling pressure was estimated to be 72,228 angler hours or 46.54 angler hours per acre. This is well above historical winter creel survey results for lake class 24 (median 17.8 hrs/acre) and above the median value for any lake class. An estimated 40,092 fish were caught, or 25.83 per acre. Most anglers targeted walleye (65.2%), black crappie (43.6%) or northern pike (16.8%). Walleye had the highest estimated yield (7,029 lbs, 4.53 lbs/acre), followed by northern pike (5,679 lbs, 3.66 lbs/acre). The harvest rate for walleye anglers (0.148/hr) was high, compared to historic results (median 0.025/hr) for the lake class. For all parties, 31.6% gave a success rating of 5 or more (out of 10) and differences were minimal among targeting anglers, ranging from 32.5% (sunfish) to 29.9% (northern pike). When asked to rate overall satisfaction with size and number of targeted species, sunfish had the highest rating for number (6.5) and northern pike had the highest rating for size (6.5). Crappie anglers had the lowest ratings for both number (5.2) and size (5.3), but these are still favorable. The fishery has changed since the previous winter creel survey in 1986, when the catch was dominated by black crappie and yellow perch. In 2003, the catch and harvest of walleye, northern pike, and sunfish increased substantially, as did overall angling effort. Anglers targeting several species seem satisfied with the fishing on Buffalo Lake, although most walleye anglers (74%) would support a (unspecified) special regulation. However, walleye catch rates and size are favorable and no changes to the current management seem needed. Results from the 2003 summer creel and lake surveys will provide a more complete picture of the Buffalo Lake fishery and assist in management decisions.

## **Introduction**

Buffalo Lake is a popular, multi-species fishery in Wright County, located 30 miles west of the Twin Cities metro area. Walleye fry are typically stocked every other year and recent lake survey results found walleye abundance to be above the expected range for lake class 24 (Minnesota Department of Natural Resources 2000). The lake is reported to receive heavy angling pressure in summer and winter, but no recent creel data exists.

In 1985-86 a winter creel survey was conducted on Buffalo Lake (Minnesota Department of Natural Resources 1986), but the lake has experienced substantial changes since then. Water quality has improved following the relocation of municipal wastewater treatment discharge from Buffalo Lake to the Crow River in 1981, and Eurasian watermilfoil (*M. spicatum*) has colonized the lake and become abundant. Submergent vegetation has also greatly increased overall.

A winter creel survey was conducted on Buffalo Lake from December 6, 2002 through March 10, 2003 using a full-time creel clerk. The objectives of the survey were to provide information on fishing pressure, angler demographics, catch and harvest, and angler satisfaction with the fishery. An open water creel survey was conducted in 2003 to complement these results and provide a year-round picture of angling on Buffalo Lake.

## **Study Area**

Buffalo Lake is located in eastern Wright County, adjoining the city of Buffalo (Figure 1). Buffalo Lake has a surface area of 1,552 acres (Table 1) and is connected to the Crow River via Deer Lake and Mill Creek. Much of the lake area is littoral (49%), maximum depth is 33 feet, and the lake is classified as eutrophic (combined Carlson's TSI=68, Minnesota Pollution Control Agency 2003). Buffalo Lake is classified as lake class 24 (Schupp 1992) and has a watershed size of 14,527 acres (Minnesota Department of Natural Resources, 1994). Three public accesses are located around the lake, along with two public fishing piers.

## **Methods**

A stratified, random, roving creel survey was conducted from December 6, 2002 through March 10, 2003. The survey was stratified by month and day type (weekday, weekend/holiday). For individual sampling days, one of two non-overlapping, nine hour periods (5 AM to 2 PM, 2-11 PM) was used. Four weekdays were sampled during each two week period and all weekend days were sampled. All weekdays and sampling periods were randomly chosen.

The creel clerk roved the lakes by foot, truck or ATV and interviewed as many anglers as possible. Interview locations were collected using a Trimble Geoexplorer GPS unit (Figure 2). During the interview, the clerk recorded the number of anglers in the party, start and end times, angler demographics, and catch information. Fish were measured to the nearest 0.1 inch; length of previously released fish was estimated by anglers. Parties spearing northern pike were recorded, but combined with anglers for analysis due to the low number encountered. Angler demographics were recorded individually, whereas all other data were recorded for the party. Anglers were also asked a series of questions regarding satisfaction with the fishing and regulations:

- 1.) “On a scale of 1 to 10, with one being poor and ten being excellent, how would you rate your fishing success?”
- 2.) “Have you been interviewed before on this lake?”
- 3.) “On a scale of 1 to 10, how satisfied are you with the number of (targeted species) you catch on Buffalo Lake?”
- 4.) “On a scale of 1 to 10, how satisfied are you with the size of (targeted species) you catch on Buffalo Lake?”
- 5.) (If targeting walleye) “Would you support a special regulation to improve the walleye fishing?” No specific regulation was suggested.

Only one answer to each question was allowed per party.

Angling pressure was estimated from instantaneous counts at randomly selected times. Two counts were made during each sampling period. Anglers who used any type of shelter, or no shelter (open ice anglers) were recorded separately, but combined for some analyses due to small sample sizes for open ice anglers during parts of the season. Data were analyzed with the General Creel Survey Analysis Program (GENCREEL, version 2; Bindman and Mach 1997).

## **Results and Discussion**

### Fishing Pressure

The creel survey covered a period of 95 days and a total of 56 nine hour periods were sampled during the survey, including 27 weekdays and 29 weekend days (Table 2). A total of 112 activity counts and 1,227 interviews were recorded; 22% of interviews were completed trips. Mean party size for fish house anglers was 1.83; open ice anglers were interviewed as individuals (Table 2). Mean completed trip length for all parties was 4.60 hours.

Total estimates of effort were 72,228 angler hours (Table 3) or 46.54 angler hours per acre. This is well above historical winter creel survey results for lake class 24 (median 17.8 hrs/acre, Cook and Younk 1998) and above the median value for any lake class. The highest pressure estimates were in January (27,797 hours, 17.91 hours per acre; Table 3) and the lowest in March (1,209 hours, 0.78 hours per acre).

### Catch and Harvest

An estimated 40,092 fish were caught and 16,418 fish harvested for all species combined (Table 4). Black crappie was the species with the highest catch (16,988) and harvest (8,452) estimates, followed by walleye (8,325 caught, 4,770 harvested) and yellow perch (8,455 caught, 208 harvested). Black crappie had the highest catch and harvest per acre (10.95 and 5.45, respectively, Table 5), followed by walleye (5.36 caught/acre, 3.07 harvested/acre). Black crappie harvest was above the historic statewide 50<sup>th</sup> percentile (3.87 fish/acre) for lake class 24 winter creel surveys (Minnesota Department of Natural Resources, unpublished data), whereas walleye harvest was far above the 75<sup>th</sup> percentile (0.23 fish/acre). Walleye had the highest estimated yield (7,029 lbs, 4.53 lbs/acre; Table 6), followed by northern pike (5,679 lbs, 3.66 lbs/acre). Yield for both northern pike and walleye were above the 75<sup>th</sup> percentile (3.16 and 0.47 pounds/acre, respectively) for lake class 24 winter creel surveys (Minnesota Department of Natural Resources, unpublished data).

Black crappie were caught at a rate of 0.79/hour for targeting anglers (Table 7), which was above the 50<sup>th</sup> percentile (0.52/hr) for lake class 24 winter creel surveys (Minnesota Department of Natural Resources, unpublished data). The catch rate for walleye was 0.15/hr for targeting anglers, also above the 50<sup>th</sup> percentile (0.04/hr). Anglers targeting sunfish had the highest catch rate overall (1.39/hr), but this was corresponded only to the 25<sup>th</sup> percentile value (1.46/hour) for lake class 24 winter creel surveys.

Harvested mean length and weight of black crappie (8.67 inches, 0.38 lbs; Table 8) were below statewide averages for winter creel surveys (9.5 inches, 0.6 lbs; Cook and Younk 1998). Harvested mean length and weight of walleye (15.85 inches, 1.47 lbs) and northern pike (23.67 inches, 3.17 lbs) were similar to statewide averages (walleye 15.1 inches, 1.7 lbs; northern pike 22.6 inches, 3.4 lbs). Relatively few yellow perch were harvested, despite having the second highest catch rate; this is likely due to their small average size (6.86 inches, 0.17 lbs). Among all targeting anglers, the majority harvested none of the target species, based on complete trip



interviews (Table 9). Anglers targeting sunfish or walleye were most likely to harvest at least one fish, and very few anglers harvested a limit of any species.

### Angler Demographics and Interview Questions

A total of 1227 parties were interviewed and most anglers targeted walleye (65.2%), black crappie (43.6%), or northern pike (16.8%) for the combined season (Table 10). However, the target species changed during the season; in December, 81.8% of anglers targeted walleye, declining to 46.0% in February. From February 1 through the close of the walleye season on February 16, 60.2% of anglers targeted walleye. For black crappie, 27.3% targeted in December, increasing to 60.6% in February and 98.0% in March. A total of 6 interviewed anglers were spearing for northern pike.

Anglers were predominantly male (93.3%) and most were 26-45 years old (Table 11). Most anglers were from the local area; 84.0 percent of anglers traveled 25 miles or less from home to Buffalo Lake (Table 12).

When asked the question “On a scale of 1 to 10, with one being poor and ten being excellent, how would you rate your fishing success?”, over half of all angler types and anglers targeting each species gave a response of 1 or 2 and thirty one percent gave a response of 5 or greater (Table 13). These data include both complete and incomplete interviews. Among targeting anglers, there was little difference in ratings. Sunfish anglers had the highest success ratings (32.5%  $\geq$  5), followed closely by walleye (30.6%), crappie (30.4%) and northern pike (29.9%). Only six parties targeted yellow perch and no analysis of perch anglers was attempted.

When asked to rate overall satisfaction with size and number of targeted species, ratings were similar between size and number of each species (Table 14). Sunfish had the highest rating for number (6.5) and northern pike had the highest rating for size (6.5) Crappie anglers had the lowest ratings for both number (5.2) and size (5.3). The length frequency of black crappie suggests that one large year class dominated the catch (Table 8). Angler satisfaction with size could change as this year class matures. Satisfaction ratings overall were quite similar among targeting anglers; approximately 30% of anglers targeting each species gave a rating of 5 or better.

Anglers targeting walleye were asked, “Would you support a special regulation to improve the walleye fishing?” Most anglers responded “Yes” (73.8%) (Table 15). Angler comments were noted for each interview; many of those who indicated support for a special regulation favored a

minimum size limit. Many who opposed a special regulation did not want a tight harvest slot, often making reference to the walleye slot limit on Mille Lacs Lake.

### Economic Value

One method for estimating the average amount spent by an angler (non-Great Lakes) on a day of fishing was reported in the 2001 National Survey of Fishing, Hunting and Wildlife-Associated recreation data (US Department of the Interior 2003). A total of 72,228 angler hours and 4.6 hours per trip equals 15,701 trips during the winter season. Using the 2001 rate of \$26 per trip (a year-round value for food, lodging, transportation, fuel, oil, bait, tackle, and licenses), the estimated value of the winter fishery was \$408,226.

### Conclusions and Management Implications

Angling pressure was high on Buffalo Lake and has increased since the last winter creel survey (72,228 hrs in 2002-03, 45,441 hrs in 1985-86) (Table 3; Minnesota Department of Natural Resources 1986). The percentage of local anglers (traveled 25 miles or less) increased from 58.5% to 84% (Table 12). Both changes are likely due to rapid growth for the city of Buffalo (pop. 10,097 in 2000, a 47% increase from 1990) and surrounding communities. Angler preferences changed as well; only 10.5% targeted walleye in 1985-86, versus 65.2% in 2002-03 (Table 10). The former survey ended February 15 when the walleye season closed, while the latter extended through March 10. Without this discrepancy, the difference is even greater, i.e. 75.4% of all anglers targeted walleye from December 6, 2002 through the end of the walleye season (February 16, 2003).

Yield for all species was similar in 1985-86 (18,411 lbs) and 2002-03 (16,365), but the composition of the harvest changed substantially (Table 6). In 1985-86 black crappie (9,640 lbs) and yellow perch (5,068 lbs) dominated the creel, whereas in 2002-03 black crappie harvest was much lower (3,250 lbs) and few yellow perch (35 lbs) were kept. Walleye had the highest yield in 2002-03 (7,029 lbs), compared to only 721 pounds in 1985-86. Walleye harvest was underestimated in 1985 due to sampling only daylight hours in December, but this could only account for a portion of the difference. Northern pike yield was also higher in 2002-03 (5,679 lbs) than in 1985-86 (2,796 lbs). A combination of higher abundance and greater angling pressure probably accounts for the increased yield of both species. Spearing pressure was very low in both surveys and does not seem to be a substantial component of the fishery. Spearing parties reported poor visibility in 2002-2003, limiting both spearing pressure and success.

Harvested black crappie were larger in 1985-86 (mean harvest weight 0.56 lbs, versus 0.38 lbs in 2002-03), possibly due to the cyclical nature of crappie year classes. Harvested yellow perch were much larger in 1985-86 (0.71 lbs, vs. 0.17 lbs in 2002-03; Table 8), possibly due to higher numbers of northern pike and walleye currently.

Sunfish were absent from the 1985-86 creel survey; no anglers targeted sunfish and the estimated catch and yield were zero. In the current survey, 6.2% of targeting anglers sought sunfish for the season and 23.5% in March (Table 10). The estimated catch was 1,194 sunfish with a yield of 356.4 pounds in 2002-03 (Tables 4 and 6) and angler satisfaction ratings for number and size of sunfish were high (6.5 and 6.3, respectively; Table 14). These factors all indicate that sunfish are now an important component of the winter fishery.

Fry stocking has been effective in Buffalo Lake; walleye catch rate and harvest have increased since 1985-86 and recent lake surveys show higher net catches following the onset of fry stocking in 1984. The increase in anglers targeting walleye reflects this. Water quality has also improved and likely contributes to improvement in northern pike, walleye, and sunfish catches. Lake surveys in 1988 and 1993 (Minnesota Department of Natural Resources 1994) found only sparse vegetation; the current abundance of Eurasian watermilfoil and Curly leaf pondweed (*P. crispus*) likely contributed to the increased catch of sunfish and northern pike in the current survey.

Anglers seem mostly satisfied with their fishing success on Buffalo Lake (Tables 13, 14). Fishing success ratings were higher when asked about overall number and size of targeted species caught than when asked about success on a given day. Most anglers indicated that they would support an unspecified special regulation for walleye (Table 15), but further study would be needed to see if anglers would accept one of the current options for a special regulation. However, walleye size and catch rate were favorable in this survey and a change in regulation may be unnecessary. The open water creel and lake surveys conducted in 2003 will provide more information on walleye abundance and level of harvest to help evaluate whether any change is needed.

### **Acknowledgments**

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Table 1. Descriptive characteristics of Buffalo Lake, Wright County, Minnesota.

Characteristic	Buffalo Lake
DOW number	86-90
Minnesota lake class <sup>1</sup>	24
Total surface acres	1,552
Percent littoral area <sup>2</sup>	49
Maximum depth (ft)	33
Secchi disk transparency <sup>3</sup> (ft)	4.3
Total alkalinity <sup>3</sup> (ppm)	184
Total phosphorus <sup>3</sup> (ppm)	0.141
Shoreline development index <sup>4</sup>	1.09

<sup>1</sup>Schupp (1992).

<sup>2</sup>Percent of the total surface area shallower than 15 ft.

<sup>3</sup>Lake Assessment Program, Minnesota Pollution Control Agency 1994.

<sup>4</sup>Shoreline length/2( $\pi$ \*lake area)<sup>1/2</sup>, length and area are consistent units (miles and square miles).

Table 2. Summary of creel strata statistics, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003. Standard errors appear in parentheses.

Statistic	Month				Entire Season
	December	January	February	March	
Start date of stratum	12/06/2002	01/01/2003	02/01/2003	03/01/2003	12/06/2002
End date of stratum	12/31/2002	01/31/2003	02/28/2003	03/10/2003	03/10/2003
Length of fishing day (hours)	18	18	18	18	18
Number of days in stratum	26	31	28	10	95
Weekdays sampled	8	9	7	3	27
Weekend/holiday days sampled	8	9	8	4	29
Number of angler counts	32	36	30	14	112
Number of fish house interviews	321	358	367	47	1,093
Number of open ice interviews	59	12	34	3	108
Total number of interviews	380	370	401	50	1,201
Percent of completed trip interviews	39.1	26.3	19.4	66.7	28.9
Mean numbers per count:					
Fish house	25.69 (4.06)	33.06 (7.06)	29.60 (7.53)	4.36 (1.53)	26.44 (3.33)
Open ice	5.41 (1.17)	1.58 (0.64)	3.37 (1.72)	0.43 (0.36)	3.01 (0.62)
All anglers	31.09 (4.73)	34.64 (7.41)	32.97 (8.89)	4.79 (1.84)	29.45 (3.70)
Mean number of anglers per party:					
Fish house	1.79 (0.21)	1.87 (0.18)	1.87 (0.41)	1.66 (0.29)	1.83 (0.15)
Open ice	1	1	1	1	1
Mean completed trip data (hours):					
Fish house	4.48 (0.69)	4.83 (0.82)	5.39 (0.85)	3.72 (2.01)	4.78 (0.46)
Open ice	3.21 (1.22)	2.38 (-)	2.34 (-)	2.67 (-)	2.70 (-)
All parties	4.30 (0.58)	4.77 (0.80)	5.05 (0.84)	3.62 (1.96)	4.60 (0.44)

Table 3. Winter fishing pressure estimates, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003.

Angler Type	Hours	SE	Hours per Acre	SE
December Estimates				
Open ice anglers	2,418	438	1.56	0.28
Fish house anglers	19,796	2,584	12.76	1.66
All winter anglers	21,976	2,867	14.16	1.85
January Estimates				
Open ice anglers	578	270	0.37	0.17
Fish house anglers	27,256	4,922	17.56	3.17
All winter anglers	27,797	5,007	17.91	3.23
February Estimates				
Open ice anglers	1,009	658	0.65	0.42
Fish house anglers	19,922	6,077	12.84	3.92
All winter anglers	21,339	6,793	13.75	4.38
March Estimates				
Open ice anglers	63	49	0.04	0.03
Fish house anglers	1,186	558	0.76	0.36
All winter anglers	1,209	592	0.78	0.38
Winter 2002-2003 Estimates				
Open ice anglers	4,068	837	2.62	0.54
Fish house anglers	68,160	8,255	43.92	5.32
All winter anglers	72,228	8,755	46.54	5.64

Table 4. Catch and harvest estimates, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	8,452	(1,999)	8,536	(2083)	16,988	(4,002)
Largemouth bass	6	(6)	14	(11)	20	(12)
Northern pike	1,789	(270)	1,987	(293)	3,776	(530)
Rock bass	0	(0)	6	(6)	6	(6)
Smallmouth bass	0	(0)	12	(9)	12	(9)
Sunfish <sup>1</sup>	1,194	(421)	1,316	(455)	2,510	(844)
Walleye	4,770	(823)	3,555	(793)	8,325	(1,520)
Yellow perch	208	(69)	8,247	(2169)	8,455	(2,218)
All species	16,418	(2,220)	23,673	(3156)	40,092	(4,924)

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

Table 5. Catch and harvest estimates per acre, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	5.45	(1.29)	5.50	(1.34)	10.95	(2.58)
Largemouth bass	0.00	(0.00)	0.01	(0.01)	0.01	(0.01)
Northern pike	1.15	(0.17)	1.28	(0.19)	2.43	(0.34)
Rock bass	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Smallmouth bass	0.00	(0.00)	0.01	(0.01)	0.01	(0.01)
Sunfish <sup>1</sup>	0.77	(0.27)	0.85	(0.29)	1.62	(0.54)
Walleye	3.07	(0.53)	2.29	(0.51)	5.36	(0.98)
Yellow perch	0.13	(0.04)	5.31	(1.40)	5.45	(1.43)
All species	10.58	(1.43)	15.25	(2.03)	25.83	(3.17)

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

Table 6. Yield estimates<sup>1</sup>, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	3,250.1	(962.8)	2.09	(0.62)
Largemouth bass	15.9	(—)	0.01	(—)
Northern pike	5,679.0	(1,568.0)	3.66	(1.01)
Rock bass	0.0	(0.0)	0.00	(0.00)
Smallmouth bass	0.0	(0.0)	0.00	(0.00)
Sunfish <sup>1</sup>	356.4	(187.3)	0.23	(0.12)
Walleye	7,028.8	(2,059.4)	4.53	(1.33)
Yellow perch	34.6	(—)	0.02	(—)
All species	16,364.8	(—)	10.54	(—)

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

Table 7. Harvest, release, and catch rate estimates, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
<b>Targeting Anglers</b>						
Black crappie	0.385	(0.026)	0.407	(0.032)	0.792	(0.049)
Largemouth bass	0.000	(—)	0.000	(—)	0.000	(—)
Northern pike	0.074	(0.007)	0.034	(0.007)	0.107	(0.011)
Sunfish <sup>1</sup>	0.685	(0.194)	0.701	(0.222)	1.386	(0.398)
Walleye	0.089	(0.015)	0.060	(0.015)	0.148	(0.027)
Yellow perch	0.478	(—)	0.243	(—)	0.721	(—)
<b>All Anglers</b>						
Black crappie	0.117	(0.020)	0.118	(0.019)	0.235	(0.038)
Largemouth bass	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Northern pike	0.025	(0.005)	0.028	(0.005)	0.052	(0.010)
Rock bass	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Smallmouth bass	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Sunfish <sup>1</sup>	0.017	(0.004)	0.018	(0.007)	0.035	(0.012)
Walleye	0.066	(0.009)	0.049	(0.010)	0.115	(0.017)
Yellow perch	0.003	(0.001)	0.114	(0.030)	0.117	(0.030)
All species	0.227	(0.023)	0.327	(0.038)	0.554	(0.054)

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



Table 8. Length frequency distribution of harvested and released fish, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003.

TL (inches)	BLC		LMB		NOP		RKB	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
<4.0	—	—	—	—	—	—	—	—
4.0-4.4	—	—	—	—	—	—	—	—
4.5-4.9	—	—	—	—	—	1	—	—
5.0-5.4	—	8	—	—	—	—	—	—
5.5-5.9	—	5	—	—	—	—	—	—
6.0-6.4	—	22	—	—	—	—	—	—
6.5-6.9	—	6	—	—	—	—	—	—
7.0-7.4	7	223	—	—	—	—	—	—
7.5-7.9	159	354	—	—	—	—	—	—
8.0-8.4	396	531	—	—	—	—	—	—
8.5-8.9	164	32	—	—	—	—	—	—
9.0-9.4	36	46	—	1	—	—	—	—
9.5-9.9	70	—	—	—	—	—	—	—
10.0-10.4	81	5	—	—	—	—	—	—
10.5-10.9	31	1	—	—	—	—	—	—
11.0-11.4	18	2	—	—	—	—	—	1
11.5-11.9	6	—	—	—	—	—	—	—
12.0-12.9	7	—	—	1	—	—	—	—
13.0-13.9	—	—	—	—	—	—	—	—
14.0-14.9	—	—	—	—	—	4	—	—
15.0-15.9	—	—	—	—	—	1	—	—
16.0-16.9	—	—	1	—	—	6	—	—
17.0-17.9	—	—	—	—	1	2	—	—
18.0-18.9	—	—	—	—	2	7	—	—
19.0-19.9	—	—	—	—	10	13	—	—
20.0-20.9	—	—	—	—	24	75	—	—
21.0-21.9	—	—	—	—	35	34	—	—
22.0-22.9	—	—	—	—	39	35	—	—
23.0-23.9	—	—	—	—	22	21	—	—
24.0-24.9	—	—	—	—	24	29	—	—
25.0-25.9	—	—	—	—	20	4	—	—
26.0-26.9	—	—	—	—	13	11	—	—
27.0-27.9	—	—	—	—	15	5	—	—
28.0-28.9	—	—	—	—	9	5	—	—
29.0-29.9	—	—	—	—	6	—	—	—
30.0-30.9	—	—	—	—	3	6	—	—
31.0-31.9	—	—	—	—	—	—	—	—
32.0-32.9	—	—	—	—	1	—	—	—
33.0-33.9	—	—	—	—	—	—	—	—
34.0-34.9	—	—	—	—	3	1	—	—
35.0-35.9	—	—	—	—	—	—	—	—
36.0-36.9	—	—	—	—	—	1	—	—
37.0-37.9	—	—	—	—	—	1	—	—
38.0-39.0	—	—	—	—	1	—	—	—
>39	—	—	—	—	—	—	—	—
Total N	975	1235	1	2	228	262	0	1
Mean Length	8.67	7.7	16.1	10.66	23.67	21.66	—	11
SE	3.28	3.44	—	—	6.88	6.03	—	—
Mean Weight	0.38	0.25	2.64	0.71	3.17	2.47	—	1.09
SE	0.14	0.11	—	—	0.98	—	—	—

Table 8 (cont.). Length frequency distribution of harvested and released fish, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003.

TL (inches)	SMB		SUN <sup>1</sup>		WAE		YEP	
	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
<4.0	—	—	—	—	—	—	—	5
4.0-4.4	—	—	—	—	—	—	—	56
4.5-4.9	—	—	—	20	—	—	2	30
5.0-5.4	—	—	—	8	—	—	—	146
5.5-5.9	—	—	—	3	—	—	2	87
6.0-6.4	—	—	3	77	—	—	10	336
6.5-6.9	—	—	64	51	—	—	1	252
7.0-7.4	—	—	42	13	—	—	1	243
7.5-7.9	—	—	16	—	—	—	4	11
8.0-8.4	—	—	11	1	—	12	5	6
8.5-8.9	—	—	1	—	—	—	1	—
9.0-9.4	—	—	—	—	—	4	2	1
9.5-9.9	—	—	—	—	—	—	—	—
10.0-10.4	—	—	—	—	4	99	—	—
10.5-10.9	—	—	—	—	4	21	—	—
11.0-11.4	—	—	—	—	12	143	—	—
11.5-11.9	—	—	—	—	16	5	—	—
12.0-12.9	—	—	—	—	34	89	—	—
13.0-13.9	—	—	—	—	27	6	—	—
14.0-14.9	—	—	—	—	45	6	—	—
15.0-15.9	—	—	—	—	75	2	—	—
16.0-16.9	—	—	—	—	108	6	—	—
17.0-17.9	—	1	—	—	71	2	—	—
18.0-18.9	—	—	—	—	29	1	—	—
19.0-19.9	—	1	—	—	6	—	—	—
20.0-20.9	—	—	—	—	8	—	—	—
21.0-21.9	—	—	—	—	8	3	—	—
22.0-22.9	—	—	—	—	7	3	—	—
23.0-23.9	—	—	—	—	4	2	—	—
24.0-24.9	—	—	—	—	4	1	—	—
25.0-25.9	—	—	—	—	3	1	—	—
26.0-26.9	—	—	—	—	—	3	—	—
27.0-27.9	—	—	—	—	—	1	—	—
28.0-28.9	—	—	—	—	—	1	—	—
29.0-30.0	—	—	—	—	—	—	—	—
>30	—	—	—	—	—	—	—	—
Total N	0	2	137	173	465	411	28	1173
Mean Length	—	18.25	7.09	5.88	15.85	11.49	6.86	6.01
SE	—	—	4.47	4.08	5.33	5.12	—	—
Mean Weight	—	—	0.3	0.16	1.47	0.59	0.17	0.1
SE	—	—	0.19	—	0.49	—	—	0.05

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

Table 9. Percent of anglers<sup>1</sup> who harvested a given number of fish, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003.

Species <sup>2</sup>	Number of Fish Harvested per Angler									
	0	0.1-0.9	1-1.9	2-2.9	3-3.9	4-4.9	5-5.9	6-6.9	7-8.9	10-12
Black crappie/all anglers	78.9	3.6	4.6	3.0	1.7	1.5	0.8	1.3	2.1	1.5
Bl. crappie/crappie anglers	61.2	3.4	7.3	5.3	3.9	2.9	1.9	2.9	4.9	4.0
Northern pike/all anglers	92.2	4.4	2.1	1.3	0.0	NA	NA	NA	NA	NA
Northern pike/pike anglers	73.5	2.9	11.8	11.8	0.0	NA	NA	NA	NA	NA
Sunfish <sup>3</sup> /all anglers	96.8	0.8	0.8	0.4	0.2	0.0	0.0	0.4	0.0	0.0
Sunfish <sup>3</sup> /sunfish anglers	54.2	0.0	12.5	0.0	4.2	8.3	4.2	8.3	0.0	1.8
Walleye/all anglers	71.7	9.9	11.6	5.7	0.4	0.4	0.0	0.2	NA	NA
Walleye/walleye anglers	59.5	11.5	18.7	8.8	0.6	0.6	0.0	0.3	NA	NA

<sup>1</sup>Data from completed trip interviews, analyzed across angler type and month. The number of fish harvested per angler was determined by dividing the number (by species) harvested by the number of anglers for each interview.

<sup>2</sup>Bag limits: crappie=15, northern pike=3, sunfish=30, walleye=6. <sup>3</sup>Includes bluegill, pumpkinseed, hybrid and green sunfish.

(continued) Species	Number of Fish Harvested per Angler				
	14-15	20.0	26.0	29.0	N
Black crappie/all anglers	1.1	NA	NA	NA	474
Black crappie/crappie	0.0	NA	NA	NA	206
Northern pike/all anglers	NA	NA	NA	NA	474
Northern pike/pike anglers	NA	NA	NA	NA	34
Sunfish/all anglers	0.2	0.2	0.0	0.0	474
Sunfish/sunfish anglers	0.0	0.0	0.0	0.0	24
Walleye/all anglers	NA	NA	NA	NA	474
Walleye/walleye anglers	NA	NA	NA	NA	331

Table 10. Percentage<sup>1</sup> of angling parties targeting species on Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003.

Species	December	January	February <sup>2</sup>	March	Season
Black crappie	27.3	35.4	60.6	98.0	43.6
Northern pike	10.3	19.2	23.4	0.0	16.8
Sunfish <sup>3</sup>	6.8	2.4	7.0	23.5	6.2
Walleye	81.8	77.0	46.0	0.0	65.2
Parties (N)	400	370	398	51	1219

<sup>1</sup>Percentages do not total to 100 because anglers could target up to two species. <sup>2</sup>The season for walleye and northern pike closed on February 16. From Feb. 1-16, the targeting percentage was 30.3 for northern pike anglers and 60.2 for walleye anglers. <sup>3</sup>Includes bluegill, pumpkinseed, hybrid and green sunfish.

Table 11. Percent distributions by age and sex of anglers, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003.

Age in Years	Males	Females	Combined
0-15	6.7	1.7	8.4
16-25	16.0	0.7	16.7
26-35	27.3	1.4	28.7
36-45	20.7	1.5	22.2
46-55	14.2	1.2	15.4
56-65	5.9	0.3	6.2
Over 65	2.4	0.0	2.4
Total (N=2227)	93.3	6.7	100.0

Table 12. Approximate one-way distance traveled by interviewed anglers to Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003.

Distance <sup>1</sup> in Miles	Responses	Percent
0-10	1067	47.2
11-25	832	36.8
26-50	320	14.1
51-100	19	0.8
101-300	14	0.6
Over 300	10	0.4
Total	2262	100

<sup>1</sup>Distances are calculated in a straight line from center of zip code areas.

Table 13. Fishing success ratings<sup>1</sup> from interviewed anglers, Buffalo Lake, Minnesota, December 6, 2002-March 10, 2003. One response was collected from each party, regardless of party size. Percentages are shown in parentheses.

Angler group	Fishing Success Rating					Total Responses
	1-2 N (%)	3-4 N (%)	5-6 N (%)	7-8 N (%)	9-10 N (%)	
Open ice anglers	563 (51.7)	176 (16.2)	188 (17.3)	122 (11.2)	40 (3.7)	1089
Fish house anglers	61 (60.4)	14 (13.9)	12 (11.9)	8 (7.9)	6 (5.9)	101
All anglers	624 (52.4)	190 (16.0)	200 (16.8)	130 (10.9)	46 (3.9)	1190

Anglers seeking<sup>2</sup>:

Black crappie	276 (53.3)	85 (16.4)	78 (15.1)	58 (11.2)	21 (4.1)	518
Northern Pike	103 (53.1)	33 (17.0)	35 (18.0)	13 (6.7)	10 (5.2)	194
Sunfish	43 (58.1)	7 (9.5)	13 (17.6)	10 (13.5)	1 (1.4)	74
Walleye	419 (54.2)	117 (15.1)	137 (17.7)	76 (9.8)	24 (3.1)	773

<sup>1</sup>Response of anglers to the question, “On a scale of one to ten, with one being poor and ten being excellent, how would you rate your fishing success today on Buffalo Lake?” <sup>2</sup>Some anglers gave multiple responses.

Table 14. Responses to questions 3 and 4. One response was collected from each party, regardless of party size. Previously interviewed anglers were not asked.

Question 3: “On a scale of 1 to 10, how satisfied are you with the number of (targeted species) you catch on Buffalo Lake?”

Species	Mean response	N
Black crappie	5.2	159
Northern Pike	6.3	42
Sunfish	6.5	24
Walleye	5.9	322
Total		547

Question 4: “On a scale of 1 to 10, how satisfied are you with the size of (targeted species) you catch on Buffalo Lake?”

Species	Mean response	N
Black crappie	5.3	157
Northern Pike	6.5	43
Sunfish	6.3	24
Walleye	6.0	322
Total		546

Table 15. Response to question 5: “Would you support a special regulation to improve the walleye fishing?” Only anglers targeting walleye were asked question 5. One response was collected from each party, regardless of party size. Previously interviewed anglers were not asked.

Response	N	%
Yes	253	73.8
No	78	22.7
No response	12	3.5
Total	343	100

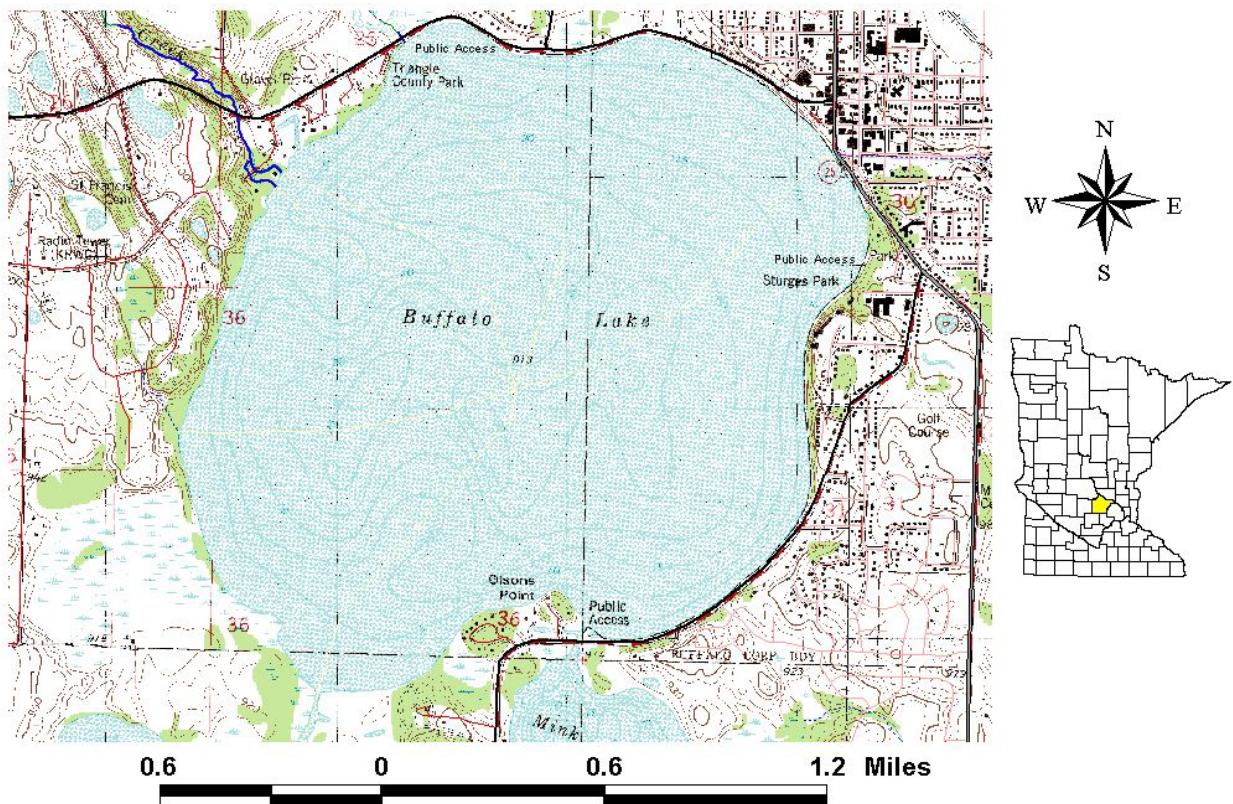


Figure 1. Location of Buffalo Lake, Wright County, Minnesota.

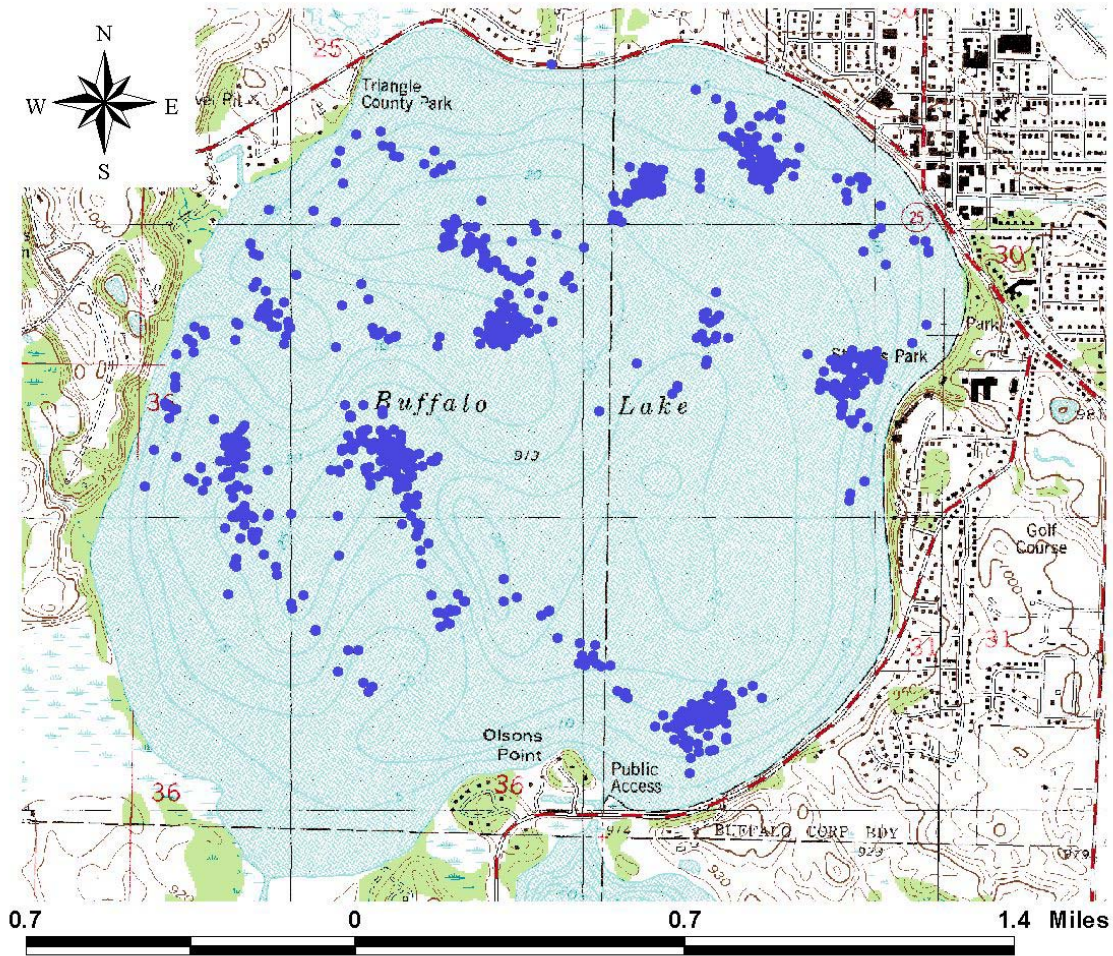


Figure 2. Location of angler interviews, Buffalo Lake, MN, December 6, 2002-March 10, 2003.

Addendum 1: Harvest Summary Form

MINNESOTA DEPARTMENT OF NATURAL RESOURCES DIVISION OF FISHERIES				
Creel Survey Summary For Buffalo Lake, Winter 2002-2003				
DOW#: 86-90	County: Wright	Lake Class: 24	Lake Area: 1,552 Acres	Dates of Survey: 12/06/02 - 03/10/03

Fishing pressure (Angler Hours)	72,228	Weekdays surveyed	27
Angler Hours per Acre	46.5	Weekend/Holidays surveyed	29
Average Party Size	1.8	Number of interviews	1,219
Average Trip Length (hours)	4.6		

What People Fished for:	Percent of Angling Parties
Black Crappie	43.6
Northern Pike	16.8
Sunfish	6.2
Walleye	65.2
(Percentages add up to more than 100 due to anglers seeking more than one species)	

Species Caught	Fish Harvested				Fish Released			
	Number	Pounds	Average		Number	Pounds	Average	
			Length (in)	weight (lb)			Length (in)	weight (lb)
Black crappie	8,452	3,250	8.7	0.38	8,536	2,168	7.7	0.25
Largemouth bass	6	16	16.1	2.64	14	10	10.7	0.71
Northern pike	1,789	5,679	23.7	3.17	1,987	4,908	21.7	2.47
Rock bass	0	0	NA	NA	6	6	11	1.06
Smallmouth bass	0	0	NA	NA	12	—	18.3	—
Sunfish	1,194	356	7.1	0.30	1,316	215	5.9	0.16
Walleye	4,770	7,029	15.9	1.47	3,555	2,092	11.5	0.59
Yellow perch	208	35	6.9	0.17	8,247	825	6.0	0.10
All species	16,418	16,365	NA	NA	23,673	10,224	NA	NA

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



# **Appendix**

Table A1. Catch and harvest estimates, Buffalo Lake, Minnesota, December 6, 2002-December 31, 2002. Standard errors appear in parentheses.

Species	Number Harvested	Number Released	Number Caught
Black crappie	470.9 (142.2)	453.6 (144.9)	924.5 (228.7)
Largemouth bass	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Northern pike	638.2 (131.1)	646.5 (125.9)	1284.8 (229.8)
Sunfish <sup>1</sup>	0.0 (0.0)	33.3 (25.4)	33.3 (25.4)
Walleye	2865.9 (707.1)	2324.2 (748.8)	5190.1 (1385.5)
Yellow perch	26.1 (15.6)	1135.8 (300.6)	1161.9 (303.9)
All species	4001.2 (733.3)	4593.4 (829.8)	8594.6 (1455.3)

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

Table A2. Catch and harvest estimates per acre, Buffalo Lake, Minnesota, December 6, 2002-December 31, 2002. Standard errors appear in parentheses.

Species	Number Harvested per Acre	Number Released per Acre	Number Caught per Acre
Black crappie	0.30 (0.09)	0.29 (0.09)	0.60 (0.15)
Largemouth bass	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Northern pike	0.41 (0.08)	0.42 (0.08)	0.83 (0.15)
Sunfish <sup>1</sup>	0.00 (0.00)	0.02 (0.02)	0.02 (0.02)
Walleye	1.85 (0.46)	1.50 (0.48)	3.34 (0.89)
Yellow perch	0.02 (0.01)	0.73 (0.19)	0.75 (0.20)
All species	2.58 (0.47)	2.96 (0.53)	5.54 (0.94)

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

Table A3. Yield estimates<sup>1</sup>, Buffalo Lake, Minnesota, December 6, 2002- December 31, 2002. Standard errors appear in parentheses.

Species	Pounds Harvested	Pounds Harvested Per Acre
Black crappie	241.7 (140.7)	0.16 (0.09)
Largemouth bass	0.0 (0.0)	0.00 (0.00)
Northern pike	2104.9 (726.9)	1.36 (0.47)
Sunfish <sup>1</sup>	0.0 (0.0)	0.00 (0.00)
Walleye	4194.2 (1853.3)	2.70 (1.19)
Yellow perch	3.6 (—)	0.00 (—)
All species	6544.3 (—)	4.22 (—)

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

Table A4. Catch and harvest estimates, Buffalo Lake, Minnesota, January 1, 2003-January 31, 2003. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	2454.6	(611.8)	2396.1	(699.4)	4850.7	(1262.0)
Largemouth bass	0.0	(0.0)	6.3	(6.6)	6.3	(6.6)
Northern pike	580.7	(120.6)	686.9	(163.5)	1267.5	(267.4)
Sunfish <sup>1</sup>	309.8	(154.0)	538.3	(263.4)	848.0	(409.1)
Walleye	1320.2	(371.8)	681.3	(187.9)	2001.4	(504.8)
Yellow perch	112.9	(36.8)	1607.1	(520.5)	1720.1	(535.4)
All species	4778.1	(743.1)	5916.0	(944.2)	10694.1	(1540.5)

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

Table A5. Catch and harvest estimates per acre, Buffalo Lake, Minnesota, January 1, 2003-January 31, 2003. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	1.58	(0.39)	1.54	(0.45)	3.13	(0.81)
Largemouth bass	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Northern pike	0.37	(0.08)	0.44	(0.11)	0.82	(0.17)
Sunfish <sup>1</sup>	0.20	(0.10)	0.35	(0.17)	0.55	(0.26)
Walleye	0.85	(0.24)	0.44	(0.12)	1.29	(0.33)
Yellow perch	0.07	(0.02)	1.04	(0.34)	1.11	(0.34)
All species	3.08	(0.48)	3.81	(0.61)	6.89	(0.99)

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

Table A6. Yield estimates, Buffalo Lake, Minnesota, January 1, 2003-January 31, 2003. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	1062.8	(356.0)	0.68	(0.23)
Largemouth bass	0.0	(0.0)	0.00	(0.00)
Northern pike	1812.0	(432.7)	1.17	(0.28)
Sunfish <sup>1</sup>	99.0	(96.2)	0.06	(0.06)
Walleye	1942.0	(832.2)	1.25	(0.54)
Yellow perch	24.1	(10.5)	0.02	(0.01)
All species	4939.8	(1007.9)	3.18	(0.65)

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

Table A7. Catch and harvest estimates, Buffalo Lake, Minnesota, February 1, 2003-February 28, 2003. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	4699.0	(1854.3)	4492.6	(1865.6)	9191.6	(3661.3)
Largemouth bass	6.0	(6.1)	7.8	(8.4)	13.8	(10.4)
Northern pike	570.0	(203.4)	608.7	(206.6)	1178.7	(395.5)
Rock bass	0.0	(0.0)	6.0	(6.1)	6.0	(6.1)
Smallmouth bass	0.0	(0.0)	12.0	(8.8)	12.0	(8.8)
Sunfish <sup>1</sup>	612.4	(360.3)	538.6	(348.8)	1151.1	(704.3)
Walleye	583.5	(197.2)	499.8	(179.8)	1083.3	(368.1)
Yellow perch	60.7	(55.5)	4526.0	(2037.2)	4586.7	(2084.4)
All species	6531.6	(1911.0)	10691.6	(2797.8)	17223.2	(4305.6)

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

Table A8. Catch and harvest estimates per acre, Buffalo Lake, Minnesota, February 1, 2003-February 28, 2003. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	3.03	(1.19)	2.89	(1.20)	5.92	(2.36)
Largemouth bass	0.00	(0.00)	0.01	(0.01)	0.01	(0.01)
Northern pike	0.37	(0.13)	0.39	(0.13)	0.76	(0.25)
Rock bass	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Smallmouth bass	0.00	(0.00)	0.01	(0.01)	0.01	(0.01)
Sunfish <sup>1</sup>	0.39	(0.23)	0.35	(0.22)	0.74	(0.45)
Walleye	0.38	(0.13)	0.32	(0.12)	0.70	(0.24)
Yellow perch	0.04	(0.04)	2.92	(1.31)	2.96	(1.34)
All species	4.21	(1.23)	6.89	(1.80)	11.10	(2.77)

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

Table A9. Yield estimates, Buffalo Lake, Minnesota, February 1, 2003-February 28. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	1656.5	(842.7)	1.07	(0.54)
Largemouth bass	15.9	(—)	0.01	(—)
Northern pike	1762.2	(1320.2)	1.14	(0.85)
Rock bass	0.0	(0.0)	0.00	(0.00)
Smallmouth bass	0.0	(0.0)	0.00	(0.00)
Sunfish <sup>1</sup>	171.2	(133.2)	0.11	(0.09)
Walleye	892.7	(337.8)	0.58	(0.22)
Yellow perch	5.7	(—)	0.00	(—)
All species	4504.2	(—)	2.90	(—)

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

Table A10. Catch and harvest estimates, Buffalo Lake, Minnesota, March 1, 2003-March 10, 2003. Standard errors appear in parentheses.

Species	Number Harvested	Number Released	Number Caught
Black crappie	827.8 (404.9)	1193.4 (588.8)	2021.2 (984.4)
Northern pike	0.0 (0.0)	45.1 (23.1)	45.1 (23.1)
Sunfish <sup>1</sup>	272.0 (153.4)	205.9 (121.9)	477.9 (218.9)
Walleye	0.0 (0.0)	50.1 (29.9)	50.1 (29.9)
Yellow perch	7.8 (5.1)	978.1 (438.3)	985.9 (441.9)
All species	1107.6 (433.0)	2472.5 (745.0)	3580.1 (1101.7)

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

Table A11. Catch and harvest estimates per acre, Buffalo Lake, Minnesota, March 1, 2003-March 10, 2003. Standard errors appear in parentheses.

Species	Number Harvested per Acre	Number Released per Acre	Number Caught per Acre
Black crappie	0.53 (0.26)	0.77 (0.38)	1.30 (0.63)
Northern pike	0.00 (0.00)	0.03 (0.01)	0.03 (0.01)
Sunfish <sup>1</sup>	0.18 (0.10)	0.13 (0.08)	0.31 (0.14)
Walleye	0.00 (0.00)	0.03 (0.02)	0.03 (0.02)
Yellow perch	0.01 (0.00)	0.63 (0.28)	0.64 (0.28)
All species	0.71 (0.28)	1.59 (0.48)	2.31 (0.71)

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

Table A12. Yield estimates, Buffalo Lake, Minnesota, March 1, 2003-March 10, 2003. Standard errors appear in parentheses.

Species	Pounds Harvested	Pounds Harvested Per Acre
Black crappie	289.1 (265.1)	0.19 (0.17)
Northern pike	0.0 (0.0)	0.00 (0.00)
Sunfish <sup>1</sup>	86.2 (89.9)	0.06 (0.06)
Walleye	0.0 (0.0)	0.00 (0.00)
Yellow perch	1.2 (—)	0.00 (—)
All species	376.5 (—)	0.24 (—)

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

Table A13. Harvest, release, and catch rate estimates, Buffalo Lake, Minnesota, December 6, 2002-December 31, 2002. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
<b>Targeting Anglers</b>						
Black crappie	0.060	(0.031)	0.075	(0.021)	0.135	(0.032)
Largemouth bass	0.000	(—)	0.000	(—)	0.000	(—)
Northern pike	0.040	(0.009)	0.013	(0.005)	0.053	(0.011)
Sunfish <sup>1</sup>	0.000	(0.000)	0.076	(0.076)	0.076	(0.076)
Walleye	0.142	(0.040)	0.123	(0.046)	0.265	(0.083)
Yellow perch	0.000	(—)	0.245	(—)	0.245	(—)
<b>All Anglers</b>						
Black crappie	0.021	(0.004)	0.021	(0.006)	0.042	(0.007)
Largemouth bass	0.000	(0.000)	0.000	(0.000)	0.000	(0.000)
Northern pike	0.029	(0.005)	0.029	(0.001)	0.059	(0.004)
Sunfish <sup>1</sup>	0.000	(0.000)	0.002	(0.001)	0.002	(0.001)
Walleye	0.130	(0.023)	0.106	(0.035)	0.236	(0.056)
Yellow perch	0.001	(0.000)	0.052	(0.014)	0.053	(0.014)
All species	0.182	(0.024)	0.209	(0.038)	0.391	(0.058)

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

Table A14. Harvest, release, and catch rate estimates, Buffalo Lake, Minnesota, January 1, 2003-January 31, 2003. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
<b>Targeting Anglers</b>						
Black crappie	0.272	(0.054)	0.266	(0.063)	0.539	(0.109)
Northern pike	0.072	(0.016)	0.054	(0.018)	0.127	(0.027)
Sunfish <sup>1</sup>	0.521	(0.178)	0.891	(0.201)	1.412	(0.360)
Walleye	0.080	(0.023)	0.031	(0.007)	0.111	(0.026)
Yellow perch	0.000	(0.000)	0.779	(0.279)	0.779	(0.279)
<b>All Anglers</b>						
Black crappie	0.088	(0.027)	0.086	(0.011)	0.175	(0.055)
Northern pike	0.021	(0.005)	0.025	(0.005)	0.046	(0.010)
Sunfish <sup>1</sup>	0.011	(0.006)	0.019	(0.010)	0.031	(0.016)
Walleye	0.048	(0.008)	0.025	(0.008)	0.072	(0.022)
Yellow perch	0.004	(0.002)	0.058	(0.018)	0.062	(0.019)
All species	0.172	(0.030)	0.213	(0.025)	0.385	(0.065)

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

Table A15. Harvest, release, and catch rate estimates, Buffalo Lake, Minnesota, February 1, 2003-February 28, 2003. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
<b>Targeting Anglers</b>						
Black crappie	0.628	(0.051)	0.591	(0.063)	1.220	(0.084)
Northern pike	0.107	(0.005)	0.030	(0.008)	0.136	(0.007)
Sunfish <sup>1</sup>	1.266	(0.588)	0.944	(0.681)	2.210	(1.268)
Walleye	0.048	(0.006)	0.033	(0.015)	0.081	(0.012)
Yellow perch	1.313	(1.271)	0.000	(0.000)	1.313	(1.271)
<b>All Anglers</b>						
Black crappie	0.220	(0.065)	0.211	(0.045)	0.431	(0.107)
Largemouth bass	0.000	(0.000)	0.000	(0.000)	0.001	(0.001)
Northern pike	0.027	(0.013)	0.029	(0.013)	0.055	(0.026)
Smallmouth bass	0.000	(0.000)	0.001	(0.000)	0.001	(0.000)
Sunfish <sup>1</sup>	0.029	(0.014)	0.025	(0.016)	0.054	(0.030)
Walleye	0.027	(0.013)	0.023	(0.002)	0.051	(0.024)
Yellow perch	0.003	(0.003)	0.212	(0.101)	0.215	(0.103)
All species	0.306	(0.069)	0.501	(0.113)	0.807	(0.156)

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

Table A16. Harvest, release, and catch rate estimates, Buffalo Lake, Minnesota, March 1, 2003-March 10, 2003. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
<b>Targeting Anglers</b>						
Black crappie	0.900	(0.075)	1.190	(0.134)	2.090	(0.198)
Northern pike	—	(0.000)	—	(0.000)	—	(0.000)
Sunfish <sup>1</sup>	1.347	(0.622)	1.057	(0.615)	2.404	(0.631)
Walleye	—	(0.000)	—	(0.000)	—	(0.000)
Yellow perch	—	(0.000)	—	(0.000)	—	(0.000)
<b>All Anglers</b>						
Black crappie	0.685	(0.190)	0.987	(0.686)	1.671	(0.175)
Northern pike	0.000	(0.000)	0.037	(0.026)	0.037	(0.026)
Sunfish <sup>1</sup>	0.225	(0.083)	0.170	(0.113)	0.395	(0.150)
Walleye	0.000	(0.000)	0.041	(0.032)	0.041	(0.032)
Yellow perch	0.006	(0.005)	0.809	(0.315)	0.815	(0.314)
All species	0.916	(0.208)	2.044	(0.764)	2.960	(0.392)

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

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**Minnesota Department of Natural Resources  
Division of Fisheries**

**Completion Report**

**Buffalo Lake Winter Creel Survey  
December 6, 2002 to March 10, 2003**

**by**

**Mark Pelham**

**Completion Report**

Approved by: \_\_\_\_\_  
Area Supervisor Date

Approved by: \_\_\_\_\_  
Regional Supervisor Date