Minnesota
F-29-R(P)-24
Area 340
Study 4
Job 697
March 2006

Minnesota Department of Natural Resources
Division of Fisheries

Completion Report

Clearwater Lake Winter Creel Survey
December 18, 2004 to March 18, 2005

By

Mark Pelham

Montrose Area Fisheries Office

Funded under Federal Aid by the Sport Fish Restoration Act

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Abstract

A winter creel survey was conducted on Clearwater Lake from December 18, 2004 through March 18, 2005. The objectives of the survey were to provide information on fishing pressure, catch and harvest, angler demographics and satisfaction, and to document changes since the last winter creel survey in 1989-90. A summer creel survey and standard lake survey in 2005 will complement these results. Total angling pressure was estimated to be 8.63 hrs/acre; this is above the 1970-1990 mean for winter creel surveys on lake class 22 of 4.7 hrs/acre, but below 1989-90 creel results (56,655 hrs, 17.4 hrs/acre). Pressure, catch, and harvest were all much higher on the west basin than on the east basin. A total of 35,599 fish were caught (11.41/acre) and 16,085 fish harvested (5.15/acre) for all species. Among species, sunfish had the highest catch (8.57/acre) and harvest (3.33/acre), followed by black crappie catch (1.76/acre) and harvest (1.38/acre). Sunfish had the highest yield (0.91 lbs/acre), but black crappie (0.86 lbs/acre) and northern pike (0.77 lbs/acre) yields were similar. Sunfish had the highest catch and harvest rate among targeting anglers (4.12/hr and 1.46/hr, respectively). More sunfish were harvested in the current survey, but mean weight was lower than in 1989-90. Lake survey data also show a decline in bluegill mean weight since 1985, but no clear trend in relative abundance. Black crappie were the most often targeted species (45%) and had the second highest catch and harvest rates (0.45/hr and 0.35/hr, respectively). Walleye were targeted by 20.8% of anglers for the season with catch and harvest rates of 0.164/hr and 0.079/hr, respectively. Walleye were smaller and more abundant in the current survey (0.16/acre harvest, 0.77 lbs mean weight); lake survey catch rates for walleye have also increased since the 1980s, whereas mean weight has decreased. However, anglers were dissatisfied with walleye size and numbers. Northern pike were targeted by 16.1% of parties for the season. Catch rates were higher for spearers (0.23/hr) than for pike anglers (0.096/hr). Northern pike harvest was much lower in the current survey (0.04/acre angling, 0.18/acre spearing), although pike size increased for both angling and spearing; however, lake survey results show higher numbers and smaller pike since the 1980s. Angler comments indicate support for more restrictive harvest regulations, increased walleye stocking, and for a public access on the east basin. Increasing creel survey frequency is recommended, particularly to monitor the walleye fishery, and a walleye special regulation could be considered. Walleye fry stocking has been successful and no change is needed.

Introduction

Clearwater Lake is located in Wright and Stearns Counties, 13 miles south of St. Cloud, Minnesota (Figure 1). Clearwater is the largest lake in the Montrose management area and a popular multi-species fishery. Walleye fingerlings were stocked for many years, although walleye were considered to be naturally reproducing until the mid-1970s. Walleye fry have been stocked every other year since 1998 and fall electrofishing surveys have consistently sampled fingerlings in years when fry have been stocked. A lake survey was conducted in July, 2005 and found a walleye catch rate that was typical for lake class 22, along with a high number of northern pike. Previous creel surveys include summer 1984, and winter 1989-1990.

A winter creel survey was conducted on Clearwater Lake from December 18, 2004 to March 18, 2005. The objectives of the survey were to provide information on fishing pressure, catch and harvest, angler demographics and satisfaction, and to document changes since the last winter creel survey. Along with the winter creel survey and summer lake survey, a summer creel survey in 2005 will help provide a clearer picture of the year-round fishery in Clearwater Lake.

Study Area

Clearwater Lake has a surface area of 3,121 acres (Table 1), maximum depth is 73 feet, and 45% of the lake is littoral. The lake has two distinct, but connected basins; the east basin is deeper and slightly larger. The Clearwater River flows through the west basin and Clearwater Lake is part of a chain of lakes along the river. Two public accesses are located on the west basin and each basin also has a private pay access. Clearwater Lake is classified as lake class 22 (Shupp 1992), is moderately eutrophic (combined Carlson's TSI=54, Minnesota Pollution Control Agency 2004), and has a watershed of 111,830 acres. Eurasian watermilfoil *(M. spicatum)* was found in the lake in 1989 and is currently widespread, but not abundant. The Clearwater Lake Association and individual landowners conduct herbicide treatments annually.

Methods

A stratified, random, roving creel survey was conducted from December 18, 2004 through March 18, 2005. The survey was stratified by month, day type (weekday, weekend/holiday), angler type (open ice, fish house, and spear house), and basin (east, west). For individual sampling days, one of two non-overlapping, eight hour periods (6 AM to 2 PM, 2-10 PM) was used and half of each shift was spent on each basin. Three weekdays and both weekend days

were sampled during each week; however, Saturday December 25 was not sampled. All weekdays, sampling periods, and starting basin were randomly chosen. A full-time creel clerk was hired for the survey, but left in mid-January; Montrose area staff completed the survey.

Creel clerks roved the lake by foot, truck, ATV, or snowmobile and interviewed as many anglers as possible. An effort was made to record complete trip interviews when anglers were seen leaving the lake. 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. Open ice anglers were always interviewed individually. Fish were measured to the nearest 0.1 inch; length of previously released fish was estimated by anglers. 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 their fishing that day and in general:

1.) "On a scale of 1 to 10, with one being poor and ten being excellent, how would you rate your fishing success today?"

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 Clearwater Lake?"

4.) "On a scale of 1 to 10, how satisfied are you with the size of (targeted species) you catch on Clearwater Lake?"

5.) "Do you have any suggestions for improving the fishery?"

Only one answer to each question was allowed per party and previously interviewed parties were not asked questions 3, 4, or 5.

Angling pressure was estimated from instantaneous counts at randomly selected times. Two counts were made during each sampling period for each basin (4 counts per shift). Open ice anglers were always counted as individuals. Data were analyzed with the General Creel Survey Analysis Program (GENCREEL, version 2; Bindman and Mach 1997).

Results

Angling Pressure

A total of 60 days were sampled over a 91 day period, including 614 interviews and 236 angler counts (Table 2). Completed trip interviews made up 39% of all interviews; completed trip interviews were highest in December (58% of all interviews) when the number of anglers

was limited by poor ice conditions and lowest in February (33%). Fish house parties represented 68% of all interviews (Table 2). Mean party size was 1.6 for fish house anglers and 1.2 for spearers; mean completed trip length in hours was 3.9 for fish house anglers, 2.9 for spearers, and 2.4 for open ice anglers (Table 2). Among basins, 396 interviews were taken on the west basin and 218 on the east basin.

Angling pressure was estimated to be 26,947 hours or 8.63 hours per acre (Table 3); this is above the 1970-1990 mean for winter creel surveys on lake class 22 of 4.7 hrs/acre (Cook and Younk 1998), but below 1989-90 creel results (56,655 hrs, 17.4 hrs/acre; Minnesota Department of Natural Resources 1991). East basin pressure was 7,997 hours or 4.93 hours/acre and west basin pressure was 18,974 hours or 12.67 hrs/acre (Table 3A). Pressure was highest in January (9,650 hrs) and lowest in March (3,642 hrs), although the survey ended March 18 (Table 3). Fish house anglers accounted for most of the angling pressure (20,624 hrs), followed by open ice anglers (3,624 hrs), and spearers (2,699 hrs).

Catch and Harvest

An estimated total of 35,599 fish were caught (11.41/acre) and 16,085 fish harvested (5.15/acre) for all species during the winter creel survey (Tables 4, 5). West basin catch (26,725) and harvest (12,278) far exceeded the east basin (9,225 caught, 3,914 harvested; Tables 4A, 4B). Among species, sunfish had the highest catch (26,733, 8.57/acre) and harvest (10,378, 3.33/acre), followed by black crappie catch (5,494, 1.76/acre) and harvest (4,318, 1.38/acre)(Tables 4, 5). This result was the same for both basins (Tables 4A, 4B, 5A, 5B). Sunfish had the highest yield (2,846 pounds, 0.91 lbs/acre), but black crappie (2,678 lbs, 0.86 lbs/acre) and northern pike (2,401 lbs, 0.77 lbs/acre) yields were similar (Table 6) due to their higher mean weight.

Sunfish had the highest catch and harvest rate among targeting anglers (4.12 and 1.46/hr, respectively; Table 7). Harvested sunfish had a mean length of 6.9 inches and a mean weight of 0.27 lbs; released sunfish had a mean length of 5.1 inches and 0.10 lbs (Table 8). Among targeting anglers, 35.5% targeted sunfish for the season, but many of these responses were after the February 20 closure for pike and walleye; 54% of sunfish anglers harvested at least one fish and 26% harvested 10 or more (Tables 9, 10).

Black crappie were the most often targeted species (45%; Table 10) and had the second highest catch and harvest rates (0.45 and 0.35/hr, respectively; Table 7). However, more than half of all crappie anglers (55.4%) harvested no black crappie and only 12.6% harvested 4 or

more black crappie (Table 9). Harvested black crappie had a mean length of 10.2 inches and a mean weight of 0.63 lbs. (Table 8).

Walleye were targeted by 20.8% of anglers for the season, but the percentages were higher in December (35.4%) and January (40.2%) before the season closure on Feb. 20 (Table 10). Walleye catch (0.164/hr) and harvest (0.079) rates were higher than angling rates for northern pike, but lower than spearing rates (Table 7). Most walleye anglers harvested no fish (80.9%) and only 4.2% harvested 2 or more fish (Table 9). Harvested walleye had a mean length of 13.1 inches and a mean weight of 0.77 pounds (Table 8).

Northern pike were targeted by 16.1% of parties (including spearers) for the season (Table 10), although 34.5% targeted pike during February 1-20, prior to the season closure. Catch rates were higher for spearers (0.23/hr) than for pike anglers (0.096/hr). Most pike anglers and spearers harvested no fish (76.9% and 62.5%, respectively); no pike anglers and only 6.3% of spearers harvested two or more fish per angler (Table 9). Pike harvested by angling had a mean length and weight of 24.4 inches and 3.4 pounds, respectively; speared pike had a mean length and weight of 25 inches and 3.6 pounds.

Other species caught in lower numbers included largemouth bass, rock bass, and yellow perch (Table 8). Catch and harvest data by month are reported in the appendix.

Angler Demographics and Interview Questions

A high proportion of anglers were male (93.7%) and about half of all anglers were between 25 and 45 years old (Table 11). Many anglers were not from the local area; only 33% traveled 10 miles or less to reach Clearwater Lake and about 23% traveled 25 miles or more (Table 12). In contrast, other recent winter creel surveys in Wright County found that anglers traveled shorter distances; on Pulaski Lake 76% of anglers traveled 10 miles or less and for Buffalo Lake 47.2% traveled 10 miles or less (Minnesota Department of Natural Resources 2004, 2005).

When asked to rate their fishing success that day on a scale of 1-10, 51.2% of all parties gave a rating of 1 or 2 and only 15.9% gave a rating greater than 6 (Table 13). The mean response for all parties was 2.9. Parties seeking sunfish reported the greatest success; 23.2% gave a rating greater than 6 and 39.8% gave a rating of 1 or 2 (Table 13). Walleye anglers reported the least success; only 8.9% gave a response greater than 6 and 65.3% responded with a 1 or 2. 29.8% of all parties had been previously interviewed.

Overall satisfaction with number and size of fish caught differed among species targeted (Table 14). Northern pike had the highest rating for number (mean response 5.7 out of 10) and size (6.3), followed by sunfish (5.6 for number, 5.5 for size) and black crappie (5.4, 5.3, respectively for number and size); walleye had the lowest rating for number (4.9) and size (4.7).

Many suggestions were given by anglers for improving the fishery; support was most evident for more restrictive harvest regulations, followed by support for increased walleye stocking and the desire for a public access on the east basin (Table 15).

Economic Value

One method for estimating the average amount of money 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). An angler trip to Clearwater Lake was considered an angler day. A total of 26,947 angler hours and 3.43 hours per trip equals 7,856 trips during the winter creel 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 $204,263. Fuel and other costs have risen since 2001, so the true value could be higher.

Discussion and Management Implications

Total angling pressure in 2004-05 was much lower than in 1989-90, despite a longer creel duration (91 days in 2004-05, 74 days in 1989-90). However, on-ice travel was considered good by mid-December 1989, but not until January 2005 due to mild weather. Spearing pressure was also much lower in 2004-05 (2.8 hrs/acre vs. 0.86 hrs/acre in 1989-90), although the season was somewhat shorter due to late ice formation. The west basin continues to have most of the angling pressure (80% of angler hours in 1989-90, 70% in 2004-05), due to the lack of public access on the east basin.

More anglers targeted black crappie in 1989-90 (65%) than in 2004-05 (45%). In 1989-90 the survey ended February 12 at the close of the walleye and pike season or the difference would be even greater. Black crappie represented nearly two thirds of the harvest by number in 1989-90 and crappie harvest was 6.69/acre, compared to only 1.38/acre in 2004-05. Summer lake survey data is inadequate to compare crappie net catch rates across years, so any change in relative abundance is unknown, but crappies were clearly a larger component of the earlier survey.

Northern pike harvest was much lower in the current survey, although pike size increased. Harvest was lower for both spearing and angling, likely due to much lower pressure in 2004-05. Harvest rates for both methods were nearly unchanged, but mean weight increased from 1989-90 (2.9 lbs spear, 2.4 lbs angle) to 2004-05 (3.6 lbs spear, 3.4 lbs angle). However, lake survey results show an increase in pike number and decrease in size since the 1980s (Figure 3). The gillnet catch of pike in summer 2005 was well above the expected range for numbers, so it was surprising that the angling catch rate was not higher. Low angling and spearing pressure (and therefore, low sample size) during the current survey may help explain the higher pike weight. It is also possible that anglers and spearers were more selective in their harvest.

Walleye were smaller, but more abundant in the current survey. Walleye harvest was similar in both surveys (0.22/acre in 1989-90, 0.16/acre in 2004-05), but mean weight of harvested walleye was much higher in 1989-90 (2.43 lbs) than in 2004-05 (0.77 lbs). Over half of all walleye caught during the 2005 season were released for a catch rate of 0.36/acre; no walleye were reported released during the 1990 season, so catch and harvest rate were equal. Further evidence comes from lake surveys; gillnet catch rates for walleye have increased since the 1980s, whereas mean weight has decreased (Figure 4). Walleye fry stocking has been successful and accounts for the younger year classes seen in the creel in 2005. However, fry stocking began in 1998, after lake survey catches had already increased, so other factors are likely involved as well.

Many walleye anglers in 2004-05 complained that it was difficult to catch walleye of desirable size. A possible reason is an abundance of small yellow perch as forage. Anglers released nearly all perch caught due to their small size (0.36/acre caught, 0.04/acre harvest). Large schools of small yellow perch were often visible in spear holes during winter (personal observation) and lake survey shoreline seining in summer 2005 found a substantial number of perch from the 2004 year class. This could also explain the low northern pike catch rate for anglers.

More sunfish were harvested in the current survey, but mean weight was lower than in 1989-90. Bluegill were sought by only 10% of parties in 1989-90, versus 35.5% in 2004-05. However, much of the angling for sunfish (all sunfish species were combined) in the current survey occurred in February and March; the prior survey ended February 12, 1990 and may have missed a large portion of the pressure and harvest for sunfish that season. Lake survey data also

show a decline in bluegill mean weight since 1985, but no clear trend in relative abundance (Figure 5).

Caution should be used when comparing results of the two winter surveys because of differences in methodology. This is true in the case of day and night angling in 1989-90, when night angling pressure was calculated separately using a different method than daytime angling. Some strata were combined for analysis in the earlier survey due to low sample sizes, possibly inflating pressure and catch results and the season was longer in 2004-05, as noted previously. However, the two surveys are similar in most respects and potential differences in results seem modest.

Management implications

Angler success on a given day and satisfaction in general seem reasonable for Clearwater Lake, with the exception of walleye anglers. Anglers in 2004-05 were dissatisfied with both the size and number of walleye caught. Lake survey results in 2005 show relative walleye abundance and mean weight within the expected range for lake class 22, but the length distribution from the current creel survey shows that relatively few walleye of desirable size were caught . It would be helpful to monitor the winter fishery to see whether this trend continues. The lake survey results indicate no need for a change in walleye stocking.

Given the importance of Clearwater Lake in the Montrose area, creel surveys should be conducted on a more frequent basis in concert with lake surveys. However, a limited creel survey, angler response cards, or other means could provide valuable information quickly on walleye and other species without a large commitment of time or resources.

A special regulation might benefit the size structure of northern pike and walleye populations. The size of both species, while acceptable, has declined in recent lake surveys and anglers also commented on this. Angler suggestions indicated support for some form of special regulations, especially for walleye. However, it is unknown whether a particular option from the available “toolbox” suite of regulations would have broad support. Northern pike spearers would likely not favor a special regulation, but both pike anglers and spearers should be encouraged to harvest more small pike.

The fishery for other species seems satisfactory at present. The results of the 2005 summer creel survey should help clarify the status of the fishery and whether any management changes are needed. A public access on the east basin was recommended in the 1990 creel report,

but this has not occurred and few options exist on the east basin for developing one. Angler comments still indicate a strong desire for this and such an access should be a high priority if a suitable location becomes available.

Acknowledgments

I would like to thank Brett Oberg for his time as survey clerk, Karen Doroff for data entry and all of the Montrose area staff for their assistance with the creel survey.

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

Characteristic	Clearwater Lake	East Basin	West Basin
DOW number	86-252	86-252-01	86-252-02
Minnesota lake class[1]	22	22	22
Total surface acres	3,121	1,623	1,498
Percent littoral area[2]	44.5	24	67
Maximum depth (ft)	73	73	41
Secchi disk transparency[3] (ft)	7.6	—	—
Total alkalinity[3] (ppm)	169	—	—
Total phosphorus[3] (ppm)	35	—	—
Carlson TSI[3]	54	—	—
Shoreline development index[4]	2.21	1.55	1.58

[1]Schupp (1992).

[2]Percent of the total surface area shallower than 15 ft.

[3]MPCA, 2004. http://www.pca.state.mn.us/water/clmp/lkwqReadFull.cfm?lakeid=86-0252

[4]Shoreline length/2(π*lake area)$^{1/2}$, length and area are consistent units (miles and square miles).

Table 2. Summary of creel strata statistics, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005. Standard errors appear in parentheses.

Statistic	Month				Entire Season
	December	January	February	March	
Start date of stratum	12/18/2004	1/1/2005	02/01/2005	03/01/2005	12/18/2004
End date of stratum	12/31/2004	1/31/2005	02/28/2005	03/18/2005	03/18/2005
Length of fishing day (hours)	16	16	16	16	16
Number of days in stratum	14	31	28	18	91
Weekdays sampled	6	10	10	9	35
Weekend/holiday days sampled	3	10	8	4	25
Number of angler counts	35	77	72	52	236
Number of fish house interviews	55	84	180	101	420
Number of open ice interviews	3	12	54	48	117
Number of spearing interviews	7	16	54	0	77
Total number of interviews	65	112	288	149	614
Percent of completed trip interviews	58	36	33	44	39
Mean parties per count:					
Fish house	5.29 (1.21)	5.08 (0.78)	4.56 (0.47)	3.00 (0.56)	4.49 (0.37)
Open ice	1.06 (0.38)	0.36 (0.14)	2.21 (0.52)	2.44 (0.51)	1.49 (0.21)
Spear house	0.71 (0.19)	0.90 (0.21)	1.52[1] (0.24)	—	1.07[1] (0.13)
Mean number of anglers per party:					
Fish house	1.87 (0.27)	1.67 (0.38)	1.41 (0.14)	1.37 (0.20)	1.56 (0.15)
Open ice	1.00	1.00	1.00	1.00	1.00
Spear house	1.10 (—)	1.24 (0.22)	1.21[1] (0.13)	—	1.21[1] (—)
Mean completed trip length (hours):					
Fish house	3.24 (0.69)	4.94 (0.84)	3.40 (1.07)	3.17 (0.65)	3.86 (0.47)
Open ice	1.75 (—)	2.50 (—)	2.50 (—)	2.38 (—)	2.40 (—)
Spear house	2.81 (—)	3.61 (—)	2.43[1] (0.56)	—	2.91[1] (—)

[1]Through end of northern pike season on February 20, 2005

Table 3. Winter fishing pressure estimates, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005.

Angler Type	Hours	SE	Hours per Acre	SE
		December 18–31		
Fish house	4,152	1,169	1.33	0.37
Open ice	432	158	0.14	0.05
Spearing	405	117	0.13	0.04
Combined Total	4,988	1,212	1.60	0.39
		January		
Fish house	8,408	1,655	2.69	0.53
Open ice	286	125	0.09	0.04
Spearing	956	227	0.31	0.07
Combined Total	9,650	1,758	3.09	0.56
		February		
Fish house	5,696	659	1.82	0.21
Open ice	1,632	464	0.52	0.15
Spearing[1]	1,339	250	0.43	0.08
Combined Total	8,666	974	2.77	0.31
		March 1–18		
Fish house	2,369	527	0.76	0.17
Open ice	1,274	328	0.41	0.11
Spearing	—	—	—	—
Combined Total	3,642	714	1.17	0.23
		Winter 2005		
Fish house	20,624	2,195	6.61	0.70
Open ice	3,624	603	1.16	0.19
Spearing[1]	2,699	357	0.86	0.11
Combined Total	26,947	3,155	8.63	1.00

[1]Through end of northern pike season on February 20, 2005

Table 3A. Winter fishing pressure estimates by basin, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005.

	East Basin				West Basin			
Angler Type	Hours	SE	Hours/ Acre	SE	Hours	SE	Hours/ Acre	SE
				Dec. 18-31				
Fish house	1,236	459	0.76	0.28	2,916	1,075	1.95	0.72
Open ice	66	43	0.04	0.03	365	152	0.24	0.10
Spearing	58	29	0.04	0.02	346	113	0.23	0.08
Total	1,361	496	0.84	0.31	3,627	1,106	2.42	0.74
				January				
Fish house	2,059	462	1.27	0.28	6,374	1,595	4.25	1.06
Open ice	157	86	0.10	0.05	129	90	0.09	0.06
Spearing	456	108	0.28	0.07	499	200	0.33	0.13
Total	2,672	549	1.65	0.34	7,002	1,675	4.67	1.12
				February				
Fish house	1,844	336	1.14	0.21	3,853	566	2.57	0.38
Open ice	872	406	0.54	0.25	760	224	0.51	0.15
Spearing[1]	392	104	0.24	0.06	946	227	0.63	0.15
Total	3,109	696	1.92	0.43	5,559	677	3.71	0.45
				March 1–18				
Fish house	440	162	0.27	0.10	1,909	490	1.27	0.33
Open ice	415	142	0.26	0.09	859	296	0.57	0.20
Spearing	—	—	—	—	—	—	—	—
Total	856	190	0.53	0.12	2,768	678	1.85	0.45
				Winter 2005				
Fish house	5,579	751	3.44	0.46	15,052	2,063	10.05	1.38
Open ice	1,511	441	0.93	0.27	2,113	411	1.41	0.27
Spearing[1]	907	154	0.56	0.09	1,792	322	1.20	0.22
Total	7,997	1,034	4.93	0.64	18,974	2,227	12.67	1.49

Table 4. Catch and harvest estimates Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	4,317.7	(756.4)	1,176.4	(396.6)	5,494.1	(882.0)
Largemouth bass	23.8	(20.8)	166.3	(45.1)	190.2	(49.0)
Northern pike angled	120.3	(49.5)	208.3	(163.8)	328.6	(172.1)
Northern pike speared	576.2	(—)	0	(—)	576.2	(—)
Rock bass	54.9	(31.7)	37.5	(16.6)	92.3	(42.1)
Sunfish[1]	10,377.6	(1,895.9)	16,354.8	(2,433.3)	26,732.5	(3,962.2)
Walleye	496.7	(—)	639.5	(—)	1,136.2	(—)
Yellow perch	117.5	(97.0)	931.8	(467.9)	1,049.3	(472.7)
All species	16,084.7	(—)	19,514.7	(—)	35,599.4	(—)

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

Table 4A. Catch and harvest estimates Clearwater Lake (East basin), Minnesota, December 18, 2004–March 18, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	1,425.8	(480.2)	666.9	(317.2)	2,092.7	(587.1)
Largemouth bass	0.0	(0.0)	68.5	(28.3)	68.5	(28.3)
Northern pike angled	85.5	(23.5)	64.0	(0.0)	149.5	(0.0)
Northern pike speared	182.3	(—)	0.0	(—)	182.3	(—)
Rock bass	12.1	(10.4)	13.6	(10.3)	25.8	(14.7)
Sunfish[1]	1,768.7	(559.5)	3,878.4	(1,425.5)	5,647.1	(1,894.7)
Walleye	341.0	(—)	335.5	(—)	676.5	(—)
Yellow perch	98.3	(95.9)	277.9	(201.5)	376.2	(213.7)
All species	3,913.7	(—)	5,311.2	(—)	9,224.8	(—)

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

Table 4B. Catch and harvest estimates Clearwater Lake (West Basin), Minnesota, December 18, 2004–March 18, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	2,908.0	(586.0)	515.2	(239.8)	3,423.2	(661.5)
Largemouth bass	23.8	(20.8)	99.0	(35.6)	122.8	(40.3)
Northern pike angled	34.8	(29.3)	138.0	(159.7)	172.8	(162.4)
Northern pike speared	393.9	(—)	0.0	(—)	393.9	(—)
Rock bass	42.7	(29.9)	23.8	(13.0)	66.6	(39.4)
Sunfish[1]	8,700.1	(1,877.1)	12,710.6	(2,118.4)	21,410.7	(3,694.7)
Walleye	155.7	(40.4)	304.0	(127.4)	459.8	(152.0)
Yellow perch	19.2	(14.5)	656.2	(422.4)	675.4	(421.8)
All species	12,278.2	(—)	14,446.8	(—)	26,725.1	(—)

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

Table 5. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	1.38	(0.24)	0.38	(0.13)	1.76	(0.28)
Largemouth bass	0.01	(0.01)	0.05	(0.01)	0.06	(0.02)
Northern pike angled	0.04	(0.02)	0.07	(0.05)	0.11	(0.06)
Northern pike speared	0.18	(—)	0	(—)	0.18	(—)
Rock bass	0.02	(0.01)	0.01	(0.01)	0.03	(0.01)
Sunfish[1]	3.33	(0.61)	5.24	(0.78)	8.57	(1.27)
Walleye	0.16	(—)	0.2	(—)	0.36	(—)
Yellow perch	0.04	(0.03)	0.3	(0.15)	0.34	(0.15)
All species	5.15	(—)	6.25	(—)	11.41	(—)

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

Table 5A. Catch and harvest estimates per acre, Clearwater Lake (East basin), Minnesota, December 18, 2004–March 18, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.88	(0.30)	0.41	(0.20)	1.29	(0.36)
Largemouth bass	0.00	(0.00)	0.04	(0.02)	0.04	(0.02)
Northern pike angled	0.05	(0.01)	0.04	(0.00)	0.09	(0.00)
Northern pike speared	0.11	(—)	0.00	(—)	0.11	(—)
Rock bass	0.01	(0.01)	0.01	(0.01)	0.02	(0.01)
Sunfish[1]	1.09	(0.34)	2.39	(0.88)	3.48	(1.17)
Walleye	0.21	(—)	0.21	(—)	0.42	(—)
Yellow perch	0.06	(0.06)	0.17	(0.12)	0.23	(0.13)
All species	2.41	(—)	3.27	(—)	5.68	(—)

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

Table 5B. Catch and harvest estimates per acre, Clearwater Lake (West basin), Minnesota, December 18, 2004–March 18, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	1.94	(0.39)	0.34	(0.16)	2.29	(0.44)
Largemouth bass	0.02	(0.01)	0.07	(0.02)	0.08	(0.03)
Northern pike angled	0.02	(0.02)	0.09	(0.11)	0.12	(0.11)
Northern pike speared	0.26	(—)	0.00	(—)	0.26	(—)
Rock bass	0.03	(0.02)	0.02	(0.01)	0.04	(0.03)
Sunfish[1]	5.81	(1.25)	8.49	(1.41)	14.29	(2.47)
Walleye	0.10	(0.03)	0.20	(0.09)	0.31	(0.10)
Yellow perch	0.01	(0.01)	0.44	(0.28)	0.45	(0.28)
All species	8.20	(—)	9.64	(—)	17.84	(—)

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

Table 6. Yield estimates, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	2,678.3	(—)	0.86	(—)
Largemouth bass	16.7	(—)	0.01	(—)
Northern pike	2,401.0	(—)	0.77	(—)
Rock bass	26.5	(—)	0.01	(—)
Sunfish[1]	2,845.9	(—)	0.91	(—)
Walleye	323.6	(—)	0.10	(—)
Yellow perch	4.2	(—)	0.00	(—)
All species	8,296.1	(—)	2.66	(—)

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

Table 7. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.350	(—)	0.102	(—)	0.452	(—)
Northern pike angling	0.076	(—)	0.020	(—)	0.096	(—)
Northern pike spearing	0.230	(—)	0.000	(—)	0.230	(—)
Sunfish[1]	1.459	(—)	2.663	(—)	4.122	(—)
Walleye	0.079	(—)	0.086	(—)	0.164	(—)
			All Anglers			
Black crappie	0.159	(0.031)	0.043	(0.015)	0.202	(0.009)
Largemouth bass	0.001	(0.001)	0.006	(0.002)	0.007	(0.002)
Northern pike	0.026	(—)	0.008	(—)	0.033	(—)
Rock bass	0.002	(0.001)	0.001	(0.001)	0.003	(0.002)
Sunfish[1]	0.381	(0.048)	0.601	(0.105)	0.982	(0.170)
Walleye	0.018	(—)	0.024	(—)	0.042	(—)
Yellow perch	0.004	(0.004)	0.034	(0.018)	0.039	(0.014)
All species	0.591	(—)	0.717	(—)	1.307	(—)

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

Table 8. Length frequency distribution of harvested and released fish, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005.

TL	Black crappie		Largemouth bass		Northern pike–angle		Northern pike–spear	
(inches)	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
<4.0	—	2	—	—	—	—	—	—
4.0–4.4	—	—	—	—	—	—	—	—
4.5–4.9	—	—	—	—	—	—	—	—
5.0–5.4	—	2	—	—	—	—	—	—
5.5–5.9	—	—	—	—	—	—	—	—
6.0–6.4	—	16	—	—	—	—	—	—
6.5–6.9	—	6	—	—	—	—	—	—
7.0–7.4	3	17	—	—	—	—	—	—
7.5–7.9	—	2	—	—	—	—	—	—
8.0–8.4	5	21	—	2	—	—	—	—
8.5–8.9	17	14	—	—	—	—	—	—
9.0–9.4	46	44	—	—	—	—	—	—
9.5–9.9	88	—	—	—	—	—	—	—
10.0–10.4	85	37	—	3	—	—	—	—
10.5–10.9	53	—	—	—	—	—	—	—
11.0–11.4	29	2	2	—	—	—	—	—
11.5–11.9	13	—	—	—	—	—	—	—
12.0–12.9	18	3	—	4	—	1	—	—
13.0–13.9	15	—	—	—	—	—	—	—
14.0–14.9	—	1	—	3	—	—	—	—
15.0–15.9	—	—	—	5	—	1	—	—
16.0–16.9	—	—	—	1	—	3	—	—
17.0–17.9	—	—	—	—	—	—	—	—
18.0–18.9	—	—	—	3	—	3	—	—
19.0–19.9	—	—	—	1	1	1	—	—
20.0–20.9	—	—	—	—	—	—	4	—
21.0–21.9	—	—	—	—	1	—	2	—
22.0–22.9	—	—	—	—	2	2	8	—
23.0–23.9	—	—	—	—	2	—	3	—
24.0–24.9	—	—	—	—	—	1	4	—
25.0–25.9	—	—	—	—	—	—	7	—
26.0–26.9	—	—	—	—	1	1	4	—
27.0–27.9	—	—	—	—	1	1	4	—
28.0–28.9	—	—	—	—	—	—	1	—
29.0–29.9	—	—	—	—	—	—	4	—
30.0–30.9	—	—	—	—	—	1	—	—
31.0–31.9	—	—	—	—	—	—	1	—
32.0–32.9	—	—	—	—	—	—	—	—
33.0–33.9	—	—	—	—	1	—	—	—
34.0–34.9	—	—	—	—	—	—	—	—
35.0–35.9	—	—	—	—	—	—	—	—
36.0–36.9	—	—	—	—	—	—	1	—
37.0–37.9	—	—	—	—	—	—	—	—
38.0–39.0	—	—	—	—	—	—	—	—
>39	—	—	—	—	—	—	—	—
Total N	372	167	2	22	9	15	43	0
Mean Length	10.19	8.64	11.00	13.64	24.37	19.93	24.95	—
SE	0.06	0.14	—	0.68	1.44	1.31	0.52	—
Mean Weight	0.63	0.41	0.70	1.66	3.44	2.03	3.59	—
SE	0.01	0.02	—	0.24	0.70	0.41	0.25	—

Table 8 (cont.). Length frequency distribution of harvested and released fish, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005.

TL	Rock bass		[1]Sunfish		Walleye		Yellow perch	
(inches)	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
<4.0	—	—	1	6	—	—	—	3
4.0–4.4	—	—	6	220	—	2	2	28
4.5–4.9	—	—	2	145	—	—	—	36
5.0–5.4	—	1	12	914	—	—	1	2
5.5–5.9	—	—	10	406	—	—	—	30
6.0–6.4	—	—	109	262	—	—	—	3
6.5–6.9	—	—	272	60	—	—	—	—
7.0–7.4	2	1	289	—	—	3	—	—
7.5–7.9	1	—	107	—	—	—	—	—
8.0–8.4	2	—	25	1	—	5	1	—
8.5–8.9	—	—	7	1	—	4	—	—
9.0–9.4	—	2	1	—	—	3	—	—
9.5–9.9	—	1	—	—	—	—	—	—
10.0–10.4	1	—	—	—	—	2	—	—
10.5–10.9	—	—	—	—	2	19	—	—
11.0–11.4	—	—	—	—	4	1	—	—
11.5–11.9	—	—	—	—	3	1	—	—
12.0–12.9	—	—	—	—	12	21	—	—
13.0–13.9	—	—	—	—	6	5	—	—
14.0–14.9	—	—	—	—	5	1	—	—
15.0–15.9	—	—	—	—	2	—	—	—
16.0–16.9	—	—	—	—	1	—	—	—
17.0–17.9	—	—	—	—	—	—	—	—
18.0–18.9	—	—	—	—	2	—	—	—
19.0–19.9	—	—	—	—	—	—	—	—
20.0–20.9	—	—	—	—	—	—	—	—
21.0–21.9	—	—	—	—	—	—	—	—
22.0–22.9	—	—	—	—	—	—	—	—
23.0–23.9	—	—	—	—	—	—	—	—
24.0–24.9	—	—	—	—	—	—	—	—
25.0–25.9	—	—	—	—	—	1	—	—
26.0–26.9	—	—	—	—	—	—	—	—
27.0–27.9	—	—	—	—	—	—	—	—
28.0–28.9	—	—	—	—	—	—	—	—
29.0–30.0	—	—	—	—	—	—	—	—
>30	—	—	—	—	—	—	—	—
Total N	6	5	841	2015	37	68	4	104
Mean Length	8.02	7.90	6.87	5.13	13.14	10.76	5.40	4.65
SE	0.49	0.84	0.02	0.01	0.30	0.33	1.01	0.07
Mean Weight	0.43	0.44	0.27	0.10	0.77	0.48	0.10	0.05
SE	0.09	0.11	0.00	0.00	0.07	0.08	0.06	0.00

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

Table 9. Percent of anglers[1] who harvested a given number of fish, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005.

	Number of Fish Harvested per Angler								
Species[2]	0	0.1–1.9	2–3.9	4–5.9	6–7.9	8–9.9	10–14.9	15–20	N
Black crappie/all anglers	77.8	8.8	7.1	3.3	1.7	1.3	0.0	0.0	239
Bl. crappie/crappie anglers	55.4	17.0	15.2	6.3	3.6	2.7	0.0	0.0	112
Northern pike/all anglers	93.3	5.9	0.8	0.0	0.0	0.0	0.0	0.0	239
Northern pike/pike anglers	76.9	23.1	0.0	0.0	0.0	0.0	0.0	0.0	13
Northern pike/spearers	62.5	31.3	6.3	0.0	0.0	0.0	0.0	0.0	32
Sunfish/all anglers	82.8	2.1	1.7	2.1	1.7	1.3	4.2	4.2	239
Sunfish/sunfish anglers	45.9	6.8	5.4	6.8	5.4	4.1	12.2	13.5	74
Walleye/all anglers	95.8	3.3	0.4	0.4	0.0	0.0	0.0	0.0	239
Walleye/walleye anglers	80.9	14.9	2.1	2.1	0.0	0.0	0.0	0.0	47

[1]Data from completed trip interviews. The number of fish harvested per angler was determined by dividing the number (by species) harvested by the number of anglers for each interview. [2]Bag limits: crappie=10, northern pike=3, sunfish=20, walleye=6.

Table 10. Percentage[1] of parties targeting species on Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005.

Species	December	January	February[2]	March	Season
Black crappie	56.9	50.0	39.9	45.6	45.0
Northern pike	10.8	17.9	25.0	0	16.1
Sunfish[3]	20.0	8.9	34.0	65.1	35.5
Walleye	35.4	40.2	20.8	0	20.8
Parties (N)	65	112	288	149	614

[1]Percentages do not total to 100 because anglers could target up to two species. [2]The season for walleye and northern pike closed on February 20. From Feb. 1–20, the percentage was 34.5 for parties targeting northern pike and 26.2 for parties targeting walleye. [3]Includes bluegill, pumpkinseed, hybrid and green sunfish.

Table 11. Percent distributions by age and sex of anglers, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005.

Age in Years	Females	Males	Combined
0–15	1.3	3.6	4.9
16–25	0.7	12.1	12.8
26–35	1.0	24.1	25.2
36–45	1.5	23.9	25.4
46–55	1.0	13.9	14.9
56–65	0.5	13.1	13.5
Over 65	0.2	3.0	3.3
Total (N=354)	6.3	93.7	100

Table 12. Approximate one-way distance traveled by interviewed anglers to Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005.

Distance[1] in Miles	Responses	Percent
0–10	290	33.0
11–25	383	43.6
26–50	180	20.5
51–100	20	2.3
101–300	5	0.6
Over 300	1	0.1
Total	879	100

[1]Distances are calculated in a straight line from center of zip code areas.

Table 13. Fishing success ratings[1] from interviewed anglers, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005. One response was collected from each party, regardless of party size. Percentages are shown in parentheses.

	Fishing Success Rating										
	1–2		3–4		5–6		7–8		9–10		Total
Angler group	N	(%)	N	(%)	N	(%)	N	(%)	N	(%)	Responses
Open ice	56	57.7	10	10.3	18	18.6	9	9.3	4	4.1	97
Fish house	199	49.9	57	14.3	78	19.5	46	11.5	19	4.8	399
Spearing	35	50.0	2	2.9	21	30.0	8	11.4	4	5.7	70
All parties	290	51.2	69	12.2	117	20.7	63	11.1	27	4.8	566
Parties seeking[2]:											
Black crappie	148	57.4	29	11.2	50	19.4	24	9.3	7	2.7	258
Northern Pike	52	52.0	8	8.0	24	24.0	11	11.0	5	5.0	100
Sunfish	72	39.8	26	14.4	41	22.7	27	14.9	15	8.3	181
Walleye	81	65.3	16	12.9	16	12.9	8	6.5	3	2.4	124

[1]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 Clearwater Lake?". [2]Some parties 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 or 4.

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

Species	Mean response	N
Black crappie	5.4	121
Northern Pike	5.7	39
Sunfish	5.6	76
Walleye	4.9	70
Total	5.4	306

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

Species	Mean response	N
Black crappie	5.3	120
Northern Pike	6.3	39
Sunfish	5.5	76
Walleye	4.7	70
Total	5.6	305

Table 15. Summarized responses to question 5, "Do you have any suggestions for improving the fishery?" Multiple responses were allowed for a given party, but not duplicate responses. Previously interviewed anglers were not asked question 5.

Number	Response
22	Increase or begin stocking
	12 ..... walleye
	4 ..... crappie
	3 ..... unspecified
	1 each .... sunfish, flathead catfish, musky, northern pike
3	Keep stocking walleye
13	Desire slot limit of some type
	9 ..... walleye
	2 ..... crappie
	1 each .... northern pike, any species
1	No walleye slot limit
5	Desire minimum length
	4 ..... walleye (suggestions: 14", 15", 20")
	1 ..... crappie (suggestion: 10")
11	Desire lower bag limit
	4 ..... walleye
	4 ..... crappie
	2 ..... sunfish
	1 ..... all species
6	Desire to protect spawning sunfish and/or crappie (closed season or areas)
12	Desire East basin public access
1	Opposed to East basin public access
5	Decrease or eliminate tournaments
6	Desire improvement in water quality
4	More parking needed at public access
3	Shallow bars, etc. should be marked as hazards
3	Carp should be eliminated
3	Complaints about litter on ice
99	Total number of suggestions

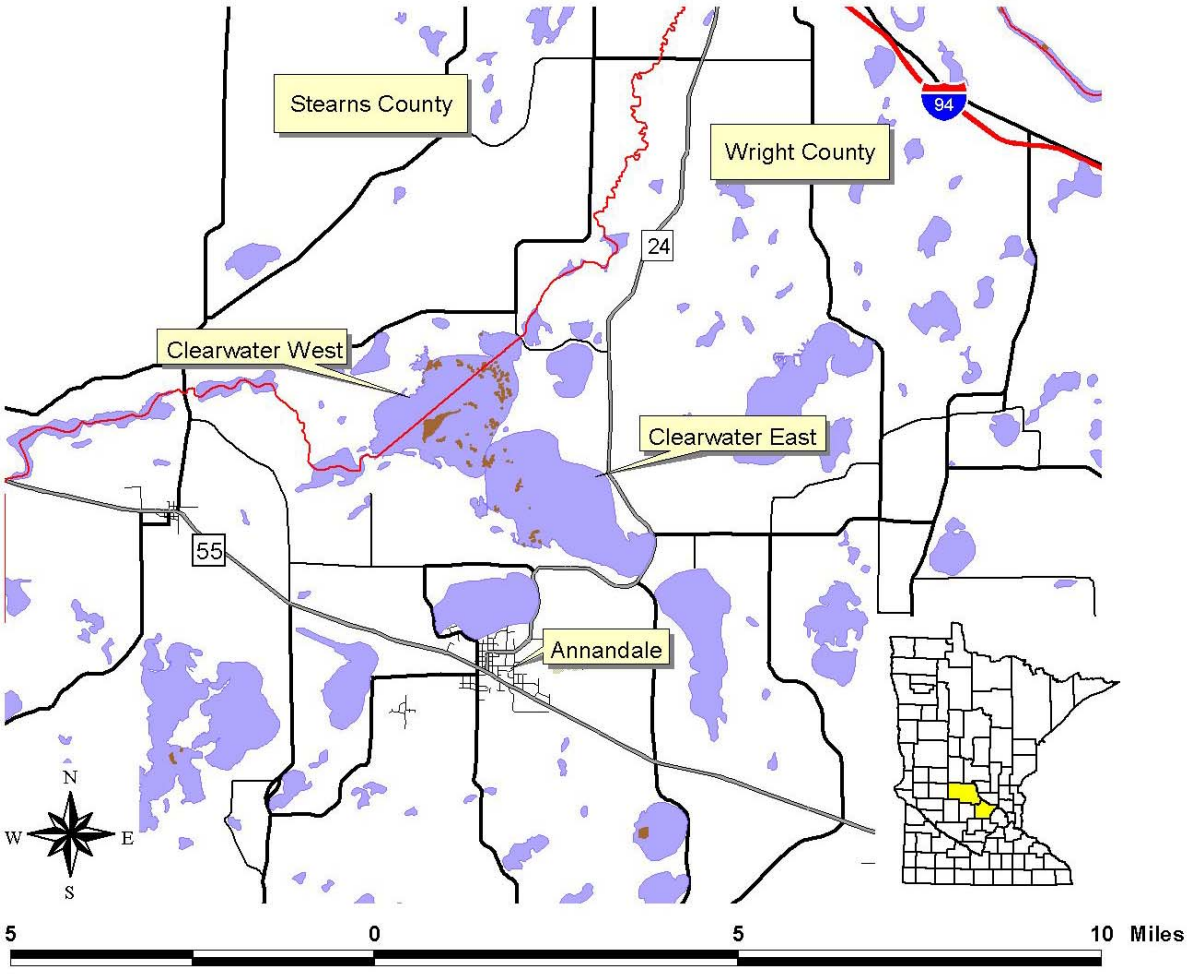

Figure 1. Location of Clearwater Lake, Wright County, Minnesota.

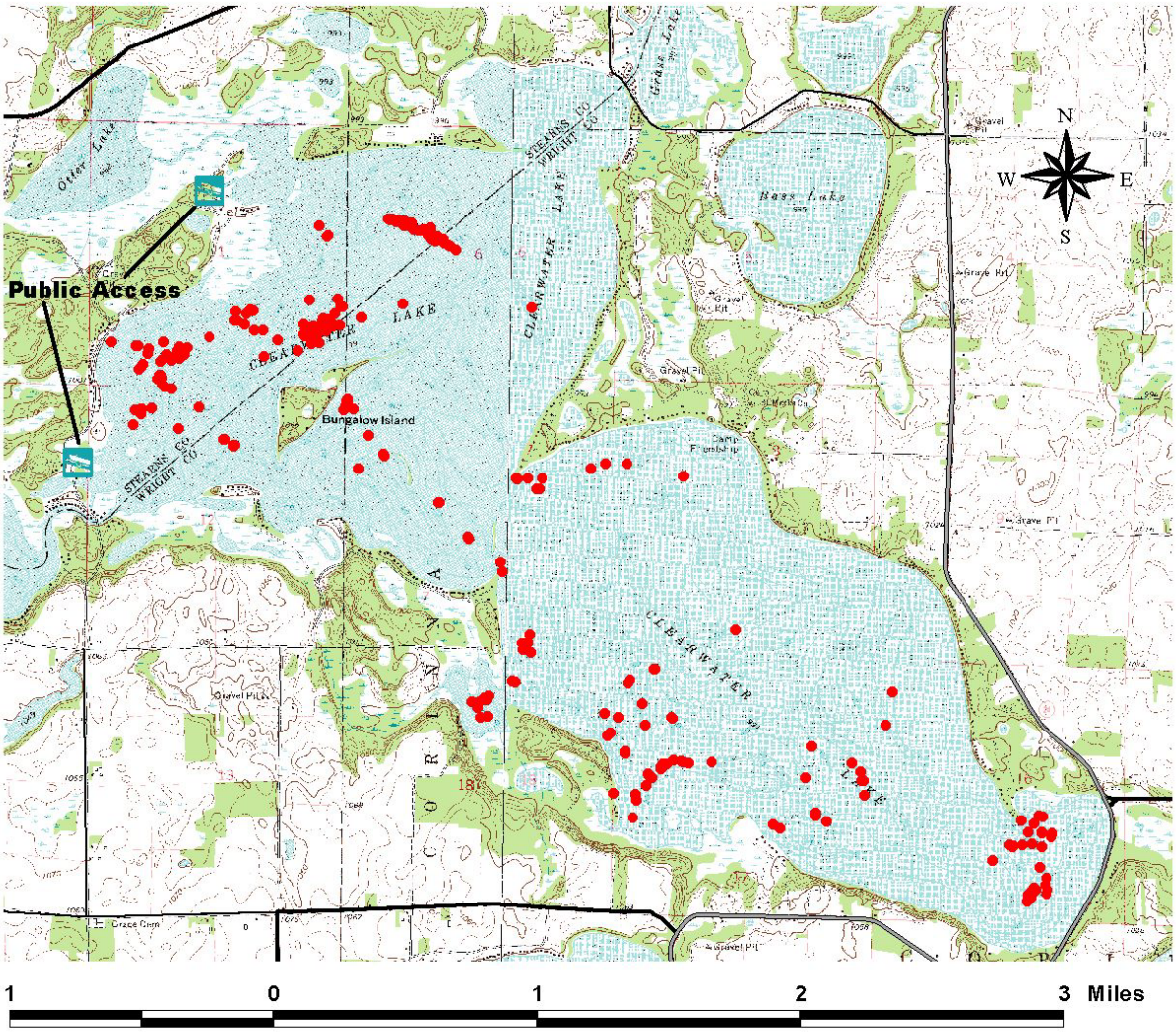

Figure 2. Location of angler interviews, Clearwater Lake, Minnesota, December 18, 2004–March 18, 2005.

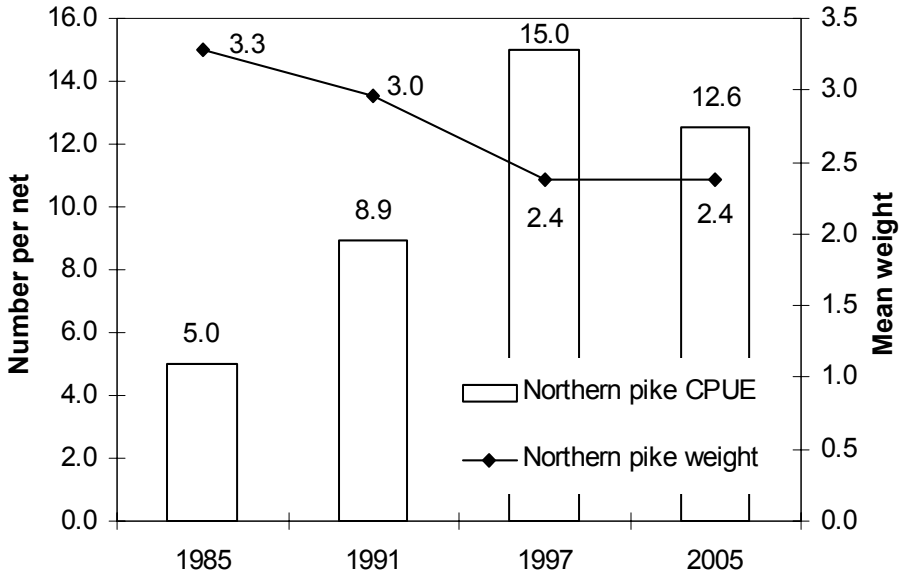

Figure 3. Lake survey gill net catch rate and mean weight for northern pike, Clearwater Lake, Minnesota, 1985-2005.

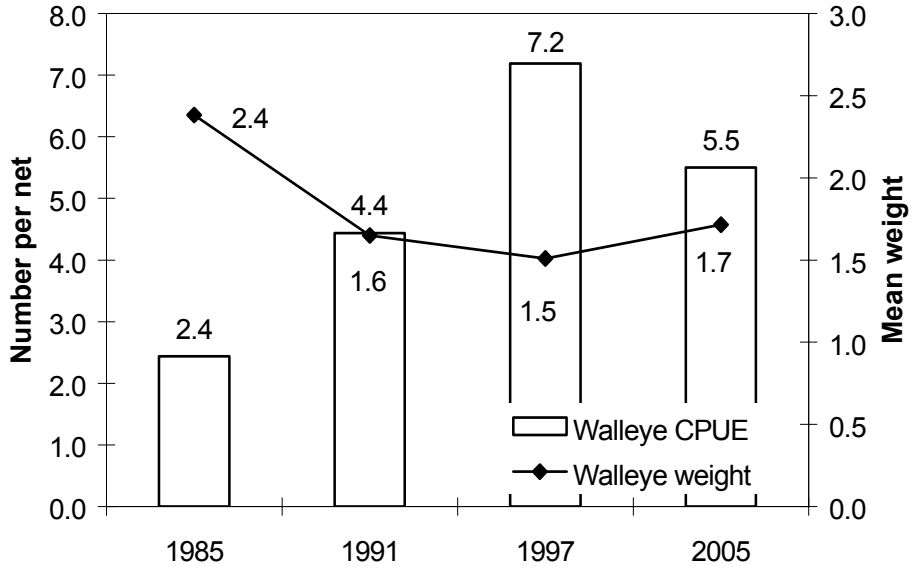

Figure 4. Lake survey gill net catch rate and mean weight for walleye, Clearwater Lake, Minnesota, 1985-2005.

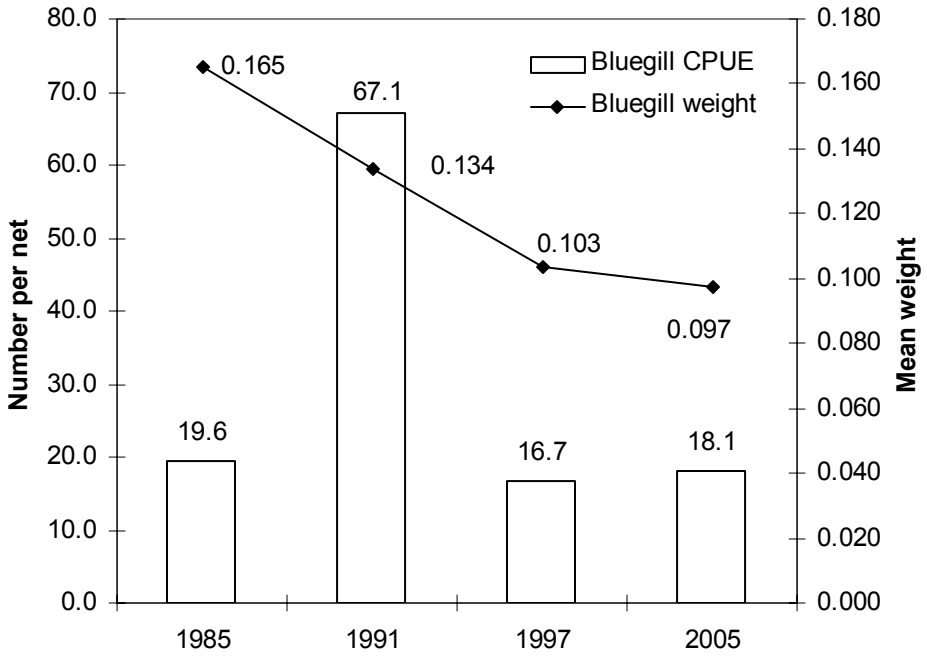

Figure 5. Lake survey trap net catch rate and mean weight for bluegill, Clearwater Lake, Minnesota, 1985-2005.

Addendum 1: Harvest Summary Form

MINNESOTA DEPARTMENT OF NATURAL RESOURCES DIVISION OF FISHERIES				
Creel Survey Summary For Clearwater Lake, Winter 2005				
DOW#: 86-252	County: Wright	Lake Class: 22	Lake Area: 3,121 Acres	Dates of Survey: 12/18/04 – 03/18/05

Fishing pressure (Angler Hours)	26,947	Weekdays surveyed	35
Angler Hours per Acre	8.63	Weekend/Holidays surveyed	25
Average Party Size	1.49	Number of interviews	614
Average Trip Length (hours)	3.61		

What People Fished for:	Percent of Angling Parties
Black Crappie	45.0
Northern Pike	16.1
Sunfish	35.5
Walleye	20.8
(Percentages add up to more than 100 due to anglers seeking more than one species)	

Species Caught	Fish Harvested				Fish Released			
			Average				Average	
	Number	Pounds	Length (in)	weight (lb)	Number	Pounds	Length (in)	weight (lb)
Black crappie	4,318	2,678	10.2	0.6	1,176	426	8.6	0.4
Largemouth bass	24	17	11.0	0.7	166	272	13.6	1.7
Northern pike-angle	120	415	24.4	3.4	208	446	19.9	2.0
Northern pike-spear	576	1,986	25.0	3.6	0	0	0	0
Rock bass	55	27	8.0	0.4	38	15	7.9	0.4
Sunfish	10,378	2,846	6.9	0.3	16,355	1,680	5.1	0.1
Walleye	497	324	13.1	0.8	640	272	10.8	0.5
Yellow perch	118	4	5.4	0.1	932	39	4.7	0.1
All species	16,085	8,296			19,515	3,149		

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

Appendix

Table A1. Catch and harvest estimates, Clearwater Lake, Minnesota, December 18, 2004–December 31, 2004. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	922.5	(540.2)	108.1	(102.3)	1,030.6	(548.8)
Northern pike	69.3	(—)	130.2	(—)	199.5	(—)
Sunfish[1]	648.6	(372.0)	216.2	(199.8)	864.9	(398.4)
Walleye	180.7	(—)	201.4	(—)	382.1	(—)
All species	1,821.2	(—)	655.9	(—)	2,477.1	(—)

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

Table A2. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, December 18, 2004–December 31, 2004. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.30	(0.17)	0.03	(0.03)	0.33	(0.18)
Northern pike	0.02	(—)	0.04	(—)	0.06	(—)
Sunfish[1]	0.21	(0.12)	0.07	(0.06)	0.28	(0.13)
Walleye	0.06	(—)	0.06	(—)	0.12	(—)
All species	0.58	(—)	0.21	(—)	0.79	(—)

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

Table A3. Yield estimates[1], Clearwater Lake, Minnesota, December 18, 2004–December 31, 2004. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	597.4	(—)	0.19	(—)
Northern pike	230.1	(—)	0.07	(—)
Sunfish[1]	197.8	(282.6)	0.06	(0.09)
Walleye	129.5	(—)	0.04	(—)
All species	1,154.8	(—)	0.37	(—)

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

Table A4. Catch and harvest estimates, Clearwater Lake, Minnesota, January 1, 2005–January 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	981.7	(333.2)	228.7	(258.2)	1,210.5	(424.8)
Largemouth bass	0.0	(0.0)	26.4	(22.6)	26.4	(22.6)
Northern pike	146.4	(80.4)	16.3	(8.9)	162.6	(64.1)
Sunfish[1]	825.6	(473.7)	2,585.6	(1,515.3)	3,411.2	(1,957.6)
Walleye	141.2	(—)	283.1	(—)	424.3	(—)
Yellow perch	14.2	(16.9)	0.0	(0.0)	14.2	(16.9)
All species	2,109.1	(—)	3,140.2	(—)	5,249.2	(—)

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

Table A5. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, January 1, 2005–January 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.31	(0.11)	0.07	(0.08)	0.39	(0.14)
Largemouth bass	0.00	(0.00)	0.01	(0.01)	0.01	(0.01)
Northern pike	0.05	(0.03)	0.01	(0.00)	0.05	(0.02)
Sunfish[1]	0.26	(0.15)	0.83	(0.49)	1.09	(0.63)
Walleye	0.05	(—)	0.09	(—)	0.14	(—)
Yellow perch	0.00	(0.01)	0.00	(0.00)	0.00	(0.01)
All species	0.68	(—)	1.01	(—)	1.68	(—)

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

Table A6. Yield estimates, Clearwater Lake, Minnesota, January 1, 2005–January 31, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	552.5	(—)	0.18	(—)
Largemouth bass	0.0	(0.0)	0.00	(0.00)
Northern pike	410.6	(—)	0.13	(—)
Sunfish[1]	201.9	(—)	0.06	(—)
Walleye	62.1	(—)	0.02	(—)
Yellow perch	0.8	(—)	0.00	(—)
All species	1,228.0	(—)	0.39	(—)

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

Table A7. Catch and harvest estimates, Clearwater Lake, Minnesota, February 1, 2005–February 28, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	1,592.7	(365.3)	481.2	(211.3)	2,073.9	(454.6)
Largemouth bass	23.8	(20.8)	18.1	(14.3)	41.9	(23.7)
Northern pike	480.8	(99.3)	55.5	(23.3)	536.3	(98.2)
Rock bass	38.6	(29.4)	37.5	(16.6)	76.1	(40.4)
Sunfish[1]	3,731.6	(1,050.6)	3,525.7	(1,160.7)	7,257.3	(1,978.2)
Walleye	174.8	(70.5)	155.0	(81.3)	329.9	(117.6)
Yellow perch	103.3	(95.5)	852.4	(465.1)	955.8	(469.6)
All species	6,145.8	(1,123.6)	5,125.4	(1,271.1)	11,271.1	(2,089.5)

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

Table A8. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, February 1, 2005–February 28, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.51	(0.12)	0.15	(0.07)	0.66	(0.15)
Largemouth bass	0.01	(0.01)	0.01	(0.00)	0.01	(0.01)
Northern pike	0.15	(0.03)	0.02	(0.01)	0.17	(0.03)
Rock bass	0.01	(0.01)	0.01	(0.01)	0.02	(0.01)
Sunfish[1]	1.20	(0.34)	1.13	(0.37)	2.33	(0.63)
Walleye	0.06	(0.02)	0.05	(0.03)	0.11	(0.04)
Yellow perch	0.03	(0.03)	0.27	(0.15)	0.31	(0.15)
All species	1.97	(0.36)	1.64	(0.41)	3.61	(0.67)

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

Table A9. Yield estimates, Clearwater Lake, Minnesota, February 1, 2005–February 28, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	1,055.4	(467.1)	0.34	(0.15)
Largemouth bass	16.7	(—)	0.01	(—)
Northern pike	1,760.3	(—)	0.56	(—)
Rock bass	21.7	(—)	0.01	(—)
Sunfish[1]	1,040.1	(—)	0.33	(—)
Walleye	132.0	(—)	0.04	(—)
Yellow perch	3.3	(—)	0.00	(—)
All species	4,029.6	(—)	1.29	(—)

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

Table A10. Catch and harvest estimates, Clearwater Lake, Minnesota, March 1, 2005–March 18, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	836.8	(194.5)	364.1	(190.8)	1,200.9	(306.7)
Largemouth bass	0.0	(0.0)	123.0	(36.8)	123.0	(36.8)
Northern pike	0.0	(0.0)	6.3	(4.7)	6.3	(4.7)
Rock bass	16.2	(11.8)	0.0	(0.0)	16.2	(11.8)
Sunfish[1]	5,262.9	(1,539.5)	10,261.5	(1,684.1)	15,524.4	(3,055.6)
Yellow perch	0.0	(0.0)	81.6	(52.4)	81.6	(52.4)
All species	6,115.9	(1,551.8)	10,836.6	(1,696.1)	16,952.4	(3,071.7)

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

Table A11. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, March 1, 2005–March 18, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.27	(0.06)	0.12	(0.06)	0.38	(0.10)
Largemouth bass	0.00	(0.00)	0.04	(0.01)	0.04	(0.01)
Northern pike	0.00	(0.00)	0.00	(0.00)	0.00	(0.00)
Rock bass	0.01	(0.00)	0.00	(0.00)	0.01	(0.00)
Sunfish[1]	1.69	(0.49)	3.29	(0.54)	4.97	(0.98)
Yellow perch	0.00	(0.00)	0.03	(0.02)	0.03	(0.02)
All species	1.96	(0.50)	3.47	(0.54)	5.43	(0.98)

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

Table A12. Yield estimates, Clearwater Lake, Minnesota, March 1, 2005–March 18, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	478.3	(—)	0.15	(—)
Largemouth bass	0.0	(0.0)	0.00	(0.00)
Northern pike	0.0	(0.0)	0.00	(0.00)
Rock bass	4.8	(—)	0.00	(—)
Sunfish[1]	1,433.1	(—)	0.46	(—)
Yellow perch	0.0	(0.0)	0.00	(0.00)
All species	1,916.1	(—)	0.61	(—)

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

Table A13. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, December 18, 2004–December 31, 2004. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.371	(—)	0.017	(—)	0.388	(—)
Northern pike	0.145	(—)	0.016	(—)	0.161	(—)
Sunfish[1]	0.864	(—)	0.288	(—)	1.152	(—)
Walleye	0.139	(—)	0.097	(—)	0.235	(—)
			All Anglers			
Black crappie	0.185	(0.044)	0.022	(0.008)	0.207	(0.121)
Northern pike	0.014	(—)	0.026	(—)	0.040	(—)
Sunfish[1]	0.130	(0.081)	0.043	(0.039)	0.173	(0.087)
Walleye	0.036	(—)	0.040	(—)	0.077	(—)
All species	0.365	(—)	0.132	(—)	0.497	(—)

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

Table A14. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, January 1, 2005–January 31, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.165	(—)	0.029	(—)	0.194	(—)
Northern pike	0.142	(—)	0.000	(—)	0.142	(—)
Sunfish[1]	1.166	(—)	3.670	(—)	4.836	(—)
Walleye	0.047	(—)	0.103	(—)	0.150	(—)
			All Anglers			
Black crappie	0.102	(0.039)	0.024	(0.029)	0.125	(0.050)
Largemouth bass	0.000	(0.000)	0.003	(0.002)	0.003	(0.002)
Northern pike	0.015	(0.009)	0.002	(0.001)	0.017	(0.007)
Sunfish[1]	0.085	(0.051)	0.267	(0.164)	0.353	(0.212)
Walleye	0.015	(—)	0.029	(—)	0.044	(—)
Yellow perch	0.002	(0.002)	0.000	(0.000)	0.002	(0.002)
All species	0.218	(—)	0.325	(—)	0.543	(—)

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

Table A15. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, February 1, 2005–February 28, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.476	(—)	0.139	(—)	0.615	(—)
Northern pike	0.245	(—)	0.005	(—)	0.250	(—)
Sunfish[1]	1.599	(—)	1.686	(—)	3.284	(—)
Walleye	0.148	(—)	0.112	(—)	0.260	(—)
Yellow perch	0.000	(—)	0.000	(—)	0.000	(—)
			All Anglers			
Black crappie	0.184	(0.049)	0.056	(0.024)	0.239	(0.059)
Largemouth bass	0.003	(0.002)	0.002	(0.002)	0.005	(0.003)
Northern pike	0.056	(0.008)	0.006	(0.002)	0.062	(0.003)
Rock bass	0.005	(0.003)	0.004	(0.002)	0.009	(0.004)
Sunfish[1]	0.431	(0.099)	0.407	(0.072)	0.837	(0.128)
Walleye	0.020	(0.007)	0.018	(0.010)	0.038	(0.013)
Yellow perch	0.012	(0.011)	0.098	(0.058)	0.110	(0.017)
All species	0.709	(0.111)	0.591	(0.097)	1.300	(0.142)

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

Table A16. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, March 1, 2005–March 18, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.445	(0.088)	0.232	(0.135)	0.677	(0.183)
Sunfish[1]	2.241	(0.258)	4.358	(1.335)	6.599	(1.439)
			All Anglers			
Black crappie	0.230	(0.054)	0.100	(0.055)	0.330	(0.090)
Largemouth bass	0.000	(0.000)	0.034	(0.015)	0.034	(0.015)
Northern pike	0.000	(0.000)	0.002	(0.001)	0.002	(0.001)
Rock bass	0.005	(0.003)	0.000	(0.000)	0.005	(0.003)
Sunfish[1]	1.445	(0.150)	2.817	(0.720)	4.262	(1.184)
Yellow perch	0.000	(0.000)	0.022	(0.015)	0.022	(0.015)
All species	1.679	(0.160)	2.975	(0.723)	4.654	(1.188)

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

Minnesota Department of Natural Resources
Division of Fisheries

Completion Report

Clearwater Lake Winter Creel Survey

December 18, 2004 to March 18, 2005

By

Mark Pelham

Montrose Area Fisheries Office

Completion Report

Approved by: _____
Area Supervisor Date

Approved by: _____
Regional Supervisor Date