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Completion Report

Clearwater Lake Summer Creel Survey
April 22, 2005 to October 31, 2005

By

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Abstract

A summer creel survey was conducted on Clearwater Lake from April 22, 2005 through October 31, 2005. The objectives of the creel survey were to provide information on fishing pressure, catch and harvest, angler demographics and satisfaction, and to document changes since the last summer creel survey in 1984. Angling pressure in 2005 was higher in summer (32.5 hrs/acre) than in winter (8.6 hrs/acre), but lower than in summer 1984 (57.4 hrs/acre). Combining the summer and winter creel results gave a year-round pressure estimate of 41.1 hours/acre for the 2005 season. Angling represented 71.2% of all recreational use. Tournaments were an important component of the fishery, but many anglers voiced opposition to them. Sunfish had the highest catch (43.6/acre) and harvest (13.8/acre). Most largemouth bass (10.6/acre catch, 1.0/acre harvest) and northern pike (3.9/acre catch, 0.6/acre harvest) were released, whereas the majority of black crappie (4.9/acre catch, 2.8/acre harvest) and walleye were harvested (2.4/acre catch, 1.4/acre harvest). Sunfish anglers had the highest catch and harvest rates among targeting anglers (3.26/hr, 1.04/hr). Largemouth bass anglers had the second highest catch rate (0.81/hr), but a low harvest rate (0.08/hr), likely due to the popularity of catch and release angling. Anglers primarily targeted walleye (40.5%), sunfish (28.6%), largemouth bass (24.9%), northern pike (19.5%), and black crappie (16.3%). Walleye fry stocking has been successful and walleye represented a much larger component of the fishery in 2005 than in 1984. Walleye anglers supported the idea of a special regulation; however, more frequent creel surveys are needed before any management changes are considered and lake survey results show little need for change. Northern pike were abundant and small; a special regulation might increase pike size, but this would likely face opposition from spearers. Lower tournament use may be needed to alleviate user conflicts and overcrowding at public accesses.

Introduction

Clearwater Lake is located in Wright County and Stearns County, 13 miles south of St. Cloud, Minnesota. Clearwater is the largest lake in the Montrose management area and has a popular multi-species fishery. Water quality has improved since the Clearwater River Watershed District was formed in the 1970s to address cultural eutrophication and the lake is popular for non-angling recreation. 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. Previous creel surveys include summer 1984, winter 1989-1990, and winter 2004-2005.

A summer creel survey was conducted on Clearwater Lake from April 22 to October 31, 2005. The objectives of the survey were to provide information on angling pressure, catch and harvest, angler demographics and satisfaction, and to document changes since the last summer creel survey. The summer 2005 creel survey completed a year-round creel survey of Clearwater Lake; combined with a summer lake survey in 2005, this provides a comprehensive picture of the Clearwater Lake fishery.

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 (Schupp 1992), is moderately eutrophic (combined Carlson's TSI=54, Minnesota Pollution Control Agency 2004), and has a watershed of 111,830 acres. Water quality has improved since the 1980s; mean annual secchi disk readings have increased from 7.2 (1980-1990) to 8.7 (1995-2005; Minnesota Pollution Control Agency 2005). 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 April 22 to October 31, 2005 using a full-time creel clerk. The survey was stratified by month, day type (weekday, weekend/holiday), angler type (boat, bank or dock, and bowfishing for carp), and basin (east, west). Only 5 bowfishing parties were interviewed and these were combined with angling for analysis. 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 period was spent on each basin. Three weekdays and both weekend days were sampled during each week, along with the Memorial Day, July 4th, and Labor Day holidays. All weekdays, sampling periods, and starting basin were randomly chosen.

The creel clerk roved the lake by boat and interviewed as many anglers as possible. Interviews were taken at public and private accesses when weather conditions were unsafe for boat travel and at other times to facilitate recording complete trip interviews. During the interview, the clerk recorded party size, start and end times, angler demographics, and catch information. Bank anglers were always interviewed individually. Fish were measured to the nearest 0.1 inch; length of 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 questions 1-4 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 sample period for each basin (4 counts per shift). Bank anglers were always counted as individuals. Data were analyzed with the General Creel Survey Analysis Program (GENCREEL, version 2; Bindman and Mach 1997).

A number of tournaments were held on Clearwater Lake during the creel survey. A DNR permit is required if there are more than 30 participants, or if the entry fee is greater than $25, or the total prize value is greater than $25,000. Data from tournaments requiring a permit were excluded from the creel analysis and reported separately. Angler counts initially included all boats, due to the difficulty of identifying tournament anglers. The number of participating boats was provided by event organizers afterwards and subtracted from angler counts during the event.

Results

Angling Pressure and Recreational Use

A total of 133 days were sampled for the season, including 74 weekdays and 59 weekend or holiday days and 531 angler counts were made (Table 2). A total of 2,502 interviews were conducted, of which 39% were complete trip interviews. Few bank interviews were conducted; 98% of all interviews were boat anglers. The mean number of anglers per boat was 1.89 for the season with a mean completed trip length of 4.04 hours. Bank anglers had a mean completed trip length of 1.83 hours and were always treated as individuals, not parties.

Total estimated angling pressure was 101,340 hours or 32.5 hours/acre (Table 3). This is well above the historical mean for lake class 22 (17.8 hrs/acre; Cook and Younk 1998), but below the 1984 summer creel estimate (57.4 hrs/acre). Angling pressure during the 2005 winter creel survey was 8.6 hrs/acre (Minnesota Department of Natural Resources 2006a), resulting in a year-round estimate of 41.1 hrs/acre. Monthly summer pressure ranged from a high of 8.53 hrs/acre in June to a low of 1.26 hrs/acre in October (Table 3). Angling pressure was also low during April 22-30 (0.5 hrs/acre). Pressure on the east basin (37,359 hours, 23 hrs/acre) was lower than on the west basin (63,981 hours, 42.7 hours/acre; Table 3A). Angling represented 71.2% of all recreational use (Table 2).

Non-fishing recreational use (40,997 hours, 13.1 hours/acre) was primarily observed from late June through August (Table 3). Pontoon boating (6.92 hrs/acre) and pleasure boating (3.23 hrs/acre) were the most common types of non-fishing recreation.

Catch and Harvest

Anglers caught an estimated 220,365 fish (70.6/acre) during the season and harvested 62,367 fish (20.0 fish/acre; Tables 4, 5). Among species, sunfish had the highest catch (136,009, 43.6/acre) and harvest (42,725, 13.8/acre). Most largemouth bass (10.6/acre catch, 1.0/acre harvest) and northern pike (3.9/acre catch, 0.6/acre harvest) were released, whereas the majority of black crappie (4.9/acre catch, 2.8/acre harvest) and walleye were harvested (2.4/acre catch, 1.4/acre harvest; Tables 4, 5). Sunfish had the highest yield (12,898 pounds, 4.13 lbs/acre), followed by walleye (5,682 pounds, 1.82 lbs/acre) and northern pike (5,411 pounds, 1.73 lbs/acre; Table 6). The fishing season opened May 14 for walleye and northern pike and on May 28 for largemouth bass. The season is continuous for black crappie, sunfish, and other panfish.

Catch and harvest were higher overall on the west basin (98.5/acre, 28.5/acre, respectively) than on the east basin (45.1/acre, 12.1/acre, respectively), likely due to easier access on the west basin and a resulting increase in angling pressure (Tables 4A, 4B, 5A, 5B). Among species, the catch was higher for most species on the west basin, but walleye catch was higher on the east basin (2.95/acre) than the west basin (1.74/acre; Tables 5A, 5B).

Sunfish anglers had the highest catch and harvest rates among targeting anglers (3.26/hr, 1.04/hr, respectively; Table 7). Largemouth bass anglers had the second highest catch rate (0.81/hr), but a low harvest rate (0.08/hr), likely due to the popularity of catch and release angling for bass. Black crappie anglers had the third highest catch rate (0.44/hr) and the second highest harvest rate (0.26/hr). The catch and harvest rates for common carp were high (0.60/hr, none released), but only 5 parties targeting carp were interviewed.

Mean length of harvested black crappie (9.6 inches, Table 8) was lower than mean length from the winter creel survey (10.2 inches, Minnesota Department of Natural Resources 2006a) and the statewide historical mean for summer creel surveys on all lakes (10.3 inches, Cook and Younk 1998). Largemouth bass had a mean harvest length of 13.3 inches, above the statewide creel historical mean of 12.7 inches. Mean harvest length of northern pike was 23.2 inches, above the statewide mean of 21.8 inches, but below the 2005 winter creel mean of 24.2 inches for angling. Sunfish had a mean harvest length of 7.2 inches, equal to the statewide historical average, but above the 2005 winter creel mean of 6.9 inches. Mean length of harvested walleye (15.3 inches) was similar to the statewide historical mean (15.2 inches), but above the 2005 winter creel mean (13.1 inches).

Most anglers targeting sunfish harvested at least one fish (62.3%) and 16.1% harvested 10 or more per angler (Table 9). In contrast, the majority of anglers targeting other species harvested no fish; 63.8% of crappie anglers kept none and 2.3% kept a limit of 10 per angler. For largemouth bass, 84.5% of targeting anglers harvested no fish and only 0.6% kept 4 or more per angler. For northern pike anglers, 72.6% harvested no fish and 3.2% kept 2 or more per angler. For walleye anglers, 67.6% harvested no walleye and 2.3% harvested 4 or more per angler.

Other species caught during the summer survey included: bigmouth buffalo, bullhead spp., bowfin, channel catfish, common carp, rock bass, smallmouth bass, and yellow perch. Of these species, nearly all were released and not identified by the creel clerk. No channel catfish or smallmouth bass were seen by the clerk and none found in the lake survey; these may have been misidentified by anglers.

Angler Demographics and Interview Questions

Anglers primarily targeted 5 species during the summer season: walleye (40.5%), sunfish (28.6%), largemouth bass (24.9%), northern pike (19.5%), and black crappie (16.3%); parties could identify up to two species when interviewed (Table 10). All parties targeted crappie (97.9%) or sunfish (52.1%) in April during the closed season for bass, pike, and walleye, but very few targeted either species in October. In contrast, the highest percentage of anglers targeted walleye in October (69.5%), whereas September was the highest month for largemouth bass (34.9%) and northern pike (27.8%).

Male anglers represented 85.6% of all anglers and most anglers were between 26 and 55 years old (Table 11). Many Clearwater Lake anglers came from outside the local area; about half of all anglers traveled more than 25 miles from home to Clearwater Lake (Table 12) and only 23.6% of angling parties were lakeshore residents. The creel clerk noted that many anglers seemed to be frequent users of the lake; 37.9% of anglers had been previously interviewed, compared to 29.7% during the winter creel survey.

When asked to rate their fishing success for that day on a scale of 1 to 10, 41.3% of all parties gave a response of 1 or 2, 5.4% gave a response of 9 or 10, and the mean response overall was 3.88 (Table 13). Among targeting anglers, mean responses ranged from a high of 4.3 for sunfish anglers to a low of 3.5 for walleye anglers. Walleye anglers seemed most dissatisfied; 49.8% gave a response of 1 or 2 versus 31.2% of largemouth bass anglers and 34.7% of sunfish

anglers. In contrast, 24.7% of sunfish anglers and 20.0% of largemouth bass anglers gave a response of 7 or greater (Table 13).

Angler satisfaction with the size and number of targeted species indicated higher satisfaction with the number caught of the species (6.30 out of 10 for all species) than with size (5.48; Table 14). The highest satisfaction ratings were 7.29 for number of sunfish caught and 6.14 for size of black crappie. Walleye had the lowest ratings for both number (5.07) and size (5.00).

When asked for suggestions for improving the fishery, a total of 665 suggestions were given with multiple responses allowed per party (Table 15). Responses varied, but among categories, angling regulations were most often suggested; 154 were in favor of some type of special regulation, especially for walleye. Slot limits were often mentioned, but anglers frequently confused a slot limit with minimum length or other regulations. Many anglers suggested increasing walleye stocking; this is not surprising, given the low satisfaction rating for walleye numbers. Public access was also a concern; many anglers desired increased parking or additional accesses, particularly on the east side, where no public access exists. Many anglers disapproved of tournaments and suggested reducing or eliminating them. Vegetation concerns were also frequently given; most anglers want less vegetation (particularly Eurasian watermilfoil), though some prefer existing or increased levels of vegetation.

Tournaments

A total of 11 tournaments were held under a DNR permit on Clearwater Lake between May and October, 2005 (Table 16). Data from these events were collected from organizers afterward and not included in the creel analysis, but are reported here separately. Including tournament data would add 6,803 hours of angling pressure or 2.18 hrs/acre to the creel results, a 6.7% increase. Most tournaments targeted largemouth bass and bass anglers released 99% of fish weighed in. Bass tournament anglers had a mean catch rate of 0.413 fish/hour based on fish weighed in, but the actual rate is likely higher due to culling; the same may be true for crappie and pike catch rates. Most pike anglers released their fish after weigh-in, whereas most crappies were harvested (Table 16).

The creel clerk interviewed many anglers who were part of fishing leagues or smaller tournaments not requiring a permit; these data are included in the creel analysis. A total of 17 such events were identified by the clerk with an approximate total of 200 boats. Many of these

events were held on weekday evenings and it is probable that more were held outside of the creel clerk's scheduled shifts and therefore not encountered. Without more data, angling pressure and other measures cannot be calculated, but may be a substantial addition to the overall impact of tournaments on the fishery. The summer creel survey in 1984 did not distinguish tournaments from other angling, preventing comparison with the current survey.

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 101,340 angler hours and 4.0 hours per trip equals 25,335 trips during the summer 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 summer fishery was $658,710. Fuel and other costs have risen since 2001, so the true value is presumably higher.

Discussion and Management Implications

Angling pressure on Clearwater Lake was higher in summer 2005 than winter 2004-05, but lower than in summer 1984. Summer 2005 pressure was 32.5 hrs/acre, for a total of 41.1 hrs/acre year-round; summer angling represented 79% of the total pressure (Table 3; Minnesota Department of Natural Resources 2006a). The summer survey season was longer (191 days) than the winter season (91 days), but summer pressure was also higher on a daily basis; mean daily pressure was 530.6 hrs/day in summer and 296.1 hrs/day in winter. The 1984 creel survey estimated summer angling pressure to be 57.4 hrs/acre, despite lasting only 130 days (Minnesota Department of Natural Resources 1985). Non-fishing recreational use was similar—13.1 hrs/acre in 2005, versus 15.4 hrs/acre; however, in 1984 fishing boats which were moving but not fishing were included in this category. This underestimates angling pressure compared to 2005, when all fishing boats were considered to be angling. A possible reason for higher pressure in 1984 is that more anglers traveled farther to the lake; 58.5% traveled over 50 miles in 1984, compared to 18.9% in 2005.

Walleye represented a much larger component of the fishery in 2005 than in 1984. Anglers harvested 1.38 walleye per acre in summer 2005, compared to 0.16/acre in 1984, but mean weight decreased from 1.6 pounds in 1984 to 1.3 pounds in 2005 (Minnesota Department

of Natural Resources 1985). The catch rate for anglers targeting walleye was 0.235/hr in 2005 and only 0.03/hr in 1984, so it is not surprising that 40.5% of summer anglers targeted walleye in 2005, compared with 4.7% in 1984. Lake survey results since 1985 have also shown an increase in walleye catch rate and a decrease in mean weight (Figure 2). However, walleye mean weight from the 2005 summer lake survey was 1.6 pounds – an acceptable size for anglers and in the expected range for lake class 22 (Minnesota Department of Natural Resources 2006b).

Angler success did not correspond well to lake survey catch data for walleye. Success and satisfaction ratings were slightly higher in the summer creel than in winter, but were the lowest among targeted species in both seasons. Results from the 2004-05 winter creel survey showed a low harvest rate for walleye (0.08/hr) by targeting anglers and a mean harvest weight of only 0.77 pounds (Minnesota Department of Natural Resources 2006a). A possible reason was an abundance of age one yellow perch for forage; these were frequently caught during lake survey shoreline seining, but were not large enough ($\bar{x} = 89$mm TL) to be sampled effectively in gill nets or trap nets (Minnesota Department of Natural Resources 2006b).

Northern pike harvest was much lower in summer 2005 than in 1984 (0.60/acre vs. 4.54/acre, respectively), likely the result of higher angling pressure and catch rate for targeting anglers in 1984 (0.39/hr vs. 0.27/hr in 2005), and a higher proportion of released fish in 2005 (84% released vs. 44% in 1984; Minnesota Department of Natural Resources 1985). Mean weight of harvested pike changed little (2.9 lbs in 2005, 3.0 lbs in 1984), but lake surveys since 1984 have shown increasing pike abundance and decreasing mean weight (Figure 3). The size threshold for what anglers think is an acceptable pike to harvest has probably changed little since 1984, resulting in many small pike being caught and released and fewer large pike harvested. Another factor is that only 19.5% of anglers targeted northern pike in 2005 and many pike were caught and released by anglers targeting other species; among all anglers, pike catch and release rates were nearly equal. Winter creel results in 2004-05 also showed a low pike harvest of 0.22/acre (Minnesota Department of Natural Resources 2006a).

Sunfish harvest (13.8/acre) in summer 2005 was higher than the winter creel (3.3/acre), but far lower than in summer 1984 (54.6/acre; Minnesota Department of Natural Resources 2006a, 1985). Lake survey results for sunfish show a decrease in size since 1985, but no trend in abundance (Figure 4). Some of the decrease in harvest is likely due to lower overall pressure in 2005, but sunfish catch and harvest rates were also much lower in summer 2005 (3.26/hr and

1.04/hr, respectively) than in 1984 (6.66/hr catch, 3.36/hr harvest). Harvested size decreased from 1984 (0.39 lbs) to 2005 (0.31 lbs), but reasons for the decrease are unclear.

Black crappie harvest was also much lower in summer 2005 (2.75/acre) than 1984 (22.4/acre), although mean harvest weight was similar (0.51 lbs in 2005; 0.48 lbs in 1984, Minnesota Department of Natural Resources 1985). Targeting catch and harvest rates also declined sharply in 2005 (0.44/hr, 0.26/hr respectively), compared to 1984 (2.09/hr, 1.26/hr respectively). A higher proportion of anglers targeted black crappie in 1984 (23%) than in 2005 (16%) and overall angling pressure was higher in the 1984 survey. This suggests that crappie abundance has decreased since 1984; however, lake survey data from mid-summer is difficult to compare across years for crappie, so changes in relative abundance are unknown.

Crappie anglers in winter 2005 had a higher harvest rate (0.35/hr) and mean harvest weight (0.63 lbs) than in summer 2005 (0.26/hr, 0.51 lbs; Minnesota Department of Natural Resources 2006a), whereas catch rates were similar. Surprisingly, summer crappie anglers gave a higher mean success rating (3.7 out of 10) than in winter (3.1) and higher overall satisfaction ratings for number (6.3) and size (6.1) than in winter (5.4, 5.3, respectively; Minnesota Department of Natural Resources 2006a). It may be that angler expectations differ seasonally or perhaps different anglers use the lake in summer.

Fewer largemouth bass were harvested during summer 2005 (0.98/acre) than in 1984 (3.95/acre), despite a higher percentage of anglers targeting bass (24.9% vs. 12.6% in 1984; Minnesota Department of Natural Resources 1985). Higher overall pressure in the earlier survey can only account for part of this; it seems likely that most of the difference is due to the current popularity of catch and release angling for bass. Further evidence is provided by catch and harvest rates; in 2005, the catch rate (0.81/hr) was approximately ten times harvest rate (0.08/hr) for targeting anglers. In 1984, the targeting catch rate was 0.90/hr and harvest was 0.32/hr (Minnesota Department of Natural Resources 1985). Mean weight of harvested largemouth bass has remained nearly unchanged (1.4 lbs in both years). Spring electrofishing in 2005 found the population of bass to be relatively abundant, but growth and mean length were below average (Minnesota Department of Natural Resources 2006b).

Management Implications

Anglers voiced support for stocking more walleye and for special regulations in general. However, there seems to be no need for higher stocking rates; walleye fry stocking has been

successful and lake survey net catches were in the expected range for the lake class. Higher stocking rates could even prove counterproductive, given the decreasing size of walleye in lake surveys and in the creel. The number of small walleye in the creel is a result of successful fry stocking and angler satisfaction seems likely to increase over time as these fish grow. A special regulation could be considered, but it is unclear why anglers have not been catching more walleye of desirable size, despite their presence in lake survey nets. More information is needed before any regulation change should be implemented.

Northern pike were abundant and small. A special regulation could be considered to protect larger pike from harvest and this may increase pike size structure. However, Clearwater Lake is popular for spearing in winter and any size-based regulation would likely face opposition from spearers. Every effort should be made to encourage selective harvest of smaller pike by anglers and spearers.

Small largemouth bass may be too abundant; if so, the population could benefit from increased harvest of smaller fish. However, there seems to be no shortage of small sunfish for forage, so other factors may be involved. Electrofishing is currently the best assessment tool for largemouth bass, but was not conducted in lake surveys prior to 2005. More sampling is recommended to better understand the population prior to considering regulation changes.

Anglers seem mostly satisfied with the sunfish and black crappie fishery and no change in management seems warranted. The decrease in sunfish size is a concern, but it seems unlikely that this is due to angler exploitation. Spring trapnetting for black crappie in survey years could help determine if any change in relative abundance is occurring.

More frequent creel surveys should be conducted in conjunction with lake surveys. Given the importance of the Clearwater Lake fishery, more data is needed to assess trends and possible regulation changes. This would be helpful to determine if the lower pressure in 2005 is typical or unusual. Targeted sampling with trapnets or electrofishing would be helpful in between lake survey years. And creel surveys of limited intensity or duration, angler response cards, or other means could provide valuable information quickly without a large commitment of time or resources.

Stricter limits may be needed on tournaments. Non-tournament anglers were dissatisfied with the number and size of tournaments, and limited parking at the public accesses was a problem on tournament days. Also, the list of tournaments under permit may give a misleading

picture of tournament activity, given the number of non-permit events encountered during the creel survey. Allowing fewer permits or less entrants may help alleviate this problem.

Acknowledgments

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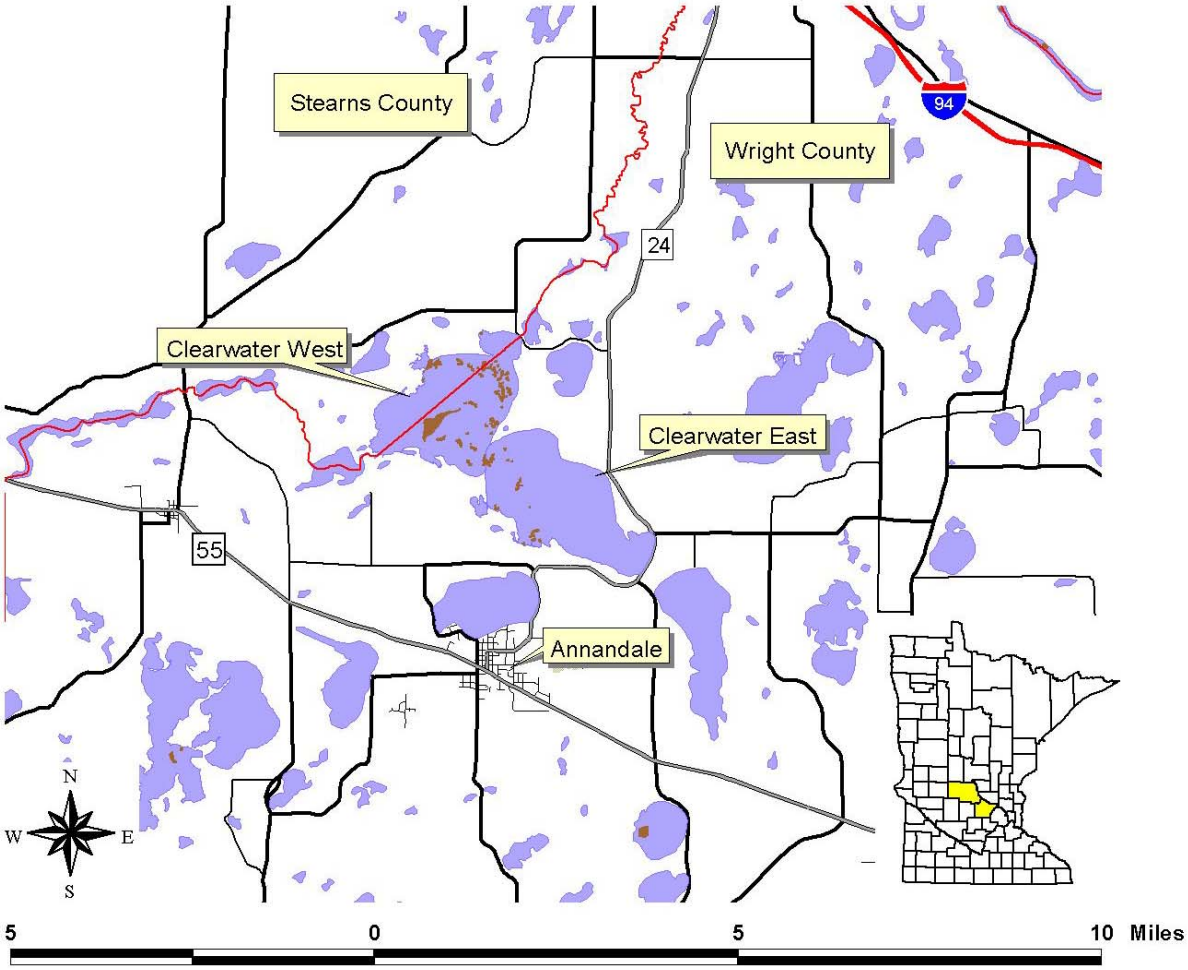
Figure 1. Location of Clearwater Lake, Wright County, Minnesota.



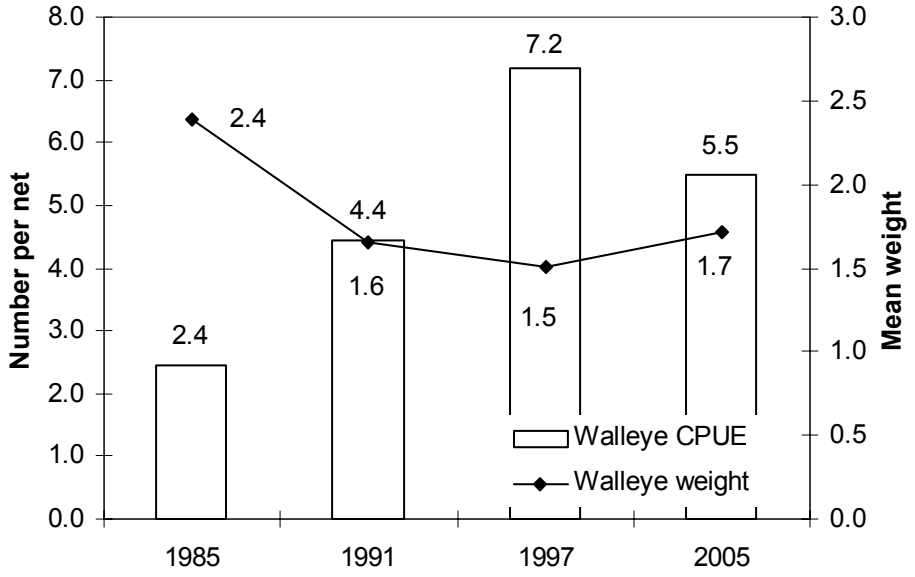


Figure 2. Lake survey gill net catch rate and mean weight for walleye, Clearwater Lake, Minnesota, 1985-2005.

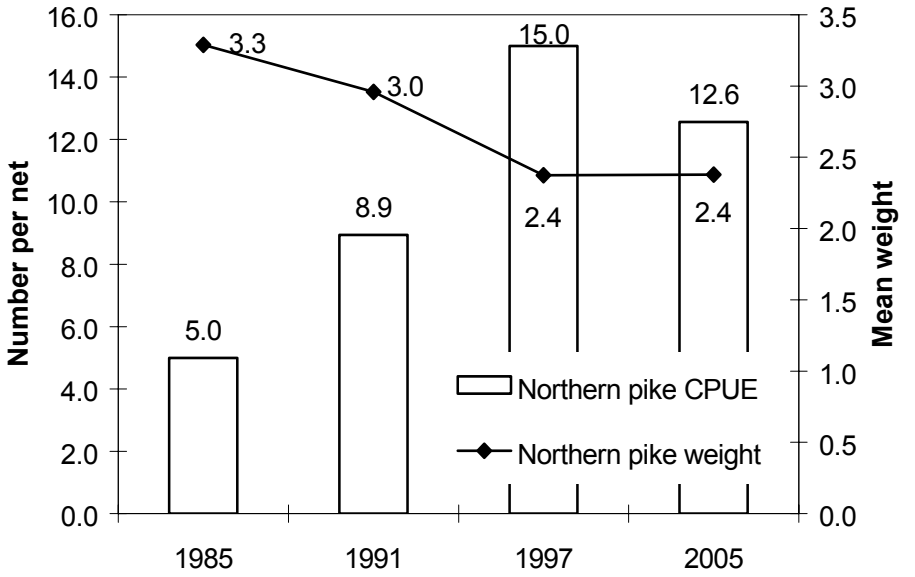


Figure 3. Lake survey gill net catch rate and mean weight for northern pike, Clearwater Lake, Minnesota, 1985-2005.

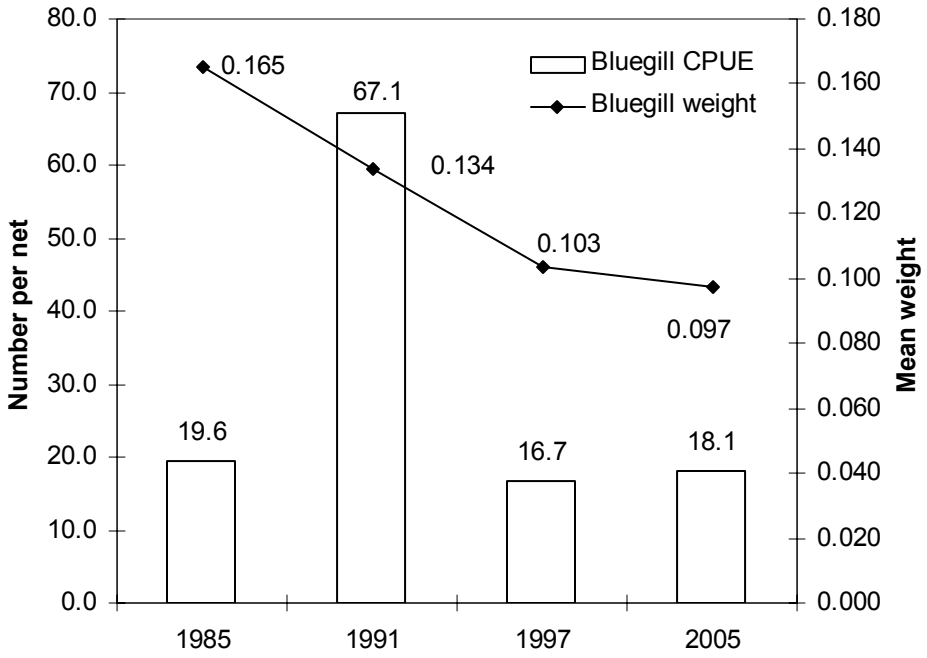


Figure 4. Lake survey trap net catch rate and mean weight for bluegill, Clearwater Lake, Minnesota, 1985-2005.

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	—	—
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]Minnesota Pollution Control Agency. 2004. MPCA website, http://www.pca.state.mn.us/water/clmp.

[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, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Statistic	Month				
	April	May	June	July	August
Start date of stratum	4/22/2005	5/1/2005	6/01/2005	7/1/2005	8/1/2005
End date of stratum	4/30/2005	5/31/2005	6/30/2005	7/31/2005	8/1/2005
Length of fishing day (hours)	16	16	16	16	16
Number of days in stratum	9	31	30	31	31
Weekdays sampled	4	11	13	11	14
Weekend/holiday days sampled	3	10	8	11	8
Number of angler counts	28	84	84	88	88
Number of boat interviews	40	313	514	517	500
Number of bank interviews	7	14	5	6	7
Other interviews	0	1	0	0	0
Total number of interviews	47	328	519	523	507
Percent of completed trip interviews	66.0	52.7	52.8	31.9	29.6
Mean parties per count:					
Boat	2.46 (0.72)	10.88 (1.62)	15.56 (1.45)	13.64 (1.20)	9.09 (0.93)
Bank	1.04 (0.47)	1.55 (0.38)	0.51 (0.11)	0.41 (0.10)	0.15 (0.05)
Mean number of anglers per party:					
Boat	2.11 (—)	1.91 (0.29)	1.93 (0.19)	1.99 (0.12)	2.06 (0.19)
Bank	1	1	1	1	1
Mean completed trip length (hours):					
Boat	3.48 (—)	4.16 (0.77)	4.80 (0.82)	3.62 (0.44)	3.98 (0.58)
Bank	7.25[1] (—)	1.48 (—)	2.23 (—)	1.08 (—)	1.25 (—)

[1] Based on one complete interview.

Table 2 (continued). Summary of creel strata statistics, Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Statistic	Month		Entire Season
	September	October	
Start date of stratum	9/1/2005	10/1/2005	4/22/2005
End date of stratum	9/30/2005	10/31/2005	10/31/2005
Length of fishing day (hours)	15	14	
Number of days in stratum	30	31	193
Weekdays sampled	10	11	74
Weekend/holiday days sampled	9	10	59
Number of angler counts	76	83	531
Number of boat interviews	322	254	2460
Number of bank interviews	1	1	41
Other interviews	0	0	1
Total number of interviews	323	255	2502
Percent of completed trip interviews	27.9	39.6	39.4
Mean parties per count:			
Boat	5.97 (0.80)	3.07 (0.44)	9.41 (0.49)
Bank	0.04 (0.03)	0.01 (0.01)	0.48 (0.07)
Mean number of anglers per party:			
Boat	1.71 (0.22)	1.67 (0.24)	1.89 (—)
Bank	1	1	1
Mean completed trip length (hours):			
Boat	4.07 (0.78)	3.76 (0.60)	4.04 (—)
Bank	—	1.00 (—)	1.83 (—)

Table 3. Recreational water surface use estimates, Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

	Month			
Activity	April 22-30	May	June	July
	Angler/User Hours			
Boat Anglers	1,304.2 (430.7)	18,293.1 (3,432.8)	26,161.1 (2,655.5)	24,827.8 (2,410.3)
Bank Anglers	264.0 (131.5)	1,258.2 (310.6)	462.7 (111.4)	346.9 (96.9)
All Anglers	1,568.2 (530.7)	19,551.3 (3,647.5)	26,623.8 (2,684.5)	25,174.7 (2,452.1)
Water skiing	0.0 (0.0)	78.5 (45.7)	568.0 (243.4)	3,533.8 (644.9)
Pleasure boating	124.0 (58.9)	371.6 (171.4)	1,135.5 (345.1)	6,097.7 (1,069.6)
Pontoon boating	16.0 (11.3)	1,419.6 (662.2)	2,963.2 (887.8)	11,853.8 (2,050.5)
Sailing	0.0 (0.0)	0.0 (0.0)	37.5 (22.4)	162.2 (70.5)
Canoeing/kayaking	0.0 (0.0)	32.0 (22.6)	175.1 (108.8)	286.5 (105.9)
Paddle boating	0.0 (0.0)	48.0 (32.0)	238.7 (92.0)	168.7 (63.9)
Personal watercraft	0.0 (0.0)	96.0 (49.2)	336.0 (81.7)	1,129.2 (233.2)
Total non-fishing	140.0 (65.1)	2,045.8 (898.9)	5,453.9 (1,472.4)	23,232.0 (3,693.7)
Total recreation use	1,708.2 (587.2)	21,597.1 (4,228.7)	32,077.7 (3,402.3)	48,406.7 (4,670.9)
Fishing as % of total	91.8	90.5	83.0	52.0
	Angler/User Hours per Acre			
Boat anglers	0.42 (0.14)	5.86 (1.10)	8.38 (0.85)	7.96 (0.77)
Bank anglers	0.08 (0.04)	0.40 (0.10)	0.15 (0.04)	0.11 (0.03)
All anglers	0.50 (0.17)	6.26 (1.17)	8.53 (0.86)	8.07 (0.79)
Water skiing	0.00 (0.00)	0.03 (0.01)	0.18 (0.08)	1.13 (0.21)
Pleasure boating	0.04 (0.02)	0.12 (0.05)	0.36 (0.11)	1.95 (0.34)
Pontoon boating	0.01 (0.00)	0.45 (0.21)	0.95 (0.28)	3.80 (0.66)
Sailing	0.00 (0.00)	0.00 (0.00)	0.01 (0.01)	0.05 (0.02)
Canoeing/kayaking	0.00 (0.00)	0.01(0.01)	0.06 (0.03)	0.09 (0.03)
Paddle boating	0.00 (0.00)	0.02 (0.01)	0.08 (0.03)	0.05 (0.02)
Personal watercraft	0.00 (0.00)	0.03 (0.02)	0.11 (0.03)	0.36 (0.07)
Total non-fishing	0.04 (0.02)	0.66 (0.29)	1.75 (0.47)	7.44 (1.18)
Total recreation use	0.55 (0.19)	9.92 (1.35)	10.28 (1.09)	15.51 (1.50)

Table 3 (continued). Recreational water surface use estimates, Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Activity	Month			Entire Season
	August	September	October	
		Angler/User Hours		
Boat Anglers	16,428.3 (1,573.0)	7,878.0 (1,151.1)	3,925.3 (654.2)	98,817.9 (5,390.5)
Bank Anglers	160.6 (63.4)	22.5 (16.8)	7.0 (7.0)	2,521.8 (374.1)
All Anglers	16,588.9 (1,585.6)	7,900.5 (1,159.2)	3,932.3 (657.7)	101,339.7 (5,576.3)
Water skiing	1,105.1 (273.9)	154.5 (71.3)	0.0 (0.0)	5,440.0 (746.6)
Pleasure boating	1,836.6 (477.6)	420.8 (173.9)	91.0 (40.5)	10,077.1 (1,247.4)
Pontoon boating	4,218.3 (1,018.5)	984.0 (394.1)	152.1 (76.2)	21,607.0 (2,574.8)
Sailing	191.4 (94.3)	52.5 (31.4)	7.0 (7.0)	450.6 (124.1)
Canoeing/kayaking	224.0 (162.5)	30.0 (30.0)	0.0 (0.0)	747.6 (225.5)
Paddle boating	206.9 (92.1)	7.5 (7.5)	0.0 (0.0)	669.8 (148.7)
Personal watercraft	331.4 (83.7)	112.5 (58.0)	0.0 (0.0)	2,005.1 (271.7)
Total non-fishing	8,113.7 (1,640.5)	1,761.8 (617.9)	250.1 (109.5)	40,997.0 (4,439.4)
Total recreation use	24,702.6 (2,811.7)	9,662.3 (1,394.8)	4,182.4 (735.2)	142,336.7 (7,874.7)
Fishing as % of total	67.2	81.8	94.0	71.2
		Angler/User Hours per Acre		
Boat anglers	5.26 (0.50)	2.52 (0.37)	1.26 (0.21)	31.66 (1.73)
Bank anglers	0.05 (0.02)	0.01 (0.01)	0.00 (0.00)	0.81 (0.12)
All anglers	5.32 (0.51)	2.53 (0.37)	1.26 (0.21)	32.47 (1.79)
Water skiing	0.35 (0.09)	0.05 (0.02)	0.00 (0.00)	1.74 (0.24)
Pleasure boating	0.59 (0.15)	0.13 (0.06)	0.03 (0.01)	3.23 (0.40)
Pontoon boating	1.35 (0.33)	0.32 (0.13)	0.05 (0.02)	6.92 (0.83)
Sailing	0.06 (0.03)	0.02 (0.01)	0.00 (0.00)	0.14 (0.04)
Canoeing/kayaking	0.07 (0.05)	0.01 (0.01)	0.00 (0.00)	0.24 (0.07)
Paddle boating	0.07 (0.03)	0.00 (0.00)	0.00 (0.00)	0.21 (0.05)
Personal watercraft	0.11 (0.03)	0.04 (0.02)	0.00 (0.00)	0.64 (0.09)
Total non-fishing	2.60 (0.53)	0.56 (0.20)	0.08 (0.04)	13.14 (1.42)
Total recreation use	7.92 (0.90)	3.09 (0.45)	1.34 (0.24)	45.61 (2.52)

Table 3A. Summer fishing pressure estimates by basin, Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005.

	East Basin				West Basin			
Angler Type	Hours	SE	Hours/ Acre	SE	Hours	SE	Hours/ Acre	SE
				April 22-30				
Boat	257.1	61.8	0.16	0.04	1,047.1	426.3	0.70	0.28
Bank	0.0	0.0	0.00	0.00	264.0	131.5	0.18	0.09
Total	257.1	61.8	0.16	0.04	1,311.1	527.1	0.88	0.35
				May				
Boat	5,823.3	1,535.1	3.59	0.95	12,469.8	3,070.4	8.32	2.05
Bank	181.1	114.1	0.11	0.07	1,077.1	288.9	0.72	0.19
Total	6,004.4	1,615.4	3.70	1.00	13,546.9	3,270.3	9.04	2.18
				June				
Boat	10,647.0	1,613.9	6.56	0.99	15,514.1	2,108.8	10.36	1.41
Bank	240.0	78.7	0.15	0.05	222.7	78.9	0.15	0.05
Total	10,887.0	1,657.5	6.71	1.02	15,736.8	2,111.7	10.51	1.41
				July				
Boat	9,379.9	1,272.6	5.78	0.78	15,447.9	2,047.0	10.31	1.37
Bank	189.8	72.5	0.12	0.04	157.1	64.3	0.10	0.04
Total	9,569.7	1,314.8	5.90	0.81	15,605.0	2,069.8	10.42	1.38
				August				
Boat	5,373.1	810.2	3.31	0.50	11,055.2	1,348.3	7.38	0.90
Bank	34.3	19.6	0.02	0.01	126.3	60.3	0.08	0.04
Total	5,407.4	816.5	3.33	0.50	11,181.5	1,359.2	7.46	0.91
				September				
Boat	3,006.6	613.3	1.85	0.38	4,871.4	974.1	3.25	0.65
Bank	7.5	7.5	0.00	0.00	15.0	15.0	0.01	0.01
Total	3,014.1	617.0	1.86	0.38	4,886.4	981.4	3.26	0.66
				October				
Boat	2,212.0	442.0	1.36	0.27	1,713.2	482.2	1.14	0.32
Bank	7.0	7.0	0.00	0.00	0.0	0.0	0.00	0.00
Total	2,219.0	447.3	1.37	0.28	1,713.2	482.2	1.14	0.32
				Season				
Boat	36,699.2	2,795.1	22.61	1.72	62,118.8	4,609.3	41.47	3.08
Bank	659.7	157.9	0.41	0.10	1,862.1	339.1	1.24	0.23
Total	37,358.8	2,887.3	23.02	1.78	63,980.9	4,770.6	42.71	3.18

Table 4. Catch and harvest estimates Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	8,607	(—)	6,789	(—)	15,396	(—)
Common carp	268	(233.1)	29	(15.9)	297	(233.6)
Largemouth bass	3,061	(—)	30,047	(—)	33,108	(—)
Northern pike	1,883	(—)	10,142	(—)	12,024	(—)
Rock bass	978	(—)	7,819	(—)	8,797	(—)
Sunfish[1]	42,725	(—)	93,284	(—)	136,009	(—)
Walleye	4,301	(—)	3,101	(—)	7,402	(—)
Yellow perch	61	(—)	6,061	(—)	6,121	(—)
All species	62,367	(—)	157,998	(—)	220,365	(—)

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

Table 4A. Catch and harvest estimates Clearwater Lake (East basin), Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	2,437	(—)	1,468	(—)	3,905	(—)
Common carp	0	(0.0)	24	(15.4)	24	(15.4)
Largemouth bass	1,178	(—)	9,826	(—)	11,005	(—)
Northern pike	745	(—)	4,220	(—)	4,964	(—)
Rock bass	634	(—)	4,309	(—)	4,943	(—)
Sunfish[1]	11,918	(—)	27,840	(—)	39,758	(—)
Walleye	2,683	(—)	2,106	(—)	4,789	(—)
Yellow perch	32	(15.9)	3,316	(570.5)	3,347	(573.4)
All species	19,652	(—)	53,472	(—)	73,123	(—)

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

Table 4B. Catch and harvest estimates Clearwater Lake (West Basin), Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	6,182	(—)	5,322	(—)	11,503	(—)
Common carp	268	(231.1)	5	(4.3)	273	(233.1)
Largemouth bass	1,883	(—)	20,262	(—)	22,144	(—)
Northern pike	1,138	(167.3)	5,926	(693.6)	7,064	(759.4)
Rock bass	344	(—)	3,510	(—)	3,855	(—)
Sunfish[1]	30,822	(—)	65,733	(—)	96,555	(—)
Walleye	1,618	(235.9)	995	(190.3)	2,613	(378.7)
Yellow perch	29	(—)	2,750	(—)	2,779	(—)
All species	42,329	(—)	105,154	(—)	147,483	(—)

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

Table 5. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	2.75	(—)	2.18	(—)	4.93	(—)
Common carp	0.09	(0.07)	0.01	(0.01)	0.10	(0.07)
Largemouth bass	0.98	(—)	9.63	(—)	10.61	(—)
Northern pike	0.60	(—)	3.25	(—)	3.85	(—)
Rock bass	0.31	(—)	2.51	(—)	2.82	(—)
Sunfish[1]	13.82	(—)	29.80	(—)	43.62	(—)
Walleye	1.38	(—)	0.99	(—)	2.37	(—)
Yellow perch	0.02	(—)	1.94	(—)	1.96	(—)
All species	19.98	(—)	50.62	(—)	70.61	(—)

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

Table 5A. Catch and harvest estimates per acre, Clearwater Lake (East basin), Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	1.50	(—)	0.90	(—)	2.41	(—)
Common carp	0.00	(0.00)	0.01	(0.01)	0.01	(0.01)
Largemouth bass	0.73	(—)	6.05	(—)	6.78	(—)
Northern pike	0.46	(—)	2.60	(—)	3.06	(—)
Rock bass	0.39	(—)	2.66	(—)	3.05	(—)
Sunfish[1]	7.34	(—)	17.15	(—)	24.50	(—)
Walleye	1.65	(—)	1.30	(—)	2.95	(—)
Yellow perch	0.02	(0.01)	2.04	(0.35)	2.06	(0.35)
All species	12.11	(—)	32.95	(—)	45.05	(—)

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

Table 5B. Catch and harvest estimates per acre, Clearwater Lake (West basin), Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	4.12	(—)	3.55	(—)	7.67	(—)
Common carp	0.18	(0.16)	0.00	(0.00)	0.18	(0.16)
Largemouth bass	1.26	(—)	13.53	(—)	14.78	(—)
Northern pike	0.76	(0.11)	3.96	(0.46)	4.72	(0.51)
Rock bass	0.23	(—)	2.34	(—)	2.57	(—)
Sunfish[1]	20.86	(—)	43.69	(—)	64.54	(—)
Walleye	1.08	(0.16)	0.66	(0.13)	1.74	(0.25)
Yellow perch	0.02	(—)	1.84	(—)	1.86	(—)
All species	28.54	(—)	70.00	(—)	98.54	(—)

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

Table 6. Yield estimates, Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	4,323.0	(—)	1.39	(—)
Common carp	3,531.9	(—)	1.13	(—)
Largemouth bass	4,204.8	(—)	1.35	(—)
Northern pike	5,411.4	(—)	1.73	(—)
Rock bass	571.8	(—)	0.18	(—)
Sunfish[1]	12,898.3	(—)	4.13	(—)
Walleye	5,681.8	(—)	1.82	(—)
Yellow perch	6.8	(—)	0.00	(—)
All species	36,703.5	(—)	11.76	(—)

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

Table 7. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
Targeting Anglers						
Black crappie	0.260	(—)	0.181	(—)	0.441	(—)
Common carp	0.602	(—)	0.000	(—)	0.602	(—)
Largemouth bass	0.082	(—)	0.726	(—)	0.808	(—)
Northern pike	0.069	(—)	0.202	(—)	0.271	(—)
Sunfish[1]	1.041	(—)	2.220	(—)	3.261	(—)
Walleye	0.134	(—)	0.101	(—)	0.235	(—)
All Anglers						
Black crappie	0.085	(—)	0.067	(—)	0.152	(—)
Common carp	0.003	(0.002)	0.003	(0.000)	0.003	(0.002)
Largemouth bass	0.030	(—)	0.297	(—)	0.327	(—)
Northern pike	0.019	(—)	0.100	(—)	0.119	(—)
Rock bass	0.010	(—)	0.077	(—)	0.087	(—)
Sunfish[1]	0.422	(—)	0.921	(—)	1.343	(—)
Walleye	0.042	(—)	0.031	(—)	0.073	(—)
Yellow perch	0.001	(—)	0.060	(—)	0.060	(—)
All species	0.612	(—)	1.562	(—)	2.174	(—)

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

Table 8. Length frequency distribution of harvested and released fish, Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005.

TL	Black crappie		Common carp		Largemouth bass		Northern pike	
(inches)	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
<4.0	—	10	—	—	—	38	—	—
4.0–4.4	—	18	—	—	—	60	—	—
4.5–4.9	—	—	—	—	—	—	—	—
5.0–5.4	—	82	—	—	—	46	—	—
5.5–5.9	—	—	—	—	—	—	—	—
6.0–6.4	1	136	—	—	1	126	—	—
6.5–6.9	1	—	—	—	—	—	—	—
7.0–7.4	4	76	—	—	—	20	—	—
7.5–7.9	8	—	—	—	1	—	—	—
8.0–8.4	38	215	—	—	—	113	—	4
8.5–8.9	115	—	—	—	1	—	—	—
9.0–9.4	247	71	—	—	1	46	—	—
9.5–9.9	303	76	—	—	4	—	—	—
10.0–10.4	130	24	—	—	10	420	—	17
10.5–10.9	47	—	—	—	8	—	—	—
11.0–11.4	26	10	—	—	17	244	—	—
11.5–11.9	8	—	—	—	16	—	—	—
12.0–12.9	10	53	—	—	85	1,017	1	41
13.0–13.9	4	4	—	—	78	669	—	19
14.0–14.9	—	—	—	—	43	892	3	76
15.0–15.9	—	—	—	—	29	476	2	62
16.0–16.9	1	—	—	—	18	188	3	82
17.0–17.9	—	—	—	—	7	31	3	31
18.0–18.9	—	—	—	—	1	58	7	195
19.0–19.9	—	—	—	—	—	41	16	17
20.0–20.9	—	—	—	2	—	6	27	296
21.0–21.9	—	—	—	—	1	1	26	53
22.0–22.9	—	—	—	—	—	1	40	190
23.0–23.9	—	—	—	—	—	—	33	102
24.0–24.9	—	—	—	—	—	—	31	213
25.0–25.9	—	—	1	2	—	—	21	74
26.0–26.9	—	—	—	—	—	—	13	55
27.0–27.9	—	—	—	—	—	—	13	29
28.0–28.9	—	—	—	1	—	—	3	16
29.0–29.9	—	—	—	—	—	—	3	1
30.0–30.9	—	—	1	—	—	—	2	8
31.0–31.9	—	—	—	—	—	—	7	4
32.0–32.9	—	—	—	—	—	—	2	2
33.0–33.9	—	—	—	—	—	—	—	2
34.0–34.9	—	—	1	—	—	—	—	3
35.0–35.9	—	—	—	—	—	—	—	3
36.0–36.9	—	—	—	—	—	—	—	2
37.0–37.9	—	—	—	—	—	—	—	—
38.0–39.0	—	—	—	—	—	—	—	—
>39	—	—	—	—	—	—	—	—
Total N	943	775	3	5	321	4,493	256	1,597
Mean Length	9.6	7.7	29.8	23.8	13.3	12.4	23.2	20.5
Mean Weight	0.5	0.3	13.2	6.7	1.4	1.2	2.9	2.1

Table 8 (cont.). Length frequency distribution of harvested and released fish, Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005.

TL	Rock bass		[1]Sunfish		Walleye		Yellow perch	
(inches)	Harvest	Release	Harvest	Release	Harvest	Release	Harvest	Release
<4.0	—	2	—	1,647	—	—	—	511
4.0–4.4	1	15	7	6,978	—	6	—	275
4.5–4.9	—	—	2	—	—	—	1	—
5.0–5.4	—	91	4	2,002	—	2	—	146
5.5–5.9	—	—	26	—	—	—	1	—
6.0–6.4	—	125	197	1,244	—	18	—	55
6.5–6.9	4	—	1,111	9	—	—	1	—
7.0–7.4	6	148	1,827	536	—	3	—	13
7.5–7.9	6	—	801	1	—	—	1	—
8.0–8.4	22	225	140	64	—	14	2	2
8.5–8.9	15	—	29	1	—	—	—	—
9.0–9.4	25	112	9	42	1	16	—	—
9.5–9.9	17	—	—	—	1	—	—	—
10.0–10.4	9	275	1	1	—	110	—	—
10.5–10.9	6	—	—	—	2	—	—	—
11.0–11.4	2	22	—	—	7	58	—	—
11.5–11.9	—	—	—	—	13	—	—	—
12.0–12.9	—	23	—	—	67	79	—	—
13.0–13.9	—	9	—	—	105	87	—	—
14.0–14.9	—	2	—	—	141	45	—	—
15.0–15.9	—	—	—	—	93	21	—	—
16.0–16.9	—	—	—	—	59	13	—	—
17.0–17.9	—	—	—	—	32	12	—	—
18.0–18.9	—	—	—	—	22	5	—	—
19.0–19.9	—	—	—	—	12	1	—	—
20.0–20.9	—	—	—	—	17	2	—	—
21.0–21.9	—	—	—	—	5	—	—	—
22.0–22.9	—	—	—	—	10	2	—	—
23.0–23.9	—	—	—	—	10	5	—	—
24.0–24.9	—	—	—	—	6	4	—	—
25.0–25.9	—	—	—	—	—	3	—	—
26.0–26.9	—	—	—	—	3	3	—	—
27.0–27.9	—	—	—	—	—	2	—	—
28.0–28.9	—	—	—	—	—	3	—	—
29.0–30.0	—	—	—	—	—	—	—	—
>30	—	—	—	—	—	—	—	—
Total N	113	1,049	4,154	12,525	606	514	6	1,002
Mean Length	8.9	8.2	7.2	4.4	15.3	12.4	5.0	3.7
Mean Weight	0.6	0.5	0.3	0.1	1.3	0.8	0.1	0.0

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

Table 9. Percent of anglers[1] who harvested a given number of fish, Clearwater Lake, Minnesota, April 22, 2005–October 31, 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	89.2	5.5	2.0	1.4	0.8	0.6	0.5	0.0	1,965
Black crappie/crappie anglers	63.8	12.8	8.8	6.0	3.5	2.8	2.3	0.0	431
Largemouth bass/all anglers	90.3	8.1	1.4	0.1	0.1	0.0	0.0	0.0	1,965
L.M. Bass/ bass anglers	84.5	10.5	4.4	0.4	0.2	0.0	0.0	0.0	477
Northern pike/all anglers	91.8	7.4	0.7	0.1	0.0	0.0	0.0	0.0	1,965
Northern pike/pike anglers	72.6	24.2	2.6	0.6	0.0	0.0	0.0	0.0	347
Sunfish/all anglers	72.0	9.8	5.8	3.3	2.3	1.2	2.9	2.7	1,965
Sunfish/sunfish anglers	37.7	16.0	13.1	8.3	6.2	2.7	8.1	8.0	677
Walleye/all anglers	87.3	8.9	3.0	0.4	0.5	0.0	0.0	0.0	1,965
Walleye/walleye anglers	67.6	22.3	8.3	1.0	1.3	0.0	0.0	0.0	699

[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, bass=6, northern pike=3, sunfish=20, walleye=6.

Table 10. Percentage[1] of parties targeting species on Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005.

Species	April	May	June	July	August	Sept.	October	Season
Black crappie	97.9	39.9	10.4	12.1	12.6	9.3	6.9	16.3
Largemouth bass	0.0	10.7	30.9	27.4	25.2	34.9	17.5	24.9
Northern pike	0.0	13.1	13.0	23.2	23.9	27.8	17.5	19.5
Sunfish[2]	52.1	21.6	28.5	37.0	40.0	17.6	6.5	28.6
Walleye	0.0	43.6	45.9	32.6	34.3	35.5	69.5	40.5
Parties (N)	48	328	501	521	507	324	246	2475

[1]Percentages do not total to 100 because anglers could target up to two species. [2]Includes bluegill, pumpkinseed, hybrid and green sunfish. The season opened May 14, 2005 for northern pike and walleye and May 28 for bass.

Table 11. Percent distributions by age and sex of anglers, Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005.

Age in Years	Females	Males	Combined
0–15	122	339	461 (9.4%)
16–25	56	408	464 (9.5%)
26–35	72	665	737 (15.1%)
36–45	153	830	983 (20.1%)
46–55	157	852	1,009 (20.6%)
56–65	72	579	651 (13.3%)
Over 65	68	483	551 (11.3%)
No age data	7	33	40
Total (N=)	707 (14.4%)	4,189 (85.6%)	4,896

Table 12. Approximate one-way distance traveled by interviewed anglers to Clearwater Lake, Minnesota, April 22, 2005–October 31, 2005.

Distance[1] in Miles	Responses	Percent
0–10	696	14.4
11–25	1,631	33.8
26–50	1,582	32.8
51–100	586	12.2
101–300	173	3.6
Over 300	151	3.1
Total	4819	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, April 22, 2005–October 31, 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
Boat anglers	1,012	41.7	386	15.9	569	23.4	333	13.7	129	5.3	2,429
Bank anglers	8	19.5	10	24.4	12	29.3	7	17.1	4	9.8	41
All parties	1,020	41.3	396	16.0	581	23.5	340	13.8	133	5.4	2,470
Parties seeking[2]:											
Black crappie	180	44.7	64	15.9	88	21.8	51	12.7	20	5.0	403
Largemouth bass	192	31.2	136	22.1	164	26.7	101	16.4	22	3.6	615
Northern Pike	219	45.3	80	16.6	94	19.5	67	13.9	23	4.8	483
Sunfish	245	34.7	127	18.0	160	22.6	117	16.5	58	8.2	707
Walleye	499	49.8	125	12.5	224	22.4	106	10.6	48	4.8	1,002

[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: "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	6.31	180
Largemouth bass	6.86	315
Northern Pike	6.44	133
Sunfish	7.29	314
Walleye	5.07	415
Total	6.30	1,357

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	6.14	180
Largemouth bass	5.66	315
Northern Pike	5.36	133
Sunfish	5.56	314
Walleye	5.00	415
Total	5.48	1,357

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
133	Increase, continue or begin stocking
95	walleye
16	unspecified
8	crappie (6), unspecified panfish (2)
5 each	largemouth bass, muskellunge (plus one opposed to stocking musky)
1 each	northern pike, smallmouth bass, yellow perch, rock bass
58	Regulations for walleye
17	desire unspecified size or slot limit
10	minimum length limit (range = 12-20 inch minimum)
6	maximum length limit (range = 14-20 inches)
11	slot limit (variety of harvest and protected slot range suggestions)
9	lower bag limit
5	other, e.g. harvest only 1 over 20 inches
24	Regulations for northern pike
10	desire slot limit (variety of harvest and protected slot range suggestions)
7	minimum or maximum length limit (range = 24-27 inches)
4	other: less small pike, more pike, catch and release only
3	no or less spearing
29	Regulations for largemouth bass
12	desire slot limit (variety of harvest and protected slot range suggestions)
5	minimum length limit (range = 12-20 inches)
1	16 inch maximum length limit
4	lower bag limit
7	catch and release only or extended season with catch and release
12	Regulations for black crappie
5	desire length limit: 10" minimum (3), 7" min. (1), 7" maximum (1)
3	slot limit, unspecified
4	change bag limit: lower (3), raise to 15 (1)
19	Regulations for sunfish
9	change bag limit: lower (6), higher (1), no limit on small sunfish (2)

7.....maximum size limit or slot limit, other unspecified regulation

3.....shorter season

13.....Area closure for shallow bays and other spawning sites

18.....Other regulations, no species mentioned, e.g. higher/lower bag limits, season length

97.....Public access to Clearwater Lake

53.....desire larger public access/more parking

30.....desire additional public access, particularly on east side of lake

6.....repair accesses

3.....desire fishing pier

1 each ....post boat ramp etiquette, create fish cleaning site, reduce number of accesses

99.....Tournament issues

93.....decrease or eliminate tournaments

6.....other, e.g. all live release, later start times, more enforcement, etc.

99.....Vegetation issues

64.....reduce vegetation, eliminate invasive species, e.g. Eurasian milfoil

21.....keep or increase Eurasian milfoil, other species

10.....eliminate or reduce herbicide use

4.....other, e.g. less lawn fertilizer, tools for cleaning off vegetation at access, etc.

39.....Recreational use issues

24.....improve marking of shallow areas and hazards

7.....desire horsepower limit or slower boat speeds

6.....desire less (or no) personal watercraft, water skiers

2.....more no wake zones, better enforcement of no wake zones

7.....Other species concerns: bowfin, bullhead, rock bass, tullibee

3.....Improve water quality

5.....Control cormorants

10.....Other concerns: limit shore development, more angling regulation enforcement, etc.

665.....Total number of suggestions

Table 16. Angling tournament[1] results, Clearwater Lake, Minnesota, May–October, 2005.

Date	Species	Number Boats	Number Participants	Total hours	Number weighed	Total pounds	Number per hour	Number released
6/5/2005	Largemouth bass	50	58	464	248	398	0.534	248
6/11/2005	Largemouth bass	56	111	666	257	564	0.386	255
6/18/2005	Largemouth bass	22	44	352	96	193	0.273	95
7/8/2005	Largemouth bass	45	90	720	231	475	0.321	229
7/16/2005	Largemouth bass	15	30	240	83	134	0.346	74
7/24/2005	Largemouth bass	47	94	799	362	650	0.453	360
8/14/2005	Largemouth bass	35	40	320	162	291	0.506	160
9/18/2005	Largemouth bass	18	36	288	137	260	0.476	137
10/9/2005	Largemouth bass	23	23	161	81	140	0.503	81
	bass total	311	526	4,010	1,657	3,105	0.413[2]	1,639
5/7/2005	Black crappie	100	225	1,575	568	317.4	0.361	100
9/10/2005	Northern pike	87	174	1,218	99	400.3	0.081	81
Total		498	925	6,803	2,324	3,822.7		1,820

[1]1For tournaments requiring DNR permit. [2]Mean number per hour.

Addendum 1: Harvest Summary Form

MINNESOTA DEPARTMENT OF NATURAL RESOURCES DIVISION OF FISHERIES				
Creel Survey Summary For Clearwater Lake, Summer 2005				
DOW # 86-252	County: Wright	Lake Class: 22	Lake Area: 3,121 Acres	Dates of Survey: 4/22/05 – 10/31/05

Fishing pressure (angler hours)	101,340	Other recreation use (user hrs)	40,997
Angler hours per acre	32.5	Other recreation user hrs/acre	13.1
Average party size	1.9	Number of days surveyed	133
Average trip length (hours)	4.0	Number of angler interviews	2,502

What People Fished for:	Percent of Angling Parties
Black crappie	16.3
Largemouth bass	24.9
Northern pike	19.5
Sunfish	28.6
Walleye	40.5
(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	8,607	4,323	9.6	0.5	6,789	2,014	7.7	0.3
Common carp	268	3,532	29.8	13.2	29	193	23.8	6.7
Largemouth bass	3,061	4,205	13.3	1.4	30,047	36,059	12.4	1.2
Northern pike	1,883	5,411	23.2	2.9	10,142	21,212	20.5	2.1
Rock bass	978	572	8.9	0.6	7,819	3,975	8.2	0.5
Sunfish species	42,725	12,898	7.2	0.3	93,284	6,951	4.4	0.1
Walleye	4,301	5,682	15.3	1.3	3,101	2,581	12.4	0.8
Yellow perch	61	7	5.0	0.1	6,061	164	3.7	0.0
All species	62,367	36,704	—	—	157,998	75,103	—	—

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, April 22, 2005–April 30, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	1,333	0.0	630	251.4	1,963	0.0
Largemouth bass	0	0.0	112	41.5	112	41.5
Northern pike	0	0.0	15	8.7	15	8.7
Rock bass	0	0.0	9	7.2	9	7.2
Sunfish[1]	286	169.0	1,709	492.9	1,994	486.3
Walleye	0	0.0	0	0.0	0	0.0
Yellow perch	0	0.0	0	0.0	0	0.0
All species	1,618	169.0	2,474	555.0	4,093	488.2

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

Table A2. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, April 22, 2005–April 30, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.43	0.00	0.20	0.08	0.63	0.00
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	0.00
Rock bass	0.00	0.00	0.00	0.00	0	0.00
Sunfish[1]	0.09	0.05	0.55	0.16	0.64	0.16
Walleye	0.00	0.00	0.00	0.00	0	0.00
Yellow perch	0.00	0.00	0.00	0.00	0	0.00
All species	0.52	0.05	0.79	0.18	1.31	(0.16)

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

Table A3. Yield estimates[1], Clearwater Lake, Minnesota, April 22, 2005–April 30, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	650.9	308.1	0.21	0.10
Largemouth bass	0.0	0.0	0.0	0.0
Northern pike	0.0	0.0	0.0	0.0
Rock bass	0.0	0.0	0.0	0.0
Sunfish[1]	79.7	(—)	0.03	(—)
Walleye	0.0	0.0	0.0	0.0
Yellow perch	0.0	0.0	0.0	0.0
All species	730.5	(—)	0.23	(—)

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

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

Species	Number Harvested		Number Released		Number Caught	
Black crappie	5,185	—	4,498	—	9,684	—
Largemouth bass	258	96.0	4,585	1,163.8	4,843	1,223.0
Northern pike	285	—	968	—	1,253	—
Rock bass	28	—	738	—	766	—
Sunfish[1]	2,624	—	7,648	—	10,273	—
Walleye	731	—	321	—	1,052	—
Yellow perch	0	0.0	74	36.4	74	36.4
All species	9,123	—	18,957	—	28,080	—

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

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

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	1.66	—	1.44	—	3.10	—
Largemouth bass	0.08	0.03	1.47	0.37	1.55	0.39
Northern pike	0.09	—	0.31	—	0.40	—
Rock bass	0.01	—	0.24	—	0.25	—
Sunfish[1]	0.84	—	2.45	—	3.29	—
Walleye	0.23	—	0.10	—	0.34	—
Yellow perch	0.00	0.00	0.02	0.01	0.02	0.01
All species	2.92	—	6.07	—	9.00	—

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

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

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	2,579.2	—	0.83	—
Largemouth bass	302.4	—	0.10	—
Northern pike	732.3	—	0.23	—
Rock bass	15.5	—	0.00	—
Sunfish[1]	859.1	—	0.28	—
Walleye	1,132.3	—	0.36	—
Yellow perch	0.0	0.0	0.00	0.00
All species	5685.5	—	1.82	—

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

Table A7. Catch and harvest estimates, Clearwater Lake, Minnesota, June 1, 2005–June 30, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	633	180.2	384	191.8	1,017	329.7
Largemouth bass	935	—	10,726	—	11,661	—
Northern pike	455	111.0	2,635	554.4	3,090	580.1
Rock bass	621	—	4,155	—	4,775	—
Sunfish[1]	11,851	—	20,501	—	32,351	—
Walleye	1,483	268.2	1,229	287.8	2,713	526.2
Yellow perch	17	12.1	690	251.7	707	251.8
All species	16,271	—	40,522	—	56,793	—

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

Table A8. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, June 1, 2005–June 30, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.20	0.06	0.12	0.06	0.33	0.11
Largemouth bass	0.30	—	3.44	—	3.74	—
Northern pike	0.15	0.04	0.84	0.18	0.99	0.19
Rock bass	0.20	—	1.33	—	1.53	—
Sunfish[1]	3.80	—	6.57	—	10.37	—
Walleye	0.48	0.09	0.39	0.09	0.87	0.17
Yellow perch	0.01	0.00	0.22	0.08	0.23	0.08
All species	5.21	—	12.98	—	18.20	—

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

Table A9. Yield estimates, Clearwater Lake, Minnesota, June 1, 2005–June 30, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	310.0	135.6	0.10	0.04
Largemouth bass	1,372.8	—	0.44	—
Northern pike	1,345.1	628.9	0.43	0.20
Rock bass	384.7	—	0.12	—
Sunfish[1]	3,661.7	—	1.17	—
Walleye	1,987.3	615.1	0.64	0.20
Yellow perch	2.5	—	0.00	—
All species	12,596.2	—	4.04	—

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

Table A10. Catch and harvest estimates, Clearwater Lake, Minnesota, July 1, 2005–July 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	1,049	—	1,009	—	2,058	—
Largemouth bass	711	236.0	6,979	0.0	7,691	0.0
Northern pike	385	109.0	2,513	423.5	2,898	463.3
Rock bass	219	—	2,030	—	2,249	—
Sunfish[1]	17,361	—	35,071	—	52,433	—
Walleye	599	166.1	334	92.7	932	245.1
Yellow perch	20	15.1	2,346	428.7	2,366	430.9
All species	20,350	—	50,762	—	71,112	—

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

Table A11. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, July 1, 2005–July 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.66	—	0.34	—	0.32	—
Largemouth bass	2.46	0.00	0.23	0.08	2.24	0.00
Northern pike	0.93	0.15	0.12	0.03	0.81	0.14
Rock bass	0.72	—	0.07	—	0.65	—
Sunfish[1]	16.80	—	5.56	—	11.24	—
Walleye	0.30	0.08	0.19	0.05	0.11	0.03
Yellow perch	0.76	0.14	0.01	0.00	0.75	0.14
All species	22.78	—	6.52	—	16.26	—

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

Table A12. Yield estimates, Clearwater Lake, Minnesota, July 1, 2005–July 31, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	560.2	—	0.18	—
Largemouth bass	870.9	725.9	0.28	0.23
Northern pike	1,166.1	841.8	0.37	0.27
Rock bass	116.5	—	0.04	—
Sunfish[1]	5,083.8	—	1.63	—
Walleye	779.5	418.9	0.25	0.13
Yellow perch	2.9	—	0.00	—
All species	8,585.2	—	2.75	—

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

Table A13. Catch and harvest estimates, Clearwater Lake, Minnesota, August 1, 2005–August 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	237	—	184	—	421	—
Largemouth bass	651	150.0	4,527	0.0	5,178	0.0
Northern pike	295	72.6	1,861	379.3	2,156	393.0
Rock bass	81	29.1	661	133.6	742	140.5
Sunfish[1]	9,195	—	23,331	—	32,526	—
Walleye	348	70.5	357	76.7	705	123.8
Yellow perch	5	—	1,966	—	1,971	—
All species	10,857	—	33,066	—	43,923	—

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

Table A14. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, August 1, 2005–August 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.13	—	0.08	—	0.06	—
Largemouth bass	1.66	0.00	0.21	0.05	1.45	0.00
Northern pike	0.69	0.13	0.09	0.02	0.60	0.12
Rock bass	0.24	0.05	0.03	0.01	0.21	0.04
Sunfish[1]	10.42	—	2.95	—	7.48	—
Walleye	0.23	0.04	0.11	0.02	0.11	0.02
Yellow perch	0.63	—	0.00	—	0.63	—
All species	14.07	—	3.48	—	10.59	—

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

Table A15. Yield estimates, Clearwater Lake, Minnesota, August 1, 2005–August 31, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	130.4	—	0.04	—
Largemouth bass	953.7	378.9	0.31	0.12
Northern pike	908.0	411.7	0.29	0.13
Rock bass	38.0	—	0.01	—
Sunfish[1]	3,036.8	—	0.97	—
Walleye	430.3	138.1	0.14	0.04
Yellow perch	0.6	—	0.00	—
All species	5,497.8	—	1.76	—

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

Table A16. Catch and harvest estimates, Clearwater Lake, Minnesota, September 1, 2005–September 30, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	119.2	41.7	34.5	17.0	153.7	48.3
Largemouth bass	430.1	—	2,745.1	—	3,175.3	—
Northern pike	315.0	85.8	1,779.6	334.4	2,094.6	371.7
Rock bass	29.5	22.4	216.7	100.2	246.2	107.7
Sunfish[1]	1,744.6	—	4,541.4	—	6,286.0	—
Walleye	484.9	118.0	369.6	103.6	854.5	198.9
Yellow perch	16.8	12.9	752.6	213.2	769.4	217.4
All species	3,144.9	—	10,494.7	—	13,639.5	—

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

Table A17. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, September 1, 2005–September 30, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.04	0.01	0.01	0.01	0.05	0.02
Largemouth bass	0.14	—	0.88	—	1.02	—
Northern pike	0.10	0.03	0.57	0.11	0.67	0.12
Rock bass	0.01	0.01	0.07	0.03	0.08	0.03
Sunfish[1]	0.56	—	1.46	—	2.01	—
Walleye	0.16	0.04	0.12	0.03	0.27	0.06
Yellow perch	0.01	0.00	0.24	0.07	0.25	0.07
All species	1.01	—	3.36	—	4.37	—

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

Table A18. Yield estimates, Clearwater Lake, Minnesota, September 1, 2005–September 30, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	67.6	—	0.02	—
Largemouth bass	595.1	—	0.19	—
Northern pike	926.4	—	0.30	—
Rock bass	17.1	—	0.01	—
Sunfish[1]	530.2	—	0.17	—
Walleye	636.2	282.5	0.20	0.09
Yellow perch	0.0	—	0.00	—
All species	2,776.4	—	0.89	—

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

Table A19. Catch and harvest estimates, Clearwater Lake, Minnesota, October 1, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested		Number Released		Number Caught	
Black crappie	38	21.6	50	30.1	88	38.8
Largemouth bass	76	29.5	372	114.8	448	128.9
Northern pike	147	43.2	371	77.5	518	111.5
Rock bass	0	0.0	10	8.6	10	8.6
Sunfish[1]	83	47.6	194	112.0	277	122.6
Walleye	655	—	491	—	1,146	—
Yellow perch	3	2.8	232	77.4	235	77.2
All species	1,003	—	1,722	—	2,724	—

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

Table A20. Catch and harvest estimates per acre, Clearwater Lake, Minnesota, October 1, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Number Harvested per Acre		Number Released per Acre		Number Caught per Acre	
Black crappie	0.01	0.01	0.02	0.01	0.03	0.01
Largemouth bass	0.02	0.01	0.12	0.04	0.14	0.04
Northern pike	0.05	0.01	0.12	0.02	0.17	0.04
Rock bass	0.00	0.00	0.00	0.00	0.00	0.00
Sunfish[1]	0.03	0.02	0.06	0.04	0.09	0.04
Walleye	0.21	—	0.16	—	0.37	—
Yellow perch	0.00	0.00	0.07	0.02	0.08	0.02
All species	0.32	—	0.55	—	0.87	—

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

Table A21. Yield estimates, Clearwater Lake, Minnesota, October 1, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Pounds Harvested		Pounds Harvested Per Acre	
Black crappie	20.7	—	0.01	—
Largemouth bass	109.8	—	0.04	—
Northern pike	333.5	—	0.11	—
Rock bass	0.0	0.0	0.00	0.00
Sunfish[1]	11.5	—	0.00	—
Walleye	716.1	—	0.23	—
Yellow perch	0.7	—	0.00	—
All species	1192.5	—	0.38	—

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

Table A22. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, April 22, 2005–April 30, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	1.191	0.162	0.537	0.212	1.728	0.290
Largemouth bass	—	—	—	—	—	—
Northern pike	—	—	—	—	—	—
Sunfish[1]	0.512	—	0.872	—	1.384	—
Walleye	—	—	—	—	—	—
			All Anglers			
Black crappie	0.850	0.288	0.402	0.156	1.252	0.424
Largemouth bass	0.000	0.000	0.071	0.034	0.071	0.034
Northern pike	0.000	0.000	0.010	0.007	0.010	0.007
Rock bass	0.000	0.000	0.006	0.005	0.006	0.005
Sunfish[1]	0.182	0.043	1.089	0.223	1.272	0.530
Walleye	—	—	—	—	—	—
Yellow perch	—	—	—	—	—	—
All species	1.032	0.291	1.578	0.274	2.610	0.680

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

Table A23. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, May 1, 2005–May 31, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.671	—	0.585	—	1.256	—
Largemouth bass	0.092	0.044	0.899	0.198	0.991	0.218
Northern pike	0.060	—	0.127	—	0.187	—
Sunfish[1]	0.674	—	1.907	—	2.581	—
Walleye	0.079	—	0.045	—	0.124	—
			All Anglers			
Black crappie	0.265	—	0.230	—	0.495	—
Largemouth bass	0.013	0.004	0.235	0.074	0.248	0.078
Northern pike	0.015	—	0.050	—	0.064	—
Rock bass	0.001	—	0.038	—	0.039	—
Sunfish[1]	0.134	—	0.391	—	0.525	—
Walleye	0.037	—	0.016	—	0.054	—
Yellow perch	0.000	0.000	0.004	0.003	0.004	0.003
All species	0.467	—	0.970	—	1.436	—

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

Table A24. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, June 1, 2005–June 30, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.123	0.037	0.099	0.083	0.223	0.114
Largemouth bass	0.054	—	0.933	—	0.987	—
Northern pike	0.058	0.021	0.202	0.055	0.260	0.063
Sunfish[1]	1.397	—	2.229	—	3.626	—
Walleye	0.154	0.023	0.129	0.034	0.283	0.053
			All Anglers			
Black crappie	0.024	0.008	0.014	0.007	0.038	0.013
Largemouth bass	0.035	—	0.403	—	0.438	—
Northern pike	0.017	0.004	0.099	0.020	0.116	0.021
Rock bass	0.023	—	0.156	—	0.179	—
Sunfish[1]	0.445	—	0.770	—	1.215	—
Walleye	0.056	0.005	0.046	0.008	0.102	0.011
Yellow perch	0.001	0.000	0.026	0.008	0.027	0.008
All species	0.611	—	1.522	—	2.133	—

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

Table A25. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, July 1, 2005–July 31, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.361	—	0.199	—	0.560	—
Largemouth bass	0.044	—	0.799	—	0.842	—
Northern pike	0.059	—	0.231	—	0.290	—
Sunfish[1]	1.626	—	3.219	—	4.846	—
Walleye	0.094	0.017	0.057	0.012	0.152	0.025
			All Anglers			
Black crappie	0.042	—	0.040	—	0.082	—
Largemouth bass	0.028	0.009	0.277	0.027	0.306	0.030
Northern pike	0.015	0.004	0.100	0.014	0.115	0.016
Rock bass	0.009	—	0.081	—	0.089	—
Sunfish[1]	0.690	—	1.393	—	2.083	—
Walleye	0.024	0.006	0.013	0.004	0.037	0.009
Yellow perch	0.001	0.001	0.093	0.015	0.094	0.014
All species	0.808	—	2.016	—	2.825	—

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

Table A26. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, August 1, 2005–August 31, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.0471	—	0.0164	—	0.0635	—
Largemouth bass	0.093	0.0613	0.5334	0.0715	0.6264	0.0848
Northern pike	0.0604	—	0.1783	—	0.2387	—
Sunfish[1]	1.3386	—	3.067	—	4.4056	—
Walleye	0.0495	0.0086	0.0689	0.0169	0.1184	0.0155
			All Anglers			
Black crappie	0.014	—	0.011	—	0.025	—
Largemouth bass	0.039	0.010	0.273	0.026	0.312	0.030
Northern pike	0.018	0.004	0.112	0.022	0.130	0.023
Rock bass	0.005	0.002	0.040	0.005	0.045	0.005
Sunfish[1]	0.554	—	1.406	—	1.961	—
Walleye	0.021	0.004	0.022	0.005	0.043	0.007
Yellow perch	0.000	—	0.119	—	0.119	—
All species	0.655	—	1.993	—	2.648	—

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

Table A27. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, September 1, 2005–September 30, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.053	0.017	0.012	0.004	0.065	0.016
Largemouth bass	0.129	0.032	0.791	0.107	0.920	0.097
Northern pike	0.086	0.029	0.345	0.119	0.431	0.130
Sunfish[1]	0.937	—	2.848	—	3.784	—
Walleye	0.176	0.048	0.121	0.046	0.297	0.085
			All Anglers			
Black crappie	0.015	0.006	0.004	0.003	0.020	0.007
Largemouth bass	0.054	—	0.348	—	0.402	—
Northern pike	0.040	0.006	0.225	0.037	0.265	0.033
Rock bass	0.004	0.003	0.027	0.012	0.031	0.013
Sunfish[1]	0.221	—	0.575	—	0.796	—
Walleye	0.061	0.014	0.047	0.014	0.108	0.025
Yellow perch	0.002	0.002	0.095	0.013	0.097	0.014
All species	0.398	—	1.328	—	1.726	—

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

Table A28. Harvest, release, and catch rate estimates, Clearwater Lake, Minnesota, October 1, 2005–October 31, 2005. Standard errors appear in parentheses.

Species	Harvest per Angler Hour		Release per Angler Hour		Catch per Angler Hour	
			Targeting Anglers			
Black crappie	0.033	0.036	0.053	0.036	0.086	0.057
Largemouth bass	0.089	0.038	0.527	0.258	0.615	0.240
Northern pike	0.091	0.013	0.134	0.025	0.225	0.035
Sunfish[1]	0.582	0.206	0.407	0.139	0.989	0.256
Walleye	0.255	—	0.184	—	0.439	—
			All Anglers			
Black crappie	0.010	0.001	0.013	0.007	0.022	0.005
Largemouth bass	0.019	0.009	0.095	0.033	0.114	0.038
Northern pike	0.037	0.013	0.094	0.025	0.132	0.036
Rock bass	0.000	0.000	0.003	0.002	0.003	0.002
Sunfish[1]	0.021	0.013	0.049	0.030	0.071	0.033
Walleye	0.167	—	0.125	—	0.292	—
Yellow perch	0.001	0.001	0.059	0.027	0.060	0.027
All species	0.255	—	0.438	—	0.693	—

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

Minnesota Department of Natural Resources
Division of Fisheries

Completion Report

Clearwater Lake Summer Creel Survey

April 22, 2005 to October 31, 2005

By

Mark Pelham

Montrose Area Fisheries Office

Completion Report

Approved by: _____
Area Supervisor Date

Approved by: _____
Regional Supervisor Date