Coldwater Lake
T15N, R05W, S30
Chippewa River watershed, 2009

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Environment

Coldwater Lake is located about 4 miles north of M-20, 9.5 miles west of US 27 and 2 miles south of Weidman in Isabella County (Figure 1). The Coldwater River flows through the lake, and then empties into the Chippewa River. The Chippewa River flows to the Tittabawassee River in Midland which flows to the Saginaw River where it discharges to Saginaw Bay of Lake Huron.

The surrounding countryside is rolling, agricultural land, and partly wooded. The immediate shoreline is slightly elevated, has sandy soils, and is mostly wooded with second growth forests. The surrounding watershed is dominated by sand to loamy sand with occasional low muck soils. The dominant soils are the Caluma sand and the Perrinton loam. These soils are characteristic of moraine areas and are generally well drained to excessively drained. The slope in the area ranges from 0 to 6%. The dominant land use around the lake is a mix of forested and agricultural and a few pockets of rangeland. The immediate shoreline and area is dominated by residences and rural development. The habitat survey in 2009 counted 158 dwellings, in eighteen 1,000-ft transects or ~46 dwellings per mile. Shoreline development was extensive with an estimated 57% of the shoreline displaying some sort of armoring mostly in the form of steel, wood, or concrete seawalls.

Coldwater Lake is 294 acres. Much of the lake is very deep, with a maximum depth of 65 ft. The littoral zone is quite narrow, and vegetation is limited to this shallower area. The width of the shoals varies from 25 feet to 300 feet. The bottom in the shoals is marl, sand and fibrous peat; in the depths it is muck, pulpy peat, and marl. Cover and vegetation are common in the littoral zone.

The Coldwater Lake shoreline is fairly regular and is somewhat elongated in shape with a fetch estimated at just over mile (Figure 2). Contour changes are extreme. Only 10% of the lake is 15 feet or less in depth, making survey netting highly challenging. A maximum depth of 65 feet is found in the southeast end of the lake. The Coldwater River is the major inlet and outlet to the lake. Additionally there are a few smaller inlet streams and springs. There is no outlet control structure on Coldwater Lake.

Aquatic vegetation is limited to the shoal areas which make up a small percentage of area. Vegetation includes Chara, Naias, and Vallisneria. Additional fish habitat is provided by docks. The 2009 habitat survey enumerated 87 small docks and 61 large docks around the lake. Areas that were more natural had most of the 68 submerged trees that were noted in the survey.

In general, Coldwater Lake is classified as a warmwater, medium size, deep lake of mesotrophic characteristics. Chemical water characteristics were analyzed by the United States Geological Survey in August, 2008. All parameters are consistent with historical values and typical of this region of the State. August measurements of secchi disk depth (12 ft.), total phosphorus (26 ug/l), and chlorophyll-a

(4.5 ug/l) yielded a Trophic Status Index (TSI) of 45.6 on a scale of 0-80. A TSI of 45.6 is in the range of mesotrophic lake classification. Mesotrophic lakes are generally defined as those with an intermediate level of productivity, greater than oligotrophic lakes, but less than eutrophic lakes. Mesotrophic lakes commonly have medium levels of nutrients, moderately clear water, a common occurrence of aquatic vegetation, and they typically support diverse biological communities. In 2002, the TSI was 38.7. While the 2009 reading is still in the mesotrophic range, it has increased from the lower more oligotrophic level toward the higher more eutrophic level possibly showing increases in enrichment.

Temperature, oxygen, and pH profiles were conducted on Coldwater Lake in August, 2009 (Table 1). These profiles were consistent with historical measurements and show typical thermocline development between 18 and 21 feet. During summer months and thermocline development, dissolved oxygen concentrations appear fish limiting (<3 mg/l) in the hypolimnion (below 24 feet). The epilimnion and littoral zone of the lake provide the most desirable habitat for fishes. Thermal characteristics of the epilimnion and littoral zone are consistent with coolwater classification where summer temperatures approach the lower to mid 70s ‖F for an extended period of time. pH values ranged from 6.5 in the lower water column to 7.9 at the surface and fall within an acceptable range to support aquatic life. Alkalinity was measured in 2009 at 156 ppm indicating well buffered water.

Public access to Coldwater Lake is from Isabella County's Coldwater Lake Family Park. The park includes 100 camping sites, out buildings, recreation areas, a beach, and a boat launch and ramp.

History

Coldwater Lake has an extensive history of fisheries management. Management records indicate that warrmwater fish species were stocked from 1935 to 1942. These included largemouth bass, bluegill, perch and walleye. The first fisheries survey was in 1941. Fish collected in 1941 included bluegill, perch, rock bass, black crappies, green sunfish, largemouth bass, walleye, pike, smallmouth bass, common white suckers, common shiners, bluntnose minnows, log perch, Iowa darters, and brook silversides. Early stocking efforts were discontinued due to the abundant populations found in 1941. A follow up netting survey was conducted in 1952. One cisco was taken during this netting effort.

In 1959, a rock spawning reef was constructed for walleye. The reef is approximately 30 feet by 60 feet and is placed in about 6 feet of water on the northeast end of the lake. This project was completed by the local sportsmen club. Files fail to document success or evaluation of this reef.

Rainbow trout were stocked in 1960 and 1961, but the program was terminated due to poor success and survival of planted fish. Despite having adequate cold water at depths, these depths are limited in oxygen.

Walleye fingerlings were stocked in 1963 and 1964.

The 1966 netting survey again documented several ciscoes in the survey catch. In the 1974 survey, bowfin, brown bullhead, yellow bullhead, and carp were captured in addition to the usual species found.

Most fish were growing below State average in 1974. Ciscoes are presently believed to be extirpated in the watershed.

Recent stocking efforts were initiated to enhance and diversify the predator populations and to help improve panfish growth and balance by increasing top down control. Walleyes have been stocked regularly since 1984 and northern pike on occasion (Table 2).

Coldwater Lake is difficult to survey using entrapment netting gear because the lake has very steep drop-offs. Several more recent surveys have been conducted using an electrofishing boat at night when fish are in the shallows. Fish were captured in 1985 to evaluate the species composition and growth of panfish. Walleye fingerlings experienced excellent survival. Bluegill mean growth index improved to +0.8 inches, which was now above State average. Yellow perch growth was somewhat below State average. Largemouth bass growth was slightly below State average and Walleye growth was slightly above State average. This was improved from past years. A 1989 evaluation also documented good growth of yellow perch, black crappie, bluegill, smallmouth bass, and walleye.

Coldwater Lake was surveyed again using netting gear in 1995. Few fish were caught due to the steep drop-offs. Thirteen fish species were collected, but not enough were taken to properly evaluate growth. Electrofishing proves to be the better tool for collecting fish data from this lake. Growth of walleyes was above State average, having a mean growth index of +2.5. Additional walleye recruitment evaluations were conducted in fall of 1996, 1997 and 1999. Many young of the year were collected, indicating excellent survival of walleye stocked in 1996 and 1999, with some natural reproduction in year 1997. The fish population appeared to be in balance, and few angler complaints were received. The 1994 and 1995 electrofishing survey further documented the excellent growth of walleye and smallmouth bass.

Zebra mussels were reported in 1997 and confirmed in 1998.

Several lake limnologies have been conducted over the years (1941, 1942, 1952, and 1953). Total alkalinity ranged from 149 ppm to 188 ppm. This is consistent with the 2009 reports.

Current Status

In June, 2009, Fisheries Division conducted a fisheries assessment on Coldwater Lake using trap net, gill net, seine, maxi-mini fyke, and electrofishing gear. The use of multiple gear types presents a general picture of the fish community. Large mesh trap and fyke nets are used to capture larger (>3 inches) species that inhabit the littoral zone or that move inshore at night. Gill nets are used to sample fishes that occupy offshore waters and are particularly effective at capturing perch and northern pike. Night electrofishing is used to capture all size ranges of species and life stages that inhabit the littoral zone or that move inshore at night. Seining and maxi-mini fyke nets are used to capture representative samples of small-bodied nongame species and smaller sizes (<3 inches) of sport fishes that inhabit the littoral zone.

A total of 1322 fish representing 24 species were collected in the 2009 assessment (Table 7). Electrofishing accounted for 44% of the total catch while trap nets, fyke nets, gill nets, maxi-mini fyke

nets, and seine accounted for 34%, 9%, 3%, 4%, and <1%, respectively. Bluegill were the most abundant species collected comprising 35% of the total catch. Rock bass and yellow perch were also very abundant. Other species collected in relatively low abundance included black crappie, bowfin, yellow and brown bullhead, white sucker, carp, golden and silver redhorse, walleye, smallmouth bass, largemouth bass, northern pike, pumpkinseed, warmouth, sea lamprey, green sunfish, common shiner, creek chub, log perch, bluntnose minnow, Iowa darter, and johnny darter,.

A total of 467 bluegill averaging 5.7 inches were collected in the 2009 assessment (Table 3). Fifty-two percent of the bluegill catch was captured with trap net gear compared to 32% captured with electrofishing gear. Average size of the bluegill trap net catch was 6.7 inches compared to 4.5 inches with electrofishing gear. Seventy-one percent of the trap net catch met or exceeded the acceptable harvest size of 6 inches compared to 6% of the electrofishing catch. Bluegill size structure was dominated by fish in the 5-7 inch size range. Age and growth analysis indicated bluegill were growing near State average having a mean growth index of -0.1 (Table 4). Age frequency showed good representation of ages 1 - 8. Bluegill longevity appears to peak at age 5 and older fish experience mortality either by harvest or natural causes.

A total of 245 rock bass averaging 6.8 inches were collected in the 2009 assessment (Table 3). Fifty-three percent of the rock bass catch was captured with trap net gear. Rock bass size structure was dominated with fish in the 5 inch to 8 inch size range. Seventy-seven percent of the rock bass met or exceeded the acceptable harvest size of 6 inches. Age and growth analysis indicated rock bass were growing near State average having a mean growth index of -0.1 (Table 4). Age frequency showed highest representation of ages 3-5. Seven year classes were represented in the survey catch. Rock bass longevity appears to peak at age 6.

A total of 179 yellow perch averaging 3.6 inches were collected in the 2009 assessment (Table 3). Ninety-seven percent of the yellow perch catch was captured with electrofishing gear. Yellow perch size structure was dominated by fish in the 1-5 inch size range. Only 2% of the catch met or exceeded the acceptable harvest size of 7 inches. Age and growth analysis indicated yellow perch were growing below State average having a mean growth index of -1.0 (Table 4). Age frequency showed relatively equal representation of the 2007-08 year classes (ages 1-2). Surveys rarely capture large amounts of larger, older yellow perch.

A total of 46 smallmouth bass averaging 9.5 inches were collected in the 2009 assessment (Table 3). Sixty-one percent of the total smallmouth bass catch was captured with electrofishing gear compared to 2% with trap nets, 1% fyke nets, and <1% with gill nets. Average size of the electrofishing catch was 8.4 inches, average size of the trap net catch was 10.1 inches, and average size of the gill net catch was 13.0 inches. Smallmouth bass size structure was dominated by fish in the 6-8 inch size range but fish in the 9-13 inch size range were common. Fifteen percent of the smallmouth bass catch met or exceeded the legal harvest size of 14 inches. Age and growth analysis indicated smallmouth bass were growing below State average having a mean growth index of -0.9 (Table 4). Age frequency showed highest representation of the 2007 (age 2) year class and good representation of the 2006 (age 3). Smallmouth bass were represented by 6 year classes although older ages were less common.

In addition to smallmouth, 20 largemouth bass were captured representing an additional 1.5% of the total catch (Table 3). Largemouth bass ranged from 1 to 15 inches and averaged 11.3 inches. Forty percent

of the largemouth bass met or exceeded the legal harvest size of 14 inches. Five year classes of largemouth bass were captured and they were growing above State average having a mean growth index of +3.1 (Table 4). There is a high percentage of ages 1-4 in the catch indicating good recruitment.

Twenty-eight walleye averaging 16.1 inches were collected in the 2009 assessment (Table 3). Seventy-five percent of the walleye catch met or exceeded the legal harvest size of 15 inches. Eight year classes of walleye were represented in the catch indicating both survival of stocked fish and survival of naturally reproduced fish. Ages 1 - 3 are well represented (Table 4). Walleye growth remains well above State average, having a growth index of +2.5.

Seven northern pike averaging 26.5 inches were collected in the 2009 assessment (Table 3). Seventy-one percent of the northern pike catch was captured with gill net gear and 29% with trap net gear. Average size of the gill net catch was 25.1 inches and average size of the trap net catch was 30.0 inches. Northern pike size structure was dominated by large fish. Seventy-one percent of the northern pike collected met or exceeded the legal harvest size of 24 inches. Sample sizes were insufficient to calculate a mean growth index (Table 4).

Only 10 pumpkinseed sunfish averaging 6.5 inches were collected in the 2009 assessment (Table 3). Seventy percent of the total catch met or exceeded the acceptable harvest size of 6 inches. Age and growth analysis indicated pumpkinseed sunfish were growing above State average having a mean growth index of +0.2 (Table 4).

Brown and yellow bullhead were common in the survey catch. Collectively they represented 3% of the survey catch. They ranged from 8 to 14 inches and averaged about 11 inches. These bullhead can provide anglers another species to target and can provide some predatory control on juvenile panfish.

Bowfin, white sucker, golden redhorse, silver redhorse, and carp were also captured but in low numbers. Anglers may enjoy catching these species. Other species collected were very low in abundance and may not significantly contribute to the sport fishery.

Bluntnose minnow, creek chub, Iowa darter, and johnny darter represent the nongame forage base.

One sea lamprey was noted in the catch.

Analysis and Discussion

The Coldwater Lake fish community remains similar in species composition and size structure to that found in 1995. Bluegill are the most abundant species. Walleye, smallmouth bass, largemouth bass, northern pike, and black crappie occur in lesser abundance but provide additional angling opportunities.

Bluegill are typically the most abundant fish species present in many lakes in the region and play a key role in community structure and overall sport fishing quality (Schneider 1981). Schneider (1990)

suggests indices of bluegill characteristics can be used to classify populations. The "Schneider Index" uses size scores of length frequency and growth data and relates them to an adjective ranking system ranging from "very poor" to "superior". Using the Schneider Index for classifying bluegill populations, Coldwater Lake scored 4.75 for a satisfactory to good rating (Table 5). Comparisons with earlier surveys were difficult because very few bluegills were captured with netting in past years. Lakes with small littoral zones are difficult to compare with shallower lakes. There appear to be abundant larger bluegills available to anglers but they may be more difficult to locate.

Rock bass catch rate and size structure in 2009 appears satisfactory and there is ample opportunity for anglers to catch rock bass.

Very few black crappie were netted in 2009. Timing and the limited shoal area are probably the reason for such a small catch. The spring of 2009 was very cold and the crappie may have been deeper than the majority of our gear sampled. Despite the low number caught, data suggests that crappie are growing well and reach larger sizes offering anglers opportunities to catch harvestable fish.

Largemouth bass and smallmouth bass represent two of the primary predator fish in Coldwater Lake. Both species exhibit fair numbers and size structure in 2009. These populations are self-sustaining and providing a good sport fishery.

The catch rate, size structure, and growth of walleye indicate a fairly stable population. Although supported in part by stocking, walleye are also naturally reproducing as indicated by the numerous age classes represented in the survey catch. There are many large walleyes available for anglers to catch.

Northern pike were stocked in the past and have been requested for stocking for many years. The northern rearing program has been very limited and has only allocated pike for Coldwater Lake in 1993 and 1995. Few were captured in the survey. Even though pike are generally best netted immediately after ice out, this low number may indicate limited reproduction. Too few samples were captured to adequately evaluate the growth and size structure parameters, but the fish captured exhibited a decent size range and were growing to sizes desirable to anglers.

Although yellow perch were found in appreciable numbers, their size structure and age distribution was relatively poor. Few yellow perch appear to survive beyond age 3 and grow large enough to recruit into the harvestable fishery. This mortality is most likely due to natural causes and predation from other piscivorous fishes may play a role. At best, the current fishery only offers an opportunity for incidental catch of yellow perch of harvestable size.

Management Direction

Management direction on Coldwater Lake should continue for warm and cool water species. Specific management for bluegill, smallmouth bass, largemouth bass, black crappie, rock bass, and yellow perch is not warranted as all of these species are self sustaining.

The current fisheries management prescription for Coldwater Lake recommends stocking both northern pike and walleye to maintain and build these populations. Coldwater Lake is a popular fishing lake and gets high fishing pressure as it has a public access site and county park and camping area located on the lake.

The Fisheries management prescription calls for stocking 3000 spring fingerling northern pike (10 fish per acre) in years 2009, 2011, and 2013. Concerns over viral hemorrhagic septicemia (VHS) and the disinfection techniques in rearing have temporarily halted the entire esocid rearing program so these fish are not available at the present time. The current prescription also requests 10,000 spring fingerling walleye (34 fish per acre) to be stocked in years 2010, 2012, and 2014. In the case of walleye rearing, VHS has limited the program so there are reduced numbers of walleye available for all statewide needs and risk assessments are being conducted to decide on stocking locations.

References

Schneider, J.C. 1981. Fish communities in warmwater lakes. Michigan Department of Natural Resources, Fisheries Division, Fisheries Research Report 1890, Ann Arbor, Michigan.

Schneider, J.C., 1990. Classifying bluegill populations from lake survey data. Michigan Department of Natural Resources, Fisheries Technical Report No. 90-10. Ann Arbor, Michigan.

Serns, S. L. 1982. Relationship of walleye fingerling density and electrofishing catch per effort in northern Wisconsin lakes. North American Journal of Fisheries Management 3: 451-452.

Figure 1. Aerial photo showing location of Coldwater Lake, Isabella County

Figure 2. Coldwater Lake bathymetric map depicting the sampling locations.

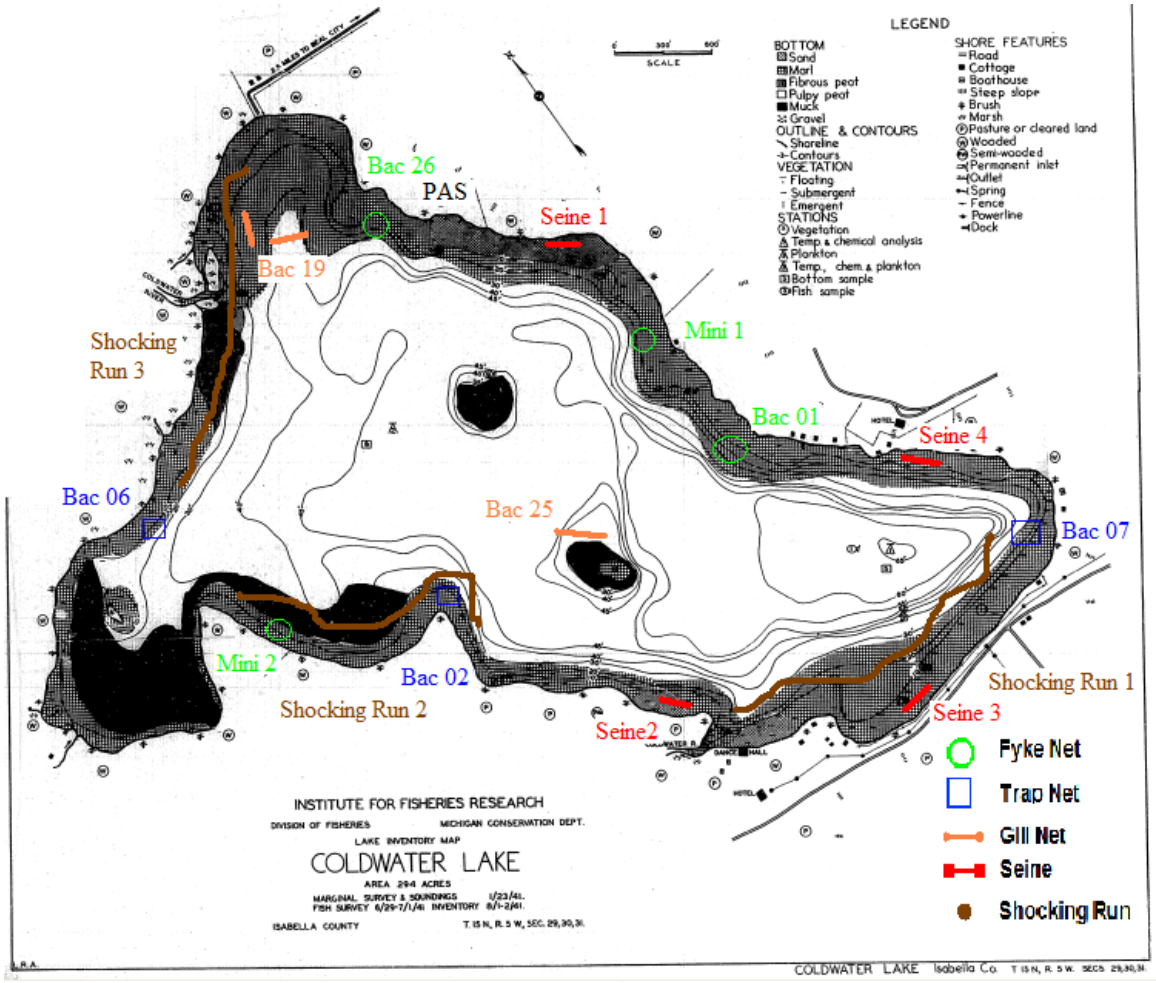

Table 1. 1979 to present stocking for Coldwater Lake, Isabella County

Species	Date	Number	Average Length (in.)
Northern Pike	06/16/1993	3,000	4.2
Northern Pike	06/09/1995	3,000	2.82
Walleye	06/26/1984	34,322	2.52
Walleye (Mu)	06/23/1987	3,600	2
Walleye (Mu)	06/15/1988	10,135	2.04
Walleye (Mu)	06/13/1990	15,322	1.92
Walleye (Mu)	06/17/1992	9,712	1.72
Walleye (Mu)	06/10/1994	22,781	1.88
Walleye (Mu)	07/02/1996	8,153	1.96
Walleye (Ti)	06/08/1999	10,934	1.88
Walleye (Ti)	06/11/2002	10,241	1.52
Walleye (Ti)	06/02/2006	10,270	1.62

Table 2. Limnological parameters for August 2009 Coldwater Lake

Depth	Temperature (F)	Oxygen (ppm)	pH
surface	72.78	9.88	7.8
3	72.73	9.83	7.88
6	72.62	9.82	7.95
9	72.29	9.76	7.95
12	71.1	9.21	7.89
15	70.57	8.48	7.83
18	69.54	7.9	7.74
21	60.3	5.66	7.57
24	56	2.86	7.45
27	52.94	1.45	7.33
30	51.02	0.94	7.24
33	49.09	0.92	7.16
36	46.77	0.94	7.09
39	45.55	0.7	7.04
42	45.12	0.39	6.69
45	44.8	0.22	6.68
48	44.6	0.19	6.67
51	44.39	0.18	6.66
54	44.14	0.17	6.67
57	43.98	0.17	6.65
60	43.81	0.16	6.62
63	43.74	0.15	6.54

Table 3. Number, Weight and Length Data by Species for Coldwater Lake, 2009.

Species	Number	Percent by number	Weight (lb.)	Percent by weight	Length range (in.)*	Average length (in.)	Percent legal size**
Black crappie	10	0.8	3.3	0.7	4-10	8	80
Bluegill	467	35.3	74	16.4	2-9	5.7	42
Bluntnose minnow	12	0.9	0.1	0	2-3	2.8	--
Brown bullhead	8	0.6	7.8	1.7	9-14	12.6	100
Bowfin	8	0.6	33.4	7.4	17-27	22.4	100
Common carp	1	0.1	3.5	0.8	19-19	19.5	100
Creek chub	1	0.1	0.2	0	7-7	7.5	--
Common shiner	5	0.4	0.4	0.1	2-6	5.1	--
White sucker	44	3.3	80.1	17.8	9-21	16.3	100
Golden redhorse	7	0.5	8.5	1.9	12-16	14.9	100
Green sunfish	2	0.2	0.2	0	4-5	5	0
Iowa darter	1	0.1	0	0	1-1	1.5	--
Johnny darter	1	0.1	0	0	2-2	2.5	--
Largemouth bass	20	1.5	20.6	4.6	1-15	11.3	35
Logperch	176	13.3	2.5	0.6	1-4	3.4	--
Northern pike	7	0.5	30.1	6.7	23-30	26.5	71
Pumpkinseed	10	0.8	2.5	0.6	4-8	6.5	70
Rock bass	245	18.5	64.8	14.4	2-9	6.8	77
Sea lamprey	1	0.1	0.4	0.1	17-17	17.5	--
Silver redhorse	12	0.9	20.1	4.5	14-19	17	100
Smallmouth bass	46	3.5	28.1	6.2	4-17	9.5	15
Walleye	28	2.1	48.6	10.8	8-26	16.5	75
Yellow perch	179	13.5	4.7	1	1-9	3.6	2
Yellow bullhead	31	2.3	16.5	3.7	6-14	10	94
All species totals:	**1,322**		**450.4**				

Table 4. Weighted Mean Length and Age Composition, Coldwater Lake, 2009

Species / Age	No. aged	Length range (in.)	State avg.length (in.)	Weighted mean len. (in.)	Weighted age freq.	Mean growth index*
Black crappie						--
Age I:	2	4-4.1	4.8	4.05	20.00%	0
Age II:	2	7-7.1	6.5	7.05	20.00%	0
Age III:	2	7.8-8.6	7.9	8.2	20.00%	0
Age IV:	4	9.1-10.9	8.9	10.17	33.33%	0
Age V:	1	9.3-9.3	9.7	9.3	6.67%	0
Bluegill						-0.1
Age I:	2	1.8-2.1	2.4	2.1	0.43%	0
Age II:	9	2.2-4.2	4.2	3.48	17.16%	1
Age III:	17	3.8-8.2	5.3	5.89	37.09%	1
Age IV:	14	4.9-8.3	6.2	6.05	21.46%	1
Age V:	13	5.7-8.1	6.9	6.76	20.99%	1
Age VI:	4	6.9-8.7	7.4	7.51	2.32%	0
Age VII:	1	9.7-9.7	8	9.7	0.21%	0
Age VIII:	1	08-Aug	8.4	8	0.33%	0
Largemouth bass						3.1
Age I:	4	1.2-6.4	5.4	3.1	20.00%	0
Age II:	7	8.5-13.1	8.7	11.28	30.00%	1
Age III:	5	12.1-14.9	10.6	14.1	25.00%	1
Age IV:	4	12.8-15.8	12	14.63	20.00%	0
Age V:	1	14.7-14.7	13.7	14.7	5.00%	0
Northern pike						--
Age II:	1	23-23	19	23	14.29%	0
Age III:	3	24.4-28.2	21.8	25.93	42.86%	0
Age IV:	1	23.4-23.4	24.2	23.4	14.29%	0
Age V:	1	29.5-29.5	26.1	29.5	14.29%	0
Age VIII:	1	30.7-30.7		30.7	14.29%	0
Pumpkinseed						0.2
Age III:	2	4.6-6	5.2	5.3	20.00%	0
Age IV:	5	5.4-6.5	5.8	5.96	50.00%	1
Age V:	1	7.0- 7.0	6.3	7	10.00%	0
Age VI:	2	7.2-8.1	6.8	7.65	20.00%	0
Rock bass						-0.1
Age I:	5	2.3-2.9	3	2.6	2.04%	1
Age II:	11	3.3-4.2	4.3	3.73	4.57%	1
Age III:	17	4-6.1	5.4	5.18	15.14%	1
Age IV:	12	5.1-9.5	6.4	7.1	26.68%	1
Age V:	16	6.0-9.0	7.2	7.17	38.23%	0
Age VI:	8	6.9-9.2	8.1	8.02	12.38%	1
Age VII:	2	9.2-9.7	8.8	9.45	0.95%	0
Smallmouth bass						-0.9
Age I:	2	4.7-5	5.5	4.85	4.35%	0

Age II:	24	6.2-9.9	8.8	7.54	54.35%	1
Age III:	10	7-14.5	11.1	10.68	21.74%	1
Age IV:	1	11.7-11.7	13	11.7	2.17%	0
Age V:	6	11.9-16.2	14.7	13.68	13.04%	1
Age VIII:	2	17-17	17.4	17	4.35%	0
Walleye						2.5
Age I:	6	8.7-10	8.2	9.35	21.43%	1
Age II:	10	10.4-16.2	11.4	15.24	35.71%	1
Age III:	4	15.5-19.2	14.4	17.5	14.29%	0
Age IV:	2	17.8-18.2	16.2	18	7.14%	0
Age V:	1	18.7-18.7	18	18.7	3.57%	0
Age VII:	1	22.6-22.6	20.8	22.6	3.57%	0
Age VIII:	3	20.4-26	21.7	23.6	10.71%	0
Age XIV:	1	23.3-23.3		23.3	3.57%	0
Yellow Perch						-1
Age I:	29	1.2-3.6	4	2.88	67.60%	1
Age II:	18	4.2-5.8	5.7	4.64	27.82%	1
Age III:	5	5.2-6.7	6.8	5.95	2.91%	1
Age IV:	2	7.9-8.3	7.8	8.1	1.12%	0
Age V:	1	9.2-9.2	8.7	9.2	0.56%	0

Table 5. Coldwater Lake bluegill classification using trap net data and the Schneider Index (Schneider 1990). Size score is given in parentheses.

Sample date	6/1/2009
Sample size	237
Average length (inches)	6.7 (5)
% $\geq$ 6 inches	71 (4)
% $\geq$ 7 inches	49 (5)
% $\geq$ 8 inches	7 (5)
Schneider Index	4.75
Rank[1]	Satisfactory - Good

[1]Rank: 1 = Very poor, 2 = Poor, 3 = Acceptable, 4=Satisfactory, 5 = Good, 6 = Excellent, 7 = Superior