

## **Cedar SD 2017**

### **Discussion**

A standard survey was conducted the week of August 14, 2017 to provide an update of the current fish community. Fisheries survey work included spring muskellunge trapping/electrofishing as well as spring electrofishing for largemouth bass. Muskie assessments are included with every other survey equating to every 6 years. Given staff limitations and a relatively high survey frequency (3 year rotation) the trap net component was dropped this survey so only gill nets were used during summer portion of the survey.

Cedar Lake is within the Mississippi River drainage and the immediate watershed (DNR Level 8 watershed) drains an area of approximately 6,800 acres. Land cover in the watershed is primarily forests and wetlands, with most of the remaining land a mix of residential development and pasture. While residential development exists in most bays of the lake, much of the shoreline is forested and is in a relatively natural condition. Diverse nearshore substrates include areas with muck, gravel, rubble, and boulders, with sand observed most frequently along vegetation transects. The water has good clarity and can occasionally have a light bog stain (brown) or plankton influenced (green) color.

Temperature - dissolved oxygen (TDO) profiles were collected from the main basin (WQ1) and two secondary basins (WQ2, WQ3) on August 14, 2017 to measure the amount of thermal habitat available for tullibee. The main basin represents the area most likely to have adequate conditions for tullibee survival and the TDO3 (temperature at 3 mg/l dissolved oxygen) from WQ1 was determined to be 10 degrees C. Overall oxy-thermal habitat in the main basin was good, with favorable conditions occurring from the surface to about 78 feet deep. Although a significant summer kill was observed in September 2009, data collected from 2009-2017 indicate the main basin has had sufficient thermal habitat for tullibee survival in each year surveyed and provides “good” habitat compared to other area lakes that are monitored. Because the Aitkin Area is located near the southern edge of Minnesota’s tullibee range, TDO profiles should continue to be collected to monitor the availability of cold-water habitat. Three additional (TDO) profiles (WQ4, WQ5, WQ6) were collected this survey to see if within basin oxy-thermal conditions are influencing gill net catch rates.

Walleye and muskellunge are the two primary management species and each are stocked as fall fingerlings annually. Additional spring muskellunge sampling was conducted in 2017, and will continue with every other survey, next in 2023, per the current plan. The walleye catch rate of 2.2/gill net was below the lake class median and goal of the plan (3.0/gill net) for the third consecutive survey, but above the long-term average (1.8/gill net). Age analysis revealed walleye between 2 and 16 years old. There were no missing year classes between the ages of 2-8. Interestingly one the most abundant year classes was the 10 year olds from the 2007 year class, indicating fish regularly survive to old age. Similar to previous surveys, size structure was good with a mean length of 19.6 inches and fish over 30" observed in the sample. The mean weight for walleye was 3.2 pounds.

Muskellunge have been challenging to sample in Cedar Lake due to their low density and the general morphology of the lake. Cedar Lake is comprised of seven basins that vary in size from several hundred acres to less than forty acres. Much of the shoreline has a sharp drop-off with the maximum depth of the basins varying from 28 feet to 106 feet, which makes sampling fish with trap nets very difficult. Cedar Lake is connected to the Mississippi River, which is native muskellunge water, via Cedar Creek. With the exception of 2005, muskellunge have been stocked annually since 1994 and has created a popular sport fishery for anglers.

The goal of this investigation was to get a representative sample of the size distribution of muskellunge in the lake and also to identify key spawning areas where muskie could be sampled on a consistent basis in the future. The survey spanned a period of 11 days beginning on 5/2/17 and ending on 5/12/17. Nets designed specifically for muskie sampling with 5x6 ft frames were used. Night time boat electrofishing was also used to supplement trap net catches. Sex and reproductive condition were determined for all muskie sampled. Fish were also measured to the nearest tenth inch and fin clipped to identify recaptured specimens. Additional scale samples were collected for genetic analysis. Water temperatures were also monitored every day.

A total of 18 muskellunge were sampled in all gears throughout the survey period ranging in size from 10.9 to 51.6 inches with a mean length of 40.7 inches. There were 4 females, 11 males and 3 fish where sex was not able to be positively determined. Despite not being sampled in high numbers with fisheries gear, angler reports suggest a healthy fishable population. Muskellunge are not captured well in standard survey gear and only 2 fish were sampled in gillnets in 2017. The Cedar Lake muskie fishery will continue to be evaluated on a regular basis to increase our knowledge of muskellunge behavior in these waters and to determine appropriate stocking guidelines. It should be noted that slightly fewer muskellunge were caught this year than in previous surveys, but timing of the survey (a little late) may have had an influence on that. In addition, scale samples from this survey and the 2007 and 2010 surveys were used for genotyping specimens and for potential mark-recapture analysis. All samples were identified as Leech Lake strain, and no recaptures were observed from previous surveys (Dr. Loren Miller, pers. comm.).

Secondary management species include largemouth bass, black crappie and northern pike. Spring night electrofishing for largemouth bass was conducted in 2017. Electrofishing yielded a catch rate of 27.7/hr similar to what was observed in 2011 (34.6/hr). The mean size of largemouth bass was 11.6 inches and fish up to 17.7 inches were observed. Largemouth bass catch rate (1.1/gill net) was similar to the previous survey and has been stable near 1/gill net since 2002. Largemouth bass ranged from 1-8 years old using otoliths from gillnetted fish, and only 7 year olds were missing from the sample.

Black crappie catch rate (8.9/gill net) increased since 2014 (Wilcoxon Signed Rank Test  $P = 0.0035$ ) and was the highest on record for the eleven surveys dating back to 1959. This comes following the lowest catch ever recorded the last time the lake was sampled in 2014. Sizes ranged from 4.3 to 12.2 inches and averaged 7 inches, with fish up to 12.2 inches in the sample. Age analysis revealed black crappie from ages 1-12; however, most of the sample consisted of fish between 1 and 6 years old.

Northern pike catch rate (8.3/gill net) increased compared to the 2014 catch rate of 6.1/gill net (Wilcoxon Signed Rank Test:  $p=0.0094$ ). Pike catches have ranged from 2.7 to 8.6/gill net in eleven previous surveys, which is typical for this lake class. Sizes in the gill net sample ranged from 11.9 to 33.9 inches, and averaged 20.6 inches and 2.0 pounds, with 17.5% greater than 24 inches.

Despite an increase in 2017 (Wilcoxon Signed Rank Test:  $p=0.0209$ ) yellow perch catches have historically been below the interquartile range for lake class 25 and remained low in 2014 (1.4/gill net).

Suspended gill nets targeting tullibee captured 179/net, the highest catch in six previous surveys using this gear type. Sizes ranged from 6.6 to 13.9 inches and averaged 8.3 inches. Age analysis revealed tullibee ages 2-10, with only 1 missing year class in the sample and 80% of the catch was 2yr olds from the 2015 year class.

## Status of the Fishery

Cedar Lake is a large and popular lake located three miles west of the City of Aitkin. There is a state owned public access with a concrete log ramp located on the south side of the lake. The shoreline is complex with several distinct basins, which provides a variety of habitats ranging from shallow vegetated bays to cool and deep open water areas. The fish community reflects the diverse habitat, and besides gamefish includes several species of shiners, darters, and minnows present.

Walleye and muskellunge are the primary management species and both species are currently stocked annually as fingerlings to maintain their populations, although some natural reproduction of walleye likely occurs. The 2017 walleye catch of 2.2/net was similar to previous assessments and generally on the lower end of the expected range for this type of lake. While walleye may not be overly abundant their population has a quality size component with fish over 30" sampled on a regular basis.

Muskellunge are not captured well in standard survey gear so sampling with special large frame nets targeting muskellunge is conducted every other survey and was completed in early May of 2017. Muskellunge have been challenging to sample in Cedar Lake due to their low density and the general morphology of the lake. Cedar Lake is connected to the Mississippi River, which is native muskellunge water, by Cedar Creek. With the exception of 2005, muskellunge have been stocked annually since 1994 and has created a popular sport fishery for anglers. A total of 18 muskellunge were sampled in all gears throughout the survey period ranging in size from 10.9 to 51.6 inches with a mean length of 40.7 inches. There were 4 females, 11 males and 3 fish where sex was not able to be positively determined. Despite not being sampled in high numbers with fisheries gear, angler reports suggest a healthy fishable population.

Largemouth bass are another popular species targeted by anglers and are not sampled well with standard survey nets so their populations are often evaluated using nighttime electrofishing. Night electrofishing was conducted 5/31/2017. Largemouth bass were caught at rate of 27.7/hr, which is a reasonable abundance and similar to what has been documented in previous work. The average size of largemouth bass was 11.6 inches and fish up to 17.7 inches were observed.

The northern pike population provides anglers yet another opportunity to catch a top predator. While not able to attain the same maximum size as muskellunge, northern pike in Cedar Lake have a decent size structure with fish averaging 2 pounds, and with individuals up to about 34 inches observed in this year's survey.

Black crappie have historically been the preferred species for panfish anglers because they tend to reach an acceptable harvest size more regularly than the lake's bluegill. The crappie fishery can be highly variable and generally fluctuates based on spawning success. A black crappie catch rate of (8.9/gill net) was an increase and the highest on record dating back to 1959. This comes following the lowest catch ever recorded the last time the lake was sampled in 2014. Sizes ranged from 4.3 to 12.2 inches and averaged 7 inches. Although still rather small sized (averaging only about 6 inches in this survey), the 2015 year class appeared to be quite strong and should provide some good fishing opportunities within a few years.

The lake is also known for its abundant tullibee/cisco population. Special nets suspended at the right depths are able to sample these fish to gain pertinent information from them. Tullibee can be found in the deep, cool oxygen rich areas of the lake in the summer and can be found almost anywhere as temperatures allow during the fall, winter and spring. The species provides an important, nutrient rich forage base for the lakes gamefish.

Anglers are reminded to follow current MN-DNR Aquatic Invasive Species guidelines as described in the MN fishing regulations handbook in order to prevent the spread of unwanted invasive species.