## WISCONSIN DEPARTMENT OF NATURAL RESOURCES

# Fishery Survey Report for Upper Turtle Lake, Barron County, Wisconsin 2021-2022

WATERBODY IDENTIFICATION CODE: 2079800


**Kyle J. Broadway**
DNR Fisheries Biologist-Senior
&
**Craig L. Landes**
DNR Fisheries Technician-Advanced


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# Executive Summary

Upper Turtle Lake was surveyed during 2021 to determine the abundance, harvest and population demographics (size and age structure, growth and recruitment) of walleye as part of the Treaty assessment protocol for lakes within the Ceded Territory. In addition, the abundance and population demographics were assessed for other sport fish. Lastly, open water and ice fishing creel surveys were completed to assess the pressure and harvest from recreational anglers.

The adult walleye population during 2021 was estimated to be 885 fish (95% CI = 545 – 1,246 fish) or 2.0 fish/acre (95% CI = 1.2 – 2.8 fish/ac) and increased since 2011. Adult walleye harvest from the recreational fishery was low, with an angling exploitation rate of 5.1%, and no tribal exploitation occurred. The walleye management objective is to maintain the adult density at 1.5 – 2.5 fish/acre by continuing to stock large fingerling (6-8 inches) walleye in alternate years at a rate of 10 fish/acre. The largemouth bass recreational fishery was popular with high directed fishing effort compared to other popular fisheries in the area despite a decline in population abundance, which could be attributed to a regulation change during 2011 liberalizing harvest opportunities. The largemouth bass population remains healthy and supports a quality recreational fishery, so the liberal harvest regulations will be maintained. Panfish angling was very popular and the main driver of the recreational fishery in Upper Turtle Lake. The panfish fishery had relatively high (67.8%) directed angler effort, high catch rates and moderate harvest pressure. Directed angling effort was greatest for black crappie as Upper Turtle Lake supports an abundant black crappie population with a moderate size structure. The catch rate of quality-size fish (≥ 8 inches) was well above average for lakes in Barron and Polk counties, and the mean size resembled the 99$^{th}$ percentile for similar complex-warm-dark Wisconsin lakes. A low-density bluegill population with a moderate size structure was present in Upper Turtle Lake with the second highest directed angling effort. Bluegill abundance remained similar over the past decade, but size structure increased as the catch rate of quality size (≥ 6 inches) fish nearly tripled, and the mean length was near the 99$^{th}$ percentile for similar complex-warm-dark Wisconsin lakes. Future fishery surveys should closely monitor the population abundance and size structure of black crappie, bluegill and possibly yellow perch due to the popularity and intensity of the current panfish recreational fishery and their importance to the overall fish community. These fisheries are highly productive and resilient to high harvest. The 25 fish daily bag limit should continue to promote quality recreational fisheries.

# Introduction

Upper Turtle Lake is a 427-acre drainage lake located in Barron County, Wisconsin. The lake has a maximum depth of 25 feet and a mean depth of 14 feet and is best characterized by relatively steep sloping shorelines. Upper Turtle Lake is a productive lake that receives moderate recreational boating use and angling pressure and has quality and diverse fisheries. Upper Turtle Lake is a fertile system classified as a complex-warm-dark lake (Rypel et al. 2019). The July-August mean Trophic State Index (TSI) values for chlorophyll-a and total phosphorus were 63 and 61, respectively. Mean TSI has generally remained stable over the past decade. Moderate algal blooms occur on Upper Turtle Lake, and submerged aquatic macrophytes are abundant in the littoral areas. The shoreline is primarily developed with 23.4 dwellings per shoreline mile, which has doubled since 1967 (11.4 dwellings per shoreline mile). There is a small intermittent inlet on the northwest end of the lake, and Upper Turtle Lake forms the headwaters of Turtle Creek, which has an outlet on the southern end of the lake and flows through Lower Turtle Lake and eventually to the Hay River. Currently, recognized invasive species include Chinese and Japanese mystery snails and curly-leaf pondweed. There is one public boat landing located along the southern shoreline off State Highway 8 (45.40790, -92.08867).

The sport fish community in Upper Turtle Lake consists of bluegill (*Lepomis macrochirus*), pumpkinseed (*L. gibbosus*), black crappie (*Pomoxis nigromaculatus*), largemouth bass (*Micropterus salmoides*), yellow perch (*Perca flavescens*), walleye (*Sander vitreus*), northern pike (*Esox Lucius*), bullheads (*Ameiurus spp.*), common carp (*Cyprinus carpio*), rockbass (*Ambloplites rupestris*) and smallmouth bass (*Micropterus dolomieu*).

Upper Turtle Lake has had a long history of management actions directed toward improving and enhancing the fishery. Many of these fisheries management activities have been directed at improving the walleye fishery. Walleye fry were stocked annually from 1933 to 1963. The walleye population during 1944 had good adult abundance, excellent size structure and a high-quality recreational fishery, but the contribution of natural recruitment (NR) was unknown. Walleye abundance and size structure during 1966 weres noted to be lower than in previous decades and corresponded with increased populations of largemouth bass and northern pike. Walleye stocking was continued until 1969, when a brief stocking cessation was recommended to evaluate NR. NR remained limited during 1970 – 1974, when no stocking occurred, as no walleye year classes were established, but an abundant adult population with excellent size structure remained during 1975. Stocking was recommended to resume the following year, and small fingerlings were stocked every other year at a rate of 50 fish/acre. The fishery remained well balanced, and a quality stocking-dependent walleye fishery persisted through 1990. The walleye population remained good through 2011, with population estimate surveys conducted during 1992 (4.0 adults/acre), 1999 (3.4 adults/acre) and 2011 (1.1 adults/acre). NR remained too limited to support a quality adult fishery, and walleye stocking was initiated

during 2014. Stocking practices shifted to large fingerlings as part of the Wisconsin Walleye Initiative with the goal of improving recruitment to the adult fishery. Since 2014, large fingerling walleye have been stocked every other year at a rate of 10 fish/acre (Appendix Table 1).

Walleye and largemouth bass are both managed with special fishing regulations in Upper Turtle Lake. There is an 18-inch minimum length limit (MLL) and three fish daily bag limit for walleye, and a no MLL and five fish daily bag limit for largemouth bass. All other species follow statewide regulations.

The Wisconsin Department of Natural Resources (DNR) surveyed Upper Turtle Lake to assess the status of the fishery during 2021. A mark-recapture survey was performed to estimate the adult density of walleye. We assessed catch rates of largemouth bass, bluegill and other panfish species to estimate relative abundance. We characterized population demographics, size structure and growth for all species when possible. Recent management efforts have focused on walleye stocking, fishing regulation changes, public outreach and maintaining littoral zone habitat and water quality.

# Methods

## FIELD SAMPLING

Upper Turtle Lake was sampled during 2021 with early spring fyke netting (SN1), early spring (SE1) and late spring (SE2) night electrofishing, fall (FE) night electrofishing and open water and ice fishing creel surveys following the DNR comprehensive Treaty assessment protocol (Appendix Table 2; Cichosz 2021).

The population abundance of adult walleye was estimated using mark-recapture methodology during the SN1 and SE1 surveys. The population size of adult walleye was estimated with Chapman's modification of the Peterson model (Ricker 1975):

$$N = \frac{(M+1)(C+1)}{(R+1)}$$

*where N = population estimate; M = the number of fish marked in the first (marking) sample; C = the total number of fish (marked and unmarked) captured in the second (recapture) sample; and R is the number of marked fish captured in the second sample.*

Walleyes were captured with fyke nets set at ice-out. Fyke nets were set on April 2, 2021 and checked every 24 hours for four days. Fyke nets had 4-foot x 6-foot frames, 0.5 to 0.75-inch bar measure mesh, and lead lengths of 75 feet or less. All walleye were measured (total length), weighed, sexed and given a specific mark indicating capture. Adult walleye ≥ 15 inches or sexable (extrusion of eggs or milt; Cichosz 2021) were marked with a fin clip, and juvenile walleye < 15 inches were marked with a different fin clip. Aging structures were collected from five walleye of each sex per 0.5-inch length group. Scales were taken from walleye < 12 inches, and dorsal spines were taken from fish > 12.0 inches. For the recapture period, walleye collected during the SE1 survey were measured, sexed and checked for marks.

The SE2 survey was conducted on May 17, 2021 to assess largemouth bass and panfish populations. The SE2 survey consisted of 0.5-mile index stations where all gamefish and panfish were captured and 1.5-mile gamefish stations where all gamefish were collected. There were two index stations and three gamefish stations completed on Upper Turtle Lake. All fish were measured, but weights and aging structures were collected from five fish per 0.5-inch length group for age and growth analysis. Catch per unit effort (CPUE; index of relative abundance) was estimated as catch per mile.

A fall night electrofishing survey was conducted on September 22, 2021 to assess the year class strength of age-0 and age-1 walleye. The entire shoreline was sampled, and walleyes < 12 inches were collected. The CPUE (catch per mile) of age-0 and age-1 walleye were compared to previous fall evaluations.

## POPULATION DEMOGRAPHICS

Population estimates and CPUEs were compared to previous surveys and lake class standards when possible.

Walleye and largemouth bass were aged with dorsal spines, and bluegills were aged with scales. Dorsal spines were cut with a Dremel saw and aged with a dissecting microscope by a single interpreter. Scale samples were pressed on acetate slides and aged on a microfiche reader by a single interpreter. When data were available, mean length at age was compared to previous surveys, county (Barron and Polk counties) averages, northern region averages (18 counties in the DNR northern region) and the median length at age for similar complex-warm-dark lakes (Rypel 2019).

The von Bertalanffy (1938) growth model was determined using mean length at age data to assess growth using the following equation:

$$Lt = L_{inf}\ (1 - e^{-k(t-t_0)})$$

*Where $L_t$ is length at time t, $L_{inf}$ is the maximum theoretical length (length infinity), e is the exponent for natural logarithms, k is the growth coefficient, t is age in years, and $t_0$ is the age when $L_t$ is zero.*

Growth equations for largemouth bass and walleye were completed by pooling sexes despite sex-specific growth differences.

Size structure was assessed by comparing proportional size distribution (PSD) and relative length frequencies to previous surveys (Neumann et al. 2013). The PSD value for a species is the number of fish of a specified length and longer divided by the number of fish of stock length or longer, the result multiplied by 100. Relative weight ($W_r$) was used to describe fish condition. Relative weight is the ratio of a fish's weight at capture to the weight of a "standard" fish of the same length determined by a standard weight equation (Wege and Anderson 1978). The mean $W_r$ was determined.

The instantaneous mortality (Z) and annual mortality ($A = 1\text{-}e^{-Z}$) rates of largemouth bass were determined using a catch curve regression fitted to those ages fully recruited to the gear (Miranda and Bettoli 2007).

To assess walleye stocking survival, an age-length key was used to estimate the abundances of walleye in each year class, assuming no natural reproduction and all fish were from stocked origin. Survival was estimated by dividing the population estimate for each age class by the total number of fish stocked for that year and multiplying it by 100. The cost of each stocking event was calculated by multiplying the number of large fingerlings stocked by the average cost per large fingerling ($1.06). Cost per recruit to age-3, age-5 and age-7 was estimated by dividing the cost of each stocking event by the estimated abundance of that year class. The survival rate of stocked large fingerlings to age-1 was estimated by dividing the density of age-1 walleye (fish/acre; Shaw and Sass 2020) by the density (fish/acre) of stocked large fingerlings the previous fall. The cost per recruit to age-1 was estimated by dividing the cost of each stocking event by the estimated abundance of that year class.

### RECREATIONAL CREEL AND TRIBAL HARVEST

Open water and ice fishing creel surveys were completed on Upper Turtle Lake to assess the pressure and harvest from recreational anglers. The creel survey began the first Saturday in May and went through the first Saturday in March the following year. However, no creel data were collected during November because of unsafe ice conditions. Creel survey methods followed a stratified random design as described by Rasmussen et al. (1998). The directed effort, catch, harvest, specific harvest rate and mean length of harvested fish were evaluated for each species during the open water and ice fishing creel surveys. Directed angling effort for each species was compared to other lakes creel surveys in Barron and Polk counties using 19 creel surveys during 2003 – 2021 and only included the most recent creel survey for each lake. Harvest trends for each species were determined by calculating the relative harvest level each month. The angling exploitation rate for adult walleye was calculated by dividing the estimated number of marked adult walleye harvested by the total number of adult walleye marked (R/M; Ricker 1975). Tribal exploitation was calculated as the total number of adult walleyes harvested divided by the adult population estimate (C/N; Ricker 1975). Total adult walleye exploitation rates were calculated by summing angling and tribal exploitation.

## Results

### EARLY SPRING FYKE NETTING AND ELECTROFISHING

#### WALLEYE

There were up to eight fyke nets fished for four nights, which totaled 29 net nights. The adult walleye population during 2021 was estimated to be 885 fish (95% CI = 545 – 1,246 fish) or 2.0 fish/acre (95% CI = 1.2 – 2.8 fish/acre). Adult walleye density was greater than other stocking-dependent lakes in Barron and Polk counties (1.4 ± 0.2 fish/acre; mean PE ± mean error; estimated using data from 55 PE surveys, across 26

lakes ranging from 1995 to 2021) and remained similar to estimates in 2008 and 2011 but lower than 1992 and 1999 (Figure 1). Walleye fyke netting CPUE was 9.0 fish/net night, which was above the 75$^{th}$ percentile (5.8 fish/net night) for similar complex-warm-dark Wisconsin lakes. There were 235 walleyes collected fyke netting.

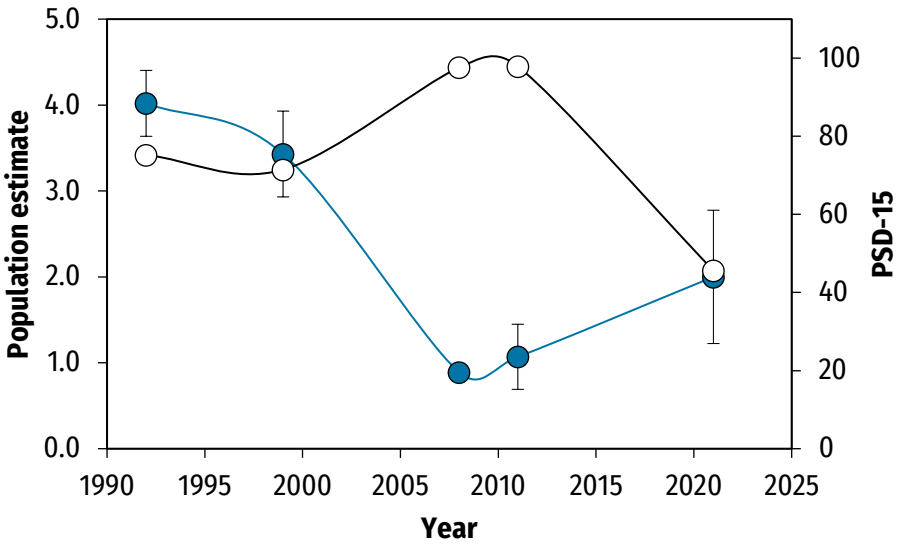


*Figure 1. Adult walleye population estimates (number of fish per acre ± 95% CI; blue circles) and PSD-15 (hollow circles) from the 1992, 1999, 2008, 2011 and 2021 fishery surveys.*

There were 169 walleyes collected during the SE1 survey (recapture period) with a CPUE of 42.3 fish/mile.

Walleyes ranged in length from 11.2 – 27.7 inches, and the mean lengths of females and males were 22.9 inches and 14.3 inches, respectively (SN1 and SE1 surveys; Figure 2). The PSD-15 was 46 and PSD-20 was 17. The PSD indices indicated good size structure and within the generally accepted range (PSD-15 = 30 – 60; Anderson and Weithman 1978) for a balanced walleye population, but PSD-15 declined by 53% since 2011 (PSD-15 was 98). Walleye mean length decreased from 2011 (21.2 inches) to 2021 (15.8 inches). In general, the abundance of the largest size classes decreased since 2011. The sex ratio was male-biased, with a male-to-female ratio of approximately 5:1.

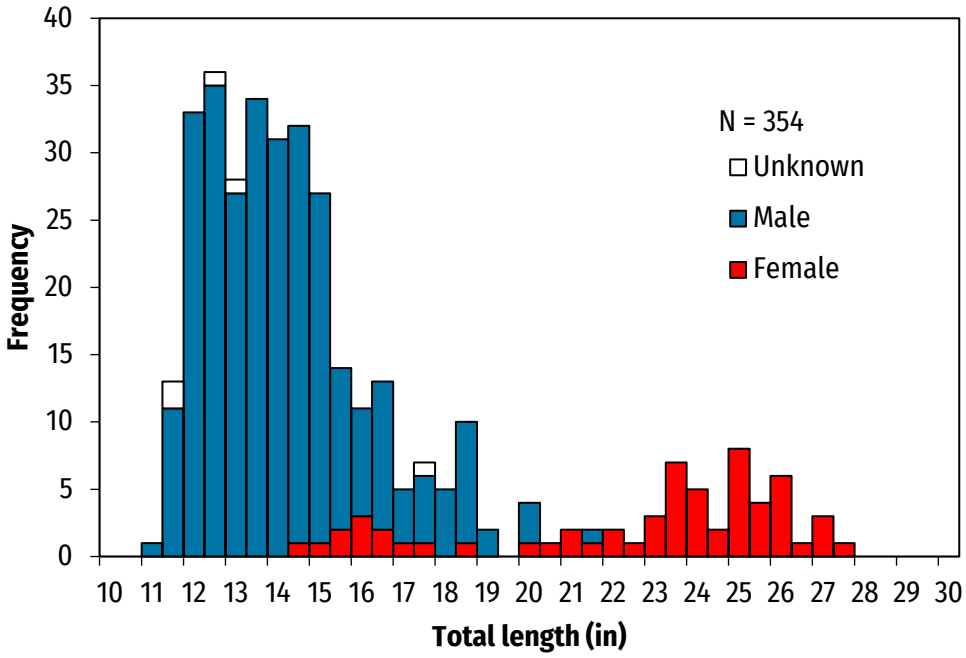


*Figure 2. Length frequency histogram for walleye collected during the SN1 and SE1 surveys in Upper Turtle Lake, Barron County, WI, 2021.*

Walleye in Upper Turtle Lake had good growth rates. Walleye ages ranged from 2 to 11, while females ranged from 5 to 11 and males 2 to 7. Mean lengths at age during the 2021 survey were slightly lower than those observed during the 2011 survey (average difference in mean length at age: -1.0 inches), complex-warm-dark Wisconsin lakes (average difference in mean length at age: -0.8 inches) and the Barron/Polk counties average (average difference in mean length at age: -0.8 inches; Figure 3). All comparisons used ages 3, 5, 7, 9 and 11 fish. The greatest differences in mean length at ages occurred at ages 3 and 5, which indicated slower growth at earlier ages. The von Bertalanffy growth model could not be fit to the observed age-length data.

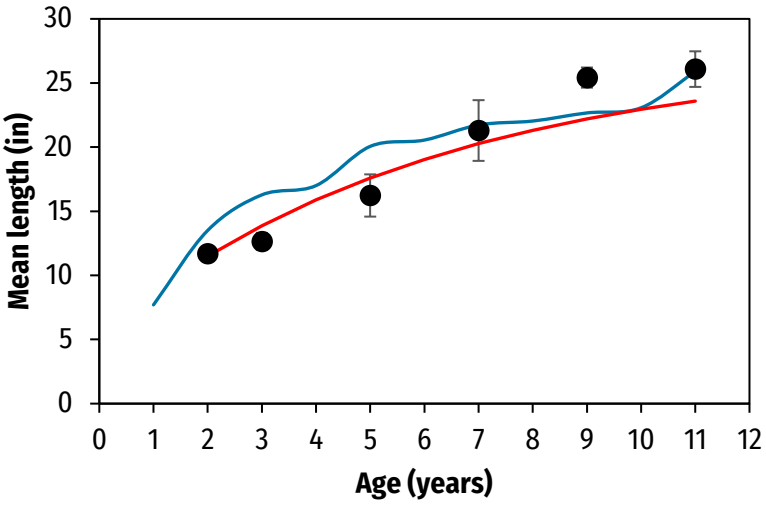


*Figure 3. Mean length at age ± standard deviation of walleye (black circles) in Upper Turtle Lake. Mean length at age estimates during the 2011 survey are represented by the blue line. The median length at age for similar complex-warm-dark Wisconsin lakes is represented by the red line. Mean length at age estimates for Barron/Polk counties were similar to the Lake Class estimates and not represented in the plot.*

Large fingerling walleye have been stocked into Upper Turtle Lake every other year since 2014 at a rate of approximately 9-10 fish/acre. Survival to age-3 was 7.1%, and the cost per age-3 fish was estimated at $14.99. Age-3 walleye were not fully mature; therefore, may have been underrepresented in this survey. The survival rate was likely higher and the cost per recruit lower than estimated for age-3 fish. Survival to age-5 was 9.6%, with the cost per age-5 fish estimated at $11.03. Large fingerling survival to age-5 in Upper Turtle Lake was slightly higher than the Barron and Polk counties' average survival to age-5 for stocking-dependent systems (8.4%; estimated using data from 10 PE surveys, including the most recent for each lake). Age-5 fish were fully mature and susceptible to survey methods, with a mean length of 16.2 inches. However, age-5 fish were not yet susceptible to harvest by the recreational fishery (18-inch MLL). Walleye were susceptible to recreational harvest at age-6. Survival to age-7 was 2.0%, and the cost per age-7 fish was estimated at $53.27. Fish greater than age-7 composed 10% of the survey catch and were likely recruits from small fingerling stockings that occurred prior to 2010. Recruitment of stocked large fingerlings to the adult population was good, with satisfactory survival of all stocked year classes. Non-stocked years yielded weak or missing year classes of ages 2, 4 and 6 fish. Natural reproduction remains low, and stocking is necessary to maintain a quality fishery.

## LATE SPRING ELECTROFISHING

### LARGEMOUTH BASS

There were 124 largemouth bass collected during the SE2 survey with a CPUE of 21.0 fish/mile, which declined since the 2011 survey (39.8 fish/mile). The CPUE was above

the 50th percentile (17.4 fish/mile) for similar complex-warm-dark Wisconsin lakes and indicative of a moderate-density population. The CPUE of largemouth bass ≥ 14 inches was 9.7 fish/mile and declined since the 2011 survey (12.9 fish/mile).

Largemouth bass ranged in length from 6.9-18.6 inches, and the mean length was 13.6 inches, which was above the 95th percentile (13.2 inches) for similar complex-warm-dark Wisconsin lakes (Figure 4). The PSD-12 was 74 and PSD-14 was 47, which indicated a good size structure, and both indices improved slightly since the 2011 fishery survey (PSD-12 = 66 and PSD-14 = 34).

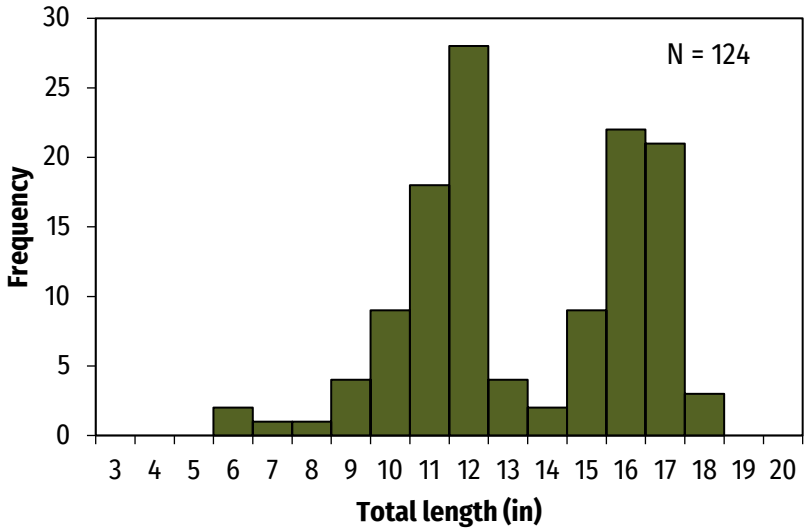


*Figure 4. Length frequency of largemouth bass captured in Upper Turtle Lake during 2021 SE2 survey.*

Largemouth bass had above-average growth rates. Mean length at age was similar to 2011 (average difference in mean length at age estimates: -0.1 inches; ages 3 – 8) but slightly lower than the median length at age standard for similar complex-warm-dark Wisconsin lakes (average difference in length at age estimates: -0.8 inches; ages 3 – 12; Figure 5) and the northern region estimates (average difference in mean length at age estimates: -1.1 inches; ages 3 – 12; Figure 5). The predicted theoretical maximum length for largemouth bass using von Bertalanffy growth models was 19.8 inches, with k and $t_0$ estimated to be 0.18 and -0.68, respectively. The mean $W_r$ of largemouth bass was 88 and indicated fish were in average overall condition (Bennett 1970).

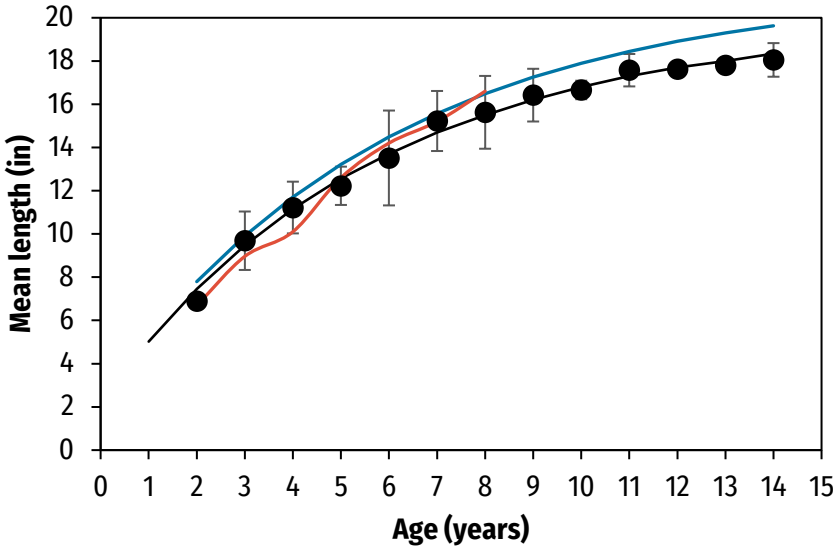


*Figure 5. Mean length at age ± standard deviation for largemouth bass during the 2021 SE2 survey on Upper Turtle Lake and the von Bertalanffy growth curve (black line). Blue line represents the median length at age estimates for complex-warm-dark Wisconsin lakes, and the red line represents the 2011 survey mean length at age estimates. Mean length at age estimates for the northern region were similar to the Lake Class estimates and not represented in the plot.*

Total annual mortality estimated from a catch curve regression model was 17.7% (ages 4 – 14; $R^2$ = 0.71; Figure 6).

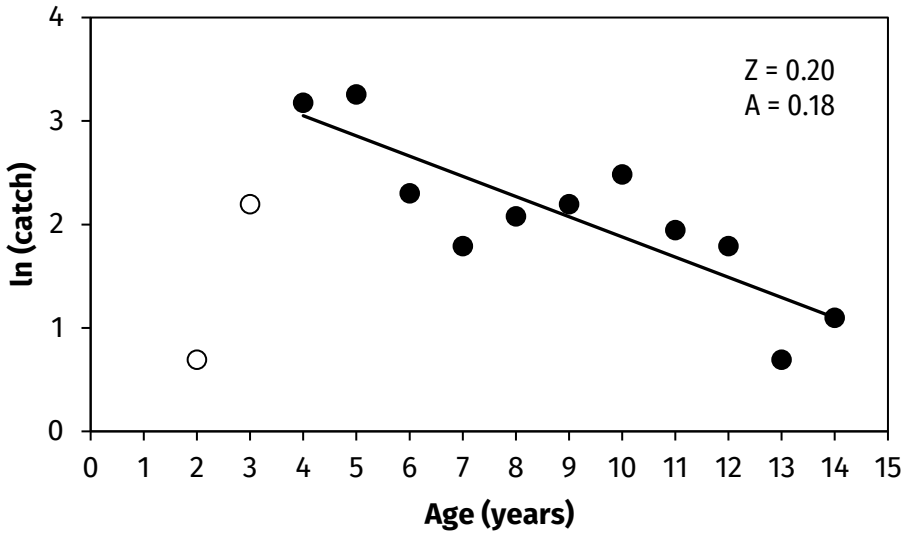


*Figure 6. Catch curve analysis plot representing the natural logarithm of the catch for each largemouth bass age class used in the analysis (black circles) and not (white circles). Z = instantaneous total mortality, A = annual total mortality rate.*

**BLUEGILL**

A low-density bluegill population with a moderate size structure was present in Upper Turtle Lake. A total of 202 bluegills were collected during the SE2 survey. Bluegill CPUE was 34.2 fish/mile, which was below the 25th percentile (54.1 fish/mile) for similar complex-warm-dark Wisconsin Lakes. Bluegill CPUE in Upper Turtle Lake was less than the mean bluegill CPUE for lakes in Barron and Polk counties (54.0 ± 4.7 fish/mile; ± SE) but remained similar to 2011 (39.0 fish/mile). The CPUE of quality size (≥ 6 inches) and preferred size (≥ 8 inches) fish was 28.3 fish/mile and 0.0 fish/mlei, respectively (Gabelhouse 1984). The CPUE of quality-size fish nearly tripled since 2011 (10.2 fish/mile) and was above the mean bluegill ≥ 6 inches CPUE for lakes in Barron and Polk counties (23.7 ± 2.1 fish/mile; ± SE).

Bluegill lengths ranged from 3.9 – 9.4 inches with an average length of 6.4 inches (Figure 7). The mean length of bluegill was near the 99th percentile (6.5 inches) for similar complex-warm-dark Wisconsin lakes. The PSD-6 was 83 and the PSD-8 was 1. The PSD-6 index value was well above the generally accepted range for a balanced bluegill population (PSD-6 = 20-60); however, PSD-8 was well below the recommendation (PSD-8 = 5 - 20) by Anderson (1985). The PSD-6 index value has nearly tripled since 2011 (PSD-6 = 27) and was well above the mean PSD-6 index value for lakes in Barron and Polk counties (PSD-6 = 47 ± 3; SE).

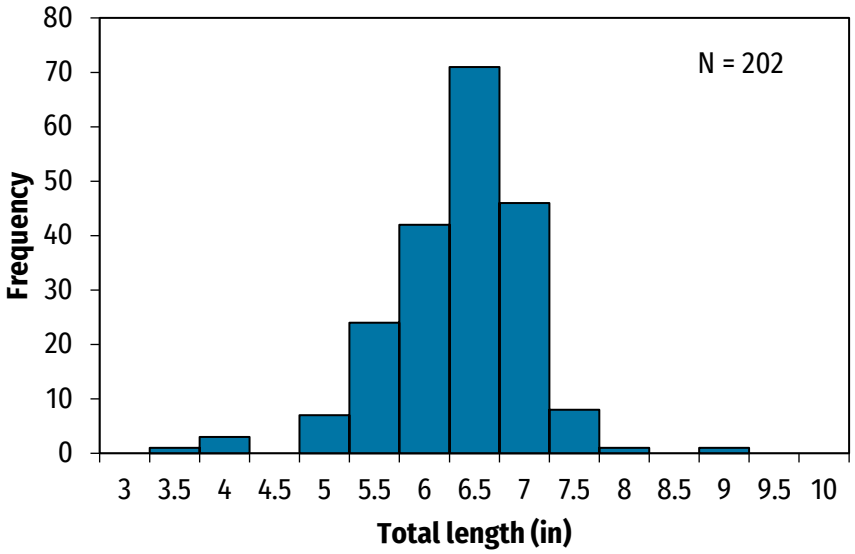


*Figure 7. Length frequency of bluegill captured from Upper Turtle Lake during the 2021 SE2 survey.*

Bluegill in Upper Turtle Lake had average growth rates. Mean length at age was similar to median length at age standards for similar complex-warm-dark Wisconsin lakes (average difference in length at age estimates: +0.1 inches). Mean length at age estimates resembled the mean Barron and Polk counties estimates (average difference in mean length at age estimates: +0.4 inches) and the northern region

estimates (average difference in mean length at age estimates: +0.2 inches). Mean length at age estimates were also similar to estimates observed during 2004 (average difference in mean length at age estimates: +0.3 inches). Age data were not collected during the 2011 survey but presumably remained similar to 2004 and 2021. Only ages 4-6 (lengths ranged from 5.3 – 8.2 inches) were included in growth comparisons as too few fish were present in other age classes. The von Bertalanffy growth model could not be fit to the observed age-length data.

**BLACK CRAPPIE**

Upper Turtle Lake supports an abundant black crappie population with a moderate size structure. A total of 72 black crappies were collected during the 2021 SE2 survey with a CPUE of 12.2 fish/mile, which increased since 2011 (1.3 fish/mile) and was above the mean black crappie CPUE for lakes in Barron and Polk counties (9.6 ± 1.9 fish/mile; ± SE). The CPUE of quality-size fish (≥ 8 inches) was 12.2 fish/mile and well above average for lakes in Barron and Polk counties (5.8 ± 1.3 fish/mile; ± SE; Gabelhouse 1984).

Lengths of black crappie ranged from 8.2 – 9.8 inches, with an average length of 9.0 inches (Figure 8). The mean length of black crappie was similar to the 99$^{th}$ percentile (8.9 inches) for similar complex-warm-dark Wisconsin lakes. PSD-8 was 100 and PSD-10 was 0. PSD index values were similar to 2011 (PSD-8 was 83) and well above the mean PSD-8 index value for lakes in Barron and Polk counties (PSD-8 = 65 ± 4; SE). These PSD index values indicate a moderate overall size structure.

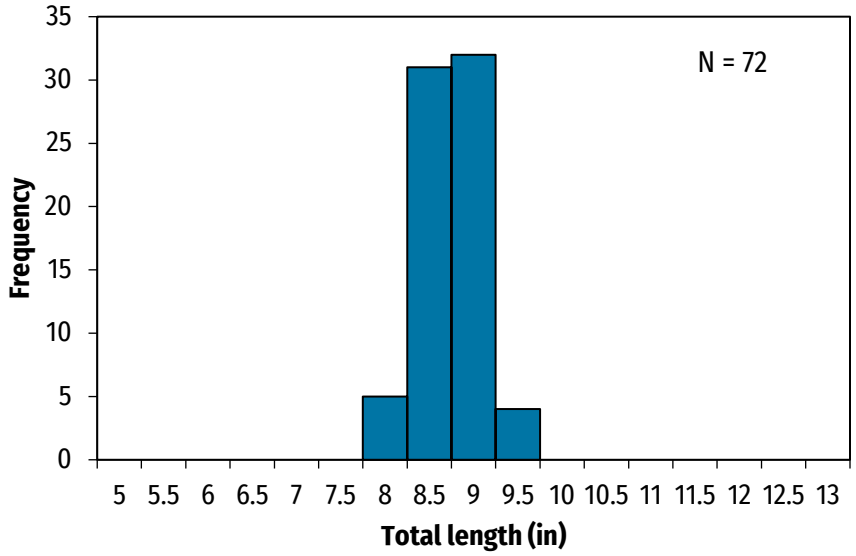


*Figure 8. Length frequency of black crappies captured from Upper Turtle Lake during the 2021 SE2 survey.*

## FALL ELECTROFISHING

### AGE-0 and AGE-1 WALLEYE

No age-0 walleye were collected during the 2021 fall electrofishing survey. Age-0 fish likely represent natural recruits and have been low since the initiation of extended growth stocking (0.42 ± 0.36 fish/mile; mean ± SE; 2014 – 2021; Figure 9). Age-0 natural recruits were observed during 2016 (0.42 fish/mile) and 2019 (2.9 fish/mile).

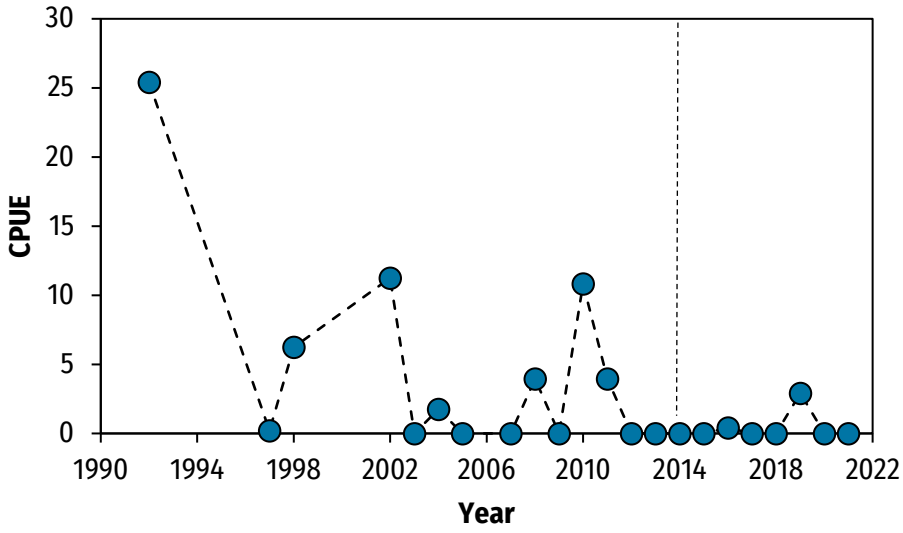


*Figure 9. Age-0 walleye CPUE (fish/mile) indexed from fall electrofishing surveys during 1992 – 2021. Large fingerling stocking began during fall 2014 (dashed line).*

There were 74 age-1 walleyes collected during 2021 with a CPUE of 15.4 fish/mile. Age-1 walleye ranged from 9.2 – 12.4 inches and would have corresponded with the fall 2020 stocking. Catch rates of age-1 walleye have increased since the start of the Wisconsin Walleye Initiative in 2014 and were consistently greater the year following stocking (11.9 ± 1.5 fish/mile, mean ± SE; 2014 - 2021) than stocked years (2.8 ± 1.7 fish/mile; SE; 2014 – 2021; Figure 10). Survival of large fingerlings stocked during 2020 to age-1 was 36.3%, and the cost per age-1 fish was $2.92. Large fingerling survival to age-1 indexed during 2021 was higher than in 2015, 2017 and 2019 (ranging from 26.5% to 32.9%). Mean survival of stocked large fingerling year classes since 2014 (four stocked years classes) was 31.1% (± 2.0%; SE) and higher than mean survival rates observed for stocking-dependent systems in Barron and Polk counties (17.5% ± 2.5%; mean survival ± mean error; estimated using data from 64 FE surveys that corresponded with a large fingerling stocking the previous year, across 19 lakes). Upper Turtle Lake is classified as a combination NR-stocking lake with limited NR and stocking necessary to support a desirable fishery. Large fingerling stockings began in 2014 and have had high survival and successfully established a quality walleye fishery with a good adult density and quality size structure. However, NR remains limited (Figure 9).

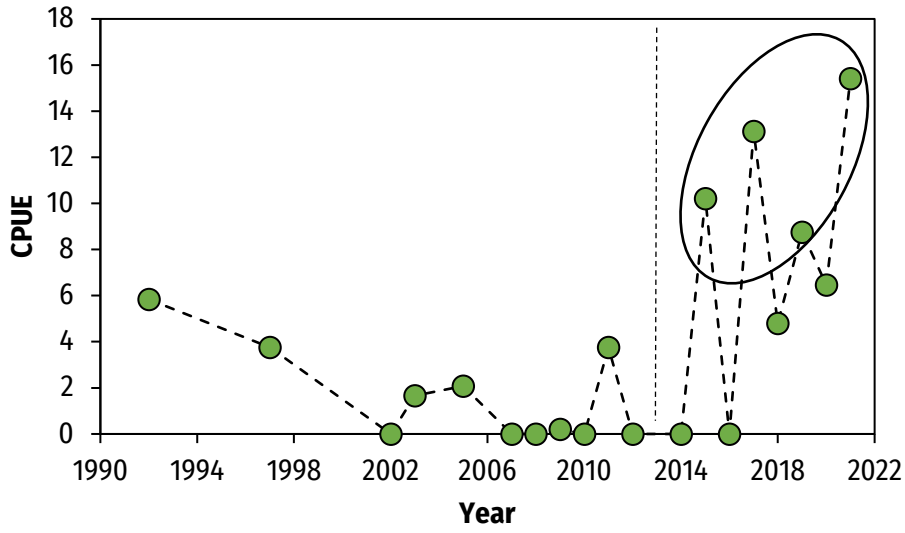


*Figure 10. Age-1 walleye CPUE (fish/mile) indexed from fall electrofishing surveys during 1992 – 2021. Stocking of large fingerling walleye began during fall 2014 (dashed line) and circled points represent* catch rates of age-1 walleye the year following a large fingerling stocking event.

**LARGEMOUTH BASS**

The 2021 fall electrofishing CPUE of largemouth bass (≥ 8 inches) was 14.6 fish/mile (Figure 11). The fall electrofishing CPUE of adult largemouth bass declined since 2010 ($P < 0.01$; adjusted $R^2 = 0.64$; simple linear regression). This corresponded with an increase in PSD-15 since 2010, but it recently declined since 2019. The PSD-12 remained similar through time.

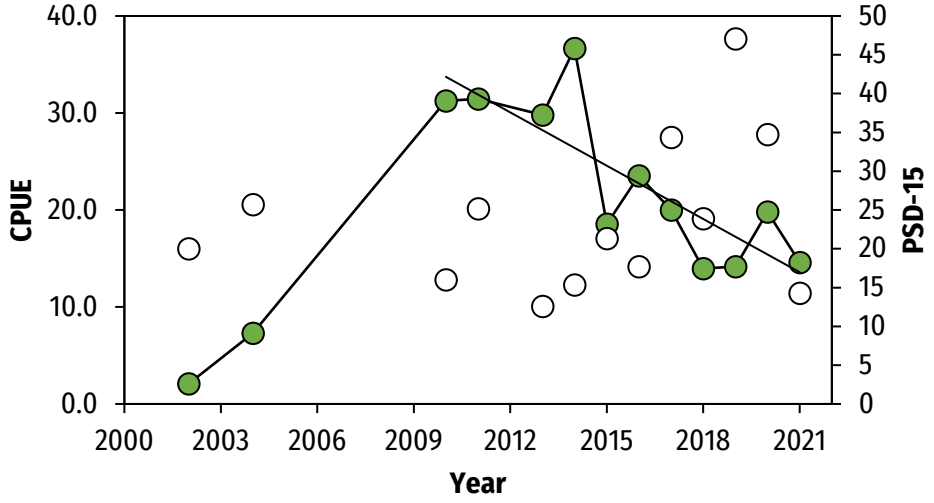


*Figure 11. Fall electrofishing CPUE (fish/mile; green circles) and PSD-15 (white circles) of adult (≥ 8 inches) largemouth bass in Upper Turtle Lake during 2002 – 2021. Solid line represents a significant decline in CPUE during 2010 – 2021 ($P < 0.01$; adjusted $R^2 = 0.64$; simple linear regression).*

**WALLEYE**

The 2021 fall electrofishing CPUE of walleye (≥ age-2) was 10.5 fish/mile (Figure 12). Walleye CPUE has increased since 2010 (P = 0.02; adjusted $R^2$ = 0.40; simple linear regression) but has remained relatively static since 2014 (Figure 12).

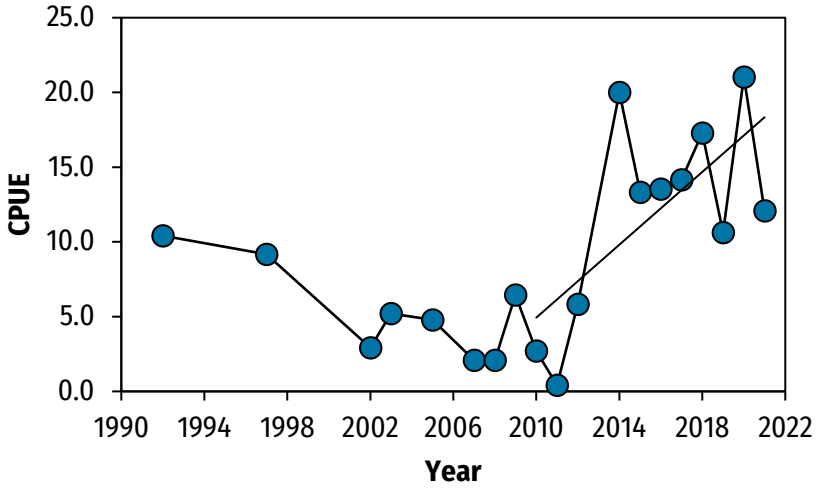


*Figure 12. Fall electrofishing CPUE (fish/mile; blue circles) of walleye* (≥ age-2) *in Upper Turtle Lake during 1992 – 2021. Solid line represents a significant increase in catch rates from 2010 – 2021 (P = 0.02; adjusted $R^2$ = 0.40; simple linear regression).*

## RECREATIONAL CREEL AND TRIBAL SPEARING

Projected angling effort amounted to 27,406 hours (62.6 hours/acre) on Upper Turtle Lake, where 17,783 hours (40.6 hours/acre) occurred during open water and 9,623 hours (22.0 hours/acre) occurred during the ice fishing seasons. Angling effort during 2021 on Upper Turtle Lake was greater than the mean projected angling pressure (42.5 ± 18.5 hours/acre; ± SD) for lakes in Barron and Polk counties (indexed using 16 creel surveys during 2004 – 2021, including most recent creel survey for each lake). Angling effort was highest during January (10.1 hours/acre) and July (9.7 hours/acre) and lowest during October (2.3 hours/acre), December (1.0 hours/acre) and March (2.0 hours/acre). Angling effort during the open water season ranged from 2.3 hours/acre during October to 9.7 hours/acre during July. Angling effort during the ice fishing season ranged from 1.0 hours/acre during December to 10.1 hours/acre during January. Directed fishing effort was greatest for black crappies (39.9 hours/acre), bluegills (30.4 hours/acre), largemouth bass (20.1 hours/acre), walleyes (9.1 hours/acre) and yellow perch (7.8 hours/acre).

**WALLEYE**

Walleyes were the fourth most targeted species by anglers, with 3,997 hours of directed effort (7.9% of total angling effort). Fishing effort for walleye (9.1 hours/acre) was similar to the average for lakes in Barron and Polk counties (7.0 hours/acre). There were 838 walleyes estimated to be caught (specific catch rate of 0.11 fish/hour),

and 37 were estimated to be harvested (specific harvest rate of 0.003 fish/hour). Directed fishing effort was similar during summer (1,768 hours) and winter (2,229 hours), but January (918 hours) and February (1,143 hours) had the greatest directed effort. Specific catch rates of walleye were highest during the open water season (0.21 fish/hour), with May (0.19 fish/hour) and October (1.1 fish/hour) having the greatest catch rates.

Adult walleye harvested from the recreational fishery was low, with an angling exploitation rate of 5.1%. No tribal exploitation of walleye occurred during 2021 by off-reservation tribal spearers. The total adult walleye exploitation rate was 5.1%.

**LARGEMOUTH AND SMALLMOUTH BASS**

Directed fishing effort for largemouth bass accounted for 8,796 hours (17.5% of total angling effort), which made them the third most targeted species by anglers. Fishing effort for largemouth bass (20.1 hours/acre) was above average for lakes in Barron and Polk counties (12.3 hours/acre). There were 6,933 largemouth bass estimated to be caught (specific catch rate of 0.7 fish/hour), and 396 were estimated to be harvested (5.7% harvest rate). The mean length of harvested fish was 14.5 inches and ranged from 10.0 – 20.0 inches, with larger fish harvested on average during the fall (16.3 inches; September – October) and winter (18.5 inches; December – February) compared to spring-summer (13.5 inches; May – August). Directed fishing effort and catch rates were highest during the open water season (May – October), with the greatest specific catch rates observed during the spring spawning period (May – June) and October.

Angler effort targeting smallmouth bass was low, with 232 hours of directed fishing effort. There were 51 smallmouth bass estimated to be caught (specific catch rate of 0.08 fish/hour). No fish were harvested.

**NORTHERN PIKE**

Directed fishing effort for northern pike accounted for 2,990 hours (5.9% of total angling effort). There were 284 northern pike estimated to be caught (specific catch rate of 0.03 fish/hour), and 28 were estimated to be harvested (9.9% harvest rate). Fishing effort for northern pike (6.8 hours/acre) was similar to the average for lakes in Barron and Polk counties (7.4 hours/acre). Effort was greater during winter (2,116 hours; December – February) then summer (875 hours; May – October). Despite this, catch rates and total harvest were greater during the open water season. The mean length of harvested fish was 26.1 inches and ranged from 21.0 – 31.0 inches.

**BLUEGILL**

Bluegills were the second most targeted species with 13,297 hours of directed effort (26.4% of total angling effort). Fishing effort for bluegill (30.4 hours/acre) was above average for lakes in Barron and Polk counties (22.3 hours/acre). There were 30,489

bluegills estimated to be caught (specific catch rate of 2.2 fish/hour), and 11,925 were estimated to be harvested (specific harvest rate of 0.89 fish/hour; Figure 13). Directed angler effort was higher during the open water season (7,768 hours) than the ice fishing season (5,529 hours). Open water fishing effort was relatively equally distributed during May – September, with the greatest targeted effort during July (2,105 hours) and the least during October (237 hours). Ice fishing effort was concentrated during December – January (93.0%). Estimated angler catch and harvest were relatively high throughout the year, with high catches observed during June, July and February. Specific harvest rates were highest during September and March (Figure 13). The mean length of harvested bluegill was 7.7 inches, with fish ≥ 7 inches composing 97% and fish ≥ 8 inches composing 39% of harvested fish. Fish ≥ 9 inches composed 1.0% of the harvested fish.

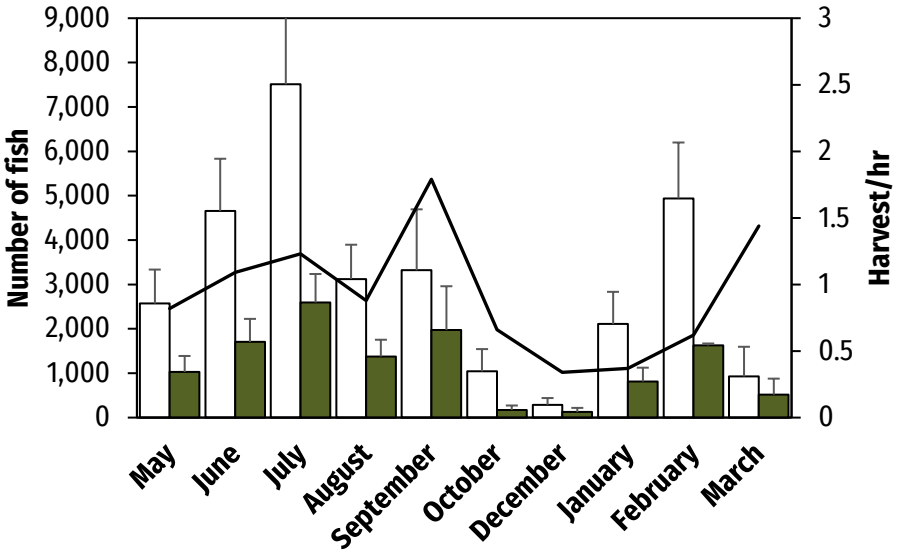


*Figure 13. Estimated number of bluegills caught (white bars ± standard deviation) and harvested (green bars ± standard deviation) by the recreational fishery during May - March. The specific rate of harvest (fish/hour) is represented by the solid line.*

**BLACK CRAPPIE**

Black crappies were the most targeted species, with 17,474 hours of directed effort (34.7% of total angling effort). Fishing effort for black crappies (39.9 hours/acre) was higher than average for lakes in Barron and Polk counties (16.0 hours/acre). There were 26,503 black crappies estimated to be caught (specific catch rate of 1.50 fish/hour), and 14,976 were estimated to be harvested (specific harvest rate of 0.85 fish/hour; Figure 14). Angler effort was approximately equal between the open water (9,103 hours) and ice fishing seasons (8,371 hours). Open water fishing effort was highest during May-July, and ice fishing effort was concentrated during January – February (84.9%). Directed fishing effort was lowest during October and December. Estimated angler catch and harvest rates were higher during May – October (mean

catch/hour = 4.1 fish; mean harvest/hour = 1.22 fish) compared to December – March (mean catch/hour = 0.8 fish; mean harvest/hour = 0.6 fish; Figure 14). The highest estimated total catch and harvest occurred during May and June (Figure 14). Despite the lower angling effort, October had the highest catch (4.3 fish/hour) and harvest (1.74 fish/hour) rates. The mean length of harvested black crappie was 9.7 inches, with fish ≥ 9 inches composing 92.3% and fish ≥ 10 inches composing 43.6% of the harvested fish. Fish ≥ 11 inches composed 5.9% of the harvested fish, and fish greater than 13 inches were observed during the creel survey.

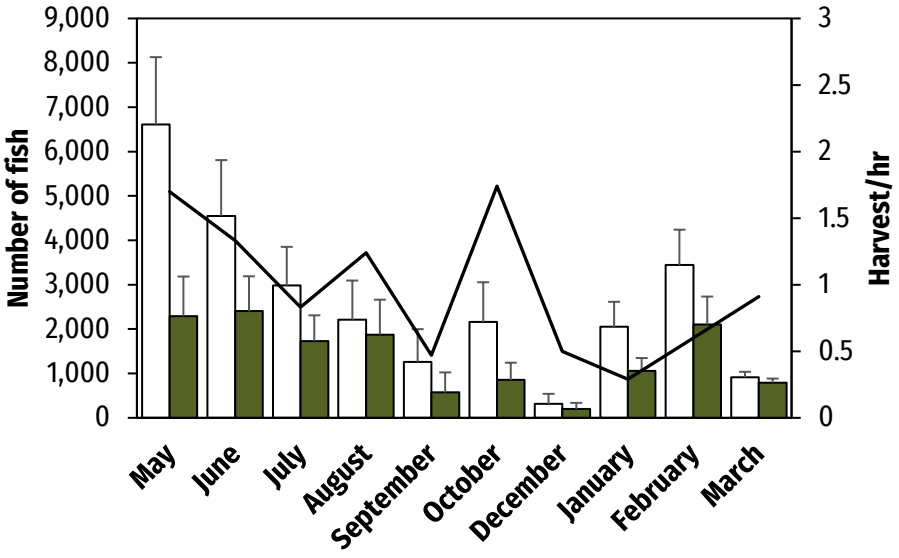


*Figure 14. Estimated number of black crappies caught (white bars ± standard deviation) and harvested (green bars ± standard deviation) by the recreational fishery during May - March. The specific rate of harvest (fish/hour) is represented by the solid line.*

**YELLOW PERCH**

Directed fishing effort for yellow perch accounted for 3,401 hours of directed effort (6.8% of total angling effort). Fishing effort for yellow perch (7.8 hours/acre) was similar to the average for lakes in Barron and Polk counties (4.9 hours/acre). There were 2,044 yellow perch estimated to be caught (specific catch rate of 0.46 fish/hour), and 826 were estimated to be harvested (specific harvest rate of 0.21 fish/hour; Figure 15). Directed angler effort for yellow perch was greater during the ice fishing season (4,968 hours; 82% of directed angling effort) compared to the open water fishing season (1,101 hours; 18% of directed angling effort). Angling effort was highest during January (2,550 hours; 9.2 hours/acre), February (994 hours; 3.6 hours/acre) and August (461 hours; 1.1 hours/acre) and relatively low during all other months (1,120 hours combined). Total angler catch and harvest were greatest during the ice fishing season but similarly high during June, July and October. Despite the lower angling effort, the highest estimated specific catch and harvest rates occurred during July and October (Figure 15). The mean length of harvested yellow perch was 9.6 inches,

where fish ≥ 9 inches composed 87.0% and fish ≥ 10 inches composed 31.5% of harvested fish.

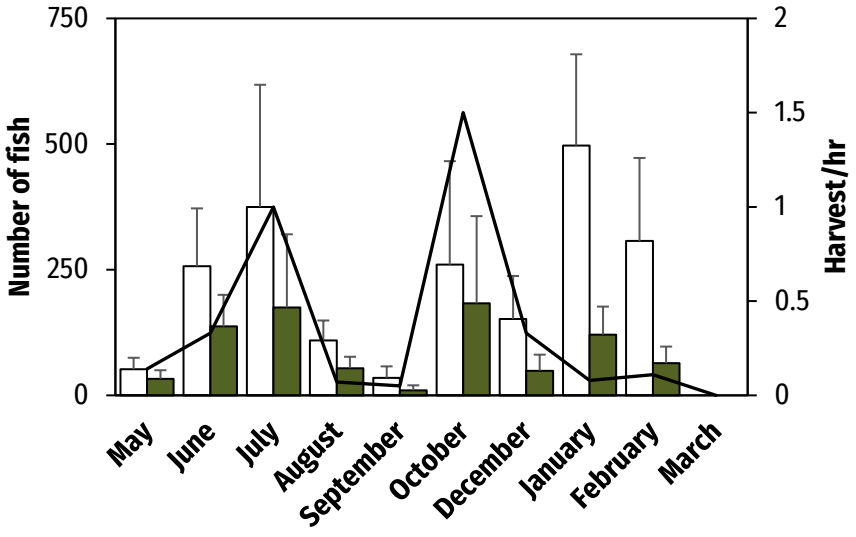


*Figure 15. Estimated number of yellow perch caught (white bars ± standard deviation) and harvested (green bars ± standard deviation) by the recreational fishery during May - March. The specific rate of harvest (fish/hour) is represented by the solid line.*

# Discussion

The fishery on Upper Turtle Lake is diverse and healthy, with desirable sportfish populations that support popular recreational fisheries. Angling effort was high compared to other lakes in the area. Panfish received the most attention from anglers and had relatively high directed angler effort, high catch rates and moderate harvest pressure. Panfish abundances and size structures have remained relatively similar since the previous fishery surveys. The walleye fishery remains stocking-dependent but supports moderate adult densities that will continue to provide quality angling opportunities. The largemouth bass fishery was popular, despite a decline in population abundance, and had a high directed fishing effort compared to other popular fisheries.

The current walleye fishery is popular among anglers with moderate effort directed at a population with moderate density, but it is good for a stocking-dependent lake and greater than that of other stocking-dependent lakes in Barron and Polk counties. Although, the current population density remains lower than it was during the 1990s. Drivers of the population decline during the late 1990s and early 2000s remain unknown but could be related to poor stocking success, variable rates of NR and changes in fish community structure. During 2011, the walleye regulation was changed to the 18-inch MLL and three fish daily bag limit to reduce adult exploitation rates and increase population size. As a result, angler exploitation of adult walleye during

2021 was low compared to other walleye fisheries in Barron and Polk counties despite a moderate amount of directed effort. Additionally, survival rates of stocked large fingerling walleye to age-1 have been high since 2014 (the start of extended growth stocking). Collectively, changes in harvest regulations to reduce exploitation and stocking practices to large fingerlings have likely contributed to higher adult densities over the previous decade.

Upper Turtle Lake is classified as a combination NR-stocking lake with limited NR where stocking is necessary to support a desirable fishery. Natural recruitment has been limited with infrequent year classes throughout the history of fisheries surveys on Upper Turtle Lake. Future fisheries surveys and evaluations of large fingerling stocking survival should account for variable contributions of NR in Upper Turtle Lake, as this can bias estimated survival rates. NR presumably remains too low and infrequent to support a quality adult fishery, so stocking likely remains necessary; however, NR should be closely monitored in the future. Fall surveys that index age-0 natural recruits and survival of stocked large fingerling to age-1 will be conducted every other year during non-stocked years.

Large fingerling walleye stocking should continue at a rate of 10 fish/acre to support this population. The goal of large fingerling stocking will be to maintain an adult density of 1.5 – 2.5 fish/acre. The current 18-in MLL, three fish daily bag limit will be maintained with the intent to sustain or increase adult densities, keep adult exploitation low and restore NR. Higher adult densities could be achieved if consistent NR were to be re-established. If increases in the frequency and/or magnitude of NR become apparent, then a parentage-based tagging analysis may be warranted during the next comprehensive survey. A parentage-based tagging analysis estimates NR contributions to the adult population and can subsequently be used to accurately assess the survival of stocked large fingerlings to various ages. Alternate stocking practices and harvest regulations could be considered for Upper Turtle Lake if NR were to be re-established.

Biological information for northern pike was not collected during the 2021 survey, but a popular recreation fishery was present and quality-sized fish were harvested, which suggested the population is presumably in good condition. Northern pike were primarily targeted during the ice fishing season.

Upper Turtle Lake supports a low-density largemouth bass population with a good size structure, well above the generally accepted range of values for a balanced largemouth bass population (Gabelhouse 1984). The largemouth bass recreational fishery was popular, despite a decline in population abundance, and had a high directed fishing effort compared to other popular fisheries in Barron and Polk counties. Although bass are managed with liberal harvest regulations, the harvest of bass appears low as largemouth bass had a low rate of harvest (5.4%), and the

population total annual mortality rate was also low (17.7%). Harvest regulations changed during 2011 (from a 14-inch MLL, five fish daily bag limit to a no MLL, five fish daily bag limit) to increase harvest opportunities and relative abundances have subsequently declined. The shift to a lower-density population yielded a greater size structure, which is likely favorable among anglers. The largemouth bass population remains healthy and supports a quality recreational fishery, so the liberal harvest regulations will be maintained. Anglers are encouraged to continue harvesting small (< 14 inches) largemouth bass. Population relative abundance, size structure, condition and growth should be evaluated again during the next survey. Otoliths should be collected during the next survey to improve growth and mortality estimates.

Panfish angling was very popular and was the main focus of the recreational fishery in Upper Turtle Lake. The panfish fishery had relatively high (67.8%) directed angler effort, high catch rates and moderate harvest pressure. Directed angler effort was approximately equal during open water and ice fishing seasons, indicating a quality year-round fishery that is primarily orientated toward black crappie and bluegill. High catch rates, moderate population size structures and good harvest potential best characterize the panfish fishery in this productive lake. Size structures and average lengths of black crappie and bluegill in this survey were good compared to similar Wisconsin lakes. High catch rates of quality-size fish undoubtedly draw attention from panfish anglers, as directed effort for panfish was above average for lakes in Barron and Polk counties. Correspondingly, harvest rates were high for black crappies (56.5%) and bluegills (39.1%), as recreational panfish fisheries are notoriously size-selective (generally self-imposed length limitations to harvest) and harvest orientated. Upper Turtle Lake supports quality panfish populations with quality recreational fisheries where anglers catch high proportions of harvestable-sized fish.

Despite a low-density bluegill population compared to similar Wisconsin lakes, the directed angling effort for bluegills remained high. Angling popularity was likely driven by a good population size structure that has improved since 2011 despite relative abundances remaining similar. Factors related to density dependence, including both intra- and interspecific competition, often govern size structure variations, but in this case, it's more likely that forage availability, foraging success, and perhaps subtle environmental changes influenced population size structure. Additionally, temporal variation in recreational harvest mortality can influence population size structure, which typically targets the largest individuals in a population and decreases size structure. But, the specific harvest rate of bluegills in Upper Turtle Lake (0.89 fish/hour) was lower than the Barron and Polk counties mean (1.1 ± 0.1 fish/hour; ± SE; indexed using 13 creel surveys during 2005 – 2022, including most recent creel survey for each lake) thus the influence of harvest pressure on the

current bluegill population is likely low. Early life predation pressure from walleye, largemouth bass and northern pike populations likely regulates bluegill abundance and helps maintain a quality size structure.

Black crappies were the most important contributor to the recreational fishery on Upper Turtle Lake. Although electrofishing surveys are typically not the best approach to index black crappie population metrics, the population appears to be in good condition and supports a quality and popular recreational fishery. Population abundance has increased since 2011 and was above average for lakes in Barron and Polk counties. Size structure has remained good and unchanged since 2011 despite increasing abundance. Correspondingly, angler catch rates of quality fish were excellent, as 43.6% of harvested fish were ≥ 10 inches, and a few trophy fish (≥ 13 inches) were observed during the creel survey. Alternate survey methods may be considered during the next comprehensive survey to better characterize population metrics due to the popularity of the black crappie fishery.

No yellow perch were observed during the 2021 fishery survey, but the presence of a good recreational fishery reflects positively on their population status. Directed effort was lower than other popular yellow perch fisheries in the area but contributes to the overall popularity of the panfish fishery in Upper Turtle Lake. Yellow perch harvest rates were high (40.4%), where 87% of harvested fish were ≥ 9 inches, which indicated anglers are catching a high proportion of harvestable-sized fish. The SE2 surveys do not accurately index population metrics of yellow perch. If future concerns arise regarding the status of yellow perch, then alternate survey methods may be warranted to index population metrics.

These panfish populations are also likely important contributors to the fish community as a primary forage base for predatory fishes. Future fishery surveys should closely monitor the population abundance and size structure of black crappies and bluegills and, if needed, yellow perch due to the popularity and intensity of the current panfish recreational fishery and their importance to the overall fish community. This was the first creel survey conducted on Upper Turtle Lake, and future management should closely monitor directed fishing effort, catch rates and harvest rates for each panfish species. These fisheries are highly productive and resilient to high harvest. The 25 fish daily bag limit should continue to promote quality recreational fisheries. No specific management actions for black crappie, yellow perch and bluegill are recommended at this time.

# Recommendations

1. Maintain walleye density at 1.5 – 2.5 fish/acre by continuing to stock large fingerling (6-8 inches) walleyes in alternate years at a rate of 10 fish/acre. Walleye stocking efforts should continue to focus solely on large fingerling

stockings. The relative contribution of large fingerlings to the adult population should be reassessed during the next comprehensive survey in 2030. Fall surveys indexing age-0 natural recruits and survival of stocked large fingerling to age-1 will be conducted every other year during non-stocked years. If increased NR becomes apparent during fall surveys, a parentage-based tagging analysis may be warranted during the next comprehensive survey to estimate NR contributions to the adult population.

2. Largemouth bass will continue to be managed with a no MLL and five5fish daily bag limit. Anglers are encouraged to harvest small largemouth bass (< 14 inches). Improvements in largemouth bass size structure may occur if harvest increases. Otoliths should be collected during the next survey to improve estimates of age, growth and mortality.
3. No specific management actions regarding northern pike, bluegill, black crappie and yellow perch are recommended at this time. Otoliths should be collected from bluegill and black crappie during the next survey to improve age and growth estimation.
4. The next comprehensive fisheries survey is scheduled for 2030 but is subject to change depending on local and statewide sampling plans. The abundance, size structure, age structure and growth of panfish should be closely monitored as these species support popular recreational fisheries and receive high harvest pressure.
5. Public input regarding the fishery and angler preference information should be assessed during the next comprehensive fisheries survey. Engaging resource constituents via public meetings or questionnaires will provide indications of public preferences and will help guide future management directions, goals and objectives.
6. Efforts to increase habitat complexity in Upper Turtle Lake should also be encouraged where applicable. Inputs of coarse woody habitat, protection/promotion of aquatic vegetation and maintenance/restoration of vegetative buffers would be beneficial. This website healthylakeswi.com is a great resource to learn about this recommendation.
7. Invasive species monitoring and control programs should continue.

# Acknowledgements

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# References

Anderson, R.O. 1985. Managing ponds for good fishing. University of Missouri Extension Division, Agricultural Guide 9410, Columbia.

Anderson, R.O., and A.S. Weithman. 1978. The concept of balance for coolwater fish populations. Pafes 371-381 in R.L. Kendall, editor. Selected coolwater fishes of North America. American Fisheries Society Special Publication 11, Bethesda, Maryland.

Bennett, G.W. 1970. Management of lakes and ponds. Von Nostrand Reinold, New York.

Cichosz, T.A. 2021. Wisconsin Department of Natural Resources 2019-2020 Ceded Territory Fishery Assessment Report. Wisconsin Department of Natural Resources. Administrative Report #95.

Gabelhouse, D.W.; Jr. 1984. A length-categorization system to assess fish stocks. North American Journal of Fisheries Management 4:273-285.

Miranda, L.E., and P.W. Bettoli. 2007. Mortality. Pages 229-277 in Guy, C.S. and M. L. Brown, editors. Analysis and Interpretation of Freshwater Fisheries Data. American Fisheries Society, Bethesda, Maryland.

Neumann, R.M., C.S. Guy, and D.W. Willis. 2013. Length, weight, and associated indices. Pages 637-676 in A.V. Zale, D.L. Parrish, and T.M. Sutton, editors. Fisheries techniques, 3rd edition. American Fisheries Society, Bethesda, Maryland.

Rasmussen, P.W., M.D. Staggs, T.D. Beard, Jr., and S.P. Newman. 1998. Bias and confidence interval coverage of creel survey estimators evaluated by simulation. Transactions of the American Fisheries Society 127:469-480.

Ricker, W. E. 1975. Computation and interpretation of biological statistics of fish populations. Fisheries Research Board of Canada Bulletin 191.

Rypel, A.L., T.D. Simonson, D.L. Oele, J.D. Griffin, T.P. Parks, D. Seibel, C.M. Roberts, S. Toshner, L. Tate, and J. Lyons. 2019. Flexible classification of Wisconsin lakes for improved fisheries conversation and management. Fisheries. Doi:10.002/fsh.10228.

Shaw, S.L, and G.G. Sass. 2020. Evaluating the relationship between yearling walleye, *Sander vitreus*, electrofishing catch-per-unit-effort and density in northern Wisconsin lakes. Fisheries Management and Ecology 00:1-6.

Wege, G.J., and R.O. Anderson. 1978. Relative weight ($W_r$): a new index of condition for largemouth bass. Pages 79 – 91 in G.D. Novinger and J.G. Dillard, editors. 1978. New approaches to the management of small impoundments. American Fisheries Society, North Central Division, Special Publication 5, Bethesda, Maryland.

von Bertalanffy, L. 1938. A quantitative theory of organic growth. Human Biology 10: 181–213.

# Appendices

*Appendix Table 1. Walleye stocking records for Upper Turtle Lake, 1986 – 2020.*

| YEAR | AGE CLASS | NUMBER STOCKED | AVG. LENGTH (IN.) |
|---|---|---|---|
| 1986 | Small Fingerling | 23,000 | 3.0 |
| 1988 | Small Fingerling | 21,106 | 3.0 |
| 1990 | Small Fingerling | 21,090 | 3.0 |
| 1992 | Small Fingerling | 20,979 | 2.0 |
| 2000 | Small Fingerling | 21,000 | 1.5 |
| 2002 | Small Fingerling | 41,892 | 1.5 |
| 2004 | Small Fingerling | 32,912 | 1.2 |
| 2006 | Small Fingerling | 15,330 | 1.2 |
| 2008 | Small Fingerling | 15,616 | 1.2 |
| 2010 | Small Fingerling | 15,616 | 1.7 |
| 2011 | Small Fingerling | 10,168 | 2.3 |
| 2014 | Large Fingerling | 3,030 | 6.2 |
| 2016 | Large Fingerling | 2,859 | 7.2 |
| 2018 | Large Fingerling | 4,268 | 6.3 |
| 2020 | Large Fingerling | 4,268 | 7.2 |

*Appendix Table 2. Survey types, gear used, target water temperature and target species.*

| SURVEY TYPE | GEAR USED | TARGET WATER TEMPERATURE (°F) | TARGET SPECIES |
|---|---|---|---|
| Spring Netting 1 (SN1) | Fyke Net | ~45 | Walleye, northern pike |
| Spring Electrofishing 1 (SE1) | Boat Electrofishing | 45-50 | Walleye |
| Spring Netting 2 (SN2) | Fyke Net | 50-55 | Muskellunge, black crappie, yellow perch |
| Spring Electrofishing 2 (SE2) | Boat Electrofishing | 55-70 | Largemouth bass, smallmouth bass, bluegill and other panfish, non-game species |
| Spring Netting 3 (SN3) | Fyke Net | 65-80 | Bluegill, black crappie |
| Fall Electrofishing (FE) | Boat Electrofishing | 50-60 | Juvenile walleye and muskellunge |