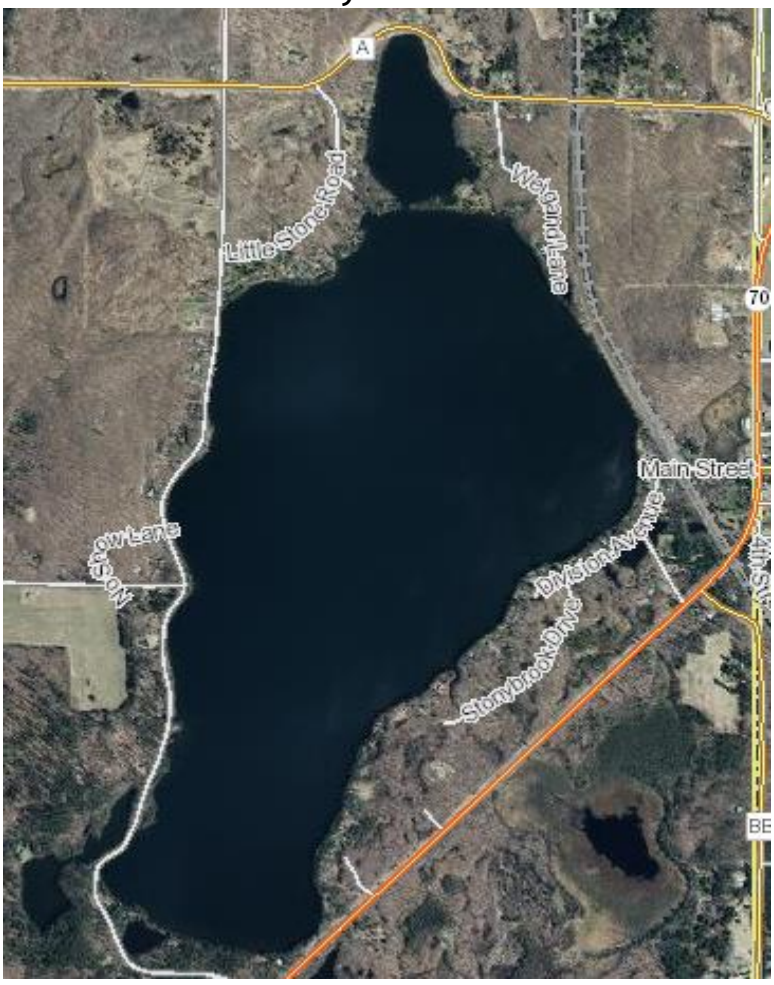
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

2023 Comprehensive Fisheries Survey Report for Stone Lake, Washburn County, WI

Waterbody Code 1884100



Craig M. Roberts
DNR Fisheries Biologist
2023

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Executive Summary

Stone Lake was surveyed in 2023 to assess the status of the fishery. We conducted a population estimate for walleye and indexed the catch rates of northern pike, smallmouth bass, largemouth bass and panfish species. We assessed general population characteristics, size structure and growth of all species.

The Stone Lake walleye population was 1.5 fish/acre and increased since 2010 (0.9 fish/acre). The overall size structure of adults also increased since 2010. No regulation changes are recommended. Stone Lake relies on a combination of natural reproduction and stocking for walleye recruitment. For this reason, walleye stocking is recommended to continue at 5-10 fish/acre.

The northern pike population remains similar in abundance compared to 2010, however average size decreased. Northern pike are limited by habitat in Stone Lake. No regulation changes are recommended.

Smallmouth bass size structure increased since 2010, however relative abundance decreased. A cold front did not seem to impact our smallmouth bass sampling which were actively spawning during the survey. This species is likely the most abundant gamefish but also the most harvested. Consideration should be given to 14–18-inch protected slot for smallmouth bass. This regulation would allow harvest of smaller smallmouth bass while protecting larger fish. Largemouth bass catch rates declined compared to 2010. However, our survey was impacted by weather the night of the survey. No regulation changes are recommended for largemouth bass.

Panfish were assessed during the late spring electrofishing survey. However, we had a low overall catch of panfish during our survey. Rock bass were the most numerous species caught followed by bluegill, black crappie and yellow perch. The creel survey provided a better indicator for panfish. Creel survey results suggest rock bass, black crappie, and bluegill were caught most frequently. Black crappie were the most harvested of the panfish species. No management changes are recommended for panfish. Overall, Stone Lake provides a healthy fishery for walleye, northern pike, smallmouth bass, largemouth bass and panfish.

Introduction

Stone Lake was surveyed in 2023 to assess the status of the fishery. We conducted a population estimate for walleye and indexed the catch rates of northern pike, smallmouth bass, largemouth bass and panfish species. We assessed general population characteristics, size structure and growth of all species. Recent management activities have been focused on stocking, regulation changes, public outreach and education.

LAKE CHARACTERISTICS

Stone Lake is an infertile and deep lake (Tables 1 & 2). More information on water quality and invasive species can be found at the Wisconsin Department of Natural Resources (DNR) Lake Page for Stone Lake. Stone Lake is classified as a Complex-Cool-Clear Lake (Rypel et al. 2019).

Table 1. Lake and watershed characteristics for Stone Lake, Washburn County, WI.

Size (ac)	523
Max depth (ft)	49
Mean depth (ft)	33
Watershed Area (ac)	2,980
Lake class	Complex-Cool-Clear

Table 2. June – August mean Trophic State Index (TSI) values for Stone Lake, Washburn County, WI.

Secchi Disk Visibility	33
Total Phosphorus	46
Chlorophyll A	38

There is one public boat landing for Stone Lake. This landing is located off Sloan Rd. Stone Lake is a popular multi-species fishery in Washburn County.

STOCKING HISTORY

Since 2002, walleye has been the only fish species stocked into Stone Lake. Since 2014, Stone Lake has been a part of the Wisconsin Walleye Initiative and the DNR has stocked walleye at a rate of 15 large fingerling walleye/acre on an alternate year basis (Appendix Table 1).

FISHING REGULATIONS

All species either follow the statewide, regional or county fishing regulations. There are currently no special regulations for this waterbody.

Methods

Stone Lake was surveyed during 2023, following DNR's Treaty assessment protocol (Cichosz 2021) to assess walleye and northern pike. After ice out, an early spring netting survey (SN1) was conducted from April 27 to May 3. Data were collected on all northern pike and walleye in Stone and Little Stone lakes. All walleye were clipped as part of the population estimate for Stone Lake only. To differentiate, walleye from Little Stone Lake were given a different clip and not included in the Stone Lake walleye population estimate. Nets were removed from Little Stone Lake May 2 and from Stone Lake May 3. The entire shoreline of Stone Lake was night electrofished May 3 to serve as the recapture run for the walleye population estimate.

A late spring electrofishing survey (SE2) was done May 23 to assess largemouth bass, smallmouth bass and panfish populations. This survey consisted of two 0.5-mile stations where all bass and panfish were collected, and two 1.5-mile stations where only bass were collected. In addition to these surveys, a fall electrofishing survey (FE) was completed to assess the abundance of age-0 and age-1 walleye. Appendix Table 2 lists descriptions of standard DNR survey types, gear used and target water temperatures.

Lake Class Standards catch per unit effort (CPUE) were calculated by comparing Stone Lake's CPUE of each species to CPUEs of the other Complex-Cool-Clear lakes in Wisconsin. When possible, CPUE was also compared to past surveys for Stone Lake.

Walleye, largemouth bass and smallmouth bass were aged with scales and dorsal spines. Bluegill were aged with scales only. Spines were cross-sectioned and aged under a microscope. Mean length at age was compared to other Complex-Cool-Clear Wisconsin lakes and the northwest Wisconsin averages for walleye. Size structure was assessed using proportional size distribution (PSD) indices (Neumann et al. 2013). The PSD value of a species is the number of fish of a specified length or longer divided by the number of fish stock length or longer, the result multiplied by 100 (Appendix Table 3).

To better evaluate the levels of walleye stocking contribution and natural reproduction, fin clips were given to all walleye stocked in 2016 and 2018. All walleye collected during the SN1 and SE1 surveys were checked for 2016 or 2018 fin clips. Age-1 walleye were also checked during the 2017 and 2019 FE surveys. The contribution of stocking and natural reproduction for age-5 (2018) and age-7 (2016) walleye was estimated using an age-length key and the proportions of clipped and unclipped age-5 and age-7 walleye from these surveys. These data were then applied to the adult population estimate to determine the number of age-5 and age-7 walleye that originated from stocking and natural reproduction. Survival was estimated by dividing the estimated number of stocked walleye from 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 cost per stocked fingerling ($1.06) by

the number of fish stocked. Cost per recruit was then calculated by dividing the total cost by the number of stocked adult fish recruited (Olson 2015).

A creel survey was conducted on Stone Lake to assess recreational fishing pressure and harvest. The creel survey began the first Saturday in May and went to the first Sunday in March, except for the month of November. Creel survey methods followed a stratified random design as described by Rasmussen et al. (1998).

Results

WALLEYE

The adult walleye population was estimated to be 1.5 fish/acre (CV=0.05; Figure 1). This estimate was greater than the 2010 estimate (0.9 fish/acre) and less than the 1984 estimate (2.2 fish/acre). The 2023 estimate was at the minimum recommended level for a stocked fishery of 1.5 fish/acre (WDNR 2022).

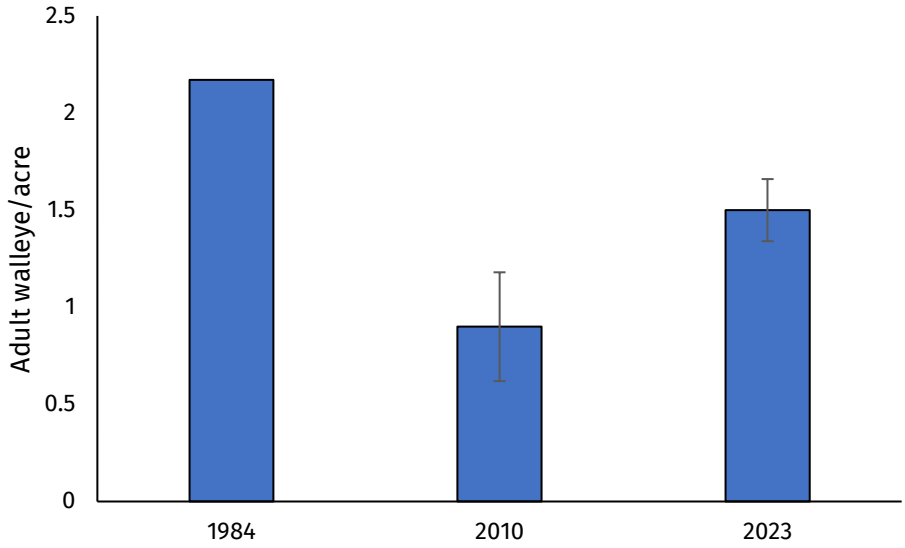

Figure 1. Walleye population estimates by year from 1984 – 2023 for Stone Lake, Washburn County, WI.

There were 609 walleye collected during the SN1 and SE1 surveys. The netting CPUE was 12.4 fish/net-night, which was much higher than 2010 (2.8 fish/net-night). This catch rate was above the 75th percentile (9.3 fish/net-night) for walleye in Complex-Cool-Clear lakes in Wisconsin. The electrofishing catch rate was 16.3 fish/mile, which also increased from 2010 (6.8 fish/mile). The mean lengths of male and female walleye were 15.4 inches and 21.9 inches, respectively (Figure 2). These averages increased compared to 2010 (Male = 15.2 inches, Female = 20.2 inches). The male to female ratio was 11.5:1. The PSD-15 was 52 and PSD-20 was 9, both of which increased compared to 2010 (PSD-15=50; PSD-20=6). Walleye generally grew at or above average rates for all ages when compared to northwest Wisconsin averages.

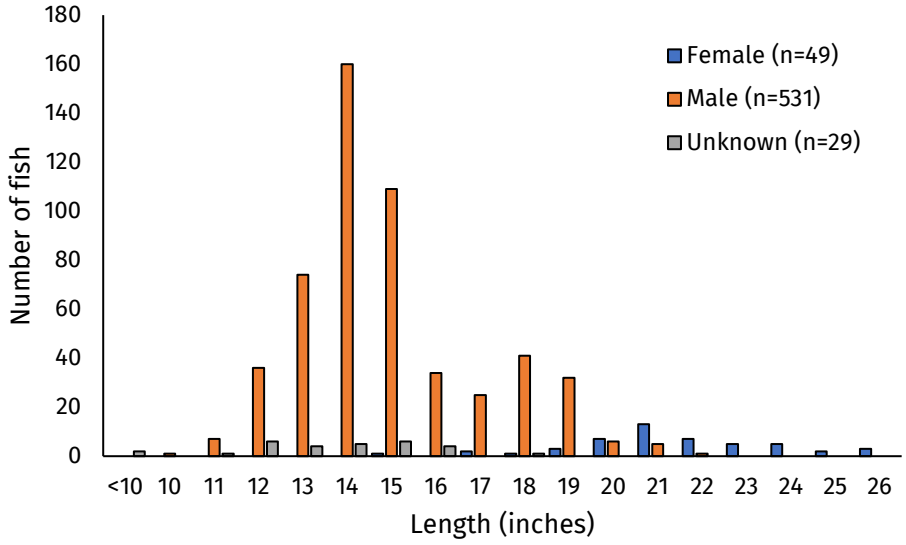

Figure 2. Length frequency of walleye by gender collected in Stone Lake, Washburn County, WI during the 2023 SN1 and SE1 surveys.

There were two age-0 walleyes collected in 2023 and the catch rate was 0.5 fish/mile, which was below the age-0 average catch rate for Stone Lake (3.3 fish/mile, Figure 3). There were six age-1 walleyes collected in 2023 and the catch rate was 1.5 fish/mile, which was above the age-1 average catch rate for Stone Lake (1.0 fish/mile, Figure 3), but matched the Ceded Territory average for stocked lakes (Cichosz 2021). During the 2017 and 2019 FE surveys, fin-clipped walleye accounted for 90% (n=10) and 100% (n=2) of the age-1 walleye collected, respectively.

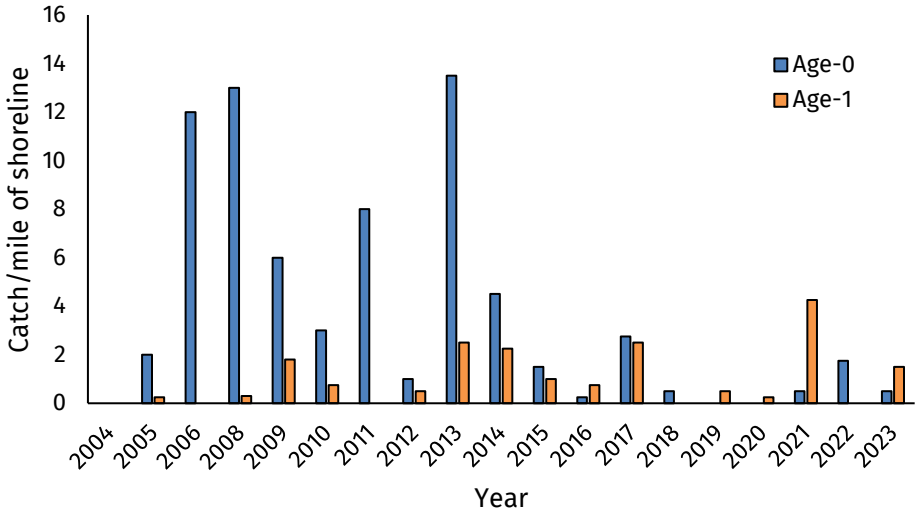

Figure 3. Catch rates of age-0 and age-1 walleye captured during FE surveys in Stone Lake, Washburn County, WI. In 2013, private stocking occurred prior to fall electrofishing.

Hatchery fin-clipped walleyes accounted for 30% of the age-5 year class and 33% of the age-7 year class (Figure 4). In total, clipped walleyes from the 2016 and 2018 stocked year classes made up 5.6% of the walleyes sampled. Estimated survival from stocking to age-5 was 0.2% and age-7 was 0.4%. The cost per recruit was estimated at $655.86 per age-5 walleye and $232.44 per age-7 walleye. Year classes during stocked years that likely had combination recruitment (stocked and natural) made up 85% of the walleye sample vs. 15% for non-stocked years that would have been from natural recruitment only. The age-3 year class made up 67% of the walleye sampled.

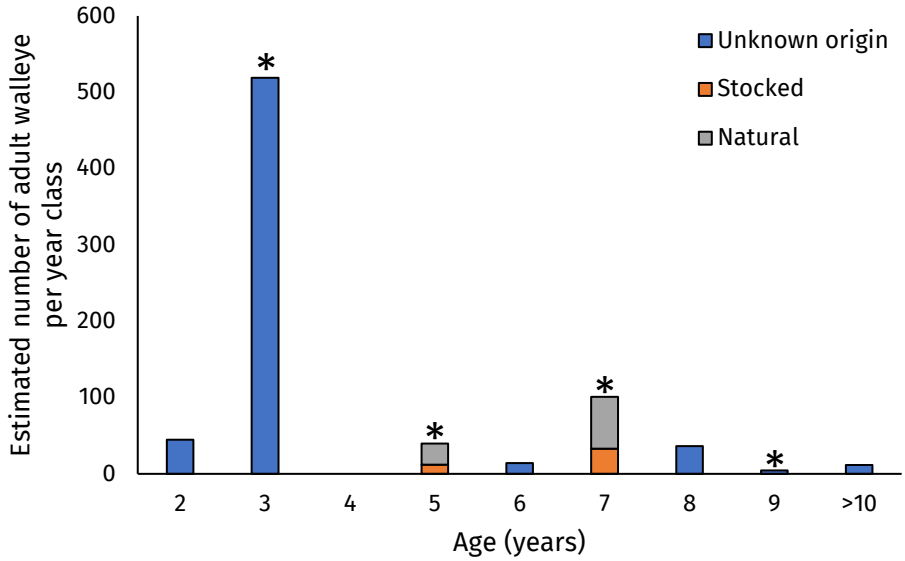

Figure 4. Estimated number of adult walleye per year class. DNR Large fingerling stockings corresponded to year classes with asterisks. Age-5 and age-7 were fin clipped years.

NORTHERN PIKE

There were 19 northern pike collected during the SN1 survey. The netting CPUE was 0.5 fish/net-night, which was slightly lower than 2010 (0.7 fish/net-night). This catch rate was below the 50th percentile (1.0 fish/net-night) for northern pike in Complex-Cool-Clear Lakes in Wisconsin. The mean length of northern pike collected was 20.5 inches (Figure 5), a decrease from 2010 (22.1 inches). Northern pike PSD was not calculated due to low sample size.

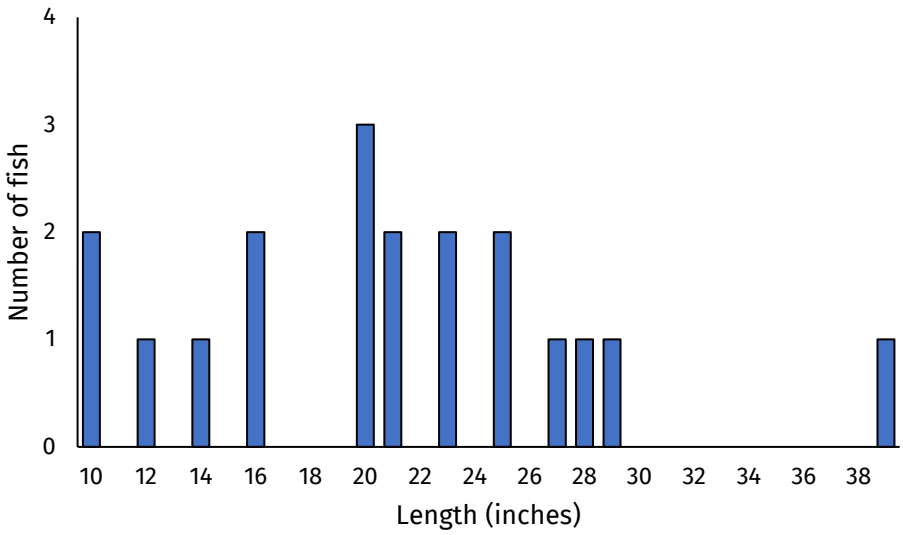

Figure 5. Length frequency of northern pike collected in Stone Lake, Washburn County, WI during the 2023 SN1 surveys.

SMALLMOUTH AND LARGEMOUTH BASS

There were 73 smallmouth bass collected during the SE2 survey for a catch rate of 18.3 fish/mile. This rate was lower than 2010 (21.8 fish/mile) and above the 75th percentile for Complex-Cool-Clear lakes. The mean length was 13.6 inches, greater than 2010 (11.1 inches) and above the 95th percentile for Complex-Cool-Clear lakes (Figure 6). The PSD-11 was 89, an increase from 2023 (62). Smallmouth bass grew faster than both the Complex-Cool-Clear averages and the 2010 survey. The annual survival was estimated at 53%.

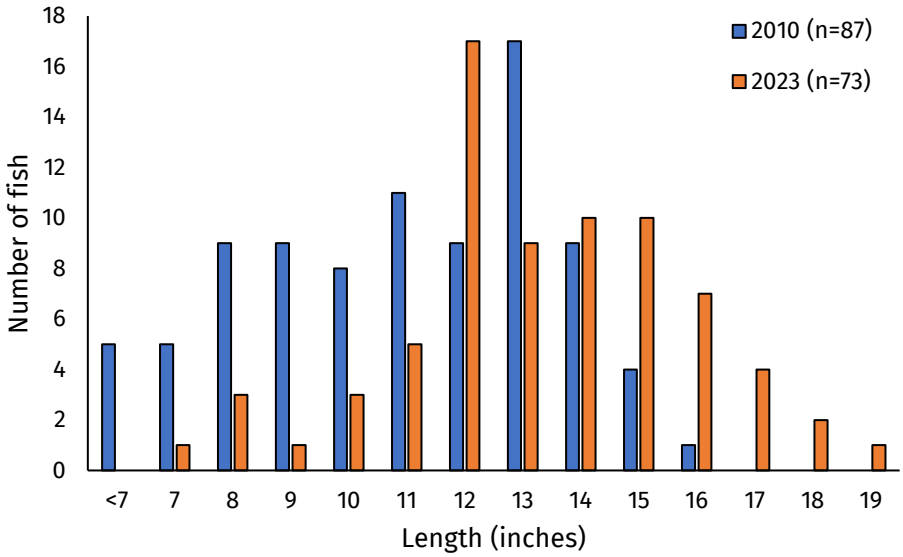

Figure 6. Length frequency of smallmouth bass collected in Stone Lake, Washburn County, WI during the 2010 and 2023 SE2 surveys.

There were nine largemouth bass collected during the SE2 survey for a catch rate of 2.3 fish/mile. This rate is lower than 2010 (8.3 fish/mile) and below the 25th percentile for Complex-Cool-Clear lakes. The mean length was 9.8 inches, which was less than 2010 (12.2 inches) and above the 50th percentile for Complex-Cool-Clear lakes. Largemouth bass growth and PSD were not calculated due to low sample size.

PANFISH

There were four species of panfish collected in the SE2 survey, which included rock bass, bluegill, black crappie and yellow perch. Rock bass were the most abundant panfish collected with 20 fish that averaged 7.6 inches. Five bluegill were collected that averaged 6.9 inches. One yellow perch and one black crappie were also collected. Due to low sample sizes, growth and PSD metrics were not calculated.

COMMON CARP

Only three carp were observed during SN1, SE1, SE2 and FE surveys of Stone Lake. In annual fall surveys since 2014, the catch rate has averaged 0.5 fish/mile and never exceeded 1.3 fish/mile.

RECREATIONAL CREEL SURVEY AND EXPLOITATION

Total angling effort amounted to 3,099 hours (5.9 hours/acre) on Stone Lake. This was lower effort than reported in 2010 (6,120 hours; 11.7 hours/acre) and much lower than the Washburn County (31.1 hours/acre) and Ceded Territory (32.0 hours/acre) averages. Effort was highest during the month of July (1.4 hours/acre) and June (1.2 hours/acre). Fishing effort during the open water season was focused on walleye (31.9%), smallmouth bass (29.9%) and black crappie (13.6%). The proportion of fishing effort in 2010 was similar for smallmouth bass (30.2%) and walleye (27.2%) except largemouth bass (19.6%) were the third most targeted species.

Black crappie were the most harvested fish (280 fish; 0.5 fish/acre) and had a mean length of 11.1 inches at harvest. Smallmouth bass were the second most harvested fish in the creel survey (99 fish; 0.2 fish/acre) and had an average size of 16.7 inches at harvest. Rock bass were the third most harvested fish (62 fish; 0.1 fish/acre) and had an average size of harvest at 9.0 inches. An estimated 31 walleye (0.1 fish/acre) were harvested during the season and the average size of harvest was 15.6 inches.

Angling exploitation for walleye was calculated at 1%. Tribal walleye exploitation was calculated at 7%. Total walleye exploitation was 8%. This total was much lower than 2010 (34.3% total exploitation).

Discussion

WALLEYE

The adult walleye population increased since the last fisheries survey in 2010. Natural reproduction occurs in Stone Lake, but stocking remains an important source of recruitment. The main source of walleye recruitment was not clearly identified. Stocking appeared important based on the catch rates and contribution of age-0 and age-1 walleye in FE surveys and since there were stronger age classes during stocked years. However, natural reproduction appeared to drive the two fin-clipped (age-5 and age-7) age classes even though both year classes had low age-0 catches during the 2016 and 2018 FE surveys. Also, natural reproduction rates appear to be very low based on fall surveys, averaging 1.2 fish/mile since 2010. The 2020 year class made up a bulk of the adult population (67%), but we weren't able to clip those fish due to COVID restrictions at that time. The 2020 year class confounds our ability to better understand walleye recruitment in this combination recruitment fishery. The 2020 year class was age-3 and predominately male, which would be unusual for a stocked year class, but females in that year class were likely immature and not recruited to the gear. The high abundance of age-3 males greatly influenced the high male: female sex ratio. Also, similar to Long Lake, Washburn County lower stocked contribution may be due to naturally recruited juvenile walleye surviving better into adulthood than stocked fish or possibly full fin regeneration altered our results (Roberts 2023). These stocking contribution estimates may be altered once the genetic parentage analysis is completed by the University of Wisconsin-Stevens Point. It is evident that fall walleye surveys are not the best indicator of future year classes for Stone Lake. Stone Lake's extremely clear water and steep shorelines make sampling juvenile walleye more difficult than in other area lakes. The walleye fishery seems to rely on combination recruitment, and it appears natural recruitment alone would not sustain the population. Therefore, stocking is still recommended for this fishery, but should be reduced to a lower stocking rate, due to the lower stocking contribution and the presence of natural recruitment.

Currently, Stone Lake is meeting the objective of 1.5 fish/acre for a stocked walleye fishery (WDNR 2022). The creel survey suggests harvest and effort for walleye were low. For these reasons, a new regulation likely isn't warranted.

NORTHERN PIKE

The northern pike population has decreased when compared to 2010. This population remains at a lower density. The creel survey documented very little angling effort for northern pike. A restrictive regulation would not likely benefit Stone Lake. There is very little aquatic vegetation for northern pike in Stone Lake, which likely limits the abundance of northern pike.

SMALLMOUTH AND LARGEMOUTH BASS

Smallmouth bass remain the most abundant gamefish in Stone Lake. Our survey suggests their population has declined slightly while average size and growth have improved since 2010. Unlike largemouth bass and panfish, smallmouth bass were observed actively spawning during the survey and were found on beds even during the cold front. Therefore, we felt more confident in the smallmouth bass sample. Smallmouth bass remain the most harvested gamefish based on the 2023 creel survey. Stone Lake also has a relatively low survival rate (53%) compared to nearby Shell Lake (67%). To help maintain a good size structure, a 14 – 18-inch protected slot could be imposed for smallmouth bass. This regulation would continue to allow harvest while protecting larger/older smallmouth bass. To move this proposal forward, DNR would need approval and support from stakeholders. If there is not support this regulation change proposal will not be implemented.

Largemouth bass were not captured effectively during our spring survey. Our survey timing and poor weather impacted our ability to catch largemouth bass and therefore did not give us a good indicator of their relative abundance. However, the creel survey suggests the population may have decreased since 2010, with less recorded harvest and effort for largemouth bass. The decrease in largemouth bass abundance could be due to the no-minimum length limit that took effect in 2012.

PANFISH

Similar to largemouth bass, we did not get a good index of the current panfish population in Stone Lake. The most abundant panfish we collected was rock bass. However, a cold front hit during our survey which may have pushed panfish away from shore during the SE2 survey. The creel survey suggests that bluegill remain part of the fishery but aren't pursued heavily. Based on the limited survey and creel data, it appears the panfish population has dropped since 2010.

COMMON CARP

Carp have been present in Stone Lake since 1900 (Johannes 1984). However, their populations have never reached a level where they are detrimental to other fish populations and aquatic habitat. Their relative abundance remains low based on our sampling and though observed as an invasive species, their impact in Stone Lake is minimal at this time.

Recommendations

1. Stone Lake has a low-density walleye population. Large fingerling walleyes contribute to this combination recruitment fishery. The walleye population has increased since 2010, which is one goal of our stocking efforts. Due to the overall contribution of natural walleye, the stocking rate will be reduced to 5-10 fish/acre.

2. The current walleye regulation seems to be effective and allows some harvest. No regulation changes are recommended for walleye.
3. The northern pike population remains at a low density. Stone Lake lacks aquatic vegetation that is needed for abundant pike populations, this is unlikely to change. No regulation changes are recommended.
4. Smallmouth bass remain the most abundant gamefish in Stone Lake. However, they are also the most harvested gamefish and have declined since 2010. Consideration should be given to a no minimum length limit, 14–18-inch protected slot, and one fish over 18 inches regulation. This regulation could improve size structure. This regulation will only be pursued with support of local stakeholders and the lake association.
5. The largemouth bass population appears lower than 2010. Given their propensity to get abundant and stunt in northwestern Wisconsin, the no-minimum length limit should stay in place for this species.
6. More inputs of coarse woody habitat, protection/promotion of aquatic vegetation and maintenance and restoration of vegetative buffers are needed habitat work in Stone Lake. This website https://healthylakeswi.com/ is a great resource to learn more.
7. Invasive species monitoring and control programs should continue. Efforts to keep aquatic invasive species out of a waterbody are much more effective than controlling invasive species once they are established.

Acknowledgements

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Appendix

Appendix Table 1. Fish stocking records for Stone Lake, Washburn County, WI, 2000-2022.

Year	Species	Age Class	Number Stocked	Avg. Length (in)	Source
2000	WALLEYE	SMALL FINGERLING	26,150	1.5	DNR
2002	WALLEYE	SMALL FINGERLING	26,135	1.7	DNR
2004	WALLEYE	SMALL FINGERLING	26,130	2.4	DNR
2006	WALLEYE	SMALL FINGERLING	18,280	2.0	DNR
2007	WALLEYE	LARGE FINGERLING	1,956	7.3	PRIVATE HATCHERY
2008	WALLEYE	SMALL FINGERLING	18,584	1.6	DNR
2009	WALLEYE	LARGE FINGERLING	2,000	7.0	PRIVATE HATCHERY
2010	WALLEYE	SMALL FINGERLING	18,305	1.7	DNR
2011	WALLEYE	LARGE FINGERLING	1,999	7.0	TRIBAL HATCHERY
2012	WALLEYE	SMALL FINGERLING	18,305	1.7	DNR
2013	WALLEYE	LARGE FINGERLING	2,000	7.0	PRIVATE HATCHERY
2014	WALLEYE	LARGE FINGERLING	7,520	6.4	DNR
2016	WALLEYE	LARGE FINGERLING	7,343	7.5	DNR
2018	WALLEYE	LARGE FINGERLING	7,229	6.5	DNR
2020	WALLEYE	LARGE FINGERLING	7,349	7.1	DNR
2022	WALLEYE	LARGE FINGERLING	7,335	6.9	DNR

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

Appendix Table 3. Proportional size distribution values.

Species	Stock Size (in)	Quality Size (in)	Preferred Size (in)
Black crappie	5	8	10
Bluegill	3	6	8
Largemouth bass	8	12	15
Northern pike	14	21	28
Pumpkinseed	3	6	8
Rock bass	4	7	9
Smallmouth bass	7	11	14
Walleye	10	15	20
Yellow perch	5	8	10