WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Fishery Survey Summary
Lac Sault Dore (Soo Lake)
Price County, Wisconsin, 2020-2023

Introduction

In follow-up to our most recent surveys in 2019, the Wisconsin Department of Natural Resources' (DNR) Fisheries Management Team from Park Falls completed annual electrofishing surveys in the fall of 2020-2023 to evaluate walleye recruitment in Lac Sault Dore, commonly known as Soo Lake. Fyke nets fished in mid-fall of 2023 targeted black crappie, and those results helped to evaluate the effectiveness of an experimental panfish harvest regulation in effect since 2018. The bycatch in our fall netting sample shed some light on the walleye population's size distribution. Quality, preferred, memorable and trophy sizes referenced in this summary are based on standard proportions of world record lengths developed for each species by the American Fisheries Society. "Keeper size" is the team's description for black crappie 9 inches or longer, based on observed angler behavior.

HABITAT AND PUBLIC ACCESS CHARACTERISTICS

Soo Lake is a 561-acre impoundment on the Elk River located about 7½ miles west of Phillips, Wisconsin. It is the downstream-most of three impoundments on the Elk River system. Maximum depth is 21 feet, and average depth is 6 feet. With Soo Lake's irregular shape and 10 islands, nearshore habitat for fish and aquatic life is quite diverse along 14 shoreline miles. Lakebed materials are estimated as 85% sand, 10% muck and 5% gravel in the shallow zone. Water quality data collected by citizen volunteers allow us to classify Soo Lake as eutrophic, consistently having high nutrient concentrations that give rise to high biological productivity. Tannins draining from the surrounding wetlands impart a brown stain that decreases water clarity and light penetration. Secchi depths measured in the late summer of the last 10 years averaged 2.6 feet. Soo Lake belongs in the class of riverine lakes that have a complex fish community with more than one predator fish species.

Eurasian water milfoil, an invasive aquatic plant first detected in 2004, had quickly spread to nuisance density that hampered navigation and recreation over much of Soo Lake. Drawing down the reservoir 6 feet over winter 2010-2011 reduced the occurrence of Eurasian water milfoil from 37% in 2010 to 0.3% in 2011 and 0.5% in 2012. The reservoir level was intentionally decreased several times since then to facilitate dam repair and road improvements. The DNR maintains a boat landing off County Highway W, and Price County has a shallow-water boat ramp on the northeast shore off County Highway S.

SURVEY EFFORT

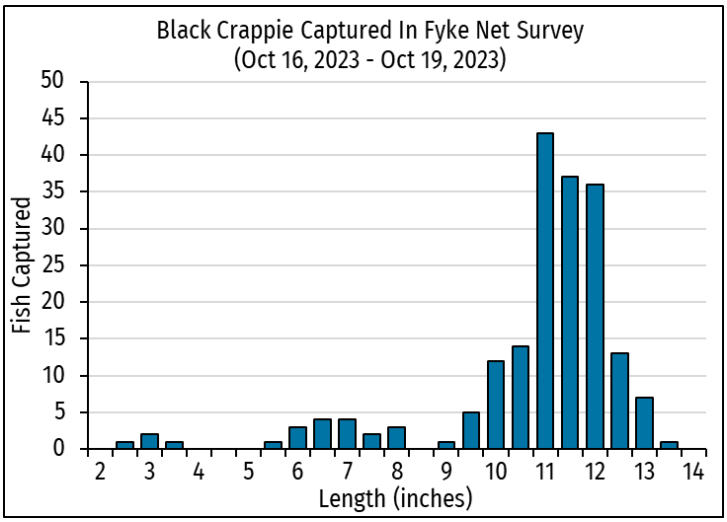
Our fall electrofishing surveys targeted young walleyes, but we collected all gamefish along two shoreline segments each two miles long in 2020 through 2023. The electrofishing catch rate of walleye fingerlings in those recent samples added to Soo Lake's history of walleye recruitment in 18 surveys completed since 1991.

ELECTROFISHING EFFORT	MILES	HOURS	WATER °F
September 22, 2020	2.00	1.83	66
September 27, 2021	2.00	1.80	63
September 26, 2022	2.00	1.78	57
October 2, 2023	2.00	1.78	68

On Oct. 16, 2023, we set six fyke nets and fished them overnight for three nights at nine locations with depths near 6 feet when the water temperature was 51° F. Those 18 net-nights of sampling effort were specifically directed at black crappie, but we measured or counted all fish captured.

Results and Discussion

BLACK CRAPPIE



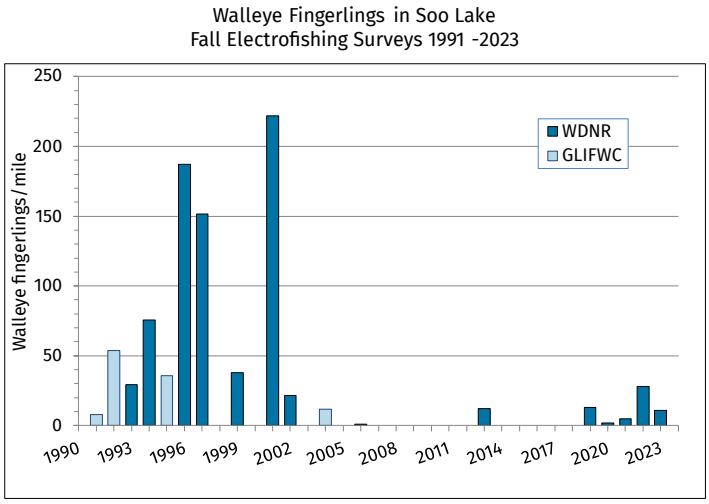
Fyke netting captured 193 black crappies that ranged from 2.5 to 13.5 inches and averaged 11.0 inches long. The catch rate of 10.7 crappies per net-night ranked between the 50th and 75th percentiles among lakes in the complex-riverine class, suggesting moderate population abundance. In the fall of 2023, Soo Lake's crappies had a favorable size distribution that should satisfy most anglers. Their average length was between the 99th and 100th percentiles, and the longest crappie in our sample matched the 100th percentile value for maximum length in the complex-riverine lake class. Ninety-one percent of crappies ≥ 5 inches were keeper-size fish 9 inches or longer, 88% attained preferred size at least 10 inches long and 31% reached memorable size of 12 inches or more. Ring counts on sectioned ear bones extracted from 14 crappies from 6.1 to 8.1 inches long revealed that Soo Lake crappies grew to 6.6 inches in two years (range 6.1-7.2; n=8) and to 7.3 inches in three years (range 6.8-7.6; n=5). By comparison, the regional average lengths were 5.5 and 7.2 inches at those ages. Among lakes in the complex-riverine category, the average length of Soo Lake crappies ranked above the 75th percentile at age 2 and between the 25th and 50th percentiles at age 3. We did not sacrifice preferred- and memorable-size crappies to estimate their age for growth analysis.

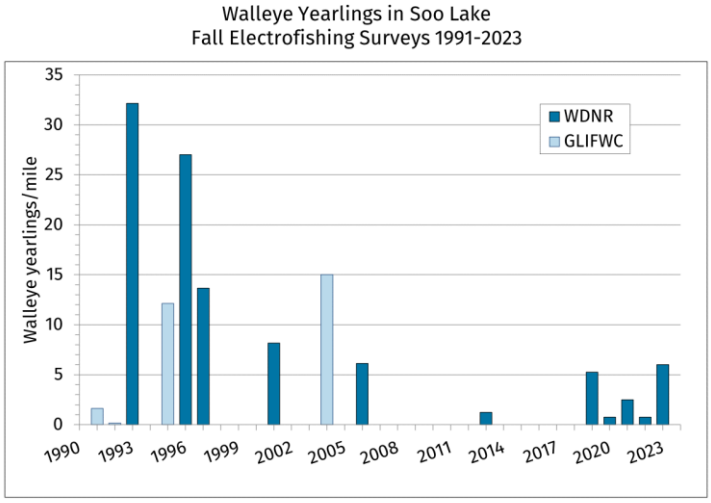
From anglers' perspective, the most abundant and desirable portion of the crappie population is comprised of one or more strong year classes that survived and grew to 11-12 inches. The 2023 fyke netting sample included several younger crappie year classes at much lower abundance. Consequently, crappie fishing may decline for a while until Soo Lake produces another strong year class and those fish grow to catchable size. The young crappies detected in this fyke net sample will not be enough to fully replace the older fish that will eventually die to angling and natural causes.

Soo Lake is among 94 Wisconsin lakes enrolled in a 10-year evaluation of three experimental panfish harvest regulations. The study compares the average length of bluegill and black crappie in samples collected before and after each experimental treatment was applied. On Soo Lake, anglers may keep a daily bag limit of 25 panfish of any size but only 10 of any one species. The average length of crappies in Soo Lake increased significantly by 3.3 inches in small electrofishing samples before (n=26) and after (n=23) this harvest restriction took effect in 2018. Bluegills had no size improvement in the same comparison (n=69 and 60, respectively). In the broad-scale trial, however, the 25/10 daily bag limit did not improve panfish size. In that study, the average length of bluegills and crappies increased only when anglers could keep no more than five of the targeted panfish species per day. Consequently, the experimental regulation will expire on April 1, 2026, when Soo Lake anglers may again keep a daily bag limit of 25 panfish of any size and any species in aggregate.

WALLEYE

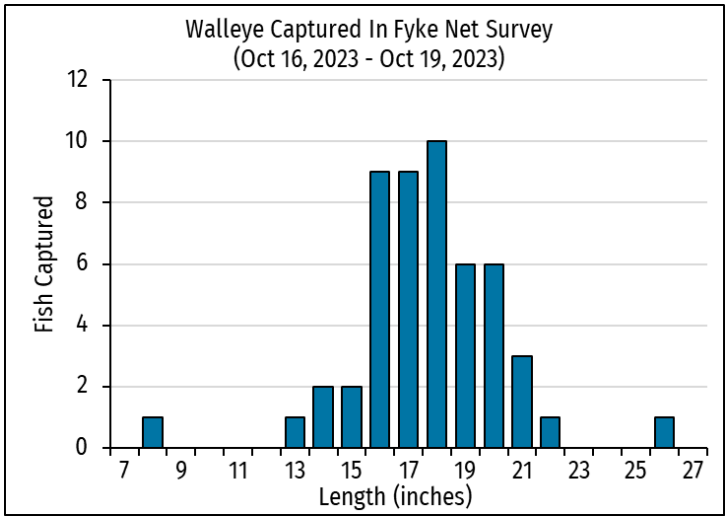
Fall electrofishing, our standard assessment of walleye recruitment, captured 2-28 fingerlings per mile in five surveys from 2019 to 2023. By comparison, the average catch rate of age-0 walleye in populations sustained entirely by natural reproduction across Wisconsin's Ceded Territory was 32.7 fingerlings per mile in 3,226 recruitment surveys completed by the DNR or the Great Lakes Indian Fish & Wildlife Commission from 1985 to 2023. In Soo Lake, the catch rate of yearlings in the same period points to adequate survival of the fingerlings produced in the previous year.





In our last surveys completed in 2019, we did not specifically target walleyes by springtime fyke netting to properly describe their population abundance and size distribution, mainly due to the challenges in capturing spawning adults that leave the impoundment and move upstream in this riverine system. However, in all spring and fall netting and electrofishing surveys from 2019 through 2023, the bycatch included walleyes in a broad array of sizes and ages. For instance, fyke nets specifically set for black crappies in the fall of 2023 captured 51 walleyes that ranged from 8.9 to 26.2 inches and averaged 18.2 inches long. In that sample, 94% of walleyes ≥ 10 inches were quality-size fish 15 inches or longer, 22% were preferred-size fish ≥ 20 inches and 2% were memorable-size fish at least 25 inches long. We did not compare these results

with lake class standards or with our objectives for walleye density and size structure in Soo Lake because the non-targeted bycatch does not represent walleye population status.



Clearly, walleye recruitment has declined since the high rates recorded 20-30 years ago. Nonetheless, natural reproduction is still supplying enough new recruits to sustain an adult population at some unknown level of abundance. Because of inherent difficulties in sampling outbound spawners with our traditional gear, it's unlikely that we will be able to obtain a reliable estimate of adult walleye density in Soo Lake. Perhaps novel methods or indirect indicators might someday show whether the population has attained or approached our goals to have 4-8 adults per acre with 50-70% at least 15 inches long. In the meantime, we will continue to monitor walleye recruitment by electrofishing in the fall to look for trends in fingerling and yearling catch rates that indicate recovery or further decline. Soo Lake's walleye population is still sustaining itself by natural reproduction, unlike in many waters where recruitment has failed completely. Walleye populations maintained by natural reproduction typically provide better fisheries than those maintained by stocking. Walleye stocking might actually suppress natural recruitment, if fingerlings fed in a hatchery and released at a larger size would have a competitive advantage over natural fingerlings that hatched and grew in the lake. Even so, we will hold that option in reserve, if dwindling catch rates of young walleye in fall electrofishing surveys signal a need for stocking. With climatic changes, we may never again see the all-time, record-setting recruitment rates that remain unsurpassed in our three-county fishery management area.

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