



WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Fishery Survey Summary

Pulaski Lake, Rusk County, Wisconsin, 2022

Introduction

The Wisconsin Department of Natural Resources' (DNR) Fisheries Management Team from Park Falls completed netting and electrofishing surveys in 2022 to assess the abundance, size structure and reproductive success of important sportfish populations in Pulaski Lake. Fyke netting and electrofishing surveys completed shortly after the spring thaw targeted Walleye and Northern Pike. The catches from those early spring surveys yielded an estimate of Pulaski Lake's adult Walleye population density, which helped us to evaluate the biennial Walleye stocking strategy that we initiated in 2014. That estimate also contributed to the broad-scale study of the trophic interactions of Walleye and Largemouth Bass. An electrofishing survey in late spring characterized the status of Largemouth Bass and Bluegill, and fall electrofishing measured natural Walleye recruitment. 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 and Yellow Perch ≥ 9 inches and Bluegill ≥ 7 inches, based on observed angler behavior.

HABITAT AND PUBLIC ACCESS CHARACTERISTICS

Pulaski Lake is a 126-acre seepage lake located about 14 miles south of Bruce, Wisconsin. It has a maximum depth of 40 feet and an average depth of 17 feet. The lake's water is moderately clear. In mid-summer 2022, the Secchi depth was 10 feet, which indicates a mesotrophic lake system with mid-range levels of nutrients and biotic productivity. Pulaski Lake is classified with lakes that have a "complex" fish community, "warm" thermal characteristics and "clear" water. The nearshore lakebed is roughly comprised of 80% sand, 10% gravel and 10% muck. Most of the shoreline is upland hardwood forest, but the entire north shore has shrub swamp and bog vegetation. Nineteen log cribs were sunk in deep water in 1970, and 30 individual "tree-drop" structures were placed to enhance fish habitat along the north shore in 2003. In 2021, the Sawdust Lakes Association obtained the DNR's approval to submerge trees in clusters as "fish sticks" structures. Aquatic invasive species include banded mystery snails, Chinese mystery snails and freshwater jellyfish. The Town of Washington maintains a public boat landing on the southeast shore with parking along the shoulder of Pulaski Lake Road.

SURVEY EFFORT

Shortly after the ice thawed when water temperature ranged from 40 to 41°F, we captured, marked and released spawning Walleye in 24 net-nights of fyke netting effort from April 18 to 22, 2022. We also measured or counted all fish species encountered in that netting effort. On April 24, 2022, we targeted mature Walleye again by nighttime electrofishing along the entire shoreline. We sampled 2.50 shoreline miles in 1.10 hours of electrofishing effort when the water temperature was 43°F. The proportion of marked Walleye in our electrofishing survey allowed us to estimate adult Walleye density.

With water temperature at 62°F, our May 24, 2022 electrofishing survey coincided with the early spawning activities of Smallmouth, Largemouth Bass and Bluegill. We dip-netted gamefish along 2.57 shoreline miles in 1.17 hours and subsampled all fish species for 0.50 miles in 0.23 hours.

Our September 15, 2022 electrofishing survey targeted young Walleye, but we collected all Walleye, Largemouth Bass and Smallmouth Bass along the entire lake perimeter, sampling 2.50 miles in 0.80 hours when the water temperature was 68°F.

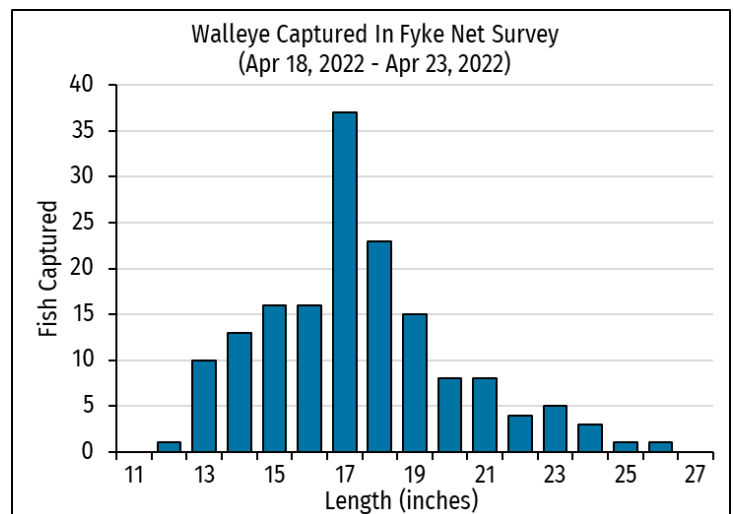
Results and Discussion

FISH COMMUNITY

Though not specifically designed to evaluate diversity, our combined netting and electrofishing efforts captured 10 fish species in 2022 compared to 11 collected by those methods in 2012-2013. The list of fish species was identical in both periods, except Golden Shiner was absent in our 2022 surveys. Fish community composition reflected the species found in the complex-warm-clear category of lakes. Largemouth Bass and Walleye were the dominant predators, and Bluegill is the most abundant panfish population. Other important forage included soft-rayed, tube-shaped White Sucker that predators typically prefer over spiny-rayed, platter-shaped fish. Yellow Perch were scarce—fyke netting captured one, and electrofishing captured nine in the spring of 2022.

WALLEYE

Early spring fyke netting in 2022 captured 283 Walleyes at a rate of 12 fish \geq 10 inches per net-night. That netting catch rate far exceeded the 75th percentile value among lakes in the complex-warm-clear classification. Those Walleyes captured just once in nets ranged from 12.6 to 26.9 inches and averaged 17.9 inches long. Early spring electrofishing captured 44 Walleyes, including 39 that we marked and released in our netting survey. Electrofishing catch rates were 18 Walleyes \geq 10 inches per mile or 40 per hour. The five Walleyes not handled before ranged from 14.0 to 22.5



inches and averaged 16.5 inches. From these netting and electrofishing samples, we estimated that Pulaski Lake's Walleye population had 188 adults or 1.5 adults per acre (95% confidence interval = 164-212; coefficient of variation = 0.065). Walleye density decreased by 51% compared to our last estimate in 2013. Adult density was near the average value of 1.8 adults per acre for Walleye populations in northern Wisconsin that are sustained primarily by stocking. The ratio of males to females was 2.6.

In 2014, the DNR initiated a three-pronged rehabilitation strategy prompted by a pattern of dwindling Walleye recruitment in Pulaski Lake. We tightened harvest restrictions for Walleye, loosened those for bass and began stocking Walleye as large fingerlings instead of small ones.

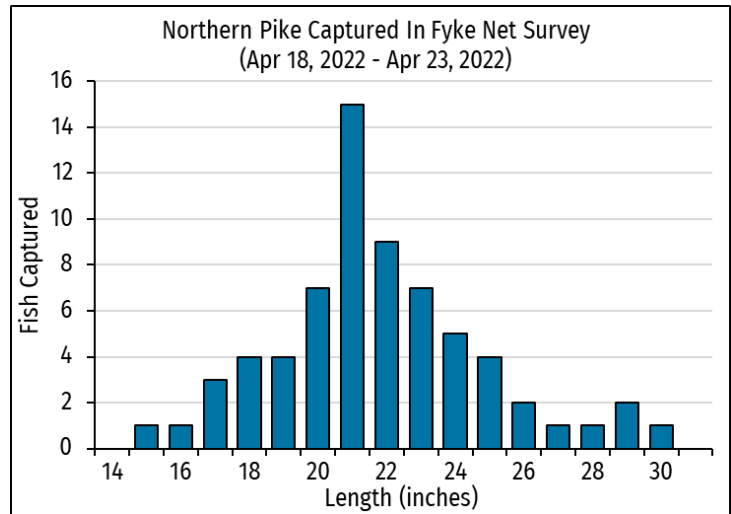
The minimum length limit on Walleye increased from 15 to 18 inches in 2016. Because Largemouth Bass were suspected of suppressing Walleye recruitment by predation or competition, that same year we removed the 14-inch minimum length limit on Largemouth and Smallmouth basses with tentative hope that more angling harvest opportunities might reduce Largemouth Bass abundance and alleviate those pressures on young Walleye. The DNR has stocked a total of 6,267 Walleyes at a rate of ten 6- to 7-inch fingerlings per acre in all even-numbered years from 2014 through 2022. Before switching to large fingerlings for better survival, the DNR stocked 26,150 Walleyes 1.6 inches on average from 2003 to 2013. Despite these interventions, our standard measure of natural Walleye recruitment remains very low in Pulaski Lake, with only two barely detectable year classes produced in the last decade. The catch rates averaged 1.8 fingerlings per mile in ten fall electrofishing surveys from 2013 to 2022. Unless fall electrofishing captures more than 25 fingerlings per mile to indicate satisfactory natural recruitment, Walleye stocking will continue while the broad-scale evaluations of bass-walleye interactions and the *Wisconsin Walleye Stocking Initiative* are completed.

Our analysis of average length at each estimated age suggests that Walleye grow fast from ages four through nine, then very slowly at ages 10, 11 and 13. Ring counts on sectioned dorsal spines revealed that, on average, female Walleye reached legal size of 18 inches in five growing seasons (n=2), while the fastest growing male Walleye needed eight years to attain 18 inches (range 16.4-19.7; n=8). Female Walleye reached 19.6 inches in six years (range 16.8–22.3; n=18) and 22.0 inches in eight years (range 19.8-24.7; n=13). We found no females less than 16.8 inches long and five years old and no males longer than 19.1 inches. In a pooled sample of males, females and Walleye whose gender was unknown, their mean length at ages four through nine was 0.7 to 1.8 inches higher than the regional average length at those ages. In a smaller sample, this same measure of Walleye growth in Pulaski Lake trailed the regional averages by 5.0, 3.4 and 5.4 inches at ages 10, 11 and 13. The rapid growth of the younger age classes influences the population's length distribution much more than the slow growth of the oldest fish. With 85% of Walleye in fyke nets at least 15 inches and 19% at least 20 inches long, the population's size structure was even better than in the spring of 2013 when 67% were \geq 15 inches, and 6% were \geq 20 inches long. Forty-two percent were legal-size Walleye 18 inches or longer. Presently, the biennial influx of stocked fingerlings maintains Pulaski Lake's Walleye fishery. Without reliable natural recruitment to replace the adults that die due to angling and natural causes, we anticipate that the population's favorable shares of legal- and preferred-size Walleye would quickly diminish if Walleye stocking is suspended.

NORTHERN PIKE

Fyke nets set for Walleye in spring 2022 captured 78 Northern Pike at a rate of 3.3 pike per net-night. That catch rate was between the 75th and 99th percentile values for Northern Pike in warm, clear lakes with complex fish communities. The 67 pike captured just once in fyke nets ranged from 15.6 to 30.3 inches and averaged 22.3 inches long. The relative abundance of Northern Pike decreased by nearly 70% since our last measure in spring 2013 when fyke nets captured 193 pike at a rate of 10.7 fish per net-night. Comparing fyke net samples from the

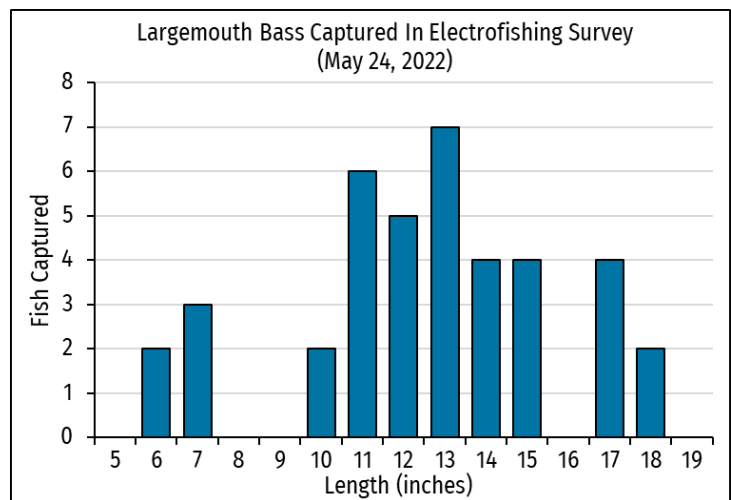
spring of 2013 and 2022, the average length increased by three inches, and the proportion of quality-size pike ≥ 21 inches jumped noticeably from 23% to 70%. But, the population's share of preferred-size pike ≥ 28 inches rose just a little bit from 5% to 6%. Anglers may keep a daily bag limit of five Northern Pike of any size. Pulaski Lake anglers could help to further reduce pike abundance and improve the population's size distribution by keeping and eating, the plentiful, intermediate-size pike from 20 to 22 inches long. Pike of that size work well for those who like to pickle their catch.



LARGEMOUTH BASS AND SMALLMOUTH BASS

Late spring electrofishing, our chosen method to assess black bass population status, captured 40 Largemouth Bass that ranged from 6.5 to 18.9 inches and averaged 13.0 inches long. Pooling Largemouth Bass of all sizes, the electrofishing capture rates of 40 bass per mile and 20 per hour indicated low to moderate population numbers that were similar to the relative abundance we found in the spring of 2013 when electrofishing captured 47 Largemouth Bass per mile and 23 per hour. In both years, the electrofishing catch rate

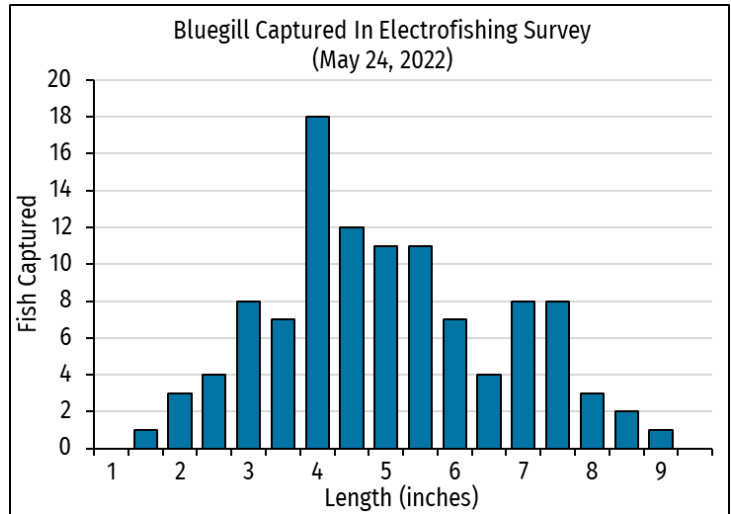
ranked between the 25th and 50th percentiles in the class of lakes with clear, warm water and complex fish communities. Though the relative abundance has changed little in the nine years since our last assessment, the average length of Largemouth Bass increased by an inch. Likewise, the shares of quality-size fish ≥ 12 inches, legal-size fish ≥ 14 inches and preferred-size bass ≥ 15 inches have increased from 36%, 17% and 13% to 76%, 41% and 29%. Smallmouth Bass are present in trace abundance in Pulaski Lake's fish community. Our late spring electrofishing samples included only two Smallmouth Bass in 2013 and 2022.



Anglers may catch and release Smallmouth Bass or Largemouth Bass in Pulaski Lake at any time. In the Southern Bass Management Zone, a daily bag limit of five Largemouth Bass or Smallmouth Bass of any size in total may be kept beginning on the first Saturday in May through the first Sunday in March. We foresee no need to modify bass harvest regulations in Pulaski Lake at this time.

BLUEGILL

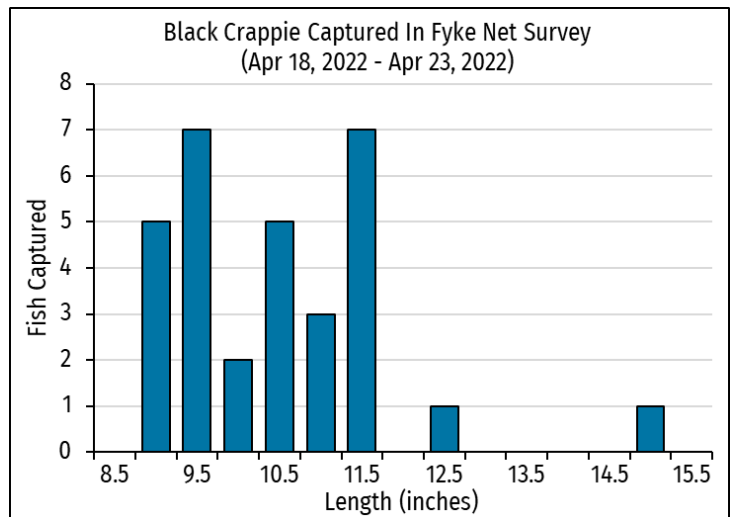
Electrofishing along a half mile of Pulaski Lake’s shoreline produced a sample of 108 Bluegills that ranged from 1.6 to 9.1 inches and averaged 5.2 inches long. Electrofishing catch rates of 216 Bluegills per mile and 463 per hour indicate moderately high population abundance, about twice as high as in the spring of 2013 when electrofishing captured 103 Bluegills per mile or 221 per hour. The late-spring electrofishing catch rate in 2022 ranked between the 50th and 75th percentile values among complex-warm-clear lakes, whereas in 2013, it ranked below the 25th percentile value. Increased Bluegill abundance may have resulted from fewer Walleye to bolster the predatory pressure exerted by Largemouth Bass. Even though their relative abundance has doubled, the population’s size structure experienced modest but noticeable declines since our last measures nine years ago. Average Bluegill length dropped by 0.58 inches, and the shares of quality-size fish ≥ 6 inches, keeper-size fish ≥ 7 inches and preferred-size fish ≥ 8 inches decreased from 54%, 29% and 8% in 2013 to 33%, 22% and 6% in 2022. Anglers may keep a daily bag limit of 25 panfish of any size and species.



Average Bluegill length dropped by 0.58 inches, and the shares of quality-size fish ≥ 6 inches, keeper-size fish ≥ 7 inches and preferred-size fish ≥ 8 inches decreased from 54%, 29% and 8% in 2013 to 33%, 22% and 6% in 2022. Anglers may keep a daily bag limit of 25 panfish of any size and species.

BLACK CRAPPIE

Fyke netting in the spring of 2022 captured 31 Black Crappies ranging from 9.1 to 15.3 and averaging 10.7 inches long. The catch rate of 1.3 crappies ≥ 5 inches per net-night points to the low population abundance needed to keep crappies growing fast to the sizes that anglers like to keep. All crappies in the fyke net sample were keeper-size fish at least 9 inches long. Sixty-one percent attained preferred size ≥ 10 inches, 6% were memorable-size fish 12 inches or longer and one crappie surpassed the 15-inch threshold for trophy size. Our late-spring electrofishing sample included only six crappies 2.0 to 3.6 inches long. By comparison, the crappies were fewer and smaller in our last surveys nine years ago. Eight



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net-nights of fyke netting effort directed specifically toward Black Crappies in the fall of 2012 captured only three crappies 8.1 to 11.2 inches long. Electrofishing in late spring of 2013 produced a small sample of 21 crappies 2.7 to 10.5 inches long, and half of those ≥ 5 inches were keeper-size fish at least 9 inches long.

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