



## WISCONSIN DEPARTMENT OF NATURAL RESOURCES

# Fishery Survey Summary

## Solberg Lake, Price County, Wisconsin, 2021

### Introduction

The Wisconsin Department of Natural Resources' (DNR) Fisheries Management Team from Park Falls completed netting and electrofishing surveys in spring and fall of 2021 to assess the status of important sportfish populations in Solberg Lake. Fyke nets set shortly after the spring thaw targeted Walleye, Muskellunge, Northern Pike and Yellow Perch. An electrofishing survey in late spring characterized the abundance and size structure of Solberg Lake's largemouth bass, smallmouth bass and bluegill populations, and fall electrofishing evaluated walleye recruitment. Quality, preferred and memorable 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  $\geq 9$  inches and Bluegill  $\geq 7$  inches, based on observed angler behavior.

### HABITAT AND PUBLIC ACCESS CHARACTERISTICS

Solberg Lake is an 859-acre impoundment on Squaw Creek located about 4½ miles north of Phillips, Wisconsin. Maximum and average depths are 16 and 7 feet. Low to moderate water clarity limits the maximum depth at which rooted aquatic plants can grow. Secchi disk visibility averaged 4.2 feet in summer (range 2.3 – 7.5). Dissolved organic compounds draining from wetlands contribute brown-stained water to the lake, and abundant algae also decrease water clarity. Moderate algae blooms are common in Solberg Lake, and occasionally they become severe as summer progresses. Solberg Lake's irregular shoreline reflects its greater potential to support littoral (nearshore) communities compared to lakes with circular shape. The shallow water habitat associated with eleven islands scattered throughout the lake also increases the system's potential for littoral zone production. Nearshore lakebed materials are roughly 48% muck, 32% sand, 9% rock and 11% gravel.

Price County maintains two public boat landings, a campground, swimming beaches, a nature trail and a pavilion, and several lakeside resorts have private boat ramps.

### SURVEY EFFORT

Shortly after the ice thawed when water temperature ranged 40-56°F, we captured, marked and released spawning Walleye in 32 net-nights of fyke netting effort from April 2-6, 2021. On April 8, 2021, we targeted mature Walleye again by nighttime electrofishing along the entire shoreline. Two boats sampled 10.98 shoreline miles in 5.75 hours of electrofishing effort when water temperature was 54°F. The proportion of marked Walleye in our electrofishing survey allowed us to estimate adult Walleye density.

With water temperature 64-69°F, our May 17, 2021 electrofishing survey coincided with the spawning activities of Smallmouth, Largemouth Bass and Bluegill. We dip-netted gamefish along 4 shoreline miles in 1.92 hours, and we subsampled all fish species for 2.5 miles in 1.23 hours.

Our September 15, 2021 electrofishing survey targeted young Walleye, but we collected all gamefish along the entire lake perimeter, sampling 9.73 miles in 3.68 hours when water temperature was 65-66°F.

## Results and Discussion

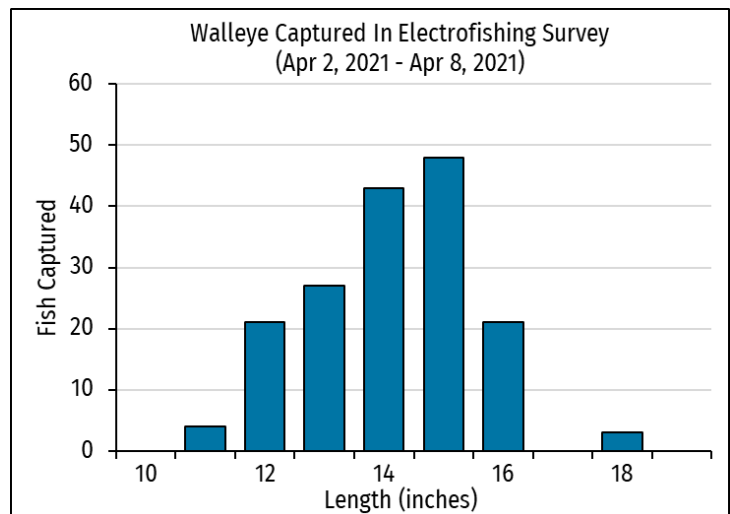
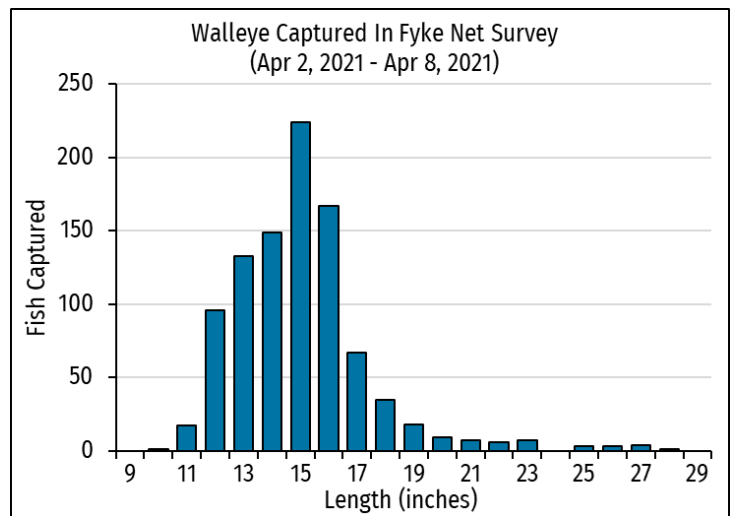
### FISH COMMUNITY

Our combined netting and electrofishing efforts captured 13 fish species in 2021 compared to 14 collected by those methods in 2013-2014. Walleye is the dominant predator in the fish community, and Black Crappie and Bluegill are the primary panfish populations. Surprisingly, redhorse have never been recorded in Solberg Lake fish surveys, though three redhorse species are commonly found in the impounded and free-flowing reaches of the Elk River about 4 miles downstream from the Solberg Lake Dam.

### WALLEYE

Early spring fyke netting captured 1014 Walleye at a rate of 34 fish  $\geq$  10 inches per net-night. Those captured just once in nets ranged between 10.8-28.3 inches and averaged 15.4 inches long. Early spring electrofishing captured 750 Walleye, including 167 that we marked and released in our netting survey.

Electrofishing catch rates were 43 Walleye  $\geq$  10 inches per mile, or 82 per hour. Those not handled before ranged from 11.0-18.5 inches and averaged 14.3 inches. From these netting and electrofishing samples, we estimated that Solberg Lake’s Walleye population had 2,640 adults or 3.1 adults per acre. Walleye density was below our goal in the [Solberg Lake Fishery Management Plan](#) to have 4-7 adults per acre. However, with 58% of Walleye in fyke nets at least 15 inches and 4.2% at least 20 inches long, the population met or exceeded its size objectives (30-40%  $\geq$  15 inches and 3-7%  $\geq$  20 inches). The ratio of males to females was 3.0. Ring counts on sectioned dorsal spines revealed that, on average, males grew to 11.9 inches in three years (n=11), 13.2 inches in four years (n=25) and 16.1 inches in five years (n=19). Female Walleye reached 16.3 inches in five years (range 13.9–18.8; n=24). We found no mature females less than four years old. In a pooled sample of males, females and Walleye whose gender was unknown, growth trailed the regional average by 1.2 inches and 0.6 inch at ages 3 and 4. However, Solberg Lake’s Walleye nearly attained the regional average length of

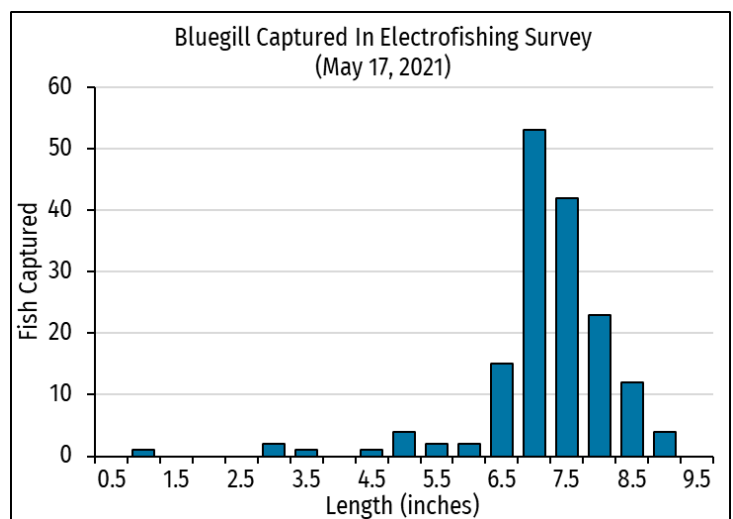


16.3 inches by age 5. At ages 6 and 7, their growth outpaced the regional average by 0.2 and 0.4 inch and by 1.1–3.3 inches at ages 8-13.

Concerned about declining reproductive success, in 2015, the DNR began stocking Walleye at a rate of 15 large fingerlings per acre in odd-numbered years. To date, Solberg Lake has received 51,400 fingerlings 6–8 inches long—the only Walleye stocked into Solberg Lake since 1961. Fall electrofishing surveys show that natural recruitment to the Walleye population has rebounded somewhat, but fingerling catch per mile (2.4 in fall 2021) remains far below average among walleye populations sustained by natural reproduction. Unless fall electrofishing captures more than 25 fingerlings per mile to indicate satisfactory natural recruitment, walleye stocking will continue while the broad-scale evaluation of the Wisconsin Walleye Stocking Initiative is completed. In addition, the special harvest regulation that allowed anglers to keep three Walleye of any size, but only one over 14 inches, will be replaced by the standard walleye regulation for Wisconsin’s Ceded Territory. Effective April 1, 2022, only three Walleye from 15 inches but less than 20 inches may be kept, except one fish may be over 24 inches. The new rule will protect about 56% of the estimated adult Walleye population.

## BLUEGILL

In our late-spring electrofishing survey, we caught 162 Bluegill that ranged between 1.4–9.2 inches and averaged 7.4 inches long. Electrofishing catch rates of 64 Bluegill  $\geq$  3 inches per mile or 131 per hour indicate the low to moderate abundance needed to assure fast growth to the sizes that anglers like to keep. Bluegill attained the Fishery Management Plan’s objectives for moderate population abundance, measured as a late spring electrofishing catch rate of 75-150 bluegill  $\geq$  3 inches per hour. With 24% of Bluegill in our sample attaining preferred size  $\geq$  8

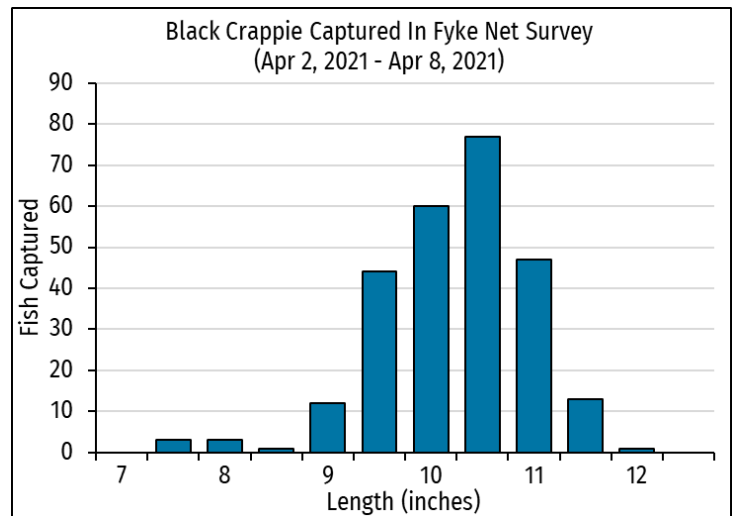


inches, the population surpassed our goal to have 15-20% at least 8 inches long. Nearly two-thirds of the 82 Bluegill measured in our fyke net survey were 8 inches or longer. Bluegill fishing in Solberg Lake is good because Walleye eat enough young Bluegill to control bluegill numbers. Perhaps the experimental panfish harvest restrictions also effected the favorable status of the bluegill population. Since 2016, anglers may keep a daily bag limit of 25 panfish, but only 10 of any one species. This special regulation will remain in place, at least until 2026, while the trial and evaluation of three new panfish regulations continues.

## BLACK CRAPPIE

Black Crappie have met or exceeded the standards set for the moderate abundance (10-20  $\geq$  5 inches per net-night) and the moderate share of preferred-size fish (20-40%  $\geq$  10 inches) that stakeholders said they wanted to see in Solberg Lake’s crappie population. Though Objectives 3.1 and 3.2 of the [Solberg Lake Fishery Management Plan](#) use mid-fall and late-spring fyke net catches, we compared those goals with our early-spring fyke netting and

late-spring electrofishing results. Identical catch rates of 12 crappies per net-night in fall 2013 and early spring 2014 offered some assurance that the substitution was valid. Spring 2021 fyke nets captured 419 Black Crappie at a rate of 13 per net-night. In a measured subsample of 261 Black Crappie, their length ranged from 7.8-12.0 inches and averaged 10.4 inches, and 76% were preferred-size fish  $\geq 10$  inches long. Only one crappie attained memorable size  $\geq 12$  inches. In late spring, we dip-netted 38 Black Crappie at electrofishing capture rates of 13 fish  $\geq 5$  inches per mile and 26 per hour. They ranged from 4.2 to 11.4 inches and averaged 8.0 inches long, and 41% were 10 inches or longer. We surmise that the combined influence of balanced predator-prey interactions, strong year classes in 2015-2017 and restricted panfish harvest is responsible for the satisfactory abundance and size structure in the Black Crappie population.



The preliminary review of three experimental panfish harvest regulations revealed that a daily bag limit of 15 panfish, but no more than five of any one species held the only promise for increasing average length by 0.5-1.0 inch in bluegill and black crappie populations. Currently, panfish anglers on Solberg Lake may keep up to 10 Black Crappie in a daily bag limit of 25 panfish. Further restricting harvest by applying the early frontrunner 15/5 panfish regulation could help to increase average crappie size, produce more memorable-size fish and moderate the boom-and-bust cycles in crappie abundance that often occur when a strong year class grows to desirable size and anglers quickly fish them down.

## YELLOW PERCH

Our spring surveys revealed little promise for good perch fishing in Solberg Lake, probably because Yellow Perch are the favorite food of Walleye, Northern Pike, Muskellunge and Largemouth Bass that collectively control perch abundance by predation. Yellow Perch often appear episodically in our surveys, making it difficult for us to characterize their population status. Fyke net catches can vary widely and suddenly, from a handful on one day to hundreds or thousands a few days later. In spring 2021, fyke nets captured only eight Yellow Perch or 0.25 perch  $\geq 5$  inches per net-night, a very low catch rate which we dismissed as an unrealistic measure of their abundance. They ranged between 6.8-9.7 inches and averaged 8.0 inches. The late-spring electrofishing sample had 54 Yellow Perch that ranged between 2.2-10.0 inches but averaged only 3.6 inches. Electrofishing captured 22 perch of all sizes per mile or 44 per hour and 2.0 perch  $\geq 5$  inches per mile or 4.1 per hour. We do not know if electrofishing catch rates can represent the relative abundance of the perch population.

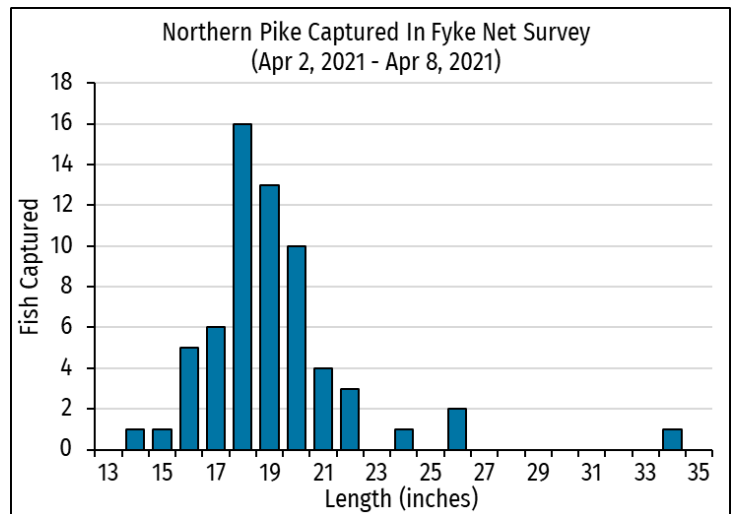
To support staff engaged in statewide fishery assessments, we extracted the ear bones from 36 young Yellow Perch and counted annular rings to estimate perch age. On average, Yellow Perch in Solberg Lake grew to 2.6 inches long at age 1 (range 2.3-3.1; n=13), 4.3 inches at age 2 (range 3.4-5.8; n=21) and 5.6 inches at age 3 (range 5.1-6.0; n=2). Yellow perch age data will be

used to assess the status and trends of perch growth, mortality and recruitment in lakes across the state, as well as to evaluate sampling protocols that optimally target different life stages.

The Solberg Lake Association purchased and stocked a total of 25,200 Yellow Perch on six occasions from 2000 to 2021. The average length in each batch ranged from 4 to 6.5 inches. Bioenergetics modeling in early 2022 revealed that the 2,000 naïve and vulnerable perch stocked in fall 2021 would be quickly eaten by Solberg Lake’s estimated 2,640 adult Walleye within 6.5 to 48 days. Consumption of stocked perch would be even faster as predators’ metabolic rate increases with higher water temperatures. In addition to Walleye, Northern Pike and Muskellunge are also known to selectively eat the largest individuals in the perch population to obtain an efficient ration that is worth the energy they direct toward feeding. Both pike and muskies are present, so stocking the biggest perch available for purchase does not help to curb predation. Because stocked perch probably do not last very long after they’re released, the Solberg Lake Association might consider redirecting their resources toward habitat improvements that could increase production in the native perch population. Installing submerged woody materials near shore would increase the amount of substrate available for Yellow Perch to attach their adhesive eggs. The lake association could revitalize its earlier project to bundle and sink discarded Christmas trees as non-traditional fish cribs that could be installed under an exemption from the department’s permitting requirements for fish and wildlife habitat improvement projects. The structures should be placed with branches intact, weighted with natural stone, and sunk at sufficient depth to attenuate egg-damaging ultraviolet light. The requirement to have a 5-foot minimum depth over the top of any fish crib structure should also prevent sunburn on perch eggs in Solberg Lake’s stained water.

### NORTHERN PIKE

Early spring fyke nets set for spawning Walleye incidentally captured 66 Northern Pike at a rate of 2.1 pike per net-night. That catch rate was between the 50<sup>th</sup> and 75<sup>th</sup> percentile values for Northern Pike in cool, dark lakes with complex fish communities. Pike ranged from 14.9-34.0 inches and averaged 19.6 inches. Only 17% were  $\geq 21$  inches, and only one fish surpassed 27 inches, growing to memorable size  $\geq 34$  inches. In our early spring electrofishing survey, we caught 29 Northern Pike at rates of 2.5 pike  $\geq 14$



inches per mile or 4.9 per hour. Those pike were between 13.5-22.0 inches and 17.3 inches on average, with only 4% at least 21 inches long. With such disappointing size structure in the pike population, it is not surprising that many anglers view Solberg Lake’s abundant and small Northern Pike as bait-stealing nuisances that interfere in their pursuit of more highly prized sportfish. Management options to improve pike population status are limited because Solberg Lake lacks the cool thermal conditions necessary to produce preferred-size pike  $\geq 28$  inches consistently. To possibly increase the average size in the pike population, the Solberg



Lake Association could encourage anglers to keep and eat the small- and intermediate-size pike 18-21 inches long that were most abundant in our recent samples. Anglers may keep a daily bag limit of five Northern Pike of any size.

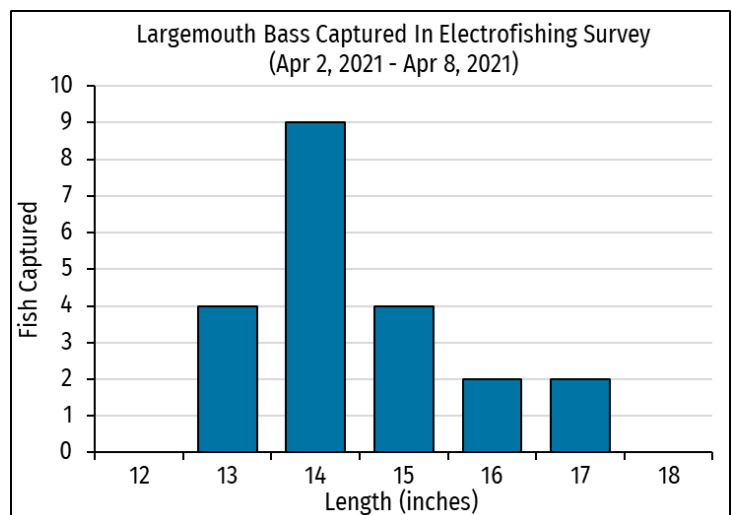
### MUSKELLUNGE

Our spring 2021 samples included eight Muskellunge ranging from 11 to 48 inches long. However, our combined catch probably does not reflect the musky population’s status because the netting and electrofishing efforts directed toward Walleye in early spring and the electrofishing effort aimed at black bass in late spring did not coincide with the optimal water temperature and day length that trigger musky spawning near shore where adults would be vulnerable to our sampling gear. So, we are reluctant to compare catch statistics from small samples with our population density and size structure objectives. Nonetheless, we can infer that musky in Solberg Lake are able to approach or attain trophy size  $\geq 50$  inches.

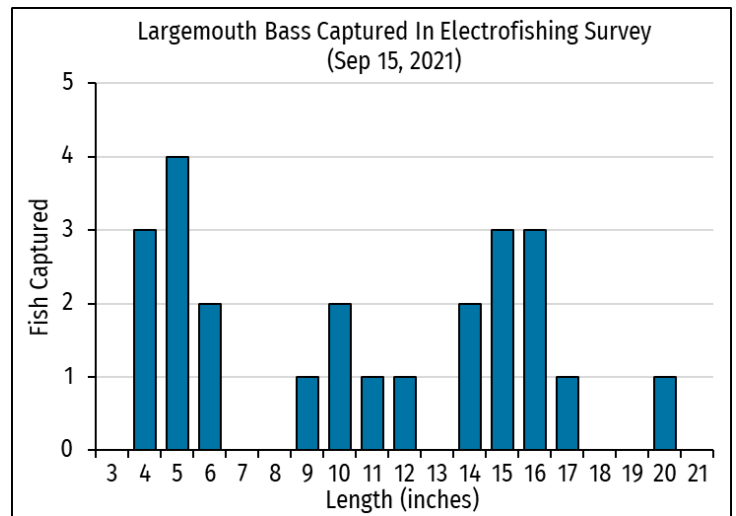
We also have convincing evidence that natural reproduction is adding new recruits to the adult population. We captured 21 young Muskellunge  $< 20$  inches long in 10 surveys since 2000 when the DNR suspended musky stocking in Solberg Lake. The largest muskies in recent surveys may have survived from the last few stocked year classes, but the fingerlings, yearlings and intermediate-size fish we routinely encounter show an unquantified level of in-lake recruitment. We hope that natural recruitment without stocking can meet our goals for a musky population at low to moderate density (0.1-0.2 adults per acre) with moderate proportions of preferred- and memorable-size fish (20-40%  $\geq 38$  inches and 10-20%  $\geq 42$  inches). Time will tell as the remaining stocked cohorts die to natural causes and angling. In 2011, when the minimum length limit on Muskellunge increased from 34 inches to 40 inches statewide, the DNR applied the special 28-inch minimum length limit to muskies in Solberg Lake to reserve harvest opportunities for the stakeholders who expressed their distinctive preference to occasionally keep a Muskellunge. We suspect that avid musky anglers will release their catch and few, if any, Muskellunge will be kept, regardless of which regulation is in effect. Netting surveys to estimate adult density in 2026 and 2027 will help us decide if we should adjust our hands-off management strategy.

### LARGEMOUTH BASS

Late spring electrofishing, our chosen method to assess black bass population status, captured four Largemouth Bass between 10-16.2 inches at rates of 1.0 bass per mile or 2.1 per hour. All other samples had more Largemouth Bass in 2021. Bass are usually scarce in fyke net catches, but early spring netting yielded 12 legal-size Largemouth Bass between 14.2-17.8 inches long. We captured 21 Largemouth Bass in our early spring electrofishing effort aimed at spawning Walleye. Those bass ranged from 13.5-17.0 inches and averaged 14.7 inches

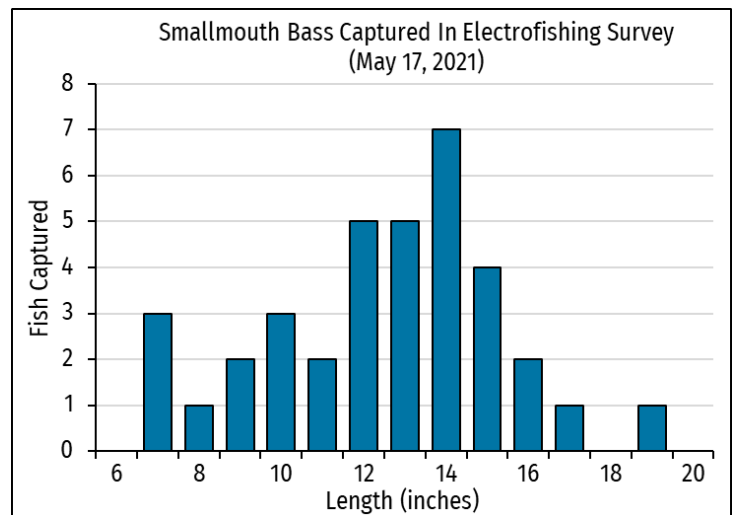


long, and catch rates were 1.9 bass per mile or 3.7 per hour. In the fall electrofishing assessment of walleye recruitment, we captured 24 Largemouth Bass at rates of 1.5 bass  $\geq$  8 inches per mile or 4.1 per hour. They ranged from 4.1-20.0 inches and averaged 10.9 inches, and two-thirds of those  $\geq$  8 inches in that sample were legal-size fish  $\geq$  14 inches long. All electrofishing catch rates in 2021 point to low population abundance, similar to those recorded in 2008 and 2014 when Largemouth Bass size structure was mediocre. Now, our small electrofishing samples from early spring and fall of 2021 include higher proportions of legal-sized Largemouth Bass  $\geq$  14 inches (67-81%), preferred-sized bass  $\geq$  15 inches (38-53%) and memorable-sized bass (0-7%).



### SMALLMOUTH BASS

Late spring electrofishing captured 36 Smallmouth Bass that ranged from 7.1-19.6 inches and averaged 13.0 inches at rates of 9.0 bass per mile and 18.9 per hour. We captured Smallmouth Bass nine times faster than Largemouth Bass in 2021. In stark contrast, electrofishing catch rates indicated that Largemouth Bass were nearly two and three times as abundant as Smallmouth Bass in late spring of 2008 and 2014. Electrofishing catch rates of 2.2 Smallmouth Bass per mile in early spring and 1.6 per mile in fall of 2021 reveal low to moderate abundance. In late spring, 42% of Smallmouth Bass  $\geq$  7 inches were preferred- and legal-sized fish  $\geq$  14 inches and 6% attained memorable size  $\geq$  17 inches long.



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

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