

WISCONSIN DEPARTMENT OF NATURAL RESOURCES
Fisheries Survey Report for Big Sand Lake,
Burnett County, WI 2022

Waterbody Code 2676800



Craig M. Roberts
DNR Fisheries Biologist
January 2023

Introduction

Big Sand Lake was surveyed in 2022 to assess the status of the fishery. We indexed the catch rates of Walleye, Northern Pike, Largemouth Bass and panfish species. We assessed general population characteristics, size structure and growth of all species. Recent management activities have focused on regulation changes, public outreach and education.

LAKE CHARACTERISTICS

Big Sand Lake is a shallow and moderately fertile lake (Tables 1 & 2). More information on water quality and invasive species can be found at Wisconsin Department of Natural Resources (DNR) Lake Page for [Big Sand Lake](#). Big Sand Lake is classified as a Complex-Warm-Clear Lake (Rypel et al. 2019). Big Sand Lake has one public boat landing. This landing is located off Olsen Rd.

Table 1. Lake and watershed characteristics for Big Sand Lake, Burnett County, WI.

Size (ac)	1,434
Max depth (ft)	55
Mean depth (ft)	9
Watershed Area (ac)	4,961
Lake class	Complex-Warm-Clear

Table 2. June – August mean Trophic State Index (TSI) values for Big Sand Lake, Burnett County, WI.

Secchi Disk Visibility	43
Total Phosphorus	-
Chlorophyll A	-

STOCKING HISTORY

Walleye are the only species currently stocked into Big Sand Lake. These fish are stocked by the St Croix Tribe. Tribal stockings have made up all stockings since 2011 (Appendix Table 1).

FISHING REGULATIONS

There are currently no special regulations in Big Sand Lake. All species either follow the statewide, Ceded Territory or county fishing regulations.

Methods

Big Sand Lake was sampled during 2022 following DNR's assessment protocol to sample Walleye, Northern Pike, Largemouth Bass and panfish (Appendix Table 2). Northern Pike and Walleye were indexed with an early spring electrofishing (SE1) survey shortly after ice-out on April 21. A late spring electrofishing (SE2) survey was

done on June 2 to assess Largemouth Bass and panfish populations, but Walleye were also collected. This survey consisted of two 0.5-mile index stations where all Largemouth Bass, Walleye and panfish were captured and two 1.5-mile stations where only Largemouth Bass and Walleye were collected.

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

Largemouth 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-Warm-Clear Wisconsin lakes. 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 and longer divided by the number of fish of stock length or longer, the result multiplied by 100 (Appendix Table 3).

Results and Discussion

NORTHERN PIKE

There were 20 Northern Pike collected during the SE1 survey for a catch rate of 3.3 fish/mile. This catch rate was identical to 2008. Northern Pike ranged in length from 10.5 to 35.5 inches. The average length was 14.9 inches, which was lower than 2008 (17.0 inches). Lake class comparisons were not made due to gear differences and PSD was not calculated because of low sample size.

The Northern Pike population in Big Sand Lake appears to have low density and low size structure. In general, fyke netting is a better sampling method for Northern Pike. However, time constraints with other surveys did not allow us to net Big Sand Lake. Northern pike are likely more abundant than our survey suggests, but this survey provided a good index of the presence of smaller fish. The current northern pike regulation (no minimum length limit, five fish daily bag limit) encourages harvest of small pike which should reduce density and increase size structure.

WALLEYE

There were eight Walleye collected during the SE1 survey for a catch rate of 1.3 fish/mile. This catch rate was a slight increase from 2008 (0.7 fish/mile). When combined with walleye collected from the SE2 survey, there were 19 fish collected and lengths ranged from 7.5 to 22.0 inches (Figure 1). Average length of Walleye was 11.0 inches. Lake class comparisons were not made due to gear differences and PSD was not calculated because of low sample size.

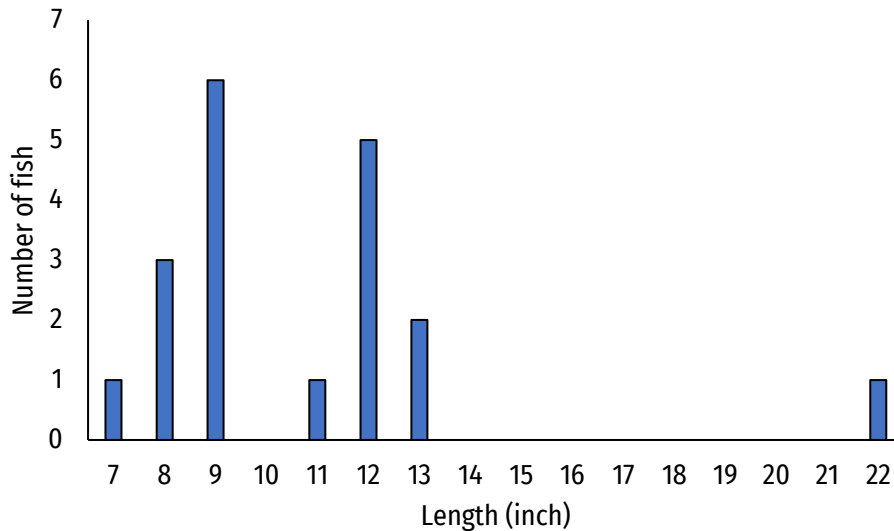


Figure 1. Length frequency of Walleye collected in Big Sand Lake during the SE1 and SE2 surveys (n=19).

Walleye are at extremely low densities in Big Sand Lake. Walleye are purely sustained by tribal stockings. Seventy four percent of the walleye collected were stocked juveniles (< 13 inches). This fishery does not seem to be well suited for walleye based on the low number of adult walleye collected. However, walleye stockings are not hurting the overall fish community, but Big Sand Lake may continue to see poor returns when stocked with Walleye.

LARGEMOUTH BASS

There were 115 Largemouth Bass collected during the SE2 survey for a catch rate of 28.8 fish/mile. This catch rate decreased from 2008 (37.5 fish/mile) but was above the 50th percentile for Complex-Warm-Clear lakes. Largemouth Bass averaged 11.5 inches, an increase from 2008 (10.9 inches) and ranged from 6.5 to 21.5 inches (Figure 2). This average met the 90th percentile for Complex-Warm-Clear lakes in Wisconsin. The PSD was 48, which was a large increase from 2008 (28). Largemouth Bass had poor growth and grew below lake class average for most ages; however, the growth was similar to 2008.

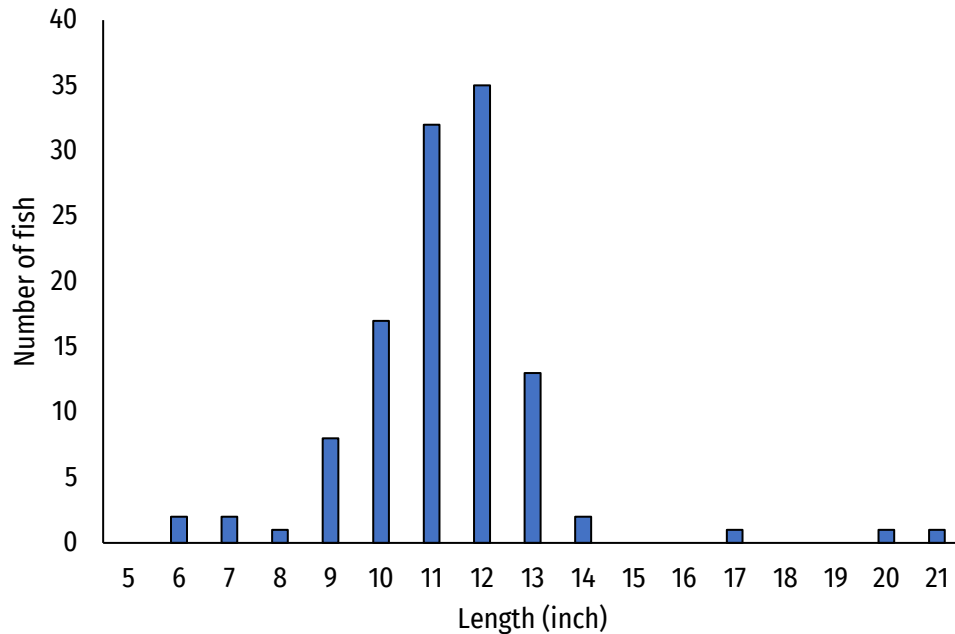


Figure 2. Length frequency of Largemouth Bass collected in Big Sand Lake during the 2022 SE2 survey (n=115).

Largemouth bass abundance decreased while size structure improved since 2008. Overall, the average size increased but the number of fish over 14 inches is not greater. This change may be related to increased harvest of small bass since the regulation change in 2012. This regulation seems to be working, however more harvest will likely be needed to increase the bass growth potential in Big Sand Lake.

PANFISH

There were 159 Bluegill collected during the SE2 survey for a catch rate of 159.0 fish/mile. This catch rate was an increase from 2008 (130 fish/mile) and also above the 50th percentile for Complex-Warm-Clear lakes. Bluegill averaged 5.4 inches, similar to 2008 (5.7 inches) and ranged from 1.9 to 8.8 inches (Figure 3). This average was above the 95th percentile for Complex-Warm Clear lakes. The PSD was 42, a decrease from 63 in 2008. Bluegill grew well below the median for Complex-Warm-Clear lakes; however, this growth was also similar to 2008.

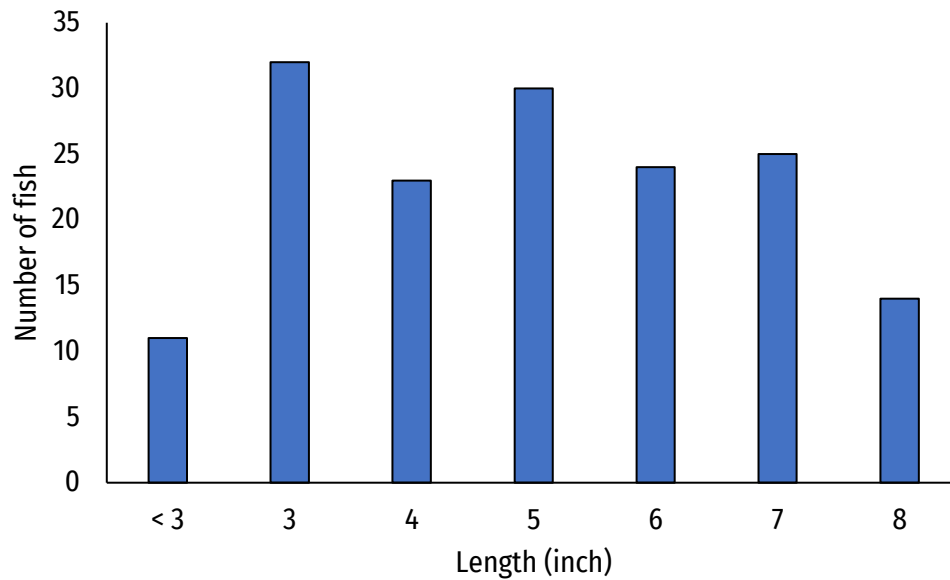


Figure 3. Length frequency of Bluegill collected in Big Sand Lake during the 2022 SE2 survey (n=159).

There were 23 Pumpkinseed collected during the SE2 survey for a catch rate of 15.3 fish/mile. Pumpkinseeds averaged 7.3 inches and ranged from 6.0 to 8.5 inches. This average was above the 95th percentile for Complex-Warm-Clear lakes.

Bluegill are currently the most abundant panfish species present in Big Sand Lake. Pumpkinseed, Yellow Perch and Rock Bass were found at lower densities. Bluegill size structure was lower compared to 2008 but still at the recommended standards for a panfish fishery (Neumann et al. 2013). Overall, Bluegill appear to have a healthy population in Big Sand Lake and no management changes are recommended at this time.

Recommendations

1. Walleye are present at extremely low densities and sustained by tribal stocking. This lake has historically had a low density, remnant population of walleye. Given the low fertility and low stocking survival of past walleye stocking, no management recommendations are suggested to bolster this population.
2. The Northern Pike population seems healthy and comparable to the last survey. This population provides a good angling and harvest opportunity, and no management changes are recommended. Fyke netting should be the sampling method in the next survey, if possible.

3. Largemouth Bass are present at moderate densities and their size structure has improved since 2008. The no minimum length limit offers a harvest opportunity and may have improved the population; therefore no management changes are recommended. Further size structure improvement may be seen if anglers harvest small bass (<14 inches).
4. Bluegill are abundant in Big Sand Lake and size structure has decreased slightly since 2008. No management changes are recommended.
5. Efforts to increase habitat complexity in Big Sand Lake should also be encouraged, where applicable. Inputs of coarse woody habitat, protection/promotion of aquatic vegetation and maintenance/restoration of vegetative buffers are needed habitat work in Big Sand Lake. This website <https://healthylakeswi.com/> is a great resource to learn more.
6. 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

Special thanks to Kent Bass, Misty Rood, and Kallie Thompson for conducting field collection, aging and data entry.

References

- 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.
- 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.

Appendix Table 1. Fish stocking records for Big Sand Lake, Burnett County, WI. 2000-2022.

Year	Species	Age Class	Number Stocked	Avg. Length (in)	Source
2000	WALLEYE	SMALL FINGERLING	40950	3.4	TRIBAL
2000	WALLEYE	SMALL FINGERLING	70000	1.6	DNR
2000	WALLEYE	LARGE FINGERLING	932	3.6	TRIBAL
2002	WALLEYE	SMALL FINGERLING	70000	1.3	DNR
2002	WALLEYE	SMALL FINGERLING	1424	2.9	TRIBAL
2002	WALLEYE	LARGE FINGERLING	179	6.7	TRIBAL
2003	WALLEYE	SMALL FINGERLING	3162	2.5	TRIBAL
2003	WALLEYE	LARGE FINGERLING	1575	4.9	TRIBAL
2004	WALLEYE	SMALL FINGERLING	70973	1.1	DNR
2005	WALLEYE	SMALL FINGERLING	2335	4.2	TRIBAL
2006	WALLEYE	SMALL FINGERLING	9718	3.1	TRIBAL
2006	WALLEYE	SMALL FINGERLING	48994	1.7	DNR
2008	WALLEYE	SMALL FINGERLING	49076	1.6	DNR
2011	WALLEYE	LARGE FINGERLING	485	5.9	TRIBAL
2013	WALLEYE	LARGE FINGERLING	290	4	TRIBAL
2014	WALLEYE	SMALL FINGERLING	11688	2.3	TRIBAL
2015	WALLEYE	FRY	376956	0.6	TRIBAL
2015	WALLEYE	LARGE FINGERLING	679	8.1	TRIBAL
2015	WALLEYE	FRY	111142	0.6	TRIBAL
2016	WALLEYE	FRY	191577	0.5	TRIBAL
2016	WALLEYE	LARGE FINGERLING	3315	6.9	TRIBAL
2017	WALLEYE	LARGE FINGERLING	1708	6.9	TRIBAL
2017	WALLEYE	FRY	242205	0.5	TRIBAL
2018	WALLEYE	LARGE FINGERLING	2101	6.5	TRIBAL
2018	WALLEYE	FRY	65188	0.5	TRIBAL
2019	WALLEYE	SMALL FINGERLING	238578	0.7	TRIBAL
2020	WALLEYE	FRY	175245	0.5	TRIBAL
2020	WALLEYE	LARGE FINGERLING	1407	7.5	TRIBAL
2021	WALLEYE	LARGE FINGERLING	1126	7.2	TRIBAL
2021	WALLEYE	SMALL FINGERLING	8445	2	TRIBAL
2022	WALLEYE	LARGE FINGERLING	1345	7.4	TRIBAL
2022	WALLEYE	FRY	267353	0.5	TRIBAL

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



A DNR Technician lifting a fyke net



A DNR electrofishing boat

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