WISCONSIN DEPARTMENT OF NATURAL RESOURCES

2021 Comprehensive Summary Report
Brekke Lake, Waupaca County
183000

Introduction And Objectives

In 2021, the Wisconsin Department of Natural Resources (DNR) conducted a comprehensive fish survey of Brekke Lake in order to provide insight and direction for the future fisheries management of this system. Comprehensive fish surveys include both spring fyke netting and spring electrofishing surveys. The primary sampling objectives of these surveys are to characterize species composition, relative abundance and size structure. The following report is a brief summary of the activities conducted, general status of fish populations and future management options for Brekke Lake.

DNR Contact

Elliot Hoffman - Fisheries Technician Advanced
647 Lakeland Rd.
Shawano, WI
Phone: 920-420-9581
Email: Elliot.hoffman@Wisconsin.gov

Lake Information

Combined Acres:46
Max. Depth: 25
Shoreline Miles: 1.3
Public Access: 1 Boat Landing

Regulations

Statewide regulations, 14-18 inch protected slot limit of largemouth and smallmouth bass, with a daily bag limit of 3 with only 1 over 18 inches.

SURVEY INFORMATION

Site Location	Survey Dates	Water Temperature (°F)	Target Species	Gear	Number of Nets	Effort
Brekke Lake	4/26/2021 - 5/5/2021	51 - 56	black crappie	Fyke Net	4	36
Brekke Lake	5/17/2021	68	bass and panfish	Boomshocker	N/A	1.0 miles

Metric Descriptions

- **Catch per unit effort (CPUE) is an index used to measure fish population relative abundance**, which simply refers to the number of fish captured per unit of distance or time. For netting surveys, we typically quantify CPUE by the number and size of fish per net night. For electrofishing, we quantify CPUE as the number caught per mile of water electrofished. CPUE indexes are compared to statewide data by percentiles and within lake trends. For example, if a CPUE is in the 90th percentile, it is higher than 90% of the other CPUEs in the state.
- **Proportional Stock Density (PSD) is an index used to describe the size structure of fish populations.** It is calculated by dividing the number of quality size fish by the number of stock size fish for a given species. PSD values between 40 - 60 generally describe a balanced fish population.
- **Length frequency distribution (LFD) is a graphical representation of the number or percentage of fish captured by half-inch or one-inch size intervals.** Smaller fish (or younger age classes) may not always be represented in the length frequency due to different habitat usage or sampling gear limitations.
- **Mean age at length is an index used to assess fish growth.** Calcified structures (e.g., otoliths, spines or scales) are collected from a specified length bin of interest (e.g., 7.0-7.5 inches for bluegill). Mean age is compared to statewide data by percentile, with growth characterized by the following benchmarks: slow (<33rd percentile), moderate (33rd to 66th percentile) and fast (>66th percentile).

Survey Method

- Brekke Lake was sampled according to spring netting III (SNIII) and spring electrofishing II (SEII) protocols as outlined in DNR Fisheries Monitoring Protocols. The primary objective of the spring netting III is to count and measure panfish, in this instance particularly black crappie. The primary objective of the spring electrofishing II survey is to count and measure adult largemouth bass, smallmouth bass and panfish. Other species of fish may be sampled during each survey but are considered by-catch as part of that survey.
- Boom shockers were used to electrofish 1.0 miles of shoreline. Gamefish were collected and measured throughout, and panfish were collected and counted along 1.0 miles of shoreline.
- Fyke nets were deployed in areas of the lake that contained spawning habitat or were likely travel areas for black crappie. All newly captured individuals were marked with a fin clip. Aging structures (otoliths) were taken from a sample of bluegill and black crappie for age and growth analyses.

RELATIVE ABUNDANCE — CATCH PER UNIT EFFORT (CPUE)

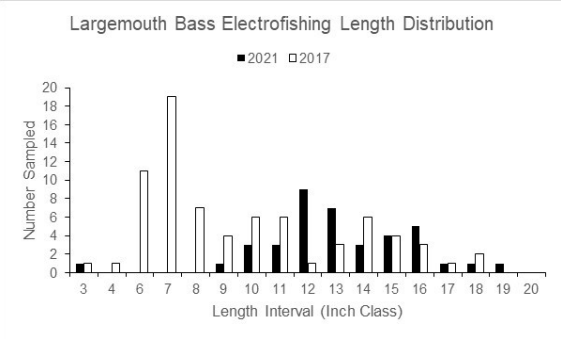
Species	Protocol	Total Number Captured	CPUE	Units	Statewide Percentile	Abundance Rating	Length Index	Length Index CPUE	Length Index Percentile	Length Index Abundance Rating
largemouth bass	Spring Electrofishing II	40	40.0	fish/mile	81st	Moderate - High	>14.0 inches	15.0	93rd	High
black crappie	Spring Fyke Netting III	41	1.1	fish/net night	28th	Low	>8.0 inches	0.9	N/A	N/A
bluegill	Spring Electrofishing II	285	285.0	fish/mile	89th	Moderate - High	>7.0 inches	2.0	33rd	Low
pumpkinseed	Spring Electrofishing II	27	27.0	fish/mile	82nd	Moderate - High	>7.0 inches	1.0	63rd	Moderate
yellow perch	Spring Electrofishing II	8	8.0	fish/mile	47th	Moderate	>8.0 inches	0	-	Low

Largemouth Bass

- Largemouth Bass (*Micropterus salmoides*) are a common predatory fish species found in many Wisconsin waterbodies. Largemouth bass typically spawn in shallow nearshore areas consisting of sand/mud or gravel substrate at approximately 60-70°F water temperatures. Electrofishing is the preferred sampling gear for largemouth bass. All results presented for largemouth bass are from spring electrofishing surveys.

2021 SIZE STRUCTURE METRICS

Total Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Size (inches)	Stock Number	Quality Number	PSD	Percentile Rank	Size Rating
40	13.4	3.6 - 19.8	8.0 and 12.0	38	31	82	84th	Moderate - High



SIZE STRUCTURE (PSD) TRENDS

PSD by Year		Historical Median
2012	2021	
47	82	65

RELATIVE ABUNDANCE TRENDS (CPUE = NUMBER PER MILE)

CPUE by Year		Historical Median
2012	2021	
78.9	40.0	59.5

Black Crappie

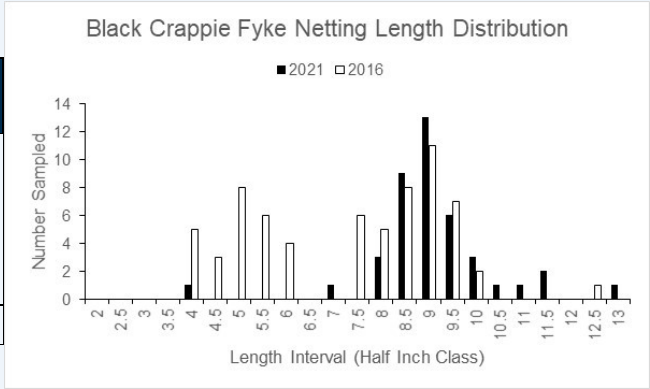
- Black crappie (*Pomoxis nigromaculatus*) are a common panfish species distributed widely across many Wisconsin waterbodies. Black crappies typically spawn in nearshore areas consisting of detritus, sand, mud or gravel substrate at approximately 58-68°F water temperatures. Electrofishing and fyke netting can be effective sampling gear for black crappie and therefore, results from both gears are presented for black crappie

2021 SIZE STRUCTURE METRICS

Year	Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Size (inches)	Stock	Quality	PSD	Percentile Rank	Size Rating
2016	66	7.5	(4.2 - 12.8)	5.0 and 8.0	58	34	59	48th	Moderate
2021	41	9.3	4.4 - 13.2)	5.0 and 8.0	40	39	98	96th	High

FYKE NETTING CPUE TRENDS (NUMBER PER NET NIGHT)

2021 Number Sampled	2012	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
41	5.5	1.1	33	28th	Low



GROWTH METRICS

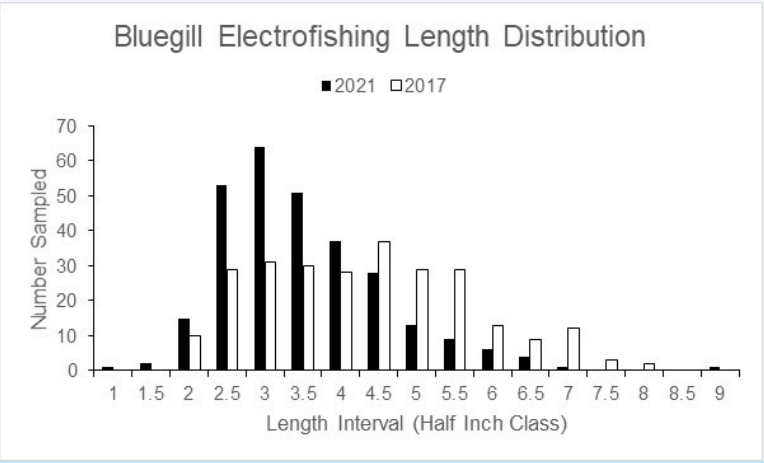
Species	Total	Length Bin	Mean Age	Age Range	Percentile Rank	Growth Rating
black crappie - 2016	5	7.5 - 8.4	4.8	4 - 5	35th	Moderate
black crappie - 2016	4	9.5 - 10.4	5.8	5 - 7	45th	Moderate
black crappie - 2021	3	7.5 - 8.0	4.0	4	64th	Moderate
black crappie - 2021	7	9.5 - 10.4	5.1	4 - 7	56th	Moderate

Bluegill

- Bluegill (*Lepomis macrochirus*) are a common panfish species distributed widely across many Wisconsin waterbodies. Bluegills typically spawn in nearshore areas consisting of sand, mud or gravel substrate at approximately 67-80°F water temperatures. Electrofishing is the standard sampling gear for bluegill but fyke netting can show some information as well. When comparing bluegill populations to other waterbodies electrofishing data is to be used for our surveys.

2021 SIZE STRUCTURE METRICS

Year	Number Measured	Average Length	Length Range	Stock and Quality Size	Stock	Quality	PSD	Percentile Rank	Size Rating
2017	262	4.6	2.2 - 8.1	3.0 and 6.0	223	39	17	25th	Low
2021	285	3.8	1.5 - 9.1	3.0 and 6.0	214	12	6	7th	Low



ELECTROFISHING TRENDS CPUE (NUMBER PER MILE)

CPUE by Year		Historical Median
2017	2021	
262.0	285.0	274.0

2021 GROWTH METRICS

Species	Total	Length Bin	Mean Age	Age Range	Percentile Rank	Growth Rating
Bluegill - 2016	6	5.5 - 6.4	6.0	5 - 7	16th	Slow
Bluegill - 2016	4	6.5 - 7.4	5.8	5 - 6	33rd	Slow
Bluegill - 2021	4	5.5 - 6.4	5.5	5 - 6	24th	Slow
Bluegill - 2021	3	6.5 - 7.4	6.3	6 - 7	19th	Slow

Full Summary

Largemouth Bass

Largemouth bass PSD was higher than desired and current regulations may need to be changed in the future. Low numbers of smaller fish in the system could be problematic with fewer recruits in the future. Continue to protect predators in the lake to control panfish numbers to increase size structure and decrease the abundance levels of bluegill.

Black Crappie

The black crappie fishery in Brekke Lake is an average fishery. Since the last fyke netting survey in 2016 the average size has increased by 1.5–inches, while the abundance levels have decreased. Growth of black crappie in Brekke Lake is average but they can 8.0 inches in four years, while growing to 10.0-inches in 5 years. Black crappie provide a fishing opportunity even at low levels in Brekke Lake. The fluctuating year class strength has the potential to change some of the metrics. The goal for black crappies in Brekke Lake is to maintain the fishery.

Bluegill

Bluegill were the dominant panfish species captured in our surveys. Densities of bluegills were moderate to high and size structure has declined since 2017, PSD was 6, and 2.0 bluegill >7.0-inches were captured per mile of electrofishing. Bluegill growth rates in Brekke Lake are slow, reaching 6.0-inches in 6 years. We will continue to work with the Panfish Team to evaluate the 2016 rules on a statewide basis and make changes as needed. Population metrics will be re-evaluated in five years to compare among lakes with experimental panfish regulations.

Other Management Recommendations

Continue to work with the Brekke Lake Association and other groups to add fish sticks/large wood debris to Brekke Lake. Brekke Lake has minimal vegetation and also lacks overhead cover for fish.