WISCONSIN DEPARTMENT OF NATURAL RESOURCES

2022 Comprehensive Summary Report
Hatch Lake, Waupaca County
282800

Introduction And Objectives

In 2022, the Wisconsin Department of Natural Resources conducted a comprehensive fish survey of Hatch 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 Hatch Lake.

DNR Contact

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Lake Information

Lake Acres:113
Max. Depth: 12
Shoreline Miles: 2.1
Public Access: 1 Boat Landing

Regulations

Statewide regulations except for largemouth/smallmouth bass, which has a one bag limit and 18-inch minimum length requirement.

SURVEY INFORMATION

Site Location	Survey Dates	Water Temperature (°F)	Target Species	Gear	Number of Nets	Effort
Hatch Lake	4/11/2022 - 4/16/2022	38 - 46	Northern Pike Walleye	Fyke Net	5	25 net nights
Hatch Lake	5/23/2022	70	Bass/Panfish	Boomshocker	N/A	2.1 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

- Hatch Lake was sampled according to spring netting I (SNI) and spring electrofishing II (SEII) protocols as outlined in the DNR Fisheries Monitoring Protocols. The primary objective of the SNI survey is to count and measure adult walleye and northern pike, and mark adult walleyes to estimate walleye abundance. The primary objective of the SEII 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 2.1 miles of shoreline. Gamefish were collected and measured throughout. 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 northern pike and walleye. All newly captured individuals were marked with a fin clip. Aging structures (spines/otoliths) were taken from a sample of northern pike, bluegill and black crappie for age and growth analyses.

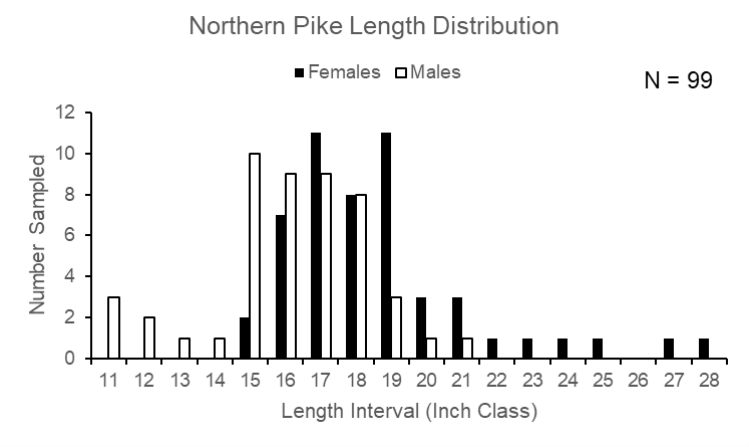
RELATIVE ABUNDANCE — CATCH PER UNIT EFFORT (CPUE)

Species	Protocol	Total Number Captured	CPUE	Units	Statewide Percentile
Northern Pike	Spring Netting I	102	4.1	fish/net night	75th
Walleye	Spring Netting I	11	0.4	fish/net night	15th
Largemouth Bass	Spring Electrofishing II	48	23.3	fish/mile	65th
Black Crappie	Spring Electrofishing II	0	0	fish/mile	N/A
Bluegill	Spring Electrofishing II	58	58.0	fish/mile	39th
Pumpkinseeds	Spring Electrofishing II	11	11	fish/mile	60th

Northern Pike

- Northern pike (*Esox lucius*) are a common predatory fish species found across many Wisconsin waterbodies. Northern Pike spawn in areas of emergent vegetation at approximately 34-40°F water temperatures. Fyke netting is the preferred sampling gear for northern pike. All results presented for northern pike are from SNI surveys.

YEAR 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
99	17.9	11.2 - 28.6	14.0 and 21.0	93	10	11	7th	Low



RELATIVE ABUNDANCE (CPUE = NUMBER PER NET NIGHT)				
Total Sampled	2003	2022	2022 Statewide Percentile Rank	2022 Abundance Rating
102	6.12	4.1	75th	Moderate - High

SIZE STRUCTURE (PSD) TRENDS	
PSD by Year	
2003	2022
64	11

2022 GROWTH METRICS					
Number Sampled	Length Bin (inches)	Sex	Mean Age	Age Range	Growth Rating
5	18.0-18.9	M	2.6	2 - 3	84th
5	18.0-18.9	F	2.8	2 - 3	63rd

Species Summary

- Hatch Lake supports a moderate to high density northern pike population, with 2022 catch rates at 4.1 fish per net night. A catch rate of 4.1 per net night ranks in the 75th percentile when compared to northern pike catch rates statewide. When compared to past surveys, the 2022 northern pike catch rates have decreased slightly.
- The size structure of northern pike in the 2022 survey was low with a PSD of 11, which ranks in the 7th percentile when compared to lakes statewide. The length ranges of male (11.2 - 21.0 inches) and female (15.3 - 28.6 inches) northern pike are within the ranges commonly found statewide; however, there were a number of individuals measuring in the lower end of the range that brought the overall PSD score down. Size structure trends over the last surveys show a decrease in northern pike size structure.
- Ageing structures were collected for 18-inch male and female northern pike to compare against statewide data. Also, the age and growth information collected was used to assess the growth within Hatch Lake and can be used in analyses to compare the growth of northern pike from future surveys of Hatch Lake. The average age for 18-inch male northern pike was 2.6 years and 2.8 years for female northern pike, these rank at the 84th and 63rd percentiles respectively when compared to statewide northern pike data.

- Northern Pike along with other predator species play a vital role in the abundance of panfish. High densities of northern pike and largemouth bass may be a factor in the improved size structure of the panfish over the past two decades.

Walleye

- Walleye (*Sander vitreus*) are a predatory fish species found throughout many Wisconsin waterbodies. Typically, walleye migrate to spawn in areas of rock or gravel substrate at approximately 40-50°F water temperatures. Fyke netting and electrofishing are both suitable gears for capturing walleye; however, electrofishing was not conducted during this survey, and all results presented for walleyes are from fyke netting surveys.

YEAR 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
10	22.5	18.6 - 24.5	10.0 and 15.0	10	10	100	100th	High

RELATIVE ABUNDANCE (CPUE = NUMBER PER NET NIGHT)

Total Sampled	2003	2022	2022 Statewide Percentile Rank	2022 Abundance Rating
11	0.3	0.4	15th	Low

SIZE STRUCTURE (PSD) TRENDS

PSD by Year	
2003	2022
N/A	100

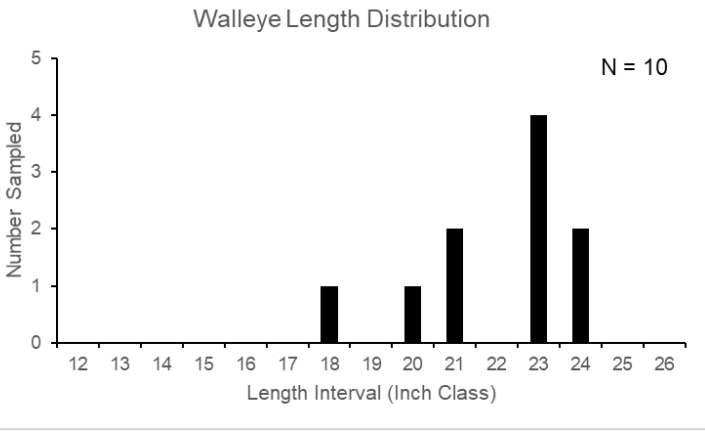



Photo Credit: DNR Staff


Photo Credit: DNR Staff

Species Summary

- Hatch Lake supports a low-density walleye population, with catch rates of 0.4 fish per net night. A catch rate of 0.4 fish per net night ranks in the 15th percentile when compared to lakes throughout Wisconsin. Catch rates remain low when compared to statewide rates. The hatch Lake walleye catch rates remain stable over time (CPUE of 0.4 and 0.3 in the 2003 and 2022 surveys, respectively).
- The size structure of walleyes in the 2022 survey was high with a PSD of 100, which ranks in the 100th percentile when compared to lakes statewide. The size structure is expected to be dominated by larger sized fish as the walleye population in Hatch Lake does not have a naturally reproducing walleye population. 2013 was the last year that Hatch Lake was stocked with walleye. Walleye stocking was halted due to limited survival/return to surveys or angling from previous stockings.
- The walleye population on Hatch Lake consists primarily of a lower density of large individuals which provides a limited harvest opportunity for anglers.

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.

YEAR 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
48	9.9	4.4 - 16.5	8.0 and 12.0	30	15	50	35th	Low - Moderate

2022 RELATIVE ABUNDANCE (CPUE = NUMBER PER MILE)

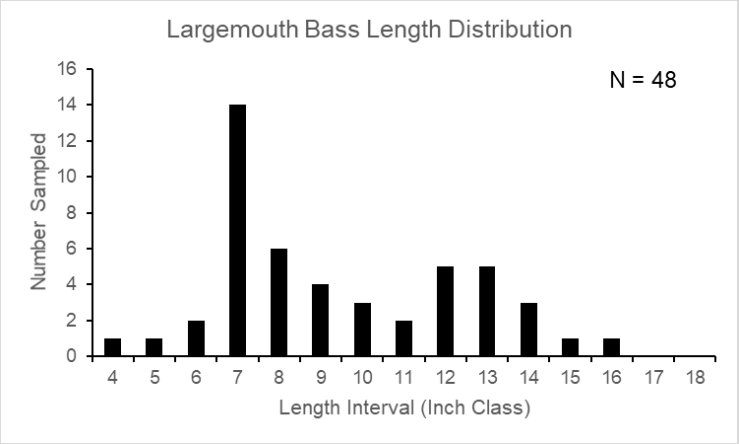
CPUE Total	Percentile Rank	Overall Abundance Rating	Length Index	Length Index CPUE	Length Index Percentile Rank	Length Index Abundance Rating
23.3	65th	Moderate - High	≥ 14.0 inches	2.4	45th	Moderate

SIZE STRUCTURE (PSD) TRENDS

PSD by Year			Historical Median
2003	2014	2022	
53	72	50	53

RELATIVE ABUNDANCE TRENDS (CPUE = NUMBER PER MILE)

CPUE by Year			Historical Median
2003	2014	2022	
31.1	8.1	23.3	23.3



Species Summary

- Hatch Lake supports a moderate-high density largemouth bass population, with catch rates of 23.3 fish per mile of electrofishing. A catch rate of 23.3 fish per mile ranks in the 65th percentile among lakes throughout Wisconsin. The relative abundance comparisons among years indicate that CPUE has increased nearly three times from the 2014 survey but is similar to what was found in the 2003 survey. Further, the CPUE of largemouth bass greater than 14 inches was moderate, which ranks in the 45th percentile when compared to statewide values.
- The size structure of largemouth bass in Hatch Lake was low-moderate with a PSD value of 50, which ranks in the 35th percentile when compared to statewide values. When compared to recent surveys on Hatch Lake, largemouth bass PSD values have remained relatively stable, indicating that the size structure of largemouth bass has been fairly consistent over the last several years.
- The current status of the largemouth bass population on Hatch Lake looks to be positive. Moderate-high relative abundance and a low-moderate size structure results in an angling opportunity to catch largemouth bass over a wide size range, but no fish over 18.0 inches were captured.
- A regulation change occurred in 2020 increasing the size limit to 18 inches and reducing the bag limit to one with the intention of increasing bass predation on panfish. Insufficient time has occurred to evaluate this new regulation. We will survey again in 2025 to evaluate effectiveness of this

Black Crappie

- Black Crappie (*Pomoxis nigromaculatus*) are a common panfish species distributed widely across many Wisconsin waterbodies. Black Crappie 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. Therefore, results from both gears are presented for black crappie

2022 SIZE STRUCTURE METRICS

Gear	Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Size (inches)	Stock	Quality	PSD	Percentile Rank	Size Rating
Fyke Netting	14	11.4	6.8 - 13.3	5.0 and 8.0	14	13	93	86th	High
Electrofishing	0	N/A	N/A	5.0 and 8.0	0	0	0	N/A	N/A

FYKE NETTING CPUE TRENDS (NUMBER PER NET NIGHT)

2022 Number Sampled	2003	2022	2022 Statewide Percentile Rank	2022 Abundance Rating
14	3.2	0.6	20th	Low

SIZE STRUCTURE (PSD) TRENDS FYKE NETTING

PSD by Year	
2003	2022
79	93

ELECTROFISHING CPUE (NUMBER PER MILE)

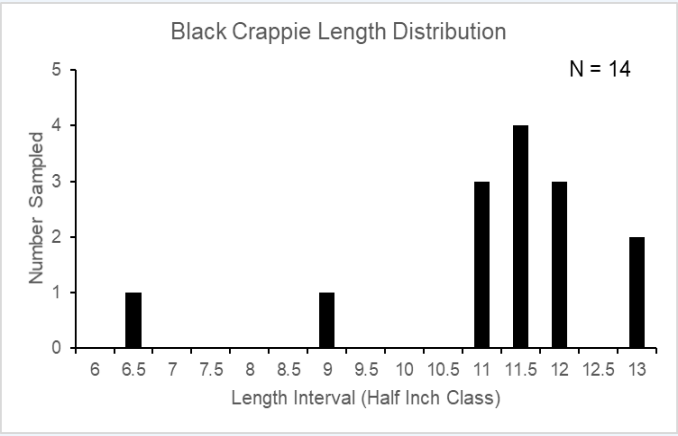
CPUE Total	Percentile Rank	Overall Abundance Rating	Length Index	Length Index CPUE	Length Index Percentile Rank	Length Index Abundance Rating
0	N/A	Low	≥ 8.0 inches	0	N/A	Low

ELECTROFISHING TRENDS CPUE (NUMBER PER MILE)

CPUE by Year			Historical Median
2003	2014	2022	
10.0	1.8	0	1.8

ELECTROFISHING SIZE STRUCTURE (PSD) TRENDS

PSD by Year			Historical Median
2003	2014	2022	
75	67	0	67



Species Summary

- Hatch Lake supports a low-density black crappie population, with catch rates of 0.6 fish per net night from the fyke netting survey and zero fish per mile of electrofishing from the boom shocking survey. The catch rate of 0.6 per net night ranks in the 20th percentile for fyke netting when compared to statewide data.
- The only size structure data collected was from fyke nets. In the fyke netting survey, crappies ranged from 11.0-13.0 inches in length. This provides a great example of why it can be informative to use results from both gears to assess the population status. The length data from the fyke netting survey resulted in a PSD value of 93, which is in the 86th percentile when compared to fyke netting data statewide.
- Population trends from previous fyke netting surveys on Hatch Lake indicate that size structure has improved since 2003 while relative abundance has declined. Black crappie have a tendency towards fluctuating year class strength, so this is not uncommon and with very few smaller sized black crappies available the lake is due for a larger year class of recruits.
- For the collection of otoliths, the most accurate way to age panfish, we would have needed to sacrifice fish. Given the low number of crappies captured, we decided not to collect age samples.

Bluegill

- Bluegill (*Lepomis macrochirus*) are a very 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.

2022 SIZE STRUCTURE METRICS

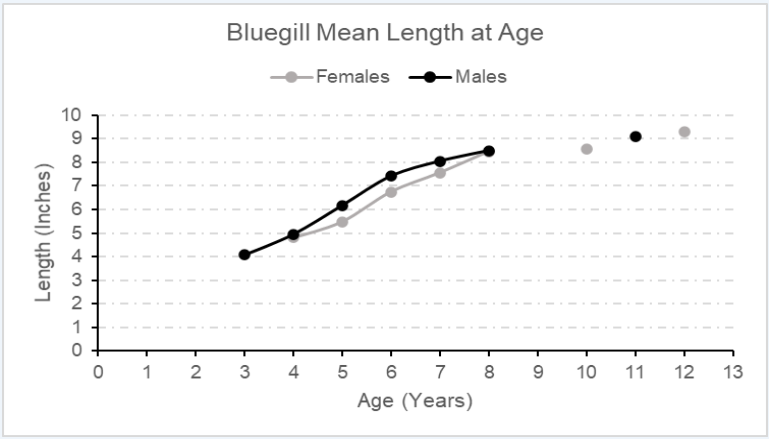
Gear	Number Measured	Average Length	Length Range	Stock and Quality Size	Stock	Quality	PSD	Percentile Rank	Size Rating
Fyke Netting	331	6.3	3.7 - 9.4	3.0 and 6.0	331	201	61	55th	Moderate
Electrofishing	58	4.4	2.2 - 7.5	3.0 and 6.0	41	16	39	57th	Moderate

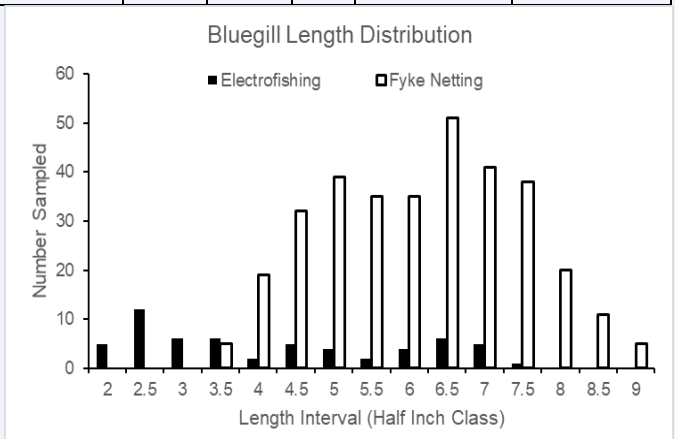
FYKE NETTING CPUE TRENDS (NUMBER PER NET NIGHT)

2022 Number Sampled	2003	2022	2022 Statewide Percentile Rank	2022 Abundance Rating
331	38.8	13.2	65th	Moderate

SIZE STRUCTURE (PSD) TRENDS FYKE NETTING

PSD by Year	
2003	2022
N/A	61





2022 GROWTH METRICS

Sample (n)	Length Bin	Sex	Mean	Age Range	Percentile	Growth Rating
11	5.5 – 6.4	M	4.8	4 - 6	42nd	Slow - Moderate
10	6.5 – 7.4	M	5.3	5 – 6	55th	Moderate
12	5.5 - 6.4	F	5.3	4 - 6	27th	Slow
14	6.5 – 7.4	F	6.1	5 - 7	24th	Slow

ELECTROFISHING CPUE (NUMBER PER MILE)

CPUE Total	Percentile Rank	Overall Abundance Rating	Length Index	Length Index CPUE	Length Index Percentile Rank	Length Index Abundance Rating
58.0	39th	Low - Moderate	≥ 7.0 inches	6.0	51st	Moderate

ELECTROFISHING TRENDS CPUE (NUMBER PER MILE)

CPUE by Year			Historical Median
2003	2014	2022	
348.0	124.2	58.0	124.2

ELECTROFISHING SIZE STRUCTURE (PSD) TRENDS

PSD by Year			Historical Median
2003	2014	2022	
4	23	39	23

Species Summary

- Hatch Lake supports a moderate density bluegill population with catch rates of 13.2 fish per net night from the fyke netting survey and 58.0 fish per mile of electrofishing from the boom shocking survey. Catch rates of 58.0 per mile rank in the 39th percentile. Catch rates of bluegill greater than 7 inches in the electrofishing survey was 6.0 per mile which ranks in the 51st percentile and is moderate when compared to lakes statewide.
- The size structure of bluegill in Hatch Lake was characterized as moderate based on data from the electrofishing survey. The length data collected from the electrofishing survey resulted in a PSD value of 39, which is in the 57th percentile when compared to statewide values.
- Population trends from previous electrofishing surveys on Hatch Lake indicate that size structure has improved over recent surveys. Moreover, relative abundance estimates have been declining when compared to past surveys. Protecting predators to decrease abundance levels while increasing the size structure has been the goal in the past few management decisions.
- The growth metrics calculated from age estimates indicate that bluegills in Hatch Lake have moderate to slow growth when compared to growth rates from bluegill populations across the state. Growth metrics were in the moderate rating for 6-inch bluegill, while 7-inch bluegills showed slower growth when comparing length bins and for both male and female sexes.

Pumpkinseeds

- Pumpkinseedss (*Lepomis gibbosus*) are a common panfish species distributed widely across many Wisconsin waterbodies. Pumpkinseedss typically spawn in nearshore areas consisting of sand or gravel substrate at approximately 60-70°F water temperatures. Electrofishing is the standard sampling gear for pumpkinseedss, but fyke netting can show some information as well. When comparing pumpkinseedss populations to other waterbodies, electrofishing data is to be used for our surveys.

2022 SIZE STRUCTURE METRICS

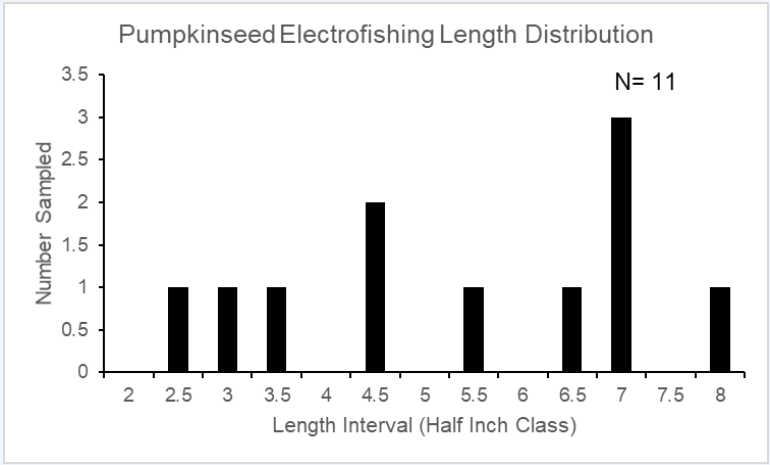
Gear	Number Measured	Average Length	Length Range	Stock and Quality Size	Stock	Quality	PSD	Percentile Rank	Size Rating
Fyke Netting	73	6.3	3.6 - 8.5	3.0 and 6.0	73	46	63	77th	Moderate-High
Electrofishing	11	5.6	2.6 - 8.4	3.0 and 6.0	10	5	50	66th	Moderate

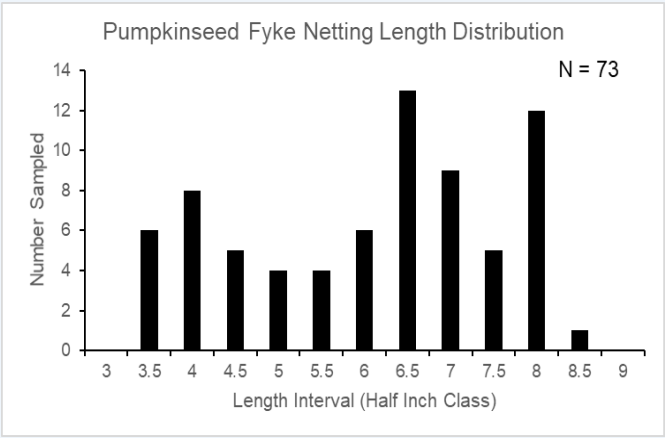
FYKE NETTING CPUE TRENDS (NUMBER PER NET NIGHT)

2022 Number Sampled	2003	2022	2022 Statewide Percentile Rank	2022 Abundance Rating
73	18.5	2.9	62nd	Moderate

SIZE STRUCTURE (PSD) TRENDS FYKE NETTING

PSD by Year	
2003	2022
N/A	63





ELECTROFISHING CPUE (NUMBER PER MILE)

CPUE Total	Percentile Rank	Overall Abundance Rating	Length Index	Length Index CPUE	Length Index Percentile Rank	Length Index Abundance Rating
11.0	60th	Moderate	≥ 7.0 inches	4.0	85th	High

ELECTROFISHING TRENDS CPUE (NUMBER PER MILE)

CPUE by Year			Historical Median
2003	2014	2022	
98.0	20.1	11.0	30.1

ELECTROFISHING SIZE STRUCTURE (PSD) TRENDS

PSD by Year			Historical Median
2003	2014	2022	
21	40	50	40

Species Summary

- Hatch Lake supports a moderate density pumpkinseeds population, with catch rates of 11.0 fish per mile of electrofishing from the boom shocking survey. Catch rates of 11.0 per mile rank in the 60th percentile. Catch rates of pumpkinseeds greater than 7 inches in the electrofishing survey was 4.0 per mile, which ranks in the 85th percentile and is high when compared to lakes statewide.
- The size structure of pumpkinseeds in Hatch Lake was characterized as moderate - high based on data from the electrofishing survey. Length data collected from the electrofishing survey resulted in a PSD value of 50, which is in the 66th percentile when compared to statewide values.
- Population trends from previous electrofishing surveys on Hatch Lake indicate that the size structure has increased over recent electrofishing surveys. The relative abundance has decreased based on data from the last electrofishing survey, which has followed a similar trend since 2003, as seen with the bluegill population. A management goal has been to control the abundance of panfish while also improving the size structure

Full Summary

Northern Pike

Hatch Lake supports a moderate density northern pike population with a low size structure. Although there were individuals captured up to 28 inches, the majority of the sample consisted of 15 - 20-inch fish. The results from age and growth analyses were impacted by a small sample size, but growth appears to be moderate to high for northern pike. Future age and growth work is warranted to confirm the 2022 findings. The northern portion of the lake, where it's likely most spawning occurs, was open water before sampling could begin because of ice on other portions of the lake blocked access. The first day of this survey had high water temperatures, along with mostly northern pike that were post spawn. This could be an indication that most of the northern pike population had already spawned and weren't able to be sampled, which could be a factor in missing some of the larger fish and having a lower PSD value.

Walleye

Data from the 2022 Hatch Lake survey indicates that the walleye population has remained similar to the 2003 survey. Although the relative abundance is considered low when compared to walleye populations statewide, Hatch Lake has not shown to have natural recruitment and shows a small population from stockings done prior to 2013. Moreover, the PSD value of 100 indicates a high size structure rating. With our low sample size, a population estimate was not conducted The Hatch Lake walleye population had seen little response from past stocking efforts, and the proposed stocking schedule was discontinued in 2013 to focus on the management of northern pike and largemouth bass as predators in Hatch Lake.

Largemouth Bass

The Hatch Lake largemouth bass population has fluctuated over the past several surveys, and currently shows a moderate - high density and a moderate size structure. Overall, the largemouth bass population is healthy, with moderate numbers of individuals to maintain positive population characteristics and help keep panfish populations from becoming overabundant through predation. The largemouth bass population provides a high-action fishery, with an average proportion of 14-inch or greater fish available for anglers. Population levels should be maintained for largemouth bass on Hatch Lake and continue to be monitored to see if there is any effect from the recent regulation change to one over 18 inches. At present, a lack of 18.0-inch largemouth bass is making this particular lake a catch and release fishery. Further age and growth analysis is recommended during the next survey.

Black Crappie

The black crappie population in Hatch Lake supports a low density and there is an excellent angling opportunity to catch a trophy black crappie. The 2022 survey results indicate that the black crappie population levels were low when compared to waterbodies throughout Wisconsin. There were very few black crappies surveyed with fyke nets, with most of the fish being greater than 11.0-inches. With the low relative abundance of black crappies, it is hoped that a year class is produced by the larger individuals present in Hatch Lake. With a low density of black crappies smaller recruits are needed to fill the void of the few larger black crappies that are most likely rather old, as age samples were not taken due to the need to sacrifice fish, which were not in high abundance.

Bluegill

Bluegill population characteristics quantified in the 2022 Hatch Lake survey show a decline in abundance and an increase in size structure from past surveys. Relative abundance and size structure metrics are at moderate levels. Growth was assessed on bluegills using age estimates from otolith cross sections, and results indicate larger bluegill have below average growth, while showing moderate growth for bluegills up to 6.0-inches in HatchLake compared to waterbodies statewide. Bluegill growth has shown faster growth rates than in 2014, which can be expected when abundance levels decline. It is likely still too early post-regulation to determine potential impact of the regulation change for largemouth bass on the bluegill population, but 2022 survey results did indicate that the catch rate of bluegills >7.0-inches per mile of electrofishing was moderate when compared to bluegill populations statewide. Although the size structure of bluegills could still improve, Hatch Lake does provide a high-action bluegill fishery, with a good number of > 7.0-inch individuals.

Pumpkinseeds

The Hatch Lake pumpkinseeds population shows a decline in relative abundance and an increase of size structure rating observed in the 2022 survey. Further, the number of > 7.0-inch size individuals was high when compared to statewide pumpkinseeds populations. Similar to the bluegill population, it is too soon to attribute positive or negative population impacts to the regulation change . However, recent survey data indicate the pumpkinseeds population is trending positively in Hatch Lake.

Habitat

Areas that have existing emergent vegetation should be enhanced or undisturbed and interested landowners should consider promoting emergent vegetation within the littoral zone. Nearshore habitat is lacking around a majority of Hatch Lake and interested landowners should consider the addition of fish sticks or tree drops in the littoral zone or leaving timber that naturally recruits to the lake undisturbed. Improvements to nearshore habitat, such as the addition of tree drops or fish sticks, could benefit both panfish and predatory species in the Hatch Lake.