WISCONSIN DEPARTMENT OF NATURAL RESOURCES

2021 Comprehensive Summary Report
White Lake, Waupaca County
272900

Introduction And Objectives

In 2021, the Wisconsin Department of Natural Resources (DNR) conducted a comprehensive fish survey of White 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 White Lake.

DNR Contact

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Lake Information

Combined Acres:1,064
Max. Depth: 11 ft
Shoreline Miles: 5.94
Public Access: 3 Boat Landing
Complex - Warm - Dark

Regulations

Statewide Regulations except panfish regulation of 25 bag limit but only 10 of any one species. Northern pike no minimum length, but pike from 25" to 35" may not be kept. Daily bag limit of 2.

SURVEY INFORMATION

Site Location	Survey Dates	Water Temperature (°F)	Target Species	Gear	Number of Nets	Effort
White Lake	3/19/2021 - 3/23/2021	39 - 48	Northern Pike Walleye	Fyke Net	8	32 net nights
White Lake	05/13/2021	64	Bass and Panfish	Boomshocker	N/A	4.1 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

- White 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 spring fyke netting I survey is to count and measure adult walleye and northern pike, and mark adult walleyes and northern pike to estimate abundance. 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 4.1 miles of shoreline. Gamefish were collected and measured throughout, and panfish were collected and counted along 1.5 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. 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	527	16.5	fish/net night	95th
largemouth bass	Spring Electrofishing II	42	10.2	fish/mile	41st
black crappie	Spring Netting II	83	2.6	fish/net night	43rd
bluegill	Spring Electrofishing II	224	149.3	fish/mile	69th
pumpkinseed	Spring Electrofishing II	31	20.7	fish/mile	76th
yellow perch	Spring Netting I	15	10.0	fish/mile	53rd

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 spring fyke netting surveys.

2021 SIZE STRUCTURE METRICS

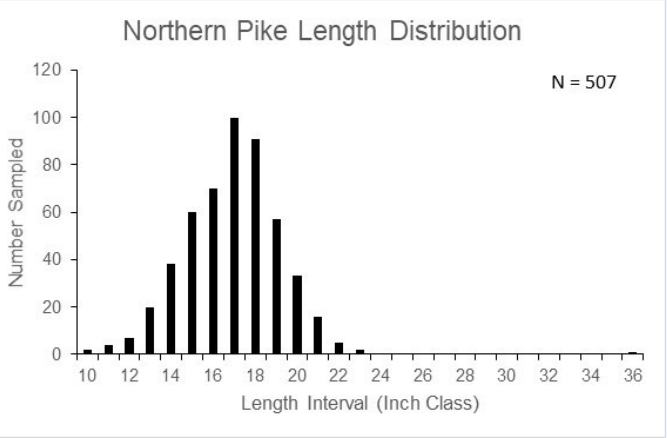
Total Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Size (inches)	Stock Number	Quality Number	PSD	Percentile Rank	Size Rating
509	17.4	9.4 - 36.3	14.0 and 21.0	473	24	5	2nd	Low

RELATIVE ABUNDANCE (CPUE = NUMBER PER NET NIGHT)

2021 Total Sampled	2002	2008	2012	2016	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
527	36.6	32.9	5.6	23.4	16.5	19.9	95th	High

SIZE STRUCTURE (PSD) TRENDS

PSD by Year					Historical Median
2002	2008	20012	2016	2021	
2	11	5	1	5	5



ADULT ABUNDANCE (POPULATION ESTIMATE)

Marked	Captured	Recaptures	Population Estimate (95% CI)	Number per Acre
464	527	18	5,103 (2,982 - 17,634)	4.8

Species Summary

- White Lake supports a high-density northern pike population, with catch rates being 16.5 per net night in the 2021 fyke netting survey. A catch rate of 16.5 ranks in the 95th percentile when compared to lakes throughout Wisconsin. Catch rates of northern pike in historical fyke netting surveys have been variable, ranging from 5.6 - 36.6 per net night.
- Size structure of northern pike in the 2021 fyke netting survey was low, with a PSD value of 5 which ranks in the 2nd percentile when compared to other lakes throughout Wisconsin. Size structure in 2021 was similar to previous fyke netting surveys between 2002 - 1016, with PSD ranges of 2 - 11.
- Population estimates of northern pike are similar to the long-term average of 5,736 in White Lake, while having 4.8 northern pike per acre. White Lake consists of a high density, and low size structure fishery.


Photo Credit: DNR Staff

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
42	12.9	6.2 - 20.2	8.0 and 12.0	38	24	63	56th	Moderate

2021 RELATIVE ABUNDANCE (CPUE = NUMBER PER MILE)

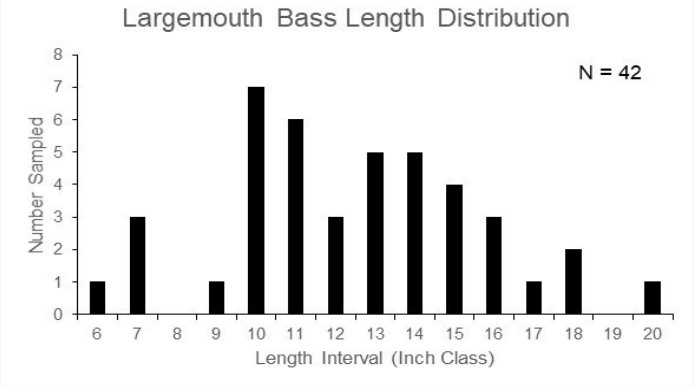
CPUE Total	Percentile Rank	Overall Abundance Rating	Length Index	Length Index CPUE	Length Index Percentile Rank	Length Index Abundance Rating
10.2	41st	Moderate	≥ 14.0 inches	3.9	58th	Moderate

SIZE STRUCTURE (PSD) TRENDS

PSD by Year					Historical Median
2002	2008	2012	2016	2021	
89	51	90	87	63	87

RELATIVE ABUNDANCE TRENDS (CPUE = NUMBER PER MILE)

CPUE by Year					Historical Median
2002	2008	2012	2016	2021	
13.8	7.5	5.3	9.7	10.2	9.7



Species Summary

- White Lake supports a moderate-density largemouth bass population. Catch rates of largemouth bass in the spring electrofishing survey were 10.2 largemouth bass per mile of electrofishing, which ranks in the 41st percentile when compared to lakes throughout Wisconsin. Catch rates over the last three spring electrofishing surveys were slightly lower, ranging between 5.3 - 9.7 per mile of electrofishing.
- Size structure of largemouth bass in 2021 was good with a PSD of 63 and a moderate catch rate of largemouth bass >14.0-inches when compared to lakes throughout Wisconsin.
- Optimal habitat for largemouth bass is present in White Lake. Interested lakeshore property owners should promote a diverse mix of native emergent, floating and submergent vegetation as well as fish sticks and large woody habitat.

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 bluegills, 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

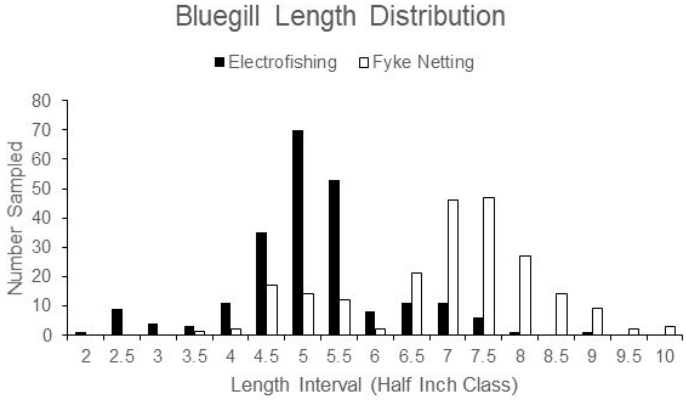
Gear	Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Size (inches)	Stock	Quality	PSD	Percentile Rank	Size Rating
Fyke Netting	217	7.2	3.9 - 10.4	3.0 and 6.0 inches	217	171	79	77th	Moderate - High
Electrofishing	224	5.4	2.4 - 9.2	3.0 and 6.0 inches	214	38	18	26th	Low

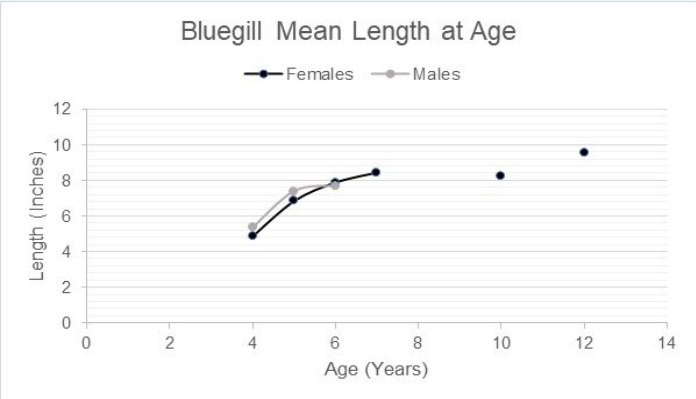
FYKE NETTING CPUE TRENDS (NUMBER PER NET NIGHT)

2021 Number Sampled	2002	2008	2012	2016	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
217	17.2	60.3	28.9	10.5	6.8	23.1	49th	Moderate

SIZE STRUCTURE (PSD) TRENDS FYKE NETTING

PSD by Year					Historical Median
2002	2008	2012	2016	2021	
84	36	97	99	79	81





2021 GROWTH METRICS

Sample (n)	Length Bin	Mean	Age Range	Percentile	Growth Rating
6	6.0 - 6.9	4.8	4 - 5	52nd	Moderate
13	7.0 - 7.9	5.8	5 - 10	47th	Moderate
9	8.0 - 8.9	5.8	5 - 7	70th	Moderate - Fast

ELECTROFISHING CPUE (NUMBER PER MILE)

CPUE Total	Percentile Rank	Overall Abundance Rating	Length Index	Length Index CPUE	Length Index Percentile	Length Index Abundance Rating
149.3	69th	Moderate - High	≥ 7.0 inches	12.7	66th	Moderate

ELECTROFISHING TRENDS CPUE (NUMBER PER MILE)

CPUE by Year					Historical Median
2002	2008	2012	2016	2021	
136.7	165.0	72.0	57.3	149.3	136.7

ELECTROFISHING SIZE STRUCTURE (PSD) TRENDS

PSD by Year					Historical Median
2002	2008	2012	2016	2021	
91	61	68	93	18	68

Species Summary

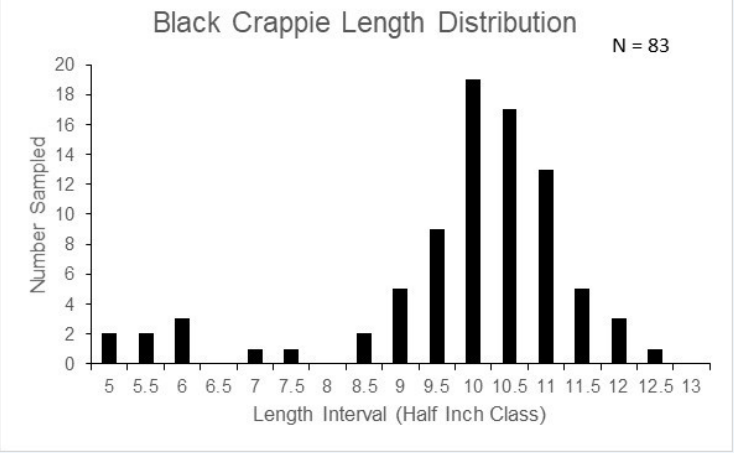
- Catch rates of bluegills in White Lake were moderate to high in the spring electrofishing, with 149.3 per mile of electrofishing captured. Catch rates from the electrofishing survey rank in the 69th percentile when compared to other lakes throughout Wisconsin. Catch rates had been declining over the last three surveys, so this increase in catch rates for the 2021 survey is a good sign of new recruits coming into the population.
- Bluegill PSD values in the spring electrofishing were 18 and is considered low when compared to other lakes throughout Wisconsin. Larger fish were not sampled during the electrofishing survey, but bluegills up to 10.0-inches were captured during the fyke netting survey. Historically, White Lake has been known to have larger bluegills. Regulation changes were put in place in 2016 to help prevent overharvest of the bluegill fishery. White Lake has the potential to grow larger bluegills >8.0-inches, limiting the harvest could help to meet this objective.
- Bluegill growth rates in White Lake are moderate to fast when compared to other lakes throughout the state. There were no male bluegills captured greater 8.0-inches, and were all males were ≤6-years old. Protection of these larger bluegills is important to sustain an above average fishery.

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.

2021 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	83	10.1	5.4 - 12.5	5.0 and 8.0 inches	83	74	89	81st	Moderate - High



SIZE STRUCTURE (PSD) TRENDS FYKE NETTING

PSD by Year					Historical Median
2002	2008	2012	2016	2021	
86	84	93	70	89	87

FYKE NETTING CPUE TRENDS (NUMBER PER NET NIGHT)

2021 Number Sampled	2002	2008	2012	2016	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
83	0.3	2.5	1.2	0.1	2.6	1.3	43rd	Moderate

Species Summary

- Catch rates of black crappies in White Clay Lake were moderate in the 2021 spring fyke netting survey (2.6 per net night). Catch rates from the fyke ranked in the 43rd percentile when compared to lakes throughout Wisconsin. Catch rates of black crappies have been variable through time, driven by strong and weak year classes.

- Black crappie PSD in the spring 2021 fyke netting survey was above average with a value of 89. Ideally, there would be higher numbers of small black crappie for the future recruitment in White Lake. Year class strength of black crappie can fluctuate from year to year, but the fact that few smaller fish in the system protection through regulations can be a benefit to the black crappie population in White Lake.

Pumpkinseed

- Pumpkinseeds (*Lepomis gibbosus*) are a common panfish species distributed widely across many Wisconsin waterbodies. Pumpkinseeds 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 pumpkinseeds, but fyke netting can show some information as well. When comparing pumpkinseed populations to other waterbodies, electrofishing data is to be used for our surveys.

ELECTROFISHING CPUE (NUMBER PER MILE)

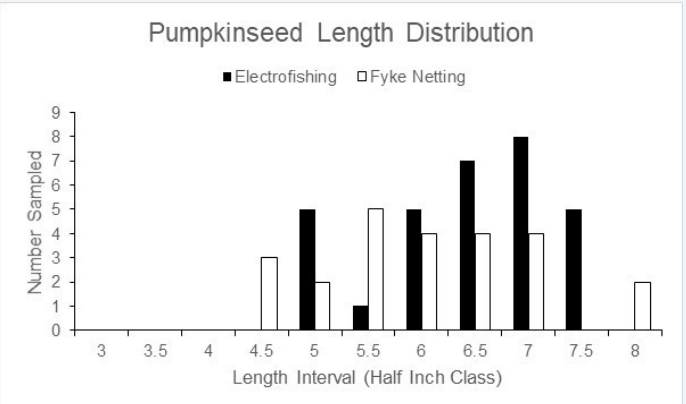
CPUE Total	Percentile Rank	Overall Abundance Rating	Length Index	Length Index CPUE	Length Index Percentile Rank	Length Index Abundance Rating
20.7	76th	Moderate - High	≥ 7.0 inches	8.7	94th	High

ELECTROFISHING TRENDS CPUE (NUMBER PER MILE)

CPUE by Year					Historical Median
2002	2008	2012	2016	2021	
14.0	28.0	12.7	2.7	20.7	14.0

ELECTROFISHING SIZE STRUCTURE (PSD) TRENDS

PSD by Year					Historical Median
2002	2008	2012	2016	2021	
95	57	79	100	81	81



Pumpkinseed

- Pumpkinseeds (*Lepomis gibbosus*) are a common panfish species distributed widely across many Wisconsin waterbodies. Pumpkinseeds 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 pumpkinseeds, but fyke netting can show some information as well. When comparing pumpkinseed populations to other waterbodies, electrofishing data is to be used for our surveys.

2021 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	24	6.3	4.6 - 8.3	3.0 and 6.0 inches	24	14	58	72nd	Moderate - High
Electrofishing	31	6.7	5.0 - 7.9	3.0 and 6.0 inches	31	25	81	94th	High

FYKE NETTING CPUE TRENDS (NUMBER PER NET NIGHT)

2021 Number Sampled	2002	2008	2012	2016	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
26	1.5	16.7	2.6	0.5	0.8	1.3	51st	Moderate

SIZE STRUCTURE (PSD) TRENDS FYKE NETTING

PSD by Year					Historical Median
2002	2008	2012	2016	2021	
89	13	96	98	58	74

Species Summary

- Pumpkinseeds catch rates were moderate to high in the spring electrofishing survey with a catch rate of 20.7 per mile of electrofishing. A catch rate of 20.7 per mile of electrofishing ranks in the 76th percentile when compared to others lakes throughout the state. Catch rates of pumpkinseed in White Lake have fluctuated over the last few surveys. The PSD value of pumpkinseed in White Lake is 81, which is in the 94th percentile when compared to other lakes throughout the state. PSD values have been variable over the last few surveys. There has been lack of smaller pumpkinseeds recruiting into the population over the last few years, keeping PSD values high.

Yellow Perch

- Yellow perch (*Perca flavescens*) are a common panfish species found throughout many Wisconsin waterbodies. Typically, yellow perch spawn in areas of emergent or submergent vegetation or submerged brush at approximately 45-50°F water temperatures. Electrofishing and fyke netting can be effective sampling gear for yellow perch. Therefore, results from both gears are presented for yellow perch.

2021 SIZE STRUCTURE METRICS

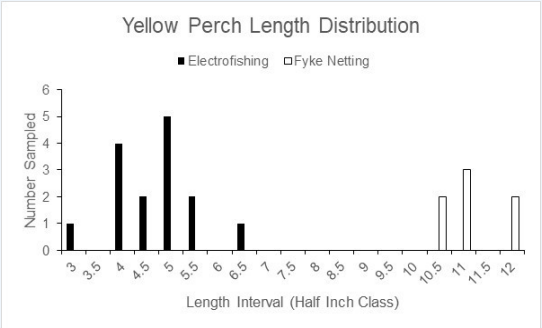
Gear	Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Size (inches)	Stock	Quality	PSD	Percentile Rank	Size Rating
Fyke Netting	7	11.4	10.7 - 12.4	5.0 and 8.0 inches	7	7	100	100th	High
Electrofishing	15	5.0	3.1 - 6.9	5.0 and 8.0 inches	8	0	0	8th	Low

2021 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
10.0	53rd	Moderate	≥ 8.0 inches	0	-	Low

ELECTROFISHING TRENDS CPUE (NUMBER PER MILE)

CPUE by Year				2021
2002	2008	2012	2016	
11	0	0	0	0



Species Summary

- White Lake has had moderate densities of yellow perch for the past 20 years. There were a few large yellow perch >10.0-inches captured in the fyke nets, and the electrofishing data shows moderate densities with most of the fish <7.0 inches.

Final Summary and Management Recommendations

Northern Pike:

White Lake supports a high-density northern pike population. Warmer water and lack of forage are limiting factors and a cause of poor size structure. White Lake has large amounts shallow water and emergent vegetation, which should be protected or enhanced to ensure northern pike have abundant spawning and nursery habitat in the future. The northern pike regulations were changed in 2020 from 5 fish daily limit and no size limit to a 5 fish daily limit with no harvest of fish from 25"-35". The intentions of this slot limit is to encourage harvest of small fish and protect any northern pike that do make it to 25" to increase the numbers of larger fish in the lake. So far no changes were detected; however, it is still too early to evaluate the effectiveness of this new regulation. The next survey scheduled in 2029 will be a more appropriate time to determine if these new regulations will have changed size structure or density levels of northern pike.

Walleye:

White Lake supports a low density walleye population that had been sustained through private stocking. Very limited optimal walleye habitat along with competition from several other predators is keeping walleye densities low. The DNR recommends managing for other predator species in White Lake as conditions for a successful walleye fishery aren't found.

Largemouth Bass:

White Lake supports a healthy largemouth bass population with moderate catch rates of legal sizes (i.e., ≥14 inches) when compared to other lakes with largemouth bass in the state. The largemouth bass population is healthy in regards to size and abundance levels. Largemouth bass were surveyed up to 20.0-inches along and had moderate density levels. Maintaining largemouth bass densities at current levels should also help to keep panfish populations from becoming overabundant and stunting.

Panfish:

Catch rates of black crappie, yellow perch, and pumpkinseeds were moderate. However, bluegills have high to moderate density levels. Year-class strength has improved in the last few years and should allow for more bluegills to grow into harvestable sizes >6.0-inches. Size structure of black crappie, bluegills, and pumpkinseeds were lower in 2021 surveys than in previous years. Bluegills and pumpkinseeds size structure and densities have remained similar to the last survey in 2016. Size structure appears to be lower than normal for bluegills, but with a large year-class coming on. These fish will be in harvestable sizes in 2022 and beyond. The black crappie population is dominated by one large year-class with a large portion of the crappie being in the 10.0- inch range. Erratic recruitment with populations dominated by 1-2 large year-classes is common with crappies. Yellow perch densities are low, but do provide the opportunity to harvest 10.0-inch fish. The panfish regulation (25 daily bag but no more than 10 of each species) which is a lower bag limit than the statewide default should help to protect the smaller yellow perch to recruit into larger sizes.

Other Management Recommendations:

- White Lake is somewhat unique among lakes in the area in that it has minimal development near shore and has large areas of emergent and submergent vegetation. White Lake is unique because of the large quantities of wild rice located throughout the lake. These native plants should be protected as the provide refuge for fish and other animals.
- Optimal fish habitat is very limited in certain parts of White Lake. Interested lakeshore owners should promote a diverse mix of native emergent, floating, and submergent vegetation as well as add fish sticks along their shoreline.
- White Lake is nearly void of any type of woody habitat in the water. Fish sticks provide habitat for many different fish species and promote the availability of invertebrates. These are critical components of the food web and provide food for many different fish species.