2021 Comprehensive Fish Survey Summary Report

Iola Millpond (WBIC 278800)

Waupaca County

Introduction And Objectives

In 2021, the Wisconsin Department of Natural Resources conducted a comprehensive fish survey of Iola Millpond in order to provide insight and direction for the future fisheries management of this millpond. Comprehensive fish surveys include both spring fyke netting and spring electrofishing surveys. 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 Iola Millpond.

Acres: 220 **Shoreline Miles:** 4.74 **Maximum Depth (feet):** 11
Lake Type: Impoundment **Public Access:** 2 Public Boat Launches
Regulations: Statewide Default Regulations except panfish only 10 panfish may be kept

Survey Methods

- Iola Millpond was sampled according to spring netting I (SNI), and spring electrofishing II (SEII) protocols as outlined in the statewide lake protocol. The primary objective of the spring fyke netting I survey is to count and measure adult walleye, northern pike, and panfish and mark adult walleyes to estimate walleye abundance. The primary objective of the spring electrofishing I survey is act as a recapture event to estimate walleye 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.
- Spring fyke netting takes place shortly after ice out when walleye and northern pike begin to spawn. Fyke nets were deployed in areas of the lake that contained spawning habitat or were likely travel areas for northern pike and walleye. All captured fish were identified to species and gamefish and panfish were measured for length. All newly captured walleye were given a partial fin clip (top caudal fin). All walleye and northern pike were weighed and age structures (i.e., otoliths, fin rays or spines) were collected from a subsample of northern pike, walleye, bluegill and black crappie for age and growth analysis.
- Spring electrofishing takes place later in the spring when water temperatures are warm enough so that largemouth bass and panfish move shallow to spawn. The entire shoreline was electrofished as part of this survey. All fish captured were identified to species and gamefish and panfish were measured for length.
- Fish metrics used to describe fish populations include catch per unit effort, total abundance, proportional stock density, length frequency distribution and mean age at length.

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Photo Credit: Elliot Hoffman

FKYE NETTING SURVEY INFORMATION

Site Location	Survey Dates	Water Temperature (°F)	Target Species	Gear	Number of Nets	Net Nights
Iola Millpond	3/24/2021 - 3/28/2021	42 - 46	northern pike and panfish	fyke netting	5	20

SPRING ELECTROFISHING II SURVEY INFORMATION

Site Location	Survey Date	Water Temperature (°F)	Target Species	Total Miles Shocked	Number of Stations	Gear	Number of Netters
Iola Millpond	5/24/2021	74	bass and panfish	1.5	3	boomshocker	2

Fish 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 surveys, we typically quantify CPUE by the number and size of fish captured per mile of shoreline. 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.

Total abundance is a metric that describes population size and is estimated by mark and recapture. In the fyke netting survey, all walleye that were captured were examined for a partial caudal fin (i.e., tail fin) clip. If a partial fin clip was not observed, one was given and the fish was released. If a partial caudal fin clip was observed, it was noted on the data sheet and the fish was released. When the walleyes were nearly done spawning, the fyke nets are pulled and the spring electrofishing I survey was conducted. All walleyes captured in the spring electrofishing I survey were examined for a top caudal fin clip. The number of walleyes marked in the spring fyke netting survey, total number captured in the spring electrofishing I survey, and number of marked walleyes captured in the spring electrofishing I survey were used to estimate walleye abundance in the Waupaca Chain O' Lakes.

Proportional stock density (PSD) is an index used to describe 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).

Northern Pike

- 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

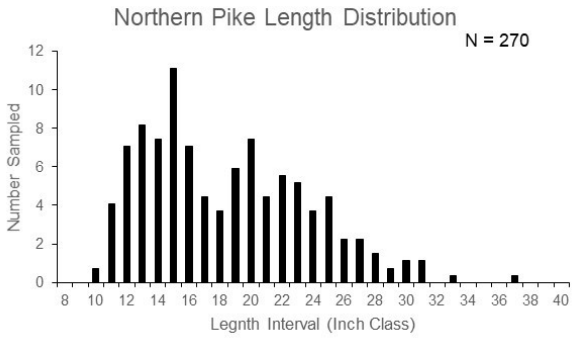
Total Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Size (inches)	Stock Number	Quality Number	PSD	Percentile Rank	Size Rating
270	19.0	10.7 - 37.0	14.0 and 21.0	216	89	41	48th	Moderate

RELATIVE ABUNDANCE (CPUE = NUMBER PER NET NIGHT)

2021 Total Sampled	2004	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
273	37.5	13.6	25.6	93rd	High

SIZE STRUCTURE (PSD) TRENDS

PSD by Year		Historical Median
2004	2021	
12	41	26



Northern Pike Summary

- Iola Millpond supports a high density northern pike population, with catch rates of 13.6 per net night in the 2021 fyke netting survey. A catch rate of 13.6 ranks in the 93rd percentile when compared to lakes throughout Wisconsin. Catch rates of northern pike in the last fyke netting surveys were higher with 37.5 per net night.
- Size structure of northern pike in the 2021 fyke netting survey was moderate with a PSD of 41 which ranks in the 48th percentile when compared to lakes throughout Wisconsin. Size structure in 2021 was higher than the last survey when PSD value was at 12.
- Lower abundance levels of northern pike has shown an increase in the size structure. Even though the abundance levels are lower than in 2004, Iola Millpond still provides a high density, and high size structure population.


Photo Credit:

Largemouth Bass

- Electrofishing is the preferred sampling gear for largemouth bass. In this particular survey, some fyke netting data will be used as well, with sampling difficulty due to vegetation.

2021 SIZE STRUCTURE METRICS

Gear	Total Number Sampled	Average Length (inches)	Length Range (inches)	Stock and Quality Size (inches)	Stock Number	Quality Number	PSD	Percentile Rank	Size Rating
Electorfishing	31	13.1	5.2 - 17.8	8.0 and 12.0	29	24	83	86th	Moderate - High
Fyke Netting	73	15.7	8.7 - 21.6	8.0 and 12.0	70	65	93	83rd	Moderate - High

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
20.7	61st	Moderate	≥ 14.0 inches	8.7	82nd	Moderate - High

RELATIVE ABUNDANCE TRENDS (CPUE = NUMBER PER MILE)

CPUE by Year				Historical Median
2015	2016	2017	2021	
20.0	25.3	27.3	20.7	23.0

SIZE ELECTROFISHING STRUCTURE TRENDS (PSD)

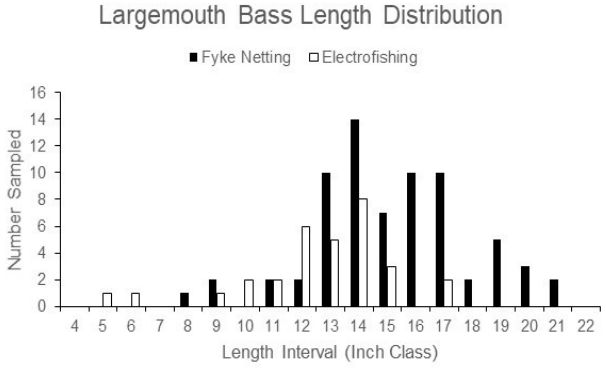
PSD by Year				Historical Median
2015	2016	2017	2021	
8	81	73	83	77

FYKE NETTING SIZE STRUCTURE (PSD) TRENDS

PSD by Year		Historical Median
2004	2021	
82	93	87

RELATIVE ABUNDANCE (CPUE = NUMBER PER NET NIGHT)

2021 Total Sampled	2004	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
73	11.0	3.7	7.3	95th	High



Largemouth Bass Summary

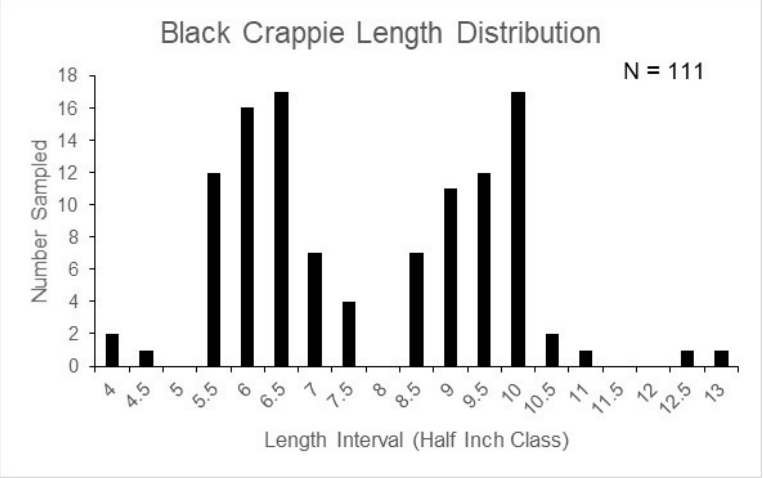
- Iola Millpond supports a moderate–high density largemouth bass population. Catch rates of largemouth bass in the spring electrofishing survey were 20.7 largemouth bass per mile of electrofishing, which ranks in the 61st percentile when compared to lakes throughout Wisconsin. Catch rates over the last three spring electrofishing surveys were similar, ranging between 20.0 - 27.3
- Size structure of largemouth bass in 2021 was also good with a PSD of 83 and high amounts of largemouth bass ≥14 inches with 8.7 per mile of shoreline sampled.
- Optimal habitat for largemouth bass is present in Iola Millpond. Interested lakeshore property owners should promote a diverse mix of native emergent, floating and submergent vegetation as well as fish sticks/large woody habitat.

Black Crappie

- Both fyke netting and electrofishing gears can be used to sample black crappies, but in this particular survey, only fyke netting data will be presented.

2021 SIZE STRUCTURE METRICS

Gear	Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Sizes (inches)	Stock Number	Quality Number	PSD	Percentile Rank	Size Rating
Fyke Netting	112	8.1	4.3 - 13.4	5.0 and 8.0 inches	108	52	48	39th	Moderate



FYKE NETTING SIZE STRUCTURE (PSD) TRENDS

PSD by Year		Historical Median
2004	2021	
11	48	30

TRENDS CPUE (NUMBER PER NET NIGHT)

2021 Number Sampled	2004	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
112	10.4	5.6	8.0	60th	Moderate

2021 GROWTH METRICS

Number Measured	Length Bin	Mean	Age Range	Percentile	Growth Rating
4	7.5 - 8.4	3	3	98th	Fast
10	9.5 - 10.4	5.4	4 - 6	53rd	Moderate

Bluegill

- Both fyke netting and electrofishing can be useful gears to sample bluegill. Therefore, results from both gears will be presented.

2021 SIZE STRUCTURE METRICS

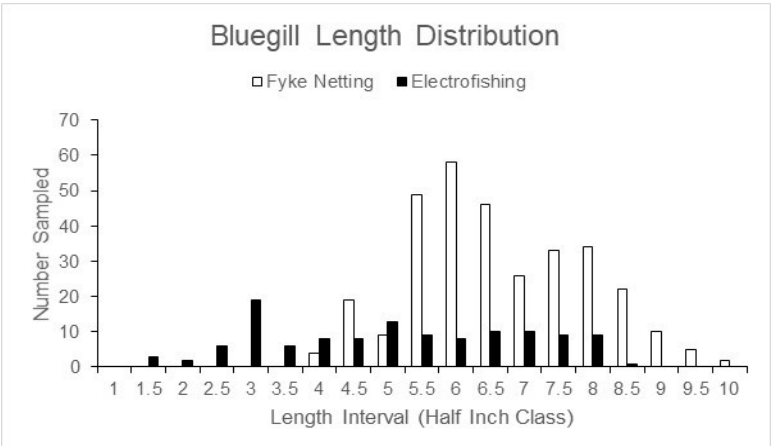
Gear	Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Sizes (inches)	Stock Number	Quality Number	PSD	Percentile Rank	Size Rating
Fyke Netting	317	6.9	4.4 - 10.3	3.0 and 6.0 inches	317	236	74	71st	Moderate - High
Electrofishing	121	5.3	1.8 - 8.7	3.0 and 6.0 inches	110	47	43	61st	Moderate

FYKE NETTING CPUE (NUMBER PER NET NIGHT) TRENDS

2021 Number Sampled	2004	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
578	105.0	28.9	66.9	81st	Moderate - High

FYKE NETTING SIZE STRUCTURE (PSD) TRENDS

PSD by Year		Historical Median
2004	2021	
56	74	65



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
80.7	48th	Moderate	≥ 7.0 inches	19.3	76th	Moderate - High

ELECTROFISHING CPUE (NUMBER PER MILE) TRENDS

CPUE by Year				Historical Median
2015	2016	2017	2021	
35.6	**104.0**	**139.3**	**80.7**	**92.3**

ELECTROFISHING SIZE STRUCTURE (PSD) TRENDS

PSD by Year				Historical Median
2015	2016	2017	2021	
44	16	48	43	44

2021 GROWTH METRICS

Number Measured	Length Bin (inches)	Mean Age	Age Range	Percentile Rank	Growth Rating
10	5.5 - 6.4	4.3	4 - 6	54th	Moderate
9	6.5 - 7.4	4.3	4 - 5	77th	Moderate - Fast

Pumpkinseed

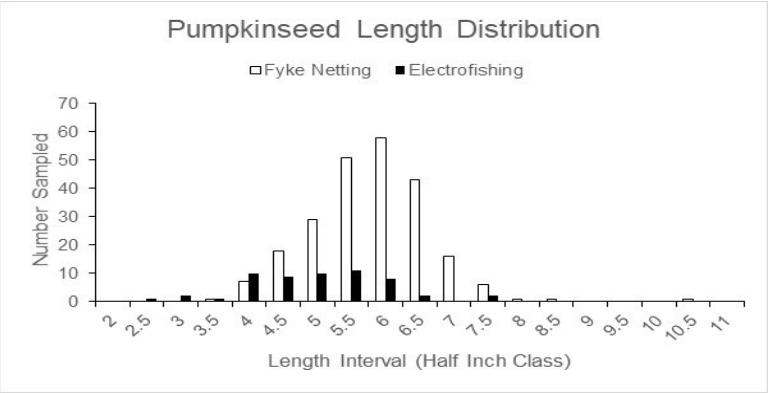
- Both fyke netting and electrofishing can be useful gears to sample pumpkinseed. Therefore, results from both gears will be presented.

2021 SIZE STRUCTURE METRICS

Gear	Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Sizes (inches)	Stock Number	Quality Number	PSD	Percentile Rank	Size Rating
Fyke Netting	232	6.1	3.9 - 10.7	3.0 and 6.0 inches	232	126	54	77th	Moderate - High
Electrofishing	56	5.2	2.8 - 7.6	3.0 and 6.0 inches	55	12	22	38th	Moderate

FYKE NETTING CPUE (NUMBER PER NET NIGHT) TRENDS

2021 Number Sampled	2004	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
269	16.1	13.5	14.8	94th	High



FYKE NETTING SIZE STRUCTURE (PSD) TRENDS

PSD by Year		Historical Median
2004	2021	
56	54	55

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
37.3	88th	Moderate - High	≥ 7.0 inches	1.3	66th	Moderate

ELECTROFISHING SIZE STRUCTURE (PSD) TRENDS

PSD by Year				Historical Median
2015	2016	2017	2021	
42	66	25	22	34

ELECTROFISHING CPUE (NUMBER PER MILE) TRENDS

CPUE by Year				Historical Median
2015	2016	2017	2021	
24.0	66.0	23.3	37.3	30.7

Yellow Perch

- Both fyke netting and electrofishing can be useful gears to sample yellow perch. In this particular survey ,only fyke netting data will be presented.

2021 SIZE STRUCTURE METRICS

Gear	Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Sizes (inches)	Stock Number	Quality Number	PSD	Percentile Rank	Size Rating
Fyke Netting	19	7.8	5.4 - 10.9	5.0 and 8.0 inches	19	9	47	84th	Moderate - High

FYKE NETTING CPUE (NUMBER PER NET NIGHT) TRENDS

2021 Number Sampled	2004	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
19	7.4	1.0	4.2	37th	Moderate

FYKE NETTING SIZE STRUCTURE (PSD) TRENDS

PSD by Year		Historical Median
2004	2021	
5	47	26

Panfish Summary

- Catch rates of black crappies in Iola Millpond were moderate in the 2021 spring fyke netting survey with 5.6 per net night captured. Catch rates from the fyke netting survey ranked in the 60th percentile when compared to lakes throughout Wisconsin. Catch rates of black crappies have been variable through time, driven by strong and weak year classes and recovering from the 2012 draw down.
- Black crappie PSD in the spring 2021 fyke netting survey was higher than the last fyke netting survey in 2004, with 47% of the adult population being above 8 inches. The majority of the black crappies captured were between 9 - 11 inches and were 5 years old. Black crappies grow really fast in Iola Millpond.
- Catch rates of bluegill in Iola Millpond were also moderate in the 2021 spring fyke netting survey (28.9 per net night) and spring electrofishing survey (80.7 per mile of electrofishing). Catch rates from the fyke netting and electrofishing surveys rank out in the 81st and 48th percentiles respectively when compared to lakes throughout Wisconsin.
- Bluegill PSD values in the 2021 spring fyke netting (74) and spring electrofishing (43) are at healthy levels when looking at the bluegill population as a whole. Furthermore, bluegill growth rates are moderate to fast. The Iola Millpond supports a high quality bluegill population, with excellent size structure and moderate abundance.
- Catch rates of pumpkinseed were high in both the 2021 spring fyke netting survey (13.5 per net night) and spring electrofishing survey (37.3 per mile of electrofishing). Catch rates have not fluctuated much with fyke nets or electrofishing gear, with the exception of 2016.
- Pumpkinseed PSD values have been at acceptable levels over the years regardless of gear, numbers of pumpkinseeds in Iola Millpond are moderate, but provide an opportunity for a harvestable sized fish >6 inches.
- Iola Millpond has had moderate densities of yellow perch for the past 25 years. Perch size structure is lacking as a majority of individuals were 5 - 8 inches at the time of this survey. In the future, this should provide another angling opportunity as the fish continue to grow.

Stocking History 1972 - Present

Species	Year	Age	Mean Length (inches)	Number Stocked
Yellow Perch	2018	Large Fingerling	5.0	661
Bluegill	2016	Large Fingerling	0.5	18,925
Largemouth Bass	2015	Large Fingerling	1.9	11,012
Northern Pike	2014	Small Fingerling	2.7	15,442
Largemouth Bass	2014	Large Fingerling	3.2	5,125
Northern Pike	2013	Small Fingerling	4.5	15,451
Largemouth Bass	2013	Large Fingerling	2.1	5,148


Photo Credit: Elliot Hoffman


Photo Credit: Elliot Hoffman

Final Summary And Management Recommendations


Photo Credit: Elliot Hoffman

Northern Pike:

- Iola Millpond supports a high density northern pike population. Plenty of cold water along with ample forage allows for northern pike to survive and grow to 30+ inches.
- Areas of Iola Millpond that have shallow water and emergent vegetation should be protected or enhanced to ensure northern pike have abundant spawning and nursery habitat in the future.

Largemouth Bass:

- Iola Millpond supports a healthy largemouth bass population with moderate to high catch per mile of legal sizes (i.e., ≥14 inches) largemouth bass in comparison to other lakes throughout Wisconsin.
- The largemouth bass population is flourishing in regards to size and abundance levels.
- Keep bass densities at current levels to prevent panfish populations from becoming overabundant.

Panfish:

- Catch rates of common panfish species (i.e., black crappie, bluegill, and pumpkinseed) were moderate.
- Size structure of black crappies was higher in 2021 surveys than in 2004. bluegill and pumpkinseed size structure and densities have remained similar to the last few surveys. Furthermore, growth rates of bluegill and black crappie were moderate to fast. Faster growth along with good size structure has resulted in high quality panfish fisheries over the last several years in Iola Millpond.
- The black crappie population is dominated by two large year classes that are 3 and 5 years old with a large portion of the crappie within the 10 inch range. Erratic recruitment with populations dominated by 1 - 2 large year classes is common with crappies.
- Protection of panfish with new regulations helps with the higher size structure that has been observed since the rehabilitation in Iola Millpond which started in 2013.

Other Management Recommendations:


Photo Credit: Elliot Hoffman

- Iola Millpond is somewhat unique among lakes in the area in that it has minimal development near the inlet and is almost completely surrounded by cattails and wooded areas. Agriculture in the area has impacted nutrient loading over the years as Iola Millpond has an abundance of algae blooms throughout the year along with dense emergent and submergent vegetation.
- Enhance and optimize fish habitat as it is limited in certain parts of Iola Millpond. Interested lakeshore owners should promote a diverse mix of native emergent, floating, and submergent vegetation as well as add fish sticks along their shoreline. These improvement could also enhance habitat for Brown Trout using Iola Millpond as a wintering site. They subsequently move upstream to the South Branch Little Wolf River during the summer months to find cooler water.