2021 Comprehensive Fish Survey Summary Report

Pearl Lake (WBIC 195400)

Waushara County

Introduction and Objectives

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

Combined Acres: 101
Lake Type: Seepage
Regulations: Statewide Default Regulations

Shoreline Miles: 2.1
Public Access: 1 Public Boat Launch

Maximum Depth (feet): 45

Survey Methods

- Pearl Lake was sampled according to SNI and SEII protocols as outlined in the statewide lake protocol. The primary objective of the SN1 survey is to count, measure, and mark adult Northern Pike to estimate abundance along with understanding the age structure in the lake. The primary objective of the SEII survey is to count and measure adult largemouth 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 the 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. All the fish caught were measured except the White Suckers which were caught on occasion. The northern pike were weighed and age structures (fin rays) collected from a subsample for age and growth analysis. All newly captured pike were given a top caudal fin clip in order to calculate a population estimate and better understand the population.
- Spring electrofishing takes place later in the spring when water temperatures warm to at least 55F and largemouth bass and panfish move to shallow water in order to spawn. The entire shoreline was electroshocked as part of this survey. All fish captured were identified to species and were measured for length. A subsample of Bluegill and Largemouth Bass were taken from the lake for the collection of otoliths for age and growth determination.
- Fish metrics used to describe fish populations include catch per unit effort, total abundance, length frequency distribution, and mean age at length.

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FKYE NETTING SURVEY INFORMATION - SNI

Site Location	Survey Dates	Water Temperature (°F)	Target Species	Gear	Number of Nets	Net Nights
Pearl Lake	3/25/2021 - 4/2/2021	41 - 42	Northern Pike	Fyke Net	5	45

SPRING ELECTROFISHING II SURVEY INFORMATION

Site Location	Survey Date	Water Temperature (°F)	Target Species	Total Miles Shocked	Number of Stations	Gear	Number of Netters
Pearl Lake	5/20/2021	65	Bass and Panfish	2.1	4	Boom shocker	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 Northern Pike 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 Northern Pike were nearly done spawning, the fyke nets are pulled. The number of Northern Pike captured, the number marked and number that are recaptured are used in a formula to estimate Northern Pike abundance in Pearl Lake.

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 Length at Age is an index used to assess fish growth. Calcified structures (e.g., otoliths, spines, or scales) were attempted to be collected from each inch bin for Northern Pike and 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 when it's ice out. All results presented for Northern Pike are from spring fyke netting surveys.

2021 NORTHERN PIKE 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
185	16.9	9.0 - 22.7	14.0 and 21.0	166	6	4	2nd	Low

NORTHERN PIKE SIZE STRUCTURE (PSD) TRENDS

PSD by Year		Historical Median
2004	2021	
0.0	4.0	2.0

NORTHERN PIKE RELATIVE ABUNDANCE (CPUE = NUMBER PER NET NIGHT)

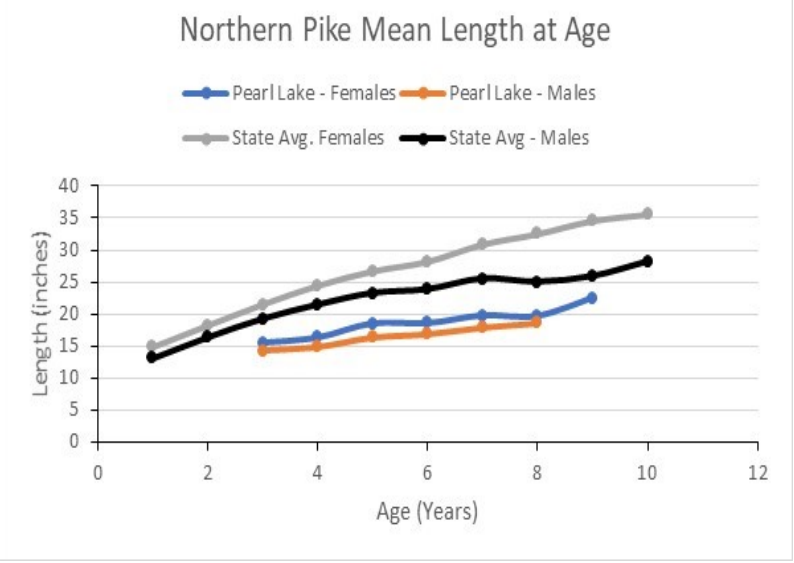
2021 Total Sampled	2004	2021	Historical Median	2021 Statewide Percentile Rank	2021 Abundance Rating
185	4.7	5.5	5.1	82nd	High

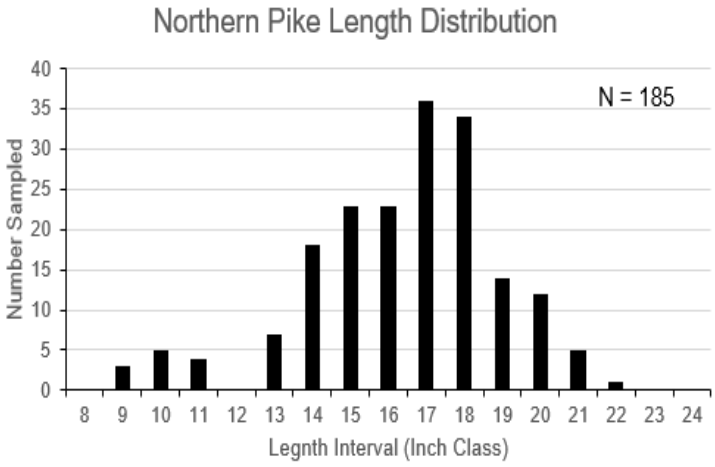
2021 NORTHERN PIKE GROWTH METRICS

Sex	Number Measured	Length Bin (inches)	Mean Age	Age Range	Growth Rating
Male	10	18.0 –18.9	5.7	4 –8	Low
Female	12	18.0 -18.9	5.2	4 –6	Low
Combined	22	18.0 -18.9	5.4	4 –8	Low

NORTHERN PIKE ADULT ABUNDANCE (POPULATION ESTIMATE)

Marked	Captured	Recaptures	Population Estimate (95% CI)	Number per Acre	Abundance Rating
185	246	60	348	3.5	Moderate





Northern Pike Summary

- Pearl Lake supports a high density Northern Pike population, with catch rates being 5.5 per net night in the 2021 fyke netting survey. A catch rate of 5.5 ranks out in the 82nd percentile when compared to lakes throughout Wisconsin. Catch rates of Northern Pike in historical fyke netting surveys have been similar, ranging from 4.7 - 5.5 per net night.
- Size structure of Northern Pike in the 2021 fyke netting survey was low with a PSD of 4 which ranks out in the 2nd percentile when compared to lakes throughout Wisconsin. Size structure in 2021 was slightly above previous fyke netting survey in 2004, PSD=0. No legal fish ≥ 26 inches were sampled in either survey.
- Population estimates of Northern Pike have stayed relatively unchanged over the last 2 surveys in Pearl Lake and show a below average fishery while having 3.5 adult Northern Pike per acre.
- Growth rates are well below average for Northern Pike in Pearl Lake with it taking 8+ years to reach 20 inches in length.

Largemouth Bass

- Electrofishing is the preferred sampling gear for Largemouth Bass. All results presented for largemouth bass are from spring electrofishing II surveys.

2021 LARGEMOUTH BASS SIZE STRUCTURE METRICS

Total Number Sampled	Average Length (inches)	Length Range (inches)	Stock and Quality Size (inches)	Stock Number	Quality Number	PSD	Percentile Rank	Size Rating	RSD 14
329	10.3	4.1 - 21.3	8.0 and 12.0	265	134	51	60th	Moderate	6

2021 LARGEMOUTH BASS RELATIVE ABUNDANCE (CPUE = NUMBER PER MILE)

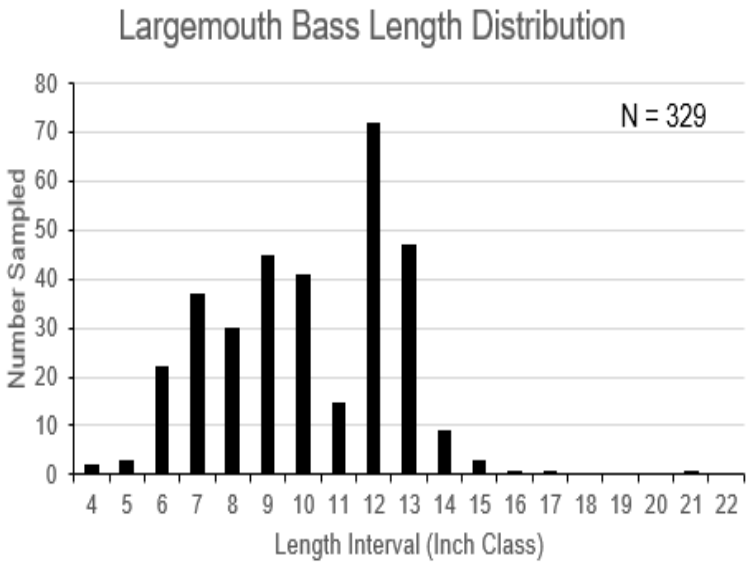
CPUE ≥ 8 inches	Percentile Rank	Overall Abundance Rating	Length Index	Length Index CPUE	Length Index Percentile Rank	Length Index Abundance Rating
126	99th	High	≥ 14.0 inches	7.14	76th	Moderately High

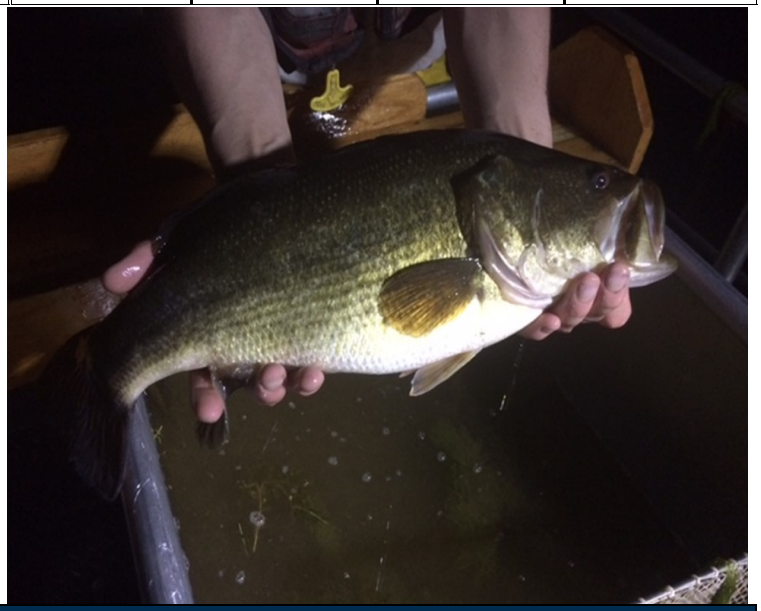
LARGEMOUTH BASS SIZE STRUCTURE TRENDS (PSD)

PSD by Year			Historical Median
2004	2012	2021	
48	12	51	37

LARGEMOUTH BASS RELATIVE ABUNDANCE TRENDS (CPUE ≥ 8 INCHES NUMBER PER MILE)

CPUE by Year			Historical Median
2004	2012	2021	
128	52	126	102





2021 LARGEMOUTH BASS GROWTH METRICS

Number Measured	Length Bin (inches)	Mean Age	Age Range	Growth Rating
10	12.0 –12.9	6.8	5 - 10	Low -Moderate
6	14.0 -14.9	8.3	7 –12	Low –Moderate

Largemouth Bass Summary

- Pearl Lake supports a high density population of Largemouth Bass. Catch rates of Largemouth Bass in the spring electrofishing survey were 126 Largemouth Bass ≥ 8 inches per mile of electrofishing, which ranks out in the 99th percentile when compared to lakes throughout Wisconsin. Catch rates over the last three spring electrofishing surveys fluctuated from 128 ≥ 8 inches in 2004 to 52 ≥ 8 inches in 2012. Catch rates in the range of 35-70 bass per mile 8 inches and larger seems to be a good range for lakes in this area of the state.
- Size structure of Largemouth Bass in 2021 was also fairly good with a PSD of 51. An RSD14 = 6 is of concern since only 6% of fish larger than 8 inches were also of legal size. The average size of bass was 10.3 inches with the largest one being a hefty 21 inches.
- Very little optimal habitat for Largemouth Bass is present in Pearl Lake. Recent interest and installation of nearshore woody habitat is encouraging. Lakeshore property owners should promote a diverse mix of native emergent, floating, submergent vegetation as well as tree drops and fish sticks.

Bluegill

- Electrofishing is the preferred sampling gear for Bluegill. All results presented for Bluegill are from spring electrofishing II surveys.

2021 BLUEGILL SIZE STRUCTURE METRICS

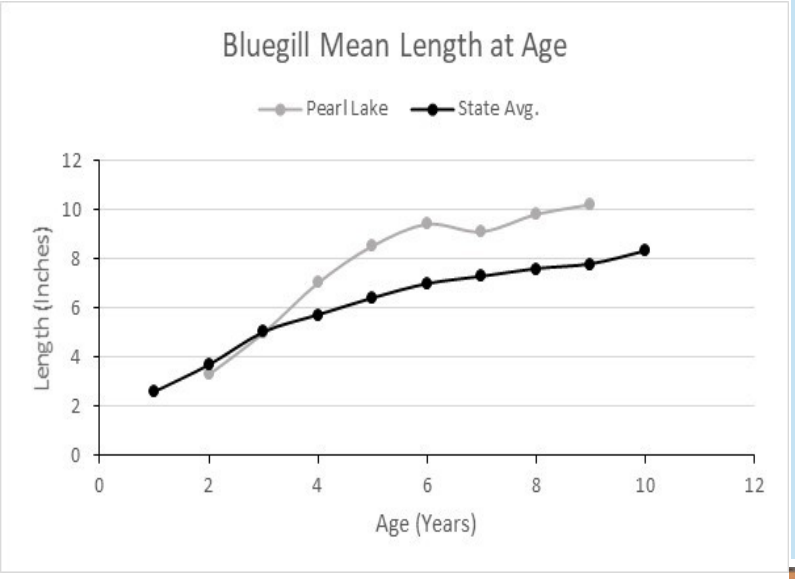
Gear	Number Measured	Average Length (inches)	Length Range (inches)	Stock and Quality Sizes (inches)	Stock Number	Quality Number	PSD	PSD 2012	Percentile Rank	Size Rating	RSD8	RSD 8 2012
Fyke Netting	21	6.4	3.6 - 10.2	3.0 and 6.0 inches	21	9	43	-	Too Few Fish	Too Few Fish	29	-
Electrofishing	200	5.4	1.6 - 9.8	3.0 and 6.0 inches	175	55	31	73	21st	Low	10	16

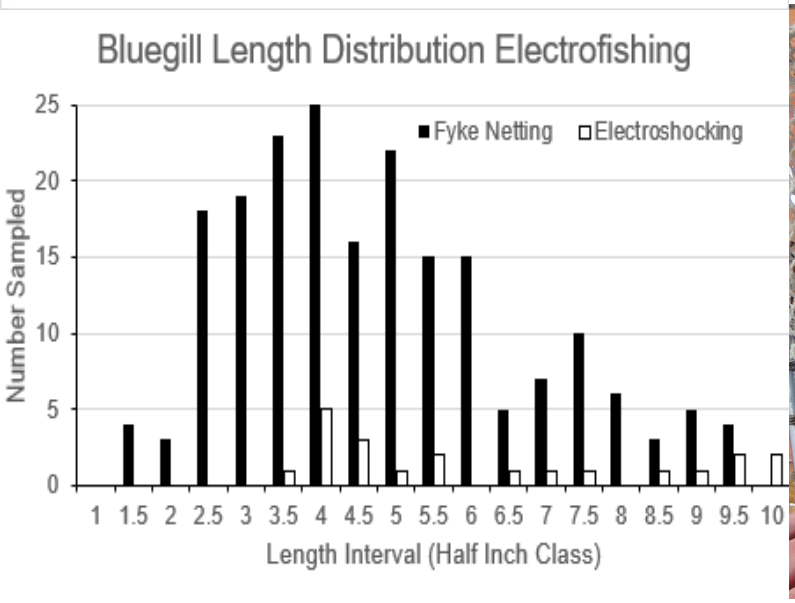
2021 BLUEGILL ELECTROFISHING CPUE (NUMBER PER MILE)

CPUE ≥ 3 inches	Percentile Rank	Overall Abundance Rating	Length Index	Length Index CPUE	Length Index Percentile Rank	Length Index Abundance Rating
175	81st	High	≥ 7.0 inches	35	88th	High

2021 BLUEGILL GROWTH METRICS

Number Measured	Length Bin (inches)	Mean Age	Age Range	Percentile Rank	Growth Rating
10	5.5 - 6.4	3.2	3 - 4	83rd	High
8	6.5 - 7.4	3.6	3 - 4	87th	High
10	7.5 - 8.4	4.3	4 - 5	96th	High





Panfish Summary

Bluegill:

- Catch rates of Bluegill were good for lakes in this area of the state. We typically like to see catch per unit effort of fish 3 inches and larger between 150—250 per mile.
- The size structure of the Bluegills sampled showed a low PSD with only 31 percent of the fish larger than 3 inches also larger than 6 inches.
- Growth rates were average to above average with fish reaching 6 inches in 3.6 years.

Black Crappie:

- The electrofishing boat is effective at catching Black Crappies, but the time of year this survey was done is not the best time of year to assess Black Crappies since they are done spawning and in deeper water where the boat is ineffective.
- Four fish were sampled rom 6.3 - 12.3 inches. Compared to similar surveys around the state Pearl Lake would rank in the 45th percentile. Fourteen crappies were sampled in 2012 (6.5-9.5 inches)

Yellow Perch:

- Only one Yellow Perch (4.6 in) was sampled in this survey (0 in 2012) Again this survey doesn't take place at the prime time of year to adequately asses Yellow Perch , but only one fish suggest a low population.

Green Sunfish:

- Green Sunfish have been common in the southern part of the state for some time, but we are encountering them more and more in our area as time goes by. We sampled 30 Green Sunfish in this survey (2.4 -6.7 inches) compared to 5 Green Sunfish in 2012. Their smaller size typically makes them less attractive to anglers, but fish that make harvestable size are good table fare.

Other fish sampled were White Suckers(30), Yellow Bullhead(6) and Horneyhead Chubs (1).

Final Summary and Management Recommendations

Northern Pike:

- Pearl Lake supports a high density Northern Pike population with growth rates below average
- With the high water there are some areas of Pearl lake that have some suitable spawning habitat. These areas would benefit from being protected or enhanced to ensure Northern Pike have spawning and nursery habitat in the future.
- The majority of Northern Pike that were caught in the fyke nets ranged between 14 and 20 inches with the largest being 22.7 inches. Average size = 16.9 inches.
- No fish larger than 26 inches were sampled. Currently the Northern Pike regulation is the southern zone state default of 2 northern pike greater then 26.
- Removing the 26 inch protective size limit should be pursued and replaced with the 5 fish no size limit regulation that is used up north.

Largemouth Bass:

- Pearl Lake supports a high density population of Largemouth Bass. Catch rates of Largemouth Bass in the spring electrofishing survey were 126 Largemouth Bass ≥ 8 inches per mile of electrofishing, Catch rates in the range of 35-70 bass per mile 8 inches and larger should be a good target for Pearl Lake.
- Size structure of Largemouth Bass in 2021 was also fairly good with a PSD of 51. An RSD14 = 6 is of concern since only 6% of fish larger than 8 inches were also of legal size.
- Growth rates of Largemouth Bass were below average with it taking 8.3 years to reach the legal size of 14 inches.
- Good habitat grows big bass and some of the new wood added, especially the nearshore trees should be very beneficial to the fishery.
- Removal of the size limit will be considered to reduce the number of bass down to the more desirable level of 35-70 bass per mile ≥ 8 inches. Bluegill growth should be considered as part of the regulation review process.

Bluegill:

- Bluegill catch rates have remained relatively unchanged from 2012 and are in the recommended range of 150-250 fish per mile 3 inches and larger.
- Size structure is somewhat low at 31% and should be closer to 50%.
- Growth rates were average to above average and like most clearwater lakes in the area, the population is likely susceptible to overharvest.

Black Crappie & Yellow Perch:

- This survey doesn't do an adequate job to assess these 2 species population but both species appear to be at low numbers and would benefit greatly from habitat improvements, especially nearshore wood. .

Other Management Recommendations:

- Like most of our developed lakes in the area, Pearl Lake is lacking optimal fish habitat in its shallow nearshore areas. It would be very beneficial to the fishery if more lakeshore owners promote a diverse mix of native emergent, submergent vegetation, as well as add wood in the form of fish sticks and tree drops along their shoreline. This would increase the amount of cover and habitat for a variety of organisms.
- The Department commends the residence of Pearl Lake for the efforts and progress they have made in addressing these habitat concerns. Keep up the good work!