



2021 Comprehensive Fish Survey Summary Report

Pearl Lake (WBIC 195400)

Waushara County

Introduction and Objectives

In 2021, the Wisconsin Department of Natural Resources (WDNR) 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.

Survey Methods

- Pearl Lake 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, measure and mark adult northern pike to estimate abundance along with understanding the age structure in the lake. The primary objective of the electrofishing II 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 had age structures (fin rays) collected from a subsample for age and growth analysis. All newly captured pike were given a partial fin clip (top caudal fin) in order to calculate recapture and get a better understanding of the population found in Pearl.
- Spring electrofishing takes place later in the spring when water temperatures are warm enough that 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 otoliths were taken from the lake to look at the age of each population.
- Fish metrics used to describe fish populations include catch per unit effort, total abundance, length frequency distribution and mean age at length.

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).

DNR Contact

**Scott Bunde - Fisheries Biologist
Senior**

Wisconsin Dept. of Natural Resources
427 E. Tower Drive, Suite 100
Wautoma, WI 54982
Phone: 920 - 787 - 5683
E-mail: scott.bunde@wisconsin.gov

Lake Information

Combined Acres: 101
Max. Depth: 45
Shoreline Miles: 2.1

Regulations

Five northern pike of any length may be kept. Five largemouth bass of any length may be kept.



Photos by WDNR Staff

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 |



Pearl Lake (WBIC 195400)

Gamefish Summary Waushara County

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 |

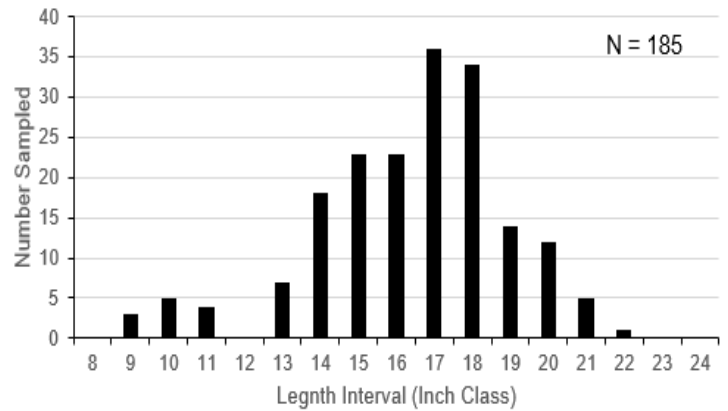
2021 NORTHERN PIKE GROWTH METRICS

| 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 |

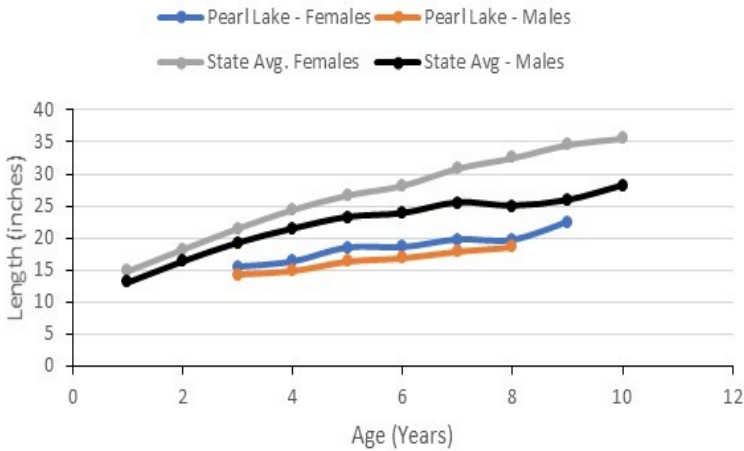
NORTHERN PIKE ADULT ABUNDANCE (POPULATION ESTIMATE)

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

Northern Pike Length Distribution



Northern Pike Mean Length at Age



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, when the 26/2 regulation was in effect.
- Population estimates of northern pike have stayed relatively unchanged over the last 2 surveys in Pearl Lake indicating a stable slow growing, high density northern pike population with very few large fish present with an estimated 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.



Photo by WDNR Staff



Pearl Lake (WBIC 195400)

Gamefish Summary

Waushara County

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 |

Largemouth Bass Length Distribution

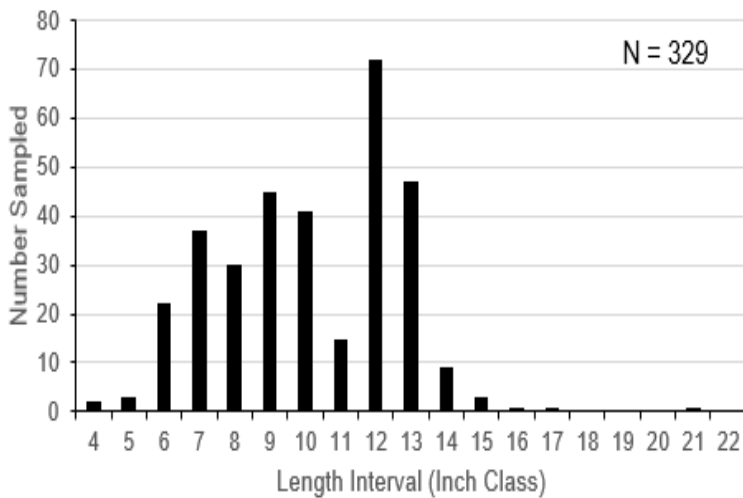


Photo by WDNR Staff

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 |

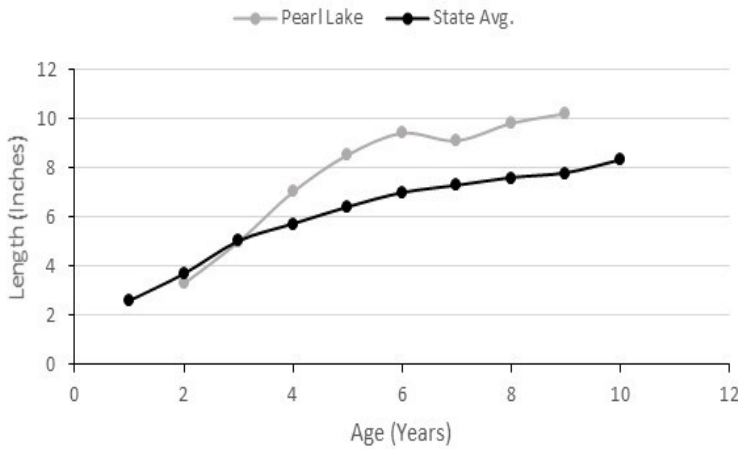
2021 BLUEGILL ELECTROFISHING CPUE (NUMBER PER MILE)

| 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 |

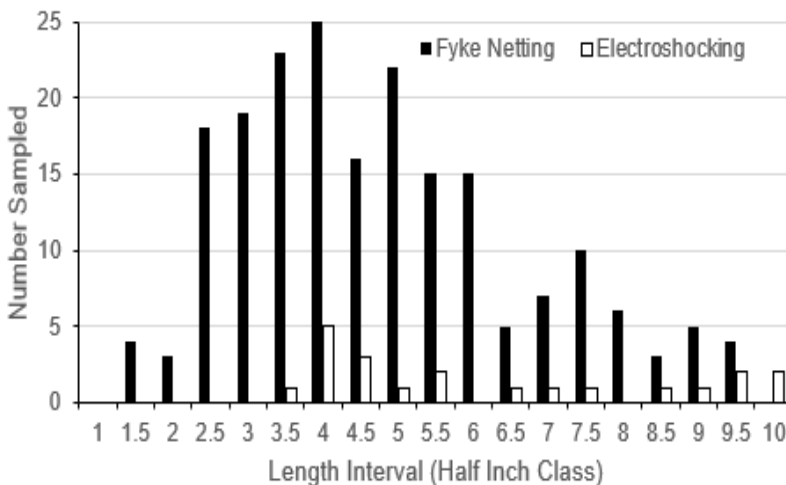
2021 BLUEGILL GROWTH METRICS

| 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 |

Bluegill Mean Length at Age



Bluegill Length Distribution Electrofishing



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 from 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:

- Yellow perch have been largely missing from surveys in Pearl Lake. Electrofishing yielded only one yellow perch (4.6 in) in this survey (0 in 2012) While not an ideal temperature and time of year for yellow perch, capturing one fish suggests a very low population.

Green Sunfish:

- Green sunfish are common in southern Wisconsin, but less so in central areas, but we are encountering them more in recent surveys. 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) and yellow bullhead(6).



Photo by WDNR Staff



Final Summary and Management Recommendations

Northern Pike:

- Pearl Lake supports a high density northern pike population with growth rates below average
- Recent higher water levels have allowed for flooded areas producing more suitable spawning habitat for northern pike. Generally, these flooded areas of vegetation and woody debris should benefit northern pike spawning and nursery habitat in the future.
- A 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.
- Since this survey the 2 fish bag limit and 26 inch minimum size limit has been removed (2024) which will create a harvest opportunity on the abundant small fish and will hopefully begin to produce a better size structure.

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 \geq 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. The goal of the new no minimum regulation is to provide a harvest opportunity on the abundant smaller fish and potentially reduce the populations size and thus limit intraspecies competition for food and grow more large fish.
- Growth rates of largemouth bass was 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 fish sticks added, especially the nearshore trees should be very beneficial to the fishery.

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 many local simple-warm-clear lakes, the population is likely susceptible to overharvest.

Black Crappie & Yellow Perch:

- This survey did an inadequate job assessing these 2 species. 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.



Photos by WDNR Staff