# Althoff Lake Survey Summary

Althoff Lake, located 3.0 miles south and 4.0 miles west of Roslyn, is a newly surveyed water due to the installation of a boat launch at the southwest portion of the lake in 2023. It is managed as a walleye and yellow perch fishery; however, northern pike are present and contribute to the fishery.

- **Northern pike**. Only three northern pike were captured in the gill nets resulting in a low CPUE (0.3/gill net) and indicating low relative abundance. The potential for increased abundance of the northern pike exists because populations tend to fluctuate with precipitation patterns, with elevated spring water levels typically providing better spawning conditions and increased recruitment.

- **Walleye.** At 5.6 walleye/gill net, relative abundance is considered moderate to high. Of those walleye that were at least ≥10.0 inches, 94% were ≥15.0 inches and 78% were ≥20.0 inches. Eleven year classes were represented from 2009 to 2022. The 2019 (age-4) cohort was the strongest year-class comprising 25% of captured walleye, which had a mean length at capture of 20.9 inches indicating good growth.

- **Yellow perch**. Yellow perch were the most abundant species in the 2023 gill-net catch (33.5/gill net). Only two year classes, 2021 and 2022, were represented. Those sampled ranged in length from 5.1 to 9.1 inches, most (98%) were from the 2022 (age-1) cohort, which had a mean length of 6.5 inches.

For more detailed results see the computer-generated South Dakota Statewide Fisheries Survey for Althoff Lake (Day; below).

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

## Althoff GPA, Day County

### MUD-Lake-346-001

### 2023

## Lake Information

**Name:** Althoff GPA

**County:** Day

**Surface Area:** 333 Acres

## Surveys and Investigations

Survey methods used by gear type, date, and effort.

| Gear | Date | Effort |
|---|---|---|
| AFS std gill net | Sep 13, 2023 | 4 net-nights |
| AFS std gill net | Sep 14, 2023 | 4 net-nights |
| AFS std gill net | Sep 15, 2023 | 4 net-nights |

## Common Fish Species Present

Yellow Perch

Walleye

Northern Pike

## Terminology

Catch per unit effort (**CPUE**) refers to the relative abundance of a species. It is defined as the number of fish captured per unit of effort (i.e., number of fish captured per net-night or number of fish captured per hour electrofishing). In this report CPUE is typically given for only stock-length fish (see length categories table for stock lengths).

A statewide effort to help make netting efforts comparable to all waters sampled across the state, occurred in 2017, with a switch to American Fisheries Society gill nets. Past gill netting efforts were completed with different style/types of nets and are not comparable side by side.

- **AFS std gill net** – 80 ft experimental gill net containing eight panels (10 ft each) of varying monofilament meshes of 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25 and 2.50 inches.
- **std experimental gill net for non-Missouri River waters** - 150 ft experimental gill net containing six panels (25 ft each) of varying monofilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.
- s**td experimental gill net for Missouri River reservoirs** – 300 ft experimental gill net containing six panels (50 ft each) of varying multifilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.

$$CPUE = \frac{number\ of\ fish}{effort}$$

Population size structure is quantified using the indices proportional size distribution of quality-length fish (**PSD**) and proportional size distribution of preferred-length fish (**PSD-P**). These indices indicate the proportion of stock-length fish that are equal to or greater than a given length. Minimum lengths for stock, quality and preferred length fish are given in the length categories table.

$$PSD = \left(\frac{number\ of\ fish \geq quality\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

$$PSD - P = \left(\frac{number\ of\ fish \geq preferred\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

Relative weight (**Wr**) is used to quantify fish plumpness. Relative weight is the ratio of what a fish weighs (W) compared to a length-specific standard weight (Ws) multiplied by 100. Relative weight values of 95-105 are commonly cited as optimum values, but values in the 80s are common during summer sampling in South Dakota.

$$Wr = \left(\frac{W}{Ws}\right) \text{x } 100$$

Confidence intervals (**CI**) are provided for many of the estimates calculated in this report. The confidence interval provides a range in which the true mean is expected to fall. For example, with an 80% CI we are 80% confident that the interval contains the true value.

Length categories include stock (**S**), quality (**Q**), preferred (**P**), memorable (**M**) and trophy (**T**). Length categories for most species have been defined based on a percentage of the world record length for that species. Some species mentioned in this report do not have defined length categories. Length categories for species used in this report are provided in the following table. Measurements are the minimum total length for each category and are reported in inches (in) and centimeters (cm).

| | Stock | | Quality | | Preferred | | Memorable | | Trophy | |
|---|---|---|---|---|---|---|---|---|---|---|
| Species Name | (in) | (cm) | (in) | (cm) | (in) | (cm) | (in) | (cm) | (in) | (cm) |
| Black Bullhead | 6 | 15 | 9 | 23 | 12 | 30 | 15 | 38 | 18 | 46 |
| Black Crappie | 5 | 13 | 8 | 20 | 10 | 25 | 12 | 30 | 15 | 38 |
| Bluegill | 3 | 8 | 6 | 15 | 8 | 20 | 10 | 25 | 12 | 30 |
| Brown Trout | 8 | 20 | 12 | 30 | 16 | 40 | 20 | 50 | 18 | 46 |
| Channel Catfish | 11 | 28 | 16 | 41 | 24 | 61 | 28 | 71 | 36 | 91 |
| Freshwater Drum | 8 | 20 | 12 | 30 | 15 | 38 | 20 | 51 | 25 | 63 |
| Lake Trout | 12 | 30 | 20 | 50 | 26 | 65 | 31 | 80 | 39 | 100 |
| Largemouth Bass | 8 | 20 | 12 | 30 | 15 | 38 | 20 | 51 | 25 | 63 |
| Muskellunge | 20 | 51 | 30 | 76 | 38 | 97 | 42 | 107 | 50 | 127 |
| Northern Pike | 14 | 35 | 21 | 53 | 28 | 71 | 34 | 86 | 44 | 112 |
| Pumpkinseed | 3 | 8 | 6 | 15 | 8 | 20 | 10 | 25 | 12 | 30 |
| Rainbow Trout | 10 | 25 | 16 | 40 | 20 | 50 | 26 | 65 | 31 | 80 |
| Rudd | 6 | 15 | 10 | 25 | 12 | 30 | 15 | 38 | 19 | 48 |
| Sauger | 8 | 20 | 12 | 30 | 15 | 38 | 20 | 51 | 25 | 63 |
| Smallmouth Bass | 7 | 18 | 11 | 28 | 14 | 35 | 17 | 43 | 20 | 51 |
| Walleye | 10 | 25 | 15 | 38 | 20 | 51 | 25 | 63 | 30 | 76 |
| White Bass | 6 | 15 | 9 | 23 | 12 | 30 | 15 | 38 | 18 | 46 |
| White Crappie | 5 | 13 | 8 | 20 | 10 | 25 | 12 | 30 | 15 | 38 |
| Yellow Bullhead | 4 | 10 | 7 | 18 | 9 | 23 | 11 | 28 | 14 | 36 |
| Yellow Perch | 5 | 13 | 8 | 20 | 10 | 25 | 12 | 30 | 15 | 38 |

## Catch Summary of Stock Length Fish

Catch per unit effort (CPUE), proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) for species sampled in survey with 80% confidence interval (CI-80).

*** Methods/Species that ignore stock length**

| | | | Abundance | | Stock Density Indices | | | | Condition | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | Sample Size (n) | CPUE | CI-80 | PSD | CI-80 | PSD-P | CI-80 | Wr | CI-80 |
| AFS std gill net | Northern Pike | 3 | 0.3 | 0.2 | 100 | | 0 | | 86 | 5 |
| | Walleye | 68 | 5.6 | 1.2 | 96 | | 79 | 7 | 90 | 1 |
| | Yellow Perch | 402 | 33.5 | 5.8 | 3 | 1 | 0 | | 107 | 1 |

## 10-Year Catch Per Unit Effort by Gear and Species

Catch per unit effort (CPUE) and average (Avg) of species across 10 years using different gear types.

*** Methods/Species that ignore stock length**

| | | CPUE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Avg |
| AFS std gill net | Northern Pike | | | | | | | | | | 0.3 | 0.30 |
| | Walleye | | | | | | | | | | 5.6 | 5.60 |
| | Yellow Perch | | | | | | | | | | 33.5 | 33.50 |

## 10-Year Size Structure and Condition Statistics by Gear and Species

Species proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) collected by different gear types across 10 years.

| | | | Year | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | Index | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| AFS std gill net | Northern Pike | PSD | | | | | | | | | | 100 |
| | | PSD-P | | | | | | | | | | 0 |
| | | Wr | | | | | | | | | | 86 |
| | Walleye | PSD | | | | | | | | | | 96 |
| | | PSD-P | | | | | | | | | | 79 |
| | | Wr | | | | | | | | | | 90 |
| | Yellow Perch | PSD | | | | | | | | | | 3 |
| | | PSD-P | | | | | | | | | | 0 |
| | | Wr | | | | | | | | | | 107 |

## Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Walleye

| | | Mean Length (expanded sample number) at capture by age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
| 2023 | 67 | 360 (3) | 428 (5) | 500 (3) | 532 (17) | 560 (10) | | 630 (3) | | 644 (6) | 650 (20) |

Species: Yellow Perch

| | | Mean Length (expanded sample number) at capture by age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
| 2023 | 402 | 164 (393) | 208 (9) | | | | | | | | |

## Fish Condition

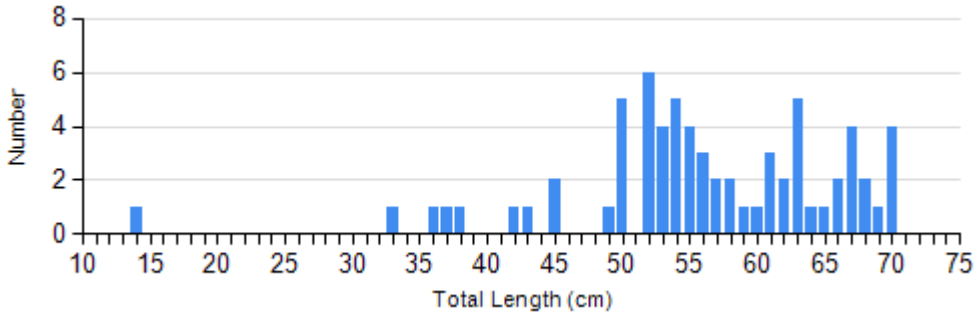
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

| | | Length Groups | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | S-Q | | Q-P | | P-M | | M | |
| Species | Year | N | Wr (SE) | N | Wr (SE) | N | Wr (SE) | N | Wr (SE) |
| Northern Pike<br>Gill Net | 2023 | 0 | | 3 | 86<br>(4.0) | 0 | | 0 | |
| Walleye<br>Gill Net | 2023 | 3 | 95<br>(2.9) | 11 | 92<br>(1.2) | 33 | 93<br>(1.1) | 20 | 83<br>(1.4) |
| Yellow Perch<br>Gill Net | 2023 | 391 | 107<br>(0.5) | 11 | 104<br>(2.4) | 0 | | 0 | |

## Length Frequency Distribution

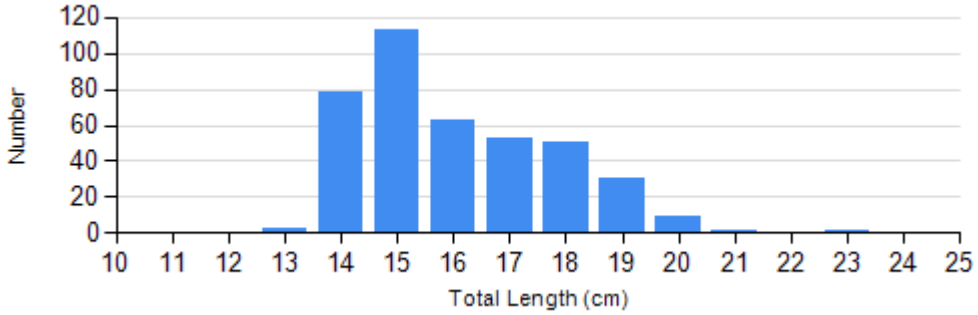
Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net




2023

Species: Yellow Perch
Gear: AFS std gill net

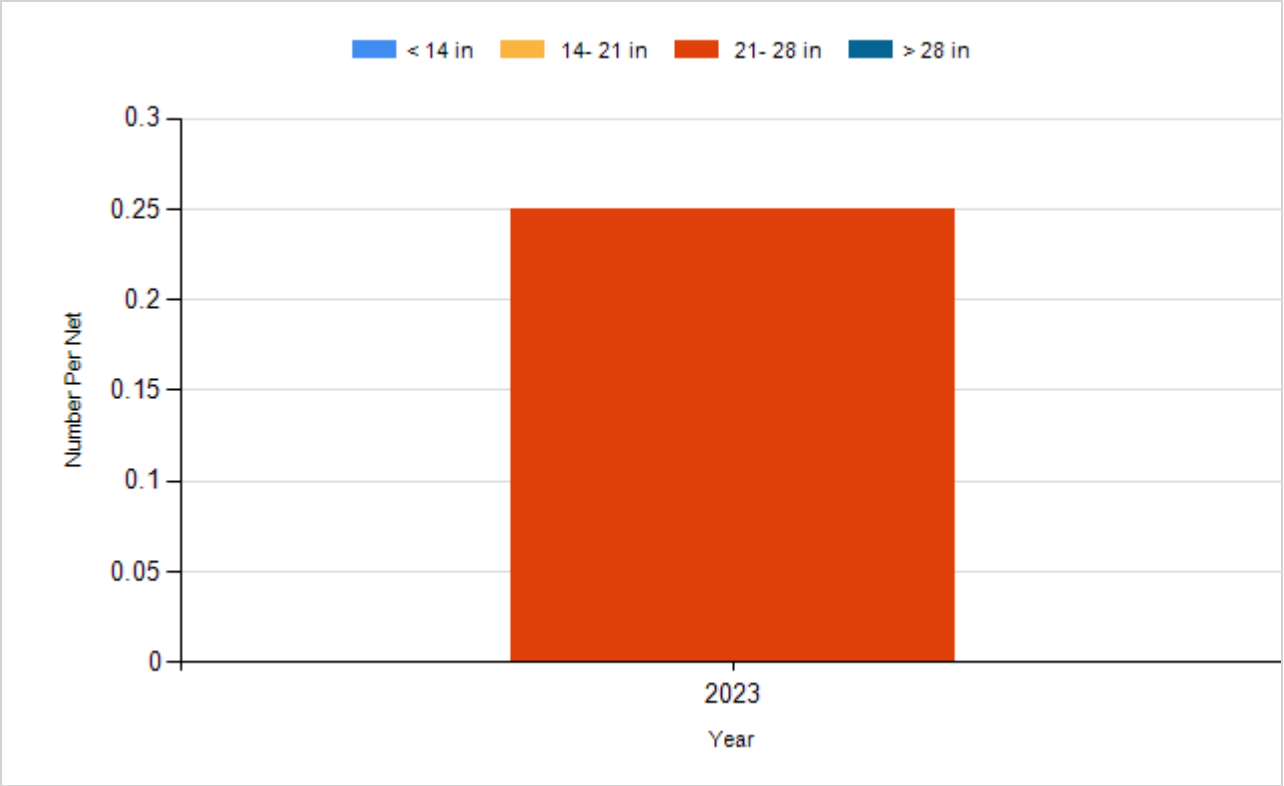



2023

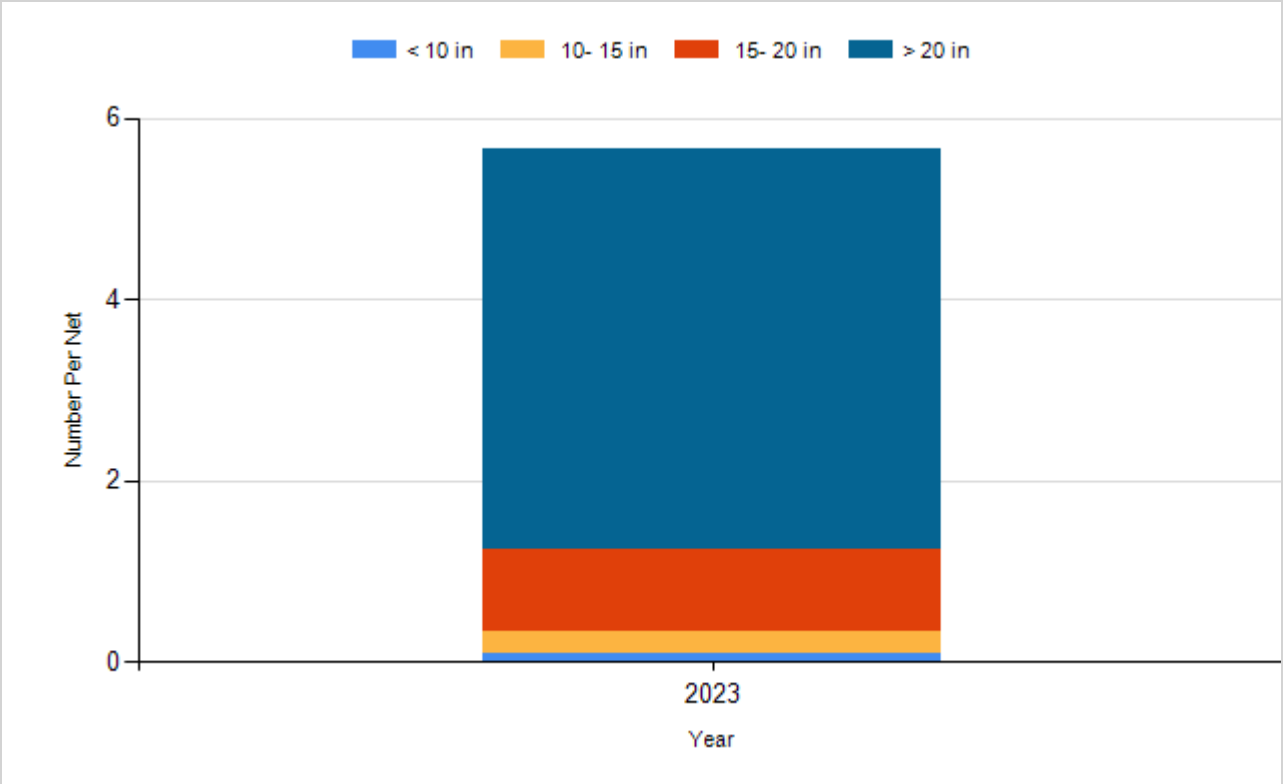
## Historic Fish Sizes and Relative Abundance

Size distribution per net by color for species sampled by year.

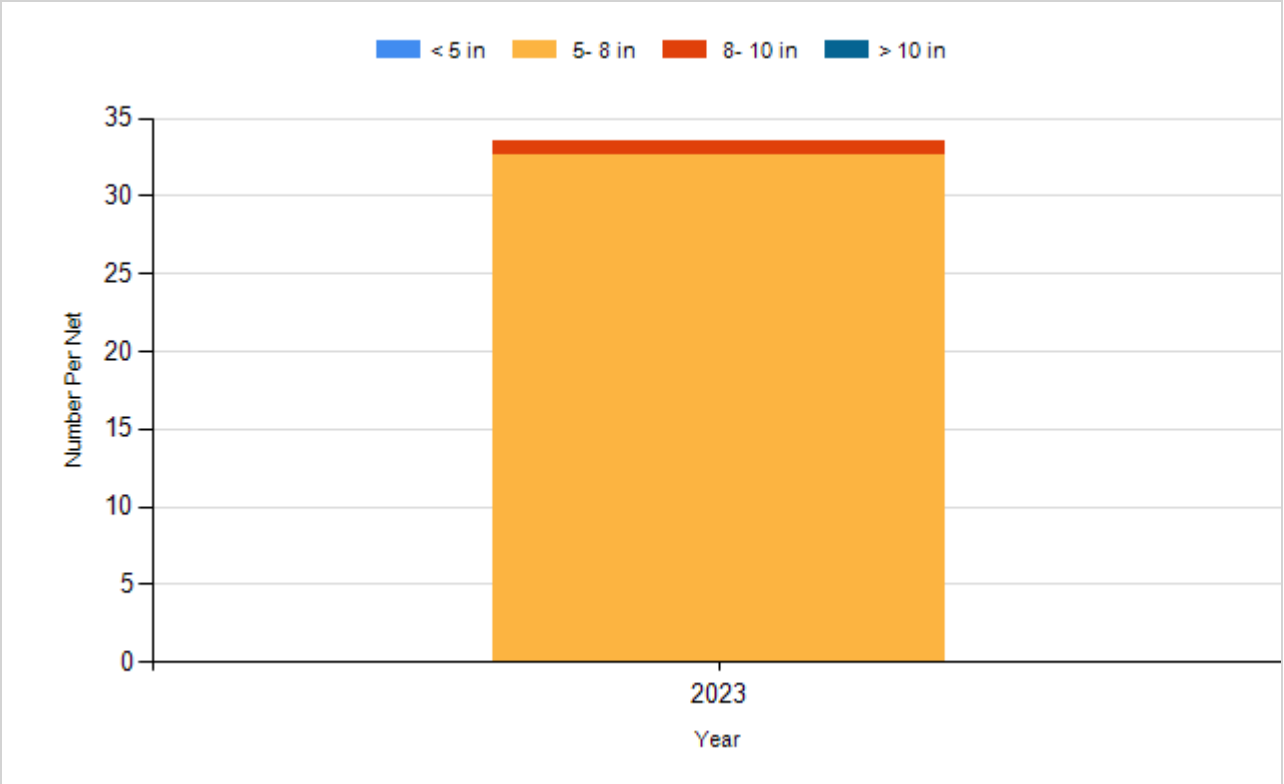
Species: Northern Pike
Gear: AFS std gill net



Species: Walleye
Gear: AFS std gill net



Species: Yellow Perch
Gear: AFS std gill net



## Fish Stocking

Number of fish stocked by year, species, and size.

| Year | Species | Size | Number |
|---|---|---|---|
| 2021 | Walleye | Fry | 200,000 |
| 2023 | Walleye | Fry | 250,000 |

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
## Althoff GPA, Day County
### MUD-Lake-346-001
### 2023

## Lake Information

**Name:** Althoff GPA

**County:** Day

**Surface Area:** 333 Acres

## Surveys and Investigations

Survey methods used by gear type, date, and effort.

| Gear | Date | Effort |
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## Common Fish Species Present

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Walleye

Northern Pike

## Terminology

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$$CPUE = \frac{number\ of\ fish}{effort}$$

Population size structure is quantified using the indices proportional size distribution of quality-length fish (**PSD**) and proportional size distribution of preferred-length fish (**PSD-P**). These indices indicate the proportion of stock-length fish that are equal to or greater than a given length. Minimum lengths for stock, quality and preferred length fish are given in the length categories table.

$$PSD = \left(\frac{number\ of\ fish \geq quality\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

$$PSD - P = \left(\frac{number\ of\ fish \geq preferred\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

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$$Wr = \left(\frac{W}{Ws}\right) \text{x } 100$$

Confidence intervals (**CI**) are provided for many of the estimates calculated in this report. The confidence interval provides a range in which the true mean is expected to fall. For example, with an 80% CI we are 80% confident that the interval contains the true value.

Length categories include stock (**S**), quality (**Q**), preferred (**P**), memorable (**M**) and trophy (**T**). Length categories for most species have been defined based on a percentage of the world record length for that species. Some species mentioned in this report do not have defined length categories. Length categories for species used in this report are provided in the following table. Measurements are the minimum total length for each category and are reported in inches (in) and centimeters (cm).

| | Stock | | Quality | | Preferred | | Memorable | | Trophy | |
|---|---|---|---|---|---|---|---|---|---|---|
| Species Name | (in) | (cm) | (in) | (cm) | (in) | (cm) | (in) | (cm) | (in) | (cm) |
| Black Bullhead | 6 | 15 | 9 | 23 | 12 | 30 | 15 | 38 | 18 | 46 |
| Black Crappie | 5 | 13 | 8 | 20 | 10 | 25 | 12 | 30 | 15 | 38 |
| Bluegill | 3 | 8 | 6 | 15 | 8 | 20 | 10 | 25 | 12 | 30 |
| Brown Trout | 8 | 20 | 12 | 30 | 16 | 40 | 20 | 50 | 18 | 46 |
| Channel Catfish | 11 | 28 | 16 | 41 | 24 | 61 | 28 | 71 | 36 | 91 |
| Freshwater Drum | 8 | 20 | 12 | 30 | 15 | 38 | 20 | 51 | 25 | 63 |
| Lake Trout | 12 | 30 | 20 | 50 | 26 | 65 | 31 | 80 | 39 | 100 |
| Largemouth Bass | 8 | 20 | 12 | 30 | 15 | 38 | 20 | 51 | 25 | 63 |
| Muskellunge | 20 | 51 | 30 | 76 | 38 | 97 | 42 | 107 | 50 | 127 |
| Northern Pike | 14 | 35 | 21 | 53 | 28 | 71 | 34 | 86 | 44 | 112 |
| Pumpkinseed | 3 | 8 | 6 | 15 | 8 | 20 | 10 | 25 | 12 | 30 |
| Rainbow Trout | 10 | 25 | 16 | 40 | 20 | 50 | 26 | 65 | 31 | 80 |
| Rudd | 6 | 15 | 10 | 25 | 12 | 30 | 15 | 38 | 19 | 48 |
| Sauger | 8 | 20 | 12 | 30 | 15 | 38 | 20 | 51 | 25 | 63 |
| Smallmouth Bass | 7 | 18 | 11 | 28 | 14 | 35 | 17 | 43 | 20 | 51 |
| Walleye | 10 | 25 | 15 | 38 | 20 | 51 | 25 | 63 | 30 | 76 |
| White Bass | 6 | 15 | 9 | 23 | 12 | 30 | 15 | 38 | 18 | 46 |
| White Crappie | 5 | 13 | 8 | 20 | 10 | 25 | 12 | 30 | 15 | 38 |
| Yellow Bullhead | 4 | 10 | 7 | 18 | 9 | 23 | 11 | 28 | 14 | 36 |
| Yellow Perch | 5 | 13 | 8 | 20 | 10 | 25 | 12 | 30 | 15 | 38 |

## Catch Summary of Stock Length Fish

Catch per unit effort (CPUE), proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) for species sampled in survey with 80% confidence interval (CI-80).

*** Methods/Species that ignore stock length**

| | | | Abundance | | Stock Density Indices | | | | Condition | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | Sample Size (n) | CPUE | CI-80 | PSD | CI-80 | PSD-P | CI-80 | Wr | CI-80 |
| AFS std gill net | Northern Pike | 3 | 0.3 | 0.2 | 100 | | 0 | | 86 | 5 |
| | Walleye | 68 | 5.6 | 1.2 | 96 | | 79 | 7 | 90 | 1 |
| | Yellow Perch | 402 | 33.5 | 5.8 | 3 | 1 | 0 | | 107 | 1 |

## 10-Year Catch Per Unit Effort by Gear and Species

Catch per unit effort (CPUE) and average (Avg) of species across 10 years using different gear types.

*** Methods/Species that ignore stock length**

| | | CPUE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | Avg |
| AFS std gill net | Northern Pike | | | | | | | | | | 0.3 | 0.30 |
| | Walleye | | | | | | | | | | 5.6 | 5.60 |
| | Yellow Perch | | | | | | | | | | 33.5 | 33.50 |

## 10-Year Size Structure and Condition Statistics by Gear and Species

Species proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) collected by different gear types across 10 years.

| | | | Year | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | Index | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
| AFS std gill net | Northern Pike | PSD | | | | | | | | | | 100 |
| | | PSD-P | | | | | | | | | | 0 |
| | | Wr | | | | | | | | | | 86 |
| | Walleye | PSD | | | | | | | | | | 96 |
| | | PSD-P | | | | | | | | | | 79 |
| | | Wr | | | | | | | | | | 90 |
| | Yellow Perch | PSD | | | | | | | | | | 3 |
| | | PSD-P | | | | | | | | | | 0 |
| | | Wr | | | | | | | | | | 107 |

## Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Walleye

| | | Mean Length (expanded sample number) at capture by age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
| 2023 | 67 | 360 (3) | 428 (5) | 500 (3) | 532 (17) | 560 (10) | | 630 (3) | | 644 (6) | 650 (20) |

Species: Yellow Perch

| | | Mean Length (expanded sample number) at capture by age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
| 2023 | 402 | 164 (393) | 208 (9) | | | | | | | | |

## Fish Condition

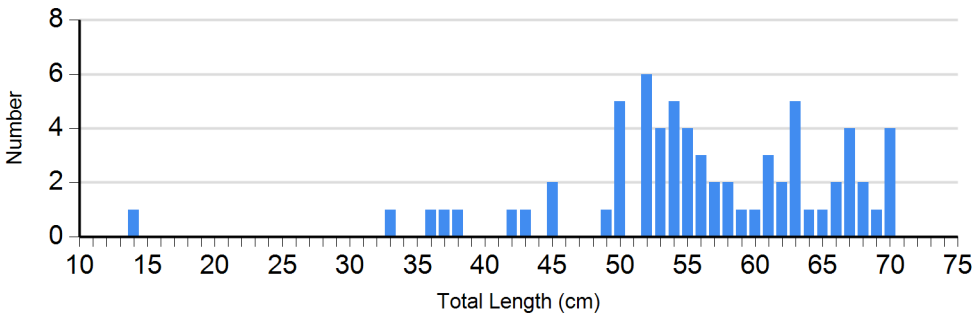
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

| | | Length Groups | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | S-Q | | Q-P | | P-M | | M | |
| Species | Year | N | Wr (SE) | N | Wr (SE) | N | Wr (SE) | N | Wr (SE) |
| Northern Pike<br>Gill Net | 2023 | 0 | | 3 | 86<br>(4.0) | 0 | | 0 | |
| Walleye<br>Gill Net | 2023 | 3 | 95<br>(2.9) | 11 | 92<br>(1.2) | 33 | 93<br>(1.1) | 20 | 83<br>(1.4) |
| Yellow Perch<br>Gill Net | 2023 | 391 | 107<br>(0.5) | 11 | 104<br>(2.4) | 0 | | 0 | |

## Length Frequency Distribution

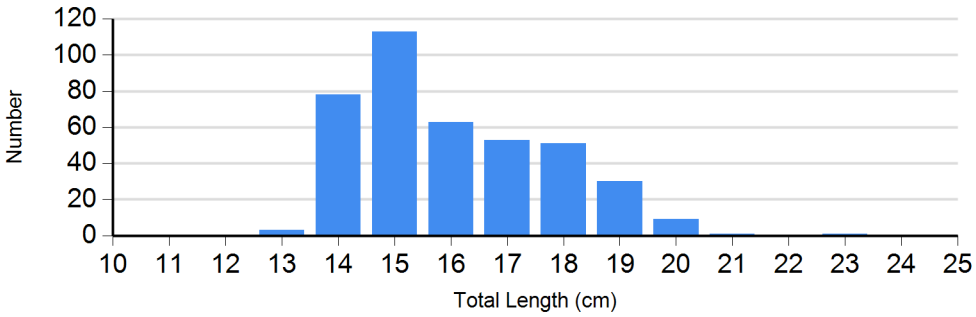
Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net




2023

Species: Yellow Perch
Gear: AFS std gill net

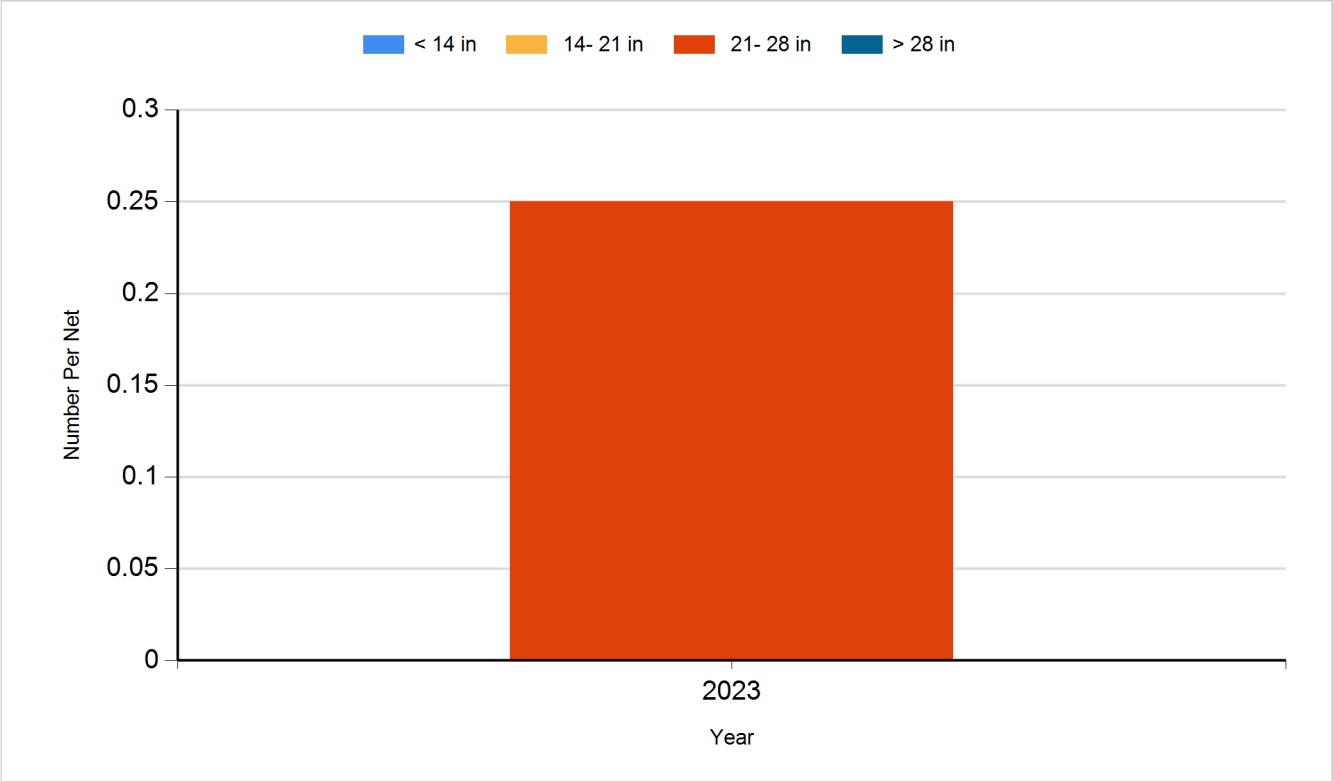



2023

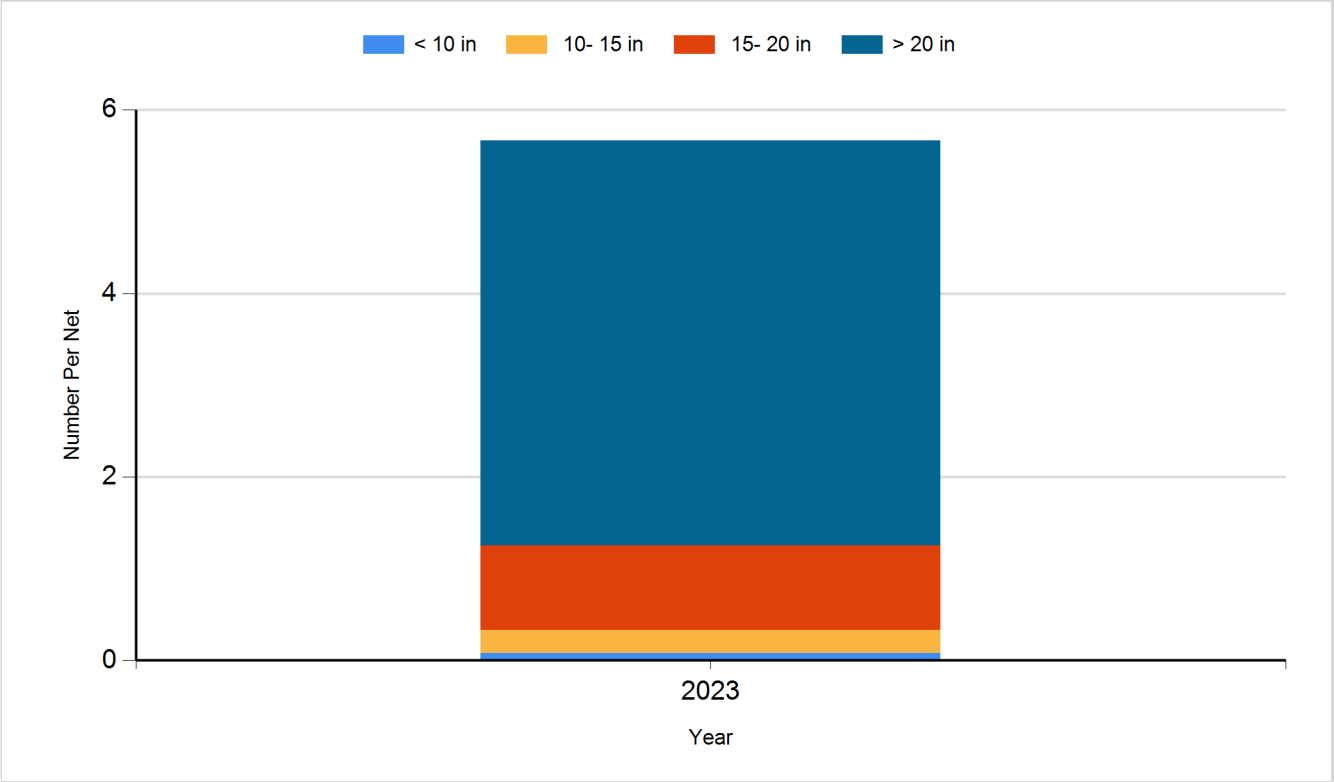
## Historic Fish Sizes and Relative Abundance

Size distribution per net by color for species sampled by year.

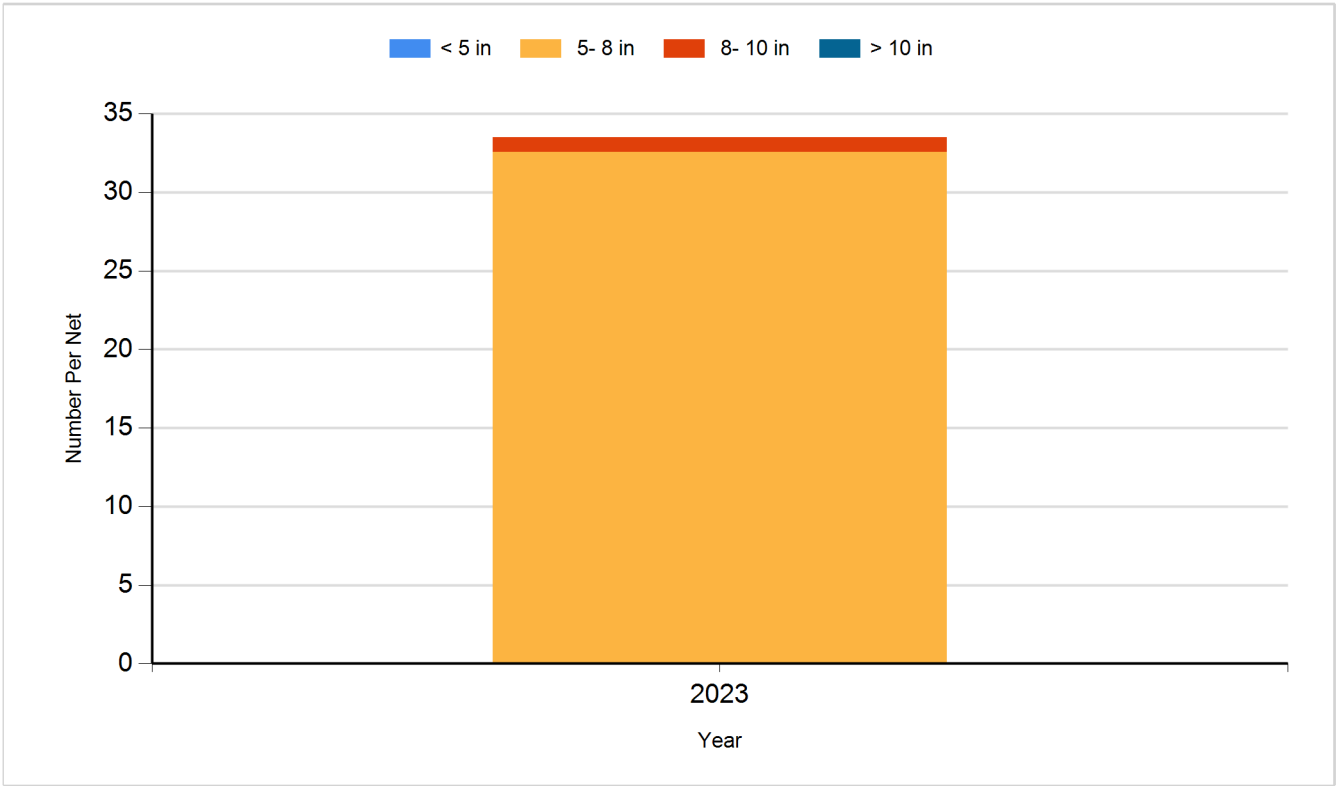
Species: Northern Pike
Gear: AFS std gill net




Species: Walleye
Gear: AFS std gill net



Species: Yellow Perch
Gear: AFS std gill net



## Fish Stocking

Number of fish stocked by year, species, and size.

| Year | Species | Size | Number |
|---|---|---|---|
| 2021 | Walleye | Fry | 200,000 |
| 2023 | Walleye | Fry | 250,000 |