# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
## McCook, Union County
## LCL-Lake-5-000
## 2016

## Lake Information

| | | | |
|---|---|---|---|
| **Name:** | McCook | **Maximum Depth:** | 14 Feet |
| **County:** | Union | **Mean Depth:** | 6 Feet |
| **Legal Description:** | T89N-R48W-Sec 4, 9-10, 15-16, 21 | **OHWM Elevation:** | 1,091 |
| **Surface Area:** | 297 Acres | | |

## Surveys and Investigations

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

| Gear | Date | Effort |
|---|---|---|
| std exp gill net | August 02, 2016 | 3 net-nights |
| std frame net (3/8 inch) | August 02, 2016 | 5 net-nights |

## Common Fish Species Present

Walleye

Channel Catfish

White Crappie

Black Crappie

Gizzard Shad

White Bass

Bluegill

Freshwater Drum

Bigmouth Buffalo

Common Carp

## 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).

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

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) |
| Bigmouth Buffalo | 11 | 28 | 18 | 46 | 24 | 61 | 30 | 76 | 37 | 94 |
| Black Bullhead | 6 | 15 | 9 | 23 | 12 | 30 | 15 | 38 | 18 | 46 |
| Black Crappie | 5 | 13 | 8 | 20 | 10 | 25 | 12 | 30 | 15 | 38 |

| | Stock | | Quality | | Preferred | | Memorable | | Trophy | |
|---|---|---|---|---|---|---|---|---|---|---|
| Species Name | (in) | (cm) | (in) | (cm) | (in) | (cm) | (in) | (cm) | (in) | (cm) |
| Blue Catfish | 12 | 30 | 20 | 51 | 30 | 76 | 35 | 89 | 45 | 114 |
| Bluegill | 3 | 8 | 6 | 15 | 8 | 20 | 10 | 25 | 12 | 30 |
| Bluegill X Gr. Sunfish Hybrid | 3 | 8 | 6 | 15 | 8 | 20 | 10 | 25 | 12 | 30 |
| Brown Bullhead | 5 | 13 | 8 | 20 | 11 | 28 | 14 | 36 | 17 | 43 |
| Burbot | 8 | 20 | 15 | 38 | 21 | 53 | 26 | 67 | 32 | 82 |
| Channel Catfish | 11 | 28 | 16 | 41 | 24 | 61 | 28 | 71 | 36 | 91 |
| Common Carp | 11 | 28 | 16 | 41 | 21 | 53 | 26 | 66 | 33 | 84 |
| Flathead Catfish | 14 | 35 | 20 | 51 | 28 | 71 | 34 | 86 | 40 | 102 |
| Freshwater Drum | 8 | 20 | 12 | 30 | 15 | 38 | 20 | 51 | 25 | 63 |
| Gizzard Shad | 7 | 18 | 11 | 28 | | | | | | |
| Green Sunfish | 3 | 8 | 6 | 15 | 8 | 20 | 10 | 25 | 12 | 30 |
| Lake Herring | 5 | 13 | 8 | 20 | 11 | 28 | 14 | 35 | 17 | 43 |
| Largemouth Bass | 8 | 20 | 12 | 30 | 15 | 38 | 20 | 51 | 25 | 63 |
| Longnose Gar | 16 | 41 | 27 | 69 | 36 | 91 | 45 | 114 | 55 | 140 |
| Muskellunge | 20 | 51 | 30 | 76 | 38 | 97 | 42 | 107 | 50 | 127 |
| Northern Pike | 14 | 35 | 21 | 53 | 28 | 71 | 34 | 86 | 44 | 112 |
| Paddlefish | 16 | 41 | 26 | 66 | 33 | 84 | 41 | 104 | 51 | 130 |
| Pumpkinseed | 3 | 8 | 6 | 15 | 8 | 20 | 10 | 25 | 12 | 30 |
| Redear Sunfish | 4 | 10 | 7 | 18 | 9 | 23 | 11 | 28 | 13 | 33 |
| River Carpsucker | 7 | 18 | 11 | 28 | 14 | 36 | 18 | 46 | 22 | 56 |
| Rock Bass | 4 | 10 | 7 | 18 | 9 | 23 | 11 | 28 | 13 | 33 |
| Rudd | 6 | 15 | 10 | 25 | 12 | 30 | 15 | 38 | 19 | 48 |
| Sauger | 8 | 20 | 12 | 30 | 15 | 38 | 20 | 51 | 25 | 63 |
| Saugeye | 9 | 23 | 14 | 35 | 18 | 46 | 22 | 56 | 27 | 69 |
| Shorthead Redhorse | 6 | 15 | 10 | 25 | 13 | 33 | 16 | 41 | 20 | 51 |
| Smallmouth Bass | 7 | 18 | 11 | 28 | 14 | 35 | 17 | 43 | 20 | 51 |
| Smallmouth Buffalo | 11 | 28 | 18 | 46 | 24 | 61 | 30 | 76 | 37 | 94 |
| Spotted Bass | 7 | 18 | 11 | 28 | 14 | 35 | 17 | 43 | 20 | 51 |
| Striped Bass | 12 | 30 | 20 | 51 | 30 | 76 | 35 | 89 | 45 | 114 |
| Striped Bass Hybrid (wiper) | 8 | 20 | 12 | 30 | 15 | 38 | 20 | 51 | 25 | 63 |
| 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 |
| White Perch | 5 | 13 | 8 | 20 | 10 | 25 | 12 | 30 | 15 | 38 |
| White Sucker | 6 | 15 | 10 | 25 | 13 | 33 | 16 | 41 | 20 | 51 |
| Yellow Bass | 4 | 10 | 7 | 18 | 9 | 23 | 11 | 28 | 13 | 33 |
| 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).

| | | Abundance | | Stock Density Indices | | | | Condition | |
|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | CPUE | CI-80 | PSD | CI-80 | PSD-P | CI-80 | Wr | CI-80 |
| std exp gill net | Channel Catfish | 6.3 | 2.3 | 58 | 18 | 5 | | 88 | 2 |
| | Common Carp | 0.3 | 0.6 | 100 | | 0 | | | |
| | Gizzard Shad | 1.3 | 1.3 | 25 | | | | | |
| | Shortnose Gar | 0.0 | 0.0 | | | | | | |
| | Walleye | 4.3 | 4.4 | 0 | | 0 | | 72 | 3 |
| | White Bass | 1.0 | 1.9 | 100 | | 0 | | 97 | 2 |
| | White Crappie | 0.0 | 0.0 | 0 | | 0 | | | |
| std frame net (3/8 inch) | Bigmouth Buffalo | 0.6 | 0.9 | 67 | | 0 | | | |
| | Black Crappie | 2.4 | 1.6 | 8 | | 8 | | 95 | 4 |
| | Bluegill | 1.0 | 1.5 | 0 | | 0 | | 124 | 9 |
| | Channel Catfish | 1.0 | 1.2 | 80 | | 0 | | 87 | 5 |
| | Common Carp | 0.2 | 0.3 | 0 | | 0 | | | |
| | Freshwater Drum | 0.8 | 0.9 | 50 | | 50 | | | |
| | Shortnose Gar | 0.0 | 0.0 | | | | | | |
| | Walleye | 2.4 | 2.1 | 0 | | 0 | | 77 | 1 |
| | White Bass | 0.2 | 0.3 | 100 | | 0 | | 70 | |
| | White Crappie | 5.8 | 5.2 | 24 | 13 | 0 | | 92 | 2 |

## 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.

| | | CPUE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Avg |
| boat shocker (night) | Bigmouth Buffalo | | | | | 0.5 | | 0.5 | | | | 0.5 |
| | Black Crappie | | | | | 8.5 | | | | | | 8.5 |
| | Bluegill | | | | | 41.5 | | 3.0 | | | | 22.3 |
| | Channel Catfish | | | | | 7.0 | | 2.0 | | | | 4.5 |
| | Common Carp | | | | | 25.0 | | 6.5 | | | | 15.8 |
| | Flathead Catfish | | | | | 0.5 | | 1.0 | | | | 0.8 |
| | Freshwater Drum | | | | | 2.0 | | | | | | 2.0 |
| | Gizzard Shad | | | | | 84.5 | | 11.0 | | | | 47.8 |
| | Largemouth Bass | 10.0 | | 45.5 | | 28.0 | | 16.5 | | | | 25.0 |
| | Shorthead Redhorse | | | | | | | 1.0 | | | | 1.0 |
| | Shortnose Gar | | | | | 0.0 | | 0.0 | | | | 0.0 |
| | Smallmouth Buffalo | | | | | 8.5 | | | | | | 8.5 |
| | Walleye | | | | | 0.5 | | 0.5 | | | | 0.5 |
| | White Bass | | | | | 9.5 | | 1.0 | | | | 5.3 |
| | White Crappie | | | | | 2.5 | | 0.5 | | | | 1.5 |
| | Yellow Bullhead | | | | | 0.5 | | | | | | 0.5 |
| | Yellow Perch | | | | | 8.5 | | | | | | 8.5 |
| large frame net | Bigmouth Buffalo | 0.1 | | | | | | | | | | 0.1 |
| | Black Crappie | 1.5 | | 4.1 | | | | | | | | 2.8 |
| | Bluegill | 1.6 | | 4.6 | | | | | | | | 3.1 |
| | Channel Catfish | 0.8 | | 0.4 | | | | | | | | 0.6 |
| | Common Carp | 0.3 | | 0.2 | | | | | | | | 0.3 |
| | Freshwater Drum | 0.7 | | 0.4 | | | | | | | | 0.6 |
| | Largemouth Bass | 0.0 | | | | | | | | | | 0.0 |
| | Shorthead Redhorse | | | 0.1 | | | | | | | | 0.1 |
| | Shortnose Gar | 0.0 | | | | | | | | | | 0.0 |
| | Walleye | | | 0.1 | | | | | | | | 0.1 |
| | White Bass | 0.5 | | 0.3 | | | | | | | | 0.4 |
| | White Crappie | 1.3 | | 1.9 | | | | | | | | 1.6 |
| | Yellow Perch | 0.2 | | 0.1 | | | | | | | | 0.2 |
| std exp gill net | Bigmouth Buffalo | 0.8 | | | | | | | | | | 0.8 |
| | Black Crappie | | | 0.3 | | | | | | | | 0.3 |
| | Channel Catfish | 11.0 | | 6.0 | | | | | | 11.0 | 6.3 | 8.6 |

| | | CPUE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | Avg |
| std exp gill net | Common Carp | | | | | | | | | 0.5 | 0.3 | 0.4 |
| | Freshwater Drum | 0.3 | | 1.3 | | | | | | 3.0 | | 1.5 |
| | Gizzard Shad | 7.0 | | 4.0 | | | | | | 1.0 | 1.3 | 3.3 |
| | Largemouth Bass | 0.0 | | | | | | | | | | 0.0 |
| | Shortnose Gar | 0.0 | | | | | | | | 0.0 | 0.0 | 0.0 |
| | Smallmouth Buffalo | | | | | | | | | 0.5 | | 0.5 |
| | Walleye | 2.8 | | 1.0 | | | | | | 2.0 | 4.3 | 2.5 |
| | White Bass | 5.3 | | 4.7 | | | | | | | 1.0 | 3.7 |
| | White Crappie | 0.3 | | | | | | | | 1.0 | 0.0 | 0.4 |
| | Yellow Perch | 1.5 | | 1.7 | | | | | | 0.5 | | 1.2 |
| std frame net (3/8 inch) | Bigmouth Buffalo | | | | | | | | | | 0.6 | 0.6 |
| | Black Crappie | | | | | | | | | 7.2 | 2.4 | 4.8 |
| | Bluegill | | | | | | | | | 0.8 | 1.0 | 0.9 |
| | Channel Catfish | | | | | | | | | 1.6 | 1.0 | 1.3 |
| | Common Carp | | | | | | | | | | 0.2 | 0.2 |
| | Flathead Catfish | | | | | | | | | 0.2 | | 0.2 |
| | Freshwater Drum | | | | | | | | | 0.6 | 0.8 | 0.7 |
| | Shortnose Gar | | | | | | | | | 0.0 | 0.0 | 0.0 |
| | Walleye | | | | | | | | | 0.6 | 2.4 | 1.5 |
| | White Bass | | | | | | | | | | 0.2 | 0.2 |
| | White Crappie | | | | | | | | | 14.0 | 5.8 | 9.9 |
| | Yellow Perch | | | | | | | | | 0.2 | | 0.2 |

## 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 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| boat shocker (night) | Black Crappie | PSD | | | | | 88 | | | | | |
| | | PSD-P | | | | | 6 | | | | | |
| | | Wr | | | | | 88 | | | | | |
| | Walleye | PSD | | | | | 0 | | 100 | | | |
| | | PSD-P | | | | | 0 | | 0 | | | |
| | | Wr | | | | | 81 | | 83 | | | |
| | Yellow Perch | PSD | | | | | 29 | | | | | |
| | | PSD-P | | | | | 0 | | | | | |
| | | Wr | | | | | 86 | | | | | |
| large frame net | Black Crappie | PSD | 73 | | 54 | | | | | | | |
| | | PSD-P | 20 | | 16 | | | | | | | |
| | | Wr | 99 | | 102 | | | | | | | |
| | Walleye | PSD | | | 100 | | | | | | | |
| | | PSD-P | | | 100 | | | | | | | |
| | | Wr | | | 75 | | | | | | | |
| | Yellow Perch | PSD | 50 | | 100 | | | | | | | |
| | | PSD-P | 0 | | 0 | | | | | | | |
| | | Wr | 82 | | 78 | | | | | | | |
| std exp gill net | Black Crappie | PSD | | | 0 | | | | | | | |
| | | PSD-P | | | 0 | | | | | | | |
| | | Wr | | | 89 | | | | | | | |
| | Walleye | PSD | 9 | | 67 | | | | | | 25 | 0 |
| | | PSD-P | 0 | | 0 | | | | | | 0 | 0 |
| | | Wr | 83 | | 79 | | | | | | 81 | 72 |
| | Yellow Perch | PSD | 0 | | 0 | | | | | | 0 | |
| | | PSD-P | 0 | | 0 | | | | | | 0 | |
| | | Wr | 96 | | 88 | | | | | | 80 | |
| std frame net (3/8 inch) | Black Crappie | PSD | | | | | | | | | 19 | 8 |
| | | PSD-P | | | | | | | | | 6 | 8 |
| | | Wr | | | | | | | | | 100 | 95 |
| | Walleye | PSD | | | | | | | | | 0 | 0 |

| | | | Year | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | Index | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| std frame net (3/8 inch) | Walleye | PSD-P | | | | | | | | | 0 | 0 |
| | | Wr | | | | | | | | | 78 | 77 |
| | Yellow Perch | PSD | | | | | | | | | 0 | |
| | | PSD-P | | | | | | | | | 0 | |
| | | Wr | | | | | | | | | 86 | |

## Length at Capture

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

Species: Black Crappie

| | | Mean Length (expanded sample number) at capture by age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
| 2007 | 15 | 145 (4) | | | | 245 (1) | 245 (10) | | | | |

## Fish Condition

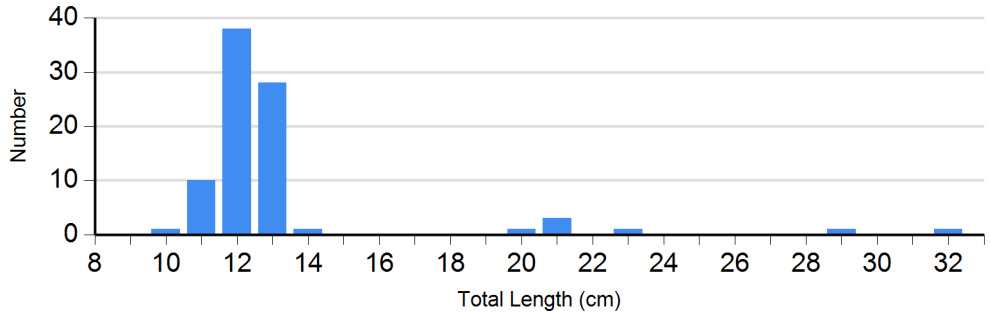
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

| | | Length Groups | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | S-Q | | Q-P | | P-M | | M | |
| Species | Year | N | Wr (SE) | N | Wr (SE) | N | Wr (SE) | N | Wr (SE) |
| Black Crappie<br>Frame Net | 2015 | 29 | 106<br>(2.2) | 5 | 94<br>(1.8) | 1 | 73 | 1 | 77 |
| | 2016 | 11 | 97<br>(2.6) | 0 | | 1 | 70 | 0 | |
| Walleye<br>Gill Net | 2015 | 3 | 80<br>(2.5) | 1 | 87 | 0 | | 0 | |
| | 2016 | 13 | 72<br>(2.0) | 0 | | 0 | | 0 | |
| Yellow Perch<br>Gill Net | 2015 | 1 | 80 | 0 | | 0 | | 0 | |

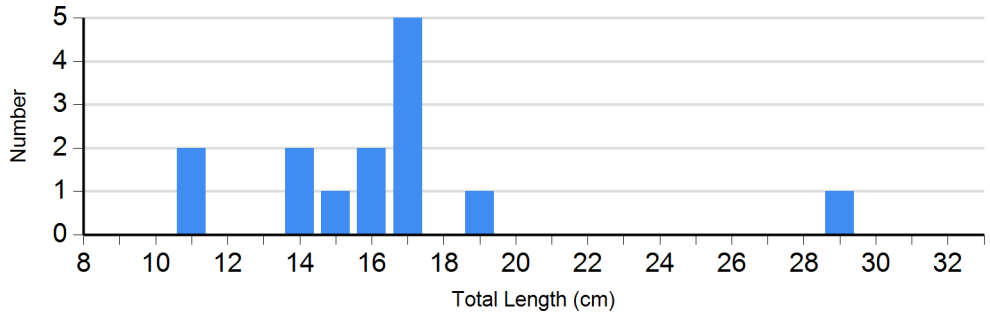
## Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: std frame net (3/8 inch)

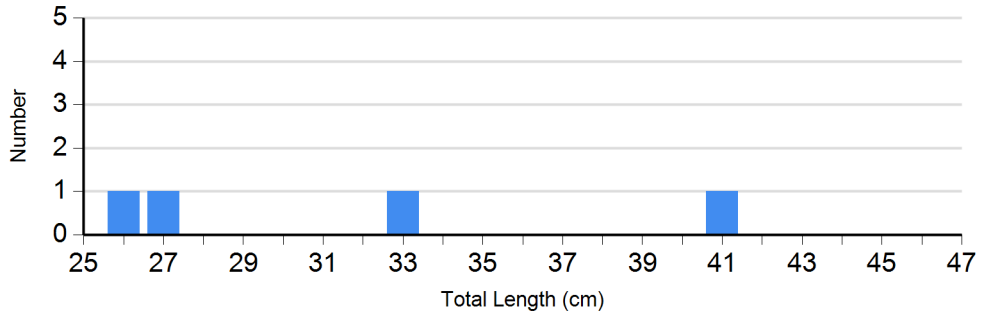



2015

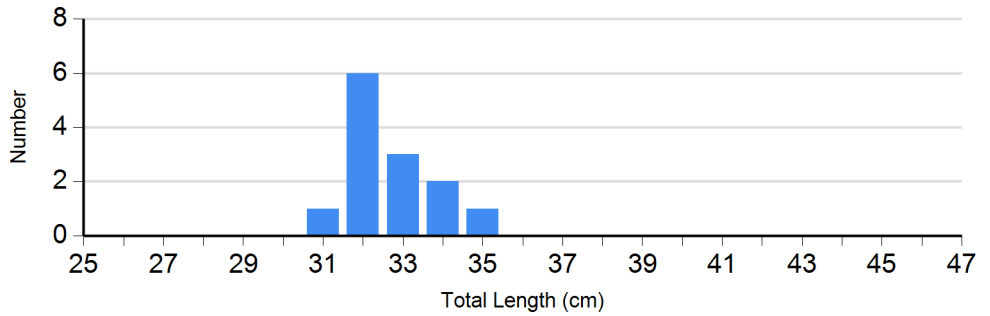



2016

Species: Walleye
Gear: std exp gill net

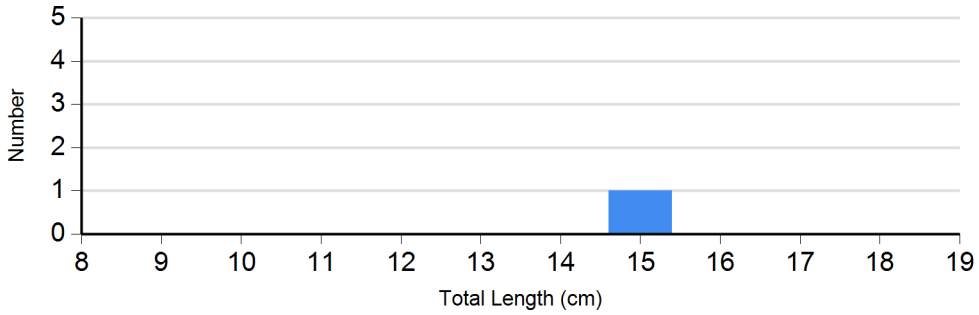



2015




2016

Species: Yellow Perch
Gear: std exp gill net

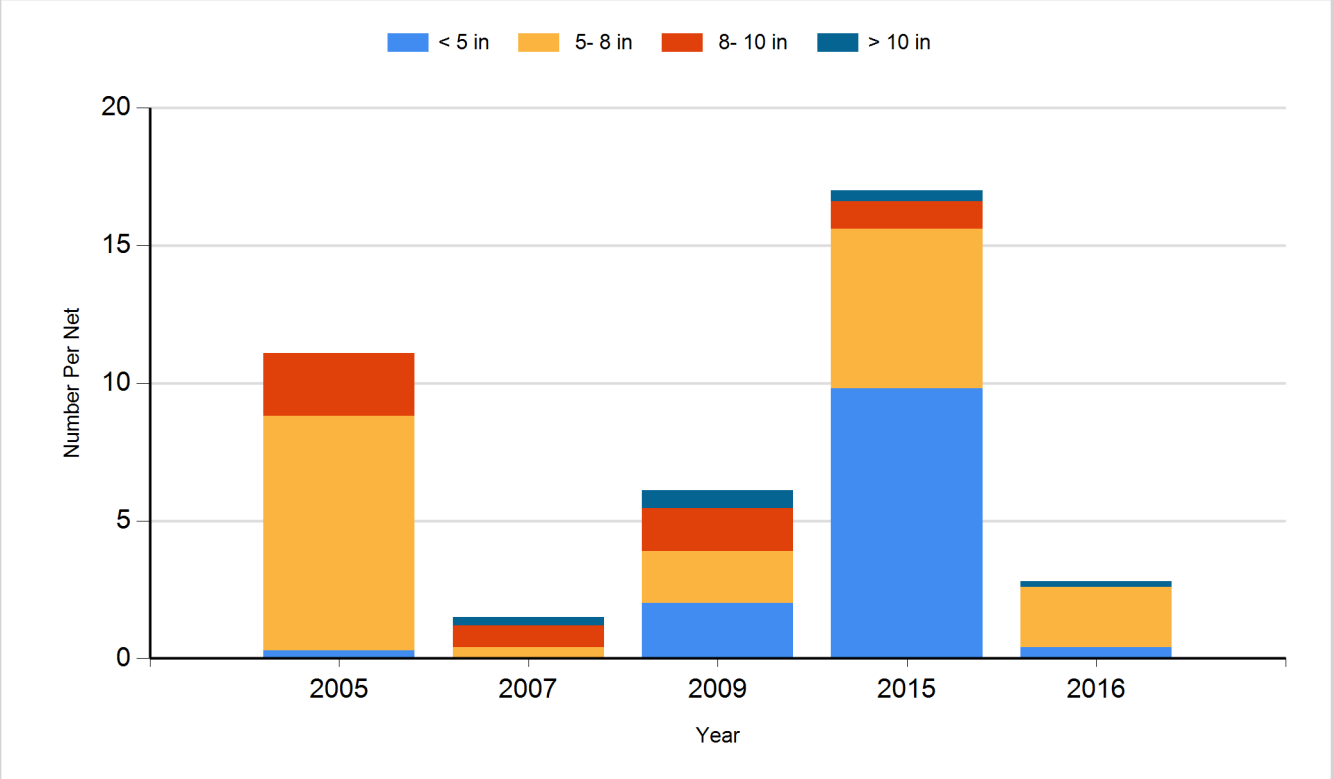



2015

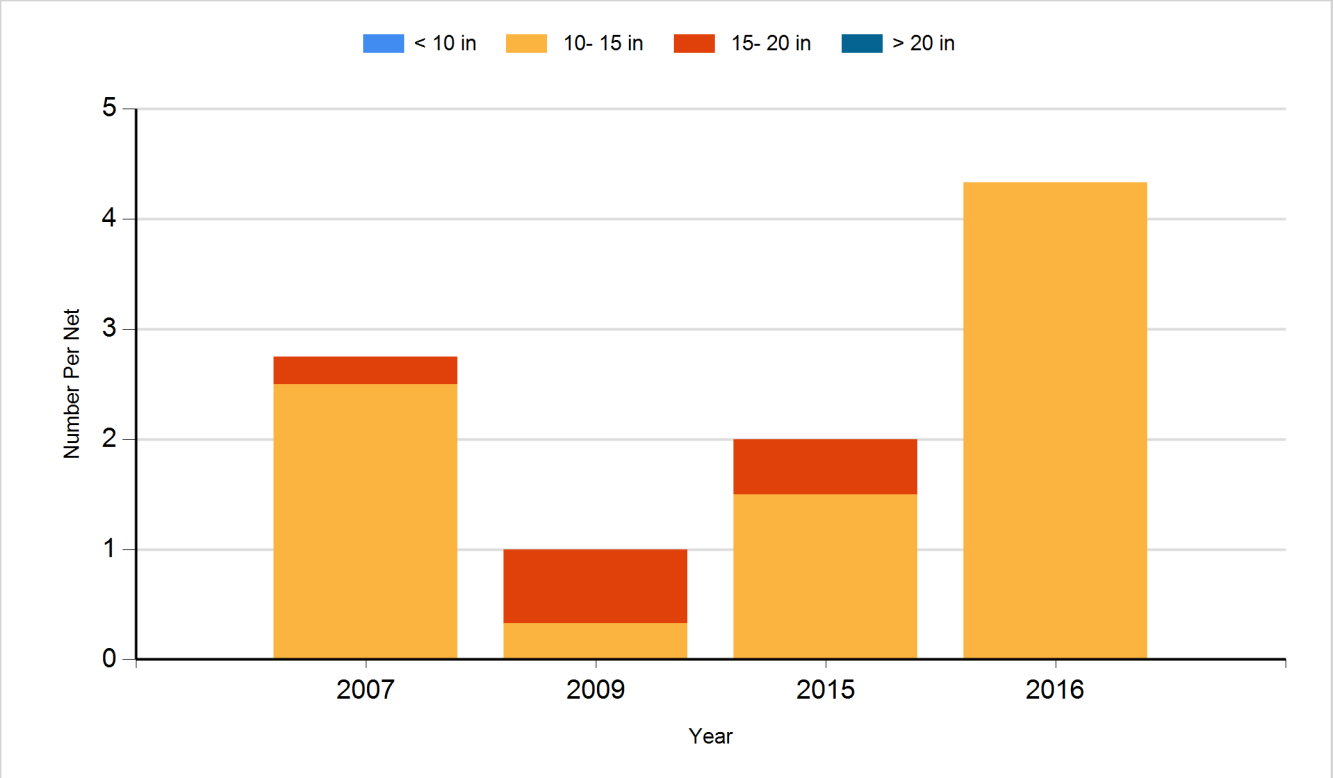
## Historic Fish Sizes and Relative Abundance

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

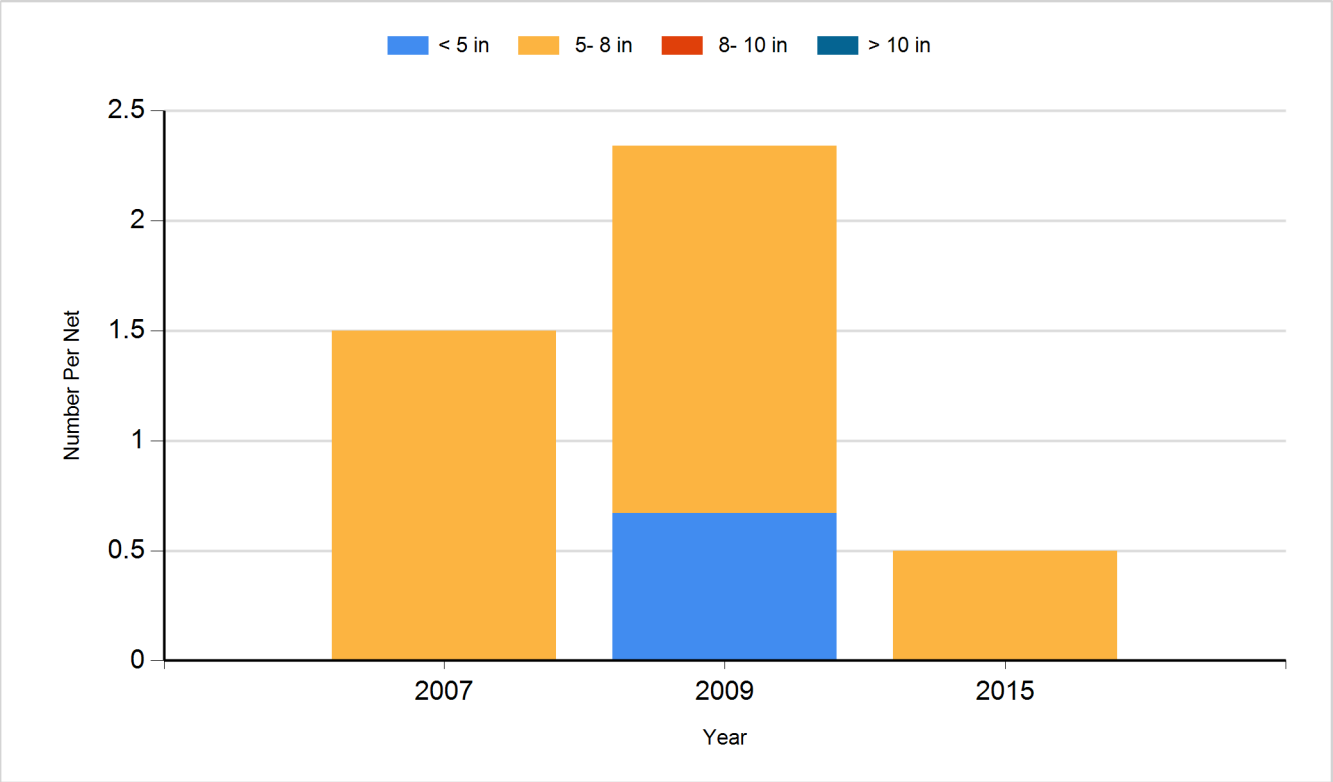
Species: Black Crappie
Gear: Frame Net




Species: Walleye
Gear: Gill Net



Species: Yellow Perch
Gear: Gill Net



## Fish Stocking

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

| Year | Species | Size | Number |
|---|---|---|---|
| 2012 | Walleye | Small Fingerling | 55,600 |
| 2013 | Walleye | Small Fingerling | 30,014 |
| 2014 | Walleye | Fry | 337,000 |
| 2015 | Walleye | Fingerling | 13,497 |