# Mission Lake Survey Summary

Mission Lake is a 59-acre impoundment located approximately two miles east of Stephan, South Dakota in Hyde County. Constructed in 1939 when the Works Progress Administration (WPA) constructed an earthen dam on a tributary to the west fork of Elm Creek. To allow for construction of the dam and the flooding of the land which would create the lake, three public use easements were granted to the State of South Dakota for the lake and a strip of land twelve feet above the highwater contour for public use.

Fishing access includes a vehicle trail from 216th Ave to the lake, a boat ramp for small boats, and ample shore fishing opportunities around the lake. Ice fishing opportunities exists if snow and trail conditions allow. Please use caution as the trail may become difficult to travel due to wet conditions.

Mission Lake's fishery was sampled using frame nets and boat electrofishing during 2019. Black Bullhead, Black Crappie, Common Carp, Green Sunfish and Northern Pike were sampled during sampling the fish population.

- **Black Crappie:** Only three Black Crappie were collected during survey. All fish collected were large and a lack of young, smaller fish collected indicates a population that is not reproducing within Mission Lake.

- **Black Bullhead:** Black Bullhead were the most abundant species collected during 2019 survey. A catch rate of 21.3 fish/net was the highest seen during the past 10 years. The fish were of size of interest of anglers with a portion of the population above 12 inches.

- **Largemouth Bass:** Fall electrofishing was completed during October 2019 to target Largemouth Bass. No Largemouth Bass were seen or collected during the survey showing a poor population of Largemouth Bass for Mission Lake.

- **Other Species:** Common Carp were collected by frame nets in 2019 (CPUE 2.1 fish/net) but due to timing of survey many of the Common Carp were in the extreme shallows of the lake spawning and were difficult to collect in our nets. Thus, not showing the full population abundance of Common Carp for Mission Lake. Past surveys have collected Channel Catfish with none collected in 2019. Plans are to include stocking Channel Catfish into Mission Lake in the future. Previous surveys have collected Bluegill, Smallmouth Bass, Walleye, and Yellow Perch. These species were not sampled in 2019.

For more detailed results see the computer-generated South Dakota Statewide Fisheries Survey for Mission Lake below. Please contact South Dakota Game, Fish and Parks Ft. Pierre office – (605) 223-7700 for additional information.

Prepared 02-18-2020 by KDP

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
## Mission, Hyde County
## CRW-Lake-891-000
## 2019

## Lake Information

**Name:** Mission

**County:** Hyde

**Legal Description:** T109-R71-S18

**Surface Area:** 57 Acres

**Maximum Depth:** 17 Feet

**Mean Depth:** 6 Feet

## Surveys and Investigations

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

| Gear | Date | Effort |
|---|---|---|
| boat shocker (day) | Oct 01, 2019 | 3600 seconds |
| frame net (std 3/4 in) | Jun 04, 2019 | 5 net-nights |
| frame net (std 3/4 in) | Jun 05, 2019 | 5 net-nights |

## Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Black Bullhead

Common Carp

Green Sunfish

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 |
| frame net (std 3/4 in) | Black Bullhead | 232 | 21.3 | 6.2 | 89 | 3 | 14 | 3 | 85 | 1 |
| | Black Crappie | 3 | 0.3 | 0.3 | 100 | | 100 | | 95 | 6 |
| | Common Carp | 26 | 2.1 | 1.3 | 48 | 17 | 0 | | 70 | 1 |
| | Green Sunfish | 3 | 0.3 | 0.2 | 33 | | 0 | | 133 | 35 |
| | Northern Pike | 1 | 0.0 | 0.0 | 0 | | 0 | | | |

## 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 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | Avg |
| frame net (std 3/4 in) | Black Bullhead | | | 2.8 | | | 8.2 | | | | 21.3 | 10.77 |
| | Black Crappie | | | 0.0 | | | 1.6 | | | | 0.3 | 0.63 |
| | Bluegill | | | 9.1 | | | 0.0 | | | | 0.0 | 3.03 |
| | Channel Catfish | | | 0.2 | | | 0.0 | | | | 0.0 | 0.07 |
| | Common Carp | | | 2.3 | | | 0.4 | | | | 2.1 | 1.60 |
| | Green Sunfish | | | 0.0 | | | 0.1 | | | | 0.3 | 0.13 |
| | Northern Pike | | | 0.7 | | | 0.1 | | | | 0.0 | 0.27 |
| | Smallmouth Bass | | | 1.0 | | | 0.0 | | | | 0.0 | 0.33 |
| | Walleye | | | 0.3 | | | 1.1 | | | | 0.0 | 0.47 |
| | Yellow Perch | | | 0.0 | | | 0.3 | | | | 0.0 | 0.10 |

## 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 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
| frame net (std 3/4 in) | Black Bullhead | PSD | | | 89 | | | 32 | | | | 89 |
| | | PSD-P | | | 68 | | | 12 | | | | 14 |
| | | Wr | | | 102 | | | 85 | | | | 85 |
| | Black Crappie | PSD | | | | | | 100 | | | | 100 |
| | | PSD-P | | | | | | 100 | | | | 100 |
| | | Wr | | | | | | 101 | | | | 95 |
| | Bluegill | PSD | | | 16 | | | | | | | |
| | | PSD-P | | | 0 | | | | | | | |
| | | Wr | | | 120 | | | | | | | |
| | Channel Catfish | PSD | | | 100 | | | | | | | |
| | | PSD-P | | | 100 | | | | | | | |
| | | Wr | | | 96 | | | | | | | |
| | Common Carp | PSD | | | 43 | | | 75 | | | | 48 |
| | | PSD-P | | | 17 | | | 25 | | | | 0 |
| | | Wr | | | 84 | | | 79 | | | | 70 |
| | Green Sunfish | PSD | | | | | | 100 | | | | 33 |
| | | PSD-P | | | | | | 0 | | | | 0 |
| | | Wr | | | | | | 121 | | | | 133 |
| | Northern Pike | PSD | | | 100 | | | 0 | | | | 0 |
| | | PSD-P | | | 43 | | | 0 | | | | 0 |
| | | Wr | | | 92 | | | 206 | | | | |
| | Smallmouth Bass | PSD | | | 50 | | | | | | | |
| | | PSD-P | | | 10 | | | | | | | |
| | | Wr | | | 109 | | | | | | | |
| | Walleye | PSD | | | 100 | | | 100 | | | | |
| | | PSD-P | | | 100 | | | 91 | | | | |
| | | Wr | | | 79 | | | 97 | | | | |
| | Yellow Perch | PSD | | | | | | 100 | | | | |
| | | PSD-P | | | | | | 0 | | | | |
| | | Wr | | | | | | 98 | | | | |

## 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+ |
| 2015 | 16 | | | | | | 319 (7) | 295 (6) | 293 (3) | | |

Species: Bluegill

| | | Mean Length (expanded sample number) at capture by age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
| 2012 | 90 | 87 (74) | 134 (1) | 134 (1) | 166 (12) | 166 (2) | | | | | |

## Fish Condition

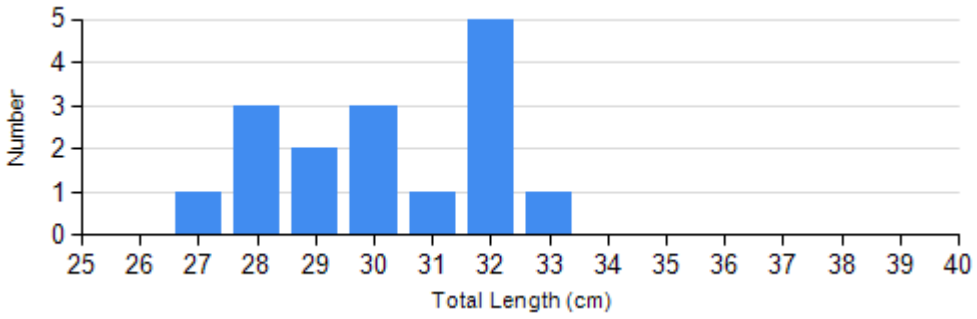
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

| | | 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 Frame Net | 2015 | 0 | | 0 | | 6 | 105 (1.6) | 10 | 99 (1.8) |
| | 2019 | 0 | | 0 | | 0 | | 3 | 95 (4.8) |

## Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: frame net (std 3/4 in)

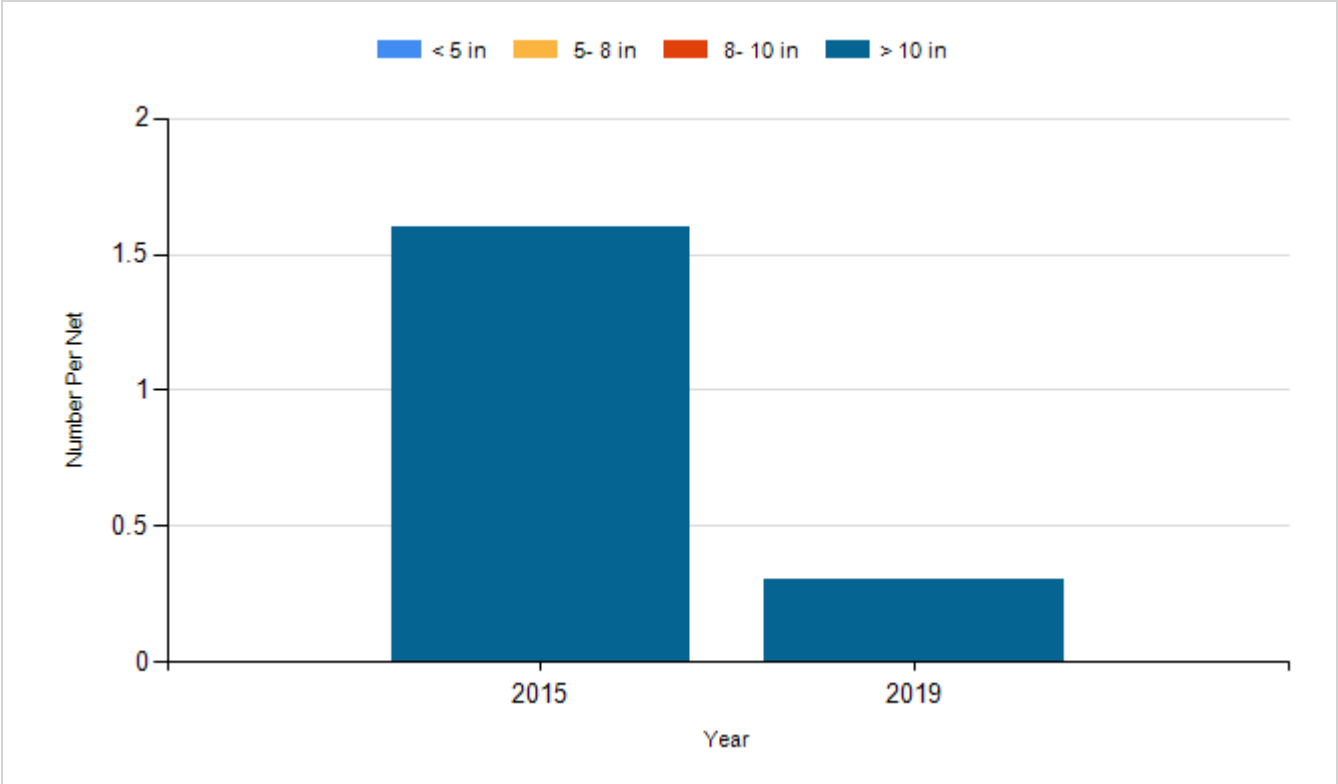



2015

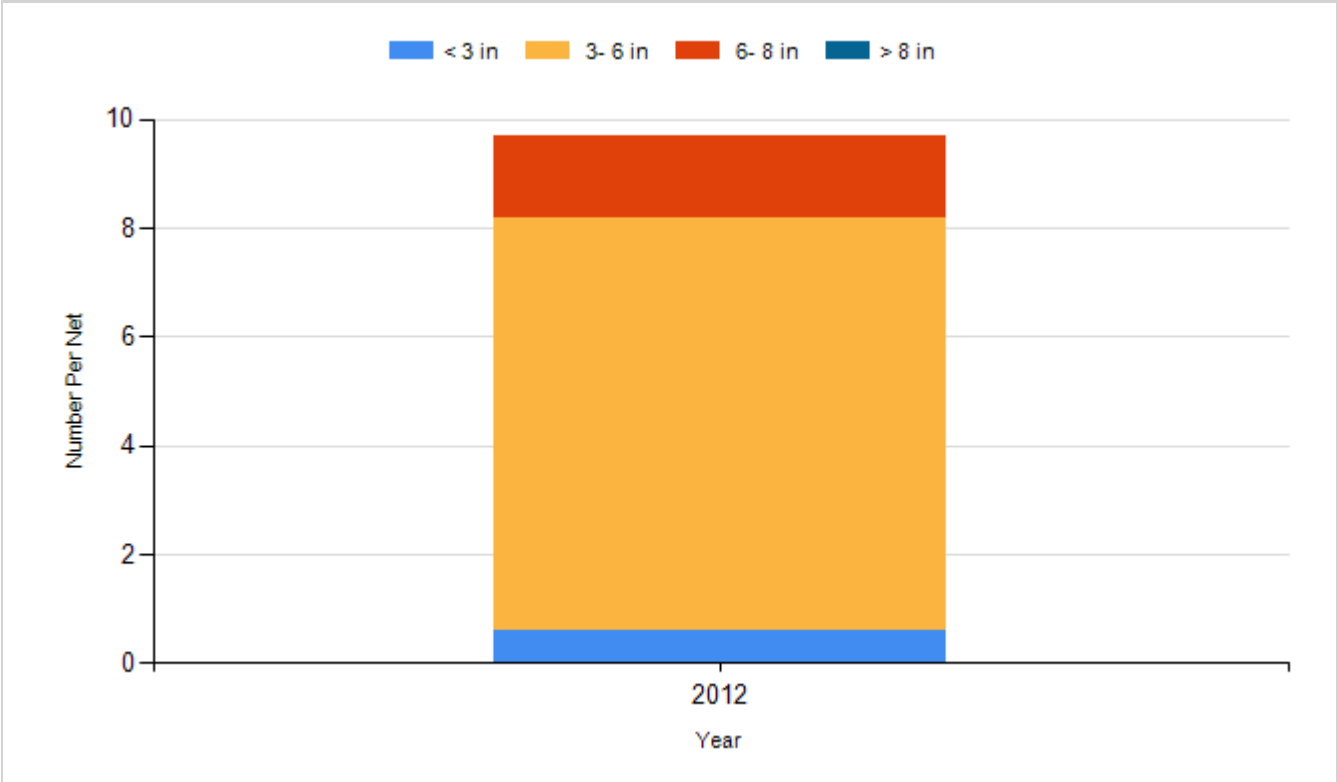
## Historic Fish Sizes and Relative Abundance

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

Species: Black Crappie
Gear: frame net (std 3/4 in)




Species: Bluegill
Gear: frame net (std 3/4 in)



## Fish Stocking

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

| Year | Species | Size | Number |
|---|---|---|---|
| 2009 | Largemouth Bass | Fingerling | 5,880 |
| 2011 | Channel Catfish | Adult | 43 |
| 2011 | White Crappie | Adult | 150 |
| 2013 | Yellow Perch | Adult | 200 |