**Note:** Zebra mussels, an invasive species, have been found in Lake Cochrane. Care should be taken by all user groups to prevent their spread. For more information regarding aquatic invasive species please visit https://sdleastwanted.sd.gov/

**Lake Cochrane Survey Summary**

Lake Cochrane, located 10.0 miles east and 2.5 miles south of Clear Lake, is managed as a multiple species fishery including panfish (i.e., black crappie, bluegill [includes bluegill, green sunfish, and sunfish hybrids], and yellow perch), largemouth bass and walleye.

- **Black crappie.** Frame nets captured substantially fewer black crappies in 2020 than in 2018. At 3.6/frame net relative abundance was considered low to moderate. Meanwhile, black crappies were the most abundant species in the 2020 gill net catch with a CPUE of 37.0, the highest recorded in surveys conducted since 2012. Most individuals in both frame net and gill net catch were 8.0 to 10.0 inches.

- **Bluegill.** Bluegill CPUE declined sharply from 2018 to 2020. The 2020 frame net CPUE was 19.9 and the lowest recorded in surveys conducted since 2012. Sampled bluegill ranged in length from 5.5 to 9.1 inches; most (99%) were ≥6.0 inches and 15% were ≥8.0 inches. Six year classes (2011, 2012, 2013, 2014, 2015, and 2017) were represented. Individuals from the 2013 (age-7) cohort were the most abundant accounting for 52% of bluegills sampled, while those from the 2015 (age-5) year class made up an additional 34%. Since 2012, mean length at capture values for age-5 bluegills have ranged from 6.1 to 7.4 inches. In 2020, age-5 bluegills had a mean length of 7.4 inches.

- **Largemouth bass.** Spring electrofishing was not completed in 2020.

- **Walleye.** Walleye numbers were low (2.3/gill net). Sampled walleyes ranged in length from 12.2 to 27.2 inches, less than half (6 of 14) were ≥15.0 inches. Individuals from four year classes (2006, 2013, 2017, and 2018) contributed to the catch, each was represented by six or fewer fish. The oldest walleye sampled was from the 2006 (age-14) cohort.

- **Yellow perch**. The 2020 mean gill net CPUE was 16.0 and suggested low relative abundance for Lake Cochrane. Those sampled ranged from 5.1 to 9.8 inches, 54% were ≥8.0 inches and 2% were 8.0 inches or longer. Individuals from six year classes (2013, 2014, and 2016 – 2019) contributed to the catch, those from the 2013 (age-7), 2017 (age-3) , and 2018 (age-2) cohorts were equally well represented and accounted for more than 90% of yellow perch in the sample. Growth tends to be slow to moderate as mean length at capture values for age-4 yellow perch have ranged from 7.6 to 8.8 inches since 2012. In 2020, the mean length of age-4 fish was 8.8 inches.
-

For more detailed results see the computer generated South Dakota Statewide Fisheries Survey for Cochrane (Deuel; below)

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
## Cochrane, Deuel County
## LQP-Lake-56-000
## 2020

## Lake Information

| | | | |
|---|---|---|---|
| **Name:** | Cochrane | **Maximum Depth:** | 24 Feet |
| **County:** | Deuel | **Mean Depth:** | 13 Feet |
| | | **OHWM Elevation:** | 1,684 |
| **Surface Area:** | 366 Acres | **Outlet Elevation:** | 1,683 |

## Surveys and Investigations

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

| Gear | Date | Effort |
|---|---|---|
| AFS std gill net | Jun 18, 2020 | 3 net-nights |
| AFS std gill net | Jun 19, 2020 | 3 net-nights |
| frame net (std 3/4 in) | Jun 18, 2020 | 6 net-nights |
| frame net (std 3/4 in) | Jun 19, 2020 | 6 net-nights |

## Common Fish Species Present

Yellow Perch

Walleye

Largemouth Bass

Bluegill

Black Crappie

Black Bullhead

Northern Pike

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).

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).

| | | | 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 | Black Bullhead | 29 | 4.8 | 4.3 | 100 | | 21 | 12 | 104 | 2 |
| | Black Crappie | 222 | 37.0 | 8.4 | 100 | | 0 | | 103 | 1 |
| | Bluegill | 4 | 0.7 | 0.6 | 100 | | 0 | | 106 | 1 |
| | Common Carp | 1 | 0.2 | 0.2 | 100 | | 100 | | 83 | |
| | Largemouth Bass | 3 | 0.5 | 0.3 | 100 | | 100 | | 92 | 3 |
| | Northern Pike | 8 | 1.3 | 0.6 | 100 | | 13 | | 84 | 3 |
| | Walleye | 14 | 2.3 | 1.2 | 43 | 22 | 36 | 22 | 86 | 2 |
| | Yellow Perch | 96 | 16.0 | 3.8 | 54 | 7 | 2 | | 105 | 1 |
| frame net (std 3/4 in) | Black Bullhead | 228 | 19.0 | 5.3 | 100 | | 7 | 2 | 97 | 1 |
| | Black Crappie | 51 | 3.6 | 1.4 | 100 | | 5 | | 95 | 1 |
| | Bluegill | 239 | 19.9 | 9.3 | 99 | | 15 | 3 | 109 | 1 |
| | Northern Pike | 2 | 0.2 | 0.2 | 50 | | 0 | | 88 | 4 |
| | Walleye | 4 | 0.3 | 0.3 | 75 | | 75 | | 83 | 2 |
| | Yellow Perch | 17 | 1.4 | 0.8 | 88 | | 6 | | 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.

*** AFS standard frame net used in 2016**

| | | CPUE | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Avg |
| AFS std gill net | Black Bullhead | | | | | | 0.0 | | 3.2 | | 4.8 | 2.67 |
| | Black Crappie | | | | | | 5.2 | | 30.3 | | 37.0 | 24.17 |
| | Bluegill | | | | | | 0.2 | | 1.3 | | 0.7 | 0.73 |
| | Common Carp | | | | | | 0.0 | | 0.0 | | 0.2 | 0.07 |
| | Largemouth Bass | | | | | | 0.2 | | 0.7 | | 0.5 | 0.47 |
| | Northern Pike | | | | | | 2.0 | | 0.3 | | 1.3 | 1.20 |
| | Walleye | | | | | | 10.0 | | 6.2 | | 2.3 | 6.17 |
| | Yellow Perch | | | | | | 36.8 | | 47.2 | | 16.0 | 33.33 |
| boat shocker (night) | Largemouth Bass | | 177.0 | | 82.3 | | 231.0 | | | | | 163.43 |
| frame net (std 3/4 in)* | Black Bullhead | | 0.2 | | 0.0 | | 0.0 | | 32.5 | | 19.0 | 10.34 |
| | Black Crappie | | 1.3 | | 1.1 | | 17.6 | | 12.3 | | 3.6 | 7.18 |
| | Bluegill | | 67.8 | | 44.5 | | 65.1 | | 46.7 | | 19.9 | 48.80 |
| | Common Carp | | 0.0 | | 0.0 | | 0.0 | | 0.1 | | 0.0 | 0.02 |
| | Largemouth Bass | | 0.0 | | 0.0 | | 0.0 | | 0.2 | | 0.0 | 0.04 |
| | Northern Pike | | 0.1 | | 0.0 | | 0.2 | | 0.1 | | 0.2 | 0.12 |
| | Walleye | | 0.3 | | 0.0 | | 0.1 | | 0.8 | | 0.3 | 0.30 |
| | Yellow Perch | | 0.9 | | 2.9 | | 3.9 | | 0.8 | | 1.4 | 1.98 |
| std exp gill net | Black Bullhead | | 0.3 | | 0.3 | | | | | | | 0.30 |
| | Black Crappie | | 19.0 | | 0.3 | | | | | | | 9.65 |
| | Bluegill | | 0.0 | | 0.3 | | | | | | | 0.15 |
| | Common Carp | | 0.0 | | 0.0 | | | | | | | 0.00 |
| | Largemouth Bass | | 0.8 | | 0.0 | | | | | | | 0.40 |
| | Northern Pike | | 2.5 | | 3.0 | | | | | | | 2.75 |
| | Walleye | | 1.8 | | 3.0 | | | | | | | 2.40 |
| | Yellow Perch | | 38.5 | | 170.0 | | | | | | | 104.25 |

## 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.

***AFS standard frame nets used in 2016**

| | | | Year | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gear | Species | Index | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| AFS std gill net | Walleye | PSD | | | | | | 80 | | 95 | | 43 |
| | | PSD-P | | | | | | 10 | | 54 | | 36 |
| | | Wr | | | | | | 95 | | 92 | | 86 |
| | Yellow Perch | PSD | | | | | | 19 | | 11 | | 54 |
| | | PSD-P | | | | | | 1 | | 0 | | 2 |
| | | Wr | | | | | | 94 | | 103 | | 105 |
| frame net (std 3/4 in)* | Black Crappie | PSD | | 100 | | 85 | | 11 | | 22 | | 100 |
| | | PSD-P | | 0 | | 38 | | 5 | | 3 | | 5 |
| | | Wr | | 96 | | 93 | | 94 | | 90 | | 95 |
| | Bluegill | PSD | | | | 69 | | 33 | | 91 | | 99 |
| | | PSD-P | | | | 4 | | 0 | | 3 | | 15 |
| | | Wr | | | | 106 | | 105 | | 103 | | 109 |
| std exp gill net | Walleye | PSD | | 43 | | 56 | | | | | | |
| | | PSD-P | | 0 | | 0 | | | | | | |
| | | Wr | | 90 | | 90 | | | | | | |
| | Yellow Perch | PSD | | 26 | | 34 | | | | | | |
| | | PSD-P | | 0 | | 5 | | | | | | |
| | | Wr | | 102 | | 97 | | | | | | |

## Length at Capture

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

Species: Bluegill

| | | Mean Length (expanded sample number) at capture by age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
| 2020 | 239 | | | 143 (1) | | 188 (82) | 191 (22) | 191 (125) | 207 (7) | 208 (5) | |
| 2018 | 555 | | | | | 160 (398) | 163 (48) | 185 (92) | 192 (10) | | 194 (7) |
| 2016 | 781 | | 93 (108) | 109 (343) | 142 (81) | 156 (115) | 178 (59) | 175 (58) | 164 (19) | | |
| 2014 | 539 | 47 (1) | 83 (11) | 105 (54) | 134 (54) | 156 (142) | 176 (110) | 179 (142) | 195 (21) | 211 (1) | 211 (1) |

Species: Walleye

| | | Mean Length (expanded sample number) at capture by age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
| 2020 | 14 | | 325 (2) | 340 (6) | | | | 557 (5) | | | 691 (1) |
| 2018 | 37 | | | | 493 (3) | 499 (26) | 556 (5) | | 620 (1) | | 665 (2) |
| 2016 | 64 | 216 (4) | 314 (8) | 423 (43) | 505 (4) | | 518 (2) | | 588 (2) | | 670 (1) |
| 2014 | 9 | | 356 (3) | | 404 (4) | 421 (1) | 472 (1) | | | | |
| 2012 | 10 | | 244 (1) | | 388 (4) | | | | | | 327 (5) |

Species: Yellow Perch

| | | Mean Length (expanded sample number) at capture by age | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | N | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10+ |
| 2020 | 96 | 134 (2) | 175 (28) | 196 (28) | 223 (3) | | 214 (4) | 228 (31) | | | |
| 2018 | 285 | | | | | 154 (253) | 211 (29) | 244 (1) | | 215 (2) | |
| 2016 | 221 | | | 179 (197) | 219 (17) | 214 (1) | 248 (5) | 293 (1) | | | |
| 2014 | 544 | 98 (26) | 160 (298) | 189 (32) | 197 (40) | 232 (85) | 237 (48) | 230 (12) | 224 (2) | | |
| 2012 | 154 | | | 162 (45) | 193 (64) | 195 (23) | 220 (3) | 204 (4) | | | 177 (16) |

## 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).

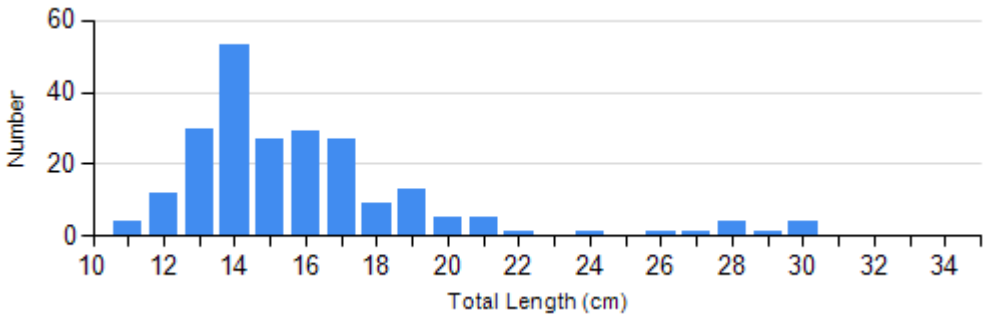
*** Includes bluegill, green sunfish, and sunfish hybrids**

| | | 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 | 2016 | 188 | 96 (0.6) | 12 | 84 (1.2) | 7 | 75 (3.1) | 4 | 80 (2.7) |
| | 2018 | 115 | 91 (0.7) | 29 | 86 (1.4) | 4 | 68 (1.1) | 0 | |
| | 2020 | 0 | | 41 | 95 (0.8) | 2 | 89 (1.6) | 0 | |
| Bluegill* Frame Net | 2016 | 526 | 103 (0.8) | 255 | 108 (1.2) | 0 | | 0 | |
| | 2018 | 51 | 100 (2.3) | 492 | 103 (0.9) | 17 | 111 (3.3) | 0 | |
| | 2020 | 2 | 115 (2.3) | 200 | 109 (0.6) | 37 | 110 (1.8) | 0 | |
| Walleye Gill Net | 2016 | 12 | 90 (1.7) | 42 | 98 (0.8) | 5 | 89 (2.0) | 1 | 93 |
| | 2018 | 2 | 82 (3.4) | 15 | 95 (1.1) | 18 | 90 (1.1) | 2 | 85 (7.0) |
| | 2020 | 8 | 85 (1.0) | 1 | 86 | 4 | 89 (3.0) | 1 | 80 |
| Yellow Perch Gill Net | 2016 | 179 | 96 (0.5) | 39 | 87 (1.0) | 3 | 75 (2.5) | 0 | |
| | 2018 | 252 | 103 (0.5) | 31 | 96 (1.6) | 0 | | 0 | |
| | 2020 | 44 | 107 (0.9) | 50 | 102 (0.9) | 2 | 106 (3.2) | 0 | |

## Length Frequency Distribution

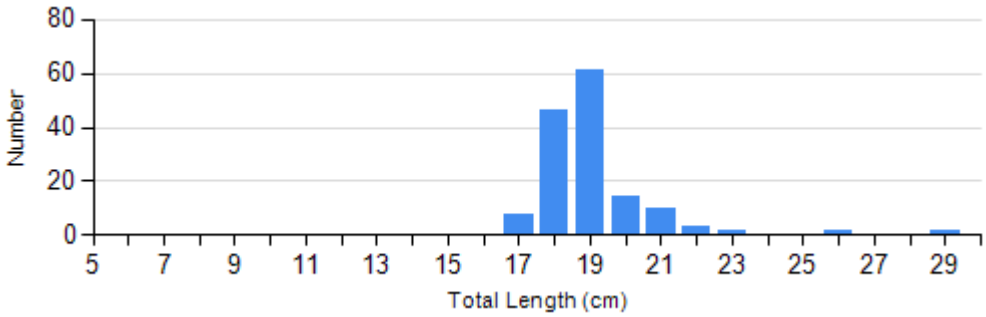
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net

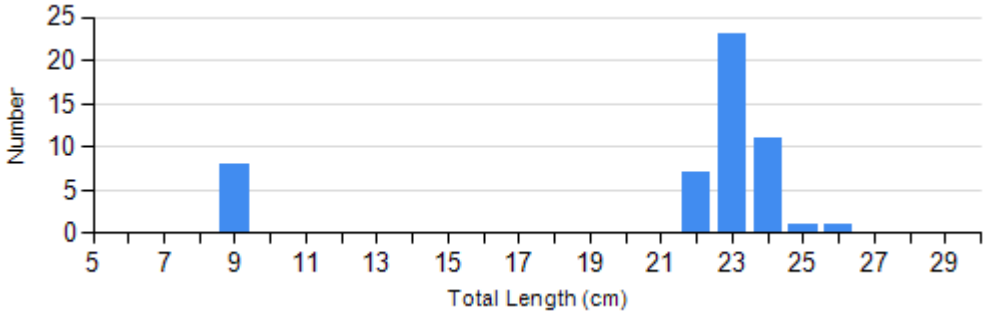



2016

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

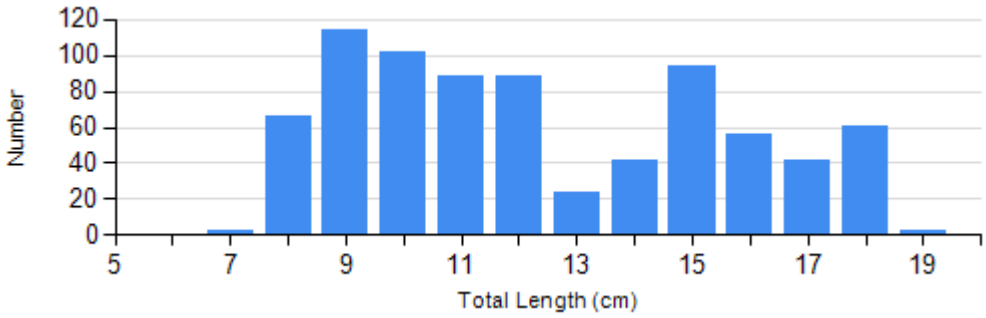



2018



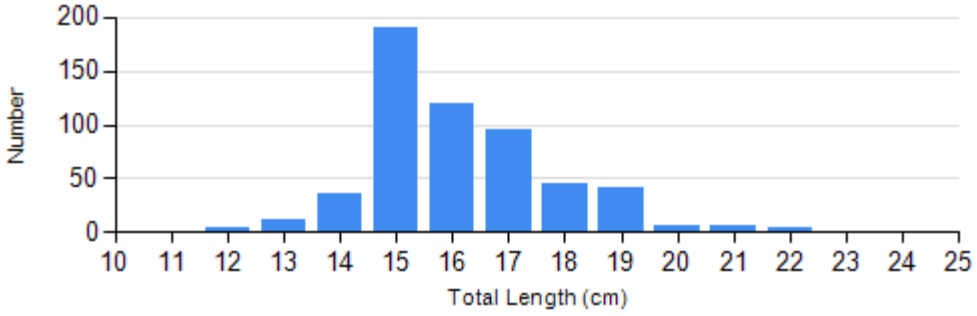

2020

Species: Bluegill
Gear: AFS std frame net

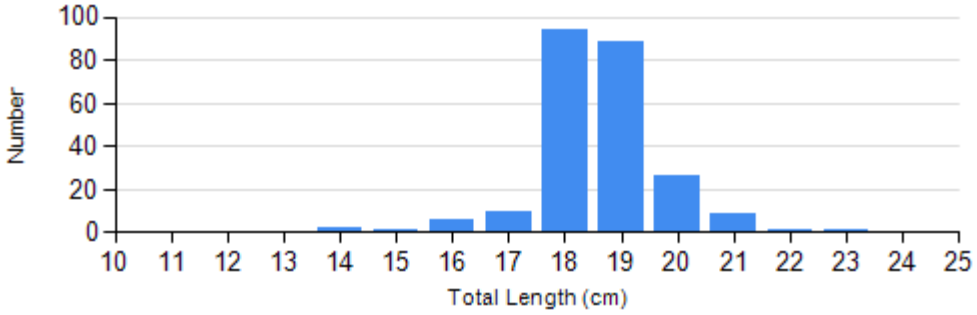



2016

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

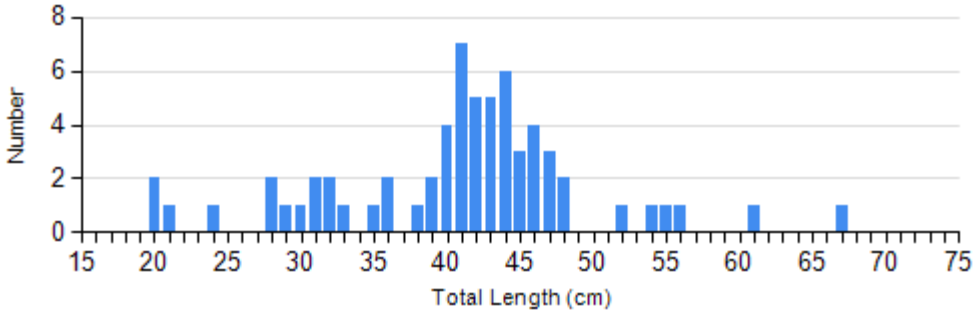



2018

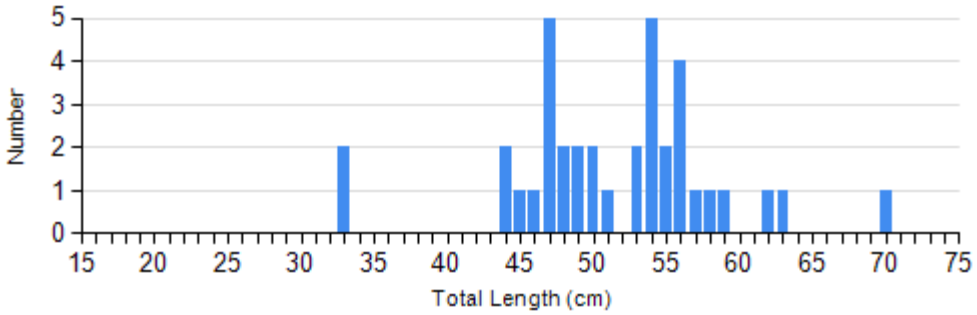



2020

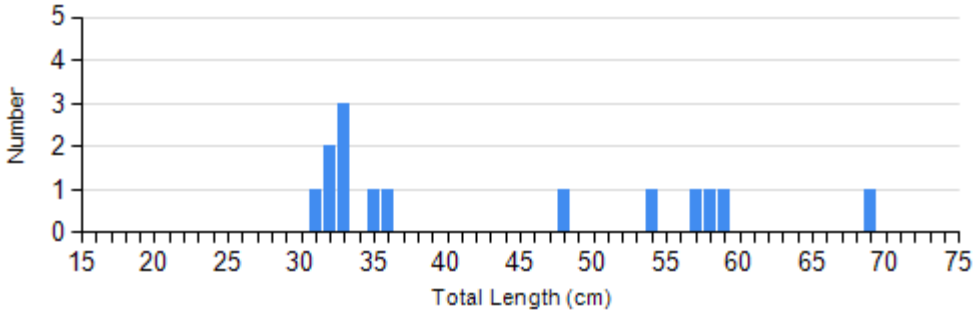
Species: Walleye
Gear: AFS std gill net




2016

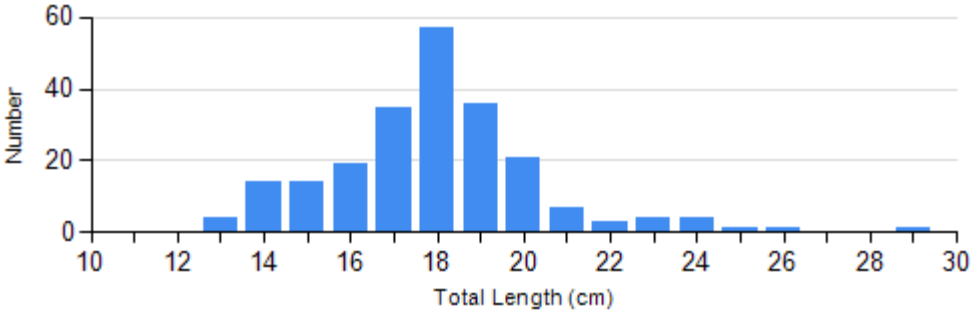



2018

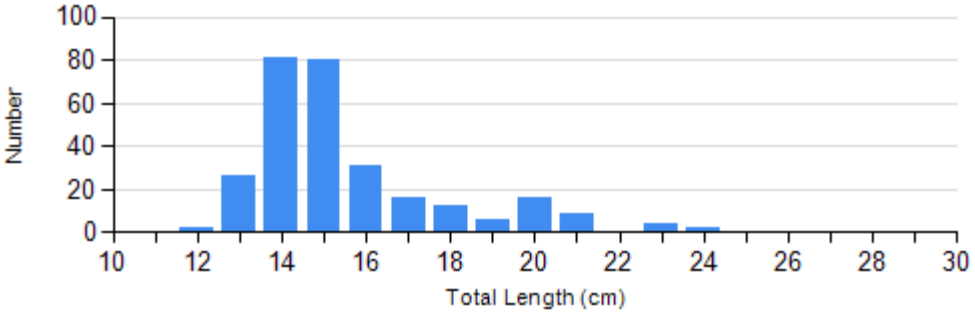



2020

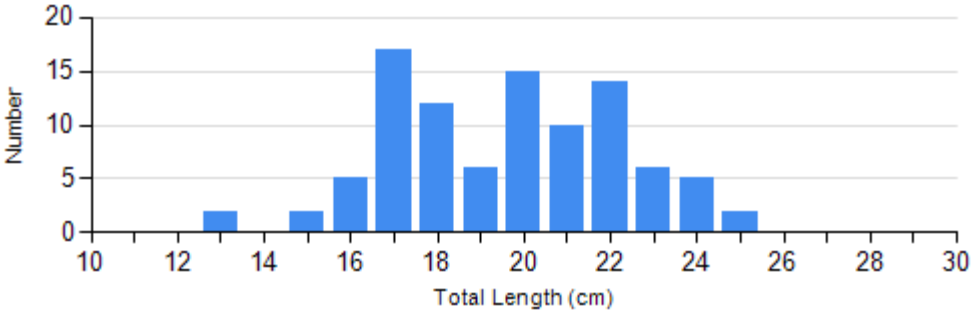
Species: Yellow Perch
Gear: AFS std gill net




2016




2018

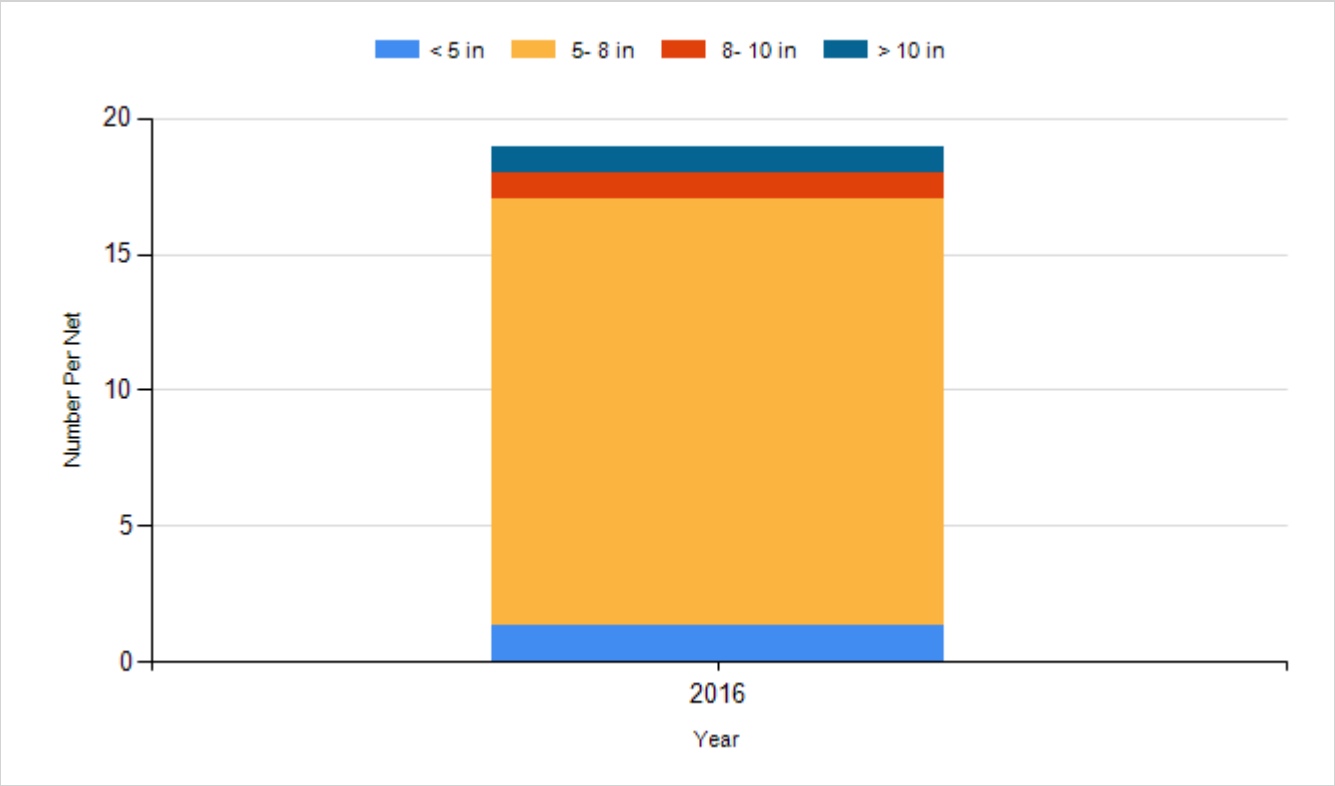



2020

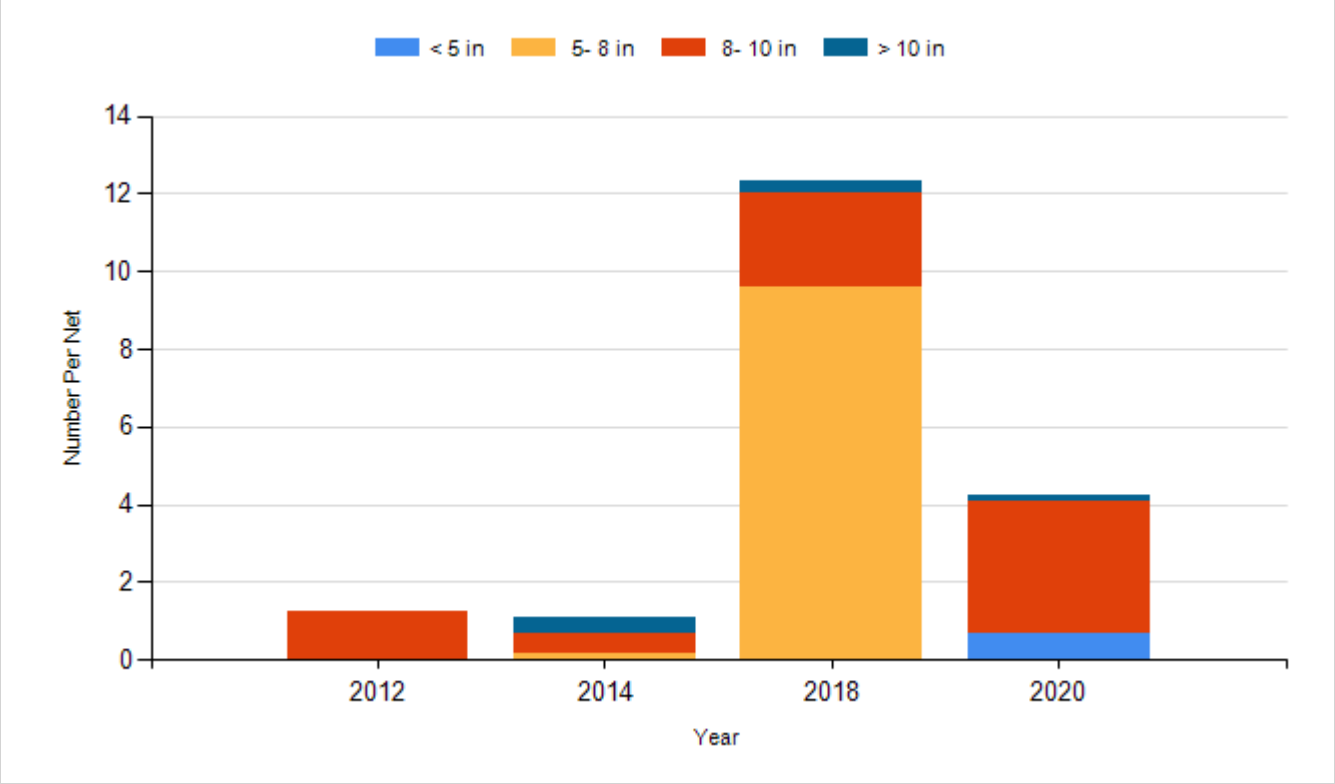
## Historic Fish Sizes and Relative Abundance

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

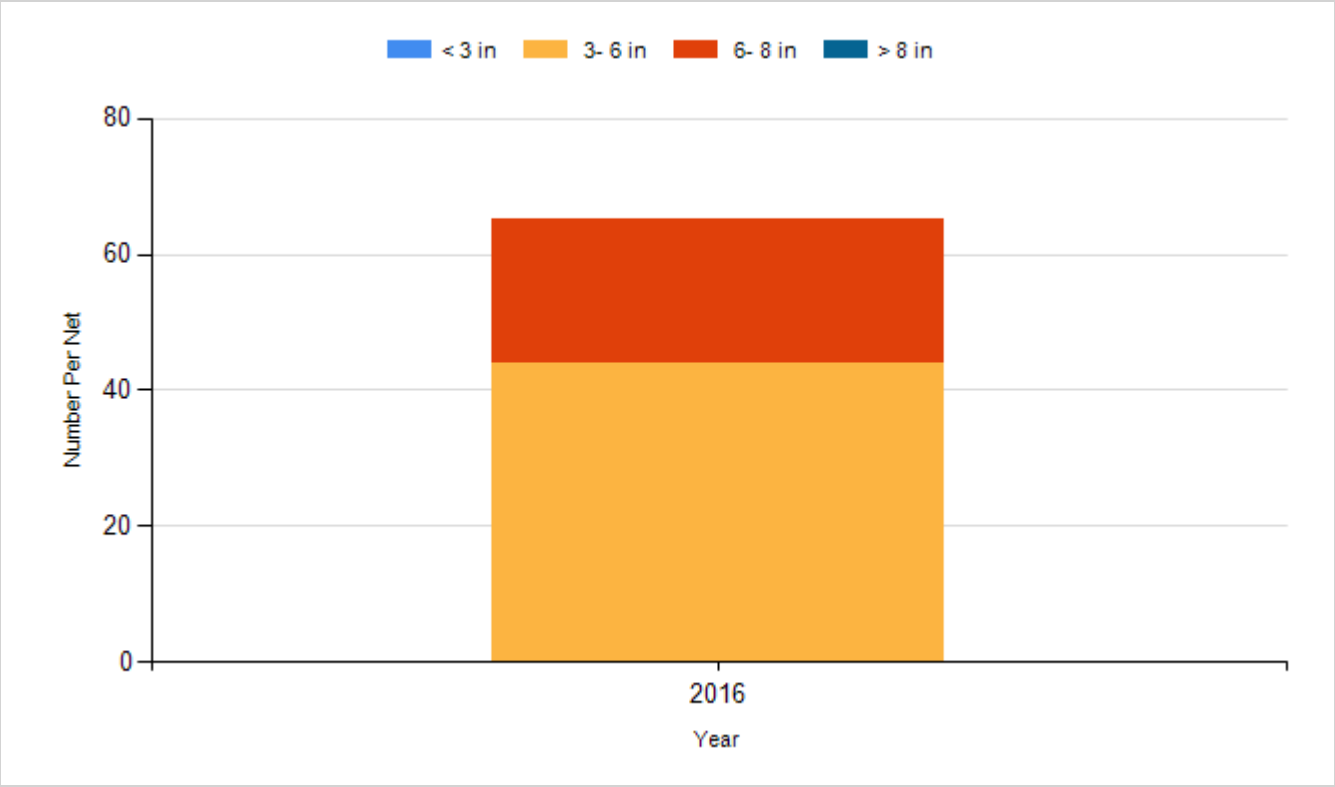
Species: Black Crappie
Gear: AFS std frame net



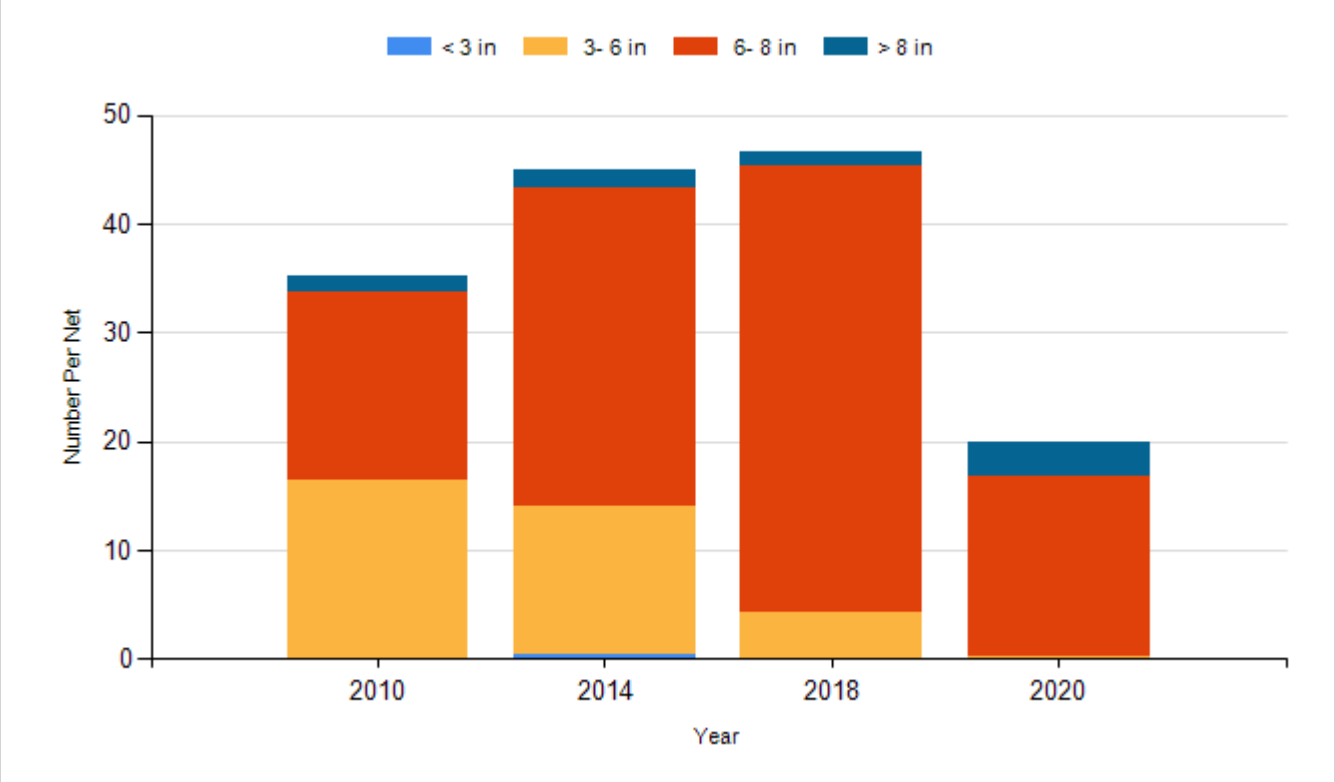

Species: Black Crappie
Gear: frame net (std 3/4 in)



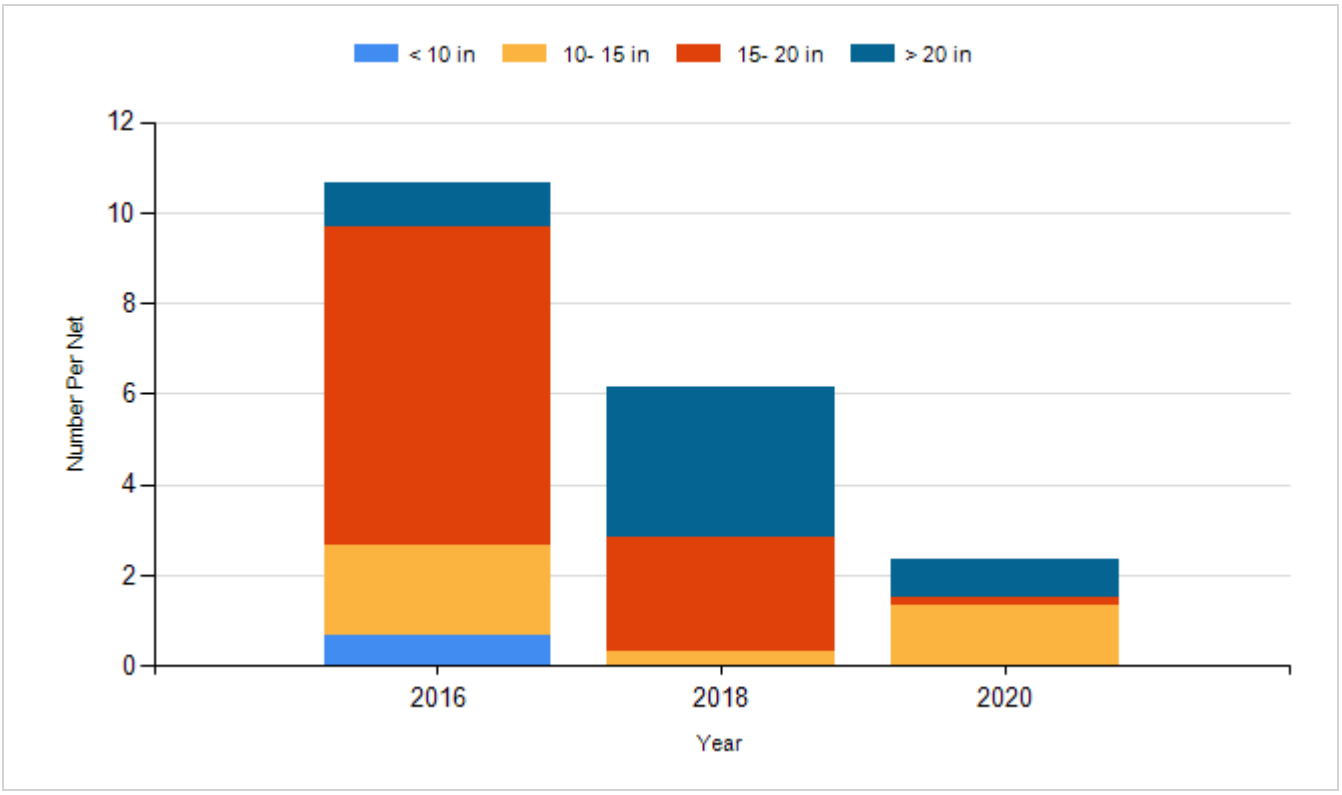
Species: Bluegill
Gear: AFS std frame net



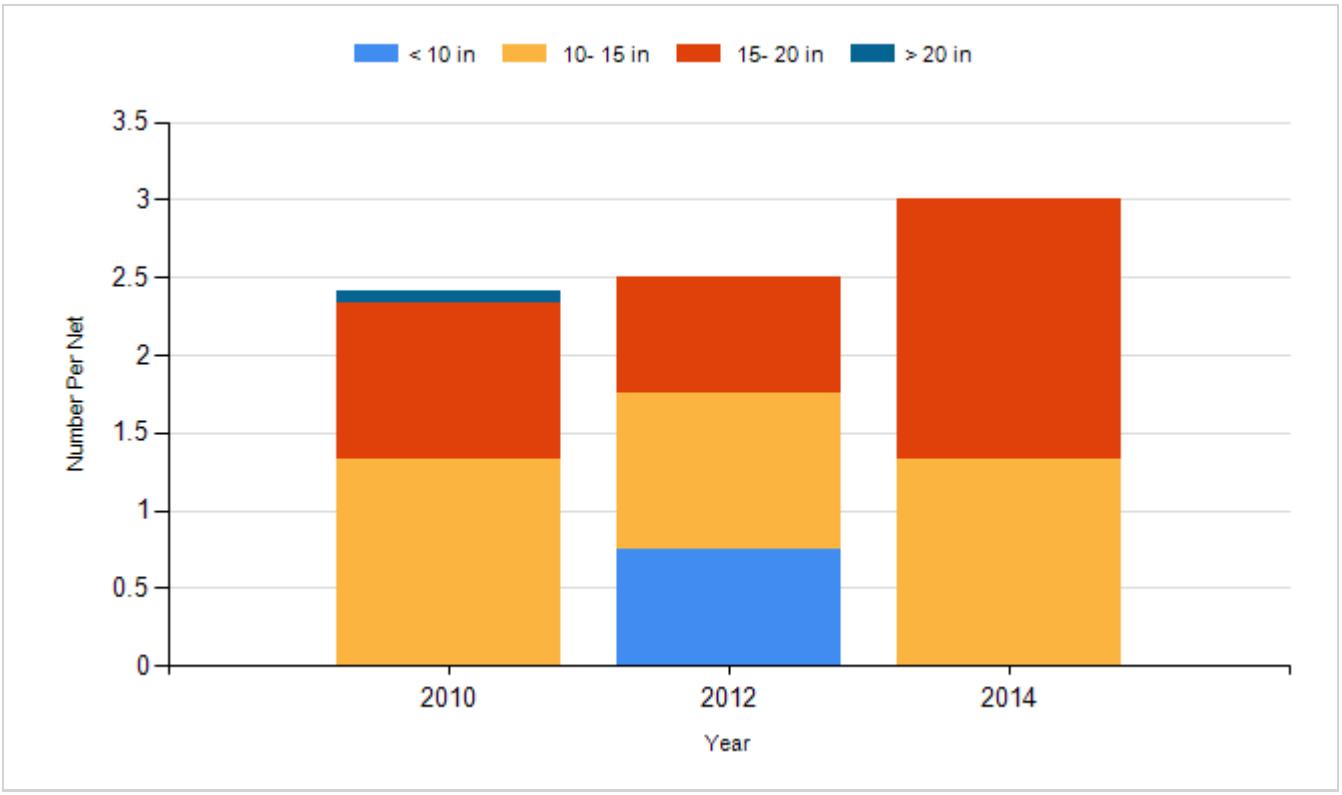

Species: Bluegill
Gear: frame net (std 3/4 in)



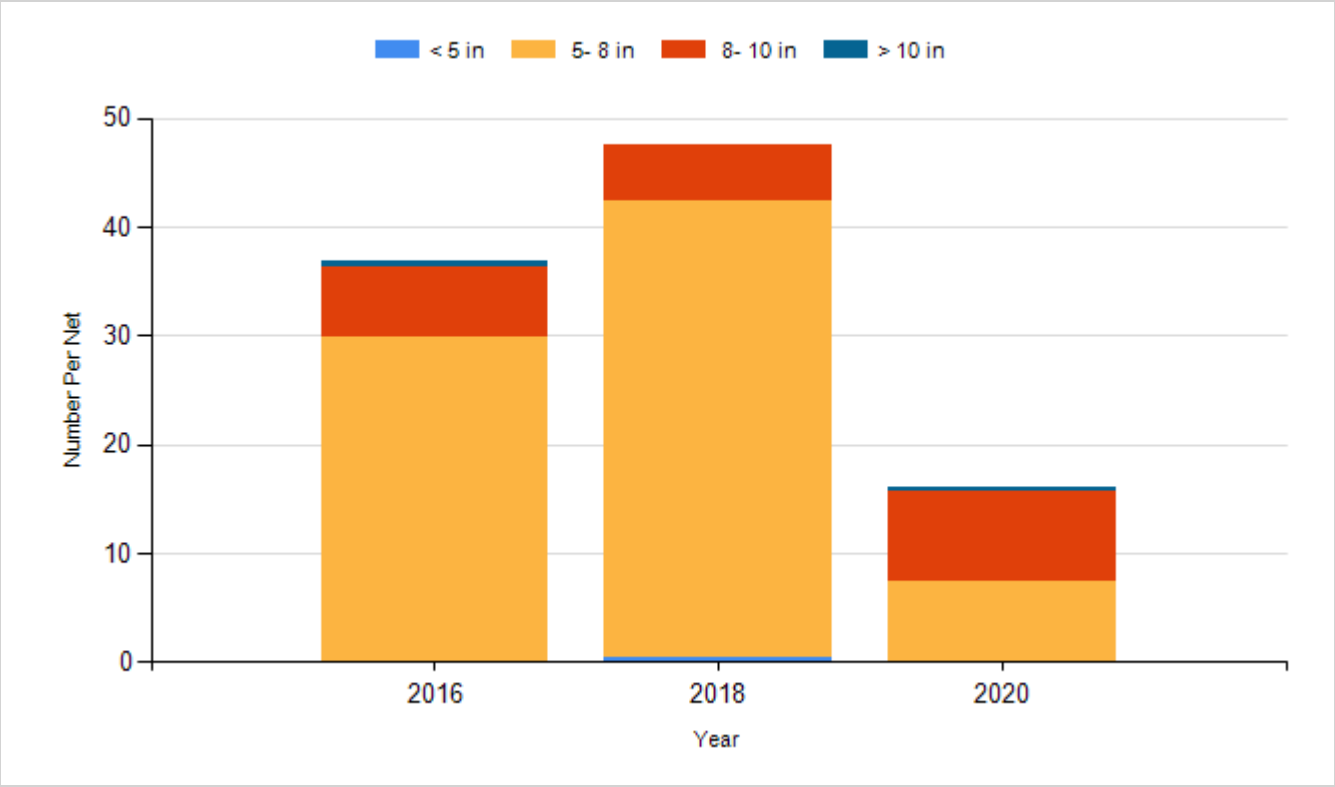
Species: Walleye
Gear: AFS std gill net



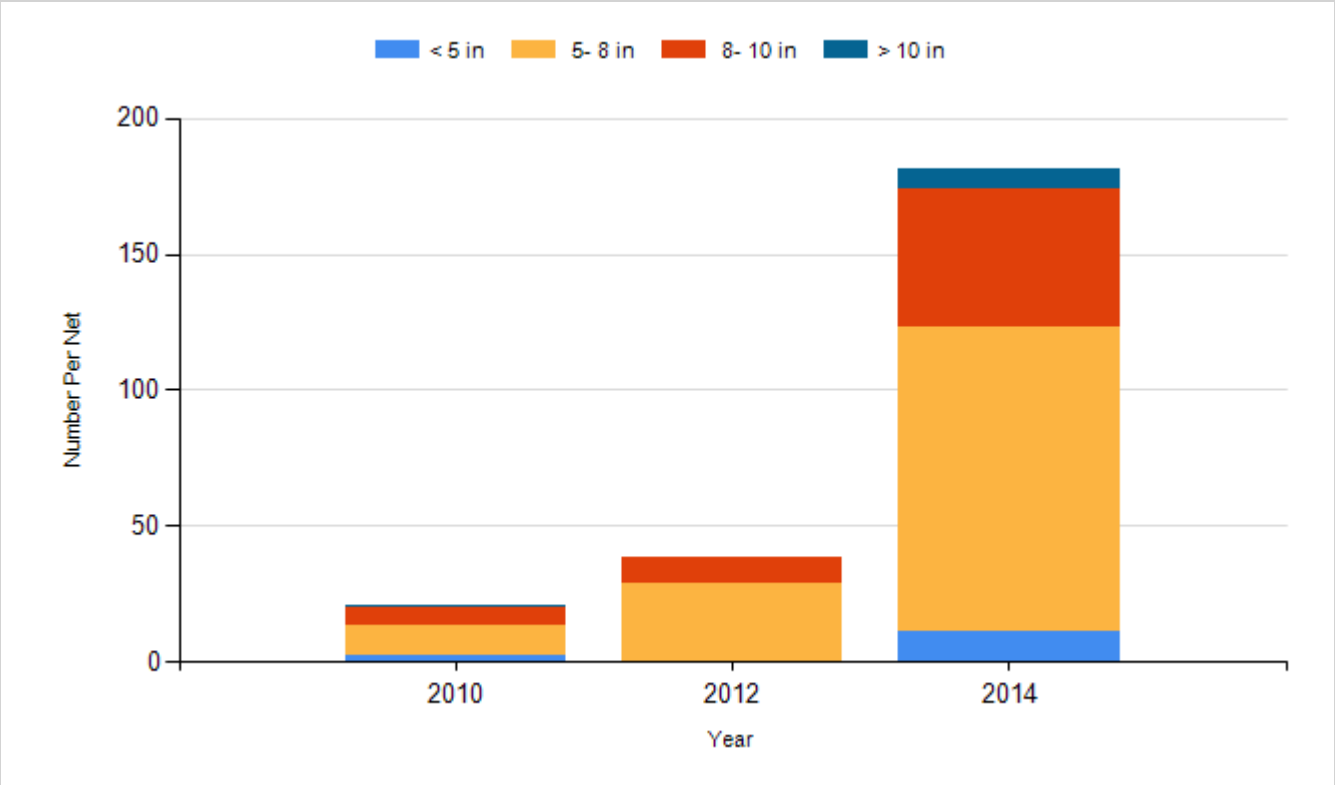

Species: Walleye
Gear: std exp gill net



Species: Yellow Perch
Gear: AFS std gill net




Species: Yellow Perch
Gear: std exp gill net



## Fish Stocking

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

| Year | Species | Size | Number |
|---|---|---|---|
| 2010 | Walleye | Large Fingerling | 3,176 |
| 2012 | Walleye | Large Fingerling | 3,725 |
| 2013 | Walleye | Large Fingerling | 11,132 |
| 2015 | Walleye | Large Fingerling | 4,026 |
| 2017 | Walleye | Large Fingerling | 16,000 |
| 2019 | Walleye | Large Fingerling | 8,700 |