

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Oak, Brookings County

LQP-Lake-68-000

2021

Lake Information

Name:	Oak	Maximum Depth:	6 Feet
County:	Brookings	Mean Depth:	4 Feet
Legal Description:	T110N- R48W-Sec 1, 12, 13; T112N-R47W-Sec 7, 18	OHWM Elevation:	1,802
Surface Area:	394 Acres	Outlet Elevation:	1,802

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 18, 2021	4 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Saugeye

Black Bullhead

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).

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.
- **std 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.

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

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.

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

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

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.

$$Wr = \left(\frac{W}{W_s} \right) \times 100$$

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).

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(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**

Gear	Species	Sample Size (n)	Abundance		Stock Density Indices			Condition		
			CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Bigmouth Buffalo	16	4.0	2.4	6		6			
	Black Bullhead	52	12.3	2.7	29	10	4			
	Common Carp	1	0.3	0.4	100		100			
	Saugeye	88	20.8	11.1	95		12	5	98	1
	Yellow Perch	23	5.8	4.7	39	16	0		84	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.

* Methods/Species that ignore stock length

Gear	Species	CPUE										Avg
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
AFS std gill net	Bigmouth Buffalo						2.5		0.0		4.0	2.17
	Black Bullhead						18.2		6.0		12.3	12.17
	Common Carp						7.0		3.8		0.3	3.70
	Northern Pike						0.0		0.2		0.0	0.07
	Saugeye						0.0		1.2		20.8	7.33
	Walleye						11.3		0.0		0.0	3.77
	White Sucker						0.2		0.0		0.0	0.07
	Yellow Perch						10.8		6.2		5.8	7.60
frame net (std 3/4 in)	Bigmouth Buffalo	0.6										0.60
	Black Bullhead	87.8										87.80
	Common Carp	2.0										2.00
	Northern Pike	11.4										11.40
	Walleye	2.6										2.60
	White Sucker	2.6										2.60
	Yellow Perch	54.0										54.00
std exp gill net	Bigmouth Buffalo	0.0		1.3	0.0	0.3						0.40
	Black Bullhead	38.5		92.7	79.3	37.3						61.95
	Common Carp	10.0		5.0	0.7	15.7						7.85
	Northern Pike	2.0		1.3	0.3	1.0						1.15
	Walleye	13.0		6.3	2.7	58.7						20.18
	White Sucker	0.5		0.0	0.0	0.0						0.13
	Yellow Perch	71.0		40.3	55.3	92.7						64.83

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.

Gear	Species	Index	Year											
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		
AFS std gill net	Bigmouth Buffalo	PSD						33						6
		PSD-P						0						6
	Black Bullhead	PSD						53			64			29
		PSD-P						6			8			4
	Common Carp	PSD						95			100			100
		PSD-P						0			39			100
	Saugeye	PSD									86			95
		PSD-P									43			12
		Wr									97			98
	Walleye	PSD							44					
		PSD-P							10					
		Wr							90					
	Yellow Perch	PSD							38		68			39
		PSD-P							2		24			0
		Wr							100		99			84
frame net (std 3/4 in)	Bigmouth Buffalo	PSD	100											
		PSD-P	0											
		Wr	87											
	Black Bullhead	PSD	17											
		PSD-P	0											
		Wr	80											
	Common Carp	PSD	70											
		PSD-P	60											
		Wr	96											
	Walleye	PSD	100											
		PSD-P	8											
		Wr	92											
	Yellow Perch	PSD	26											
		PSD-P	2											
		Wr	88											
std exp gill net	Bigmouth Buffalo	PSD	0		0		100							
		PSD-P	0		0		0							

Gear	Species	Index	Year									
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
std exp gill net	Black Bullhead	PSD	5		2	78	54					
		PSD-P	0		0	0	4					
		Wr	85									
	Common Carp	PSD	5		20	0	0					
		PSD-P	0		0	0	0					
		Wr	88									
	Walleye	PSD	88		0	100	5					
		PSD-P	0		0	0	0					
		Wr	89		93	98	91					
Yellow Perch	PSD	3		22	17	41						
	PSD-P	0		2	0	1						
	Wr	80		92	104	97						

Length at Capture

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

Species: Saugeye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	7		370 (4)	461 (1)	532 (2)						

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	37	166 (11)	217 (15)	246 (4)	262 (7)						
2014	123	140 (50)	162 (8)	186 (21)	204 (38)	226 (5)					

Fish Condition

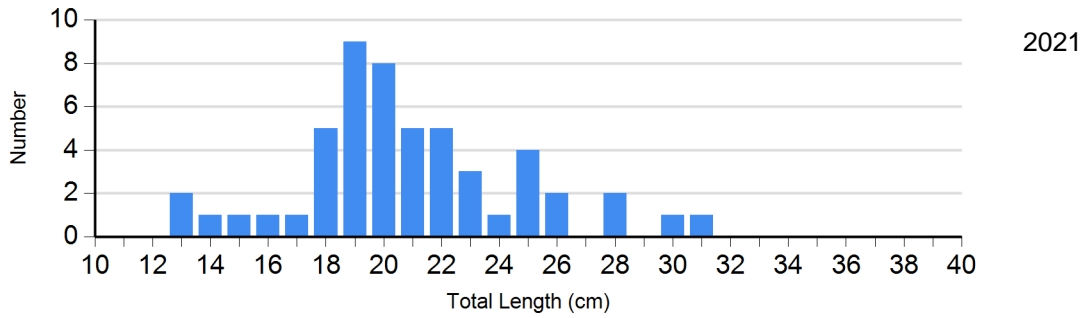
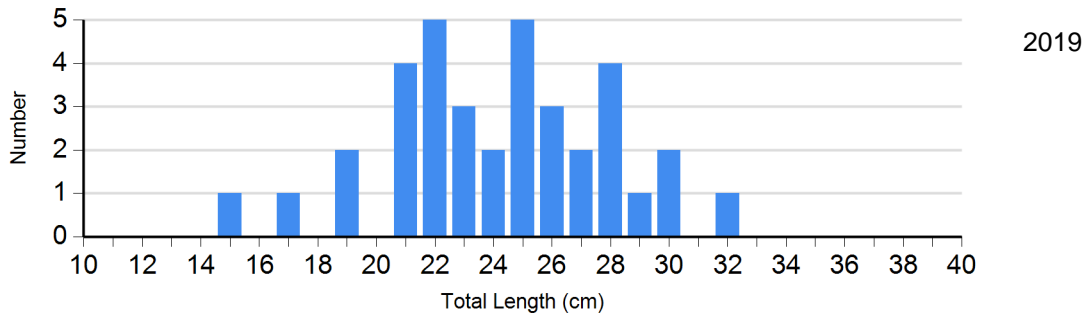
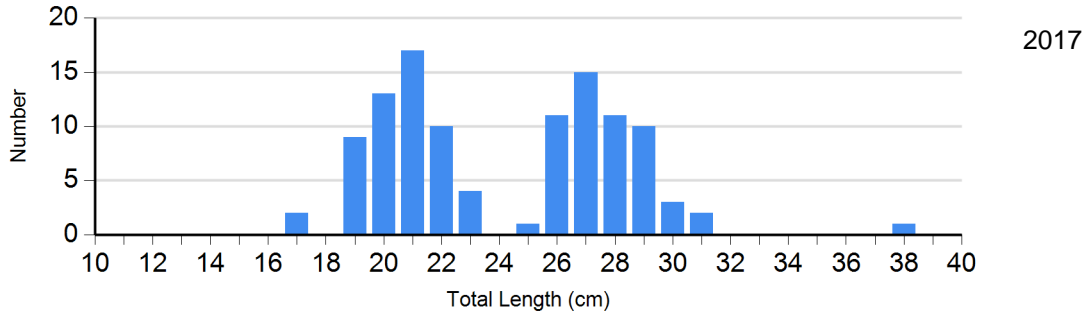
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Saugeye Gill Net	2019	1	106	3	100 (3.0)	3	91 (3.2)	0	
	2021	4	105 (5.5)	69	97 (1.1)	9	98 (2.7)	1	78
Walleye Gill Net	2017	38	89 (0.9)	23	92 (0.9)	7	86 (1.3)	0	
Yellow Perch Gill Net	2017	40	102 (1.2)	24	98 (1.4)	1	97	0	
	2019	12	98 (2.3)	16	99 (1.8)	9	99 (2.2)	0	
	2021	14	83 (1.5)	9	85 (2.3)	0		0	

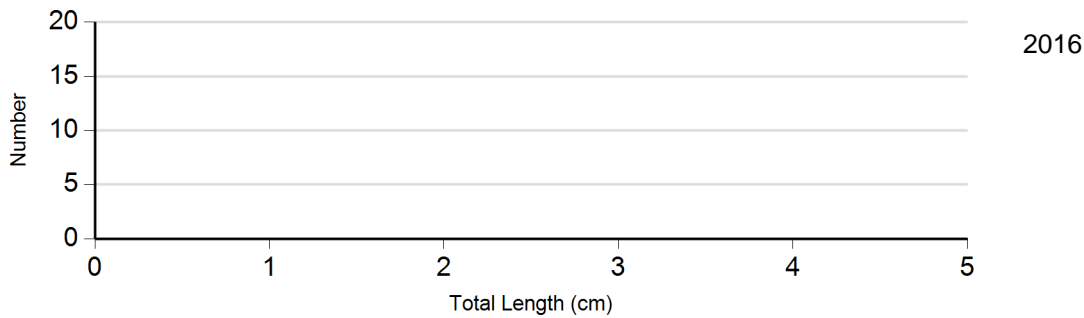
Length Frequency Distribution

Length frequency histogram of species sampled by year.

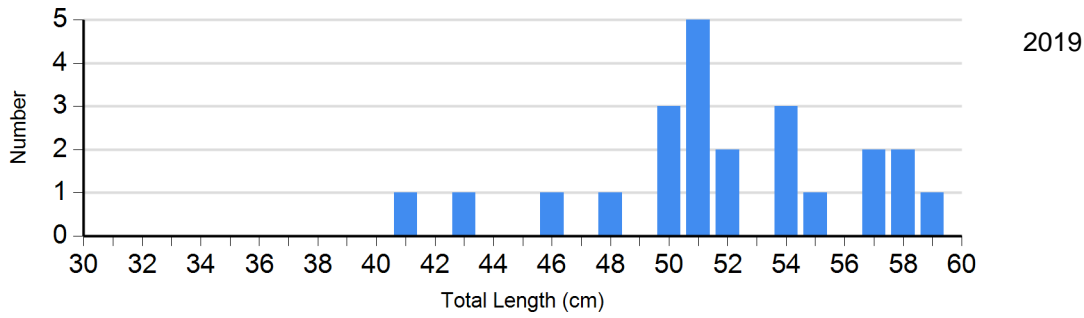
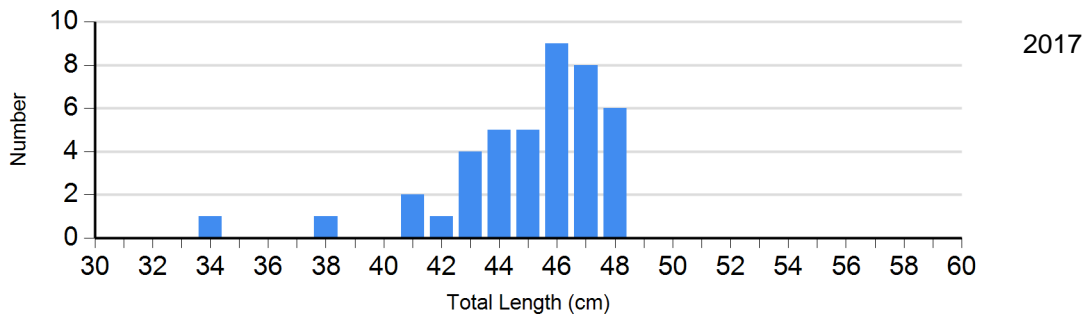
Species: Black Bullhead
Gear: AFS std gill net



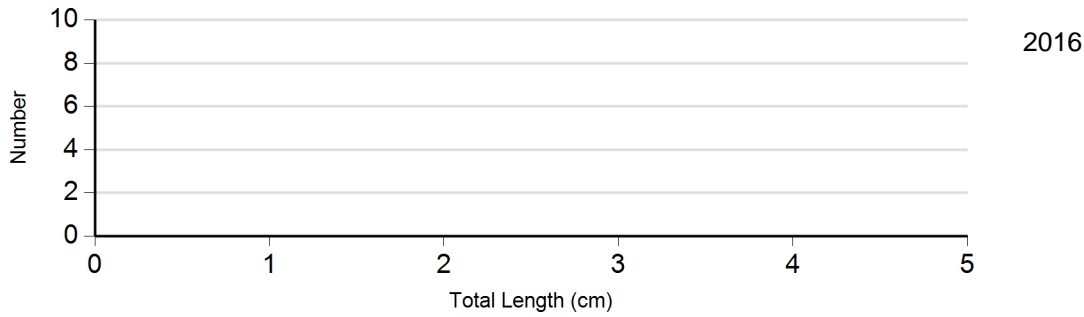
Species: Black Bullhead
Gear: std exp gill net



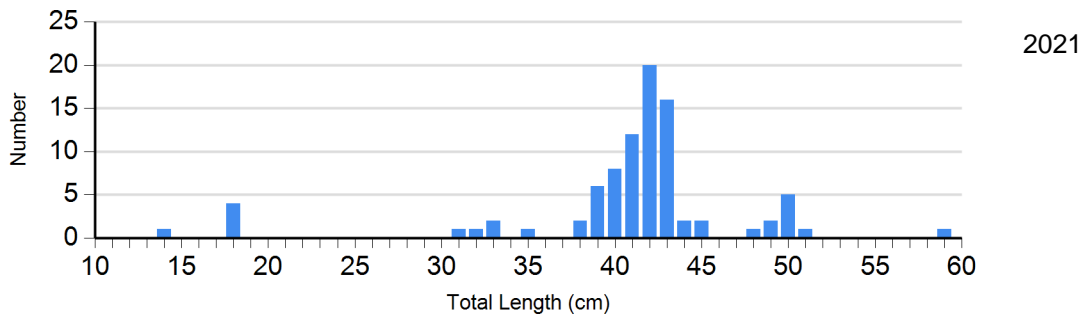
Species: Common Carp
Gear: AFS std gill net



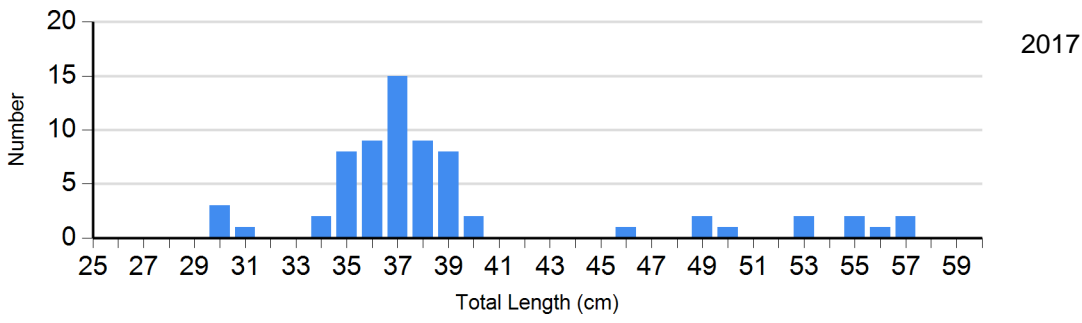
Species: Common Carp
Gear: std exp gill net



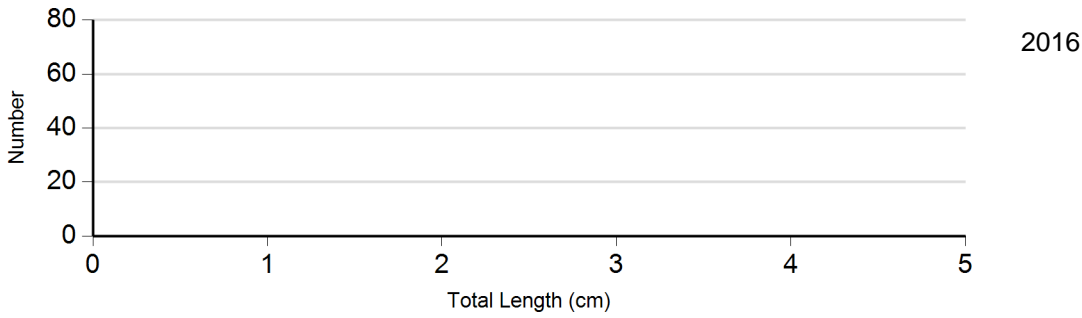
Species: Saugeye
Gear: AFS std gill net



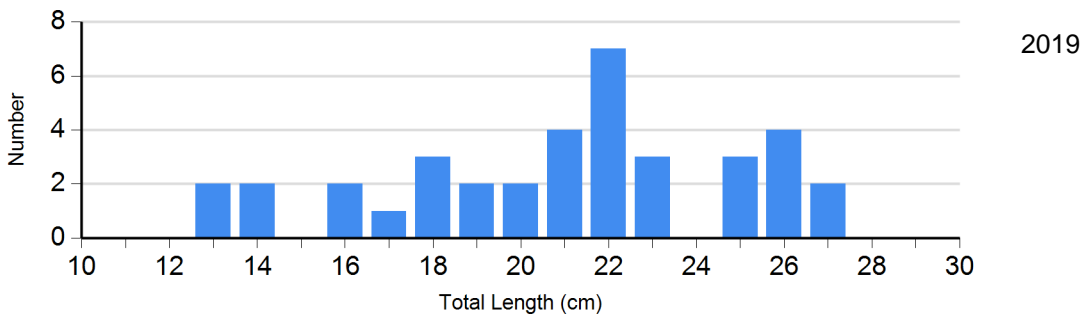
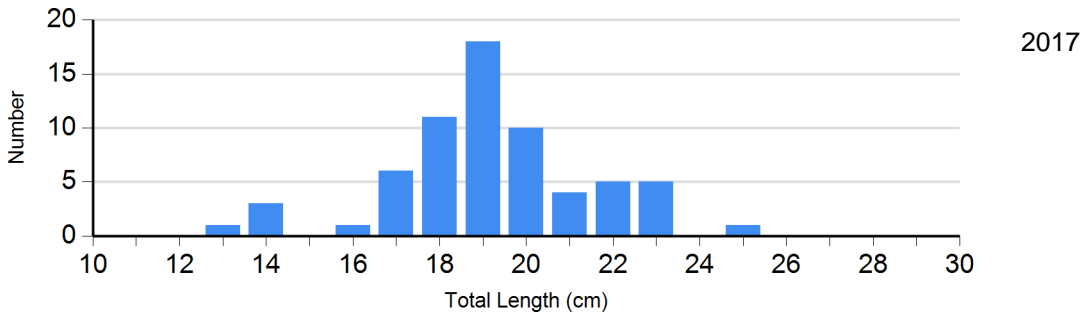
Species: Walleye
Gear: AFS std gill net

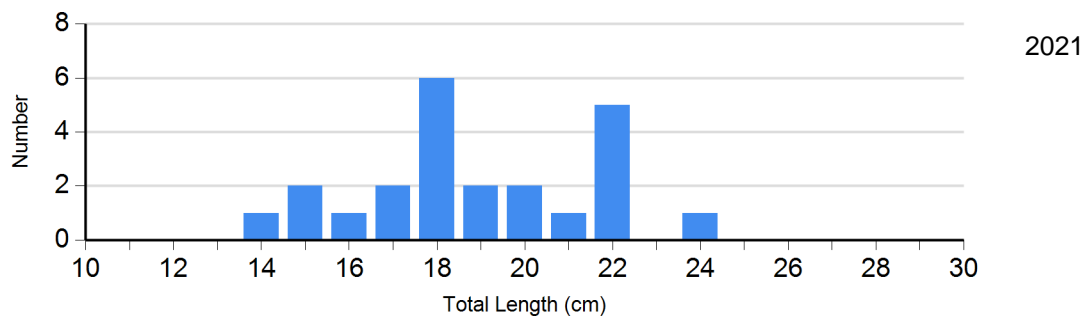


Species: Walleye
Gear: std exp gill net

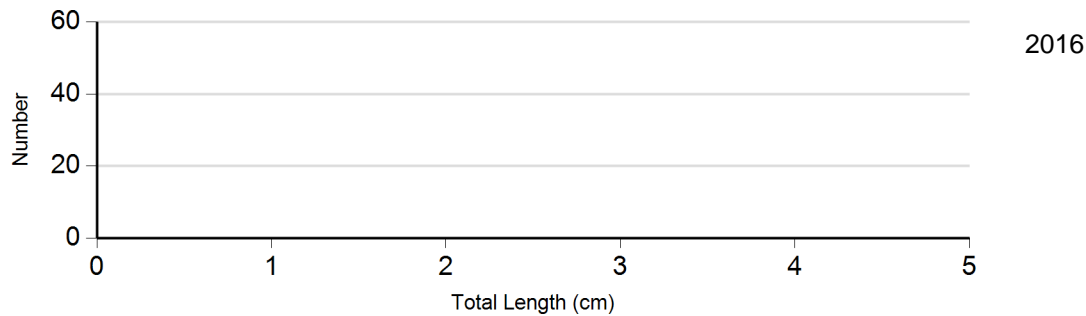


Species: Yellow Perch
Gear: AFS std gill net





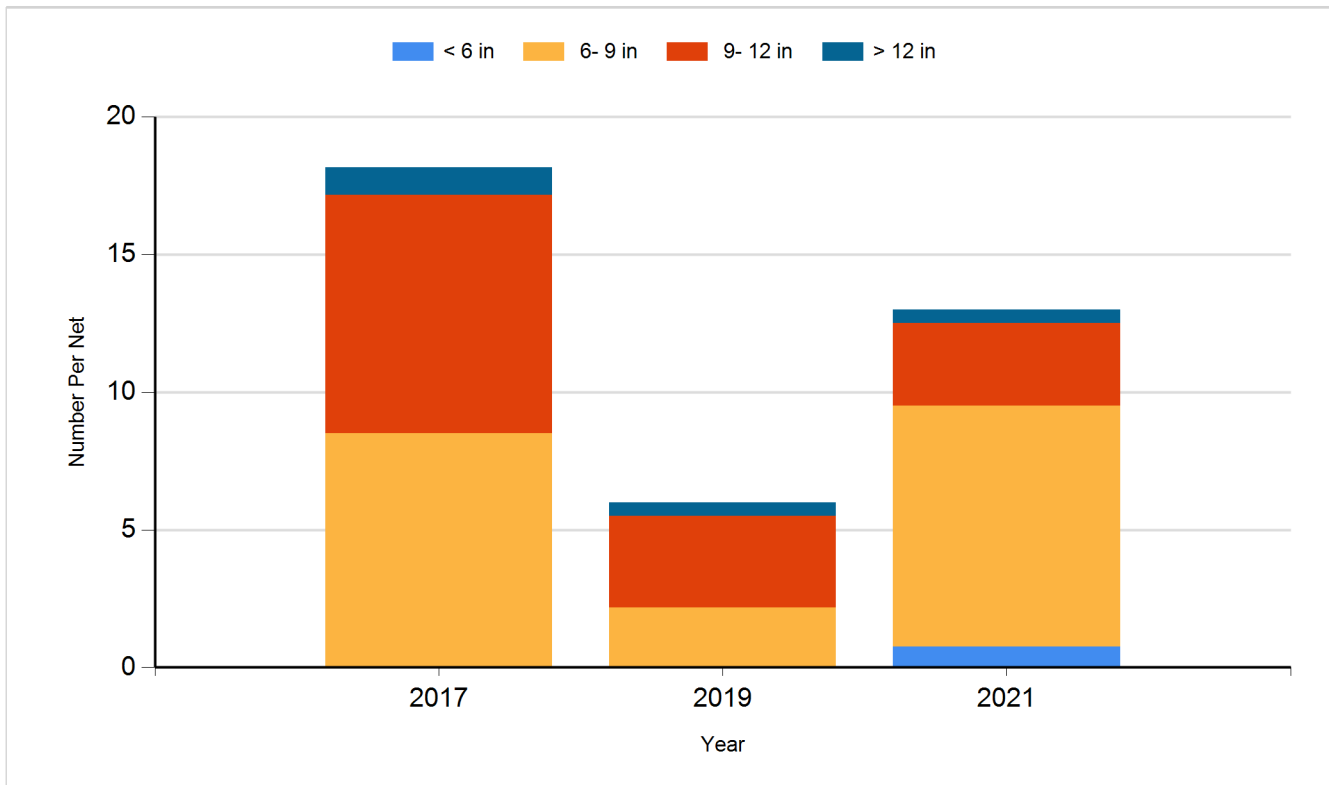
Species: Yellow Perch
 Gear: std exp gill net



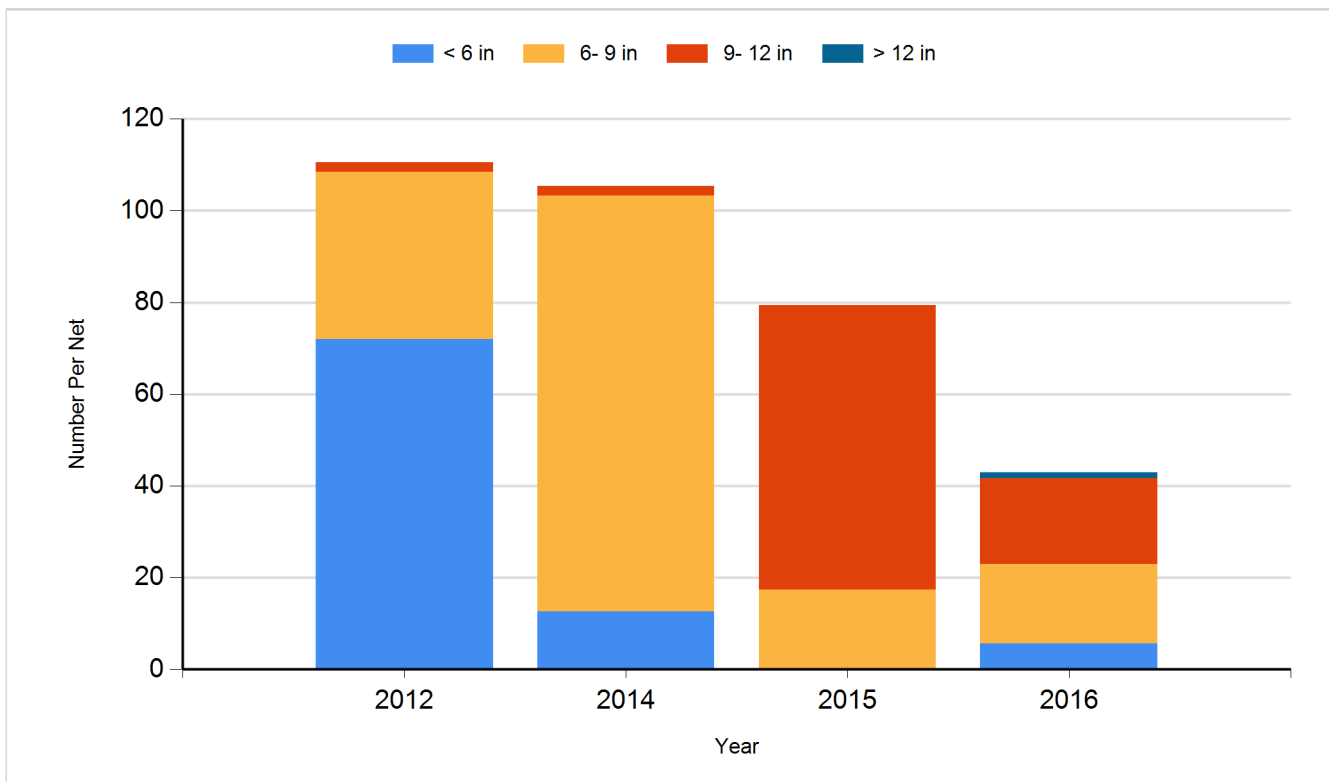
Historic Fish Sizes and Relative Abundance

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

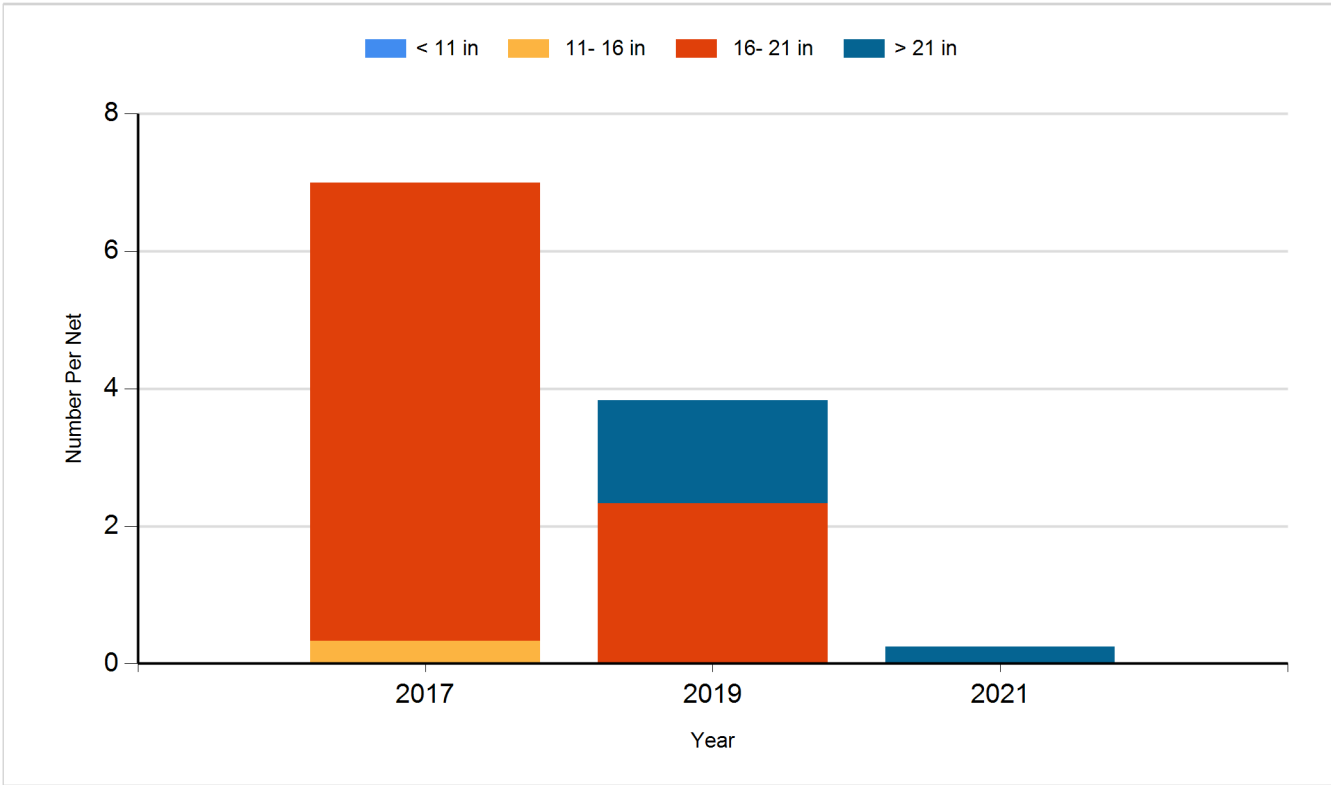
Species: Black Bullhead
Gear: AFS std gill net



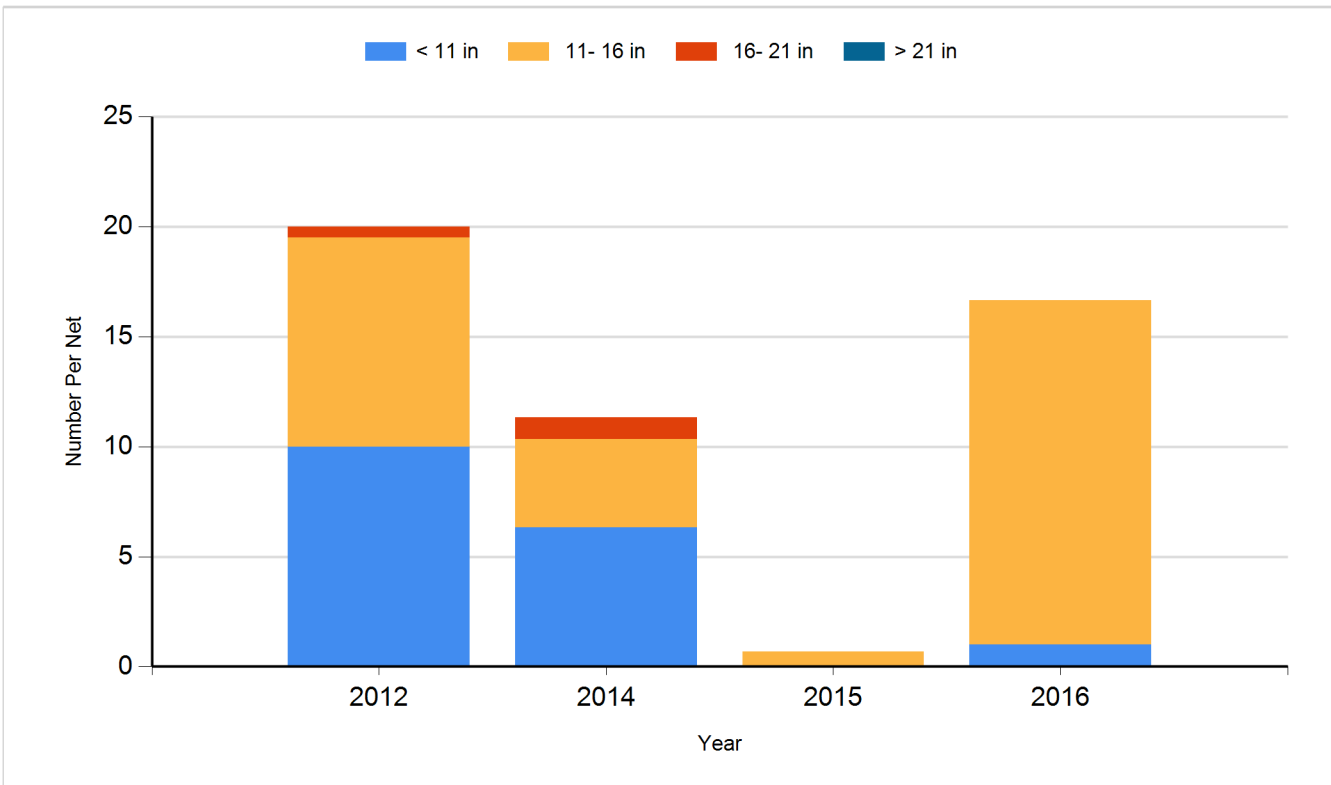
Species: Black Bullhead
Gear: std exp gill net



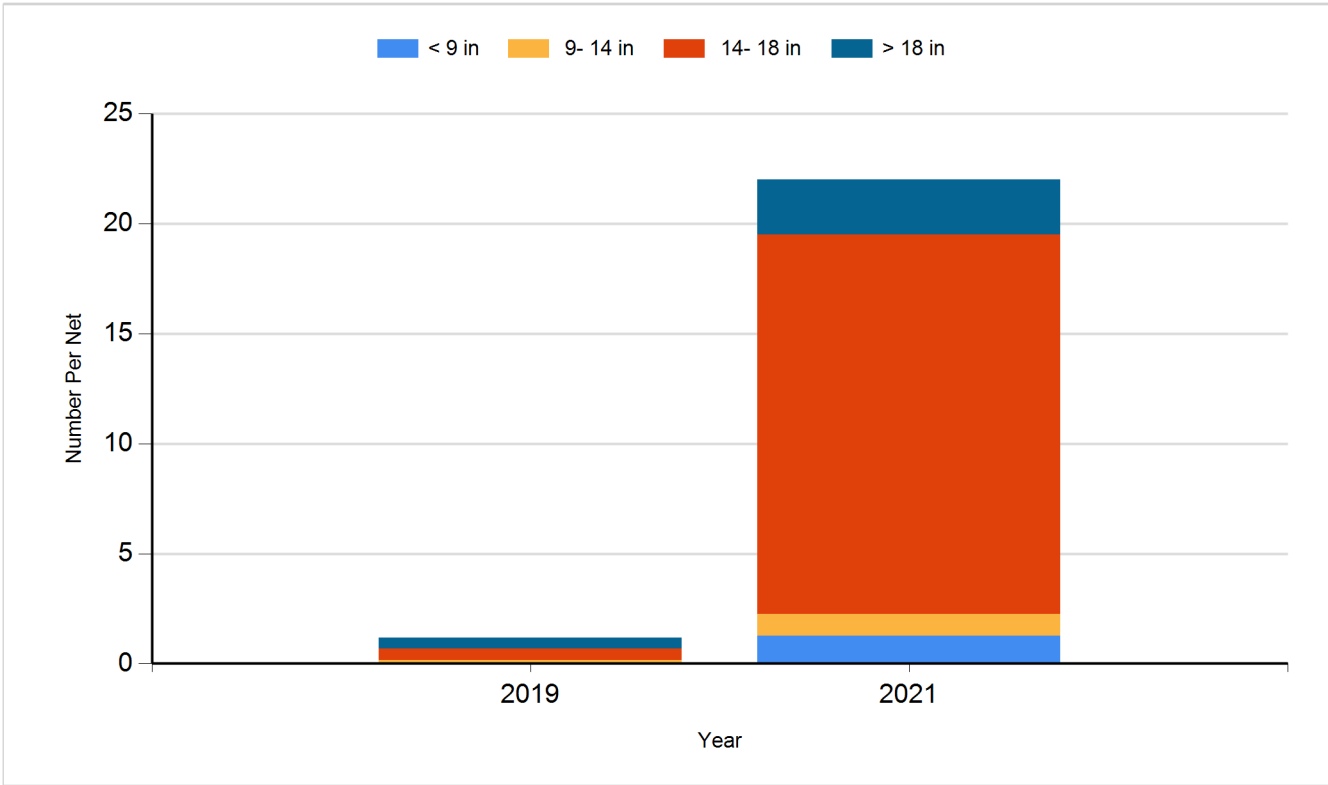
Species: Common Carp
Gear: AFS std gill net



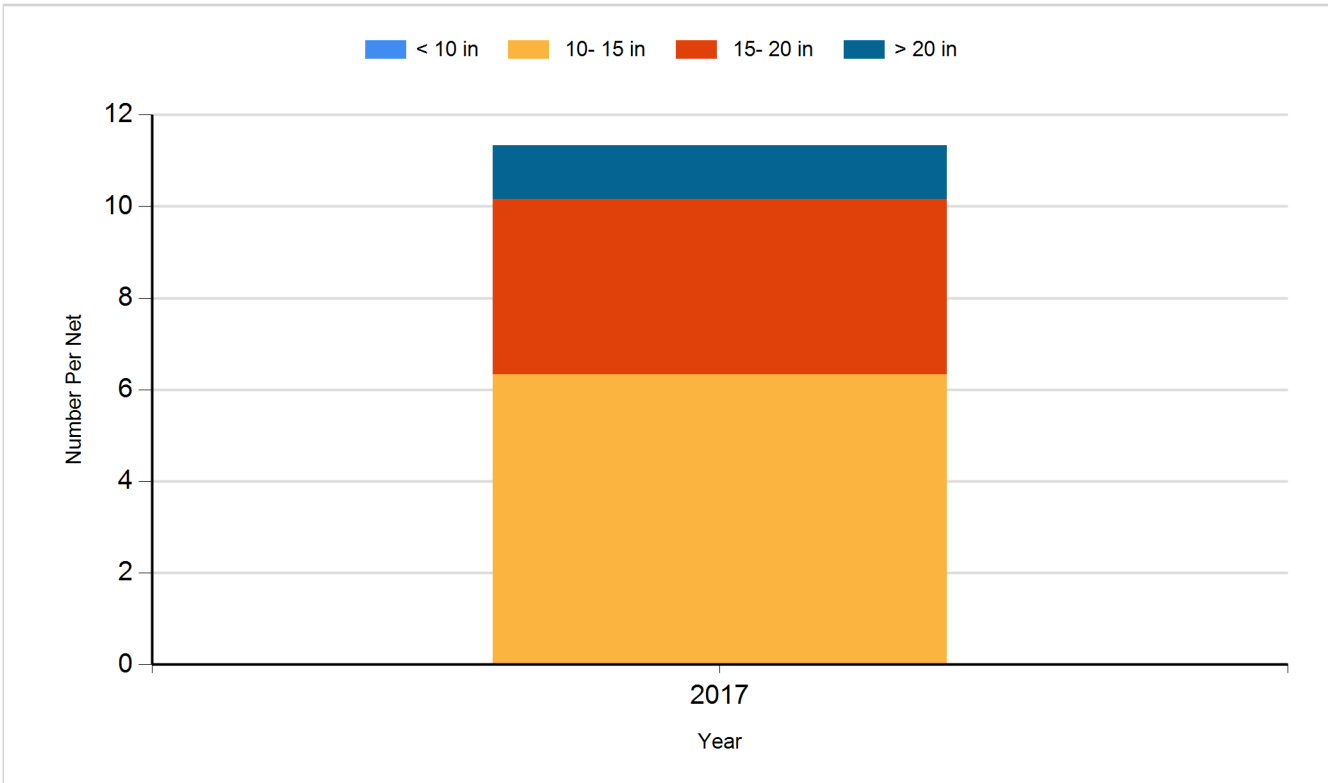
Species: Common Carp
Gear: std exp gill net



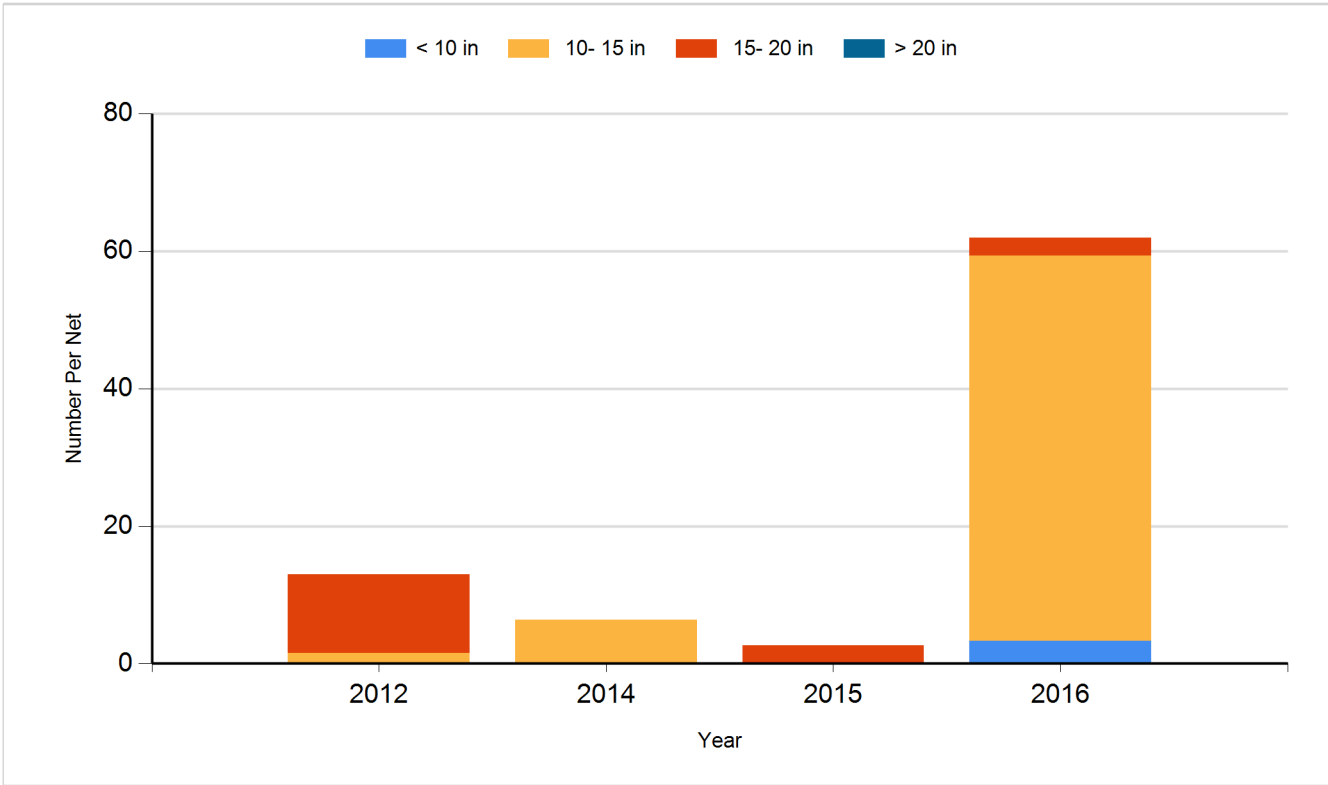
Species: Saugeye
Gear: AFS std gill net



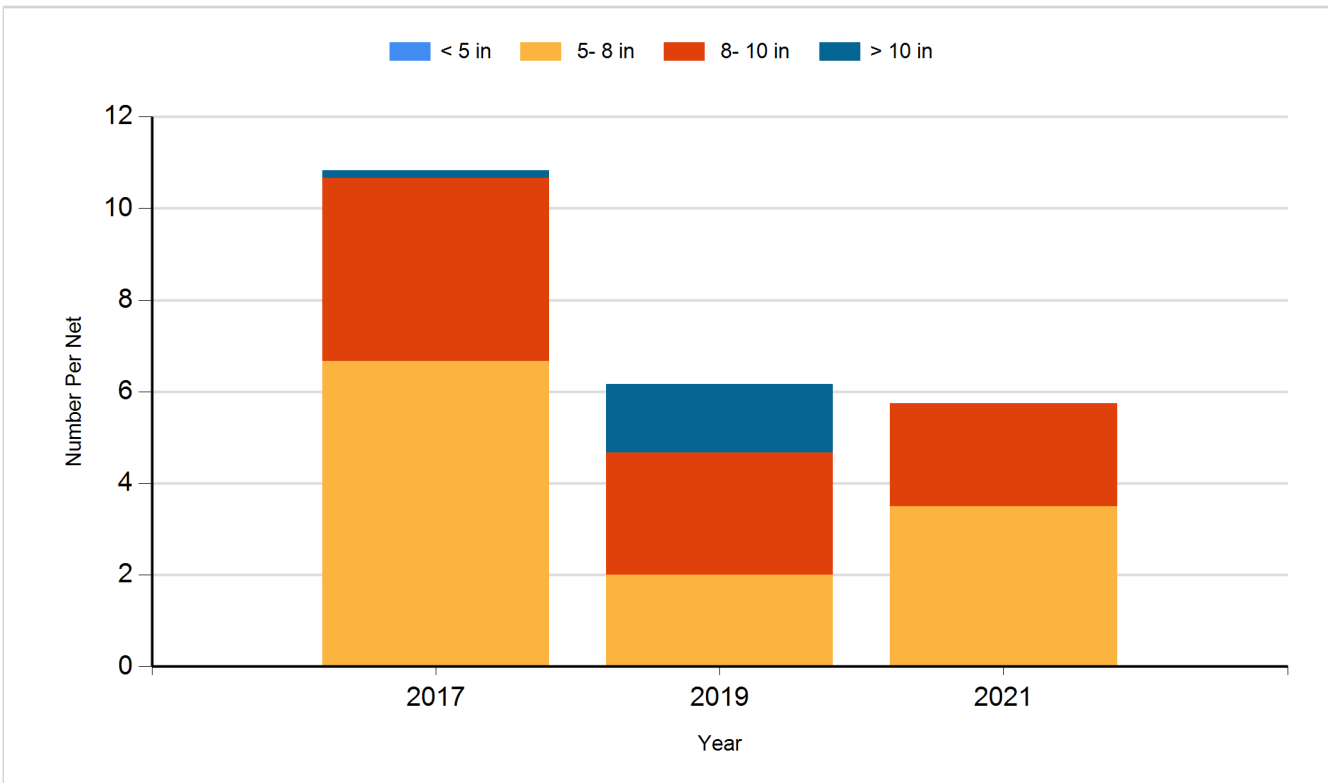
Species: Walleye
Gear: AFS std gill net



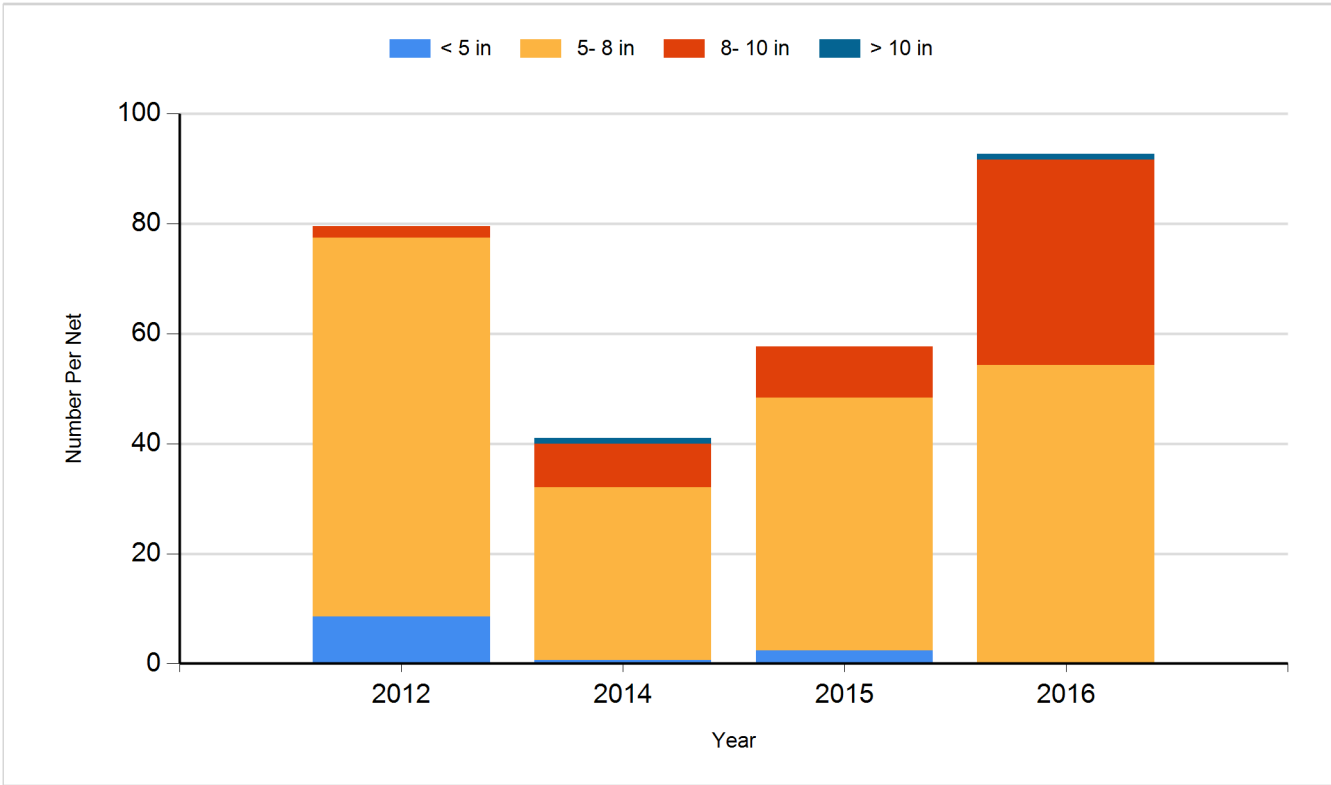
Species: Walleye
Gear: std exp gill net



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	Small Fingerling	40,800
2011	Yellow Perch	Small Fingerling	2,560
2012	Yellow Perch	Adult	3,053
2012	Yellow Perch	Fingerling	3,950
2013	Walleye	Small Fingerling	39,930
2013	Yellow Perch	Fry	1,440,000
2013	Yellow Perch	Small Fingerling	5,170
2014	Walleye	Fry	400,000
2014	Yellow Perch	Small Fingerling	5,700
2015	Walleye	Small Fingerling	28,160
2016	Saugeye	Small Fingerling	28,000
2018	Saugeye	Small Fingerling	27,400
2019	Saugeye	Small Fingerling	28,000
2021	Saugeye	Fry	400,000
2021	Saugeye	Juvenile	35,670