Bullhead Lake Survey Summary

Bullhead Lake, located 4.5 miles north and 2.0 miles east of Goodwin, is managed as a walleye and yellow perch fishery but other fish species (e.g., northern pike) are present and contribute to the fishery.

- **Walleye.** Fewer walleyes were sampled in 2020 than in 2016. At 5.7/gill net relative abundance was moderate. Sampled walleyes ranged in length from 8.3 to 27.6 inches, of those that were at least 10.0 inches, 79% were ≥15.0 inches and 18% were ≥20.0 inches. Individuals from the 2017 (age-3) year class, which had a mean length at capture of 15.4 inches, were the most abundant accounting for 68% walleyes sampled.

- **Yellow Perch**. Yellow perch relative abundance (12.8/gill net) was considered moderate in 2020. Those sampled ranged in length from 4.7 to 11.0 inches, of those that were at least 5.0 inches, 51% were ≥8.0 inches and 21% were ≥10.0 inches. Individuals from four cohorts (2016 – 2019) contributed to the catch. Year classes produced in 2017 – 2019 (ages 1 – 3) were represented by a similar number of individuals and accounted for 78 of the 80 yellow perch sampled. Growth appears to be moderate with mean length at capture values from 7.6 to 7.9 inches at age 2 in surveys conducted since 2012. In 2020, the mean length at capture of age-2 fish was 7.9 inches.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Bullhead, Deuel County
UBS-Lake-320-000
2020

Lake Information

Name:	Bullhead	**Maximum Depth:**	11 Feet
County:	Deuel	**Mean Depth:**	7 Feet
		OHWM Elevation:	1,862
Surface Area:	453 Acres	**Outlet Elevation:**	1,861

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 08, 2020	6 net-nights

Common Fish Species Present

Walleye

Northern Pike

Yellow Perch

White Sucker

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).

*** 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	Common Carp	4	0.7	0.5	100		25		95	6
	Northern Pike	3	0.5	0.5	33		33		89	2
	Walleye	39	5.7	1.3	79	11	18	10	98	1
	White Sucker	4	0.7	0.5	100		75		104	4
	Yellow Perch	80	12.8	3.6	51	8	21	7	110	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.

		CPUE										
Gear	Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Avg
AFS std gill net	Bigmouth Buffalo						0.6				0.0	0.30
	Black Bullhead						16.8				0.0	8.40
	Common Carp						1.1				0.7	0.90
	Northern Pike						0.4				0.5	0.45
	Walleye						25.3				5.7	15.50
	White Sucker						0.4				0.7	0.55
	Yellow Perch						9.8				12.8	11.30
std exp gill net	Black Bullhead		212.0									212.00
	Common Carp		1.7									1.70
	Northern Pike		1.3									1.30
	Walleye		7.7									7.70
	White Sucker		2.3									2.30
	Yellow Perch		30.3									30.30

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	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AFS std gill net	Walleye	PSD						73				79
		PSD-P						21				18
		Wr						97				98
	Yellow Perch	PSD						86				51
		PSD-P						31				21
		Wr						94				110
std exp gill net	Walleye	PSD		43								
		PSD-P		35								
		Wr		83								
	Yellow Perch	PSD		53								
		PSD-P		1								
		Wr		96								

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+
2020	38	232 (5)	384 (1)	391 (26)	488 (2)						662 (4)
2016	303	277 (69)	391 (82)	442 (2)	491 (94)		527 (44)	607 (1)	634 (10)		669 (1)
2012	23		306 (13)	421 (1)	521 (8)				641 (1)		

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	80	135 (30)	201 (22)	248 (26)	279 (2)						
2016	118	151 (2)	194 (25)	238 (51)	258 (24)	276 (1)	292 (10)	244 (5)			
2012	92	125 (1)	193 (60)	225 (31)							

Fish Condition

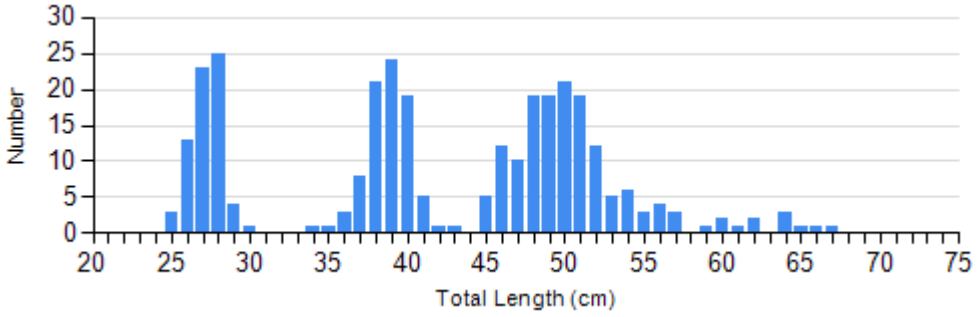
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Walleye Gill Net	2016	82	99 (0.6)	157	98 (0.4)	58	92 (0.8)	6	91 (2.2)
	2020	7	97 (3.0)	21	100 (0.9)	2	94 (4.7)	4	93 (3.5)
Yellow Perch Gill Net	2016	16	100 (2.1)	65	95 (0.7)	35	91 (1.3)	2	84 (0.6)
	2020	38	113 (1.2)	23	109 (1.0)	16	106 (2.1)	0	

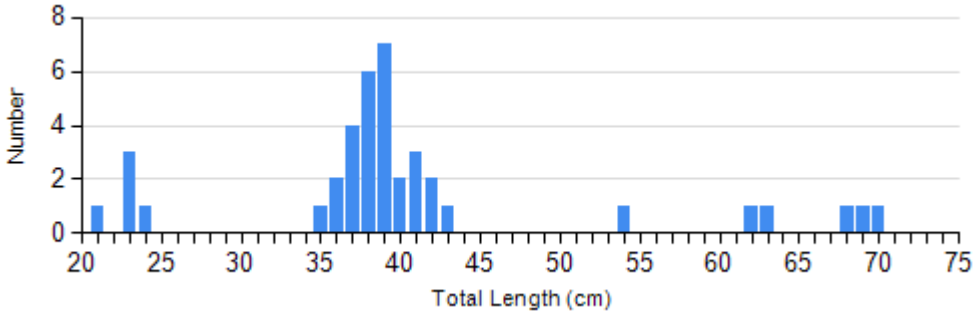
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net



2016



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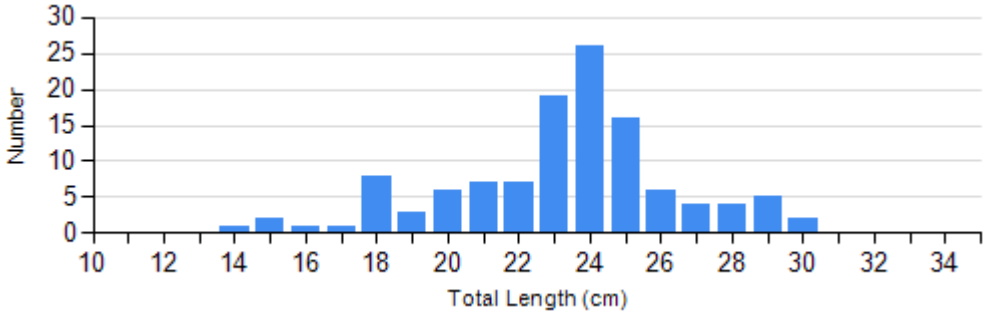
Species: Yellow Perch
Gear: AFS std gill net



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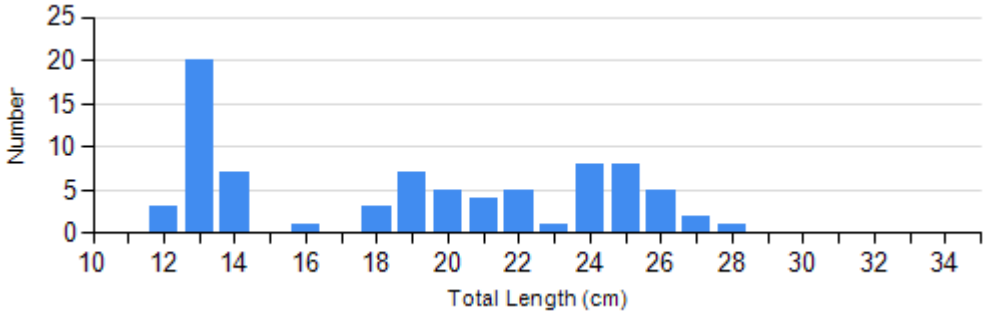
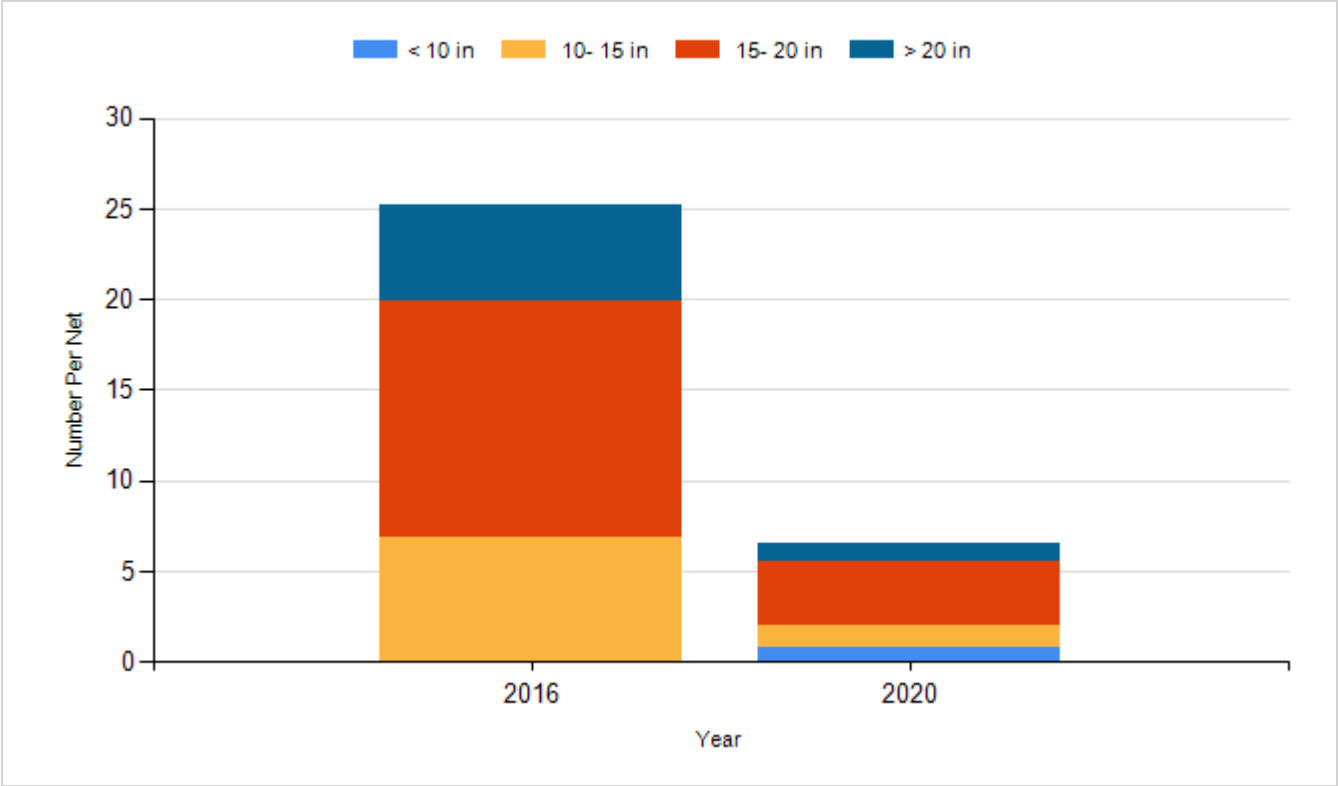


2020

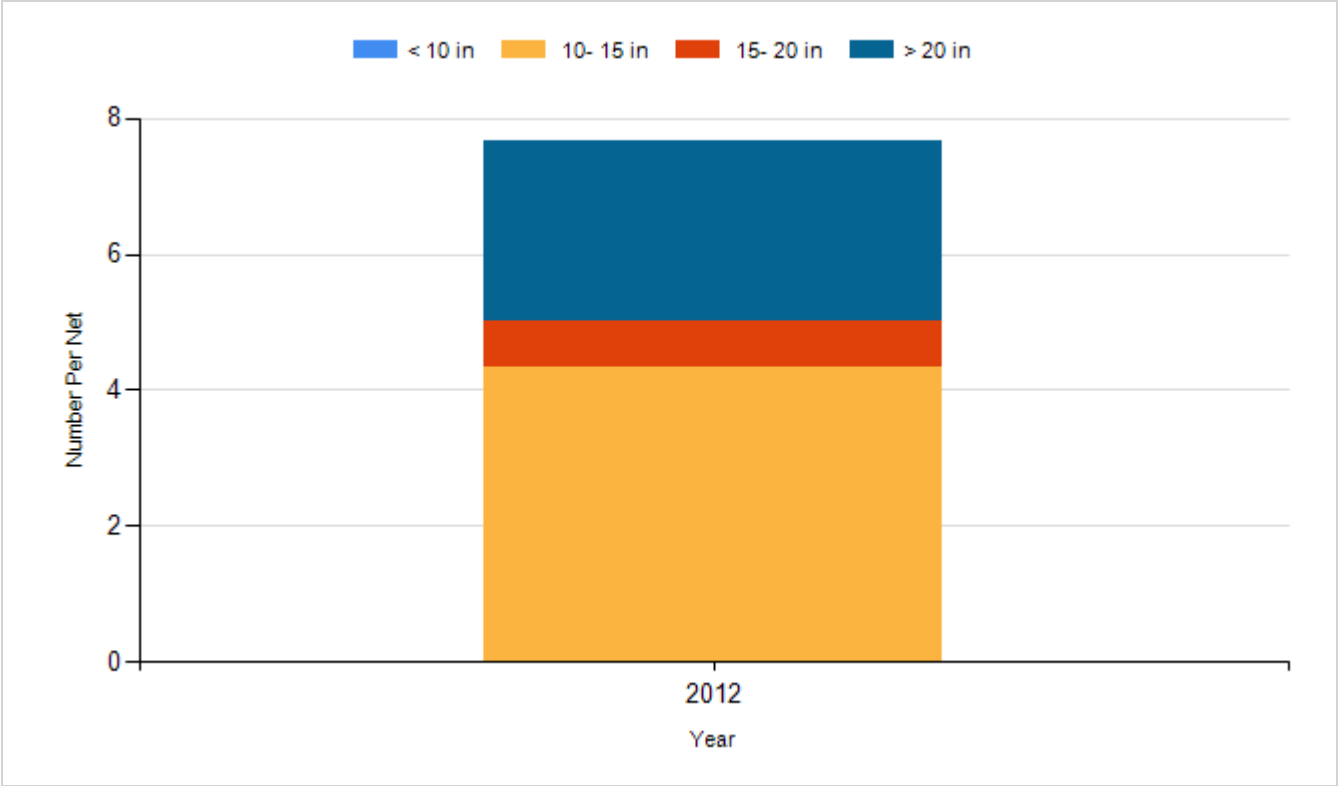
Historic Fish Sizes and Relative Abundance

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

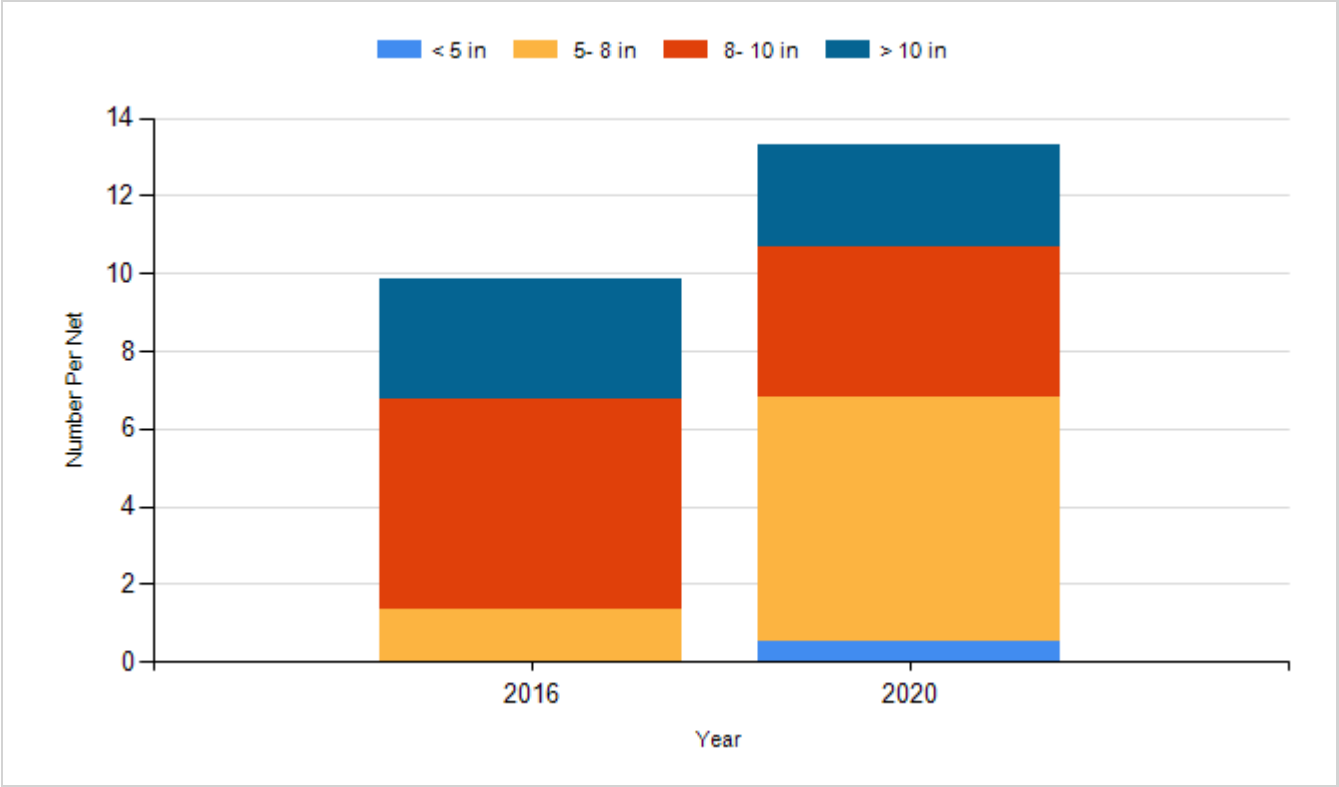
Species: Walleye
Gear: AFS std gill net



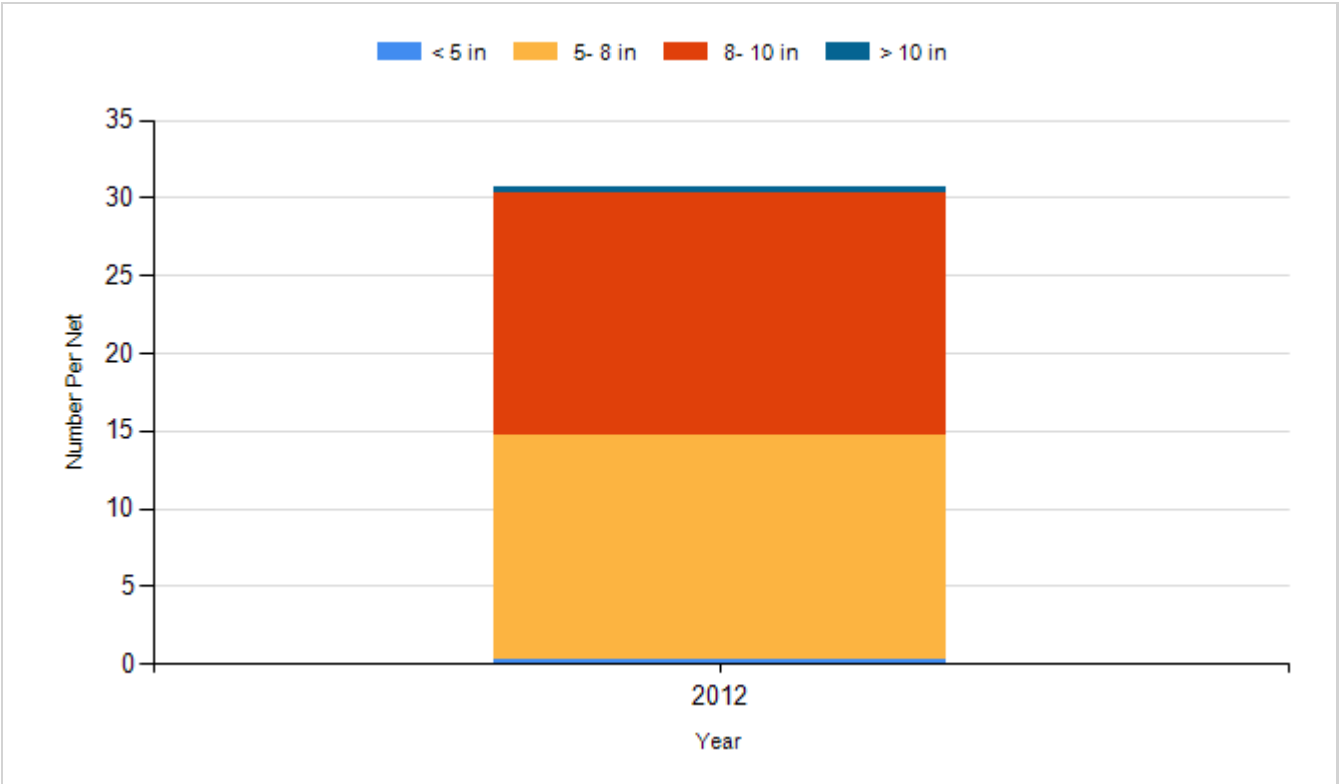
Species: Walleye
Gear: std exp gill net



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	Fry	350,000
2012	Walleye	Fry	170,000
2014	Walleye	Fry	300,000
2016	Walleye	Fry	300,000
2017	Walleye	Fry	285,000
2019	Saugeye	Small Fingerling	44,500