

Cottonwood Lake Survey Summary

Cottonwood Lake, located along SD-26 about 10.0 miles southwest of Redfield, is primarily managed for walleye and yellow perch but other fish species (e.g., northern pike) also contribute to the fishery.

- **Northern pike.** Northern pike numbers were considerably lower in 2018 (0.3/gill net) than 2013 (5.5/gill net). In 2018, only three northern pike ranging in length from 21.7 to 34.3 inches were sampled.
- **Walleye.** At 11.0 walleyes per gill net, relative abundance was considered high in 2018. Gill net captured walleyes ranged in length from 7.5 to 27.2 inches; seven year classes (2010, 2011, and 2013 – 2017) were represented. The 2014 – 2016 cohorts, two of which were naturally produced, accounted for >75% of walleyes sampled and the high proportion of walleyes from 12.6 to 18.9 inches. Walleye growth appears to be good with mean length at capture values of 16.1 inches at age 3 and 17.8 inches at age 4.
- **Yellow Perch.** Yellow perch were not abundant (2.8/gill net). Sampled yellow perch ranged in length from 5.3 to 13.9 inches and five year classes (2012 and 2014 – 2017) were represented. The 2016 cohort comprised 47% of yellow perch sampled. Yellow perch appear to grow well in Cottonwood Lake reaching 10.8 inches at age 3.

For more detailed results see the computer generated South Dakota Statewide Fisheries Survey for Cottonwood Lake (below).

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Cottonwood, Spink County
TUR-Lake-498-000
2018

Lake Information

Name:	Cottonwood	Maximum Depth:	9 Feet
County:	Spink	Mean Depth:	7 Feet
Surface Area:	1,475 Acres		

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 01, 2018	4 net-nights
AFS std gill net	May 30, 2018	4 net-nights
AFS std gill net	May 31, 2018	4 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Northern Pike

Common Carp

Black Bullhead

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)
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
Bluegill	3	8	6	15	8	20	10	25	12	30
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Common Carp	11	28	16	41	21	53	26	66	33	84
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
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
Rock Bass	4	10	7	18	9	23	11	28	13	33
Rudd	6	15	10	25	12	30	15	38	19	48
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
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 Sucker	6	15	10	25	13	33	16	41	20	51
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).

Gear	Species	Abundance		Stock Density Indices				Condition	
		CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Black Bullhead	0.4	0.2	100		100		105	6
	Common Carp	1.2	0.4	93		93		108	3
	Northern Pike	0.3	0.2	100		67		94	5
	Walleye	11.0	1.2	56	6	4	3	90	1
	Yellow Perch	2.8	0.6	62	13	29	12	109	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.

Gear	Species	CPUE										Avg
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
AFS std gill net	Black Bullhead										0.4	0.4
	Common Carp										1.2	1.2
	Northern Pike										0.3	0.3
	Walleye										11.0	11.0
	Yellow Perch										2.8	2.8
frame net (std 3/4 in)	Black Bullhead					690.5						690.5
	Black Crappie					2.3						2.3
	Common Carp					0.2						0.2
	Northern Pike					1.9						1.9
	Walleye					6.5						6.5
	Yellow Perch					0.1						0.1
std exp gill net	Black Bullhead					23.0						23.0
	Common Carp					0.3						0.3
	Northern Pike					5.5						5.5
	Walleye					16.2						16.2
	Yellow Perch					0.0						0.0

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											
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018		
AFS std gill net	Northern Pike	PSD												100
		PSD-P												67
		Wr												94
	Walleye	PSD												56
		PSD-P												4
		Wr												90
	Yellow Perch	PSD												62
		PSD-P												29
		Wr												109
frame net (std 3/4 in)	Northern Pike	PSD						88						
		PSD-P						21						
		Wr						78						
	Walleye	PSD							24					
		PSD-P							2					
		Wr							85					
	Yellow Perch	PSD							100					
		PSD-P							100					
		Wr							90					
std exp gill net	Northern Pike	PSD						91						
		PSD-P						30						
		Wr							85					
	Walleye	PSD							12					
		PSD-P							4					
		Wr							89					
	Yellow Perch	PSD												
		PSD-P												
		Wr												

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+
2018	149	216 (17)	346 (57)	410 (39)	451 (21)	469 (12)		503 (2)	616 (2)		
2013	111	200 (2)	260 (57)	326 (41)	488 (11)						

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	34	154 (10)	221 (16)	275 (6)	321 (1)		353 (1)				

Fish Condition

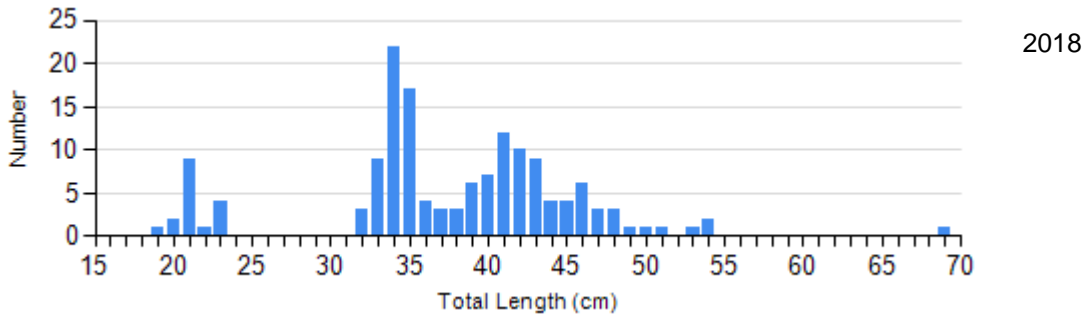
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2018	0		1	91	1	102	1	89
Walleye Gill Net	2018	58	90 (0.6)	69	89 (0.7)	4	89 (3.3)	1	76
Yellow Perch Gill Net	2018	13	111 (2.0)	11	112 (2.3)	8	106 (1.6)	2	100 (0.1)

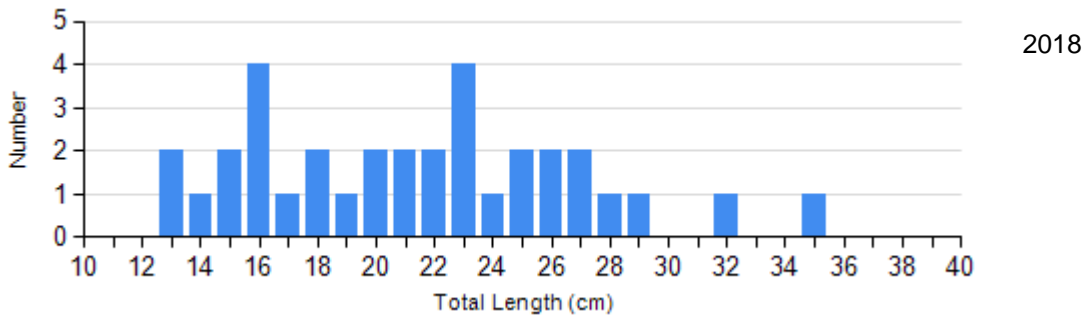
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net



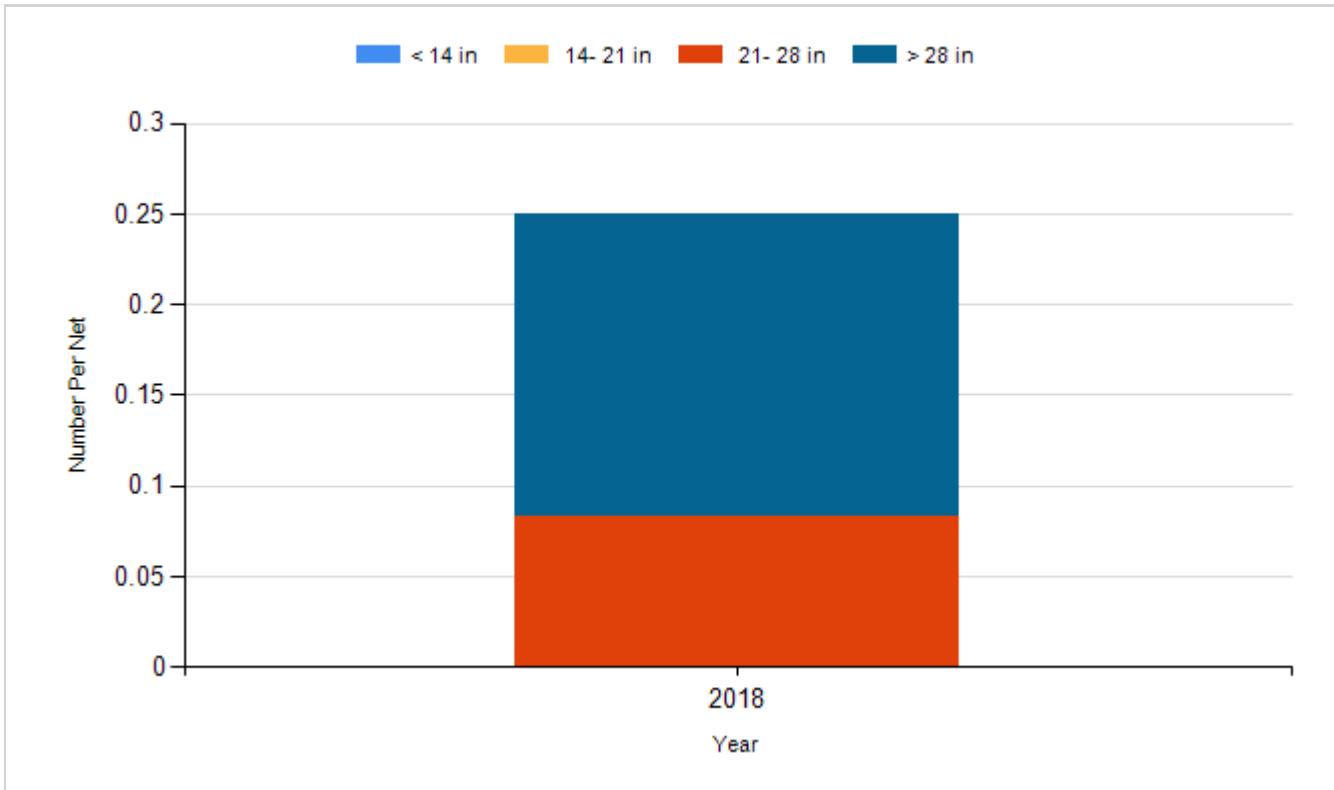
Species: Yellow Perch
Gear: AFS std gill net



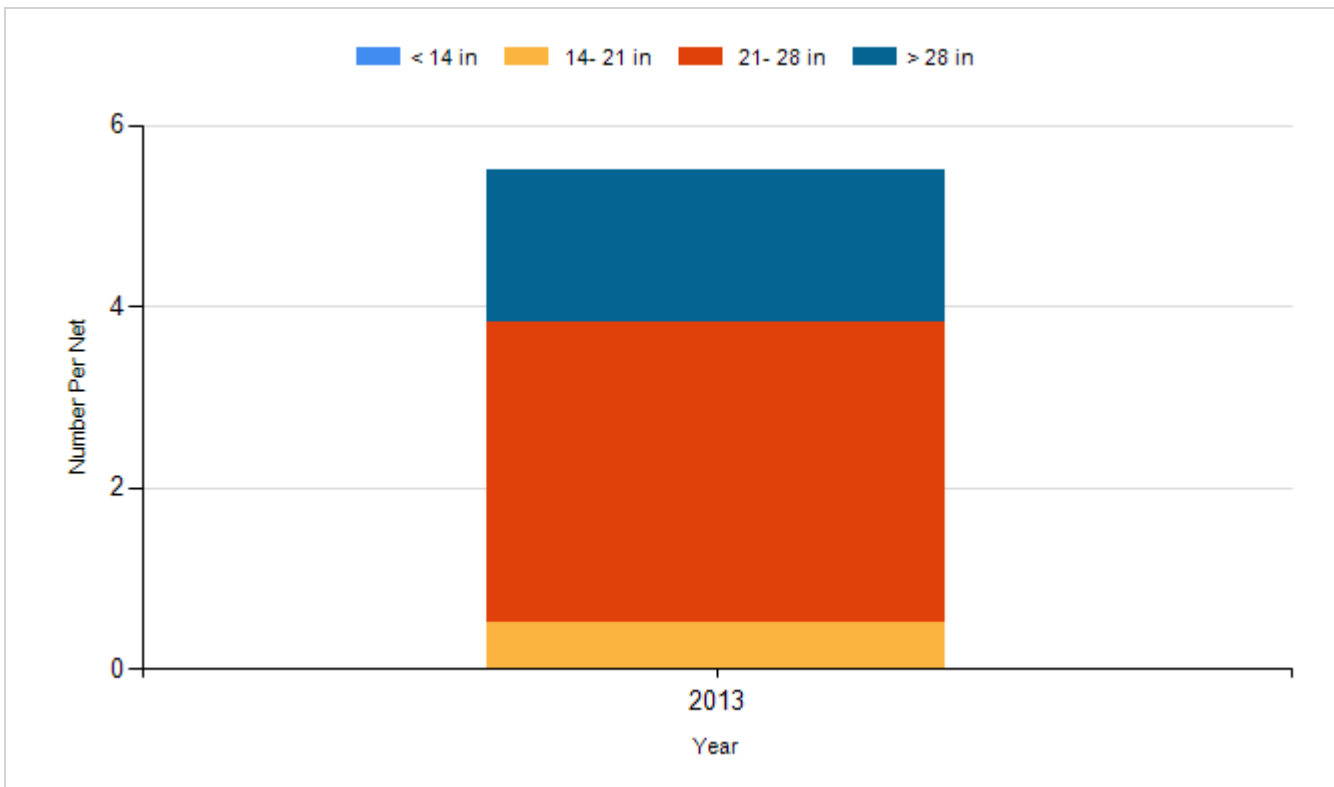
Historic Fish Sizes and Relative Abundance

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

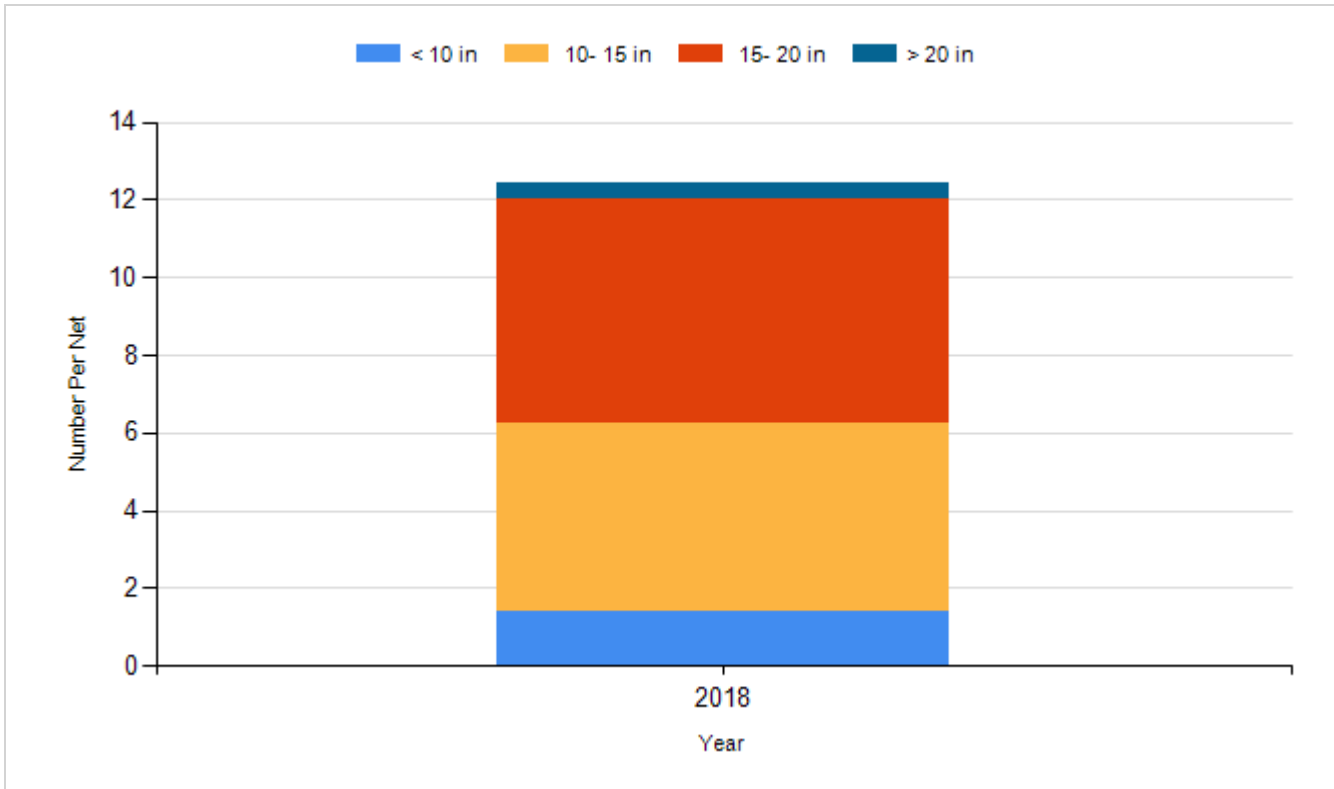
Species: Northern Pike
Gear: AFS std gill net



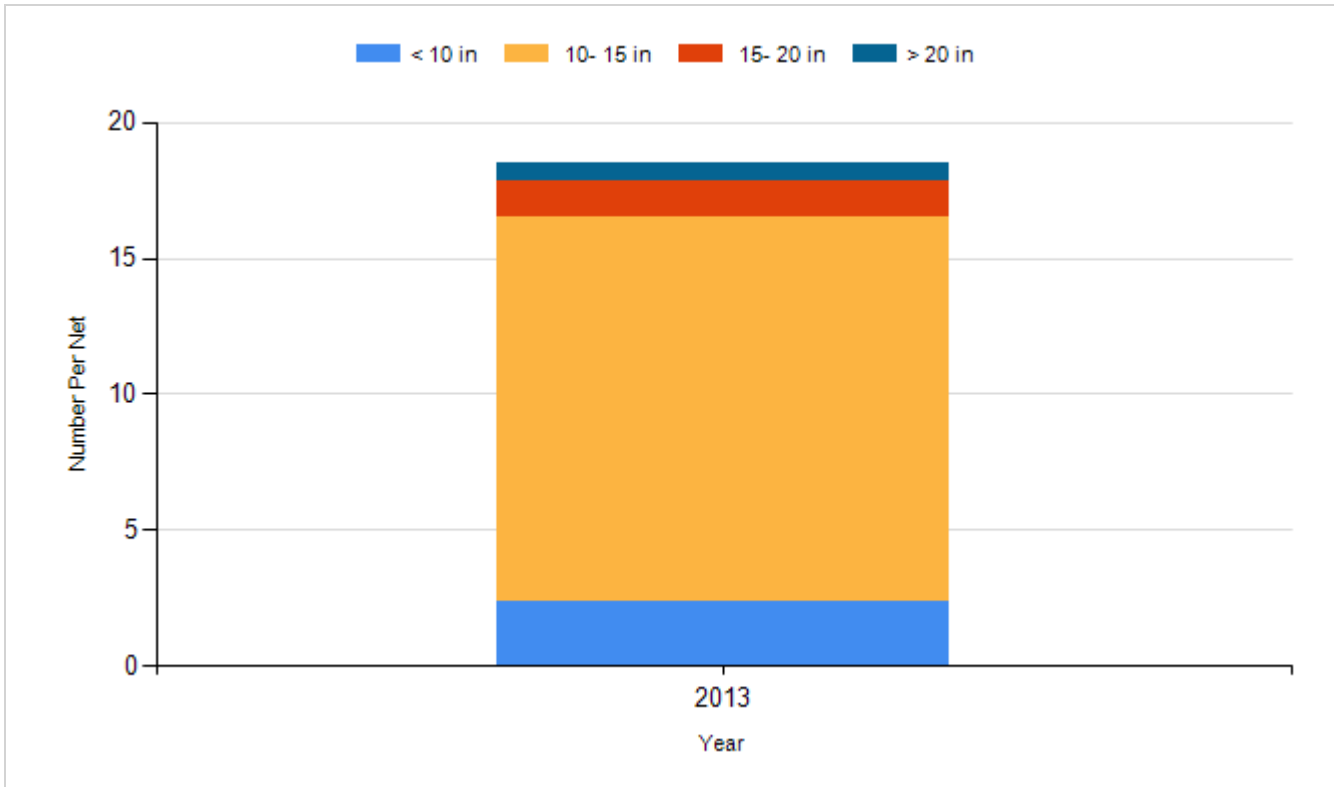
Species: Northern Pike
Gear: std exp gill net



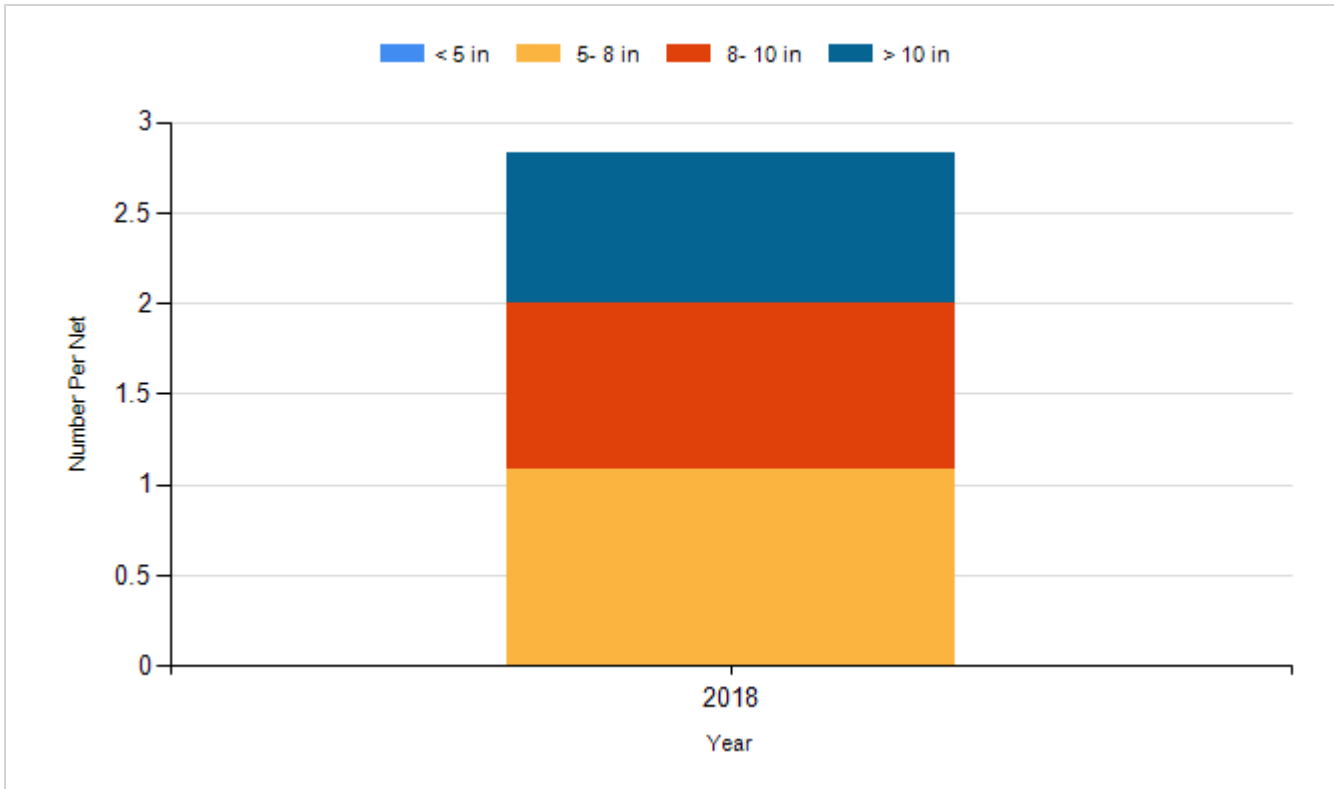
Species: Walleye
Gear: AFS std gill net



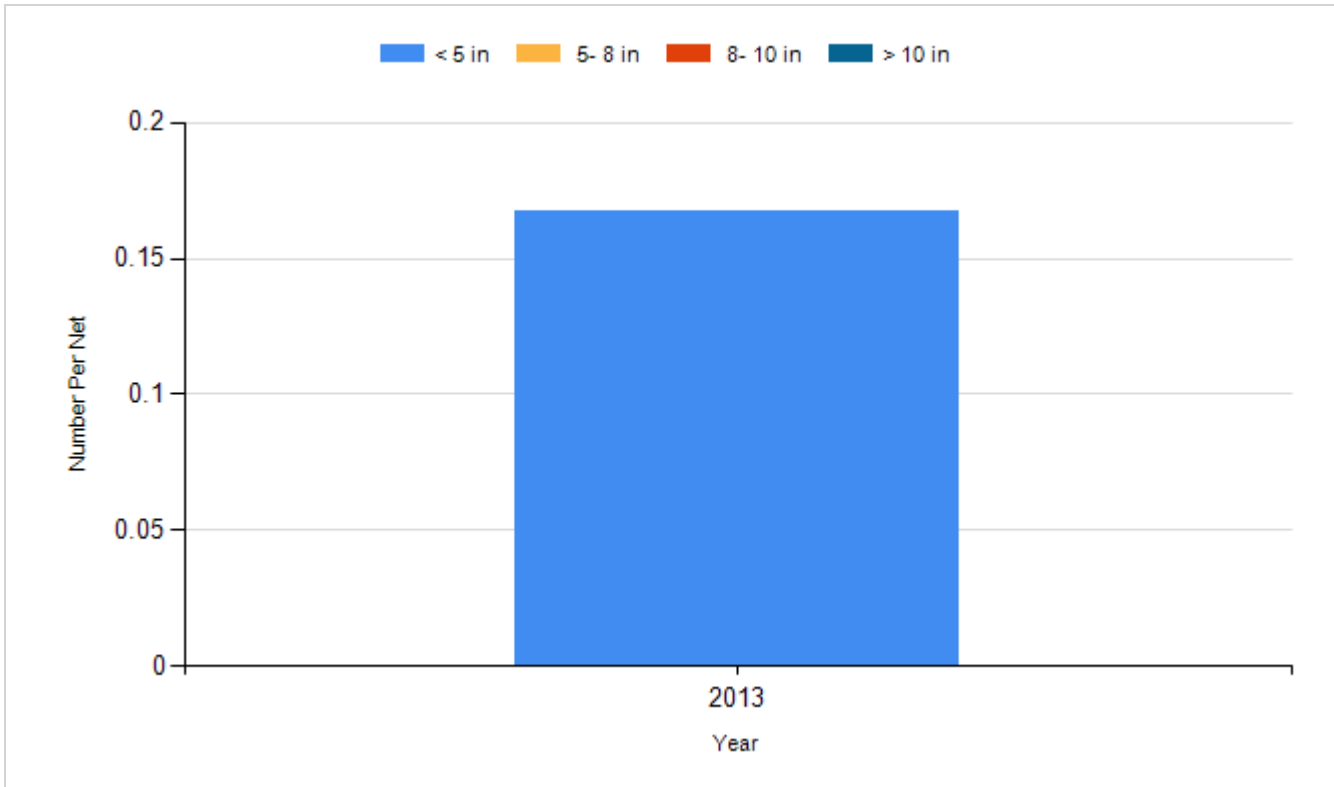
Species: Walleye
Gear: std exp gill net



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
2009	Walleye	Small Fingerling	132,850
2010	Walleye	Fry	1,650,000
2010	Yellow Perch	Juvenile	3,200
2011	Walleye	Fry	800,000
2013	Walleye	Fry	825,000
2014	Yellow Perch	Small	6,250
2015	Walleye	Fry	850,000
2016	Yellow Perch	Juvenile	4,800
2017	Walleye	Small Fingerling	126,000