

Punished Woman Lake Survey Summary

Punished Woman Lake, located on the northern edge of the city limits of South Shore, is managed as a northern pike and yellow perch fishery, but other fish species (e.g., walleye) are present and contribute to the fishery.

- **Northern pike.** The relative abundance of northern pike was low to moderate (2.2 per gill net) in 2021. Thirteen northern pike from 15.4 to 26.0 inches were netted.
- **Walleye (includes saugeye).** Although the lake is managed as a northern pike and yellow perch fishery, walleyes are commonly stocked into Punished Woman Lake. In 2021, gill nets caught 19 walleyes that were 10.0 inches or longer (3.2 per net). Seven year classes contributed to the catch, each was represented by six or fewer individuals. The oldest walleyes sampled were from the 2008 (age 13) cohort. Although sample sizes were low, the 2021 sample suggests good walleye growth with a mean length at capture at age 4 of 16.3 inches.
- **Yellow perch.** Yellow perch numbers were lower in 2021 than in 2017. At 3.0 per gill net, relative abundance was considered low. Sampled yellow perch ranged in length from 5.1 to 6.7 inches with three cohorts (2017 – 2019) being represented. Individuals from the 2017 (age 4) year class, which had a mean length at capture of 6.3 inches, were the most abundant accounting for 15 of the 18 yellow perch in the sample.

For more detailed results see the computer-generated South Dakota Statewide Fisheries Survey for Punished Woman Lake (Codington; below)

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Punished Women, Codington County
UMN-Lake-610-000
2021

Lake Information

Name:	Punished Women	Maximum Depth:	12 Feet
County:	Codington	OHWM Elevation:	1,845
Surface Area:	479 Acres	Outlet Elevation:	1,845

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 03, 2021	6 net-nights

Common Fish Species Present

Walleye

Yellow Perch

Northern Pike

Black Bullhead

White Sucker

Common Carp

Pumpkinseed

Golden Shiner

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	Black Bullhead	67	11.2	2.5	67	8	0		86	2
	Common Carp	3	0.3	0.3	100		100		106	2
	Golden Shiner*	23	3.8							
	Northern Pike	13	2.2	0.7	31		0		83	2
	Pumpkinseed	1	0.2	0.2	0		0		114	
	Walleye	21	3.2	0.9	89		42	18	87	2
	White Sucker	3	0.5	0.5	67		0		94	1
	Yellow Perch	18	3.0	1.5	0		0		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.

* Methods/Species that ignore stock length

Gear	Species	CPUE										Avg
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
AFS std gill net	Black Bullhead						20.0				11.2	15.60
	Bluegill						0.2				0.0	0.10
	Common Carp						3.5				0.3	1.90
	Golden Shiner*						0.0				3.8	1.90
	Northern Pike						3.2				2.2	2.70
	Pumpkinseed						0.0				0.2	0.10
	Walleye						5.3				3.2	4.25
	White Sucker						4.2				0.5	2.35
	Yellow Perch						7.3				3.0	5.15
frame net (std 3/4 in)	Black Bullhead		62.4									62.40
	Common Carp		0.2									0.20
	Golden Shiner*		0.2									0.20
	Northern Pike		1.3									1.30
	Walleye		0.2									0.20
	White Sucker		0.4									0.40
	Yellow Perch		4.8									4.80
std exp gill net	Black Bullhead		80.3									80.30
	Common Carp		0.7									0.70
	Golden Shiner*		10.3									10.30
	Northern Pike		5.7									5.70
	Walleye		7.3									7.30
	White Sucker		11.0									11.00
	Yellow Perch		22.3									22.30

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.

Gear	Species	Index	Year											
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		
AFS std gill net	Northern Pike	PSD								37			31	
		PSD-P								5			0	
		Wr								86			83	
	Walleye	PSD									94			89
		PSD-P									44			42
		Wr									95			87
	Yellow Perch	PSD									14			0
		PSD-P									0			0
		Wr									85			92
std exp gill net	Northern Pike	PSD		41										
		PSD-P		18										
		Wr		91										
	Walleye	PSD		32										
		PSD-P		0										
		Wr		96										
	Yellow Perch	PSD		1										
		PSD-P		0										
		Wr		91										

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+
2021	21	226 (2)	285 (1)		413 (6)		568 (2)	495 (4)			613 (6)
2017	32		346 (1)	405 (9)	472 (1)	484 (6)		542 (11)		613 (2)	683 (2)
2013	23		223 (2)	361 (19)		474 (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+
2021	18		146 (1)	150 (2)	159 (15)						
2017	43			155 (7)	173 (31)	203 (3)	206 (1)	206 (1)			
2013	175	99 (9)	107 (80)	130 (38)	150 (42)	180 (6)					

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).

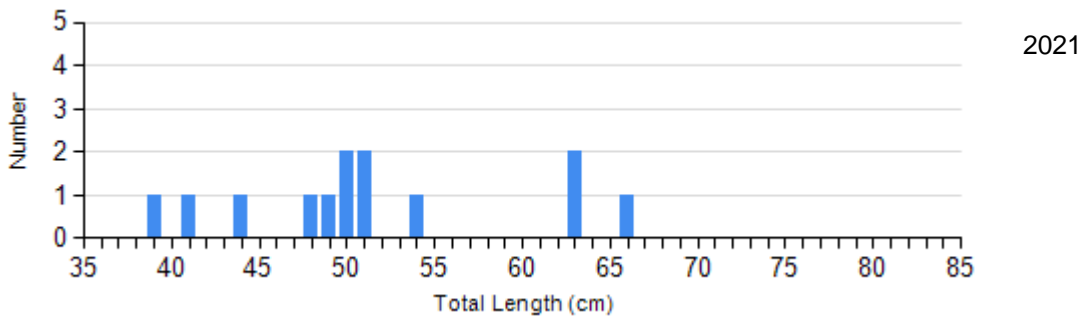
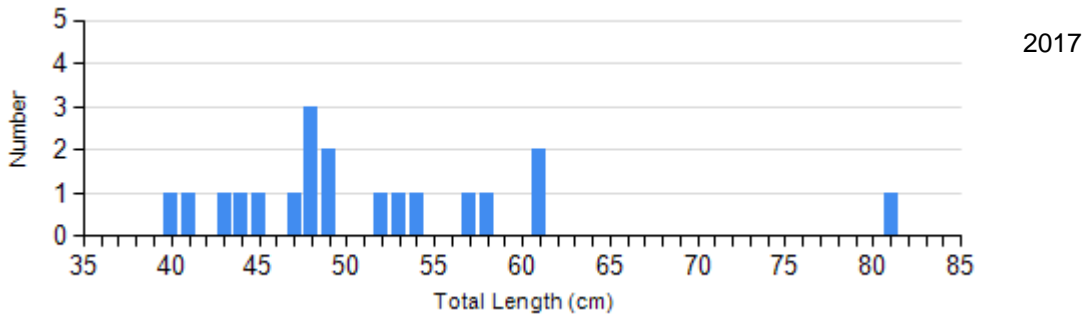
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2017	12	86 (1.3)	6	86 (3.1)	1	87	0	
	2021	9	86 (2.0)	4	78 (2.1)	0		0	
Walleye Gill Net	2017	2	92 (2.8)	16	93 (1.1)	12	97 (1.7)	2	92 (4.1)
	2021	2	83 (5.6)	9	87 (1.9)	5	85 (1.6)	3	95 (4.3)
Yellow Perch Gill Net	2017	38	85 (1.2)	6	84 (2.9)	0		0	
	2021	18	92 (1.6)	0		0		0	

Length Frequency Distribution

Length frequency histogram of species sampled by year.

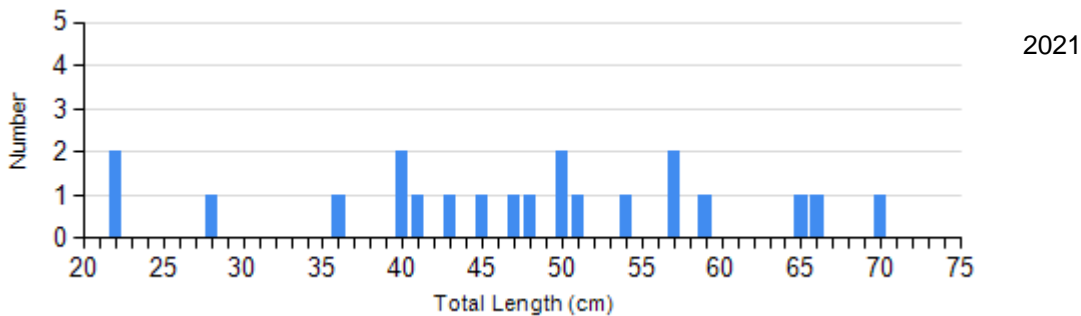
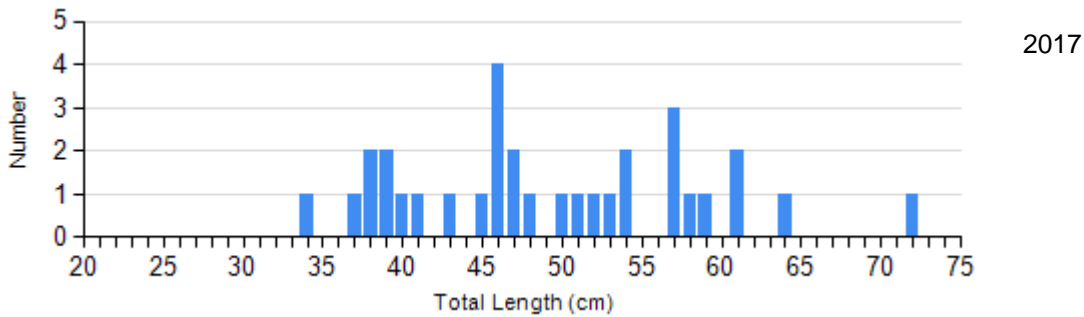
Species: Northern Pike

Gear: AFS std gill net

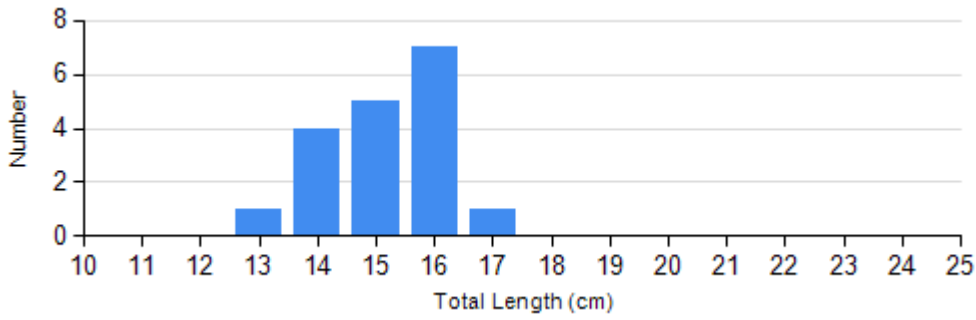
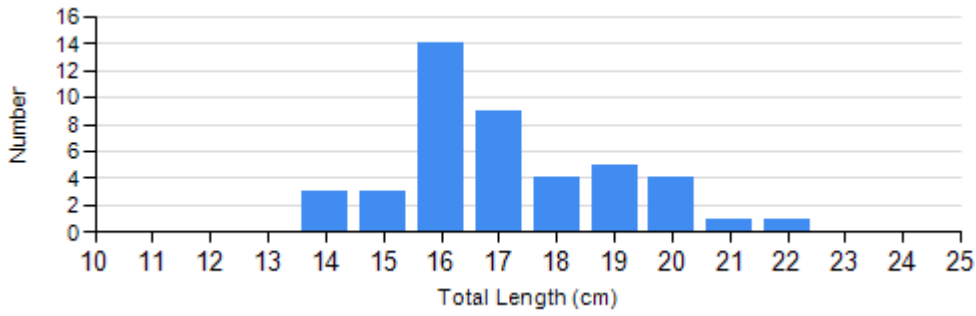


Species: Walleye

Gear: AFS std gill net



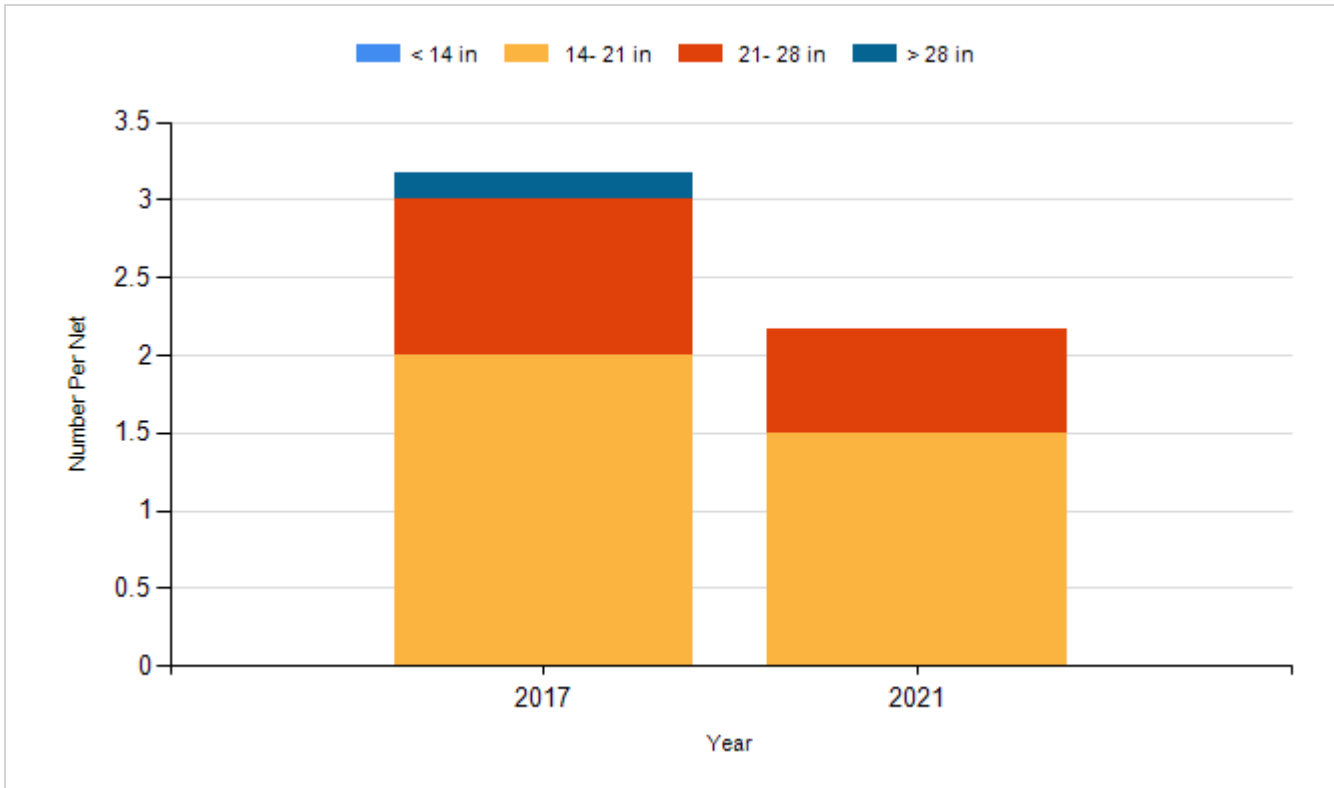
Species: Yellow Perch
Gear: AFS std gill net



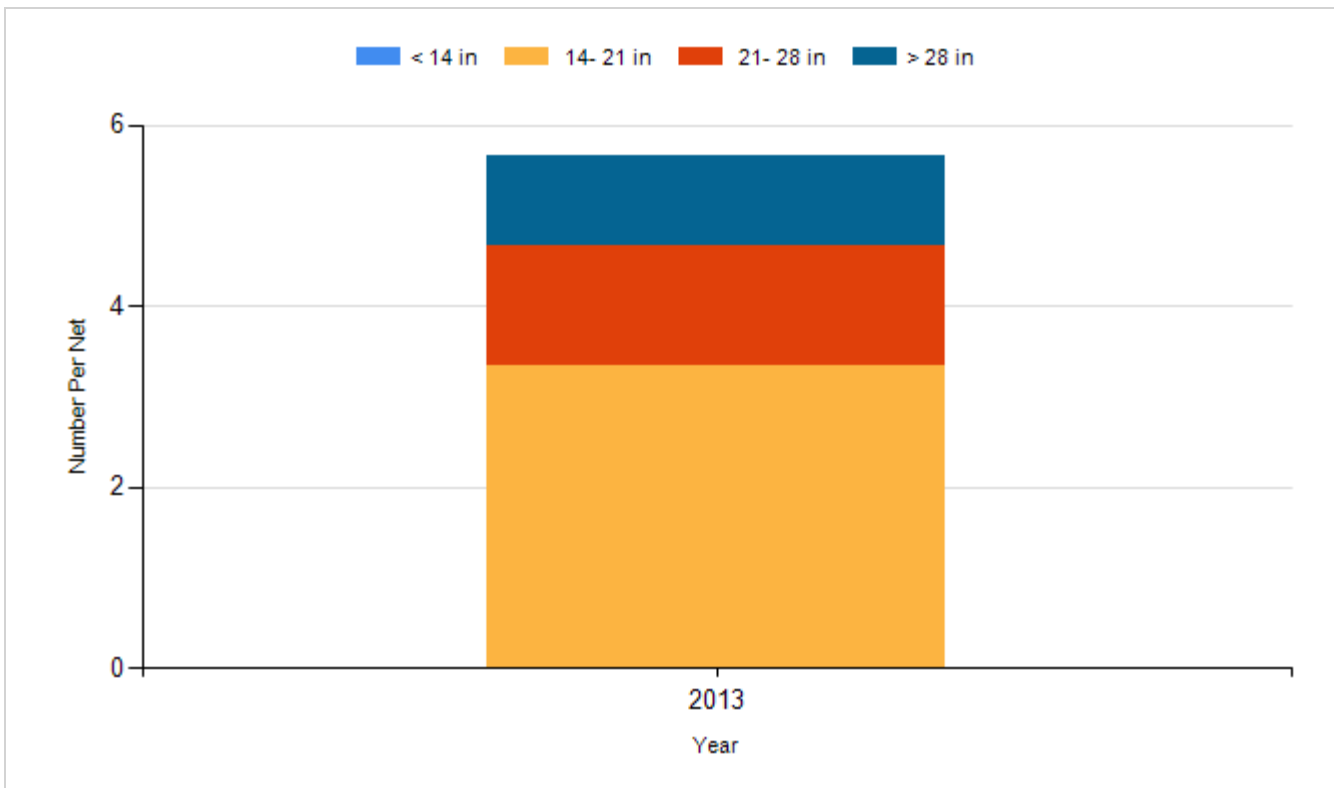
Historic Fish Sizes and Relative Abundance

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

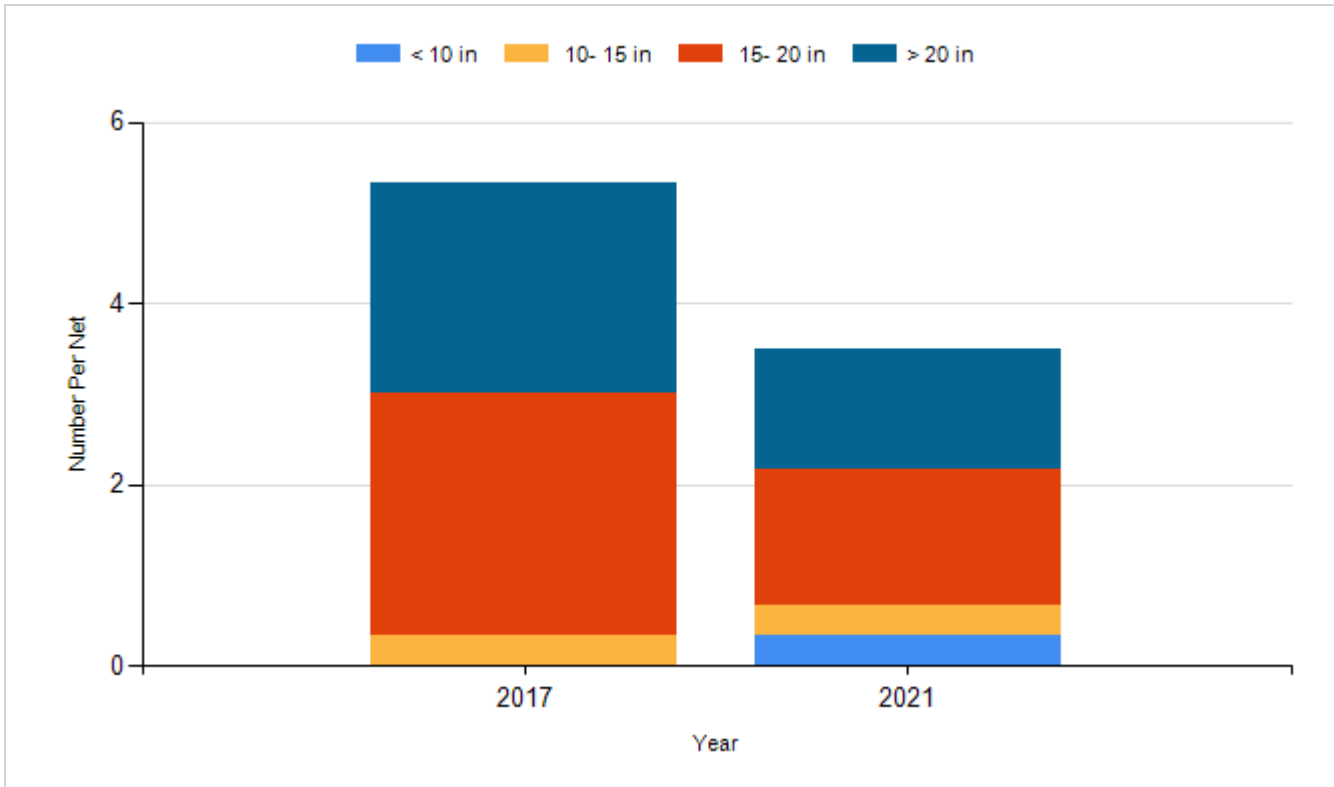
Species: Northern Pike
Gear: AFS std gill net



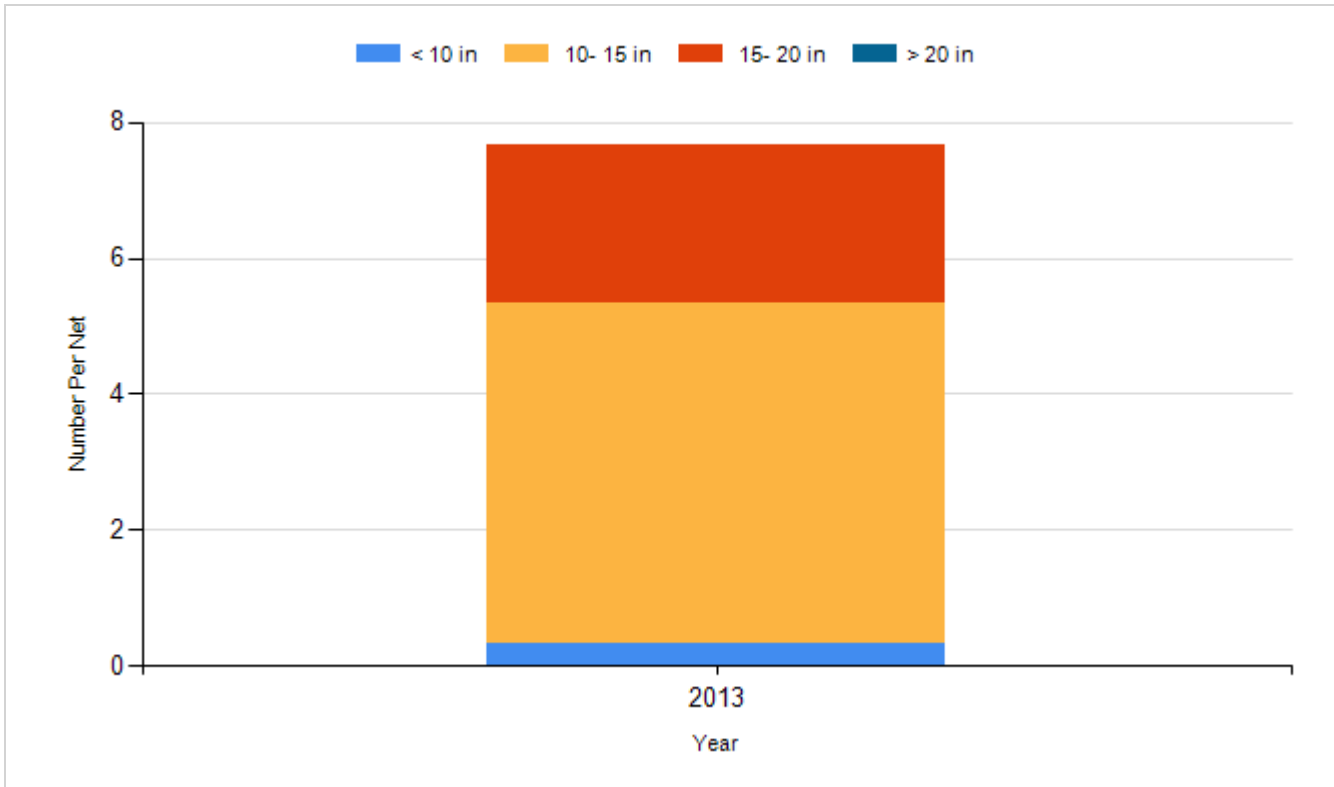
Species: Northern Pike
Gear: std exp gill net



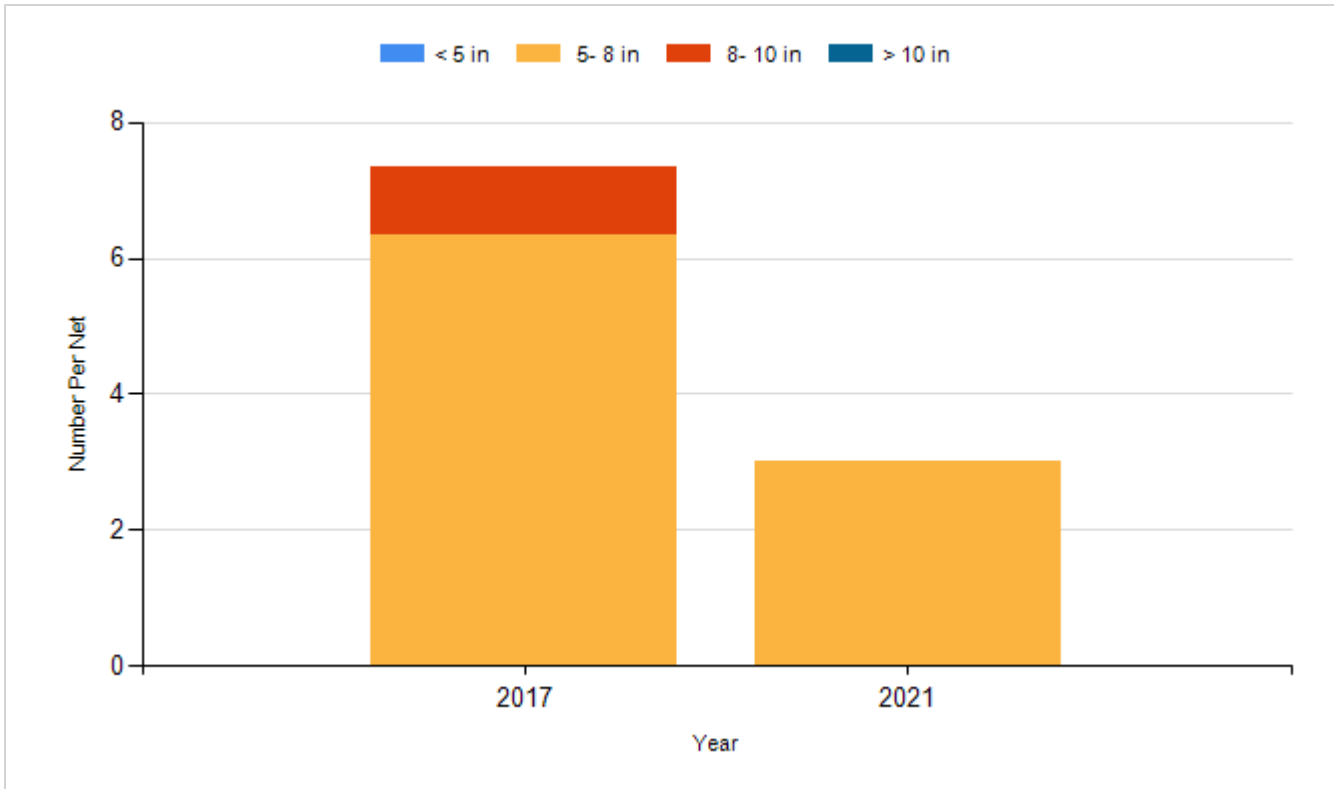
Species: Walleye
Gear: AFS std gill net



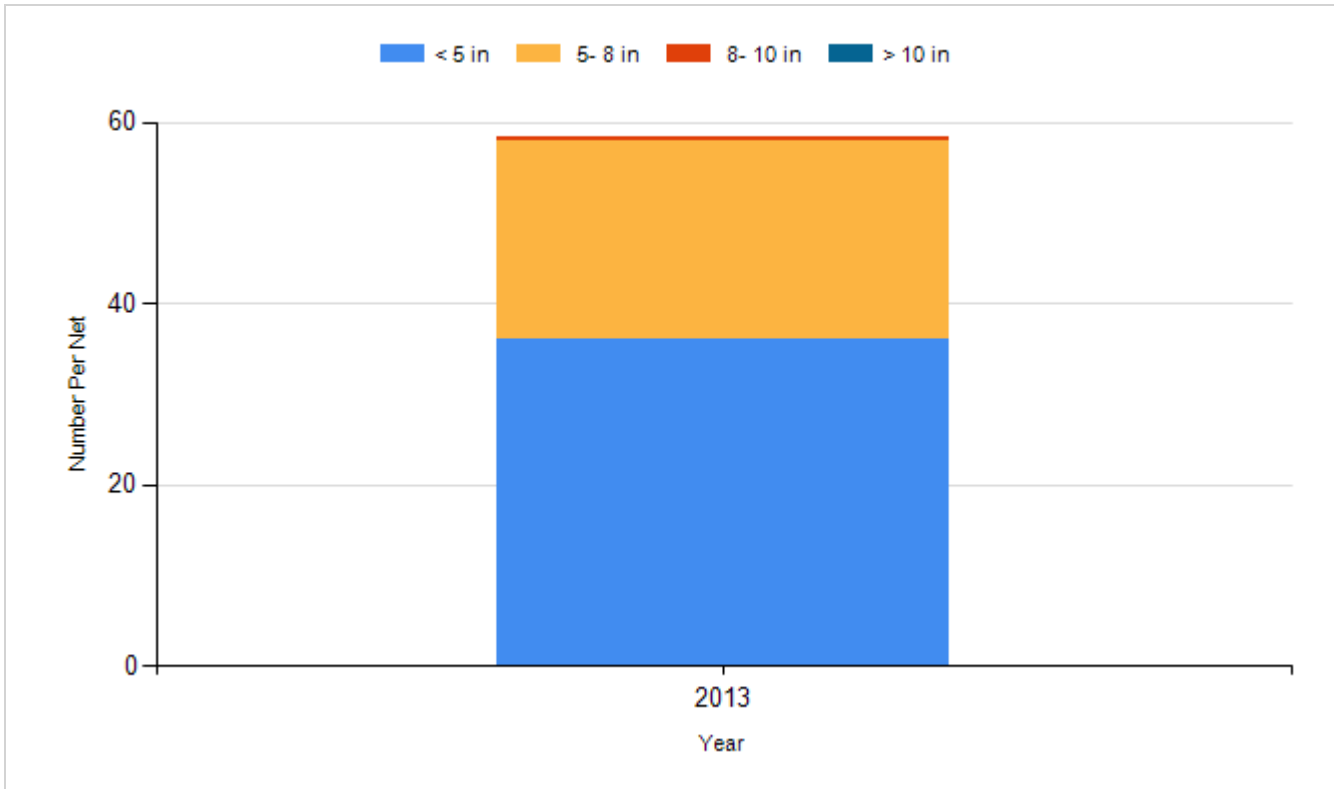
Species: Walleye
Gear: std exp gill net



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
2010	Walleye	Fry	450,000
2012	Walleye	Fry	225,000
2013	Walleye	Fry	400,000
2014	Walleye	Fry	250,000
2017	Walleye	Fry	240,000
2019	Saugeye	Small Fingerling	36,000
2021	Walleye	Fry	250,000