Six-Mile Lake Survey Summary

Six-Mile Lake, located 3.0 miles west of Lake City, is managed as a northern pike and yellow perch fishery, but other fish species (e.g., walleye) are present at times and contribute to the fishery.

- **Northern pike.** The relative abundance of northern pike was high (8.8 per gill net) in 2021. Northern pike from 13.8 to 34.6 inches were netted, nearly half (47%) were ≥21.0 inches and 9% were ≥28.0 inches.

- **Walleye.** Although the lake is managed as a northern pike and yellow perch fishery, walleyes are commonly stocked into Six-Mile Lake. In 2021, gill nets caught 27 walleyes that were 10.0 inches or longer (4.5 per net). Nearly all (24 of 27) were from the 2019 (age 2) cohort, which coincided with a fry stocking. Fish from the 2019 (age 2) cohort had a mean length at capture of 15.5 inches.

- **Yellow perch**. Yellow perch numbers were higher in 2021 than in 2017. At 11.8 per gill net, relative abundance was considered moderate. Those sampled ranged in length from 5.1 to 9.4 inches, 15% were ≥8.0 inches. Three cohorts (2018 – 2020) were represented in the gill net catch. Individuals from the 2018 (age-3) year class were the most numerous accounting for more than half (55%) of yellow perch in the sample, while the 2019 (age 2) cohort made up an additional 38%. Growth tends to be slower with mean lengths at capture at age 3 from 6.9 to 7.6 inches since 2013. In 2021, the mean length at capture at age 3 was 7.5 inches.

For more detailed results see the computer-generated South Dakota Statewide Fisheries Survey for Six-Mile (Marshall; below)

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Six Mile, Marshall County
UJA-Lake-882-005
2021

Lake Information

Name: Six Mile

County: Marshall

Surface Area: 117 Acres

Maximum Depth: 11 Feet

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 10, 2021	6 net-nights

Common Fish Species Present

Walleye

Northern Pike

Yellow Perch

Black Bullhead

White Sucker

Black Crappie

Green Sunfish

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	135	3.8	1.4	9		0		91	2
	Black Crappie	2	0.3	0.5	100		100		109	9
	Common Carp	7	0.0	0.0	0		0			
	Green Sunfish	1	0.2	0.2	0		0		113	
	Northern Pike	53	8.8	2.4	47	10	9		101	1
	Walleye	28	4.5	1.2	67	14	0		101	2
	White Sucker	7	1.2	0.7	100		100		99	3
	Yellow Perch	71	11.8	2.8	15	6	0		99	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	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
AFS std gill net	Black Bullhead						0.0				3.8	1.90
	Black Crappie						0.2				0.3	0.25
	Common Carp						0.0				0.0	0.00
	Green Sunfish						0.0				0.2	0.10
	Northern Pike						6.2				8.8	7.50
	Walleye						4.0				4.5	4.25
	White Sucker						2.5				1.2	1.85
	Yellow Perch						2.0				11.8	6.90
frame net (std 3/4 in)	Black Bullhead		22.4									22.40
	Black Crappie		0.8									0.80
	Common Carp		0.1									0.10
	Northern Pike		1.8									1.80
	Walleye		0.1									0.10
	White Sucker		0.2									0.20
	Yellow Perch		2.7									2.70
std exp gill net	Black Bullhead		1.0									1.00
	Black Crappie		0.3									0.30
	Northern Pike		16.3									16.30
	Walleye		2.3									2.30
	White Sucker		3.3									3.30
	Yellow Perch		30.0									30.00

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	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AFS std gill net	Northern Pike	PSD						57				47
		PSD-P						5				9
		Wr						87				101
	Walleye	PSD						96				67
		PSD-P						38				0
		Wr						94				101
	Yellow Perch	PSD						0				15
		PSD-P						0				0
		Wr						97				99
std exp gill net	Northern Pike	PSD		45								
		PSD-P		6								
		Wr		85								
	Walleye	PSD		57								
		PSD-P		0								
		Wr		98								
	Yellow Perch	PSD		31								
		PSD-P		1								
		Wr		100								

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	27	291 (1)	393 (24)	486 (2)							
2017	24		364 (2)	438 (7)	494 (7)	584 (1)	570 (7)				
2013	7		379 (7)								

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	71	143 (5)	159 (27)	191 (39)							
2017	13		148 (8)	174 (5)							
2013	127	101 (37)	147 (28)	194 (33)	206 (25)	204 (4)					

Fish Condition

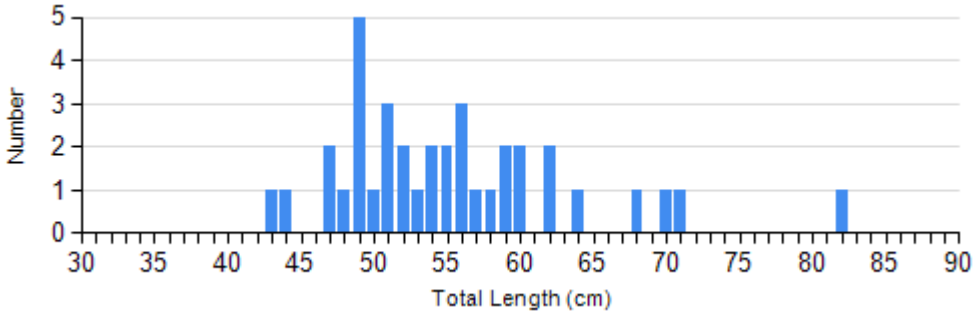
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2017	16	87 (0.9)	19	86 (1.9)	2	91 (3.5)	0	
	2021	28	104 (1.3)	20	99 (1.1)	4	95 (3.9)	1	87
Walleye Gill Net	2017	1	95	14	94 (1.0)	9	94 (1.7)	0	
	2021	9	100 (1.9)	18	101 (1.5)	0		0	
Yellow Perch Gill Net	2017	12	97 (1.7)	0		0		0	
	2021	60	99 (0.9)	11	97 (1.6)	0		0	

Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Northern Pike
Gear: AFS std gill net



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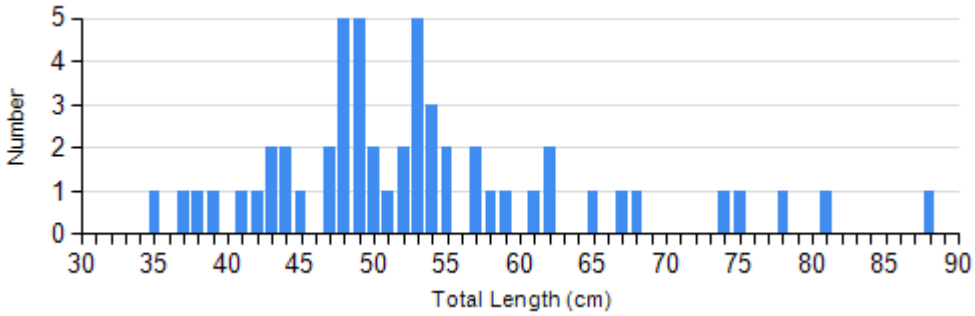
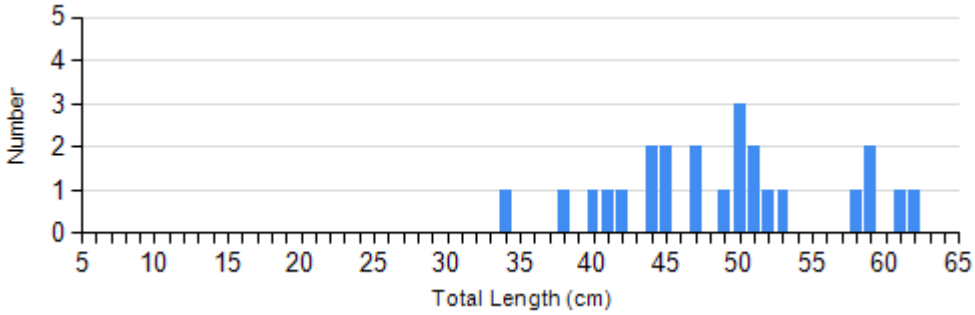


2021

Species: Walleye
Gear: AFS std gill net



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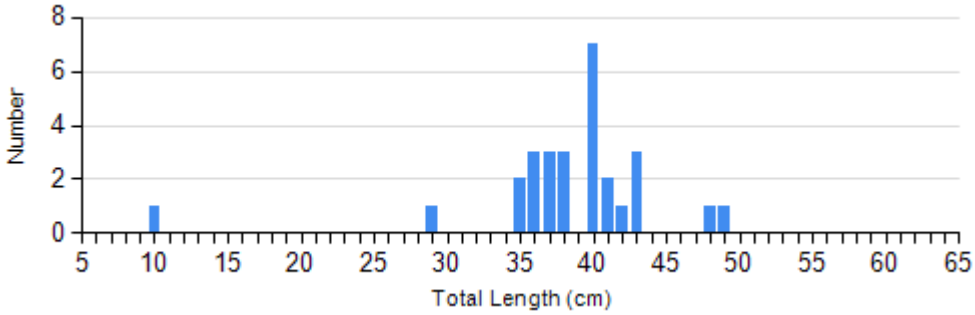
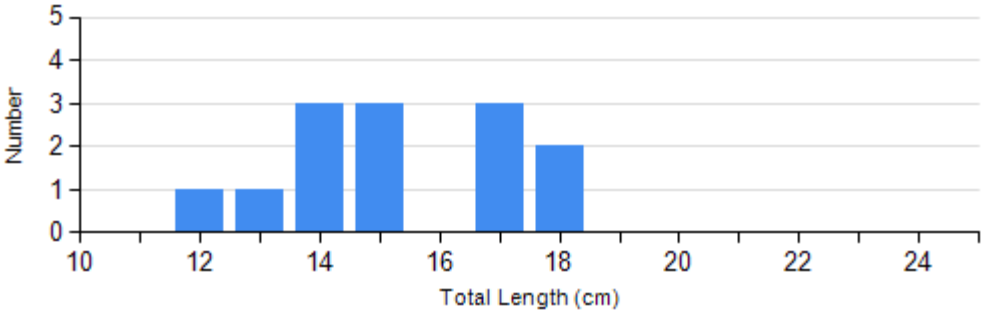
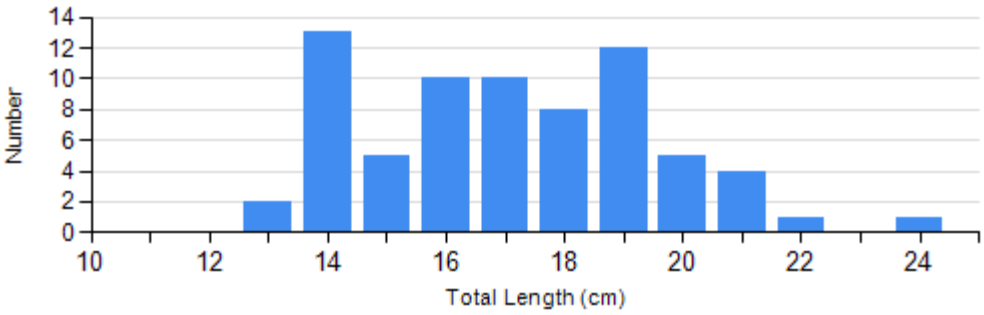


2021

Species: Yellow Perch
Gear: AFS std gill net



2017

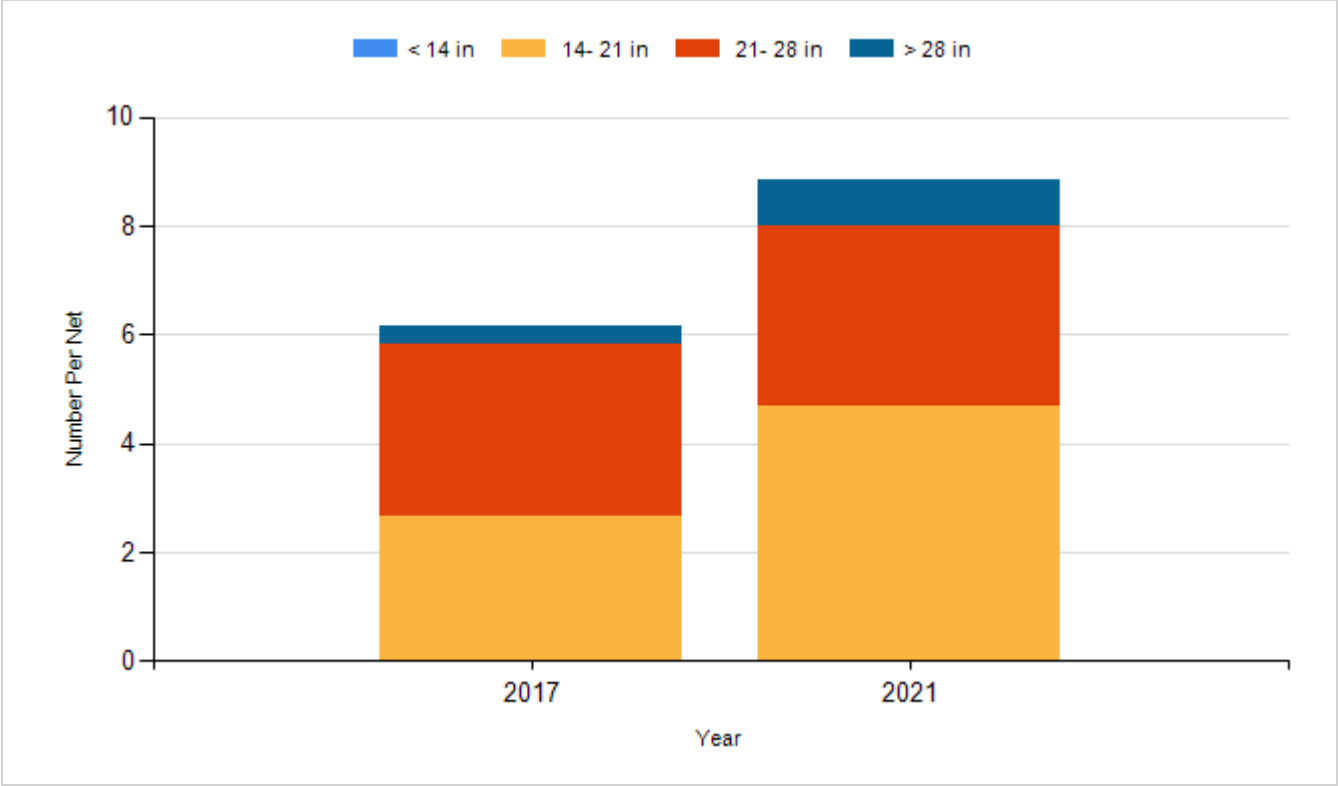


2021

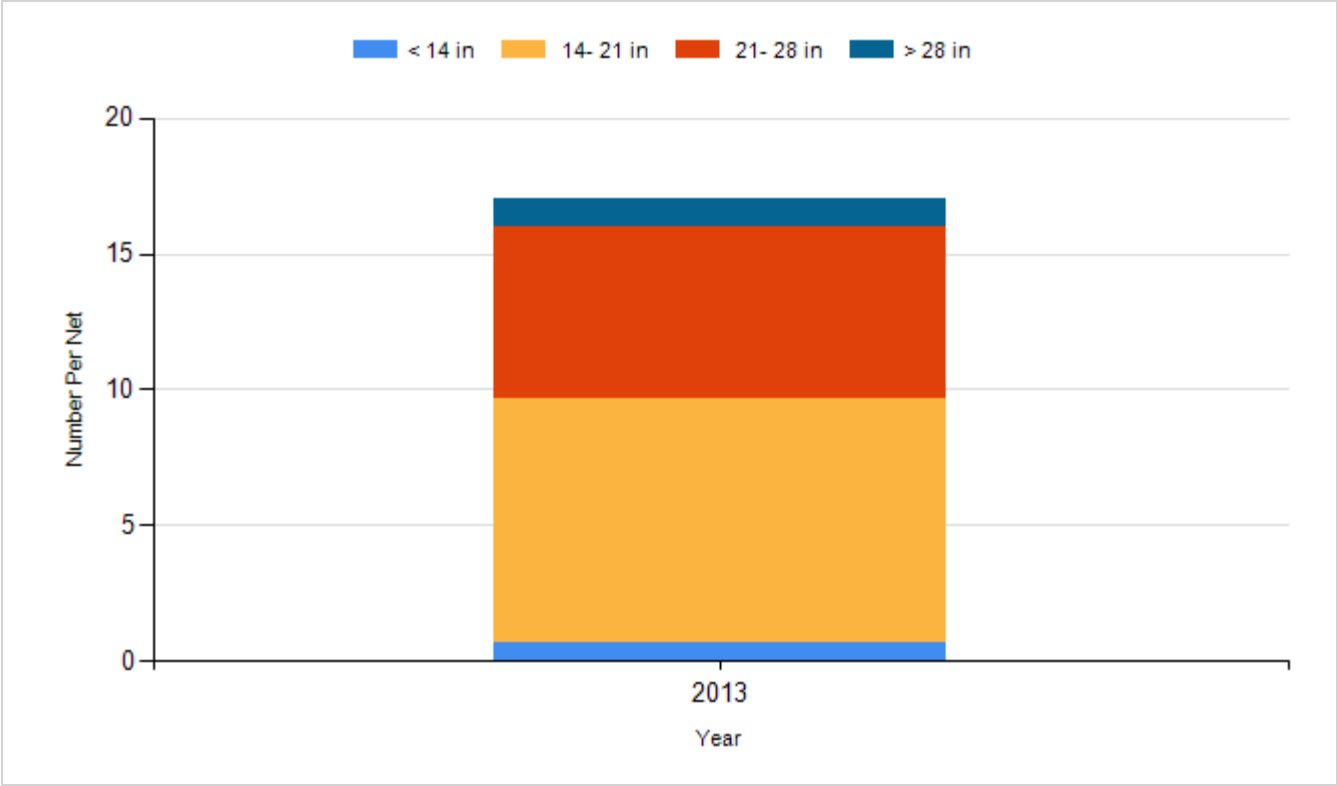
Historic Fish Sizes and Relative Abundance

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

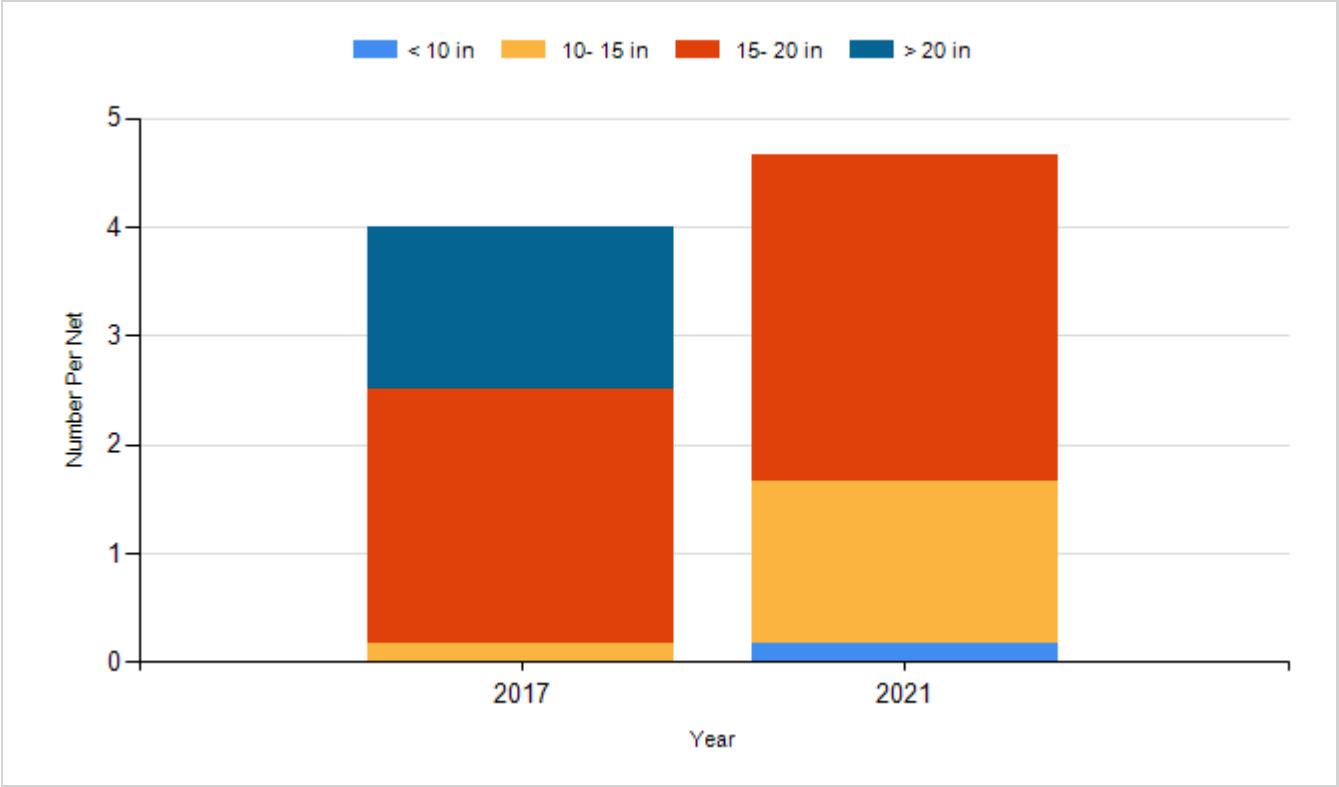
Species: Northern Pike
Gear: AFS std gill net



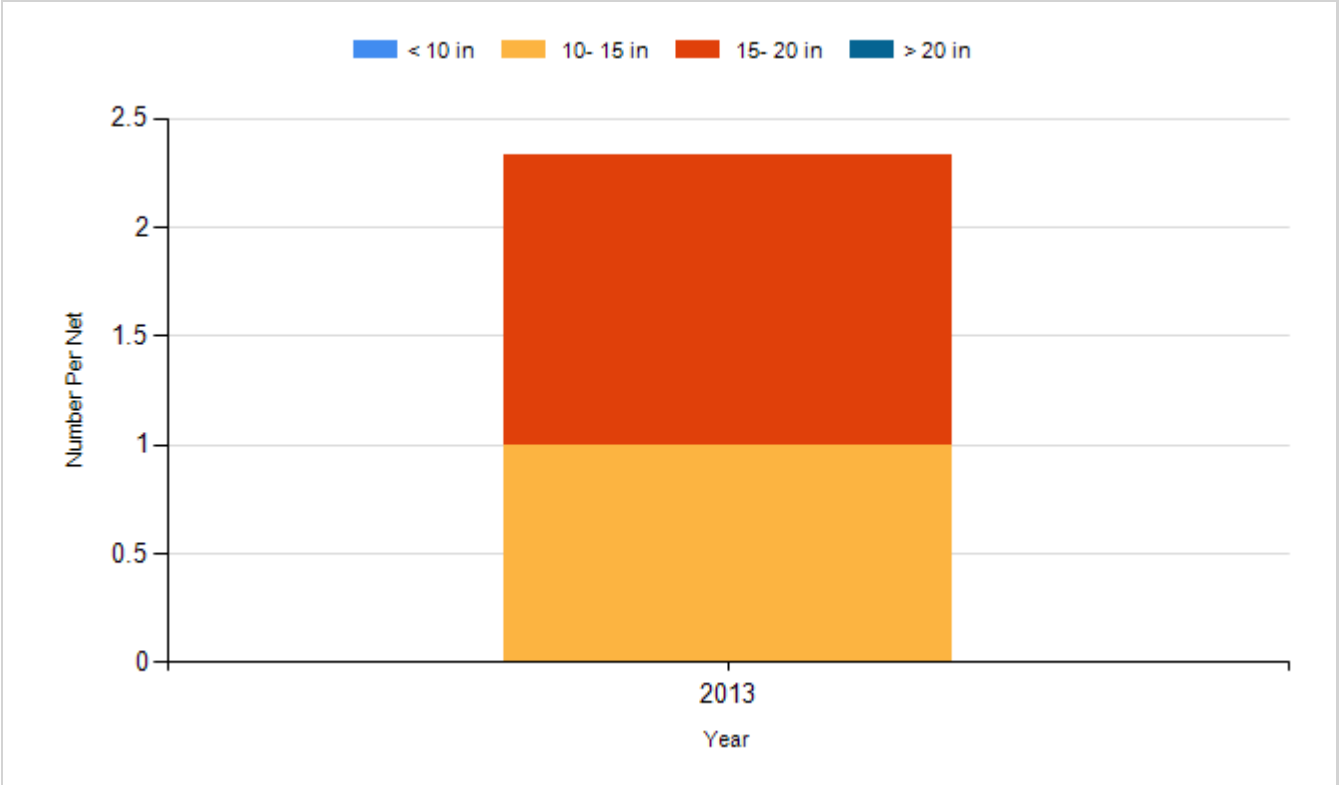
Species: Northern Pike
Gear: std exp gill net



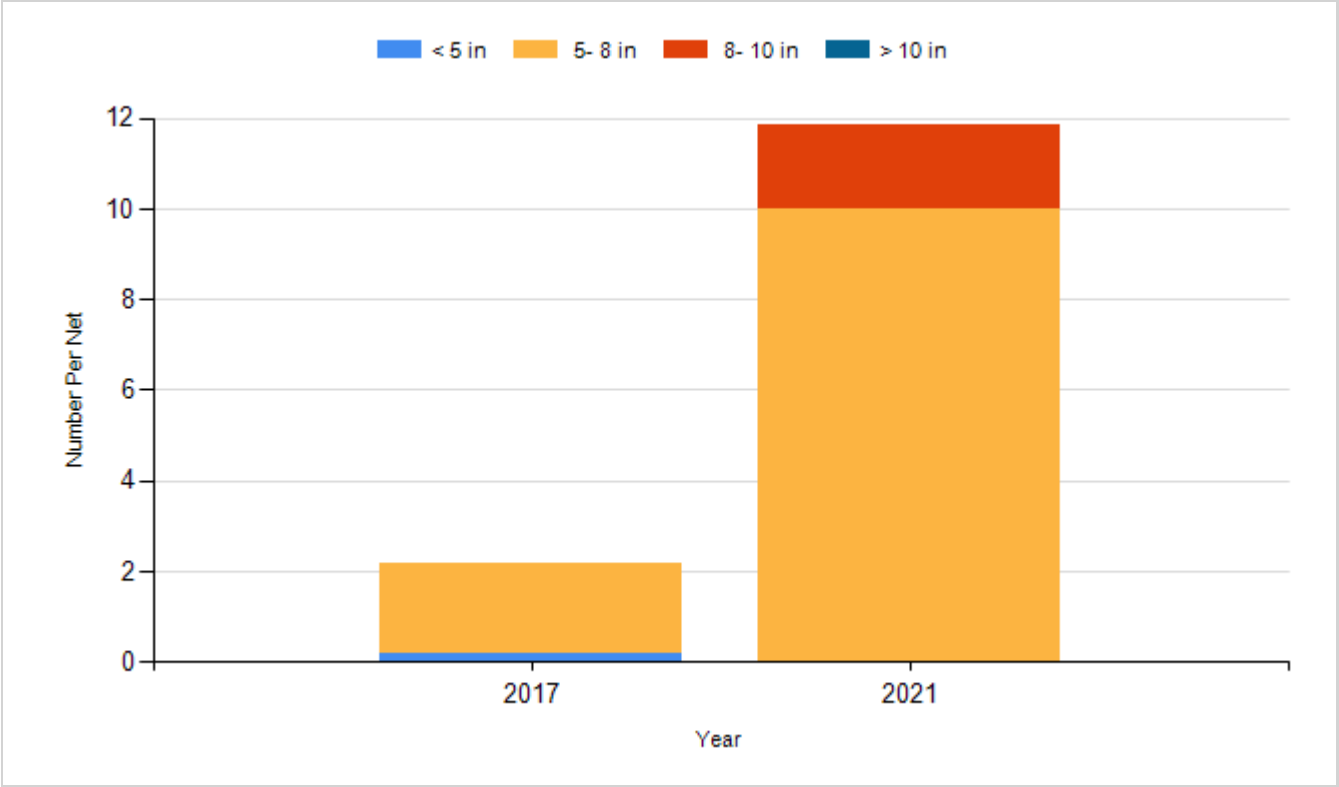
Species: Walleye
Gear: AFS std gill net



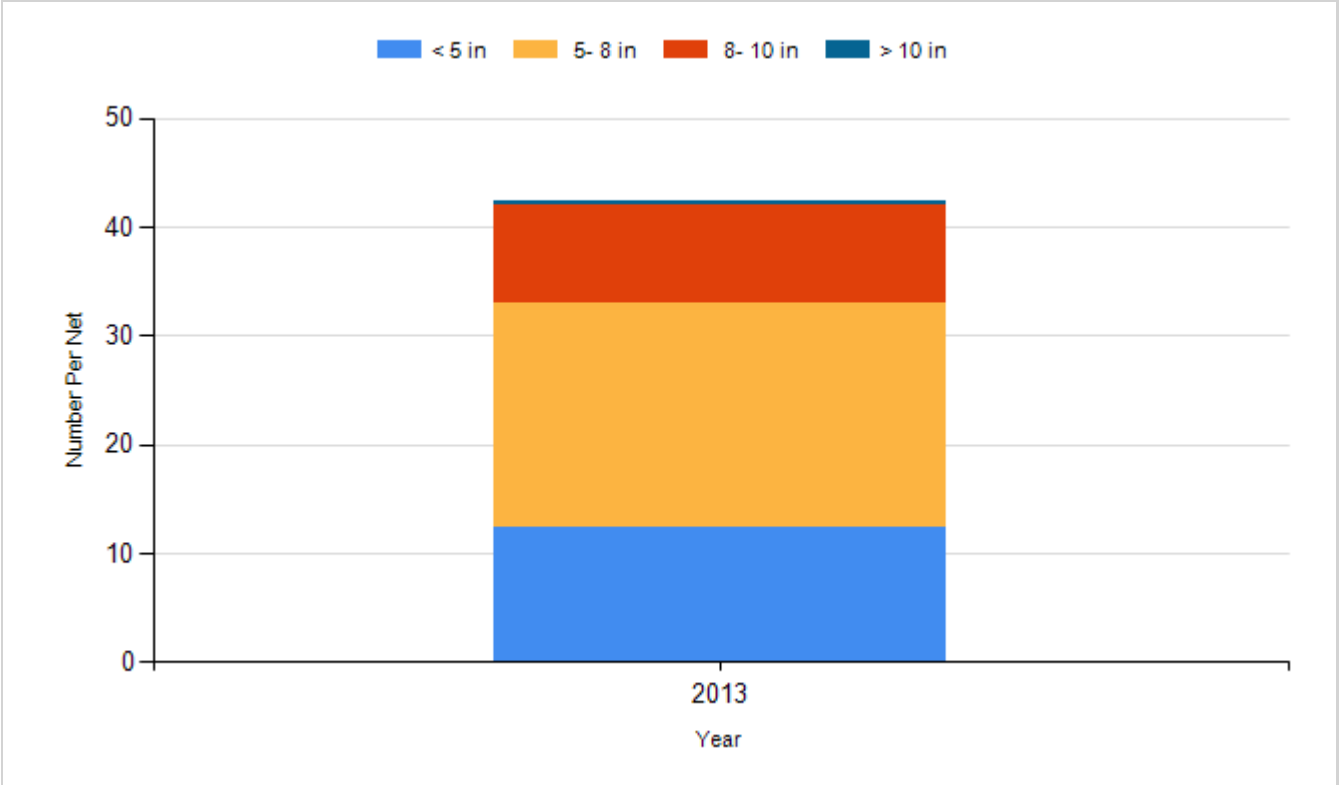
Species: Walleye
Gear: std exp gill net



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	100,000
2012	Walleye	Fry	50,000
2014	Walleye	Fry	50,000
2017	Saugeye	Fry	200,000
2019	Walleye	Fry	50,000
2021	Walleye	Fry	50,000