Minnewasta Lake Survey Summary

Minnewasta Lake, located 4.0 miles north and 2.0 miles west of Waubay, is managed as a northern pike, walleye, and yellow perch fishery; other fish species are present and contribute to the fishery.

- **Northern pike.** More northern pike were sampled in 2021 than in 2018. In 2021, the mean gill net CPUE of 2.7 suggested moderate to high relative abundance. Sampled northern pike ranged in length from 16.5 to 37.8 inches; 50% were ≥21.0 inches and 22% were ≥28 inches or longer.

- **Walleye.** Walleyes were the most abundant species in the 2021 gill net catch. At 4.6 per net, relative abundance was considered moderate to high. Sampled walleyes ranged in length from 7.9 to 28.0 inches, of those that were at least 10.0 inches nearly half (49%) were ≥15.0 inches while only 5% were ≥20.0 inches. Individuals from eight cohorts produced between 2008 and 2020 contributed to the catch. Fish from the 2018 (age-3) year class, which coincided with a non-stocked year, were the most abundant accounting for 49% of walleyes in the sample. Although no walleyes were stocked into Minnewasta Lake in 2018, fish from the 1.4 million fry stocked into North Rush Lake, which connects to Minnewasta Lake to the south, may have contributed to this year class. The 2021 sample suggests good walleye growth with mean length at capture for age-3 and age-4 fish of 14.4 and 15.9 inches.

- **Yellow perch**. Yellow perch numbers were similar to those observed in 2018. At 2.8 per net, relative abundance was considered low. Sampled yellow perch ranged in length from 6.7 to 10.1 inches, 70% were ≥8.0 inches and 6% were ≥10 inches. The entire sample was comprised of individuals from two year classes (2018 and 2019). The 2018 (age-3) cohort, which coincided with the stocking of 26,750 fingerlings, accounted for 61% of fish in the sample, while individuals from the 2019 (age-2) cohort made up the additional 39%. Growth appears to be moderate with age-3 yellow perch having mean length at capture values from 8.5 to 10.2 inches in surveys conducted since 2012. In 2021, the mean length at capture of age-3 fish was 9.1 inches.

For more detailed results see the computer-generated South Dakota Statewide Fisheries Survey for Minnewasta Lake (Day; below).

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Minnewasta, Day County
UBS-Lake-411-705
2021

Lake Information

Name: Minnewasta

County: Day

Surface Area: 606 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 09, 2021	4 net-nights
AFS std gill net	Jun 10, 2021	4 net-nights
AFS std gill net	Jun 11, 2021	4 net-nights

Common Fish Species Present

Walleye

Yellow Perch

Northern Pike

White Sucker

Black Bullhead

White Bass

Smallmouth Bass

Rock Bass

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	3	0.3	0.2	33		0		111	5
	Common Carp	2	0.2	0.2	50		0		107	6
	Northern Pike	32	2.7	0.7	50	14	22	12	85	2
	Rock Bass	2	0.2	0.2	100		0		110	2
	Smallmouth Bass	2	0.2	0.2	100		50		111	4
	Walleye	56	4.6	1.4	49	10	5		88	1
	White Bass	4	0.3	0.2	100		100		97	2
	White Sucker	5	0.4	0.3	100		100		105	8
	Yellow Perch	33	2.8	1.0	70	12	6		114	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.

		CPUE										
Gear	Species	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
AFS std gill net	Black Bullhead							0.1			0.3	0.20
	Black Crappie							0.1			0.0	0.05
	Common Carp							0.4			0.2	0.30
	Northern Pike							0.8			2.7	1.75
	Rock Bass							0.2			0.2	0.20
	Smallmouth Bass							0.0			0.2	0.10
	Walleye							2.8			4.6	3.70
	White Bass							0.1			0.3	0.20
	White Sucker							0.9			0.4	0.65
	Yellow Perch							3.1			2.8	2.95
frame net (std 3/4 in)	Black Bullhead	13.2										13.20
	Black Crappie	3.4										3.40
	Common Carp	0.1										0.10
	Northern Pike	0.5										0.50
	Rock Bass	0.2										0.20
	Smallmouth Bass	0.1										0.10
	Walleye	5.6										5.60
	White Bass	2.8										2.80
	White Sucker	0.5										0.50
	Yellow Perch	0.4										0.40
std exp gill net	Black Bullhead	3.0			1.7							2.35
	Black Crappie	0.2			0.0							0.10
	Common Carp	0.2			0.0							0.10
	Northern Pike	2.8			0.2							1.50
	Walleye	24.0			0.8							12.40
	White Sucker	1.7			1.2							1.45
	Yellow Perch	4.8			1.7							3.25

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							100			50
		PSD-P							30			22
		Wr							77			85
	Walleye	PSD							38			49
		PSD-P							9			5
		Wr							90			88
	Yellow Perch	PSD							92			70
		PSD-P							62			6
		Wr							110			114
std exp gill net	Northern Pike	PSD	88			0						
		PSD-P	18			0						
		Wr	86			72						
	Walleye	PSD	13			40						
		PSD-P	2			0						
		Wr	90			82						
	Yellow Perch	PSD	97			100						
		PSD-P	76			80						
		Wr	112			103						

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	55	200 (1)	295 (6)	365 (27)	405 (7)	435 (7)	490 (5)				697 (2)
2018	38	196 (4)	285 (11)	341 (7)	380 (11)		454 (1)		539 (4)		
2015	5				317 (3)	389 (2)					
2012	147	193 (3)	317 (126)	443 (3)	454 (12)	493 (1)		571 (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	33		190 (13)	231 (20)							
2018	37	133 (2)	209 (6)	245 (10)		289 (2)	289 (4)	293 (8)	294 (3)	334 (1)	340 (1)
2015	10			215 (1)	283 (7)		317 (2)				
2012	43	101 (14)	212 (4)	259 (8)	299 (11)	306 (5)		339 (1)			

Fish Condition

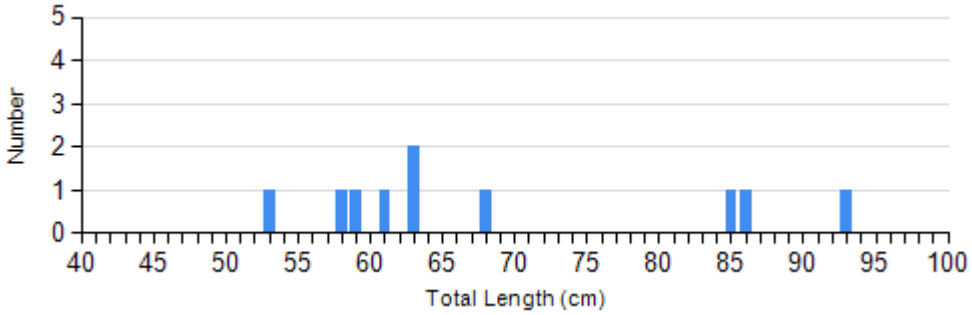
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2018	0		7	74 (3.2)	1	79	2	86 (2.8)
	2021	16	86 (1.8)	9	83 (1.9)	3	90 (3.6)	4	82 (4.0)
Walleye Gill Net	2018	21	90 (1.3)	10	90 (1.6)	2	85 (3.0)	1	91
	2021	28	88 (1.0)	24	88 (0.9)	1	95	2	92 (2.8)
Yellow Perch Gill Net	2018	3	117 (0.6)	11	115 (2.7)	14	108 (2.1)	9	104 (2.6)
	2021	10	113 (1.7)	21	114 (1.7)	2	119 (7.0)	0	

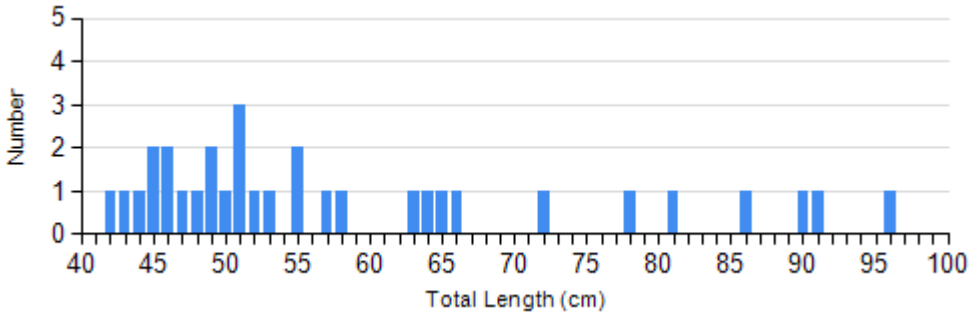
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Northern Pike
Gear: AFS std gill net

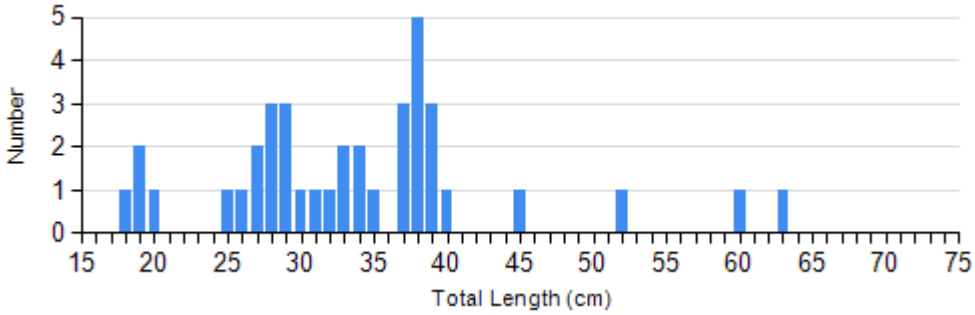


2018



2021

Species: Walleye
Gear: AFS std gill net



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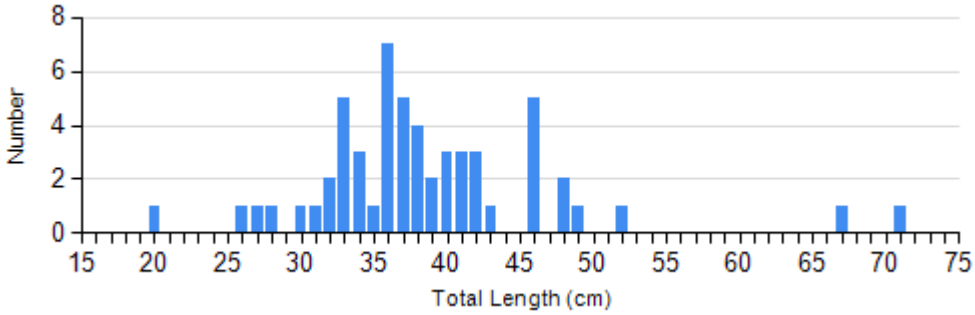
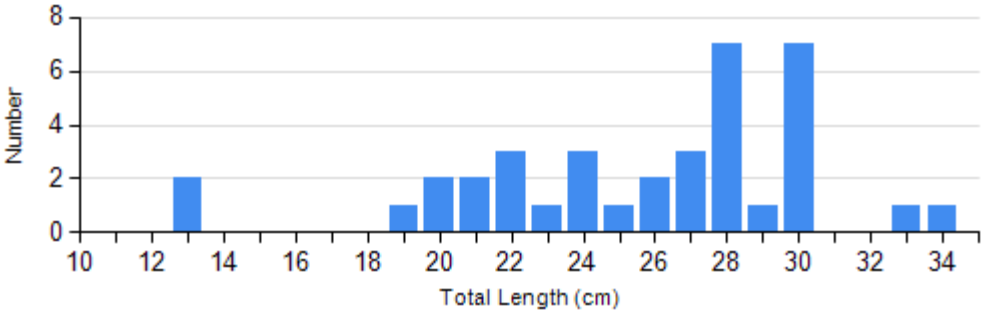
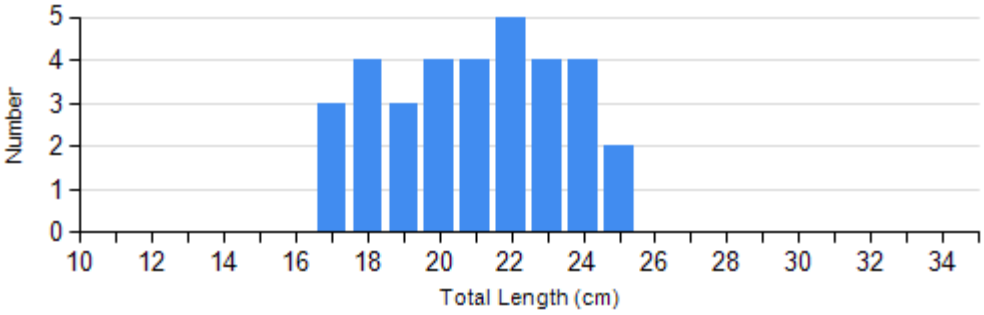


2021

Species: Yellow Perch
Gear: AFS std gill net



2018

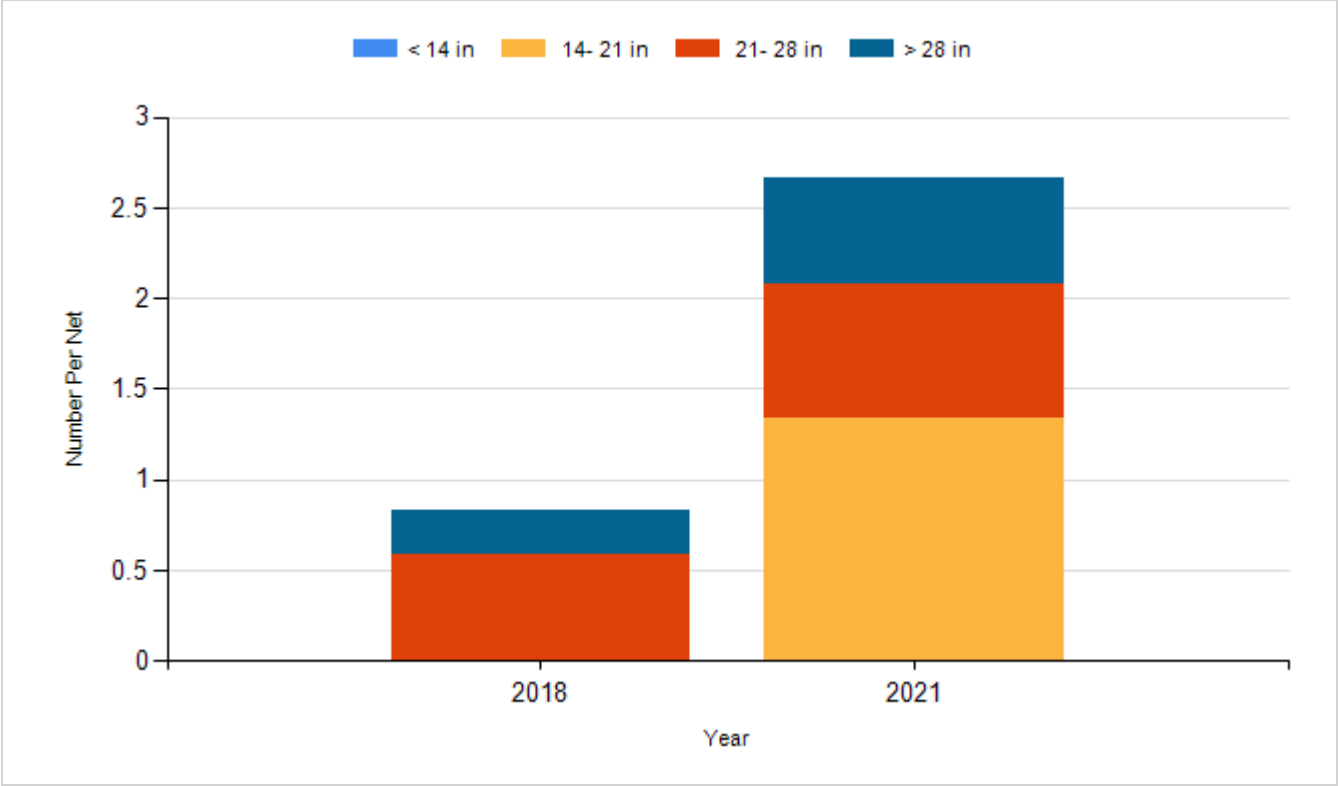


2021

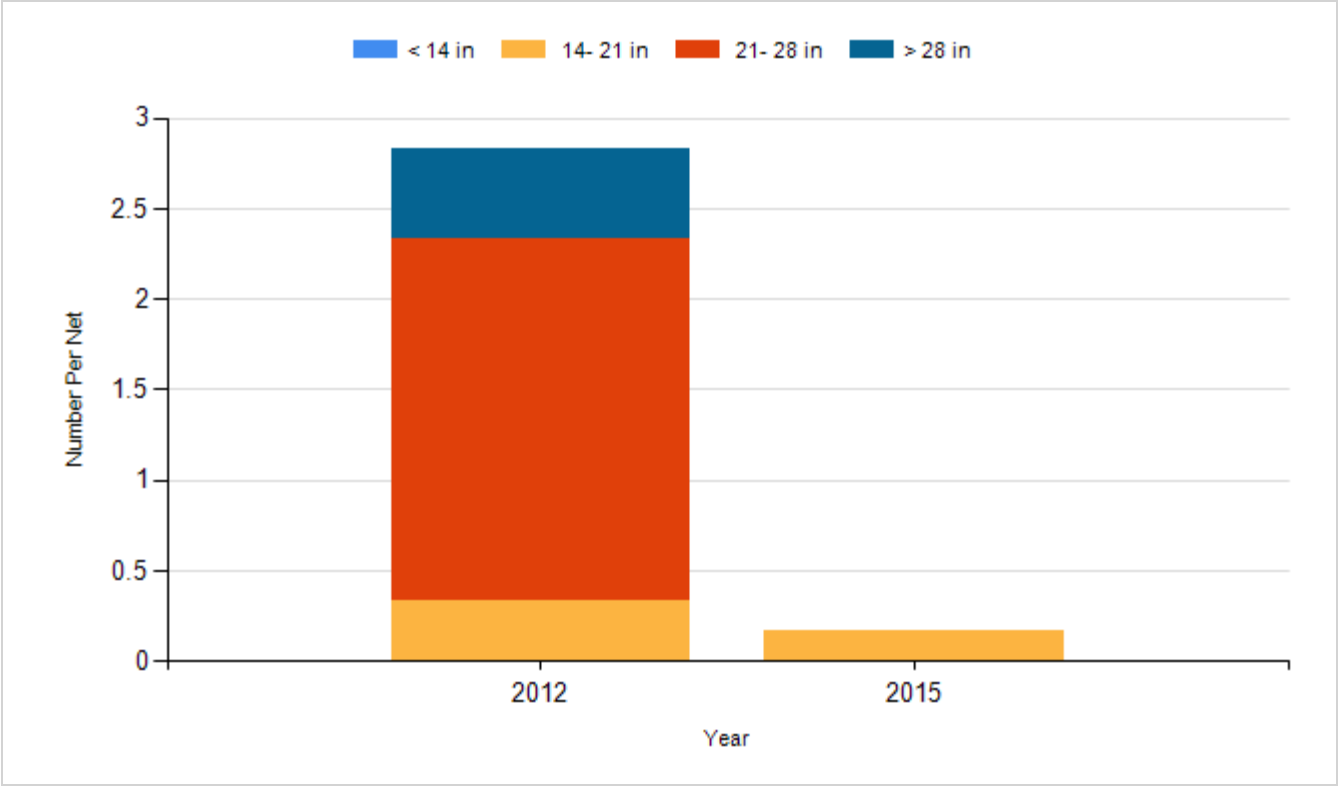
Historic Fish Sizes and Relative Abundance

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

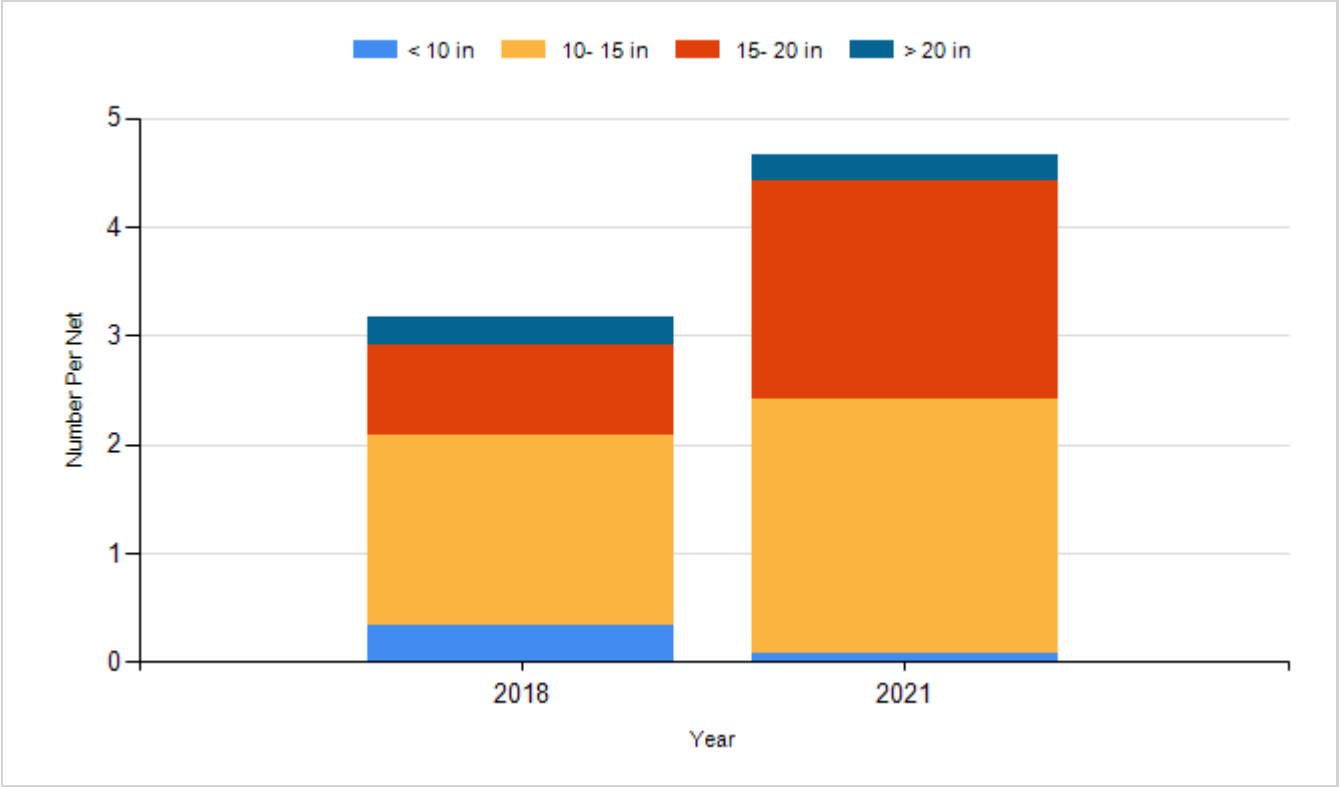
Species: Northern Pike
Gear: AFS std gill net



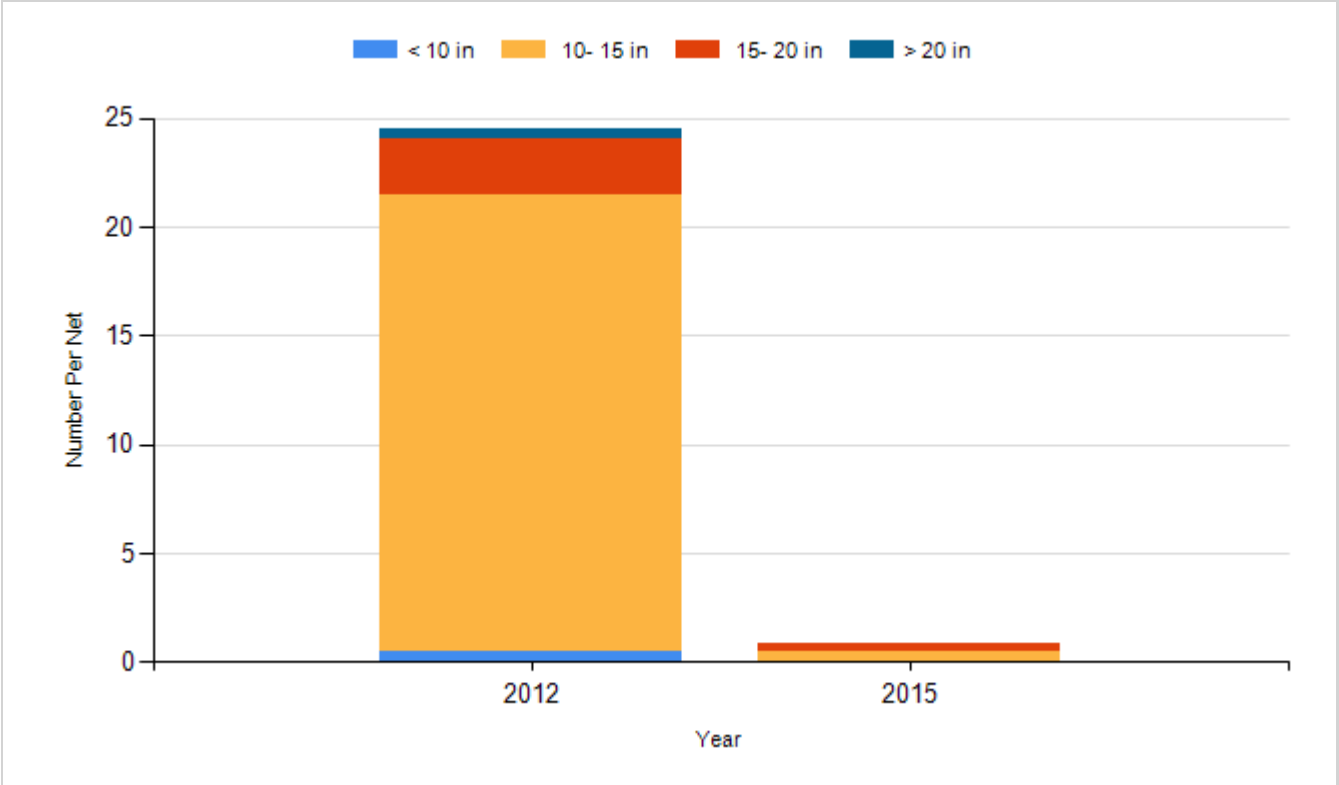
Species: Northern Pike
Gear: std exp gill net



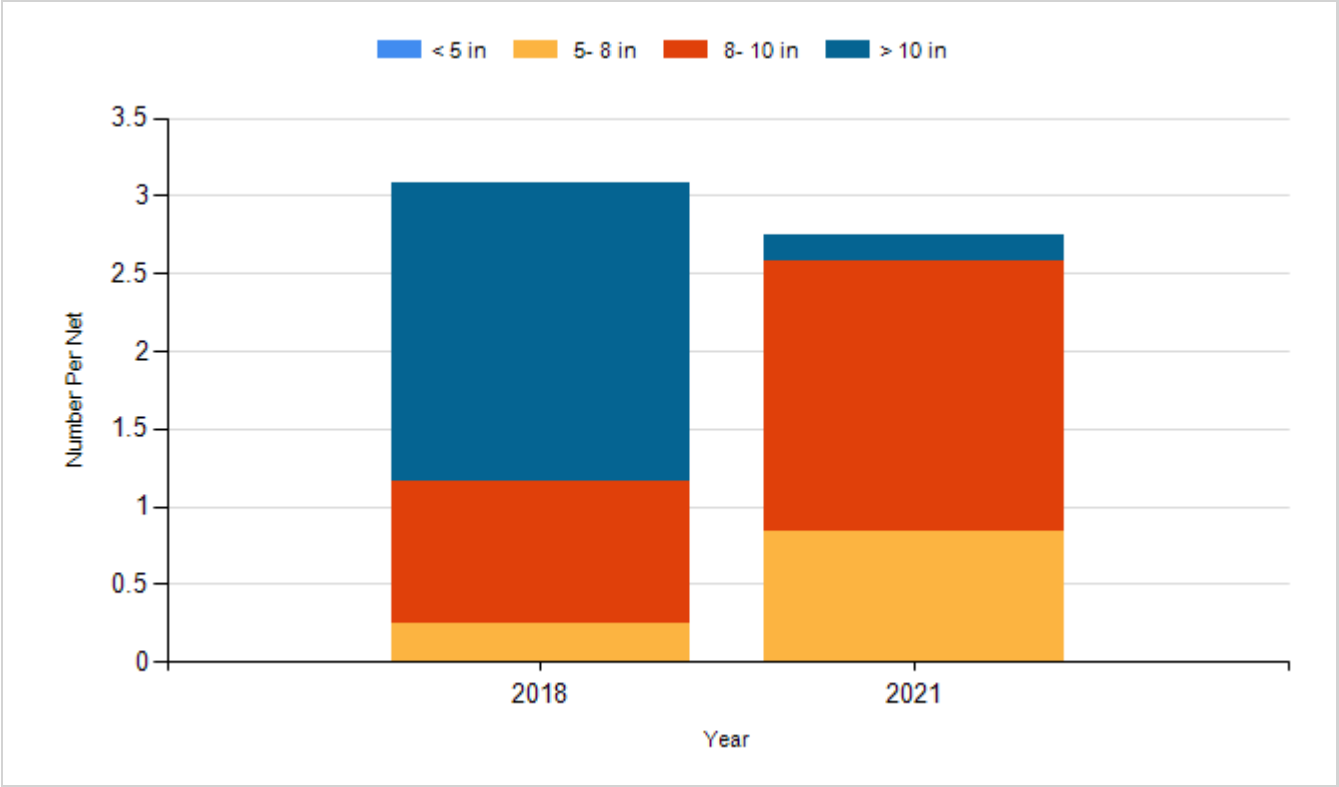
Species: Walleye
Gear: AFS std gill net



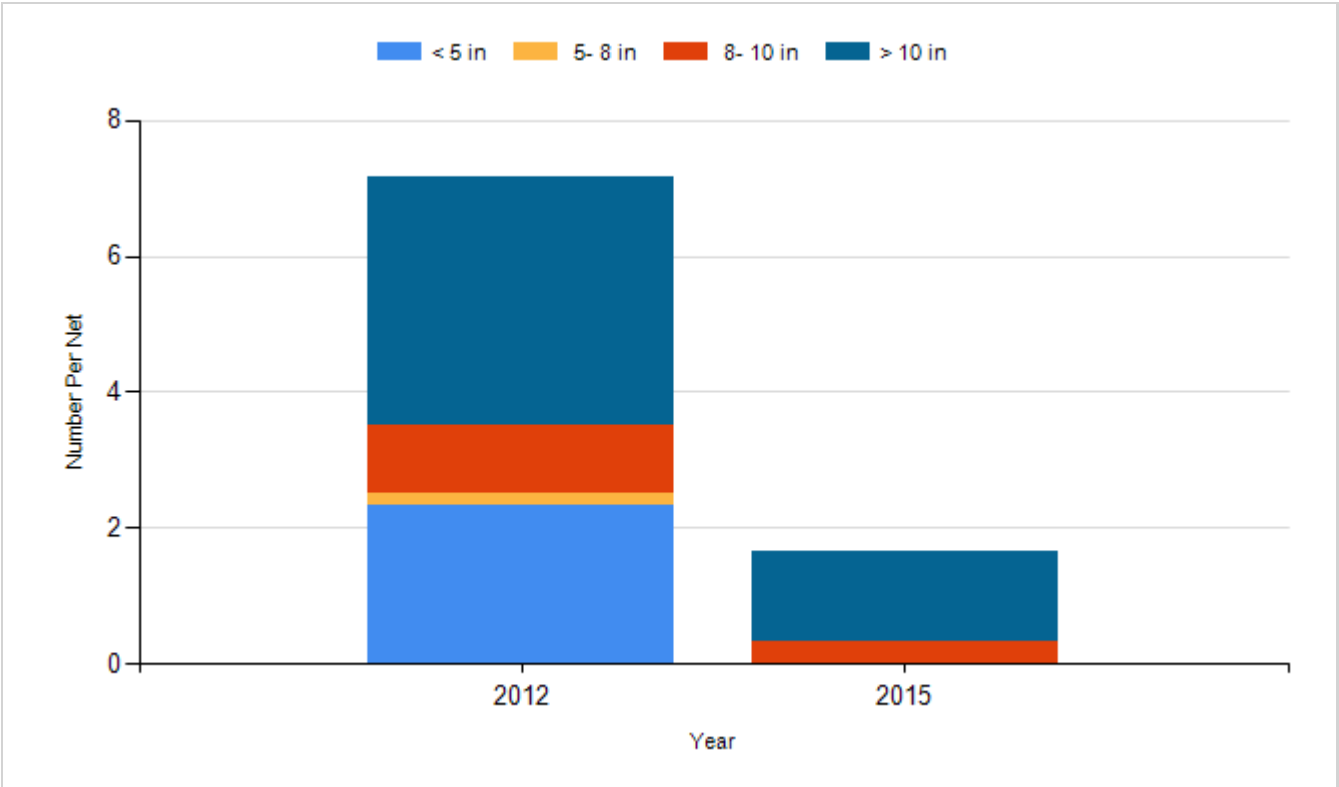
Species: Walleye
Gear: std exp gill net



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
2013	Walleye	Fry	300,000
2014	Walleye	Fry	300,000
2015	Walleye	Fry	300,000
2017	Walleye	Fry	300,000
2018	Yellow Perch	Fingerling	26,750
2019	Walleye	Fry	300,000
2021	Walleye	Fry	600,000