

2023 Spring Lake Survey Summary

Water: Spring Lake

County: Walworth

Legal Description: T124N-R74W-S6

GPS: 45.43121, -99.83202

Surface Area: 852 Acres

Class: Warm Water Permanent

Maximum Depth: 9 feet

Mean Depth: 6 feet

Spring Lake is an 852-acre natural lake 10 miles west and 1 mile south of the City of Bowdle in east central Walworth County. A dirt trail from a county gravel road off US HWY 12 provides access to the west shoreline of the lake. A primitive, rock boat ramp on a Game Production Area provides opportunity to launch small to mid-sized boats. There are no other public use facilities at Spring Lake. Most of the angling pressure occurs during the ice-fishing season.

Primary game fish managed at Spring Lake include Walleye and Yellow Perch. Yellow Perch were introduced naturally when the lake filled to current levels. Recent Walleye stockings occurred in 2014, 2018, 2021 and 2023. Northern Pike and Black Bullhead also have a historical presence.

Spring lake was surveyed on August 7-8, 2023, utilizing ¾ inch standard frame nets sets. Yellow Perch, Walleye, Northern Pike, and Black Bullhead were observed during the 2023 survey.

- **Walleye:** Catch rates were relatively high with an average of 13 fish sampled per standard frame net set. Several year classes of Walleye were recorded with numerous fish between 20 and 25 inches. Condition was comparable to the state average. Growth rates were well above average with Walleye reaching 18 inches at age 3. In addition to years that fry were stocked, the 2023 survey recorded Walleye from the 2017 and 2020 year classes indicating natural reproduction occurs during favorable conditions. It is anticipated that the 2023 fry stocking will develop another strong year class due to increased water levels.
- **Yellow Perch:** Numbers decreased from 15.7 per net in 2021 to 0.4 per net in 2023 due to mortality of larger fish and the high density walleye population. All perch observed were small, likely from the 2021 year class. Relative condition (weight at length) was above the state average. Perch year classes at Spring Lake tend to vary greatly based on success of reproduction and recruitment associated with seasonal water levels.
- **Other Species:** 13.2 Black Bullhead per net were observed with most fish being over 12 inches. Small bullhead likely have high mortality from predation as it is believed they are a major prey source for adult Walleye. 1 northern Pike and 1 Green Sunfish were also sampled.

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Spring, Walworth County

LLO-Lake-239-000

2023

Lake Information

Name: Spring **Maximum Depth:** 9 Feet
County: Walworth **Mean Depth:** 6 Feet
Legal Description: T122-R74-S6
Surface Area: 852 Acres

Surveys and Investigations

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

Gear	Date	Effort
frame net (std 3/4 in)	Jun 07, 2023	5 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Black Bullhead

Northern Pike

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
frame net (std 3/4 in)	Black Bullhead	66	13.2	4.7	100		92	5	93	2
	Northern Pike	1	0.2	0.3	0		0		98	
	Walleye	66	13.0	5.2	77	8	35	9	86	1
	Yellow Perch	4	0.4	0.6	0		0		106	28

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
		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
AFS std gill net	Black Bullhead					0.0		0.0	5.0			1.67
	Northern Pike					0.3		0.0	1.0			0.43
	Walleye					29.7		0.0	14.0			14.57
	Yellow Perch					4.7		12.3	34.0			17.00
fall night EF-WAE*	Walleye								161.0			161.0 0
frame net (std 3/4 in)	Black Bullhead		0.3			1.3		2.2	66.1		13.2	16.62
	Black Crappie		0.0			0.0		0.1	0.0		0.0	0.02
	Green Sunfish		0.0			0.0		0.0	1.4		0.0	0.28
	Northern Pike		0.0			0.2		0.6	0.4		0.2	0.28
	Walleye		9.8			45.8		21.1	6.1		13.0	19.16
	Yellow Perch		0.5			0.6		2.0	14.9		0.4	3.68
std exp gill net	Walleye		29.5									29.50

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											
			2014	2015	2016	2017	2018	2019	2020	2021	2022	2023		
AFS std gill net	Black Bullhead	PSD									80			
		PSD-P									10			
		Wr									100			
	Northern Pike	PSD					100					100		
		PSD-P					0					100		
		Wr					102					96		
	Walleye	PSD					100					89		
		PSD-P					6					32		
		Wr					91					103		
	Yellow Perch	PSD					100			70	62			
		PSD-P					100			19	25			
		Wr					115			112	95			
frame net (std 3/4 in)	Black Bullhead	PSD		67			94		69	94			100	
		PSD-P		0			88		8	36			92	
		Wr		104			98		125	118			93	
	Northern Pike	PSD					100		14	100			0	
		PSD-P					0		0	0			0	
		Wr					101		98	89			98	
	Walleye	PSD		100			100		49	88			77	
		PSD-P		0			4		30	12			35	
		Wr		81			92		104	97			86	
	Yellow Perch	PSD		100			100		83	66			0	
		PSD-P		80			100		63	3			0	
		Wr		87			113		106	91			106	
std exp gill net	Walleye	PSD		100										
		PSD-P		0										
		Wr		86										

Back-Calculated Lengths

Mean species back-calculated total length (mm) at age, standard error (SE), and sample size (N).

Species: Walleye

Year Class	Age	N	Mean back-calculated length (SE) at age											
			1	2	3	4	5	6	7	8	9	10		
2022	1	1	167											
2021	2	16	241 (7.8)	322 (5.8)										
2020	3	20	232 (6.5)	334 (6.7)	417 (8.3)									
2018	5	15	239 (6.3)	332 (8.6)	399 (5.8)	461 (3.5)	504 (2.5)							
2017	6	2	274 (9.8)	381 (1.7)	446 (.7)	492 (7.3)	524 (13.3)	557 (4.9)						
2014	9	5	270 (17.3)	364 (21.7)	412 (15.7)	455 (11.9)	487 (10.2)	524 (11.3)	559 (7.3)	598 (6.2)	628 (7.2)			
Weighted Mean		59	240	334	411	462	502	533	559	598	628			
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20		
2022	1	1												
2021	2	16												
2020	3	20												
2018	5	15												
2017	6	2												
2014	9	5												
Weighted Mean		59												

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	28	263 (2)	473 (1)	393 (5)	443 (7)			470 (3)			551 (10)
2018	89				435 (72)			491 (18)			
2015	100	191 (41)			431 (59)						

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	68		177 (23)	205 (11)	227 (14)	251 (8)	255 (1)	288 (7)	315 (2)	338 (1)	
2020	42	135 (13)	144 (2)	217 (9)	237 (12)			300 (3)		299 (2)	340 (1)
2018	14						282 (4)	307 (6)	294 (4)		

Fish Condition

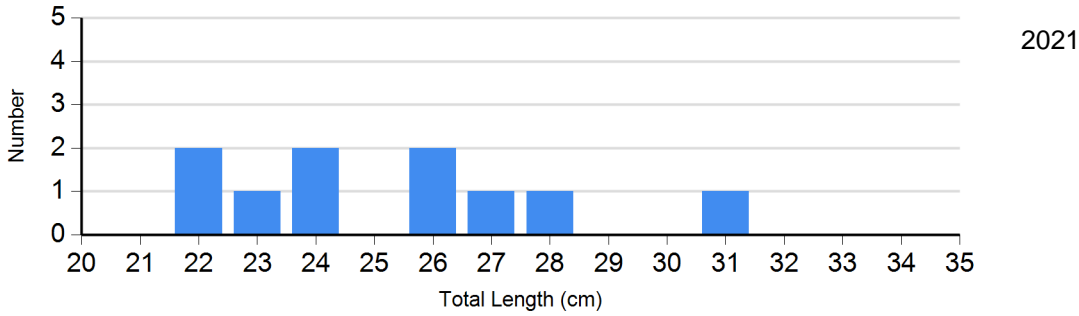
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2021	2	93 (0.7)	7	102 (3.8)	1	93	0	
Northern Pike Gill Net	2021	0		0		2	96 (4.3)	0	
Walleye Gill Net	2021	3	158 (67.1)	16	98 (1.7)	9	95 (3.3)	0	
Yellow Perch Gill Net	2020	11	111 (1.9)	19	112 (2.1)	4	120 (3.7)	3	109 (4.9)
	2021	26	97 (1.2)	25	95 (1.3)	15	91 (2.0)	2	93 (1.7)

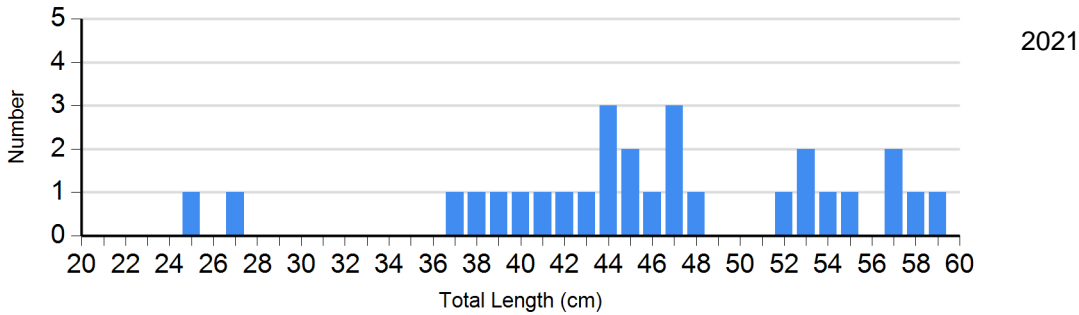
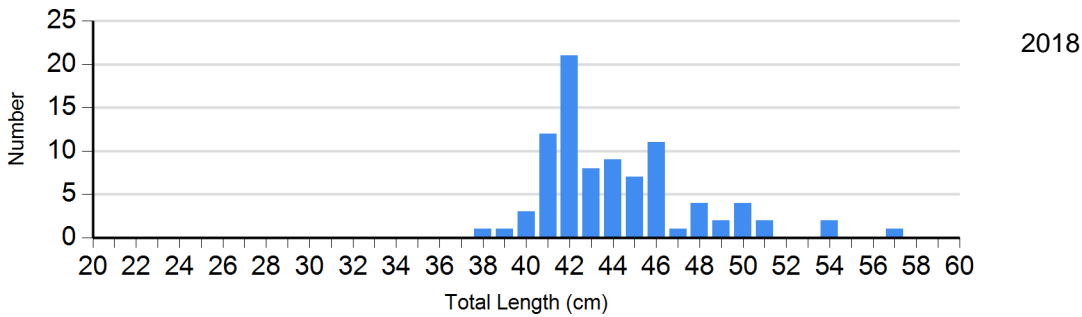
Length Frequency Distribution

Length frequency histogram of species sampled by year.

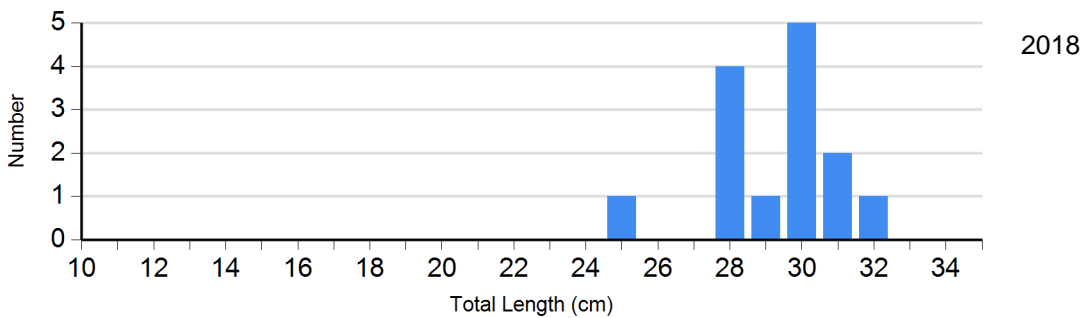
Species: Black Bullhead
Gear: AFS std gill net

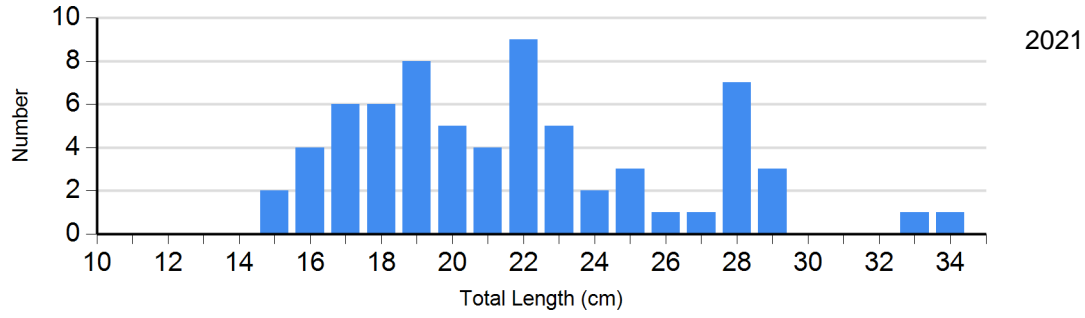
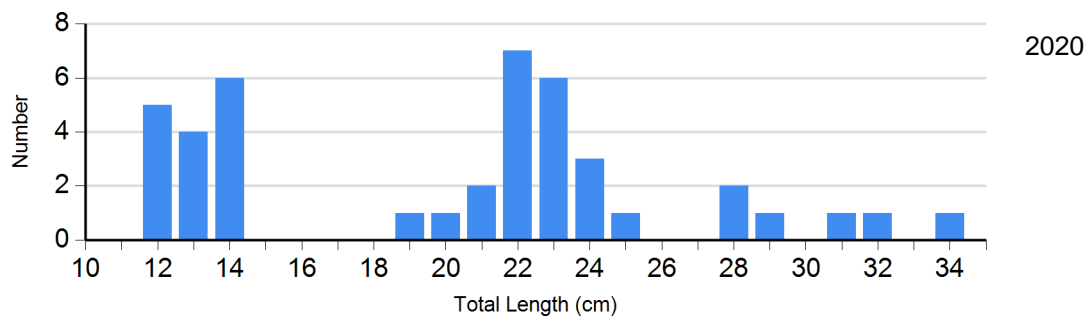


Species: Walleye
Gear: AFS std gill net



Species: Yellow Perch
Gear: AFS std gill net

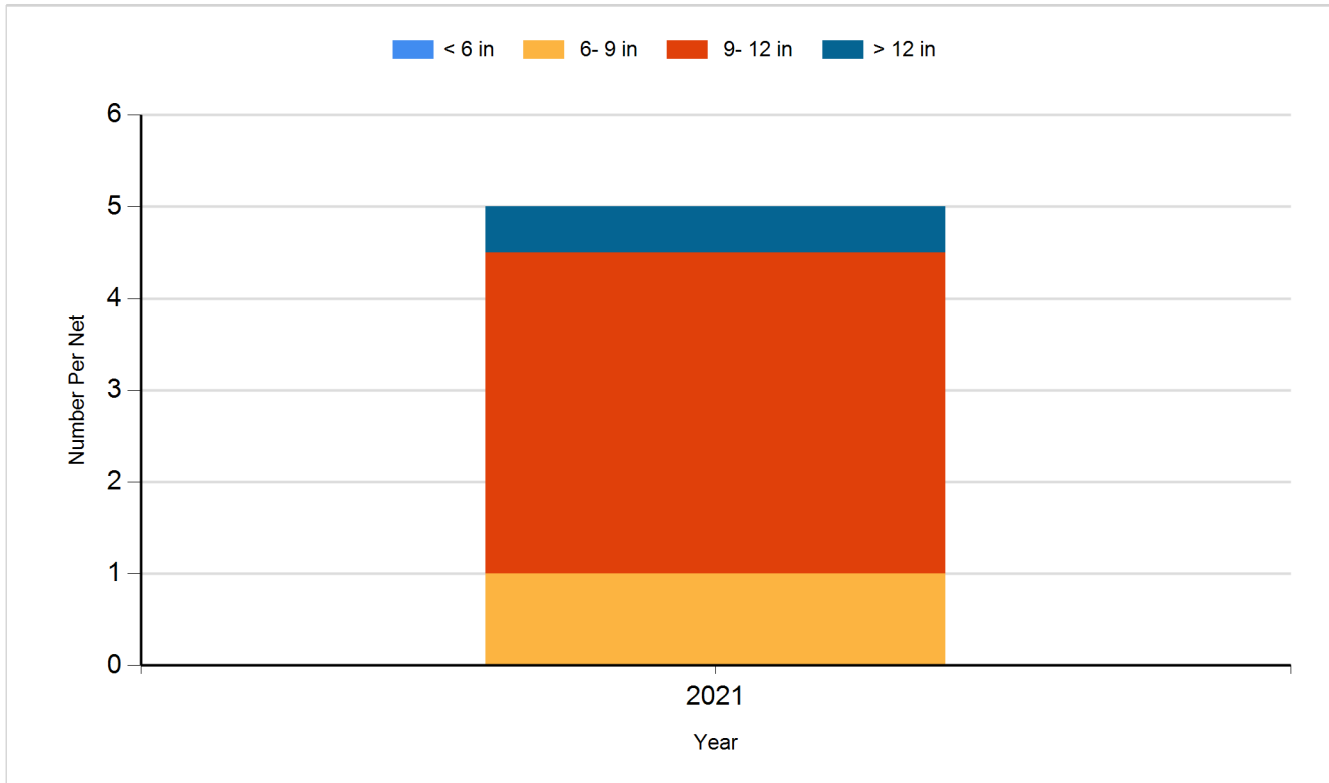




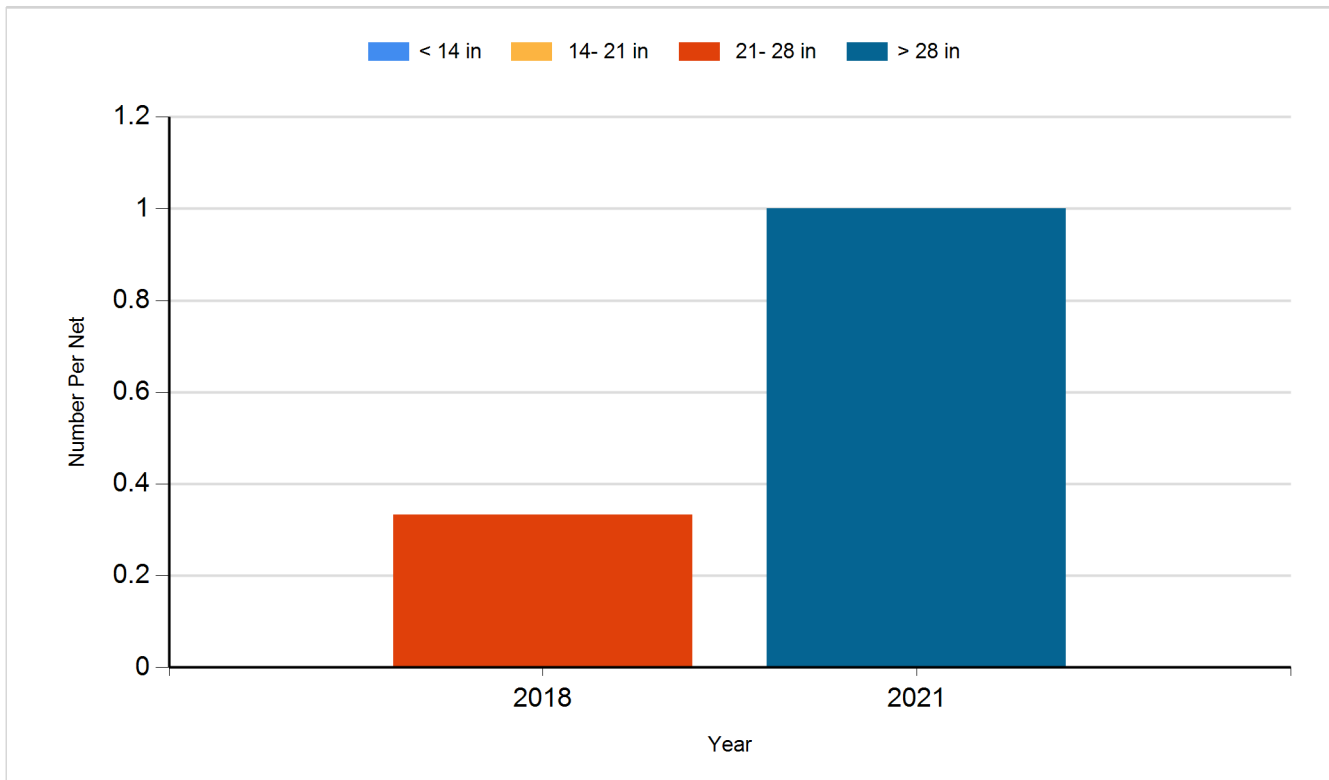
Historic Fish Sizes and Relative Abundance

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

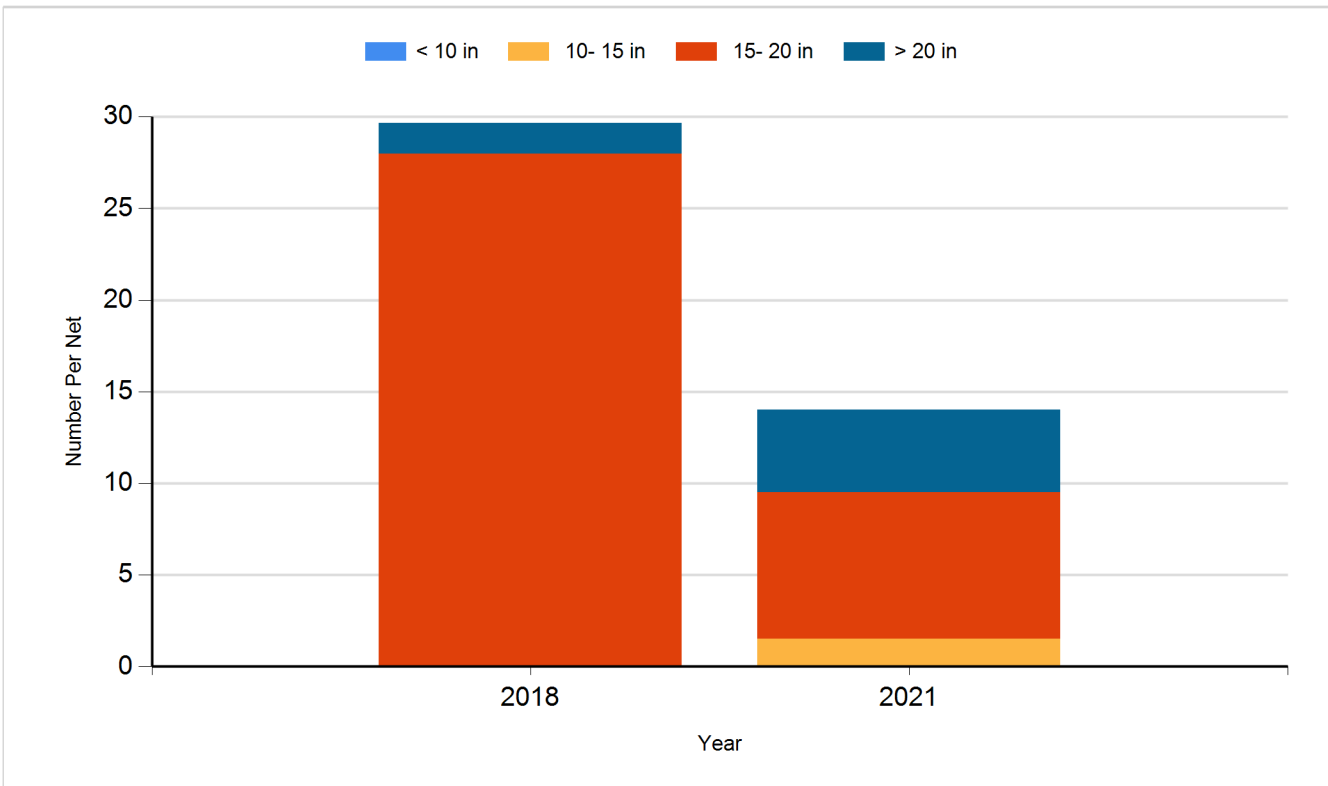
Species: Black Bullhead
Gear: AFS std gill net



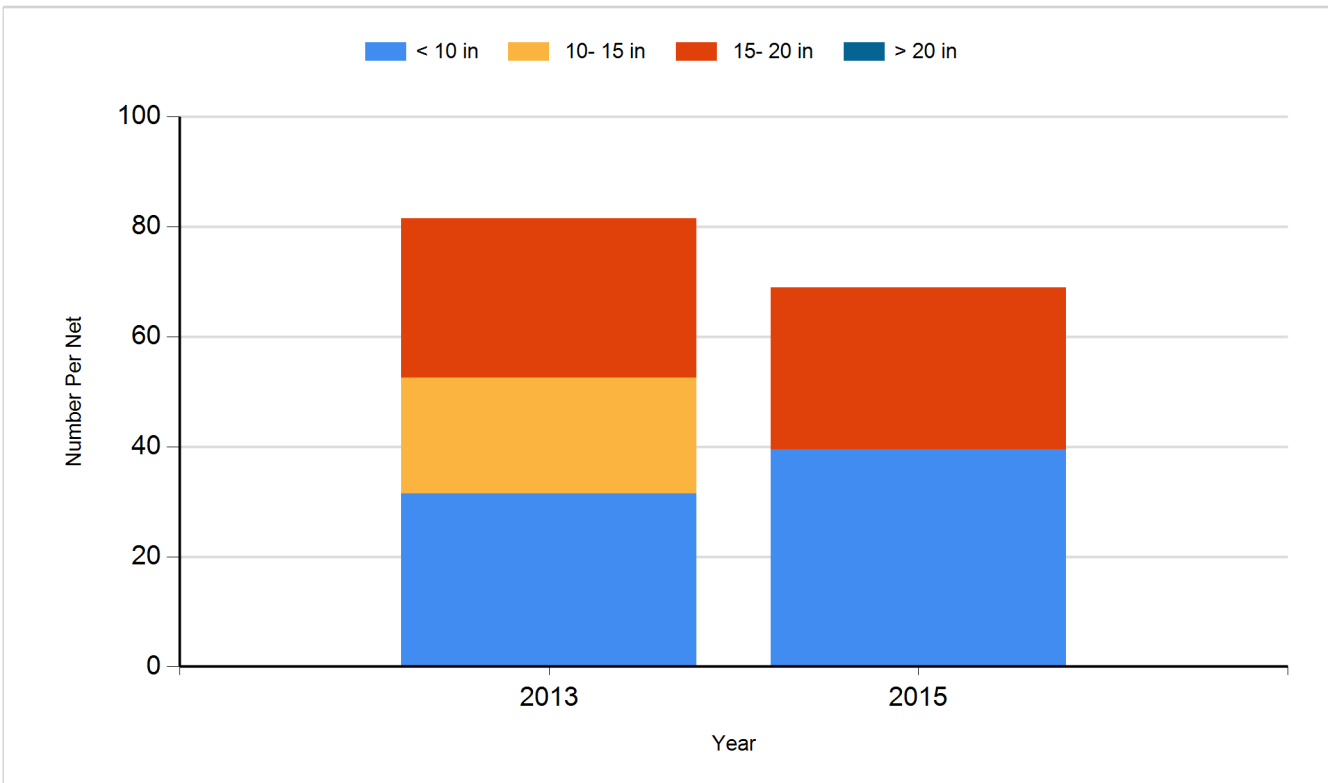
Species: Northern Pike
Gear: AFS std gill net



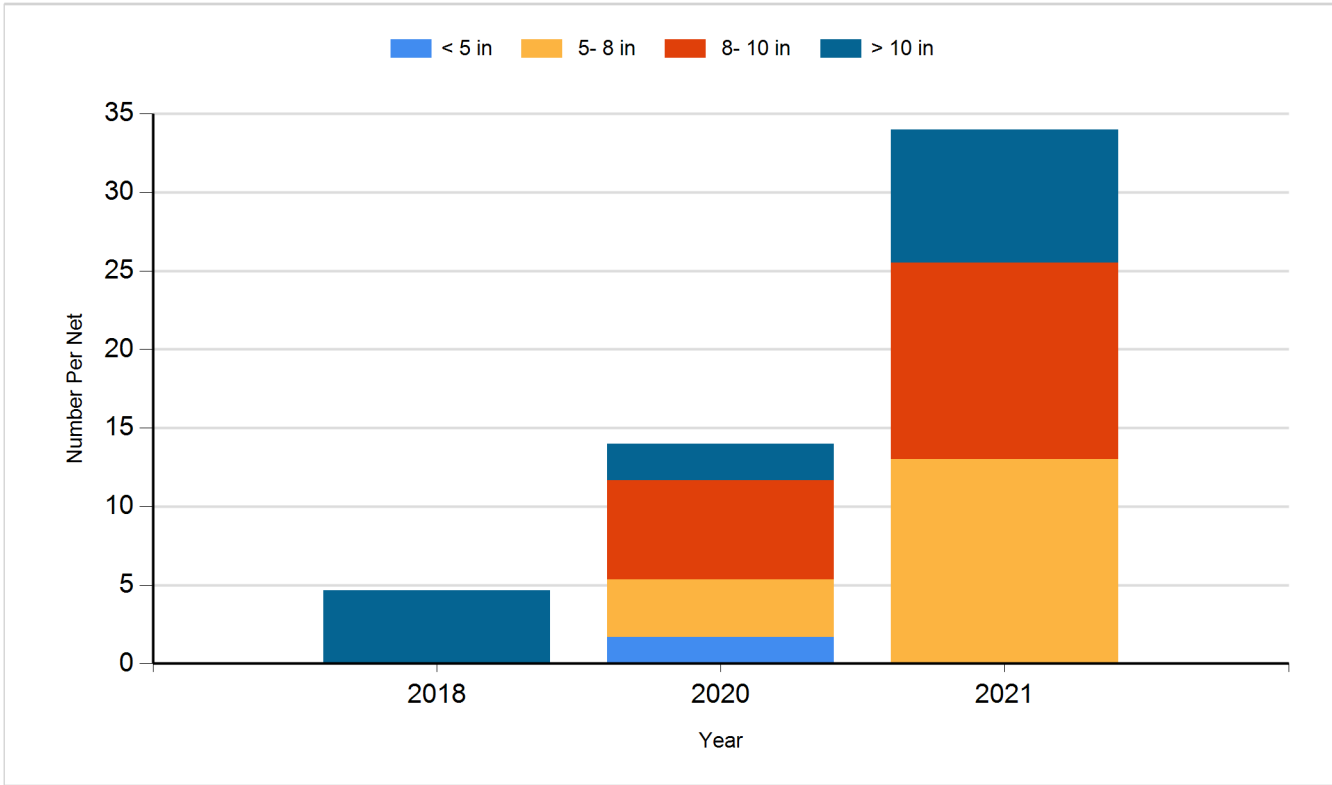
Species: Walleye
Gear: AFS std gill net



Species: Walleye
Gear: std exp gill net



Species: Yellow Perch
Gear: AFS std gill net



Fish Stocking

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2012	Yellow Perch	Adult	300
2014	Walleye	Fry	750,000
2015	Yellow Perch	Fingerling	6,600
2018	Walleye	Fry	720,000
2021	Walleye	Fry	400,000
2023	Walleye	Fry	400,000