Middle Lynn Lake Survey Summary

Middle Lynn Lake, located 6.5 miles west, 2.5 miles south, and 0.5 miles west of Roslyn, is primarily managed as a muskellunge, walleye, and yellow perch fishery; other fish species are present and contribute to the fishery.

- **Muskellunge.** Adult muskellunge, likely migrants from Lynn Lake during high water conditions, were present in Middle Lynn Lake before the initial fingerling stocking in 2015. Since 2015, muskellunge fingerlings have been stocked on two occasions (2017 and 2021). Abundance remains low and muskellunge are difficult to sample. In 2021, Middle Lynn Lake was used as an egg source for walleye spawning operations, both large and small frame nets were used to collect walleye brood stock and muskellunge for an extended period following ice out. During this extended sampling period only two muskellunge, one 33.8 inches and the other 34.0 inches in length, were sampled. No muskellunge have been sampled in standard fisheries surveys conducted from 2012 - 2021.

- **Walleye.** Walleye numbers were higher in 2021 than in 2018. At 7.8 per gill net, relative abundance was considered moderate to high for Middle Lynn Lake. Sampled walleyes ranged in length from 8.7 to 26.4 inches, of those that were at least 10.0 inches 86% were ≥15.0 inches and 5% were ≥20.0 inches. Eight year classes (2011, 2013, and 2015 – 2020) were represented in the gill net catch. Individuals from the naturally produced 2018 (age-3) cohort were the most numerous accounting for 33% of walleyes sampled, while those from the 2017 (age-4) year class, which coincided with a small fingerling stocking, made up an additional 27%. The 2021 sample suggests good walleye growth with mean length at capture values for age-3 and age-4 fish of 17.2 and 18.4 inches.

- **Yellow Perch**. Although yellow perch were the most abundant species in the 2021 gill net catch (10.0 per net), relative abundance was considered low to moderate. Sampled yellow perch ranged in length from 4.7 to 13.0 inches, of those that were at least 5.0 inches 89% were ≥8.0 inches and 67% were ≥10.0 inches. Six consecutive cohorts (2015 – 2020) were represented in the gill net catch. Individuals from the 2018 (age-3) cohort, which had a mean length at capture of 10.0 inches, were the most abundant accounting for nearly 70% of sampled yellow perch.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Middle Lynn, Day County
MUD-Lake-308-001
2021

Lake Information

Name: Middle Lynn

Maximum Depth: 24 Feet

County: Day

Surface Area: 1,037 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 01, 2021	6 net-nights
AFS std gill net	Jun 02, 2021	6 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Northern Pike

Bluegill

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.
- 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	2	0.2	0.2	50		0		107	3
	Bluegill	3	0.3	0.2	67		67		131	7
	Northern Pike	1	0.1	0.1	100		100		93	
	Walleye	108	7.8	2.6	86	5	5		97	1
	Yellow Perch	123	10.0	1.5	89	4	67	6	105	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							0.3			0.2	0.25
	Bluegill							0.0			0.3	0.15
	Northern Pike							0.1			0.1	0.10
	Walleye							1.8			7.8	4.80
	Yellow Perch							3.6			10.0	6.80
frame net (std 3/4 in)	Black Bullhead	11.2										11.20
	Black Crappie	0.1										0.10
	Bluegill	0.4										0.40
	Walleye	1.8										1.80
	Yellow Perch	84.3										84.30
std exp gill net	Black Bullhead	0.7			1.5							1.10
	Northern Pike	0.0			0.3							0.15
	Walleye	1.8			5.7							3.75
	Yellow Perch	177.2			11.8							94.50

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.

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AFS std gill net	Walleye	PSD							71			86
		PSD-P							43			5
		Wr							91			97
	Yellow Perch	PSD							58			89
		PSD-P							9			67
		Wr							102			105
std exp gill net	Walleye	PSD	55			3						
		PSD-P	0			0						
		Wr	95			89						
	Yellow Perch	PSD	31			87						
		PSD-P	10			80						
		Wr	99			94						

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	108	240 (18)	373 (15)	438 (36)	468 (29)	485 (5)	493 (1)		552 (3)		675 (1)
2018	30	174 (9)	299 (5)	377 (1)	478 (1)	498 (5)			555 (2)	643 (2)	694 (5)
2015	35	140 (2)	296 (32)		458 (1)						
2012	59	200 (44)	340 (13)	375 (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	123	137 (16)	225 (1)	255 (85)	291 (16)	322 (3)	332 (2)				
2018	43	133 (8)	204 (30)	269 (5)							
2015	71	136 (1)	163 (8)	274 (3)	269 (44)	280 (14)					
2012	1782	101 (727)	176 (839)	239 (164)	271 (43)	267 (10)					

Fish Condition

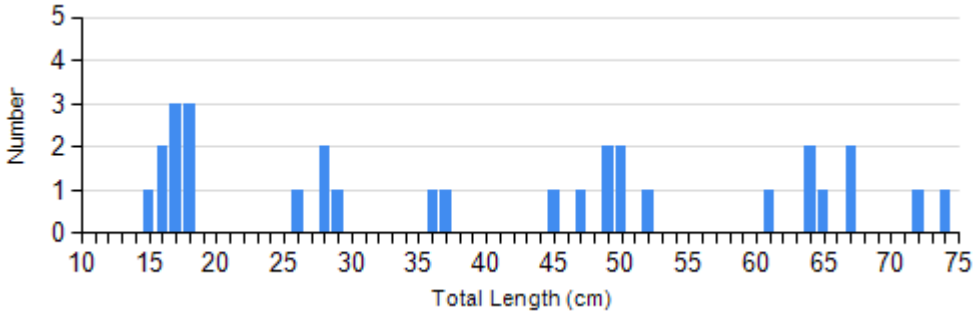
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Walleye Gill Net	2018	6	99 (1.4)	6	95 (2.7)	2	85 (3.2)	7	82 (2.4)
	2021	13	100 (1.2)	75	97 (0.7)	4	95 (1.0)	1	82
Yellow Perch Gill Net	2018	18	106 (2.5)	21	99 (1.2)	4	95 (3.5)	0	
	2021	13	110 (2.9)	27	108 (1.8)	68	103 (0.9)	12	100 (1.9)

Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net



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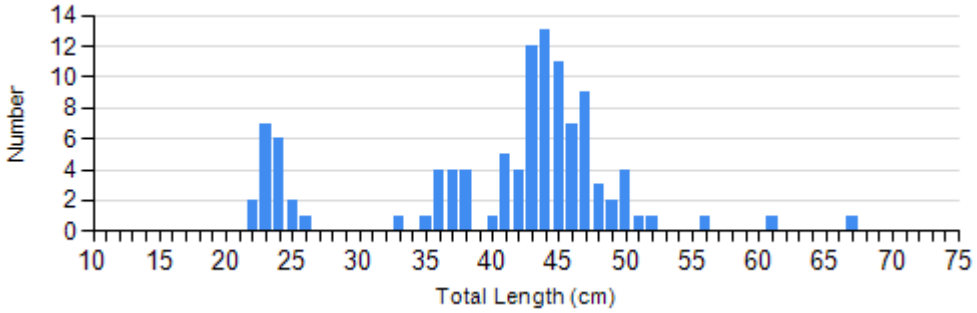
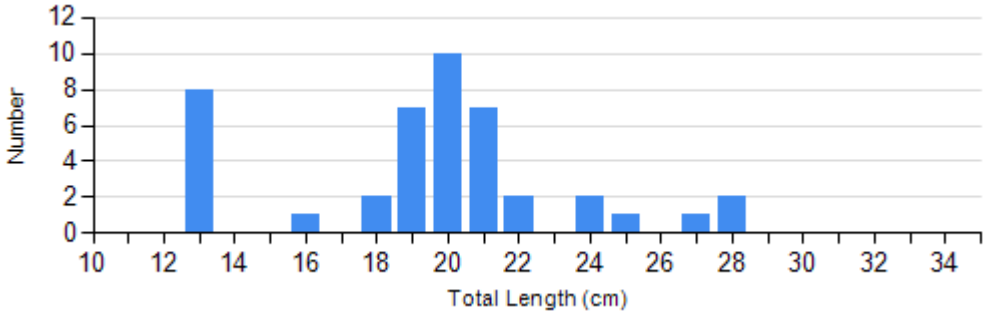


2021

Species: Yellow Perch
Gear: AFS std gill net



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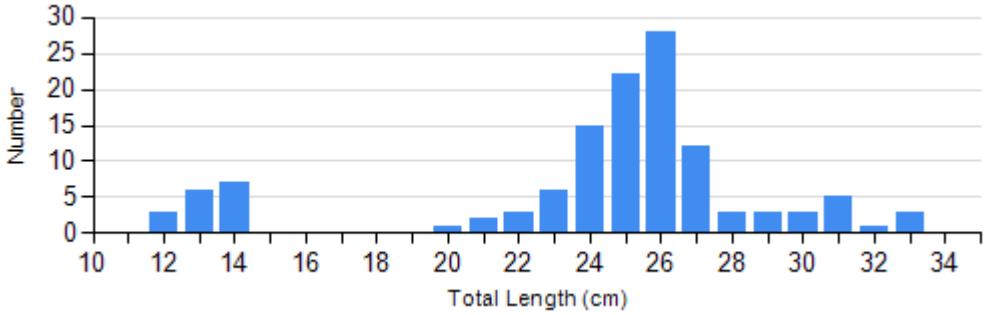
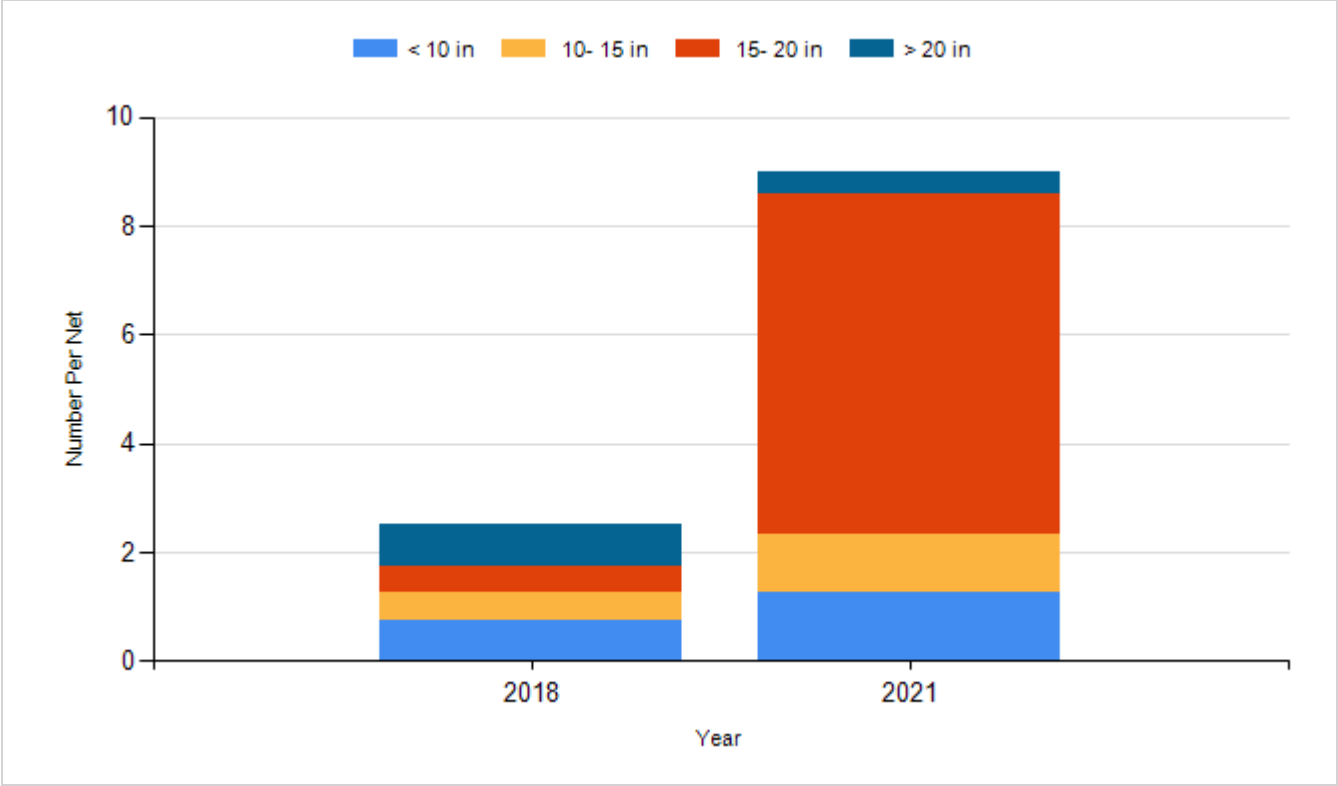


2021

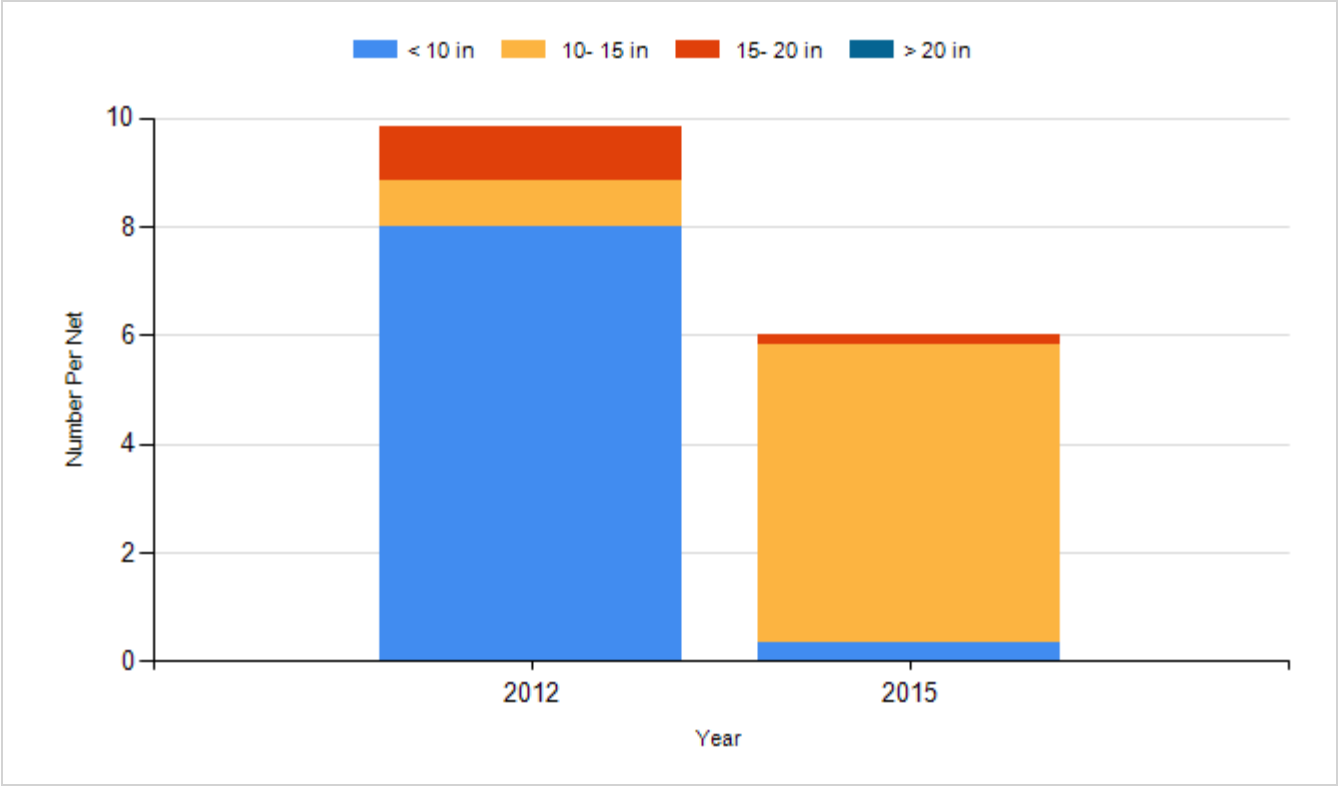
Historic Fish Sizes and Relative Abundance

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

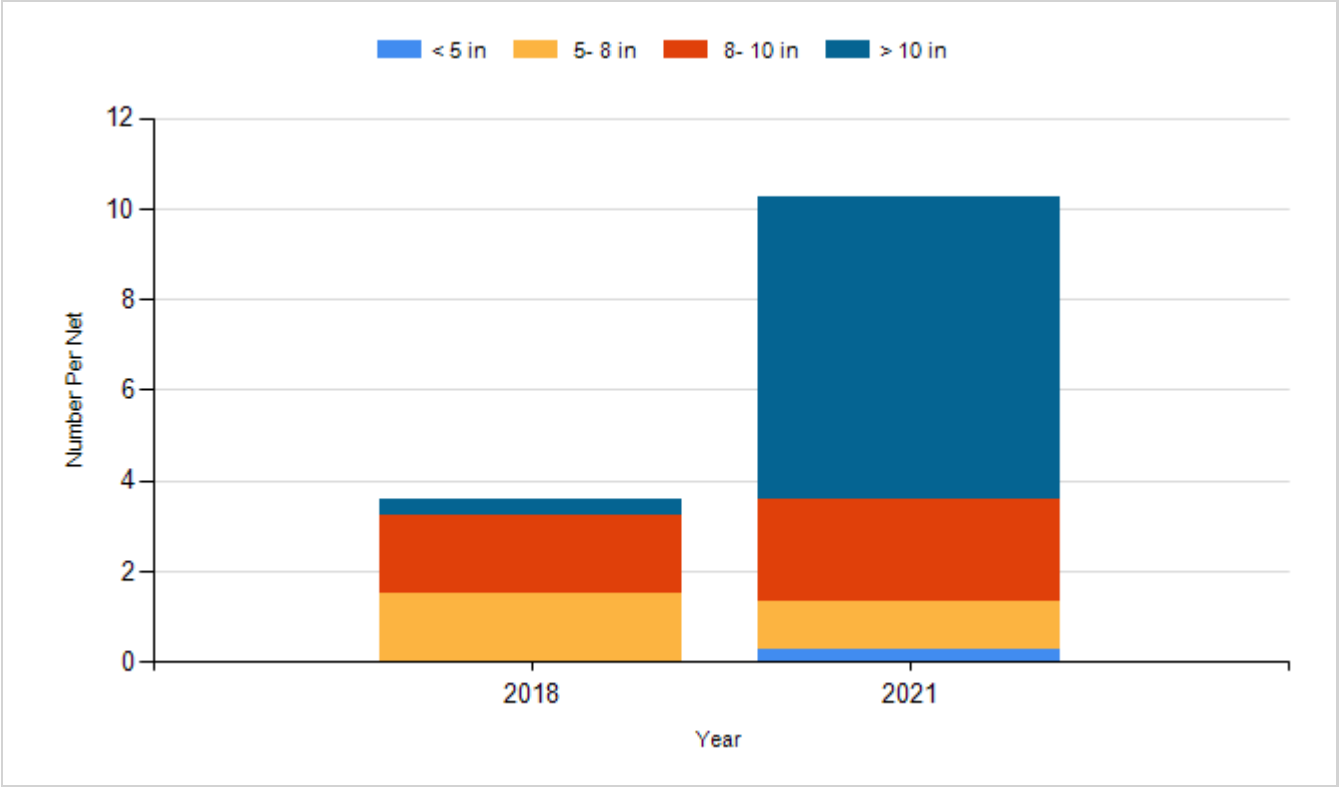
Species: Walleye
Gear: AFS std gill net



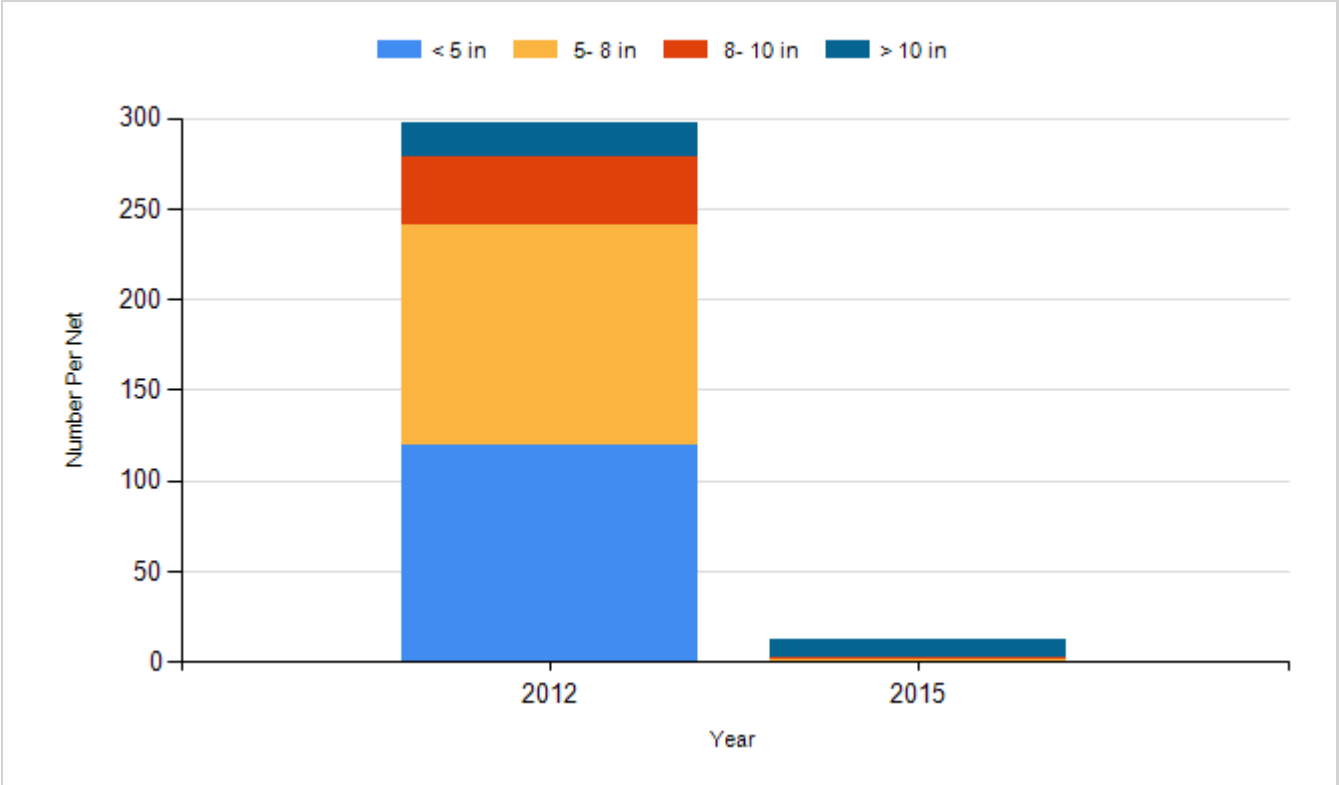
Species: Walleye
Gear: std exp gill net



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	700,000
2013	Walleye	Fry	375,000
2015	Muskellunge	Large Fingerling	1,054
2015	Walleye	Fry	370,000
2017	Muskellunge	Large Fingerling	1,542
2017	Walleye	Small Fingerling	99,120
2019	Walleye	Fry	550,000
2021	Muskellunge	Juvenile	799
2021	Walleye	Fry	550,000