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 four occasions (2017, 2021, 2022, and 2023). Abundance remains low and muskellunge are difficult to sample. In 2024, 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 15 muskellunge from 20.0 to 41.0 inches were netted, 80% were $\geq$ 30.0 inches and 60% were $\geq$ 38.0 inches. Few muskellunge have been sampled in standard fisheries surveys conducted from 2012 – 2024, with only one captured in the 2024 gill net survey that measured 38.8 inches.

- **Walleye.** At 3.9 per gill net, relative abundance of walleyes $\geq$ 10.0 inches was considered low to moderate for Middle Lynn Lake. Sampled walleyes ranged in length from 6.3 to 27.6 inches, of those at least 10.0 inches, 21% were $\geq$ 15.0 inches and 13% were $\geq$ 20.0 inches. Eight year classes (2010, 2012, 2013, 2017, 2018, and 2021 – 2023) contributed to the gill net catch. The naturally produced 2022 (age-2) cohort was the most represented single cohort accounting for 42% of walleyes sampled. Meanwhile, fish from the 2021 (age-3) and 2023 (age-1) year classes, which coincided with fry stockings, made up an additional 49%. The 2024 sample suggests good walleye growth with a mean length at capture for age-3 fish of 14.7 inches.

- **Yellow Perch**. Yellow perch were the most abundant species in the 2024 gill net catch. At 11.8 per gill net, relative abundance was considered moderate. Sampled yellow perch ranged in length from 4.7 to 14.6 inches, of those at least 5.0 inches, 64% were $\geq$ 8.0 inches and 1% were $\geq$ 10.0 inches. Four cohorts (2017, 2018, 2022, and 2023) were represented in the gill net catch. Individuals from the 2022 (age-2) cohort, which had a mean length at capture of 8.2 inches, were the most abundant accounting for 90% 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
2024

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	May 29, 2024	4 net-nights
AFS std gill net	May 30, 2024	4 net-nights
AFS std gill net	May 31, 2024	4 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Northern Pike

Muskellunge

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.

$$CPUE = \frac{number\ of\ fish}{effort}$$

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.

$$PSD = \left(\frac{number\ of\ fish \geq quality\ length}{number\ of\ fish \geq stock\ length}\right) x\ 100$$

$$PSD - P = \left(\frac{number\ of\ fish \geq preferred\ length}{number\ of\ fish \geq stock\ length}\right) x\ 100$$

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.

$$Wr = \left(\frac{W}{Ws}\right) x\ 100$$

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).

Species Name	Stock (in)	(cm)	Quality (in)	(cm)	Preferred (in)	(cm)	Memorable (in)	(cm)	Trophy (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 CPUE	Abundance CI-80	Stock Density Indices PSD	Stock Density Indices CI-80	Stock Density Indices PSD-P	Stock Density Indices CI-80	Condition Wr	Condition CI-80
AFS std gill net	Muskellunge	1	0.1	0.1	100		100		97	
	Northern Pike	5	0.4	0.3	100		80		79	6
	Walleye	65	3.9	1.2	21	9	13	8	94	2
	Yellow Perch	143	11.8	2.4	64	6	1		106	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.
* Methods/Species that ignore stock length

Gear	Species											
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg
AFS std gill net	Black Bullhead				0.3			0.2			0.0	0.17
	Bluegill				0.0			0.3			0.0	0.10
	Muskellunge				0.0			0.0			0.1	0.03
	Northern Pike				0.1			0.1			0.4	0.20
	Walleye				1.8			7.8			3.9	4.50
	Yellow Perch				3.6			10.0			11.8	8.47
std exp gill net	Black Bullhead	1.5										1.50
	Northern Pike	0.3										0.30
	Walleye	5.7										5.70
	Yellow Perch	11.8										11.80

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	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AFS std gill net	Walleye	PSD				71			86			21
		PSD-P				43			5			13
		Wr				91			97			94
	Yellow Perch	PSD				58			89			64
		PSD-P				9			67			1
		Wr				102			105			106
std exp gill net	Walleye	PSD	3									
		PSD-P	0									
		Wr	89									
	Yellow Perch	PSD	87									
		PSD-P	80									
		Wr	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+
2024	64	182 (16)	284 (27)	374 (16)			547 (1)	532 (1)			674 (3)
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)						

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2024	143	136 (12)	208 (129)				335 (1)	374 (1)			
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)					

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	2021	13	100 (1.2)	75	97 (0.7)	4	95 (1.0)	1	82
	2024	37	95 (1.4)	4	95 (2.2)	2	88 (5.2)	4	87 (3.1)
Yellow Perch Gill Net	2021	13	110 (2.9)	27	108 (1.8)	68	103 (0.9)	12	100 (1.9)
	2024	51	107 (1.2)	89	105 (0.7)	0		2	89 (0.8)

Length Frequency Distribution
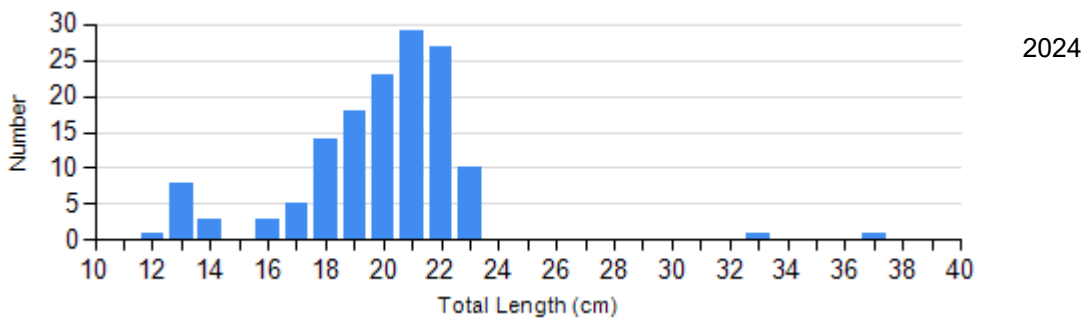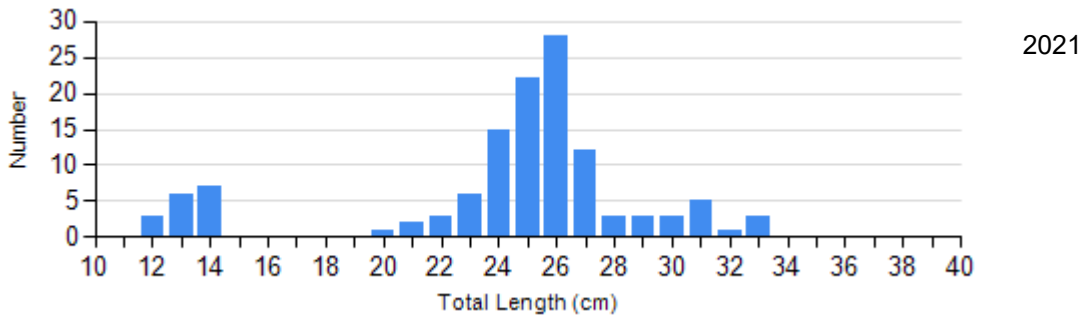
Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net
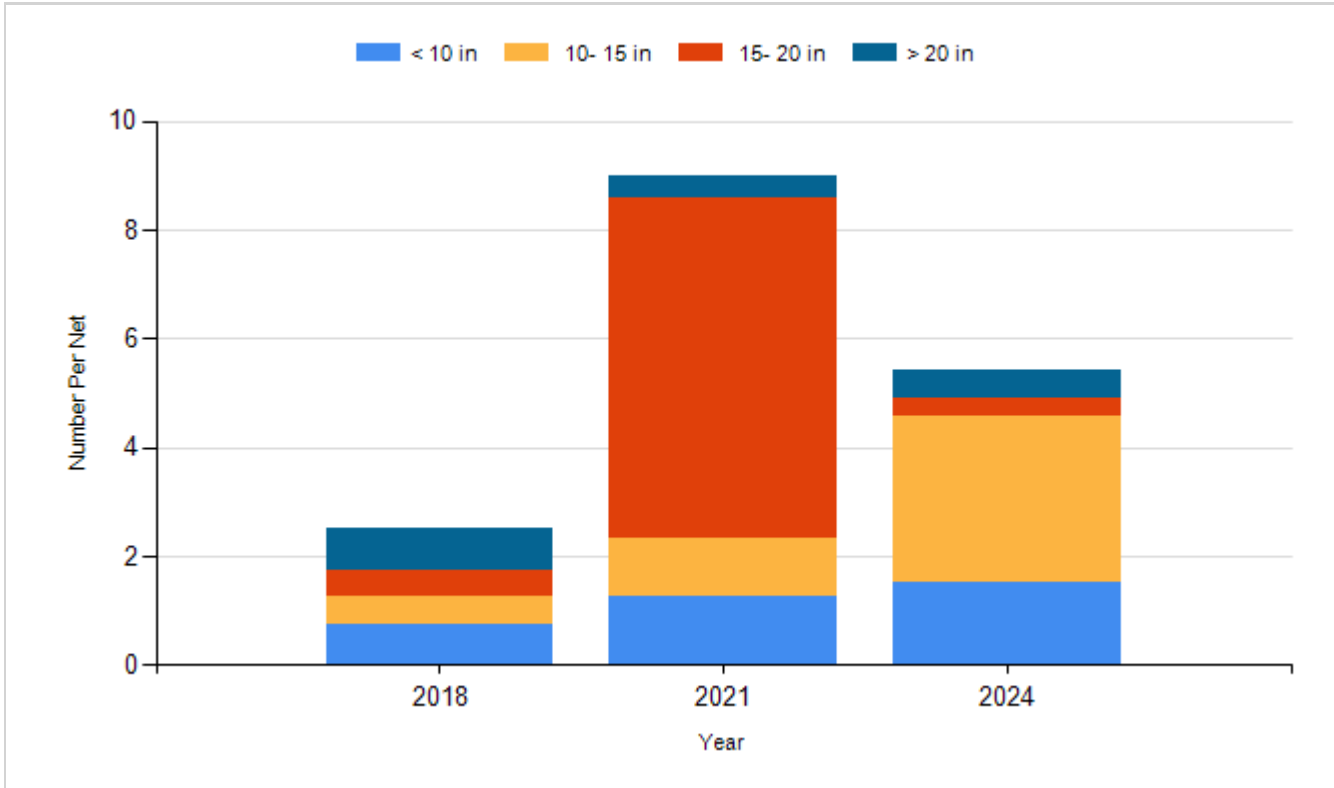

2021

2024

Species: Yellow Perch
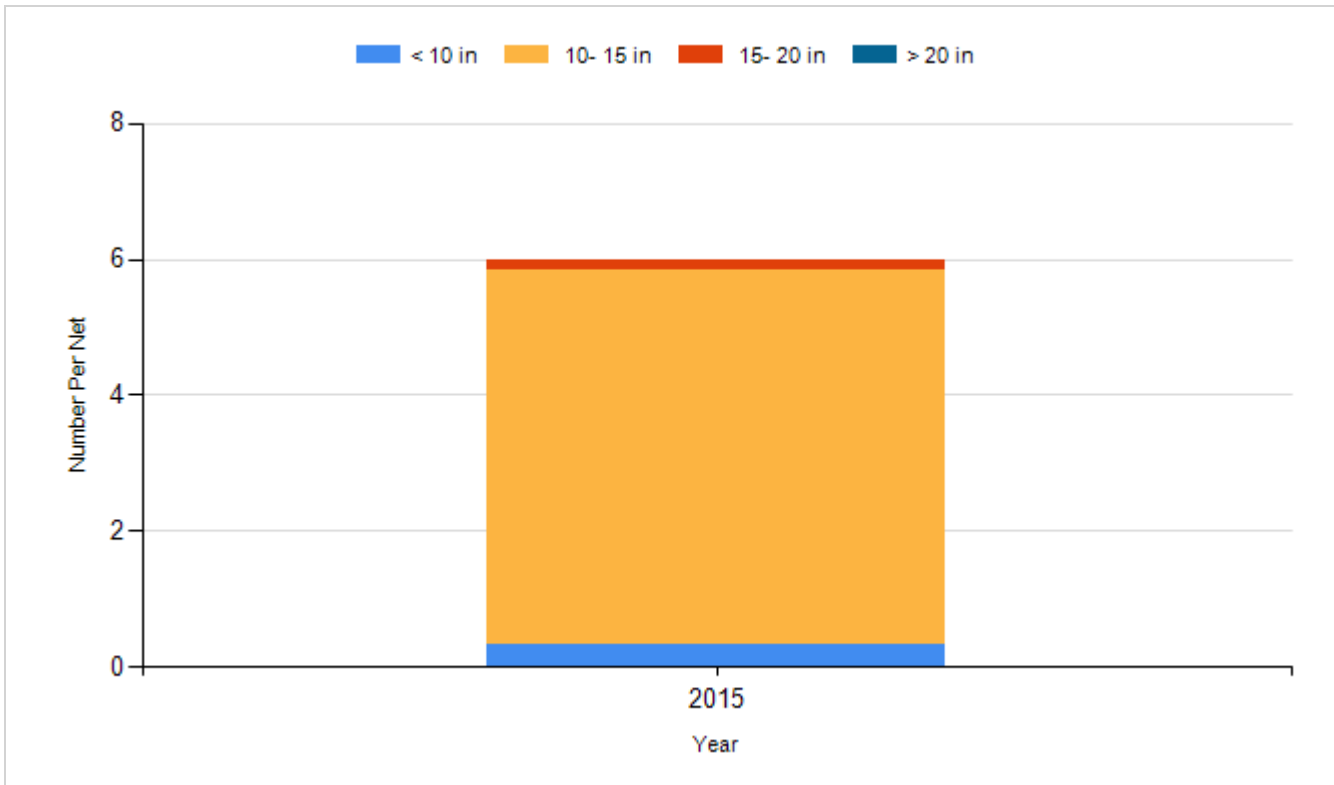Gear: AFS std gill net

2021

2024
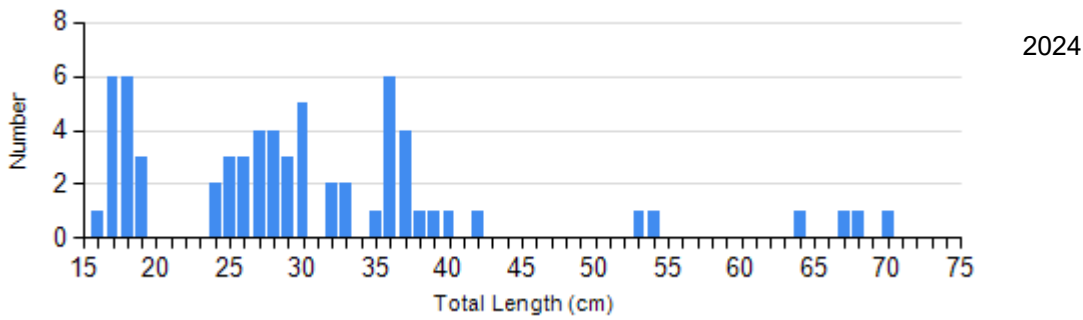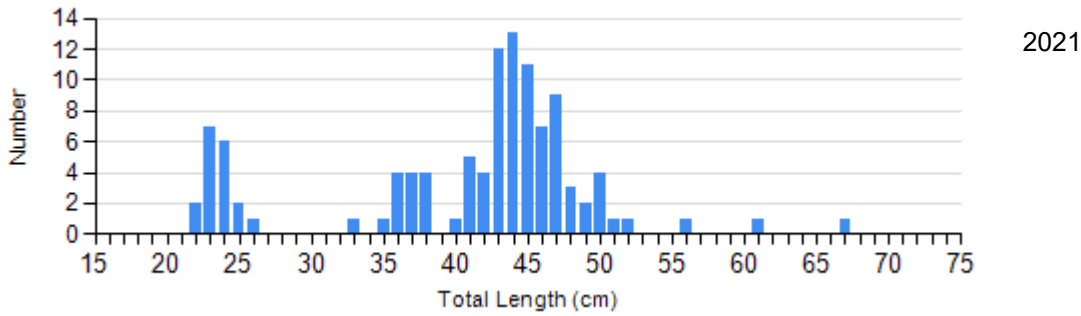
Historic Fish Sizes and Relative Abundance

Size distribution per net by color for species sampled by year.
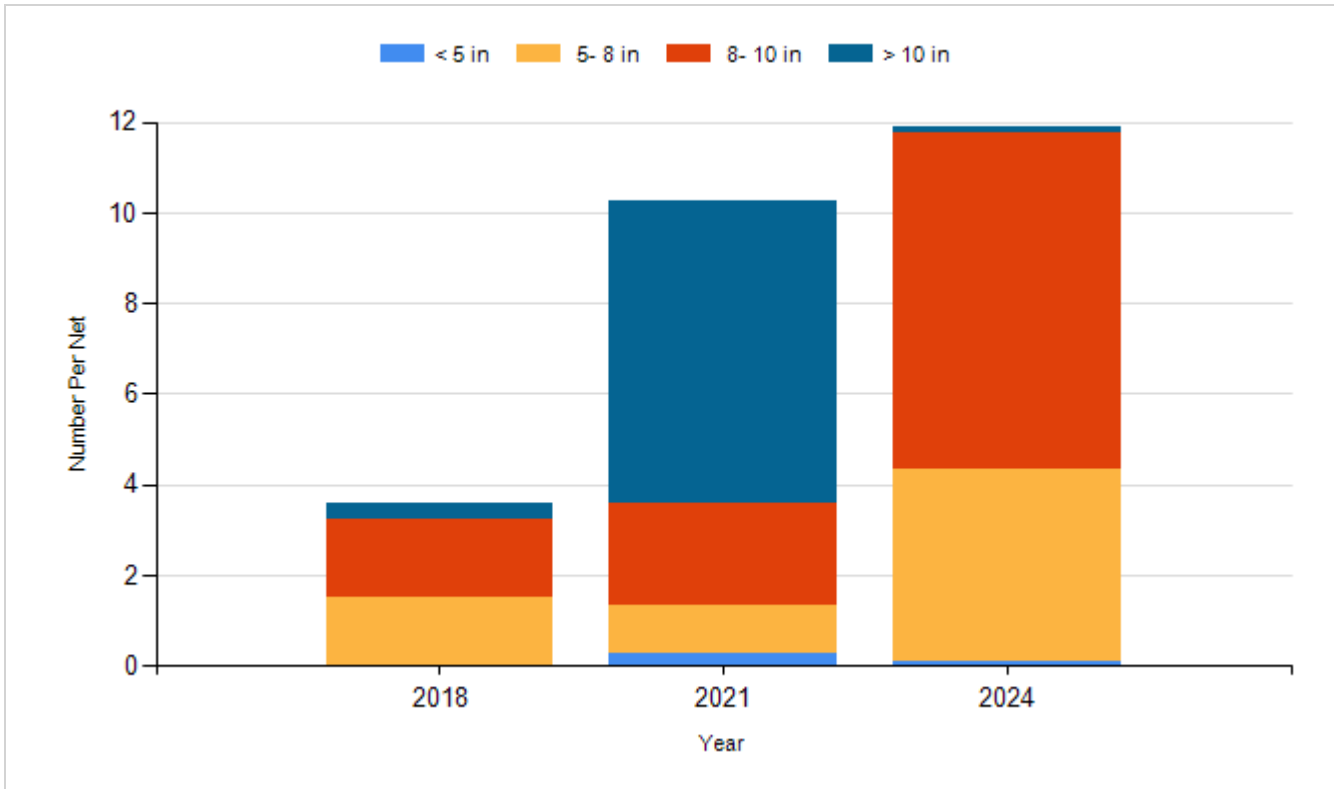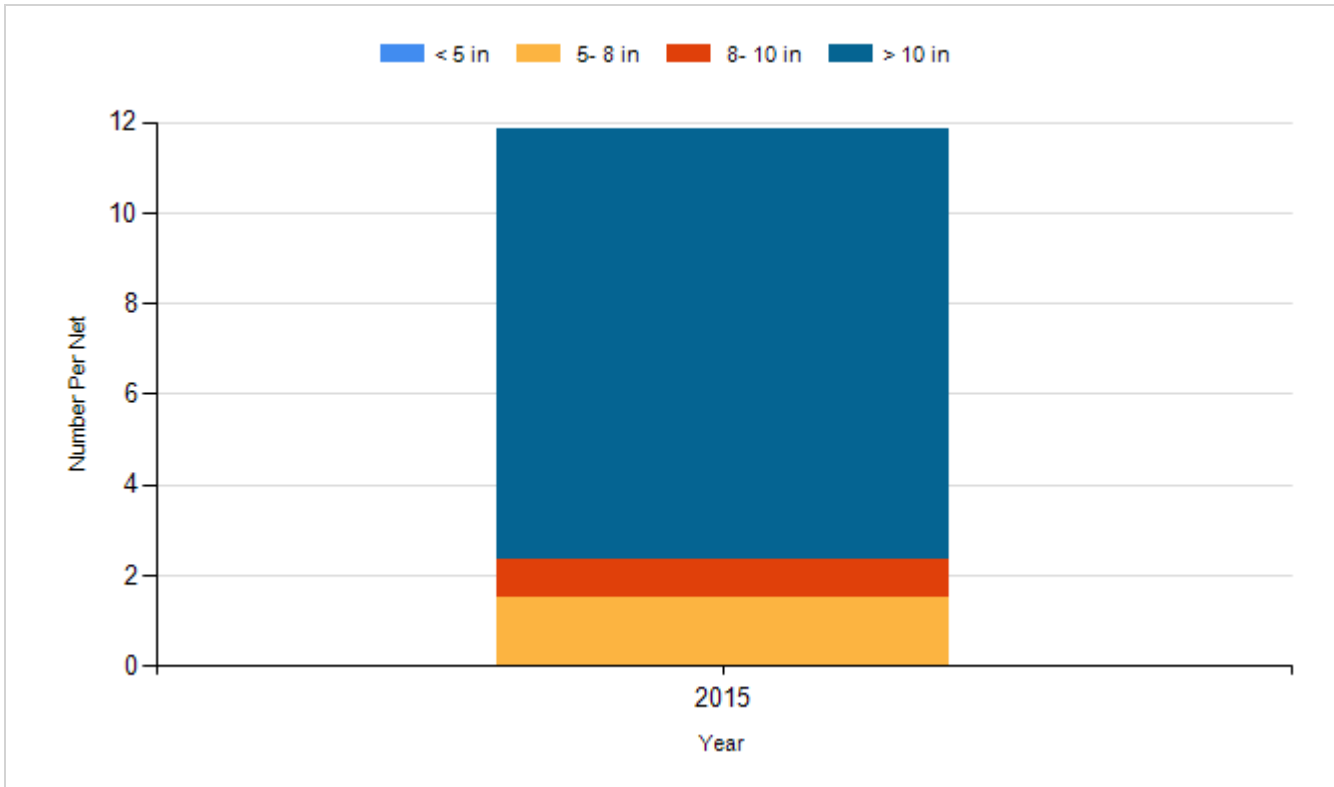
Species: Walleye
Gear: AFS std gill net

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
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
2022	Muskellunge	Adult	115
2022	Muskellunge	Juvenile	1,008
2023	Muskellunge	Adult	57
2023	Walleye	Fry	600,000