Lynn Lake Survey Summary

Lynn Lake, located 10.0 miles northwest of Webster, is managed as a multiple species fishery including panfish (i.e., black crappie, bluegill, and yellow perch), muskellunge and walleye. As with most lakes in the area, other fish species (e.g., northern pike, smallmouth bass) also contribute to the fishery.

Frame netting, which is typically used to sample black crappie and bluegill populations in northeast South Dakota, was not completed in 2021. Thus, the following summary will focus on those fish species assessed using gill nets (e.g., walleye, yellow perch) and muskellunge, which were targeted using large-framed trap nets shortly after ice out.

- **Muskellunge.** Muskellunge were introduced into Lynn Lake in 2001 and subsequently stocked on nine occasions from 2002 – 2021. Despite these stockings, relative abundance remains low. In 2021, 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 34 muskellunge from 32.5 to 48.3 inches were netted, 50% were ≥38.0 inches and 35% were ≥42.0 inches. Few muskellunge have been sampled in standard fisheries surveys conducted from 2012 - 2021.

- **Walleye.** Fewer walleyes were sampled in 2021 than in 2019. At 4.6 per gill net, relative abundance was considered low to moderate for Lynn Lake. Sampled walleyes ranged in length from 11.4 to 28.0 inches, 67% were ≥15.0 inches and 24% were ≥20.0 inches. Nine cohorts (2007, 2009, and 2014 – 2020) contributed to the catch, none were particularly strong. Individuals from naturally produced cohorts in 2018 (age 3) and 2020 (age 1) were the most abundant accounting for 58% of walleyes in the sample. The 2021 sample suggests good walleye growth with a mean length at capture at age 3 of 17.2 inches.

- **Yellow perch**. The 2021 mean gill net CPUE of 6.5 suggested low to moderate relative abundance. Yellow perch ranging in length from 5.5 to 12.2 inches were netted, 19% were ≥8.0 inches and 14% were ≥10.0 inches. The catch was comprised of fish from three year classes (2017, 2018, and 2020), most (86%) were from the 2020 (age-1) cohort, which had a mean length at capture of 6.7 inches.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Lynn, Day County
MUD-Lake-308-003
2021

Lake Information

Name: Lynn

County: Day

Surface Area: 1,607 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 31, 2021	4 net-nights
AFS std gill net	Sep 01, 2021	4 net-nights
AFS std gill net	Sep 02, 2021	4 net-nights

Common Fish Species Present

Black Crappie

Northern Pike

Muskellunge

Yellow Perch

Walleye

Smallmouth Bass

Rock Bass

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	1	0.1	0.1	100		0		89	
	Black Crappie	1	0.1	0.1	0		0		110	
	Bluegill	2	0.2	0.2	0		0		106	2
	Northern Pike	9	0.8	0.3	100		0		91	3
	Rock Bass	8	0.7	0.3	25		0		106	4
	Walleye	55	4.6	1.2	67	9	24	9	85	1
	Yellow Perch	78	6.5	0.9	19	7	14	6	96	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; AFS standard frame nets used in 2016**

		CPUE										
Gear	Species	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
AFS std gill net	Black Bullhead					0.0	0.0	0.0	0.0		0.1	0.02
	Black Crappie					0.1	0.5	0.3	0.1		0.1	0.22
	Bluegill					0.5	0.0	0.1	0.0		0.2	0.16
	Muskellunge					0.1	0.1	0.0	0.0		0.0	0.04
	Northern Pike					0.3	0.5	0.3	0.1		0.8	0.40
	Rock Bass					1.3	0.9	0.4	0.0		0.7	0.66
	Smallmouth Bass					0.2	0.2	0.0	0.1		0.0	0.10
	Walleye					10.3	4.0	9.2	13.5		4.6	8.32
	Yellow Perch					1.5	4.8	9.1	8.0		6.5	5.98
Fall night EF-WAE*	Walleye	4.0	315.0	157.8	10.0	547.5	7.1	14.0				150.77
frame net (std 3/4 in)**	Black Bullhead	2.1	0.9	0.1		0.0						0.78
	Black Crappie	5.2	1.7	0.3		1.0						2.05
	Bluegill	8.7	7.1	2.4		17.0						8.80
	Northern Pike	0.2	0.6	0.2		0.2						0.30
	Rock Bass	0.2	1.5	0.2		0.1						0.50
	Smallmouth Bass	0.2	0.2	0.1		0.2						0.18
	Walleye	0.8	1.2	1.2		1.5						1.18
	Yellow Perch	4.6	3.8	0.2		0.2						2.20
std exp gill net	Black Bullhead	0.7	0.2	0.2	0.0							0.28
	Black Crappie	0.8	0.2	0.0	0.2							0.30
	Bluegill	0.8	0.0	0.0	0.2							0.25
	Muskellunge	0.2	0.0	0.0	0.0							0.05
	Northern Pike	2.8	1.5	0.8	0.0							1.28
	Rock Bass	0.0	0.3	0.3	0.7							0.33
	Smallmouth Bass	0.3	0.0	0.3	0.0							0.15
	Walleye	9.5	8.5	8.7	4.8							7.88
	Yellow Perch	93.2	37.0	24.7	2.7							39.40

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					44	79	35	40		67
		PSD-P					19	33	25	12		24
		Wr					85	90	86	97		85
	Yellow Perch	PSD					33	31	34	20		19
		PSD-P					0	0	9	1		14
		Wr					110	102	104	104		96
std exp gill net	Walleye	PSD	86	27	69	31						
		PSD-P	11	8	29	14						
		Wr	89	88	84	84						
	Yellow Perch	PSD	36	49	1	81						
		PSD-P	6	9	0	0						
		Wr	99	106	105	101						

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	318 (17)	415 (5)	438 (15)	462 (4)	494 (1)	578 (1)	583 (1)			629 (11)
2019	165	287 (93)	398 (38)	460 (12)		502 (3)	526 (4)		575 (4)	543 (1)	614 (10)
2018	110	283 (56)	366 (22)		503 (3)	507 (4)		571 (5)	574 (3)	607 (14)	656 (3)
2017	48	304 (9)	389 (2)	452 (8)	469 (10)		527 (7)	574 (2)	600 (6)	515 (1)	614 (3)
2016	128	264 (30)	339 (43)	387 (20)		492 (12)	588 (3)	554 (10)	494 (1)	576 (1)	646 (8)
2015	52	227 (27)	310 (16)		423 (3)	479 (2)	565 (2)				687 (2)
2014	74	218 (24)	324 (2)	381 (27)	462 (2)	525 (11)	539 (2)			611 (2)	670 (4)
2013	52	248 (2)	325 (38)	465 (4)	496 (5)						616 (3)
2012	62	258 (13)	422 (4)	461 (36)	534 (2)	487 (3)				636 (1)	592 (3)

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	78	169 (67)		280 (10)	311 (1)						
2019	96	187 (95)	267 (1)								
2018	105	193 (92)	256 (13)								
2017	58	192 (57)	221 (1)								
2016	13	195 (13)									
2015	16	183 (3)	227 (13)								
2014	148	168 (138)	176 (8)	230 (1)		244 (1)					
2013	222	176 (5)	195 (153)	226 (53)	258 (12)						
2012	559	152 (348)	222 (122)	241 (90)							

Fish Condition

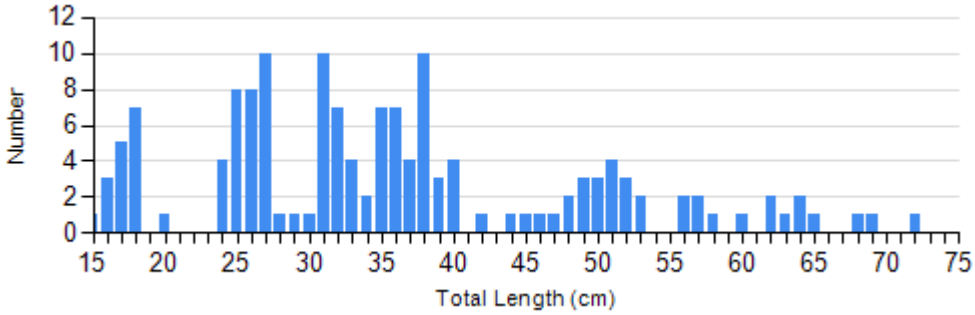
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2017	10	93 (1.2)	22	91 (1.7)	13	91 (1.6)	3	78 (7.6)
	2018	72	87 (0.6)	11	87 (1.5)	19	83 (1.8)	8	81 (3.6)
	2019	97	97 (0.7)	45	98 (1.1)	16	95 (2.0)	4	78 (7.6)
	2021	18	83 (2.4)	24	85 (1.4)	8	87 (1.9)	5	91 (2.7)
Yellow Perch Gill Net	2017	40	101 (1.0)	18	103 (1.3)	0		0	
	2018	72	105 (0.8)	27	102 (1.1)	10	101 (1.5)	0	
	2019	77	104 (0.8)	18	103 (1.4)	1	103	0	
	2021	63	96 (0.9)	4	96 (3.3)	10	97 (1.5)	1	89

Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net



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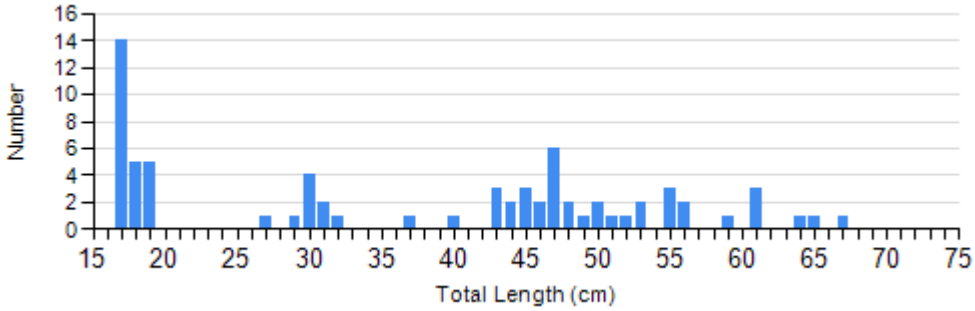

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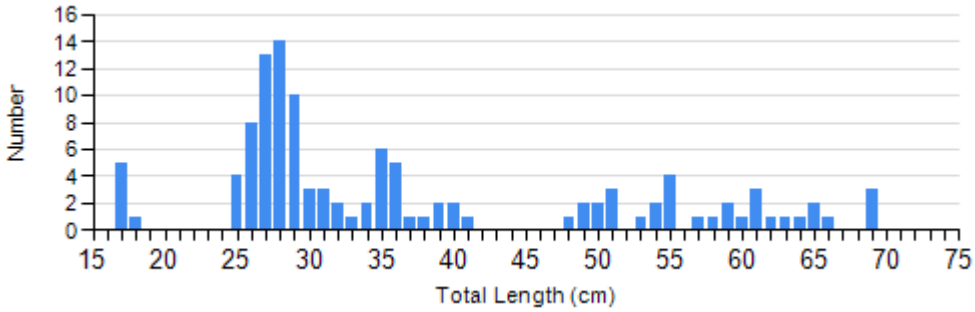

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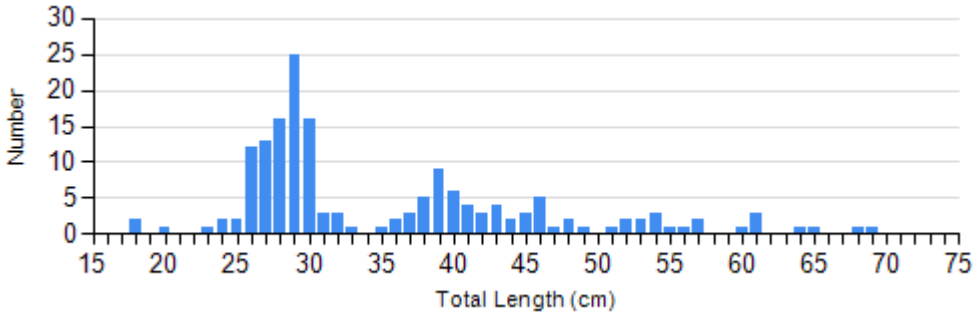

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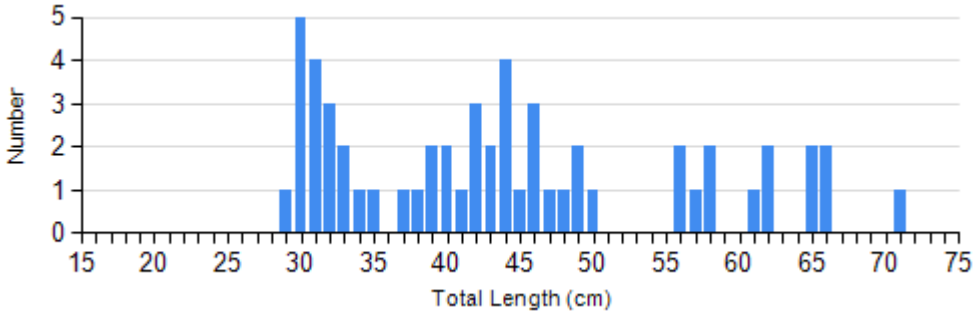
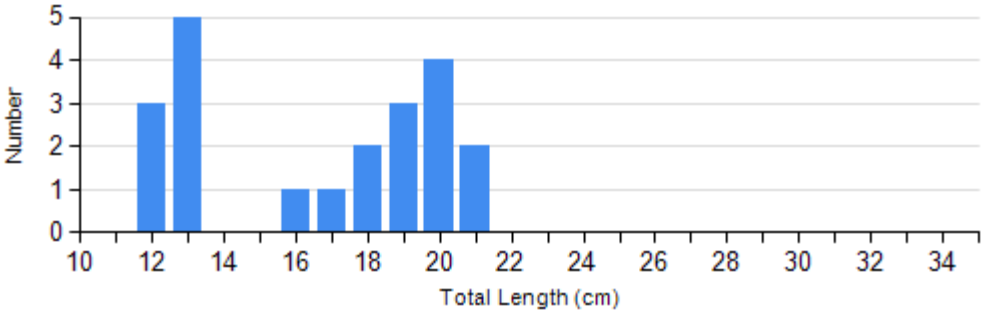


2021

Species: Yellow Perch
Gear: AFS std gill net



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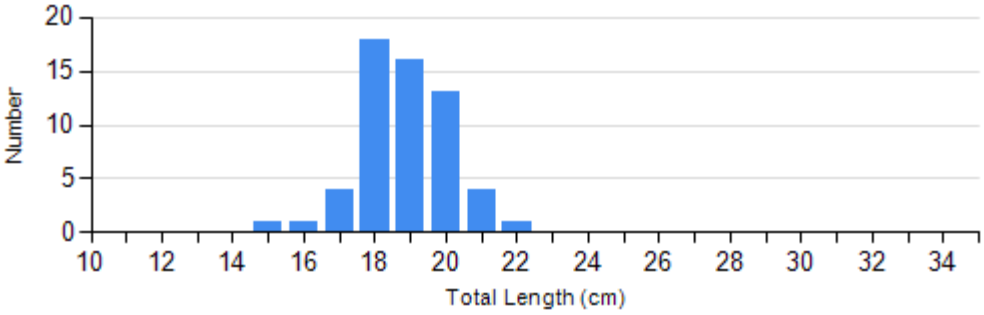

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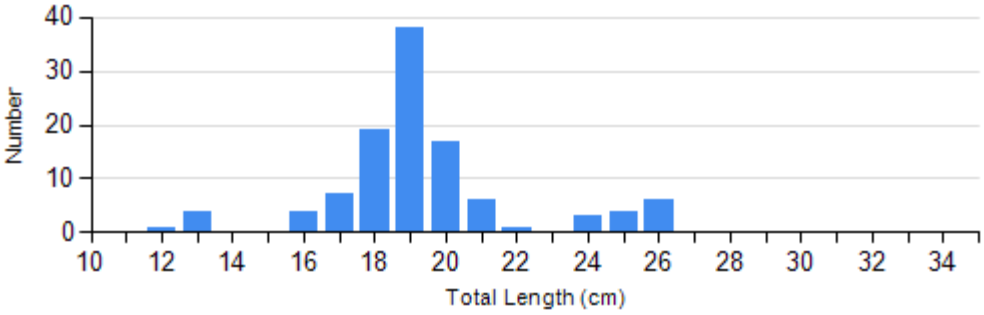

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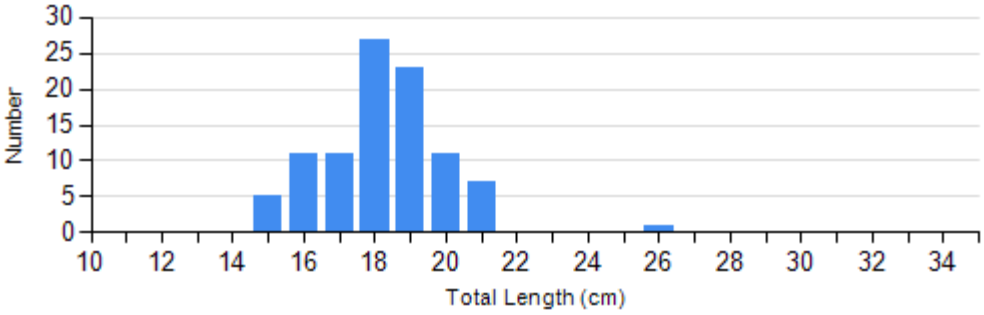

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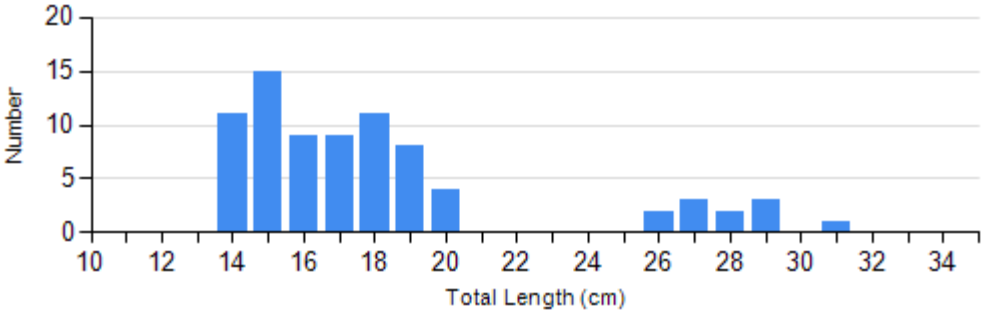
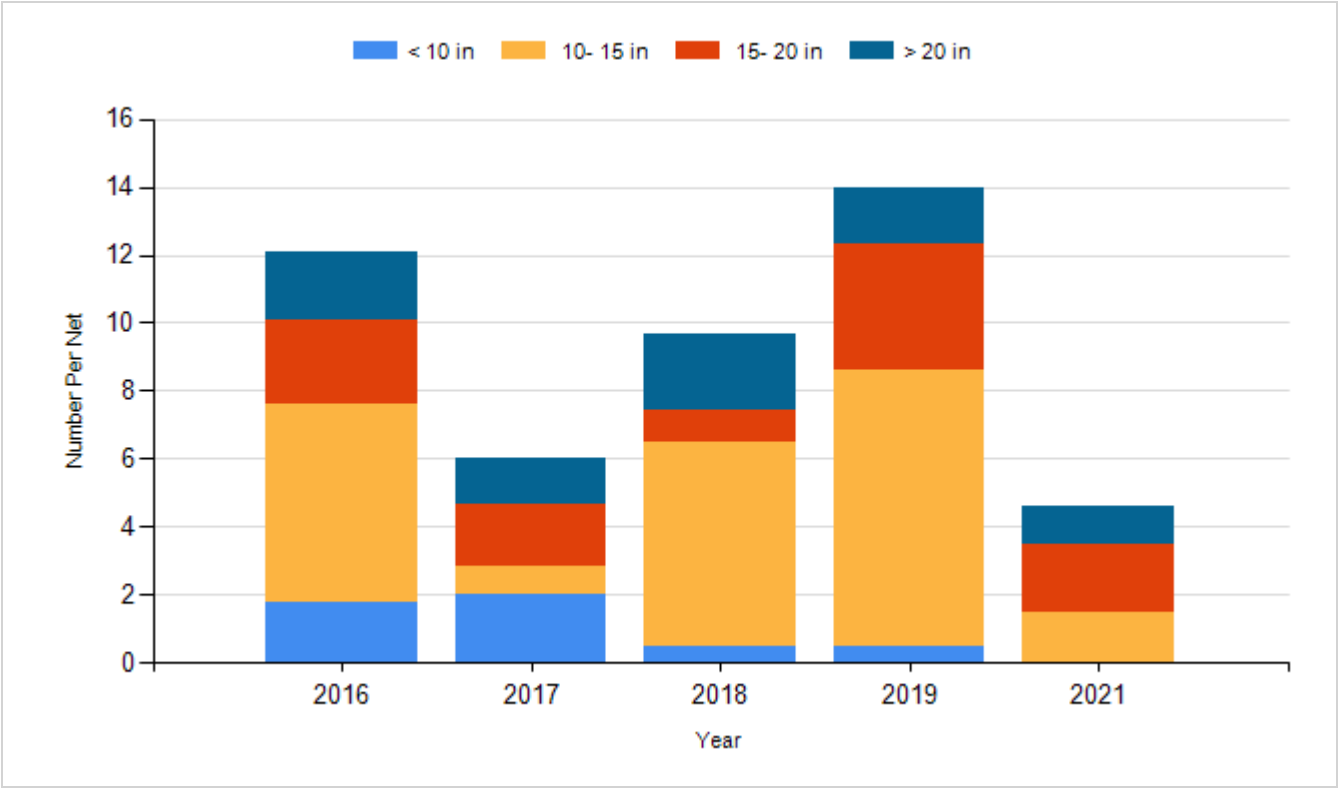


2021

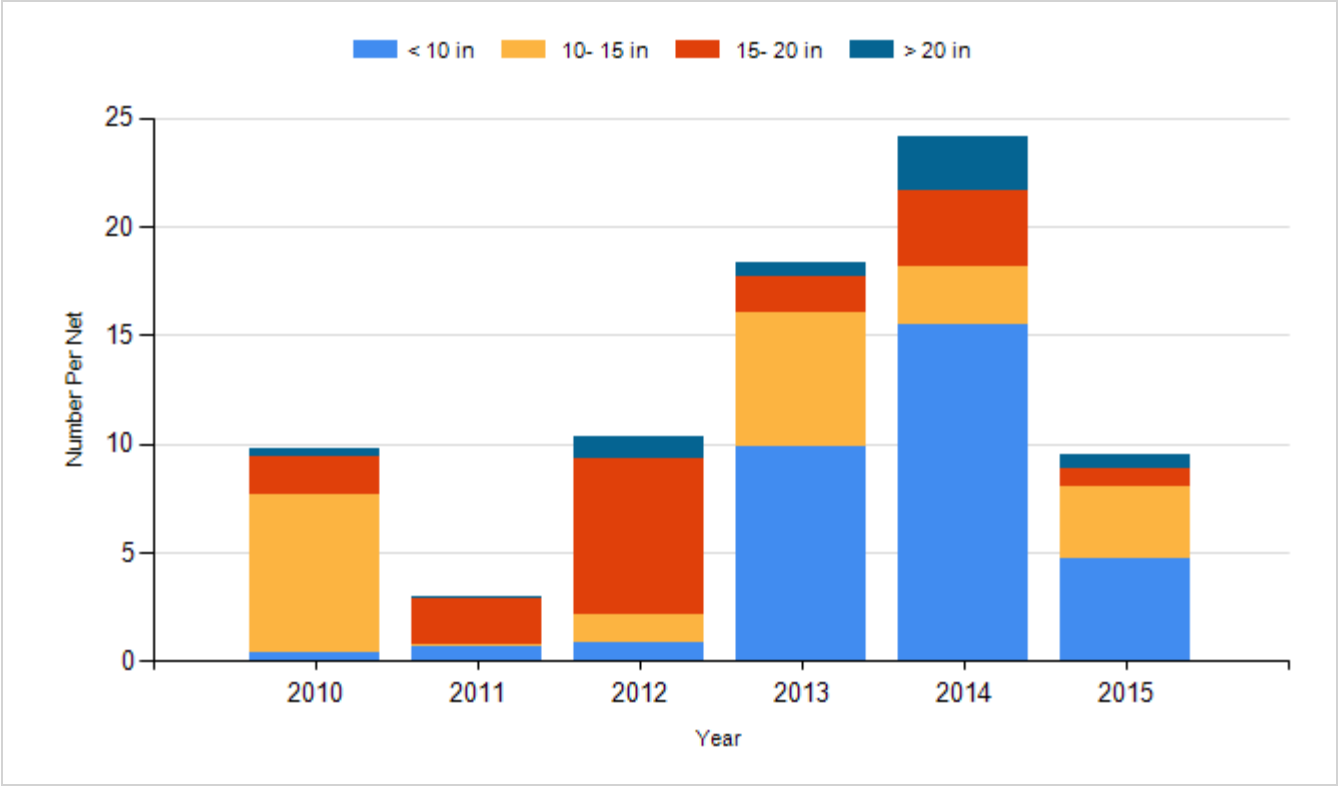
Historic Fish Sizes and Relative Abundance

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

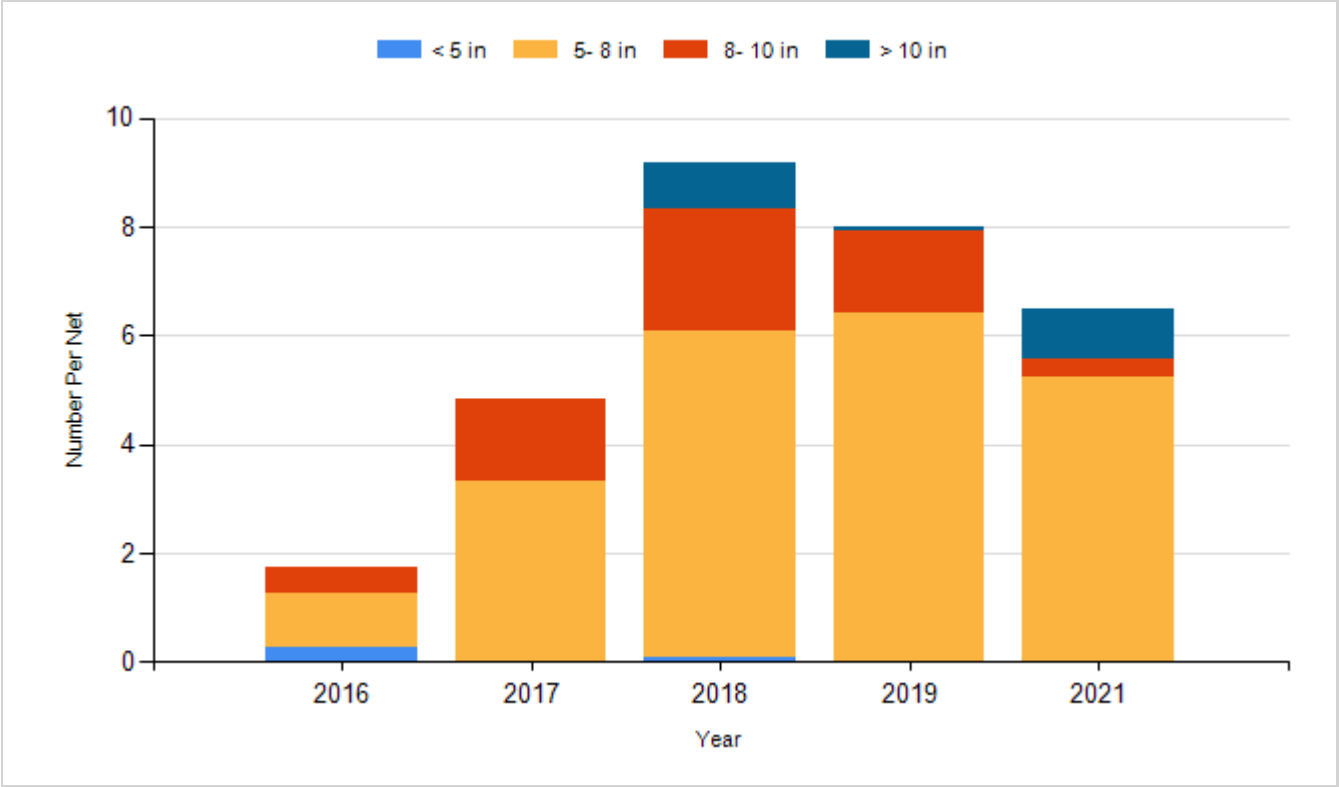
Species: Walleye
Gear: AFS std gill net



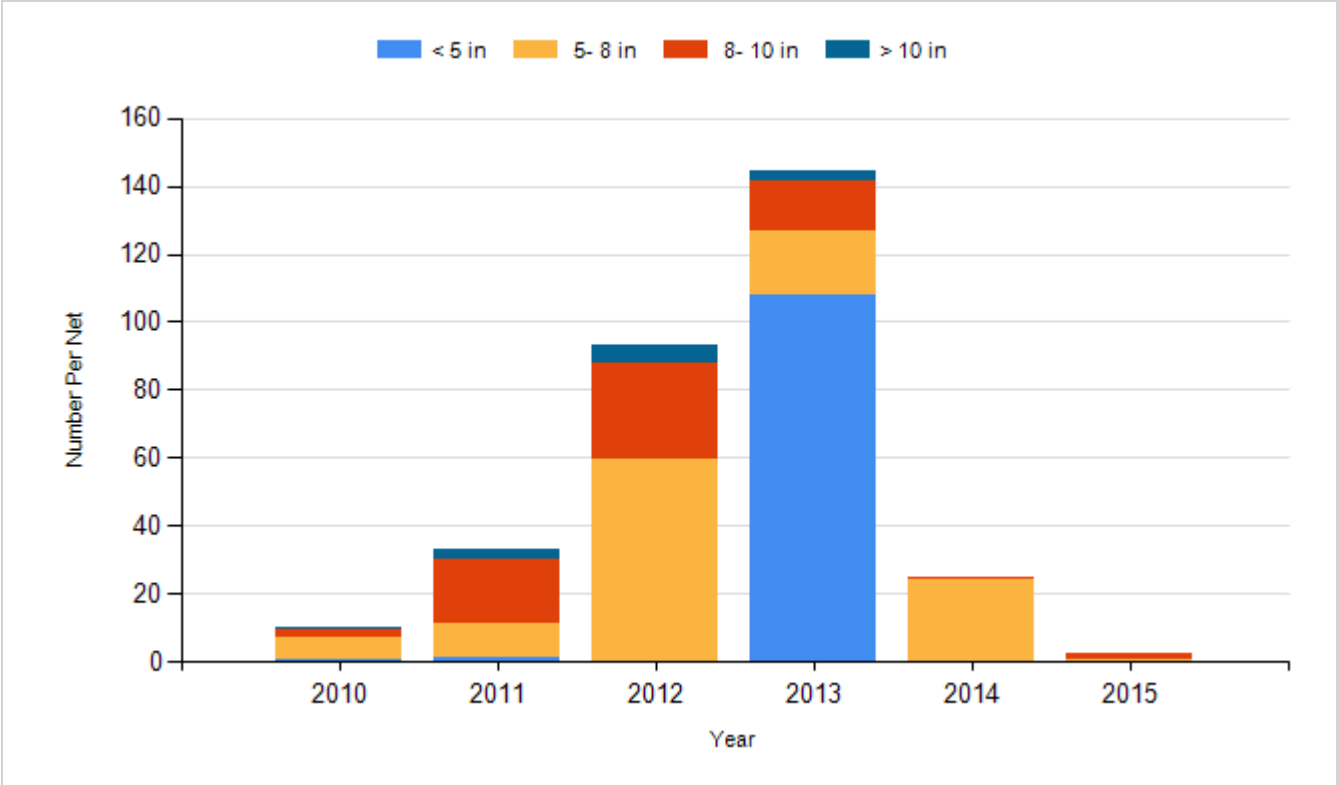
Species: Walleye
Gear: std exp gill net



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	Muskellunge	Juvenile	770
2011	Walleye	Fry	700,000
2012	Muskellunge	Large Fingerling	3,018
2013	Walleye	Fry	750,000
2014	Muskellunge	Large Fingerling	1,600
2016	Muskellunge	Large Fingerling	1,577
2016	Walleye	Fry	800,000
2019	Walleye	Fry	650,000
2020	Muskellunge	Juvenile	26
2021	Muskellunge	Juvenile	1,048
2021	Walleye	Fry	800,000