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) also contribute to the fishery.

Frame netting, which is typically used to sample black crappie and bluegill populations in northeast South Dakota, was not conducted during the standard survey in 2019. 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 seven occasions from 2002 – 2019. Despite these stockings, relative abundance remains low and muskellunge have been difficult to sample. In 2019, large-framed trap nets were used to target muskellunge for an extended period following ice out. Forty-eight muskellunge ranging in length from 31.0 to 47.0 inches were sampled, of those 29% were ≥38.0 inches and 22% were 42.0 inches or longer. Few muskellunge have been sampled during standard fisheries surveys conducted from 2010 - 2019.

- **Walleye.** Walleye numbers have increased in each of the last two surveys. At 13.5/gill net, relative abundance was considered high in 2019. A wide length range of walleyes was sampled (7.1 to 27.2 inches), of those that were at least 10.0 inches 40% were ≥15.0 inches and 12% were 20.0 inches or longer. The 2018 (age-1) cohort was the most abundant accounting for more than 50% of the walleye catch. Growth is moderate to fast with mean length at capture values from 15.0 to 18.5 inches at age 3 since 2010. In 2019, the mean length at capture of age-3 fish was 18.1 inches.

- **Yellow perch**. Slightly fewer yellow perch were sampled in 2019 than 2018. The 2019 mean gill net CPUE of 8.0 suggested low to moderate relative abundance. Yellow perch ranging in length from 5.9 to 10.2 inches were sampled, of which 20% were ≥8.0 inches and 1% were 10.0 inches or longer. The entire catch was comprised of fish from year classes produced in 2017 and 2018; most (95 of 96) were from the 2018 (age-1) cohort, which had a mean length at capture of 7.4 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
2019

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	Sep 10, 2019	6 net-nights
AFS std gill net	Sep 11, 2019	6 net-nights
large frame net	Apr 24, 2019	10 net-nights
large frame net	Apr 25, 2019	10 net-nights
large frame net	Apr 26, 2019	10 net-nights
large frame net	Apr 30, 2019	10 net-nights
large frame net	May 01, 2019	10 net-nights
large frame net	May 02, 2019	10 net-nights
large frame net	May 03, 2019	10 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Smallmouth Bass

Northern Pike

Muskellunge

Black Crappie

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).

*** Methods/Species that ignore stock length**

			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 Crappie	3	0.1	0.1	0		0		126	
	Northern Pike	2	0.1	0.1	100		100		75	
	Smallmouth Bass	18	0.1	0.1	100		100		112	
	Walleye	168	13.5	2.9	40	5	12	4	97	1
	Yellow Perch	96	8.0	2.5	20	6	1		104	1
large frame net	Muskellunge	48	0.7	0.2	100		29	10		

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.

*** AFS standard frame nets used in 2016**

		CPUE										
Gear	Species	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
AFS std gill net	Black Crappie							0.1	0.5	0.3	0.1	0.3
	Bluegill							0.5	0.0	0.1	0.0	0.2
	Muskellunge							0.1	0.1	0.0	0.0	0.1
	Northern Pike							0.3	0.5	0.3	0.1	0.3
	Rock Bass							1.3	0.9	0.4	0.0	0.7
	Smallmouth Bass							0.2	0.2	0.0	0.1	0.1
	Walleye							10.3	4.0	9.2	13.5	9.3
	Yellow Perch							1.5	4.8	9.1	8.0	5.9
fall night EF-WAE	Walleye	0.0	143.0	4.0	315.0	157.8	10.0	547.5	7.1	14.0		133.2
frame net (std 3/4 in)*	Black Bullhead	0.1	0.7	2.1	0.9	0.1		0.0				0.7
	Black Crappie	1.7	11.9	5.2	1.7	0.3		1.0				3.6
	Bluegill	6.8	22.4	8.7	7.1	2.4		17.0				10.7
	Northern Pike	0.1	0.1	0.2	0.6	0.2		0.2				0.2
	Rock Bass	0.1	0.4	0.2	1.5	0.2		0.1				0.4
	Smallmouth Bass	0.1	0.6	0.2	0.2	0.1		0.2				0.2
	Walleye	2.2	1.6	0.8	1.2	1.2		1.5				1.4
	Yellow Perch	2.7	18.7	4.6	3.8	0.2		0.2				5.0
large frame net	Muskellunge										0.7	0.7
std exp gill net	Black Bullhead	0.0	0.1	0.7	0.2	0.2	0.0					0.2
	Black Crappie	0.1	2.2	0.8	0.2	0.0	0.2					0.6
	Bluegill	0.2	0.2	0.8	0.0	0.0	0.2					0.2
	Muskellunge	0.0	0.0	0.2	0.0	0.0	0.0					0.0
	Northern Pike	0.0	0.6	2.8	1.5	0.8	0.0					1.0
	Rock Bass	0.3	0.1	0.0	0.3	0.3	0.7					0.3
	Smallmouth Bass	0.0	0.0	0.3	0.0	0.3	0.0					0.1
	Walleye	9.4	2.3	9.5	8.5	8.7	4.8					7.2
	Yellow Perch	9.8	31.7	93.2	37.0	24.7	2.7					33.2

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	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AFS std gill net	Walleye	PSD							44	79	35	40
		PSD-P							19	33	25	12
		Wr							85	90	86	97
	Yellow Perch	PSD							33	31	34	20
		PSD-P							0	0	9	1
		Wr							110	102	104	104
large frame net	Muskellunge	PSD										100
		PSD-P										29
std exp gill net	Walleye	PSD	22	95	86	27	69	31				
		PSD-P	4	7	11	8	29	14				
		Wr	93	88	89	88	84	84				
	Yellow Perch	PSD	31	69	36	49	1	81				
		PSD-P	7	9	6	9	0	0				
		Wr	101	101	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+
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)
2011	42	346 (2)	412 (37)				627 (1)				588 (2)
2010	170	338 (131)	425 (21)	470 (11)		571 (1)		510 (2)	511 (1)		577 (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+
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)							
2011	571	174 (171)	226 (382)	253 (7)	277 (11)						
2010	177	188 (157)	239 (12)	288 (7)	285 (1)						

Fish Condition

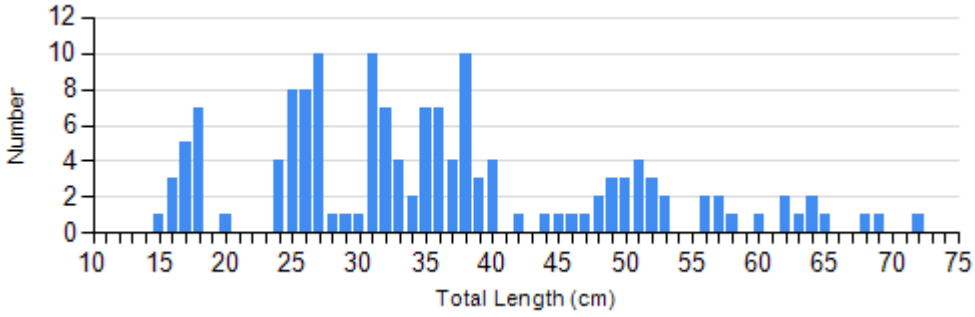
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Walleye Gill Net	2015	20	86 (1.3)	5	82 (1.8)	2	77 (3.0)	2	73 (3.1)
	2016	70	85 (0.5)	30	87 (1.3)	17	88 (2.1)	7	76 (2.7)
	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)
Yellow Perch Gill Net	2015	3	102 (0.7)	13	100 (2.7)	0		0	
	2016	12	112 (1.4)	6	107 (2.5)	0		0	
	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	

Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net



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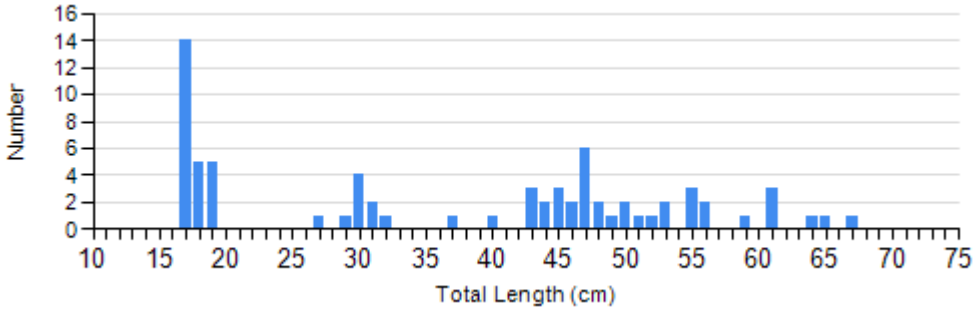

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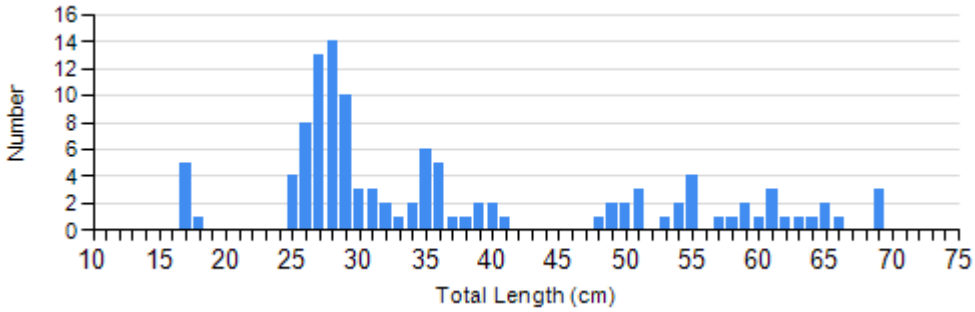
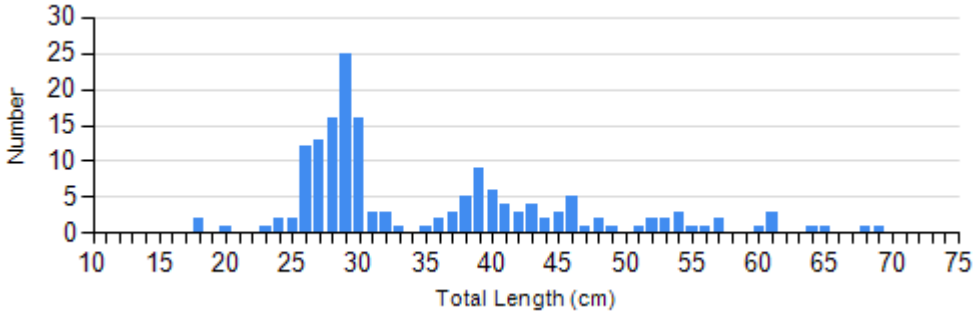
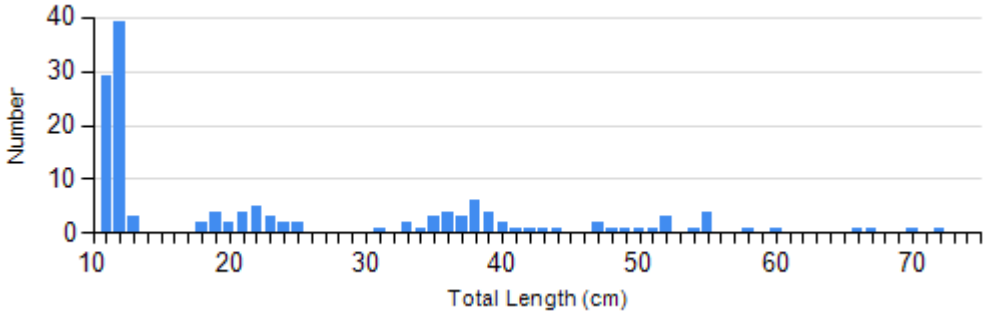


2018



2019

Species: Walleye
Gear: std exp gill net



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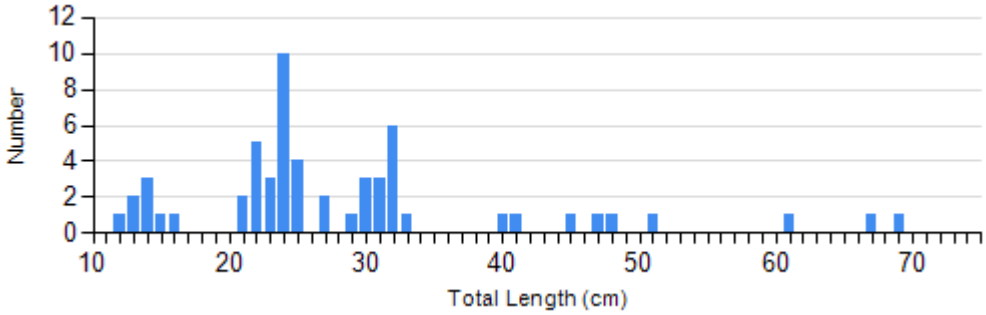
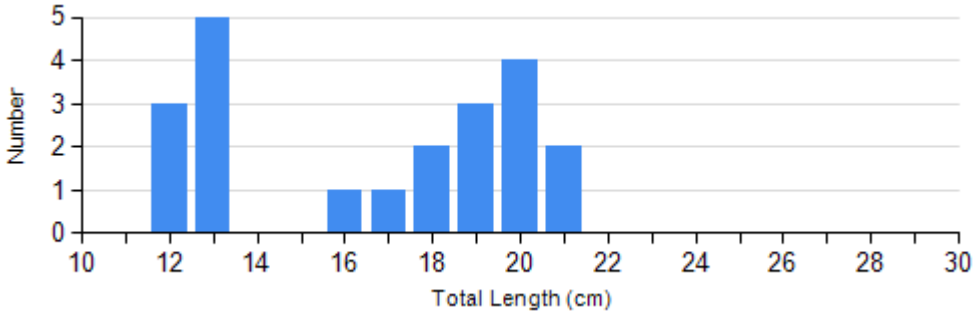


2015

Species: Yellow Perch
Gear: AFS std gill net



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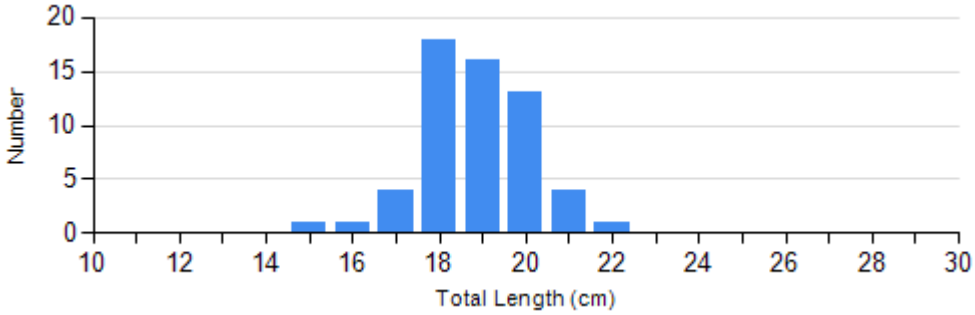
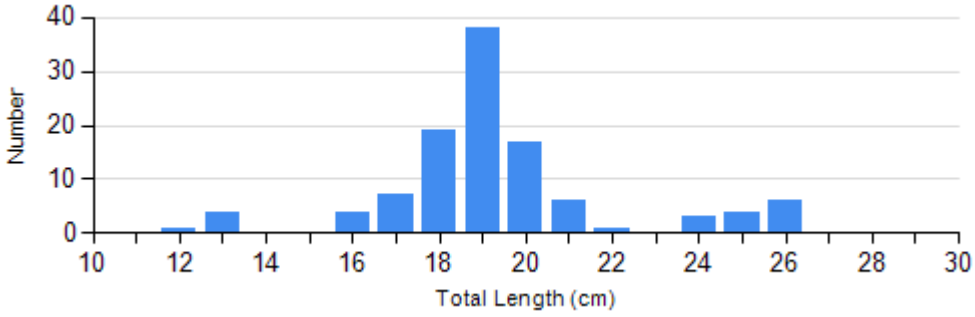


2017



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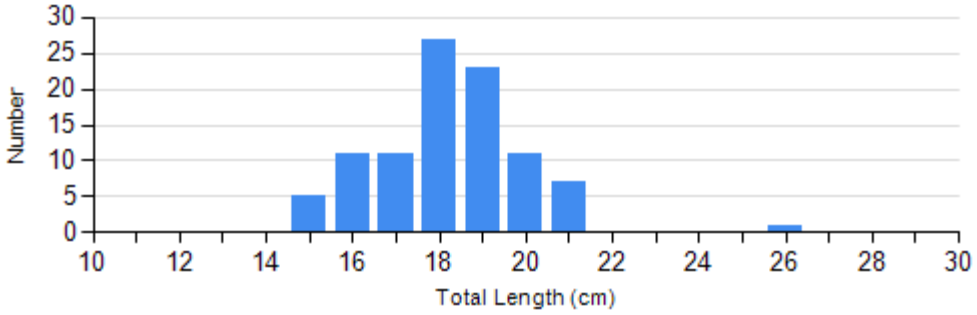
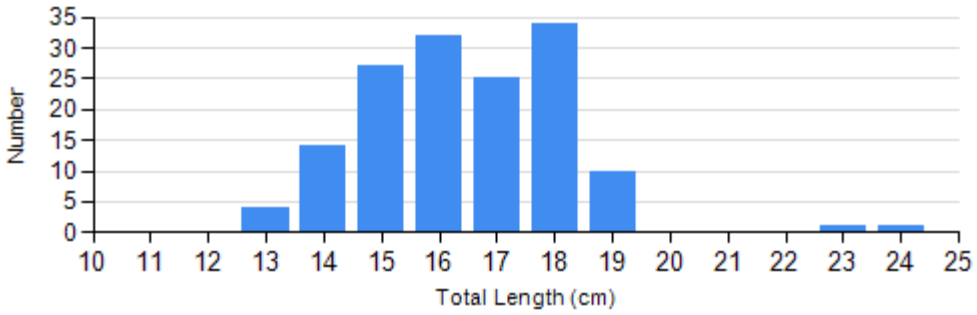
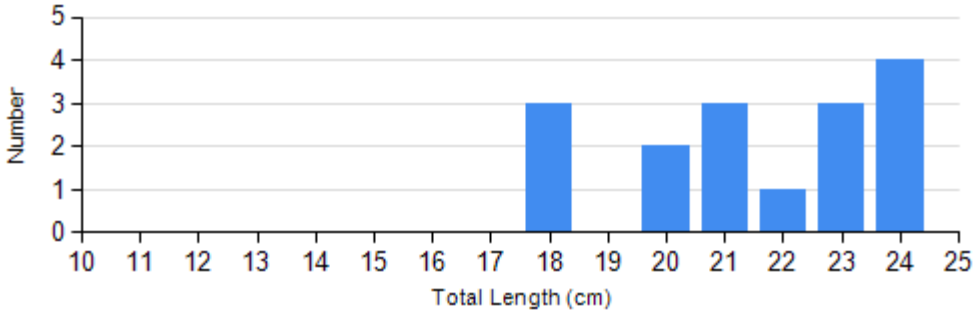


2019

Species: Yellow Perch
Gear: std exp gill net



2014

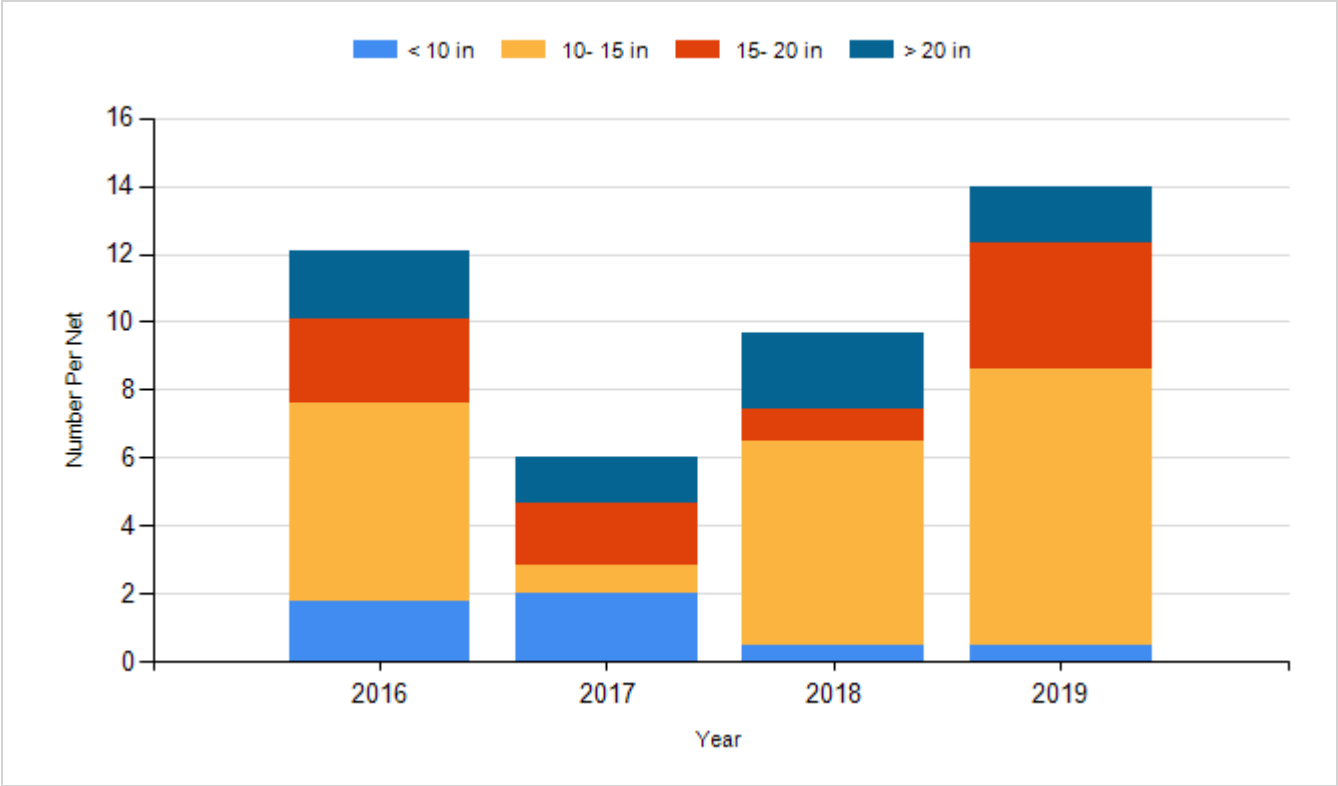


2015

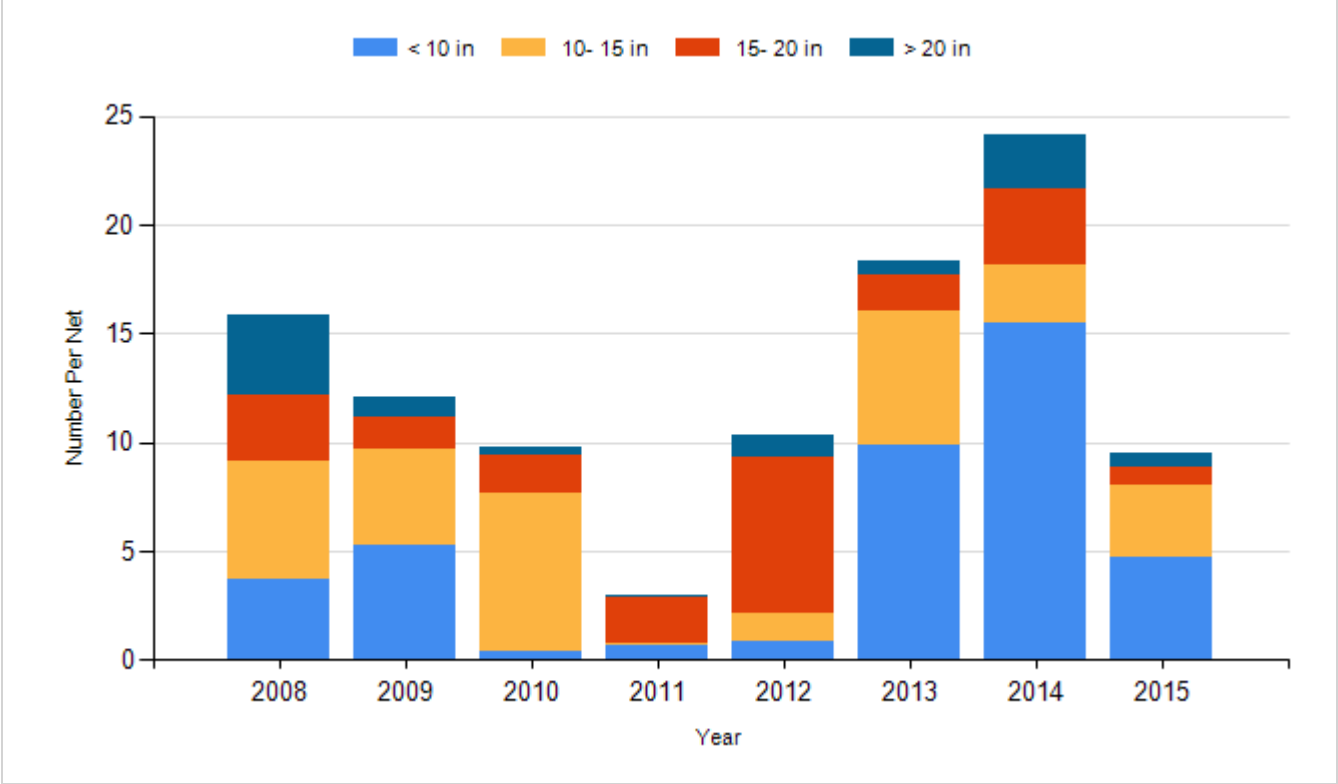
Historic Fish Sizes and Relative Abundance

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

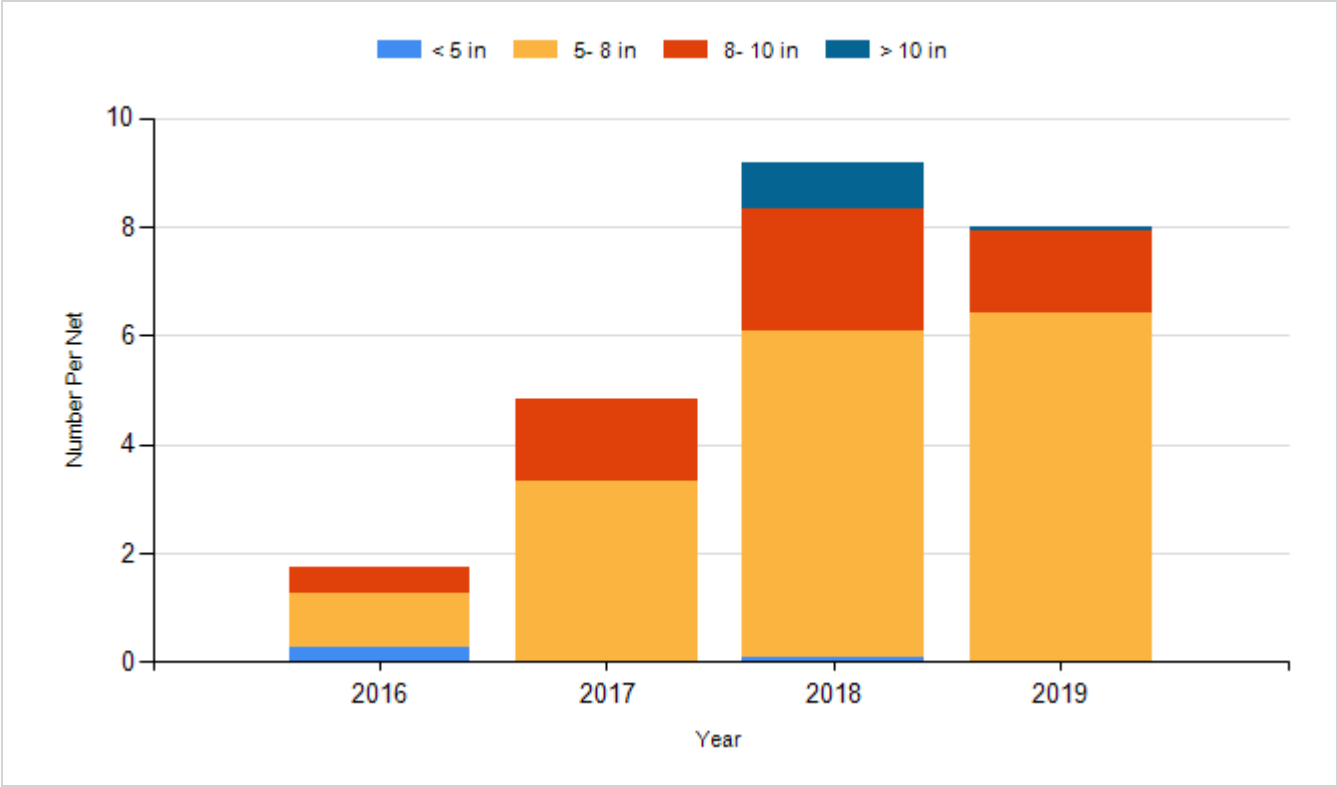
Species: Walleye
Gear: AFS std gill net



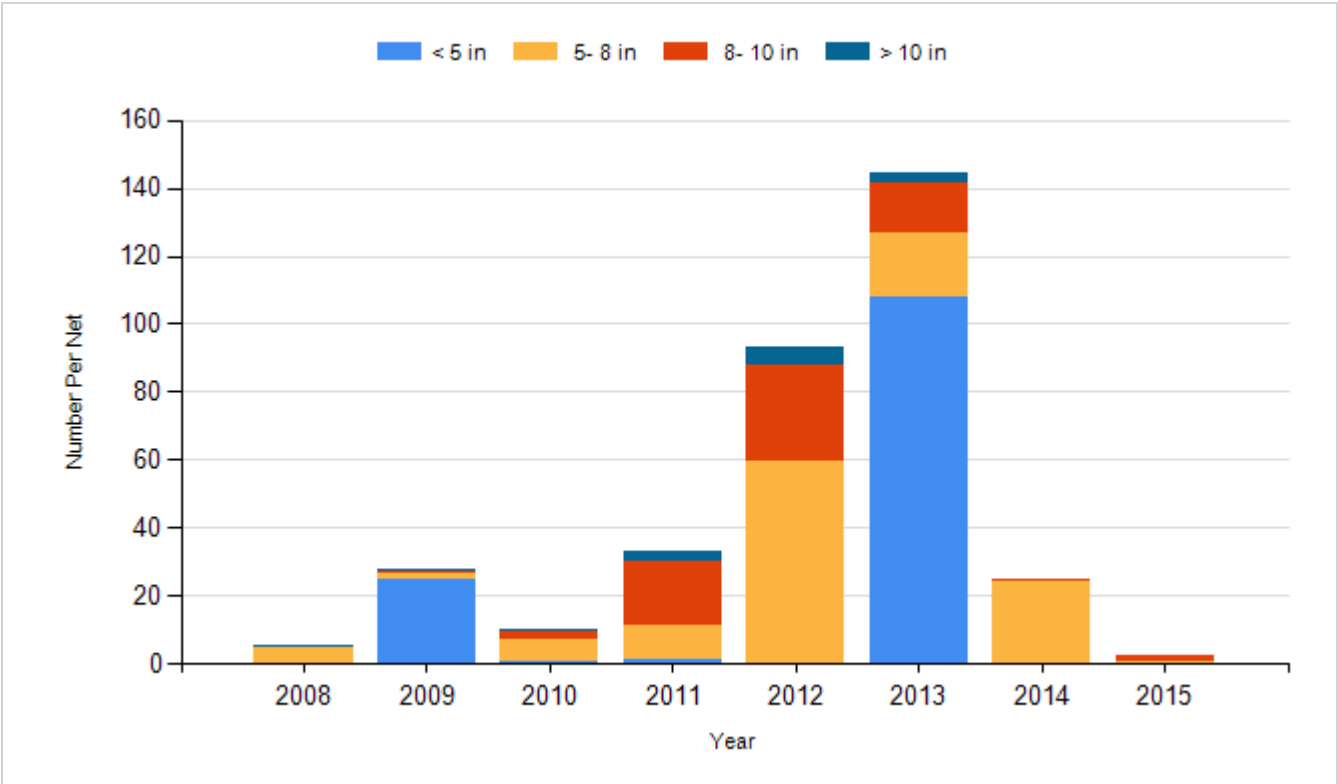
Species: Walleye
Gear: std exp gill net



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