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 in 2018. Frame nets are included in fish sampling efforts on a three-year rotation at Lynn Lake (next survey scheduled for 2019). Thus, the following summary will focus on those fish species assessed using gill nets (e.g., walleye, yellow perch).

- **Muskellunge.** Muskellunge were introduced into Lynn Lake in 2001 and subsequently stocked on seven occasions from 2002 – 2018. Despite these stockings, relative abundance remains low and muskellunge are difficult to sample. In 2018, Lynn Lake was used as an egg source for walleye spawning operations; both large and small frame nets were used to collect walleye broodstock and muskellunge for an extended period of time following ice out. Ten muskellunge that ranged in length from 28.1 to 43.0 inches were sampled. Few muskellunge have been sampled during standard fisheries surveys conducted from 2009 - 2018.

- **Walleye.** Walleye numbers were higher in 2018 than 2017. At 9.2/gill net, relative abundance was considered moderate to high. A wide length range of walleyes was sampled (6.7 to 27.2 inches) as 11 year classes produced between 2000 and 2018 were represented. Those from the 2017 (age-1) and 2016 (age-2) cohorts, which had mean lengths of 11.1 and 14.4 inches, were the most abundant accounting for more than 70% of the walleye catch.

- **Yellow perch**. Although the yellow perch catch has increased in each of the last two surveys (2017 and 2018), relative abundance remains low to moderate (9.1/gill net). Sampled yellow perch ranged in length from 4.7 to 10.2 inches; three year classes (2016 – 2018) comprised the entire sample. Those from the 2017 (age-1) cohort, which had a mean length of 7.6 inches, accounted for 88% of yellow perch in the sample.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Lynn, Day County
MUD-Lake-308-003
2018

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 05, 2018	6 net-nights
AFS std gill net	Sep 06, 2018	6 net-nights
fall night EF-WAE	Oct 17, 2018	3600 seconds

Common Fish Species Present

Black Crappie

Northern Pike

Muskellunge

Yellow Perch

Walleye

Smallmouth Bass

Rock Bass

Bluegill

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)
Bigmouth Buffalo	11	28	18	46	24	61	30	76	37	94
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
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Common Carp	11	28	16	41	21	53	26	66	33	84
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Gizzard Shad	7	18	11	28						
Green Sunfish	3	8	6	15	8	20	10	25	12	30
Lake Herring	5	13	8	20	11	28	14	35	17	43
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
Rock Bass	4	10	7	18	9	23	11	28	13	33
Rudd	6	15	10	25	12	30	15	38	19	48
Saugeye	9	23	14	35	18	46	22	56	27	69
Shorthead Redhorse	6	15	10	25	13	33	16	41	20	51
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
White Sucker	6	15	10	25	13	33	16	41	20	51
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	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Black Crappie	0.3	0.3	0		0		126	4
	Bluegill	0.1	0.1	0		0		104	
	Northern Pike	0.3	0.2	100		100		72	9
	Rock Bass	0.4	0.3	20		0		116	4
	Walleye	9.2	1.8	35	6	25	6	86	1
	Yellow Perch	9.1	3.2	34	6	9	4	104	1
fall night EF-WAE*	Walleye	14.0	8.1					92	2

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 std frame nets used in 2016**

		CPUE										
Gear	Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Avg
AFS std gill net	Black Crappie								0.1	0.5	0.3	0.3
	Bluegill								0.5	0.0	0.1	0.2
	Muskellunge								0.1	0.1	0.0	0.1
	Northern Pike								0.3	0.5	0.3	0.4
	Rock Bass								1.3	0.9	0.4	0.9
	Smallmouth Bass								0.2	0.2	0.0	0.1
	Walleye								10.3	4.0	9.2	7.8
	Yellow Perch								1.5	4.8	9.1	5.1
fall night EF-WAE*	Walleye	127.1	0.0	143.0	4.0	315.0	157.8	10.0	547.5	7.1	14.0	132.6
frame net (std 3/4 in)**	Black Bullhead	0.0	0.1	0.7	2.1	0.9	0.1		0.0			0.6
	Black Crappie	1.7	1.7	11.9	5.2	1.7	0.3		1.0			3.4
	Bluegill	20.6	6.8	22.4	8.7	7.1	2.4		17.0			12.1
	Northern Pike	0.1	0.1	0.1	0.2	0.6	0.2		0.2			0.2
	Rock Bass	0.3	0.1	0.4	0.2	1.5	0.2		0.1			0.4
	Smallmouth Bass	0.1	0.1	0.6	0.2	0.2	0.1		0.2			0.2
	Walleye	1.5	2.2	1.6	0.8	1.2	1.2		1.5			1.4
	Yellow Perch	1.7	2.7	18.7	4.6	3.8	0.2		0.2			4.6
std exp gill net	Black Bullhead	0.0	0.0	0.3	0.7	0.2	0.2	0.0				0.2
	Black Crappie	0.5	0.3	6.5	0.8	0.2	0.0	0.2				1.2
	Bluegill	0.2	0.5	0.7	0.8	0.0	0.0	0.2				0.3
	Muskellunge	0.0	0.0	0.0	0.2	0.0	0.0	0.0				0.0
	Northern Pike	0.2	0.0	1.7	2.8	1.5	0.8	0.0				1.0
	Rock Bass	0.0	1.0	0.3	0.0	0.3	0.3	0.7				0.4
	Smallmouth Bass	0.0	0.0	0.0	0.3	0.0	0.3	0.0				0.1
	Walleye	20.5	28.3	7.0	9.5	8.5	8.7	4.8				12.5
	Yellow Perch	8.2	29.5	95.2	93.2	37.0	24.7	2.7				41.5

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	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AFS std gill net	Muskellunge	PSD								100	100	
		PSD-P								100	0	
		Wr								87	85	
	Walleye	PSD								44	79	35
		PSD-P								19	33	25
		Wr								85	90	86
	Yellow Perch	PSD								33	31	34
		PSD-P								0	0	9
		Wr								110	102	104
std exp gill net	Muskellunge	PSD				100						
		PSD-P				0						
		Wr				93						
	Walleye	PSD	35	22	95	86	27	69	31			
		PSD-P	14	4	7	11	8	29	14			
		Wr	90	93	88	89	88	84	84			
	Yellow Perch	PSD	45	31	69	36	49	1	81			
		PSD-P	2	7	9	6	9	0	0			
		Wr	108	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+
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)
2009	123	301 (37)	357 (48)	422 (7)	499 (6)		483 (2)	517 (6)	544 (2)	516 (13)	669 (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+
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)						
2009	149	115 (127)	232 (22)								

Fish Condition

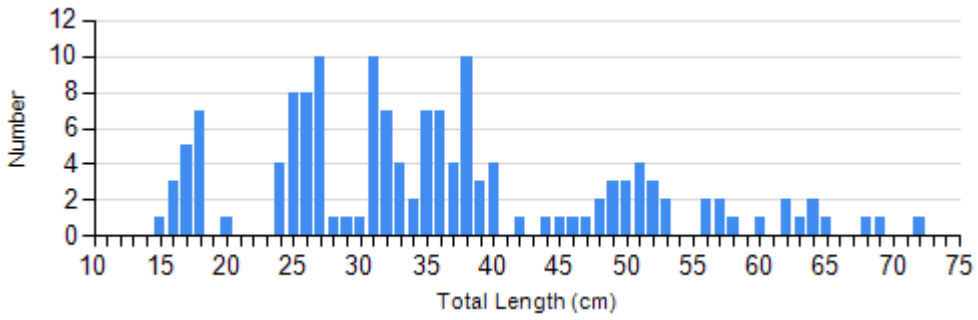
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2014	16	84 (1.2)	21	83 (0.7)	11	86 (1.9)	4	86 (2.3)
	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)
Yellow Perch Gill Net	2014	146	105 (0.5)	2	104 (6.8)	0		0	
	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	

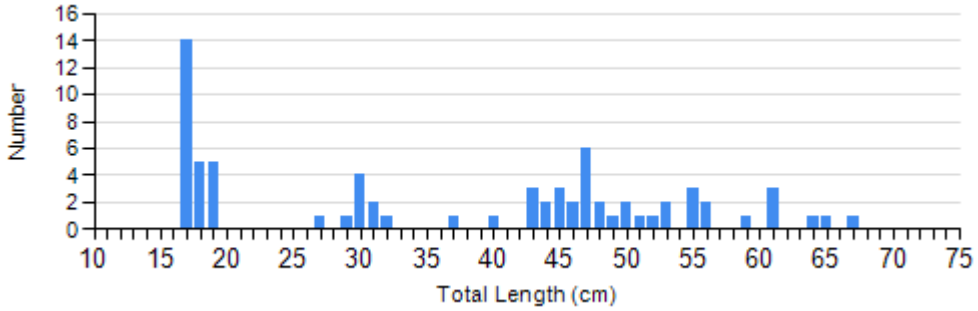
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net



2016



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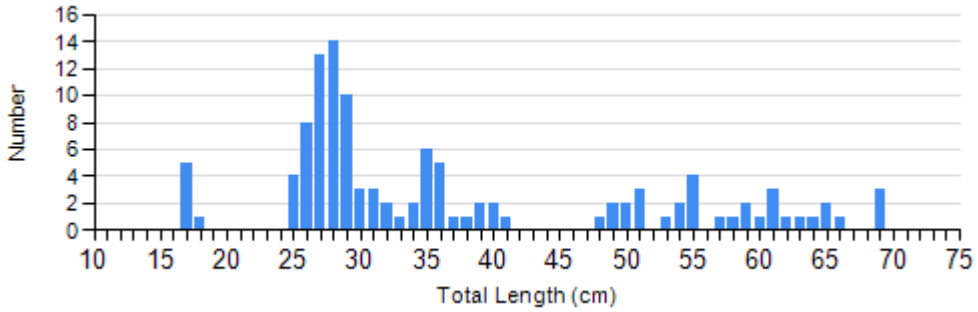
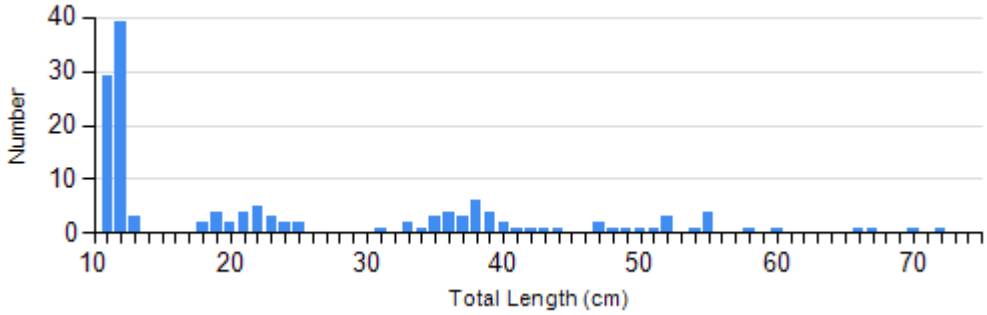
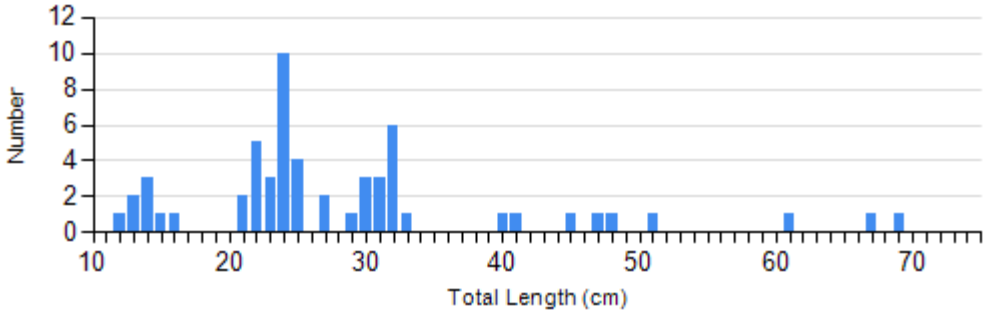


2018

Species: Walleye
Gear: std exp gill net

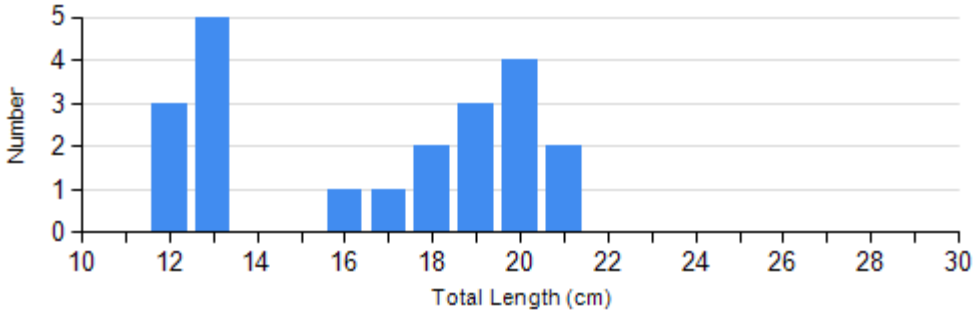


2014

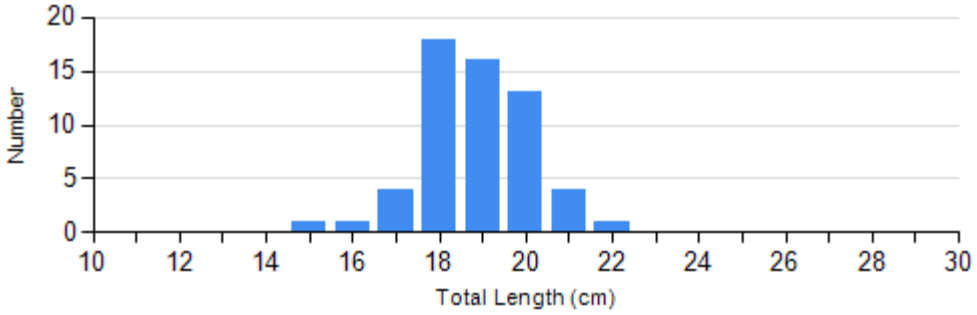


2015

Species: Yellow Perch
Gear: AFS std gill net



2016



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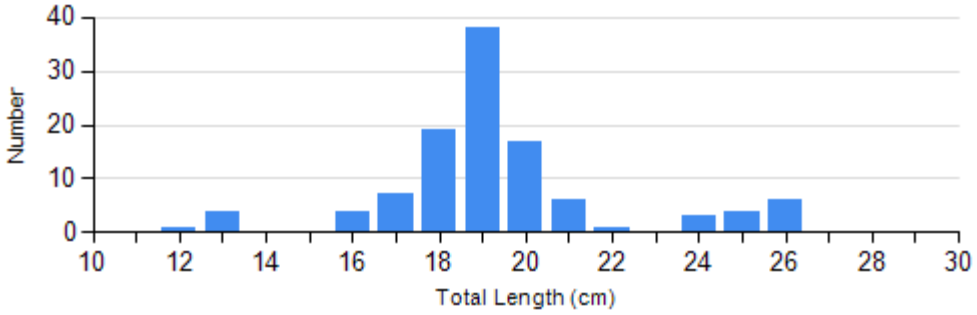
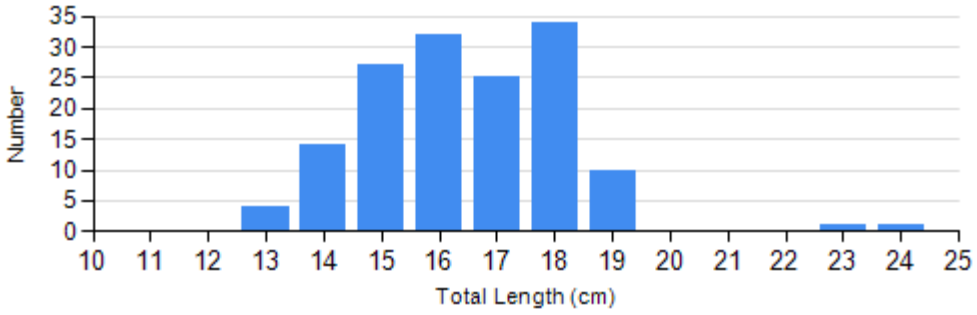
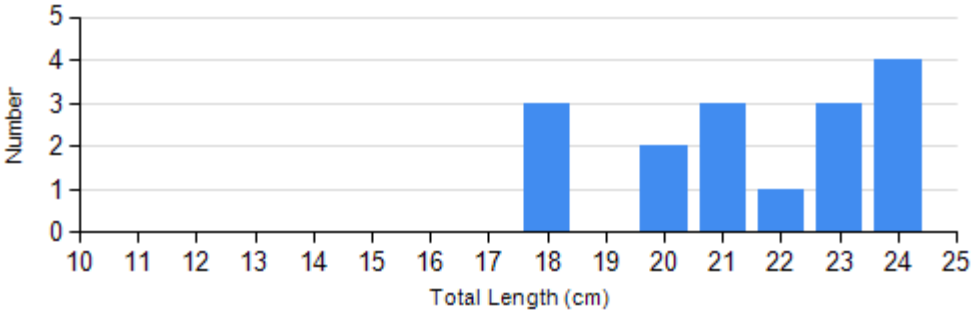


2018

Species: Yellow Perch
Gear: std exp gill net



2014


Number
5
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3
2
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11
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16
17
18
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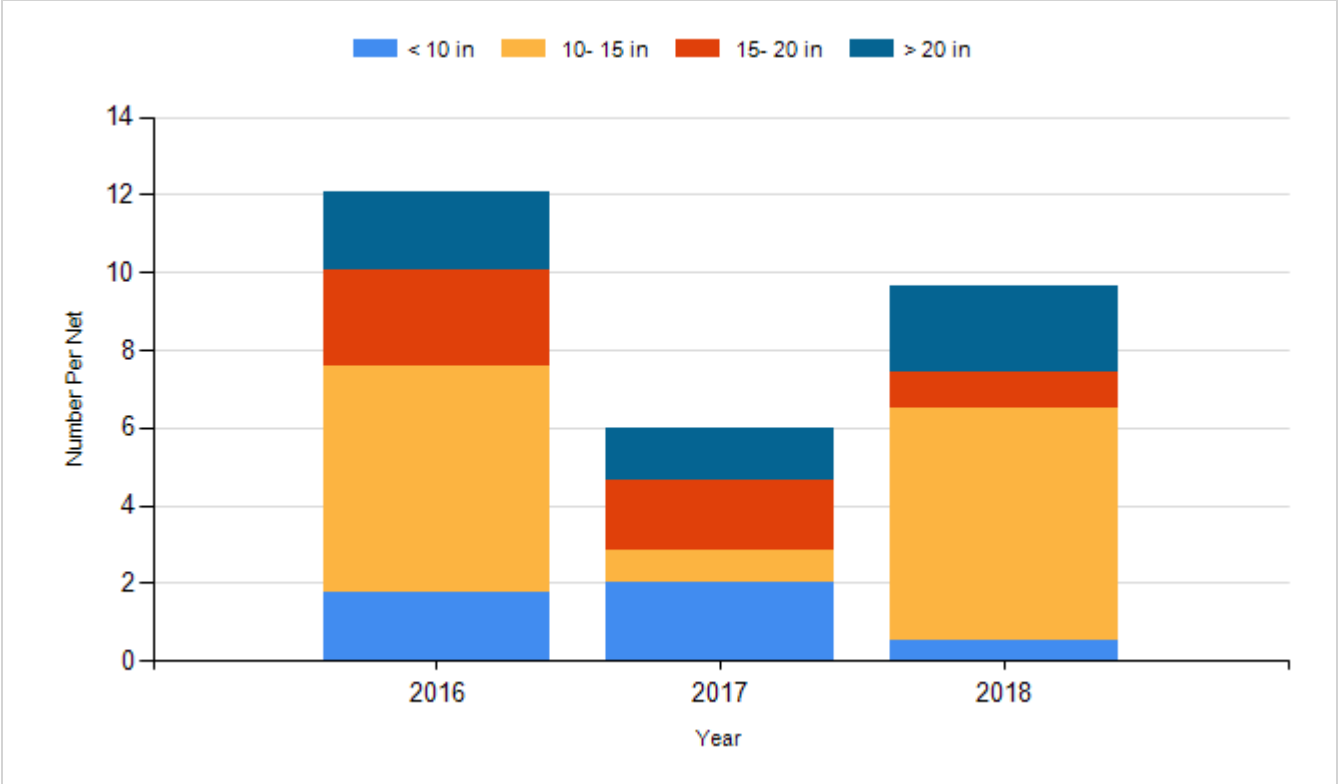
20
21
22
23
24
25
Total Length (cm)

2015

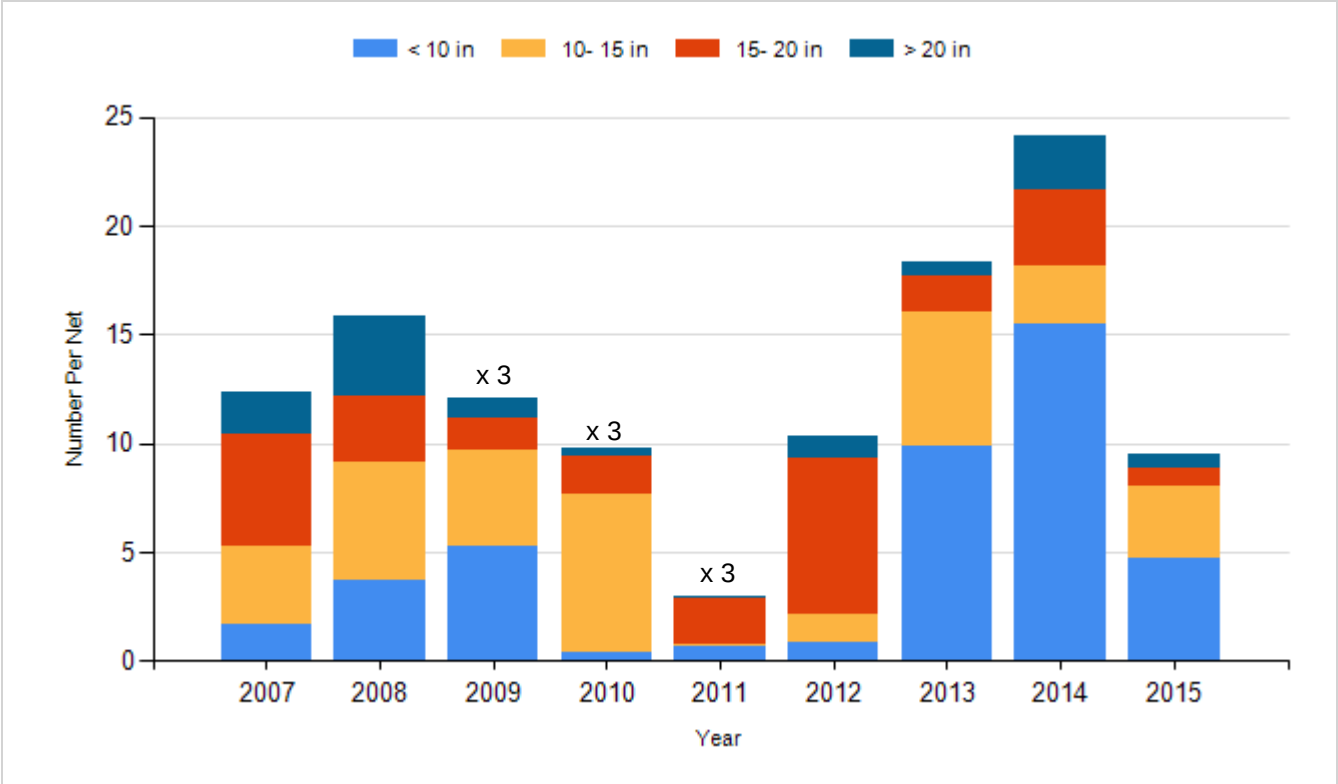
Historic Fish Sizes and Relative Abundance

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

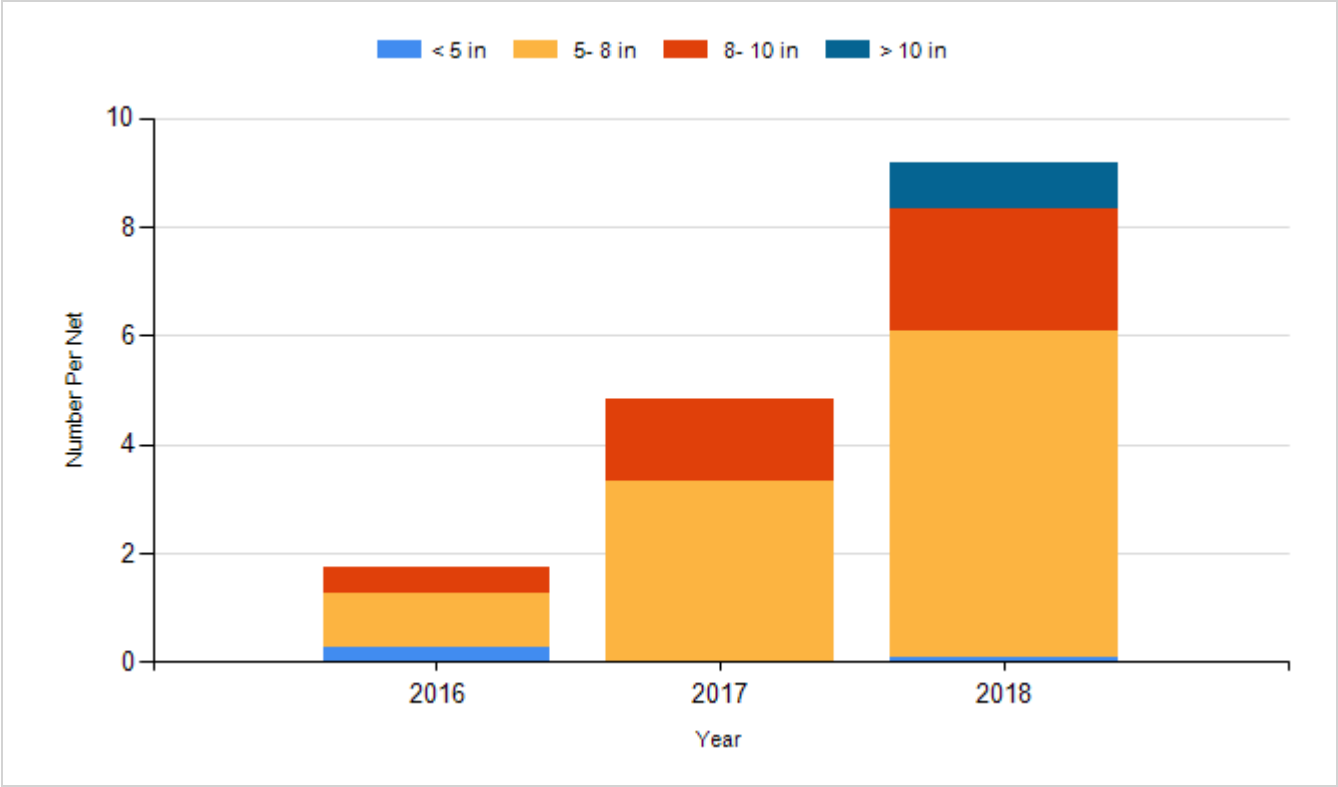
Species: Walleye
Gear: AFS std gill net



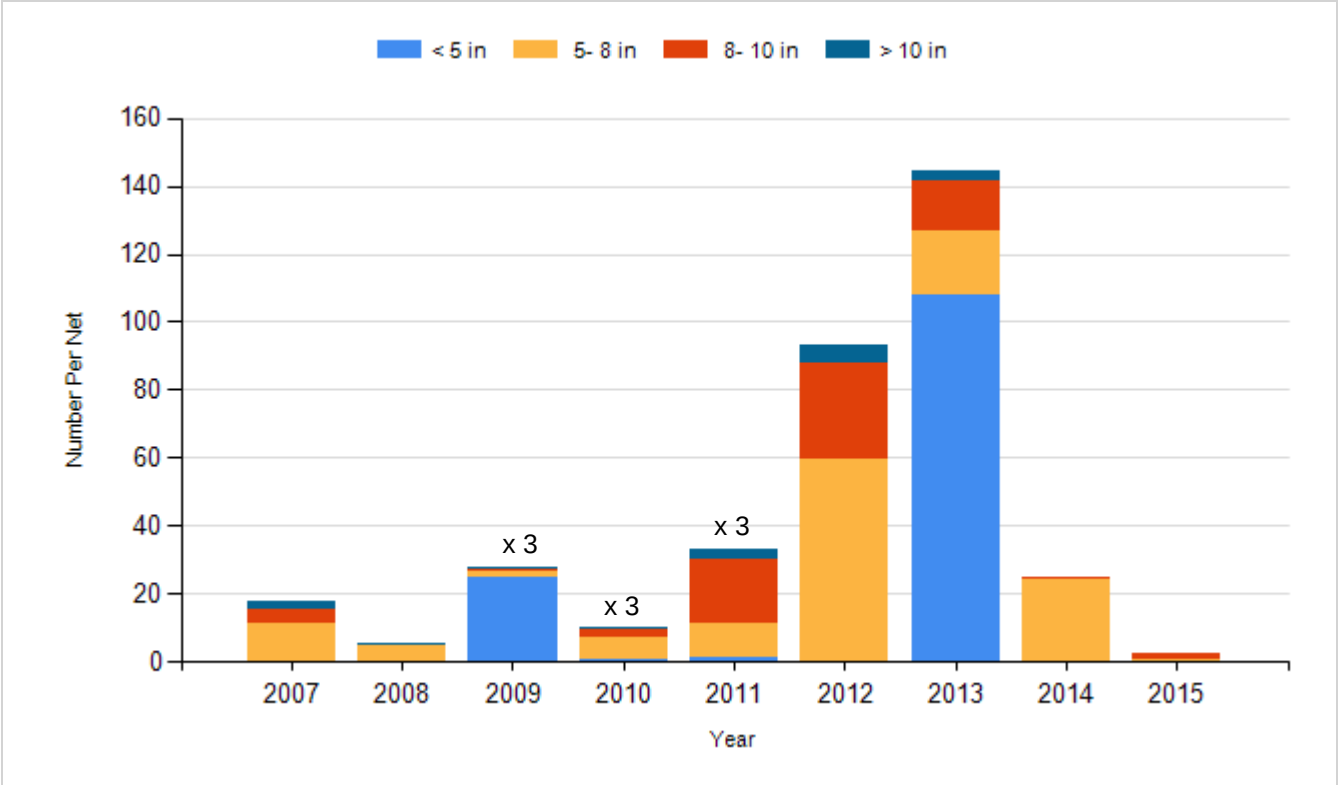
Species: Walleye
Gear: std exp gill net



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