SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Spirit, Kingsbury County
LKT-Lake-95-801
2016

Lake Information

Name:	Spirit	**Maximum Depth:**	11 Feet
County:	Kingsbury	**Mean Depth:**	9 Feet
Legal Description:	T112-R57-Sec. 13, 24-25 and T112- R56- Sec. 18-19, 30		
Surface Area:	1,245 Acres		

Surveys and Investigations

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

Gear	Date	Effort
std exp gill net	July 28, 2016	3 net-nights

Common Fish Species Present

Walleye

Yellow Perch

White Sucker

Northern Pike

Black Bullhead

Common Carp

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).

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

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

	Stock		Quality		Preferred		Memorable		Trophy	
Species Name	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)
Blue Catfish	12	30	20	51	30	76	35	89	45	114
Bluegill	3	8	6	15	8	20	10	25	12	30
Bluegill X Gr. Sunfish Hybrid	3	8	6	15	8	20	10	25	12	30
Brown Bullhead	5	13	8	20	11	28	14	36	17	43
Burbot	8	20	15	38	21	53	26	67	32	82
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Common Carp	11	28	16	41	21	53	26	66	33	84
Flathead Catfish	14	35	20	51	28	71	34	86	40	102
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
Longnose Gar	16	41	27	69	36	91	45	114	55	140
Muskellunge	20	51	30	76	38	97	42	107	50	127
Northern Pike	14	35	21	53	28	71	34	86	44	112
Paddlefish	16	41	26	66	33	84	41	104	51	130
Pumpkinseed	3	8	6	15	8	20	10	25	12	30
Redear Sunfish	4	10	7	18	9	23	11	28	13	33
River Carpsucker	7	18	11	28	14	36	18	46	22	56
Rock Bass	4	10	7	18	9	23	11	28	13	33
Rudd	6	15	10	25	12	30	15	38	19	48
Sauger	8	20	12	30	15	38	20	51	25	63
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
Smallmouth Buffalo	11	28	18	46	24	61	30	76	37	94
Spotted Bass	7	18	11	28	14	35	17	43	20	51
Striped Bass	12	30	20	51	30	76	35	89	45	114
Striped Bass Hybrid (wiper)	8	20	12	30	15	38	20	51	25	63
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 Perch	5	13	8	20	10	25	12	30	15	38
White Sucker	6	15	10	25	13	33	16	41	20	51
Yellow Bass	4	10	7	18	9	23	11	28	13	33
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	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
std exp gill net	Black Bullhead	1.3	1.7	100		0			
	Common Carp	1.0	1.1	100		100			
	Northern Pike	1.7	0.6	100		0		83	6
	Walleye	6.0	1.9	0		0		86	1
	White Sucker	6.0	5.8	100		100			
	Yellow Perch	19.3	14.6	76	8	62	9	110	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.

		CPUE										
Gear	Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
large frame net	Bigmouth Buffalo							0.2				0.2
	Black Bullhead						1.4	34.0				17.7
	Common Carp						5.0	8.6				6.8
	Northern Pike						10.8	2.4				6.6
	Walleye						9.8	10.8				10.3
	White Sucker						1.2	3.8				2.5
	Yellow Perch						0.4	1.6				1.0
std exp gill net	Black Bullhead						1.3	1.3	13.7	10.7	1.3	5.7
	Common Carp						0.7	1.3	1.3	0.7	1.0	1.0
	Northern Pike						4.0	1.0	0.7	3.0	1.7	2.1
	Walleye						19.3	12.7	8.7	1.3	6.0	9.6
	White Sucker						3.0	8.7	3.0	6.3	6.0	5.4
	Yellow Perch						12.7	43.0	17.3	46.7	19.3	27.8

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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
large frame net	Northern Pike	PSD						70	75			
		PSD-P						4	25			
		Wr						78	63			
	Walleye	PSD						10	30			
		PSD-P						0	0			
		Wr						85	74			
	Yellow Perch	PSD						50	63			
		PSD-P						50	63			
		Wr						102	81			
std exp gill net	Northern Pike	PSD						50	67	100	33	100
		PSD-P						0	33	0	0	0
		Wr						73	63	104	79	83
	Walleye	PSD						9	29	96	100	0
		PSD-P						0	0	0	0	0
		Wr						83	77	92	87	86
	Yellow Perch	PSD						82	57	4	78	76
		PSD-P						76	20	4	6	62
		Wr						106	86	116	107	110

Fish Condition

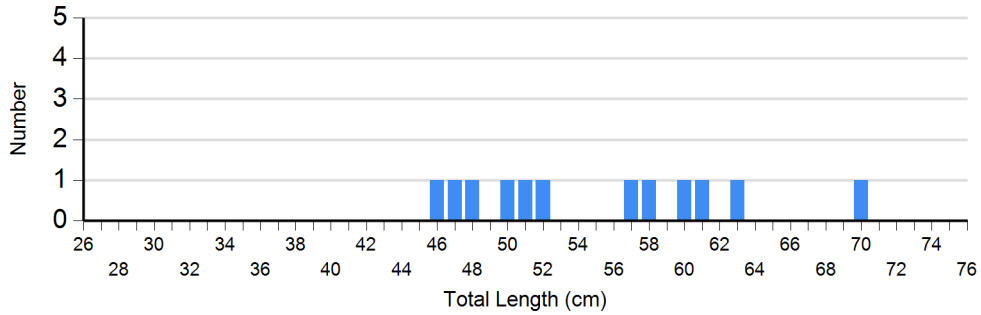
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2012	6	75 (3.8)	6	71 (3.7)	0		0	
	2013	1	57	1	63	1	69	0	
	2014	0		2	104 (6.0)	0		0	
	2015	6	77 (2.6)	3	83 (5.3)	0		0	
	2016	0		5	83 (4.4)	0		0	
Walleye Gill Net	2012	53	83 (0.6)	5	86 (1.7)	0		0	
	2013	27	77 (1.0)	11	75 (1.8)	0		0	
	2014	1	91	25	92 (1.0)	0		0	
	2015	0		4	87 (1.8)	0		0	
	2016	18	86 (1.1)	0		0		0	
Yellow Perch Gill Net	2012	7	119 (3.7)	2	100 (3.8)	25	104 (1.4)	4	99 (2.0)
	2013	55	90 (1.4)	48	84 (1.0)	13	81 (0.6)	13	79 (1.7)
	2014	50	117 (2.6)	0		1	101	1	94
	2015	31	111 (1.0)	100	107 (1.0)	4	105 (3.7)	5	90 (2.9)
	2016	14	114 (2.5)	8	114 (3.1)	36	107 (1.8)	0	

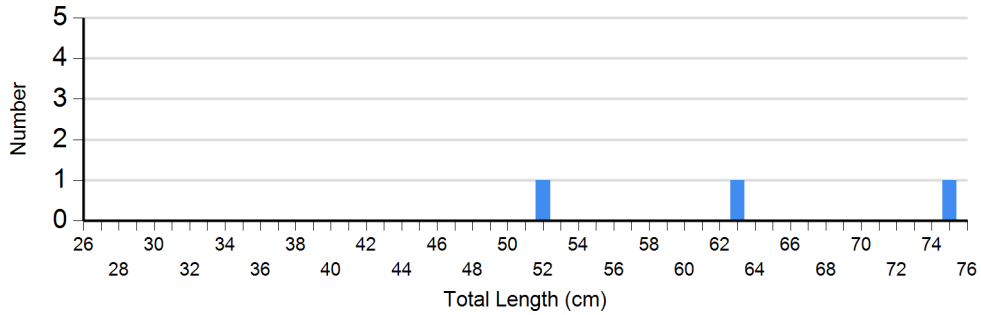
Length Frequency Distribution

Length frequency histogram of species sampled by year.

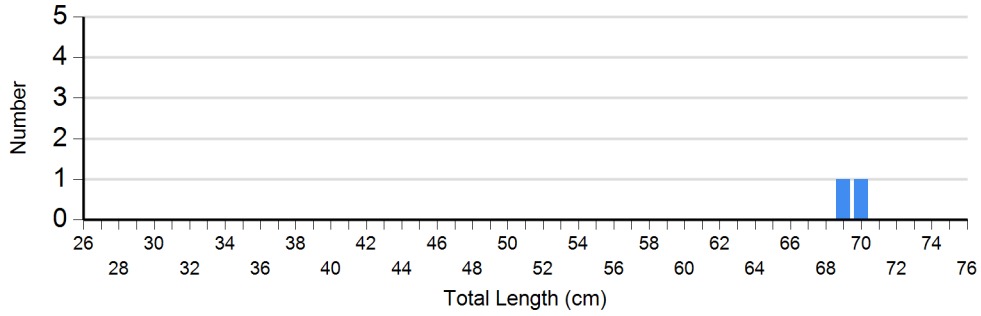
Species: Northern Pike
Gear: std exp gill net



2012



2013



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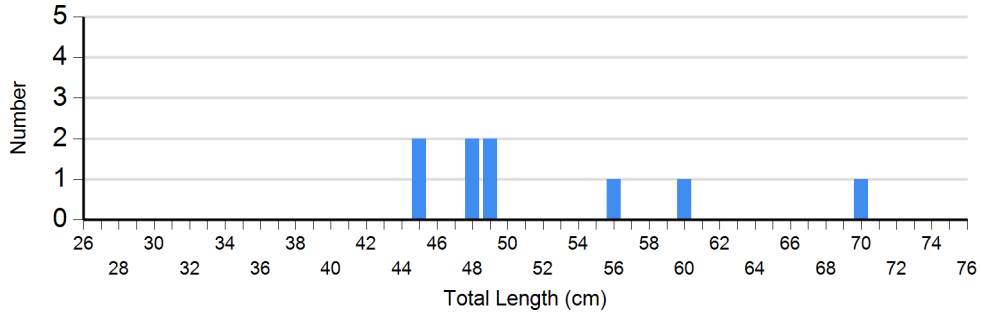
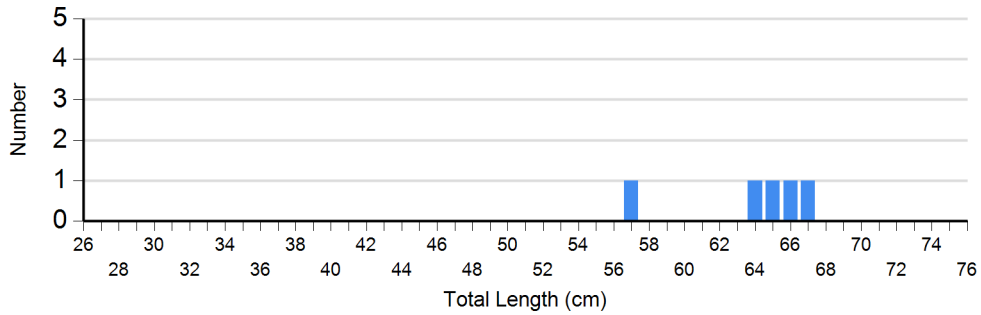
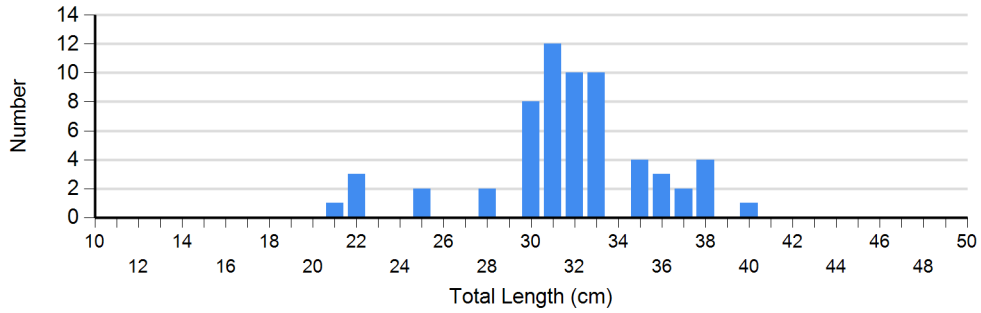


2015



2016

Species: Walleye
Gear: std exp gill net



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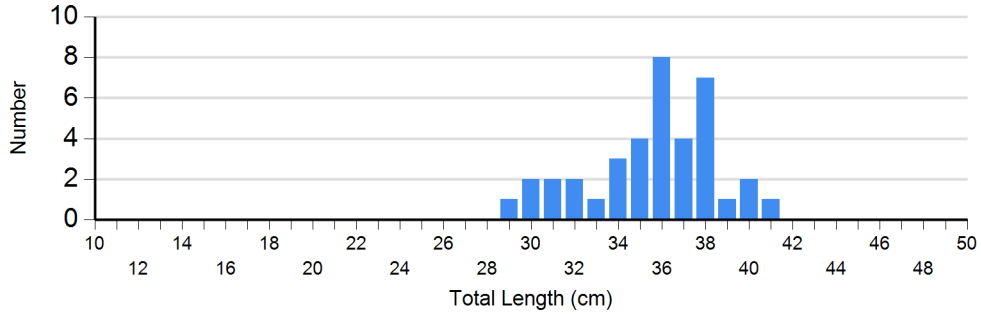

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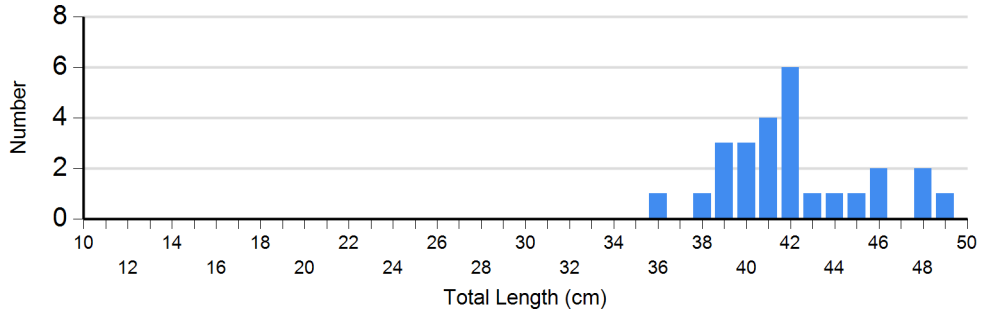
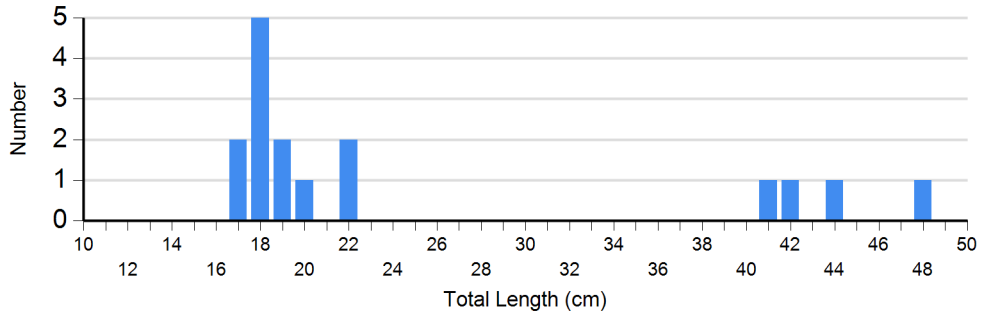
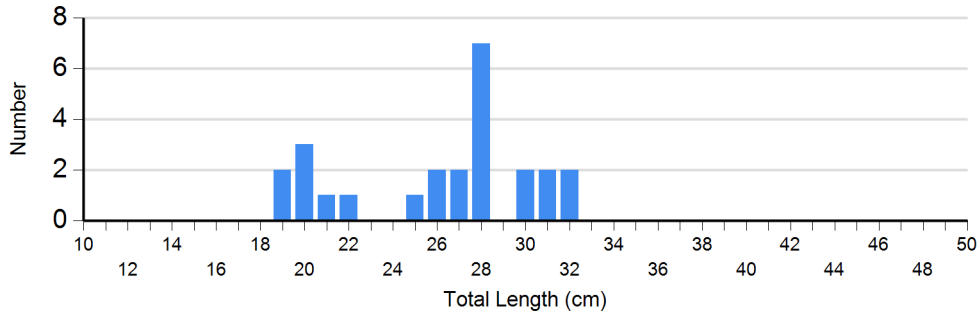


2014

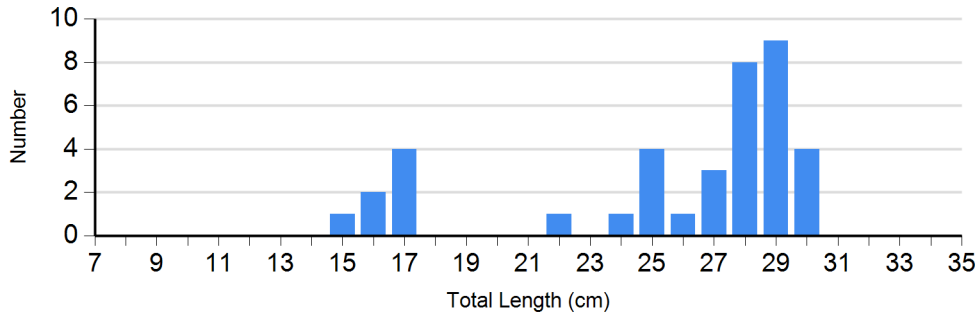


2015

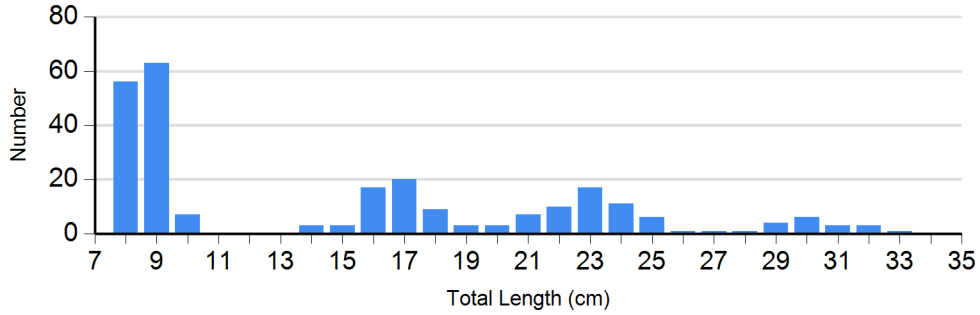


2016

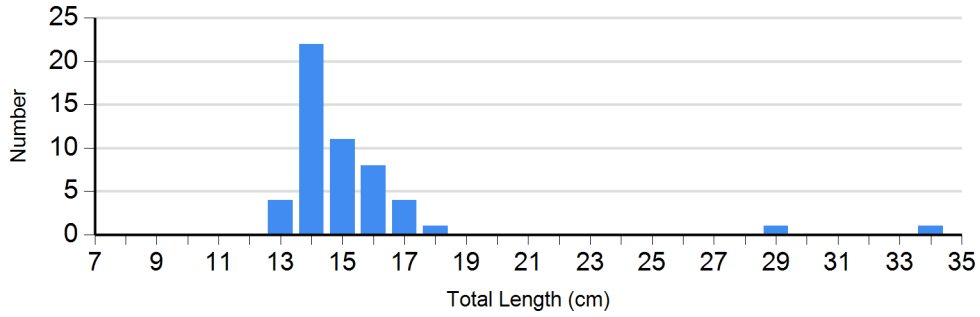
Species: Yellow Perch
Gear: std exp gill net



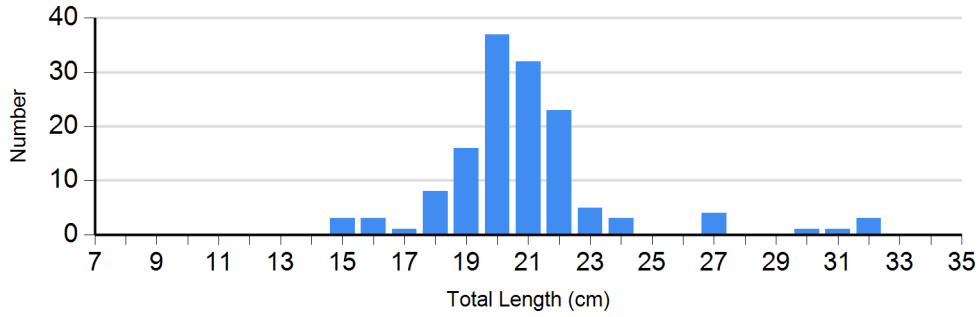
2012



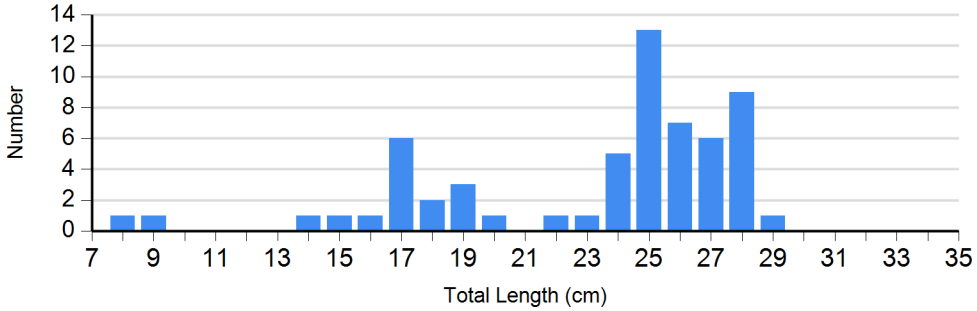
2013



2014



2015


Number
14
12
10
8
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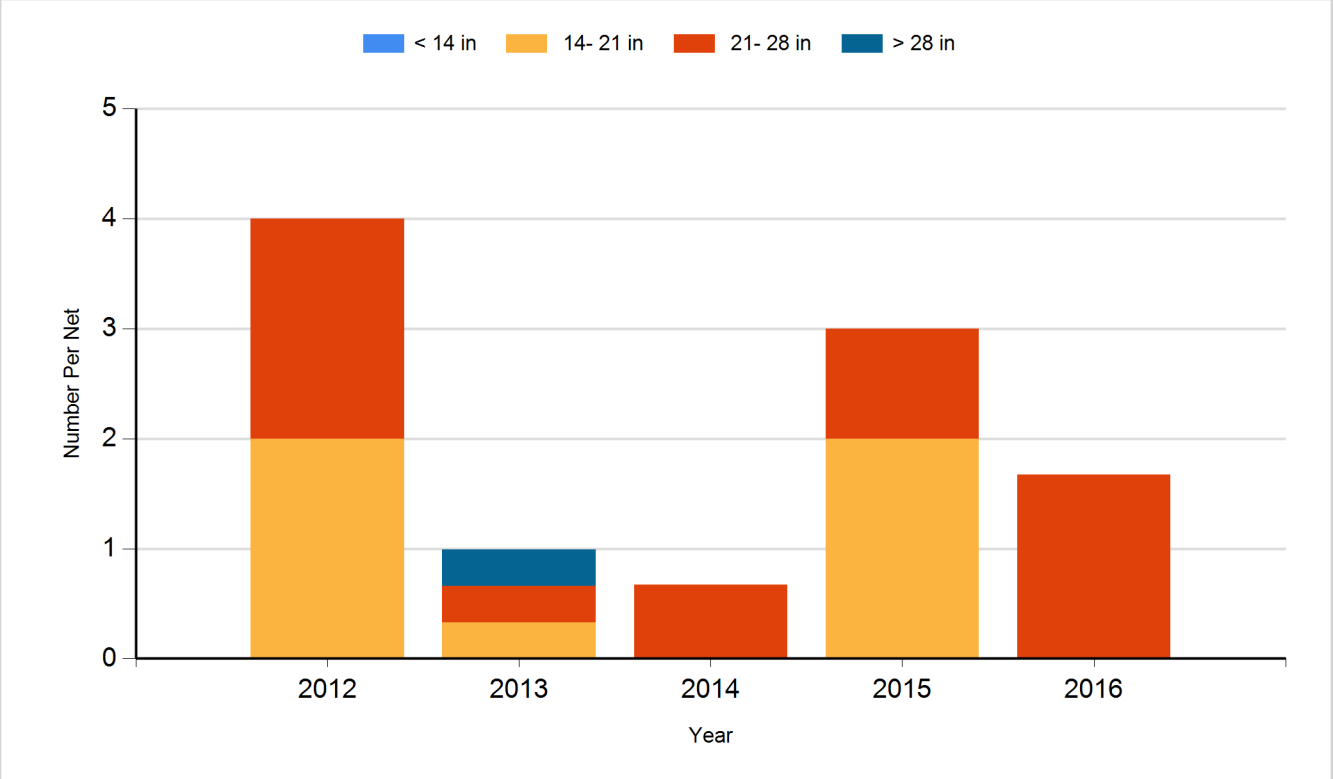
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
Total Length (cm)

2016

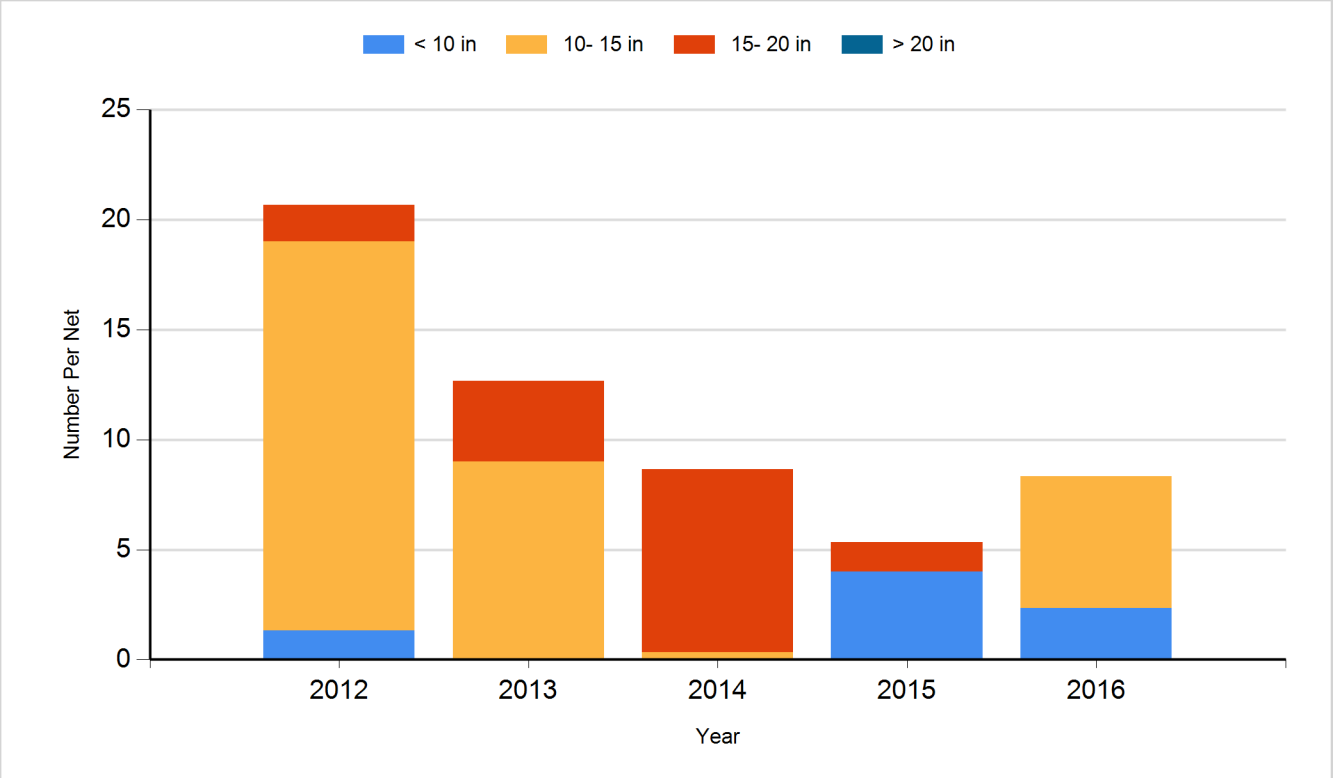
Historic Fish Sizes and Relative Abundance

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

Species: Northern Pike
Gear: Gill Net



Species: Walleye
Gear: Gill Net



Species: Yellow Perch
Gear: Gill Net