SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Herman, Lake County
LBS-Lake-136-000
2017

Lake Information

Name:	Herman	**Maximum Depth:**	13 Feet
County:	Lake	**Mean Depth:**	5 Feet
Legal Description:	T106N-R35W-Sec, 10-11, 14-15, 22-23	**OHWM Elevation:**	1,669
Surface Area:	1,279 Acres	**Outlet Elevation:**	1,668

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	July 20, 2017	6 net-nights

Common Fish Species Present

Walleye

Yellow Perch

White Sucker

White Bass

Black Bullhead

Common Carp

Bigmouth Buffalo

Channel Catfish

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
AFS std gill net	Bigmouth Buffalo	0.8	0.5	40		0			
	Black Bullhead	8.0	1.8	71	10	48	11		
	Channel Catfish	0.5	0.5	67		33		105	10
	Common Carp	5.3	1.7	6		3			
	Walleye	1.2	0.7	43		29		82	2
	White Bass	8.0	1.2	63	10	46	11	83	3
	White Sucker	10.2	5.7	97		87	7		
	Yellow Perch	2.7	2.5	81		6		105	4

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	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
AFS std gill net	Bigmouth Buffalo										0.8	0.8
	Black Bullhead										8.0	8.0
	Channel Catfish										0.5	0.5
	Common Carp										5.3	5.3
	Walleye										1.2	1.2
	White Bass										8.0	8.0
	White Sucker										10.2	10.2
	Yellow Perch										2.7	2.7
fall night EF-WAE	Walleye	64.8	6.5	1.0	26.5	42.5	18.5					26.6
	Yellow Perch					0.0						0.0
large frame net	Bigmouth Buffalo		10.1	9.5	4.4	4.5	6.4					7.0
	Black Bullhead		109.1	71.6	275.1	228.3	16.0					140.0
	Black Crappie		0.1	0.6	1.5	0.8	0.2					0.6
	Bluegill		0.8	0.2	0.1	1.0	0.2					0.5
	Channel Catfish		0.2	2.5	0.4	2.7						1.5
	Common Carp			0.5	7.3	2.2	0.7					2.7
	Green Sunfish			0.1		0.2						0.2
	Northern Pike		0.2	1.5	3.1	0.3	2.3					1.5
	Smallmouth Bass			0.3		0.1						0.2
	Walleye		1.4	1.0	0.4	0.3	1.1					0.8
	White Bass		1.9	1.7	3.4	0.9	3.7					2.3
	White Sucker		11.1	31.0	11.9	3.0	4.5					12.3
	Yellow Perch		0.6	0.8		8.9	0.1					2.6
std exp gill net	Bigmouth Buffalo			0.8	0.0	0.8	1.3	0.3				0.6
	Black Bullhead		6.0	14.0	18.0	32.0	12.3	35.0	40.0	14.0		21.4
	Black Crappie									0.3		0.3
	Channel Catfish		0.3	0.3	0.3	1.0		0.3				0.4
	Common Carp				9.3	1.5	1.3	1.3		0.3		2.7
	Green Sunfish					0.3						0.3
	Northern Pike		1.3	0.8	2.3	1.8		0.7	0.7	1.0		1.2
	Smallmouth Bass				0.3							0.3
	Walleye		2.7	4.5	6.0	12.0	2.0	4.0	1.0	6.3		4.8
	White Bass		2.0	1.5	1.3	6.0	0.7	0.3	2.0	7.3		2.6

		CPUE									
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
std exp gill net	White Sucker		15.0	13.0	10.0	4.5	5.0	6.7	13.0	14.0		10.2
	Yellow Perch		14.7	31.0	26.3	33.3	0.7	4.0	8.3	18.0		17.0

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	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AFS std gill net	Walleye	PSD										43
		PSD-P										29
		Wr										82
	Yellow Perch	PSD										81
		PSD-P										6
		Wr										105
fall night EF-WAE	Walleye	Wr	97	86	127	84	84	75				
large frame net	Black Crappie	PSD		0	100	20	63	100				
		PSD-P		0	17	13	0	50				
		Wr			109	118	112	104				
	Northern Pike	PSD		100	13	55	67	57				
		PSD-P		0	0	6	0	4				
		Wr			84	88	83	70				
	Walleye	PSD		46	30	25	0	73				
		PSD-P		8	20	0	0	0				
		Wr		89	86	79	85	91				
	Yellow Perch	PSD		80	38		54	100				
		PSD-P		0	38		4	0				
		Wr		106	103		93	112				
std exp gill net	Black Crappie	PSD									0	
		PSD-P									0	
		Wr									98	
	Northern Pike	PSD		100	0	29	71		50	50	67	
		PSD-P		0	0	0	0		50	0	0	
		Wr		87	92	85	87		83	86	84	
	Walleye	PSD		75	28	56	58	50	67	33	21	
		PSD-P		13	0	11	8	0	17	0	5	
		Wr		92	84	86	93	93	95	79	85	
	Yellow Perch	PSD		89	51	41	71	0	100	40	33	
		PSD-P		0	45	0	3	0	0	36	11	

			Year									
Gear	Species	Index	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
std exp gill net	Yellow Perch	Wr		107	107	102	91	112	100	106	104	

Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Black Crappie

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2013	1							248 (1)			

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2013	7	219 (1)	330 (3)	412 (2)		483 (1)					
2012	53	260 (19)	396 (18)	430 (3)	413 (6)	474 (4)		499 (2)		525 (1)	
2011	18	275 (4)		400 (9)	430 (2)		542 (3)				
2010	19		276 (11)	349 (5)		470 (3)					
2009	7		274 (1)		433 (5)		550 (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+
2013	2	135 (1)	193 (1)								
2012	133	163 (35)	223 (76)	235 (24)							
2011	79	151 (44)	218 (33)	223 (2)							
2010	124	155 (60)	191 (1)	260 (63)							

Fish Condition

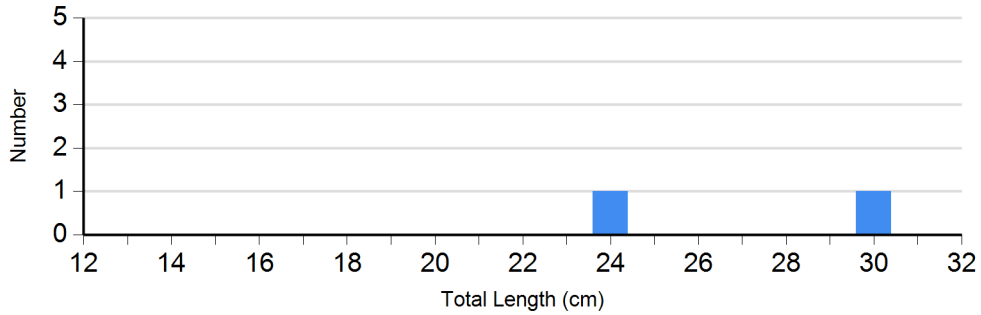
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2013	0		1	108	0		1	100
Northern Pike Gill Net	2014	1	90	0		1	76	0	
	2015	1	83	1	89	0		0	
	2016	1	79	2	86 (3.7)	0		0	
Walleye Gill Net	2013	3	98 (4.2)	3	88 (1.8)	0		0	
	2014	4	100 (3.4)	6	91 (2.5)	2	94 (1.8)	0	
	2015	2	74 (7.6)	1	89	0		0	
	2016	15	87 (1.2)	3	78 (8.2)	1	78	0	
	2017	4	82 (2.0)	1	82	1	87	1	80
Yellow Perch Gill Net	2013	2	112 (0.9)	0		0		0	
	2014	0		12	100 (1.7)	0		0	
	2015	15	106 (2.6)	1	108	9	104 (2.0)	0	
	2016	36	103 (1.5)	12	106 (0.6)	5	101 (1.1)	1	102
	2017	3	110 (4.8)	12	104 (3.8)	1	101	0	

Length Frequency Distribution

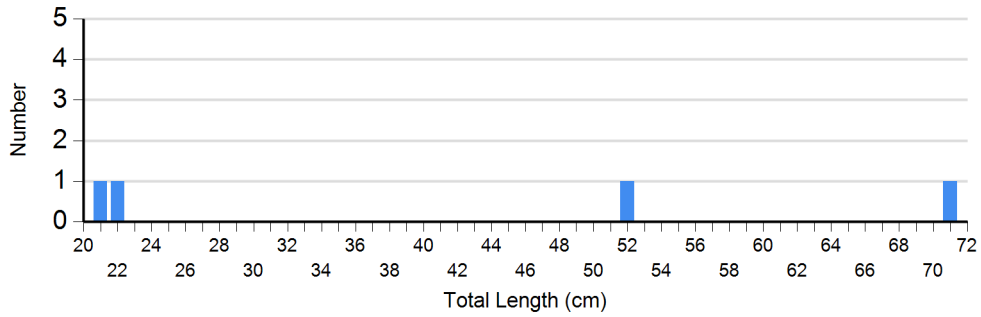
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: large frame net

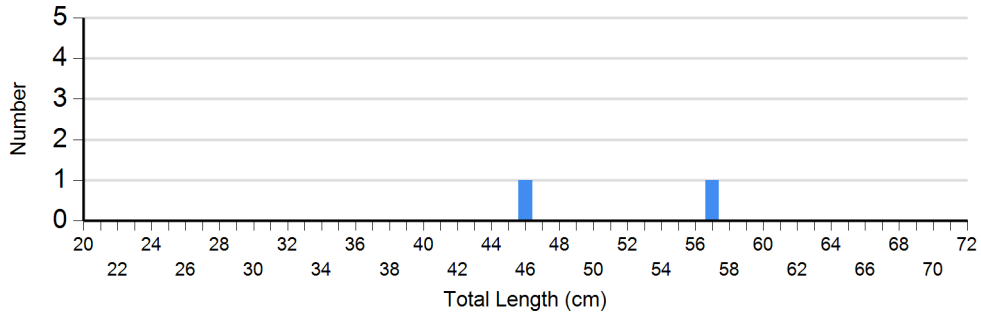


2013

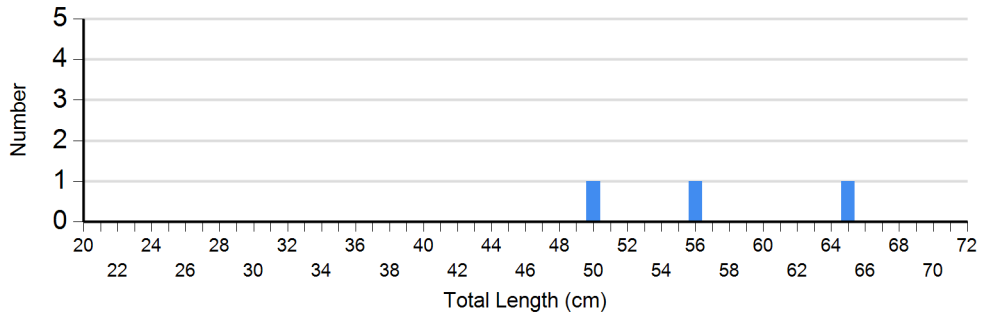
Species: Northern Pike
Gear: std exp gill net



2014

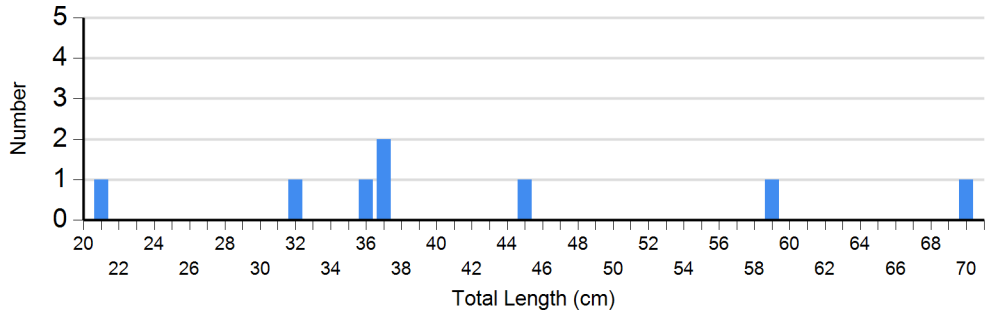


2015



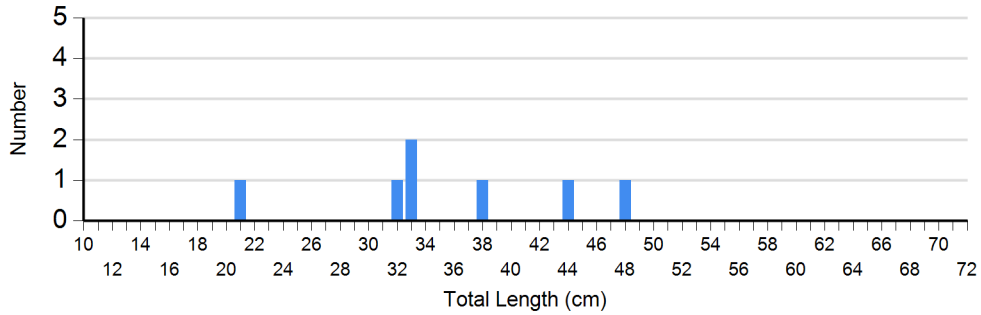
2016

Species: Walleye
Gear: AFS std gill net

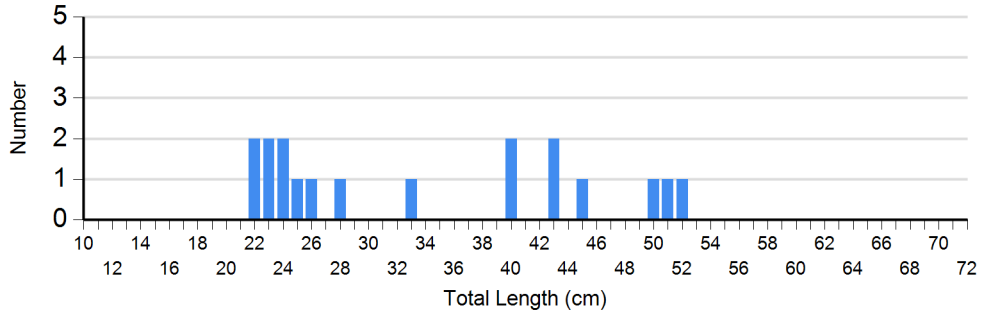


2017

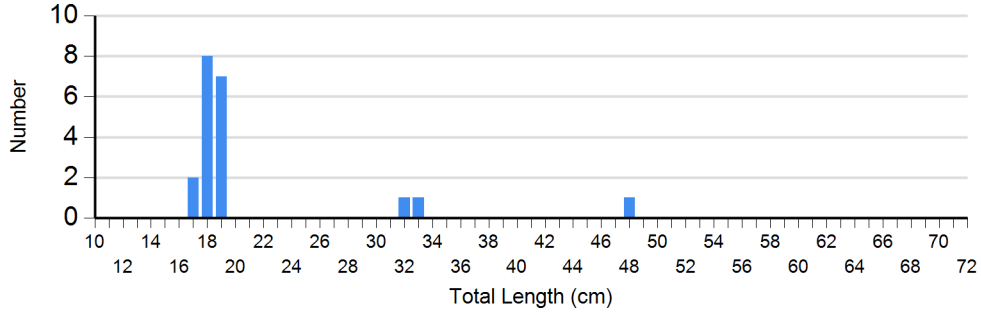
Species: Walleye
Gear: std exp gill net



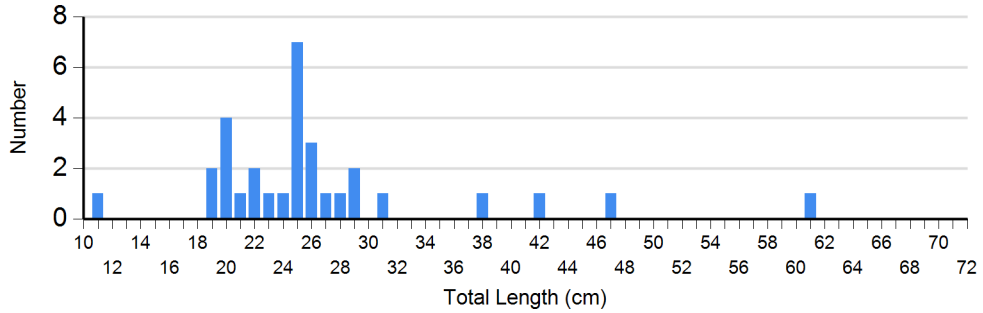
2013



2014

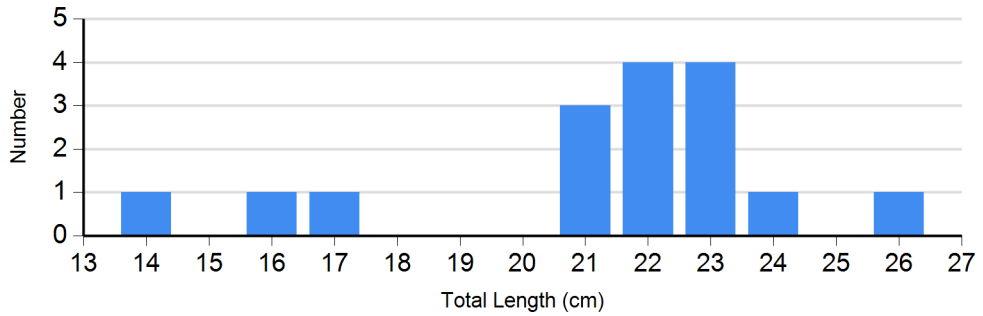


2015



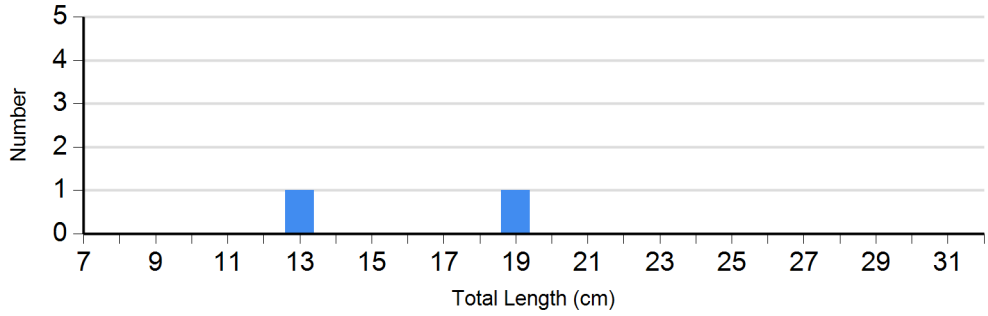
2016

Species: Yellow Perch
Gear: AFS std gill net

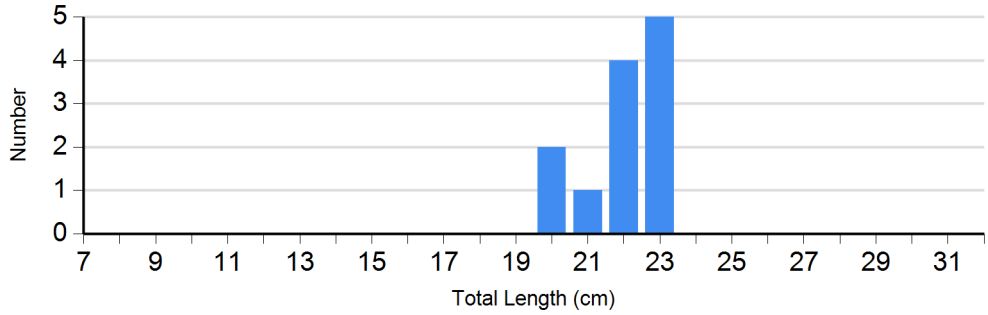


2017

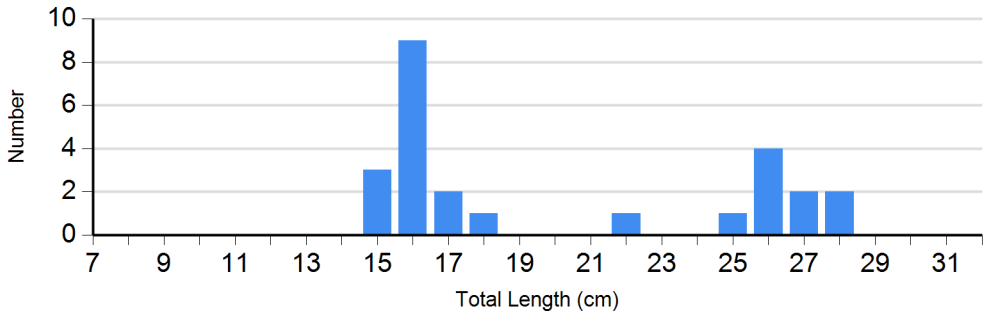
Species: Yellow Perch
Gear: std exp gill net



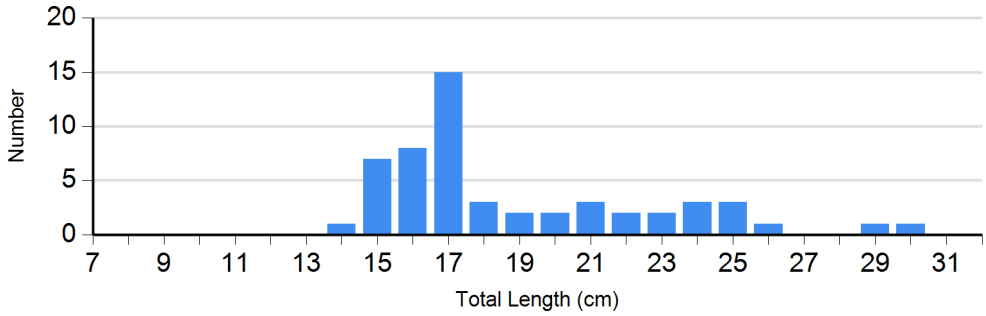
2013



2014


Number
10
8
6
4
2
0
7
9
11
13
15
17
19
21
23
25
27
29
31
Total Length (cm)

2015

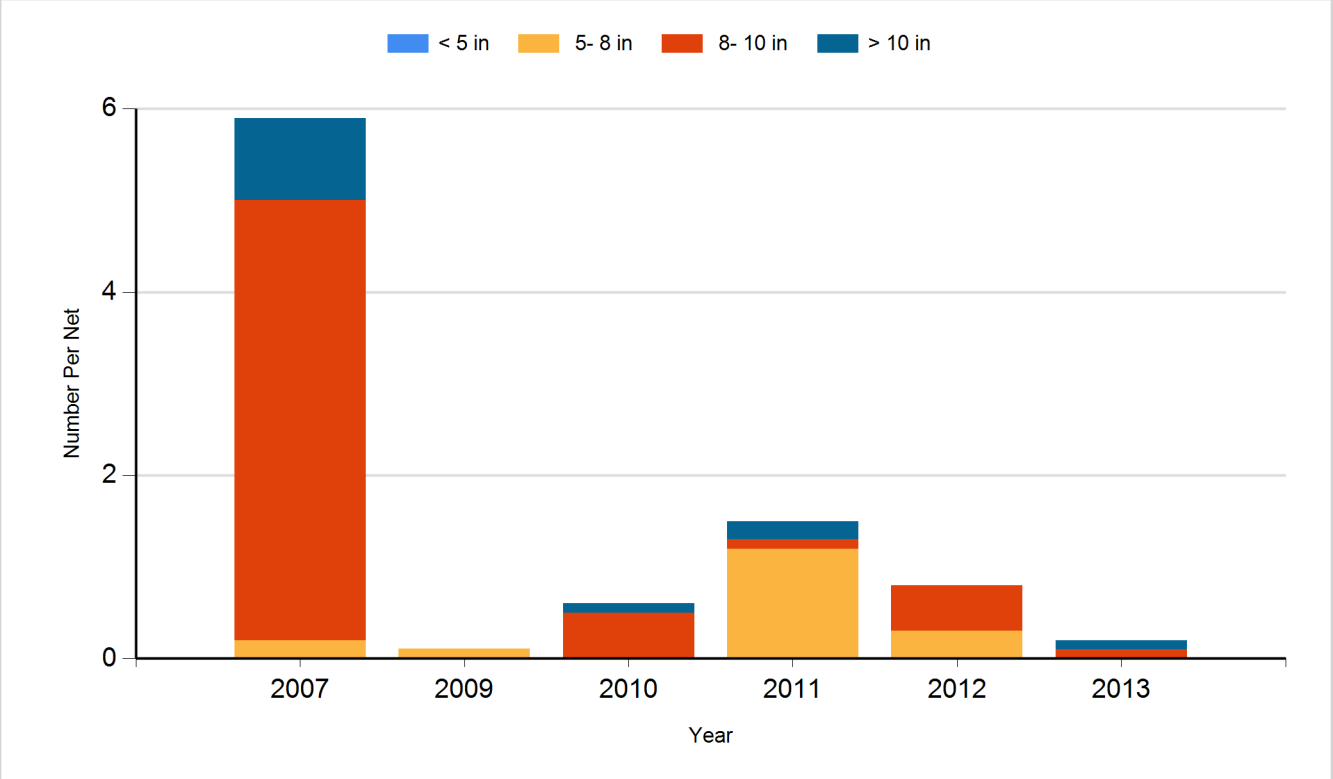

Number
20
15
10
5
0
7
9
11
13
15
17
19
21
23
25
27
29
31
Total Length (cm)

2016

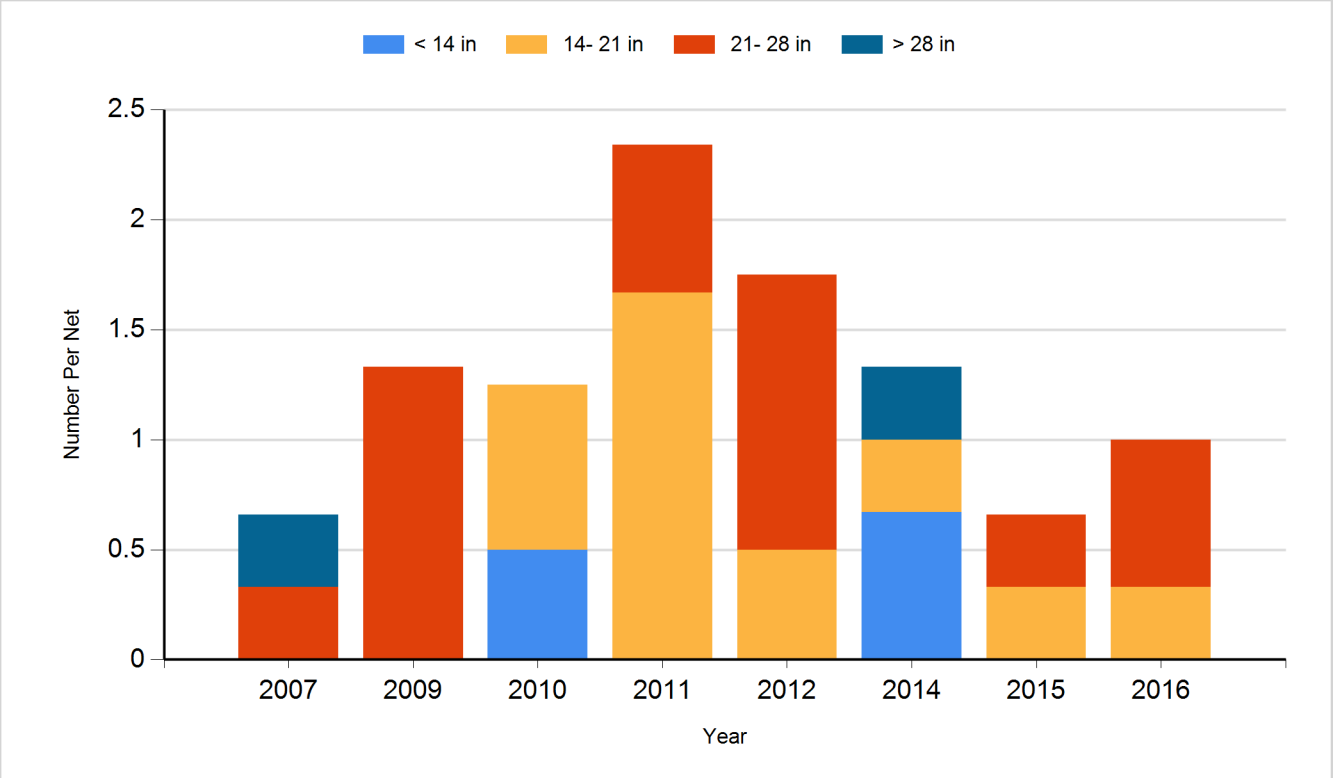
Historic Fish Sizes and Relative Abundance

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

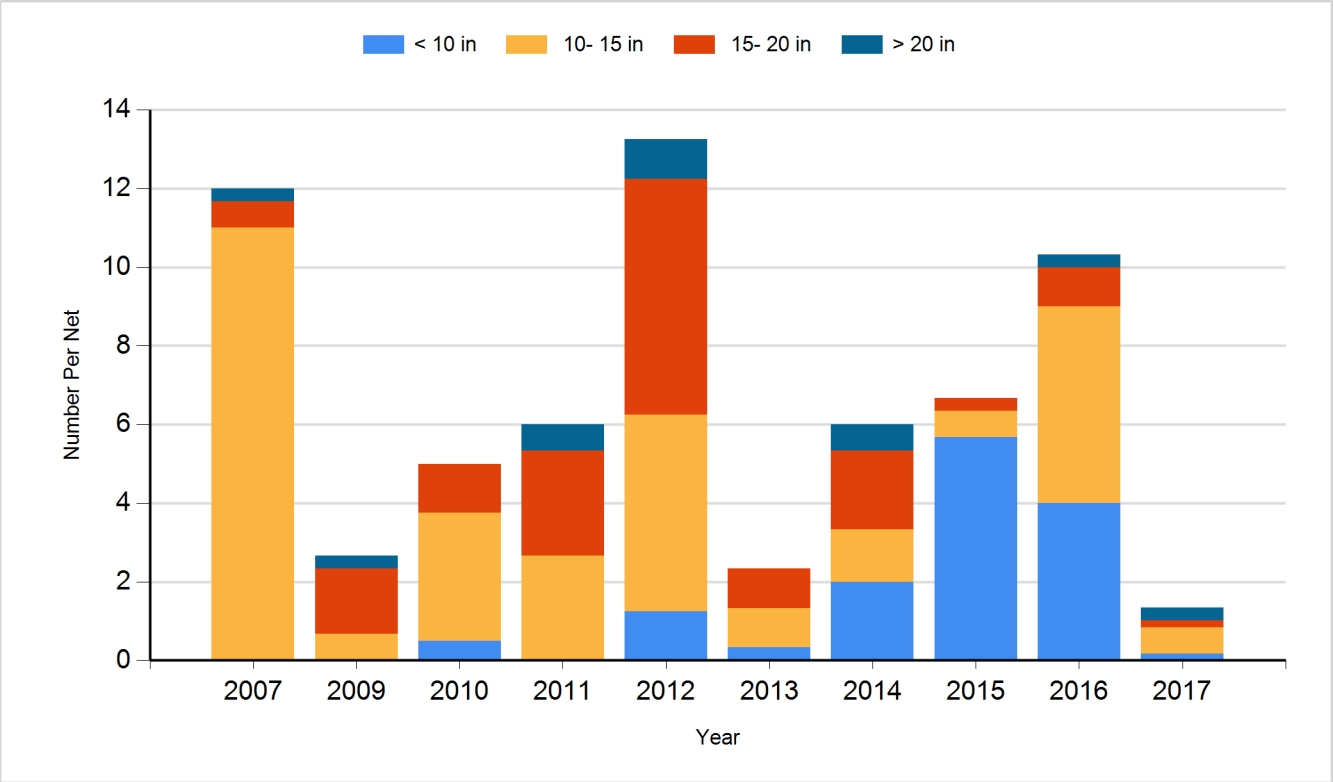
Species: Black Crappie
Gear: Frame Net



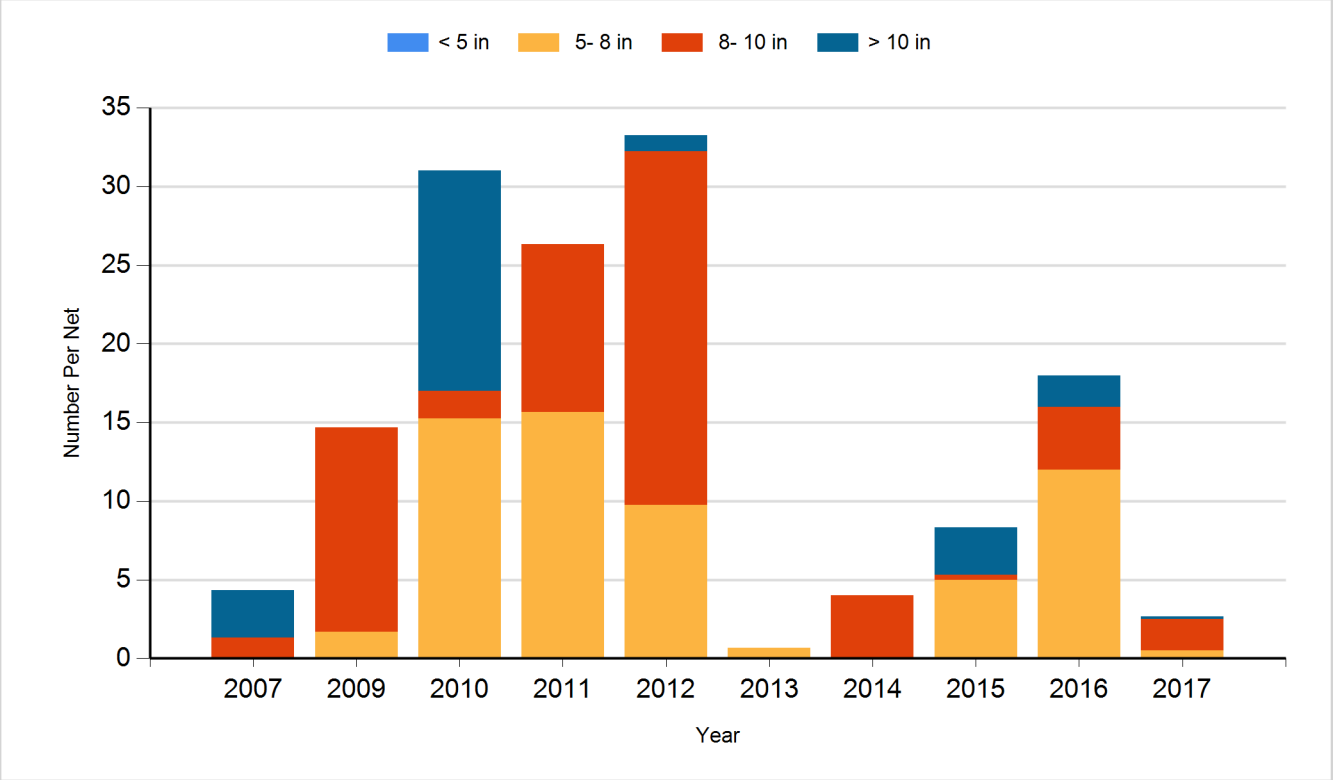
Species: Northern Pike
Gear: Gill Net



Species: Walleye
Gear: Gill Net



Species: Yellow Perch
Gear: Gill Net



Fish Stocking

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2007	Walleye	Fry	1,400,000
2008	Walleye	Fry	1,400,000
2009	Yellow Perch	Fry	7,539,000
2010	Walleye	Large Fingerling	1,312
2011	Walleye	Small Fingerling	135,790
2012	Walleye	Small Fingerling	130,130
2013	Walleye	Small Fingerling	135,200
2014	Walleye	Small Fingerling	95,920
2015	Walleye	Fry	337,604
2016	Walleye	Fry	340,000
2017	Walleye	Fry	340,000