

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Newell, Butte County
LBF-Lake-528-000
2017

Lake Information

Name: Newell
County: Butte
Surface Area: 154 Acres

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	October 05, 2017	3600 seconds
std exp gill net	August 01, 2017	4 net-nights
std frame net (3/8 inch)	May 18, 2017	10 net-nights

Common Fish Species Present

Bluegill

Yellow Perch

Northern Pike

Largemouth Bass

Walleye

Smallmouth Bass

Rudd

White Sucker

Gizzard Shad

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).

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

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.

$$PSD = \left(\frac{\text{number of fish} \geq \text{quality length}}{\text{number of fish} \geq \text{stock length}} \right) \times 100$$

$$PSD - P = \left(\frac{\text{number of fish} \geq \text{preferred length}}{\text{number of fish} \geq \text{stock length}} \right) \times 100$$

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.

$$Wr = \left(\frac{W}{W_s} \right) \times 100$$

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).

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(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

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(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).

Gear	Species	Abundance		Stock Density Indices			Condition			
		CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80	
boat shocker (night)	Largemouth Bass	10.0	6.7	80		20		119	5	
	Smallmouth Bass	1.0	1.5	100		0		117		
	Walleye	29.0	2.7	75		25		97	3	
std exp gill net	Bluegill	0.5	0.5	50		0		113	3	
	Gizzard Shad	0.3	0.4	100				115		
	Northern Pike	4.5	1.9	39	19	6		87	2	
	Rudd	11.3	5.8	100		67	11			
	Walleye	8.8	3.4	69	12	14		80	1	
	White Sucker	1.5	1.1	100		83		100	6	
	Yellow Perch	10.5	3.0	2		0		93	1	
	std frame net (3/8 inch)	Bluegill	2.4	0.9	33	15	13		108	4
		Northern Pike	0.2	0.2	0		0		82	4
Rudd		3.0	1.1	97		53	14			
Smallmouth Bass		0.0	0.0	0		0				
Walleye		0.9	0.6	67		11		82	2	
White Sucker		0.7	0.3	100		100		95	6	
Yellow Perch		0.4	0.2	25		0		92	5	

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.

Gear	Species	CPUE										Avg
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
boat shocker (night)	Largemouth Bass					30.0		20.8	13.8	39.0	10.0	22.7
	Smallmouth Bass					1.2		1.0		1.0	1.0	1.1
	Walleye					46.8		123.8	101.0	38.0	29.0	67.7
boat shocker (night, AC)	Largemouth Bass			4.7	15.0							9.9
	Smallmouth Bass			0.7	1.0							0.9
	Walleye			77.5	68.0							72.8
frame net (1/2 inch)	Black Bullhead			1.0								1.0
	Bluegill			8.3								8.3
	Golden Shiner			0.0								0.0
	Northern Pike			0.5								0.5
	Rudd			12.0								12.0
	Walleye			2.3								2.3
	White Sucker			9.6								9.6
frame net (std 3/4 in)	Black Bullhead				1.4	1.3						1.4
	Bluegill				5.5	21.5	29.1		17.3	28.9		20.5
	Northern Pike				1.1	1.0	0.3		0.6	1.2		0.8
	Rudd				18.3	15.4	46.0		21.3	11.7		22.5
	Smallmouth Bass							0.1				0.1
	Walleye				0.6	0.6	1.1		1.0	1.1		0.9
	White Sucker				2.0	1.5	1.9		0.4	3.3		1.8
	Yellow Perch				0.3	0.1	0.9			0.2		0.4
std exp gill net	Bluegill									1.0	0.5	0.8
	Gizzard Shad									0.0	0.3	0.2
	Northern Pike			2.5			4.5			3.5	4.5	3.8
	Rudd			2.0						18.5	11.3	10.6
	Walleye			3.5			8.5			20.0	8.8	10.2
	White Sucker			0.5			3.0			1.5	1.5	1.6
	Yellow Perch			0.5			3.0			11.5	10.5	6.4
std exp gill net (150 ft)	Black Bullhead				0.5							0.5
	Bluegill					0.5						0.5
	Northern Pike				1.0	3.5			3.0			2.5
	Rudd				0.0	37.0			25.5			20.8
	Walleye				3.0	12.5			4.0			6.5

		CPUE										
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
std exp gill net (150 ft)	White Sucker				0.5	2.5			3.5			2.2
	Yellow Perch					3.5			3.5			3.5
std frame net (3/8 inch)	Bluegill										2.4	2.4
	Northern Pike										0.2	0.2
	Rudd										3.0	3.0
	Smallmouth Bass										0.0	0.0
	Walleye										0.9	0.9
	White Sucker										0.7	0.7
	Yellow Perch										0.4	0.4

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.

Gear	Species	Index	Year									
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
boat shocker (night)	Walleye	PSD					23		67	42	42	75
		PSD-P					0		7	1	4	25
		Wr					100		93	86	99	97
boat shocker (night, AC)	Walleye	PSD			25	15						
		PSD-P			4	0						
		Wr			85	90						
frame net (1/2 inch)	Northern Pike	PSD			50							
		PSD-P			0							
		Wr			78							
	Walleye	PSD			83							
		PSD-P			11							
		Wr			79							
frame net (std 3/4 in)	Northern Pike	PSD				67	25	100		20	17	
		PSD-P				22	0	0		20	0	
		Wr				76	78	83		77	86	
	Walleye	PSD				60	0	75		75	64	
		PSD-P				0	0	25		13	9	
		Wr				85	81	80		80	80	
	Yellow Perch	PSD				50	100	50			0	
		PSD-P				50	0	33			0	
		Wr				85	88	88			90	
std exp gill net	Northern Pike	PSD			60				11		14	39
		PSD-P			0				0		0	6
		Wr			76				81		83	87
	Walleye	PSD			86				35		50	69
		PSD-P			0				12		10	14
		Wr			85				84		84	80
	Yellow Perch	PSD			100				33		52	2
		PSD-P			0				0		0	0
		Wr			98				101		98	93

Gear	Species	Index	Year										
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
std exp gill net (150 ft)	Northern Pike	PSD				50	71				17		
		PSD-P				0	14				17		
		Wr				80	84				78		
	Walleye	PSD				83	32				75		
		PSD-P				17	0				13		
		Wr				82	78				81		
	Yellow Perch	PSD					43				0		
		PSD-P					0				0		
		Wr					93				98		
std frame net (3/8 inch)	Northern Pike	PSD										0	
		PSD-P										0	
		Wr										82	
	Walleye	PSD											67
		PSD-P											11
		Wr											82
	Yellow Perch	PSD											25
		PSD-P											0
		Wr											92

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+
2017	36	221 (1)	306 (3)	371 (10)	400 (10)	455 (2)		512 (5)	449 (2)	533 (2)	517 (1)
2016	84	212 (4)	282 (10)	346 (28)	380 (12)	410 (2)	456 (6)	454 (14)	489 (8)		
2015	16			364 (4)	421 (2)		457 (6)	401 (2)	551 (2)		
2013	32		318 (8)	323 (8)	360 (6)	371 (4)		500 (2)	564 (2)		688 (2)
2012	50			330 (20)	353 (14)	407 (12)		419 (2)		462 (2)	

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).

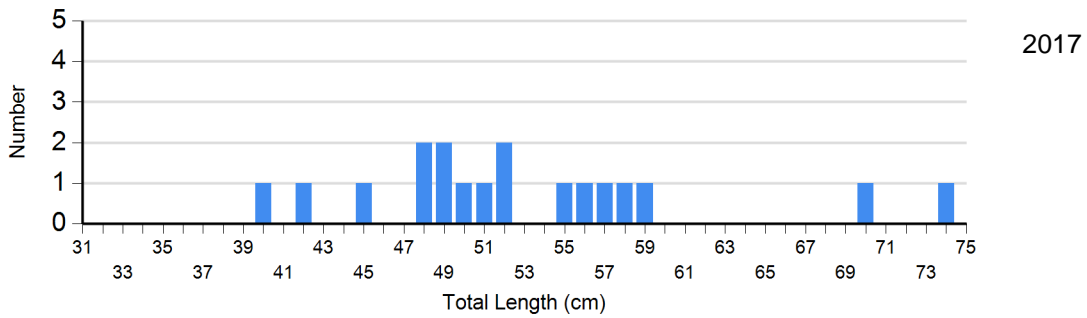
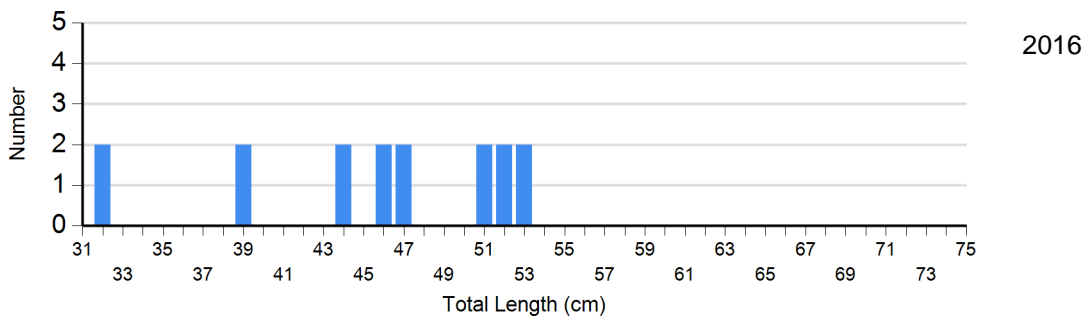
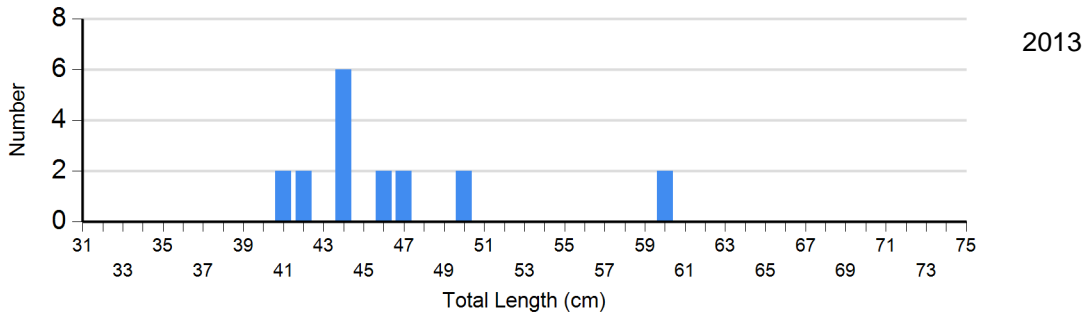
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2013	16	80 (1.1)	2	88 (0.0)	0		0	
	2015	10	77 (2.1)	0		2	83 (0.0)	0	
	2016	12	84 (1.9)	2	75 (0.0)	0		0	
	2017	11	87 (1.5)	6	87 (3.1)	1	95	0	
Walleye Gill Net	2013	22	85 (0.9)	8	86 (0.7)	2	77 (0.0)	2	77 (0.0)
	2015	4	80 (2.9)	10	82 (1.2)	2	78 (0.0)	0	
	2016	40	84 (0.8)	32	85 (0.8)	8	78 (0.4)	0	
	2017	11	79 (1.1)	19	80 (1.0)	5	80 (1.6)	0	
Yellow Perch Gill Net	2013	8	102 (2.7)	4	98 (3.5)	0		0	
	2015	14	98 (1.3)	0		0		0	
	2016	22	100 (2.9)	24	97 (1.4)	0		0	
	2017	41	93 (1.0)	1	93	0		0	

Length Frequency Distribution

Length frequency histogram of species sampled by year.

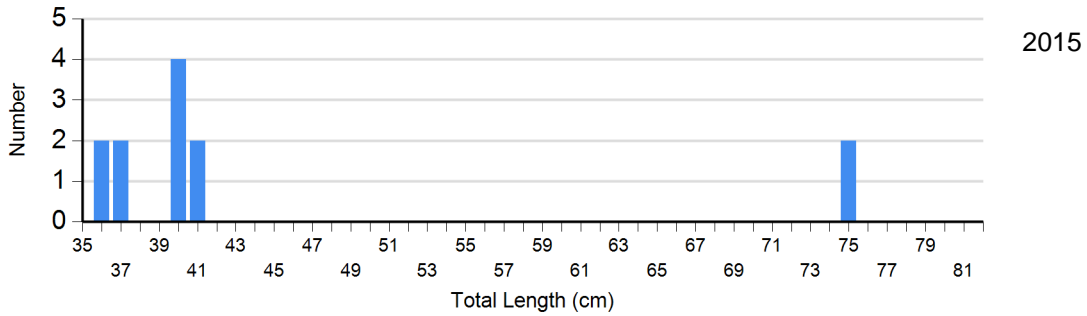
Species: Northern Pike

Gear: std exp gill net

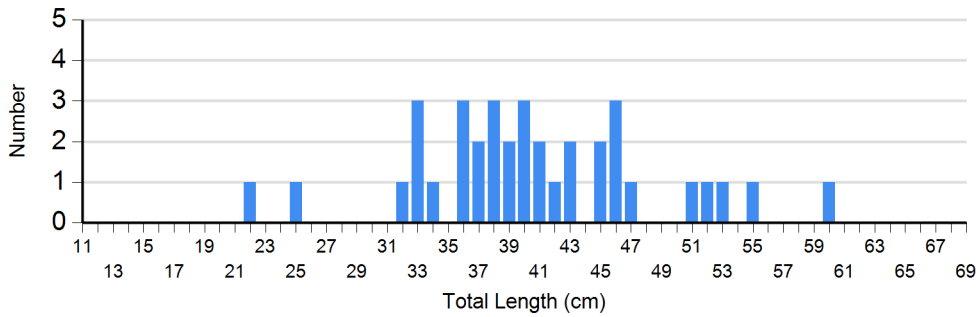
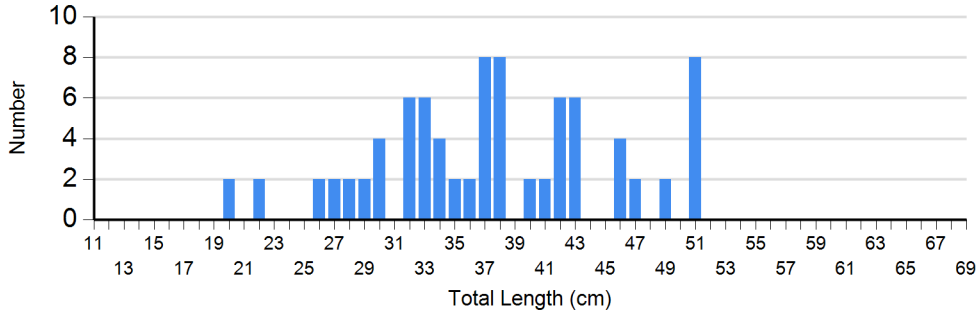
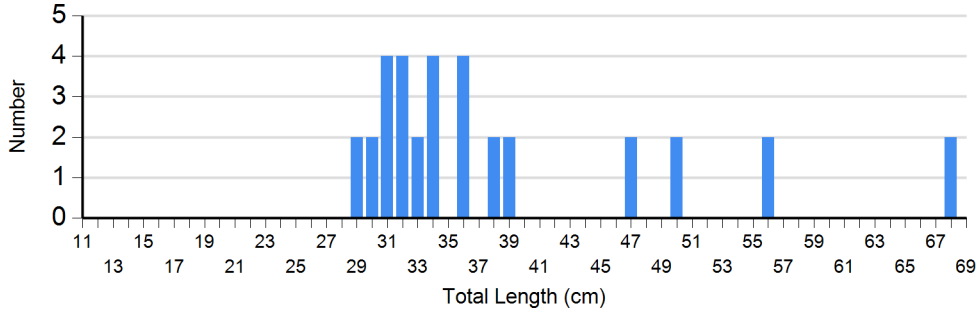


Species: Northern Pike

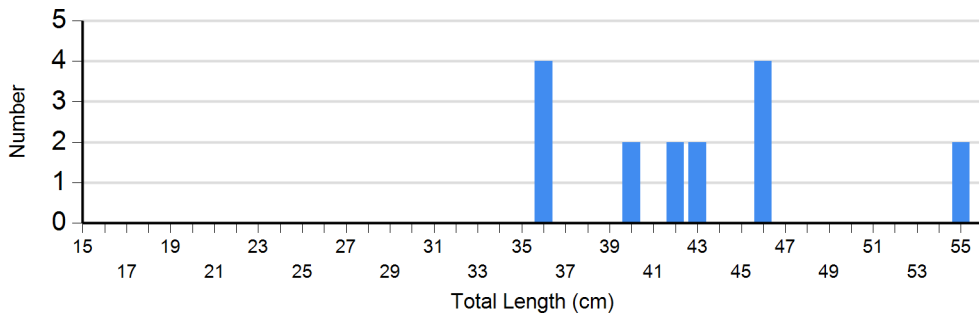
Gear: std exp gill net (150 ft)



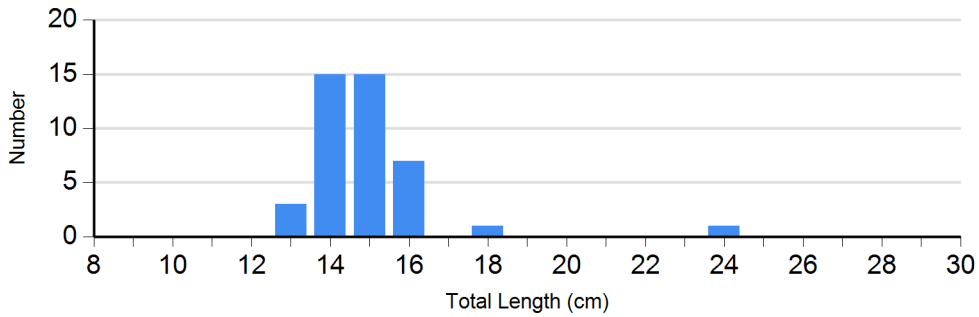
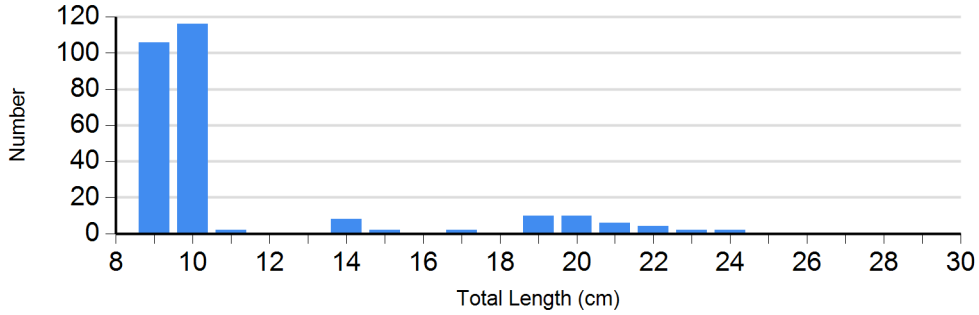
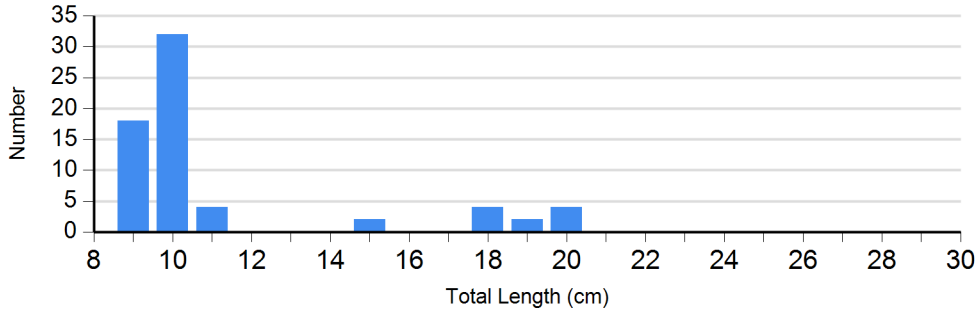
Species: Walleye
 Gear: std exp gill net



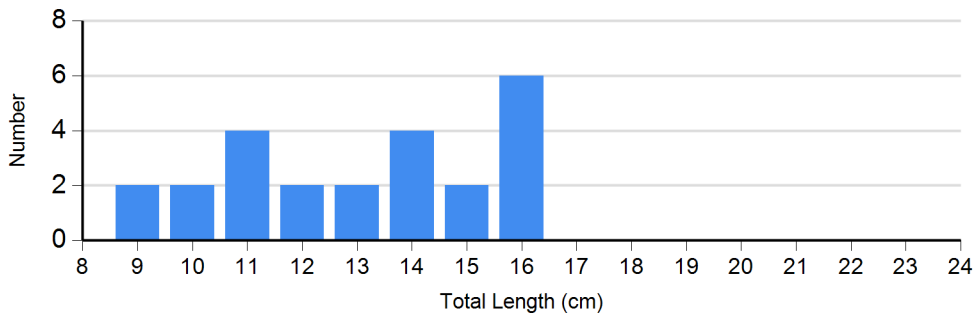
Species: Walleye
 Gear: std exp gill net (150 ft)



Species: Yellow Perch
Gear: std exp gill net



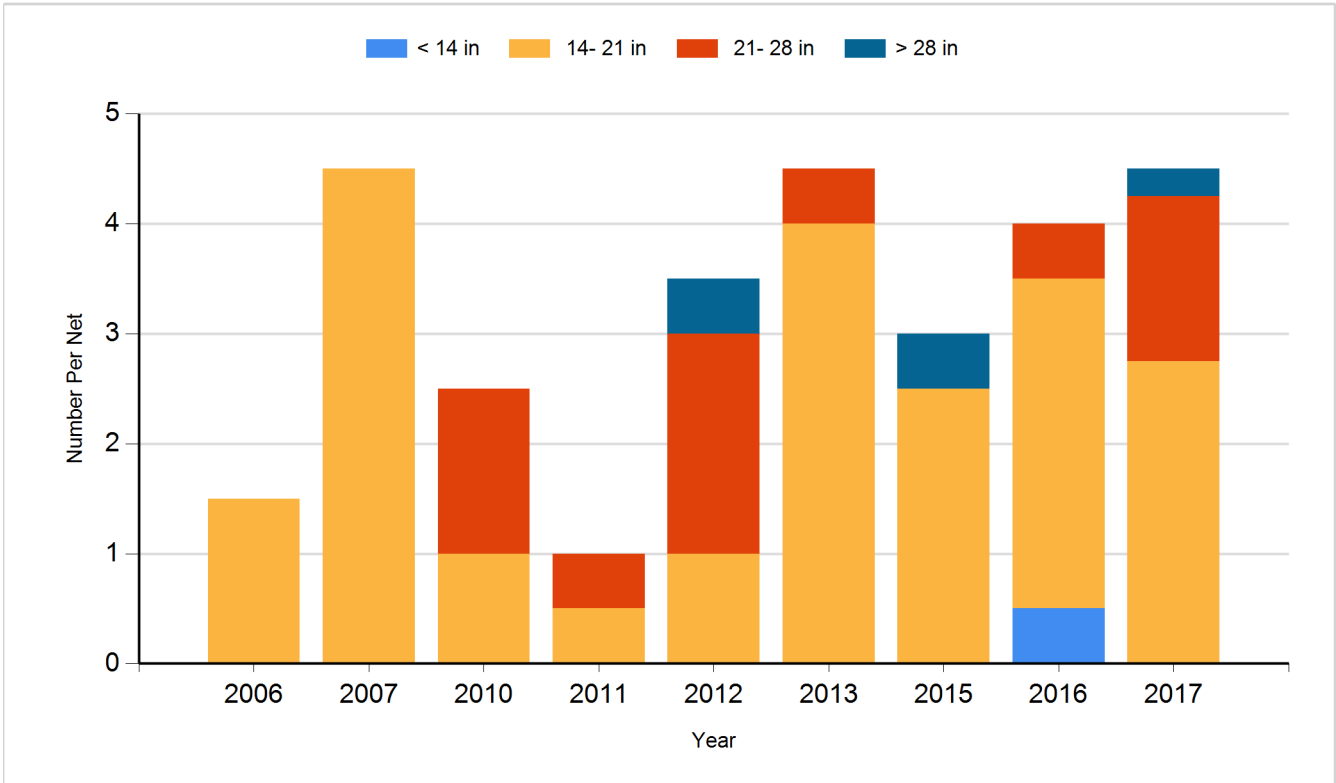
Species: Yellow Perch
Gear: std exp gill net (150 ft)



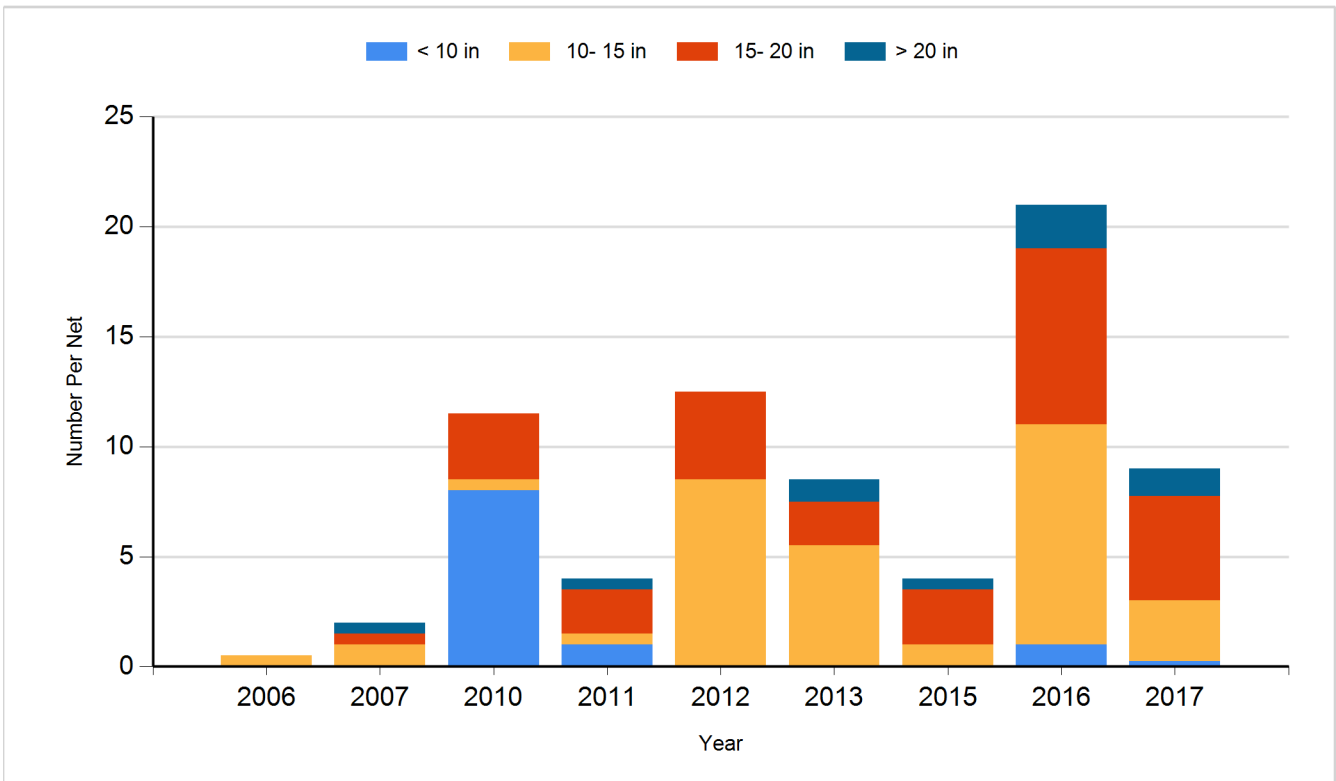
Historic Fish Sizes and Relative Abundance

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

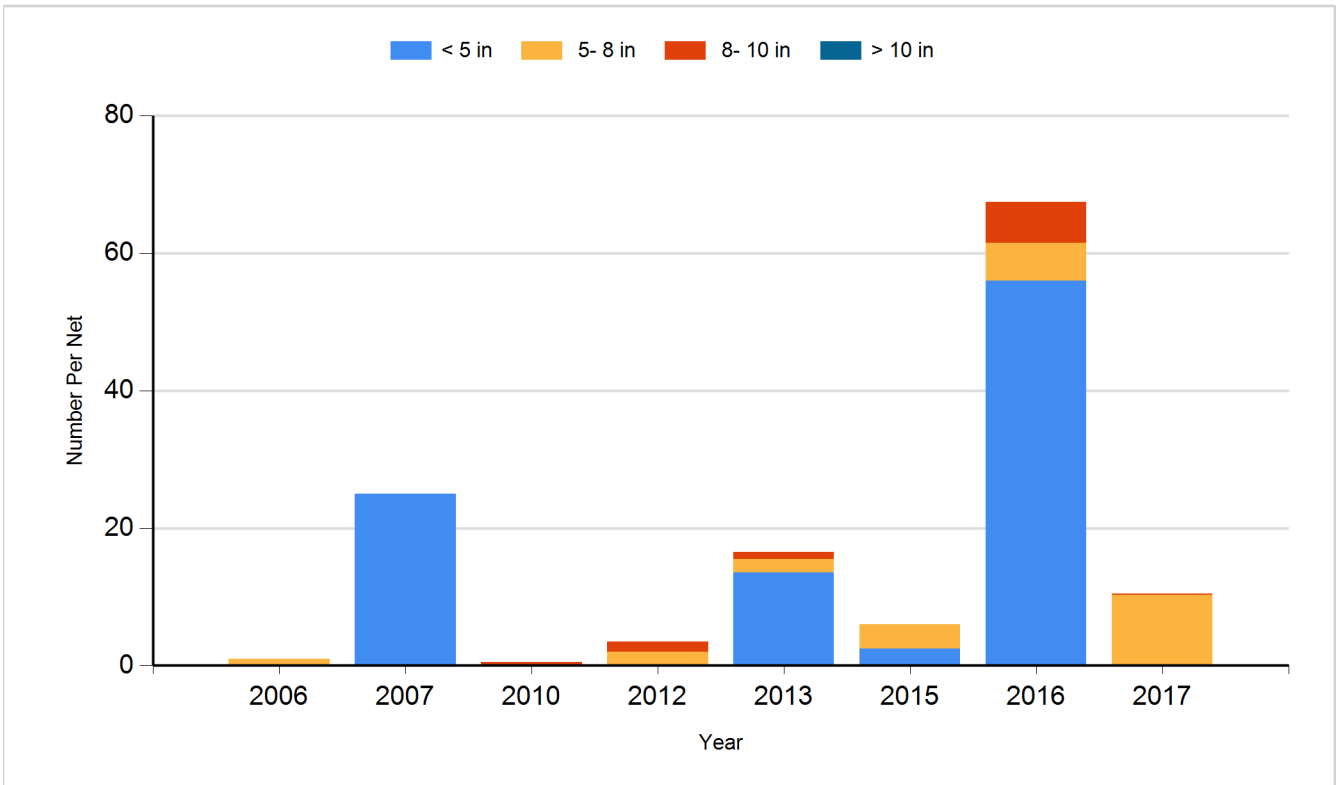
Species: Northern Pike
Gear: Gill Net



Species: Walleye
Gear: Gill Net



Species: Yellow Perch
Gear: Gill Net



Fish Stocking

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

Year	Species	Size	Number
2006	Largemouth Bass	Adult	180
2006	Walleye	Juvenile	187
2007	Walleye	Fingerling	50,000
2008	Walleye	Small Fingerling	53,975
2009	Walleye	Fingerling	54,100
2012	Largemouth Bass	Adult	540
2012	Largemouth Bass	Fingerling	9,120
2012	Smallmouth Bass	Fingerling	5,130
2013	Largemouth Bass	Fingerling	11,970
2014	Largemouth Bass	Juvenile	750
2015	Largemouth Bass	Adult	230
2015	Largemouth Bass	Fingerling	3,690
2016	Gizzard Shad	Adult	37
2016	Largemouth Bass	Adult	424
2017	Gizzard Shad	Adult	125