SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Newell, Butte County
LBF-Lake-528-000
2016

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 13, 2016	7200 seconds
frame net (std 3/4 in)	June 21, 2016	20 net-nights
std exp gill net	August 05, 2016	4 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).

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

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
boat shocker (night)	Largemouth Bass	39.0	13.6	33	8	10	5	117	2
	Smallmouth Bass	1.0	0.9	0		0		135	0
	Walleye	38.0	9.8	42	11	4		99	3
frame net (std 3/4 in)	Bluegill	28.9	2.8	76	2	8	2	116	1
	Northern Pike	1.2	0.4	17		0		86	1
	Rudd	11.7	3.8	77	4	62	4		
	Walleye	1.1	0.3	64	16	9		80	1
	White Sucker	3.3	0.7	100		100		94	1
	Yellow Perch	0.2	0.1	0		0		90	0
std exp gill net	Bluegill	1.0	0.0	100		0		125	3
	Gizzard Shad	0.0	0.0	0					
	Northern Pike	3.5	0.5	14		0		83	2
	Rudd	18.5	1.4	81	7	57	8		
	Walleye	20.0	0.9	50	8	10	5	84	1
	White Sucker	1.5	0.5	100		100		94	3
	Yellow Perch	11.5	0.5	52	11	0		98	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
boat shocker (night)	Largemouth Bass	55.2					30.0		20.8	13.8	39.0	31.8
	Smallmouth Bass						1.2		1.0		1.0	1.1
	Walleye	67.1					46.8		123.8	101.0	38.0	75.3
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	57.7				5.5	21.5	29.1		17.3	28.9	26.7
	Northern Pike	0.1				1.1	1.0	0.3		0.6	1.2	0.7
	Rudd	18.6				18.3	15.4	46.0		21.3	11.7	21.9
	Smallmouth Bass	0.1						0.1				0.1
	Walleye	2.4				0.6	0.6	1.1		1.0	1.1	1.1
	White Sucker	9.3				2.0	1.5	1.9		0.4	3.3	3.1
	Yellow Perch	0.1				0.3	0.1	0.9			0.2	0.3
std exp gill net	Bluegill										1.0	1.0
	Gizzard Shad										0.0	0.0
	Northern Pike	4.5			2.5			4.5			3.5	3.8
	Rudd	2.0			2.0						18.5	7.5
	Walleye	2.0			3.5			8.5			20.0	8.5
	White Sucker	2.5			0.5			3.0			1.5	1.9
	Yellow Perch	0.0			0.5			3.0			11.5	3.8
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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	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

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
boat shocker (night)	Walleye	PSD	32					23		67	42	42
		PSD-P	4					0		7	1	4
		Wr	95					100		93	86	99
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	0				67	25	100		20	17
		PSD-P	0				22	0	0		20	0
		Wr	79				76	78	83		77	86
	Walleye	PSD	18				60	0	75		75	64
		PSD-P	0				0	0	25		13	9
		Wr	86				85	81	80		80	80
	Yellow Perch	PSD	100				50	100	50			0
		PSD-P	100				50	0	33			0
		Wr	82				85	88	88			90
std exp gill net	Northern Pike	PSD	0			60			11			14
		PSD-P	0			0			0			0
		Wr	82			76			81			83
	Walleye	PSD	50			86			35			50
		PSD-P	25			0			12			10
		Wr	82			85			84			84
	Yellow Perch	PSD	0			100			33			52
		PSD-P	0			0			0			0
		Wr				98			101			98

			Year									
Gear	Species	Index	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
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	

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+
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)	

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2007	100	104 (100)									

Fish Condition

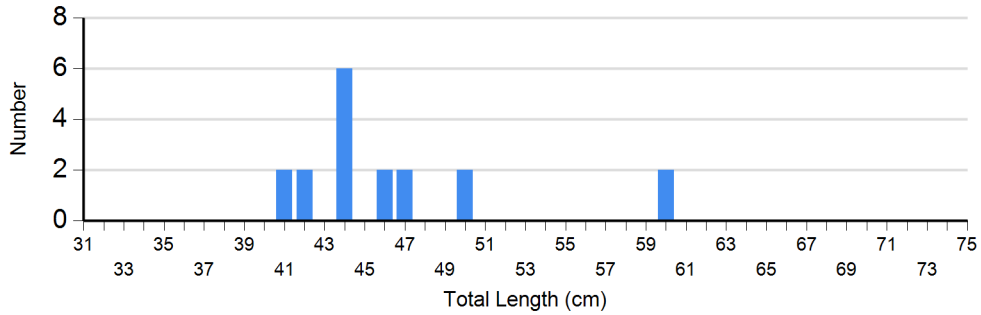
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	4	75 (4.2)	8	86 (4.8)	2	90 (0.0)	0	
	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	
Walleye Gill Net	2012	34	78 (0.6)	16	77 (0.9)	0		0	
	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	
Yellow Perch Gill Net	2012	8	96 (2.2)	6	90 (0.4)	0		0	
	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	

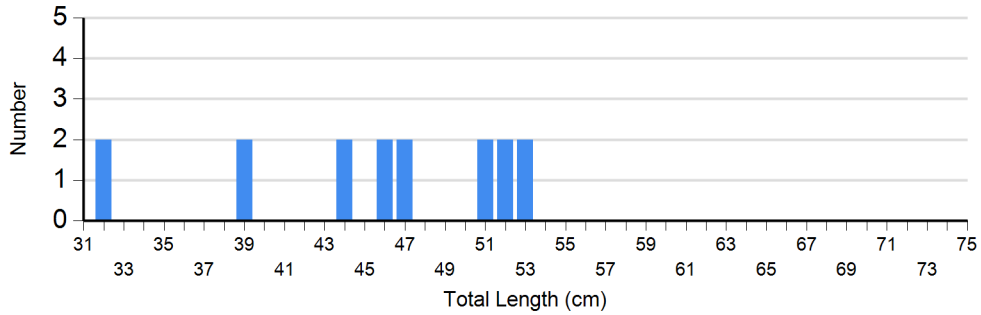
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Northern Pike
Gear: std exp gill net

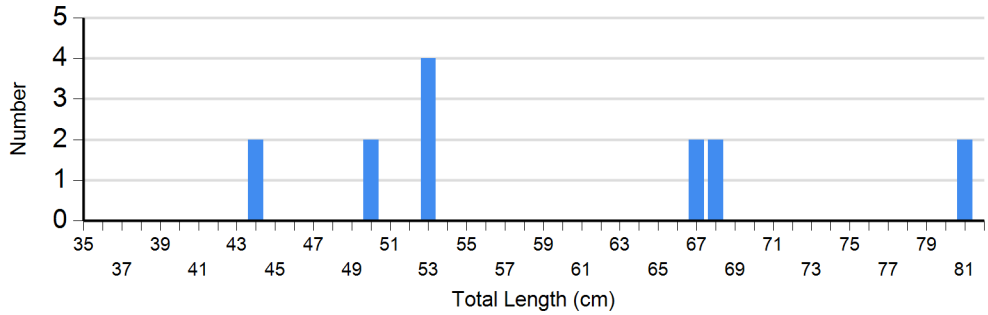


2013

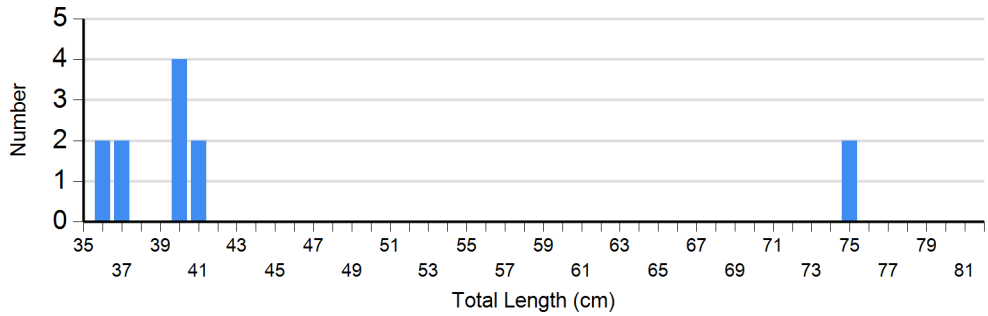


2016

Species: Northern Pike
Gear: std exp gill net (150 ft)

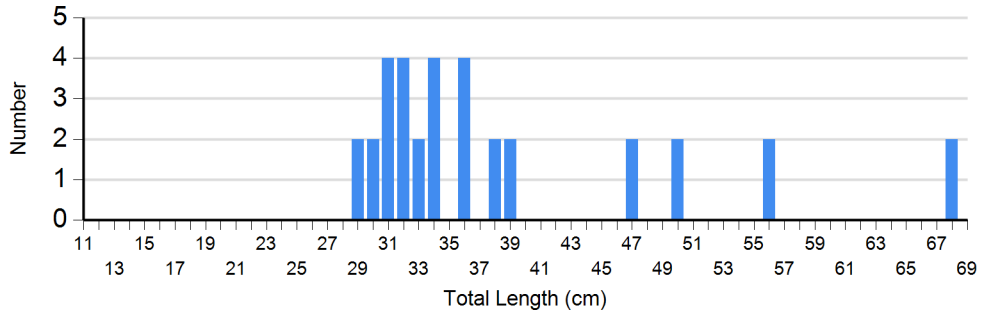


2012

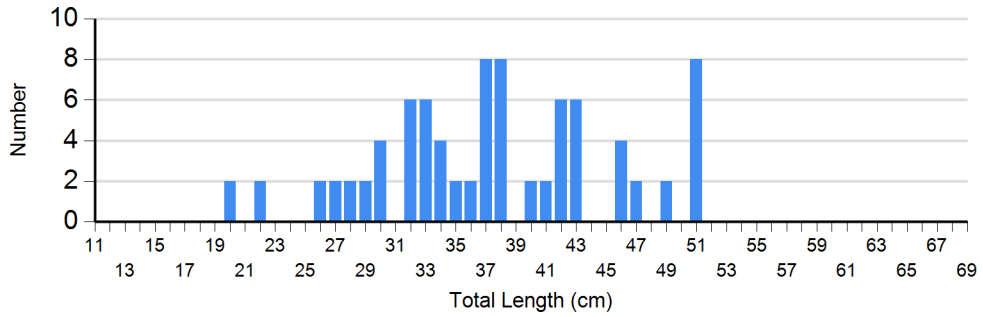


2015

Species: Walleye
Gear: std exp gill net

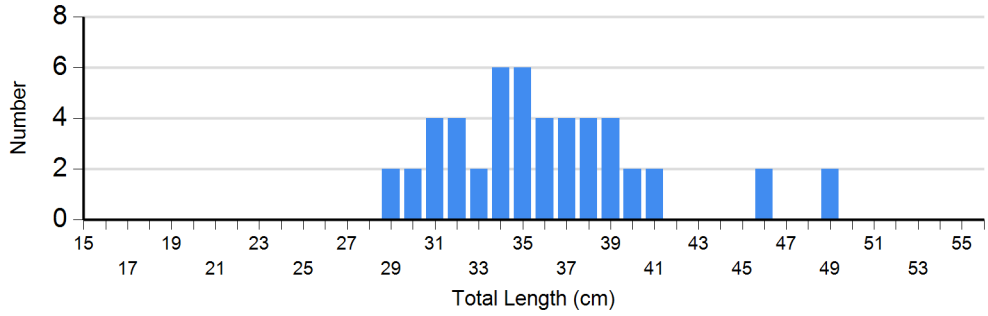


2013

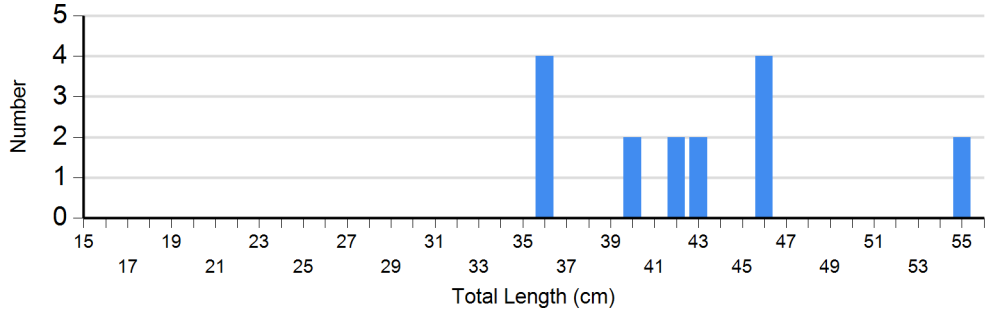


2016

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

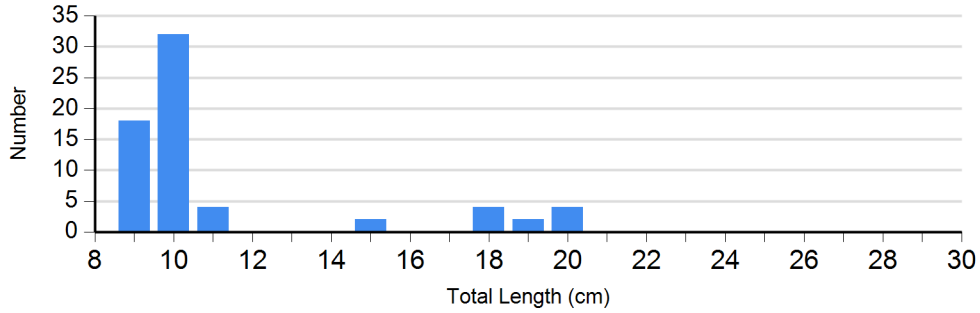


2012

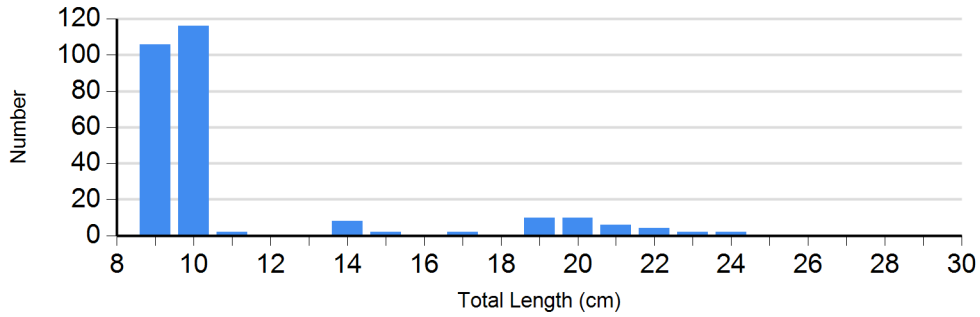


2015

Species: Yellow Perch
Gear: std exp gill net

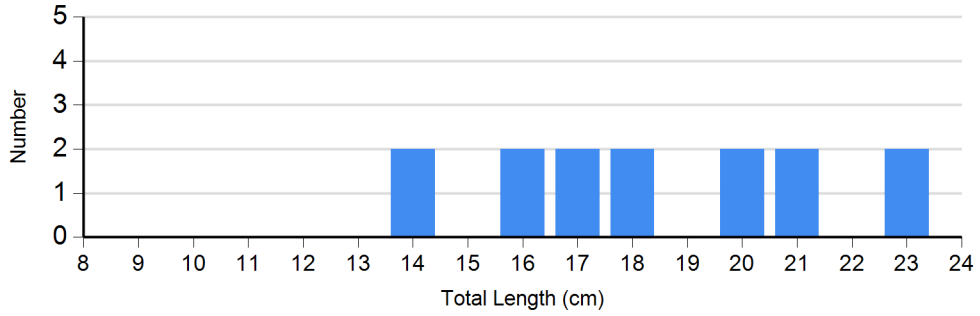


2013

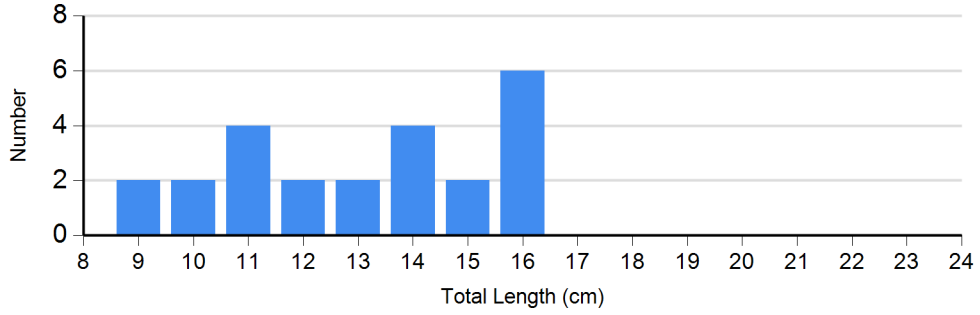


2016

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



2012

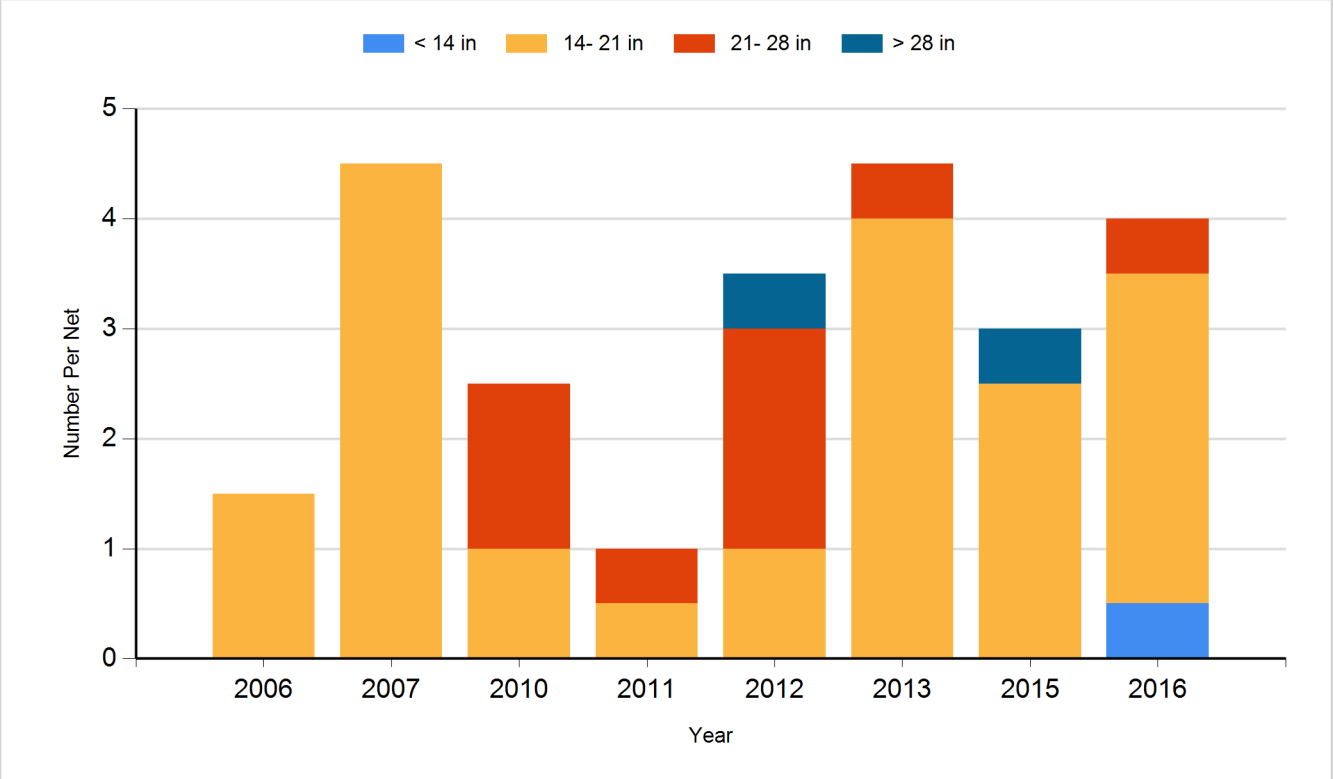


2015

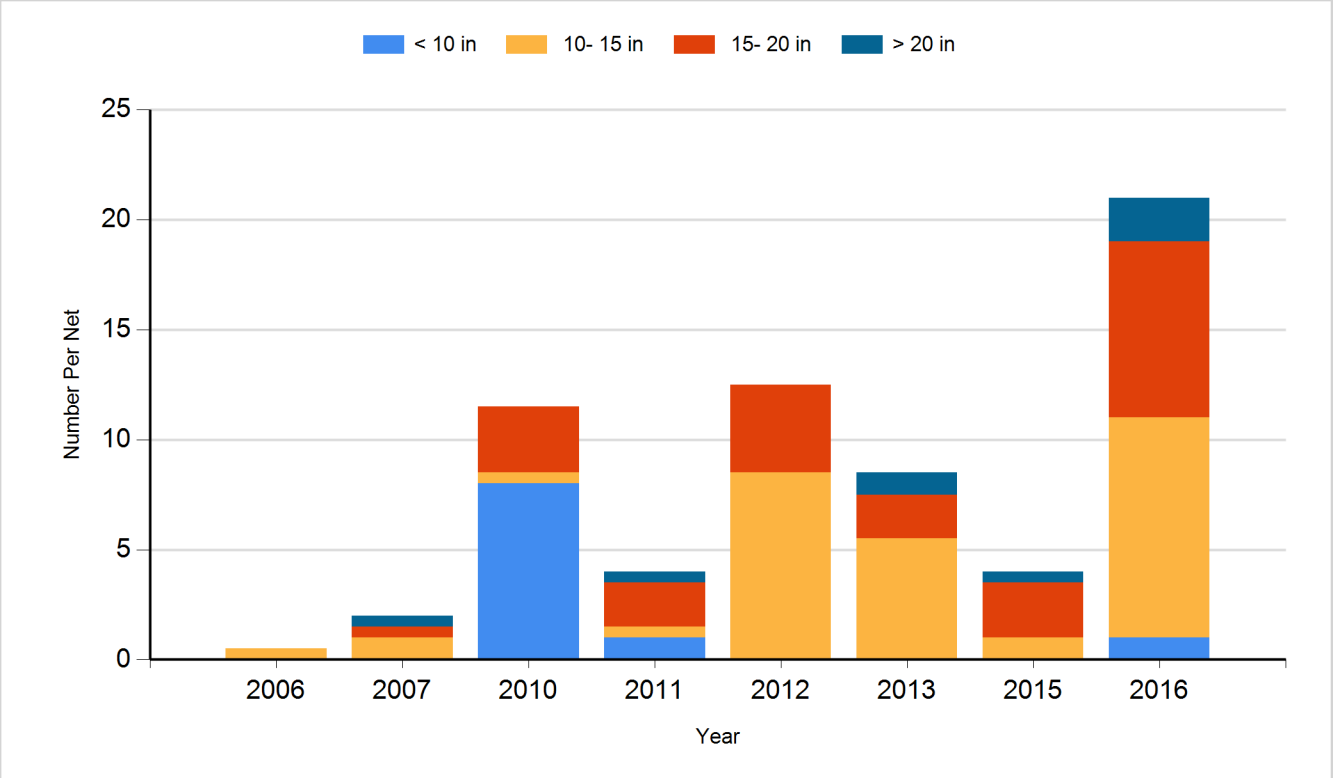
Historic Fish Sizes and Relative Abundance

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

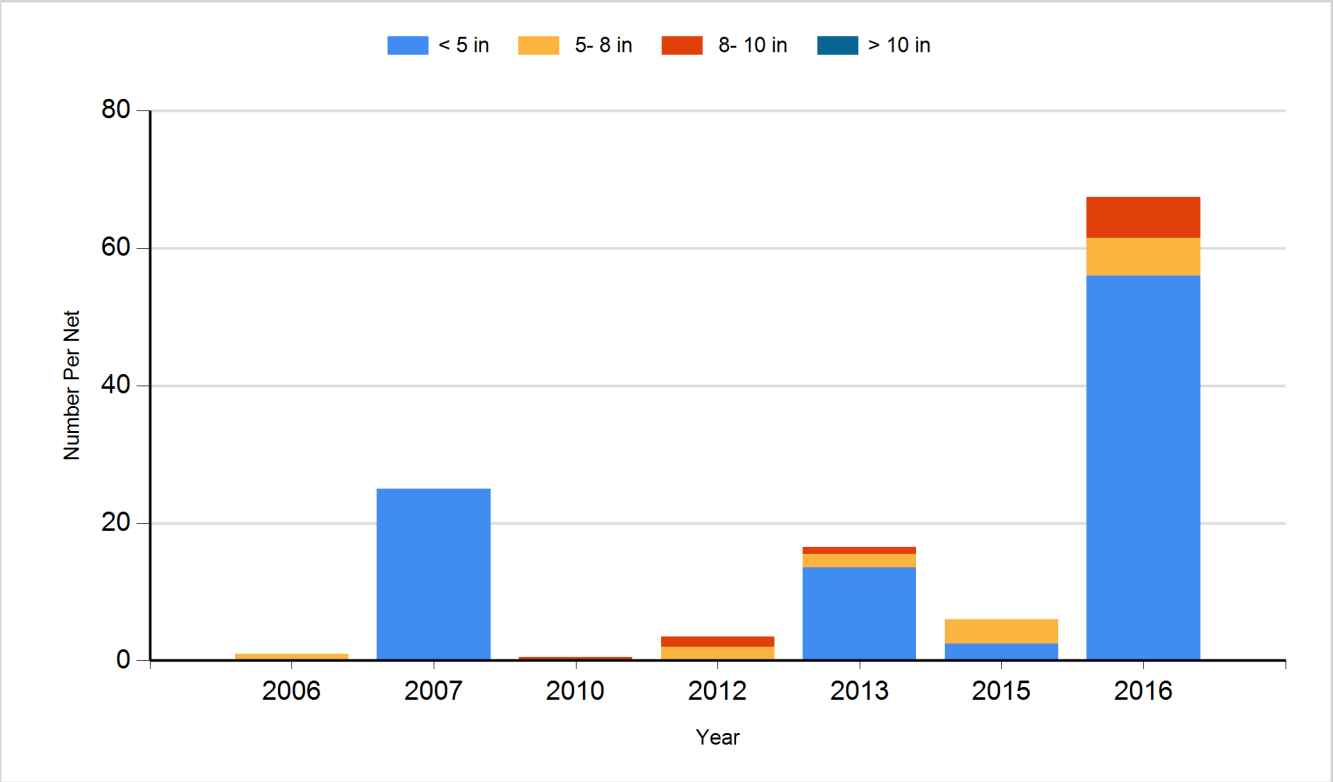
Species: Northern Pike
Gear: Gill Net



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
2005	Walleye	Fingerling	2,230
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