

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Newell, Butte County
LBF-Lake-528-000
2015

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)	September 30, 2015	7590 seconds
frame net (std 3/4 in)	July 07, 2015	16 net-nights
std exp gill net (150 ft)	July 07, 2015	4 net-nights

Common Fish Species Present

Yellow Perch

Northern Pike

Largemouth Bass

Bluegill

Walleye

Smallmouth Bass

Rudd

White Sucker

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	13.8	4.3	71	13	36	14	115	2
	Walleye	101.0	25.6	42	5	1		86	1
frame net (std 3/4 in)	Bluegill	17.3	4.3	41	4	7	2	113	1
	Northern Pike	0.6	0.3	20		20		77	3
	Rudd	21.3	9.7	98	1	65	4		
	Walleye	1.0	0.6	75		13		80	2
	White Sucker	0.4	0.2	100		100		89	3
std exp gill net (150 ft)	Northern Pike	3.0	2.8	17		17		78	2
	Rudd	25.5	7.1	78	6	27	6		
	Walleye	4.0	1.9	75		13		81	1
	White Sucker	3.5	1.4	100		100		99	1
	Yellow Perch	3.5	2.4	0		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.

Gear	Species	CPUE										
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Avg
boat shocker (night)	Largemouth Bass	30.8	55.2					30.0		20.8	13.8	30.1
	Smallmouth Bass	0.8						1.2	1.0			1.0
	Walleye	26.8	67.1					46.8		123.8	101.0	73.1
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	0.3					1.4	1.3				1.0
	Bluegill	17.5	57.7				5.5	21.5	29.1		17.3	24.8
	Northern Pike	0.1	0.1				1.1	1.0	0.3		0.6	0.5
	Rudd	11.8	18.6				18.3	15.4	46.0		21.3	21.9
	Smallmouth Bass	0.1	0.1						0.1			0.1
	Walleye	0.3	2.4				0.6	0.6	1.1		1.0	1.0
	White Sucker	2.9	9.3				2.0	1.5	1.9		0.4	3.0
	Yellow Perch	0.5	0.1				0.3	0.1	0.9			0.4
std exp gill net	Northern Pike	1.5	4.5			2.5			4.5			3.3
	Rudd		2.0			2.0						2.0
	Walleye	0.5	2.0			3.5			8.5			3.6
	White Sucker	3.0	2.5			0.5			3.0			2.3
	Yellow Perch	1.0	0.0			0.5			3.0			1.1
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
	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.

Gear	Species	Index	Year										
			2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
boat shocker (night)	Walleye	PSD	33	32						23		67	42
		PSD-P	4	4						0		7	1
		Wr	89	95						100		93	86
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	0				67	25	100		20	
		PSD-P	0	0				22	0	0		20	
		Wr	77	79				76	78	83		77	
	Walleye	PSD	100	18				60	0	75		75	
		PSD-P	50	0				0	0	25		13	
		Wr	88	86				85	81	80		80	
	Yellow Perch	PSD	25	100				50	100	50			
		PSD-P	25	100				50	0	33			
		Wr	92	82				85	88	88			
std exp gill net	Northern Pike	PSD	0	0			60				11		
		PSD-P	0	0			0				0		
		Wr	78	82			76				81		
	Walleye	PSD	0	50			86				35		
		PSD-P	0	25			0				12		
		Wr	81	82			85				84		
	Yellow Perch	PSD	0	0			100				33		
		PSD-P	0	0			0				0		
		Wr	94				98				101		

Gear	Species	Index	Year									
			2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
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

Back-Calculated Lengths

Mean species back-calculated total length (mm) at age, standard error (SE), and sample size (N).

Species: Walleye

Year Class	Age	N	Mean back-calculated length (SE) at age											
			1	2	3	4	5	6	7	8	9	10		
2014	1	32	168 (1.7)											
2013	2	22	184 (2.6)	234 (2.5)										
2012	3	22	187 (3.6)	275 (6.2)	317 (6.3)									
2011	4	18	190 (3)	264 (3.8)	330 (2.8)	365 (3.5)								
2010	5	24	150 (3.8)	227 (4.1)	289 (3.9)	338 (3.4)	377 (2.8)							
2009	6	4	128 (8.4)	189 (4.3)	239 (1)	312 (1)	361 (4)	391 (.7)						
2006	9	2	197 (0)	246 (0)	289 (0)	333 (0)	379 (0)	400 (0)	416 (0)	436 (0)	448 (0)			
Weighted Mean		124	173	246	305	346	375	394	416	436	448			
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20		
2014	1	32												
2013	2	22												
2012	3	22												
2011	4	18												
2010	5	24												
2009	6	4												
2006	9	2												
Weighted Mean		124												

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+
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).

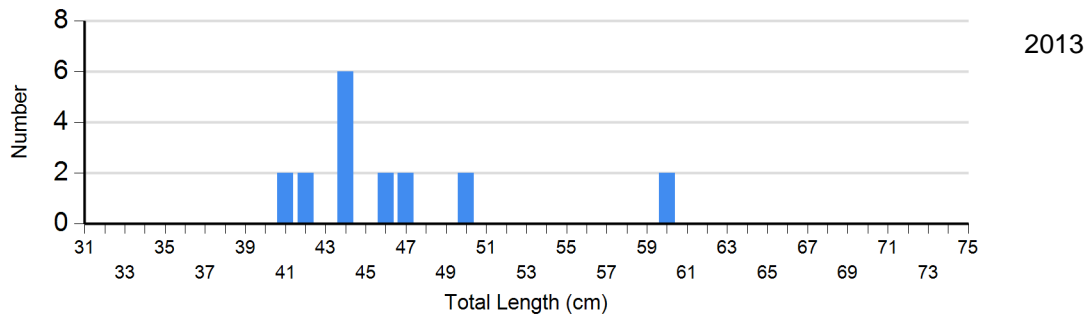
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2011	2	80 (0.0)	2	80 (0.0)	0		0	
	2012	4	75 (4.2)	8	86 (4.8)	2	90 (0.0)	0	
	2013	16	80 (1.1)	2	88 (0.0)	0		0	
	2015	10	77 (2.1)	0		2	83 (0.0)	0	
Walleye Gill Net	2011	2	87 (0.0)	8	83 (0.7)	2	72 (0.0)	0	
	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	
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	

Length Frequency Distribution

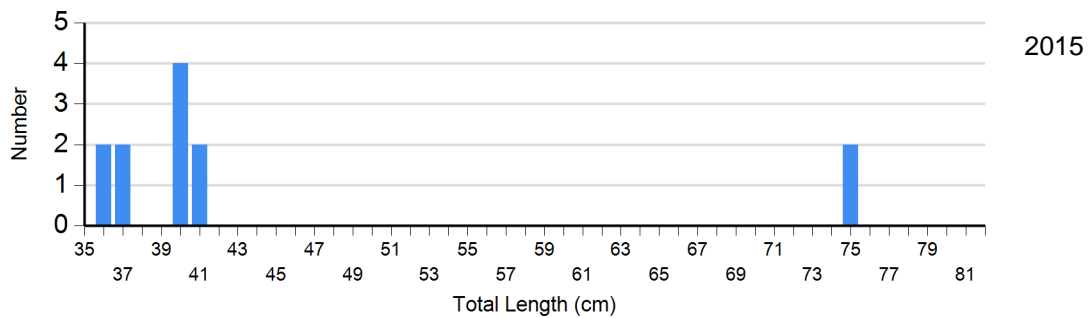
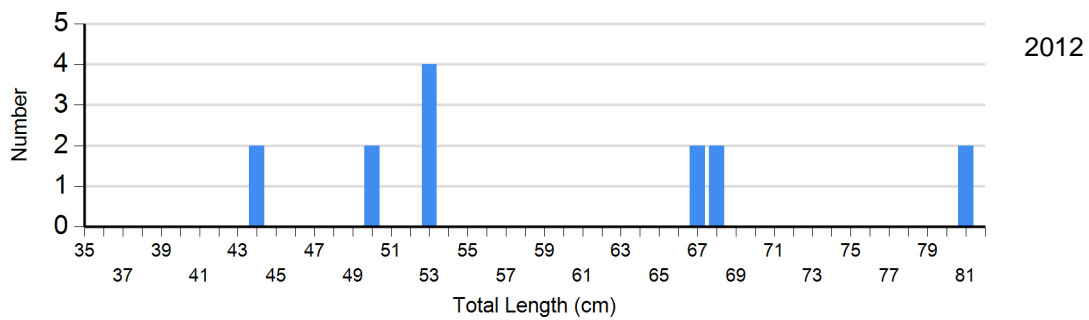
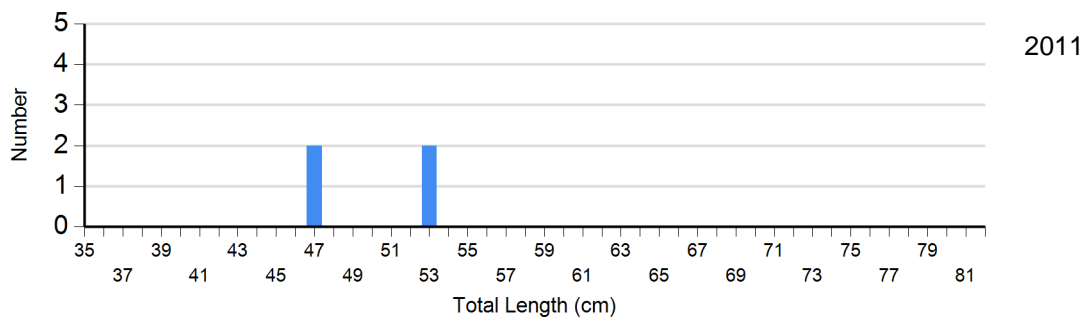
Length frequency histogram of species sampled by year.

Species: Northern Pike

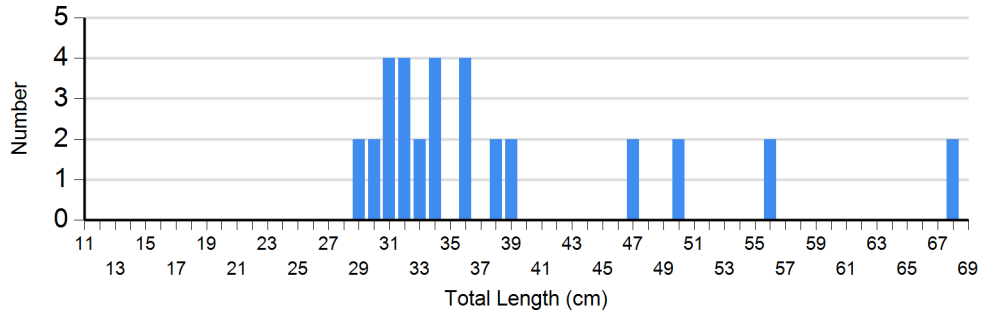
Gear: std exp gill net



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

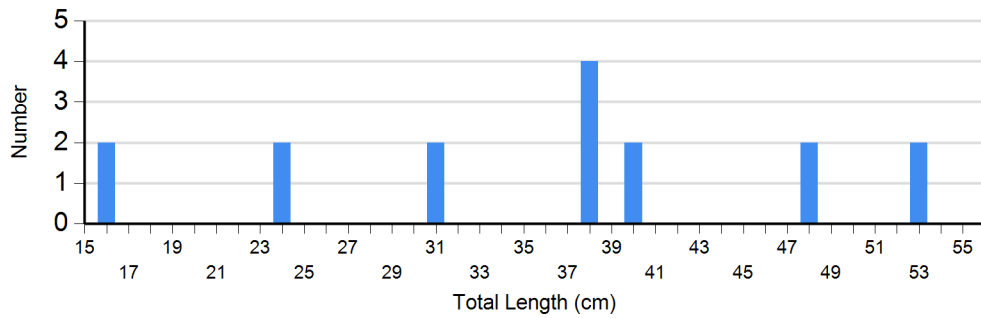


Species: Walleye
Gear: std exp gill net

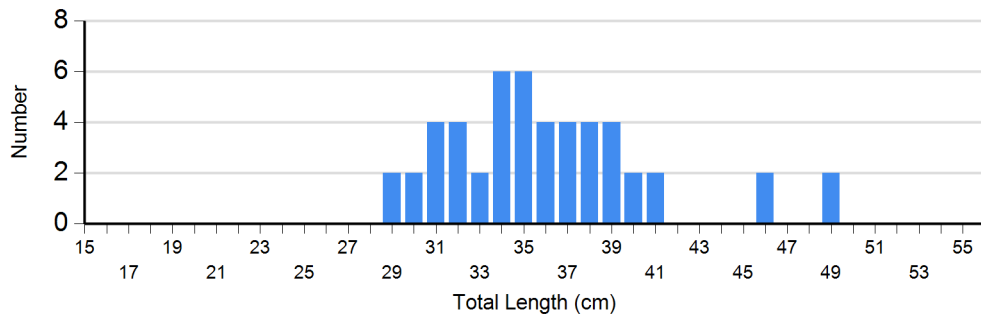


2013

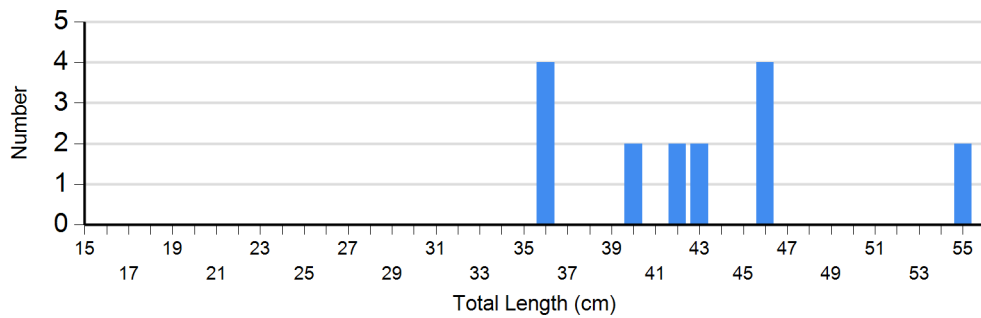
Species: Walleye
Gear: std exp gill net (150 ft)



2011

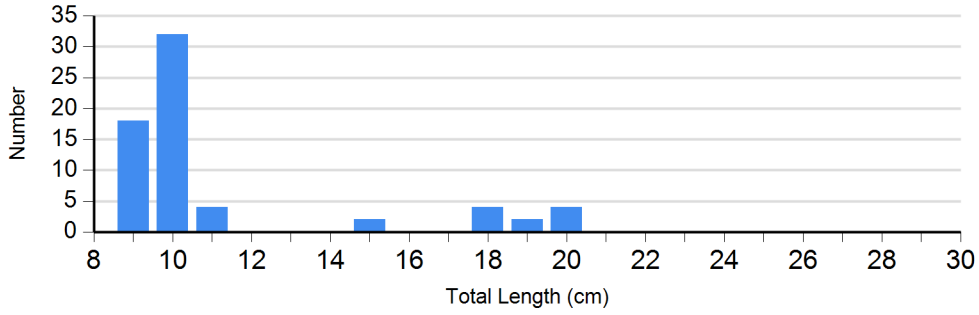


2012

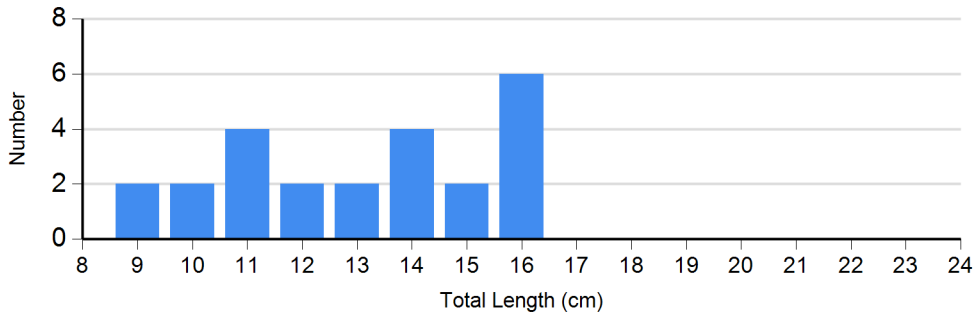
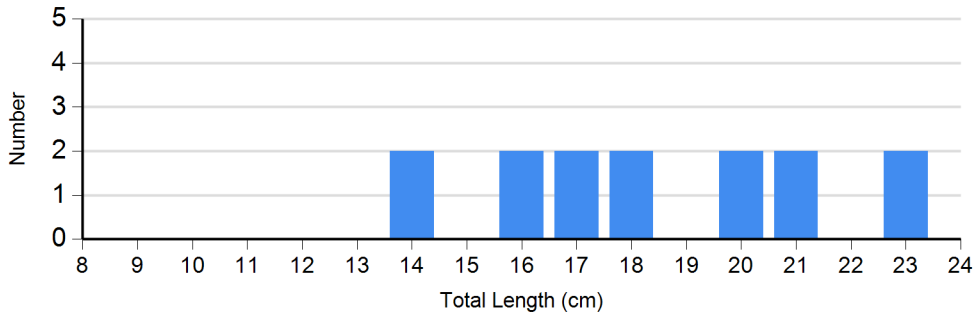


2015

Species: Yellow Perch
Gear: std exp gill net



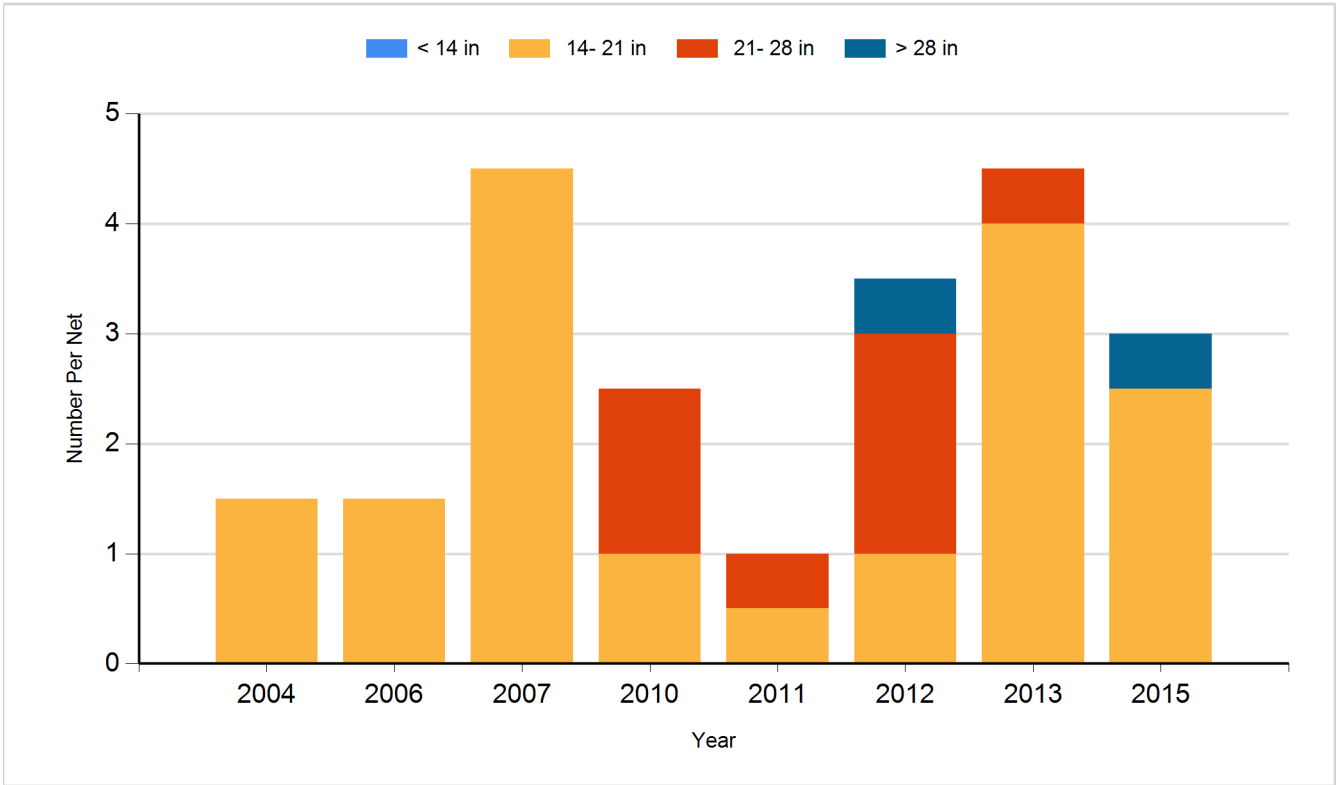
Species: Yellow Perch
Gear: std exp gill net (150 ft)



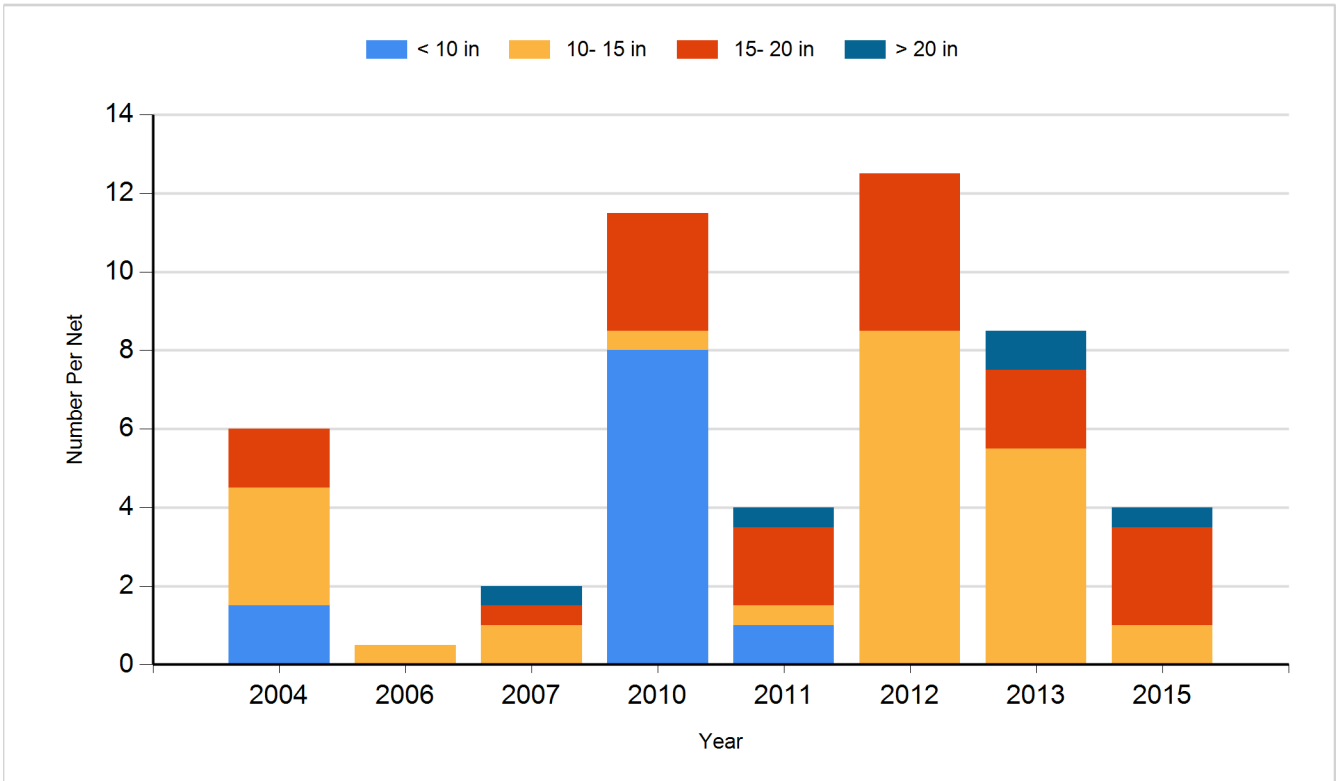
Historic Fish Sizes and Relative Abundance

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

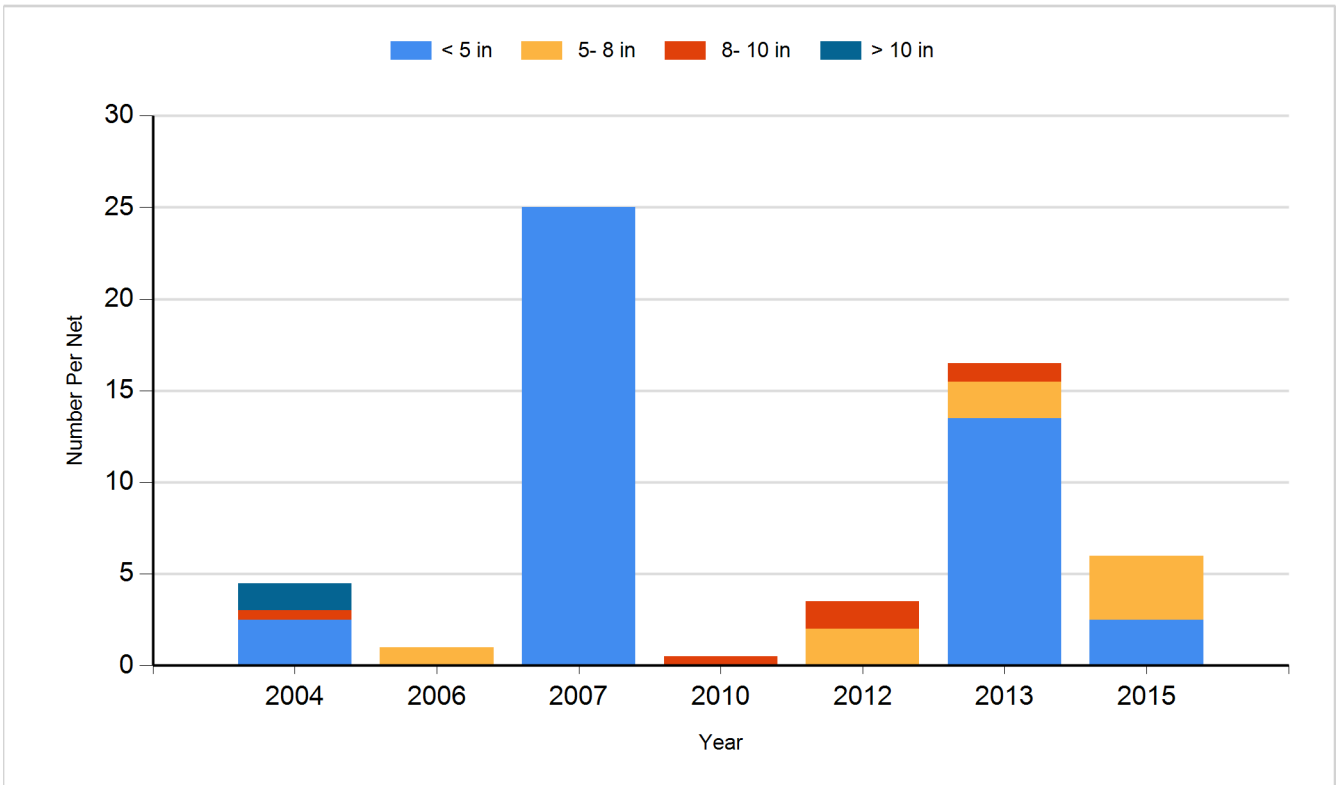
Species: Northern Pike
Gear: Gill Net



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
2004	Walleye	Fingerling	308
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