SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Buffalo South, Marshall County
UJA-Lake-917-000
2017

Lake Information

Name:	Buffalo South	**Maximum Depth:**	14 Feet
County:	Marshall	**Mean Depth:**	8 Feet
		OHWM Elevation:	1,835
Surface Area:	2,112 Acres	**Outlet Elevation:**	1,835

Surveys and Investigations

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

Gear	Date	Effort
AFS std frame net	June 13, 2017	6 net-nights
AFS std frame net	June 14, 2017	6 net-nights
AFS std frame net	June 15, 2017	6 net-nights
AFS std gill net	June 13, 2017	4 net-nights
AFS std gill net	June 14, 2017	4 net-nights
AFS std gill net	June 15, 2017	4 net-nights

Common Fish Species Present

Yellow Perch

Northern Pike

Largemouth Bass

Walleye

Bluegill

Black Bullhead

White Sucker

Black Crappie

Common Carp

Smallmouth Bass

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 frame net	Black Bullhead	57.8	27.5	100		86	1	85	1
	Black Crappie	0.6	0.3	91		82		95	3
	Bluegill	8.5	5.0	33	5	25	5	105	2
	Common Carp	0.1	0.1	100		100			
	Largemouth Bass	0.1	0.1	50		0		121	15
	Northern Pike	0.2	0.1	75		25		72	3
	Smallmouth Bass	0.1	0.1	100		100		113	
	Walleye	0.2	0.1	67		0		88	2
	White Sucker	0.3	0.2	100		100		94	6
	Yellow Perch	0.3	0.2	33		17		88	6
AFS std gill net	Black Bullhead	21.3	5.0	100		69	4	83	1
	Black Crappie	1.4	0.5	71		53	20	106	4
	Bluegill	1.4	0.5	94		65	19	118	5
	Common Carp	0.1	0.1	100		100		101	
	Golden Shiner	0.0	0.0						
	Largemouth Bass	0.3	0.3	75		25		119	5
	Northern Pike	4.1	0.8	39	10	6		85	2
	Walleye	3.5	1.1	43	11	14	8	89	1
	White Sucker	5.5	1.5	100		100		107	1
	Yellow Perch	2.9	1.0	6		0		102	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	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
AFS std frame net	Black Bullhead										57.8	57.8
	Black Crappie										0.6	0.6
	Bluegill										8.5	8.5
	Common Carp										0.1	0.1
	Largemouth Bass										0.1	0.1
	Northern Pike										0.2	0.2
	Smallmouth Bass										0.1	0.1
	Walleye										0.2	0.2
	White Sucker										0.3	0.3
	Yellow Perch										0.3	0.3
AFS std gill net	Black Bullhead										21.3	21.3
	Black Crappie										1.4	1.4
	Bluegill										1.4	1.4
	Common Carp										0.1	0.1
	Golden Shiner										0.0	0.0
	Largemouth Bass										0.3	0.3
	Northern Pike										4.1	4.1
	Walleye										3.5	3.5
	White Sucker										5.5	5.5
	Yellow Perch										2.9	2.9
boat shocker (night)	Walleye	81.3		131.9		61.0						91.4
boat shocker (night, AC	Largemouth Bass						33.0		27.8			30.4
frame net (std 3/4 in)	Black Bullhead		17.9		22.0		14.1		19.3			18.3
	Black Crappie		0.5		1.2		5.2		1.4			2.1
	Bluegill		73.7		14.9		10.1		9.6			27.1
	Common Carp		0.1		0.1							0.1
	Northern Pike		0.4		0.4		0.2		0.5			0.4
	Orangespotted Sunfish		0.0									0.0
	Smallmouth Bass		0.2		0.1		0.1		0.1			0.1
	Sunfish Hybrid		0.0									0.0
	Walleye		0.1		0.1		0.2		0.2			0.2
	Western Painted Turtle								0.0			0.0

		CPUE										
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
frame net (std 3/4 in)	White Sucker		0.6									0.6
	Yellow Perch		8.4		8.7		0.9		2.0			5.0
std exp gill net	Black Bullhead		0.2		3.1		41.0		25.0			17.3
	Black Crappie		0.0		0.2		0.5		0.3			0.3
	Bluegill				0.3		0.8					0.6
	Emerald Shiner						0.0					0.0
	Golden Shiner				0.0							0.0
	Largemouth Bass				0.1							0.1
	Northern Pike		1.2		3.2		14.8		4.5			5.9
	Walleye		0.3		0.7		3.0		6.2			2.6
	White Sucker		1.3		1.8		4.8		7.7			3.9
	Yellow Perch		13.4		14.9		26.0		19.3			18.4

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.

			Year									
Gear	Species	Index	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AFS std frame net	Black Crappie	PSD										91
		PSD-P										82
		Wr										95
	Northern Pike	PSD										75
		PSD-P										25
		Wr										72
	Walleye	PSD										67
		PSD-P										0
		Wr										88
	Yellow Perch	PSD										33
		PSD-P										17
		Wr										88
AFS std gill net	Black Crappie	PSD										71
		PSD-P										53
		Wr										106
	Northern Pike	PSD										39
		PSD-P										6
		Wr										85
	Walleye	PSD										43
		PSD-P										14
		Wr										89
	Yellow Perch	PSD										6
		PSD-P										0
		Wr										102
boat shocker (night)	Walleye	PSD	0		0		0					
		PSD-P	0		0		0					
		Wr	95		96		94					
frame net (std 3/4 in)	Black Crappie	PSD		78		67		99		96		
		PSD-P		56		52		83		92		
		Wr		99		98		99		97		
	Northern Pike	PSD		75		100		50		13		

			Year									
Gear	Species	Index	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
frame net (std 3/4 in)	Northern Pike	PSD-P		25		29		0		0		
		Wr		82		83		79		80		
	Walleye	PSD		100		100		0		50		
		PSD-P		100		100		0		50		
		Wr		96		99		86		130		
	Yellow Perch	PSD		7		6		25		85		
		PSD-P		3		0		0		3		
		Wr		84		83		92		88		
std exp gill net	Black Crappie	PSD		0		75		100		100		
		PSD-P		0		0		67		100		
		Wr				111		98		94		
	Northern Pike	PSD		81		69		48		37		
		PSD-P		10		14		4		15		
		Wr		88		91		84		83		
	Walleye	PSD		100		54		17		32		
		PSD-P		0		23		6		8		
		Wr		99		92		88		88		
	Yellow Perch	PSD		0		2		10		29		
		PSD-P		0		0		0		0		
		Wr		93		95		102		100		

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	42		252 (1)	319 (18)	393 (14)	424 (1)		448 (2)	536 (1)	608 (1)	675 (4)
2015	44	168 (3)	270 (23)	346 (5)	404 (5)	387 (5)	540 (1)	525 (1)			645 (1)
2013	18		275 (5)	313 (10)	461 (1)	451 (1)					671 (1)
2011	17		254 (7)	377 (5)			521 (4)				641 (1)
2009	7	161 (2)			407 (2)	458 (1)			499 (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+
2017	35		134 (2)	147 (16)	182 (16)			233 (1)			
2015	139	97 (13)	133 (41)	162 (3)		199 (8)	196 (60)	211 (14)			
2013	157			155 (2)	159 (64)	178 (87)	197 (3)		204 (1)		
2011	588		101 (239)	133 (264)	153 (82)	184 (2)	203 (2)				
2009	974	92 (244)	118 (608)	149 (98)	163 (18)	143 (6)					

Fish Condition

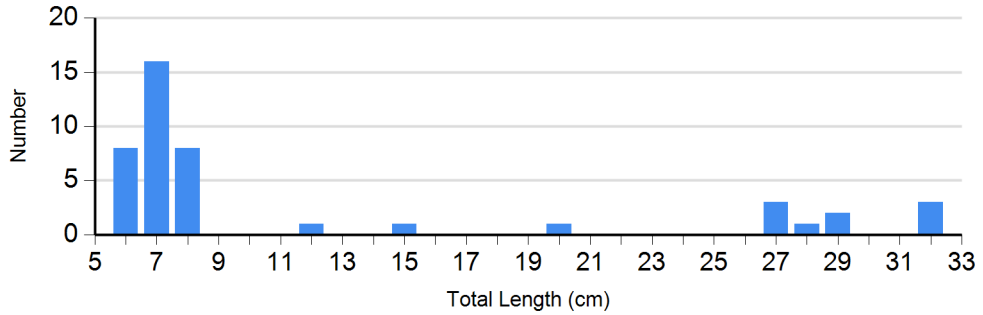
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	1	128	15	107 (1.7)	70	98 (0.7)	8	87 (2.7)
	2015	1		1	114	14	98 (1.1)	8	94 (1.9)
	2017	1	111	1	97	6	94 (2.4)	3	92 (2.5)
Northern Pike Gill Net	2013	46	84 (0.9)	39	83 (1.1)	3	96 (0.8)	1	87
	2015	17	83 (1.4)	6	80 (1.5)	4	87 (2.4)	0	
	2017	30	86 (1.2)	16	81 (1.6)	1	101	2	103 (4.0)
Walleye Gill Net	2013	15	87 (2.4)	2	94 (0.5)	0		1	97
	2015	25	89 (1.0)	9	88 (1.7)	2	91 (1.8)	1	69
	2017	24	89 (1.1)	12	94 (1.8)	2	90 (2.2)	4	79 (2.6)
Yellow Perch Gill Net	2013	141	103 (0.8)	15	94 (1.5)	0		0	
	2015	82	102 (1.0)	34	95 (1.2)	0		0	
	2017	33	103 (1.5)	2	90 (0.3)	0		0	

Length Frequency Distribution

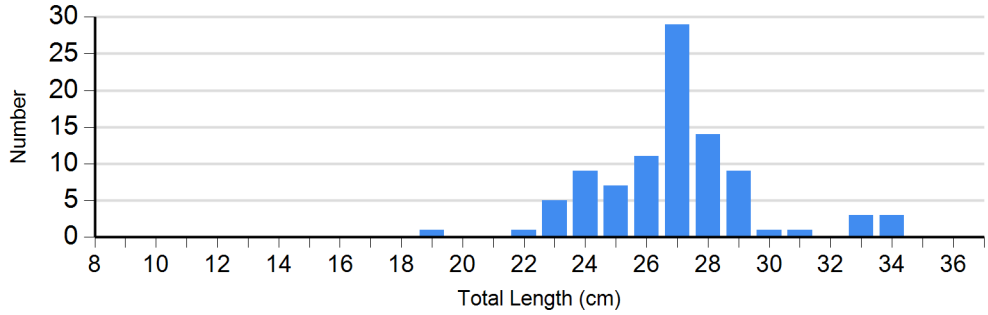
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net

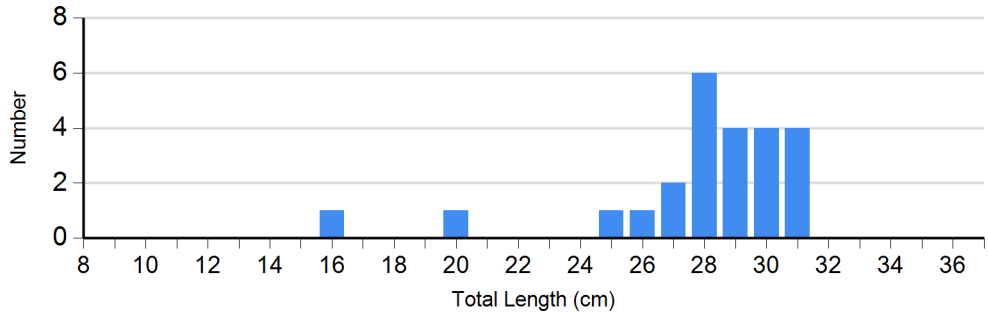


2017

Species: Black Crappie
Gear: frame net (std 3/4 in)

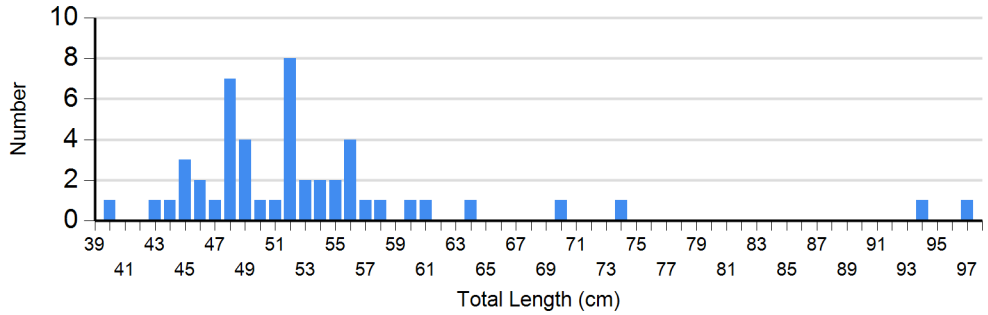


2013



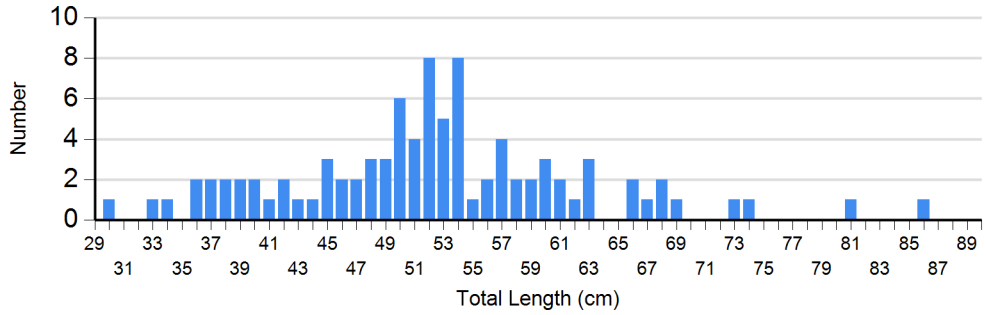
2015

Species: Northern Pike
Gear: AFS std gill net

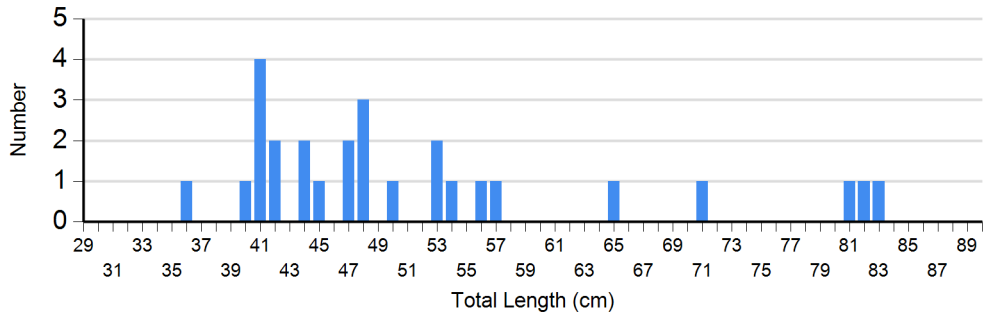


2017

Species: Northern Pike
Gear: std exp gill net

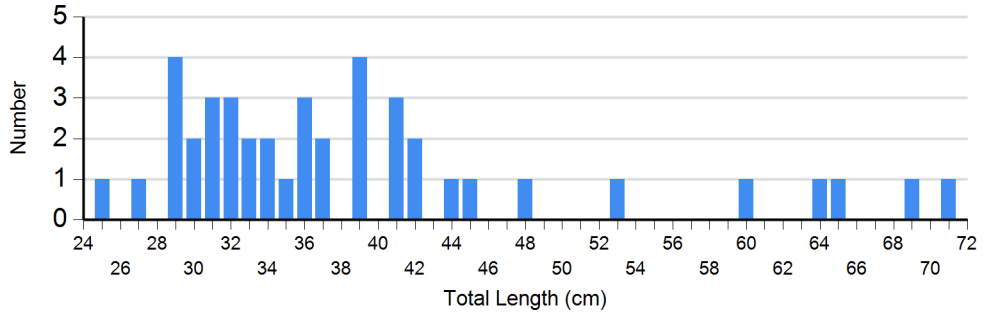


2013



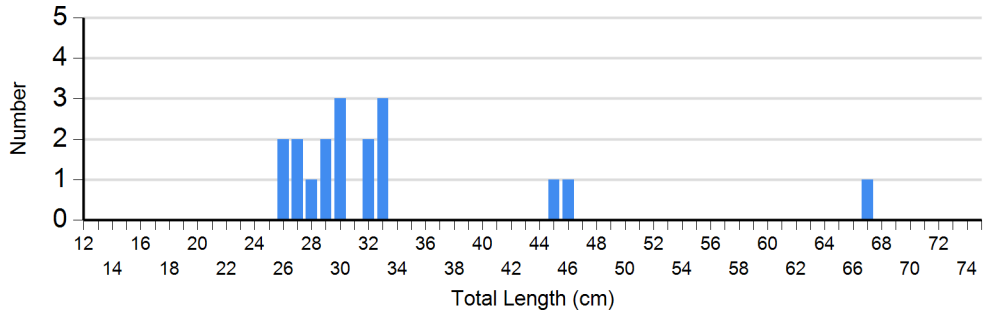
2015

Species: Walleye
Gear: AFS std gill net

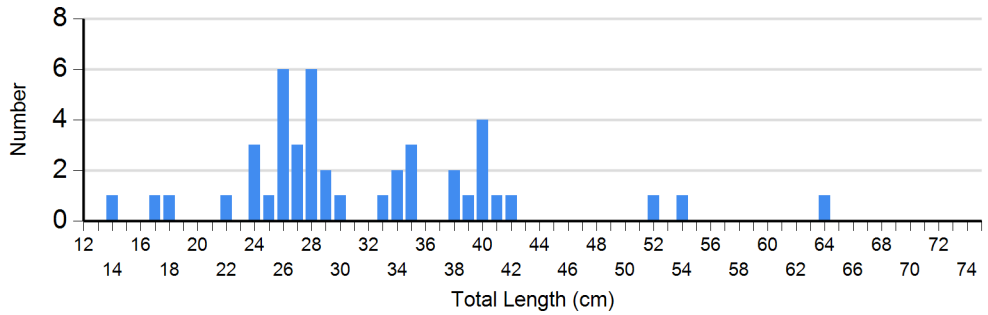


2017

Species: Walleye
Gear: std exp gill net

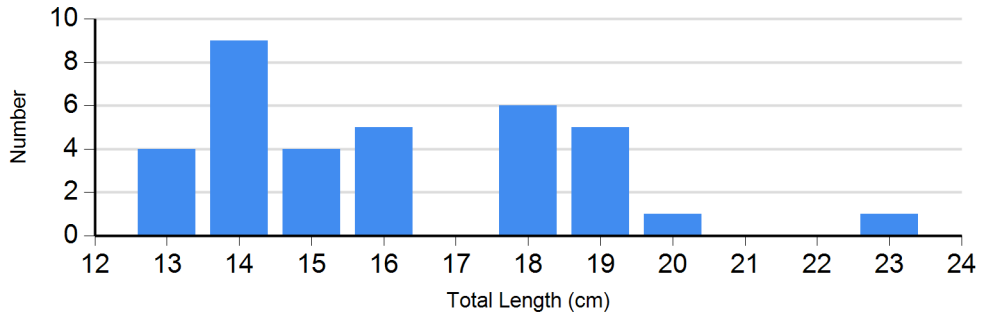


2013



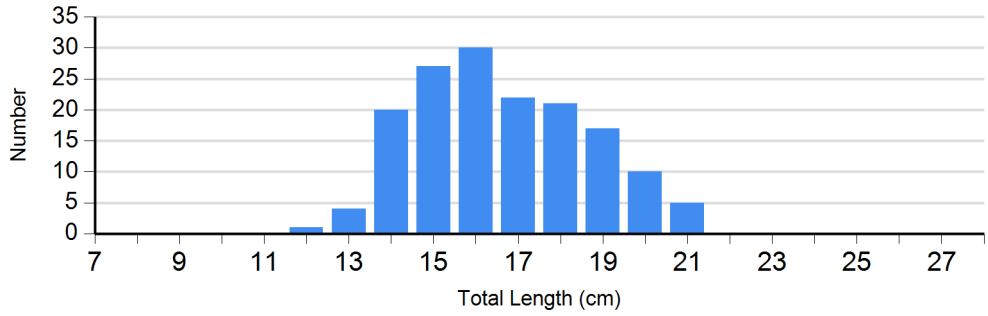
2015

Species: Yellow Perch
Gear: AFS std gill net

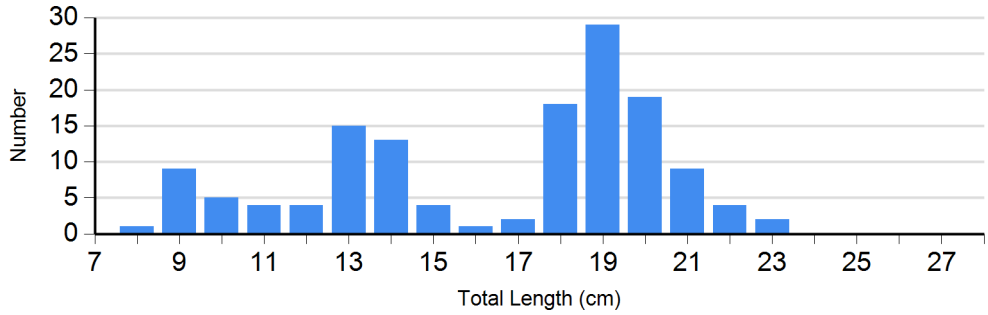


2017

Species: Yellow Perch
Gear: std exp gill net



2013

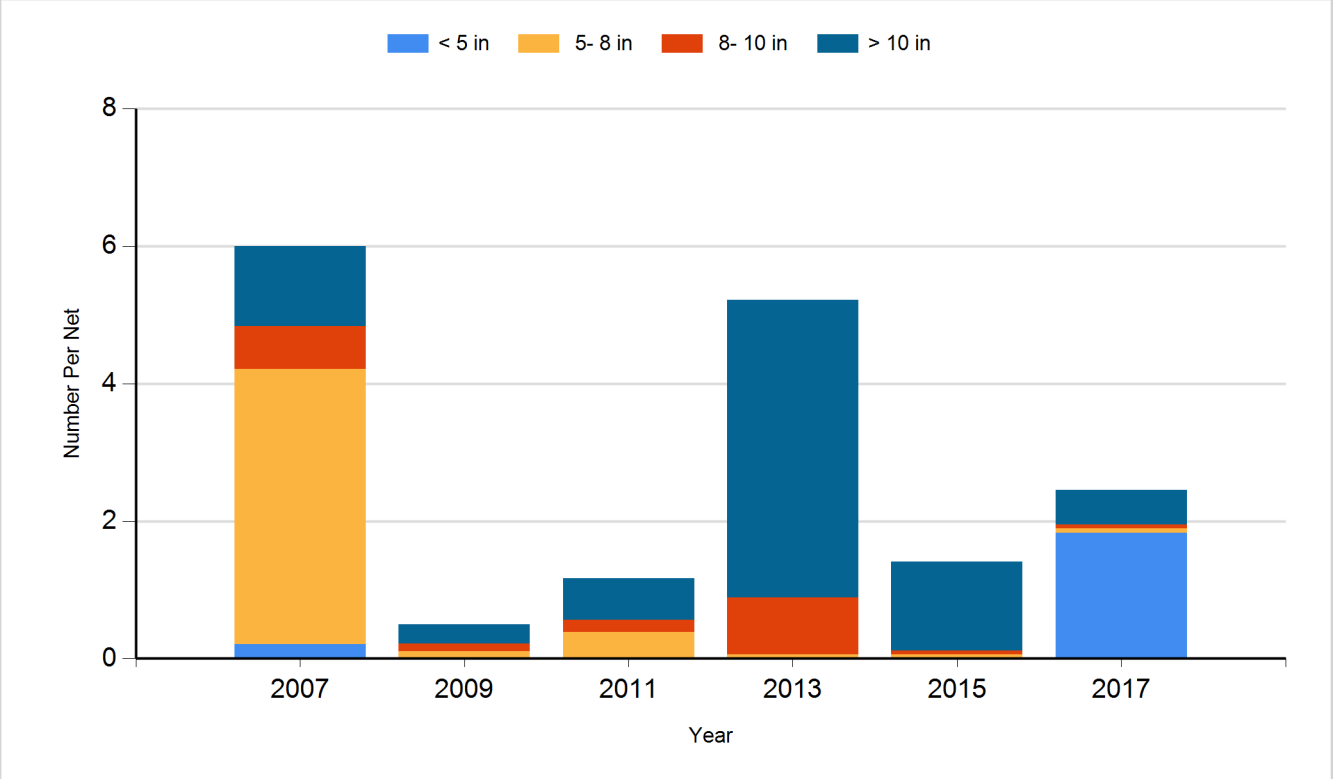


2015

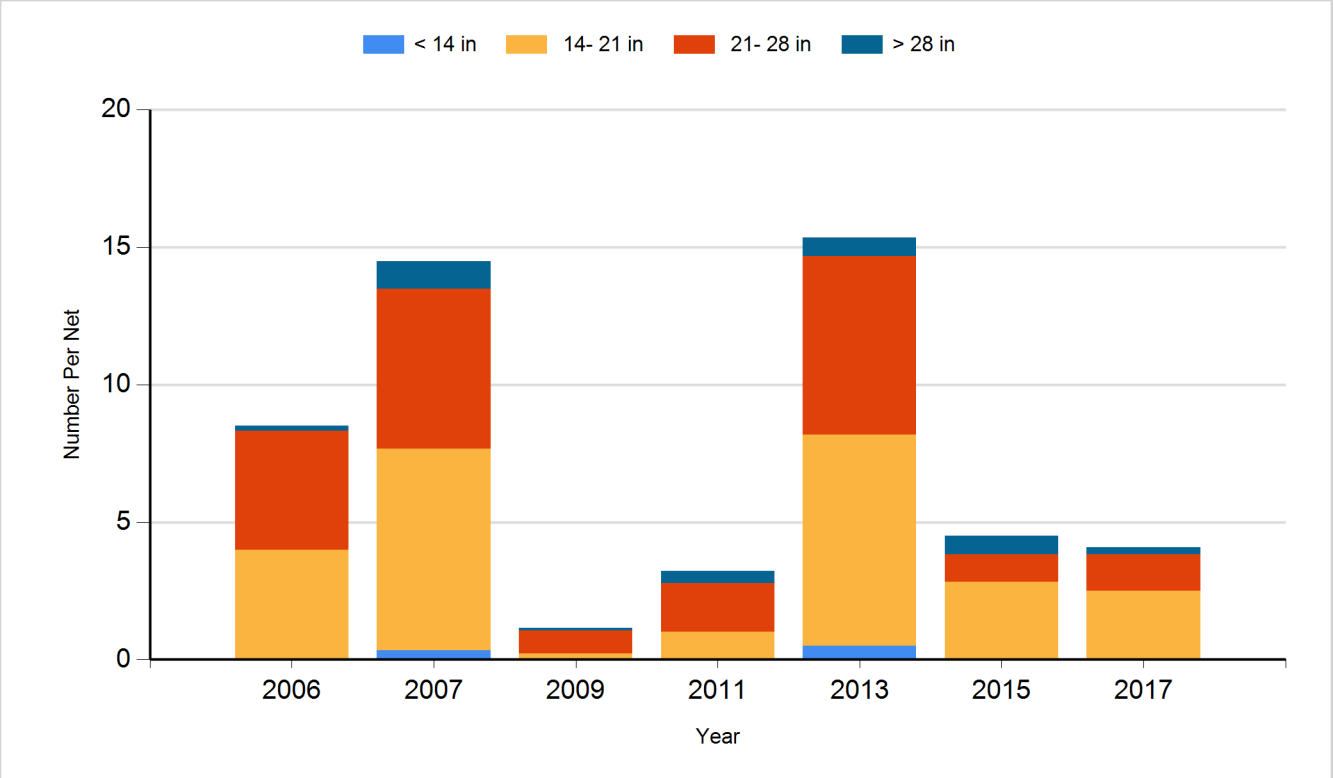
Historic Fish Sizes and Relative Abundance

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

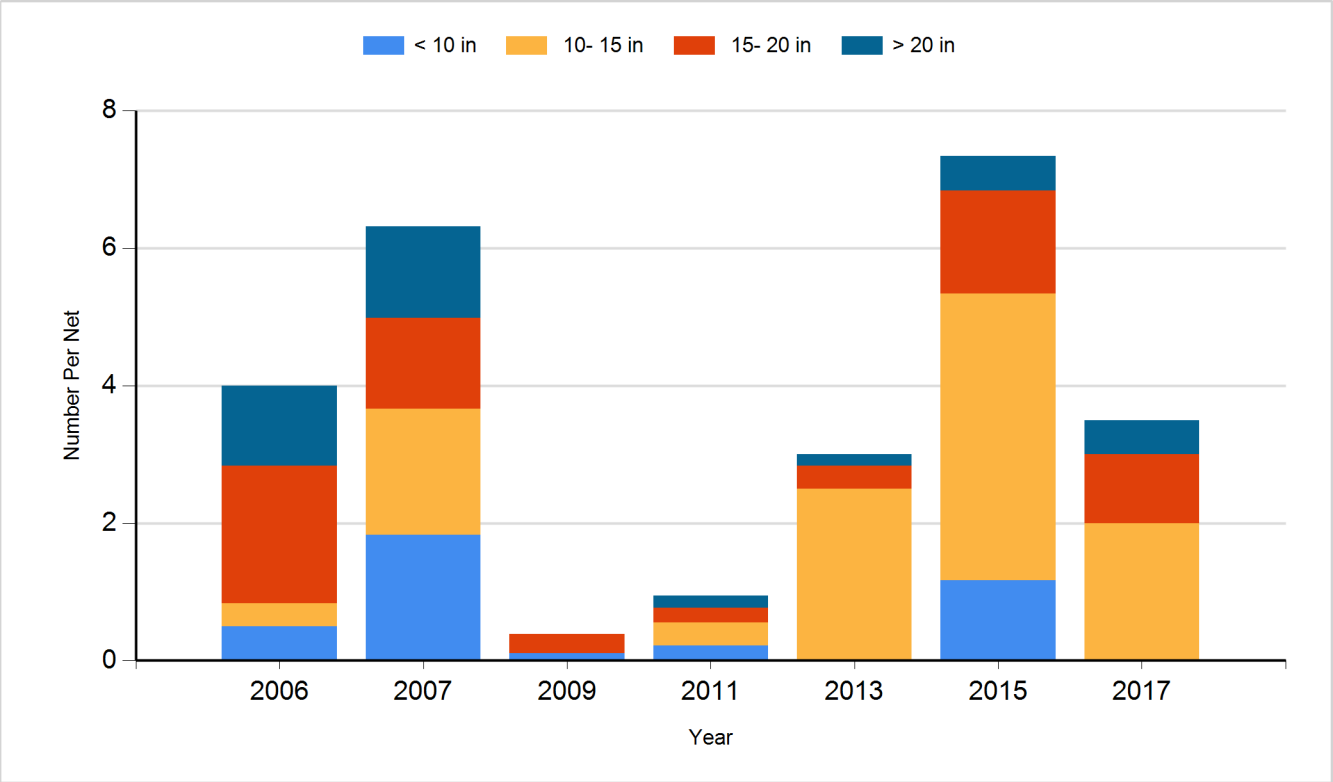
Species: Black Crappie
Gear: Frame Net



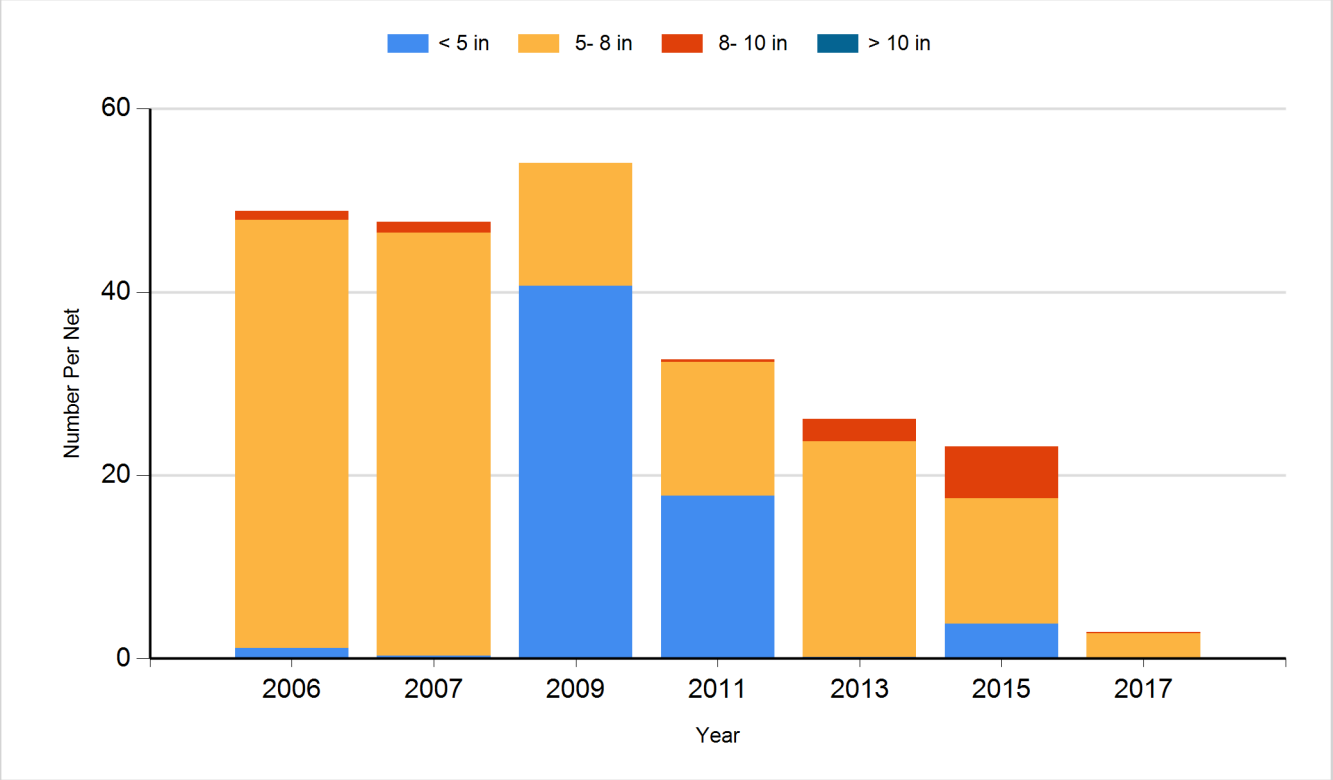
Species: Northern Pike
Gear: Gill Net



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
2006	Largemouth Bass	Fry	103,320
2006	Walleye	Fry	2,200,000
2008	Walleye	Small Fingerling	220,560
2010	Walleye	Small Fingerling	220,060
2012	Walleye	Small Fingerling	213,730
2014	Walleye	Small Fingerling	177,750
2016	Largemouth Bass	Adult	67
2016	Walleye	Fingerling	178,000