

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Diamond, Minnehaha County
LBS-Lake-223-800
2016

Lake Information

Name:	Diamond	Maximum Depth:	12 Feet
County:	Minnehaha	Mean Depth:	8 Feet
Legal Description:	T104N-R52W-Sec. 5		
Surface Area:	295 Acres		

Surveys and Investigations

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

Gear	Date	Effort
std exp gill net	June 30, 2016	3 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Black Bullhead

Common Carp

Sunfish Hybrid

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
std exp gill net	Black Bullhead	50.3	8.9	74	5	1			
	Common Carp	12.0	3.8	83	10	25	11		
	Sunfish Hybrid	0.0	0.0						
	Walleye	6.7	3.3	20		0		79	2
	Yellow Perch	14.3	9.9	70	11	35	11	93	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										Avg	
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		
large frame net	Black Bullhead	256.8		17.1		140.4		90.8					126.3
	Black Crappie	0.1		1.1		1.0		3.8					1.5
	Common Carp	11.6		3.3		2.4		2.6					5.0
	Green Sunfish			0.4		0.6		0.8					0.6
	Northern Pike	0.2											0.2
	Orangespotted Sunfish							0.0					0.0
	Sunfish Hybrid			0.0		0.0		0.0					0.0
	Walleye	2.4		3.4		0.2							2.0
	White Sucker	0.1		0.3									0.2
	Yellow Perch	0.6		2.6		3.6		10.8					4.4
std exp gill net	Black Bullhead	11.7		6.0		58.0		93.0	148.7	76.0	50.3		63.4
	Black Crappie			0.0		1.0							0.5
	Common Carp	4.0		8.0		0.5		13.7	14.3	7.7	12.0		8.6
	Sunfish Hybrid									0.0	0.0		0.0
	Walleye	1.3		5.7		0.5			0.0	4.3	6.7		3.1
	Yellow Perch	1.7		11.0		13.0		6.0	22.3	7.0	14.3		10.8

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										
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
large frame net	Black Crappie	PSD	100		36		20		0				
		PSD-P	0		9		20		0				
		Wr	106		105		119		104				
	Northern Pike	PSD	100										
		PSD-P	0										
		Wr	77										
	Walleye	PSD	63		9		0						
		PSD-P	4		9		0						
		Wr	71		78		97						
	Yellow Perch	PSD	83		42		11			2			
		PSD-P	33		0		6			0			
		Wr	85		104		109			98			
std exp gill net	Black Crappie	PSD			0		0						
		PSD-P			0		0						
		Wr					117						
	Walleye	PSD	50		6		0			0	8	20	
		PSD-P	0		6		0			0	8	0	
		Wr	76		81		96				77	79	
	Yellow Perch	PSD	80		85		38			0	0	57	70
		PSD-P	0		12		0			0	0	0	35
		Wr	96		102		110			104	105	100	93

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+
2009	20	216 (3)	281 (8)	302 (8)			525 (1)				
2007	20	208 (15)	255 (3)			454 (1)	483 (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+
2014	67	147 (67)									
2009	33	136 (1)	211 (27)		236 (1)	260 (4)					

Fish Condition

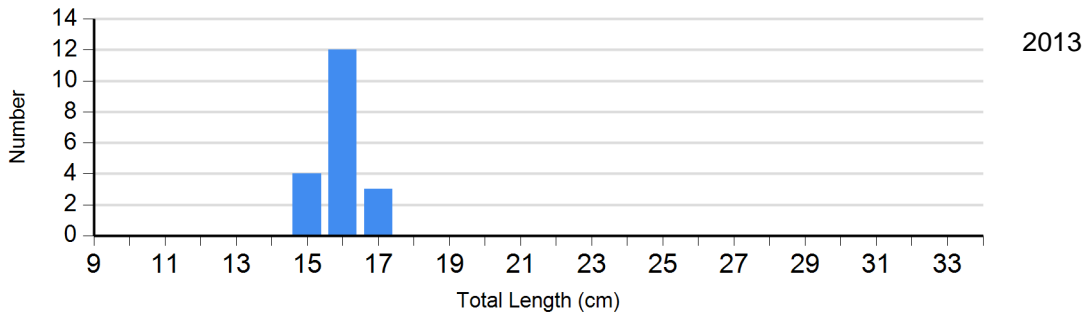
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2013	19	104 (1.7)	0		0		0	
Walleye Gill Net	2014	0		0		0		0	
	2015	12	76 (0.9)	0		1	86	0	
	2016	16	77 (1.3)	4	83 (1.6)	0		0	
Yellow Perch Gill Net	2013	18	104 (1.9)	0		0		0	
	2014	67	105 (1.5)	0		0		0	
	2015	9	103 (1.9)	12	97 (0.9)	0		0	
	2016	13	98 (2.6)	15	93 (1.8)	10	92 (1.0)	5	81 (3.5)

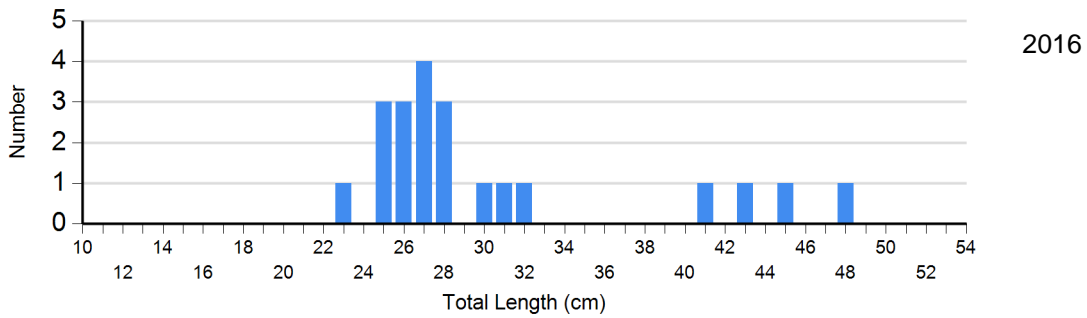
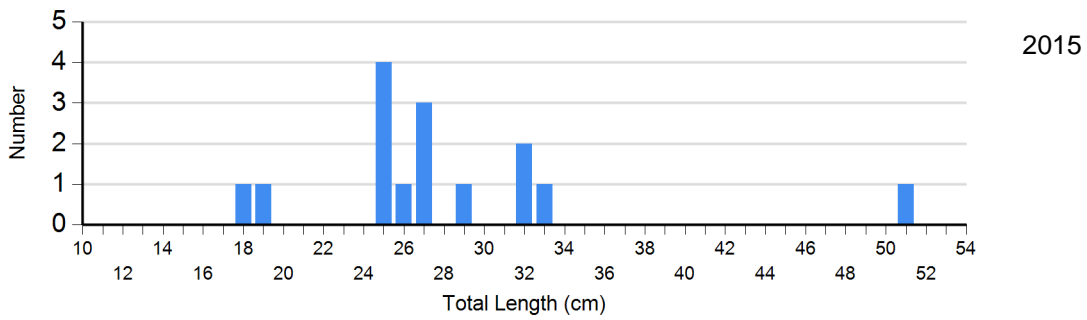
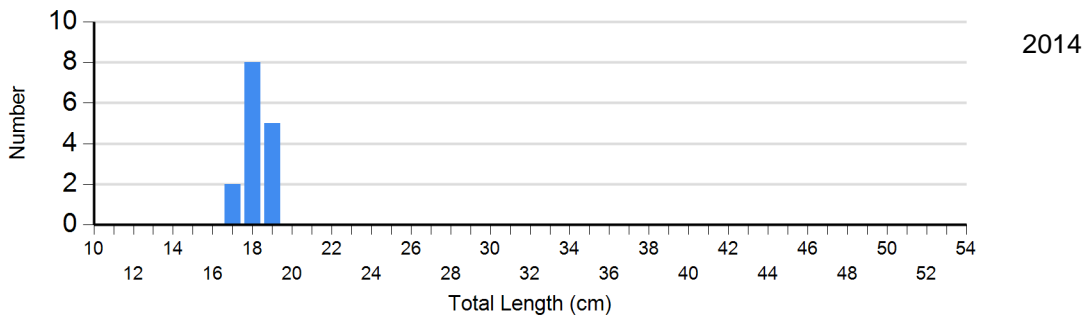
Length Frequency Distribution

Length frequency histogram of species sampled by year.

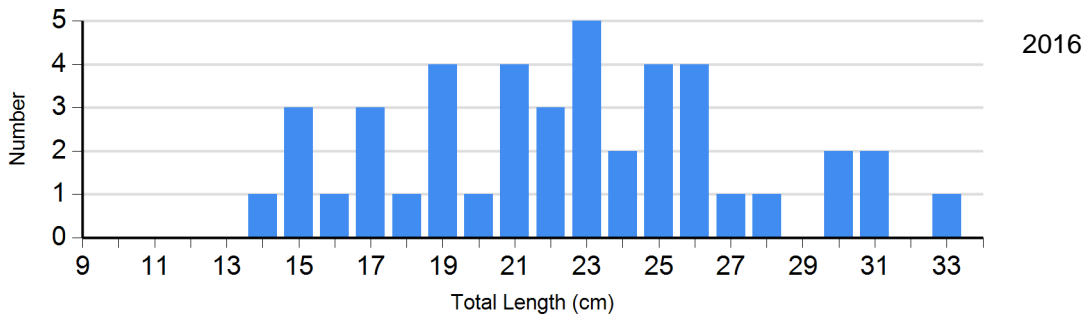
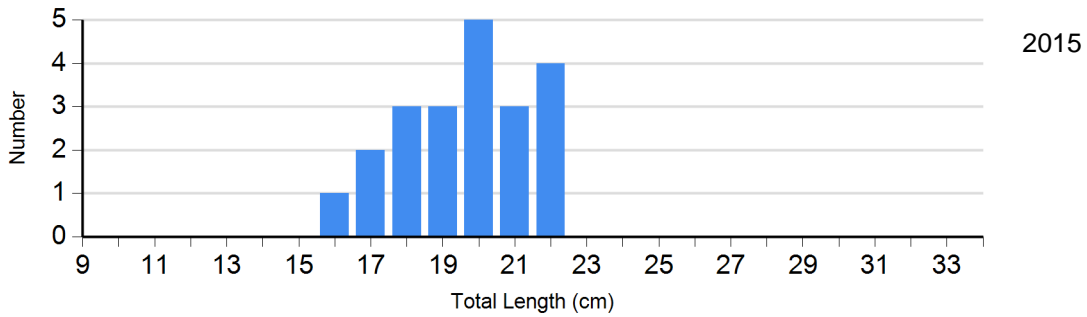
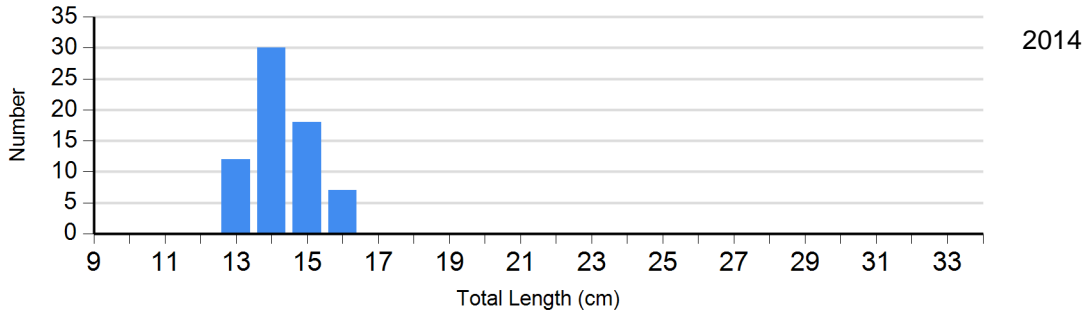
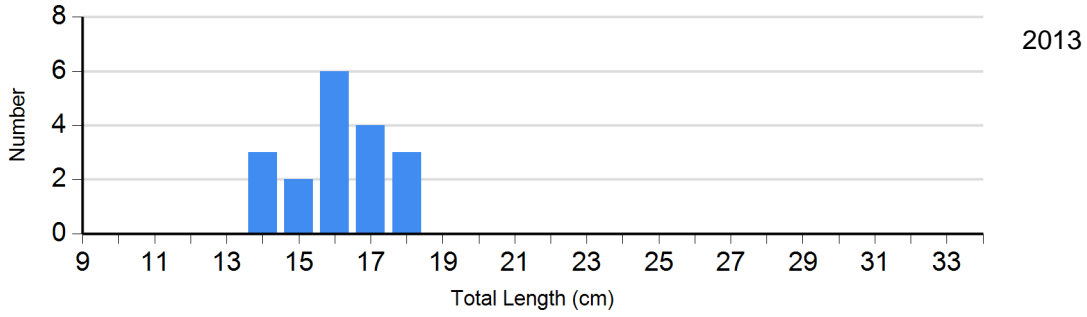
Species: Black Crappie
Gear: large frame net



Species: Walleye
Gear: std exp gill net



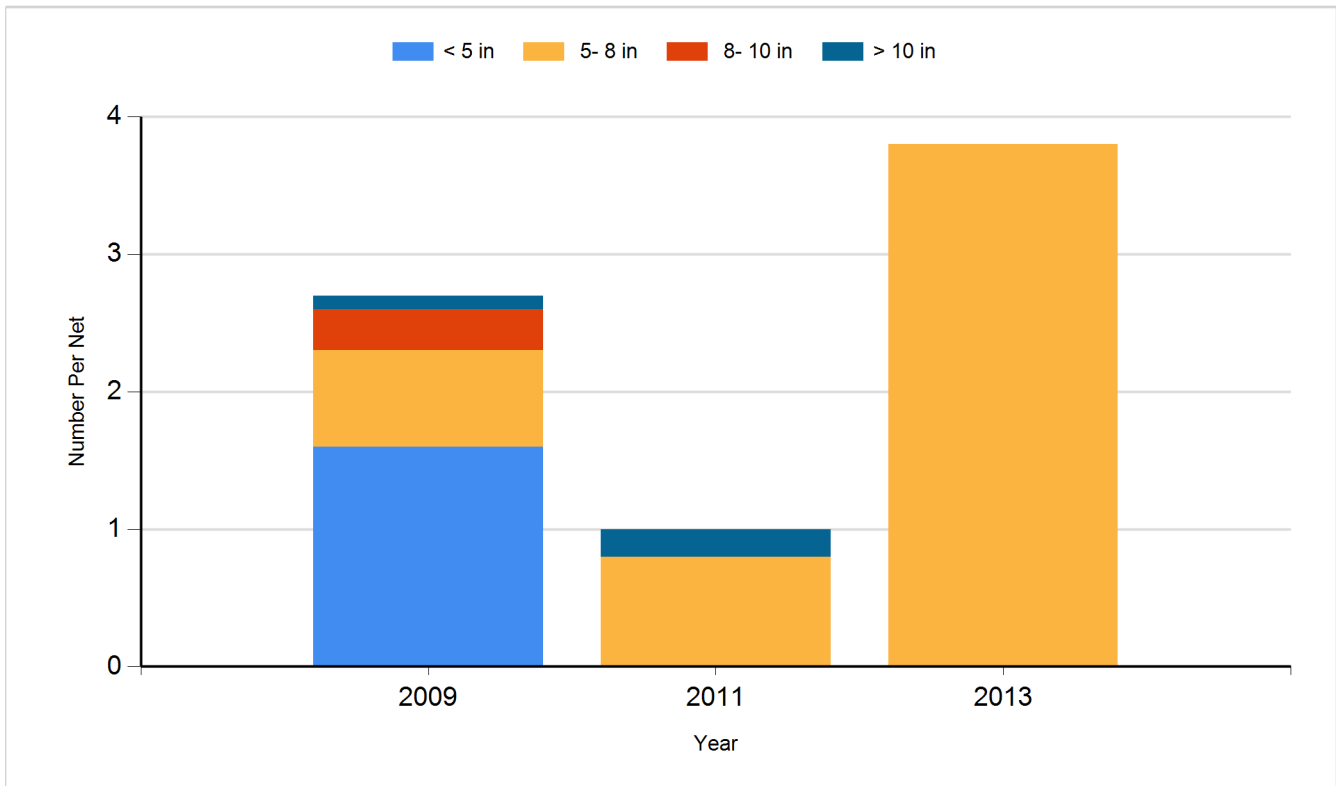
Species: Yellow Perch
Gear: std exp gill net



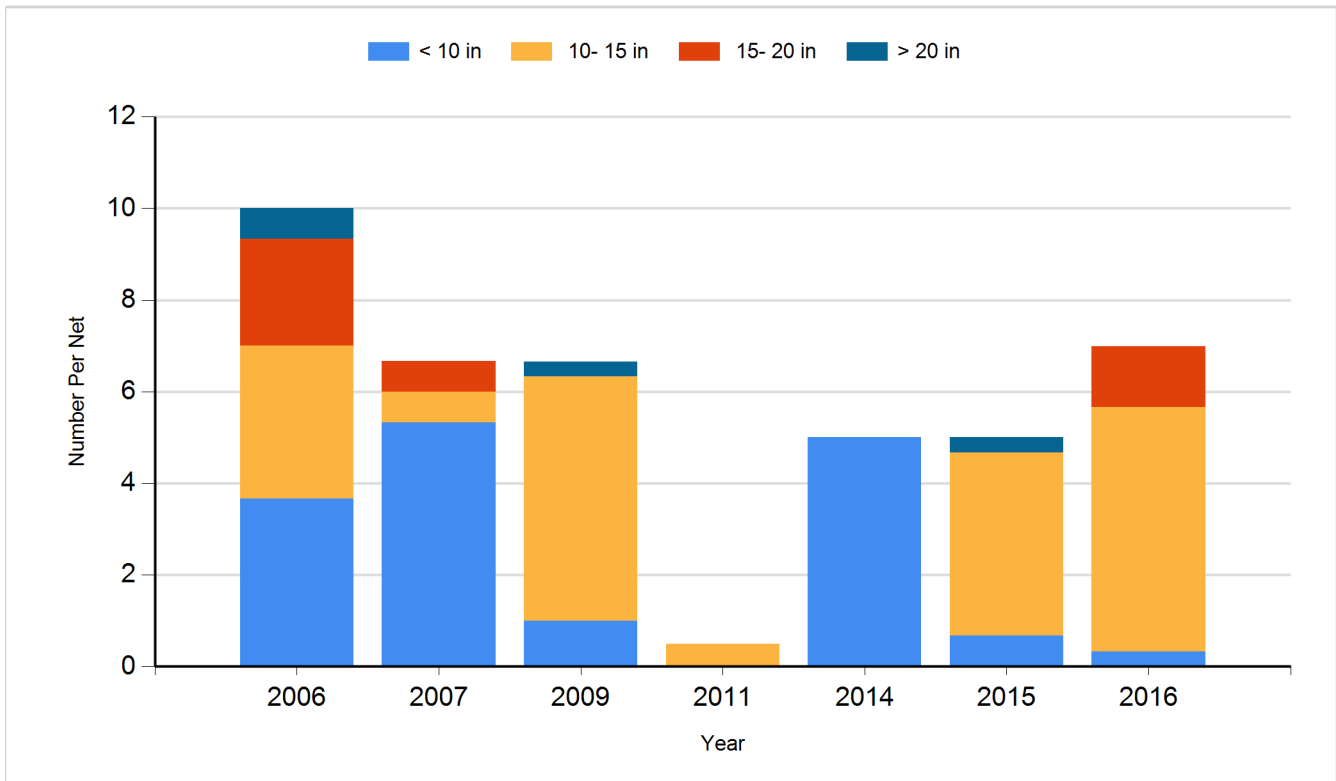
Historic Fish Sizes and Relative Abundance

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

Species: Black Crappie
Gear: Frame Net



Species: Walleye
Gear: Gill Net



Species: Yellow Perch
Gear: Gill Net

