

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Waggoner, Haakon County

BAD-Lake-2426-000

2015

Lake Information

Name: Waggoner

County: Haakon

Surface Area: 95 Acres

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	September 09, 2015	7200 seconds
frame net (std 3/4 in)	July 14, 2015	16 net-nights
std exp gill net (150 ft)	July 14, 2015	4 net-nights

Common Fish Species Present

Yellow Perch

Northern Pike

Largemouth Bass

Bluegill

Black Crappie

Black Bullhead

White Sucker

Golden Shiner

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	45.0	7.2	84	6	51	8	107	2
frame net (std 3/4 in)	Black Bullhead	1.1	0.3	100		100		93	2
	Black Crappie	42.1	5.1	93	1	0		95	0
	Bluegill	72.4	8.7	98	1	25	2	102	0
	Golden Shiner	0.0	0.0						
	Northern Pike	2.4	0.5	79	10	16	9	94	3
	White Sucker	0.4	0.2	100		100		86	3
	Yellow Perch	0.6	0.2	100		100		101	5
	std exp gill net (150 ft)	Black Bullhead	1.0	0.9	100		0		112
Black Crappie		7.0	0.9	29	13	0		109	4
Bluegill		3.0	0.9	17		0		116	3
Golden Shiner		0.0	0.0						
Largemouth Bass		0.5	0.5	0		0		101	0
Northern Pike		2.0	1.9	50		0		92	2
White Sucker		0.5	0.5	100		100		103	0

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
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
boat shocker (night)	Largemouth Bass	48.0	86.6	38.0		71.4				73.0	45.0	60.3
	Smallmouth Bass	2.4	1.5									2.0
	Walleye								2.0			2.0
boat shocker (night, AC)	Largemouth Bass						130.0					130.0
frame net (1/2 inch)	Black Bullhead					0.9						0.9
	Black Crappie					21.0						21.0
	Bluegill					16.9						16.9
	Golden Shiner					0.0						0.0
	Northern Pike					0.9						0.9
	White Sucker					0.4						0.4
	Yellow Perch					7.1						7.1
frame net (std 3/4 in)	Black Bullhead	2.3						0.6			1.1	1.3
	Black Crappie	15.7						74.3			42.1	44.0
	Bluegill	25.3						56.1			72.4	51.3
	Golden Shiner	0.0						0.0			0.0	0.0
	Largemouth Bass	0.7						0.9				0.8
	Northern Pike	4.0						5.0			2.4	3.8
	White Sucker	2.3						0.4			0.4	1.0
Yellow Perch	5.3						1.5			0.6	2.5	
std exp gill net	Black Bullhead					9.0						9.0
	Black Crappie	6.0				28.0						17.0
	Bluegill	29.0				6.0						17.5
	Golden Shiner					0.0						0.0
	Largemouth Bass					1.0						1.0
	Northern Pike	17.0				2.0						9.5
	Smallmouth Bass	1.0										1.0
	Walleye	1.0										1.0
	White Sucker	1.0										1.0
Yellow Perch	20.0				22.0						21.0	
std exp gill net (150 ft)	Black Bullhead							4.5			1.0	2.8
	Black Crappie							4.0			7.0	5.5
	Bluegill							1.5			3.0	2.3
	Golden Shiner							0.0			0.0	0.0

		CPUE										
Gear	Species	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Avg
std exp gill net (150 ft)	Largemouth Bass										0.5	0.5
	Northern Pike							7.0			2.0	4.5
	White Sucker							1.0			0.5	0.8
	Yellow Perch							5.5				5.5

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										100	
		PSD-P										50	
		Wr										100	
frame net (1/2 inch)	Black Crappie	PSD					2						
		PSD-P					0						
		Wr					98						
	Northern Pike	PSD					67						
		PSD-P					0						
		Wr					86						
	Yellow Perch	PSD					82						
		PSD-P					22						
		Wr					93						
frame net (std 3/4 in)	Black Crappie	PSD	11							51		93	
		PSD-P	4							0		0	
		Wr	93							103		95	
	Northern Pike	PSD	92								55		79
		PSD-P	17								30		16
		Wr									77		94
	Yellow Perch	PSD	44								75		100
		PSD-P	6								25		100
		Wr	88								97		101
std exp gill net	Black Crappie	PSD	0					0					
		PSD-P	0					0					
		Wr	101					106					
	Northern Pike	PSD	94					100					
		PSD-P	18					0					
		Wr	90					85					
	Walleye	PSD	100										
		PSD-P	0										
		Wr	95										
Yellow Perch	PSD	40					73						

Gear	Species	Index	Year										
			2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
std exp gill net	Yellow Perch	PSD-P	15					0					
		Wr	90				92						
std exp gill net (150 ft)	Black Crappie	PSD								13		29	
		PSD-P							0			0	
		Wr								104		109	
	Northern Pike	PSD									79		50
		PSD-P									7		0
		Wr									87		92
	Yellow Perch	PSD									64		
		PSD-P									27		
		Wr									95		

Back-Calculated Lengths

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

Species: Black Crappie

Year Class	Age	N	Mean back-calculated length (SE) at age												
			1	2	3	4	5	6	7	8	9	10			
2014	1	2	78 (0)												
2013	2	12	70 (1.3)	133 (1.4)											
2012	3	4	61 (.5)	120 (6)	177 (4.6)										
2011	4	14	62 (1.4)	105 (2.8)	158 (2.5)	190 (2.2)									
2010	5	8	86 (6.1)	131 (6.9)	167 (4.1)	193 (3.7)	208 (3.3)								
2009	6	26	85 (1.5)	132 (2)	167 (2)	189 (1.8)	208 (1.7)	225 (1.7)							
2008	7	4	83 (6.5)	123 (8.9)	162 (7.5)	182 (9.5)	199 (7.6)	212 (6)	223 (4.7)						
Weighted Mean		70	76	125	165	189	207	223	223						
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20			
2014	1	2													
2013	2	12													
2012	3	4													
2011	4	14													
2010	5	8													
2009	6	26													
2008	7	4													
Weighted Mean		70													

Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Black Crappie

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2015	676	101 (2)	164 (36)	197 (12)	221 (160)	220 (107)	230 (294)	226 (66)			
2010	294		151 (190)	177 (102)		225 (2)					
2006	156	109 (62)		172 (69)	184 (15)	238 (10)					

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2010	46	100 (2)	162 (6)	200 (10)	222 (10)	229 (14)	233 (4)				
2006	40		165 (22)	213 (12)	296 (6)						

Fish Condition

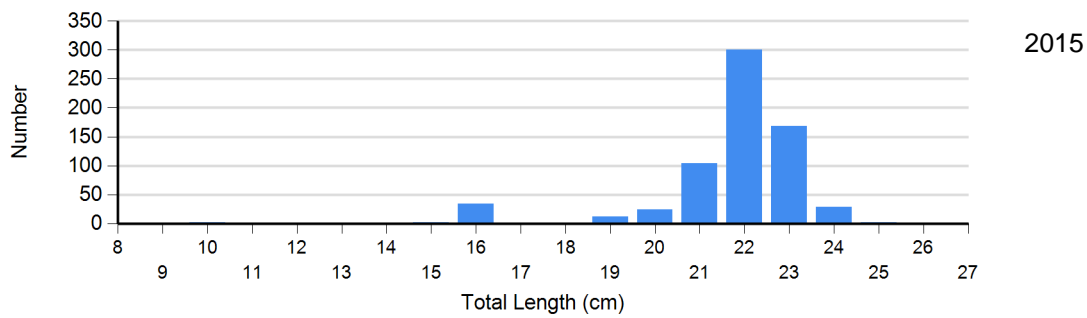
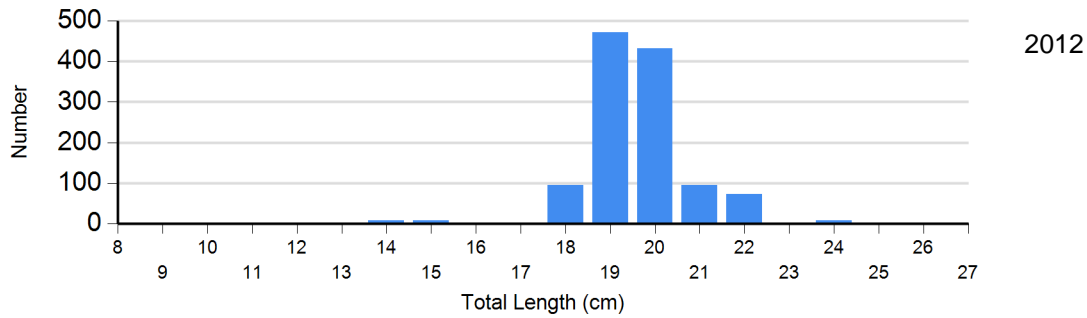
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2012	582	103 (0.5)	606	102 (0.7)	0		0	
	2015	48	102 (0.8)	624	94 (0.3)	2	99 (0.0)	0	
Northern Pike Gill Net	2012	6	80 (1.3)	20	86 (1.3)	2	110 (0.0)	0	
	2015	4	96 (0.7)	4	89 (2.4)	0		0	
Yellow Perch Gill Net	2012	8	101 (4.0)	8	87 (2.0)	6	98 (0.9)	0	

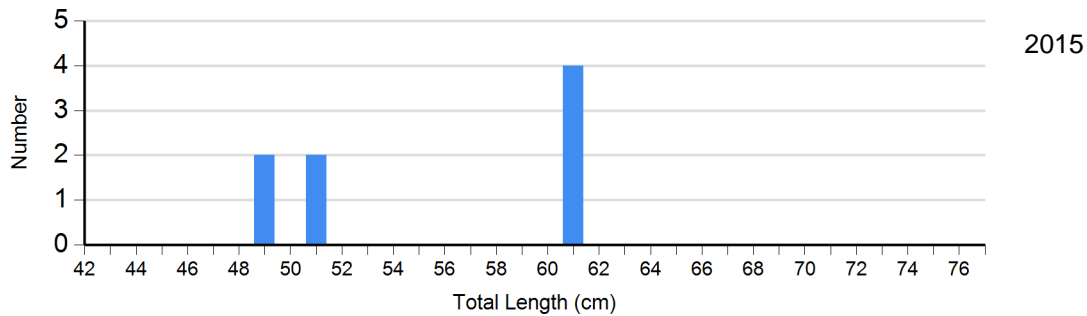
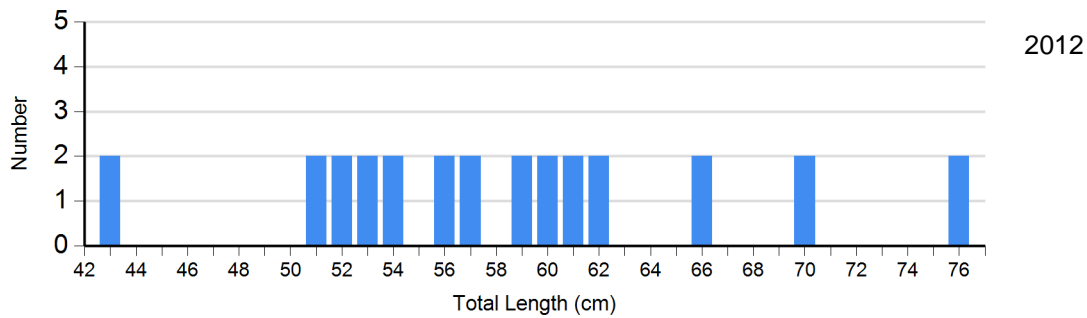
Length Frequency Distribution

Length frequency histogram of species sampled by year.

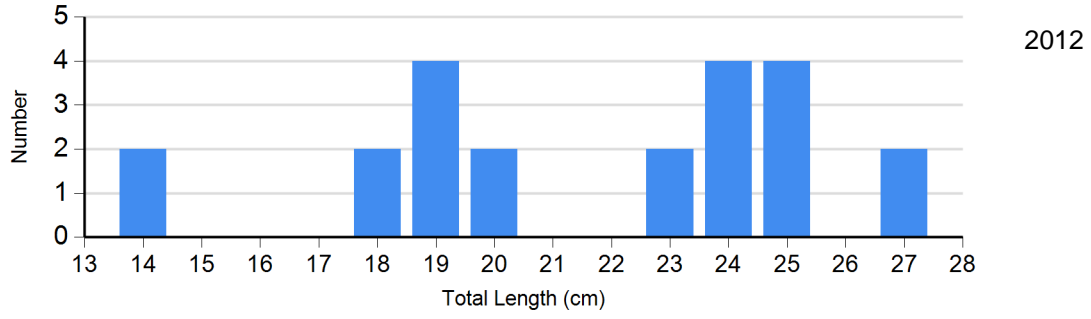
Species: Black Crappie
Gear: frame net (std 3/4 in)



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



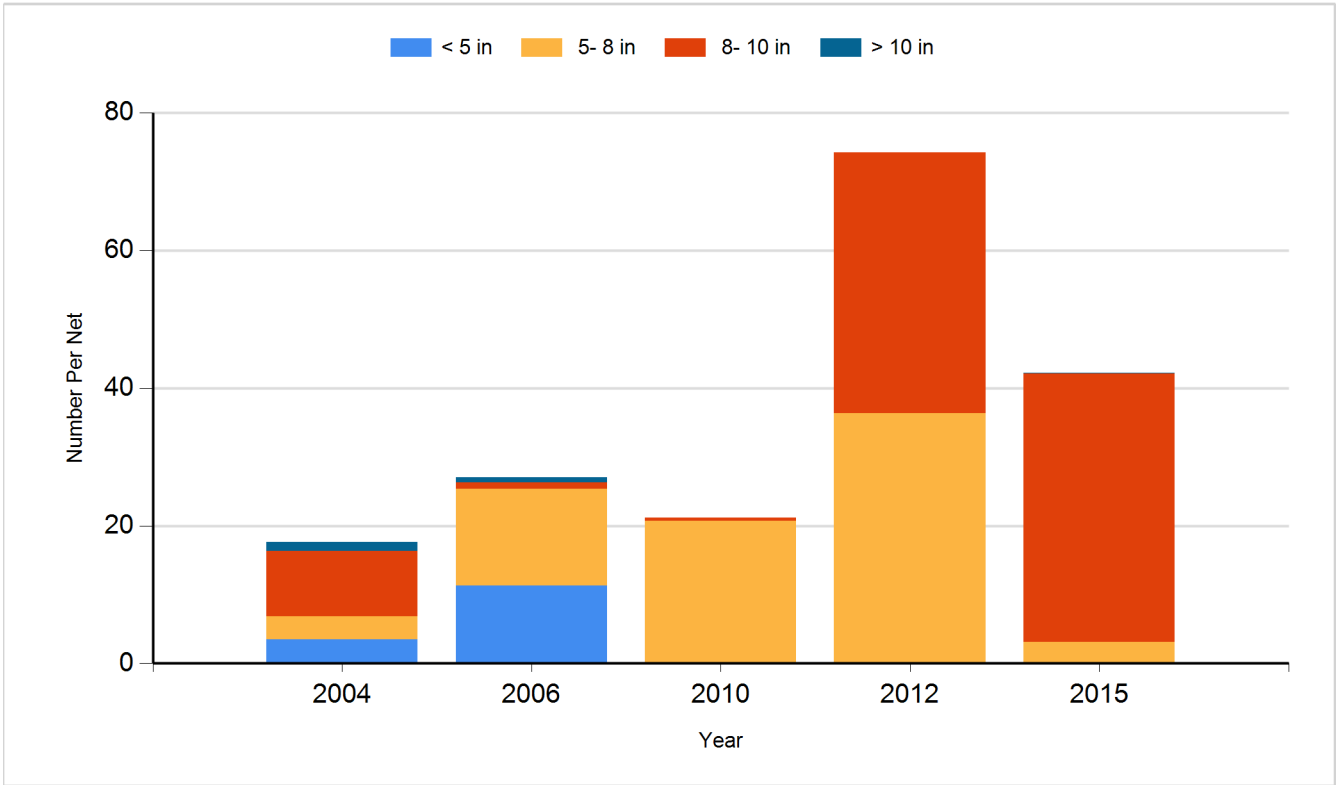
Species: Yellow Perch
Gear: std exp gill net (150 ft)



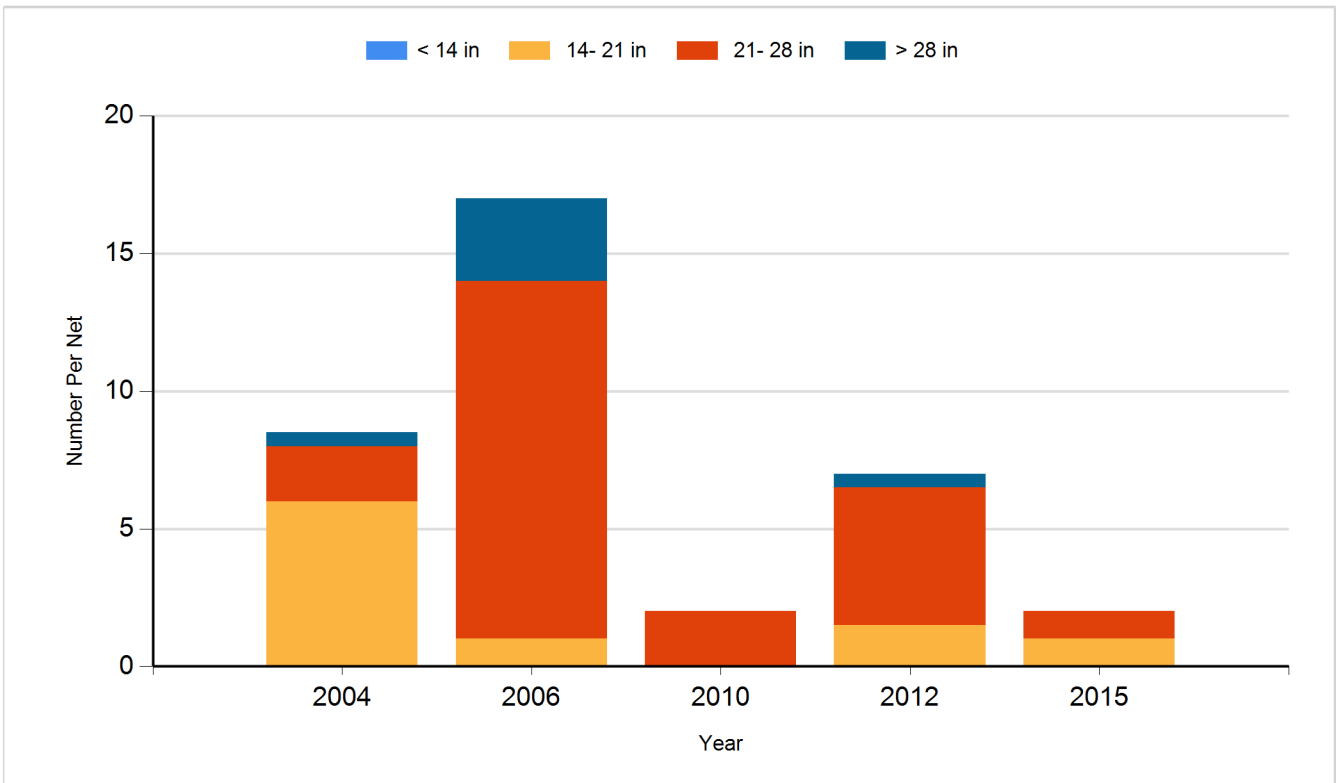
Historic Fish Sizes and Relative Abundance

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

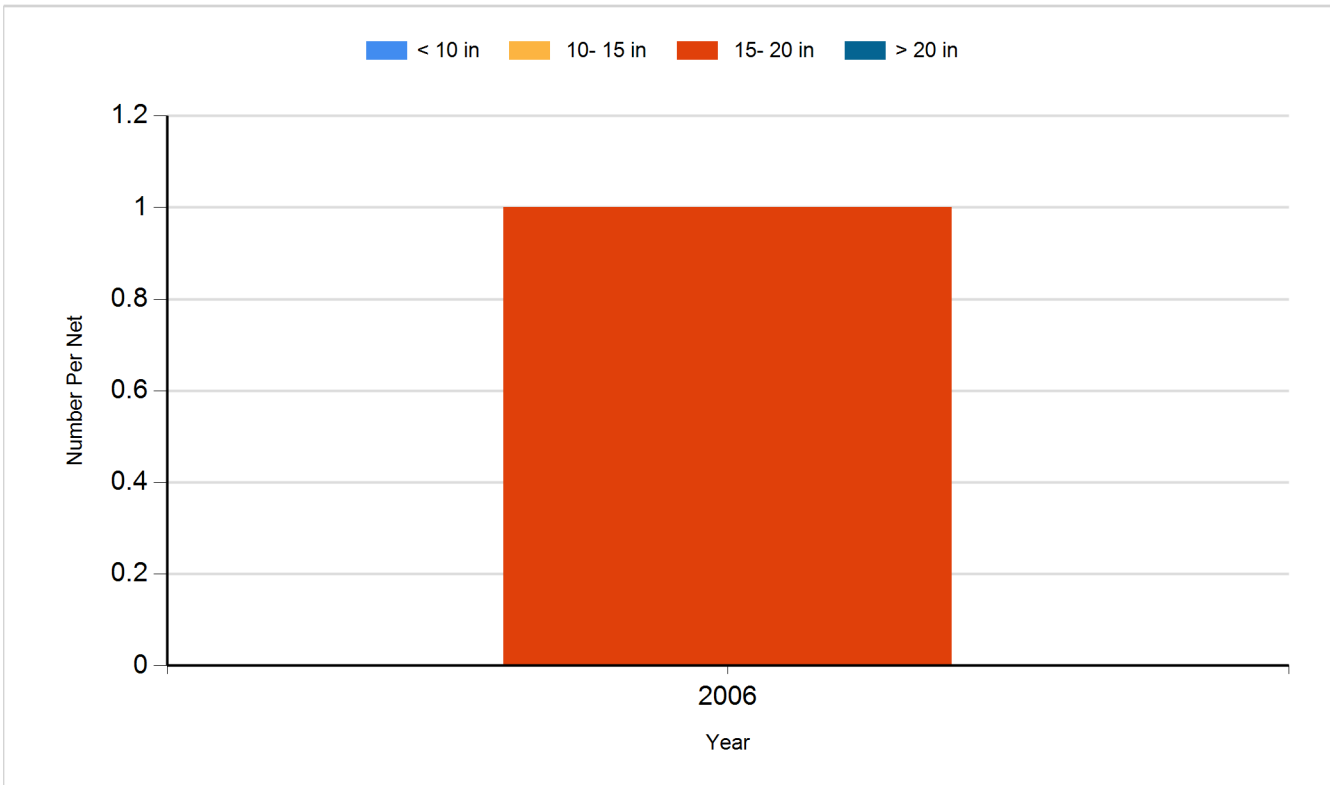
Species: Black Crappie
Gear: Frame Net



Species: Northern Pike
Gear: Gill Net



Species: Walleye
Gear: Gill Net



Species: Yellow Perch
Gear: Gill Net

