SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Alvin, Lincoln County
LBS-Lake-180-000
2015

Lake Information

Name: Alvin

County: Lincoln

Legal Description: T100N-R49W-Sec. 33,34

Surface Area: 105 Acres

Maximum Depth: 26 Feet

Mean Depth: 9 Feet

Surveys and Investigations

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

Gear	Date	Effort
std exp gill net	June 23, 2015	3 net-nights
std frame net (3/8 inch)	June 23, 2015	10 net-nights

Common Fish Species Present

Largemouth Bass

Channel Catfish

Bluegill

Black Crappie

Walleye

Black Bullhead

Common Carp

White Sucker

White Crappie

Green Sunfish

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
std exp gill net	Black Bullhead	142.3	38.9	0		0			
	Black Crappie	1.0	1.1	0		0			
	Channel Catfish	12.7	4.4	84	9	0		85	2
	Common Carp	6.3	5.5	5		5			
	Freshwater Drum	0.7	0.6	100		50			
	Gizzard Shad	0.3	0.6	0					
	River Carpsucker	1.3	1.7	100		75			
	Walleye	0.3	0.6	100		0		93	
	White Sucker	4.0	3.3	100		33			
std frame net (3/8 inch)	Bigmouth Buffalo	0.1	0.1	100		0			
	Black Bullhead	133.1	40.5	2	1	0			
	Black Crappie	35.9	13.5	8	2	0		100	1
	Bluegill	60.5	28.8	34	3	0		94	1
	Channel Catfish	1.0	0.5	20		0		82	5
	Common Carp	0.1	0.1	0		0			
	Freshwater Drum	0.0	0.0	0		0			
	Golden Shiner	0.0	0.0						
	Green Sunfish	1.5	1.2	7		0		103	4
	Northern Pike	0.1	0.1	100		0		113	
	Orangespotted Sunfish	0.0	0.0						
	River Carpsucker	0.2	0.2	100		50			
	Sunfish Hybrid	0.0	0.0						
	White Crappie	3.6	4.7	56	13	22	11	90	2
	White Sucker	3.1	1.3	97		65	13		

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	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Avg
boat shocker (night)	Largemouth Bass		25.5		17.5		17.2	50.5				27.7
large frame net	Bigmouth Buffalo						0.6		0.2			0.4
	Black Bullhead	198.2	136.8	39.2	62.2	58.8	31.3	16.5	26.2			71.2
	Black Crappie	17.7	32.1	15.9	2.1	183.8	40.1	13.0	44.5			43.7
	Bluegill	47.5	87.9	26.1	27.5	21.3	6.1	47.5	4.1			33.5
	Channel Catfish	2.4	1.2	3.1	7.2	5.4	2.2	5.9	1.4			3.6
	Common Carp				0.1	0.4	1.1		0.2			0.5
	Freshwater Drum				0.6		0.1	0.3				0.3
	Golden Shiner		0.0					0.0	0.0			0.0
	Green Sunfish	0.3	0.5		0.9				0.2			0.5
	Largemouth Bass	0.1			0.0			0.2				0.1
	Northern Pike		0.1	0.1	0.7		0.3	0.1	0.1			0.2
	Orangespotted Sunfish		0.0	0.0								0.0
	Pumpkinseed							0.1	0.1			0.1
	River Carpsucker						0.2	0.1				0.2
	Sunfish Hybrid	0.0	0.0		0.0							0.0
	White Crappie	0.8	0.3	0.2	0.1	0.8		0.2	0.1			0.4
	White Sucker	2.5	4.4	7.1	2.6	4.3	6.7	3.3	1.0			4.0
	Yellow Bullhead							0.4				0.4
	Yellow Perch	0.2	0.2		0.2							0.2
std exp gill net	Black Bullhead									2.0	142.3	72.2
	Black Crappie										1.0	1.0
	Channel Catfish									5.3	12.7	9.0
	Common Carp									1.0	6.3	3.7
	Freshwater Drum									1.7	0.7	1.2
	Gizzard Shad										0.3	0.3
	Northern Pike									0.7		0.7
	River Carpsucker									1.3	1.3	1.3
	Walleye										0.3	0.3
	White Sucker									2.0	4.0	3.0
std frame net (3/8 inch)	Bigmouth Buffalo									0.5	0.1	0.3
	Black Bullhead									70.1	133.1	101.6
	Black Crappie									6.2	35.9	21.1

		CPUE										
Gear	Species	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Avg
std frame net (3/8 inch)	Bluegill									3.2	60.5	31.9
	Channel Catfish									1.9	1.0	1.5
	Common Carp									0.9	0.1	0.5
	Freshwater Drum										0.0	0.0
	Golden Shiner										0.0	0.0
	Green Sunfish										1.5	1.5
	Largemouth Bass									0.0		0.0
	Northern Pike									0.3	0.1	0.2
	Orangespotted Sunfish									0.0	0.0	0.0
	River Carpsucker									0.3	0.2	0.3
	Sunfish Hybrid										0.0	0.0
	White Crappie									0.8	3.6	2.2
	White Sucker									3.3	3.1	3.2
	Yellow Bullhead									0.6		0.6
	Yellow Perch									0.2		0.2

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	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
large frame net	Black Crappie	PSD	34	3	13	38	1	68	53	6		
		PSD-P	7	0	0	0	0	0	1	0		
		Wr	101	102	104	110	110	101	105	109		
	Northern Pike	PSD		0	100	0		67	100	100		
		PSD-P		0	0	0		0	0	0		
		Wr		85	74	89		80	95	96		
	Yellow Perch	PSD	0	50		100						
		PSD-P	0	0		0						
		Wr	79	101		89						
std exp gill net	Black Crappie	PSD										0
		PSD-P										0
	Northern Pike	PSD									100	
		PSD-P									0	
		Wr									97	
	Walleye	PSD										100
		PSD-P										0
		Wr										93
std frame net (3/8 inch)	Black Crappie	PSD									77	8
		PSD-P									2	0
		Wr									93	100
	Northern Pike	PSD									100	100
		PSD-P									0	0
		Wr									84	113
	Yellow Perch	PSD									0	
		PSD-P									0	
		Wr									94	

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	13	88 (2.2)									
2013	2	29	91 (2.1)	153 (3.1)								
2012	3	6	96 (2.2)	178 (6)	215 (4.3)							
Weighted Mean		48	91	157	215							

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2014	1	13										
2013	2	29										
2012	3	6										
Weighted Mean		48										

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	409	124 (70)	176 (316)	224 (23)							
2014	70	125 (11)	207 (56)		248 (2)	239 (1)					
2013	445		173 (420)	212 (4)	228 (17)	226 (4)					
2012	135	139 (44)	189 (24)	215 (3)	225 (42)	228 (21)		320 (1)			
2011	409	120 (13)	197 (159)	207 (237)							
2010	1838	130 (19)	177 (1819)								
2009	167	117 (154)	190 (4)	218 (3)	222 (6)	191 (1)					
2008	163	119 (22)	157 (61)	188 (58)	204 (4)	192 (18)					
2007	325	109 (4)	178 (307)	201 (7)	224 (5)	220 (2)					
2006	323	128 (226)	185 (27)	210 (14)	213 (32)	245 (16)	269 (8)				

Fish Condition

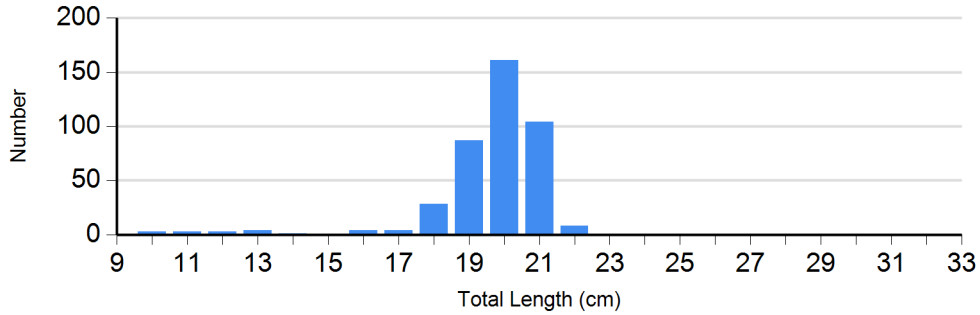
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2011	128	112 (3.7)	273	97 (0.7)	0		0	
	2012	61	111 (1.1)	68	99 (0.7)	0		1	89
	2013	420	111 (0.7)	25	91 (1.4)	0		0	
	2014	14	106 (4.6)	47	89 (1.1)	1	83	0	
	2015	329	102 (0.8)	30	85 (0.6)	0		0	
Northern Pike Gill Net	2014	0		2	97 (6.5)	0		0	
Walleye Gill Net	2015	0		1	93	0		0	

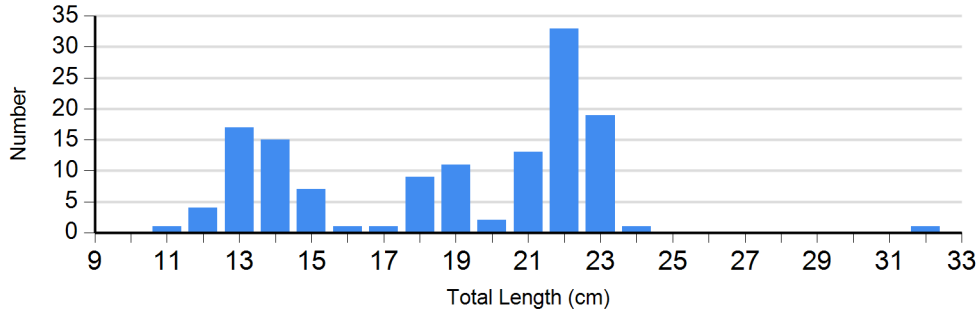
Length Frequency Distribution

Length frequency histogram of species sampled by year.

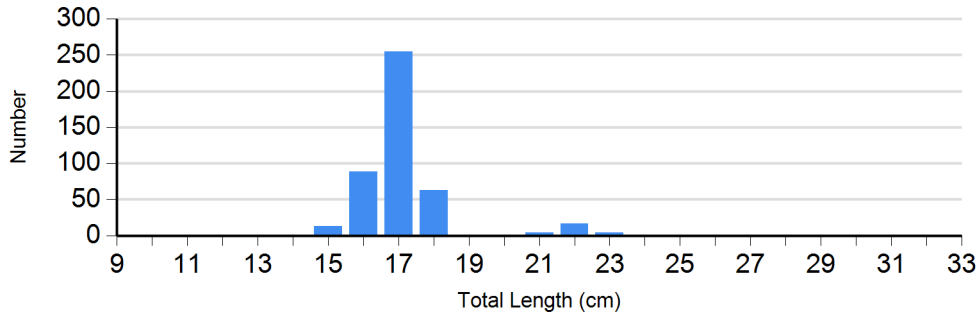
Species: Black Crappie
Gear: large frame net



2011

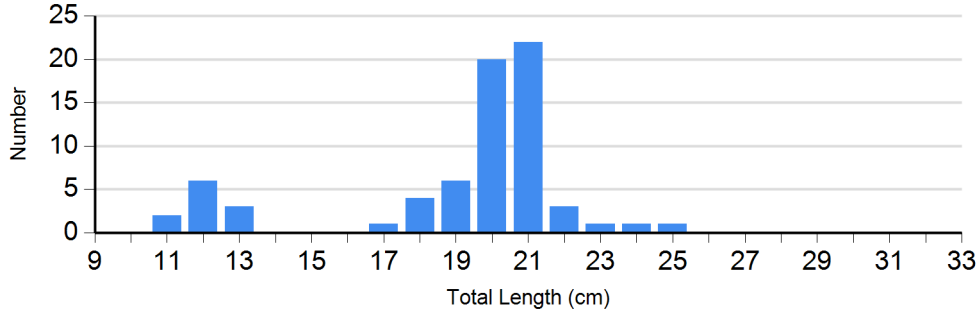


2012

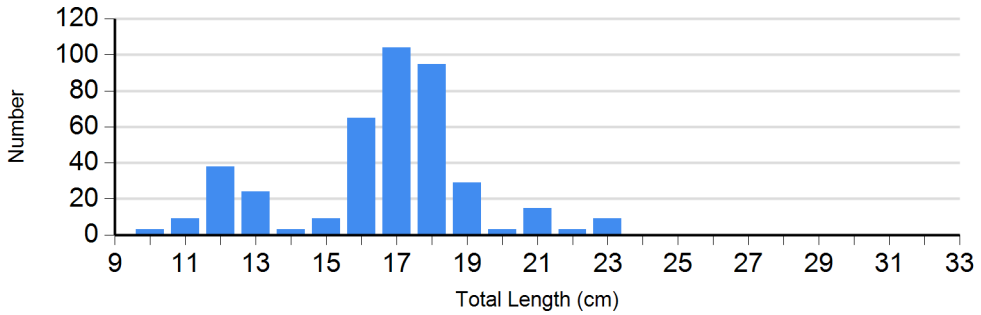


2013

Species: Black Crappie
Gear: std frame net (3/8 inch)

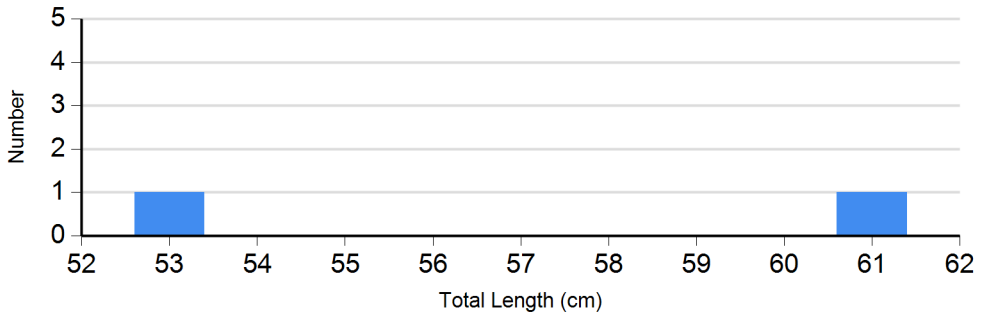


2014



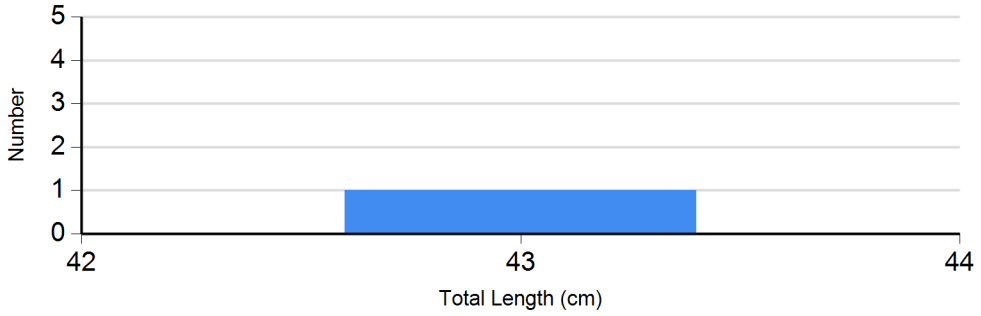
2015

Species: Northern Pike
Gear: std exp gill net



2014

Species: Walleye
Gear: std exp gill net

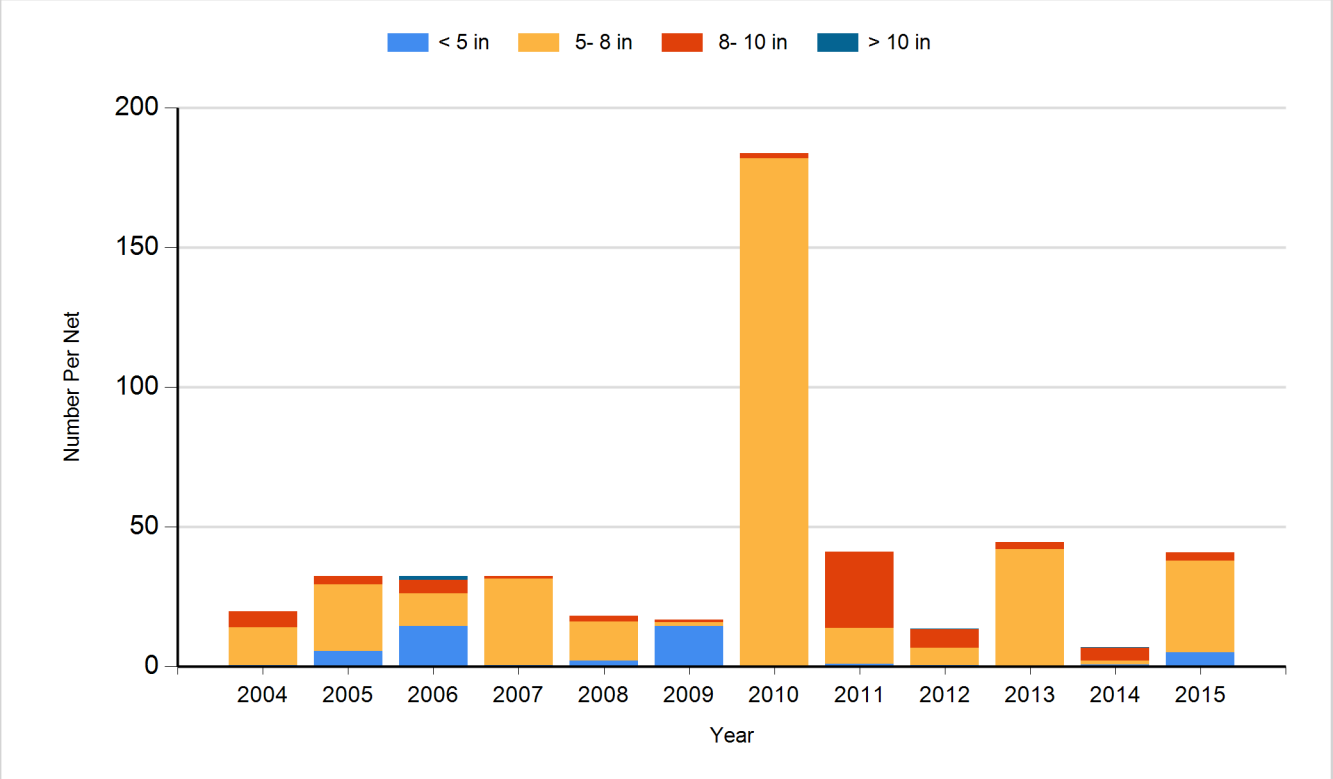


2015

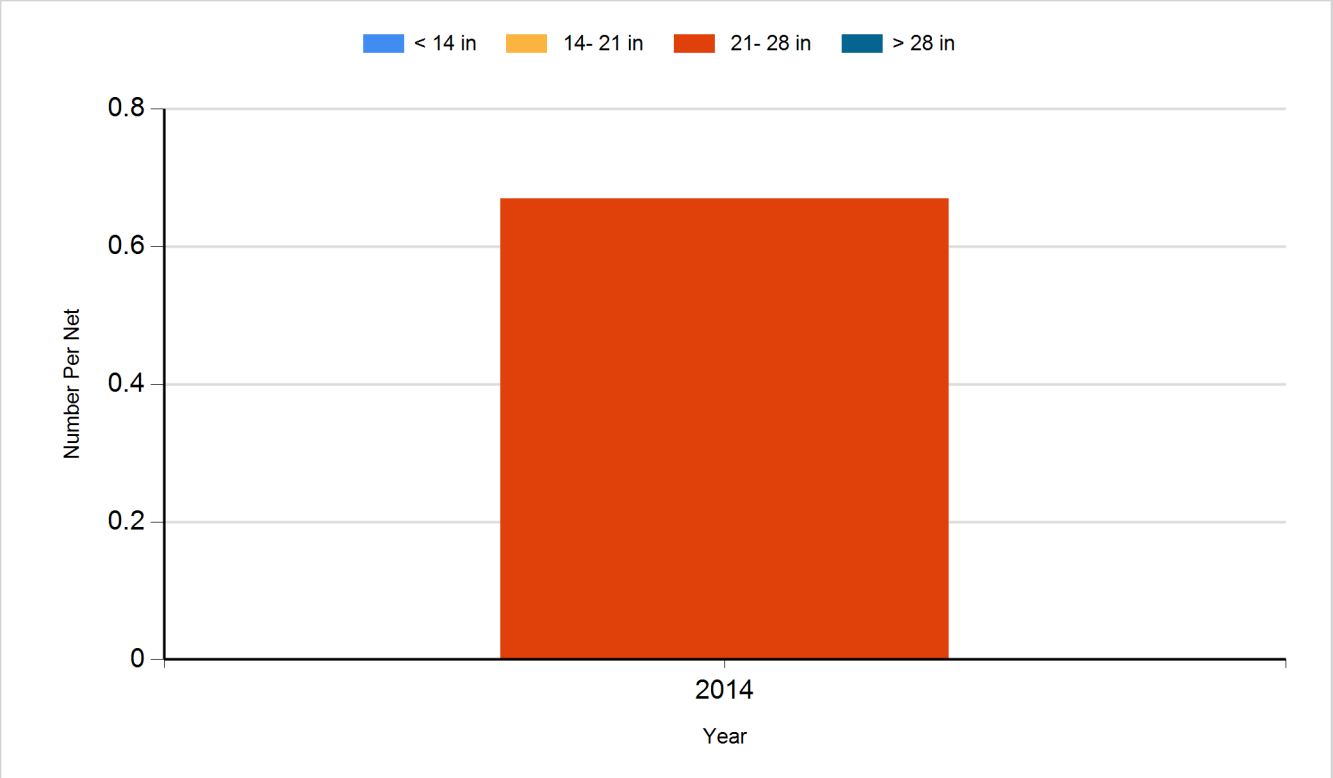
Historic Fish Sizes and Relative Abundance

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

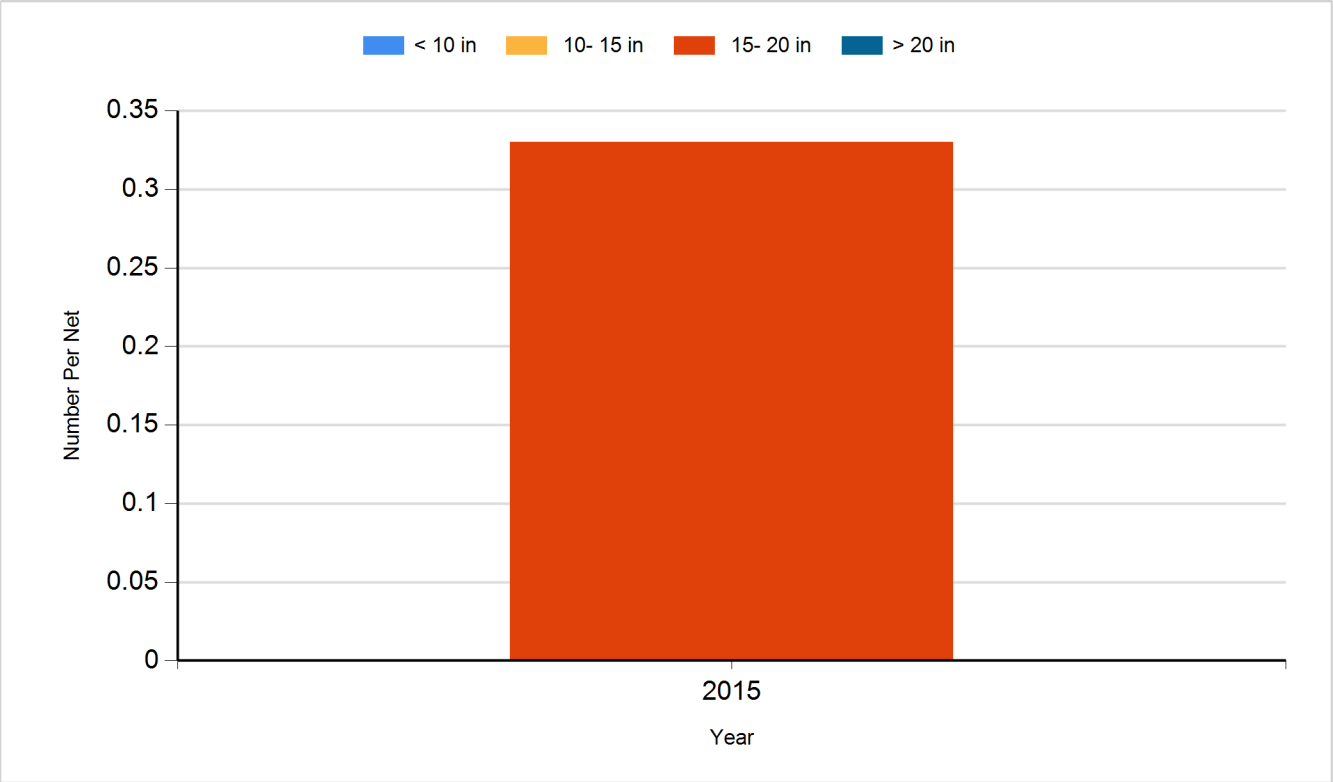
Species: Black Crappie
Gear: Frame Net



Species: Northern Pike
Gear: Gill Net



Species: Walleye
Gear: Gill Net



Fish Stocking

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2004	Channel Catfish	Adult	358
2004	Largemouth Bass	Juvenile	220
2005	Channel Catfish	Adult	460
2007	Walleye	Adult	430
2008	Fathead Minnow	Adult	684,610
2010	Largemouth Bass	Juvenile	1,585
2011	Largemouth Bass	Fingerling	2,240
2012	Largemouth Bass	Adult	259
2013	Largemouth Bass	Large Fingerling	1,056
2013	Walleye	Adult	300
2014	Walleye	Fry	90,000
2015	Gizzard Shad	Adult	50
2015	Walleye	Small Fingerling	7,560