SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Bear Butte, Meade County
LBF-Lake-42-000
2016

Lake Information

Name: Bear Butte

County: Meade

Surface Area: 228 Acres

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	September 21, 2016	7200 seconds
frame net (std 3/4 in)	May 26, 2016	20 net-nights

Common Fish Species Present

Yellow Perch

Northern Pike

Largemouth Bass

Black Crappie

Black Bullhead

Walleye

Bluegill

Channel Catfish

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
boat shocker (night)	Largemouth Bass	14.0	4.6	64	14	7		109	3
	Walleye	13.0	5.0	69	14	8		94	1
frame net (std 3/4 in)	Black Bullhead	817.5	176.3	0		0		87	0
	Black Crappie	22.2	5.0	96	1	95	1	113	0
	Bluegill	1.0	0.3	90		0		138	3
	Channel Catfish	0.1	0.1	100		0		79	0
	Northern Pike	0.1	0.1	100		0			
	Walleye	0.1	0.1	100		0		96	0
	Yellow Perch	5.3	1.5	85	5	19	6	91	1

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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
boat shocker (night)	Largemouth Bass				6.0	28.0			2.4	9.0	14.0	11.9
	Smallmouth Bass									1.5		1.5
	Walleye					4.0			1.2	22.5	13.0	10.2
frame net (1/2 inch)	Black Bullhead				260.4							260.4
	Black Crappie				90.3							90.3
	Channel Catfish				0.3							0.3
	Golden Shiner				0.0							0.0
	Yellow Perch				9.1							9.1
frame net (std 3/4 in)	Black Bullhead					863.8	757.5	2,116.0	879.9	404.2	817.5	973.2
	Black Crappie					97.8	123.3	10.6	26.8	6.2	22.2	47.8
	Bluegill							0.4		0.3	1.0	0.6
	Channel Catfish										0.1	0.1
	Largemouth Bass							0.1				0.1
	Northern Pike					1.0	0.5	0.4	0.1	0.6	0.1	0.5
	Walleye							0.1		0.2	0.1	0.1
	Yellow Perch					16.8	8.0	5.8		1.2	5.3	7.4
std exp gill net	Black Bullhead				42.0							42.0
	Black Crappie				13.0							13.0
	Channel Catfish				23.0							23.0
	Yellow Perch				4.0							4.0
std exp gill net (150 ft)	Black Bullhead					9.5	138.0	79.0	220.5			111.8
	Black Crappie					6.0	7.0	1.0				4.7
	Channel Catfish					3.0	13.0	3.5	1.5			5.3
	Largemouth Bass					0.5	0.0					0.3
	Northern Pike					1.0	2.0	2.0	1.0			1.5
	Rainbow Trout							0.0				0.0
	Yellow Perch						3.0		11.5			7.3

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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
boat shocker (night)	Walleye	PSD					0			0	33	69
		PSD-P					0			0	0	8
		Wr								103	103	94
frame net (1/2 inch)	Black Crappie	PSD				4						
		PSD-P				0						
		Wr				115						
	Yellow Perch	PSD				56						
		PSD-P				11						
		Wr				88						
frame net (std 3/4 in)	Black Crappie	PSD					23	91	92	100	100	96
		PSD-P					2	0	0	0	13	95
		Wr					108	108	97	97	95	113
	Northern Pike	PSD					100	100	67	100	100	100
		PSD-P					0	75	33	0	67	0
		Wr					90	88	87	74	79	
	Walleye	PSD							0		100	100
		PSD-P							0		0	0
		Wr							76		89	96
	Yellow Perch	PSD					31	55	43		83	85
		PSD-P					7	2	0		17	19
		Wr					81	83	81		85	91
std exp gill net	Black Crappie	PSD				8						
		PSD-P				0						
		Wr				112						
	Yellow Perch	PSD				25						
		PSD-P				0						
		Wr				89						
std exp gill net (150 ft)	Black Crappie	PSD					50	71	50			
		PSD-P					0	0	0			
		Wr					109	113	106			

			Year									
Gear	Species	Index	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
std exp gill net (150 ft)	Northern Pike	PSD					100	100	75	50		
		PSD-P					0	0	25	0		
		Wr					92	95	104	81		
	Yellow Perch	PSD						67		35		
		PSD-P						0		0		
		Wr						79		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	2	18	89 (2.7)	180 (3.4)								
2011	5	2	69 (0)	138 (0)	171 (0)	209 (0)	253 (0)					
2010	6	12	84 (2.4)	153 (2.9)	193 (3.1)	212 (3)	229 (3.9)	266 (2.6)				
2009	7	26	79 (1.7)	144 (2.2)	188 (2.1)	205 (1.7)	221 (1.5)	239 (2)	271 (2.1)			
Weighted Mean		58	83	157	189	207	225	248	271			

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2014	2	18										
2011	5	2										
2010	6	12										
2009	7	26										
Weighted Mean		58										

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+
2016	440		180 (18)			256 (10)	267 (126)	270 (286)			
2014	428			188 (2)	211 (32)	220 (394)					

Fish Condition

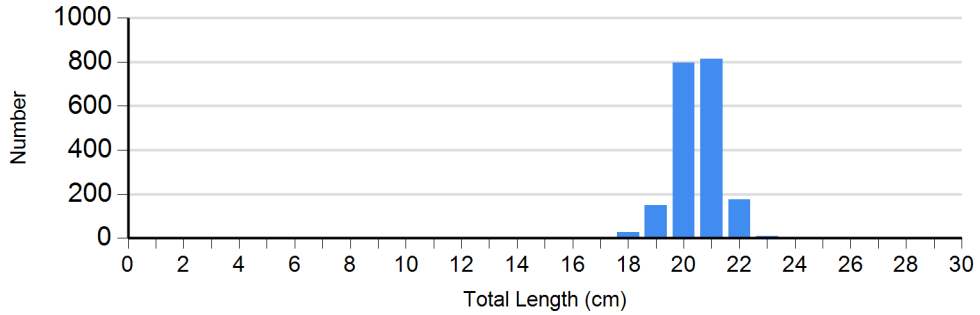
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2012	176	115 (0.6)	1796	107 (0.2)	0		0	
	2013	14	105 (2.7)	156	96 (0.4)	0		0	
	2014	2		426	97 (0.3)	0		0	
	2015	0		108	96 (0.6)	16	93 (1.3)	0	
	2016	16	110 (2.7)	4	112 (0.0)	424	113 (0.3)	0	
Northern Pike Gill Net	2012	0		4	95 (0.8)	0		0	
	2013	2		4	109 (13.2)	2	93 (0.0)	0	
	2014	2	91 (0.0)	2	72 (0.0)	0		0	
Yellow Perch Gill Net	2012	2	82 (0.0)	4	77 (4.4)	0		0	
	2014	30	97 (0.9)	16	89 (1.8)	0		0	

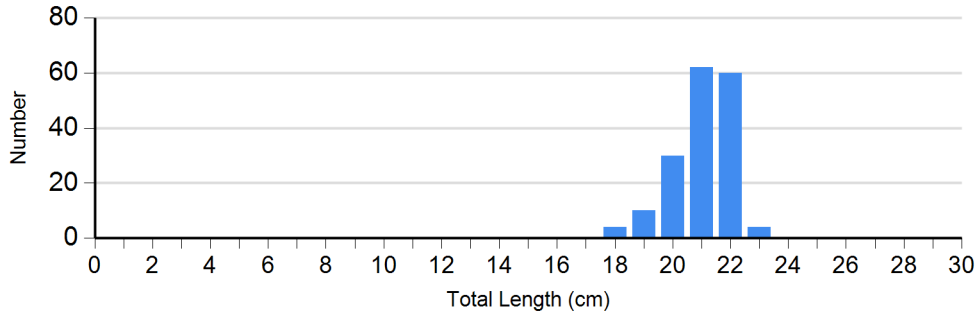
Length Frequency Distribution

Length frequency histogram of species sampled by year.

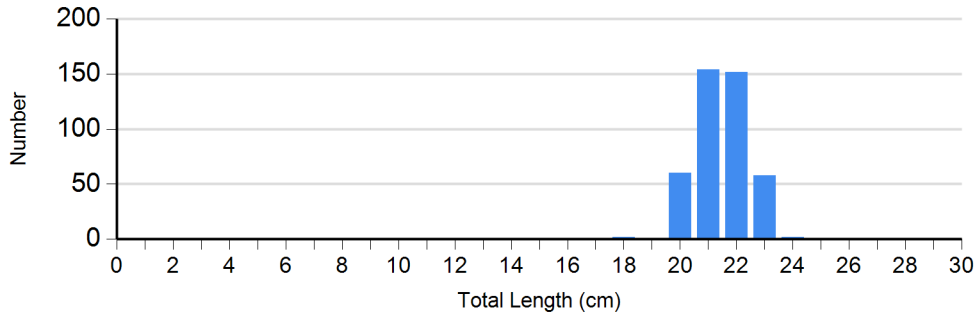
Species: Black Crappie
Gear: frame net (std 3/4 in)



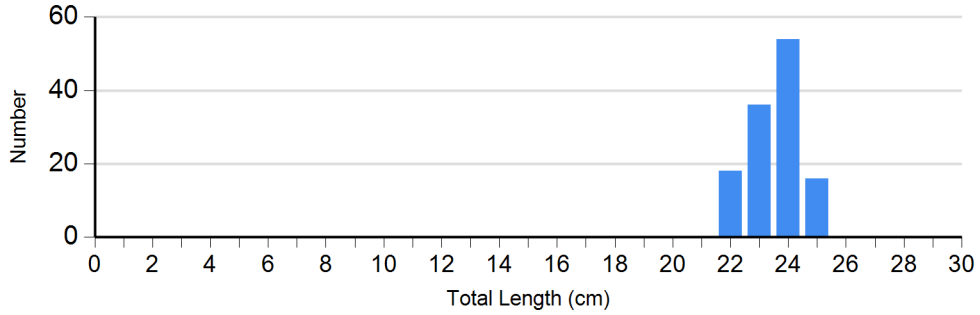
2012



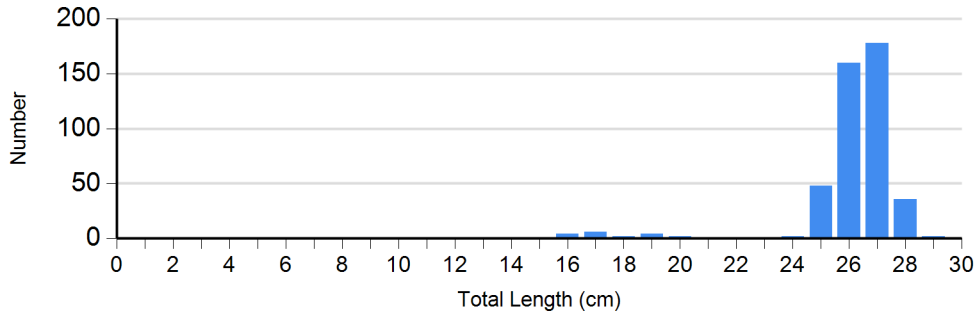
2013



2014

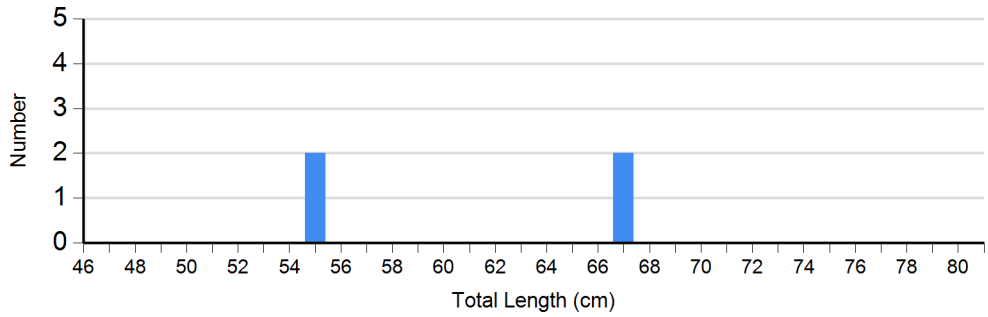


2015

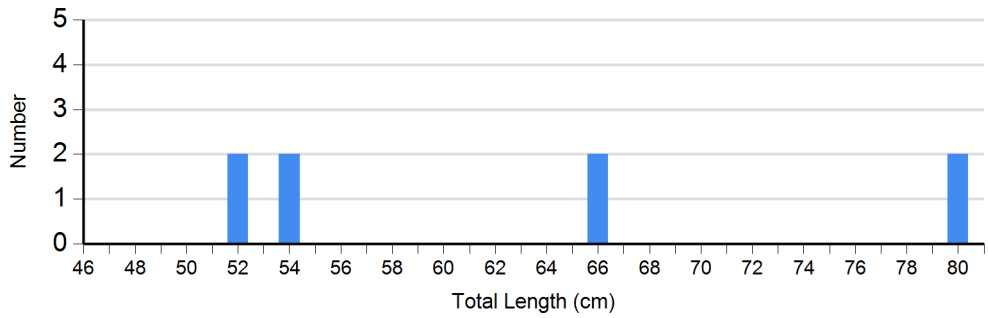


2016

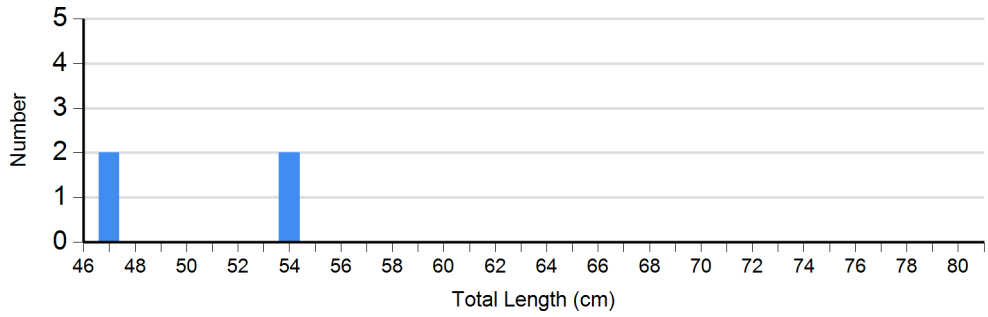
Species: Northern Pike
Gear: std exp gill net (150 ft)



2012

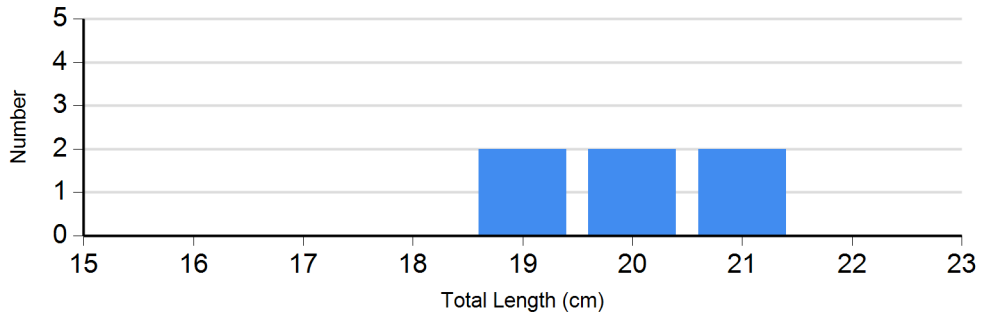


2013

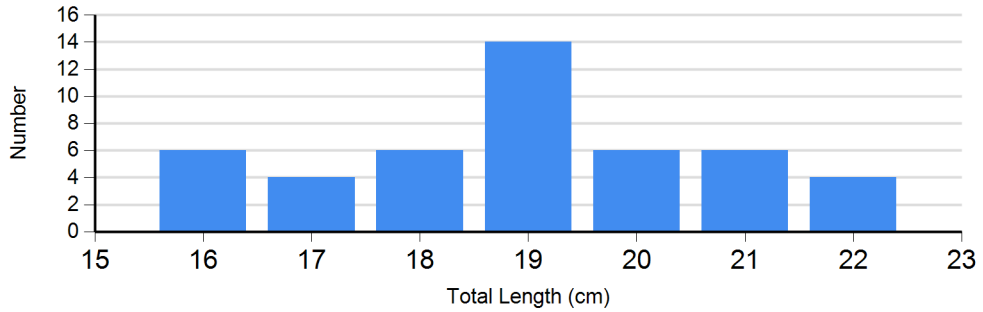


2014

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



2012

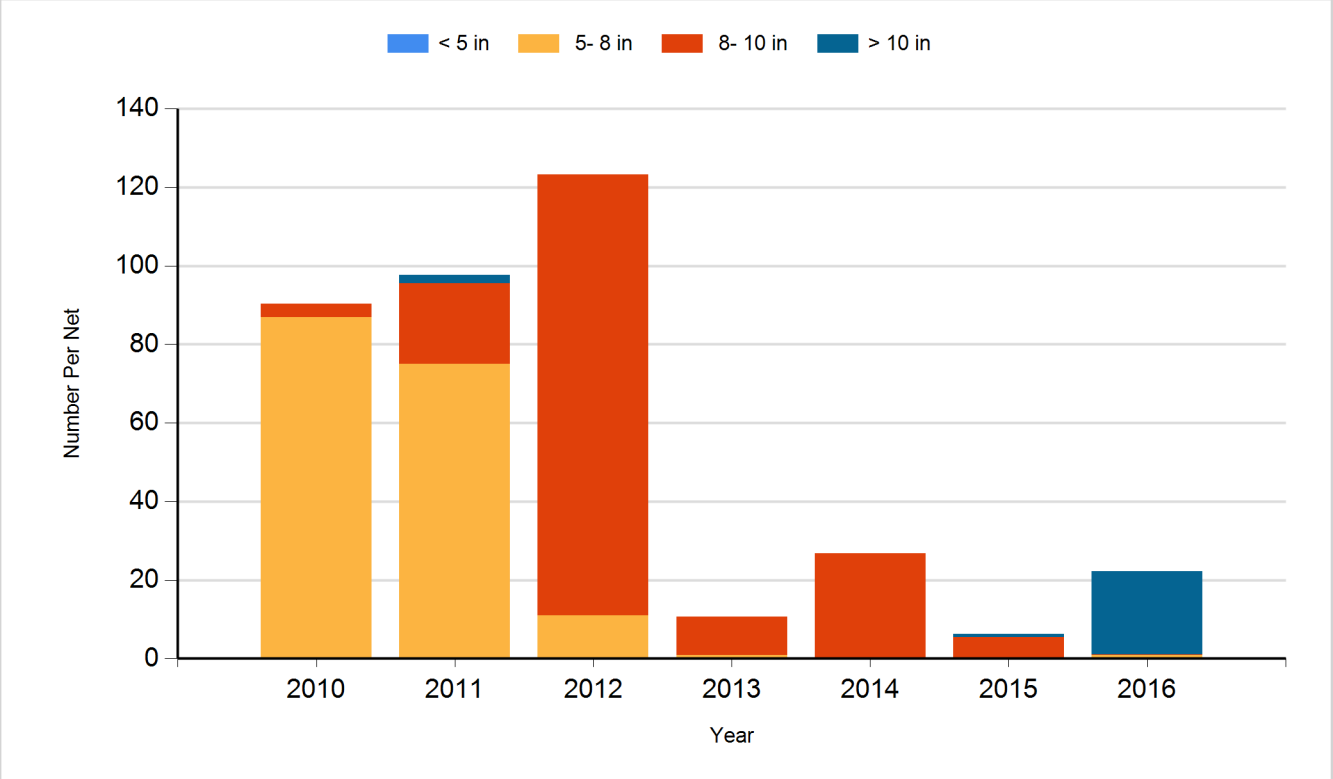


2014

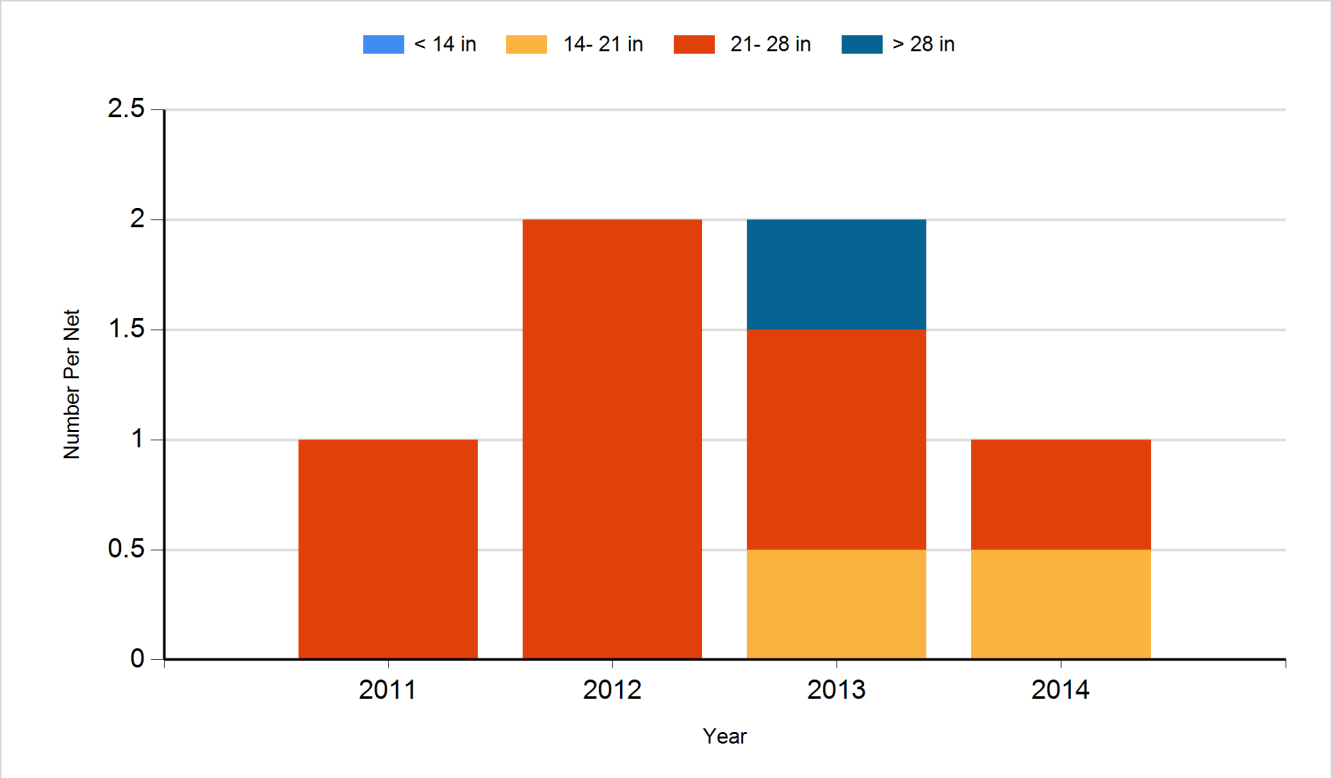
Historic Fish Sizes and Relative Abundance

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

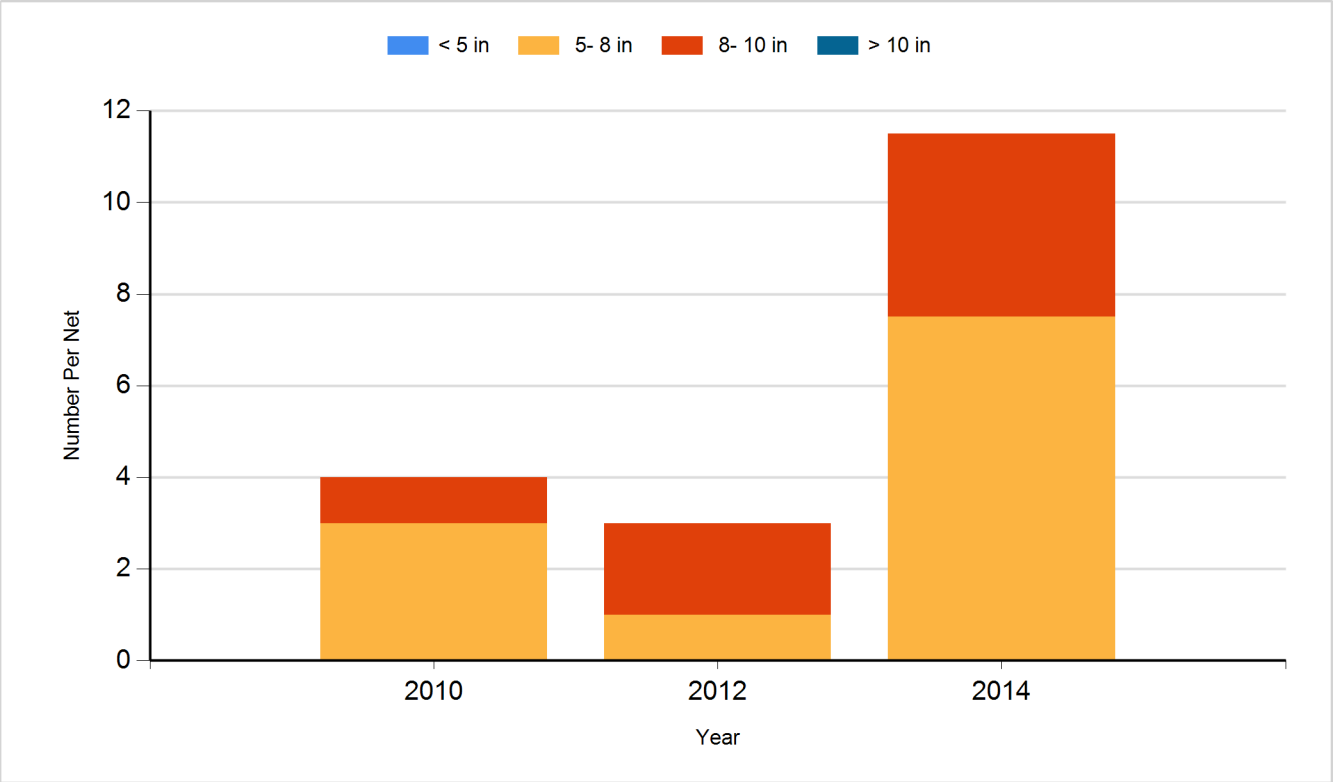
Species: Black Crappie
Gear: Frame Net



Species: Northern Pike
Gear: Gill Net



Species: Yellow Perch
Gear: Gill Net



Fish Stocking

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

Year	Species	Size	Number
2008	Black Crappie	Adult	230
2008	Fathead Minnow	Large	2,400
2008	Largemouth Bass	Fingerling	5,620
2009	Channel Catfish	Adult	570
2009	Largemouth Bass	Fingerling	13,000
2009	Yellow Perch	Adult	500
2010	Golden Shiner	Adult	50
2010	Northern Pike	Adult	110
2010	Walleye	Small Fingerling	20,000
2010	Yellow Perch	Adult	900
2011	Channel Catfish	Adult	200
2011	Largemouth Bass	Adult	150
2011	Largemouth Bass	Fingerling	10,000
2011	Northern Pike	Fry	77,600
2011	Yellow Perch	Adult	700
2012	Largemouth Bass	Adult	378
2012	Yellow Perch	Adult	341
2014	Largemouth Bass	Adult	100
2014	Largemouth Bass	Fingerling	1,875
2014	Northern Pike	Adult	305
2014	Rainbow Trout	Catchable	100
2014	Walleye	Large Fingerling	3,238
2015	Channel Catfish	Adult	55
2015	Gizzard Shad	Adult	29
2015	Largemouth Bass	Adult	190
2015	Northern Pike	Adult	20
2015	Rainbow Trout (Ennis)	Catchable 11"	600
2015	Walleye	Fingerling	900
2016	Channel Catfish	Adult	180
2016	Gizzard Shad	Adult	32
2016	Rainbow Trout (Shasta)	Catchable 11"	963
2016	Walleye	Fingerling	25,500