SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Eagle Butte, Dewey County
LMO-Lake-999-000
2021

Lake Information

Name: Eagle Butte

County: Dewey

Legal Description: T13-R24-S32

Surface Area: 50 Acres

Maximum Depth: 25 Feet

Mean Depth: 13 Feet

Surveys and Investigations

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

Gear	Date	Effort
frame net (std 3/4 in)	Jun 22, 2021	5 net-nights
frame net (std 3/4 in)	Jun 23, 2021	5 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Black Bullhead

Yellow Perch

Common Carp

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).

A statewide effort to help make netting efforts comparable to all waters sampled across the state, occurred in 2017, with a switch to American Fisheries Society gill nets. Past gill netting efforts were completed with different style/types of nets and are not comparable side by side.

- **AFS std gill net** – 80 ft experimental gill net containing eight panels (10 ft each) of varying monofilament meshes of 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25 and 2.50 inches.
- **std experimental gill net for non-Missouri River waters** - 150 ft experimental gill net containing six panels (25 ft each) of varying monofilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.
- s**td experimental gill net for Missouri River reservoirs** – 300 ft experimental gill net containing six panels (50 ft each) of varying multifilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.

$$CPUE = \frac{number\ of\ fish}{effort}$$

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)
Black Bullhead	6	15	9	23	12	30	15	38	18	46
Black Crappie	5	13	8	20	10	25	12	30	15	38
Bluegill	3	8	6	15	8	20	10	25	12	30
Brown Trout	8	20	12	30	16	40	20	50	18	46
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Lake Trout	12	30	20	50	26	65	31	80	39	100
Largemouth Bass	8	20	12	30	15	38	20	51	25	63
Muskellunge	20	51	30	76	38	97	42	107	50	127
Northern Pike	14	35	21	53	28	71	34	86	44	112
Pumpkinseed	3	8	6	15	8	20	10	25	12	30
Rainbow Trout	10	25	16	40	20	50	26	65	31	80
Rudd	6	15	10	25	12	30	15	38	19	48
Sauger	8	20	12	30	15	38	20	51	25	63
Smallmouth Bass	7	18	11	28	14	35	17	43	20	51
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
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).

*** Methods/Species that ignore stock length**

			Abundance		Stock Density Indices				Condition	
Gear	Species	Sample Size (n)	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
frame net (std 3/4 in)	Black Bullhead	126	12.6	7.0	99		86	4	86	1
	Black Crappie	1580	158.0	38.0	29	2	10	1	92	1
	Bluegill	480	48.0	24.5	20	2	1		94	1
	Common Carp	12	1.2	1.2	42	24	0		90	3
	Largemouth Bass	2	0.2	0.2	0		0		85	
	Yellow Perch	25	2.5	1.0	20	13	0		68	3

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.

*** Methods/Species that ignore stock length**

		CPUE										
Gear	Species	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
AFS std frame net	Black Bullhead						2.3					2.30
	Black Crappie						3.2					3.20
	Bluegill						6.4					6.40
	Common Carp						0.2					0.20
	Yellow Perch						2.9					2.90
boat shocker (night)	Largemouth Bass			70.0			52.0	14.0	75.0	54.0		53.00
frame net (std 3/4 in)	Black Bullhead			10.0							12.6	11.30
	Black Crappie			10.0							158.0	84.00
	Bluegill			10.1							48.0	29.05
	Common Carp			0.0							1.2	0.60
	Largemouth Bass			0.3							0.2	0.25
	Smallmouth Bass			0.0							0.0	0.00
	Yellow Perch			7.9							2.5	5.20

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	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AFS std frame net	Black Bullhead	PSD						91				
		PSD-P						74				
		Wr						99				
	Black Crappie	PSD						78				
		PSD-P						0				
		Wr						99				
	Bluegill	PSD						95				
		PSD-P						61				
		Wr						104				
	Common Carp	PSD						100				
		PSD-P						0				
		Wr						111				
	Yellow Perch	PSD						83				
		PSD-P						14				
		Wr						89				
boat shocker (night)	Largemouth Bass	PSD			26			13	96	51	20	
		PSD-P			17			10	4	14	15	
		Wr			100			106	111	109	105	
frame net (std 3/4 in)	Black Bullhead	PSD			100							99
		PSD-P			54							86
		Wr			99							86
	Black Crappie	PSD			54							29
		PSD-P			0							10
		Wr			108							92
	Bluegill	PSD			91							20
		PSD-P			1							1
		Wr			106							94
	Common Carp	PSD										42
		PSD-P										0
		Wr										90
	Largemouth Bass	PSD			0							0
		PSD-P			0							0

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
frame net (std 3/4 in)	Largemouth Bass	Wr			97							85
	Yellow Perch	PSD			94							20
		PSD-P			51							0
		Wr			87							68

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
2019	2	6	122 (3.9)	158 (1.1)								
2018	3	13	109 (3.4)	150 (2.8)	176 (2.7)							
2017	4	9	119 (3.2)	146 (6.3)	178 (5.1)	206 (7.6)						
2016	5	14	113 (7.6)	147 (9)	177 (8.6)	204 (7.2)	229 (6.2)					
2015	6	2	109 (13.2)	125 (29.9)	159 (20)	170 (31.1)	200 (33.9)	206 (40)				
Weighted Mean		44	114	148	176	202	225	206				

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2019	2	6										
2018	3	13										
2017	4	9										
2016	5	14										
2015	6	2										
Weighted Mean		44										

Species: Bluegill

Year Class	Age	N	Mean back-calculated length (SE) at age 1	2	3	4	5	6	7	8	9	10
2019	2	5	88 (2.7)	119 (1)								
2018	3	10	66 (3.2)	96 (2.7)	123 (3)							
2017	4	9	64 (2.3)	90 (3.1)	115 (2.2)	138 (2.9)						
2016	5	2	93 (25.2)	119 (29.4)	139 (23.8)	157 (15.7)	179 (9.9)					
2015	6	1	63	107	127	150	159	175				
Weighted Mean		27	71	100	121	142	172	175				

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2019	2	5										
2018	3	10										
2017	4	9										
2016	5	2										
2015	6	1										
Weighted Mean		27										

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+
2021	1580		168 (392)	180 (621)	225 (157)	248 (286)	190 (125)				
2017	32			180 (7)	226 (5)	238 (19)	227 (1)				
2014	200				201 (182)	204 (18)					

Species: Bluegill

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	480		128 (22)	142 (309)	147 (138)	197 (8)	189 (4)				
2017	64		112 (1)	144 (3)	181 (9)	196 (9)	206 (33)	209 (6)	225 (2)		
2014	202			159 (71)	180 (120)	196 (6)	193 (4)				

Species: Largemouth Bass

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2017	50		256 (1)	272 (43)		348 (1)	326 (1)	478 (4)			
2014	138			281 (114)	394 (8)	402 (4)	451 (6)	467 (6)			

Fish Condition

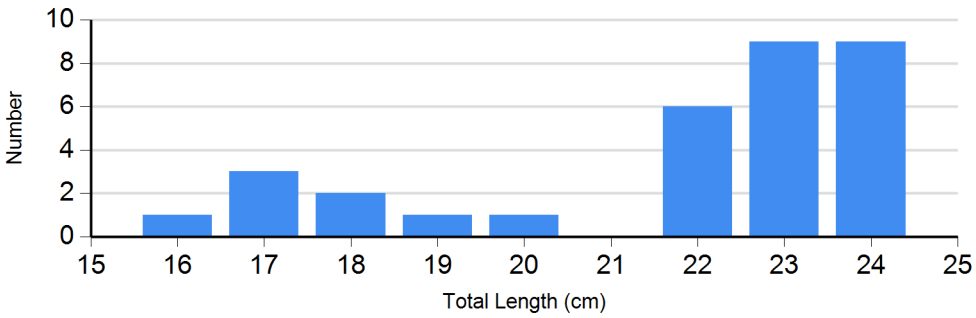
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2017	7	108 (2.3)	25	97 (1.4)	0		0	
	2021	1116	98 (0.4)	305	80 (0.7)	159	74 (1.2)	0	
Bluegill Frame Net	2017	3	113 (6.9)	22	105 (1.8)	39	102 (1.4)	0	
	2021	386	95 (0.6)	90	91 (1.1)	4	79	0	
Largemouth Bass Electro Fishing	2017	45	105 (1.0)	2	107 (1.0)	4	117 (2.0)	1	107
	2018	1		26	111 (1.8)	0		1	117
	2019	61	112 (0.9)	46	106 (1.2)	15	106 (3.9)	3	112 (7.1)
	2020	43	105 (0.9)	3	97 (3.9)	7	107 (3.9)	1	99

Length Frequency Distribution

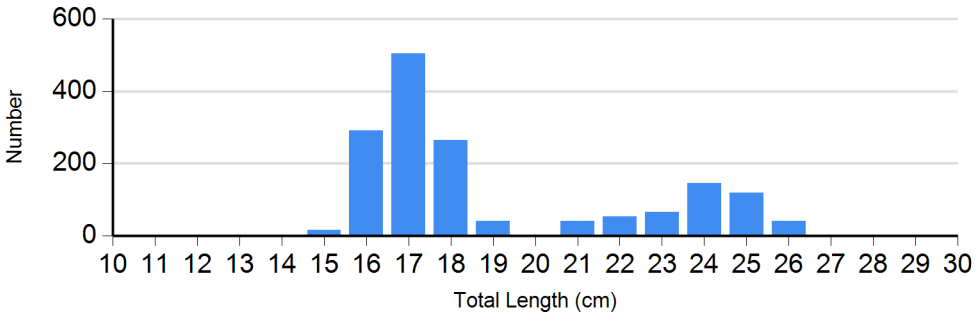
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net



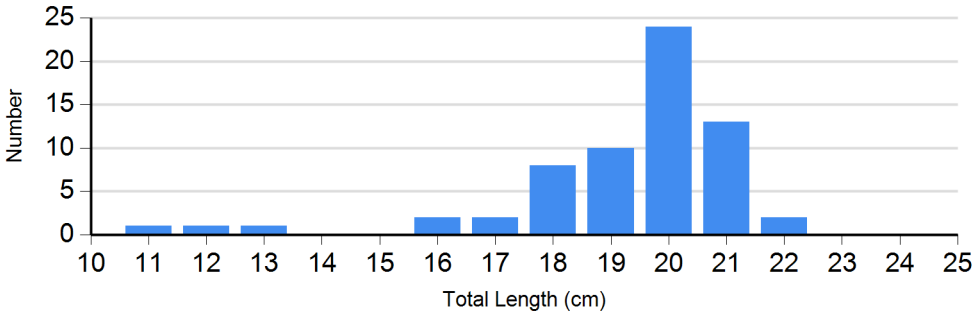
2017

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



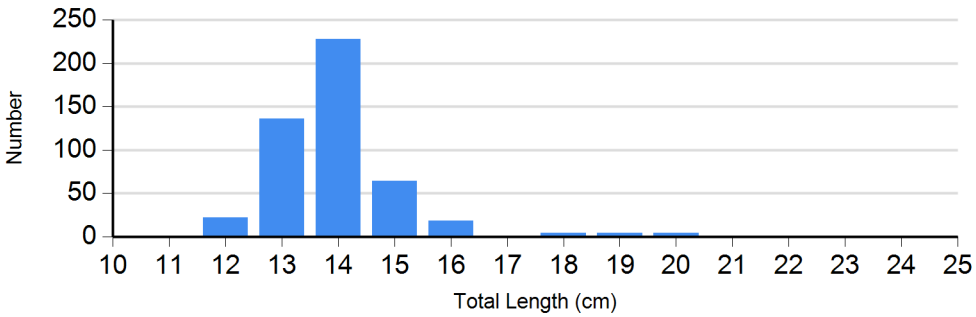
2021

Species: Bluegill
Gear: AFS std frame net



2017

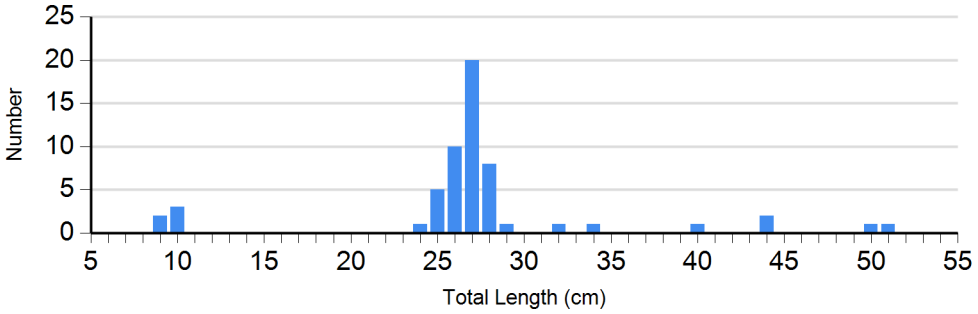
Species: Bluegill
Gear: frame net (std 3/4 in)



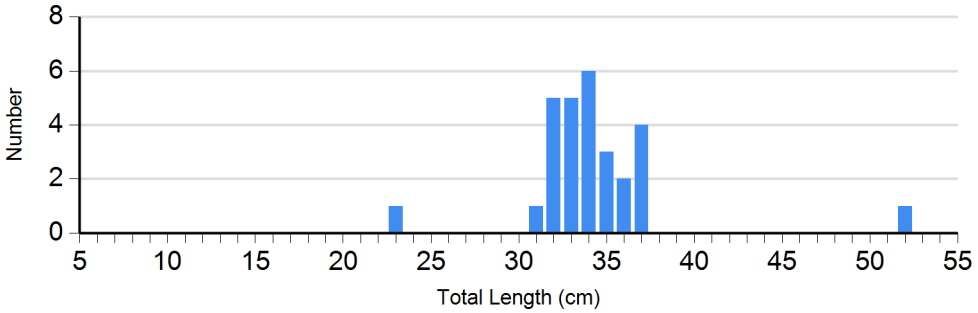
2021

Species: Largemouth Bass
Gear: boat shocker (night)

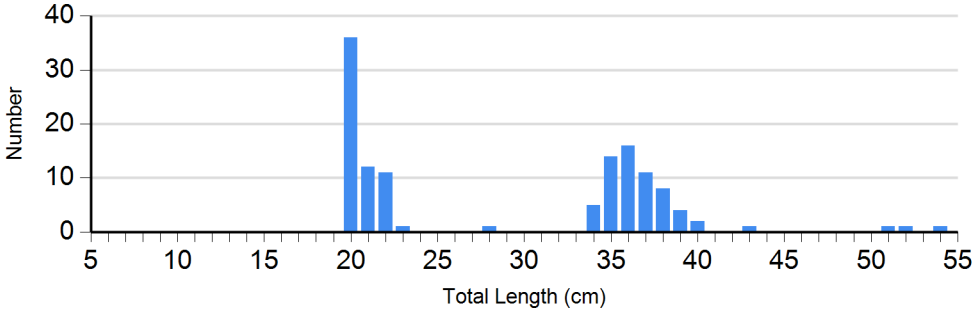
2017



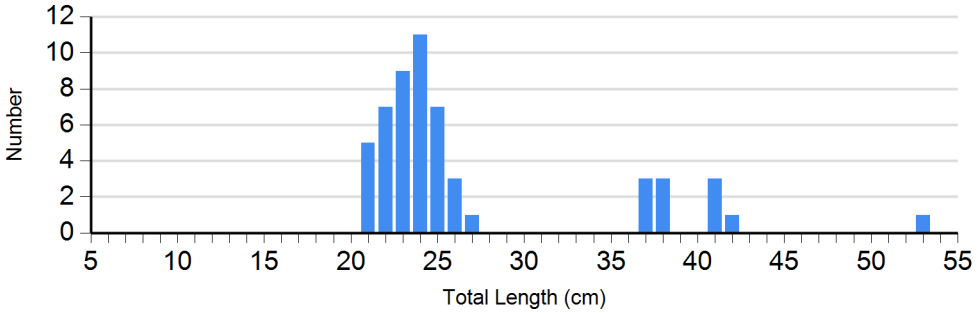
2018



2019



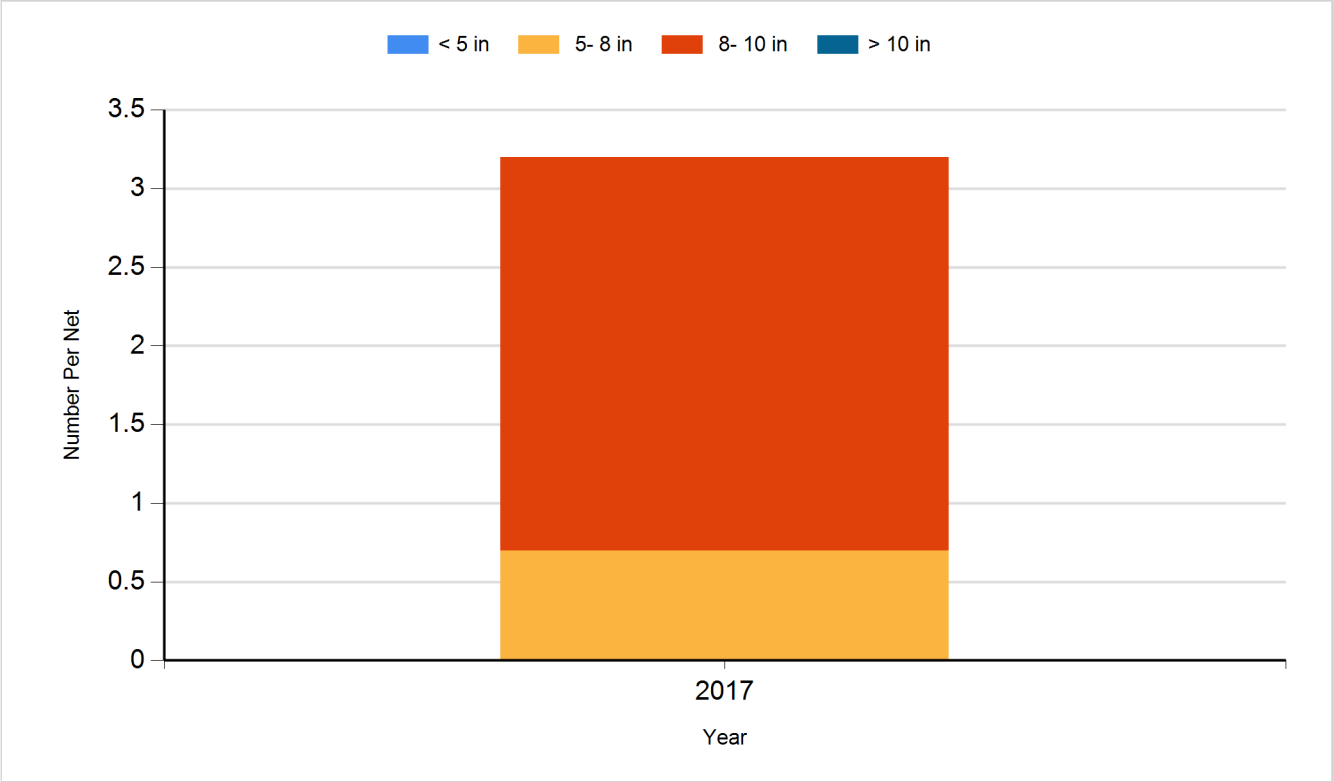
2020



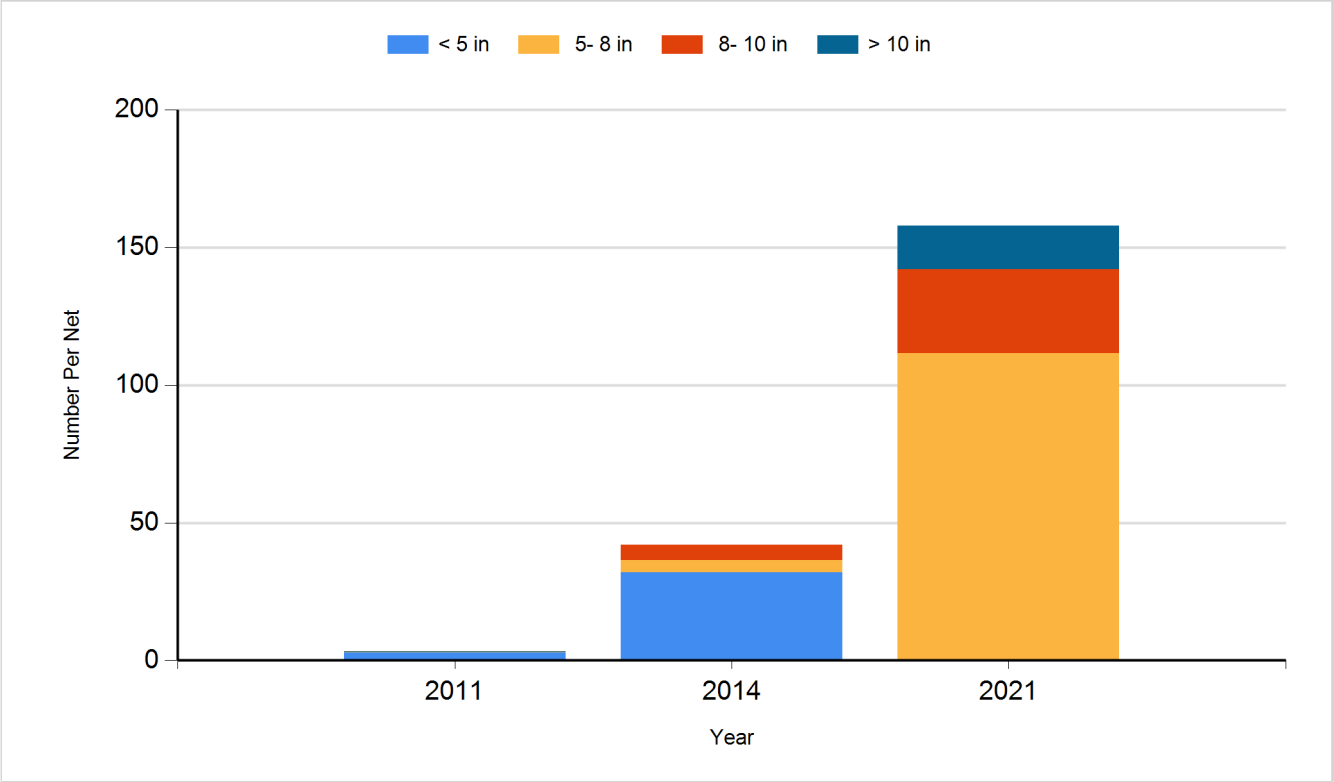
Historic Fish Sizes and Relative Abundance

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

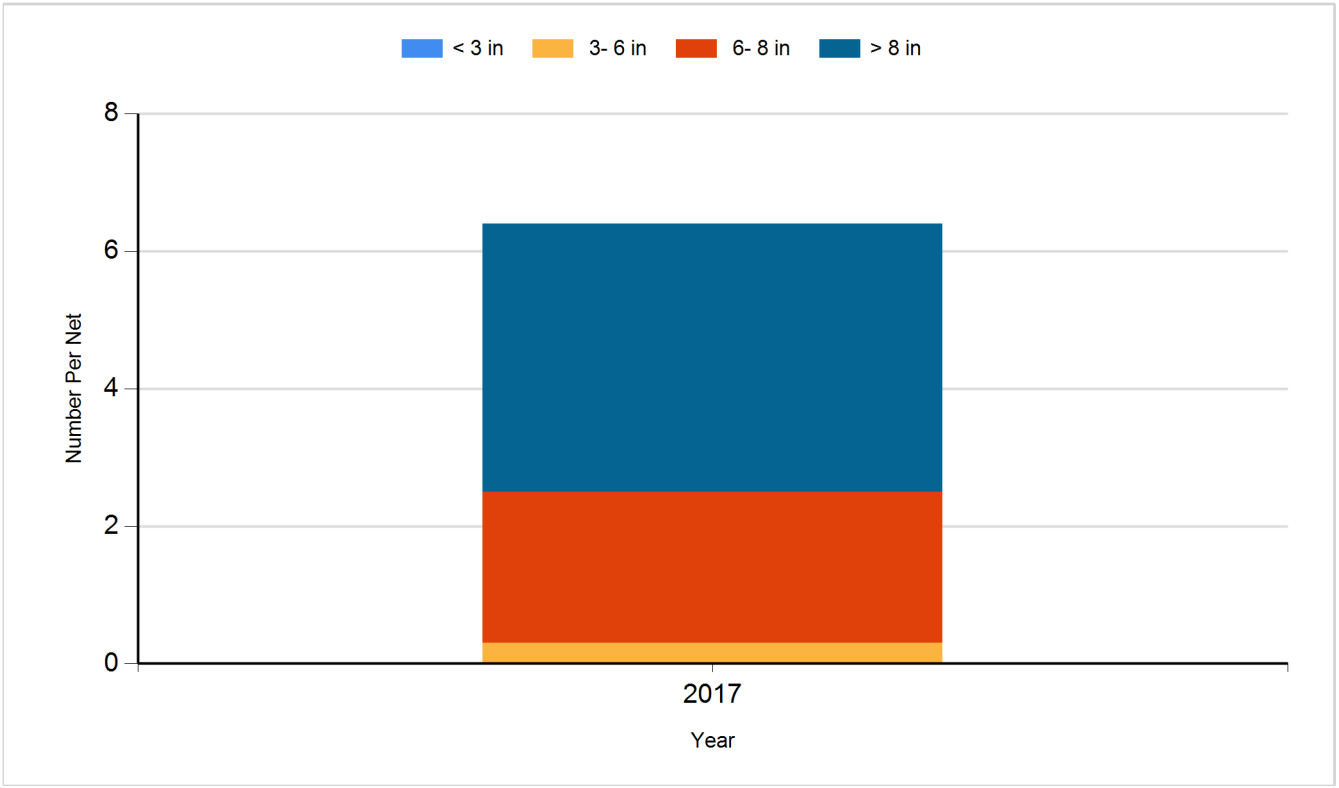
Species: Black Crappie
Gear: AFS std frame net



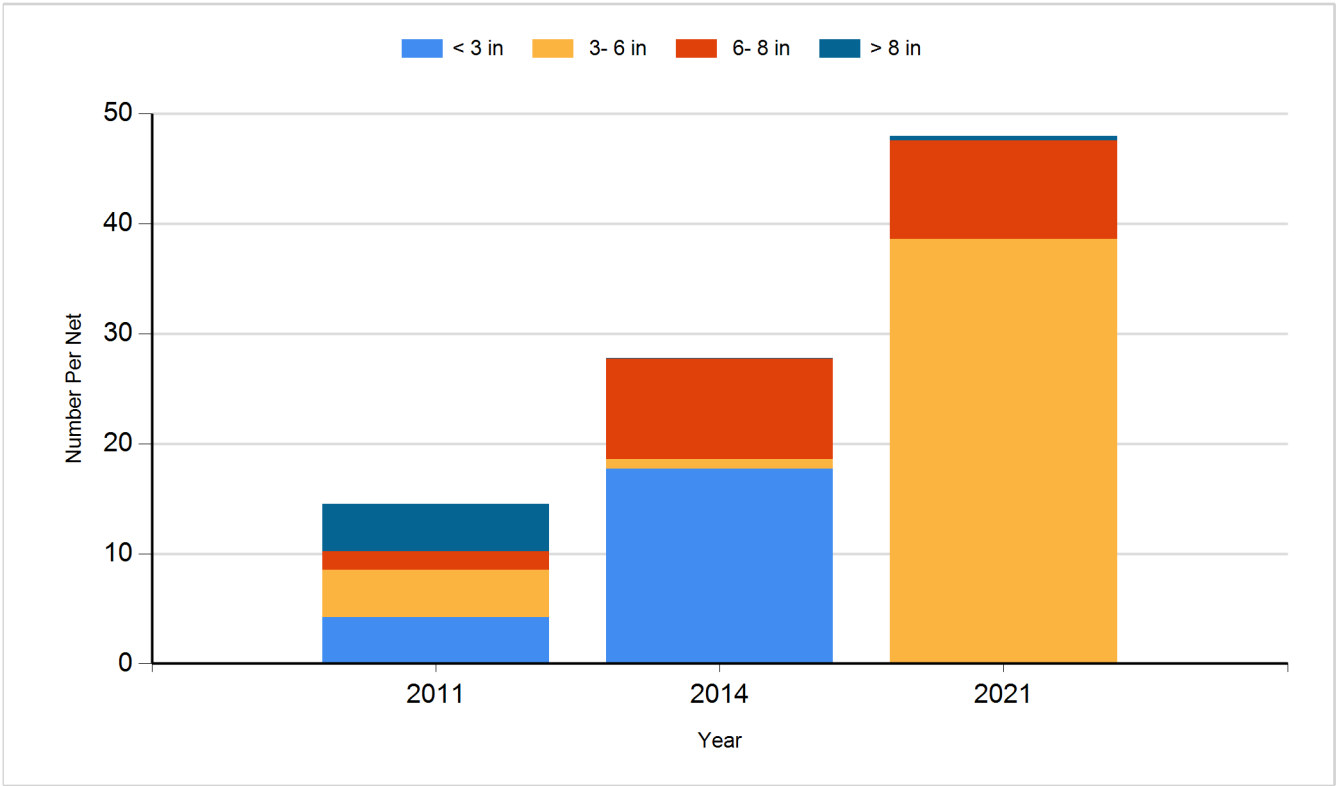
Species: Black Crappie
Gear: frame net (std 3/4 in)



Species: Bluegill
Gear: AFS std frame net



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



Species: Largemouth Bass
Gear: boat shocker (night)