SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Herrick, Gregory County
PON-Lake-75-000
2020

Lake Information

Name: Herrick

County: Gregory

Legal Description: T96-R71-S26

Surface Area: 11 Acres

Maximum Depth: 14 Feet

Mean Depth: 6 Feet

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	Sep 28, 2020	1605 seconds
frame net (std 3/4 in)	Jun 23, 2020	8 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Black Bullhead

Yellow Perch

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).

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
boat shocker (night)	Largemouth Bass	72	145.0	81.4	58	9	27	8	101	1
frame net (std 3/4 in)	Black Bullhead	29	3.6	2.1	93		93		101	2
	Black Crappie	133	16.5	9.1	58	6	36	6	95	1
	Bluegill	332	41.5	25.6	44	4	3	1	102	1
	Green Sunfish	1	0.1	0.2	100		0		110	
	Largemouth Bass	7	0.3	0.4	100		100		99	5
	Yellow Perch	14	1.8	1.0	71		21		91	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.

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

		CPUE										
Gear	Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Avg
AFS std frame net	Black Bullhead							1.3				1.30
	Black Crappie							3.9				3.90
	Bluegill							12.4				12.40
	Green Sunfish							0.9				0.90
boat shocker (night)	Largemouth Bass	147.0			78.0			180.0			145.0	137.50
frame net (std 3/4 in)	Black Bullhead	1.4			0.6						3.6	1.87
	Black Crappie	7.3			9.8						16.5	11.20
	Bluegill	12.6			10.0						41.5	21.37
	Green Sunfish	1.6			1.3						0.1	1.00
	Largemouth Bass	0.0			0.1						0.3	0.13
	Yellow Perch	0.3			0.6						1.8	0.90

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	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AFS std frame net	Black Bullhead	PSD							100			
		PSD-P							100			
		Wr							101			
	Black Crappie	PSD							67			
		PSD-P							0			
		Wr							91			
	Bluegill	PSD							55			
		PSD-P							1			
		Wr							92			
	Green Sunfish	PSD							83			
		PSD-P							0			
		Wr							109			
boat shocker (night)	Largemouth Bass	PSD	45			65			51			58
		PSD-P	35			31			17			27
		Wr	104			108			100			101
frame net (std 3/4 in)	Black Bullhead	PSD	82			100						93
		PSD-P	18			83						93
		Wr	108			92						101
	Black Crappie	PSD	47			69						58
		PSD-P	0			1						36
		Wr	91			84						95
	Bluegill	PSD	21			48						44
		PSD-P	0			0						3
		Wr	92			85						102
	Green Sunfish	PSD	62			92						100
		PSD-P	8			0						0
		Wr	123			117						110
	Largemouth Bass	PSD				100						100
		PSD-P				100						100
		Wr				106						99
	Yellow Perch	PSD	50			100						71
		PSD-P	0			50						21

			Year									
Gear	Species	Index	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
frame net (std 3/4 in)	Yellow Perch	Wr	99			89						91

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	1	1	142									
2018	2	9	92 (4.5)	141 (3.7)								
2017	3	12	92 (5)	150 (9.3)	196 (10.1)							
2016	4	17	104 (4.7)	151 (4.5)	190 (5.3)	232 (3.8)						
2015	5	6	92 (5.5)	133 (9.3)	168 (10.8)	198 (7.1)	238 (4)					
2014	6	2	97 (1.1)	136 (2.3)	173 (2.6)	206 (11)	232 (12)	259 (19.8)				
2013	7	1	61	107	145	179	198	233	261			
2012	8	1	67	95	129	174	194	211	237	271		
Weighted Mean		49	96	144	185	218	228	241	249	271		

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2019	1	1										
2018	2	9										
2017	3	12										
2016	4	17										
2015	5	6										
2014	6	2										
2013	7	1										
2012	8	1										
Weighted Mean		49										

Species: Bluegill

Year Class	Age	N	Mean back-calculated length (SE) at age									
			1	2	3	4	5	6	7	8	9	10
2018	2	10	59 (2.4)	94 (2.4)								
2017	3	7	56 (2.6)	78 (4)	115 (4.2)							
2016	4	15	53 (1.5)	77 (2.2)	117 (3.5)	141 (3.1)						
2015	5	9	53 (2.6)	79 (3.7)	108 (4.6)	142 (3.6)	163 (4.9)					
2014	6	3	51 (5.6)	79 (9.2)	111 (15)	135 (11.7)	161 (12.8)	178 (14.6)				
2012	8	1	42	71	94	128	152	172	185	209		
Weighted Mean		45	54	81	113	140	162	177	185	209		

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2018	2	10										
2017	3	7										
2016	4	15										
2015	5	9										
2014	6	3										
2012	8	1										
Weighted Mean		45										

Species: Largemouth Bass

Year Class	Age	N	Mean back-calculated length (SE) at age									
			1	2	3	4	5	6	7	8	9	10
2020	0	1										
2019	1	5	109 (6.6)									
2018	2	20	107 (2.8)	186 (6.4)								
2017	3	14	112 (6.5)	194 (8.3)	252 (9.3)							
2016	4	10	119 (6.4)	200 (8.2)	261 (8)	311 (7.3)						
2015	5	12	111 (6.4)	189 (10.1)	260 (11.8)	321 (9.2)	368 (10.8)					
2014	6	2	115 (2.8)	195 (13.2)	280 (47.9)	328 (38.1)	368 (43.1)	410 (48.9)				
2013	7	1	126	216	314	377	427	472	503			
2012	8	3	105 (1.7)	172 (7.9)	240 (9.5)	288 (16.2)	342 (18.9)	380 (14.9)	414 (11)	442 (9.2)		
2010	10	1	140	140	232	232	271	271	341	341	373	373
Weighted Mean		69	112	190	258	313	362	386	417	417	373	373

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2020	0	1										
2019	1	5										
2018	2	20										
2017	3	14										
2016	4	10										
2015	5	12										
2014	6	2										
2013	7	1										
2012	8	3										
2010	10	1										
Weighted Mean		69										

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+
2020	129	174 (3)	165 (37)	209 (31)	256 (38)	257 (14)	286 (4)	275 (2)	297 (2)		
2017	27		166 (1)		205 (22)	222 (4)					
2014	100		130 (10)	186 (5)	199 (26)	214 (24)	216 (17)	216 (11)	218 (6)		
2011	56		136 (1)	156 (5)	184 (1)	196 (31)	210 (12)	204 (4)	235 (1)	246 (1)	

Species: Bluegill

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	328		124 (71)	139 (69)	154 (122)	173 (49)	180 (13)		212 (4)		
2017	93		82 (15)	101 (6)	140 (28)	160 (27)	174 (16)	226 (1)			
2014	100		84 (2)	116 (3)	133 (30)	148 (46)	161 (18)	182 (1)			
2011	101			98 (20)	114 (10)	142 (61)	158 (8)	162 (1)			

Species: Largemouth Bass

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	70	184 (5)	230 (20)	293 (15)	356 (11)	397 (12)	443 (2)	521 (1)	465 (3)		394 (1)
2017	138	174 (18)	244 (50)	291 (16)	350 (37)	396 (13)	407 (3)	459 (1)	493 (2)		
2014	30	167 (4)	261 (9)	319 (4)	316 (2)	355 (2)		355 (1)	404 (1)	413 (2)	453 (5)
2011	64	152 (15)	239 (10)	263 (15)	295 (6)	379 (5)	398 (4)	410 (4)	430 (1)	476 (1)	501 (4)

Fish Condition

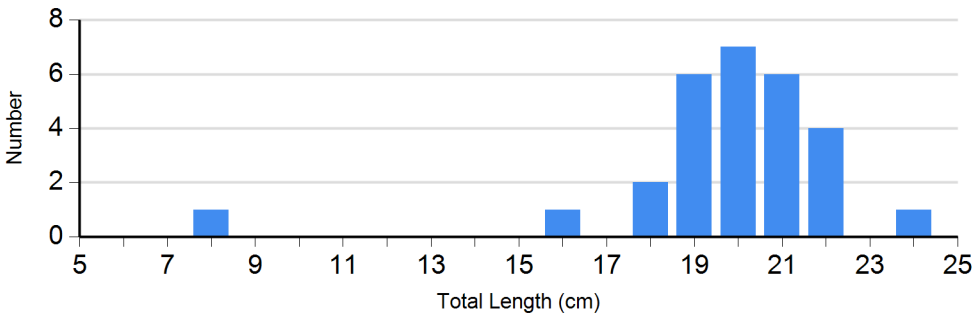
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	9	89 (1.7)	18	92 (4.5)	0		0	
	2020	56	98 (0.9)	29	96 (0.8)	47	90 (0.6)	0	
Bluegill Frame Net	2017	39	92 (2.8)	47	93 (1.2)	1	100	0	
	2020	185	102 (0.7)	138	102 (1.3)	9	96 (2.4)	0	
Largemouth Bass Electro Fishing	2017	59	101 (0.9)	41	101 (0.8)	20	96 (2.6)	0	
	2020	25	103 (1.3)	19	100 (1.3)	15	99 (1.6)	1	108

Length Frequency Distribution

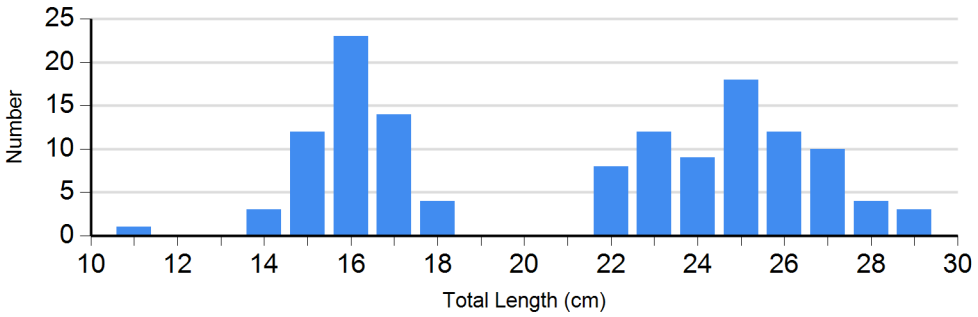
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net



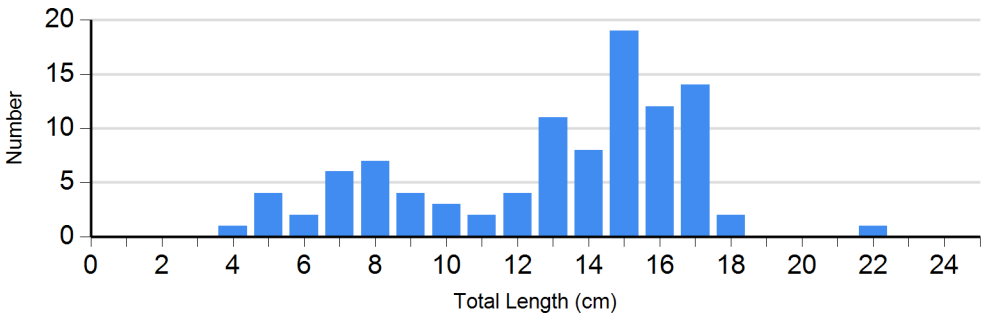
2017

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



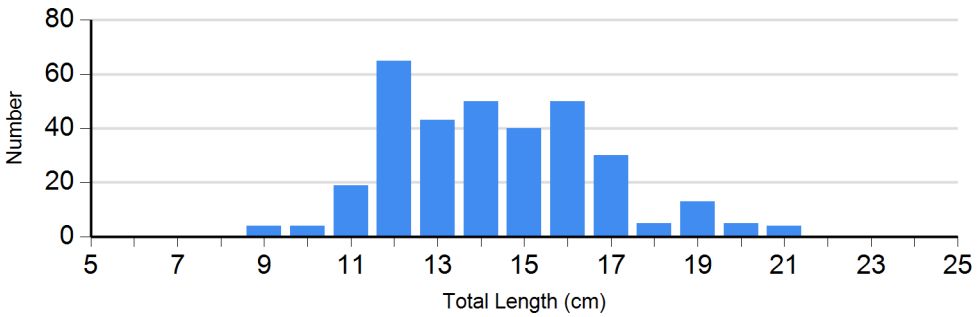
2020

Species: Bluegill
Gear: AFS std frame net



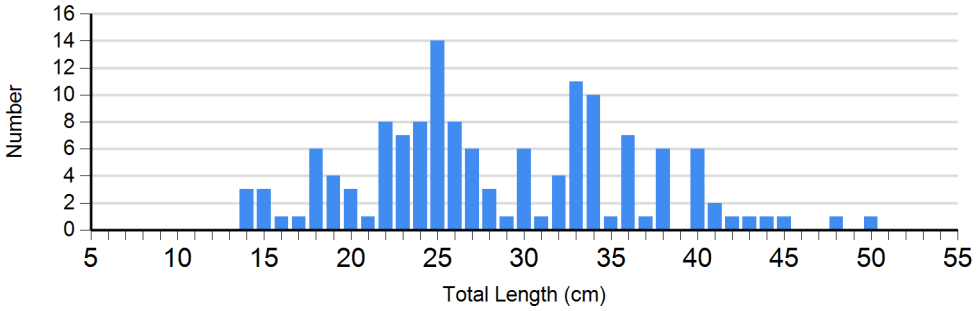
2017

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

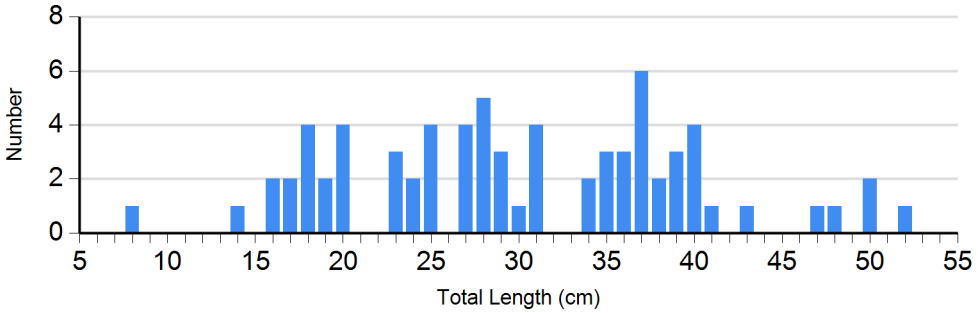


2020

Species: Largemouth Bass
Gear: boat shocker (night)



2017

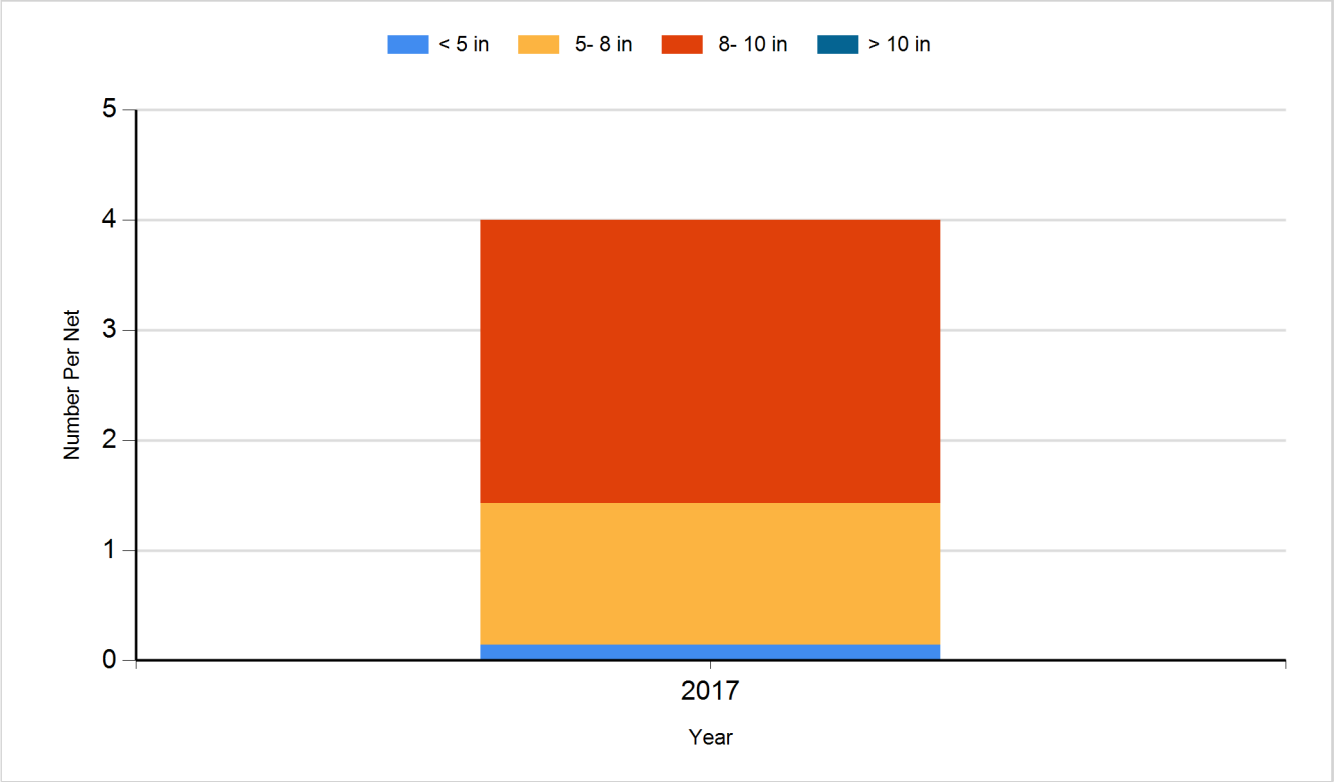


2020

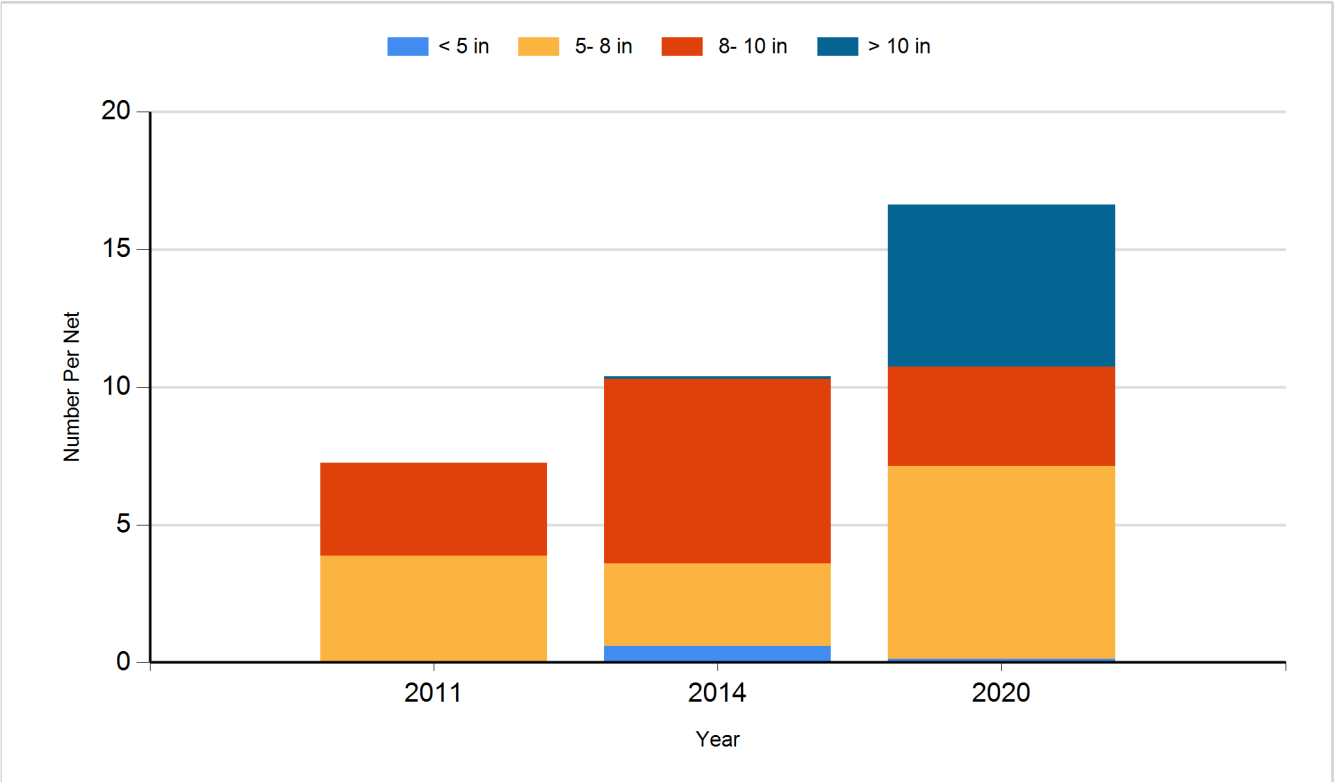
Historic Fish Sizes and Relative Abundance

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

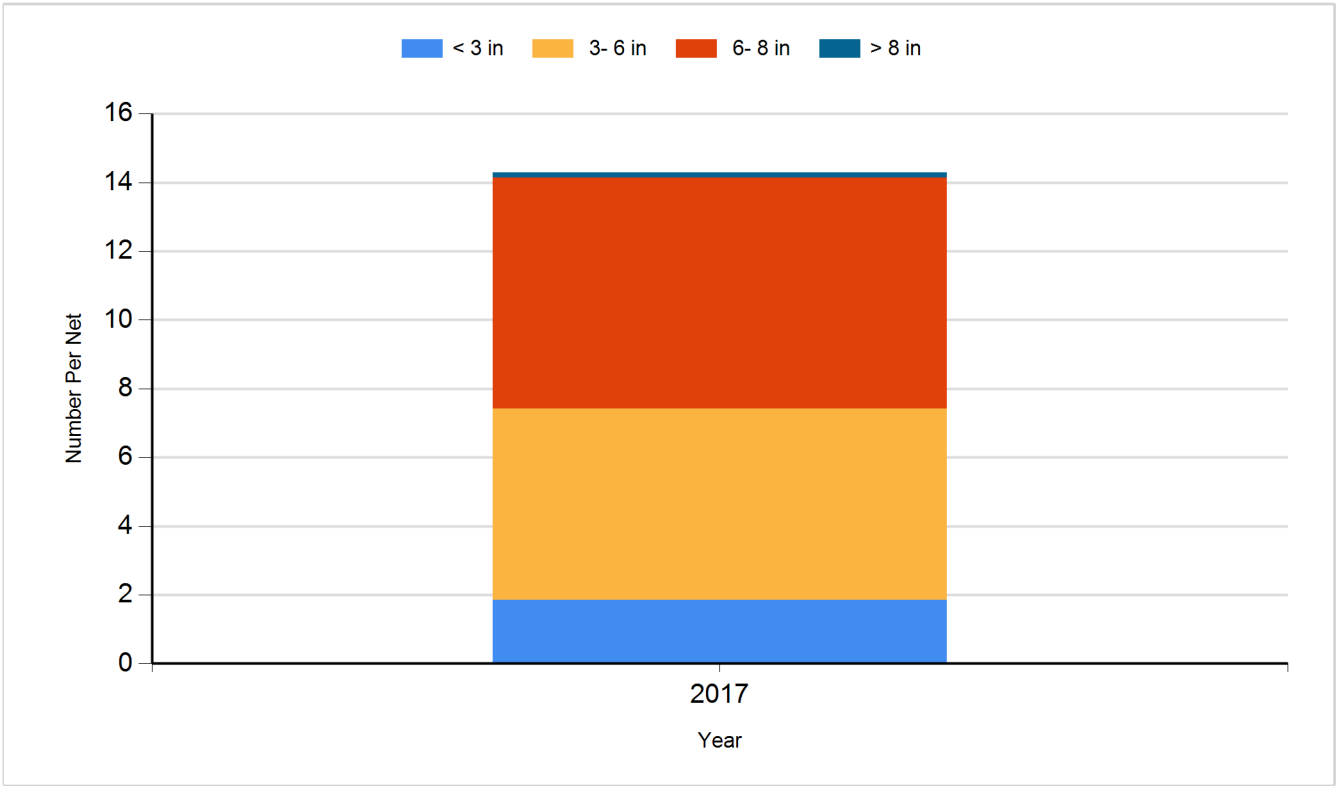
Species: Black Crappie
Gear: AFS std frame net



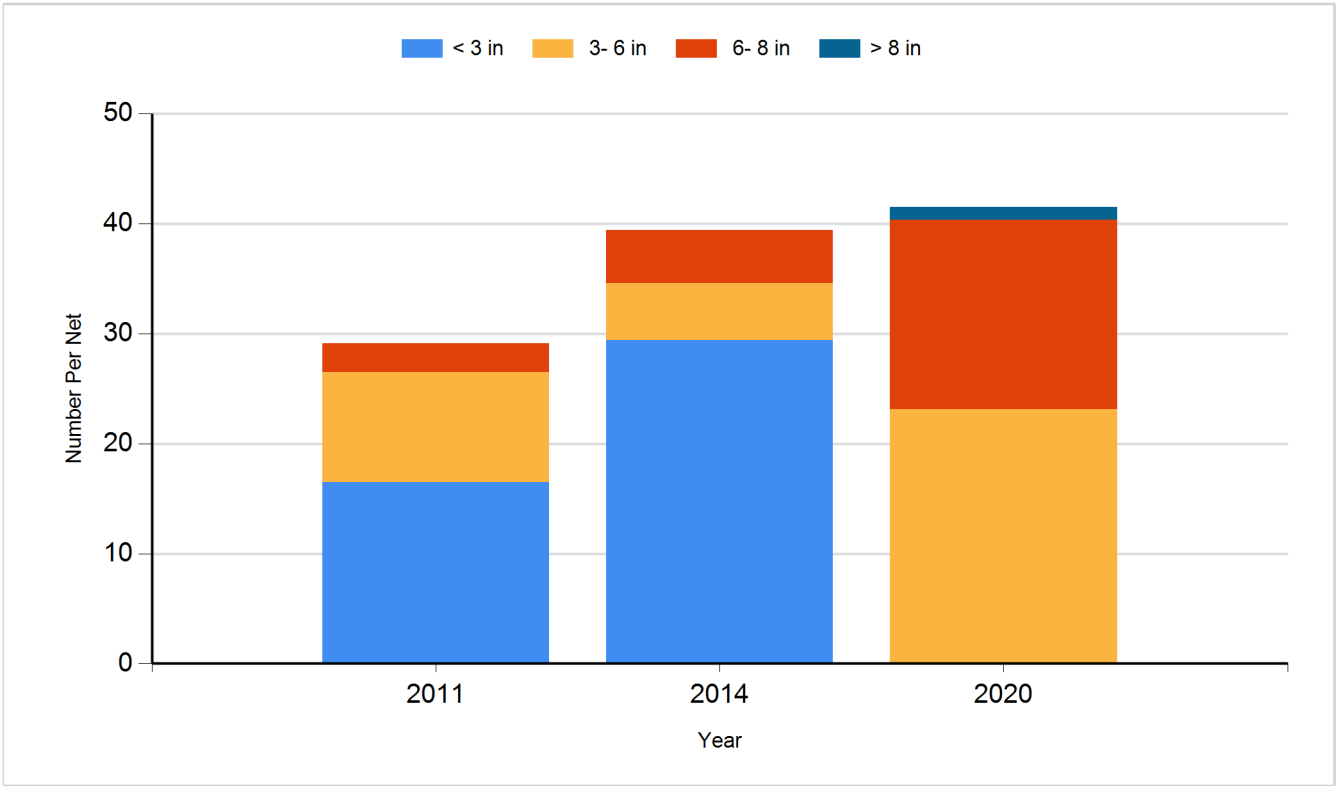
Species: Black Crappie
Gear: frame net (std 3/4 in)



Species: Bluegill
Gear: AFS std frame net



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



Species: Largemouth Bass
Gear: boat shocker (night)