

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Burke, Gregory County

FTR-Lake-3197-000

2020

Lake Information

Name: Burke **Maximum Depth:** 16 Feet
County: Gregory **Mean Depth:** 9 Feet
Legal Description: T97-R71-S32
Surface Area: 29 Acres

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	Oct 05, 2020	3600 seconds
boat shocker (night)	Sep 28, 2020	3600 seconds
frame net (std 3/4 in)	Jun 23, 2020	10 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Yellow Perch

Northern Pike

Black Bullhead

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.
- **std 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.

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

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)
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**

Gear	Species	Sample Size (n)	Abundance		Stock Density Indices			Condition		
			CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
boat shocker (night)	Largemouth Bass	83	28.0	5.2	68	9	41	10	121	1
frame net (std 3/4 in)	Black Bullhead	2	0.2	0.2	100		50		97	6
	Black Crappie	210	21.0	10.0	15	3	2		105	1
	Bluegill	44	4.4	1.4	64	11	11		120	3
	Northern Pike	17	1.7	0.7	94		18		88	2
	Yellow Perch	17	1.7	1.1	24		6		123	31

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**

Gear	Species	CPUE										Avg
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
AFS std frame net	Black Bullhead							0.1				0.10
	Black Crappie							10.9				10.90
	Bluegill							11.4				11.40
	Largemouth Bass							0.1				0.10
	Northern Pike							0.1				0.10
	Yellow Perch							0.6				0.60
boat shocker (night)	Largemouth Bass	52.5			18.0		35.5	33.0	13.0	25.5	28.0	29.36
frame net (std 3/4 in)	Black Bullhead	12.4			0.8						0.2	4.47
	Black Crappie	10.4			3.9						21.0	11.77
	Bluegill	12.6			6.9						4.4	7.97
	Green Sunfish	1.4			0.1						0.0	0.50
	Northern Pike	0.4			0.2						1.7	0.77
	Yellow Perch	0.3			2.0						1.7	1.33

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											
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
AFS std frame net	Black Bullhead	PSD									100			
		PSD-P									0			
		Wr									88			
	Black Crappie	PSD									51			
		PSD-P									0			
		Wr									105			
	Bluegill	PSD									83			
		PSD-P									5			
		Wr									107			
	Largemouth Bass	PSD									0			
		PSD-P									0			
		Wr									93			
	Northern Pike	PSD									100			
		PSD-P									0			
		Wr									96			
Yellow Perch	PSD									17				
	PSD-P									0				
	Wr									107				
boat shocker (night)	Largemouth Bass	PSD	66			87		34	27	77	65	68		
		PSD-P	23			60		30	12	46	35	41		
		Wr	107			118		106	103	112	110	121		
frame net (std 3/4 in)	Black Bullhead	PSD	100			100							100	
		PSD-P	7			100							50	
		Wr	91			89							97	
	Black Crappie	PSD	64			72							15	
		PSD-P	0			8							2	
		Wr	107			104							105	
	Bluegill	PSD	75			62							64	
		PSD-P	2			12							11	
		Wr	115			112							120	
	Northern Pike	PSD	100			100							94	
		PSD-P	33			0							18	

Gear	Species	Index	Year									
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
frame net (std 3/4 in)	Northern Pike	Wr	76			95						88
	Yellow Perch	PSD	100			60						24
		PSD-P	0			0						6
		Wr	94			103						123

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	144											
2018	2	1	82	143										
2017	3	2	75 (7.1)	113 (.9)	153 (.6)									
2016	4	11	75 (3.5)	110 (4.2)	143 (5.1)	177 (4.8)								
2015	5	7	73 (4.3)	100 (4.9)	126 (4)	154 (3.3)	176 (4.3)							
2014	6	1	81	115	134	149	163	184						
2013	7	2	78 (6.1)	122 (25)	139 (25.1)	167 (20.1)	191 (15)	217 (21.4)	241 (22.3)					
Weighted Mean		25	78	110	138	167	178	206	241					
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20		
2019	1	1												
2018	2	1												
2017	3	2												
2016	4	11												
2015	5	7												
2014	6	1												
2013	7	2												
Weighted Mean		25												

Species: Bluegill

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	2	81 (14.7)																	
2018	2	4	48 (3.1)	102 (1.4)																
2017	3	5	86 (5.7)	113 (3.7)	155 (4.6)															
2016	4	9	78 (4)	110 (2.2)	144 (2.8)	171 (3.9)														
2015	5	5	61 (6.9)	101 (5.7)	124 (8.1)	153 (7.9)	180 (7.2)													
2014	6	1	65	102	122	137	160	172												
2013	7	1	49	75	99	124	158	179	199											
Weighted Mean		28	71	106	139	160	174	176	199											
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20								
2020	0	1																		
2019	1	2																		
2018	2	4																		
2017	3	5																		
2016	4	9																		
2015	5	5																		
2014	6	1																		
2013	7	1																		
Weighted Mean		28																		

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	14																		
2019	1	7	131 (5.6)																	
2018	2	1	133	194																
2017	3	11	111 (4.7)	191 (9.2)	258 (8.2)															
2016	4	4	128 (11.6)	229 (14.5)	284 (14.2)	325 (17.3)														
2015	5	5	116 (12.1)	206 (14.3)	277 (9.9)	335 (18.3)	392 (24.5)													
2014	6	4	126 (17.1)	195 (16.7)	252 (15.4)	306 (16.2)	362 (18.8)	407 (10.4)												
2013	7	3	126 (6.2)	222 (24.5)	295 (29.2)	332 (29.8)	375 (30.8)	420 (35.6)	457 (32.6)											
2012	8	2	141 (39.5)	182 (41.6)	274 (28.9)	348 (34.6)	403 (25.6)	442 (27.6)	477 (22.4)	501 (21.8)										
Weighted Mean		51	122	202	269	327	381	419	465	501										
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20								
2020	0	14																		
2019	1	7																		
2018	2	1																		
2017	3	11																		
2016	4	4																		
2015	5	5																		
2014	6	4																		
2013	7	3																		
2012	8	2																		
Weighted Mean		51																		

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	208	159 (2)	161 (2)	176 (14)	188 (109)	192 (64)	194 (13)	264 (4)			
2017	109				199 (109)						
2014	75	110 (39)	165 (1)	202 (23)	239 (6)	249 (5)	243 (1)				
2011	82		153 (7)	194 (37)	217 (24)	221 (11)	233 (2)				

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	36	110 (3)	132 (5)	174 (6)	188 (13)	194 (7)	184 (1)	206 (1)			
2017	114	128 (8)	134 (6)	168 (41)	181 (53)	199 (6)					
2014	70	74 (1)	113 (20)	146 (14)	185 (5)	192 (13)	193 (13)	202 (3)			
2011	101			141 (39)	166 (42)		188 (4)	187 (9)	195 (5)		193 (2)

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	62	157 (13)	217 (2)	294 (24)	355 (5)	446 (7)	441 (4)	502 (5)	533 (3)		
2018	39	135 (14)	241 (2)	283 (8)	366 (6)	430 (2)	488 (4)	525 (2)	527 (1)		
2014	54	164 (40)	285 (1)	351 (4)	407 (1)	409 (3)	433 (2)	423 (1)		454 (1)	496 (1)
2011	35	200 (1)	268 (8)	310 (13)	351 (5)	402 (3)	409 (3)	460 (1)	424 (1)		

Fish Condition

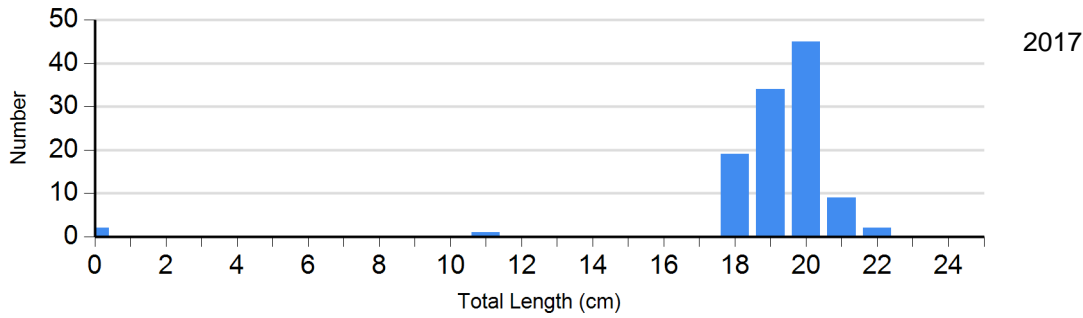
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2017	53	107 (0.9)	56	104 (0.8)	0		0	
	2020	178	105 (0.7)	28	105 (0.7)	2	95	2	94
Bluegill Frame Net	2017	19	115 (2.6)	89	106 (1.4)	6	100 (3.4)	0	
	2020	16	115 (3.8)	23	123 (2.6)	5	120 (1.5)	0	
Largemouth Bass Electro Fishing	2016	47	106 (1.1)	3	107 (5.6)	18	109 (2.8)	3	104 (0.4)
	2017	24	102 (1.8)	5	106 (5.9)	3	110 (1.2)	1	98
	2018	6	110 (2.8)	8	111 (2.7)	9	115 (3.0)	3	109 (2.7)
	2019	18	111 (1.6)	15	104 (1.7)	14	116 (2.5)	4	108 (5.3)
	2020	18	120 (1.8)	15	120 (1.8)	17	124 (2.0)	6	123 (3.2)

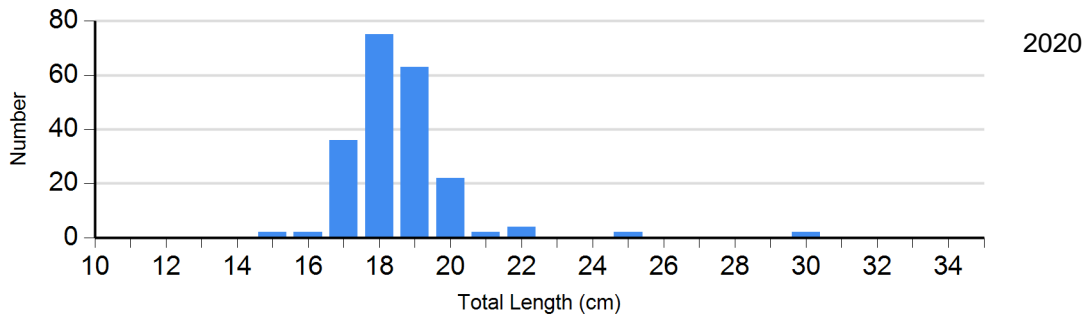
Length Frequency Distribution

Length frequency histogram of species sampled by year.

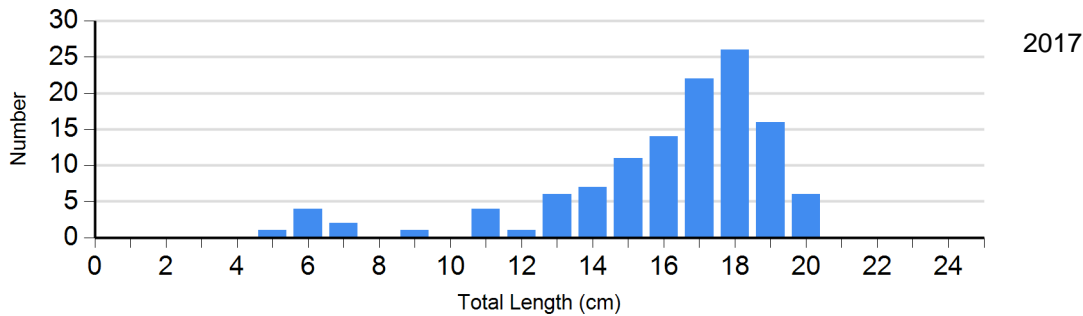
Species: Black Crappie
Gear: AFS std frame net



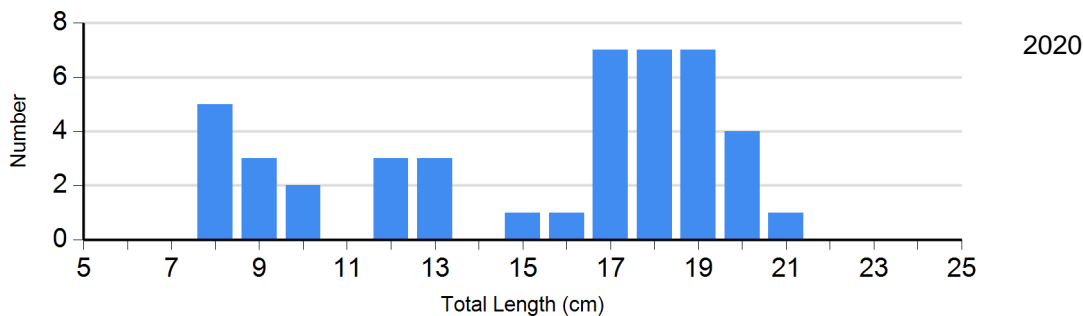
Species: Black Crappie
Gear: frame net (std 3/4 in)



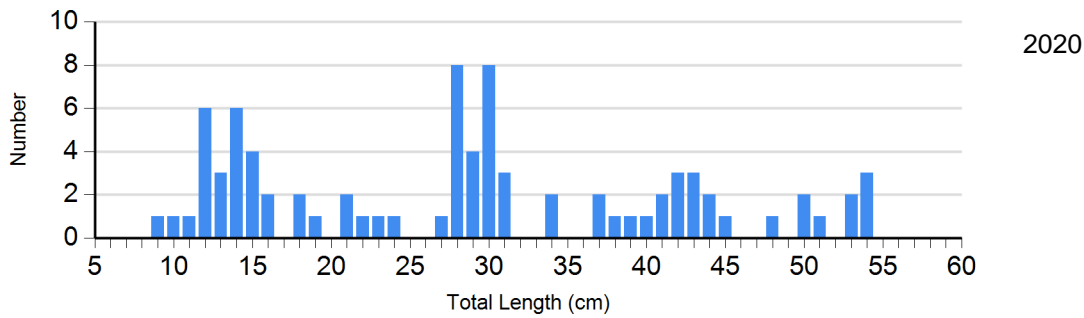
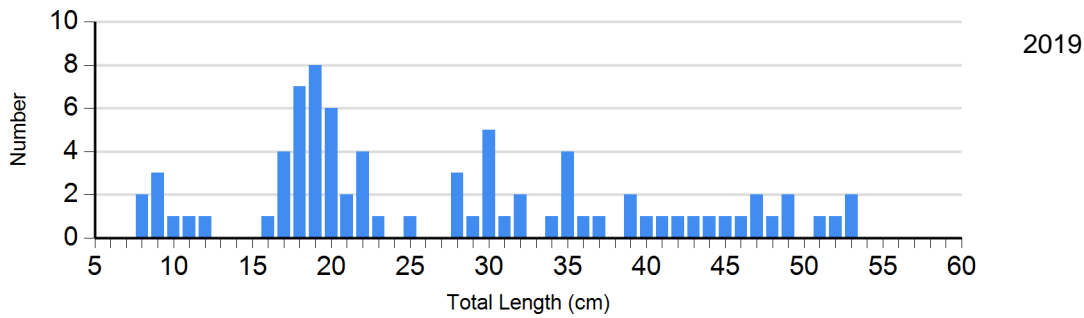
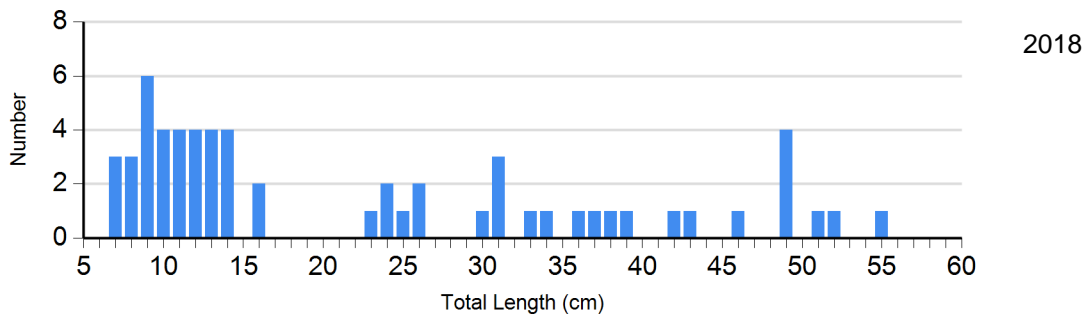
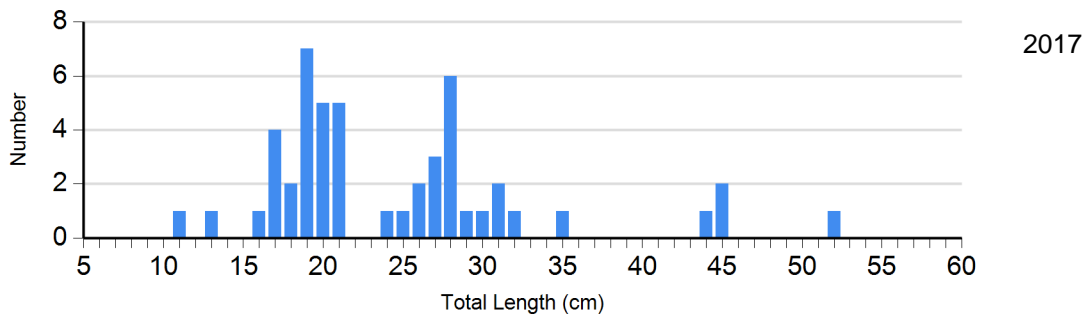
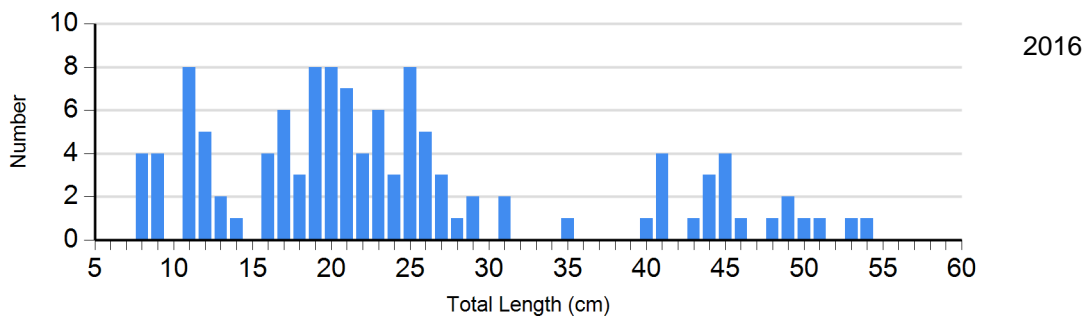
Species: Bluegill
Gear: AFS std frame net



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



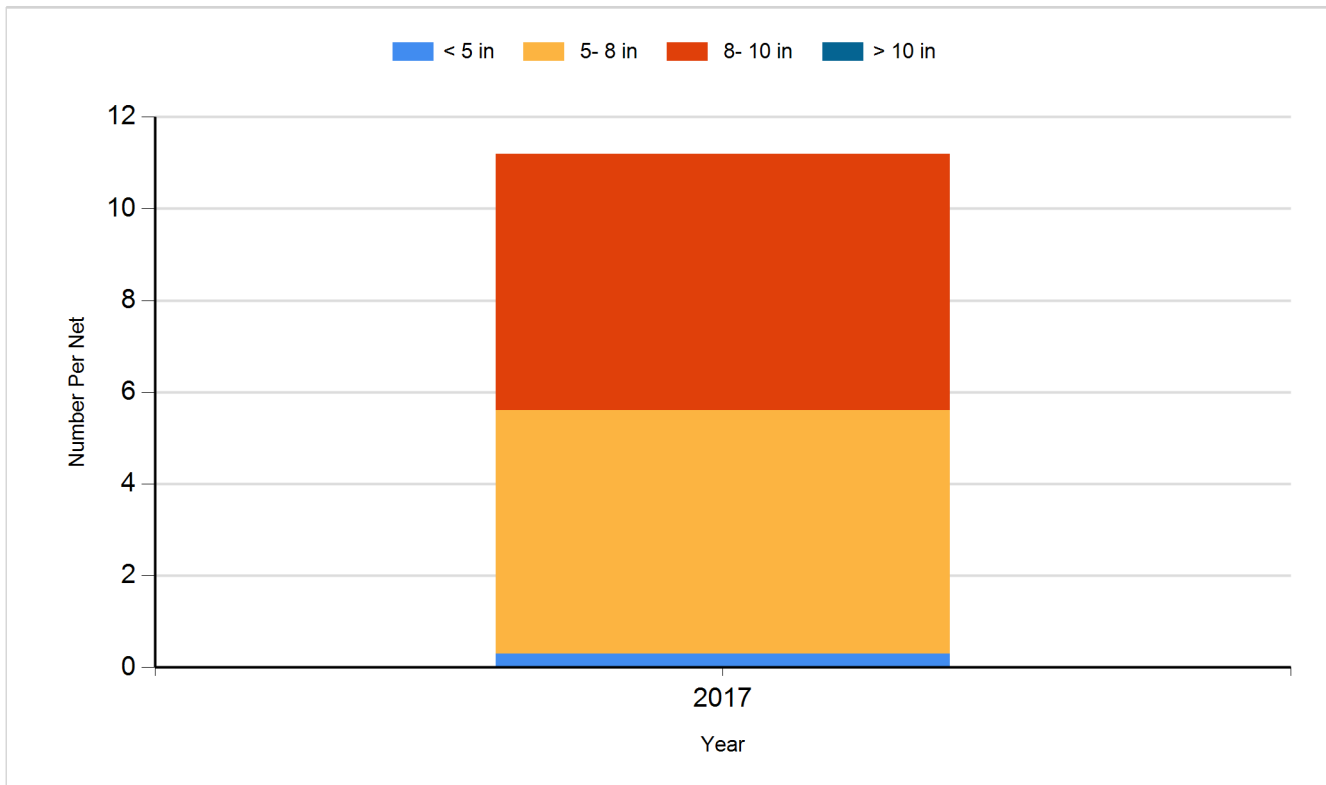
Species: Largemouth Bass
Gear: boat shocker (night)



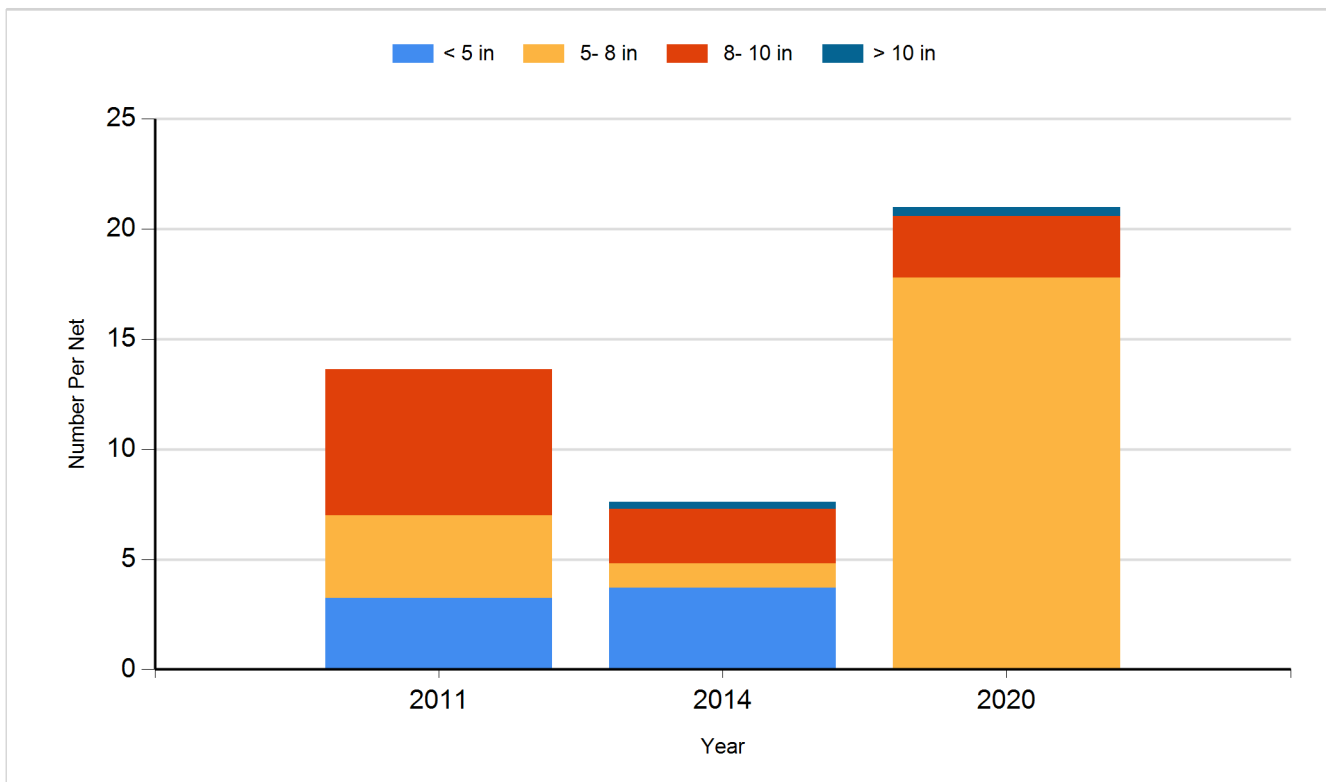
Historic Fish Sizes and Relative Abundance

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

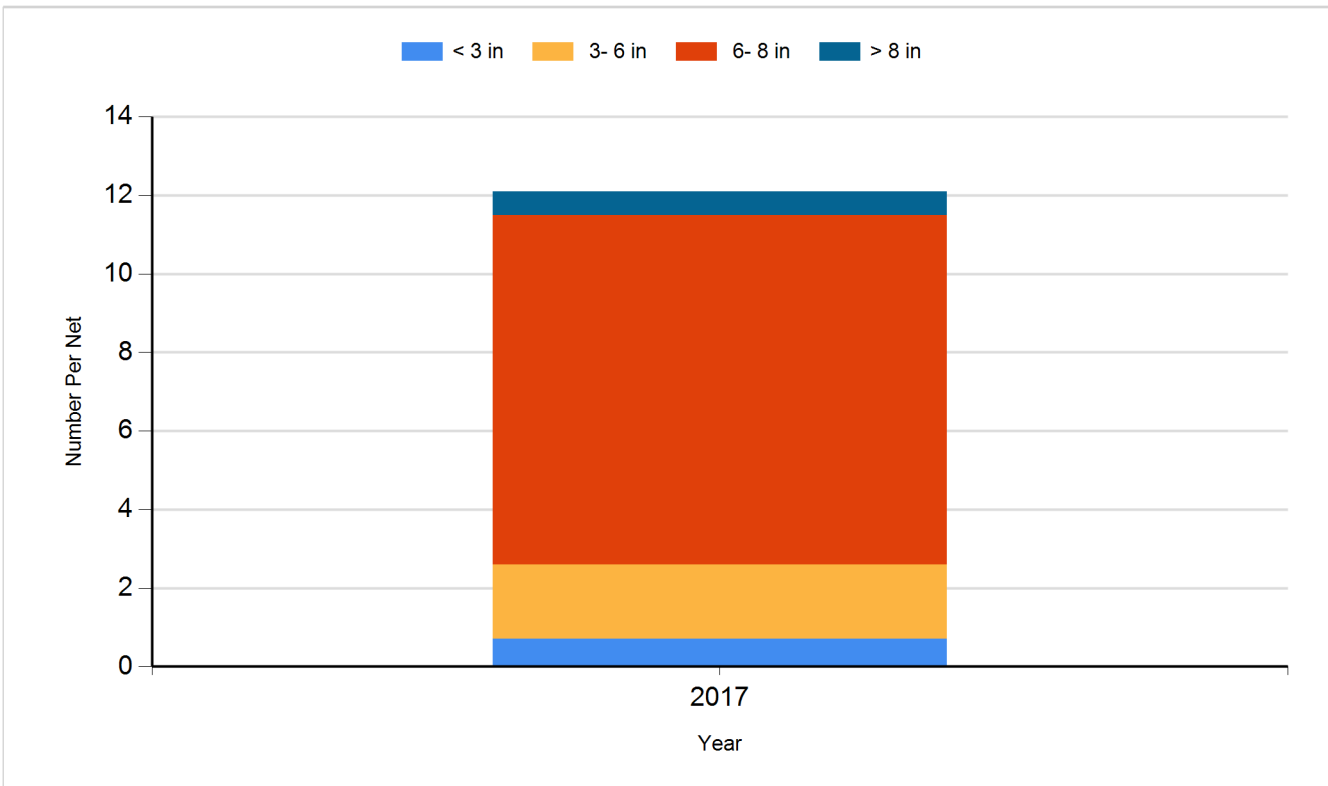
Species: Black Crappie
Gear: AFS std frame net



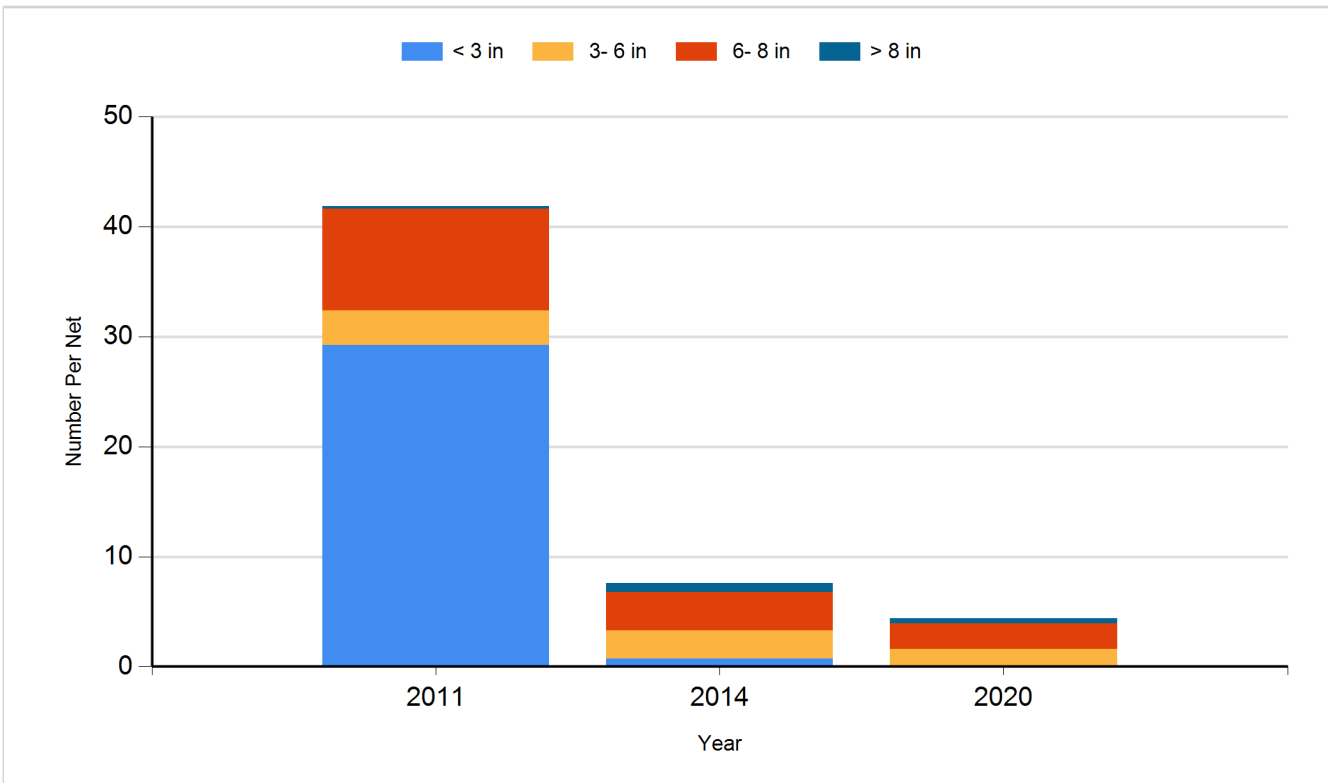
Species: Black Crappie
Gear: frame net (std 3/4 in)



Species: Bluegill
Gear: AFS std frame net



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



Species: Largemouth Bass
Gear: boat shocker (night)

