SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Reliance, Lyman County
FTR-Lake-3897-000
2019

Lake Information

Name: Reliance

County: Lyman

Legal Description: T105-R73-S16

Surface Area: 39 Acres

Maximum Depth: 11 Feet

Mean Depth: 6 Feet

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	Oct 07, 2019	3600 seconds
frame net (std 3/4 in)	Jun 24, 2019	5 net-nights
frame net (std 3/4 in)	Jun 25, 2019	5 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Black Bullhead

Golden Shiner

Channel Catfish

Yellow Perch

Sunfish Hybrid

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	55	55.0	9.0	93		64	10	103	2
frame net (std 3/4 in)	Black Bullhead	138	13.7	5.0	66	6	23	5	93	1
	Black Crappie	256	24.9	13.4	57	4	5	2	85	1
	Bluegill	1128	112.8	27.5	76	2	3	1	92	1
	Channel Catfish	8	0.8	0.5	50		0		105	4
	Golden Shiner	104	10.4	0.6						
	Largemouth Bass	2	0.2	0.3	100		100		85	0
	Sunfish Hybrid	6	0.0	0.0						
	Yellow Perch	1	0.1	0.1	0		0		83	

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	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
boat shocker (night)	Largemouth Bass			138.0		45.0		191.0			55.0	107.25
frame net (std 3/4 in)	Black Bullhead		9.7			3.6		3.8			13.7	7.70
	Black Crappie		0.0			0.0		0.0			24.9	6.23
	Bluegill		6.1			9.9		17.0			112.8	36.45
	Channel Catfish		0.0			0.0		0.0			0.8	0.20
	Golden Shiner		0.0			0.0		0.0			10.4	2.60
	Green Sunfish		10.1			10.0		1.0			0.0	5.28
	Largemouth Bass		0.1			0.4		0.5			0.2	0.30
	Sunfish Hybrid		0.0			0.0		0.0			0.0	0.00
	Yellow Perch		0.0			0.0		0.0			0.1	0.03

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	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
boat shocker (night)	Largemouth Bass	PSD			56		2		67			93
		PSD-P			16		0		2			64
		Wr			103		108		111			103
frame net (std 3/4 in)	Black Bullhead	PSD		3			42		79			66
		PSD-P		1			0		16			23
		Wr		88			106		104			93
	Black Crappie	PSD										57
		PSD-P										5
		Wr										85
	Bluegill	PSD		95			2		40			76
		PSD-P		30			0		0			3
		Wr		106			137		115			92
	Channel Catfish	PSD										50
		PSD-P										0
		Wr										105
	Largemouth Bass	PSD		100			0		40			100
		PSD-P		0			0		0			100
		Wr		116			138		97			85
	Yellow Perch	PSD										0
		PSD-P										0
		Wr										83

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
2018	1	3	99 (3.6)									
2017	2	1	67	107								
2016	3	14	76 (3.4)	120 (4.6)	166 (4.1)							
2015	4	24	72 (2.7)	127 (4.5)	176 (5.7)	202 (4.4)						
2014	5	7	77 (3.2)	136 (8.4)	190 (8.8)	222 (6.2)	237 (6.5)					
2013	6	2	64 (1.6)	136 (30.9)	180 (37.3)	224 (21.4)	247 (14)	264 (12.4)				
2012	7	1	61	169	207	230	244	256	264			
Weighted Mean		52	75	127	176	208	240	261	264			

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2018	1	3										
2017	2	1										
2016	3	14										
2015	4	24										
2014	5	7										
2013	6	2										
2012	7	1										
Weighted Mean		52										

Species: Bluegill

Year Class	Age	N	Mean back-calculated length (SE) at age									
			1	2	3	4	5	6	7	8	9	10
2018	1	1	64									
2017	2	3	57 (6.1)	93 (1.3)								
2016	3	11	47 (2)	94 (5.6)	129 (7.5)							
2015	4	21	51 (1.5)	102 (3.8)	140 (3.9)	165 (3.8)						
2014	5	6	53 (1.4)	104 (5.6)	142 (7.5)	162 (5.4)	187 (5.3)					
Weighted Mean		42	51	99	137	164	187					

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2018	1	1										
2017	2	3										
2016	3	11										
2015	4	21										
2014	5	6										
Weighted Mean		42										

Species: Largemouth Bass

Year Class	Age	N	Mean back-calculated length (SE) at age									
			1	2	3	4	5	6	7	8	9	10
2018	1	2	80 (2.6)									
2017	2	3	94 (15)	178 (5.6)								
2016	3	5	121 (8.6)	204 (9.6)	291 (10.8)							
2015	4	21	99 (3.7)	210 (9.1)	284 (9.4)	342 (8.4)						
2014	5	14	80 (3.4)	204 (12)	274 (9.6)	340 (8.7)	382 (6.4)					
2013	6	8	81 (2.8)	181 (10.3)	264 (7.2)	341 (6.7)	385 (7.9)	422 (6.2)				
2012	7	1	65	144	218	277	331	383	425			
Weighted Mean		54	92	200	277	340	381	418	425			

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2018	1	2										
2017	2	3										
2016	3	5										
2015	4	21										
2014	5	14										
2013	6	8										
2012	7	1										
Weighted Mean		54										

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+
2019	256	123 (5)	123 (2)	184 (84)	208 (136)	242 (25)	273 (3)	271 (1)			

Species: Bluegill

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	1128	107 (13)	116 (34)	147 (228)	167 (760)	193 (93)					
2016	169	93 (9)	145 (151)	191 (2)	195 (1)	191 (6)					
2014	99	118 (84)	114 (14)	165 (1)							
2011	61	105 (3)		222 (1)	180 (4)	209 (19)	176 (23)	176 (11)	184 (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+
2019	55	224 (2)	298 (3)	343 (5)	375 (21)	413 (14)	444 (9)	445 (1)			
2016	191	237 (55)	224 (3)	338 (129)	361 (4)						
2014	138	198 (138)									
2012	115	256 (51)	337 (41)	364 (9)	402 (11)	414 (3)					

Fish Condition

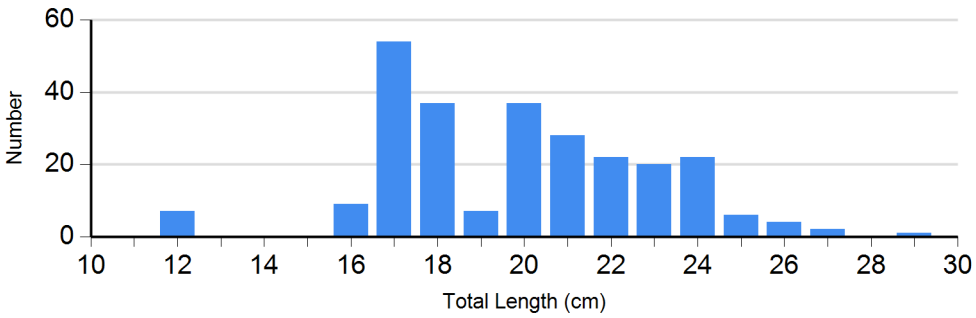
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2019	107	85 (0.8)	129	84 (0.8)	13	86 (1.4)	0	
Bluegill Frame Net	2016	102	115 (1.6)	68	114 (1.3)	0		0	
	2019	272	87 (0.8)	822	93 (0.7)	34	93 (2.2)	0	
Largemouth Bass Electro Fishing	2016	63	115 (1.5)	124	110 (0.6)	4	99 (3.4)	0	
	2019	4	101 (3.8)	16	102 (2.1)	35	104 (2.3)	0	

Length Frequency Distribution

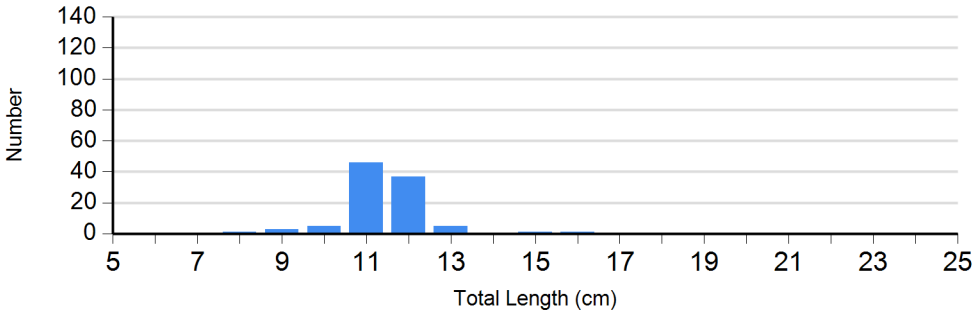
Length frequency histogram of species sampled by year.

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

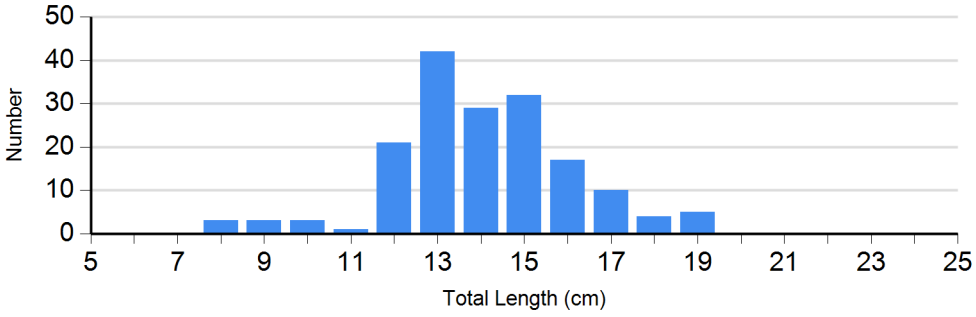


2019

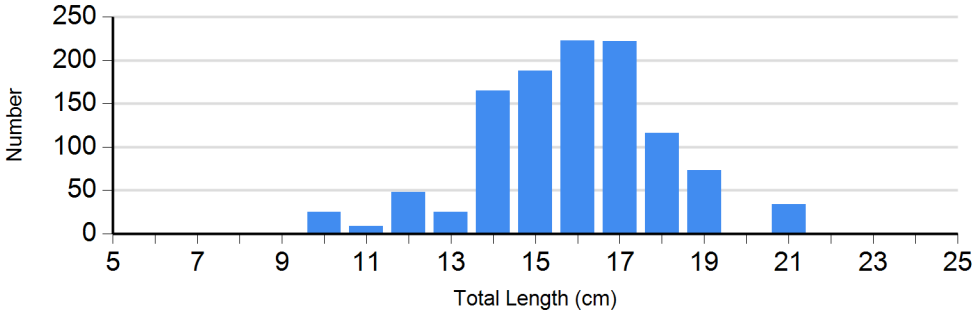
Species: Bluegill
Gear: frame net (std 3/4 in)



2014



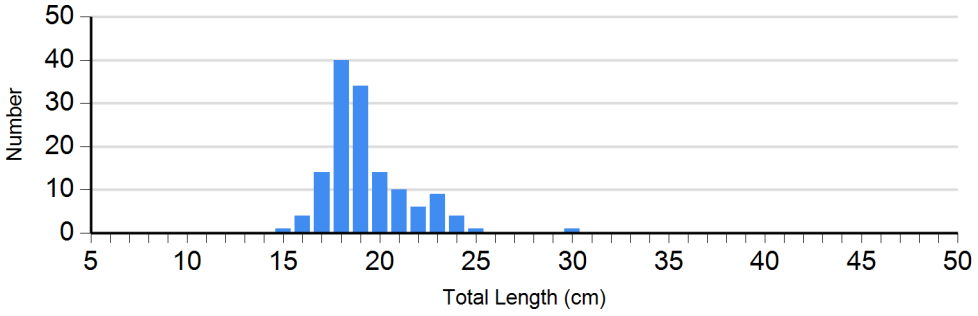
2016



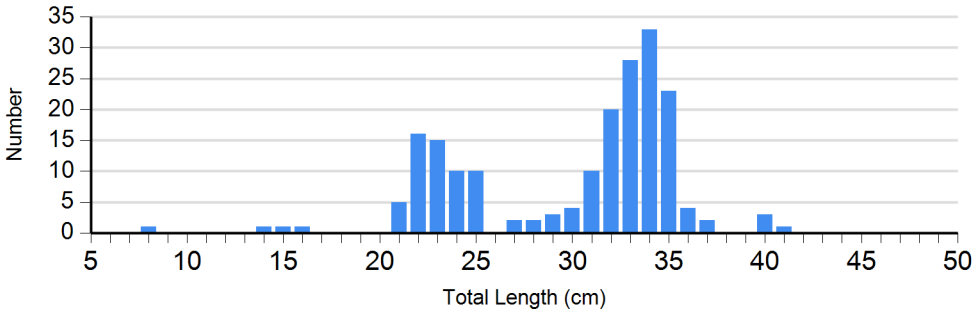
2019

Species: Largemouth Bass
Gear: boat shocker (night)

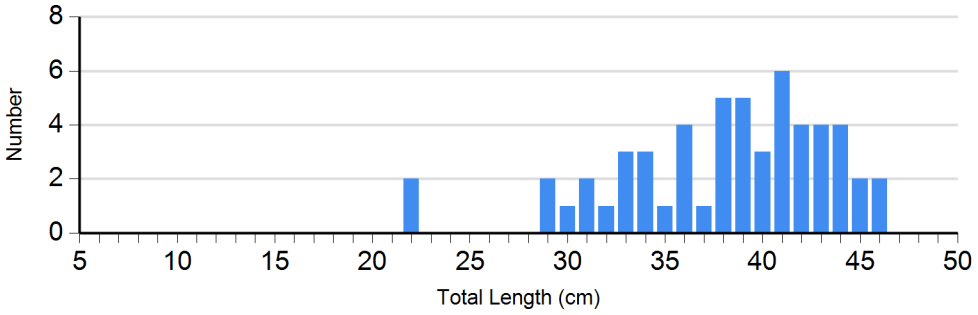
2014



2016



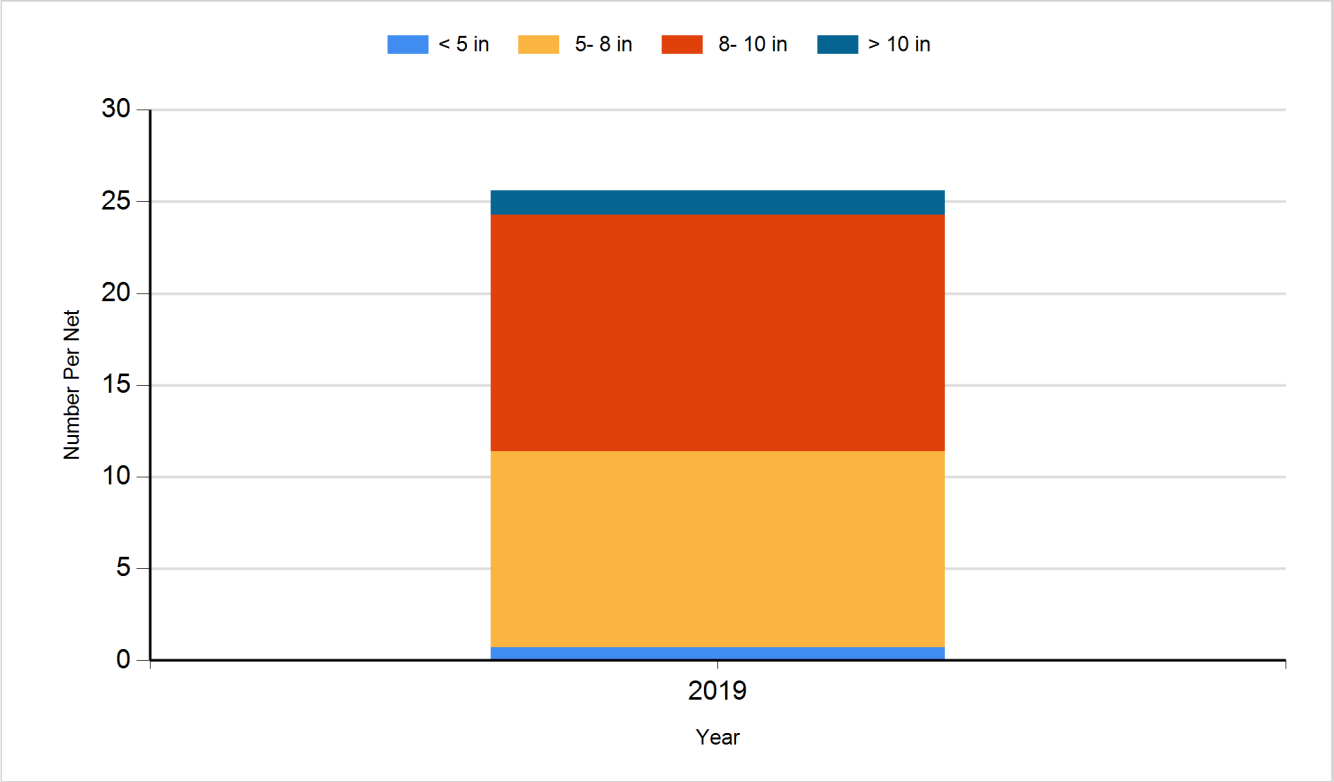
2019



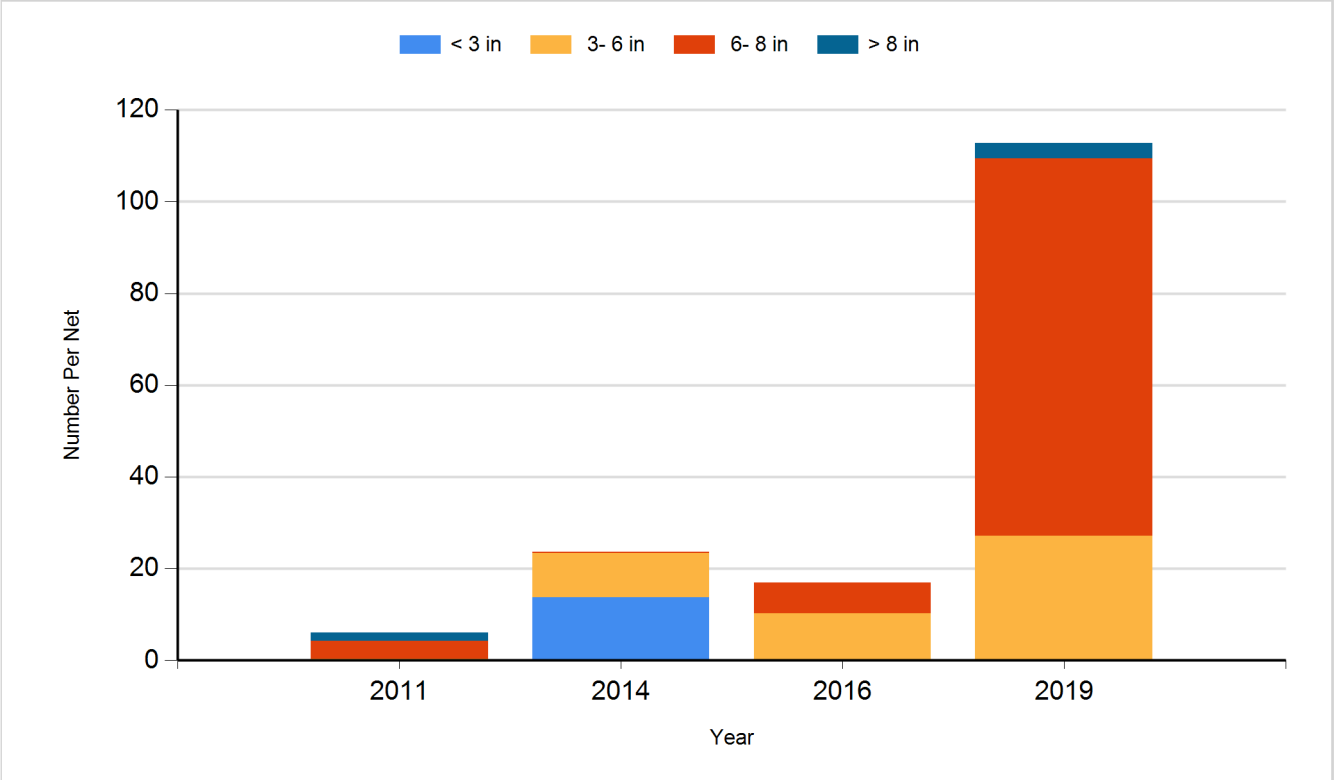
Historic Fish Sizes and Relative Abundance

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

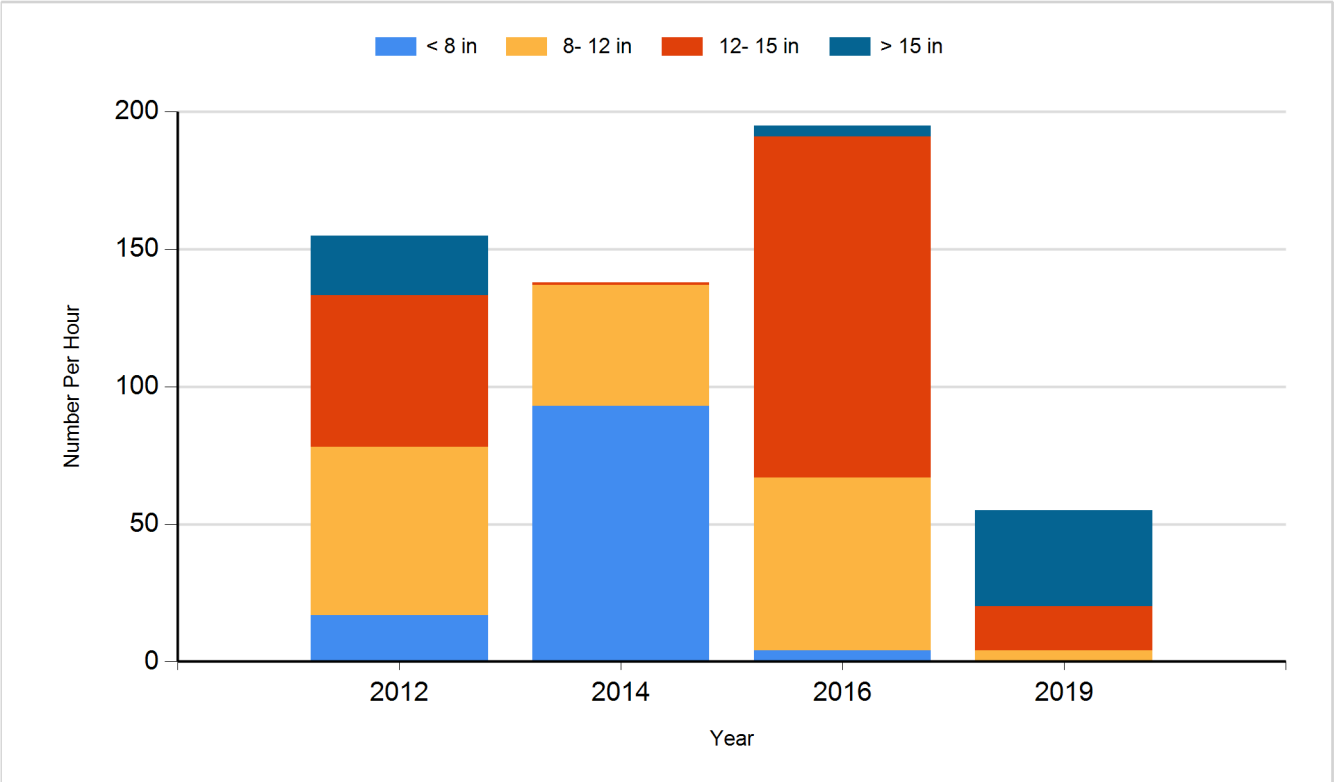
Species: Black Crappie
Gear: frame net (std 3/4 in)



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



Species: Largemouth Bass
Gear: boat shocker (night)



Fish Stocking

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

Year	Species	Size	Number
2009	Largemouth Bass	Fingerling	4,200
2010	Bluegill	Adult	300
2010	Largemouth Bass	Fingerling	4,180
2010	Largemouth Bass	Juvenile	150
2012	Largemouth Bass	Juvenile	100
2015	Channel Catfish	Adult	90