SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Beaulieu, Tripp County
LWH-Lake-458-000
2021

Lake Information

Name: Beaulieu

County: Tripp

Legal Description: T98-R76-S14

Surface Area: 19 Acres

Maximum Depth: 15 Feet

Mean Depth: 12 Feet

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	Oct 04, 2021	2009 seconds
frame net (std 3/4 in)	Jun 28, 2021	4 net-nights
frame net (std 3/4 in)	Jun 29, 2021	4 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Black Bullhead

Green Sunfish

Channel Catfish

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	25	15.0	9.4	100		50	28	113	3
frame net (std 3/4 in)	Black Bullhead	933	59.9	13.7	11	2	0		84	1
	Bluegill	438	54.8	22.6	90	2	0		108	1
	Channel Catfish	1	0.1	0.2	100		0		117	
	Green Sunfish	15	1.9	1.1	7		0		107	4
	Sunfish Hybrid	1	0.0	0.0						

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							1.8				1.80
	Black Crappie							0.7				0.70
	Bluegill							1.4				1.40
	Bluegill X Gr. Sunfish Hybrid							0.4				0.40
	Yellow Perch							0.3				0.30
boat shocker (night)	Black Bullhead		0.0		0.0	0.0		32.4	0.0		0.0	5.40
	Black Crappie		0.0		0.0	0.0		0.0	0.0		0.0	0.00
	Bluegill		0.0		0.0	0.0		34.8	0.0		0.0	5.80
	Channel Catfish		0.0		0.0	0.0		1.2	0.0		0.0	0.20
	Largemouth Bass		52.0		46.5	31.9		19.8	37.5		15.0	33.78
frame net (std 3/4 in)	Black Bullhead		3.5		10.0						59.9	24.47
	Black Crappie		5.4		3.4						0.0	2.93
	Bluegill		10.1		9.9						54.8	24.93
	Channel Catfish		0.0		0.7						0.1	0.27
	Green Sunfish		0.0		0.2						1.9	0.70
	Largemouth Bass		0.0		0.0						0.0	0.00
	Sunfish Hybrid		0.0		0.0						0.0	0.00
	Yellow Perch		0.9		0.2						0.0	0.37

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							72			
		PSD-P							0			
		Wr							87			
	Black Crappie	PSD							86			
		PSD-P							14			
		Wr							97			
	Bluegill	PSD							100			
		PSD-P							7			
		Wr							112			
boat shocker (night)	Black Bullhead	PSD							26			
		PSD-P							0			
		Wr							88			
	Black Crappie	PSD							0			
		PSD-P							0			
	Bluegill	PSD							63			
		PSD-P							21			
		Wr							98			
	Channel Catfish	PSD							100			
		PSD-P							0			
		Wr							102			
	Largemouth Bass	PSD		77		94	84		21	44		100
		PSD-P		73		87	76		0	12		50
		Wr		115		109	108		110	92		113
frame net (std 3/4 in)	Black Bullhead	PSD		3		49						11
		PSD-P		0		0						0
		Wr		81		90						84
	Black Crappie	PSD		7		6						
		PSD-P		7		6						
		Wr		109		97						
	Bluegill	PSD		6		1						90
		PSD-P		2		0						0
		Wr		111		102						108

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
frame net (std 3/4 in)	Channel Catfish	PSD				43						100
		PSD-P				0						0
		Wr				106						117
	Green Sunfish	PSD				0						7
		PSD-P				0						0
		Wr				107						107
	Largemouth Bass	PSD		0		0						
		PSD-P		0		0						

Back-Calculated Lengths

Mean species back-calculated total length (mm) at age, standard error (SE), and sample size (N).

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	3	45 (3.5)	101 (4.1)								
2018	3	12	50 (2.8)	105 (4.1)	133 (4.1)							
2017	4	12	44 (1.8)	88 (2.9)	118 (3.5)	145 (3.3)						
2016	5	3	46 (1.2)	82 (3.1)	115 (6.1)	137 (6.5)	164 (3.3)					
Weighted Mean		30	47	96	124	143	164					

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2019	2	3										
2018	3	12										
2017	4	12										
2016	5	3										
Weighted Mean		30										

Species: Largemouth Bass

Year Class	Age	N	Mean back-calculated length (SE) at age									
			1	2	3	4	5	6	7	8	9	10
2021	0	2										
2020	1	11	95 (3)									
2019	2	2	81 (1.4)	130 (6.7)								
2017	4	3	105 (4)	155 (4.2)	226 (6.6)	303 (4.7)						
2016	5	2	59 (.6)	143 (20.5)	197 (15.7)	239 (8.3)	314 (13.1)					
2015	6	3	94 (8.1)	139 (5.3)	198 (3.8)	256 (18)	316 (28.6)	360 (29.9)				
2014	7	2	66 (13.1)	122 (2.3)	182 (4)	236 (11.8)	297 (23.5)	332 (32.3)	394 (14.5)			
Weighted Mean		25	89	139	203	263	310	349	394			

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2021	0	2										
2020	1	11										
2019	2	2										
2017	4	3										
2016	5	2										
2015	6	3										
2014	7	2										
Weighted Mean		25										

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+
2015	34		141 (2)	168 (19)	167 (11)				344 (2)		
2013	55		146 (51)			294 (2)			301 (2)		

Species: Bluegill

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	438		129 (12)	155 (223)	164 (186)	178 (17)					
2015	99		98 (1)	114 (57)	125 (41)						
2013	101		98 (74)	126 (23)	182 (3)	211 (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+
2021	25	126 (13)	156 (2)		352 (3)	350 (2)	401 (3)	425 (2)			
2015	71	164 (43)		379 (5)	407 (3)	440 (3)	448 (7)	480 (9)	505 (1)		
2013	27	225 (7)	339 (1)			424 (17)		470 (1)		485 (1)	

Fish Condition

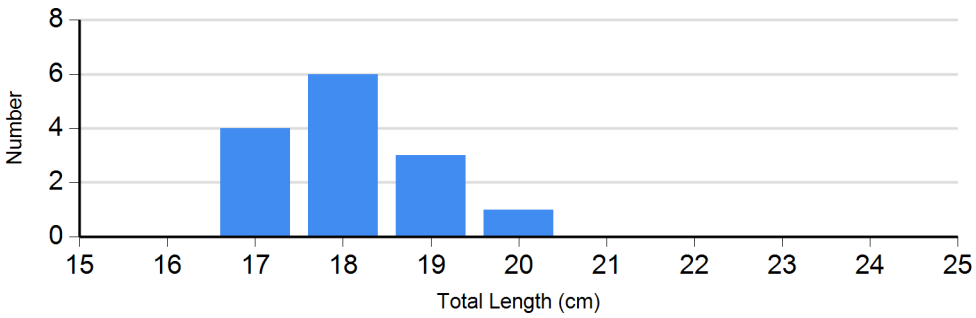
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2018	1	108	5	96 (3.7)	1	89	0	
Bluegill Frame Net	2018	0		13	112 (2.5)	1	104	0	
	2021	43	109 (2.4)	395	107 (0.9)	0		0	
Largemouth Bass Electro Fishing	2018	11	109 (2.6)	3	115 (1.9)	0		0	
	2019	14	95 (3.1)	8	95 (4.4)	3	68 (28.7)	0	
	2021	0		5	113 (2.7)	5	113 (3.9)	0	

Length Frequency Distribution

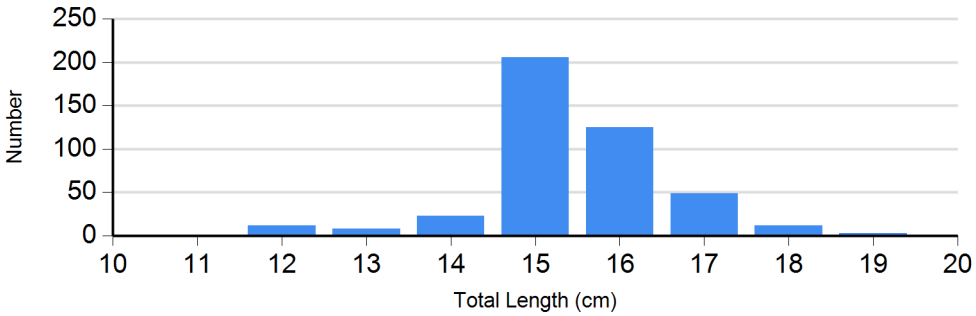
Length frequency histogram of species sampled by year.

Species: Bluegill
Gear: AFS std frame net



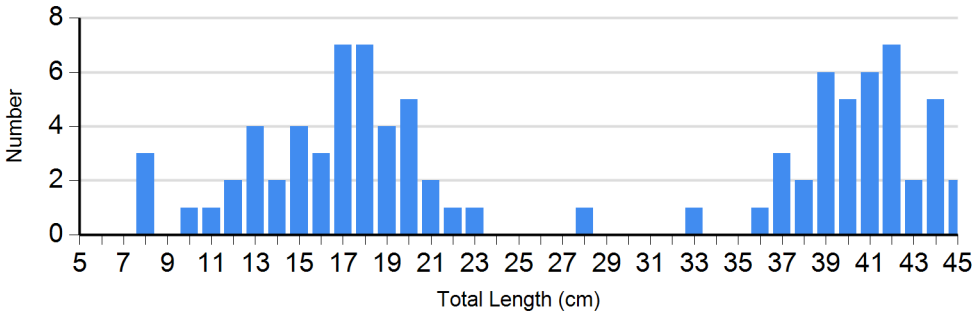
2018

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

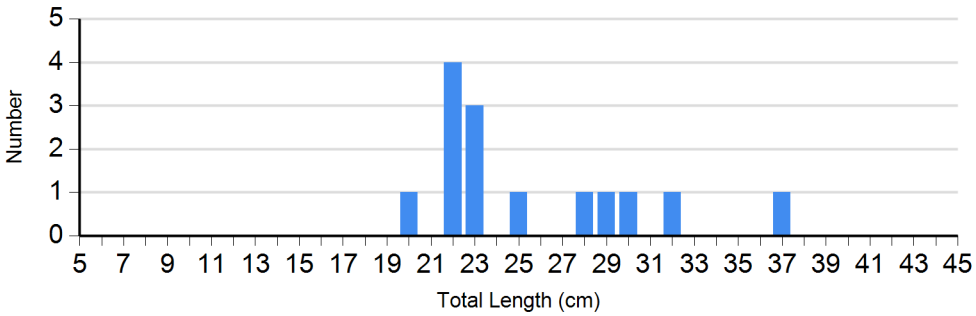


2021

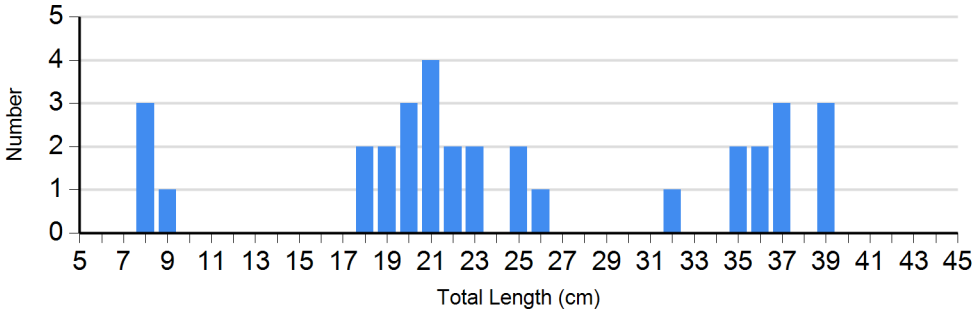
Species: Largemouth Bass
Gear: boat shocker (night)



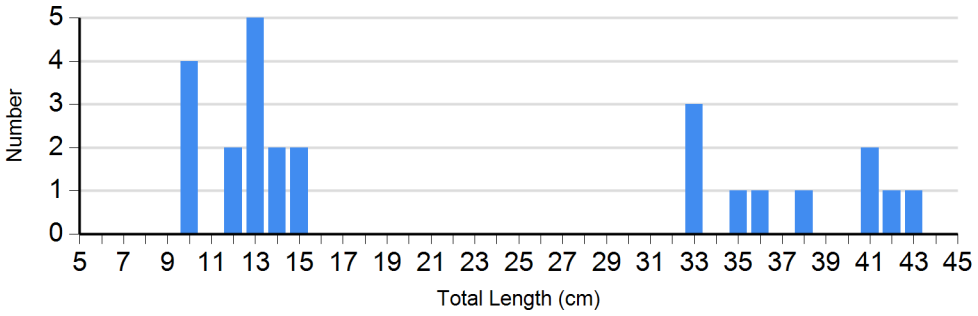
2016



2018



2019

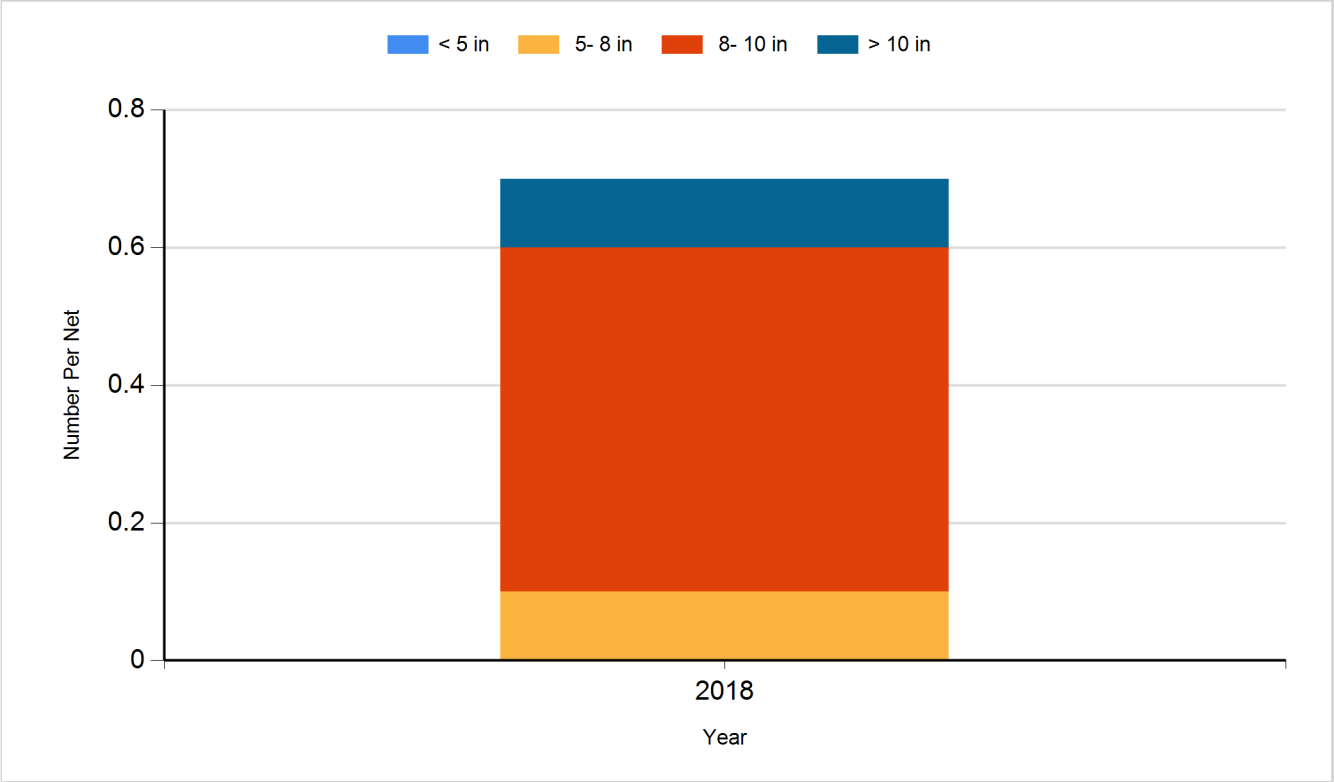


2021

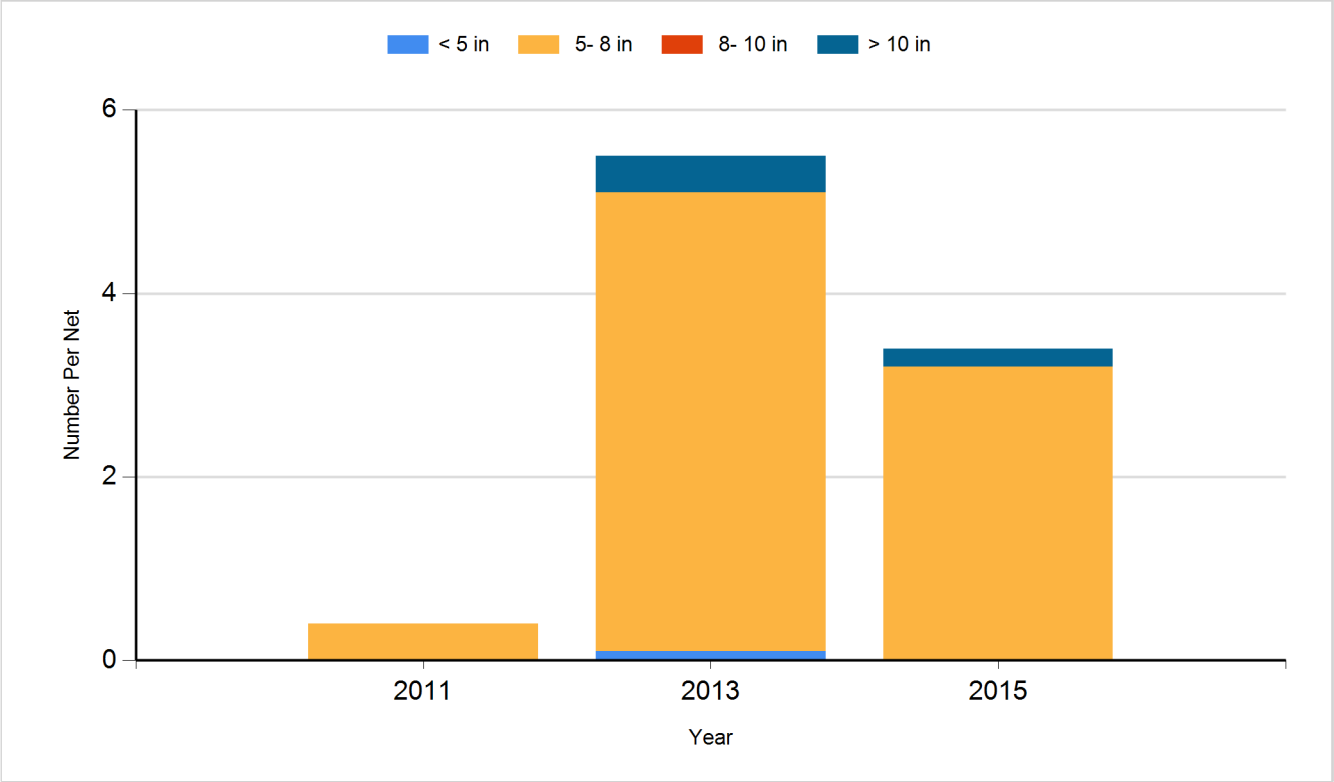
Historic Fish Sizes and Relative Abundance

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

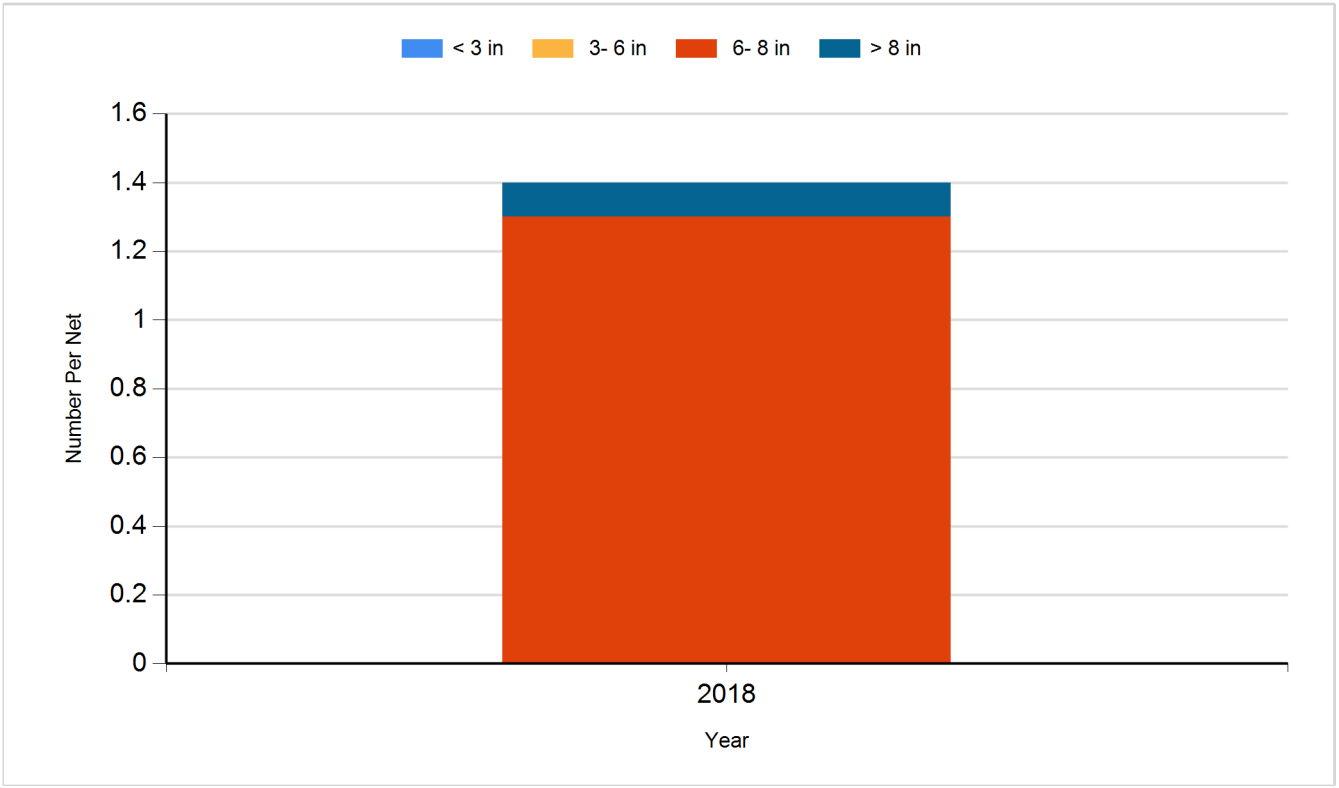
Species: Black Crappie
Gear: AFS std frame net



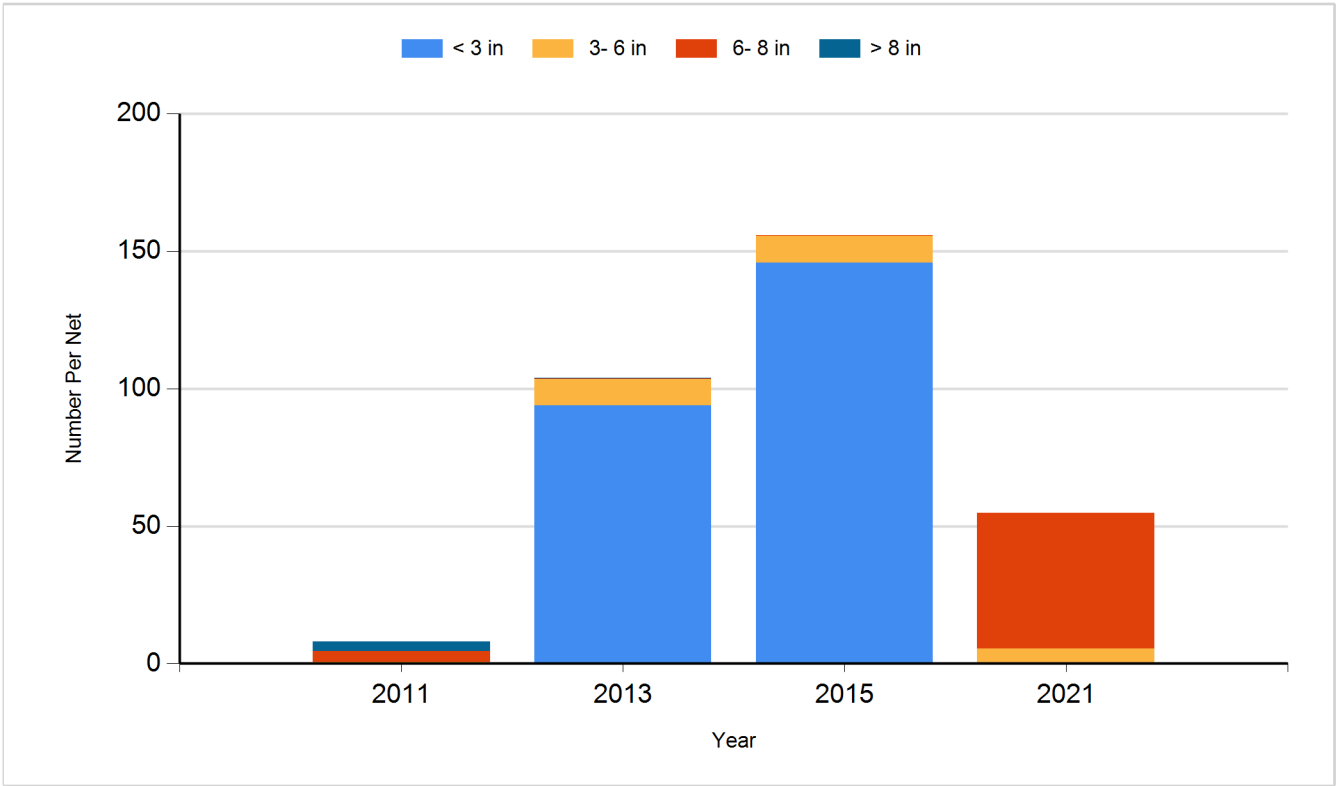
Species: Black Crappie
Gear: frame net (std 3/4 in)



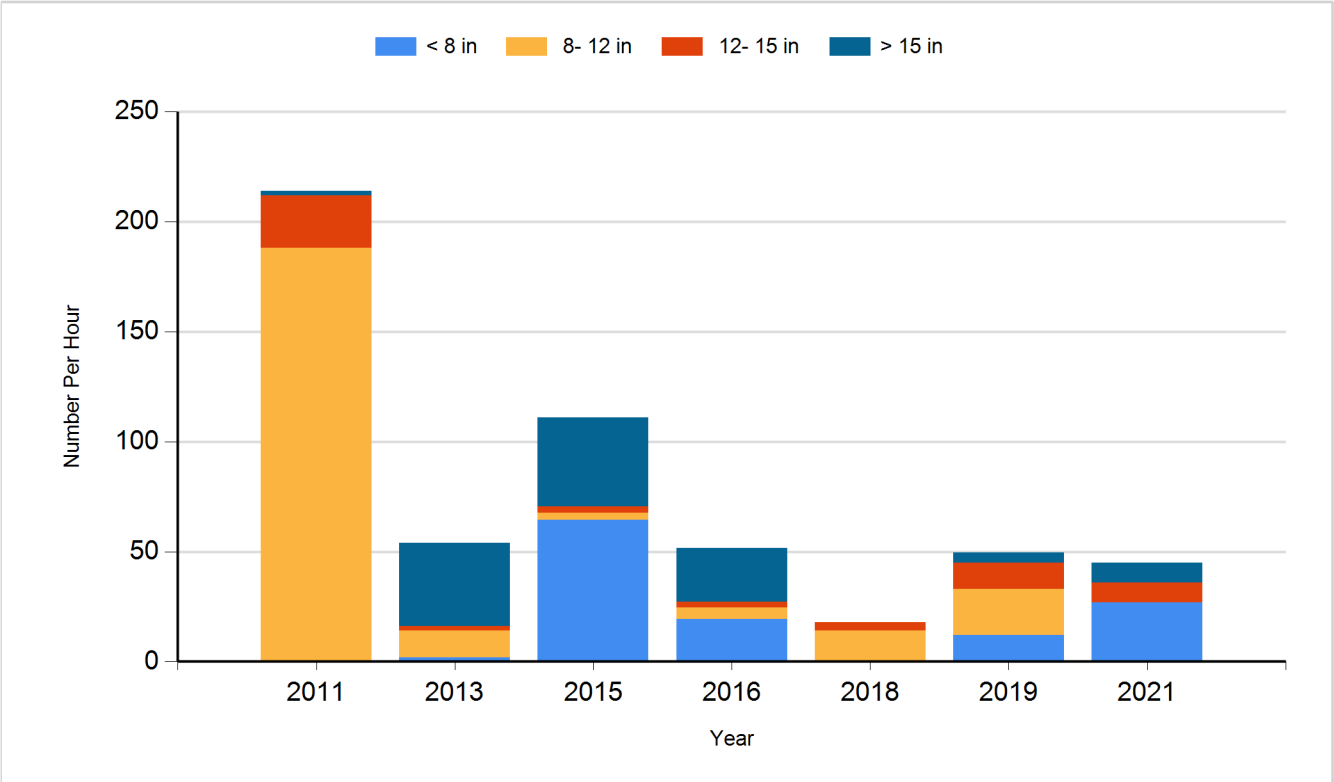
Species: Bluegill
Gear: AFS std frame net



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



Species: Largemouth Bass
Gear: boat shocker (night)



Fish Stocking

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

Year	Species	Size	Number
2014	Channel Catfish	Juvenile	100
2015	Largemouth Bass	Juvenile	645
2018	Black Crappie	Adult	2
2018	Bluegill	Adult	79
2018	Catfish	Adult	99
2018	Largemouth Bass	Adult	105
2019	Largemouth Bass	Adult	88
2019	Largemouth Bass	Juvenile	168