SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Cottonwood Springs, Fall River County
MCS-Lake-6-000
2022

Lake Information

Name: Cottonwood Springs

County: Fall River

Surface Area: 26 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std frame net	Aug 05, 2022	4 net-nights
AFS std gill net	Aug 05, 2022	2 net-nights
boat shocker (day)	Sep 13, 2022	2400 seconds

Common Fish Species Present

Black Crappie

Smallmouth Bass

Rainbow Trout

Largemouth Bass

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
AFS std frame net	Black Crappie	48	11.3	6.7	67	11	7		98	1
	Green Sunfish	12	3.0	1.8	67		25		101	3
	Largemouth Bass	24	1.8	1.4	0		0		82	3
AFS std gill net	Black Crappie	24	12.0	36.9	88		21	14	99	3
	Green Sunfish	1	0.5	1.5	0		0		111	
	Largemouth Bass	1	0.0	0.0	0		0			
boat shocker (day)	Largemouth Bass	99	91.5	53.7	2		2		86	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	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg
AFS std frame net	Black Crappie										11.3	11.30
	Green Sunfish										3.0	3.00
	Largemouth Bass										1.8	1.80
AFS std gill net	Black Crappie										12.0	12.00
	Green Sunfish										0.5	0.50
	Largemouth Bass										0.0	0.00
boat shocker (day)	Largemouth Bass										91.5	91.50
boat shocker (night)	Largemouth Bass				137.5	65.0	93.0					98.50
	Smallmouth Bass				0.0	0.0	0.8					0.27
frame net (1/4 inch)	Green Sunfish				1.0							1.00
	Largemouth Bass				0.0							0.00
frame net (std 3/4 in)	Black Crappie				10.7							10.70
	Green Sunfish				4.3							4.30
	Largemouth Bass				2.0							2.00
	Rainbow Trout				0.7							0.70
std exp gill net	Black Crappie				0.0							0.00
	Rainbow Trout				0.0							0.00

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	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AFS std frame net	Black Crappie	PSD										67
		PSD-P										7
		Wr										98
	Green Sunfish	PSD										67
		PSD-P										25
		Wr										101
	Largemouth Bass	PSD										0
		PSD-P										0
		Wr										82
AFS std gill net	Black Crappie	PSD										88
		PSD-P										21
		Wr										99
	Green Sunfish	PSD										0
		PSD-P										0
		Wr										111
	Largemouth Bass	PSD										0
		PSD-P										0
boat shocker (day)	Largemouth Bass	PSD										2
		PSD-P										2
		Wr										86
boat shocker (night)	Largemouth Bass	PSD				10	0	2				
		PSD-P				3	0	1				
		Wr				92	96	90				
	Smallmouth Bass	PSD						0				
		PSD-P						0				
		Wr						81				
frame net (1/4 inch)	Green Sunfish	PSD				0						
		PSD-P				0						
		Wr				104						
	Largemouth Bass	PSD				0						
		PSD-P				0						

			Year									
Gear	Species	Index	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
frame net (std 3/4 in)	Black Crappie	PSD				50						
		PSD-P				0						
		Wr				101						
	Green Sunfish	PSD				23						
		PSD-P				0						
		Wr				113						
	Largemouth Bass	PSD				0						
		PSD-P				0						
		Wr				98						
	Rainbow Trout	PSD				0						
		PSD-P				0						
		Wr				75						
std exp gill net	Black Crappie	PSD				100						
		PSD-P				0						
		Wr				106						
	Rainbow Trout	PSD				0						
		PSD-P				0						
		Wr				83						

Fish Condition

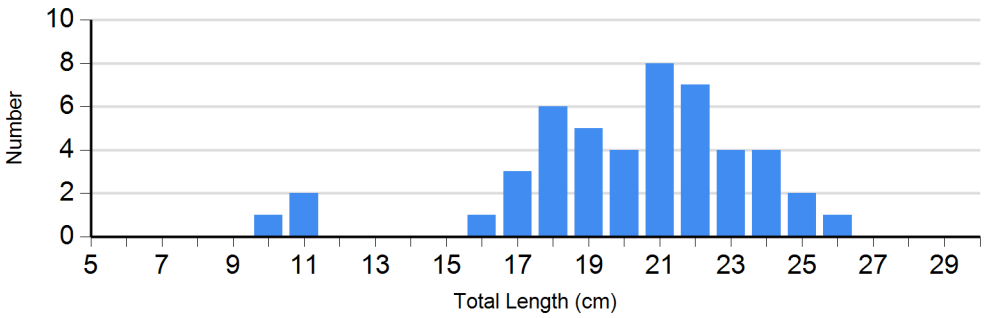
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2022	15	98 (1.4)	27	99 (1.1)	3	89 (2.9)	0	
Largemouth Bass Electro Fishing	2018	121	90 (0.5)	2	93 (2.5)	1	106	0	
	2022	60	85 (1.0)	0		0		1	129
Smallmouth Bass Electro Fishing	2018	1	81	0		0		0	

Length Frequency Distribution

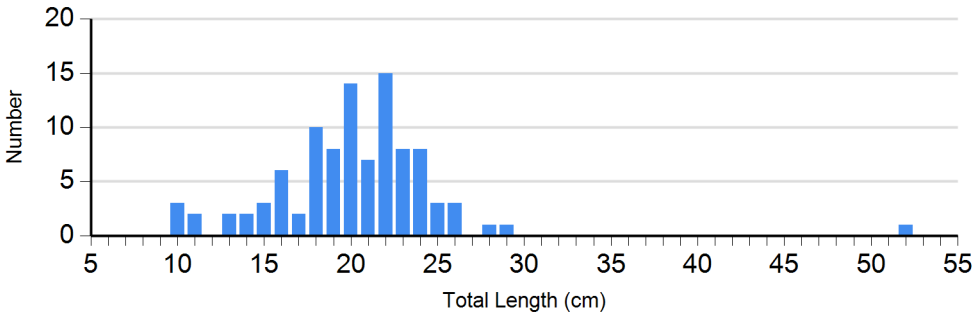
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net



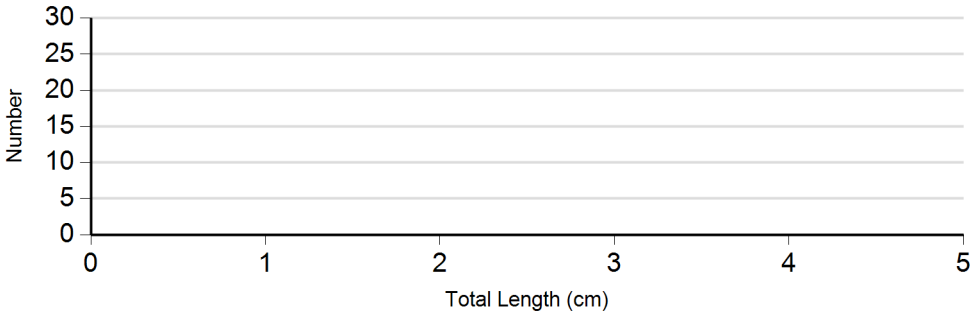
2022

Species: Largemouth Bass
Gear: boat shocker (day)

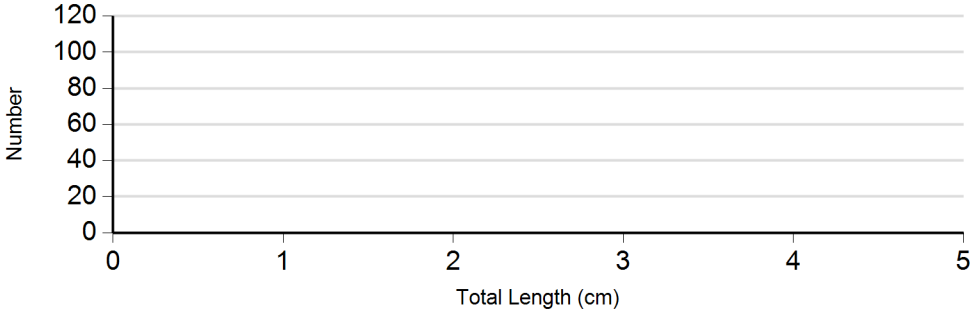


2022

Species: Largemouth Bass
Gear: boat shocker (night)



2017

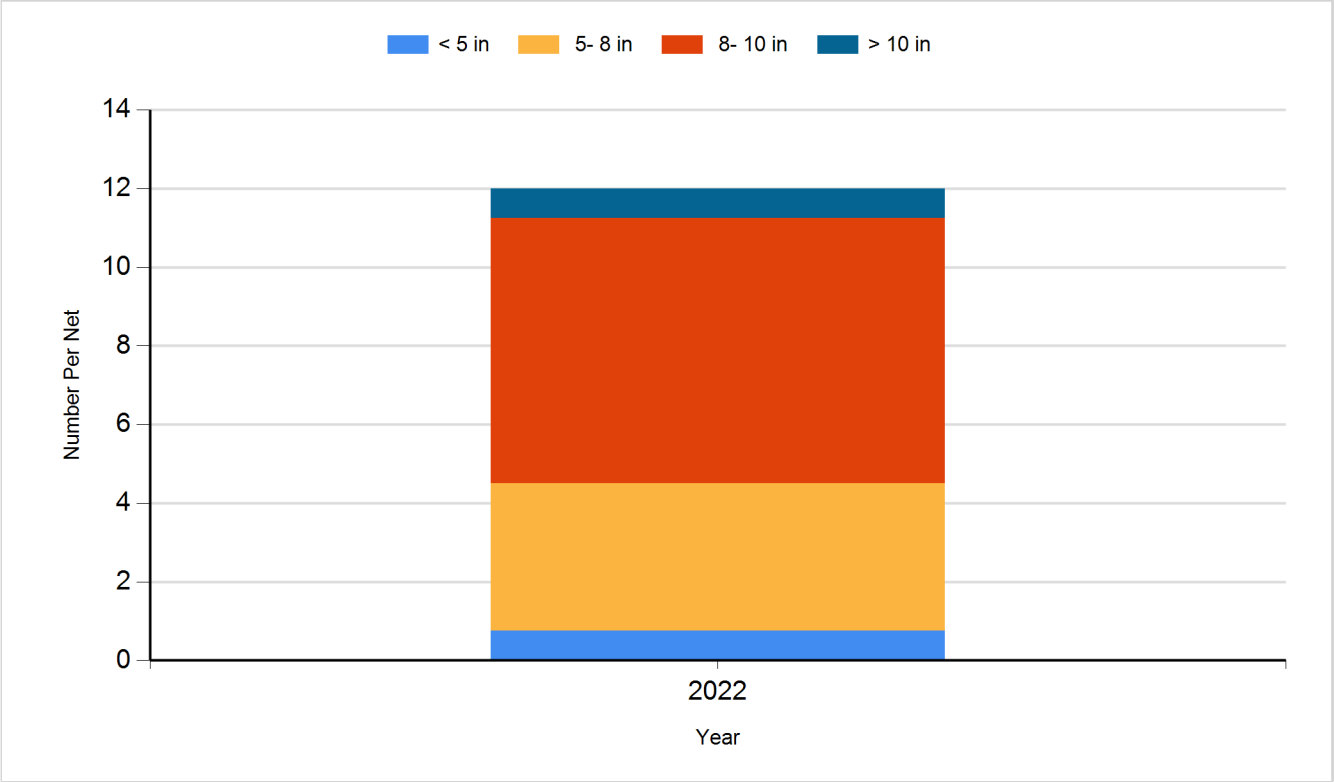


2018

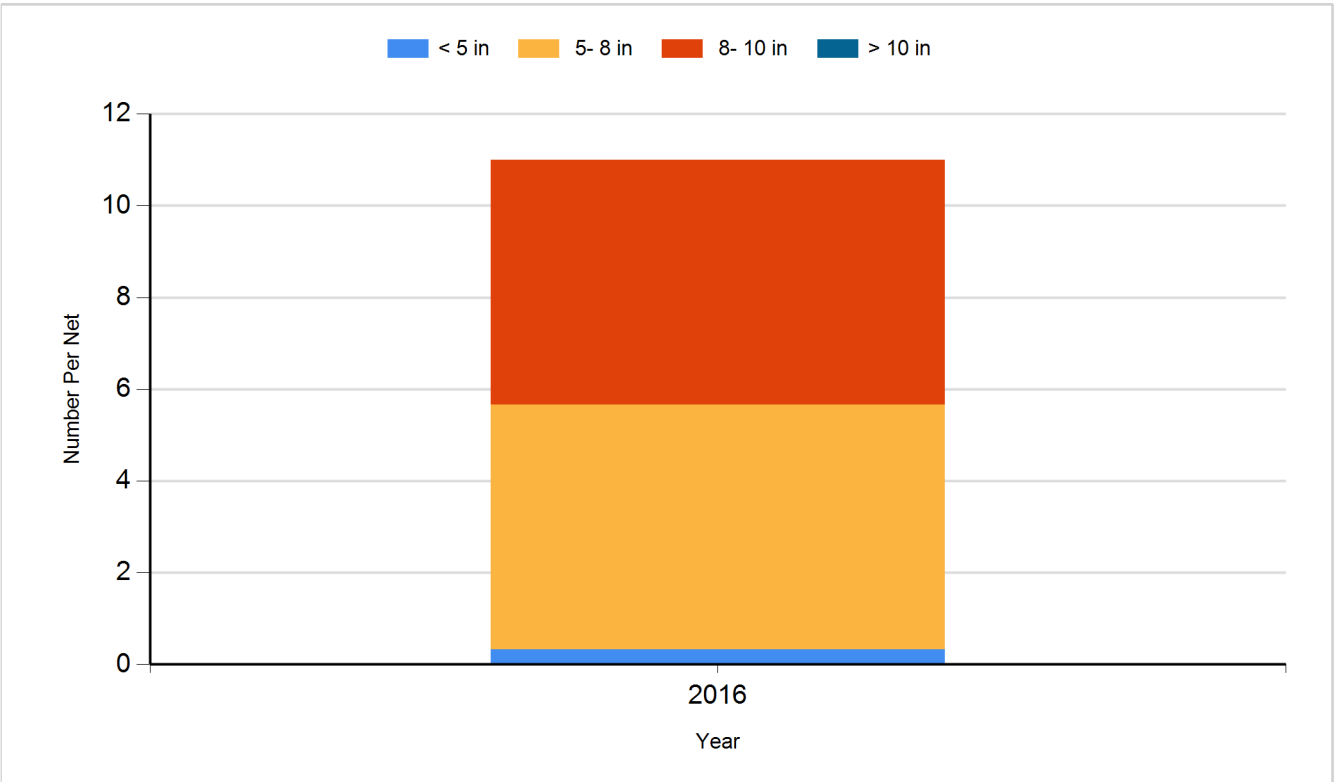
Historic Fish Sizes and Relative Abundance

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

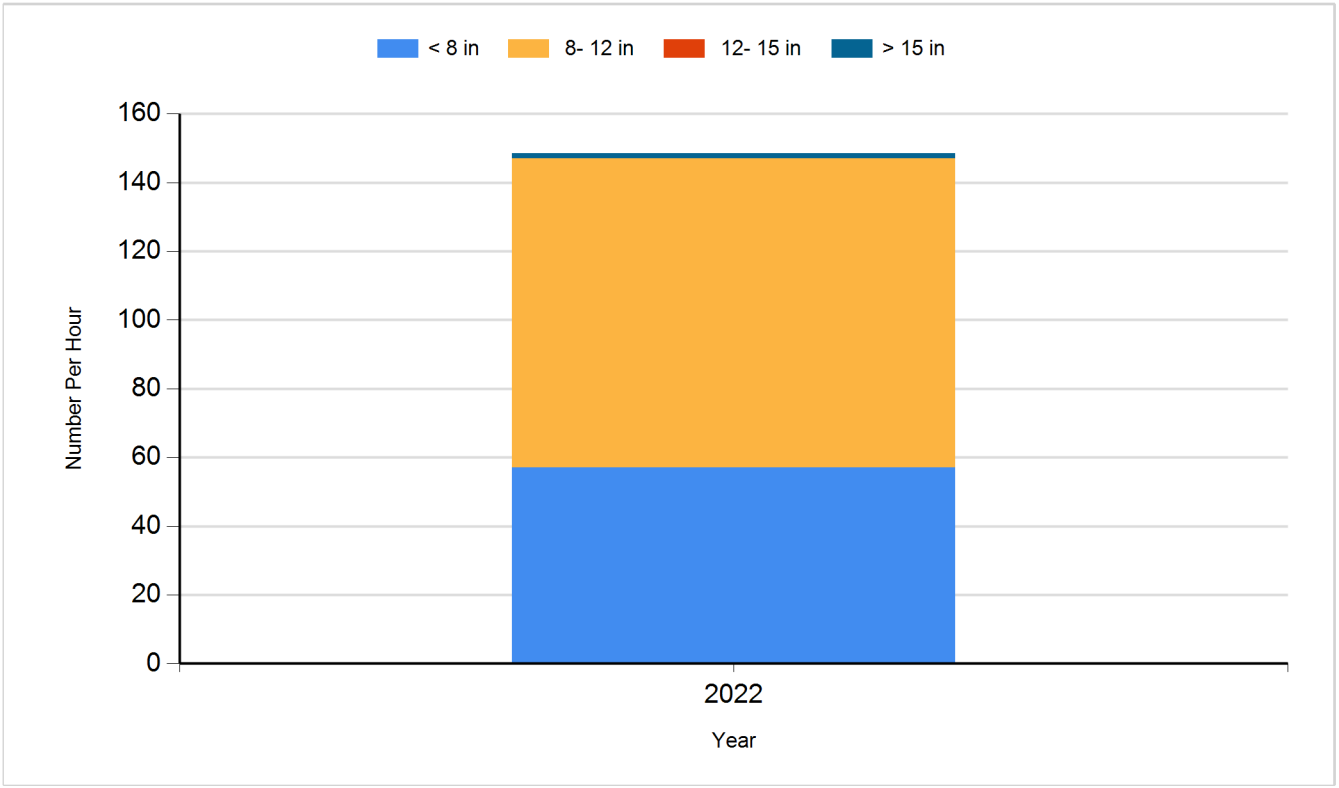
Species: Black Crappie
Gear: AFS std frame net



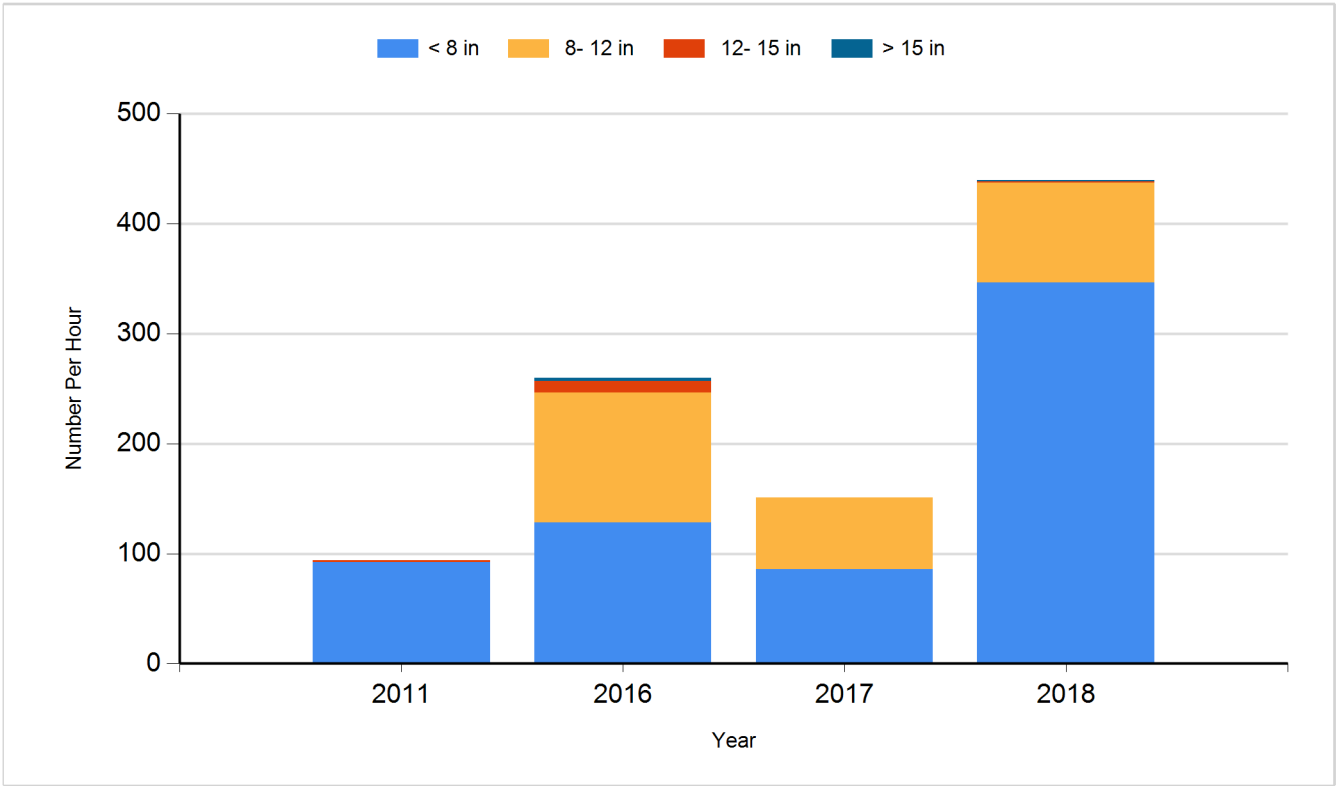
Species: Black Crappie
Gear: frame net (std 3/4 in)



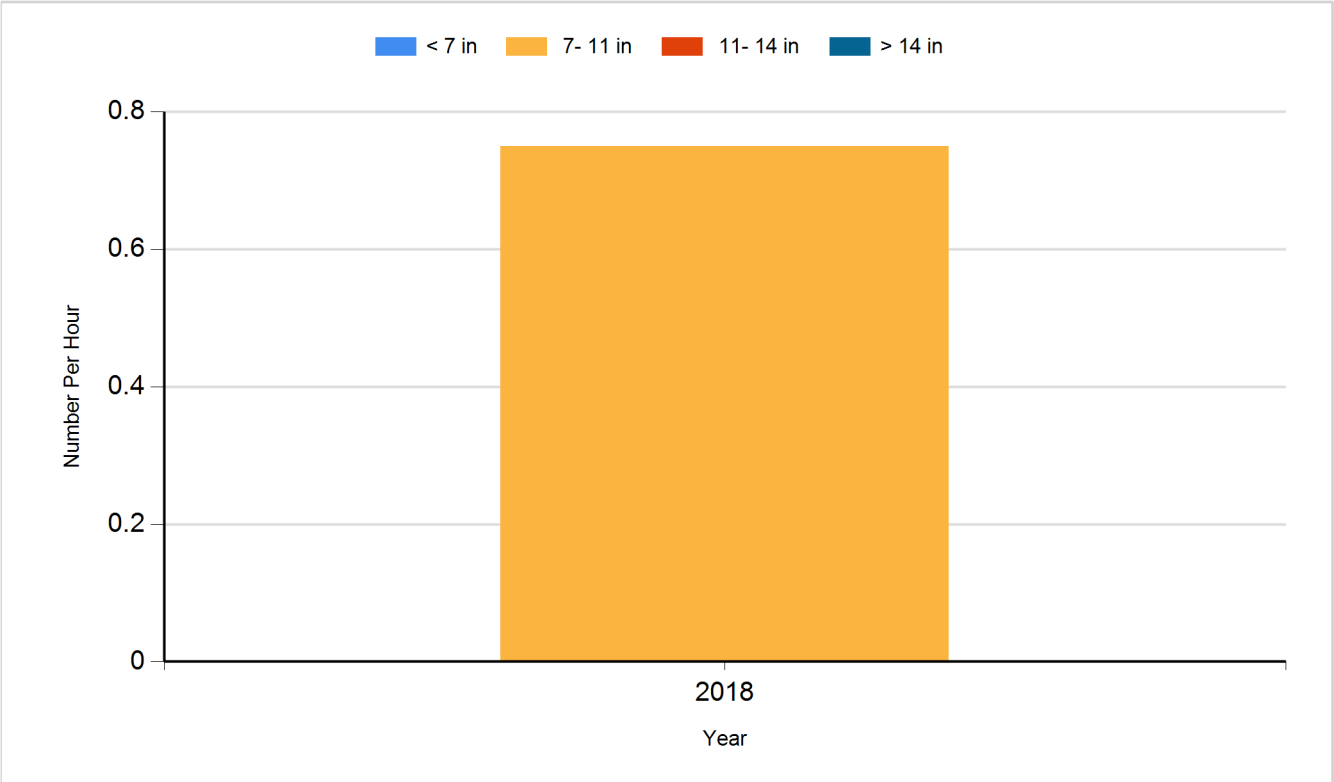
Species: Largemouth Bass
Gear: boat shocker (day)



Species: Largemouth Bass
Gear: boat shocker (night)



Species: Smallmouth Bass
Gear: boat shocker (night)



Fish Stocking

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

Year	Species	Size	Number
2011	Rainbow Trout (Erwin x Arlee)	Catchable	500
2011	Rainbow Trout (Shasta)	Catchable	1,000
2012	Rainbow Trout (Erwin x Arlee)	Catchable	1,000
2012	Rainbow Trout (Shasta)	Catchable	1,000
2013	Rainbow Trout (Erwin x Arlee)	Catchable	500
2013	Rainbow Trout (Shasta)	Catchable	1,500
2014	Rainbow Trout (Shasta)	Catchable	1,500
2015	Rainbow Trout (Erwin x Arlee)	Catchable	1,000
2015	Rainbow Trout (Shasta)	Catchable	1,000
2016	Rainbow Trout (Erwin x Arlee)	Catchable	1,000
2016	Rainbow Trout (Shasta)	Catchable	1,000
2017	Rainbow Trout (Erwin x Arlee)	Catchable	500
2017	Rainbow Trout (Shasta)	Catchable	1,500
2018	Rainbow Trout (Shasta)	Catchable 11"	1,500
2019	Rainbow Trout (Erwin x Arlee)	Catchable 11"	500
2019	Rainbow Trout (Shasta)	Catchable 11"	1,000
2020	Rainbow Trout (Arlee)	Catchable 11"	2,000
2021	Rainbow Trout (Arlee)	Adult	768
2021	Rainbow Trout (Shasta)	Adult	1,500
2022	Rainbow Trout (Shasta)	Adult	1,000
2022	Rainbow Trout (Trout Lodge)	Adult	1,000