2023 Burke Lake (Gregory County)

Burke Lake is located 1.3 miles east of the town of Burke on highway 36. It is a 29-acre impoundment with a mean depth of 9 feet and maximum depth of 16 feet. Access locations at Burke Lake consist of a concrete plank boat ramp, handicap accessible fishing pier and several maintained shore fishing accesses. Additionally, a campground is located on the north side of the lake. It is managed as a multi-species fishery consisting of Black Crappie, Bluegill and Largemouth Bass. Other fish species present consist of Northern Pike and Yellow Perch. Sampling occurs every three years, consisting of frame nets targeting all species and fall electrofishing targeting Largemouth Bass. This fishery experienced a winterkill in 2022/2023. Stocking in the spring and summer of 2023 occurred to help reestablish fish populations.

- **Black Crappie:** The catch rate of Black Crappie in 2023 was 1 fish per frame net. Of the Black Crappie sampled, 25% were 8 inches or larger. Black Crappie have a relative weight (Wr) of 114*.

- **Bluegill:** The catch rate of Bluegill in 2023 was 25 fish per frame net. Of the Bluegill sampled, 6% were 6 inches or larger. Bluegill have a relative weight (Wr) of 135*.

- **Largemouth Bass:** The catch rate of Largemouth Bass in 2023 was 2.4 fish per hour of electrofishing. Of the Largemouth sampled, 50% were 15 inches or longer.

In 2023, 425 adult Black Crappie, 70 adult Bluegill and 1,800 juvenile Largemouth Bass were stocked in response to winterkill.

* 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.

Created 1/29/2024 BV

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Burke, Gregory County
FTR-Lake-3197-000
2023

Lake Information

Name: Burke

County: Gregory

Legal Description: T97-R71-S32

Surface Area: 29 Acres

Maximum Depth: 16 Feet

Mean Depth: 9 Feet

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	Oct 19, 2023	3000 seconds
frame net (std 3/4 in)	Jun 27, 2023	4 net-nights
frame net (std 3/4 in)	Jun 28, 2023	4 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Yellow Perch

Northern Pike

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	3	2.4	2.3	50		50			
frame net (std 3/4 in)	Black Crappie	38	1.0	0.7	25		0		114	4
	Bluegill	195	24.4	10.4	18	4	0		135	1
	Northern Pike	5	0.6	0.3	100		20		84	3
	Yellow Perch	15	1.9	0.9	13		0		105	3

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
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	18.0		35.5	33.0	13.0	25.5	28.0			2.4	22.20
frame net (std 3/4 in)	Black Bullhead	0.8						0.2			0.0	0.33
	Black Crappie	3.9						21.0			1.0	8.63
	Bluegill	6.9						4.4			24.4	11.90
	Green Sunfish	0.1						0.0			0.0	0.03
	Northern Pike	0.2						1.7			0.6	0.83
	Yellow Perch	2.0						1.7			1.9	1.87

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std frame net	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	87		34	27	77	65	68			50
		PSD-P	60		30	12	46	35	41			50
		Wr	118		106	103	112	110	121			
frame net (std 3/4 in)	Black Crappie	PSD	72						15			25
		PSD-P	8						2			0
		Wr	104						105			114
	Bluegill	PSD	62						64			18
		PSD-P	12						11			0
		Wr	112						120			135
	Northern Pike	PSD	100						94			100
		PSD-P	0						18			20
		Wr	95						88			84
	Yellow Perch	PSD	60						24			13
		PSD-P	0						6			0
		Wr	103						123			105

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)				

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)			

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)

Fish Condition

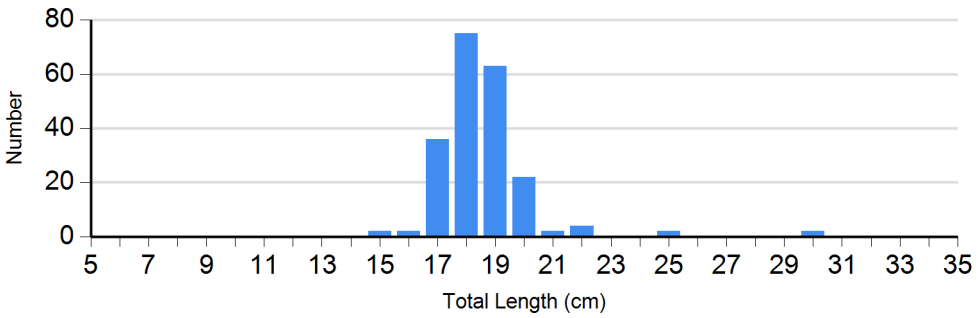
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2020	178	105 (0.7)	28	105 (0.7)	2	95	2	94
	2023	6	116 (3.7)	2	107 (7.7)	0		0	
Bluegill Frame Net	2020	16	115 (3.8)	23	123 (2.6)	5	120 (1.5)	0	
	2023	160	135 (1.2)	35	127 (2.6)	0		0	
Largemouth Bass Electro Fishing	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)

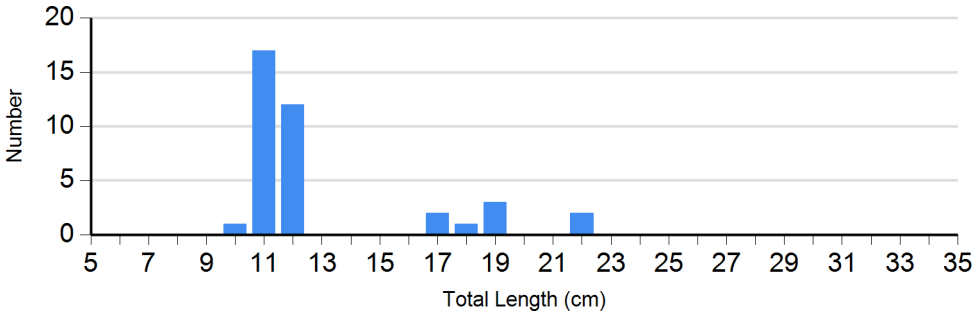
Length Frequency Distribution

Length frequency histogram of species sampled by year.

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

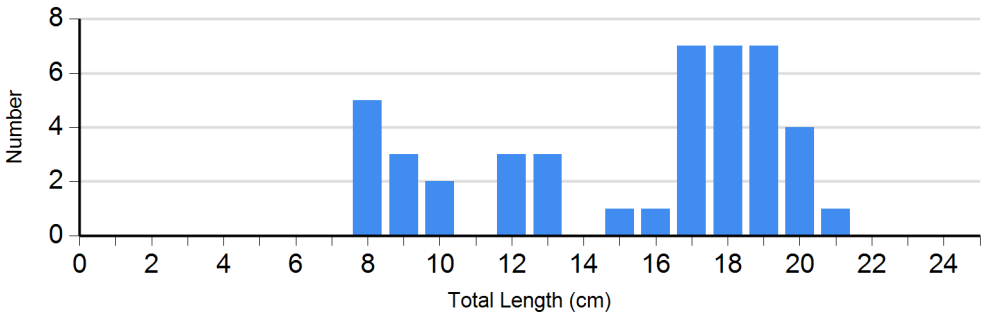


2020

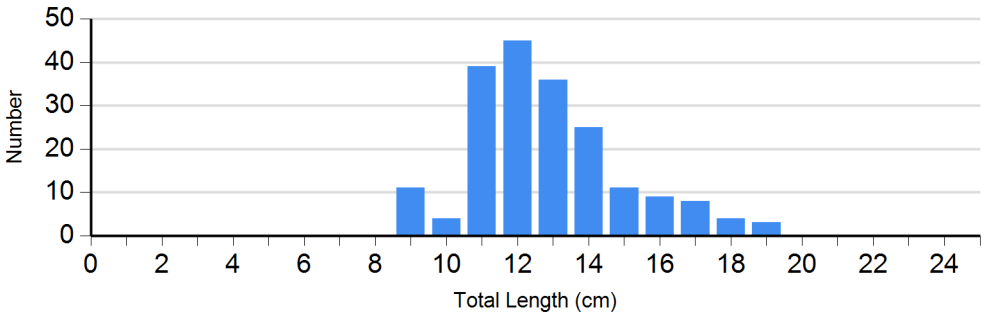


2023

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

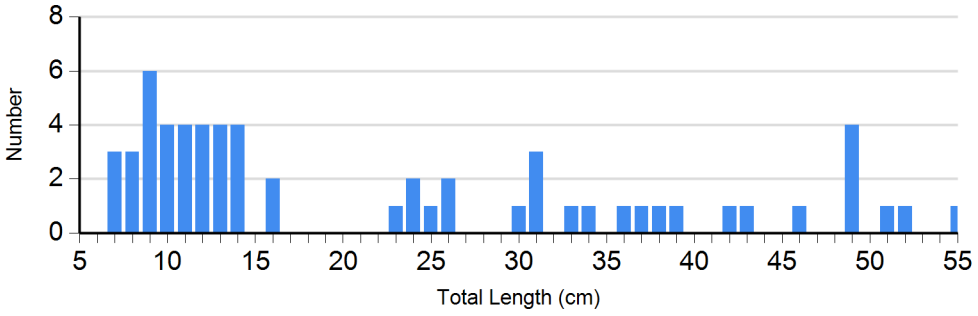


2020

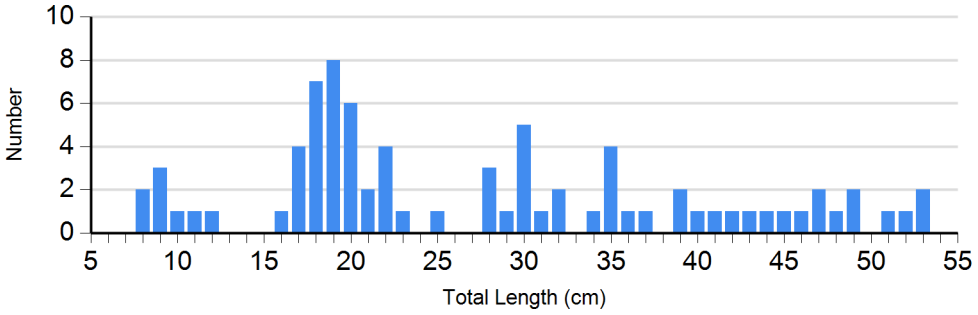


2023

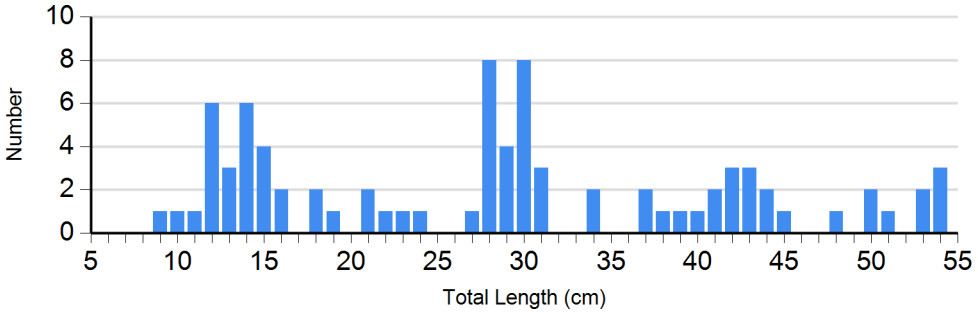
Species: Largemouth Bass
Gear: boat shocker (night)



2018



2019

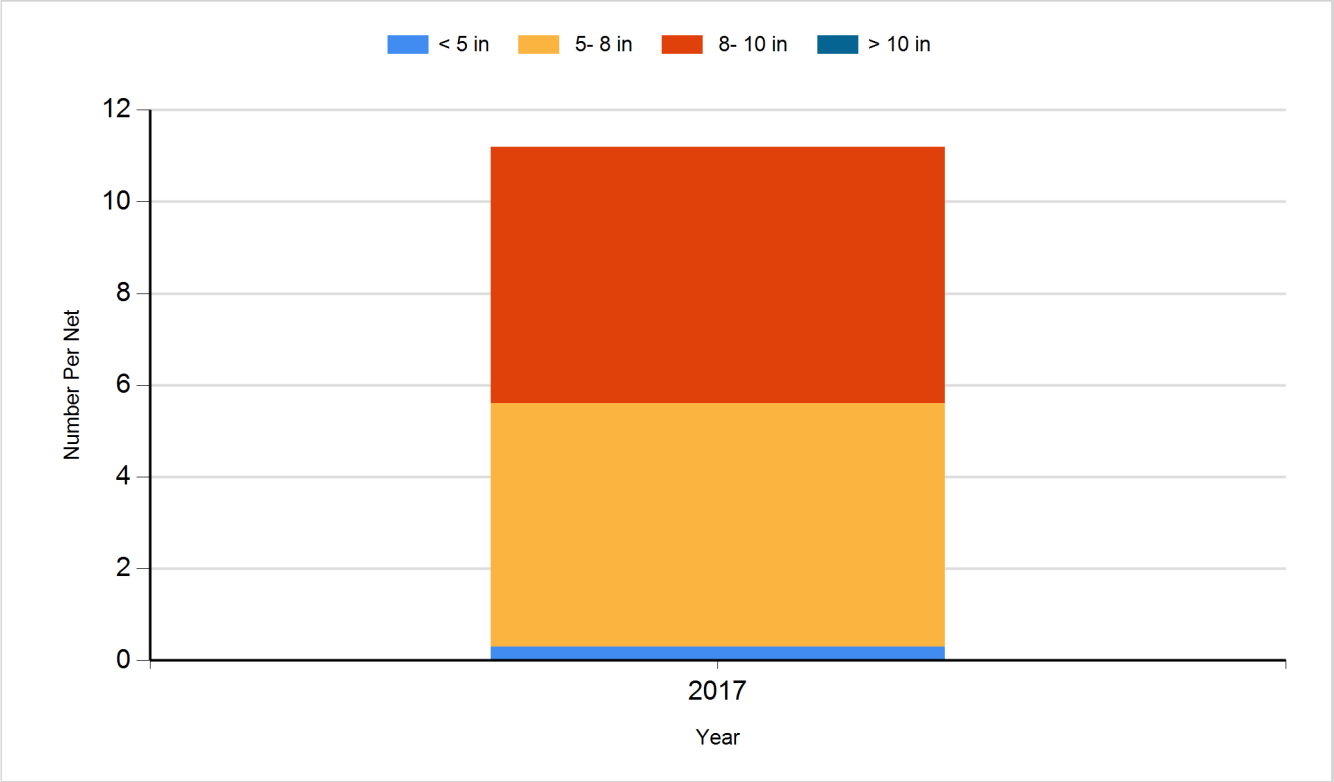


2020

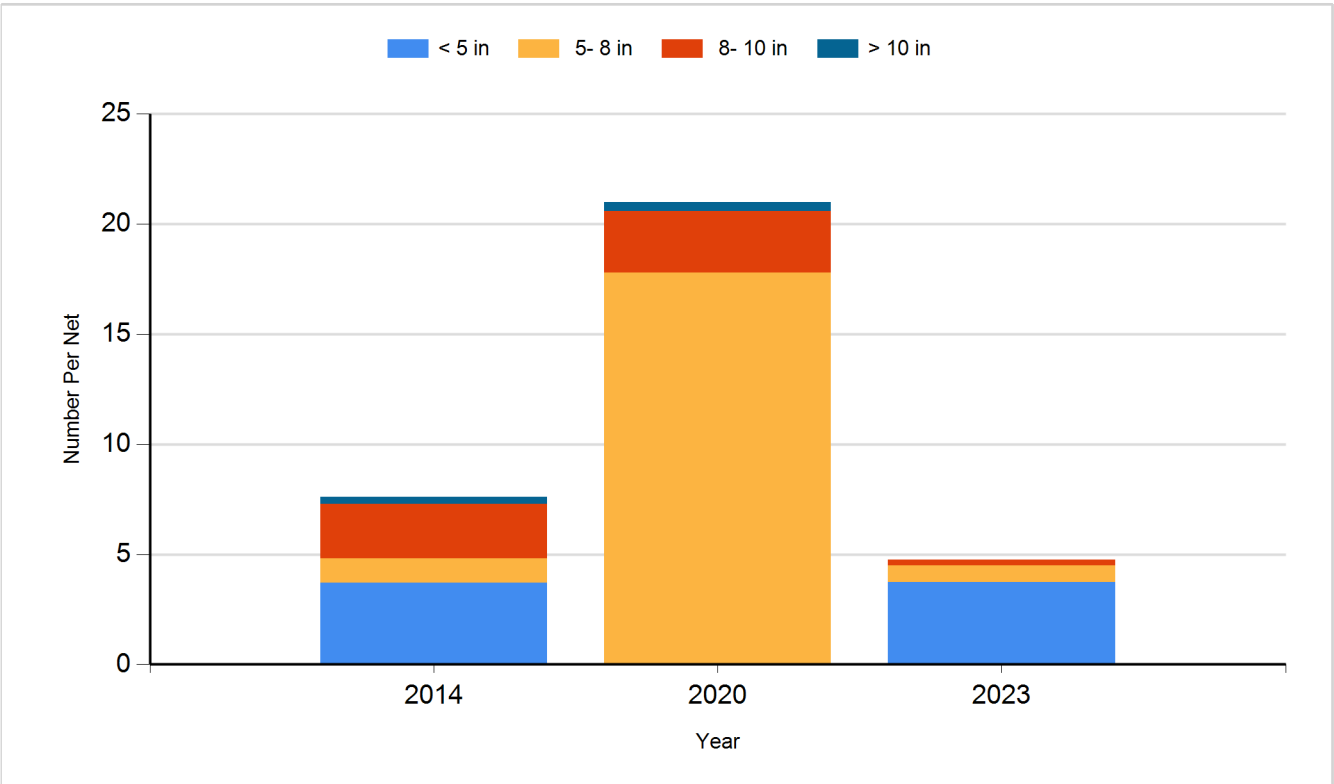
Historic Fish Sizes and Relative Abundance

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

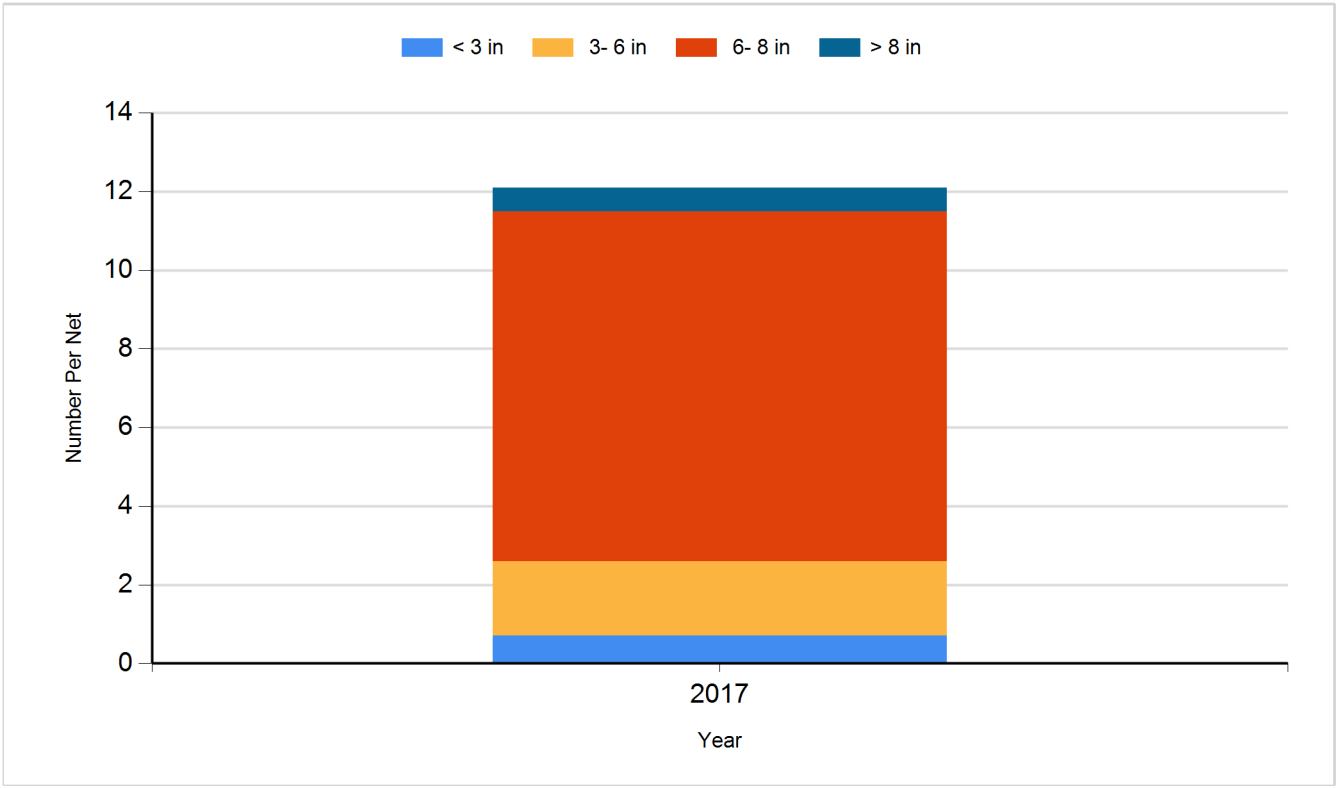
Species: Black Crappie
Gear: AFS std frame net



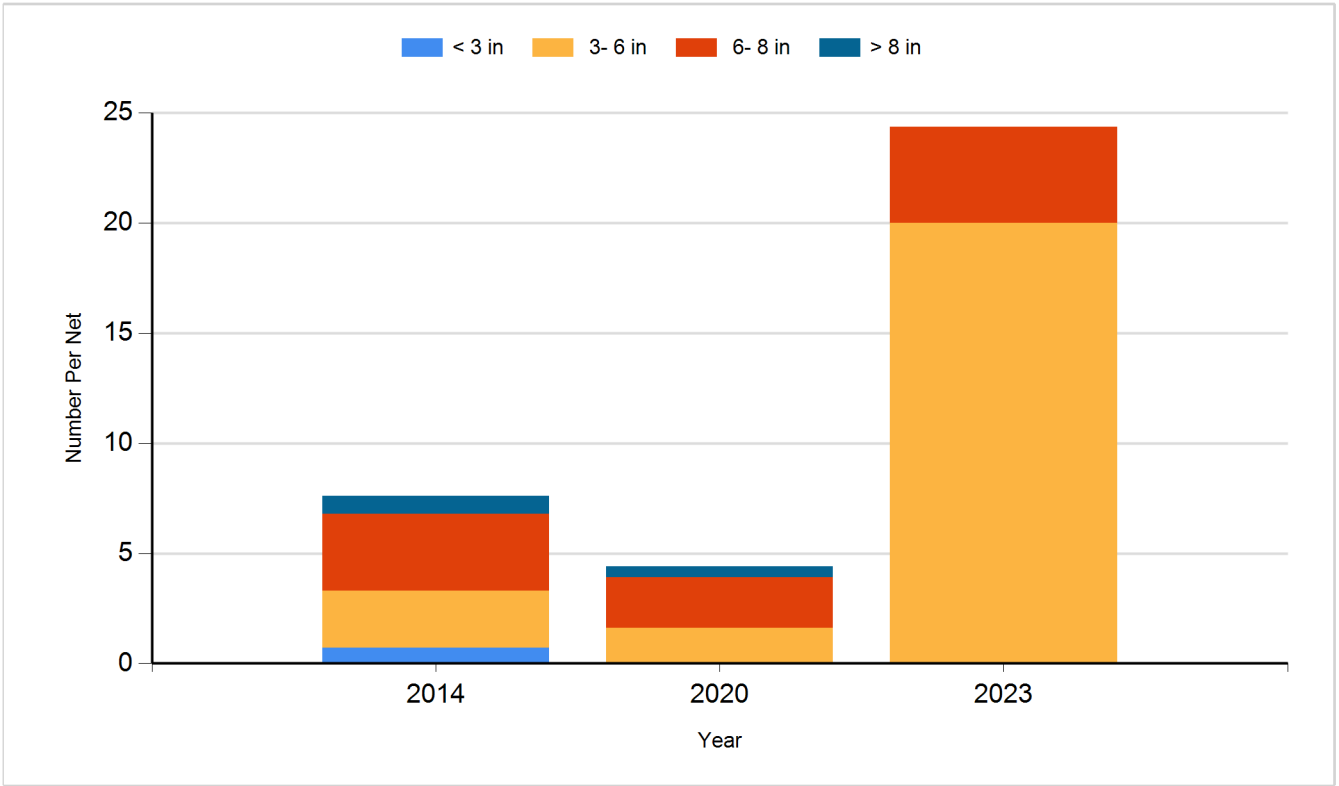
Species: Black Crappie
Gear: frame net (std 3/4 in)



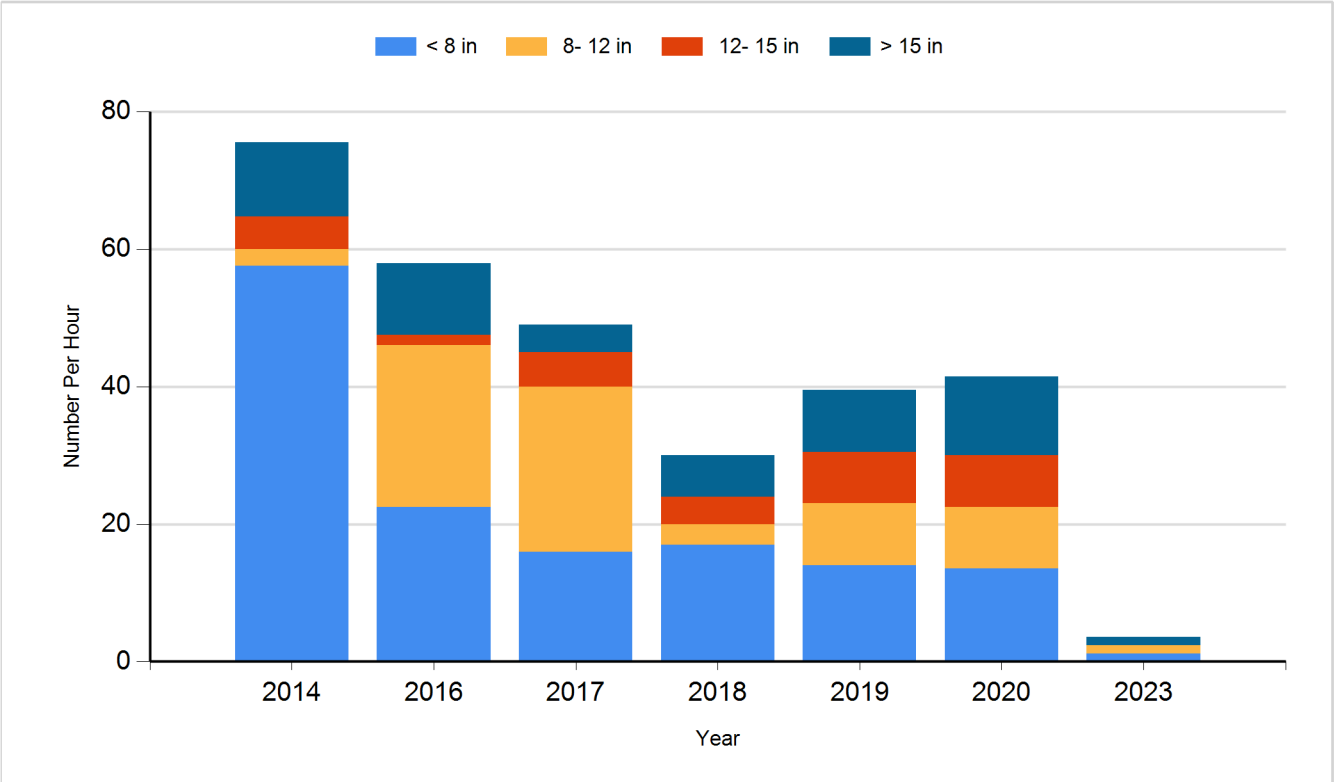
Species: Bluegill
Gear: AFS std frame net



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



Species: Largemouth Bass
Gear: boat shocker (night)



Fish Stocking

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

Year	Species	Size	Number
2022	Northern Pike	Adult	150
2023	Black Crappie	Adult	425
2023	Bluegill	Adult	70
2023	Largemouth Bass	Juvenile	1,800