

2024 Fairfax Lake (Gregory County)

Fairfax Lake is located 1.5 miles north of the town of Fairfax on 365th Avenue. It is a 20-acre impoundment with a mean depth of 12 feet and maximum depth of 22 feet. Access locations at Fairfax consist of a gravel boat ramp, handicap accessible fishing pier and several maintained shoreline access locations along the west shore. 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 winter kill in 2022/2023. Stocking occurred in 2023/2024 to help reestablish fish populations.

- **Black Crappie:** The catch rate of Black Crappie in 2024 was 0.2 fish per frame net. Of the Black Crappie sampled all fish were 8 inches or larger. Black Crappie have a relative weight (Wr) of 93*.
- **Bluegill:** the catch rate of Bluegill in 2024 was 10.6 fish per frame net. Of the Bluegill sampled, 75% were 6 inches or larger. Bluegill have a relative weight (Wr) of 117*.
- **Largemouth Bass:** The catch rate of Largemouth Bass was 82.8 fish per hour of electrofishing. Of the Largemouth Bass sampled, 76% were 12 inches or larger. Largemouth Bass have a relative weight (Wr) of 120*.

In 2023, 917 adult Black Crappie, 275 adult Bluegill and 1,800 juvenile Largemouth Bass were stocked. In 2024, 336 adult Bluegill were stocked.

* 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.

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Fairfax, Gregory County

FTR-Lake-5880-000

2024

Lake Information

Name: Fairfax **Maximum Depth:** 22 Feet
County: Gregory **Mean Depth:** 12 Feet
Legal Description: T95-R68-S15
Surface Area: 20 Acres

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	Oct 10, 2024	1200 seconds
boat shocker (night)	Oct 14, 2024	1595 seconds
frame net (std 3/4 in)	Jul 10, 2024	5 net-nights
frame net (std 3/4 in)	Jul 11, 2024	5 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Black Bullhead

Northern Pike

Yellow Perch

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	68	82.8	35.1	76	8	0		120	2
frame net (std 3/4 in)	Black Bullhead	2087	207.0	127.7	39	1	20	1	99	1
	Black Crappie	3	0.2	0.2	100		100		93	
	Bluegill	106	10.6	4.9	75	6	24	6	117	2
	Northern Pike	4	0.4	0.4	100		75		94	3
	Yellow Perch	1	0.1	0.1	100		100			

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	
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024		
boat shocker (night)	Largemouth Bass		28.0		10.0	85.0	60.5		0.0	0.0	82.8	38.04	
frame net (std 3/4 in)	Black Bullhead		1.5			2.9			2.7		207.0	53.53	
	Black Crappie		0.5			20.7			0.9		0.2	5.58	
	Bluegill		66.8			34.0			283.3		10.6	98.68	
	Largemouth Bass		0.0			0.1			0.0		0.0	0.03	
	Northern Pike		0.2				0.1			0.8		0.4	0.38
	Yellow Perch		1.0				0.1			0.9		0.1	0.53

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									
			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
boat shocker (night)	Largemouth Bass	PSD		54		90	75	57		0	0	76
		PSD-P		25		80	28	12		0	0	0
		Wr		99		105	98	92				120
frame net (std 3/4 in)	Black Bullhead	PSD		93				100			100	39
		PSD-P		67				83			96	20
		Wr		91				97			84	99
	Black Crappie	PSD		100				65			22	100
		PSD-P		60				4			0	100
		Wr		104				120			104	93
	Bluegill	PSD		23				65			71	75
		PSD-P		3				0			12	24
		Wr		107				104			104	117
	Largemouth Bass	PSD						100				
		PSD-P						100				
		Wr						90				
	Northern Pike	PSD		100				100			100	100
		PSD-P		100				100			75	75
		Wr		100				99			80	94
Yellow Perch	PSD		70				100			89	100	
	PSD-P		0				0			33	100	
	Wr		89				79			86		

Back-Calculated Lengths

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

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	3	5	124 (3.5)	204 (7.3)	266 (8.4)									
2020	4	13	88 (6.3)	147 (8.3)	209 (8.4)	280 (4.3)								
2019	5	3	71 (8.8)	114 (10.2)	177 (23.3)	230 (16.7)	273 (10.1)							
Weighted Mean		21	94	156	218	271	273							
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20		
2021	3	5												
2020	4	13												
2019	5	3												
Weighted Mean		21												

Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	2479	111 (149)	122 (208)	147 (877)	174 (651)	188 (499)	179 (97)				
2019	340			144 (107)	161 (221)	183 (13)					
2016	734	74 (71)	108 (229)	146 (414)			194 (8)		243 (6)		254 (6)

Species: Largemouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2024	68			308 (16)	310 (44)	310 (8)					
2020	154	169 (9)	196 (32)	265 (48)	334 (47)	343 (9)	461 (5)	533 (3)	476 (2)		
2018	20			290 (3)	369 (1)	436 (6)	422 (5)	516 (3)	484 (3)		

Fish Condition

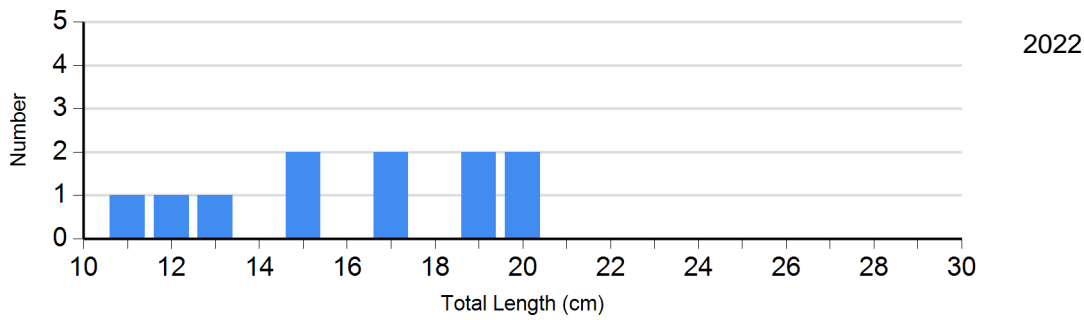
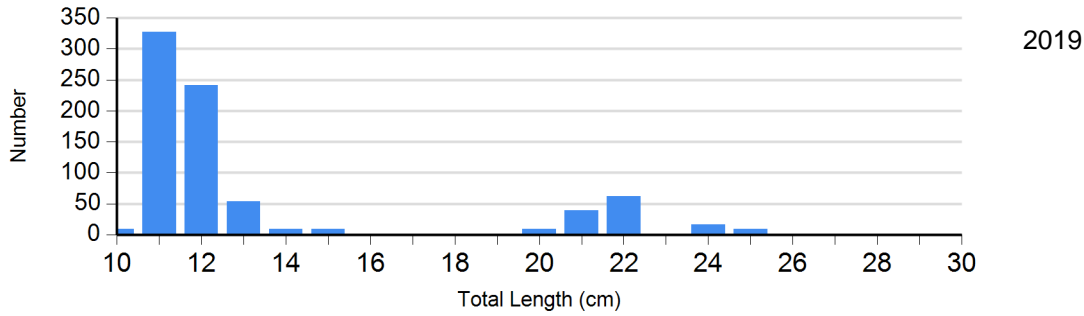
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2022	7	104 (4.0)	2	104 (10.3)	0		0	
	2024	0		0		2	93	0	
Bluegill Frame Net	2022	832	108 (0.7)	1673	102 (0.6)	328		0	
	2024	27	114 (3.4)	54	117 (1.8)	25	124 (3.7)	0	
Largemouth Bass Electro Fishing	2020	52	90 (0.7)	55	91 (0.7)	11	102 (1.2)	3	95 (2.4)
	2023	0		0		0		0	
	2024	16	119 (2.4)	52	121 (1.6)	0		0	

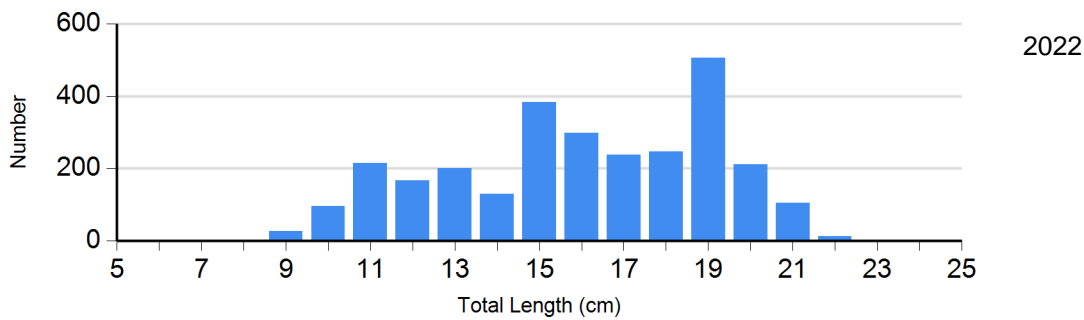
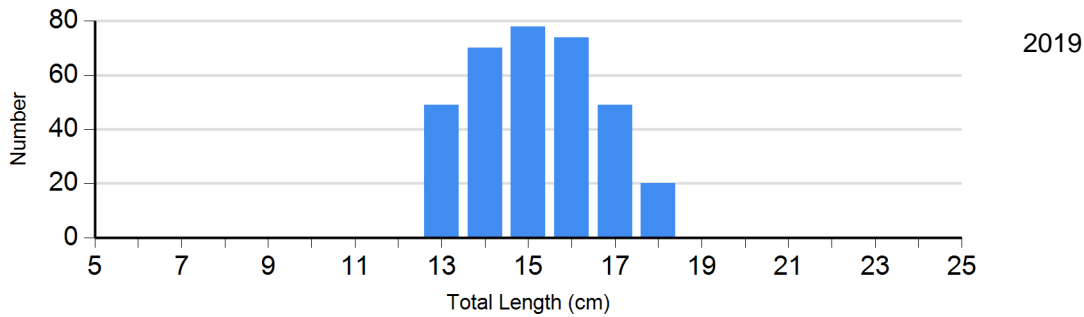
Length Frequency Distribution

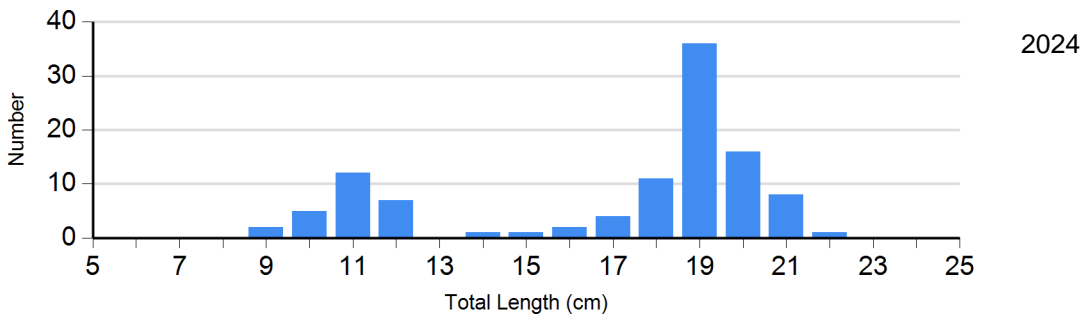
Length frequency histogram of species sampled by year.

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

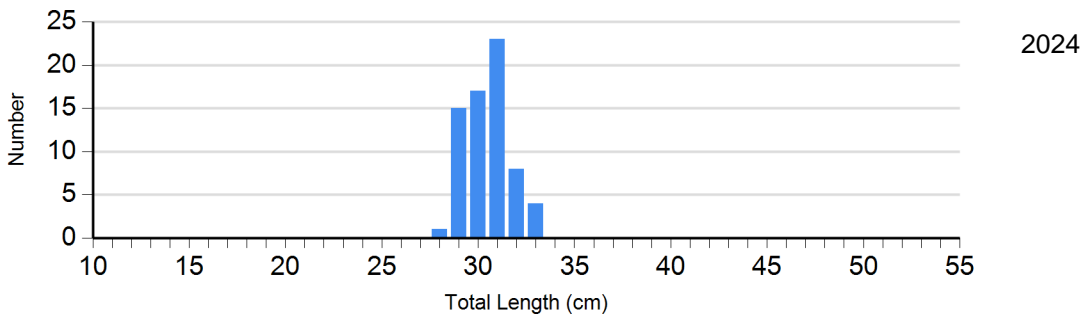
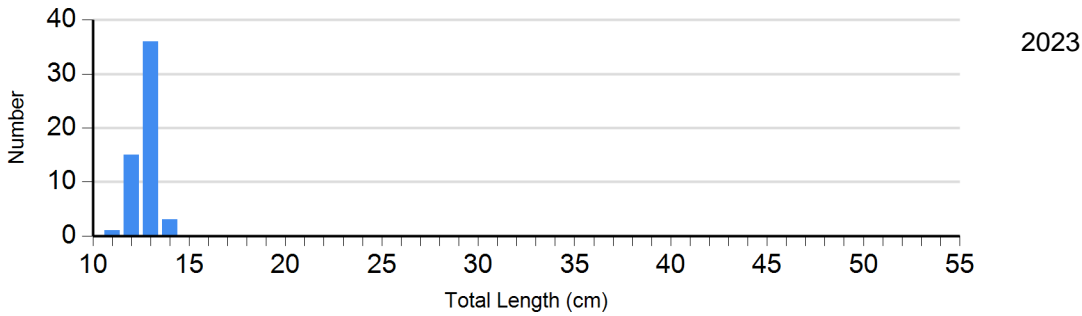
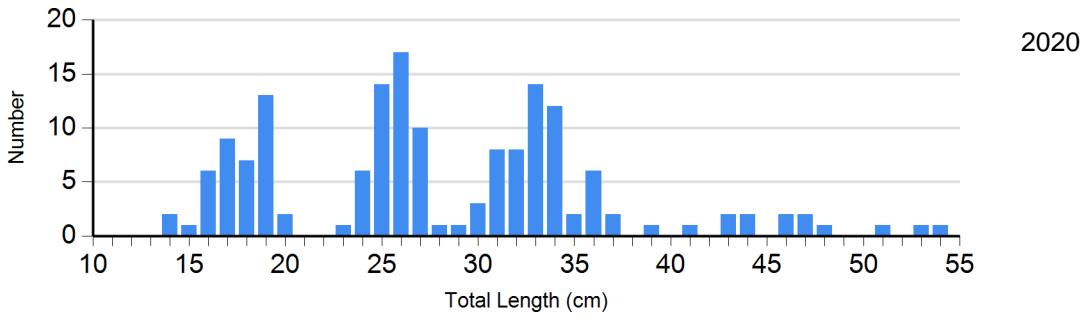
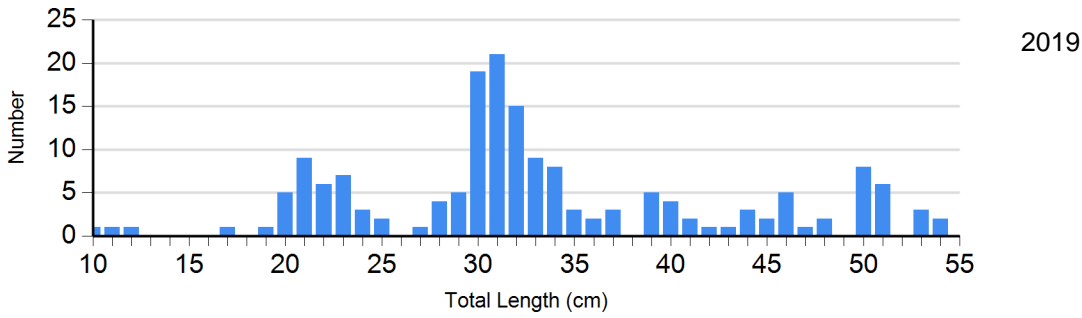


Species: Bluegill
Gear: frame net (std 3/4 in)





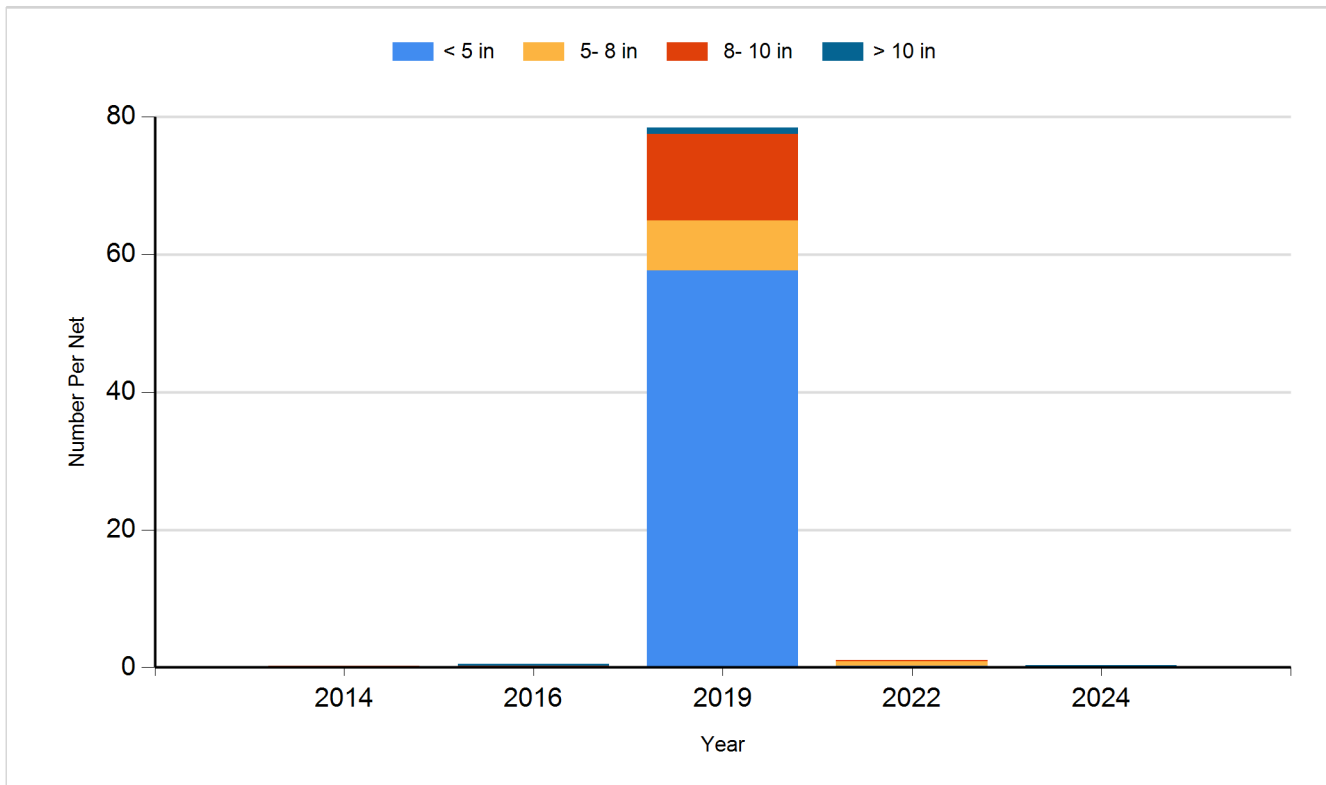
Species: Largemouth Bass
Gear: boat shocker (night)



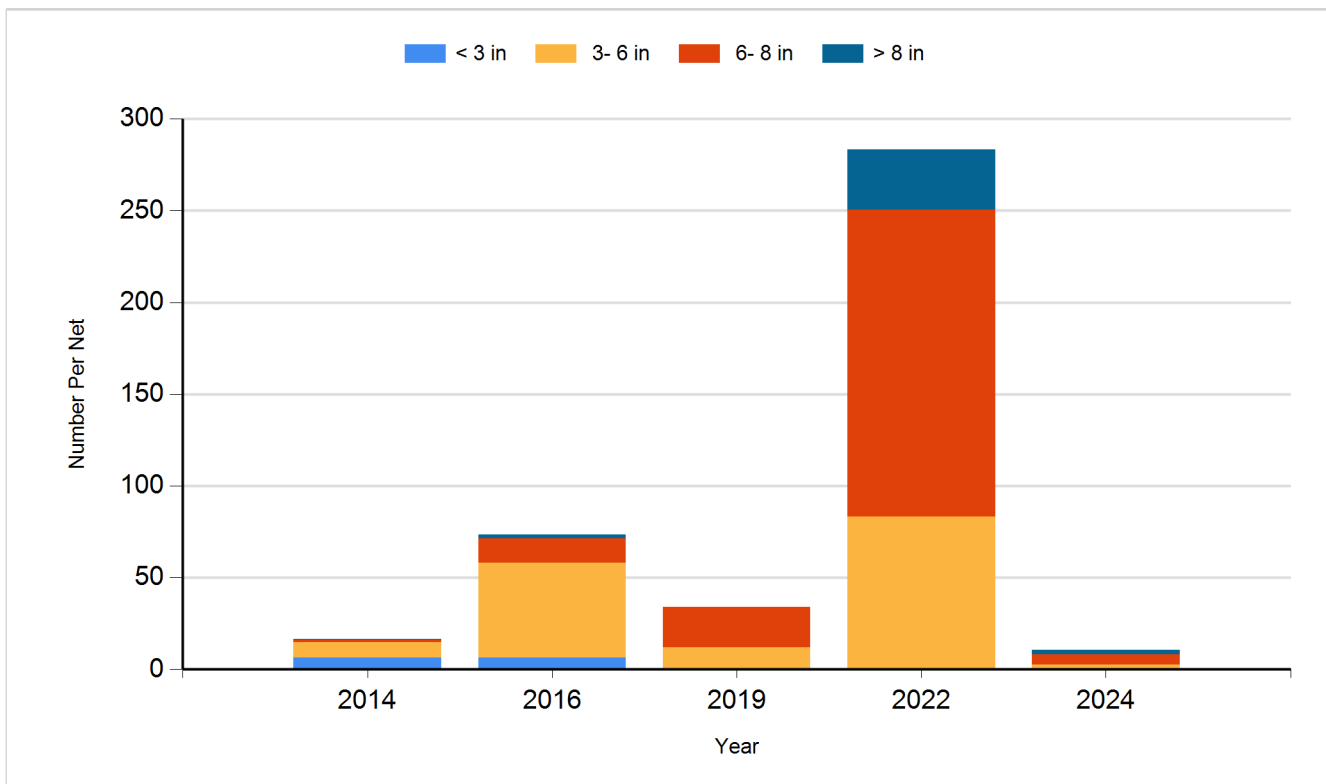
Historic Fish Sizes and Relative Abundance

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

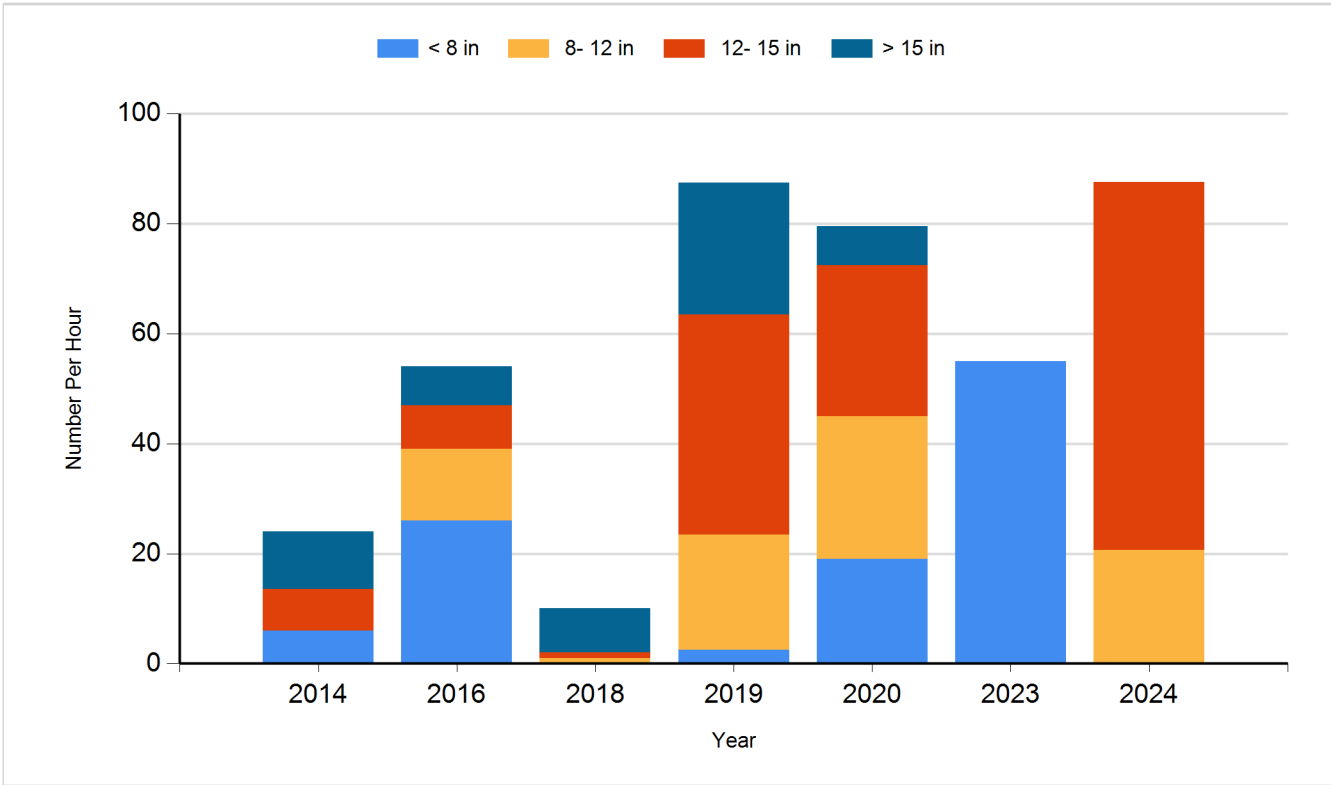
Species: Black Crappie
Gear: frame net (std 3/4 in)



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
2023	Black Crappie	Adult	917
2023	Bluegill	Adult	275
2023	Largemouth Bass	Juvenile	1,800
2024	Bluegill	Adult	336