Waggoner Lake Survey Summary

Waggoner Lake is a 107-acre impoundment located 3 miles North of Philip. Waggoner is a multispecies fishery with the primary species being Largemouth Bass, Bluegill, Black Crappie and Northern Pike. Other species include Black Bullhead, Yellow Perch, Green Sunfish, Smallmouth Bass and White Sucker. In 2023, only a fall daytime electrofishing survey was completed on September 25.

Largemouth bass. The 2023 electrofishing survey captured 123 bass for a catch rate of 147.6 fish per hour. This is one of the highest catch rates at Waggoner in recent history. Most of these fish were very small (under five inches). Only 9 of these bass were over 8 inches. Hopefully, this large year class will recruit to the adult population next year.

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Waggoner, Haakon County
BAD-Lake-2426-000
2023

Lake Information

Name: Waggoner

County: Haakon

Surface Area: 95 Acres

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (day)	Sep 25, 2023	3000 seconds

Common Fish Species Present

Yellow Perch

Northern Pike

Largemouth Bass

Bluegill

Black Crappie

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 (day)	Largemouth Bass	122	9.6	10.3	88		38		123	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				1.5							1.50
	Black Crappie				8.3							8.30
	Bluegill				15.0							15.00
	Golden Shiner				0.0							0.00
	Green Sunfish				0.7							0.70
AFS std gill net	Black Bullhead				0.3	4.5	0.0					1.60
	Black Crappie				2.5	0.0	1.0					1.17
	Golden Shiner				0.0	0.0	0.0					0.00
	Largemouth Bass				0.0	0.5	0.0					0.17
	Northern Pike				0.8	0.0	0.0					0.27
	White Sucker				2.5	1.0	0.0					1.17
	Yellow Perch				0.0	1.0	0.0					0.33
boat shocker (day)	Largemouth Bass								35.2	29.5	9.6	24.77
boat shocker (night)	Largemouth Bass	73.0	45.0	29.0	20.0	44.0	24.4	16.0				35.91
	Walleye*	2.0	0.0	0.0	0.0	0.0	0.0	0.0				0.29
frame net (std 3/4 in)	Black Bullhead		1.1			2.8	10.4	34.0	527.8	166.8		123.82
	Black Crappie		42.1			2.5	19.9	50.7	36.3	25.6		29.52
	Bluegill		72.4			3.5	11.3	11.0	10.0	19.0		21.20
	Channel Catfish		0.0			0.0	0.0	0.0	0.8	0.6		0.23
	Golden Shiner		0.0			0.0	0.0	0.0	0.0	0.0		0.00
	Green Sunfish		0.0			0.3	13.0	62.3	21.5	29.0		21.02
	Largemouth Bass		0.0			0.3	0.0	0.0	0.0	0.0		0.05
	Northern Pike		2.4			0.0	0.0	0.2	0.5	0.0		0.52
	Sunfish Hybrid		0.0			0.0	0.0	0.0	0.0	5.2		0.87
	White Sucker		0.4			0.0	0.0	0.0	0.5	0.4		0.22
	Yellow Perch		0.6			0.0	0.1	1.2	9.0	15.8		4.45
std exp gill net	Black Bullhead		1.0									1.00
	Black Crappie		7.0									7.00
	Bluegill		3.0									3.00
	Golden Shiner		0.0									0.00
	Largemouth Bass		0.5									0.50
	Northern Pike		2.0									2.00
	White Sucker		0.5									0.50

		CPUE										
Gear	Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
std exp gill net	Yellow Perch		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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std frame net	Black Crappie	PSD				82						
		PSD-P				0						
		Wr				91						
	Bluegill	PSD				98						
		PSD-P				63						
		Wr				112						
AFS std gill net	Black Crappie	PSD				50		100				
		PSD-P				10		100				
		Wr				98		108				
	Largemouth Bass	PSD					0					
		PSD-P					0					
		Wr					121					
	Northern Pike	PSD				100						
		PSD-P				100						
		Wr				88						
	Yellow Perch	PSD					50					
		PSD-P					0					
		Wr					110					
boat shocker (day)	Largemouth Bass	PSD								63	81	88
		PSD-P								25	41	38
		Wr								110	105	123
boat shocker (night)	Largemouth Bass	PSD	86	84	48	100	66	62	69			
		PSD-P	37	51	28	30	20	33	31			
		Wr	104	107	110	109	108	115	116			
frame net (std 3/4 in)	Black Crappie	PSD		93			100	84	50	97	97	
		PSD-P		0			0	72	19	13	3	
		Wr		95			97	100	104	94	90	
	Bluegill	PSD		98			100	90	80	95	17	
		PSD-P		25			93	71	30	18	3	
		Wr		102			118	125	127	114	111	
	Largemouth Bass	PSD					0					

			Year									
Gear	Species	Index	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
frame net (std 3/4 in)	Largemouth Bass	PSD-P					0					
		Wr					112					
	Northern Pike	PSD		79					0	50		
		PSD-P		16					0	0		
		Wr		94					98	109		
	Yellow Perch	PSD		100				0	14	83	95	
		PSD-P		100				0	14	28	18	
		Wr		101				105	111	103	87	
std exp gill net	Black Crappie	PSD		29								
		PSD-P		0								
		Wr		109								
	Bluegill	PSD		17								
		PSD-P		0								
		Wr		116								
	Largemouth Bass	PSD		0								
		PSD-P		0								
		Wr		101								
	Northern Pike	PSD		50								
		PSD-P		0								
		Wr		92								

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	676	101 (2)	164 (36)	197 (12)	221 (160)	220 (107)	230 (294)	226 (66)			

Species: Largemouth Bass

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2014	118	213 (16)	244 (8)		341 (23)	365 (63)	395 (8)				

Fish Condition

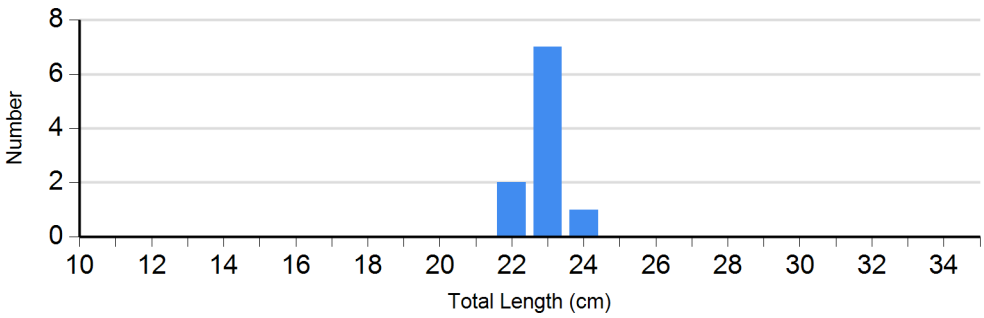
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	25	109 (1.7)	20		114	96 (0.3)	0	
	2020	152	106 (0.5)	94	106 (0.8)	55	96 (0.7)	3	96 (1.2)
	2021	5	88 (4.5)	121	96 (0.4)	19	84 (0.7)	0	
	2022	4		120	90 (0.4)	4	75	0	
Bluegill Frame Net	2019	9	129 (6.3)	17	131 (2.2)	62	121 (0.9)	2	143
	2020	13	130 (2.8)	33	131 (1.9)	19	117 (1.9)	1	116
	2021	2		31	116 (2.4)	7	103 (1.3)	0	
	2022	79	112 (1.1)	13	104 (2.8)	3	104	0	
Largemouth Bass Electro Fishing	2019	8	114 (3.8)	6	118 (3.9)	7	115 (3.0)	0	
	2020	5	117 (3.0)	6	114 (5.2)	5	117 (5.3)	0	
	2021	12	98 (2.2)	12	118 (2.1)	8	118 (2.4)	0	
	2022	5	93 (4.0)	11	101 (1.4)	11	114 (1.9)	0	
	2023	1	120	4	121 (0.9)	3	125 (7.6)	0	

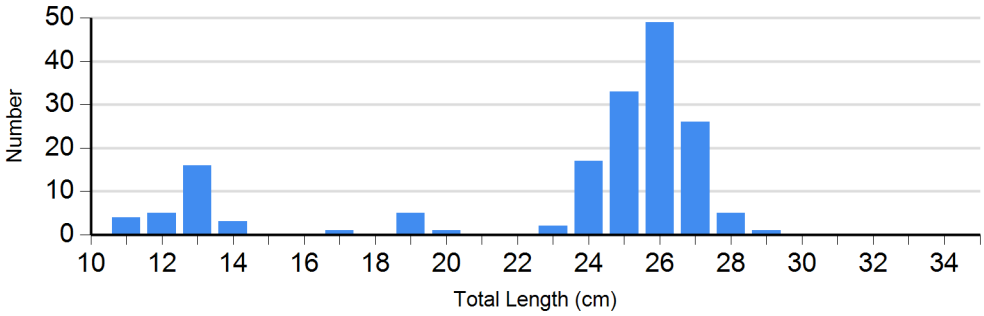
Length Frequency Distribution

Length frequency histogram of species sampled by year.

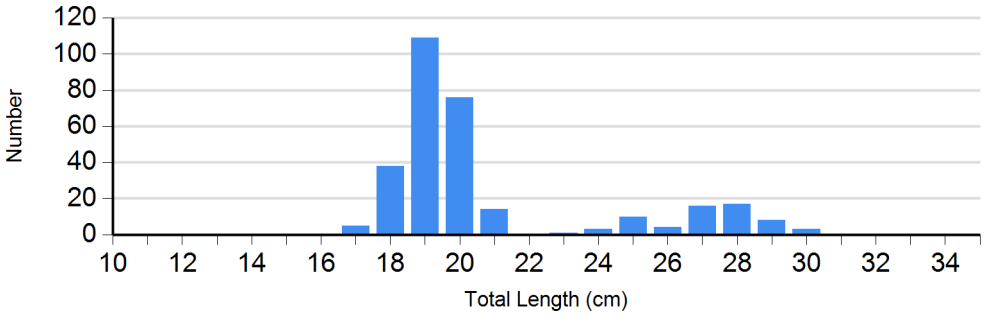
Species: Black Crappie
Gear: frame net (std 3/4 in)



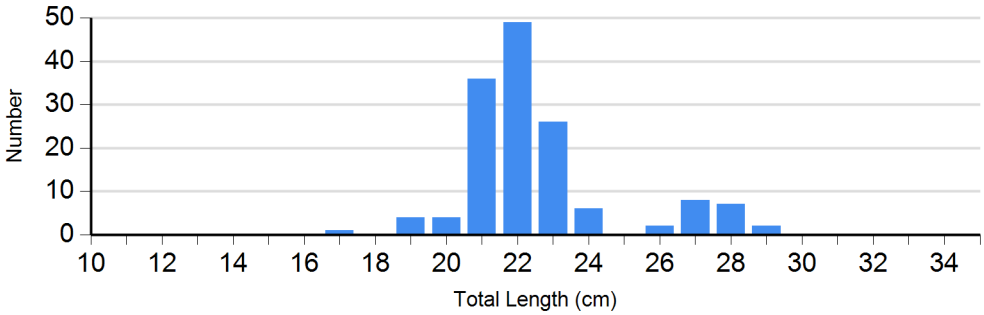
2018



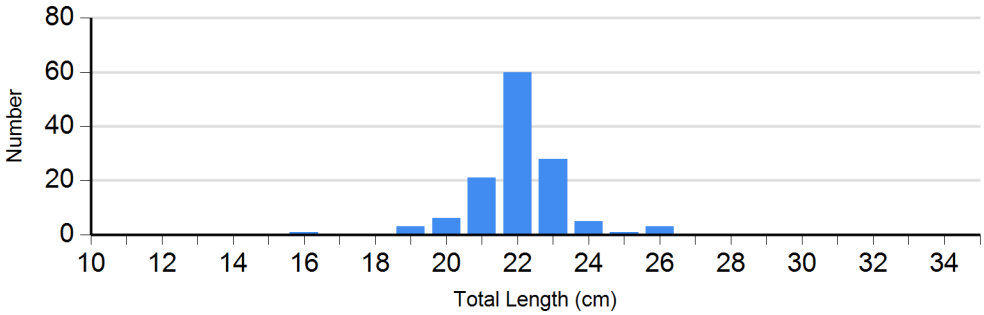
2019



2020

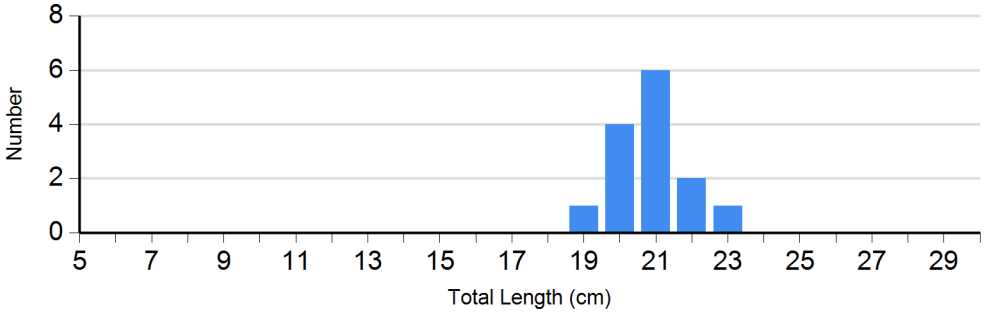


2021

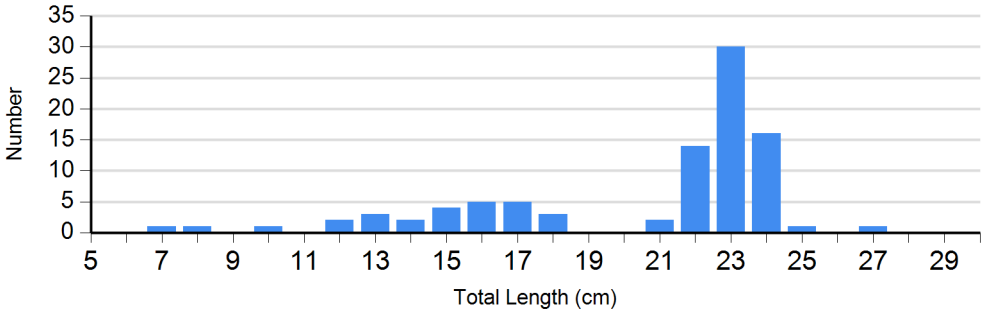


2022

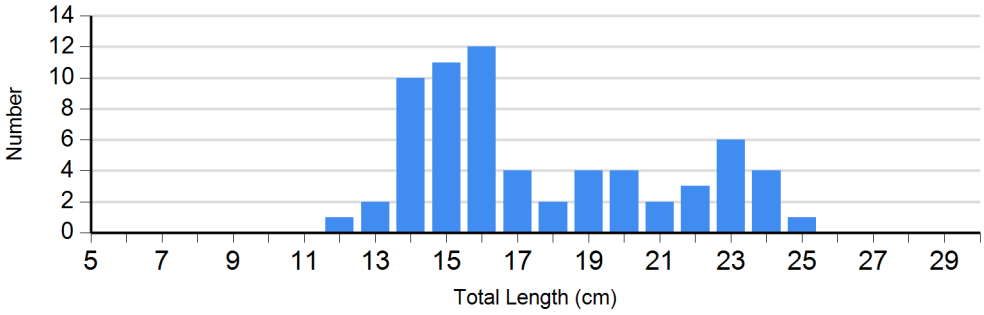
Species: Bluegill
Gear: frame net (std 3/4 in)



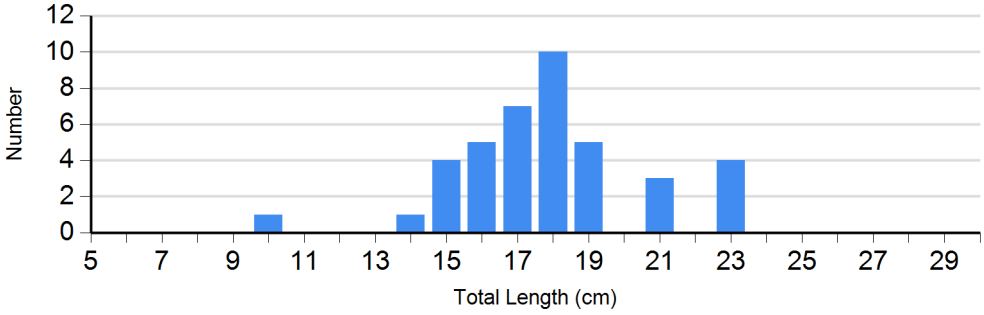
2018



2019



2020



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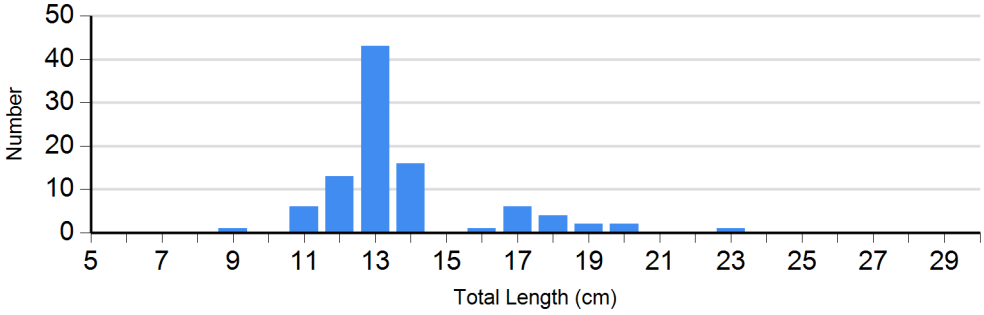
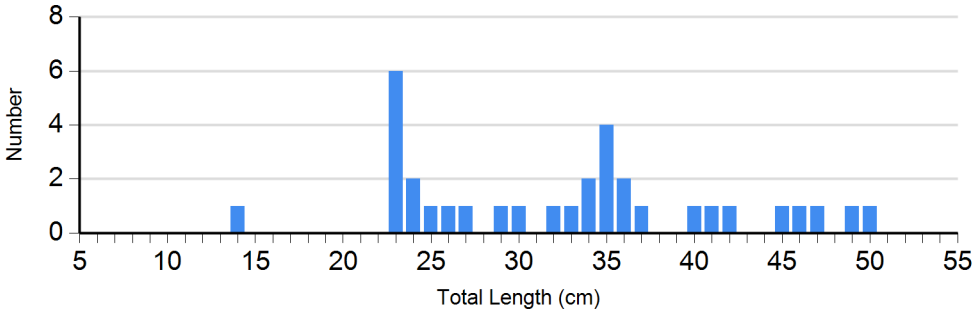


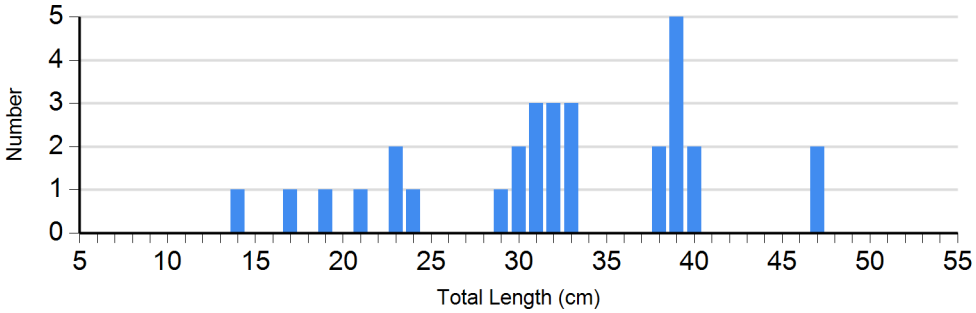
2022

Species: Largemouth Bass
Gear: boat shocker (day)

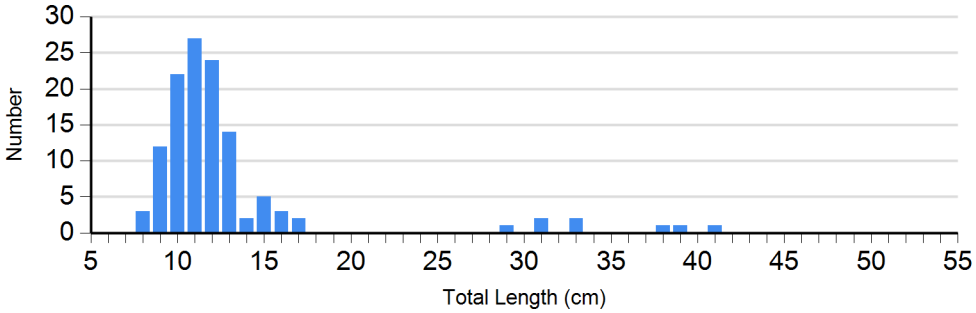
2021



2022

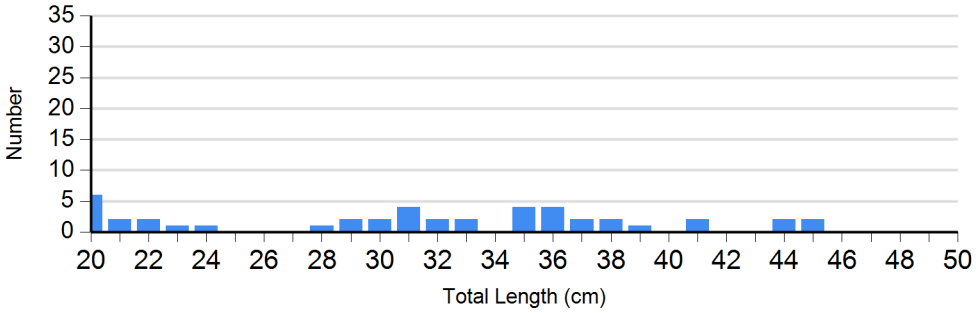


2023

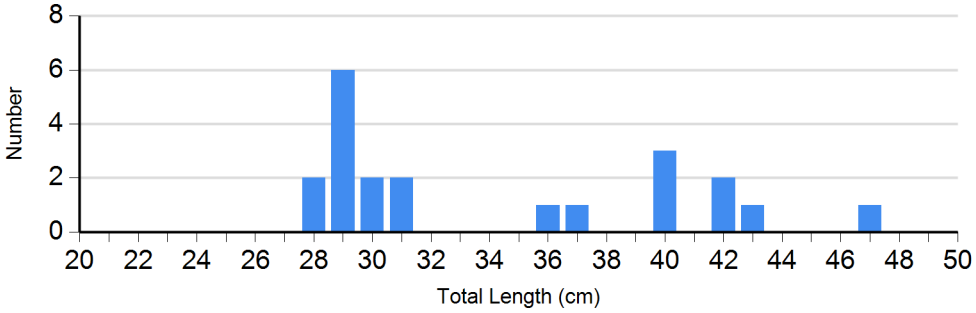


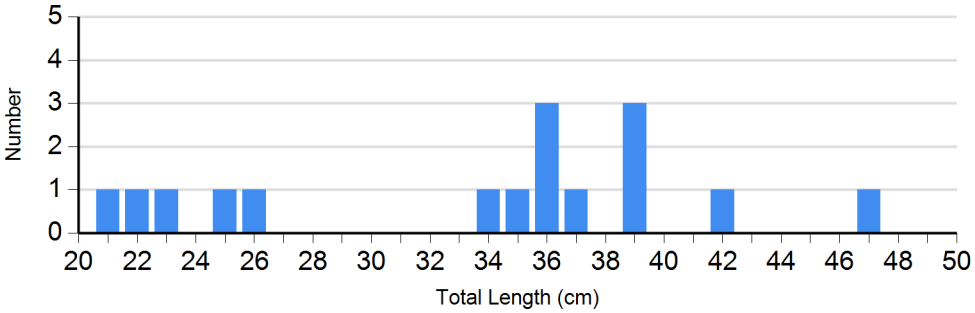
Species: Largemouth Bass
Gear: boat shocker (night)

2018



2019



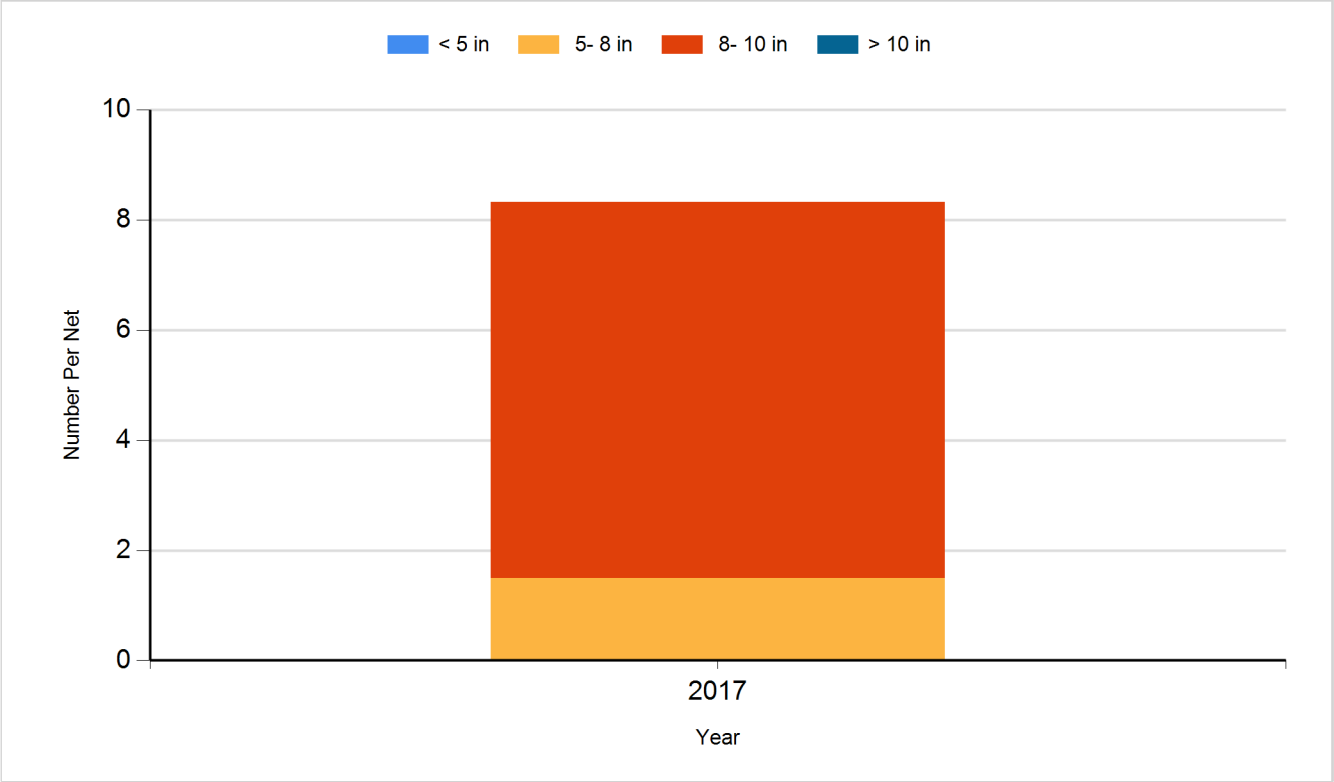

5
4
3
2
1
0
Number
20
22
24
26
28
30
32
34
36
38
40
42
44
46
48
50
Total Length (cm)

2020

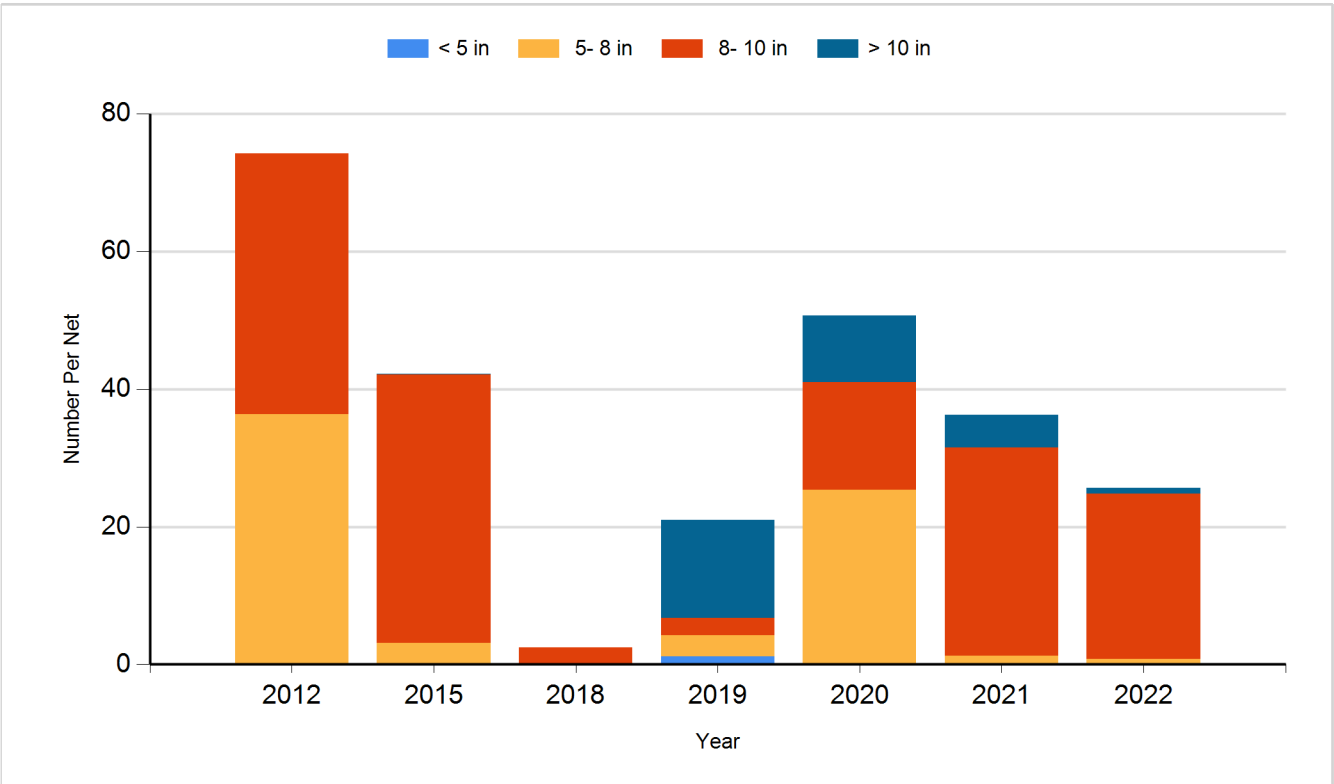
Historic Fish Sizes and Relative Abundance

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

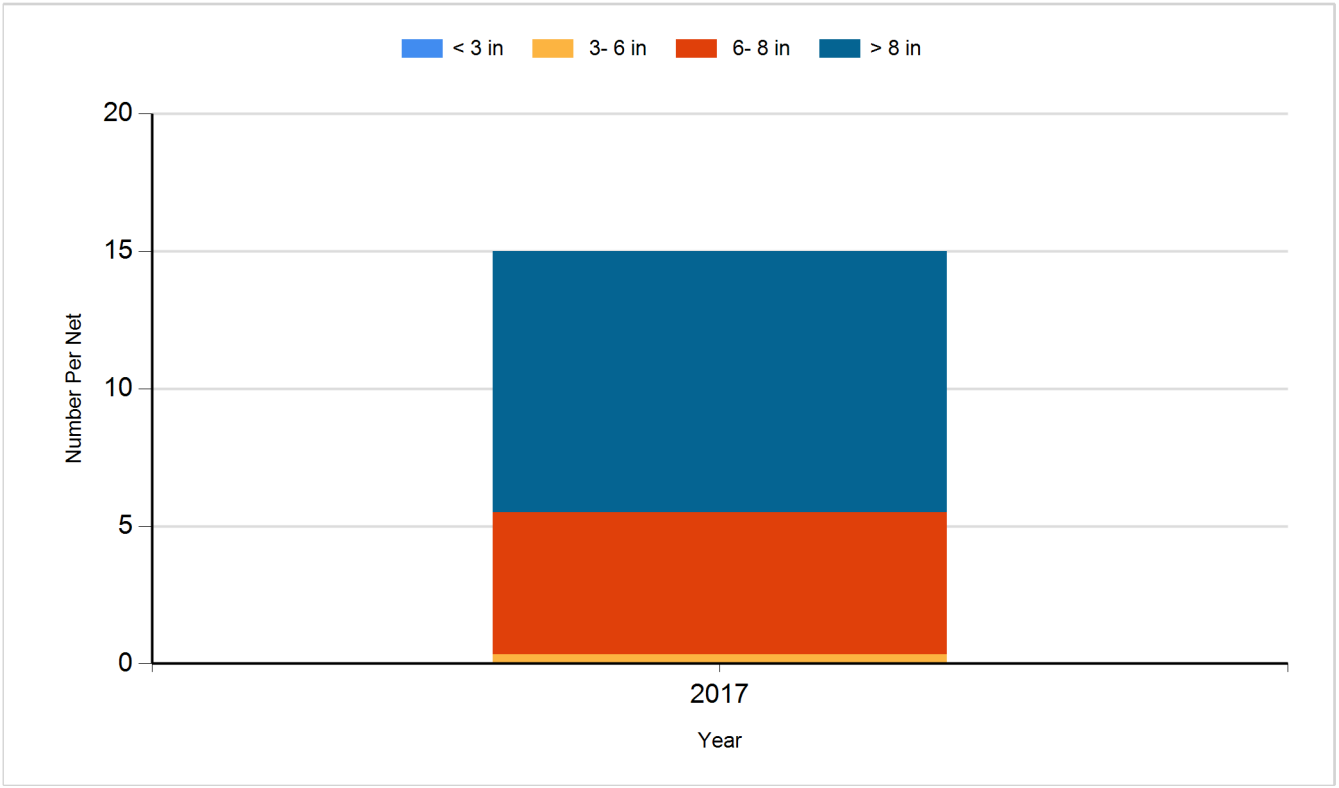
Species: Black Crappie
Gear: AFS std frame net



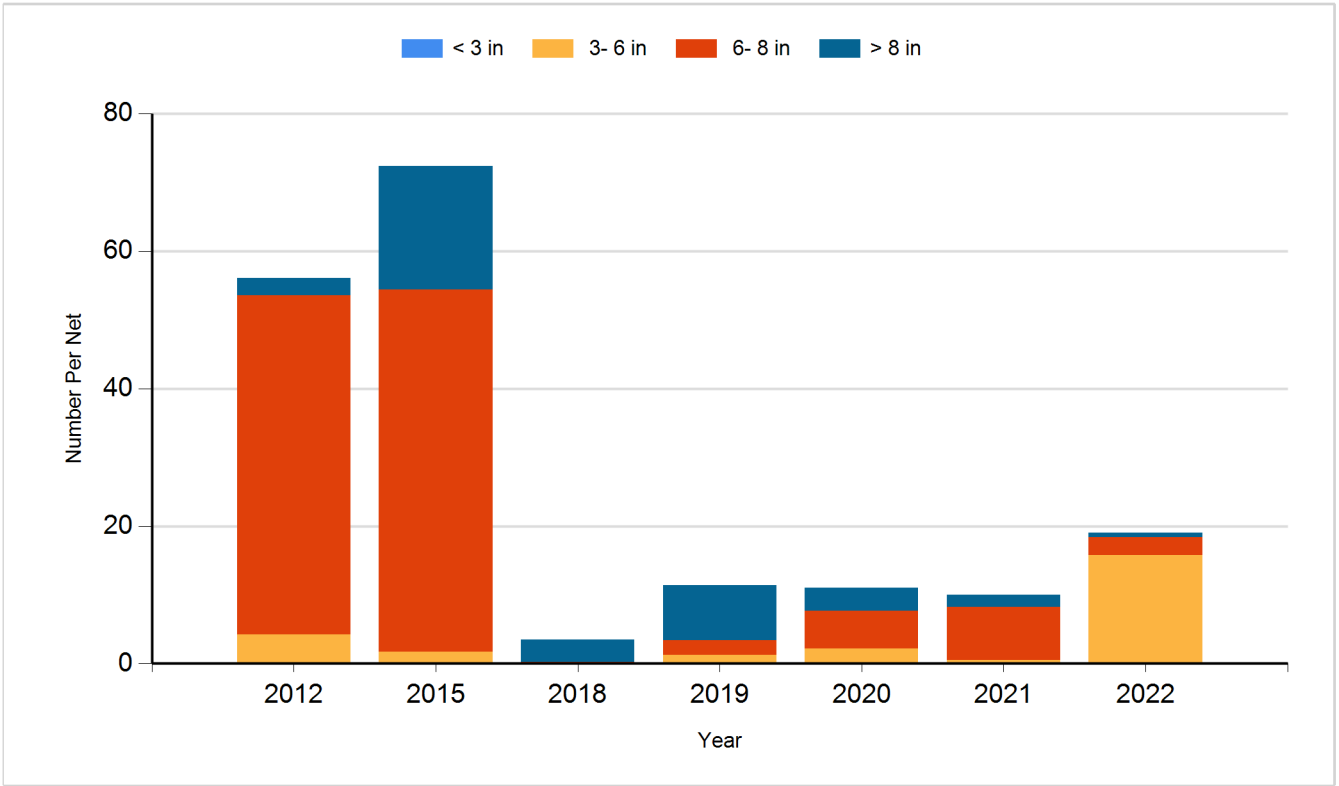
Species: Black Crappie
Gear: frame net (std 3/4 in)



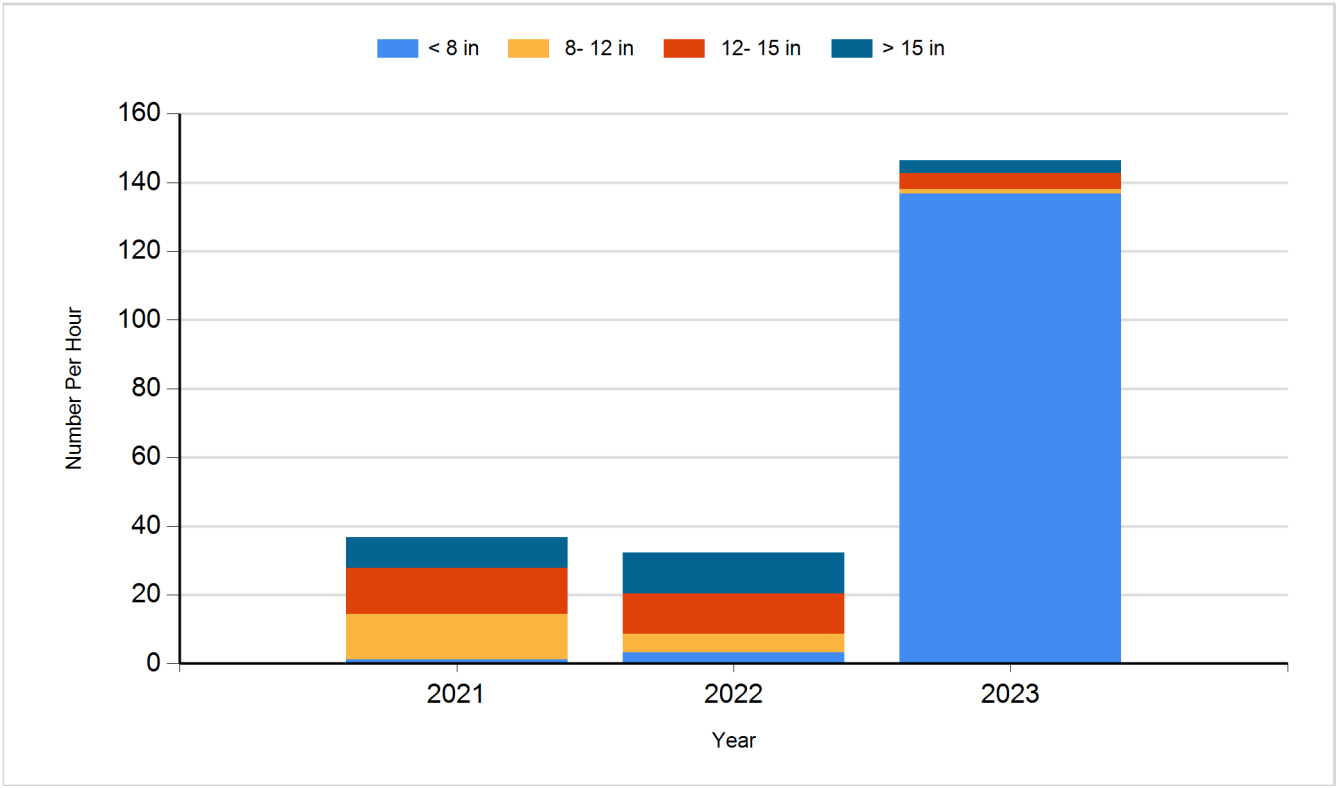
Species: Bluegill
Gear: AFS std frame net



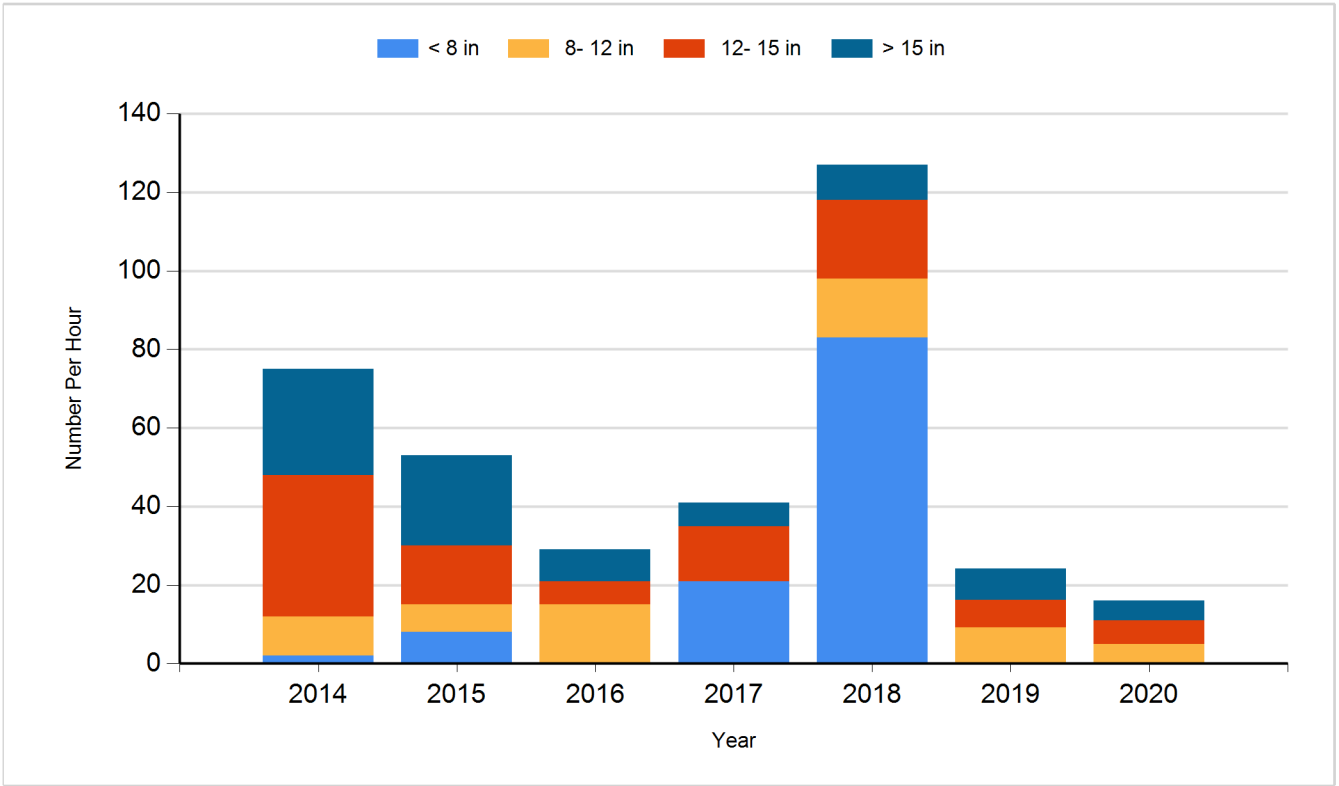
Species: Bluegill
Gear: frame net (std 3/4 in)



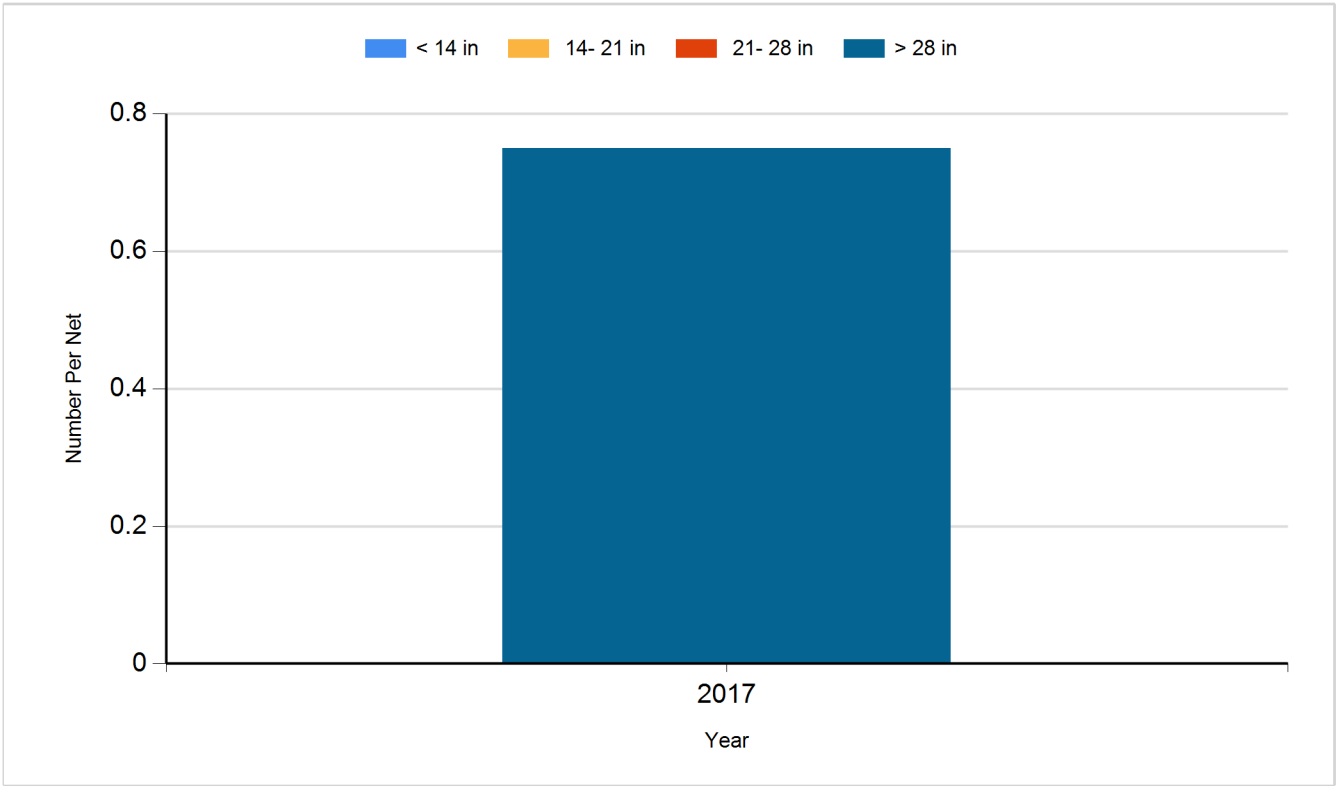
Species: Largemouth Bass
Gear: boat shocker (day)



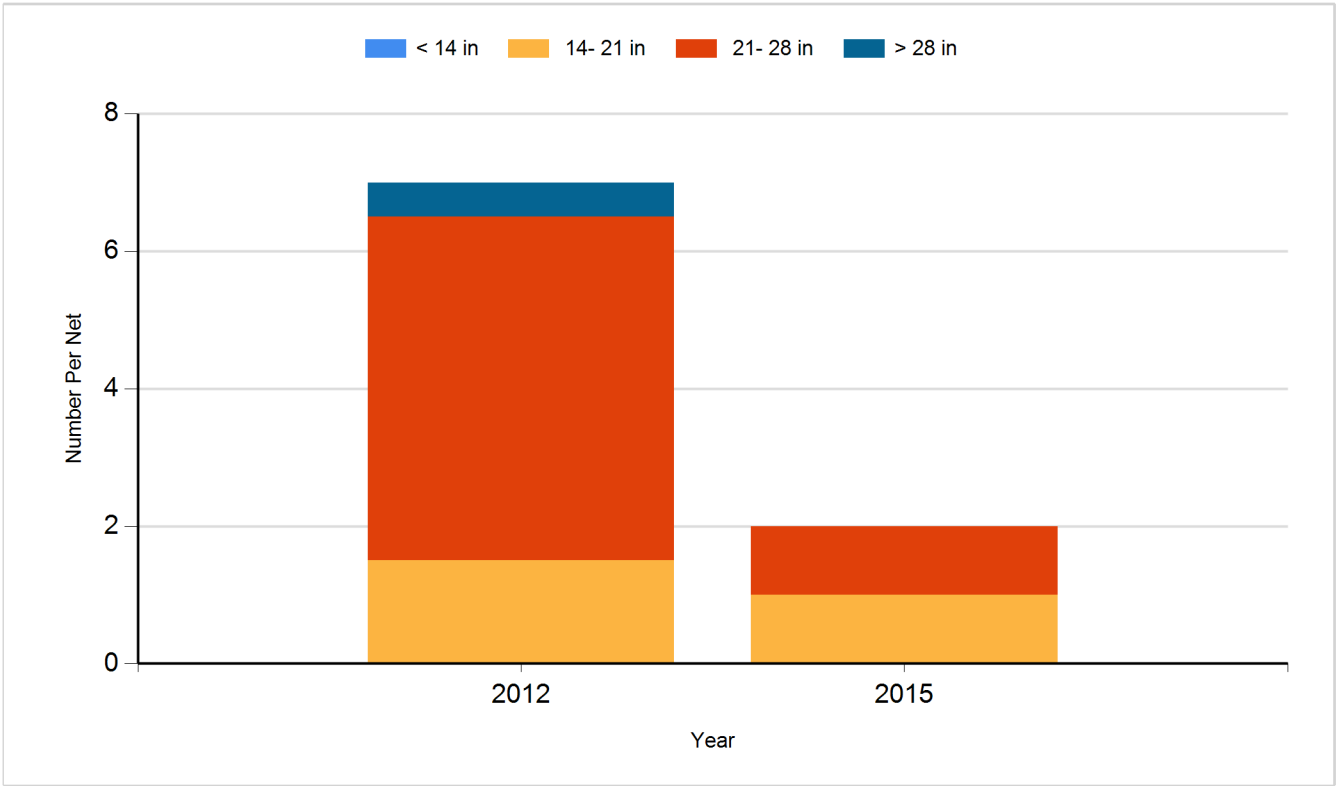
Species: Largemouth Bass
Gear: boat shocker (night)



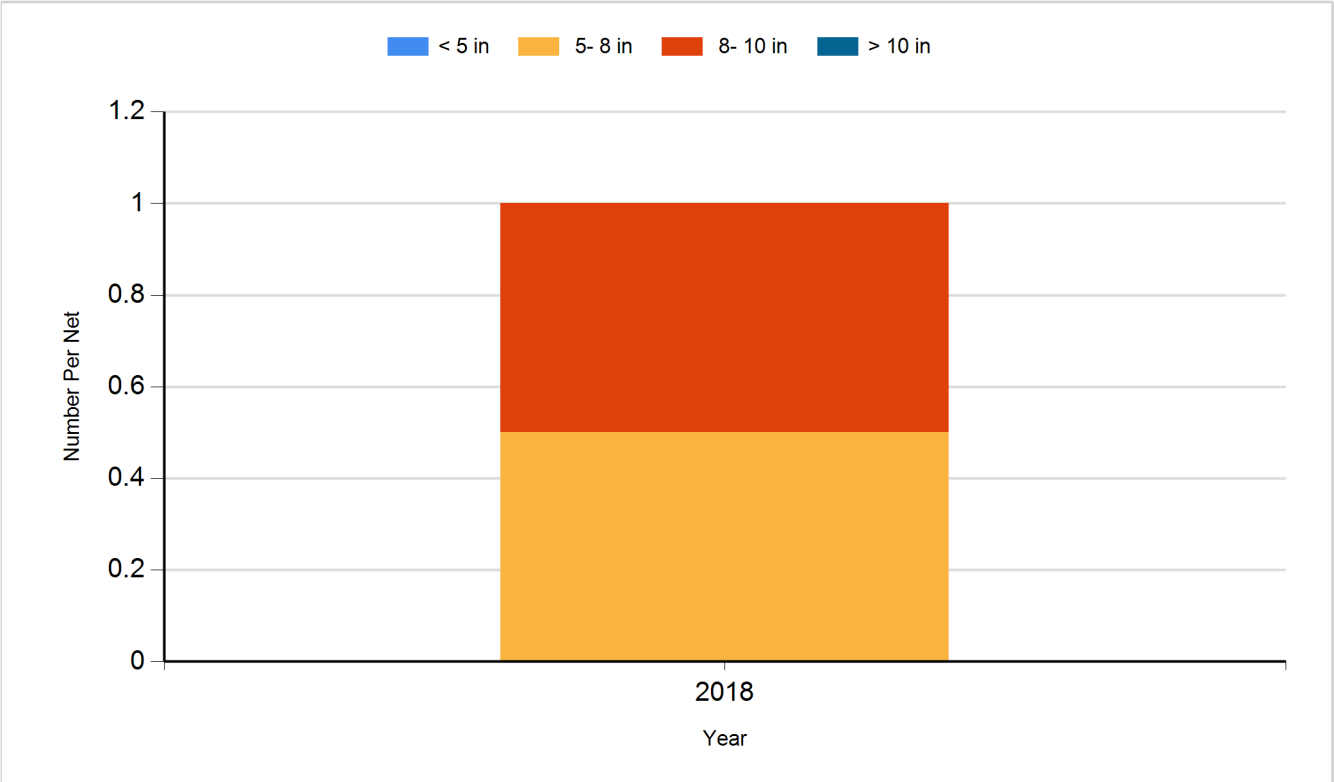
Species: Northern Pike
Gear: AFS std gill net



Species: Northern Pike
Gear: std exp gill net



Species: Yellow Perch
Gear: AFS std gill net



Fish Stocking

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

Year	Species	Size	Number
2017	Largemouth Bass	Fingerling	18,000
2017	Largemouth Bass	Fry	44,500
2018	Largemouth Bass	Juvenile	300
2021	Largemouth Bass	Adult	140
2021	Largemouth Bass	Fingerling	2,500
2022	Largemouth Bass	Adult	175
2022	Largemouth Bass	Fry	50,700
2023	Largemouth Bass	Adult	145