

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Waggoner, Haakon County

BAD-Lake-2426-000

2022

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 14, 2022	3350 seconds
frame net (std 3/4 in)	Jun 23, 2022	5 net-nights

Common Fish Species Present

Yellow Perch

Northern Pike

Largemouth Bass

Bluegill

Black Crappie

Black Bullhead

Green Sunfish

Sunfish Hybrid

Channel Catfish

White Sucker

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 (day)	Largemouth Bass	30	29.5	10.8	81	12	41	15	105	3
frame net (std 3/4 in)	Black Bullhead	910	160.8	40.9	55	2	4	1	83	1
	Black Crappie	128	25.6	16.4	97		3		90	1
	Bluegill	95	19.0	13.2	17	6	3		111	1
	Channel Catfish	3	0.6	0.9	100		0		117	11
	Golden Shiner	7	0.0	0.0						
	Green Sunfish	145	29.0	15.5	23	5	1		112	2
	Sunfish Hybrid	26	5.2	5.9	100		35	15		
	White Sucker	2	0.4	0.4	100		100		89	8
	Yellow Perch	79	15.8	8.5	95		18	6	87	1

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	
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022		
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		32.35
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	505.8	160.8		119.15
	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	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	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.

Gear	Species	Index	Year												
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022			
AFS std frame net	Black Bullhead	PSD					89								
		PSD-P					56								
		Wr					100								
	Black Crappie	PSD					82								
		PSD-P					0								
		Wr					91								
	Bluegill	PSD					98								
		PSD-P					63								
		Wr					112								
	Green Sunfish	PSD					50								
		PSD-P					25								
		Wr					125								
	AFS std gill net	Black Bullhead	PSD					100	100						
			PSD-P					100	33						
			Wr					104	113						
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								
White Sucker		PSD					100	100							
		PSD-P					100	100							
		Wr					102	104							
Yellow Perch		PSD								50					
		PSD-P								0					
		Wr								110					
boat shocker (day)	Largemouth Bass	PSD										63	81		
		PSD-P										25	41		

Gear	Species	Index	Year										
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
boat shocker (day)	Largemouth Bass	Wr										110	105
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 Bullhead	PSD			100			100	10	27	52	55	
		PSD-P			100			73	5	0	4	4	
		Wr			93			103	106	95	92	83	
	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	
	Channel Catfish	PSD									100	100	
		PSD-P									0	0	
		Wr									114	117	
	Green Sunfish	PSD						0	18	11	40	23	
		PSD-P						0	3	0	0	1	
		Wr						146	127	123	115	112	
	Largemouth Bass	PSD						0					
		PSD-P						0					
		Wr						112					
	Northern Pike	PSD			79					0	50		
		PSD-P			16					0	0		
		Wr			94					98	109		
	White Sucker	PSD			100						100	100	
		PSD-P			100						100	100	
		Wr			86						101	89	
	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 Bullhead	PSD			100								
		PSD-P			0								
		Wr			112								
	Black Crappie	PSD			29								
		PSD-P			0								

Gear	Species	Index	Year									
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
std exp gill net	Black Crappie	Wr			109							
		PSD			17							
	Bluegill	PSD-P			0							
		Wr			116							
		PSD			0							
	Largemouth Bass	PSD-P			0							
		Wr			101							
		PSD			50							
	Northern Pike	PSD-P			0							
		Wr			92							
		PSD			100							
	White Sucker	PSD-P			100							
Wr				103								

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

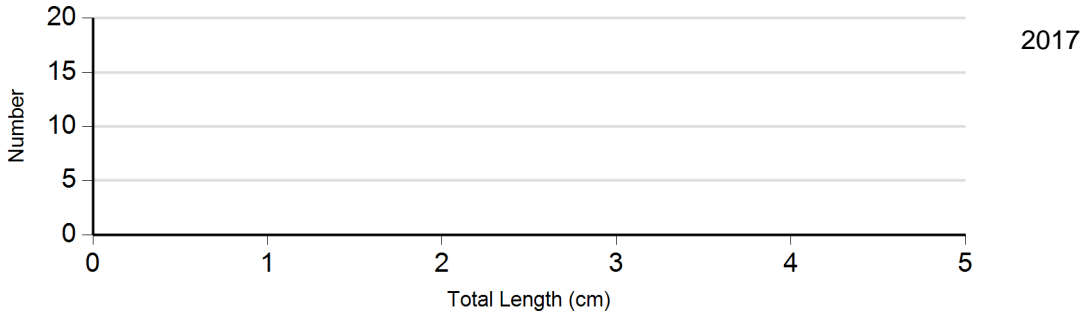
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2018	0		6	114 (4.4)	3	111 (8.5)	0	
Black Crappie Frame Net	2018	0		10	97 (1.6)	0		0	
	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	2018	0		1	108	13	119 (2.3)	0	
	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	2018	15	111 (2.6)	20	107 (2.5)	9	106 (1.6)	0	
	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	
White Sucker Gill Net	2018	0		0		0		2	104 (6.4)
Yellow Perch Gill Net	2018	1	109	1	111	0		0	

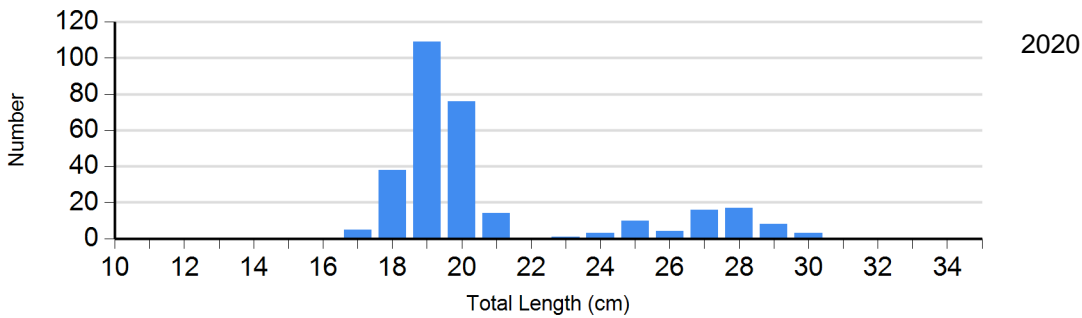
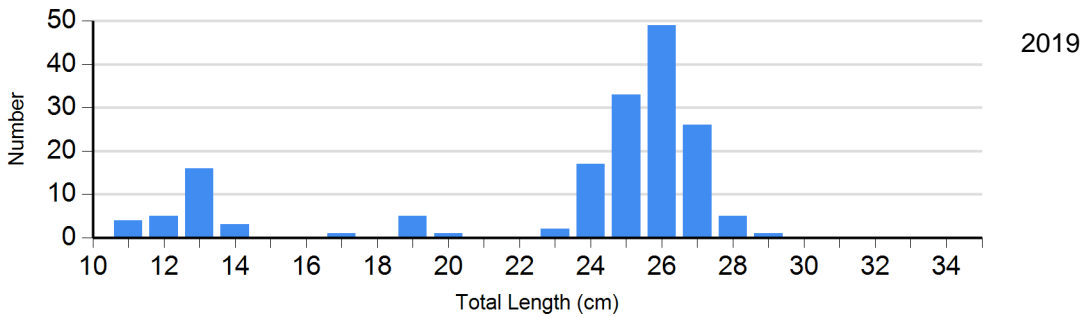
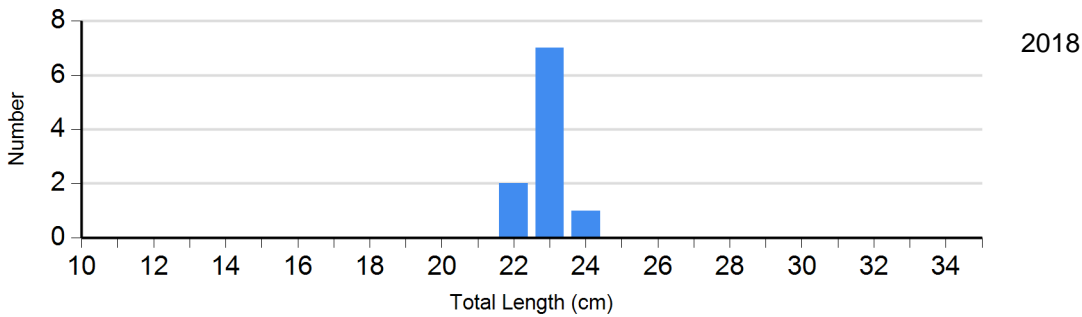
Length Frequency Distribution

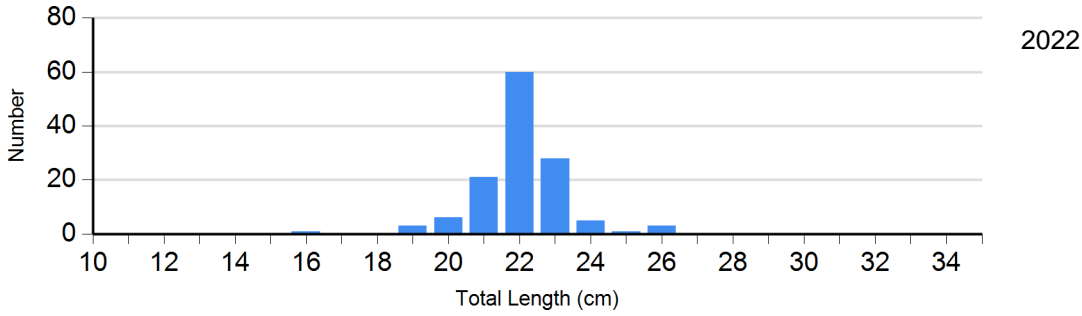
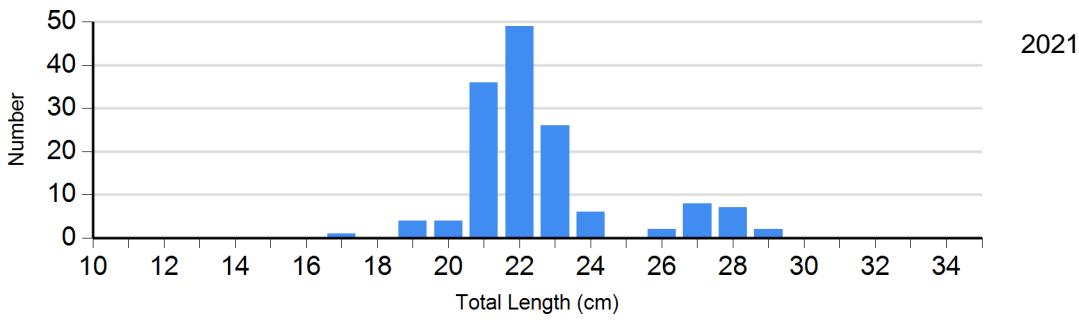
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net

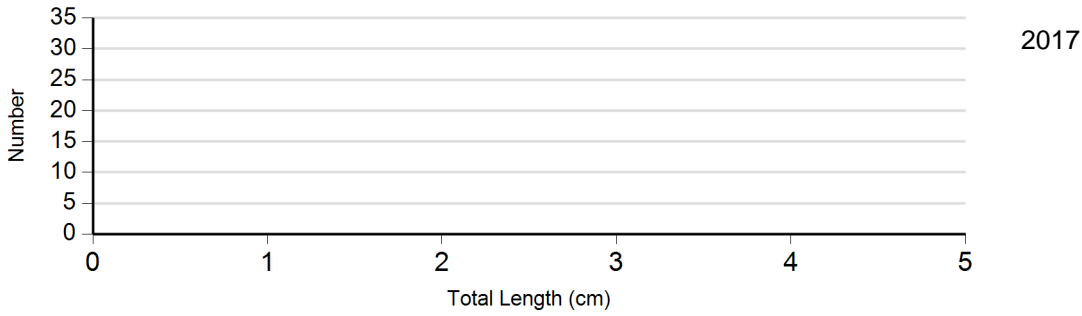


Species: Black Crappie
Gear: frame net (std 3/4 in)

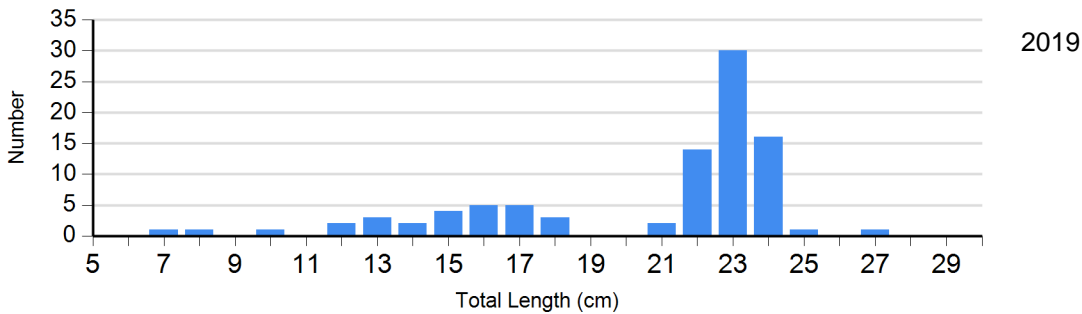
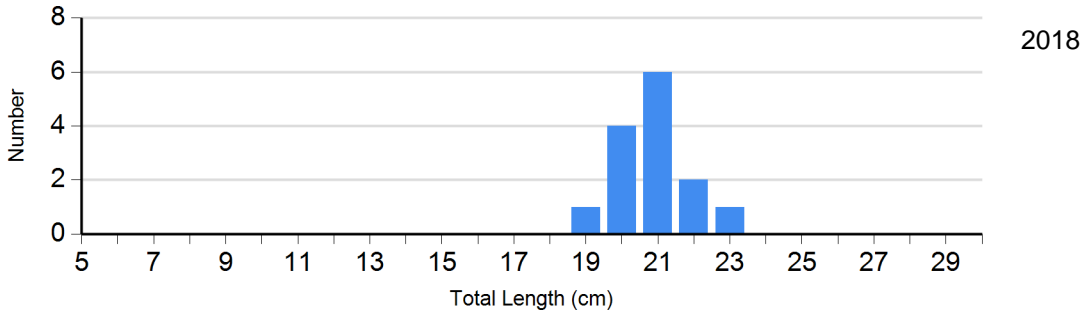


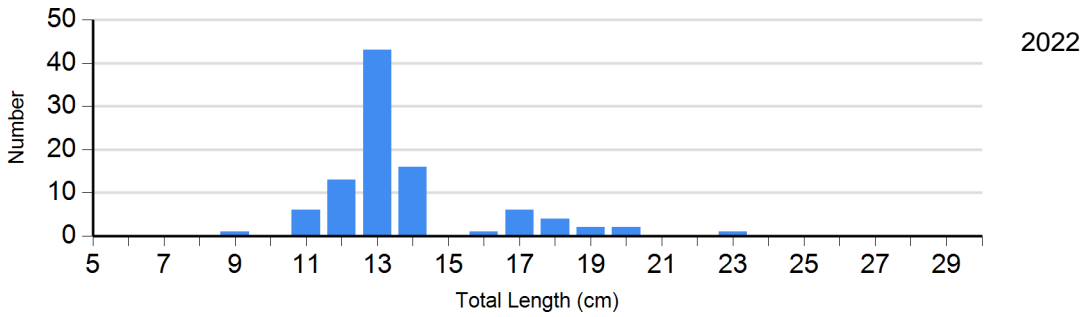
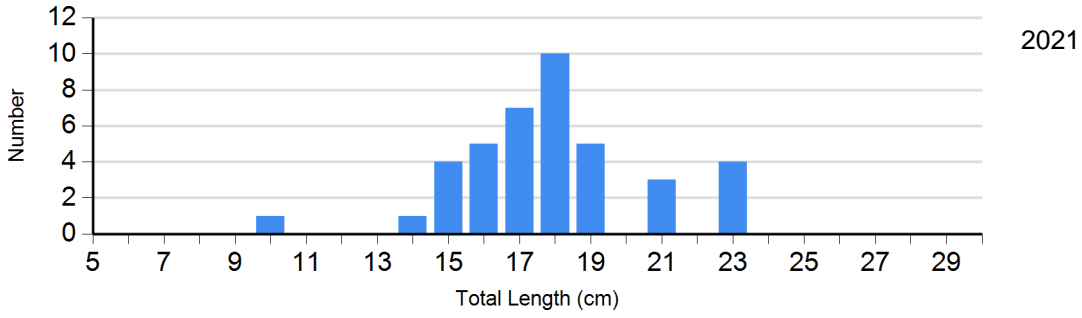
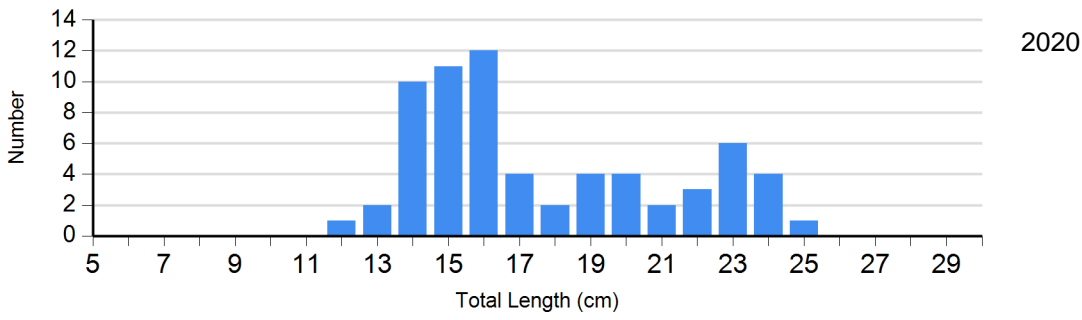


Species: Bluegill
Gear: AFS std frame net

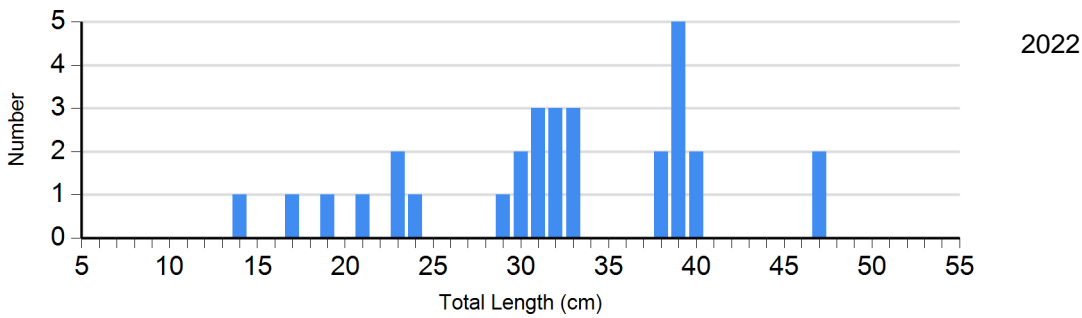
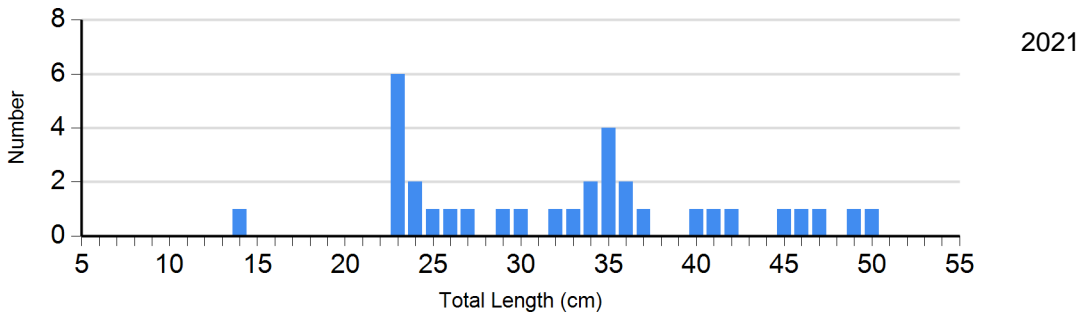


Species: Bluegill
Gear: frame net (std 3/4 in)

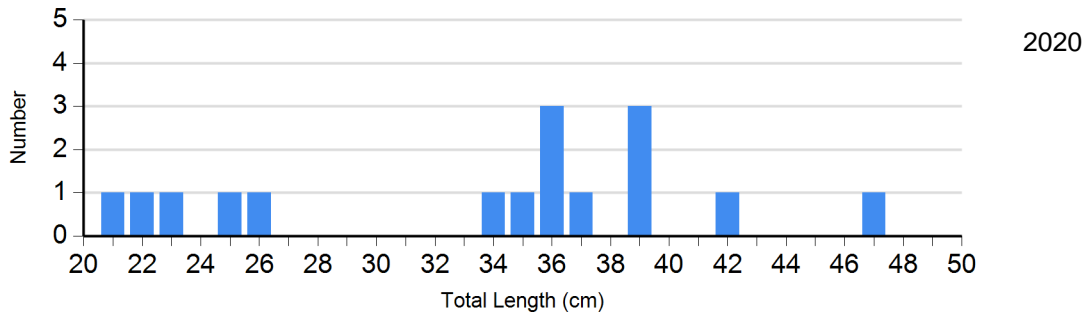
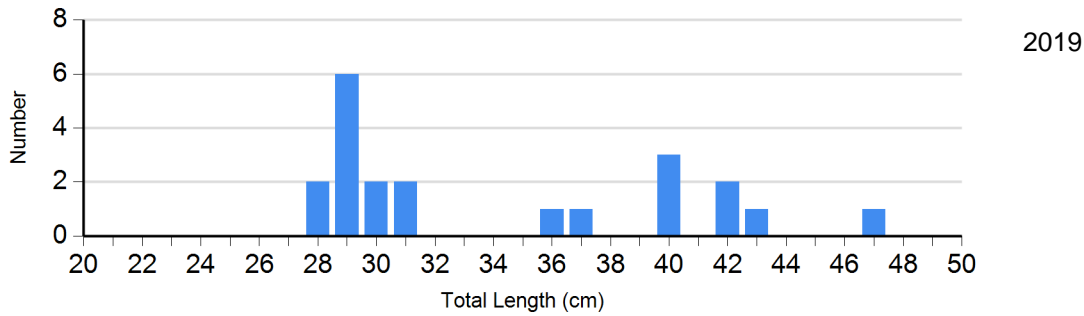
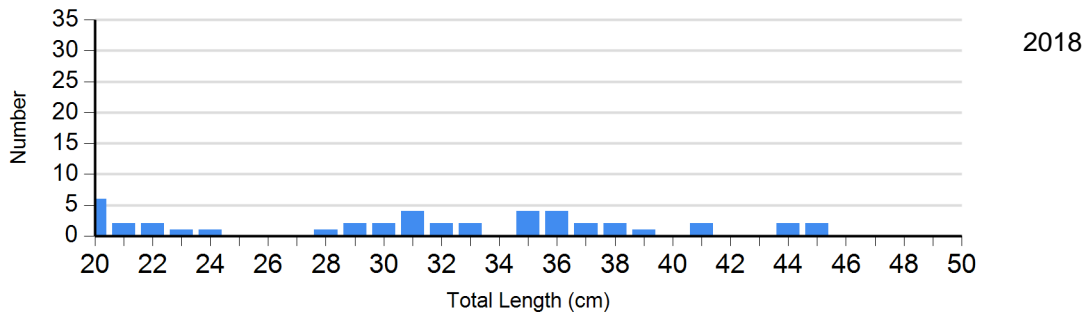
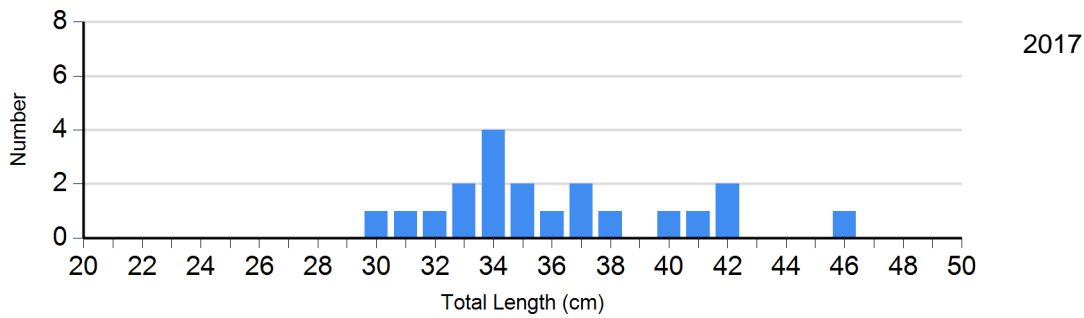




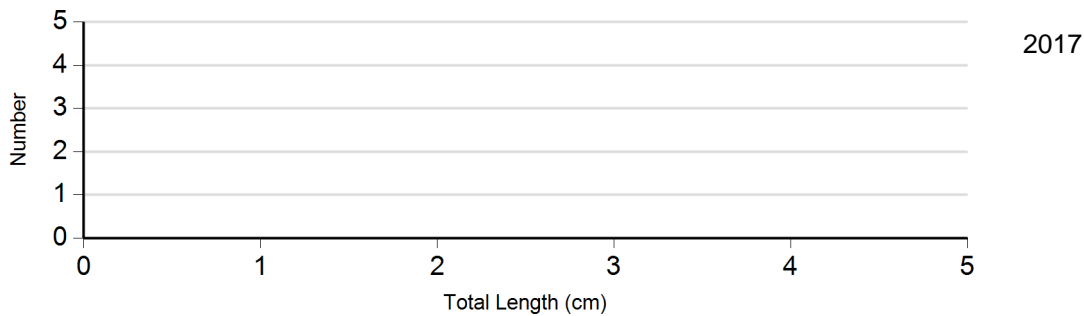
Species: Largemouth Bass
 Gear: boat shocker (day)



Species: Largemouth Bass
 Gear: boat shocker (night)



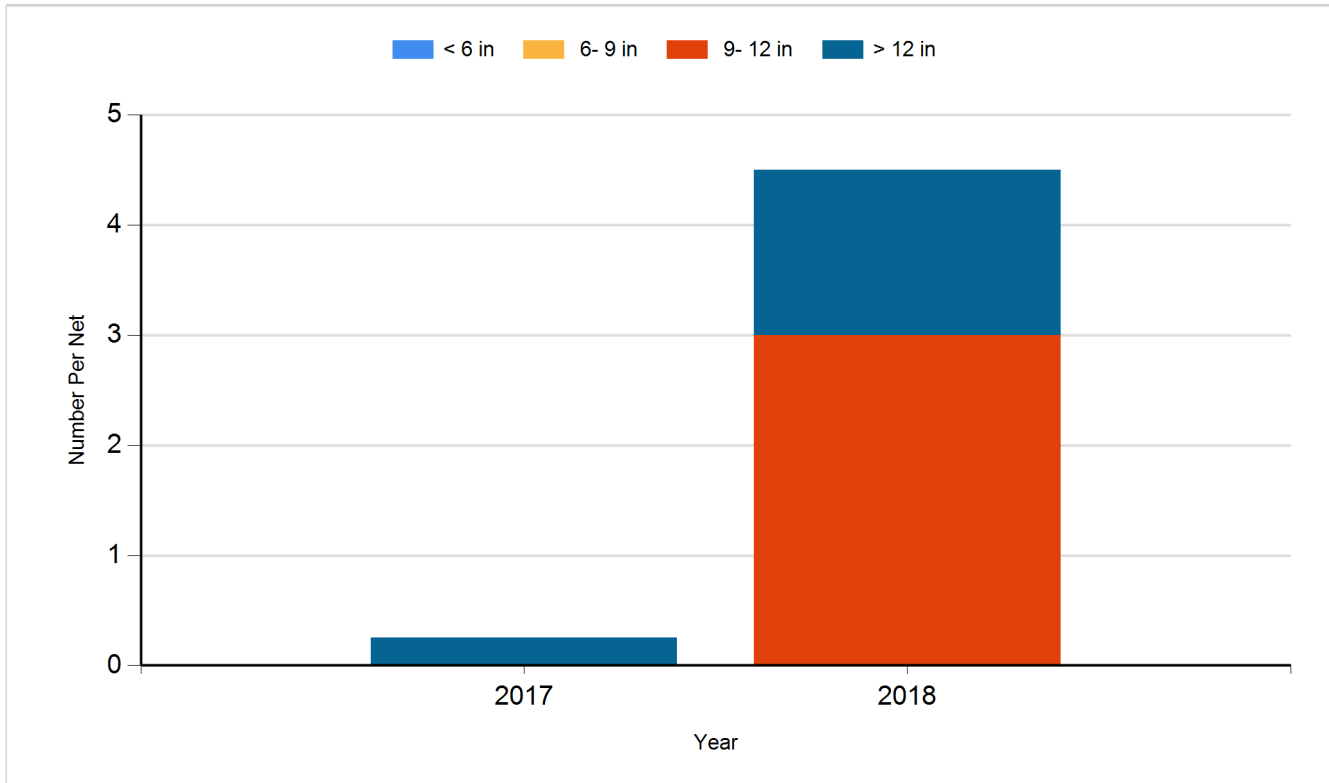
Species: White Sucker
 Gear: AFS std gill net



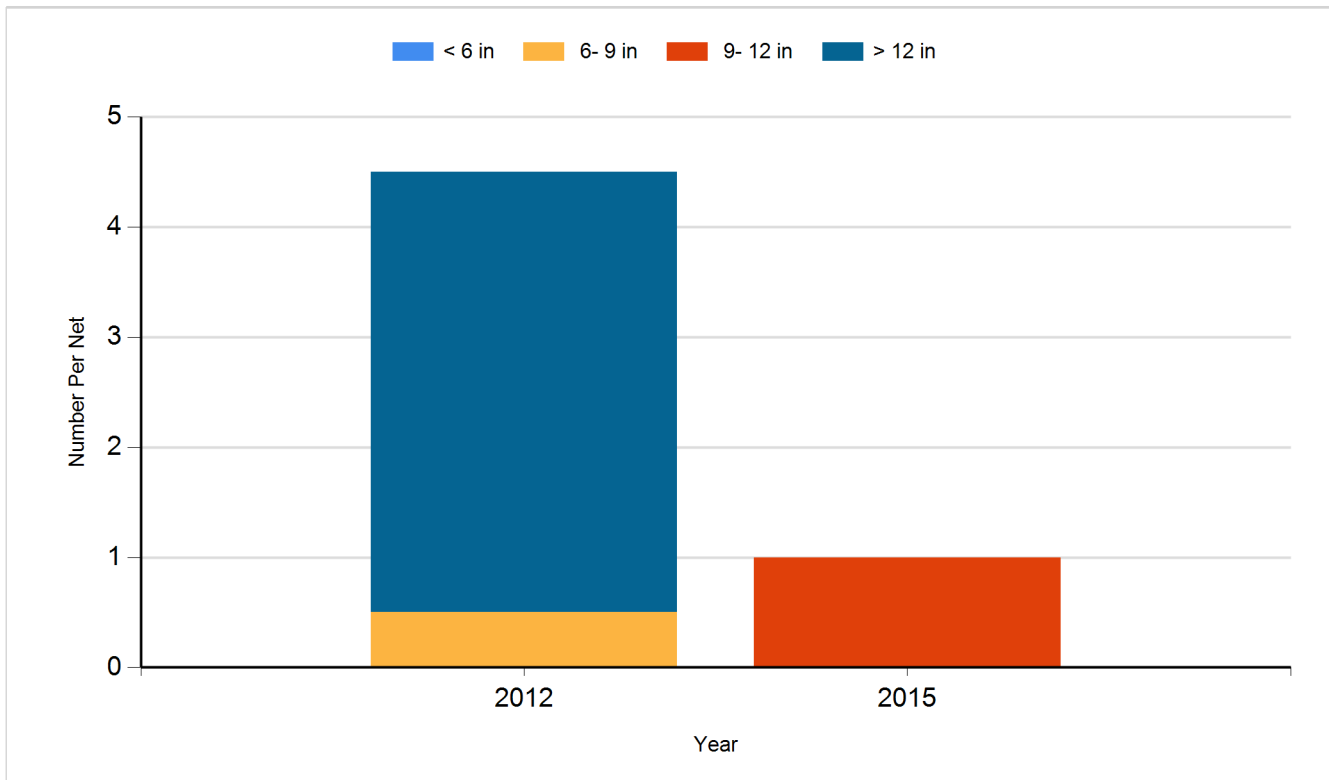
Historic Fish Sizes and Relative Abundance

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

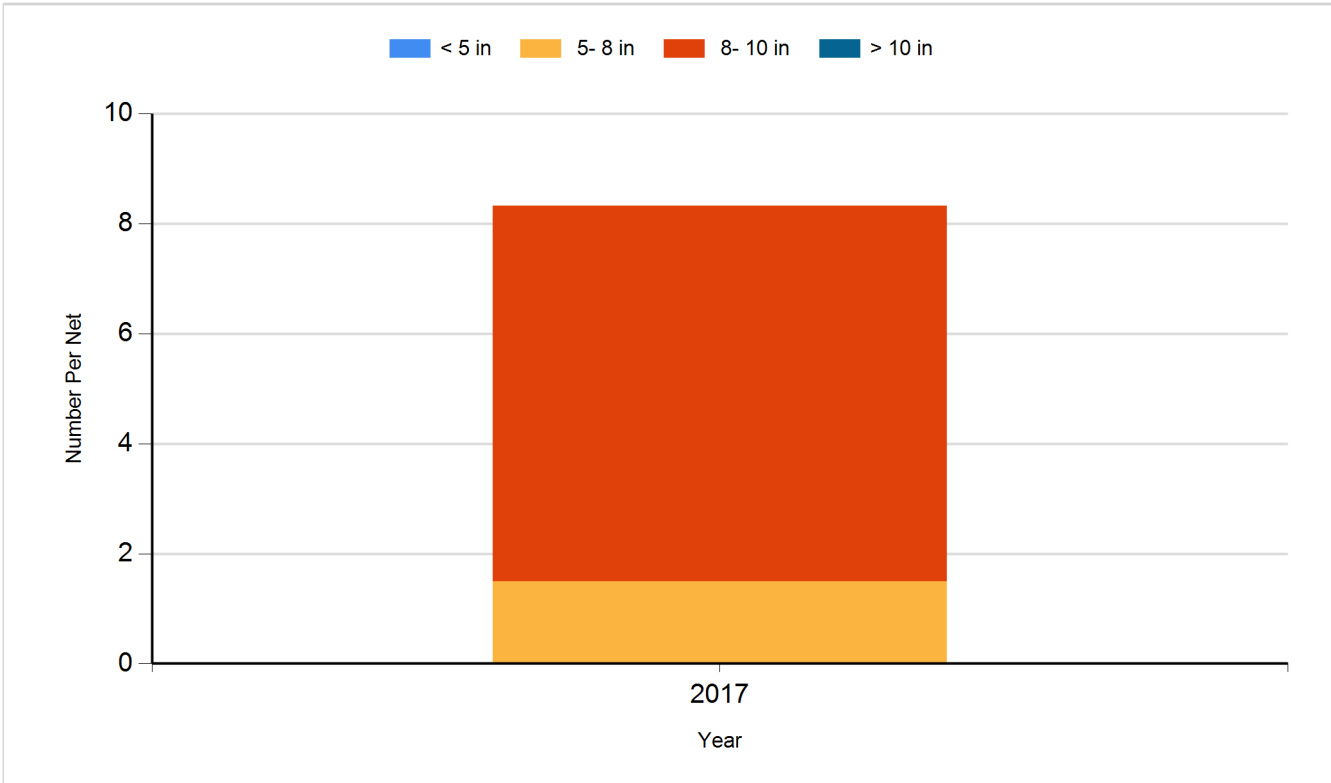
Species: Black Bullhead
Gear: AFS std gill net



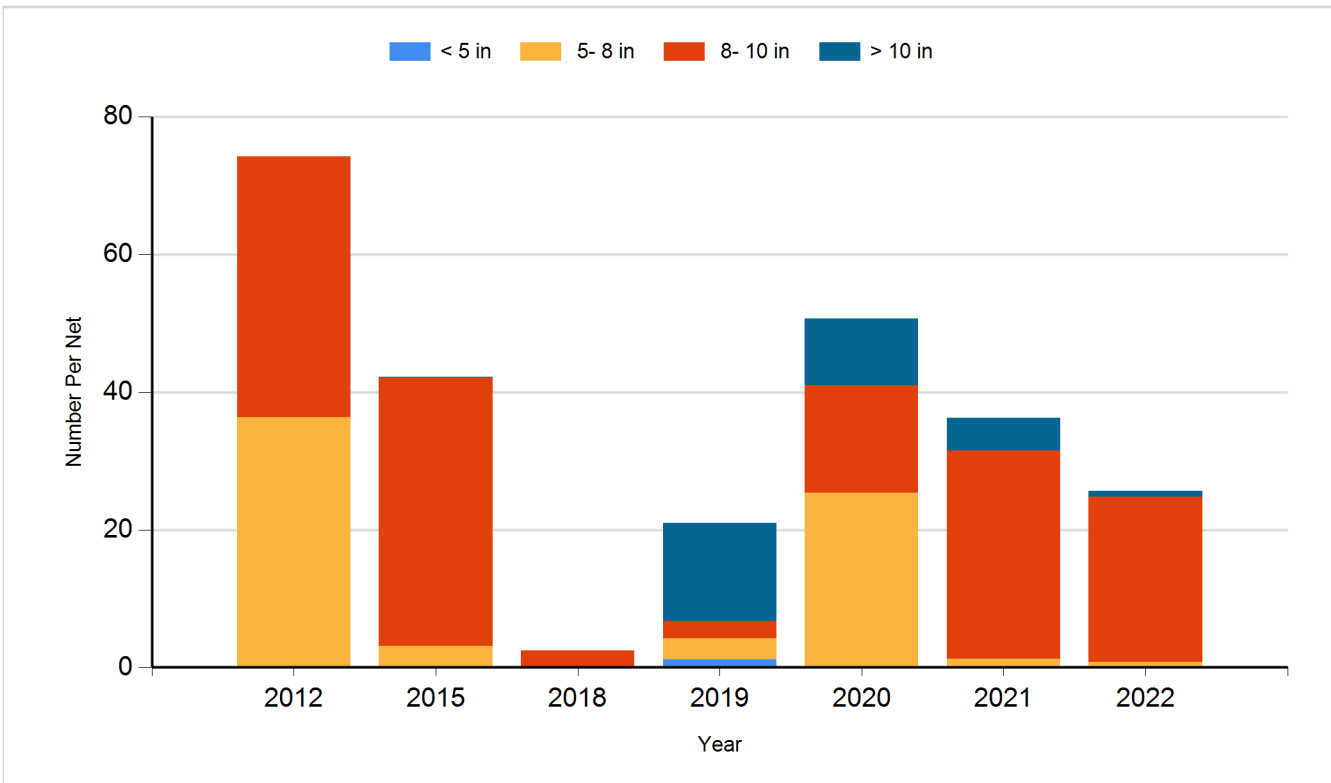
Species: Black Bullhead
Gear: std exp gill net



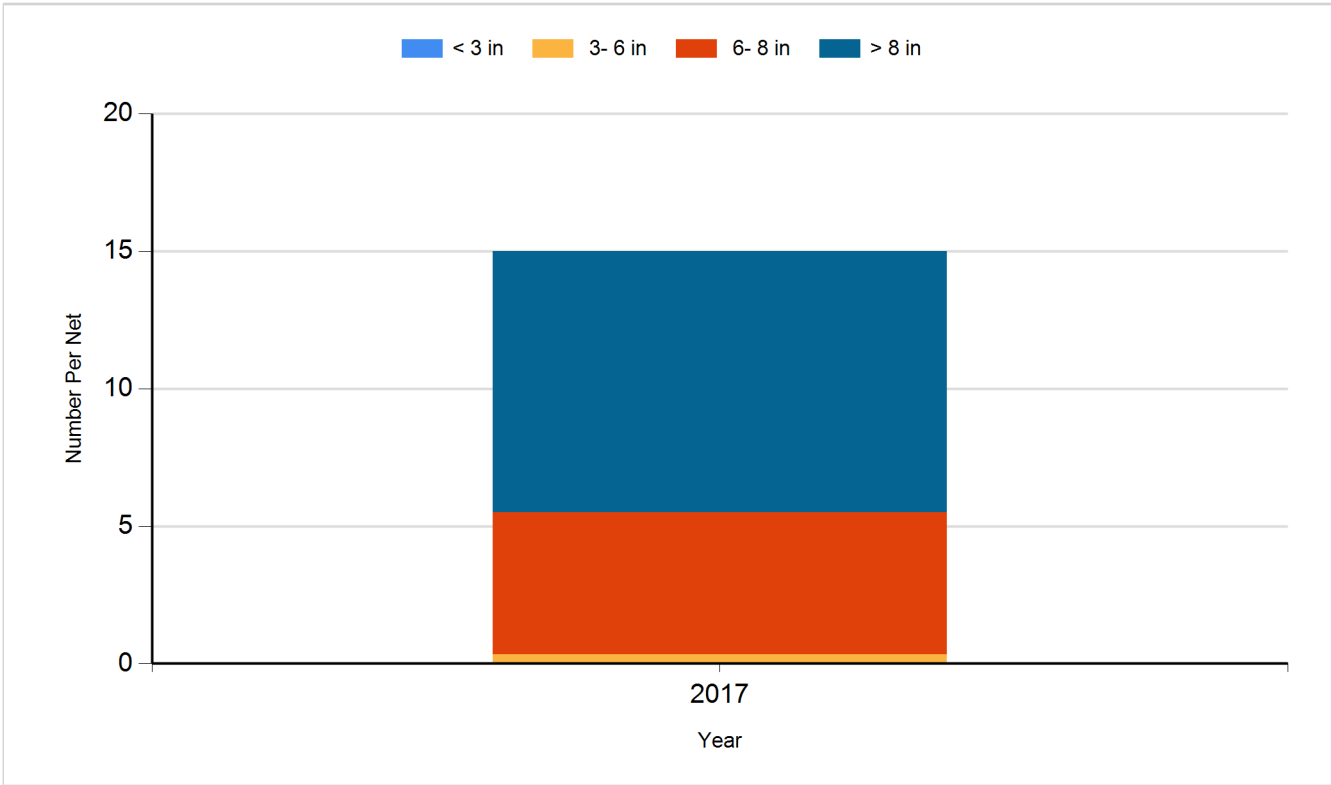
Species: Black Crappie
Gear: AFS std frame net



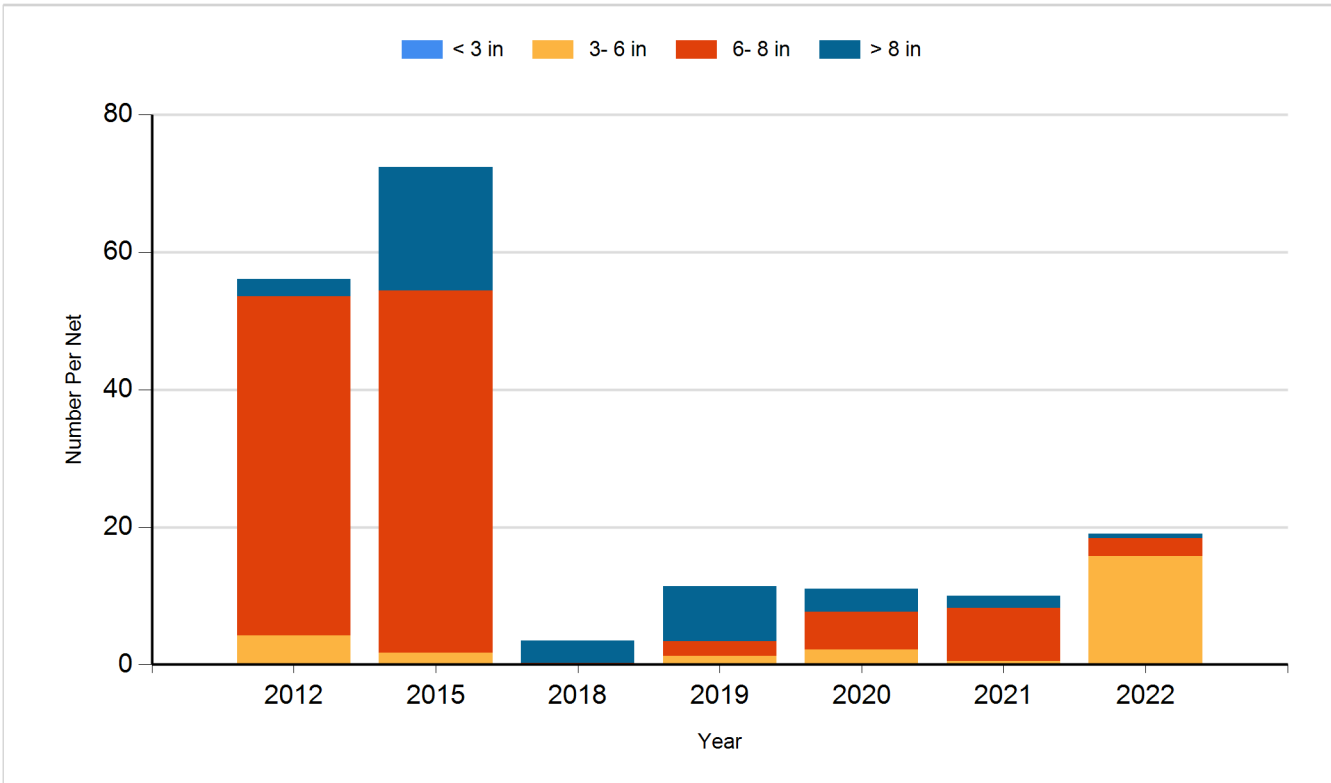
Species: Black Crappie
Gear: frame net (std 3/4 in)



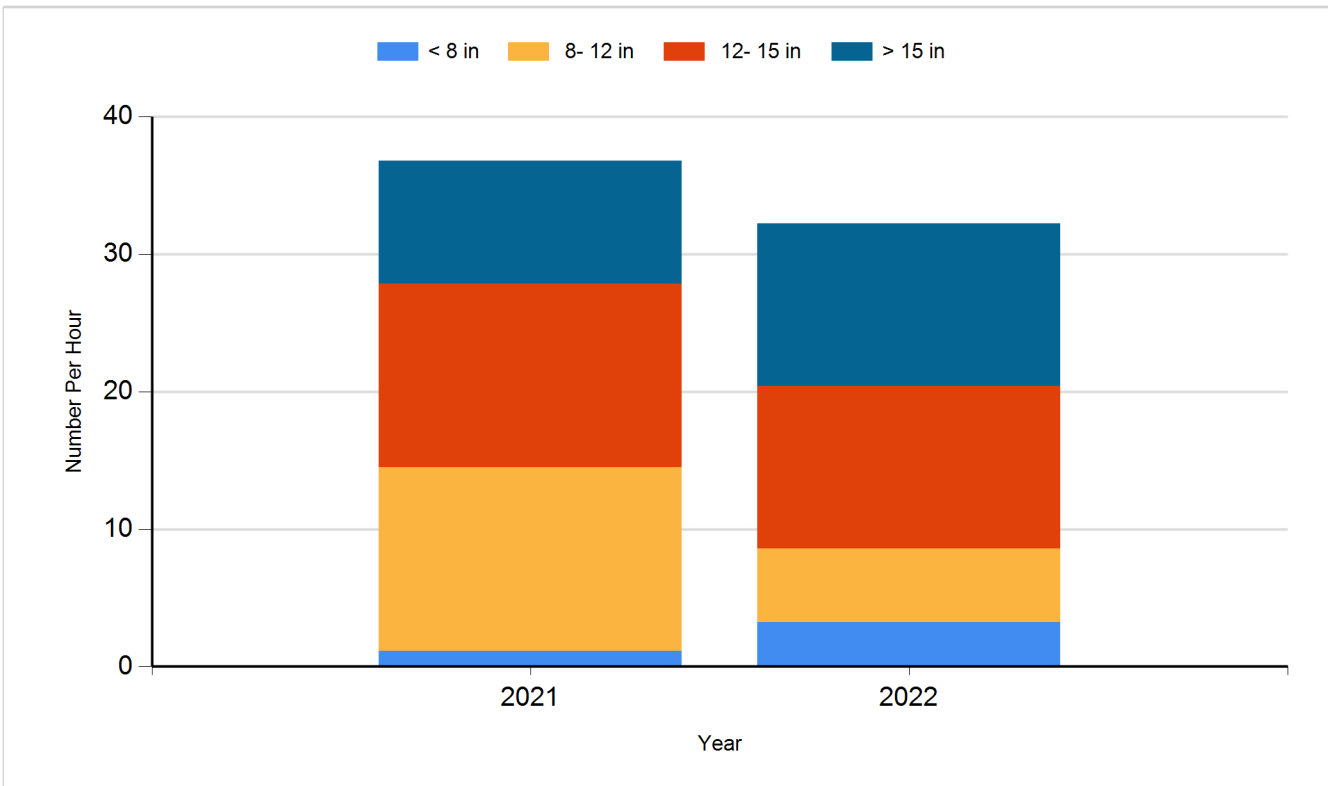
Species: Bluegill
Gear: AFS std frame net



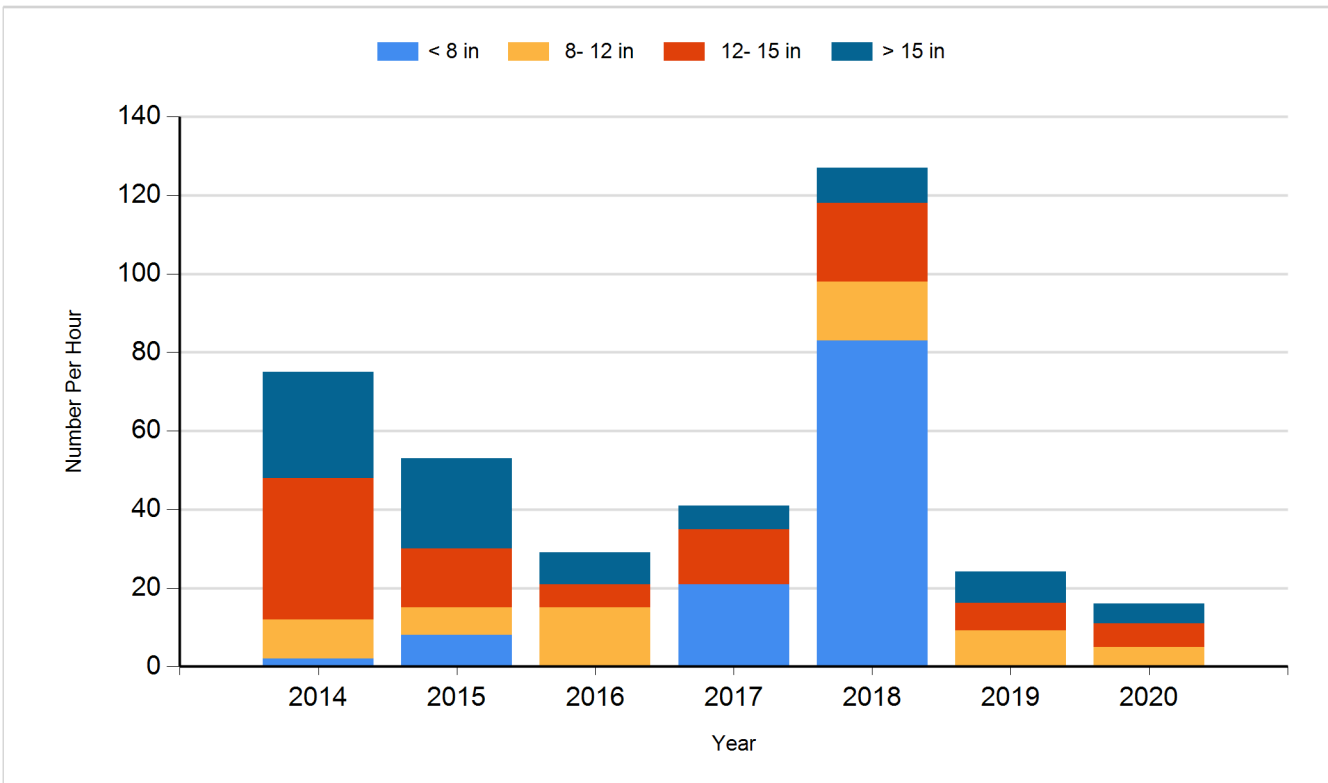
Species: Bluegill
Gear: frame net (std 3/4 in)



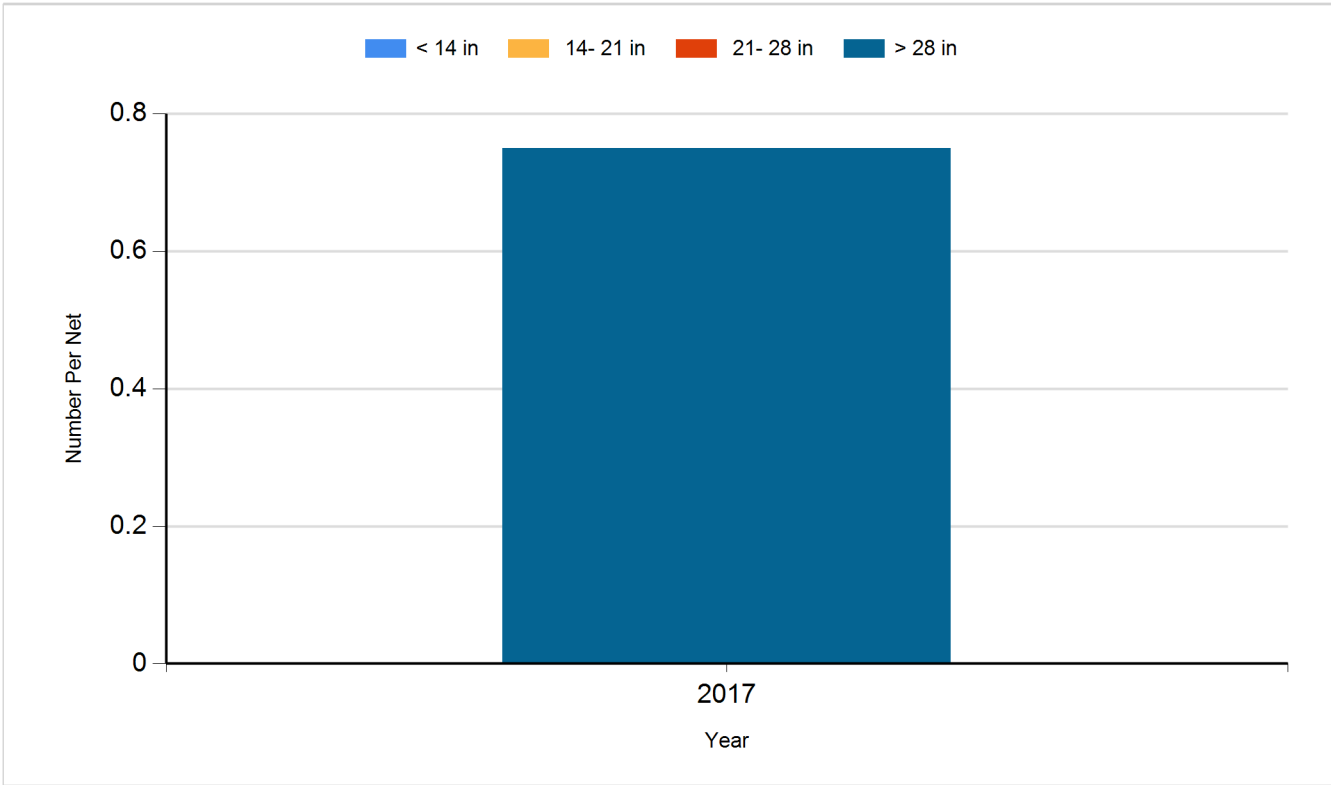
Species: Largemouth Bass
Gear: boat shocker (day)



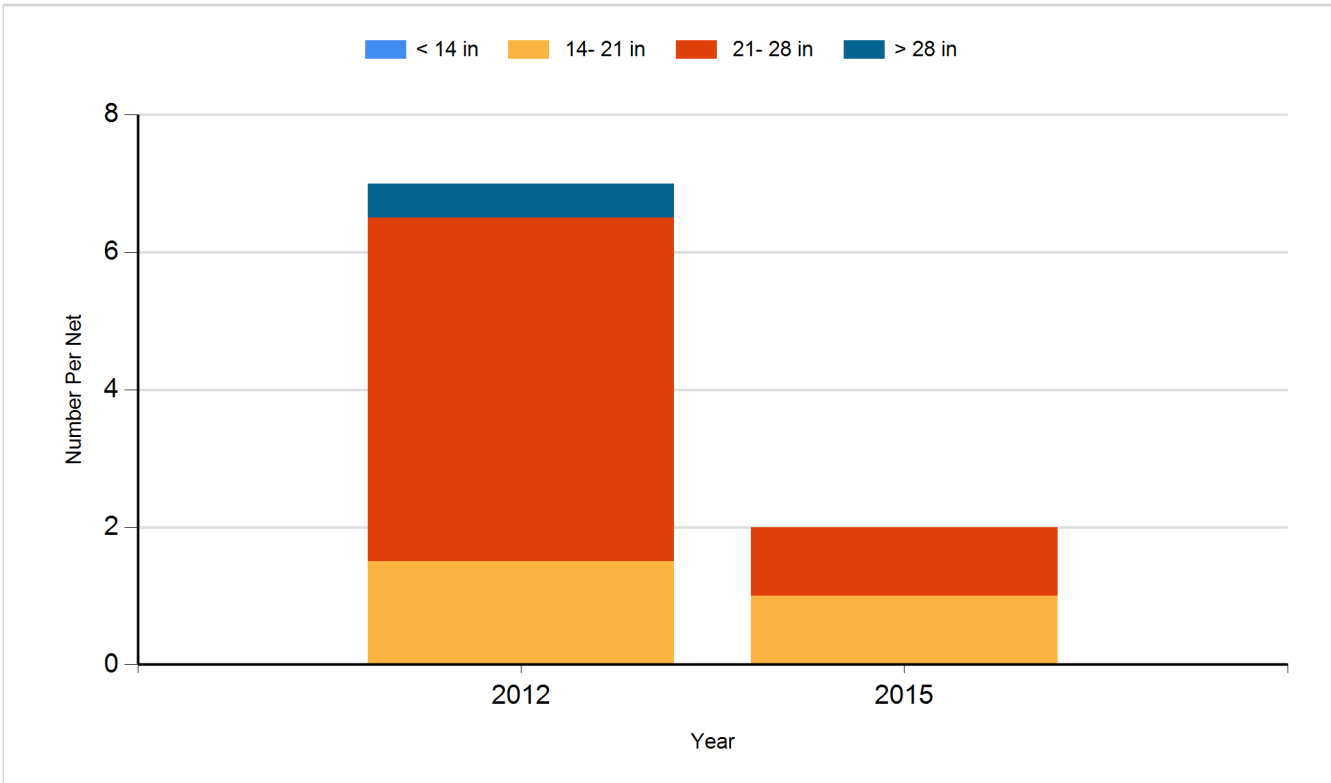
Species: Largemouth Bass
Gear: boat shocker (night)



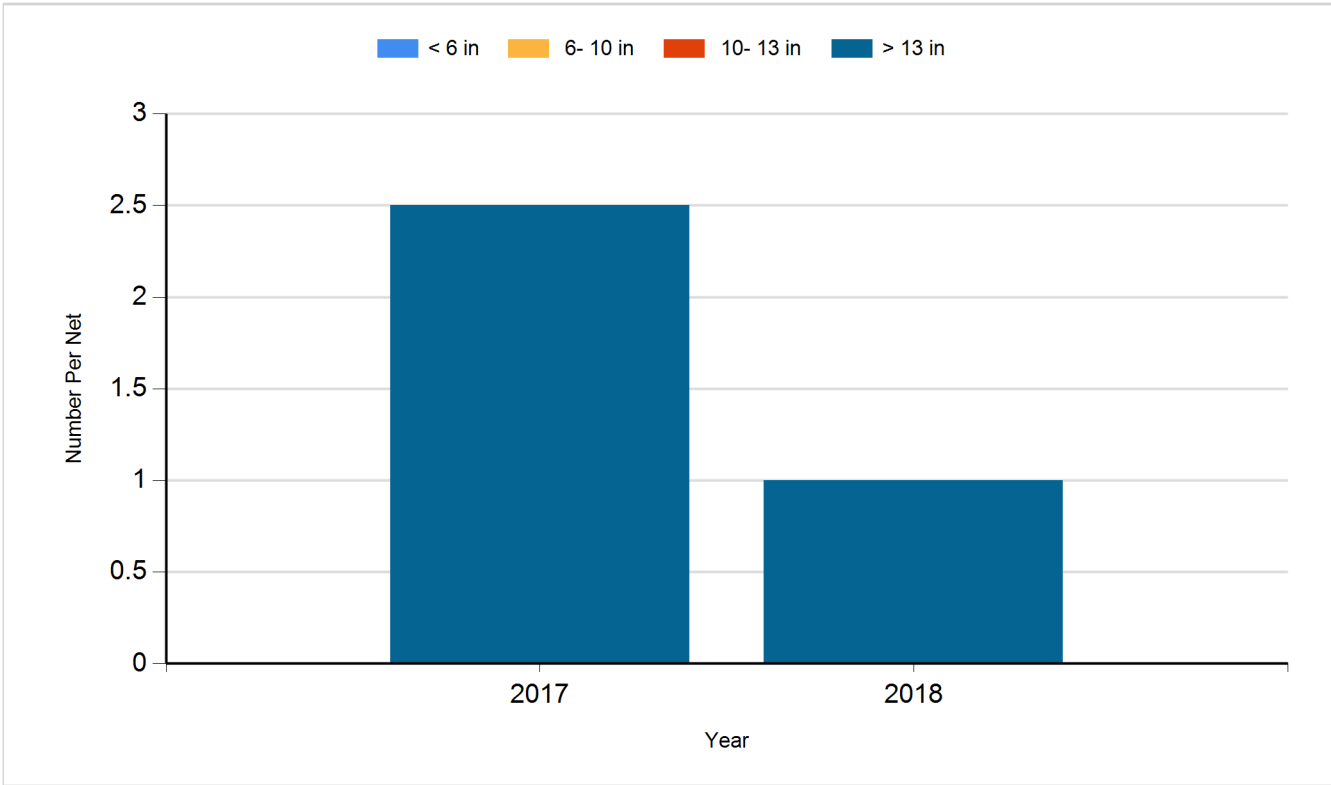
Species: Northern Pike
Gear: AFS std gill net



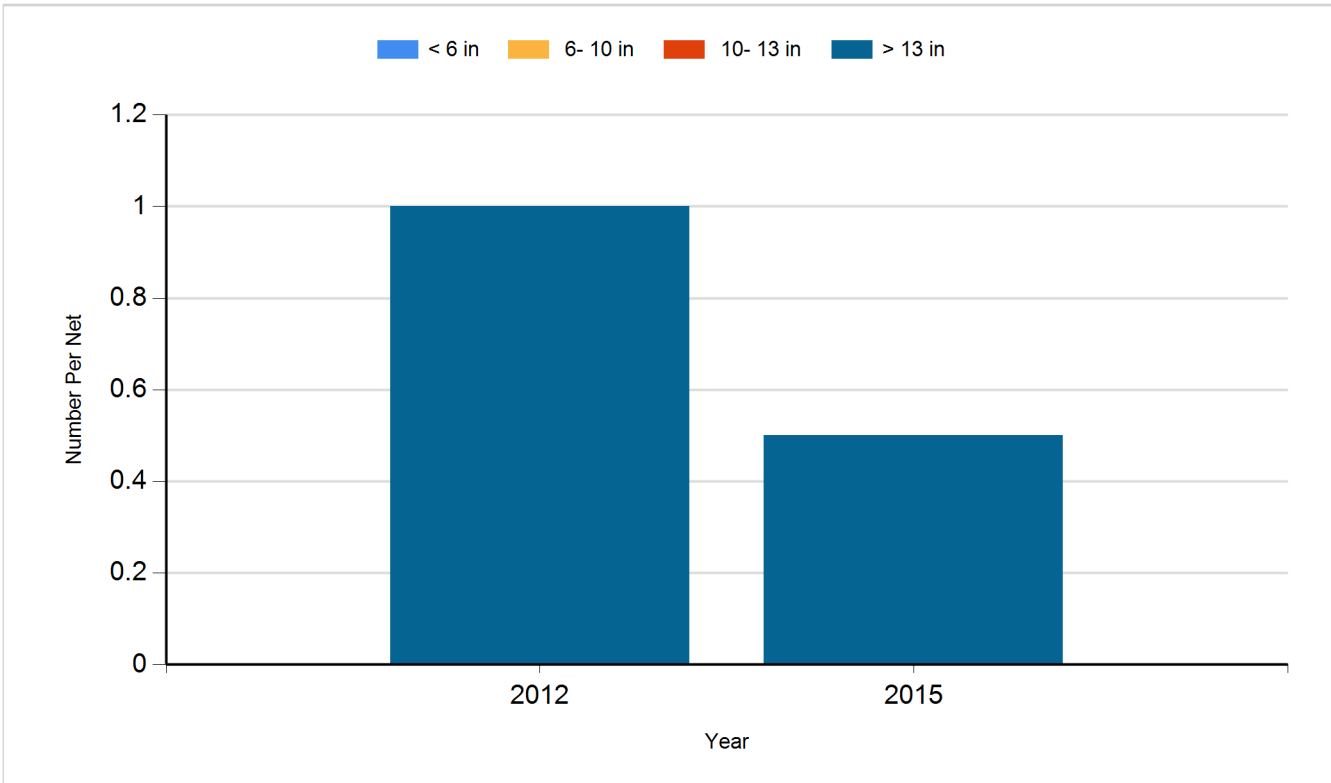
Species: Northern Pike
Gear: std exp gill net



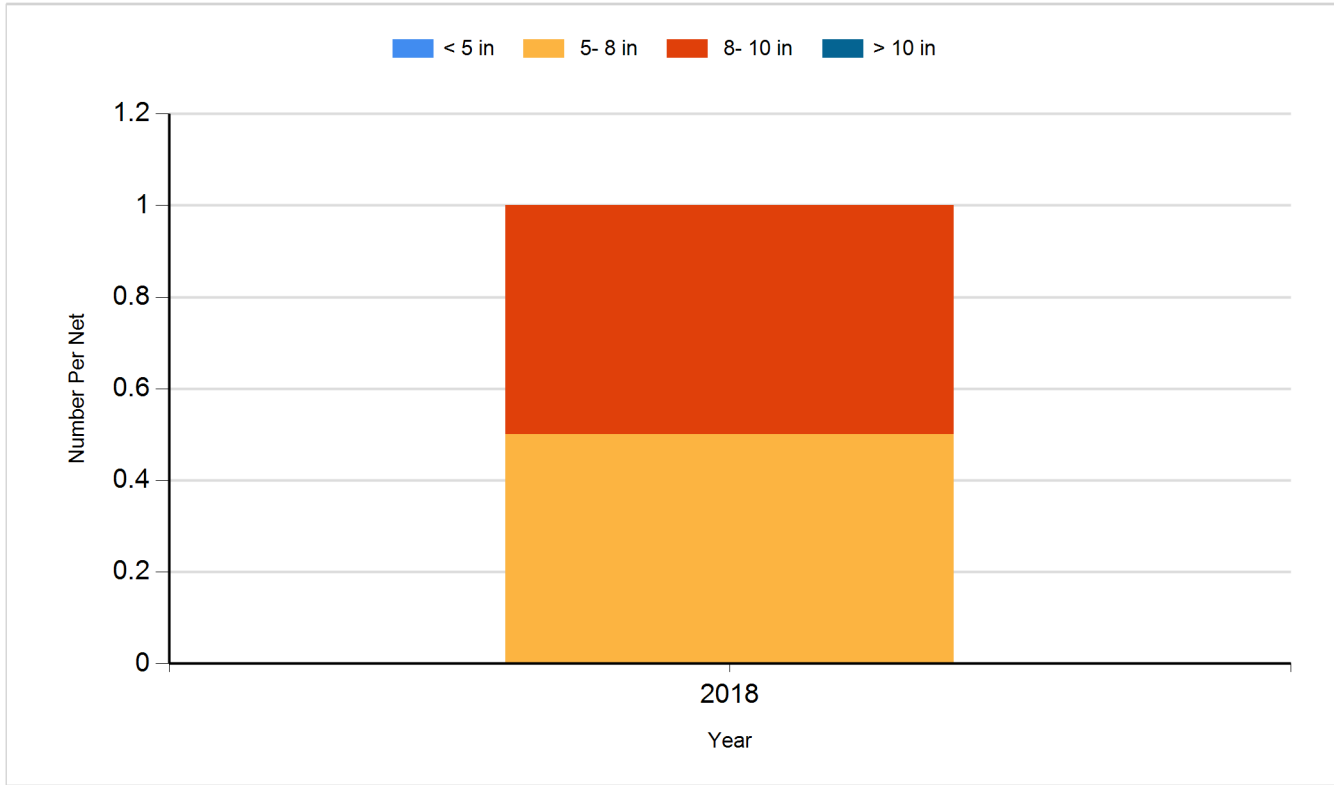
Species: White Sucker
Gear: AFS std gill net



Species: White Sucker
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