

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Stockade, Custer County

MCS-Lake-12-000

2024

Lake Information

Name: Stockade

County: Custer

Surface Area: 129 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 06, 2024	4 net-nights
AFS std gill net	Aug 07, 2024	4 net-nights
boat shocker (day)	Oct 11, 2024	3600 seconds
frame net (std 3/4 in)	Aug 06, 2024	4 net-nights
frame net (std 3/4 in)	Aug 07, 2024	3 net-nights

Common Fish Species Present

Yellow Perch

Smallmouth Bass

Northern Pike

Largemouth Bass

Bluegill

Black Bullhead

Black Crappie

Walleye

Green Sunfish

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
AFS std gill net	Black Bullhead	50	6.3	2.7	100		14	8	94	2
	Black Crappie	14	1.8	1.2	71		0		116	17
	Bluegill	95	11.9	6.5	80	6	22	6	102	2
	Golden Shiner	3	0.0	0.0						
	Largemouth Bass	3	0.4	0.4	67		0		130	24
	Northern Pike	14	1.8	0.6	93		29		90	3
	Smallmouth Bass	2	0.3	0.4	100		100		87	8
	White Sucker	4	0.5	0.3	100		100		98	5
	Yellow Perch	15	1.9	1.3	47	21	0		85	2
boat shocker (day)	Largemouth Bass	98	71.0	11.1	56	9	20	7	109	2
	Smallmouth Bass	4	4.0	3.0	0		0		94	2
	Walleye*	2	2.0	3.0	100		100		101	14
frame net (std 3/4 in)	Black Bullhead	36	5.1	5.3	100		8		88	4
	Black Crappie	26	3.7	2.9	65	15	12		94	3
	Bluegill	168	24.0	8.4	61	5	11	3	99	4
	Green Sunfish	4	0.6	0.3	100		0		111	5
	Northern Pike	10	1.4	0.9	40		0		87	3
	Walleye	1	0.1	0.2	100		100		84	
	Yellow Perch	62	8.4	3.4	25	8	0		87	5

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		
AFS std frame net	Black Bullhead			0.0			18.1						9.05
	Black Crappie			0.0			5.9						2.95
	Bluegill			0.0			8.4						4.20
	Green Sunfish			0.0			0.3						0.15
	Northern Pike			0.0			0.4						0.20
	White Sucker			0.0			0.1						0.05
	Yellow Perch			0.0			0.8						0.40
AFS std gill net	Black Bullhead				38.5		11.3	16.5	15.3	11.0	6.3		16.48
	Black Crappie				0.0		2.3	7.3	5.5	2.5	1.8		3.23
	Bluegill				1.5		5.0	20.5	11.5	6.5	11.9		9.48
	Channel Catfish				0.3		0.0	0.3	0.0	0.0	0.0		0.10
	Golden Shiner				0.0		0.0	0.0	0.0	0.0	0.0		0.00
	Largemouth Bass				0.0		0.0	0.3	0.0	0.3	0.4		0.17
	Northern Pike				1.8		2.3	3.3	2.0	1.8	1.8		2.17
	Smallmouth Bass				0.3		0.3	1.5	1.0	0.5	0.3		0.65
	Walleye				0.0		0.0	0.8	0.3	0.5	0.0		0.27
	White Sucker				0.3		0.8	1.8	0.3	0.5	0.5		0.70
	Yellow Perch				2.5		0.3	7.0	16.5	3.3	1.9		5.25
boat shocker (day)	Largemouth Bass								86.0		71.0		78.50
	Smallmouth Bass								2.0		4.0		3.00
	Walleye*								0.0		2.0		1.00
boat shocker (night)	Largemouth Bass	84.0	68.0	66.9	105.0	134.0	59.0	64.0		47.0			78.49
	Smallmouth Bass	0.0	9.0	13.7	7.0	26.0	1.0	4.0		6.0			8.34
	Walleye*	0.0	0.0	0.0	0.0	4.0	0.0	1.0		1.0			0.75
frame net (std 3/4 in)	Black Bullhead	471.1			91.4					6.9	5.1		143.63
	Black Crappie	5.3			2.5					3.1	3.7		3.65
	Bluegill	12.8			9.1					30.1	24.0		19.00
	Bluegill X Gr. Sunfish Hybrid	0.1			0.0					0.0	0.0		0.03
	Golden Shiner	0.0			0.0					0.0	0.0		0.00
	Green Sunfish	0.0			0.0					0.4	0.6		0.25
	Largemouth Bass	0.1			0.0					0.0	0.0		0.03
	Northern Pike	0.6			0.8					0.6	1.4		0.85
Smallmouth Bass	0.4			0.6					0.0	0.0		0.25	

CPUE

Gear	Species	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg
frame net (std 3/4 in)	Walleye	0.0			0.0					0.0	0.1	0.03
	White Sucker	0.1			0.1					0.0	0.0	0.05
	Yellow Perch	3.0			21.0					13.6	8.4	11.50
std exp gill net	Black Bullhead	41.0	53.5									47.25
	Black Crappie	0.5	0.0									0.25
	Bluegill	1.5	1.0									1.25
	Golden Shiner	0.0	0.0									0.00
	Largemouth Bass	0.5	1.0									0.75
	Northern Pike	5.5	4.5									5.00
	Smallmouth Bass	0.0	0.0									0.00
	White Sucker	0.5	1.0									0.75
	Yellow Perch	61.5	63.5									

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				
AFS std frame net	Black Bullhead	PSD			100					95						
		PSD-P			0					0						
		Wr			97					86						
	Black Crappie	PSD			67					40						
		PSD-P			0					2						
		Wr			93					97						
	Bluegill	PSD								52						
		PSD-P								10						
		Wr								98						
	Green Sunfish	PSD								100						
		PSD-P								50						
		Wr								118						
	Northern Pike	PSD								100						
		PSD-P								0						
		Wr								85						
	White Sucker	PSD			100					100						
		PSD-P			100					100						
		Wr			100					81						
Yellow Perch	PSD								33							
	PSD-P								0							
	Wr								81							
AFS std gill net	Black Bullhead	PSD				100			98	100	100	100	100	100		
		PSD-P				0			0	2	7	16	14			
		Wr				88			95	95		98	94			
	Black Crappie	PSD								11	93	77	50	71		
		PSD-P								0	0	0	10	0		
		Wr								107	110		98	116		
	Bluegill	PSD				100				75	94	98	81	80		
		PSD-P				33				10	10	33	31	22		
		Wr				109				108	106		97	102		
	Largemouth Bass	PSD									100		100	67		
		PSD-P									100		100	0		
		Wr									116		100	130		

Gear	Species	Index	Year										
			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
AFS std gill net	Northern Pike	PSD				86		100	85	88	100	93	
		PSD-P				29		11	38	13	29	29	
		Wr				95		91	96		90	90	
	Smallmouth Bass	PSD				100		100	100	100	100	100	
		PSD-P				100		100	67	100	100	100	
		Wr				77		89	102		91	87	
	Walleye	PSD								67	100	100	
		PSD-P								0	100	0	
		Wr								88		89	
	White Sucker	PSD				100		100	100	100	100	100	
		PSD-P				100		100	100	100	100	100	
		Wr				97		97	102		100	98	
	Yellow Perch	PSD				60		0	0	5	15	47	
		PSD-P				10		0	0	0	0	0	
		Wr				84		93	108		81	85	
boat shocker (day)	Largemouth Bass	PSD								59		56	
		PSD-P								8		20	
		Wr								109		109	
	Smallmouth Bass	PSD								0		0	
		PSD-P								0		0	
		Wr								99		94	
	Walleye	PSD											100
		PSD-P											100
		Wr											101
boat shocker (night)	Largemouth Bass	PSD	46	72	78	65	66	53	83		55		
		PSD-P	18	47	19	11	16	14	19		13		
		Wr	125	75	111	103	105	104	101		105		
	Smallmouth Bass	PSD	0	33	56	71	73	100	75		17		
		PSD-P	0	22	19	14	35	100	0		0		
		Wr		66	100	93	90	60	88		86		
	Walleye	PSD						0		0		100	
		PSD-P						0		0		100	
		Wr						104		102		100	
frame net (std 3/4 in)	Black Bullhead	PSD	0			79					98	100	
		PSD-P	0			0					9	8	
		Wr	84			88					91	88	

Gear	Species	Index	Year									
			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
frame net (std 3/4 in)	Black Crappie	PSD	69			15					92	65
		PSD-P	2			5					68	12
		Wr	109			102					87	94
	Bluegill	PSD	93			44					80	61
		PSD-P	23			16					16	11
		Wr	111			103					96	99
	Green Sunfish	PSD									100	100
		PSD-P									33	0
		Wr									111	111
	Largemouth Bass	PSD	100									
		PSD-P	0									
		Wr	110									
	Northern Pike	PSD	40			50					60	40
		PSD-P	0			17					0	0
		Wr	81			96					93	87
	Smallmouth Bass	PSD	67			80						
		PSD-P	33			20						
		Wr	95			90						
	Walleye	PSD										100
		PSD-P										100
		Wr										84
White Sucker	PSD	100			100							
	PSD-P	100			100							
	Wr	102			101							
Yellow Perch	PSD	92			89					20	25	
	PSD-P	42			4					0	0	
	Wr	78			76					83	87	
std exp gill net	Black Bullhead	PSD	0	12								
		PSD-P	0	0								
		Wr	98	104								
	Black Crappie	PSD	0									
		PSD-P	0									
		Wr	96									
	Bluegill	PSD	100	50								
		PSD-P	100	50								
		Wr	102	123								
	Largemouth Bass	PSD	100	100								

Gear	Species	Index	Year										
			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
std exp gill net	Largemouth Bass	PSD-P	0	100									
		Wr	131	99									
	Northern Pike	PSD	64	78									
		PSD-P	9	0									
		Wr	90	95									
	White Sucker	PSD	100	100									
		PSD-P	100	100									
		Wr	109	104									
	Yellow Perch	PSD	62	60									
		PSD-P	15	5									
		Wr	89	90									

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+
2015	100		140 (2)	178 (42)	192 (45)	210 (13)	215 (1)				

Species: Largemouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	71	366 (71)									

Species: Smallmouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	9	302 (9)									

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	127			187 (39)	206 (52)	220 (20)	237 (3)		245 (4)	234 (2)	250 (5)

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).

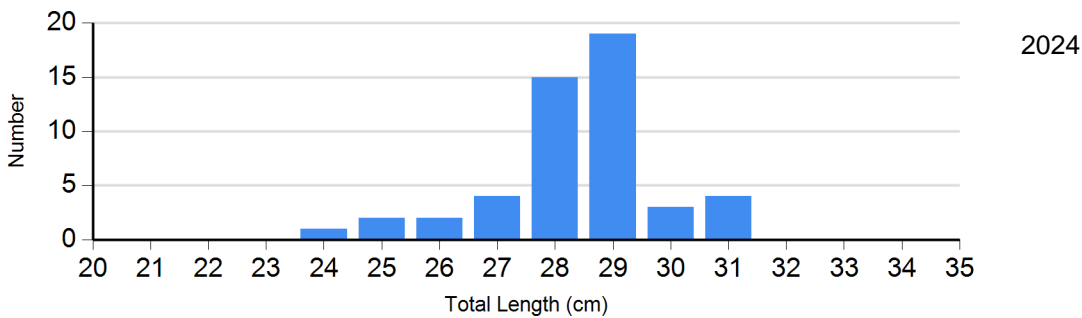
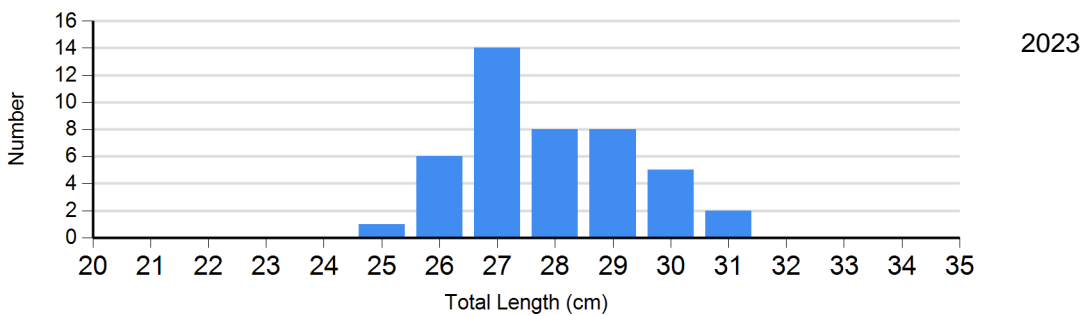
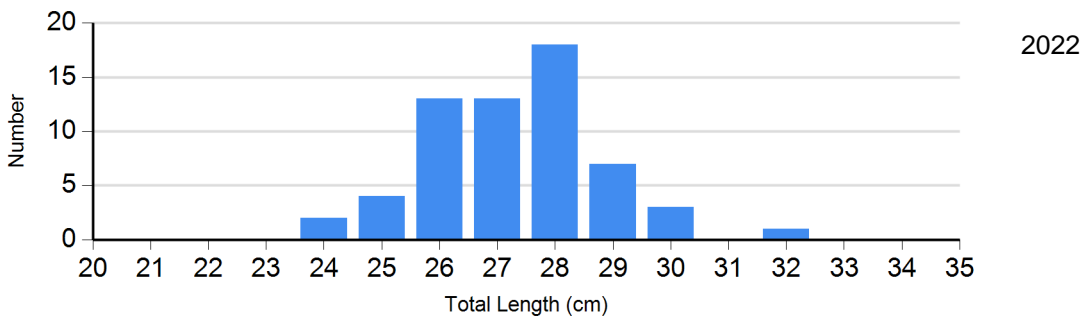
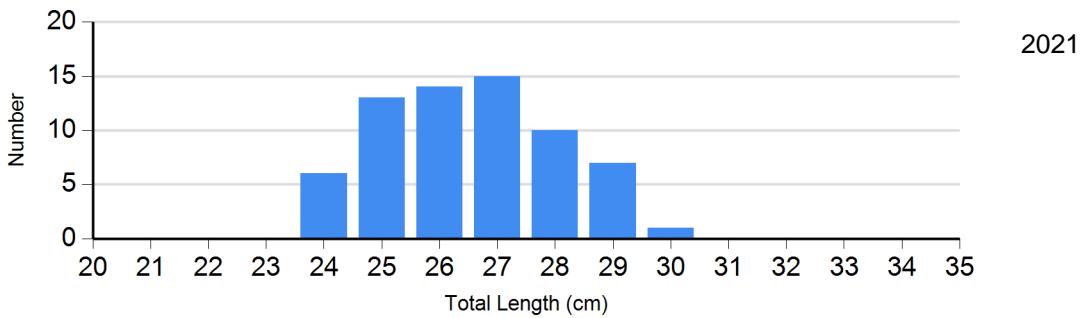
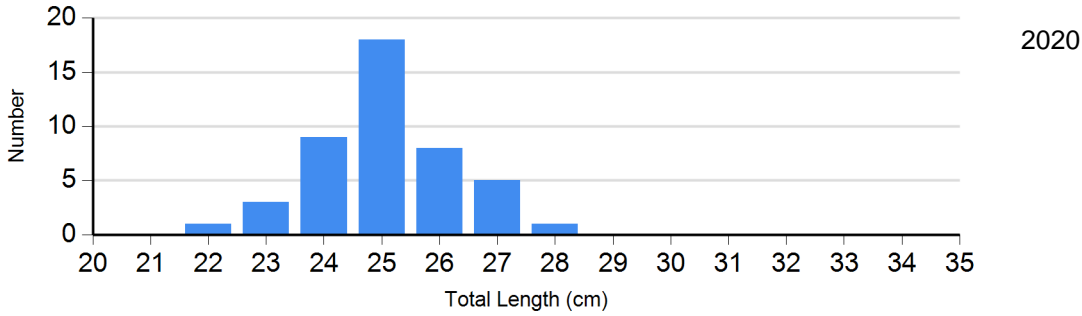
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2020	1	89	44	95 (1.4)	0		0	
	2021	0		65	94 (1.2)	1	98	0	
	2023	0		37	100 (1.5)	7	91 (3.1)	0	
	2024	0		43	94 (1.7)	7	93 (4.0)	0	
Black Crappie Frame Net	2020	28	99 (1.2)	18	94 (1.3)	1	77	0	
	2023	2	86 (8.3)	6	98 (5.7)	15	87 (1.4)	2	57 (25.5)
	2024	9	100 (3.6)	14	90 (3.2)	3	89 (7.8)	0	
Bluegill Frame Net	2020	32	99 (7.4)	28	98 (1.9)	7	91 (1.2)	0	
	2023	47	102 (1.8)	155	96 (1.0)	39	86 (1.8)	0	
	2024	66	109 (7.7)	84	95 (1.3)	18	84 (2.1)	0	
Largemouth Bass Electro Fishing	2020	28	108 (2.4)	23	102 (2.0)	8	96 (3.3)	0	
	2021	11	103 (2.7)	41	102 (0.9)	12	96 (2.2)	0	
	2022	35	110 (1.2)	44	109 (0.9)	7	99 (3.6)	0	
	2023	21	108 (2.1)	20	106 (1.5)	5	103 (4.7)	1	2
	2024	31	112 (1.3)	26	108 (1.7)	14	105 (4.5)	0	
Northern Pike Gill Net	2020	0		8	91 (1.3)	1	92	0	
	2021	2	88 (10.3)	6	103 (8.6)	4	90 (4.6)	1	
	2023	0		5	91 (2.8)	1	82	1	
	2024	1	84	9	93 (2.3)	4	85 (5.0)	0	
Smallmouth Bass Electro Fishing	2020	0		0		1	60	0	
	2021	1	80	3	90 (5.1)	0		0	
	2022	2	99 (4.4)	0		0		0	

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Smallmouth Bass Electro Fishing	2023	5	87 (3.9)	1	81	0		0	
	2024	4	94 (1.7)	0		0		0	
Walleye Gill Net	2021	1	75	2	94 (8.3)	0		0	
	2023	0		2	89 (1.2)	0		0	
White Sucker Gill Net	2020	0		0		0		3	97 (6.6)
	2021	0		0		0		7	102 (2.2)
	2023	0		0		0		2	100 (0.6)
	2024	0		0		0		4	98 (3.8)
Yellow Perch Gill Net	2020	1	93	0		0		0	
	2021	28	108 (2.2)	0		0		0	
	2023	11	82 (2.2)	2	73 (2.9)	0		0	
	2024	8	88 (2.7)	7	81 (1.7)	0		0	

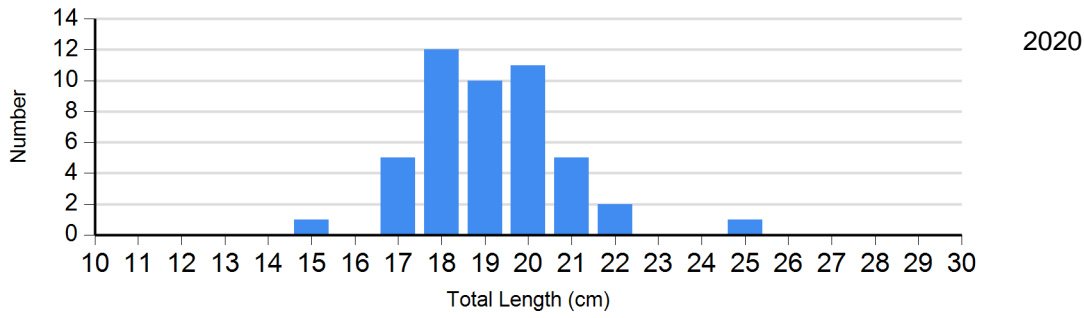
Length Frequency Distribution

Length frequency histogram of species sampled by year.

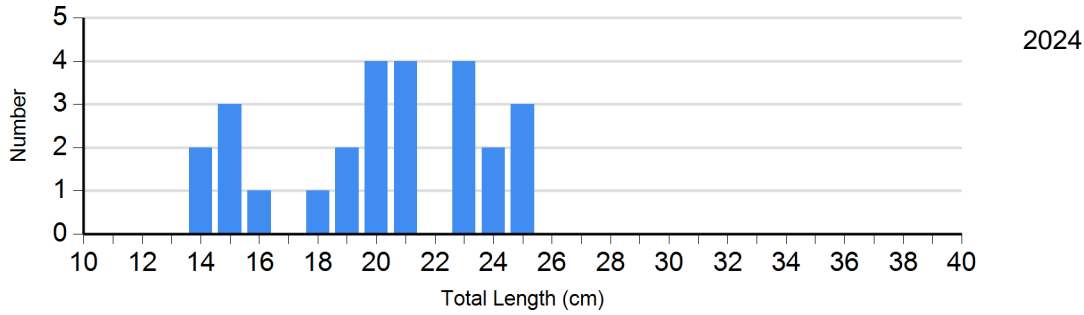
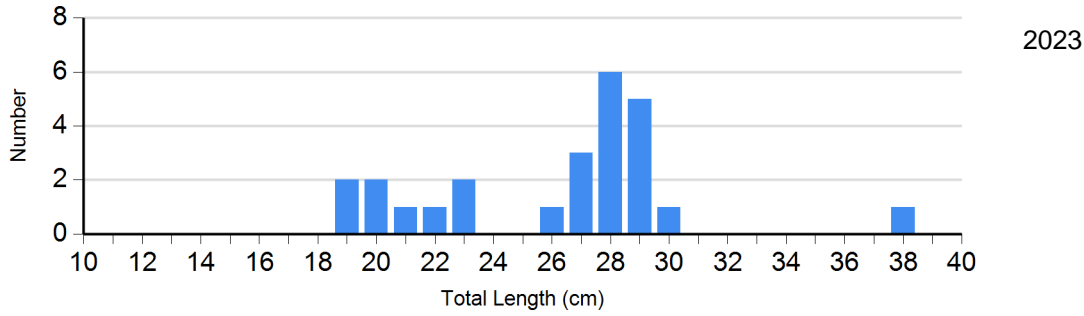
Species: Black Bullhead
Gear: AFS std gill net



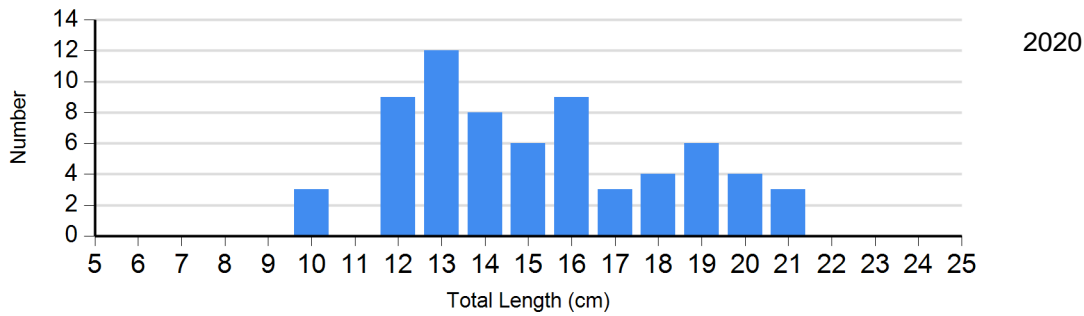
Species: Black Crappie
Gear: AFS std frame net



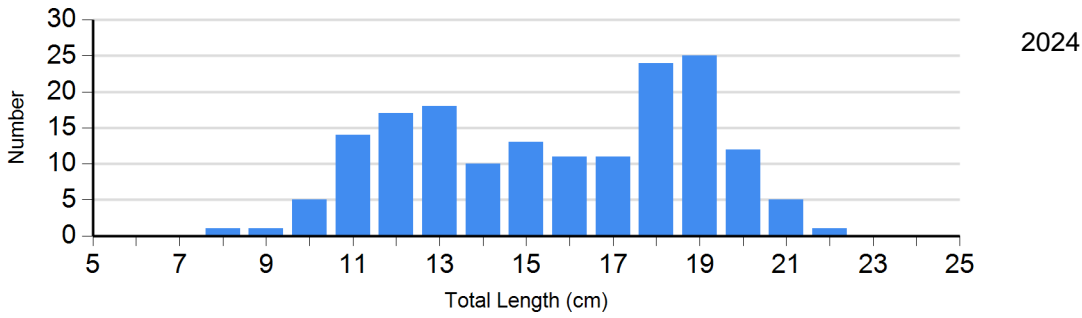
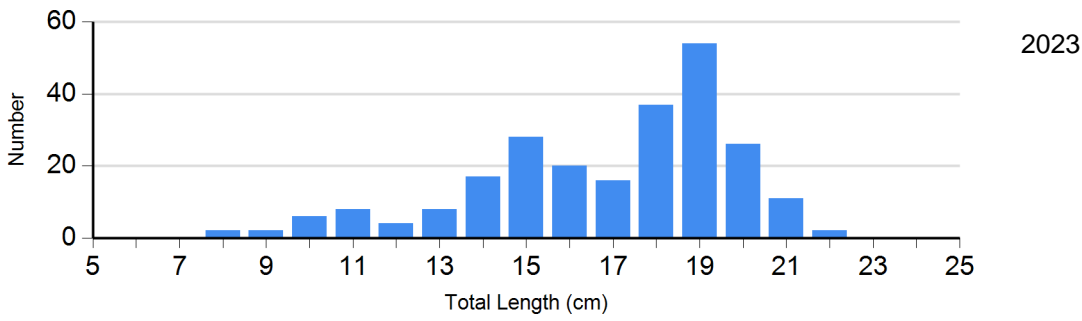
Species: Black Crappie
Gear: frame net (std 3/4 in)



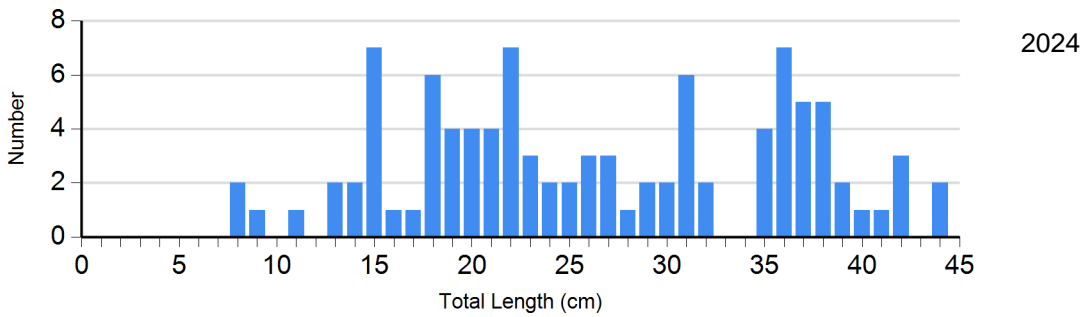
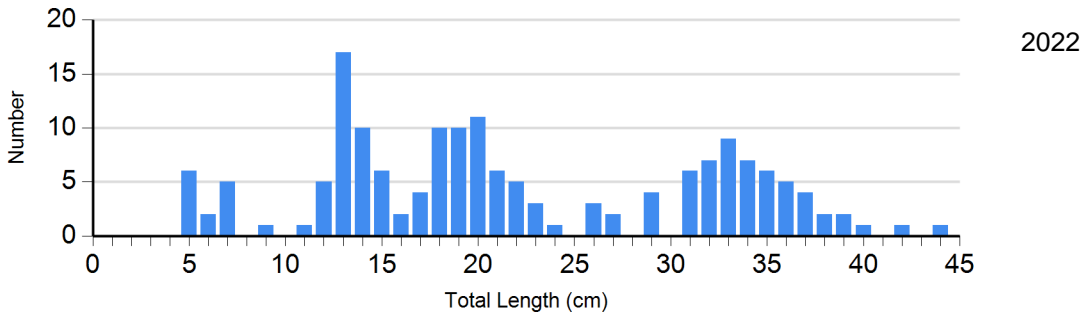
Species: Bluegill
Gear: AFS std frame net



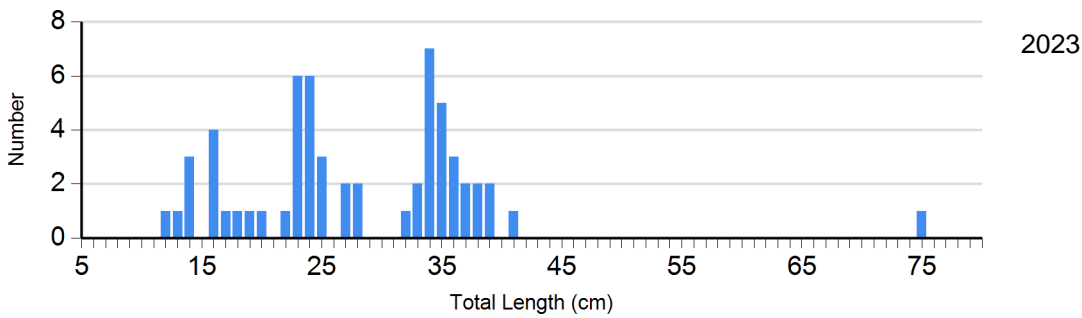
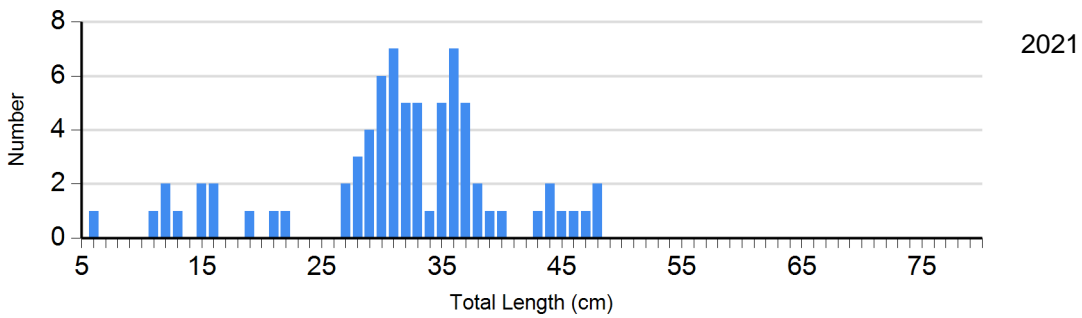
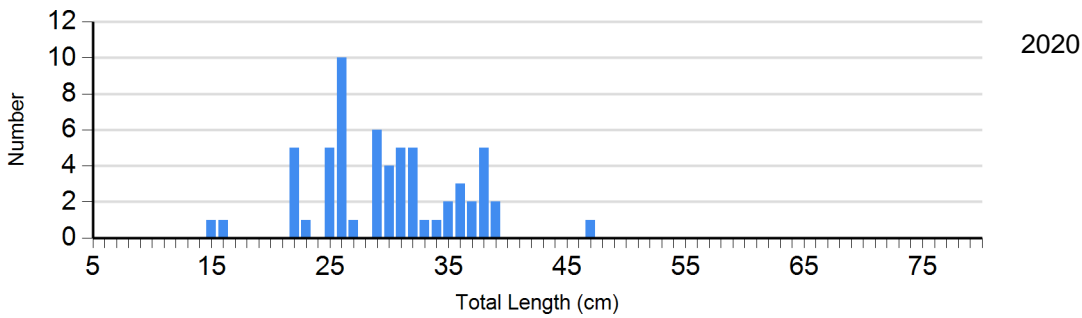
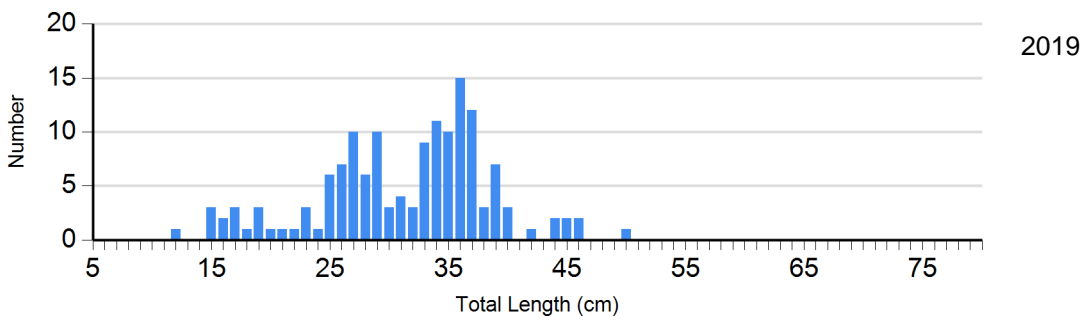
Species: Bluegill
Gear: frame net (std 3/4 in)



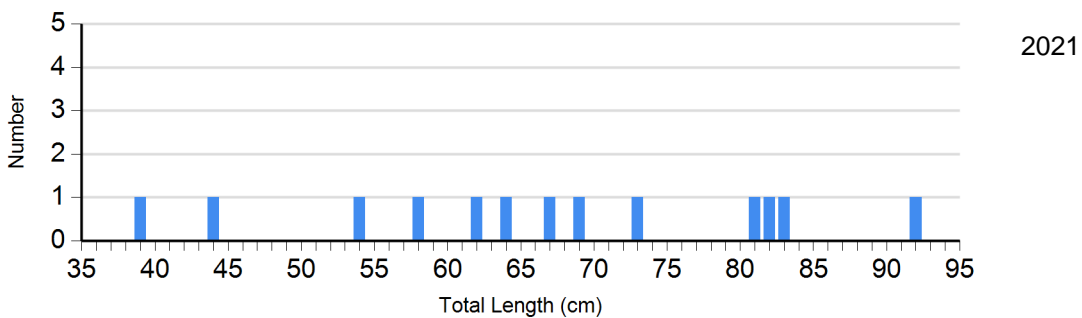
Species: Largemouth Bass
Gear: boat shocker (day)

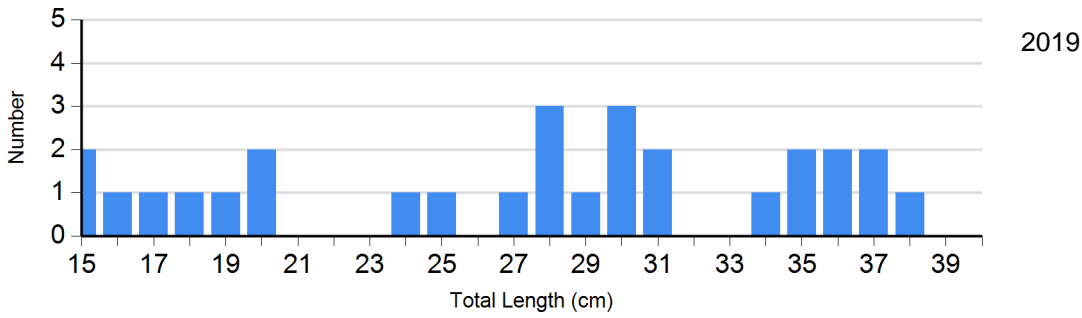
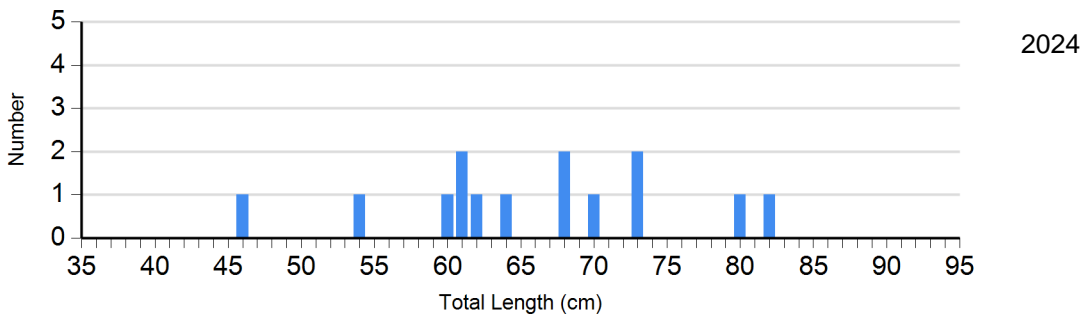


Species: Largemouth Bass
 Gear: boat shocker (night)

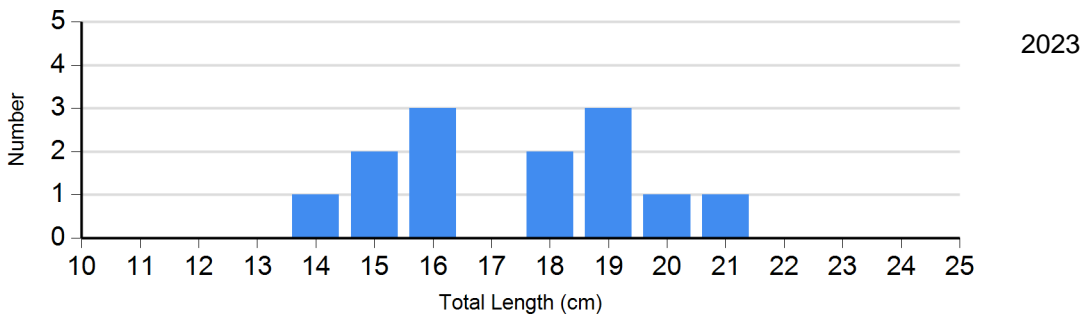
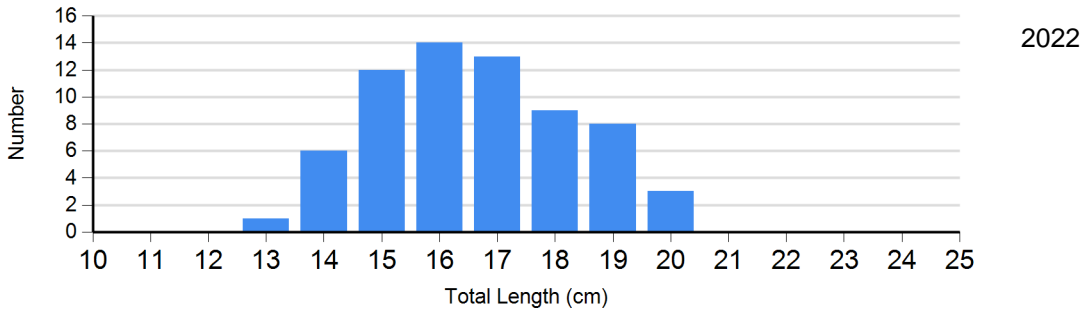
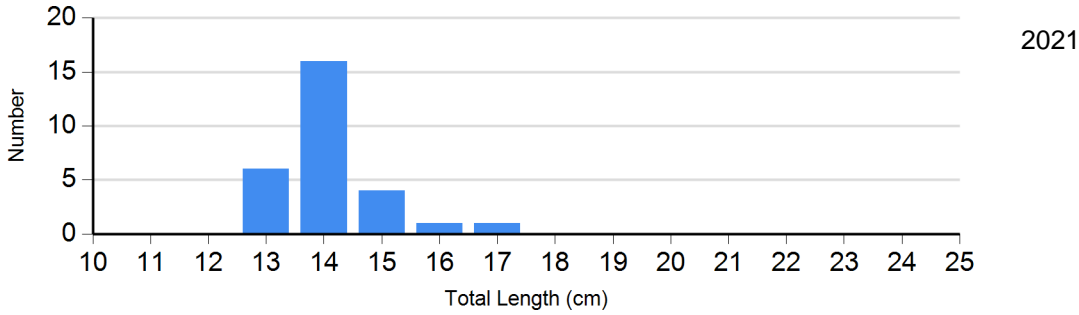


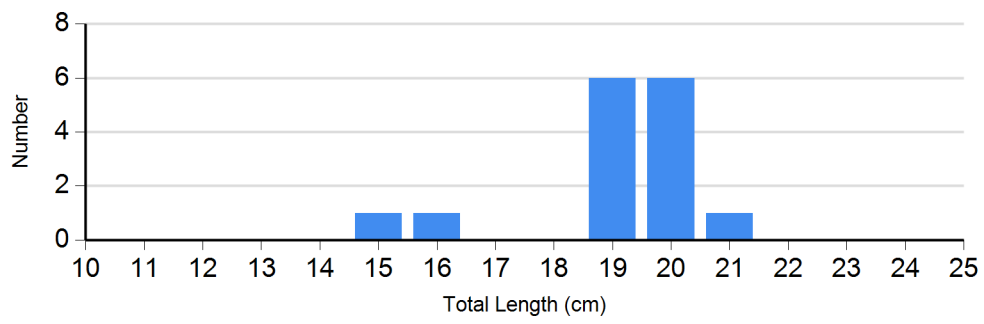
Species: Northern Pike
 Gear: AFS std gill net





Species: Yellow Perch
Gear: AFS std gill net



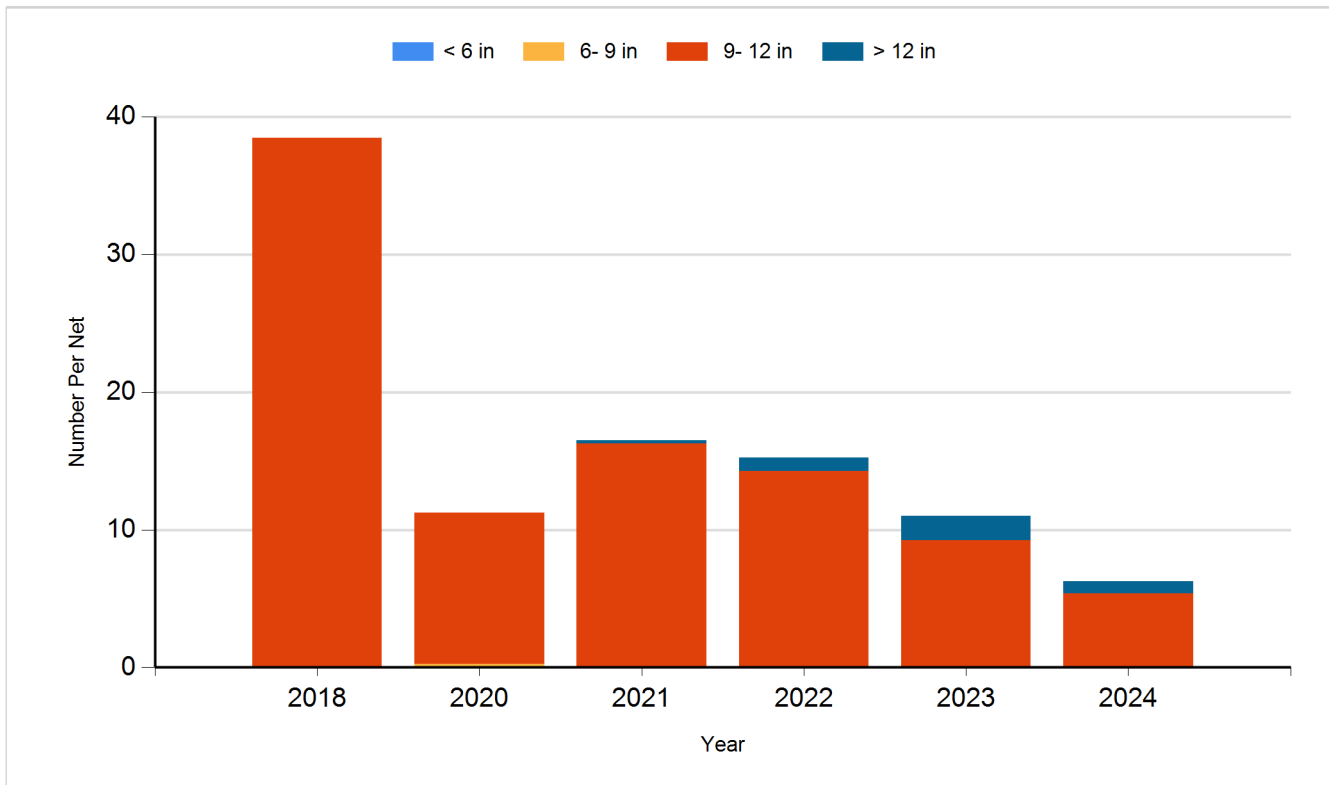


2024

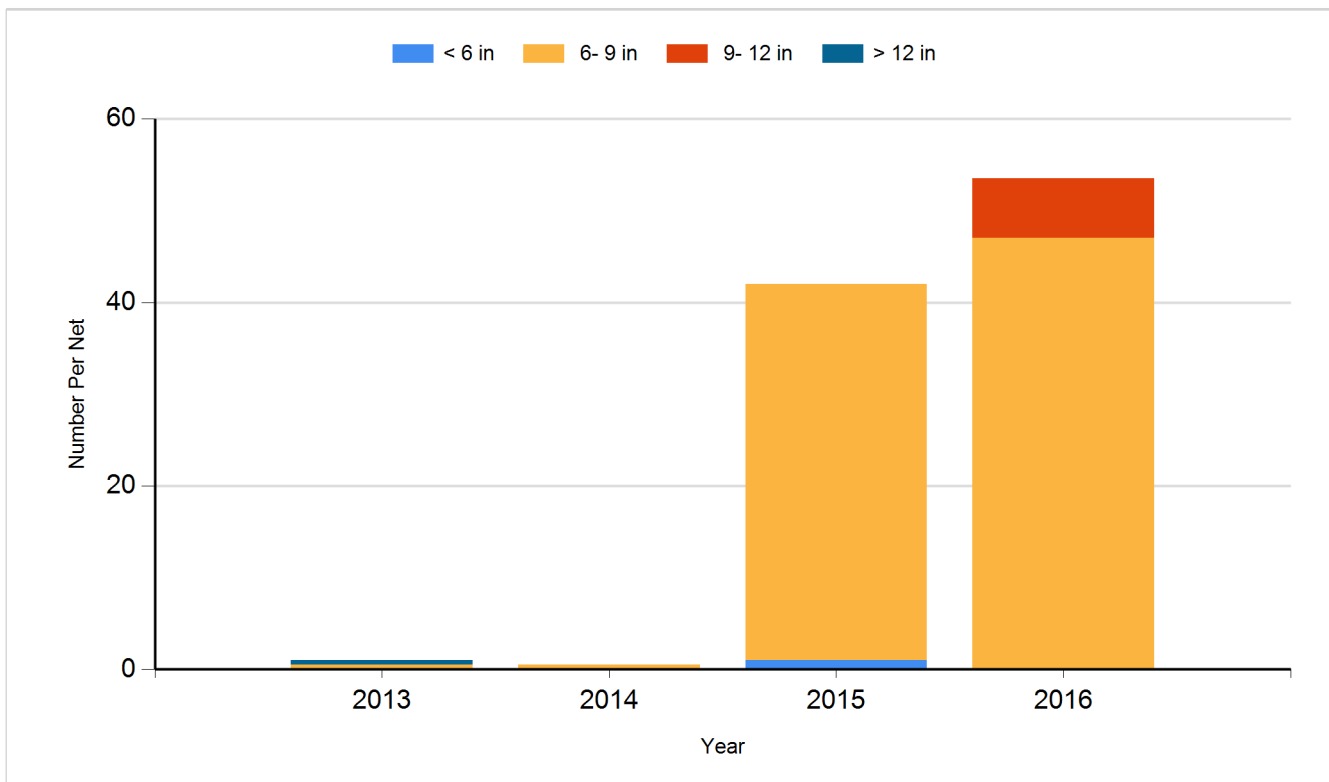
Historic Fish Sizes and Relative Abundance

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

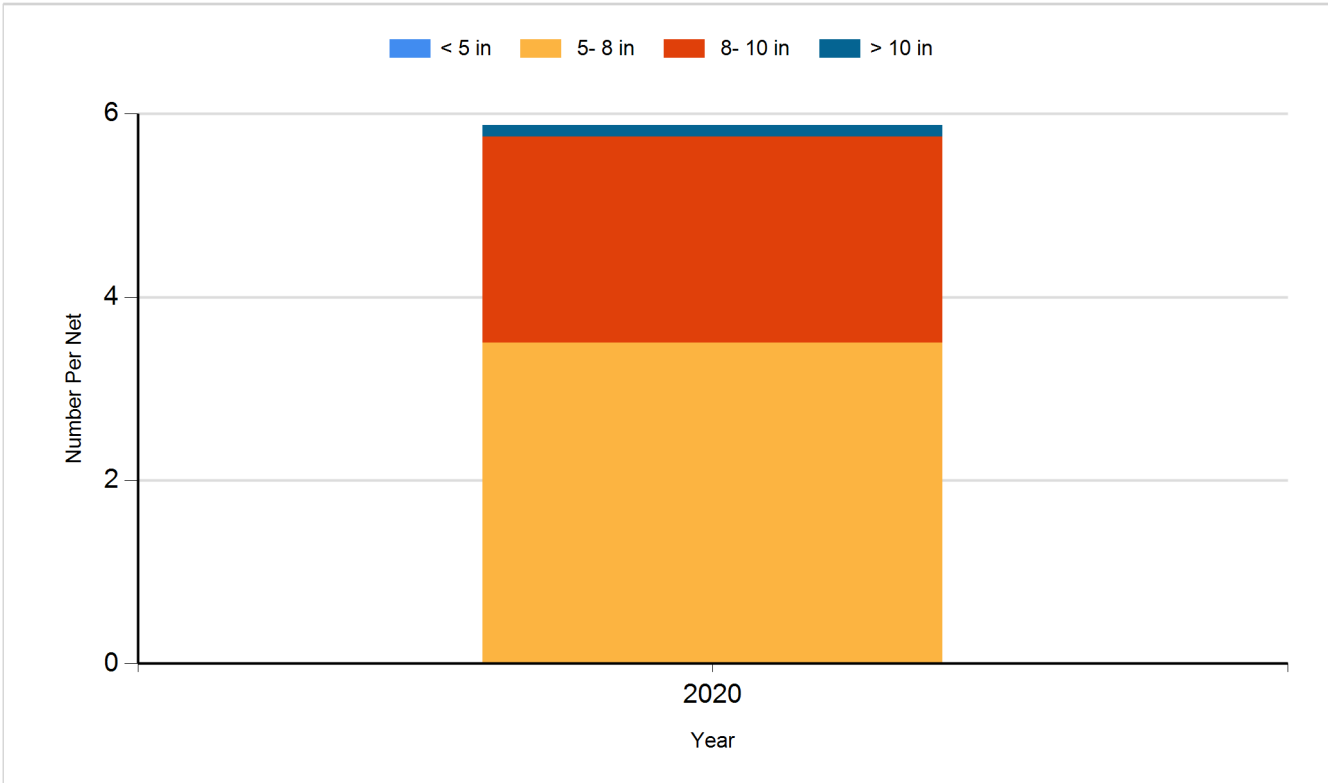
Species: Black Bullhead
Gear: AFS std gill net



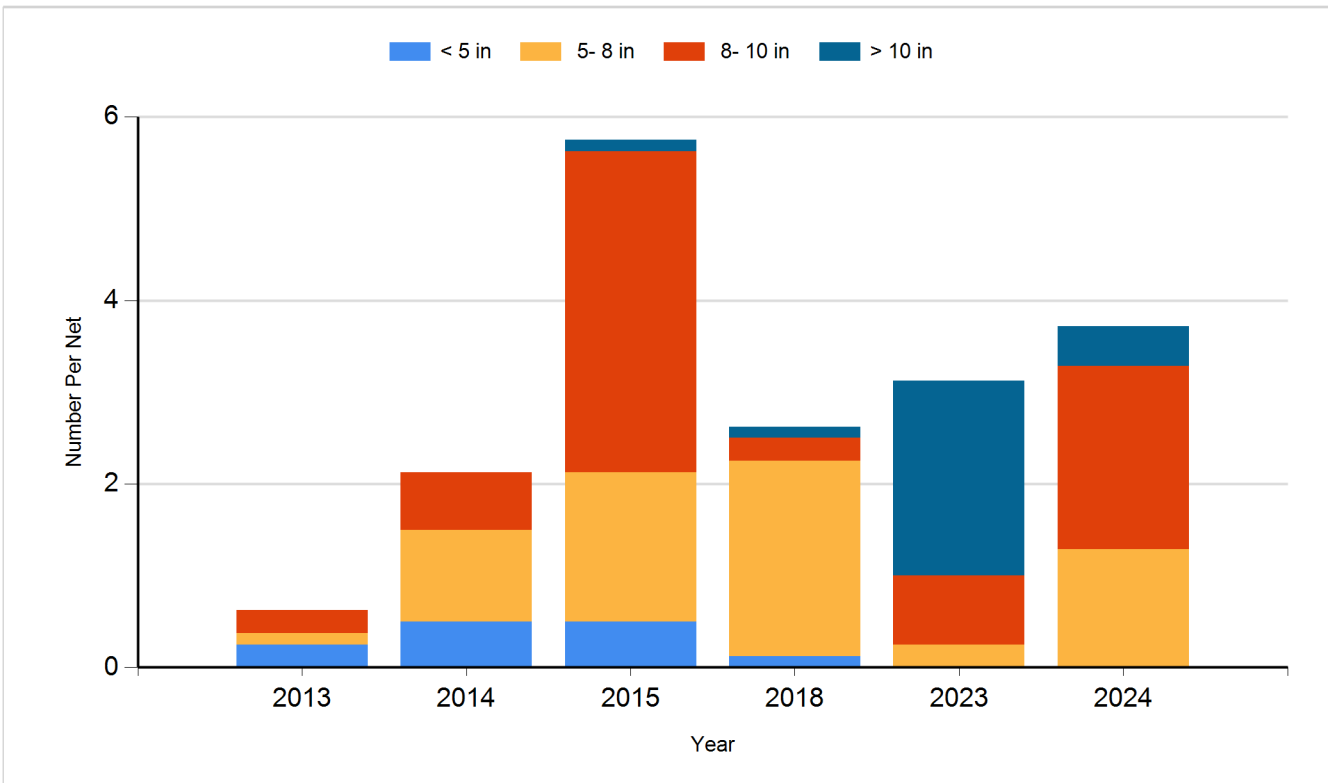
Species: Black Bullhead
Gear: std exp gill net



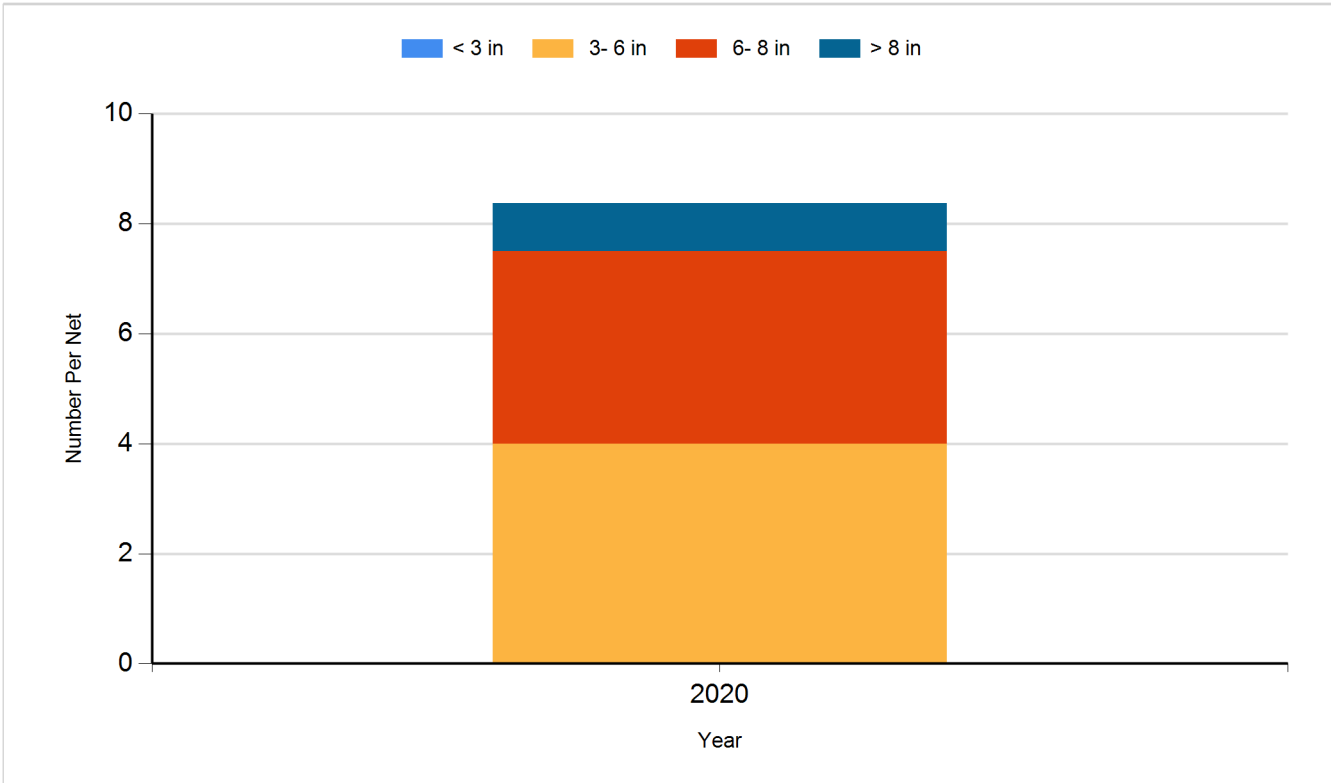
Species: Black Crappie
Gear: AFS std frame net



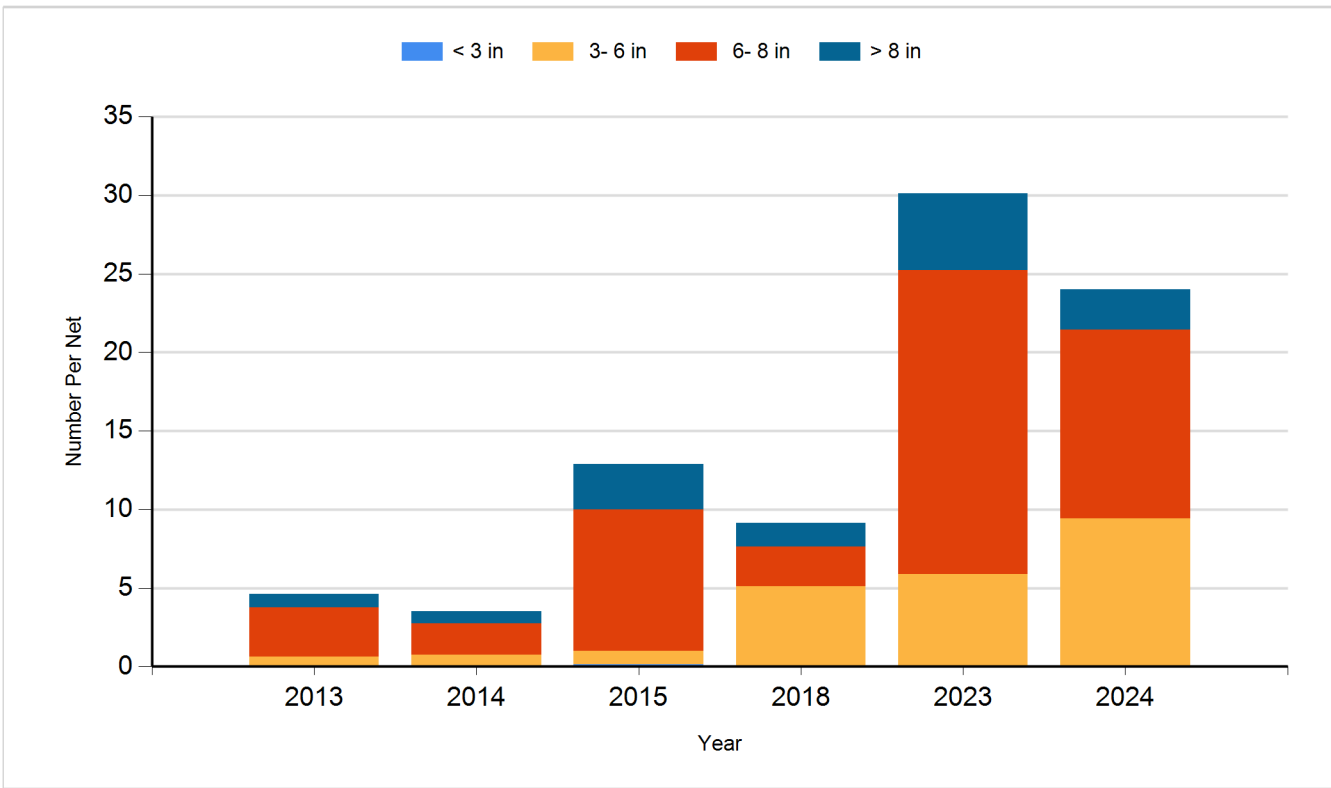
Species: Black Crappie
Gear: frame net (std 3/4 in)



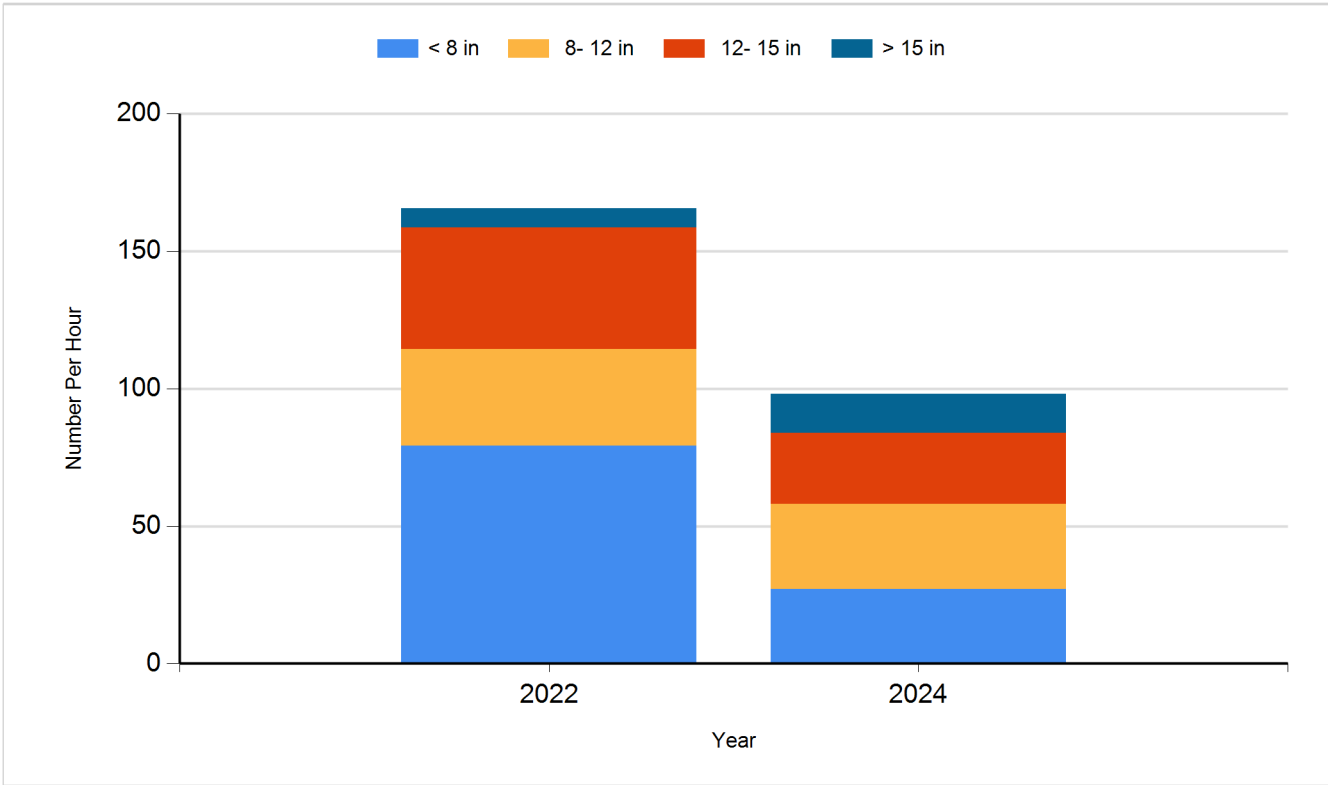
Species: Bluegill
Gear: AFS std frame net



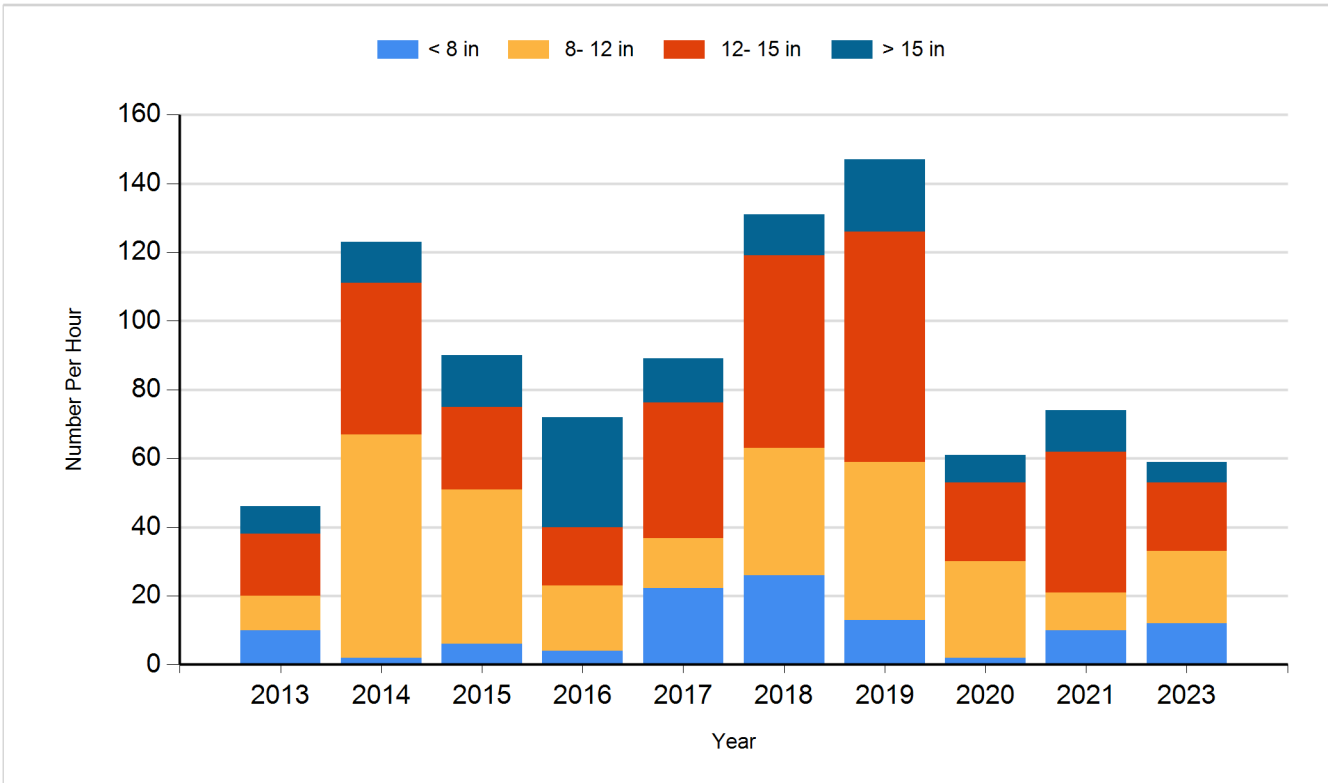
Species: Bluegill
Gear: frame net (std 3/4 in)



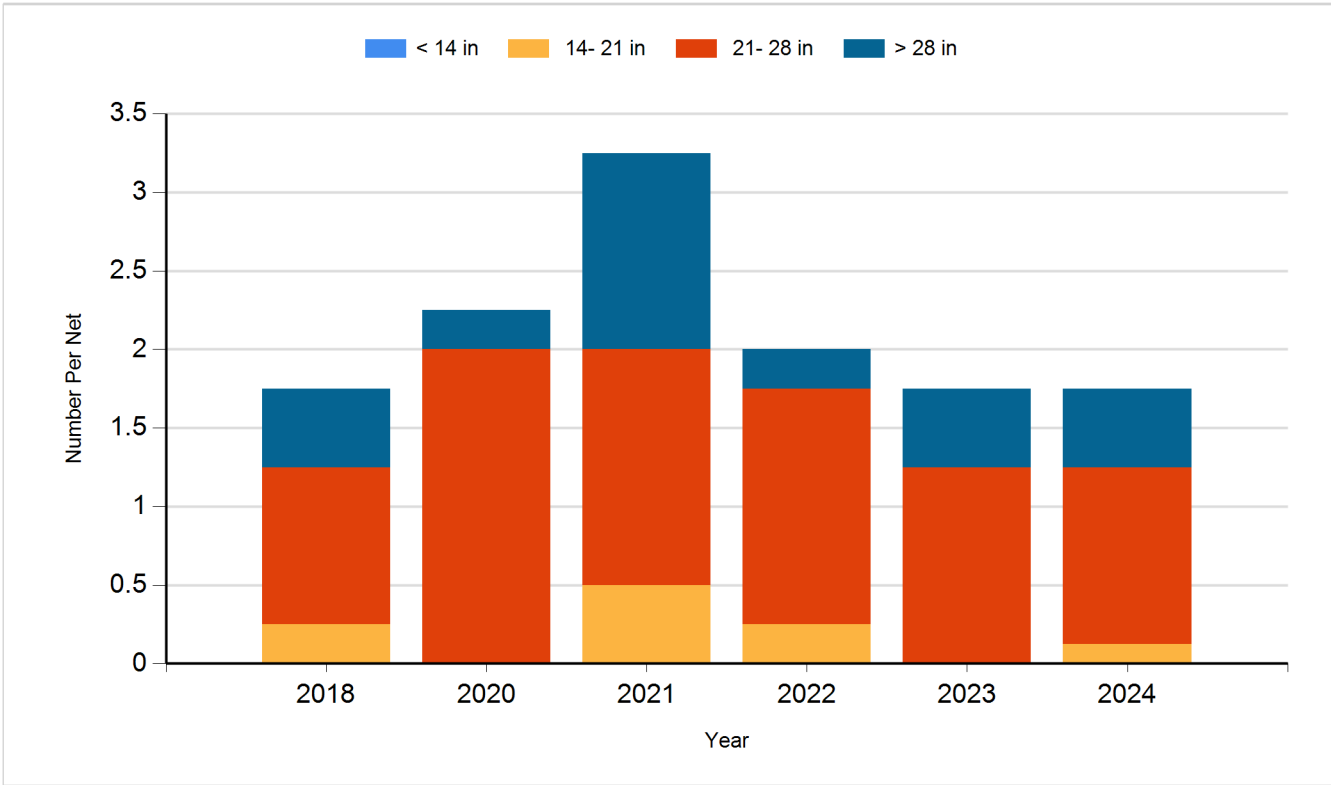
Species: Largemouth Bass
Gear: boat shocker (day)



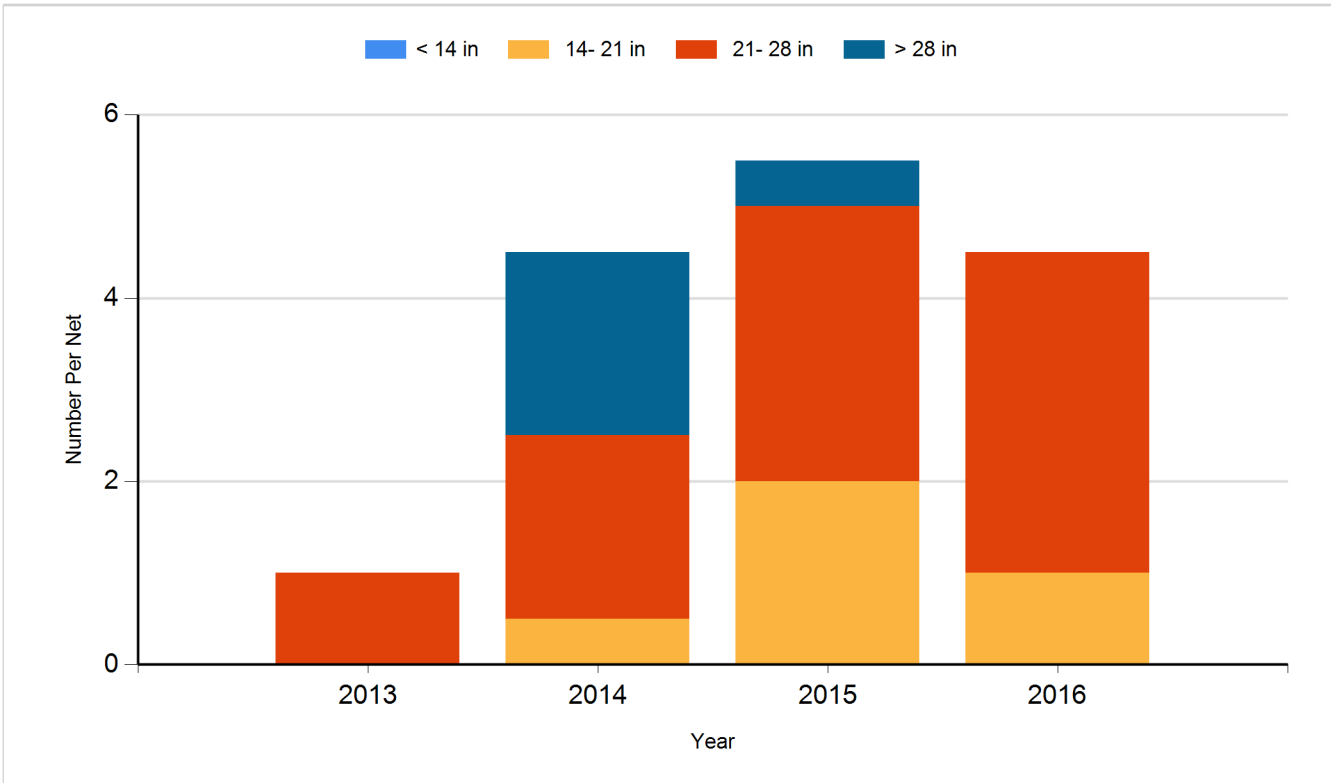
Species: Largemouth Bass
Gear: boat shocker (night)



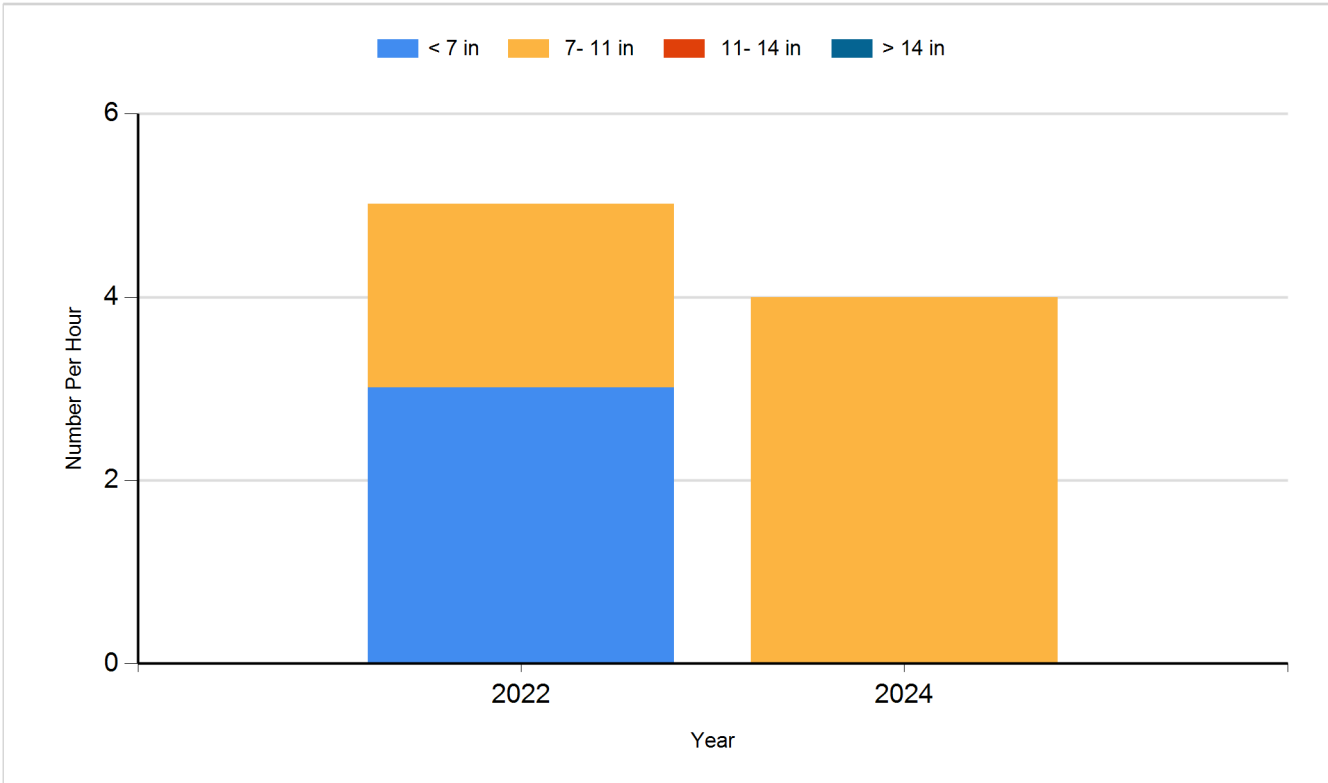
Species: Northern Pike
Gear: AFS std gill net



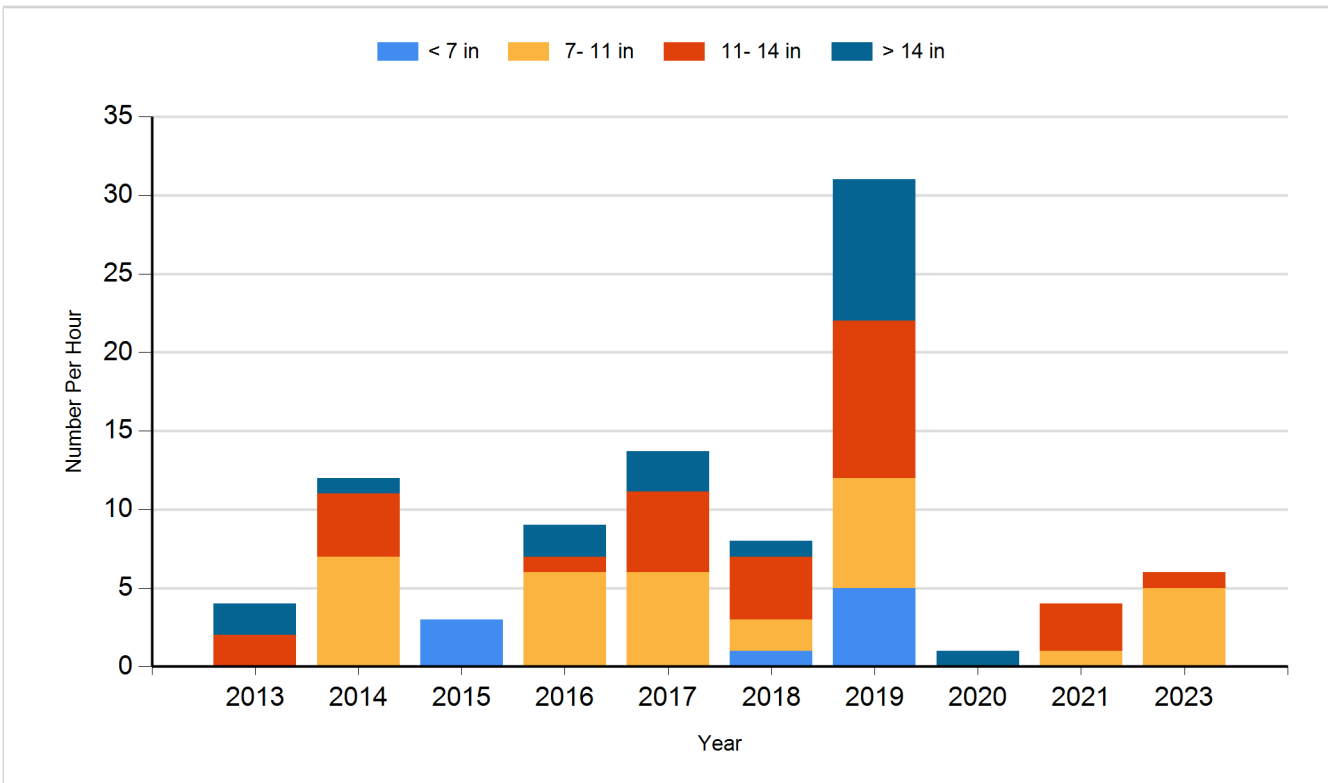
Species: Northern Pike
Gear: std exp gill net



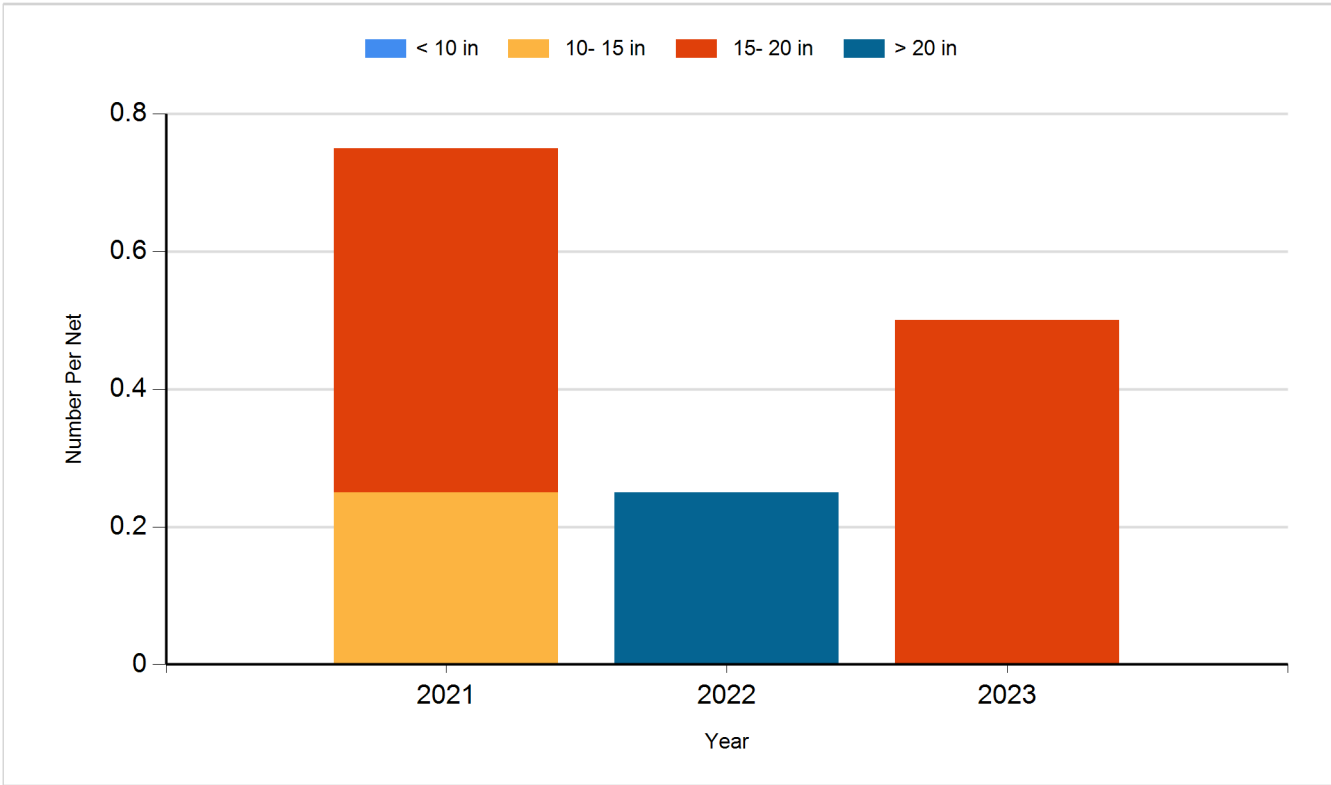
Species: Smallmouth Bass
Gear: boat shocker (day)



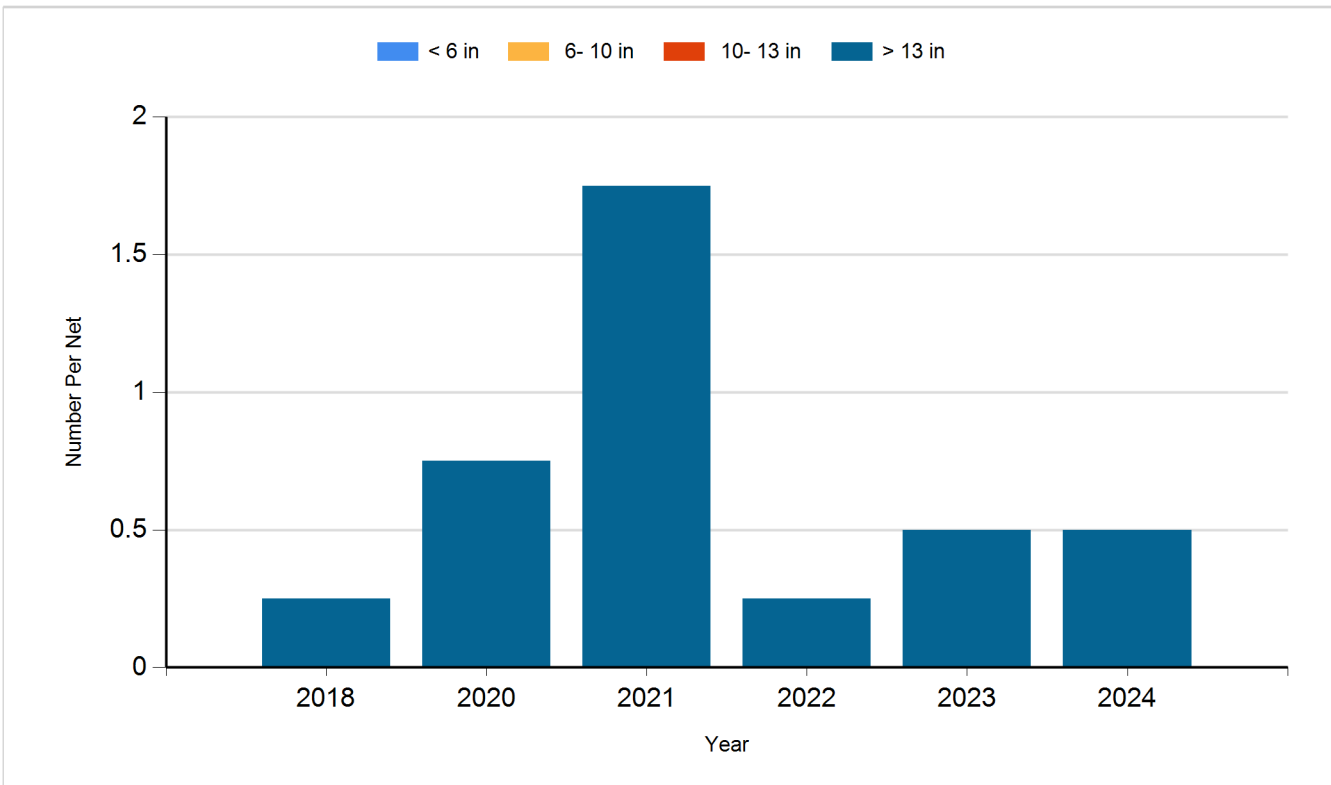
Species: Smallmouth Bass
Gear: boat shocker (night)



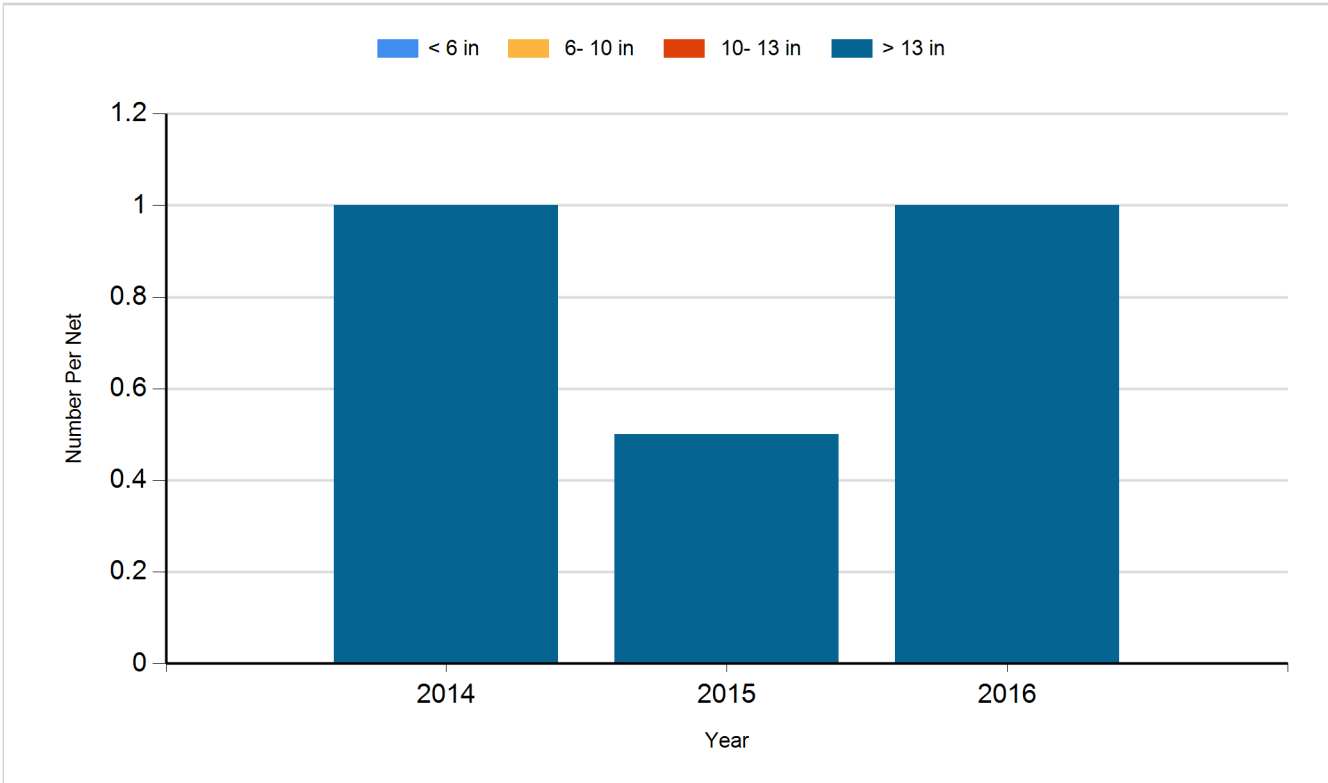
Species: Walleye
Gear: AFS std gill net



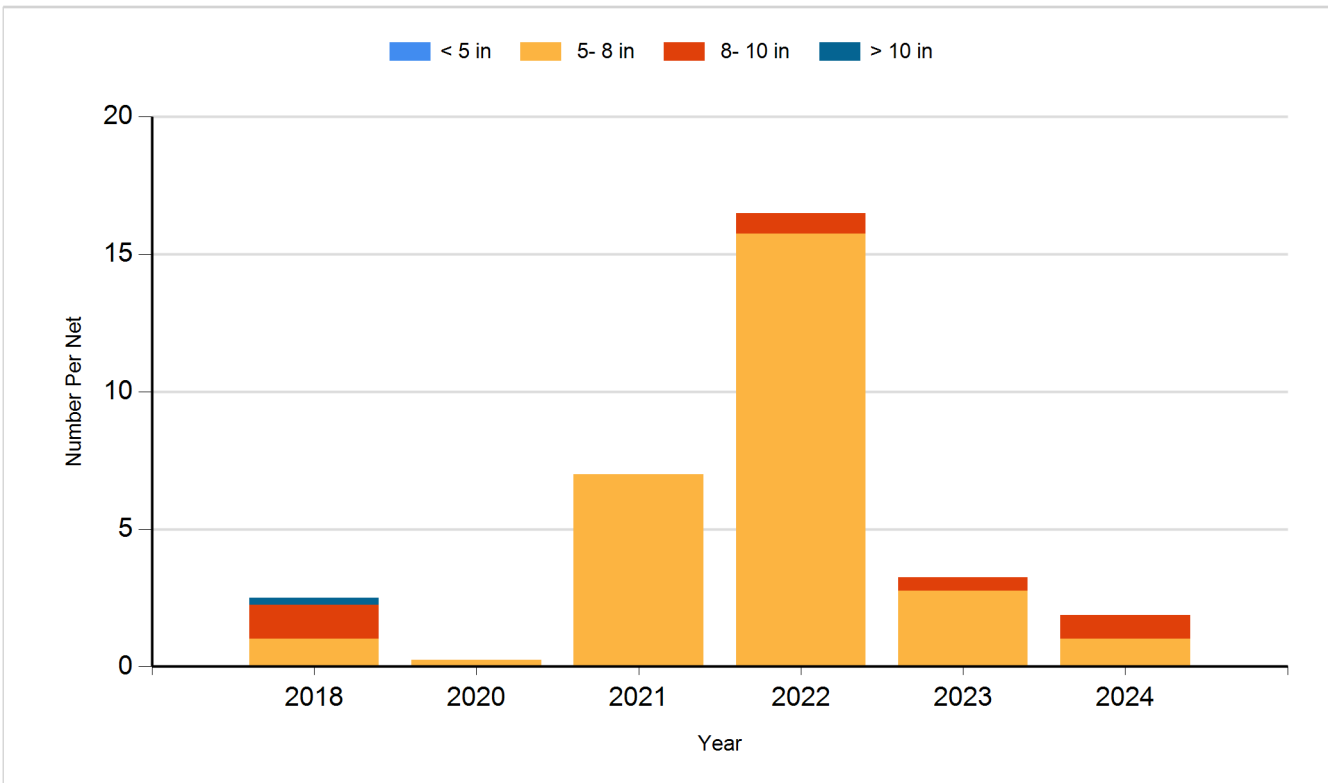
Species: White Sucker
Gear: AFS std gill net



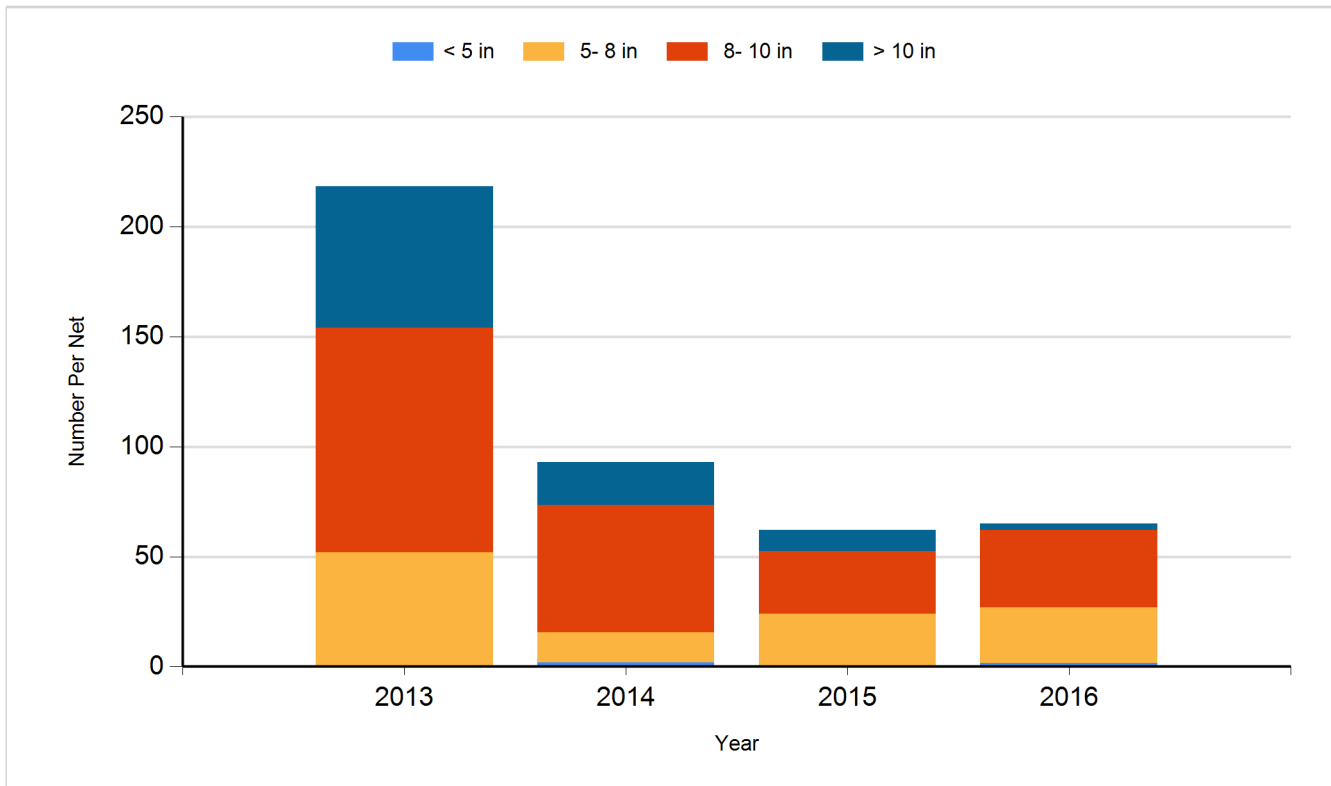
Species: White Sucker
Gear: std exp gill net



Species: Yellow Perch
Gear: AFS std gill net



Species: Yellow Perch
Gear: std exp gill net



Fish Stocking

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

Year	Species	Size	Number
2013	Smallmouth Bass	Fingerling	4,770
2016	Smallmouth Bass	Juvenile	300
2017	Walleye	Large Fingerling	9,500
2019	Walleye	Small Fingerling	12,240
2023	Walleye	Juvenile	10,000
2024	Walleye	Juvenile	30,253