

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Mitchell, Davison County

LJA-Lake-623-000

2022

Lake Information

Name:	Mitchell	Maximum Depth:	29 Feet
County:	Davison	Mean Depth:	12 Feet
Legal Description:	T103W- R60N-Sec 4-6, 9; T104N- R60W-Sec 31-32		
Surface Area:	690 Acres	Watershed Area:	19,821.31 Sq Miles

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 01, 2022	4 net-nights
AFS std gill net	May 31, 2022	6 net-nights
boat shocker (night)	Jun 06, 2022	7200 seconds
frame net (std 3/4 in)	Jun 01, 2022	5 net-nights
frame net (std 3/4 in)	May 31, 2022	5 net-nights

Common Fish Species Present

Bluegill

Black Crappie

Largemouth Bass

River Carpsucker

Channel Catfish

White Crappie

Northern Pike

Freshwater Drum

Smallmouth Bass

Shorthead Redhorse

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
AFS std gill net	Bigmouth Buffalo	1	0.1	0.1	100		100		
	Black Crappie	4	0.4	0.6	50		0	111	10
	Bluegill	1	0.1	0.1	100		0	121	
	Channel Catfish	46	4.5	0.8	87	8	4	94	4
	Common Carp	2	0.2	0.2	100		100		
	Freshwater Drum	14	1.4	0.6	57	22	14	87	
	Northern Pike	17	1.7	0.4	88		18	88	2
	River Carpsucker	67	6.7	4.5	100		97		
	Shorthead Redhorse	6	0.6	0.5	100		67		
	Walleye	2	0.2	0.2	50		0	72	23
boat shocker (night)	Largemouth Bass	7	3.5	1.8	86		43	102	4
frame net (std 3/4 in)	Black Crappie	35	3.5	2.2	74	11	3	97	2
	Bluegill	25	2.5	2.5	44	16	0	113	3
	Channel Catfish	13	1.3	1.0	100		31	93	3
	Common Carp	2	0.2	0.2	100		100		
	Smallmouth Bass	6	0.6	0.8	17		0	95	3
	White Crappie	31	3.1	2.0	97		10	98	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 Crappie					20.3							20.30
	Bluegill					4.6							4.60
	Channel Catfish					2.3							2.30
	Common Carp					1.3							1.30
	Freshwater Drum					0.1							0.10
	Green Sunfish					0.1							0.10
	Northern Pike					0.1							0.10
	Orangespotted Sunfish					0.0							0.00
	Shorthead Redhorse					0.1							0.10
	Sunfish Hybrid					0.0							0.00
White Crappie					16.9							16.90	
AFS std gill net	Bigmouth Buffalo					0.1	0.0	0.1		0.4	0.1		0.14
	Black Bullhead					0.0	0.0	0.4		0.2	0.0		0.12
	Black Crappie					7.4	1.5	0.8		0.5	0.4		2.12
	Bluegill					0.1	0.2	0.1		0.2	0.1		0.14
	Channel Catfish					13.4	8.3	8.9		2.3	4.5		7.48
	Common Carp					0.0	0.7	0.7		1.1	0.2		0.54
	Flathead Catfish					0.1	0.0	0.1		0.0	0.0		0.04
	Freshwater Drum					2.6	8.6	2.8		2.9	1.4		3.66
	Northern Pike					0.3	0.0	0.0		1.5	1.7		0.70
	Quillback					0.0	0.0	0.0		0.0	0.0		0.00
	River Carpsucker					0.0	0.0	0.6		3.4	6.7		2.14
	Shorthead Redhorse					0.0	0.0	0.0		0.1	0.6		0.14
	Walleye					0.3	0.3	0.4		0.2	0.2		0.28
	White Crappie					3.0	0.8	1.5		0.7	0.0		1.20
	White Sucker					0.0	0.0	0.0		0.7	0.0		0.14
boat shocker (night)	Largemouth Bass				3.5					4.5	3.5		3.83
	Smallmouth Bass				20.0					0.0	0.0		6.67
electrofishing (flathead)	Flathead Catfish									9.3			9.30
fall night EF-WAE*	Flathead Catfish	0.0	156.9	13.6									56.83
	Largemouth Bass	0.0	0.0	0.0									0.00
	Walleye	119.5	12.4	0.2									44.03
frame net (std 3/4 in)	Bigmouth Buffalo	0.1	0.0	0.5	0.0		0.0	0.0		0.0	0.0		0.08

		CPUE										
Gear	Species	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg
frame net (std 3/4 in)	Black Bullhead	0.0	0.0	0.0	0.1		0.0	0.0		0.0	0.0	0.01
	Black Crappie	1.4	1.0	7.3	43.9		12.7	2.1		13.2	3.5	10.64
	Bluegill	2.3	2.3	4.0	2.3		16.1	3.3		26.8	2.5	7.45
	Channel Catfish	2.6	4.6	18.7	6.4		9.2	1.8		8.8	1.3	6.68
	Common Carp	2.3	0.0	1.4	1.3		0.8	0.2		0.9	0.2	0.89
	Flathead Catfish	0.3	0.1	0.3	0.0		0.5	0.2		0.2	0.0	0.20
	Freshwater Drum	0.5	0.9	0.0	0.1		0.2	0.1		0.2	0.0	0.25
	Green Sunfish	0.0	0.0	0.0	0.4		0.1	0.0		0.2	0.0	0.09
	Largemouth Bass	0.0	0.0	0.0	0.1		0.0	0.0		0.0	0.0	0.01
	Northern Pike	0.3	0.1	0.1	0.3		0.0	0.0		0.0	0.0	0.10
	Shorthead Redhorse	0.4	0.0	0.0	0.1		0.0	0.0		0.0	0.0	0.06
	Smallmouth Bass	0.4	0.0	0.0	0.2		0.4	0.1		0.1	0.6	0.23
	Sunfish Hybrid	0.0	0.0	0.0	0.0		0.0	0.1		0.0	0.0	0.01
	Walleye	0.1	0.5	0.0	0.0		0.0	0.0		0.1	0.0	0.09
	White Crappie	0.0	0.4	0.7	15.3		21.5	4.2		13.3	3.1	7.31
White Sucker	0.3	0.0	0.0	0.0		0.1	0.0		0.0	0.0	0.05	
hoop net	Black Crappie				7.0	0.0						3.50
	Bluegill				1.3	0.0						0.65
	Channel Catfish				0.7	2.3						1.50
	Smallmouth Bass				0.7	0.0						0.35
	White Crappie				2.3	0.0						1.15
std exp gill net	Bigmouth Buffalo	1.0	0.0	0.0	1.0							0.50
	Black Bullhead	0.0	0.0	0.0	0.0							0.00
	Black Crappie	0.6	0.3	14.0	5.8							5.18
	Bluegill	0.6	0.0	0.0	0.2							0.20
	Channel Catfish	9.8	16.5	18.4	22.0							16.68
	Common Carp	1.0	2.5	0.4	0.8							1.18
	Freshwater Drum	1.4	2.0	3.8	5.0							3.05
	Largemouth Bass	0.2	0.0	0.0	0.0							0.05
	Northern Pike	0.8	0.3	0.0	0.0							0.28
	Shorthead Redhorse	0.6	0.5	0.0	0.0							0.28
	Smallmouth Bass	0.2	0.8	0.2	0.0							0.30
	Walleye	2.4	2.8	0.8	0.8							1.70
	White Crappie	0.0	0.8	0.0	5.0							1.45
White Sucker	0.4	0.0	0.0	0.0							0.10	

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 Crappie	PSD					100							
		PSD-P					0							
		Wr					95							
	Bluegill	PSD					85							
		PSD-P					4							
		Wr					114							
	Channel Catfish	PSD					79							
		PSD-P					4							
		Wr					95							
	Northern Pike	PSD					100							
		PSD-P					100							
		Wr					79							
	Shorthead Redhorse	PSD					100							
		PSD-P					100							
	White Crappie	PSD					99							
PSD-P						0								
Wr						100								
AFS std gill net	Black Crappie	PSD					100	80	25			40	50	
		PSD-P					2	7	13			0	0	
		Wr					102	94	105			111	111	
	Bluegill	PSD					100	100	0			100	100	
		PSD-P					0	0	0			50	0	
		Wr					100	121	132			118	121	
	Channel Catfish	PSD					85	87	82			70	87	
		PSD-P					2	4	3			9	4	
		Wr					86	87	96			93	94	
	Northern Pike	PSD					100					27	88	
		PSD-P					100					0	18	
		Wr					83					81	88	
	River Carpsucker	PSD									83	100	100	
		PSD-P									83	53	97	
	Shorthead Redhorse	PSD										100	100	
PSD-P											100	67		

Gear	Species	Index	Year											
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022		
AFS std gill net	Shorthead Redhorse	Wr										114		
	White Crappie	PSD						96	50	60		43		
		PSD-P						0	13	0		0		
		Wr						105	96	105		106		
boat shocker (night)	Largemouth Bass	PSD				71						100	86	
		PSD-P				71						100	43	
		Wr				105						104	102	
	Smallmouth Bass	PSD				3								
		PSD-P				3								
		Wr				97								
frame net (std 3/4 in)	Black Crappie	PSD	65	88	0	49		79	43		50	74		
		PSD-P	41	25	0	2		0	5		0	3		
		Wr	107	101	108	103		93	94		96	97		
	Bluegill	PSD	96	33	29	79		84	91		56	44		
		PSD-P	67	6	4	0		6	0		3	0		
		Wr	97	102	104	107		105	105		107	113		
	Channel Catfish	PSD	39	78	58	62		90	94		78	100		
		PSD-P	19	43	13	1		7	6		8	31		
		Wr	80	85	89	97		87	93		93	93		
	Largemouth Bass	PSD		0		100								
		PSD-P		0		0								
		Wr				97								
	Northern Pike	PSD	67	100	100	100						0		
		PSD-P	0	100	0	67						0		
		Wr	80	104	86	85								
	Shorthead Redhorse	PSD	100			100								
		PSD-P	100			100								
		Wr	84											
	Smallmouth Bass	PSD	60	0		100		100	100		0	17		
		PSD-P	20	0		50		50	100		0	0		
		Wr	94			91		95	77		106	95		
	White Crappie	PSD		33	13	66		96	90		49	97		
		PSD-P		33	0	0		0	2		2	10		
		Wr		99	99	99		88	93		100	98		
	hoop net	Black Crappie	PSD				71							
			PSD-P				0							

Gear	Species	Index	Year											
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022		
hoop net	Black Crappie	Wr				104								
		Bluegill	PSD				50							
			PSD-P				0							
	Channel Catfish	Wr				103								
		PSD				50	64							
		PSD-P				0	0							
		Wr				87	93							
		PSD				0								
	Smallmouth Bass	PSD-P				0								
		Wr				100								
		PSD				14								
	White Crappie	PSD-P				0								
		Wr				101								
		PSD												
	std exp gill net	Black Crappie	PSD	100	100	3	62							
PSD-P			100	100	0	0								
Wr			79	104	113	109								
Bluegill		PSD	67			100								
		PSD-P	67			0								
		Wr	109			102								
Channel Catfish		PSD	61	32	55	44								
		PSD-P	16	6	11	0								
		Wr	89	86	95	92								
Largemouth Bass		PSD	100	0										
		PSD-P	0	0										
		Wr	128											
Northern Pike		PSD	100	100										
		PSD-P	0	0										
		Wr	74	93										
Shorthead Redhorse		PSD	100	100										
		PSD-P	100	100										
		Wr	93											
Smallmouth Bass		PSD	100	100	100									
		PSD-P	0	100	100									
		Wr	89	98	95									
White Crappie		PSD		0		76								
		PSD-P		0		0								

			Year									
Gear	Species	Index	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
std exp gill net	White Crappie	Wr		102		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+
2022	35		164 (2)	206 (19)	236 (10)	232 (3)					
2021	109		166 (23)	202 (66)	217 (20)						
2015	87		180 (87)								
2014	216	107 (208)	199 (1)	244 (5)	302 (2)						
2013	17	140 (5)	194 (3)	259 (4)	271 (3)	264 (2)					

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	25		133 (15)	170 (6)	191 (4)						
2021	228		125 (103)	178 (100)	191 (17)	196 (6)	214 (3)				
2015	48		135 (24)	151 (17)	175 (4)	202 (3)					
2014	19	91 (6)	109 (8)	160 (4)	181 (1)		212 (1)				
2013	27	118 (1)	161 (2)	184 (2)	208 (13)	210 (7)	234 (1)				

Species: White Crappie

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	31			214 (24)	242 (7)						
2021	116		188 (74)	215 (30)		228 (12)					
2015	8		186 (8)								
2014	9	130 (8)			341 (1)						

Fish Condition

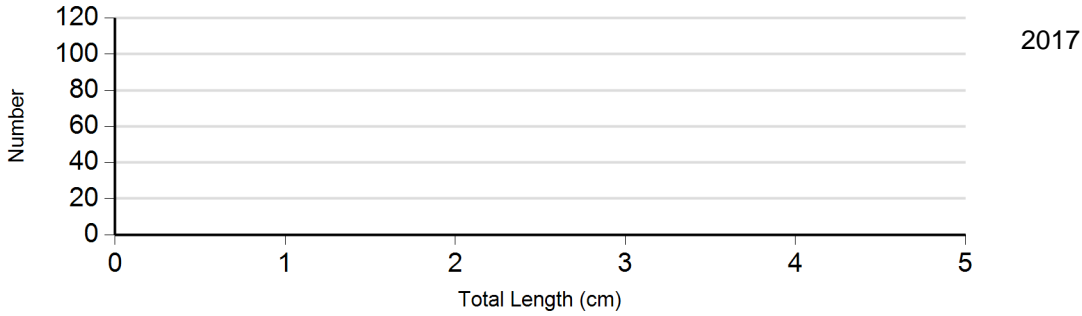
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2018	27	100 (2.3)	100	91 (1.0)	0		0	
	2019	12	99 (3.9)	8	88 (2.9)	1	86	0	
	2021	59	100 (1.2)	60	91 (1.0)	0		0	
	2022	9	103 (2.3)	25	95 (1.5)	0		1	90
Bluegill Frame Net	2018	25	107 (1.8)	126	104 (1.1)	10	100	0	
	2019	3	116 (4.3)	30	104 (1.2)	0		0	
	2021	107	101 (1.8)	126	113 (1.2)	8	107 (5.0)	0	
	2022	14	110 (2.9)	11	116 (2.0)	0		0	
Channel Catfish Gill Net	2018	11	82 (1.9)	69	88 (1.0)	3	94	0	
	2019	16	91 (2.3)	70	97 (1.5)	3	101	0	
	2021	7	89 (4.7)	14	94 (3.2)	2	102 (4.2)	0	
	2022	6	88 (4.8)	37	95 (3.4)	2	98 (4.2)	0	
Largemouth Bass Electro Fishing	2021	0		0		9	104 (1.8)	0	
	2022	1	110	3	104 (4.7)	3	98 (3.4)	0	
Northern Pike Gill Net	2021	11	85 (2.1)	4	71 (21.0)	0		0	
	2022	2	89 (14.0)	12	88 (1.9)	3	87 (4.1)	0	
White Crappie Frame Net	2018	9	88	205	88 (0.6)	1		0	
	2019	4	120 (11.6)	37	90 (1.7)	1	91	0	
	2021	61	104 (0.9)	57	93 (2.2)	2		0	
	2022	1	101	27	98 (1.0)	3	98 (2.9)	0	

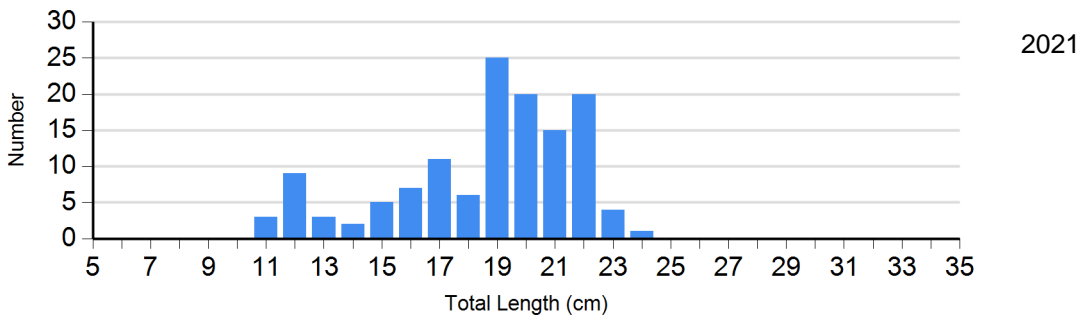
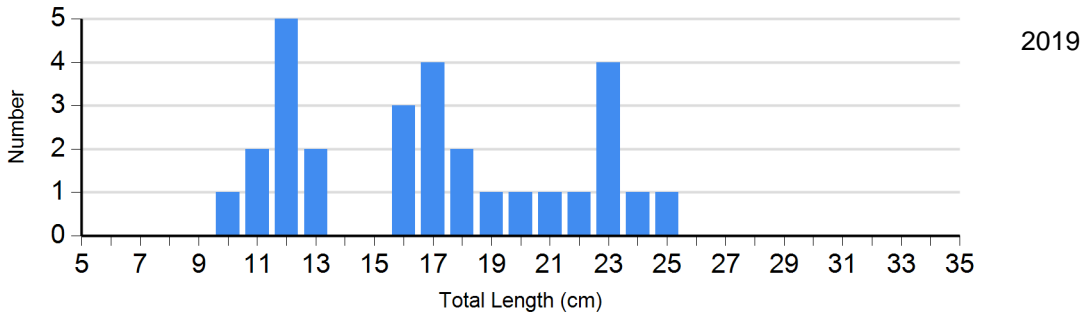
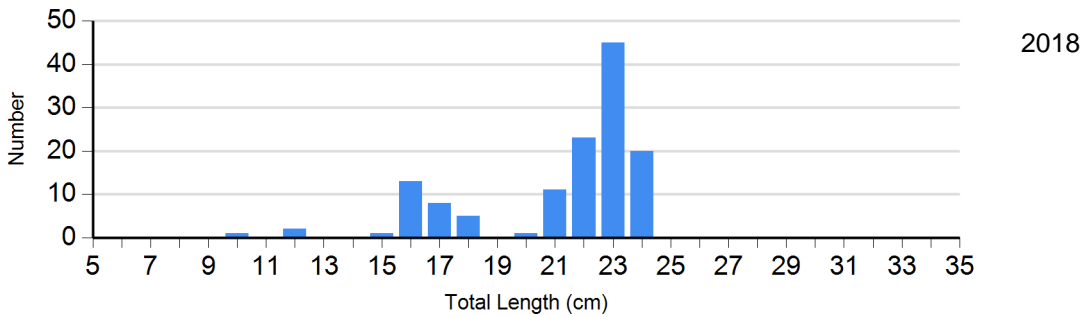
Length Frequency Distribution

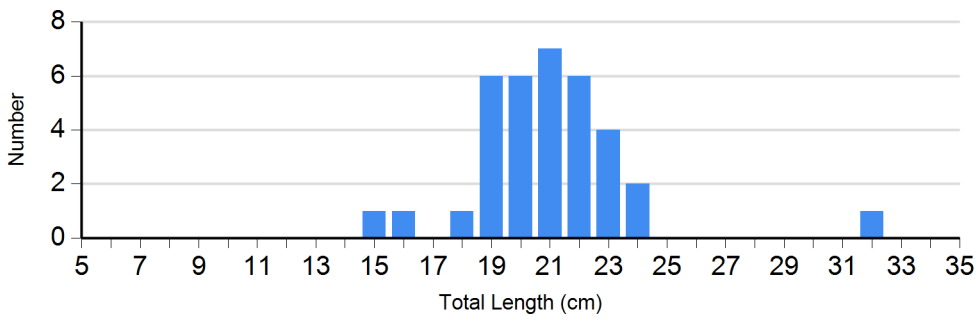
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net



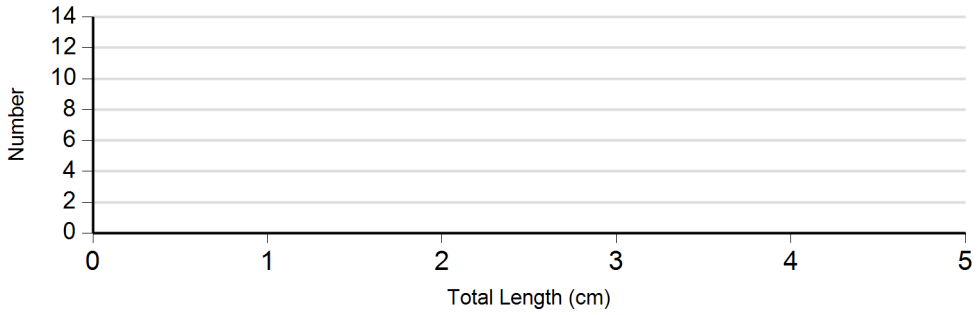
Species: Black Crappie
Gear: frame net (std 3/4 in)





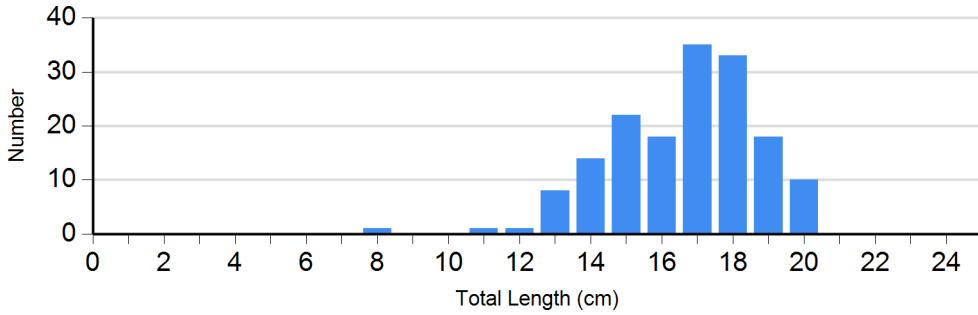
2022

Species: Bluegill
Gear: AFS std frame net

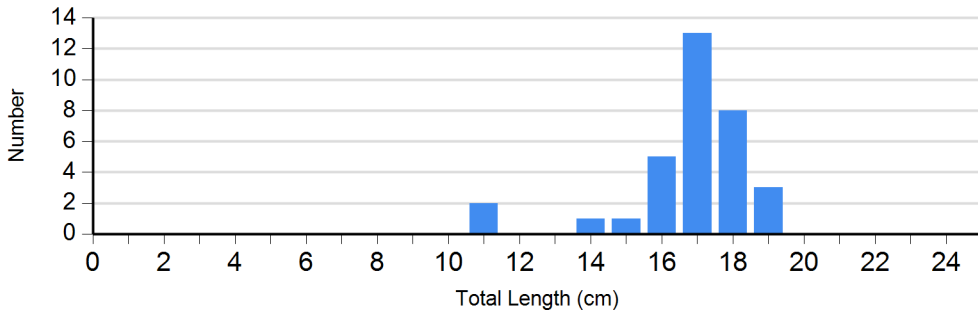


2017

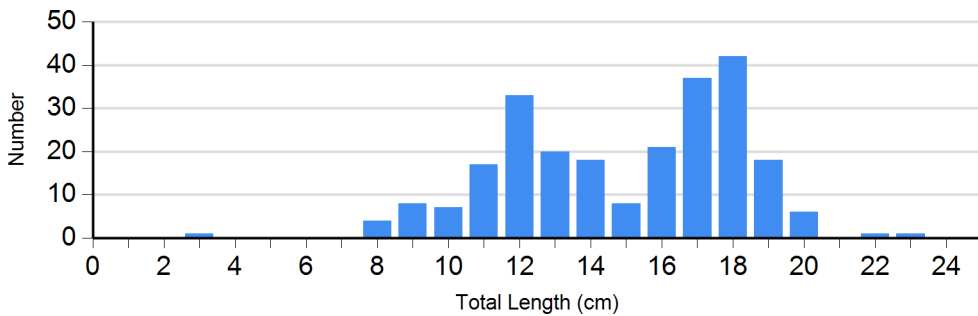
Species: Bluegill
Gear: frame net (std 3/4 in)



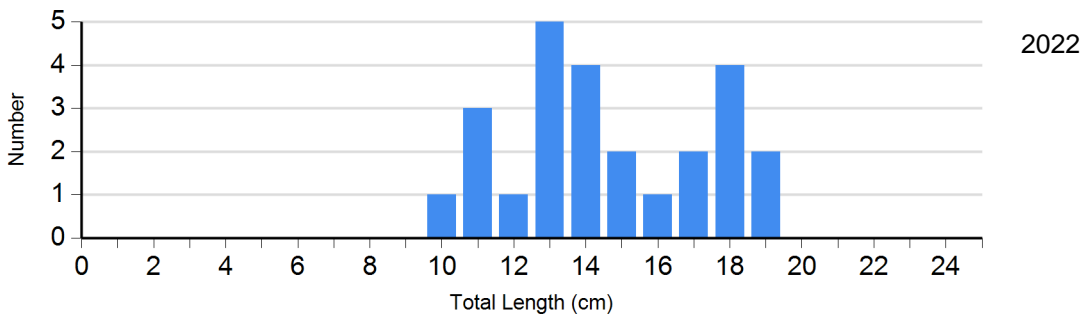
2018



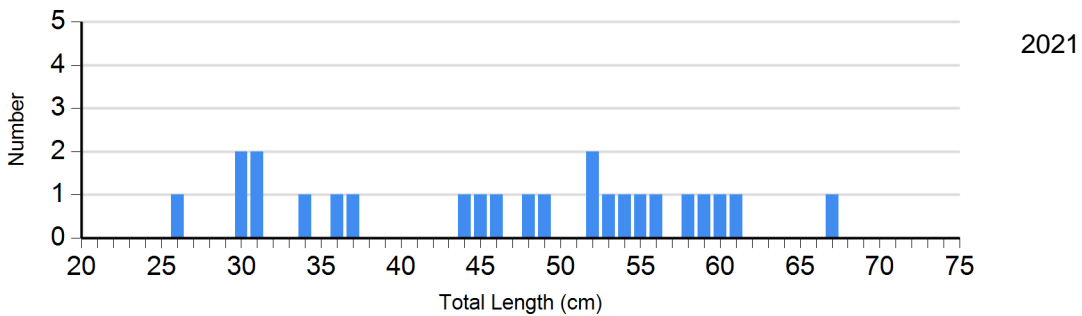
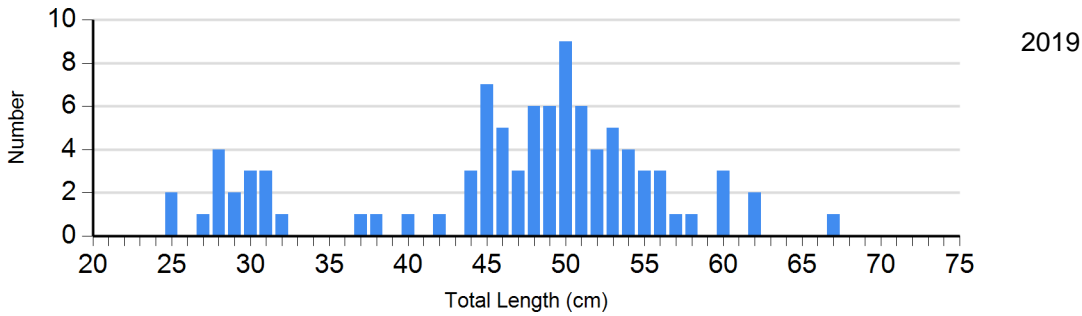
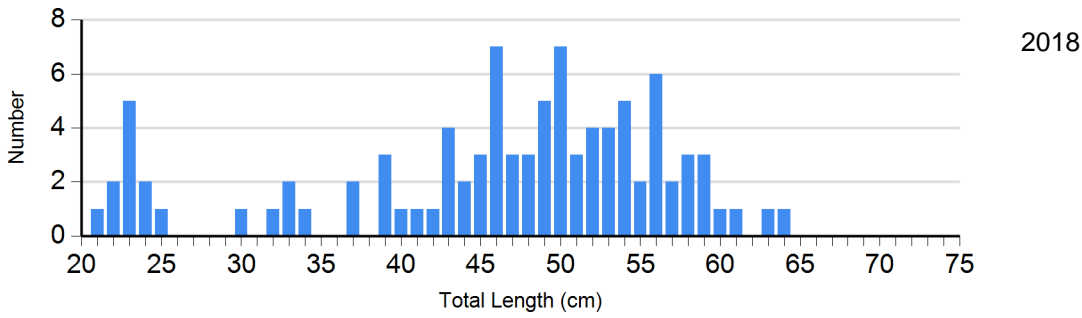
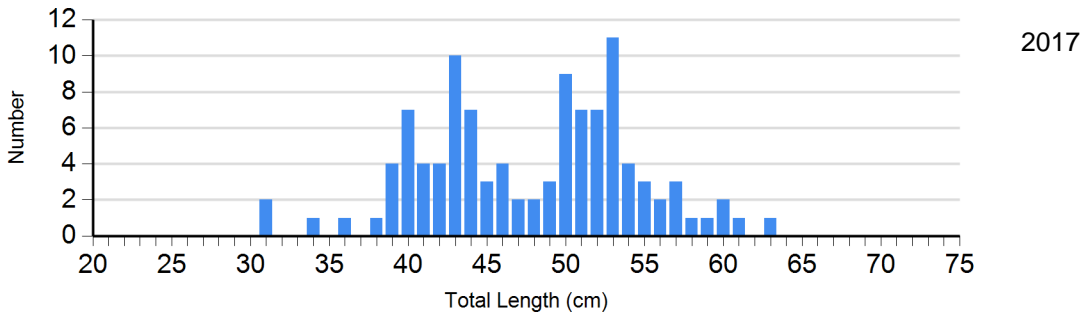
2019

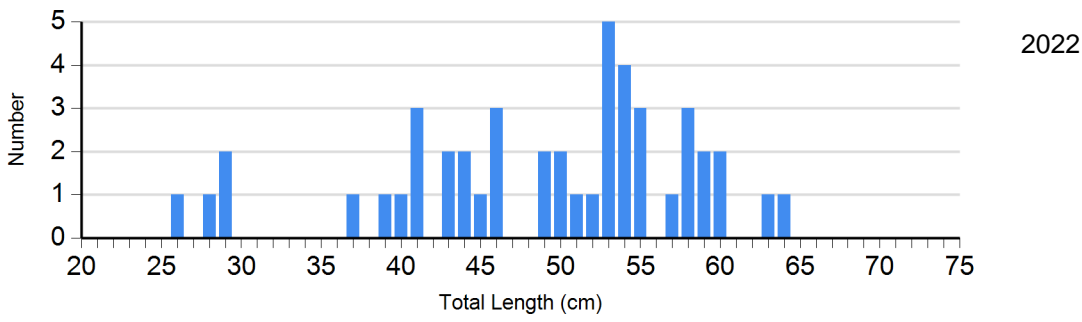


2021

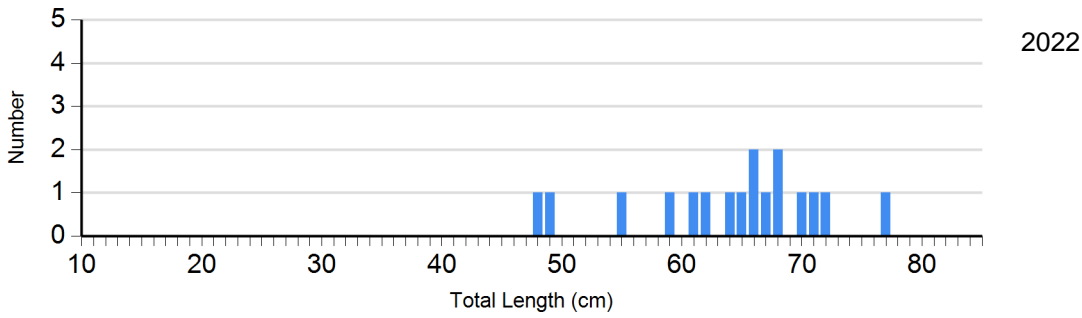
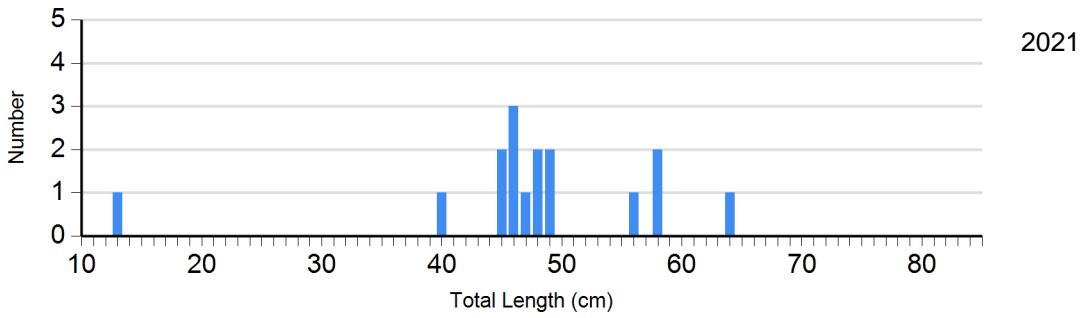


Species: Channel Catfish
 Gear: AFS std gill net

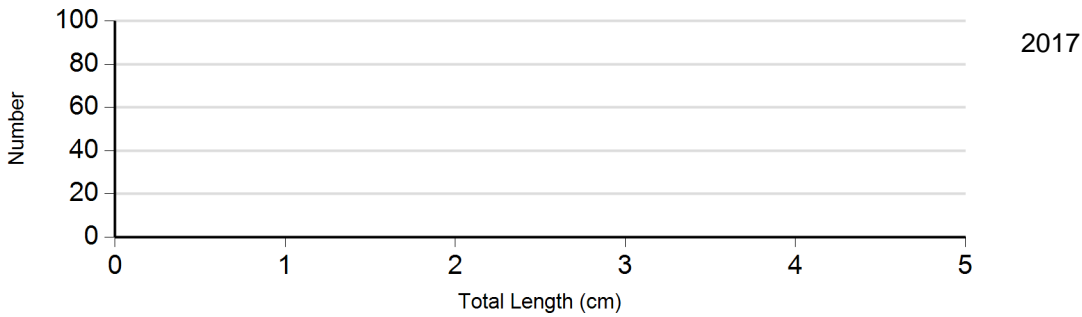




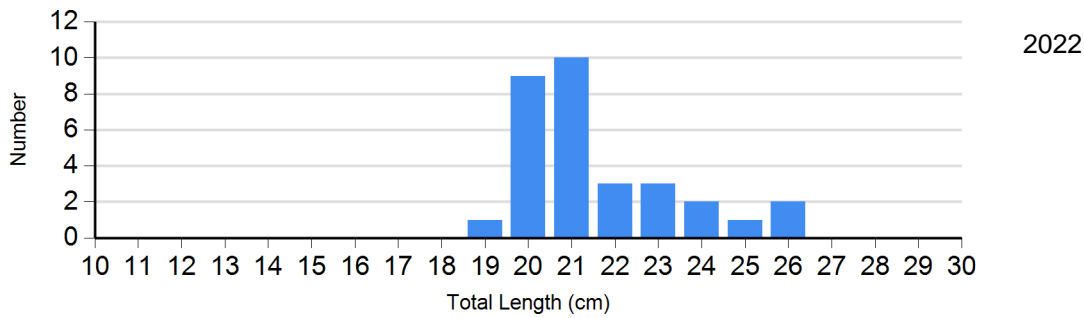
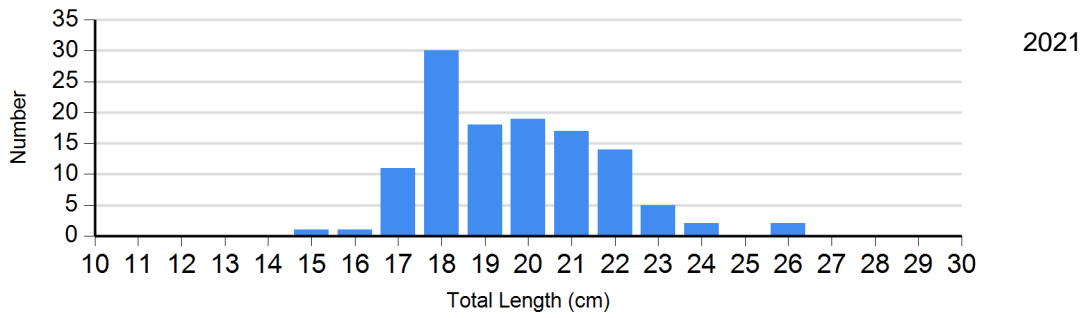
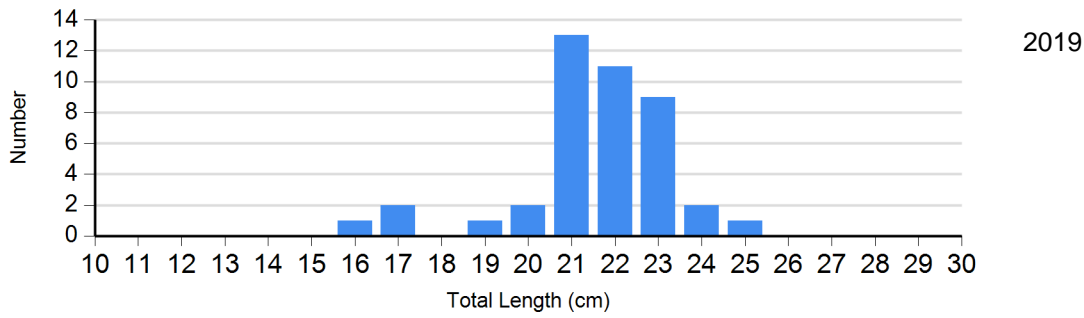
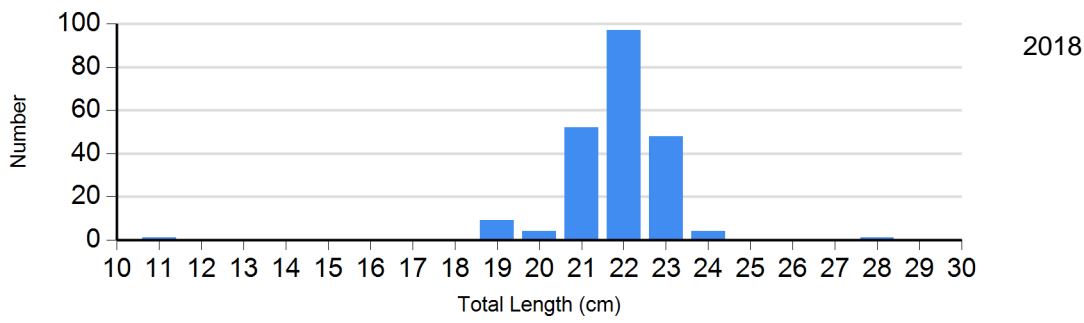
Species: Northern Pike
 Gear: AFS std gill net



Species: White Crappie
 Gear: AFS std frame net



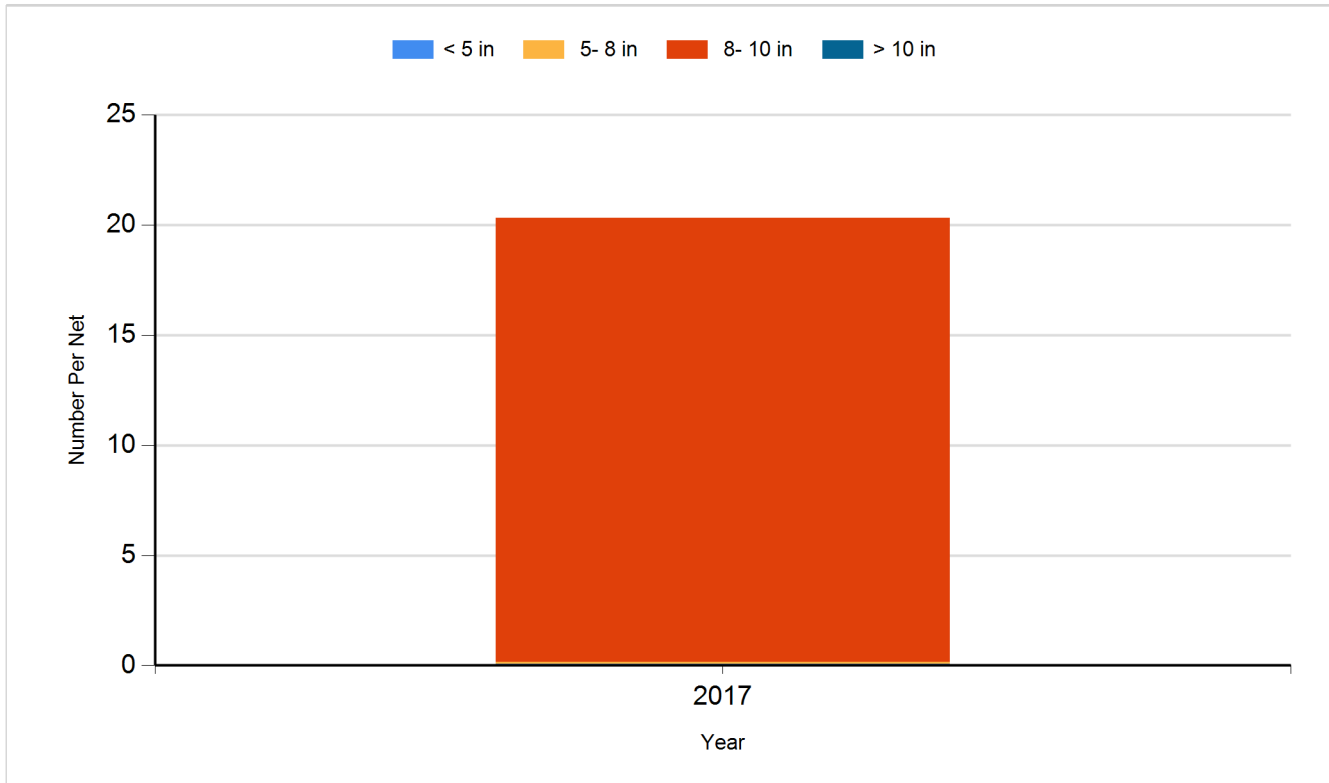
Species: White Crappie
Gear: frame net (std 3/4 in)



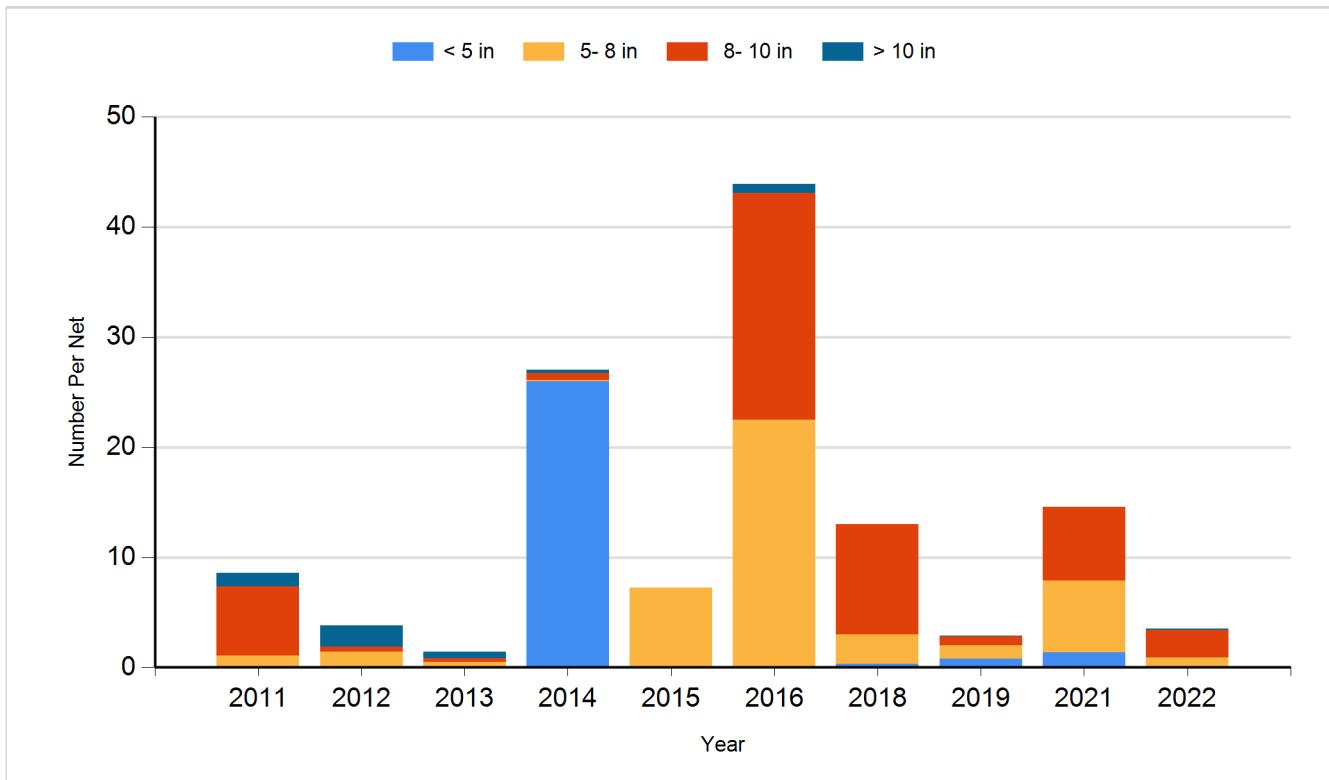
Historic Fish Sizes and Relative Abundance

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

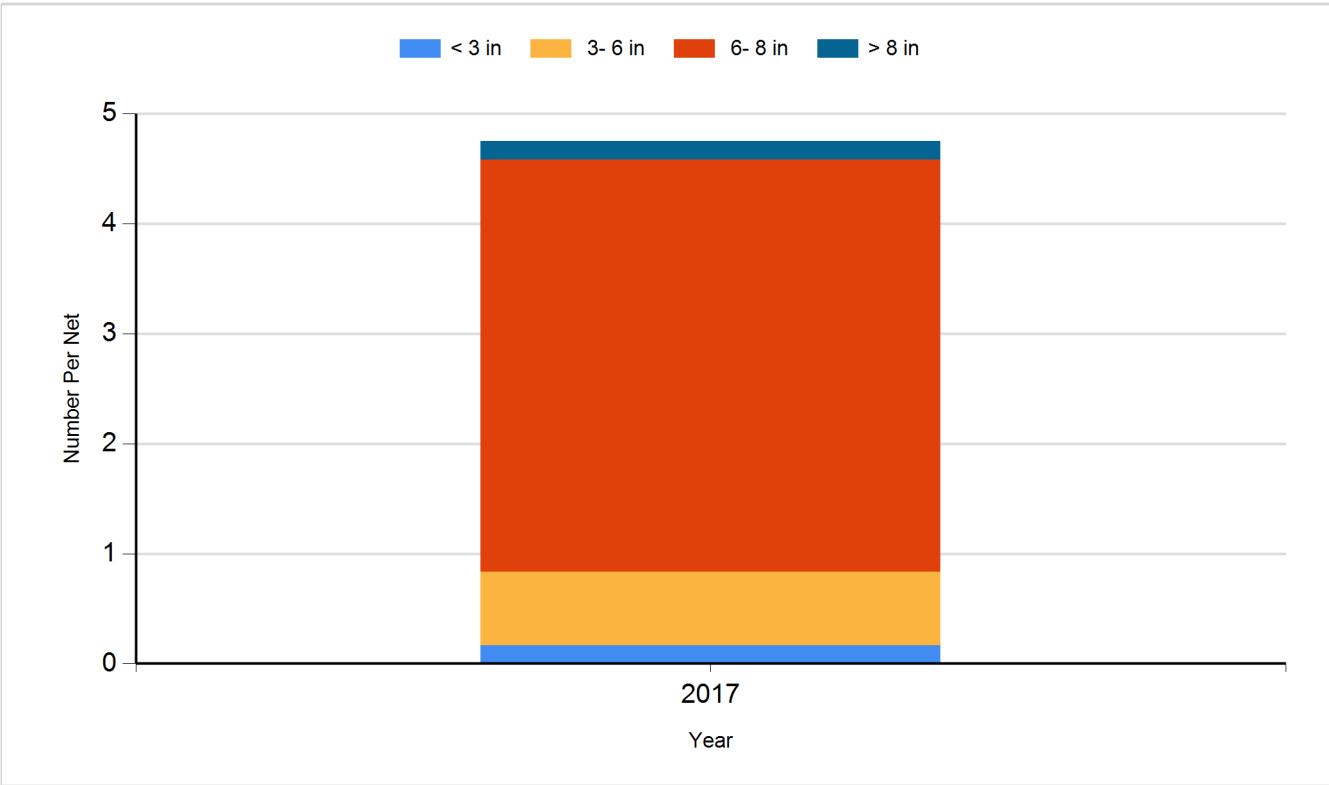
Species: Black Crappie
Gear: AFS std frame net



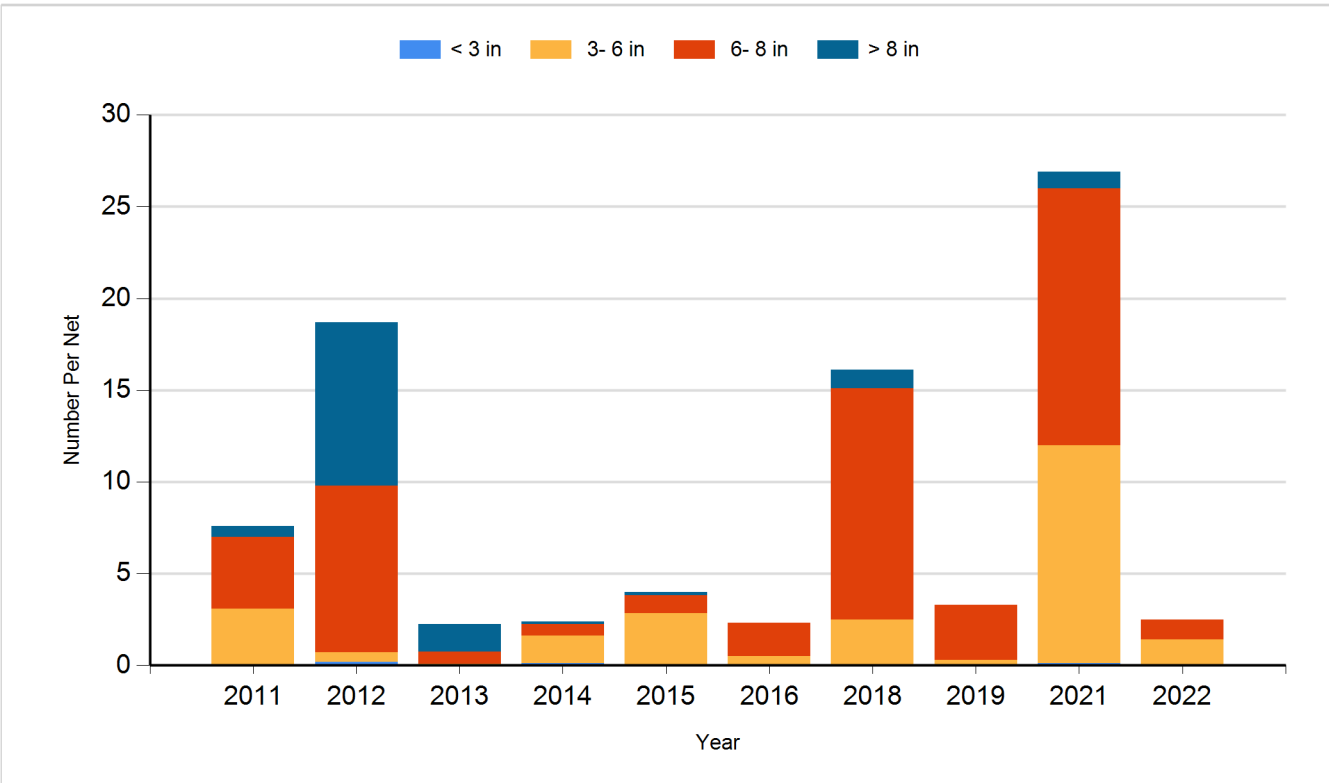
Species: Black Crappie
Gear: frame net (std 3/4 in)



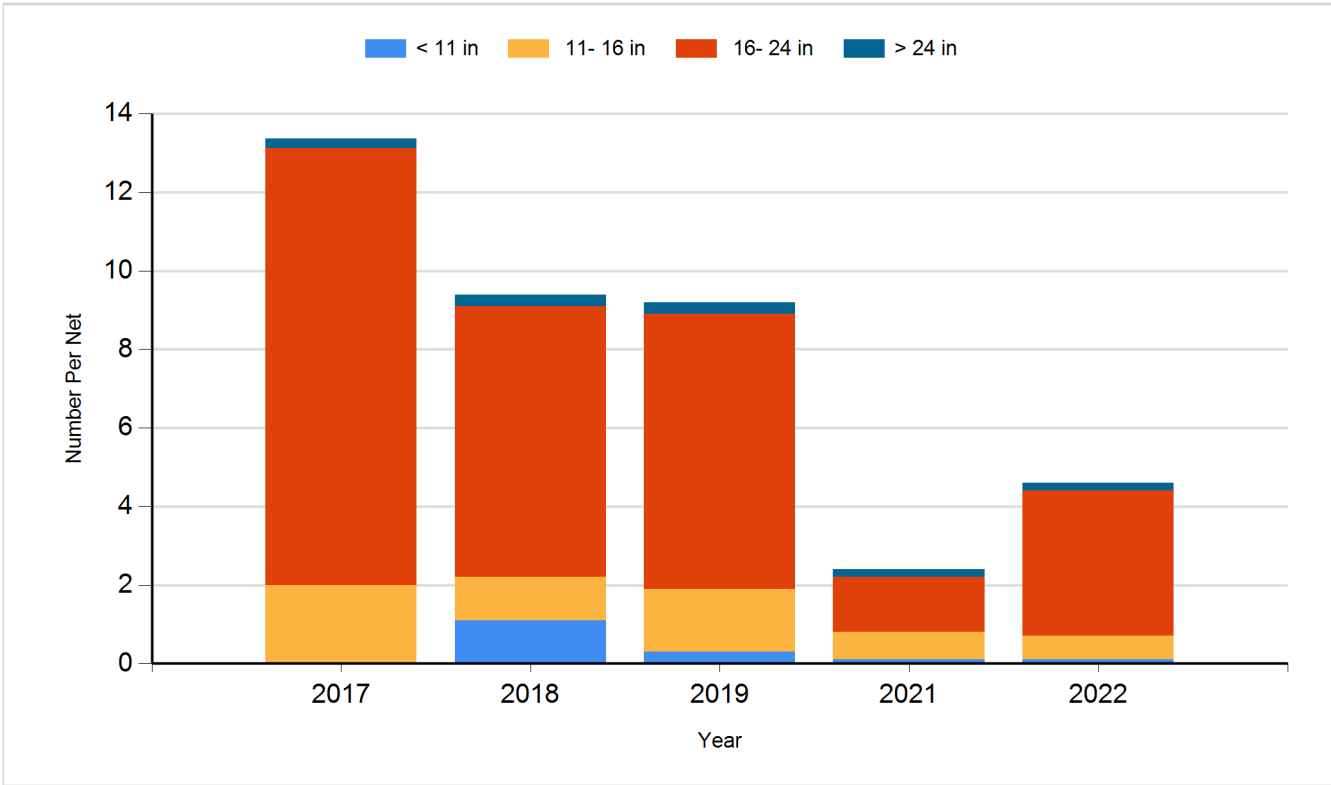
Species: Bluegill
Gear: AFS std frame net



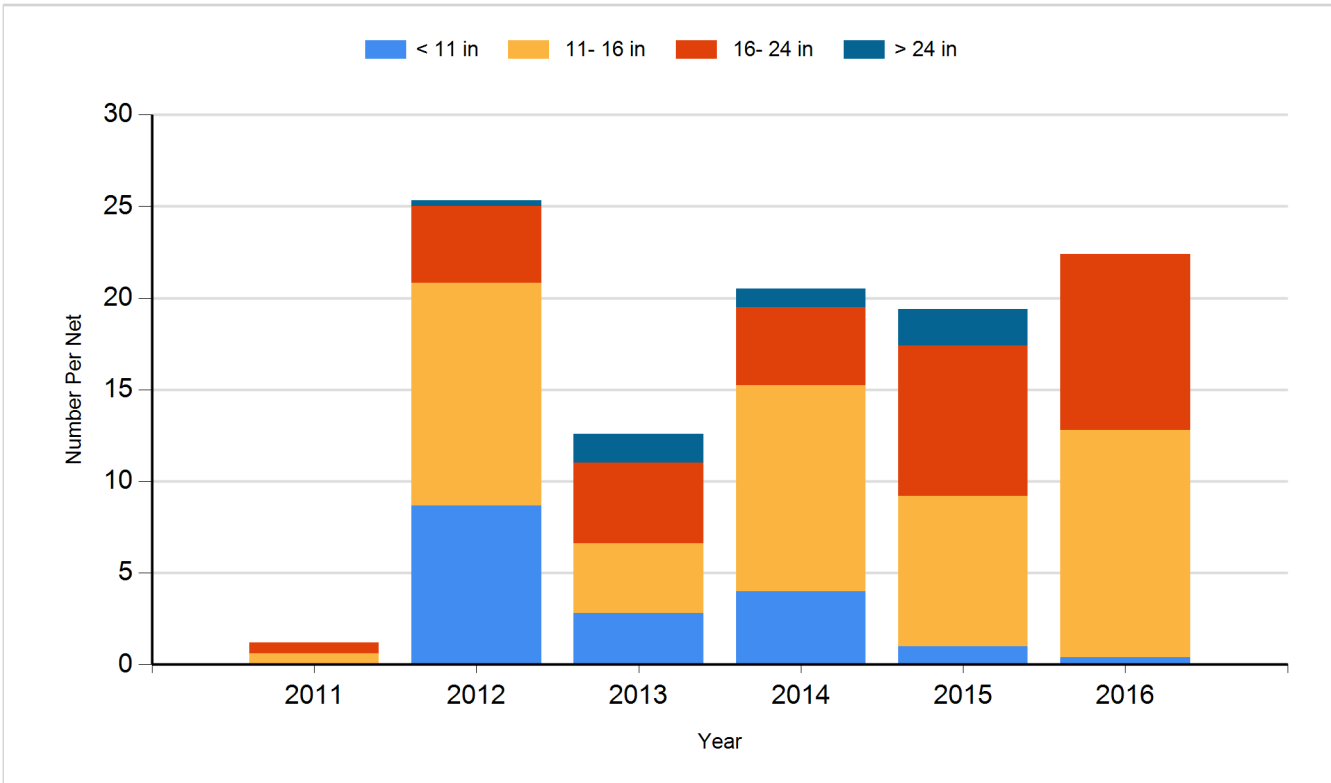
Species: Bluegill
Gear: frame net (std 3/4 in)



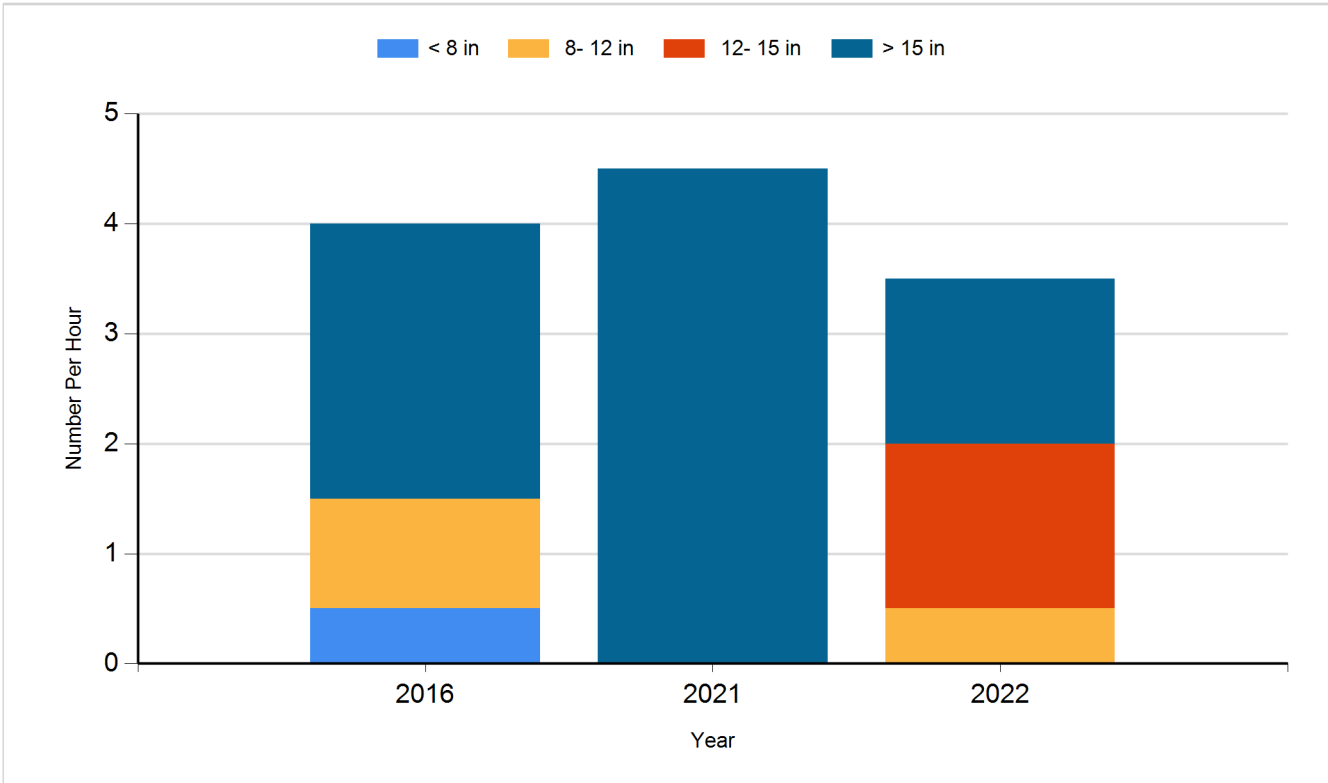
Species: Channel Catfish
Gear: AFS std gill net



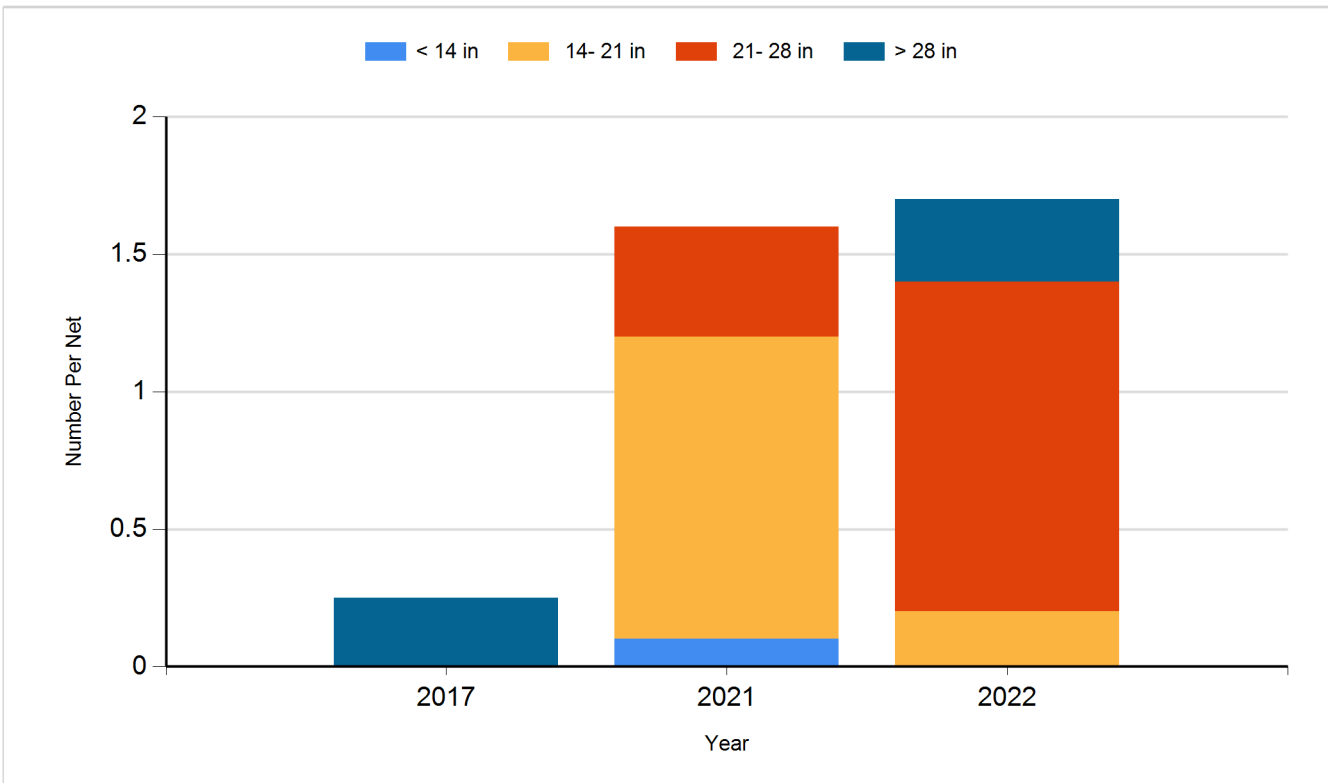
Species: Channel Catfish
Gear: std exp gill net



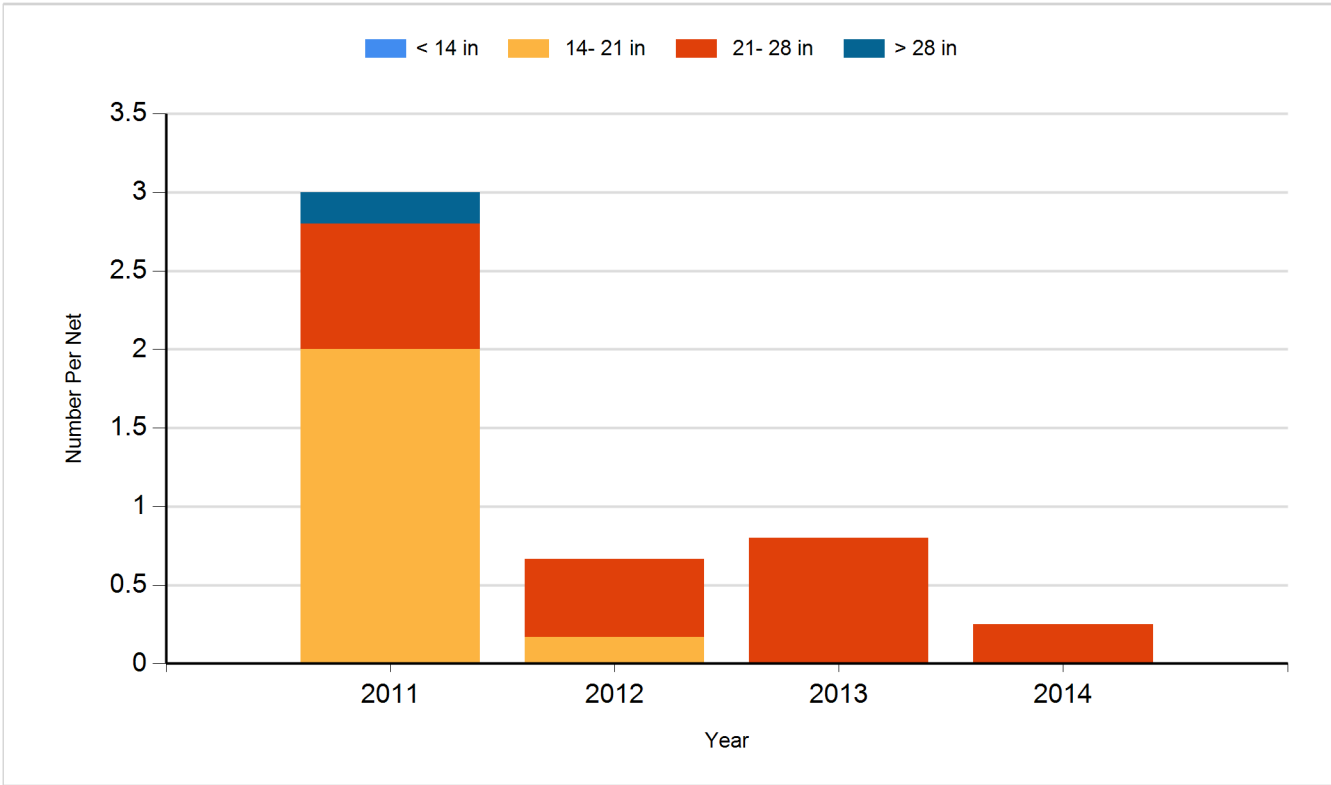
Species: Largemouth Bass
Gear: boat shocker (night)



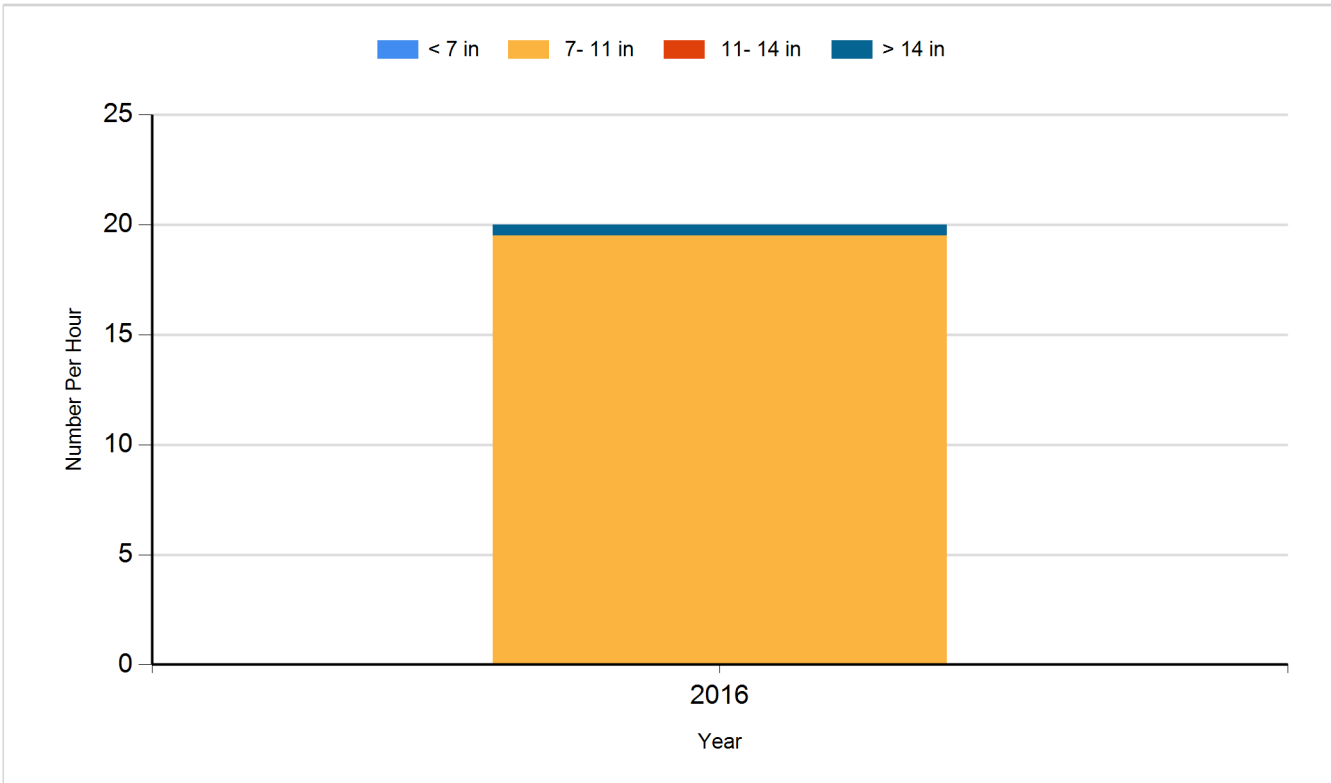
Species: Northern Pike
Gear: AFS std gill net



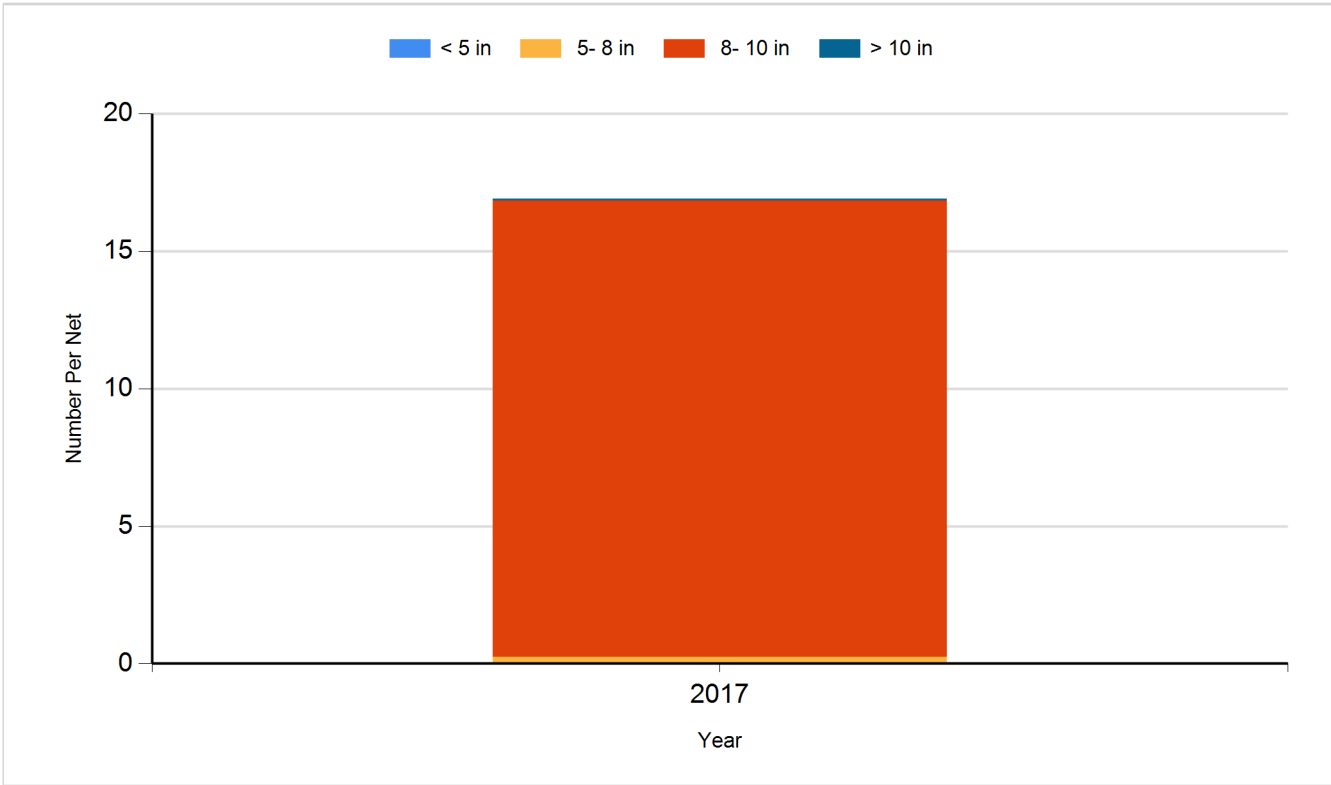
Species: Northern Pike
Gear: std exp gill net



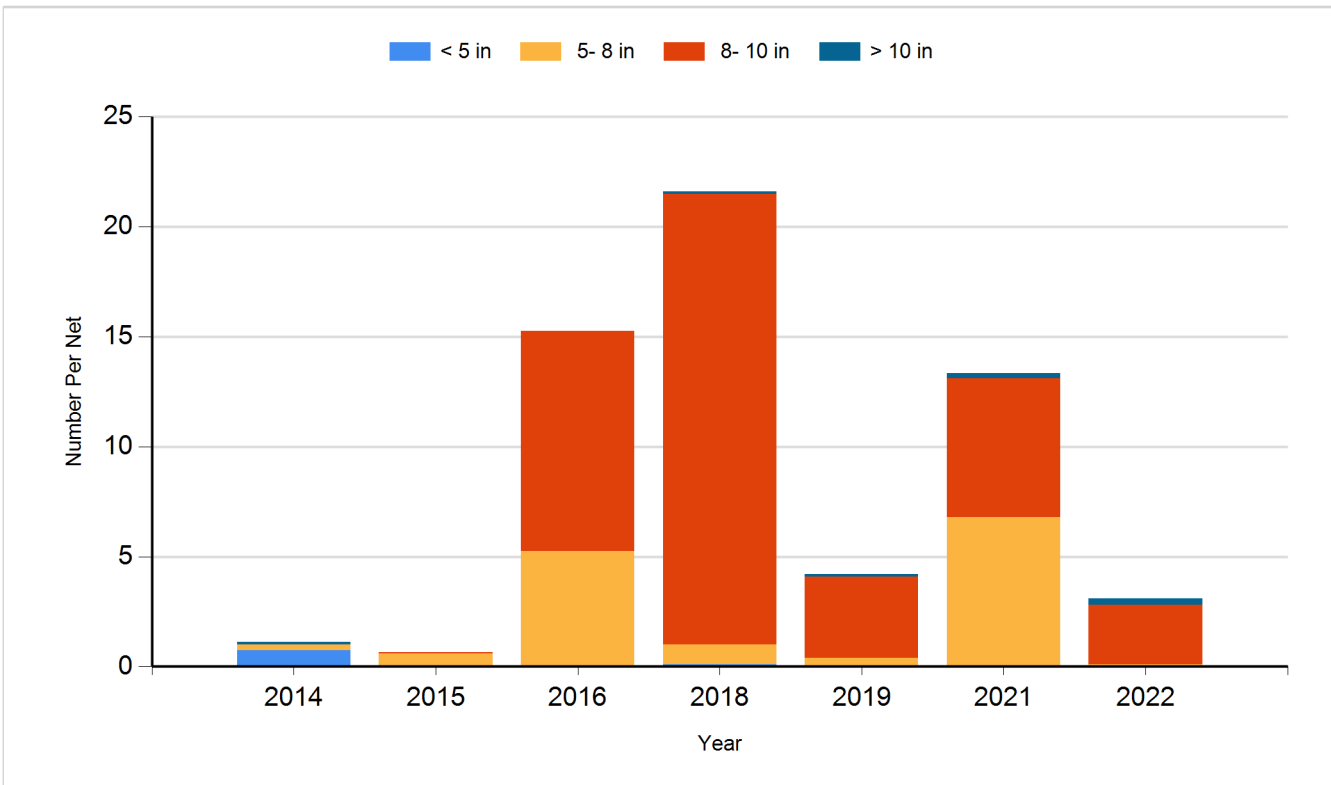
Species: Smallmouth Bass
Gear: boat shocker (night)



Species: White Crappie
Gear: AFS std frame net



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



Fish Stocking

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

Year	Species	Size	Number
2012	Walleye	Small Fingerling	67,340
2013	Walleye	Small Fingerling	32,080
2015	Walleye	Small Fingerling	52,698
2016	Walleye	Small Fingerling	48,020
2017	Walleye	Fingerling	59,000
2018	Walleye	Small	47,040
2019	Walleye	Small Fingerling	51,000
2021	Walleye	Juvenile	59,570
2022	Largemouth Bass	Juvenile	40,000