SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Mitchell, Davison County
LJA-Lake-623-000
2021

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 02, 2021	10 net-nights
boat shocker (night)	Jun 07, 2021	7200 seconds
electrofishing (flathead)	Jul 12, 2021	2400 seconds
electrofishing (flathead)	Jun 21, 2021	7200 seconds
electrofishing (flathead)	Jun 22, 2021	6000 seconds
electrofishing (flathead)	Jun 28, 2021	8400 seconds
electrofishing (flathead)	Jun 29, 2021	8400 seconds
frame net (std 3/4 in)	Jun 02, 2021	9 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

White Crappie

Flathead Catfish

Channel Catfish

River Carpsucker

Freshwater Drum

Northern Pike

Common Carp

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
AFS std gill net	Bigmouth Buffalo	4	0.4	0.2	50		25			
	Black Bullhead	2	0.2	0.3	50		0			
	Black Crappie	5	0.5	0.4	40		0		111	5
	Bluegill	2	0.2	0.2	100		50		118	2
	Channel Catfish	24	2.3	1.1	70	15	9		93	3
	Common Carp	11	1.1	1.2	64		18			
	Freshwater Drum	33	2.9	0.9	17		3			
	Northern Pike	16	1.5	0.5	27		0		81	7
	River Carpsucker	34	3.4	2.1	100		53	13		
	Shorthead Redhorse	1	0.1	0.1	100		100		114	
	Walleye	2	0.2	0.3	50		0		86	5
	White Crappie	7	0.7	0.4	43		0		106	8
	White Sucker	7	0.7	0.4	86		86			
boat shocker (night)	Largemouth Bass	9	4.5	13.9	100		100		104	2
electrofishing (flathead)		0	0.0	0.0						
	Flathead Catfish	403	9.3	2.2	48	8	26	7	89	1
frame net (std 3/4 in)	Black Crappie	135	15.0	7.9	44	6	0		96	1
	Bluegill	246	27.3	10.8	69	4	5	2	107	2
	Channel Catfish	79	8.8	5.1	78	7	8	5	93	2
	Common Carp	8	0.9	0.8	88		25			
	Flathead Catfish	2	0.2	0.2	50		0			
	Freshwater Drum	2	0.2	0.2	0		0			
	Green Sunfish	2	0.2	0.2	0		0			
	Northern Pike	1	0.0	0.0	0		0			
	Smallmouth Bass	1	0.1	0.2	0		0		106	
	Walleye	1	0.1	0.2	0		0		78	
	White Crappie	127	14.1	8.0	34	6	0		100	2

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	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
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	0.15
	Black Bullhead						0.0	0.0	0.4		0.2	0.15
	Black Crappie						7.4	1.5	0.8		0.5	2.55
	Bluegill						0.1	0.2	0.1		0.2	0.15
	Channel Catfish						13.4	8.3	8.9		2.3	8.23
	Common Carp						0.0	0.7	0.7		1.1	0.63
	Flathead Catfish						0.1	0.0	0.1		0.0	0.05
	Freshwater Drum						2.6	8.6	2.8		2.9	4.23
	Northern Pike						0.3	0.0	0.0		1.5	0.45
	Quillback						0.0	0.0	0.0		0.0	0.00
	River Carpsucker						0.0	0.0	0.6		3.4	1.00
	Shorthead Redhorse						0.0	0.0	0.0		0.1	0.03
	Walleye						0.3	0.3	0.4		0.2	0.30
	White Crappie						3.0	0.8	1.5		0.7	1.50
	White Sucker						0.0	0.0	0.0		0.7	0.18
boat shocker (night)	Largemouth Bass					3.5					4.5	4.00
	Smallmouth Bass					20.0					0.0	10.00
electrofishing (flathead)											0.0	0.00
	Flathead Catfish										9.3	9.30
fall night EF-WAE*	Flathead Catfish	0.0	0.0	156.9	13.6							42.63
	Largemouth Bass	4.3	0.0	0.0	0.0							1.08
	Walleye	0.5	119.5	12.4	0.2							33.15

		CPUE										
Gear	Species	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
frame net (std 3/4 in)	Bigmouth Buffalo	0.0	0.1	0.0	0.5	0.0		0.0	0.0		0.0	0.08
	Black Bullhead	0.7	0.0	0.0	0.0	0.1		0.0	0.0		0.0	0.10
	Black Crappie	3.8	1.4	1.0	7.3	43.9		12.7	2.1		15.0	10.90
	Bluegill	18.5	2.3	2.3	4.0	2.3		16.1	3.3		27.3	9.51
	Channel Catfish	1.8	2.6	4.6	18.7	6.4		9.2	1.8		8.8	6.74
	Common Carp	3.6	2.3	0.0	1.4	1.3		0.8	0.2		0.9	1.31
	Flathead Catfish	0.0	0.3	0.1	0.3	0.0		0.5	0.2		0.2	0.20
	Freshwater Drum	1.6	0.5	0.9	0.0	0.1		0.2	0.1		0.2	0.45
	Green Sunfish	0.0	0.0	0.0	0.0	0.4		0.1	0.0		0.2	0.09
	Largemouth Bass	0.0	0.0	0.0	0.0	0.1		0.0	0.0		0.0	0.01
	Northern Pike	0.1	0.3	0.1	0.1	0.3		0.0	0.0		0.0	0.11
	Shorthead Redhorse	1.0	0.4	0.0	0.0	0.1		0.0	0.0		0.0	0.19
	Smallmouth Bass	0.4	0.4	0.0	0.0	0.2		0.4	0.1		0.1	0.20
	Sunfish Hybrid	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.00
	Walleye	0.0	0.1	0.5	0.0	0.0		0.0	0.0		0.1	0.09
	White Crappie	0.0	0.0	0.4	0.7	15.3		21.5	4.2		14.1	7.03
	White Sucker	0.3	0.3	0.0	0.0	0.0		0.1	0.0		0.0	0.09
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	0.0	1.0	0.0	0.0	1.0						0.40
	Black Bullhead	2.8	0.0	0.0	0.0	0.0						0.56
	Black Crappie	2.7	0.6	0.3	14.0	5.8						4.68
	Bluegill	0.2	0.6	0.0	0.0	0.2						0.20
	Channel Catfish	16.7	9.8	16.5	18.4	22.0						16.68
	Common Carp	1.0	1.0	2.5	0.4	0.8						1.14
	Flathead Catfish	0.0	0.0	0.0	0.0	0.0						0.00
	Freshwater Drum	11.3	1.4	2.0	3.8	5.0						4.70
	Largemouth Bass	0.0	0.2	0.0	0.0	0.0						0.04
	Northern Pike	0.7	0.8	0.3	0.0	0.0						0.36
	Shorthead Redhorse	1.8	0.6	0.5	0.0	0.0						0.58
	Smallmouth Bass	0.0	0.2	0.8	0.2	0.0						0.24
	Walleye	3.3	2.4	2.8	0.8	0.8						2.02
	White Crappie	0.0	0.0	0.8	0.0	5.0						1.16
	White Sucker	0.2	0.4	0.0	0.0	0.0						0.12

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	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
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				
	Common Carp	PSD						100				
		PSD-P						40				
	Northern Pike	PSD						100				
		PSD-P						100				
		Wr						79				
	White Crappie	PSD						99				
		PSD-P						0				
		Wr						100				
AFS std gill net	Black Crappie	PSD						100	80	25		40
		PSD-P						2	7	13		0
		Wr						102	94	105		111
	Bluegill	PSD						100	100	0		100
		PSD-P						0	0	0		50
		Wr						100	121	132		118
	Channel Catfish	PSD						85	87	82		70
		PSD-P						2	4	3		9
		Wr						86	87	96		93
	Common Carp	PSD							86	100		64
		PSD-P							43	71		18
	Flathead Catfish	PSD						100		0		
		PSD-P						0		0		
		Wr						102		166		
	Northern Pike	PSD						100				27
		PSD-P						100				0

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AFS std gill net	Northern Pike	Wr						83				81
	River Carpsucker	PSD								83		100
		PSD-P								83		53
	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
		PSD-P					71					100
		Wr					105					104
electrofishing (flathead)	Flathead Catfish	PSD										48
		PSD-P										26
		Wr										89
frame net (std 3/4 in)	Black Crappie	PSD	63	65	88	0	49		79	43		44
		PSD-P	50	41	25	0	2		0	5		0
		Wr	105	107	101	108	103		93	94		96
	Bluegill	PSD	97	96	33	29	79		84	91		69
		PSD-P	48	67	6	4	0		6	0		5
		Wr	112	97	102	104	107		105	105		107
	Channel Catfish	PSD	78	39	78	58	62		90	94		78
		PSD-P	44	19	43	13	1		7	6		8
		Wr	92	80	85	89	97		87	93		93
	Common Carp	PSD	83	100		100	93		100	50		88
		PSD-P	22	50		71	67		50	50		25
		Wr	98	90								
	Flathead Catfish	PSD		100	0	100			100	100		50
		PSD-P		0	0	25			20	0		0
		Wr		78	86	94			101	93		
	Largemouth Bass	PSD			0		100					
		PSD-P			0		0					
		Wr					97					
	Northern Pike	PSD	0	67	100	100	100					0
		PSD-P	0	0	100	0	67					0
		Wr	66	80	104	86	85					
	White Crappie	PSD			33	13	66		96	90		34
		PSD-P			33	0	0		0	2		0
		Wr			99	99	99		88	93		100

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
hoop net	Black Crappie	PSD					71					
		PSD-P					0					
		Wr					104					
	Bluegill	PSD					50					
		PSD-P					0					
		Wr					103					
	Channel Catfish	PSD					50	64				
		PSD-P					0	0				
		Wr					87	93				
	White Crappie	PSD					14					
		PSD-P					0					
		Wr					101					
std exp gill net	Black Crappie	PSD	69	100	100	3	62					
		PSD-P	56	100	100	0	0					
		Wr	105	79	104	113	109					
	Bluegill	PSD	0	67			100					
		PSD-P	0	67			0					
		Wr	117	109			102					
	Channel Catfish	PSD	27	61	32	55	44					
		PSD-P	2	16	6	11	0					
		Wr	90	89	86	95	92					
	Common Carp	PSD	83	60	100	100	100					
		PSD-P	67	40	60	100	50					
		Wr	99	99								
	Largemouth Bass	PSD		100	0							
		PSD-P		0	0							
		Wr		128								
	Northern Pike	PSD	75	100	100							
		PSD-P	0	0	0							
		Wr	77	74	93							
	White Crappie	PSD			0		76					
		PSD-P			0		0					
		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+
2021	133		167 (36)	201 (77)	217 (21)						
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)					
2012	38	163 (14)	253 (6)	255 (11)	266 (6)	273 (1)					

Species: Bluegill

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	244		123 (76)	178 (133)	192 (25)	196 (7)	220 (4)				
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)				
2012	187	86 (7)		200 (11)	195 (84)	202 (55)	206 (32)				

Species: Largemouth Bass

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2012	28	161 (12)	276 (1)	308 (1)	317 (5)			374 (2)	399 (5)	441 (3)	

Species: White Crappie

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	127		186 (94)	215 (23)		226 (11)					
2015	8		186 (8)								
2014	9	130 (8)			341 (1)						

Fish Condition

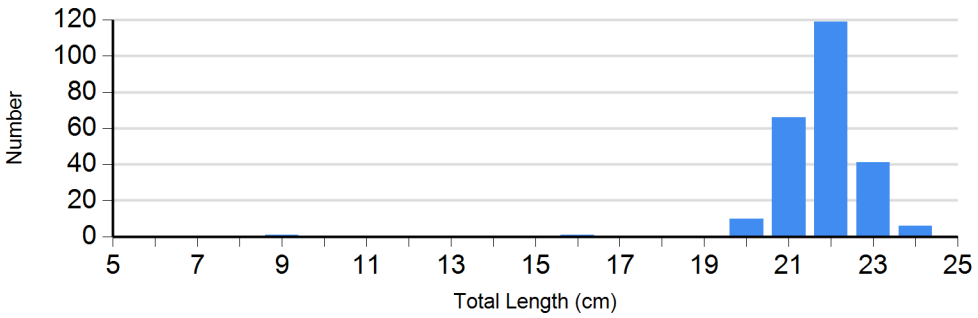
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2017	1	162	242	94 (0.9)	0		0	
	2018	27	100 (2.3)	100	91 (1.0)	0		0	
	2019	12	99 (3.9)	8	88 (2.9)	1	86	0	
	2021	76	100 (1.2)	59	91 (1.0)	0		0	
Bluegill Frame Net	2017	8	117 (0.9)	45	114 (1.6)	2	102 (3.0)	0	
	2018	25	107 (1.8)	126	104 (1.1)	10	100	0	
	2019	3	116 (4.3)	30	104 (1.2)	0		0	
	2021	76	101 (1.9)	157	113 (1.2)	13	107 (4.3)	0	
Channel Catfish Gill Net	2017	16	84 (1.4)	89	87 (0.9)	2	86	0	
	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	
Largemouth Bass Electro Fishing	2021	0		0		9	104 (1.8)	0	
Northern Pike Gill Net	2017	0		0		2	83 (7.1)	0	
	2021	11	85 (2.1)	4	71 (21.0)	0		0	
White Crappie Frame Net	2017	3	190	199	98 (0.8)	1	90	0	
	2018	9	88	205	88 (0.6)	1		0	
	2019	4	120 (11.6)	37	90 (1.7)	1	91	0	
	2021	84	104 (0.9)	43	93 (2.3)	0		0	

Length Frequency Distribution

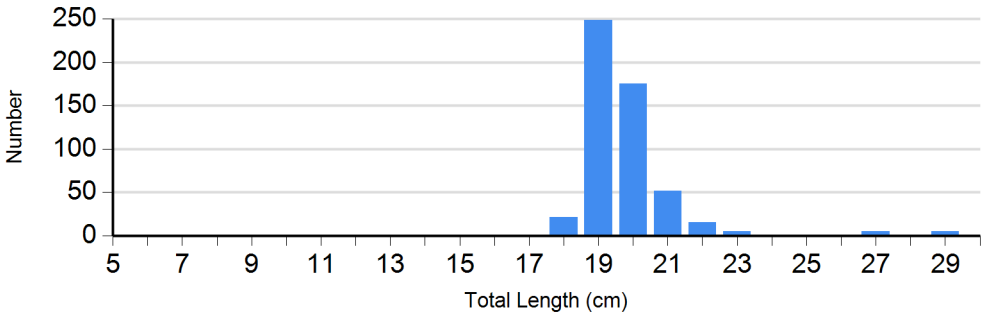
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net

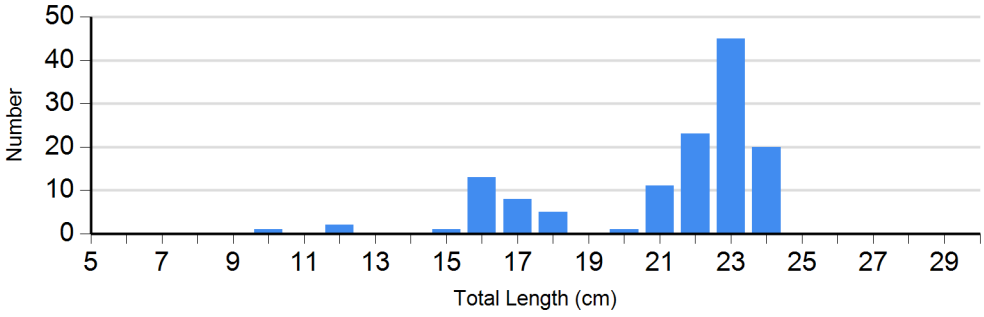


2017

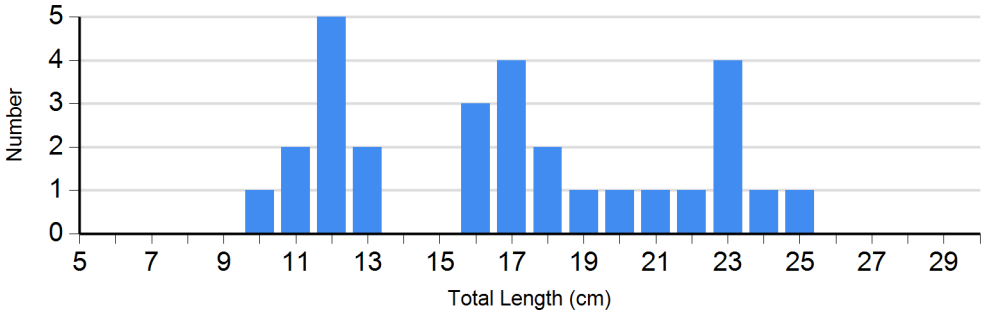
Species: Black Crappie
Gear: frame net (std 3/4 in)



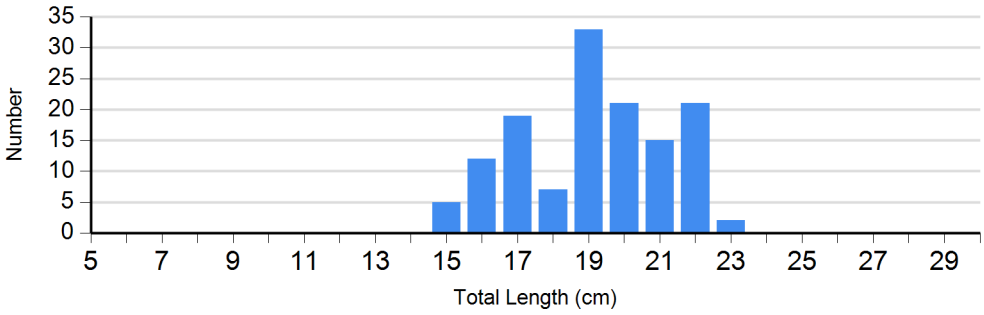
2016



2018

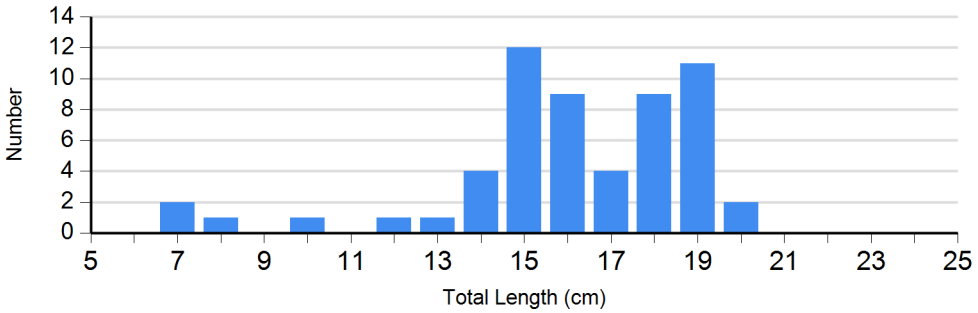


2019



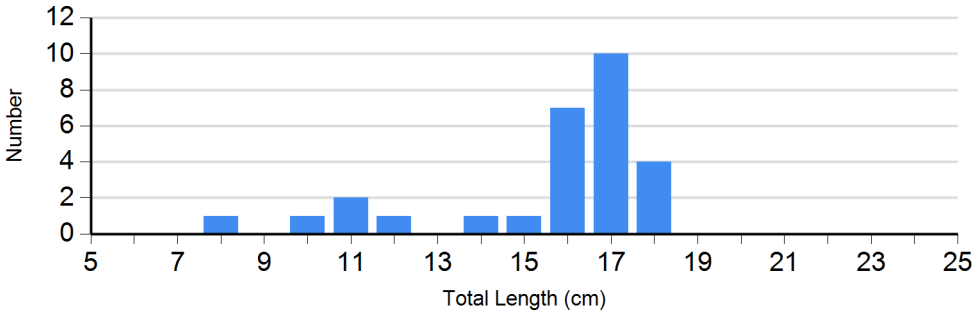
2021

Species: Bluegill
Gear: AFS std frame net

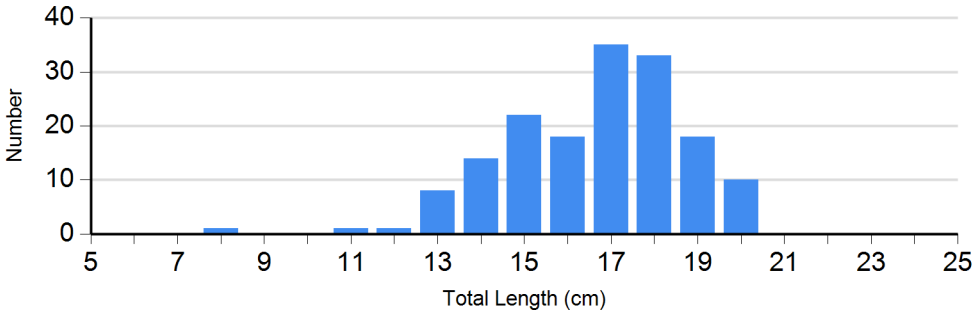


2017

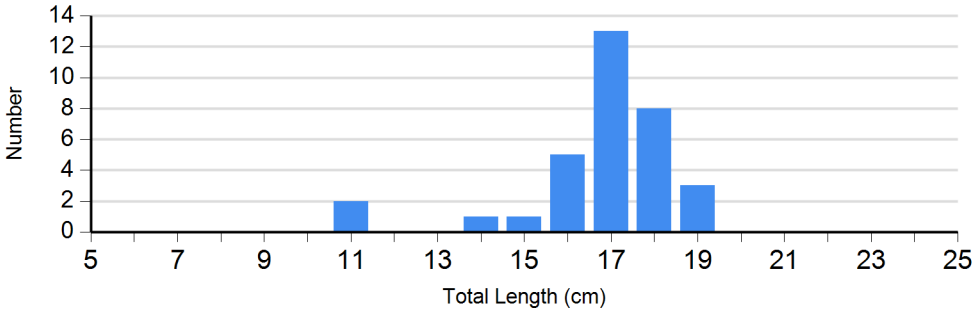
Species: Bluegill
Gear: frame net (std 3/4 in)



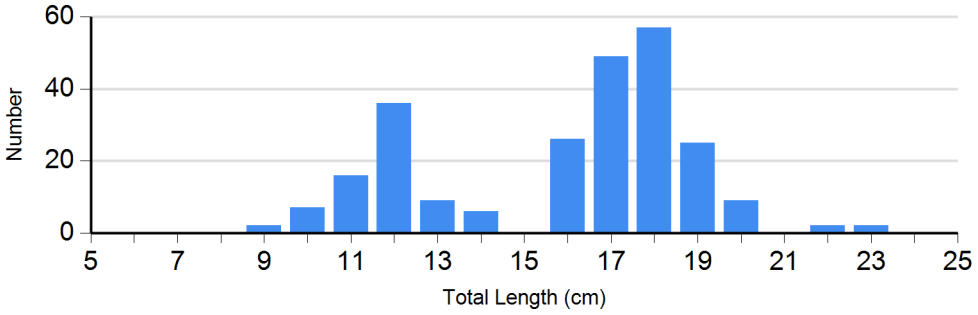
2016



2018

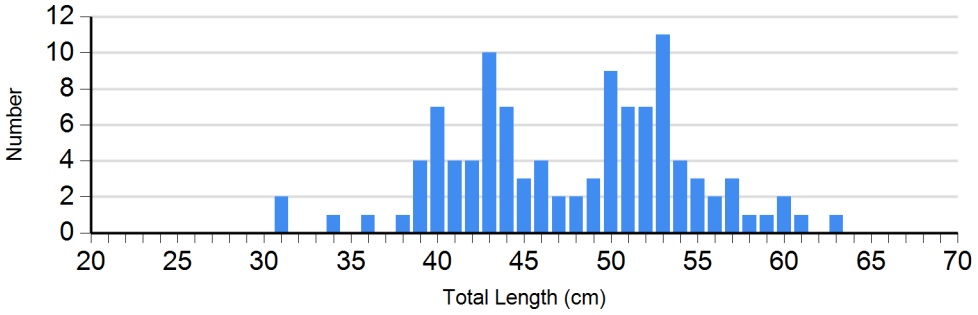


2019

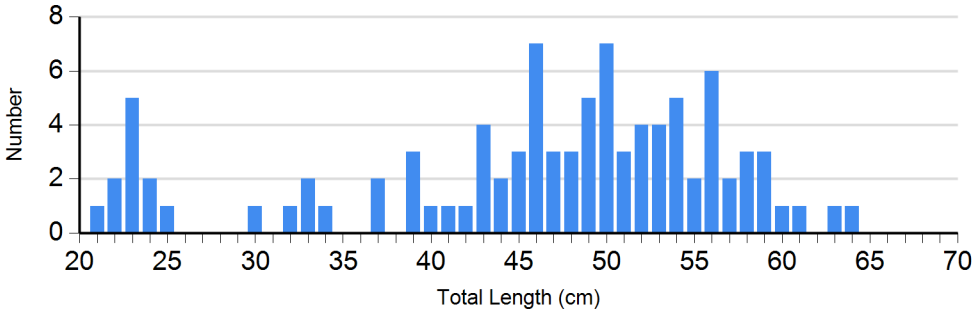


2021

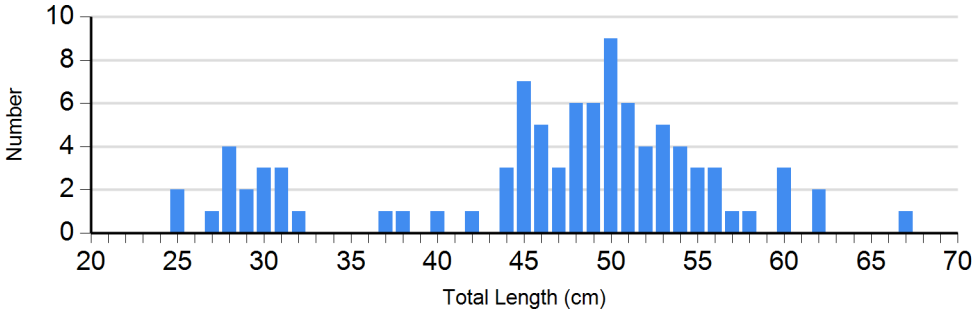
Species: Channel Catfish
Gear: AFS std gill net



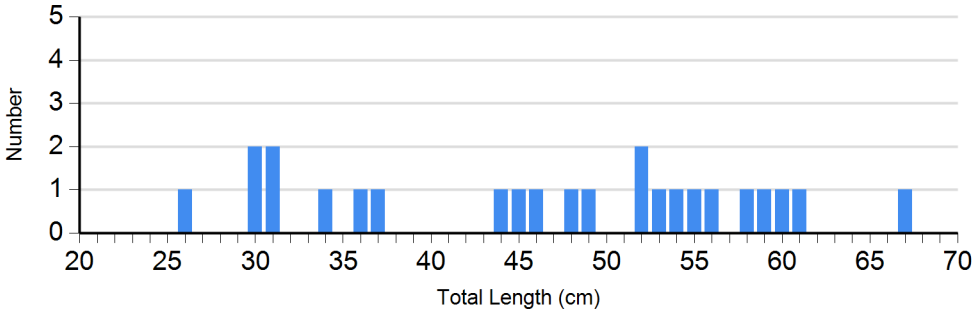
2017



2018

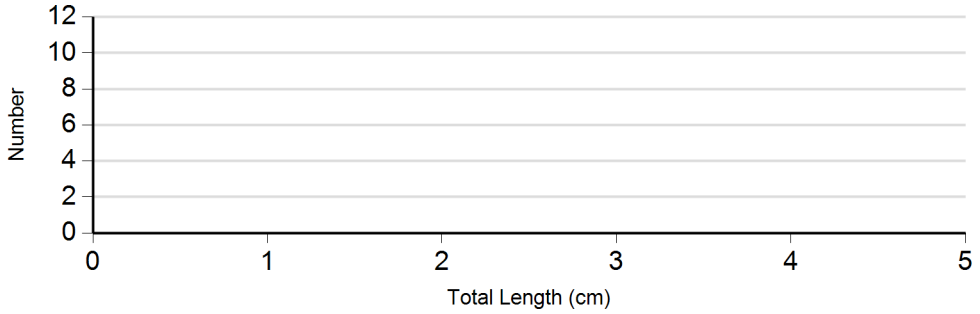


2019



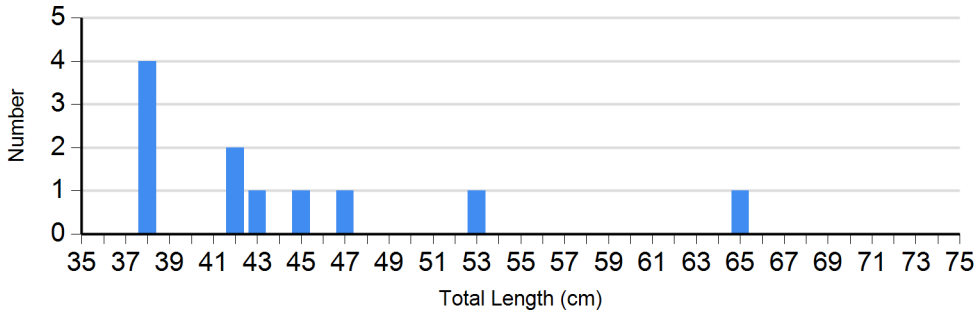
2021

Species: Channel Catfish
Gear: std exp gill net



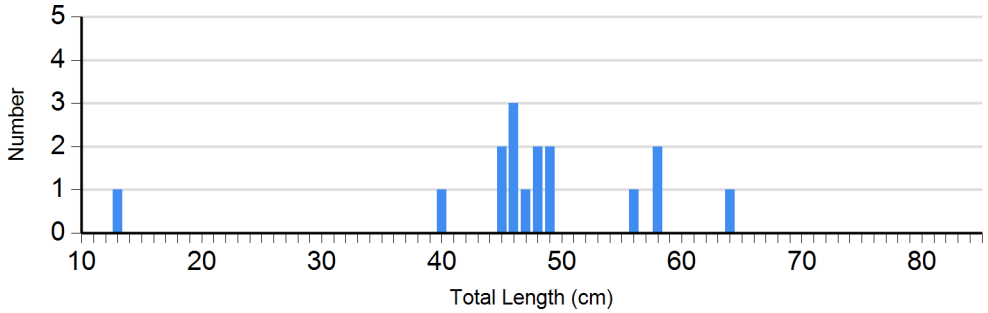
2016

Species: Common Carp
Gear: AFS std gill net



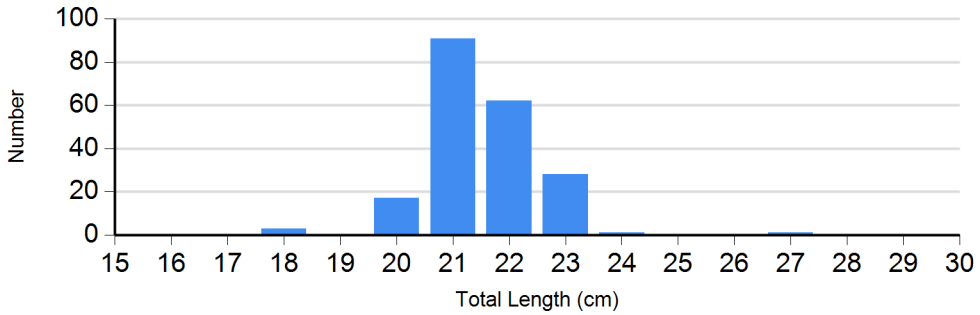
2021

Species: Northern Pike
Gear: AFS std gill net



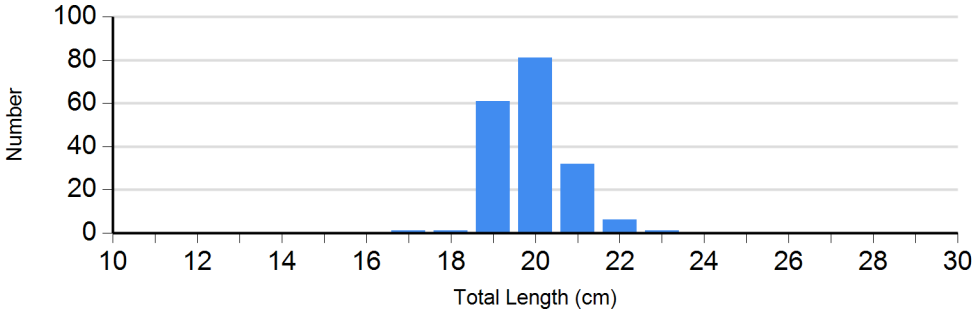
2021

Species: White Crappie
Gear: AFS std frame net

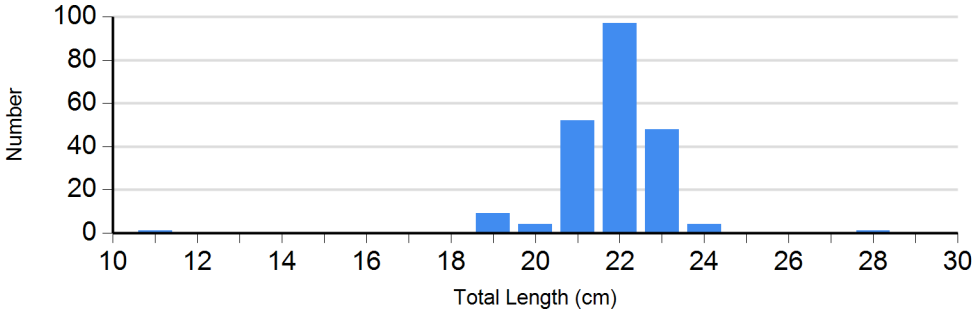


2017

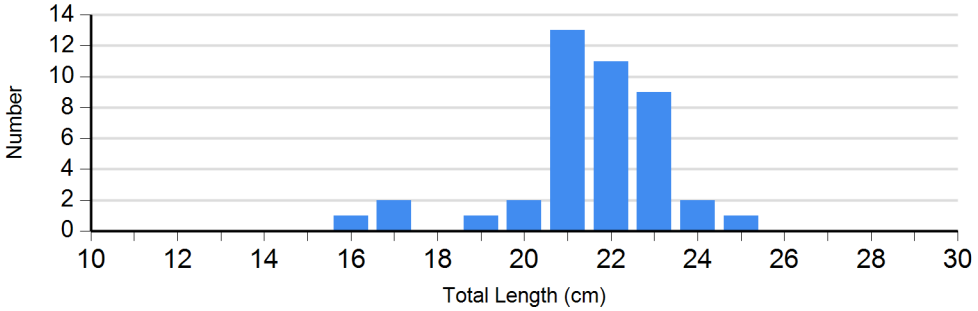
Species: White Crappie
Gear: frame net (std 3/4 in)



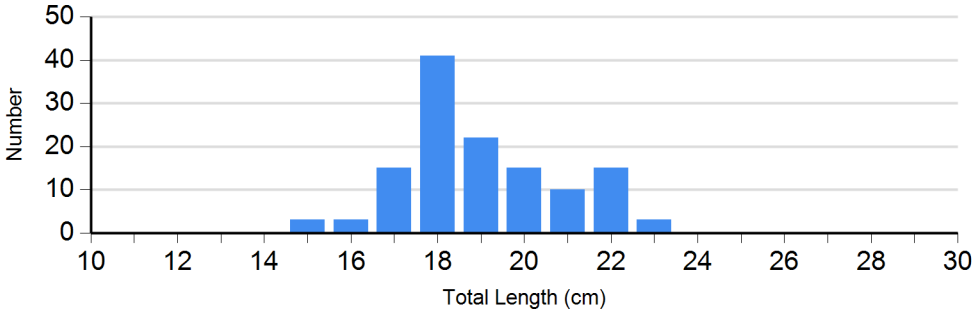
2016



2018



2019

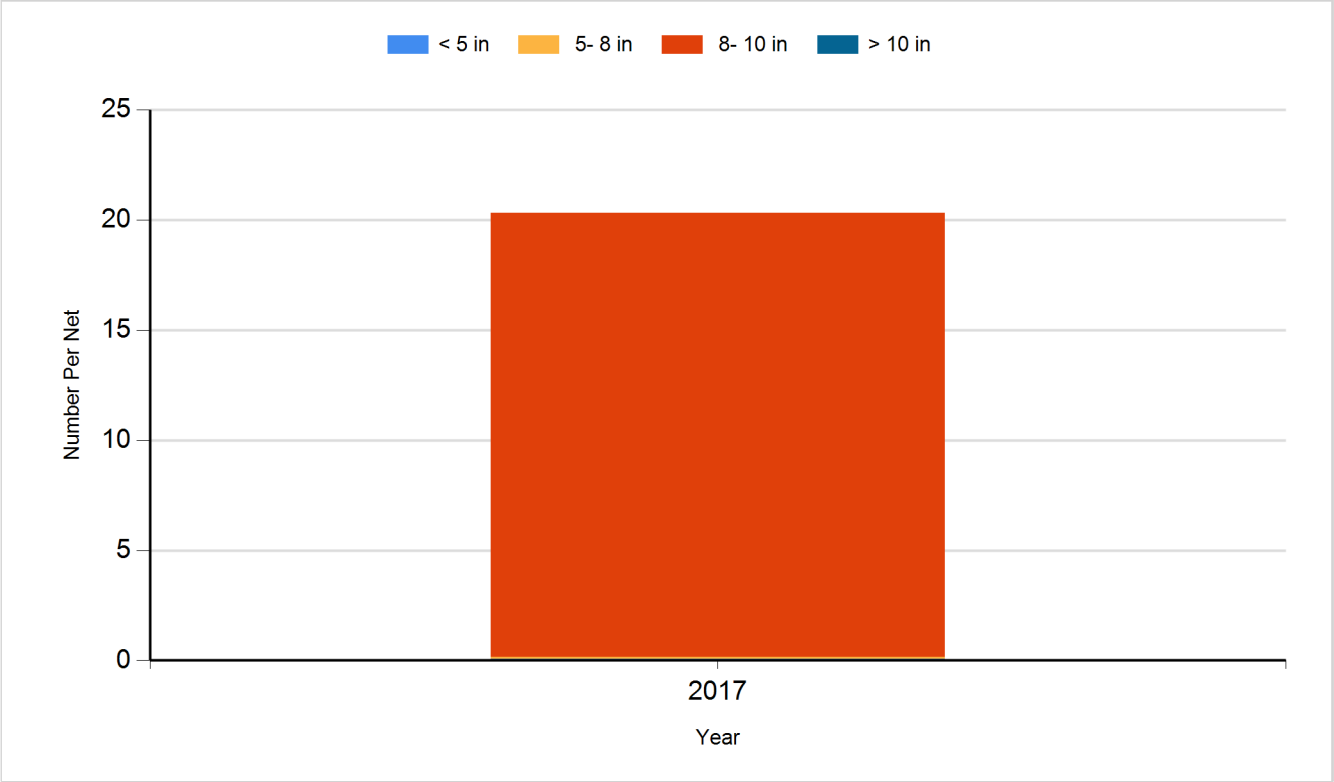


2021

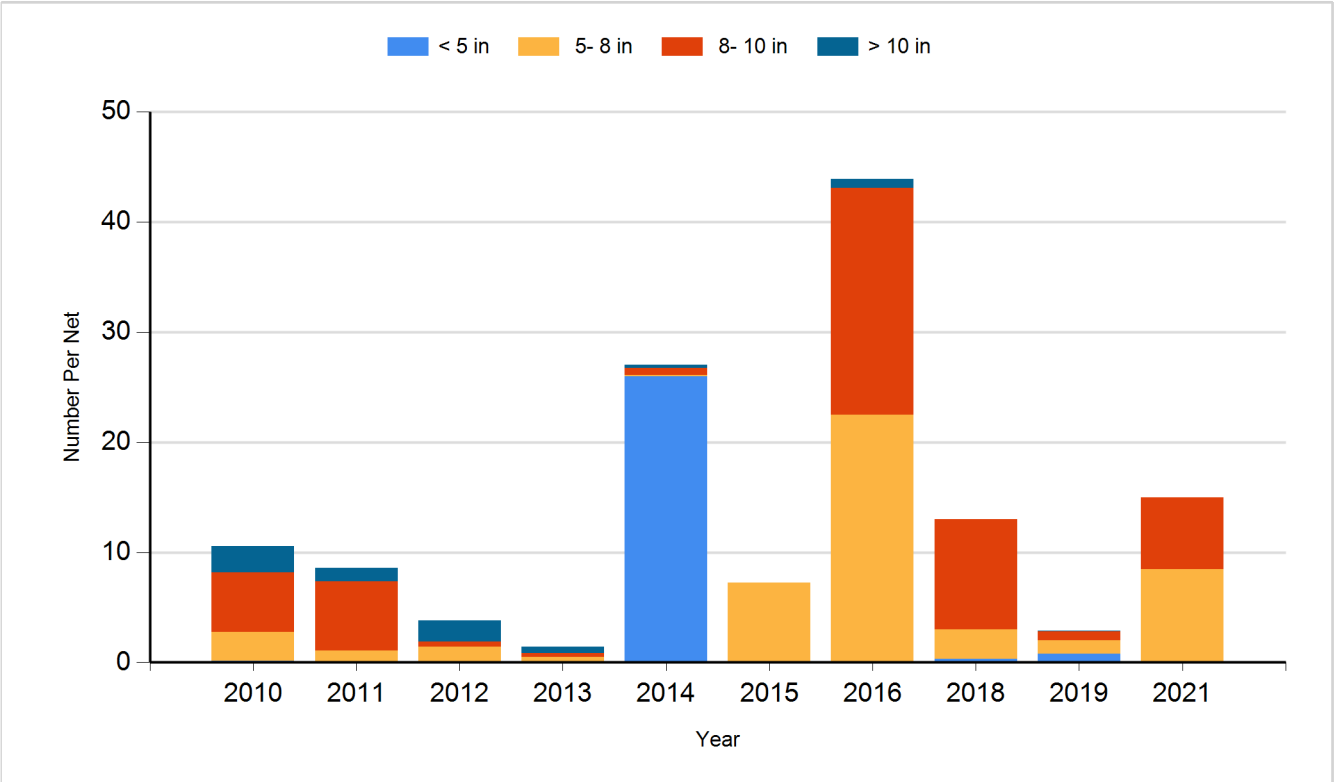
Historic Fish Sizes and Relative Abundance

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

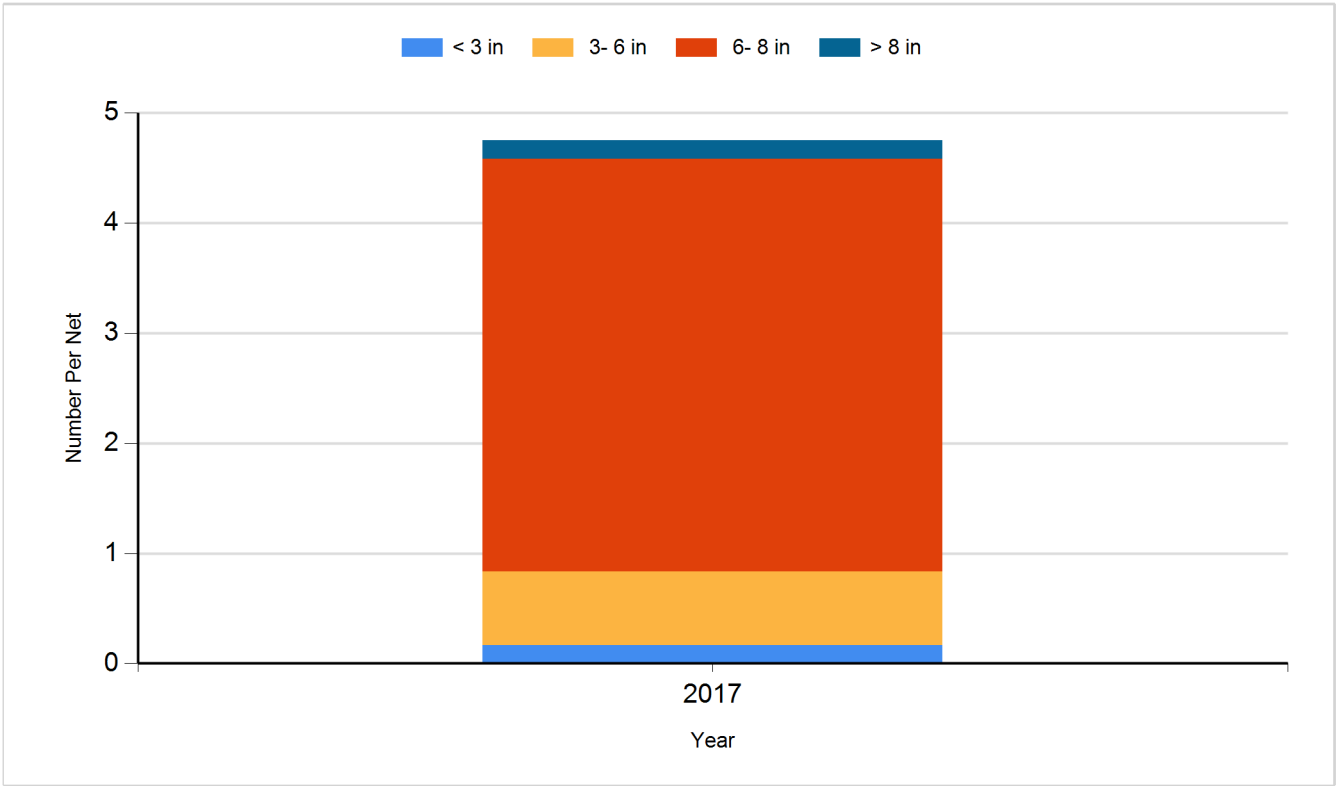
Species: Black Crappie
Gear: AFS std frame net



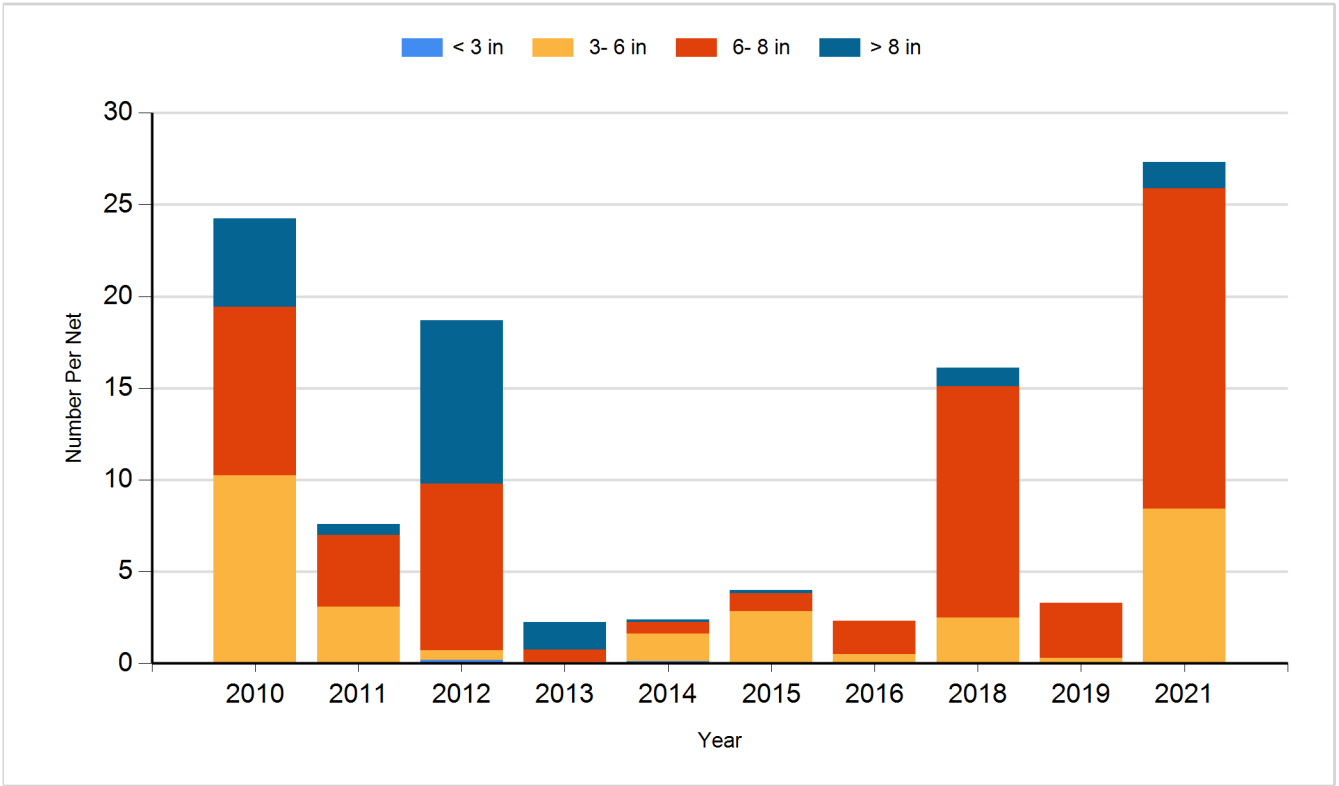
Species: Black Crappie
Gear: frame net (std 3/4 in)



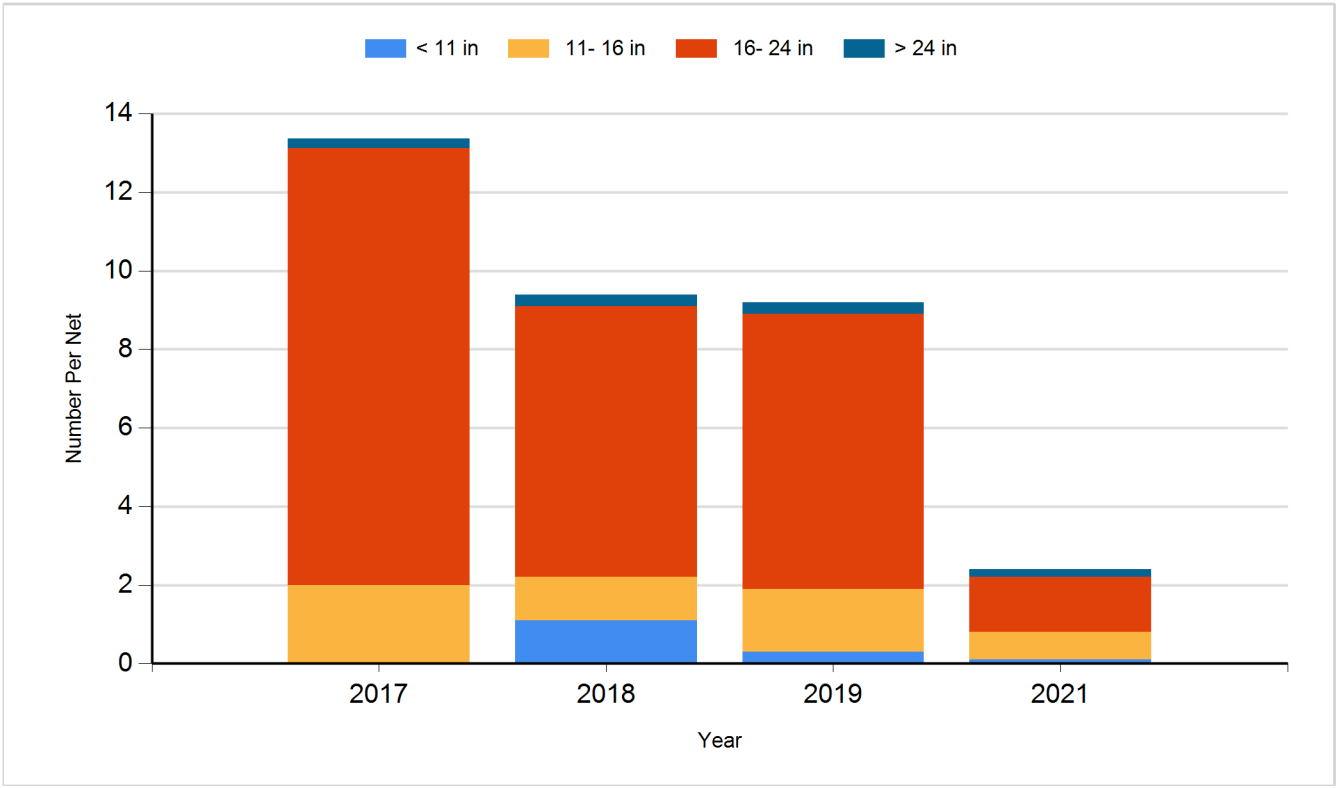
Species: Bluegill
Gear: AFS std frame net



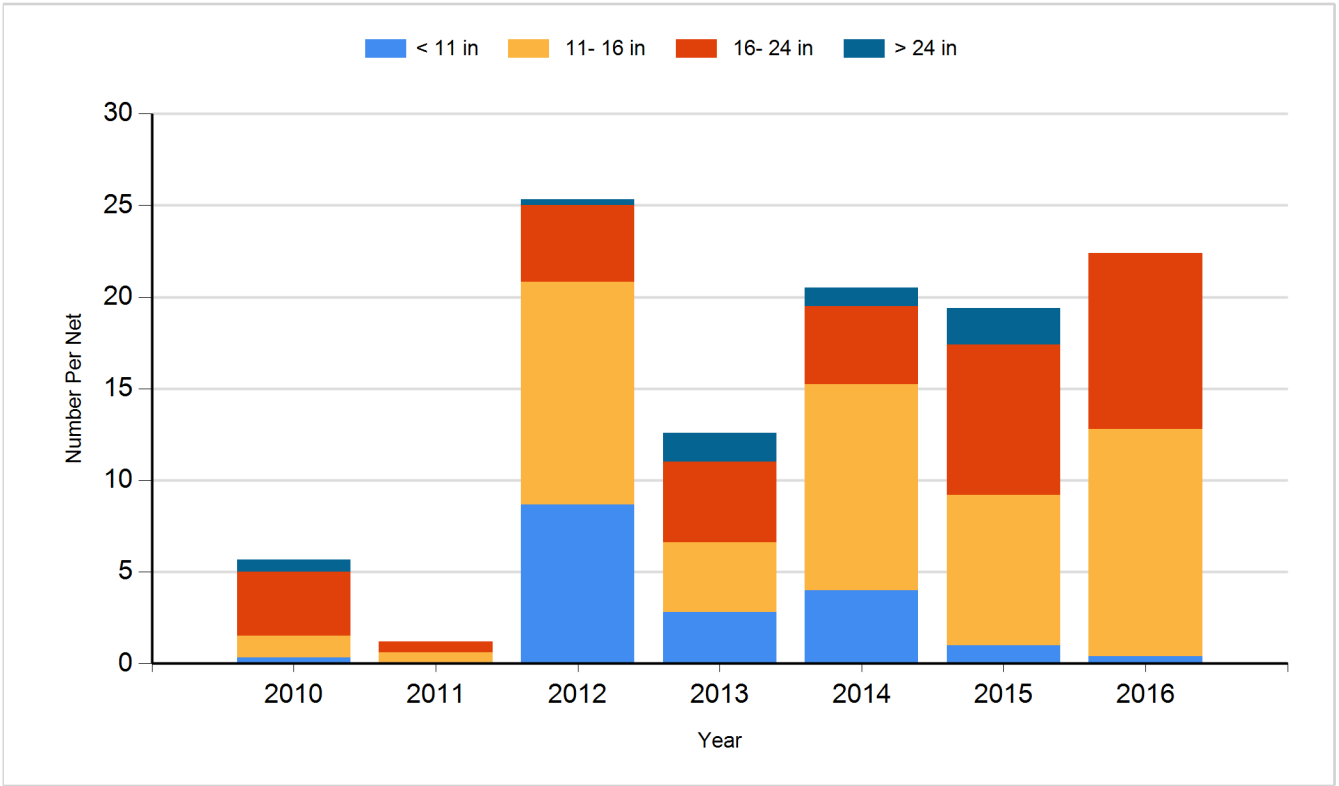
Species: Bluegill
Gear: frame net (std 3/4 in)



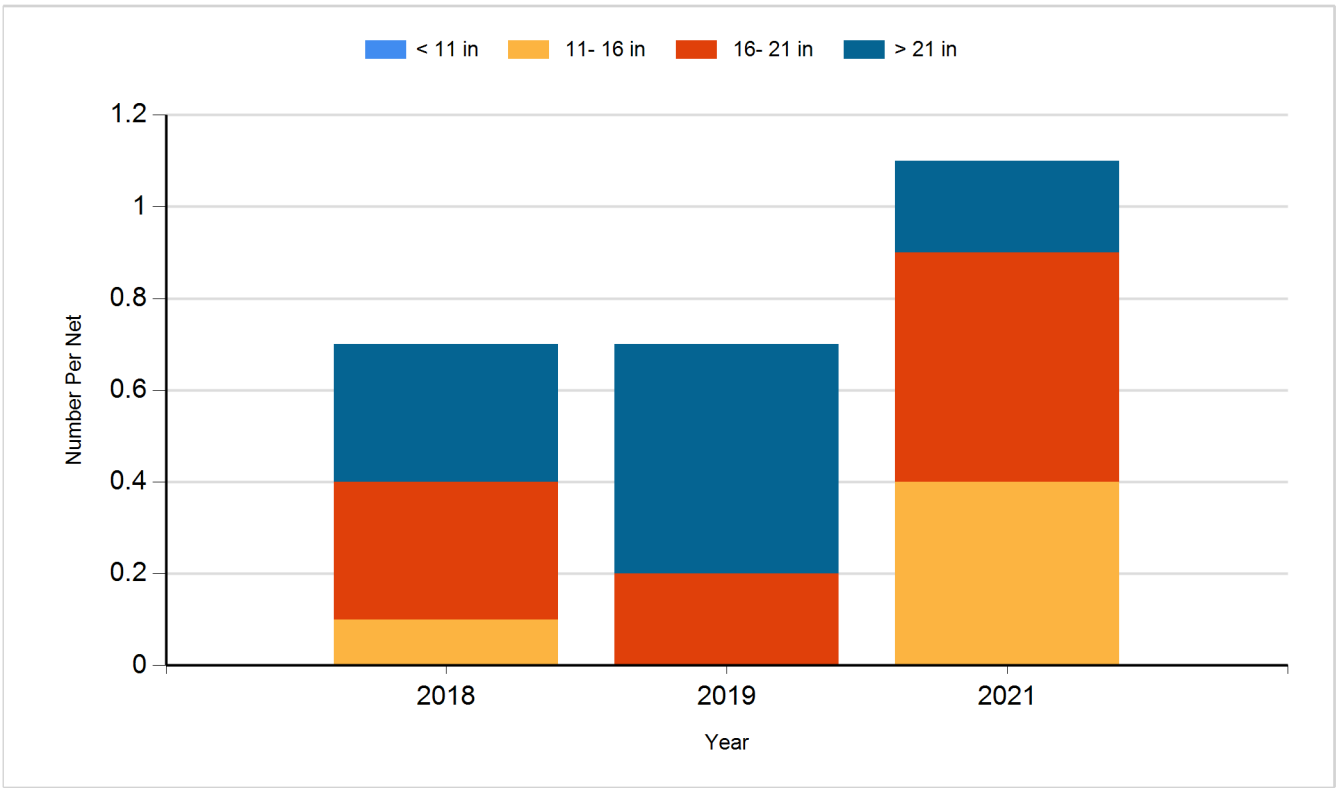
Species: Channel Catfish
Gear: AFS std gill net



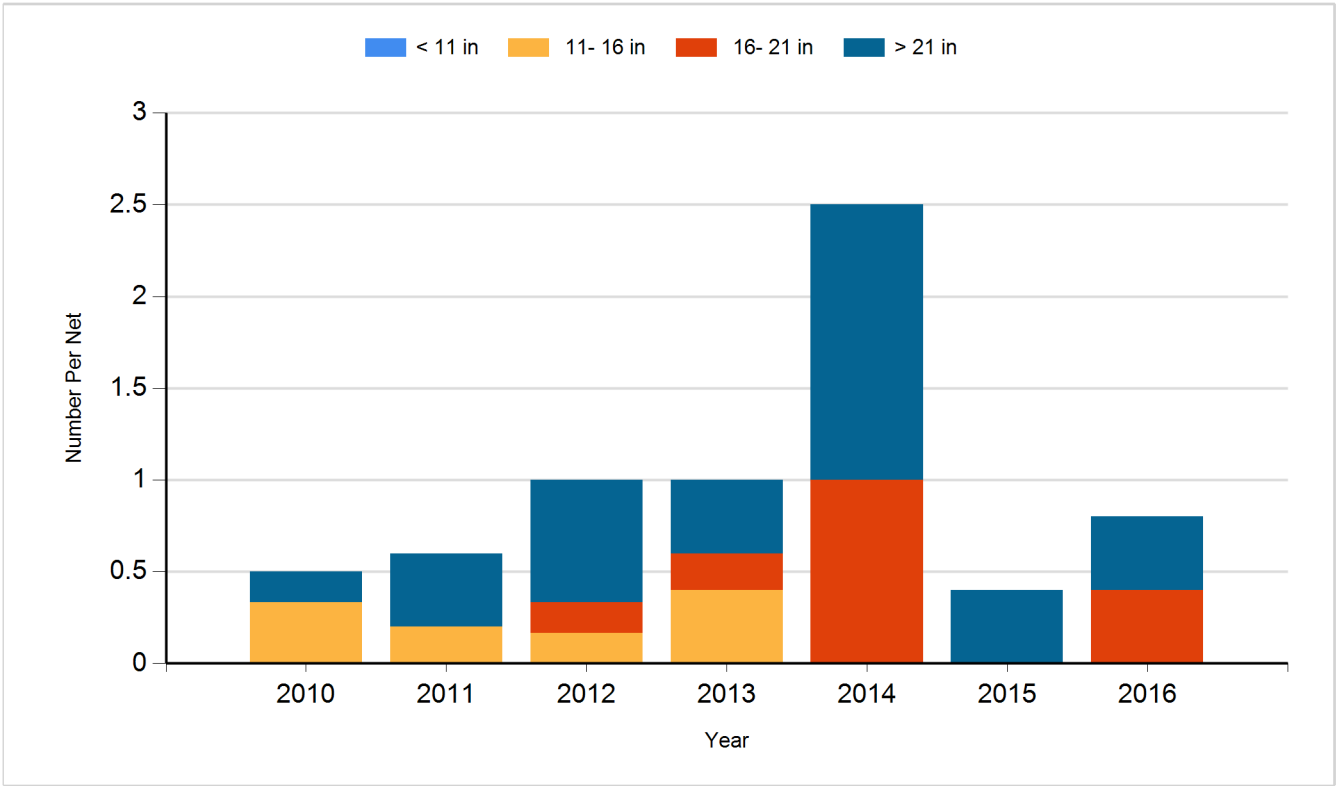
Species: Channel Catfish
Gear: std exp gill net



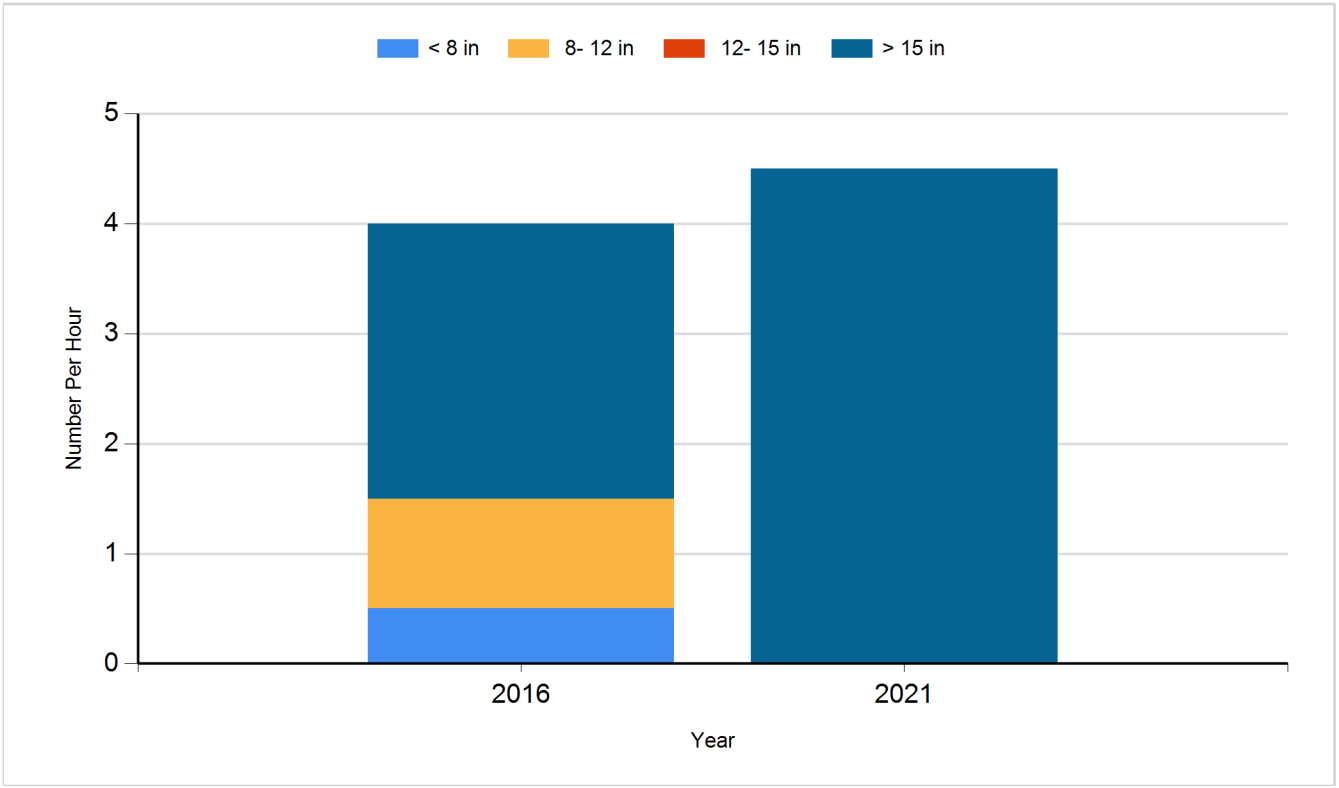
Species: Common Carp
Gear: AFS std gill net



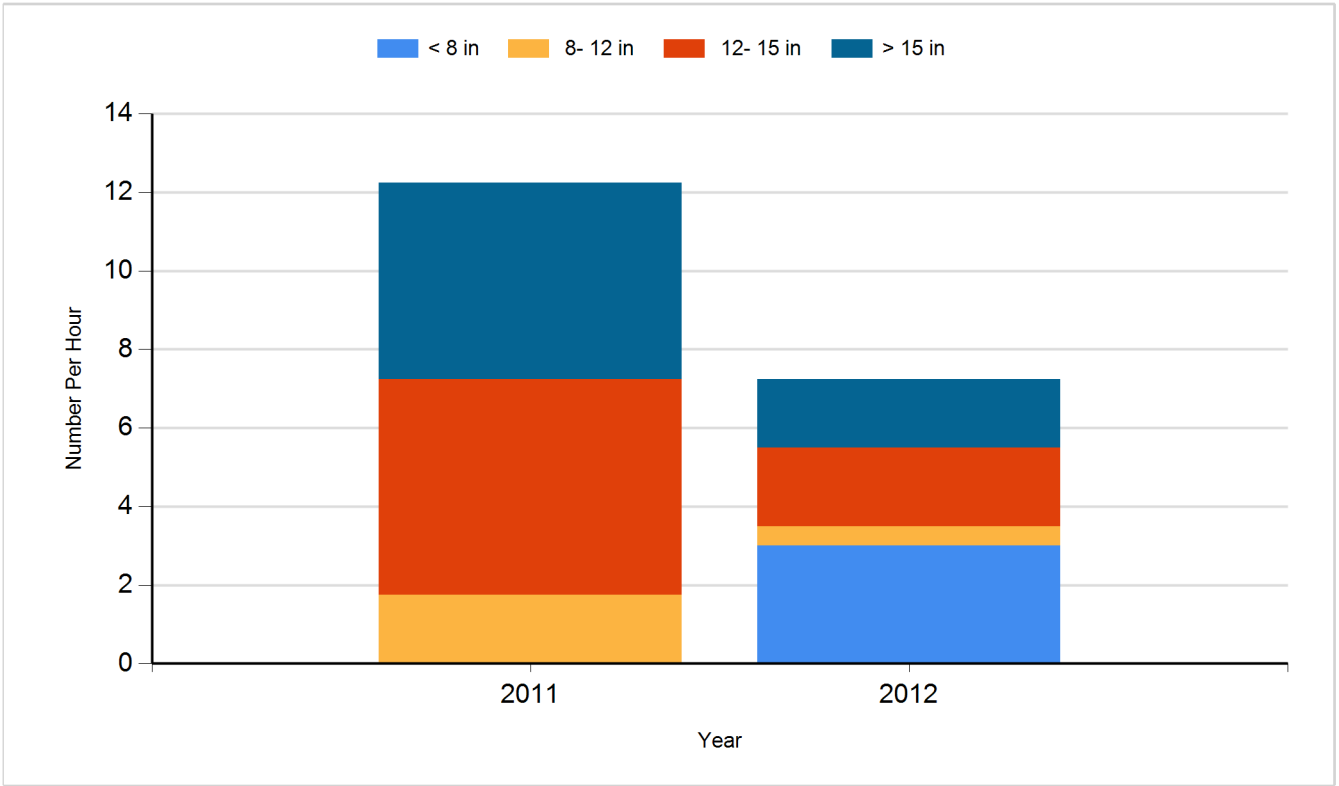
Species: Common Carp
Gear: std exp gill net



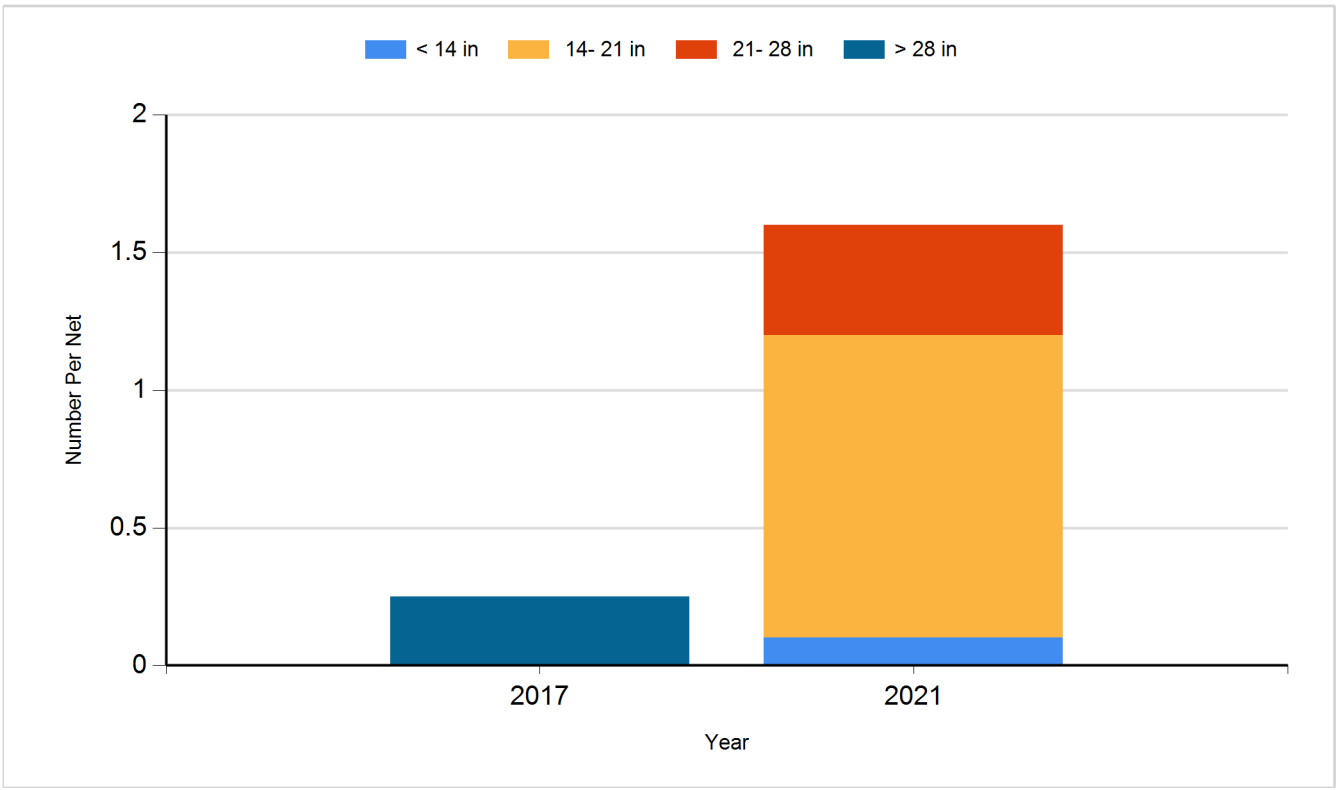
Species: Largemouth Bass
Gear: boat shocker (night)



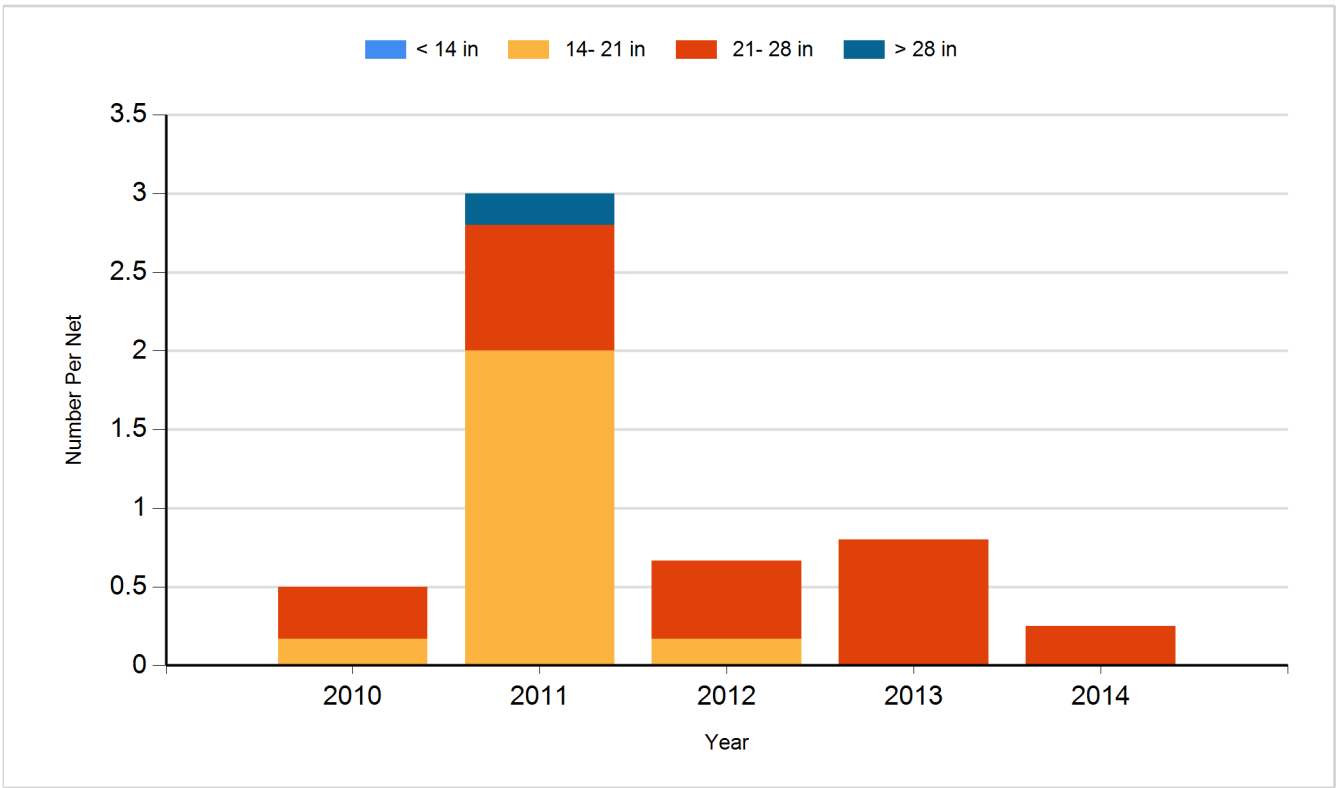
Species: Largemouth Bass
Gear: fall night EF-WAE



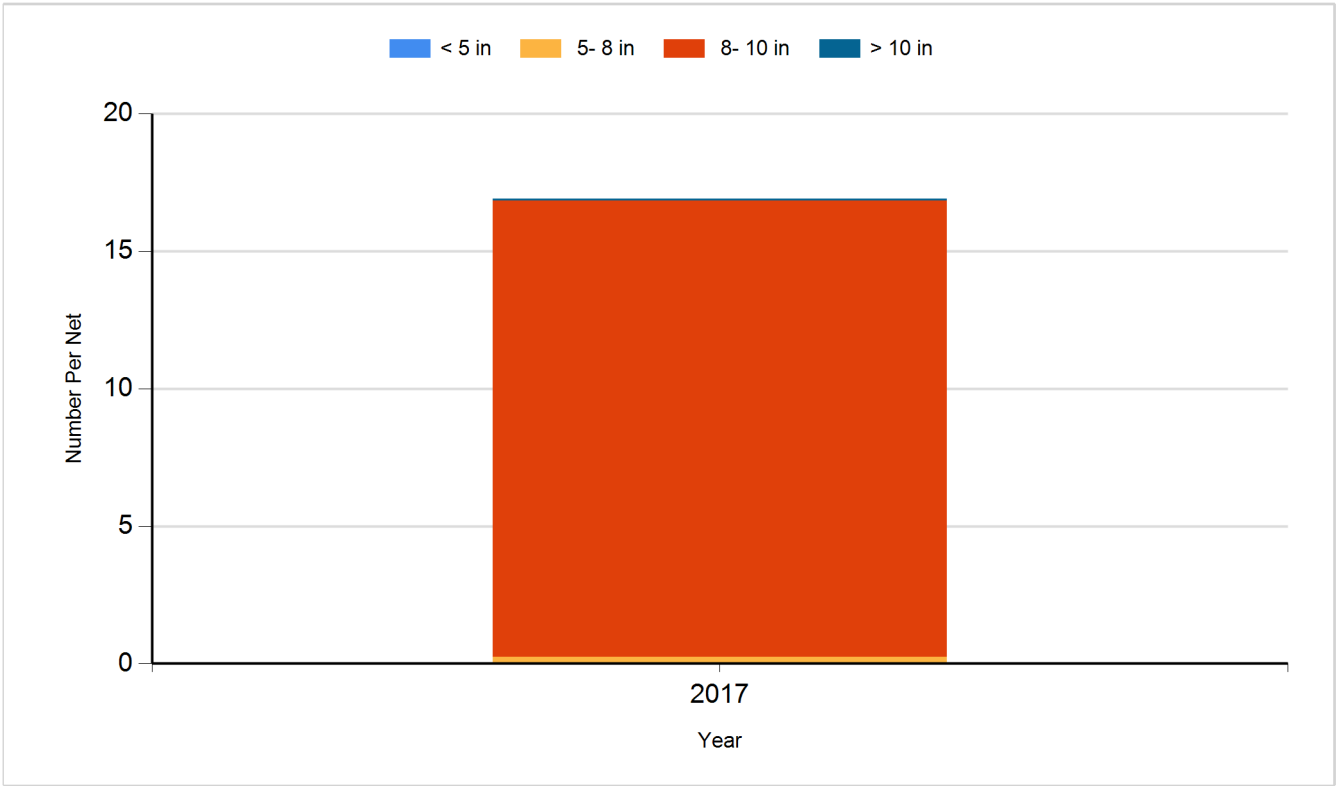
Species: Northern Pike
Gear: AFS std gill net



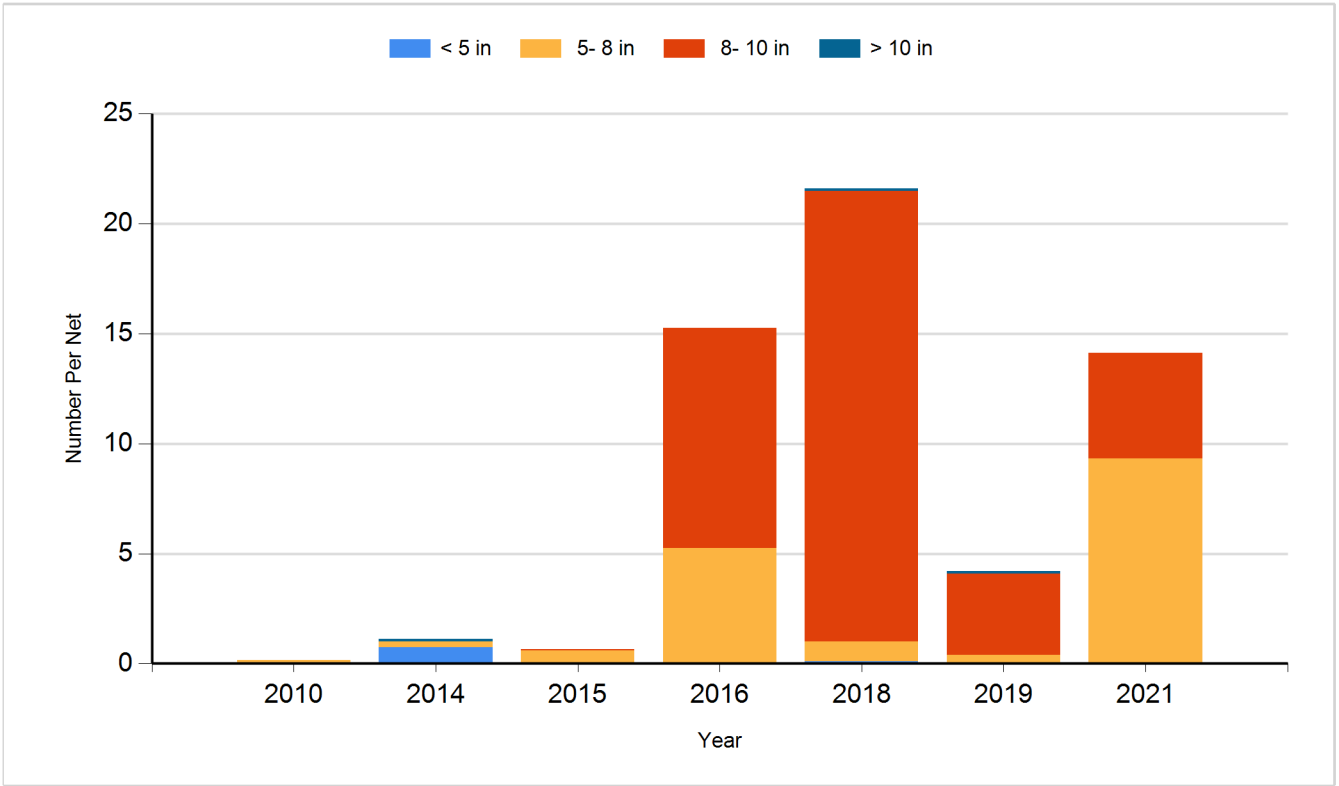
Species: Northern Pike
Gear: std exp gill net



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