

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Byre, Lyman County

MED-Lake-25-000

2022

Lake Information

Name: Byre **Maximum Depth:** 17 Feet
County: Lyman **Mean Depth:** 7 Feet
Legal Description: T75-R105-S4
Surface Area: 121 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 15, 2022	1 net-nights
AFS std gill net	Jun 16, 2022	1 net-nights
boat shocker (night)	Oct 18, 2022	3600 seconds
frame net (std 3/4 in)	Jun 15, 2022	5 net-nights
frame net (std 3/4 in)	Jun 16, 2022	5 net-nights

Common Fish Species Present

Black Crappie

Largemouth Bass

Walleye

Bluegill

Northern Pike

Common Carp

Black Bullhead

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 Crappie	14	7.0	3.1	0		0	100	2	
	Common Carp	5	2.5	1.5	100		40	87	4	
	Northern Pike	5	2.5	7.7	100		20	89	3	
	Walleye	2	1.0	3.1	100		100	81	11	
boat shocker (night)	Largemouth Bass	10	10.0	8.8	100		50	28	114	4
frame net (std 3/4 in)	Black Bullhead	4	0.4	0.4	75		0	83	7	
	Black Crappie	1127	112.7	52.8	21	2	0	98	1	
	Bluegill	155	15.5	6.9	98		0	105	1	
	Common Carp	6	0.6	0.5	100		33	87	7	
	Northern Pike	15	1.5	0.7	100		73	82	2	
	Walleye	18	1.8	0.5	67	18	44	19	79	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**

Gear	Species	CPUE										Avg
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
AFS std gill net	Black Bullhead							1.0			0.0	0.50
	Black Crappie							2.0			7.0	4.50
	Common Carp							0.0			2.5	1.25
	Northern Pike							2.0			2.5	2.25
	Walleye							2.0			1.0	1.50
	Yellow Perch							0.5			0.0	0.25
boat shocker (night)	Largemouth Bass	11.0			7.0			20.0			10.0	12.00
fall night EF-WAE*	Walleye							23.0		8.0		15.50
frame net (std 3/4 in)	Black Bullhead	1.4			45.8			3.2			0.4	12.70
	Black Crappie	9.8			26.0			91.9			112.7	60.10
	Bluegill	0.0			0.9			15.3			15.5	7.93
	Common Carp	1.8			0.9			0.5			0.6	0.95
	Green Sunfish	0.0			0.2			0.0			0.0	0.05
	Largemouth Bass	0.4			0.0			0.0			0.0	0.10
	Northern Pike	0.3			1.1			0.3			1.5	0.80
	Orangespotted Sunfish	0.0			0.0			0.0			0.0	0.00
	Walleye	1.9			1.3			2.5			1.8	1.88
	Yellow Perch	0.0			0.2			0.8			0.0	0.25
std exp gill net	Black Bullhead	0.5			35.5							18.00
	Black Crappie	0.0			7.0							3.50
	Common Carp	1.0			2.0							1.50
	Northern Pike	0.0			0.5							0.25
	Walleye	1.0			8.0							4.50

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 gill net	Black Bullhead	PSD								50			
		PSD-P								0			
		Wr								109			
	Black Crappie	PSD									100		0
		PSD-P									25		0
		Wr									81		100
	Common Carp	PSD											100
		PSD-P											40
		Wr											87
	Northern Pike	PSD									25		100
		PSD-P									25		20
		Wr									77		89
	Walleye	PSD									75		100
		PSD-P									0		100
		Wr									82		81
boat shocker (night)	Largemouth Bass	PSD	91			100				15		100	
		PSD-P	91			43				10		50	
		Wr	121			116				119		114	
	Walleye	PSD	32			24							
		PSD-P	5			0							
		Wr	91			89							
frame net (std 3/4 in)	Black Bullhead	PSD	100			88				100		75	
		PSD-P	36			1				6		0	
		Wr	95			88				86		83	
	Black Crappie	PSD	89			69				71		21	
		PSD-P	1			0				1		0	
		Wr	88			101				92		98	
	Bluegill	PSD				67				36		98	
		PSD-P				22				7		0	
		Wr				108				103		105	
	Common Carp	PSD	100			89				100		100	
		PSD-P	44			22				40		33	

Gear	Species	Index	Year										
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
frame net (std 3/4 in)	Common Carp	Wr	88			87			57			87	
		Largemouth Bass	PSD	100					0				
			PSD-P	50					0				
	Northern Pike	Wr	109										
		PSD	100			91		67			100		
			PSD-P	0			27		0			73	
	Walleye	Wr	86			73		55			82		
			PSD	89			62		44		67		
				PSD-P	47			54		24		44	
		Wr	83			75		101			79		
			std exp gill net	Black Bullhead	PSD	0			85				
					PSD-P	0			0				
Wr	89					86							
Black Crappie	PSD					86							
	PSD-P					0							
	Wr					93							
Common Carp	PSD	100			75								
	PSD-P	50			25								
	Wr	94			89								
Northern Pike	PSD				100								
	PSD-P				0								
	Wr				74								
Walleye	PSD	50			13								
	PSD-P	0			6								
	Wr	77			78								

Back-Calculated Lengths

Mean species back-calculated total length (mm) at age, standard error (SE), and sample size (N).

Species: Black Crappie

Year Class	Age	Mean back-calculated length (SE) at age										
		N	1	2	3	4	5	6	7	8	9	10
2020	2	19	70 (1.9)	138 (2.3)								
2019	3	14	82 (3)	146 (2.7)	191 (3.6)							
2018	4	1	93	118	151	198						
Weighted Mean		34	76	141	188	198						

Year Class	Age	Mean back-calculated length (SE) at age										
		N	11	12	13	14	15	16	17	18	19	20
2020	2	19										
2019	3	14										
2018	4	1										
Weighted Mean		34										

Species: Bluegill

Year Class	Age	Mean back-calculated length (SE) at age										
		N	1	2	3	4	5	6	7	8	9	10
2020	2	4	94 (4.7)	142 (4.7)								
2019	3	10	64 (4.3)	112 (5.3)	153 (5)							
Weighted Mean		14	73	121	153							

Year Class	Age	Mean back-calculated length (SE) at age										
		N	11	12	13	14	15	16	17	18	19	20
2020	2	4										
2019	3	10										
Weighted Mean		14										

Species: Largemouth Bass

Year Class	Age	N	Mean back-calculated length (SE) at age										
			1	2	3	4	5	6	7	8	9	10	
2019	3	1	90	153	245								
2018	4	2	94 (4.4)	214 (21.1)	270 (33.5)	331 (30)							
2017	5	1	109	160	226	277	331						
2016	6	2	106 (34.3)	220 (17.9)	287 (14.1)	350 (5.7)	436 (8.5)	478 (7.2)					
2015	7	1	67	203	286	357	411	446	497				
Weighted Mean		7	95	198	267	333	404	467	497				

Year Class	Age	N	Mean back-calculated length (SE) at age										
			11	12	13	14	15	16	17	18	19	20	
2019	3	1											
2018	4	2											
2017	5	1											
2016	6	2											
2015	7	1											
Weighted Mean		7											

Species: Walleye

Year Class	Age	N	Mean back-calculated length (SE) at age										
			1	2	3	4	5	6	7	8	9	10	
2018	4	1	155	292	426	491							
Weighted Mean		1	155	292	426	491							

Year Class	Age	N	Mean back-calculated length (SE) at age										
			11	12	13	14	15	16	17	18	19	20	
2018	4	1											
Weighted Mean		1											

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	1127		181 (749)	199 (358)	213 (20)						
2019	1242	120 (97)	125 (276)	191 (194)	208 (650)	235 (13)	250 (13)				
2016	259			203 (235)	218 (25)						
2013	99	100 (1)	163 (3)	193 (7)	211 (17)	220 (45)	224 (26)				

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	152		168 (35)	172 (117)							
2019	108	110 (48)	152 (27)	181 (23)	210 (7)	218 (3)	243 (1)	253 (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+
2022	8			320 (1)	380 (3)	364 (1)	504 (2)	523 (1)			
2019	20	217 (9)	235 (8)	256 (1)		423 (1)		461 (1)			
2016	7	183 (1)		342 (3)	335 (1)		441 (1)		460 (1)		
2013	63	165 (54)	272 (1)			416 (7)			521 (1)		

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	1										645 (1)
2016	16		303 (8)	309 (6)	508 (2)						
2013	2		324 (1)	404 (1)							

Fish Condition

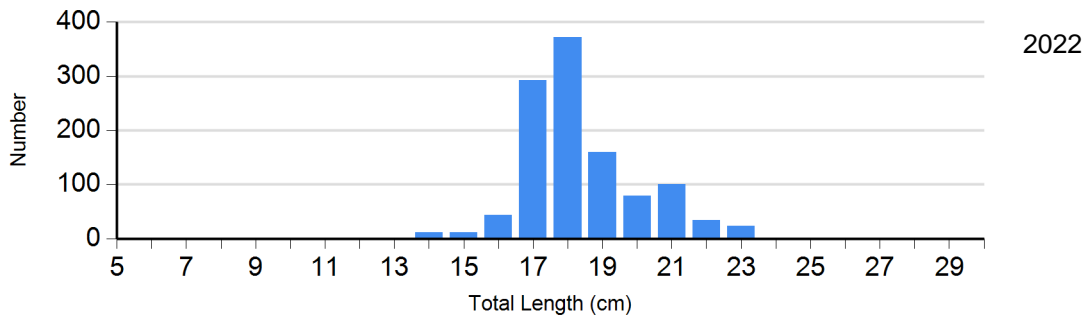
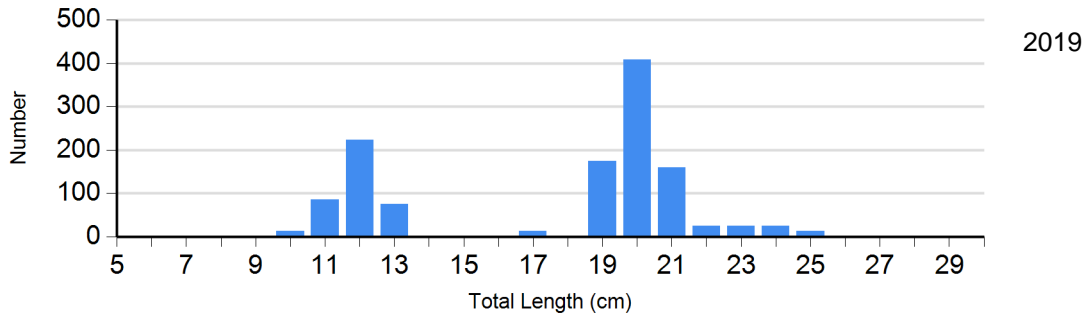
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2019	1	103	1	116	0		0	
Black Crappie Frame Net	2019	262	97 (1.2)	644	90 (0.5)	13	84	0	
	2022	890	101 (0.6)	237	88 (0.9)	0		0	
Bluegill Frame Net	2019	98	101 (1.7)	45	110 (6.4)	9	100 (1.8)	1	94
	2022	3	112 (16.3)	152	105 (0.9)	0		0	
Common Carp Gill Net	2022	0		3	90 (4.1)	2	82 (2.6)	0	
Largemouth Bass Electro Fishing	2019	17	118 (2.2)	1	135	2	115 (5.4)	0	
	2022	0		5	113 (2.1)	3	120 (8.2)	2	109 (7.6)
Northern Pike Gill Net	2019	3	87 (5.6)	0		0		1	49
	2022	0		4	87 (2.7)	1	94	0	
Walleye Gill Net	2019	1	76	3	84 (2.0)	0		0	
	2022	0		0		1	73	1	90

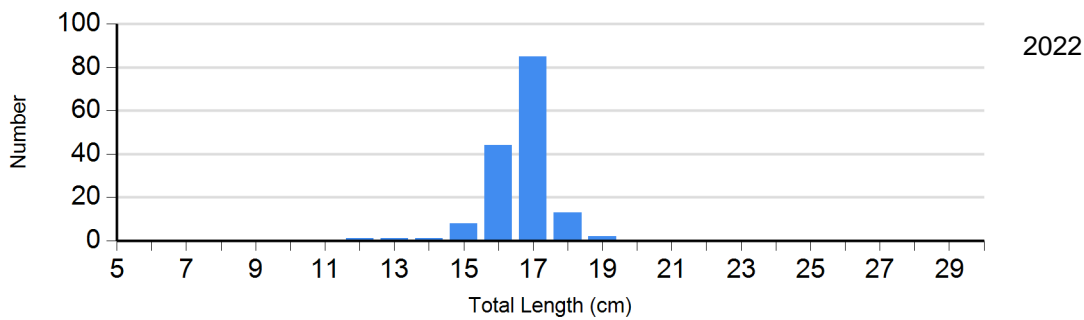
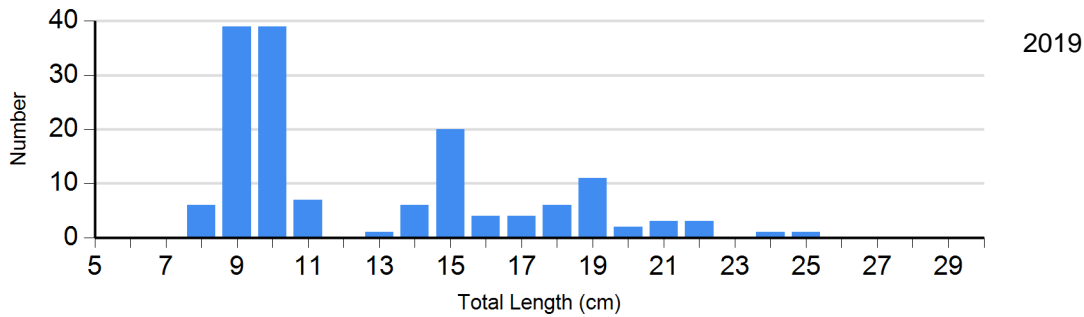
Length Frequency Distribution

Length frequency histogram of species sampled by year.

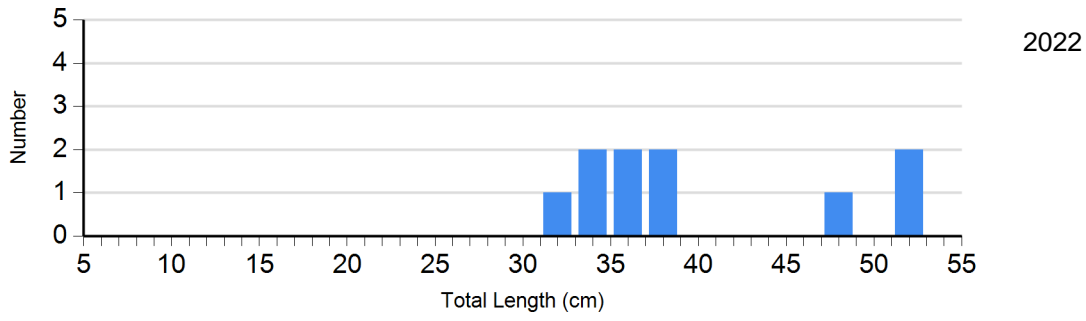
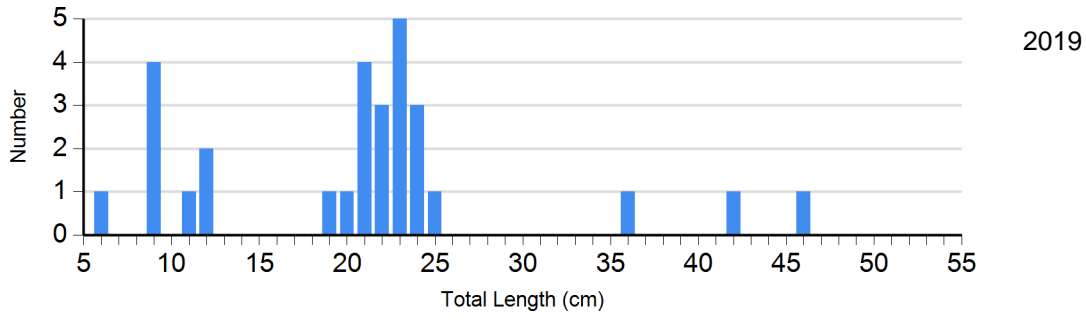
Species: Black Crappie
Gear: frame net (std 3/4 in)



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



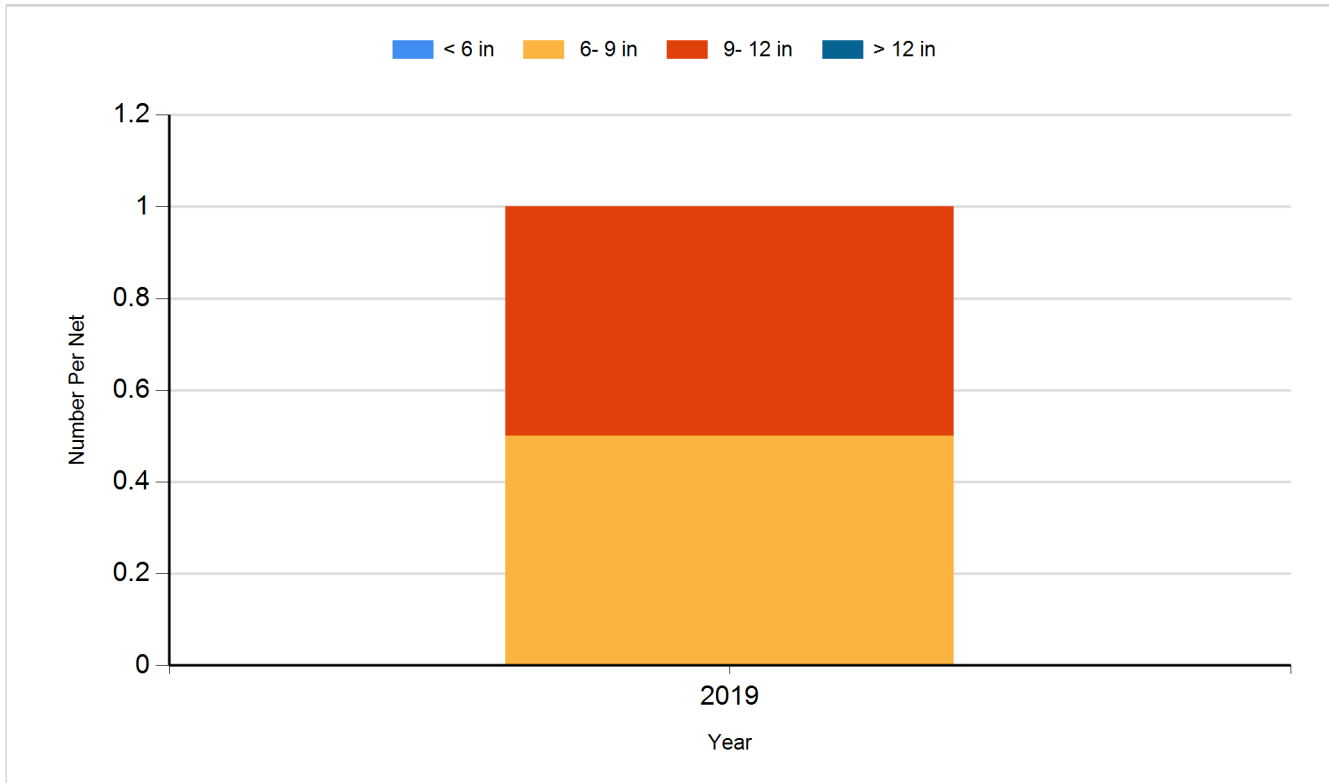
Species: Largemouth Bass
Gear: boat shocker (night)



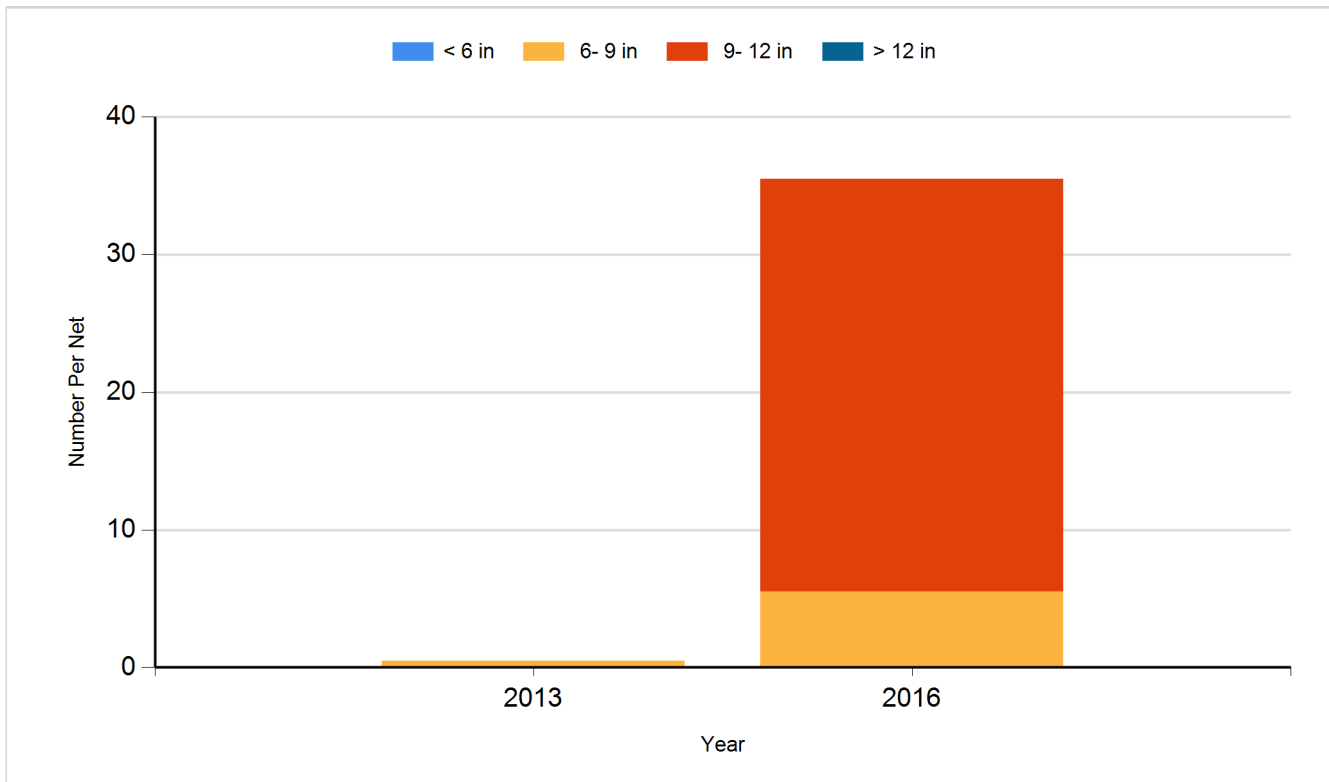
Historic Fish Sizes and Relative Abundance

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

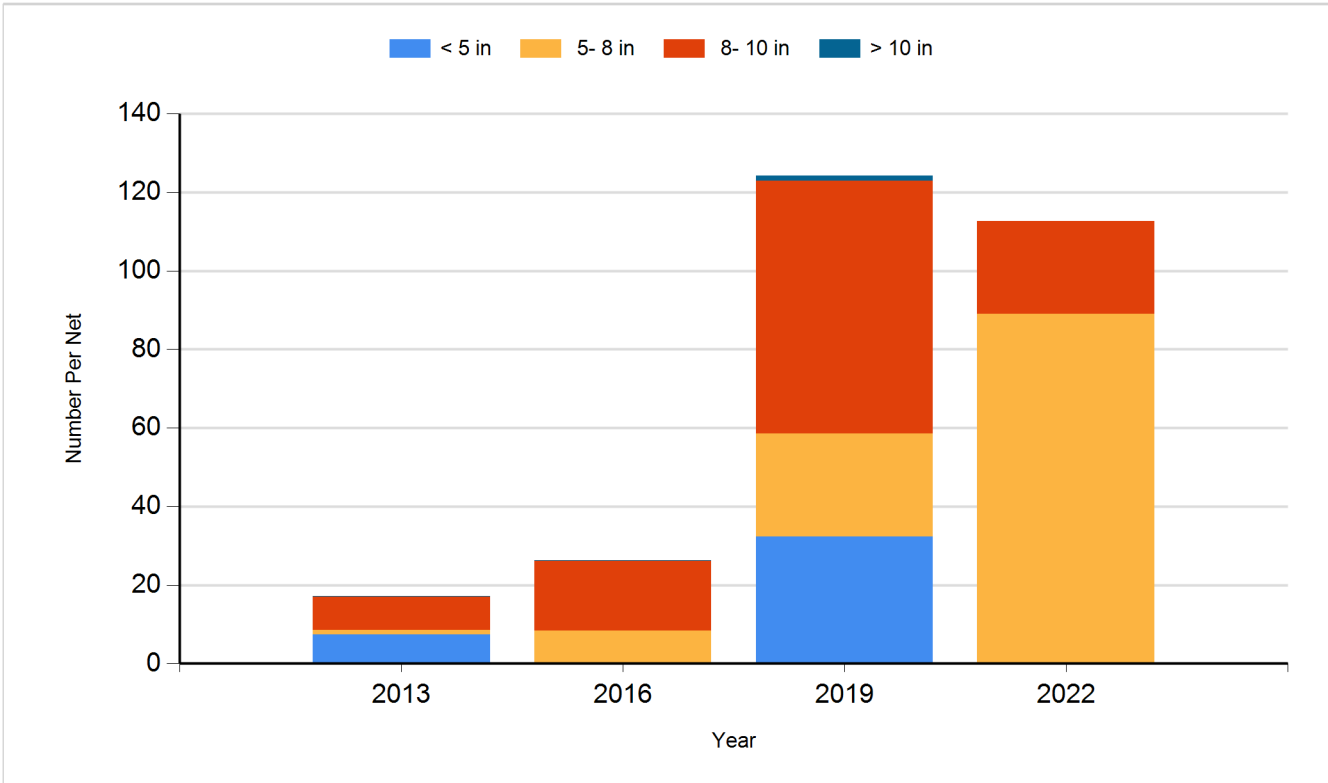
Species: Black Bullhead
Gear: AFS std gill net



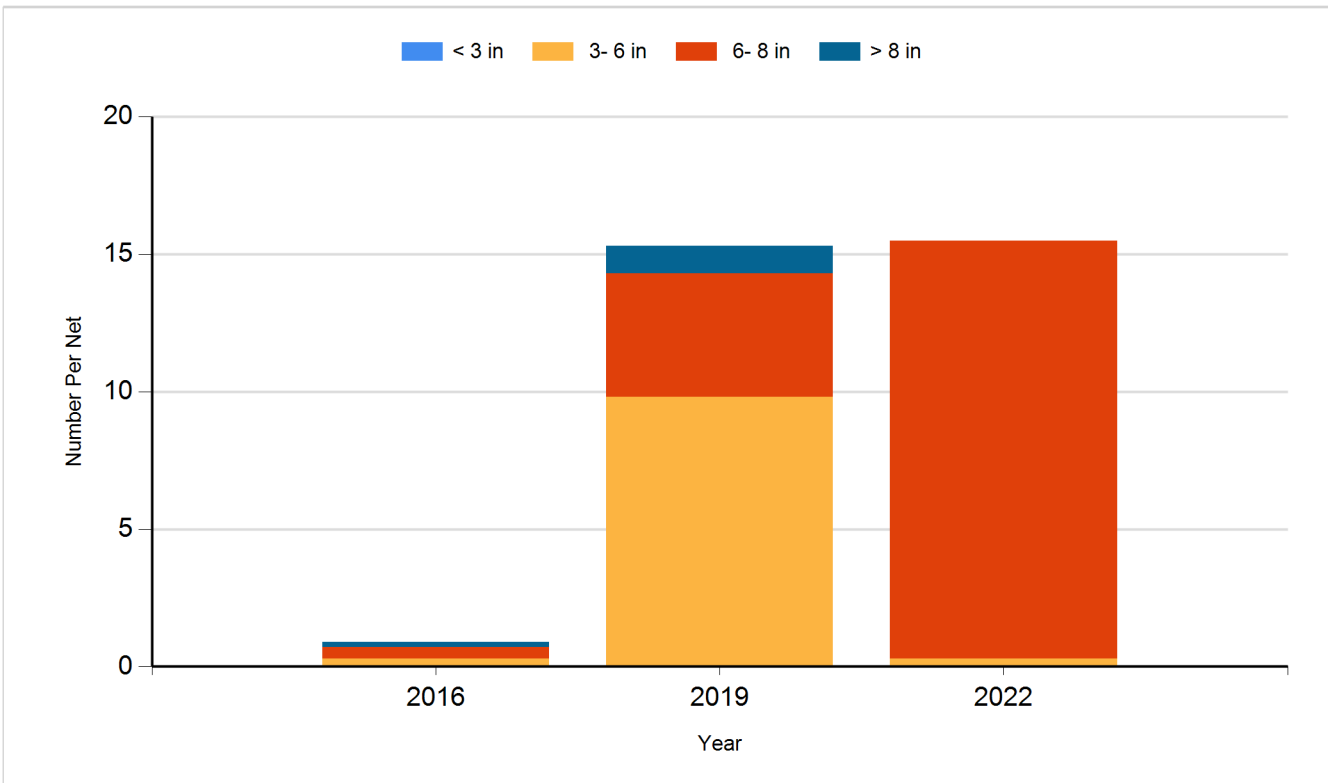
Species: Black Bullhead
Gear: std exp gill net



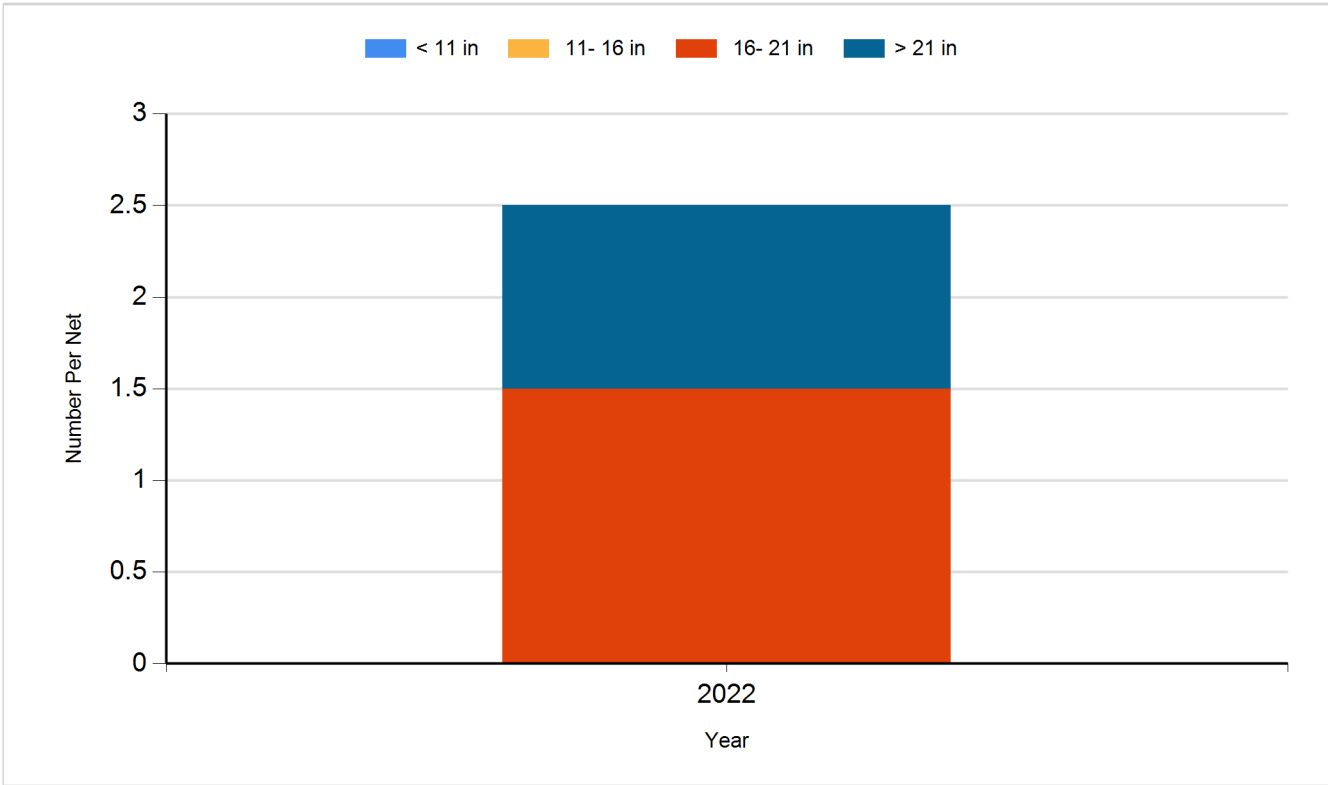
Species: Black Crappie
Gear: frame net (std 3/4 in)



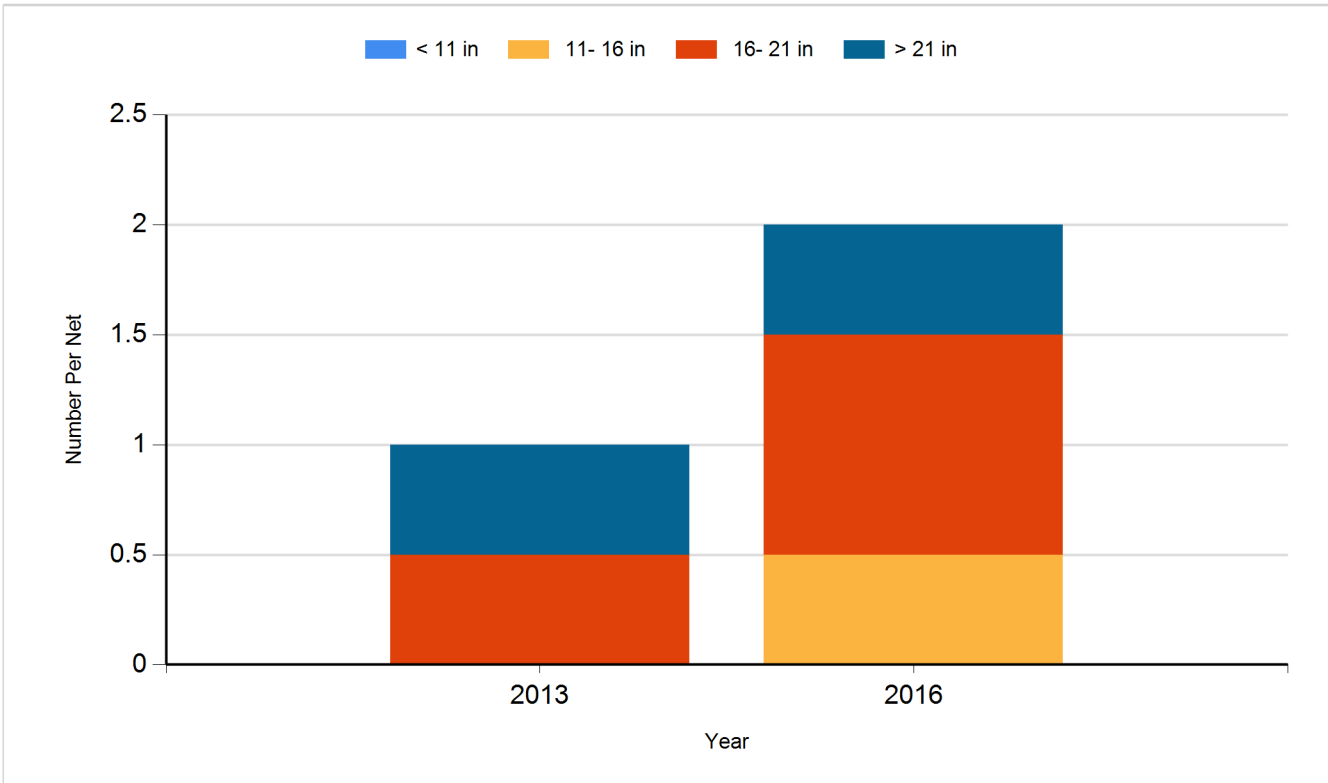
Species: Bluegill
Gear: frame net (std 3/4 in)



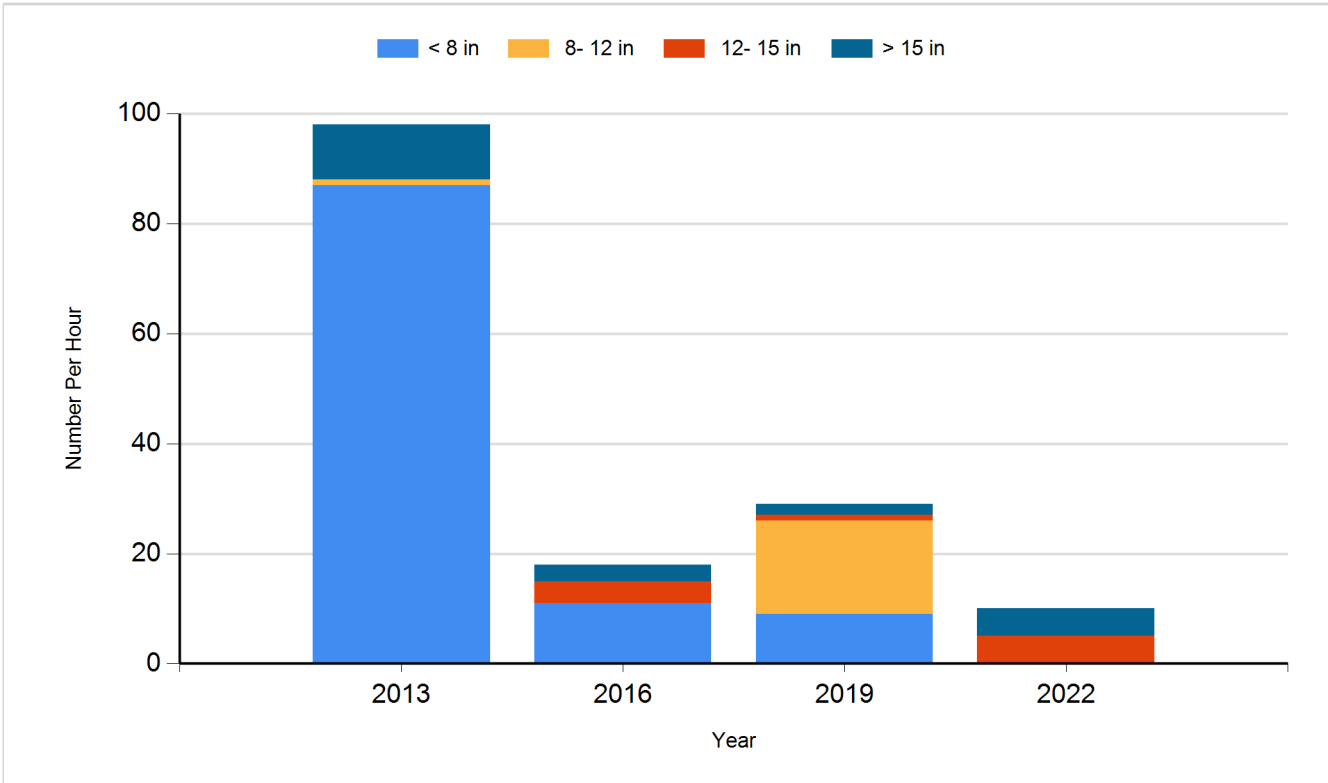
Species: Common Carp
Gear: AFS std gill net



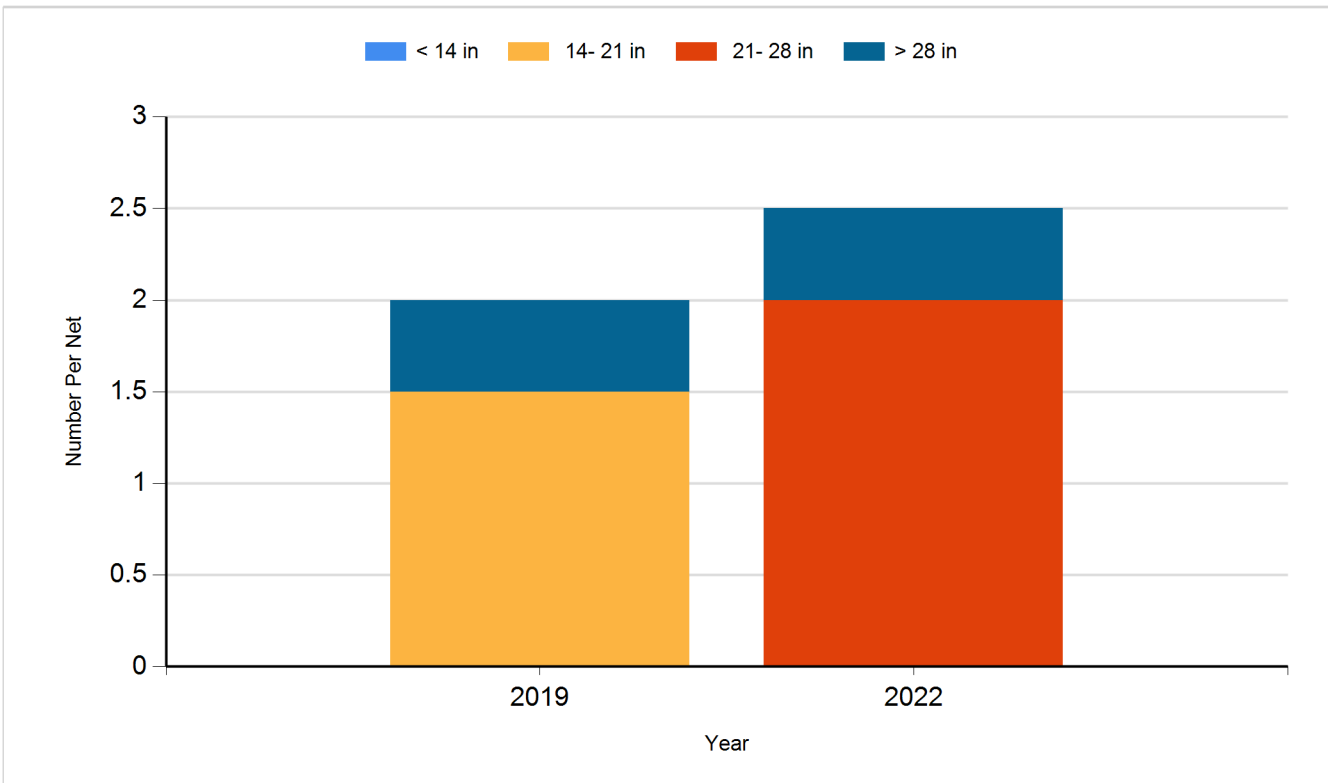
Species: Common Carp
Gear: std exp gill net



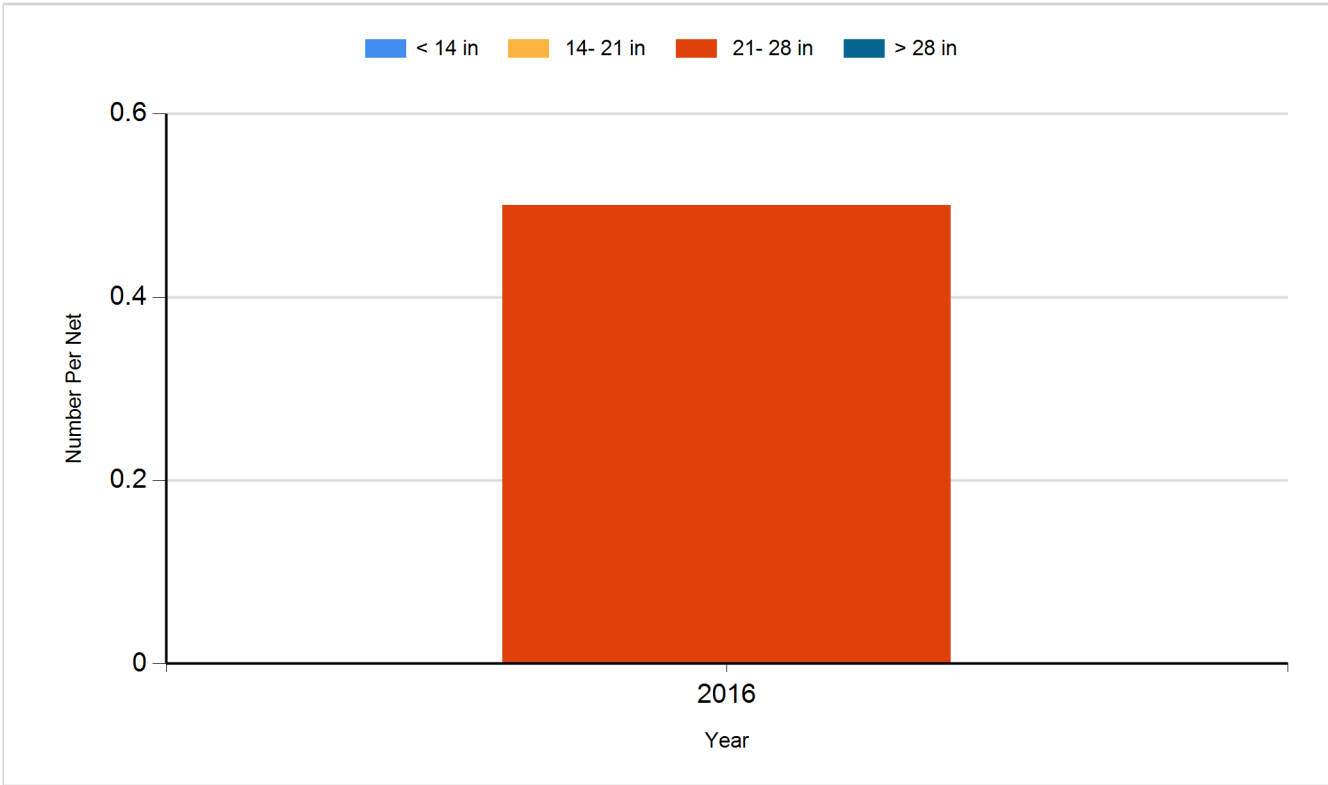
Species: Largemouth Bass
Gear: boat shocker (night)



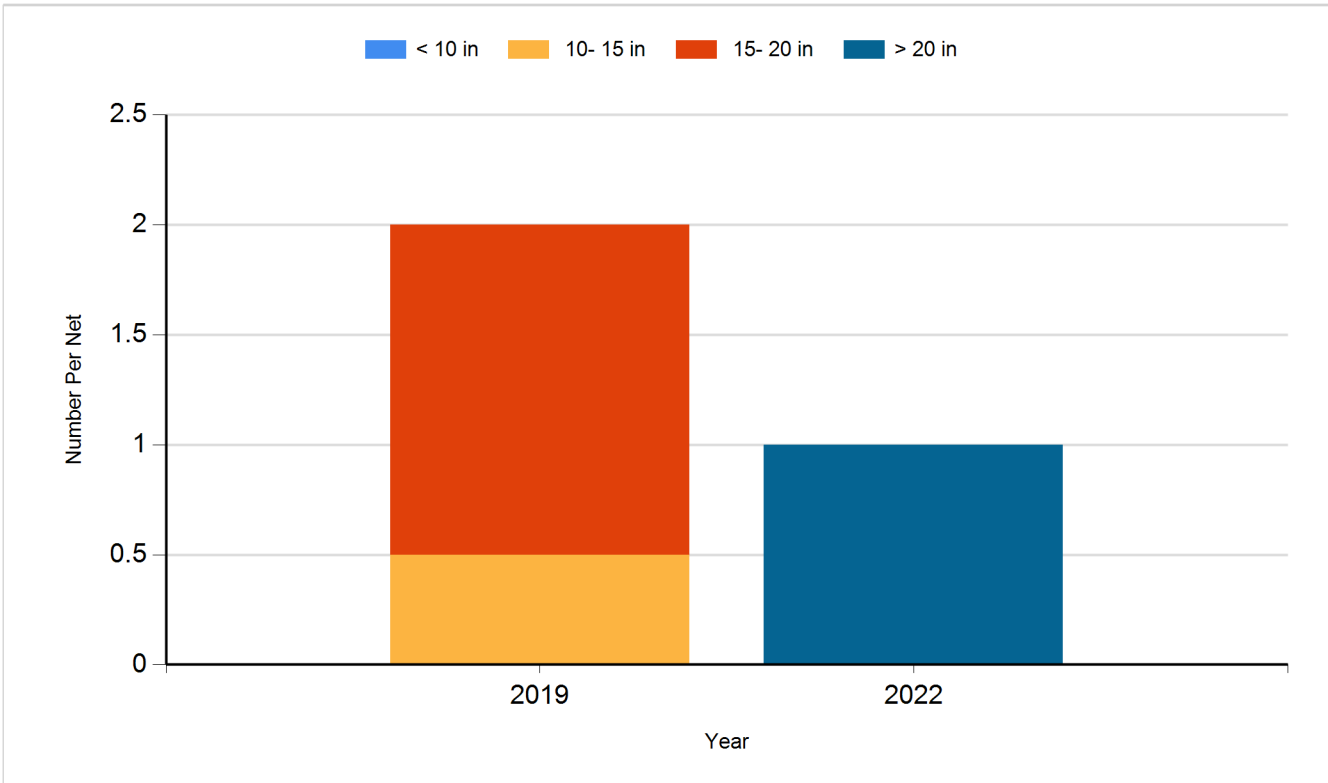
Species: Northern Pike
Gear: AFS std gill net



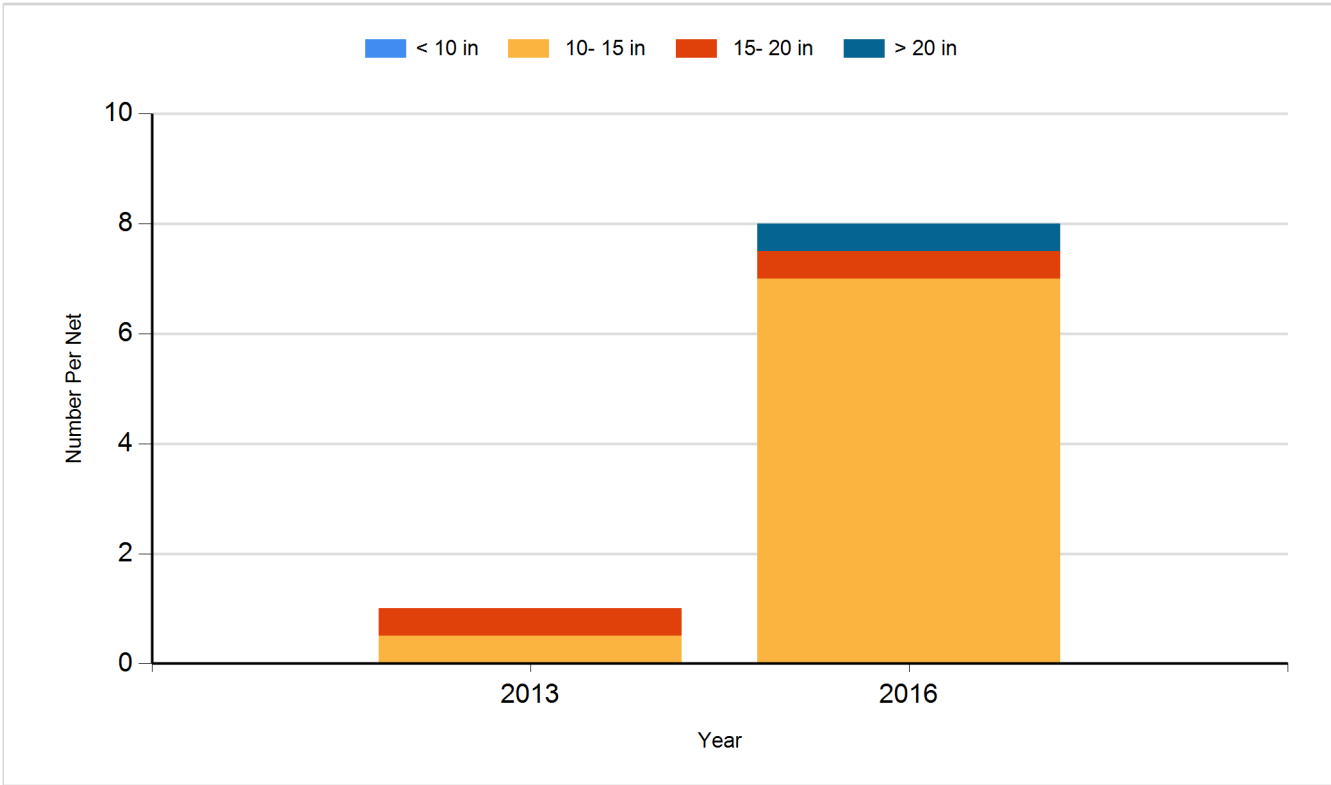
Species: Northern Pike
Gear: std exp gill net



Species: Walleye
Gear: AFS std gill net



Species: Walleye
Gear: std exp gill net



Fish Stocking

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

Year	Species	Size	Number
2013	Walleye	Large Fingerling	1,144
2015	Walleye	Large Fingerling	900
2017	Walleye	Large Fingerling	2,960
2019	Walleye	Small Fingerling	9,185
2021	Walleye	Juvenile	10,866