

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Byre, Lyman County

MED-Lake-25-000

2019

## 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 26, 2019	1 net-nights
AFS std gill net	Jun 27, 2019	1 net-nights
boat shocker (night)	Oct 03, 2019	3600 seconds
fall night EF-WAE	Oct 03, 2019	3600 seconds
frame net (std 3/4 in)	Jun 26, 2019	5 net-nights
frame net (std 3/4 in)	Jun 27, 2019	5 net-nights

## **Common Fish Species Present**

Largemouth Bass

Black Crappie

Walleye

Bluegill

Black Bullhead

Northern Pike

Yellow Perch

Common Carp

Orangespotted Sunfish

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## 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	2	1.0	3.1	50		0		109	8
	Black Crappie	5	2.0	0.0	100		25		81	4
	Northern Pike	4	2.0	6.2	25		25		77	13
	Walleye	4	2.0	6.2	75		0		82	3
	Yellow Perch	1	0.5	1.5	0		0		97	
boat shocker (night)	Largemouth Bass	29	20.0	20.8	15		10		119	3
fall night EF-WAE*	Walleye	23	23.0	7.7						
frame net (std 3/4 in)	Black Bullhead	33	3.2	0.6	100		6		86	4
	Black Crappie	1242	91.9	21.1	71	2	1	0	92	1
	Bluegill	153	15.3	8.5	36	5	7	3	103	3
	Common Carp	5	0.5	0.6	100		40		57	5
	Largemouth Bass	2	0.0	0.0	0		0			
	Northern Pike	3	0.3	0.3	67		0		55	23
	Orangespotted Sunfish	2	0.0	0.0						
	Walleye	28	2.5	0.8	44	16	24	14	101	37
	Yellow Perch	8	0.8	0.5	50		0		88	3

## 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.

Gear	Species	CPUE										Avg
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
AFS std gill net	Black Bullhead										1.0	1.00
	Black Crappie										2.0	2.00
	Northern Pike										2.0	2.00
	Walleye										2.0	2.00
	Yellow Perch										0.5	0.50
boat shocker (night)	Largemouth Bass	28.0			11.0			7.0			20.0	16.50
	Walleye	74.0			69.0			33.0			0.0	44.00
fall night EF- WAE	Walleye										23.0	23.00
frame net (std 3/4 in)	Black Bullhead	3.7			1.4			45.8			3.2	13.53
	Black Crappie	10.1			9.8			26.0			91.9	34.45
	Bluegill	1.6			0.0			0.9			15.3	4.45
	Common Carp	0.2			1.8			0.9			0.5	0.85
	Green Sunfish	0.0			0.0			0.2			0.0	0.05
	Largemouth Bass	0.5			0.4			0.0			0.0	0.23
	Northern Pike	0.4			0.3			1.1			0.3	0.53
	Orangespotted Sunfish	0.0			0.0			0.0			0.0	0.00
	Walleye	0.8			1.9			1.3			2.5	1.63
	Yellow Perch	0.0			0.0			0.2			0.8	0.25
std exp gill net	Black Bullhead	5.0			0.5			35.5				13.67
	Black Crappie	7.5			0.0			7.0				4.83
	Common Carp	1.0			1.0			2.0				1.33
	Northern Pike	0.0			0.0			0.5				0.17
	Walleye	5.0			1.0			8.0				4.67

## 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											
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019		
AFS std gill net	Black Bullhead	PSD												50
		PSD-P												0
		Wr												109
	Black Crappie	PSD												100
		PSD-P												25
		Wr												81
	Northern Pike	PSD												25
		PSD-P												25
		Wr												77
	Walleye	PSD												75
		PSD-P												0
		Wr												82
	Yellow Perch	PSD												0
		PSD-P												0
		Wr												97
boat shocker (night)	Largemouth Bass	PSD	50			91				100			15	
		PSD-P	29			91				43			10	
		Wr	110			121				116			119	
	Walleye	PSD	20			32				24				
		PSD-P	0			5				0				
		Wr	86			91				89				
frame net (std 3/4 in)	Black Bullhead	PSD	78			100				88			100	
		PSD-P	49			36				1			6	
		Wr	82			95				88			86	
	Black Crappie	PSD	6			89				69			71	
		PSD-P	1			1				0			1	
		Wr	99			88				101			92	
	Bluegill	PSD	44							67			36	
		PSD-P	13							22			7	
		Wr	95							108			103	
	Common Carp	PSD	50			100				89			100	
		PSD-P	0			44				22			40	

Gear	Species	Index	Year										
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
frame net (std 3/4 in)	Common Carp	Wr	86			88			87			57	
		Largemouth Bass	PSD	40			100						0
			PSD-P	40			50						0
	Northern Pike	Wr	108			109							
		PSD	50			100			91			67	
			PSD-P	25			0			27			0
	Walleye	Wr	90			86			73			55	
		PSD	63			89			62			44	
			PSD-P	0			47			54			24
	Yellow Perch	Wr	77			83			75			101	
		PSD							0			50	
			PSD-P							0			0
	std exp gill net	Black Bullhead	PSD	0			0			85			
			PSD-P	0			0			0			
			Wr	91			89			86			
Black Crappie		PSD	0						86				
		PSD-P	0						0				
		Wr	103						93				
Common Carp		PSD	50			100			75				
		PSD-P	0			50			25				
		Wr	87			94			89				
Northern Pike		PSD							100				
		PSD-P							0				
		Wr							74				
Walleye		PSD	50			50			13				
		PSD-P	0			0			6				
		Wr	77			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	N	Mean back-calculated length (SE) at age																	
			1	2	3	4	5	6	7	8	9	10								
2018	1	4	94 (1.6)																	
2017	2	9	67 (2.3)	99 (2.5)																
2016	3	5	74 (6.6)	124 (15.4)	165 (16.4)															
2015	4	18	63 (1.4)	113 (4.8)	170 (4.7)	203 (3.9)														
2014	5	1	77	152	201	216	228													
2013	6	1	53	87	149	205	232	244												
Weighted Mean		38	69	111	169	204	230	244												
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20								
2018	1	4																		
2017	2	9																		
2016	3	5																		
2015	4	18																		
2014	5	1																		
2013	6	1																		
Weighted Mean		38																		

Species: Bluegill

Year Class	Age	N	Mean back-calculated length (SE) at age																	
			1	2	3	4	5	6	7	8	9	10								
2018	1	11	90 (5.7)																	
2017	2	10	53 (4.1)	135 (2.8)																
2016	3	13	56 (2.6)	118 (6.3)	170 (5.3)															
2015	4	4	54 (8.8)	133 (4.4)	178 (3.8)	202 (8.1)														
2014	5	2	61 (12)	98 (6.3)	154 (.8)	182 (5.7)	204 (12.1)													
2013	6	1	47	98	155	198	228	239												
2012	7	1	58	111	158	197	227	240	249											
Weighted Mean		42	64	123	169	196	216	240	249											
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20								
2018	1	11																		
2017	2	10																		
2016	3	13																		
2015	4	4																		
2014	5	2																		
2013	6	1																		
2012	7	1																		
Weighted Mean		42																		

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	0	3												
2018	1	9	98 (4.5)											
2017	2	8	102 (7)	179 (11.8)										
2016	3	1	84	150	220									
2014	5	1	114	275	366	399	410							
2012	7	1	78	169	276	347	412	437	452					
Weighted Mean		23	99	184	287	373	411	437	452					

Year Class	Age	N	Mean back-calculated length (SE) at age											
			11	12	13	14	15	16	17	18	19	20		
2019	0	3												
2018	1	9												
2017	2	8												
2016	3	1												
2014	5	1												
2012	7	1												
Weighted Mean		23												

## 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+
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)				
2010	101		155 (94)	211 (3)	245 (3)		243 (1)				

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	108	110 (48)	152 (27)	181 (23)	210 (7)	218 (3)	243 (1)	253 (1)			
2010	16		146 (14)					209 (1)		216 (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+
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)		
2010	28	185 (1)	286 (16)	285 (2)	350 (5)			511 (1)			500 (4)

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	16		303 (8)	309 (6)	508 (2)						
2013	2		324 (1)	404 (1)							
2010	12	216 (2)	354 (1)	378 (9)							

## **Fish Condition**

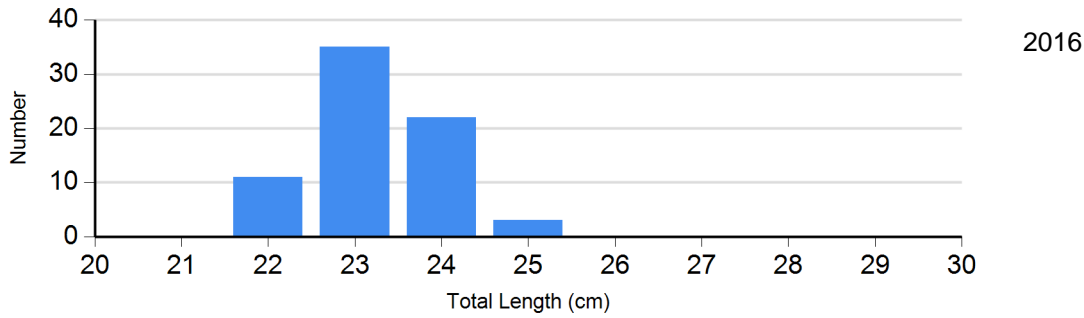
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2016	11	90 (1.8)	60	86 (2.6)	0		0	
	2019	1	103	1	116	0		0	
Black Crappie Frame Net	2016	80	107 (1.6)	179	98 (0.9)	1	84	0	
	2019	262	97 (1.2)	644	90 (0.5)	13	84	0	
Bluegill Frame Net	2016	3	109 (10.3)	4	111 (8.7)	2	103 (14.2)	0	
	2019	98	101 (1.7)	45	110 (6.4)	9	100 (1.8)	1	94
Common Carp Gill Net	2016	1	94	2	89 (3.6)	1	84	0	
Largemouth Bass Electro Fishing	2016	0		4	122 (3.7)	3	107 (1.0)	0	
	2019	17	118 (2.2)	1	135	2	115 (5.4)	0	
Northern Pike Gill Net	2016	0		1	74	0		0	
	2019	3	87 (5.6)	0		0		1	49
Walleye Gill Net	2016	14	79 (1.3)	1	67	1	72	0	
	2019	1	76	3	84 (2.0)	0		0	
Yellow Perch Gill Net	2019	1	97	0		0		0	

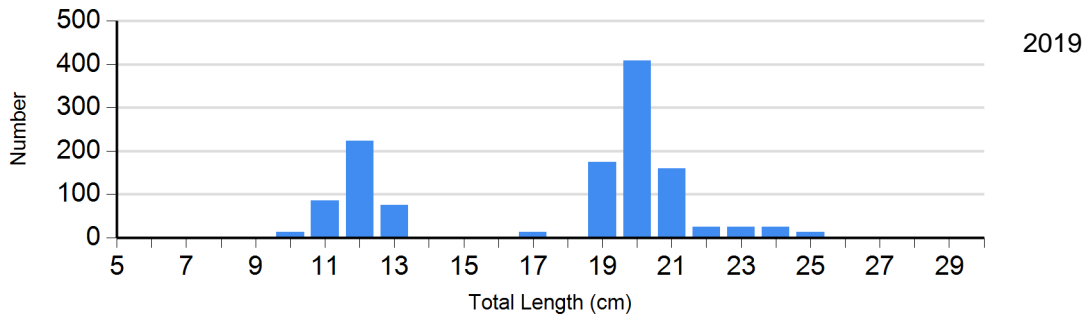
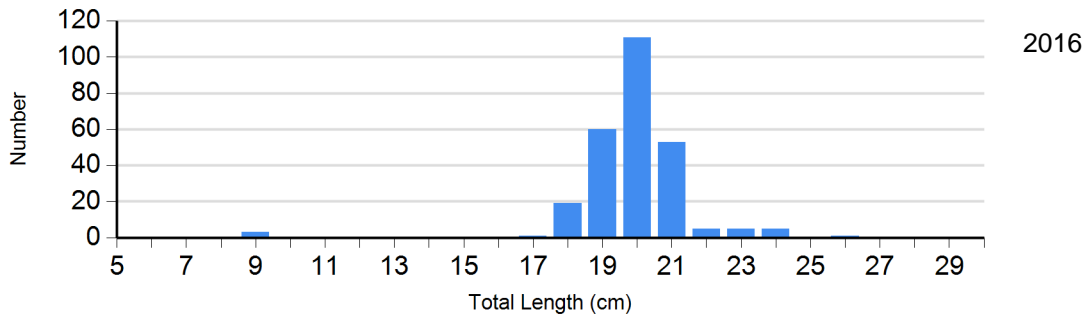
## Length Frequency Distribution

Length frequency histogram of species sampled by year.

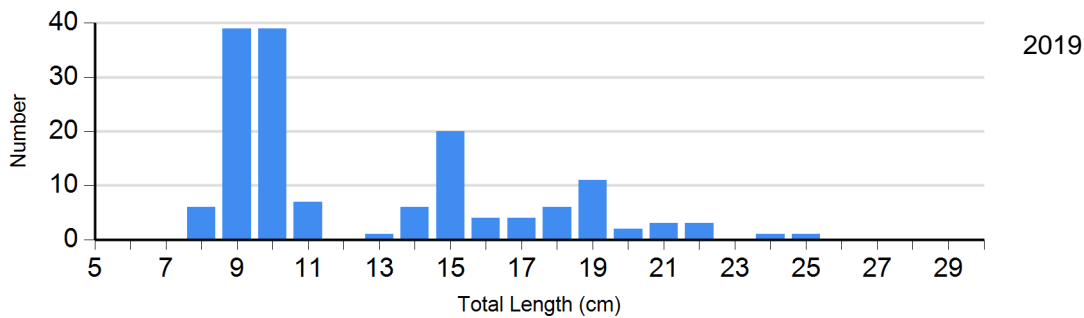
Species: Black Bullhead  
Gear: std exp gill net



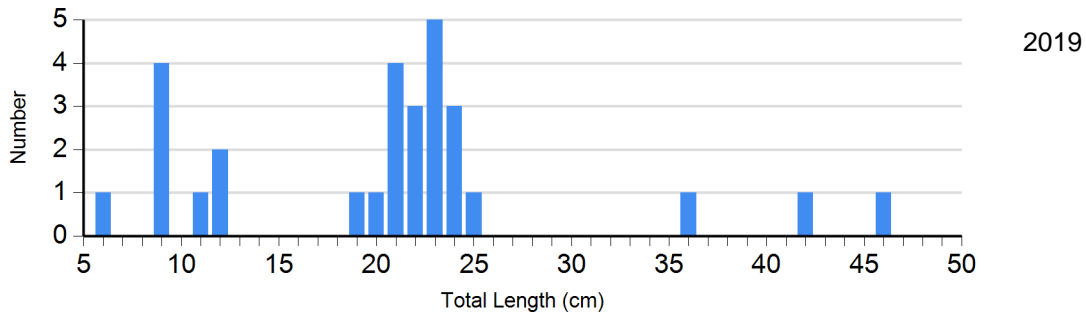
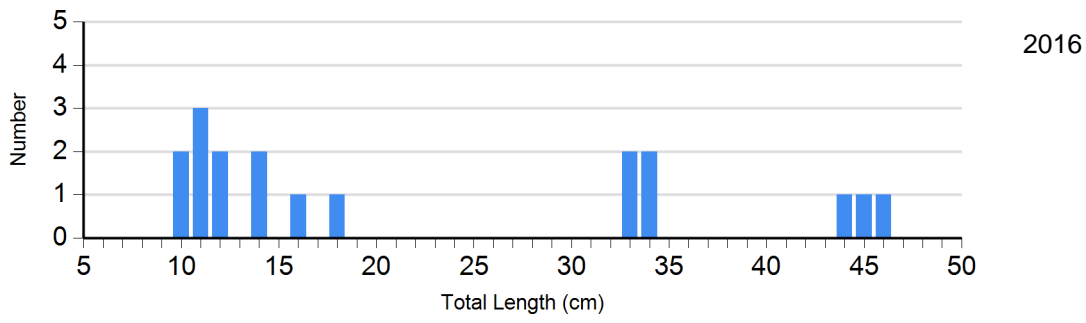
Species: Black Crappie  
Gear: frame net (std 3/4 in)



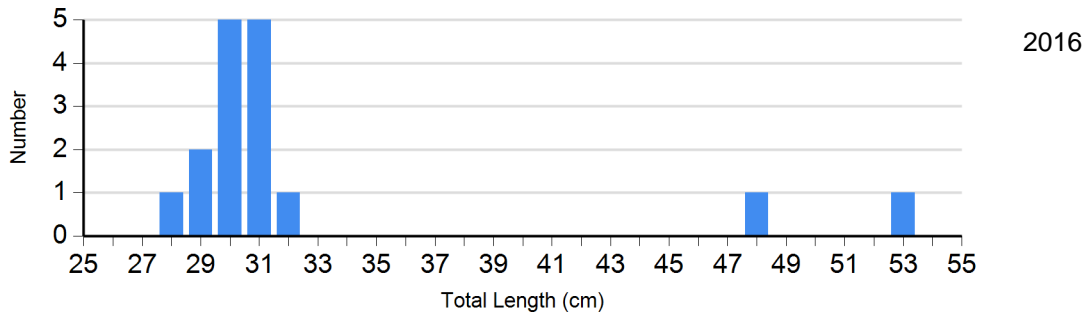
Species: Bluegill  
Gear: frame net (std 3/4 in)



Species: Largemouth Bass  
Gear: boat shocker (night)



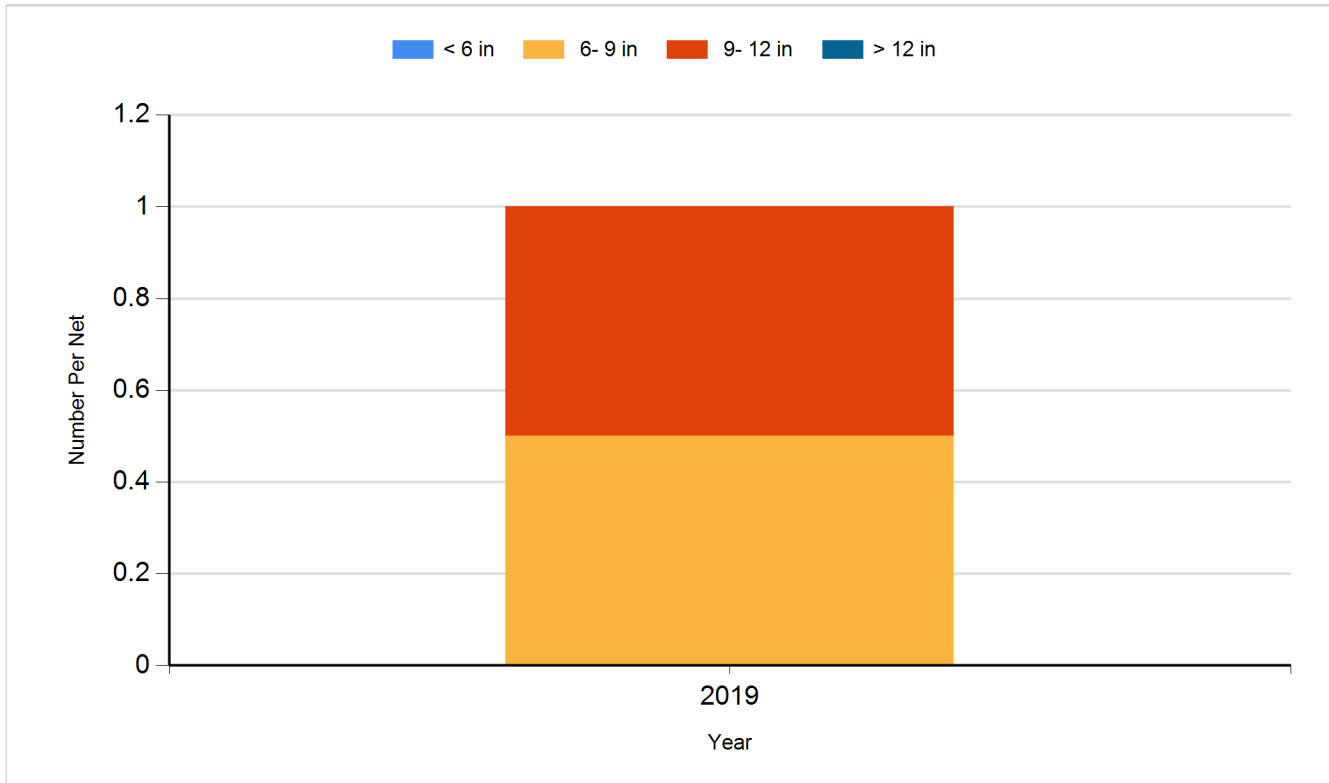
Species: Walleye  
Gear: std exp gill net



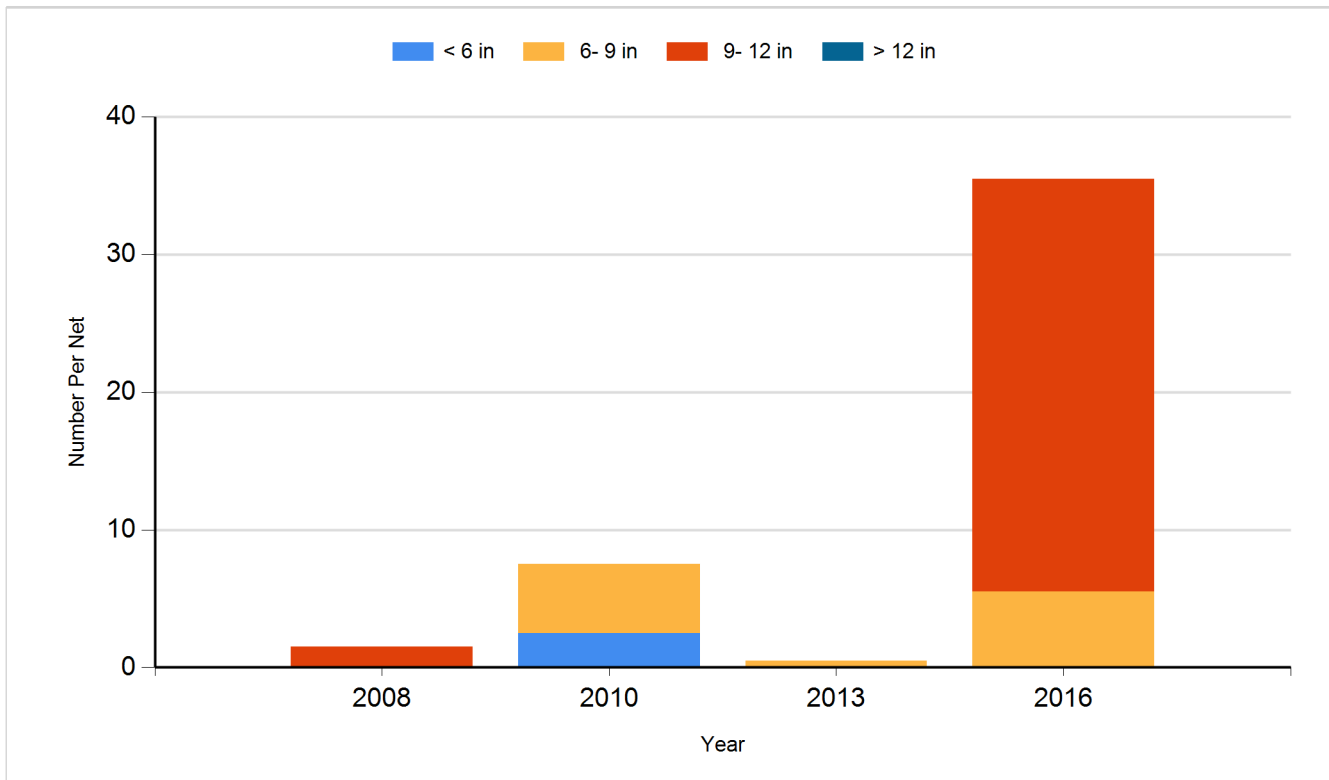
## Historic Fish Sizes and Relative Abundance

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

Species: Black Bullhead  
Gear: AFS std gill net

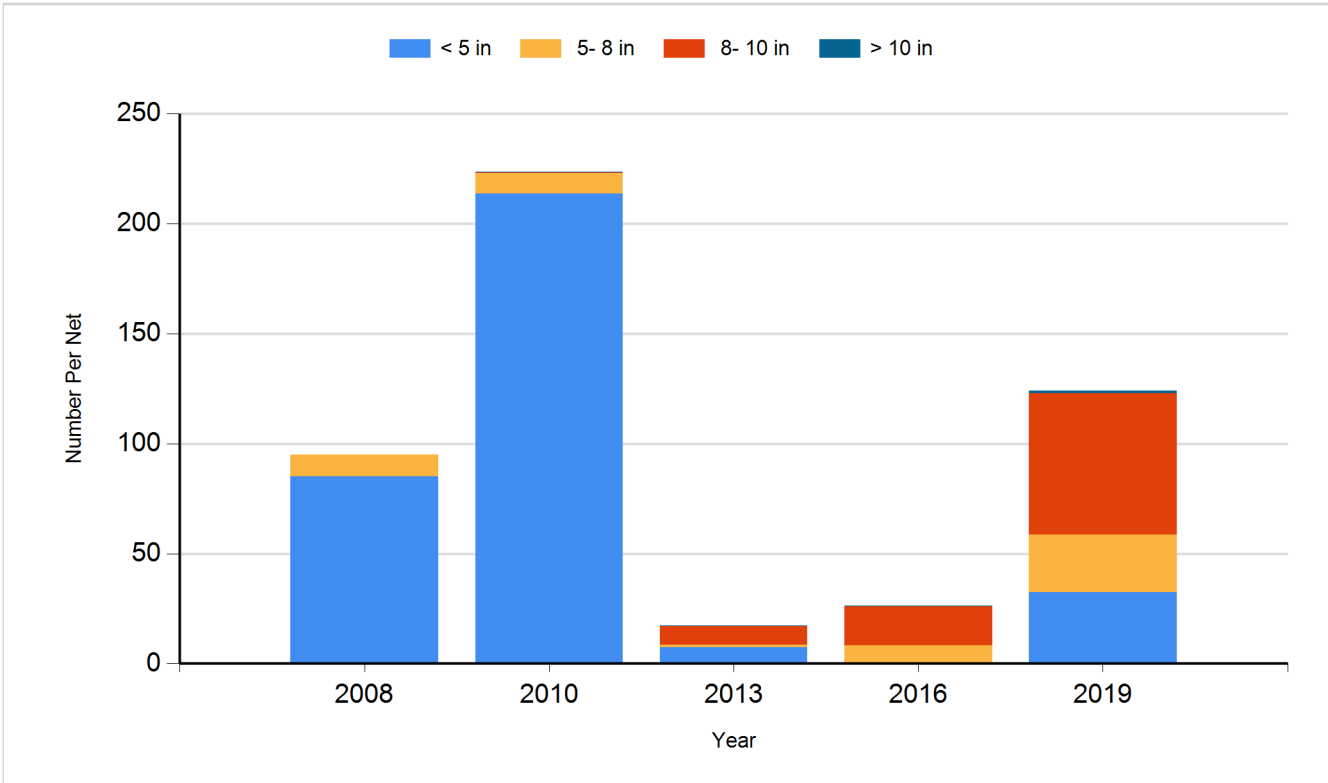


Species: Black Bullhead  
Gear: std exp gill net

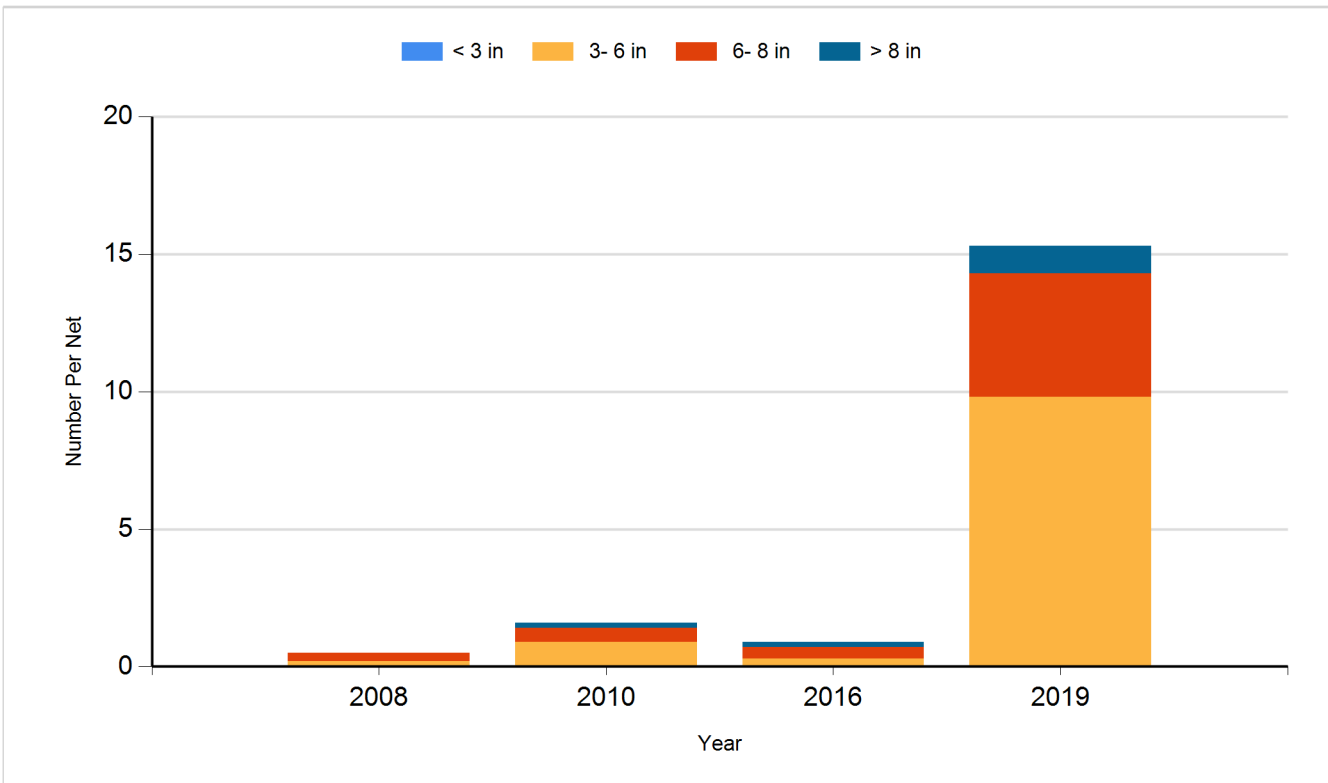




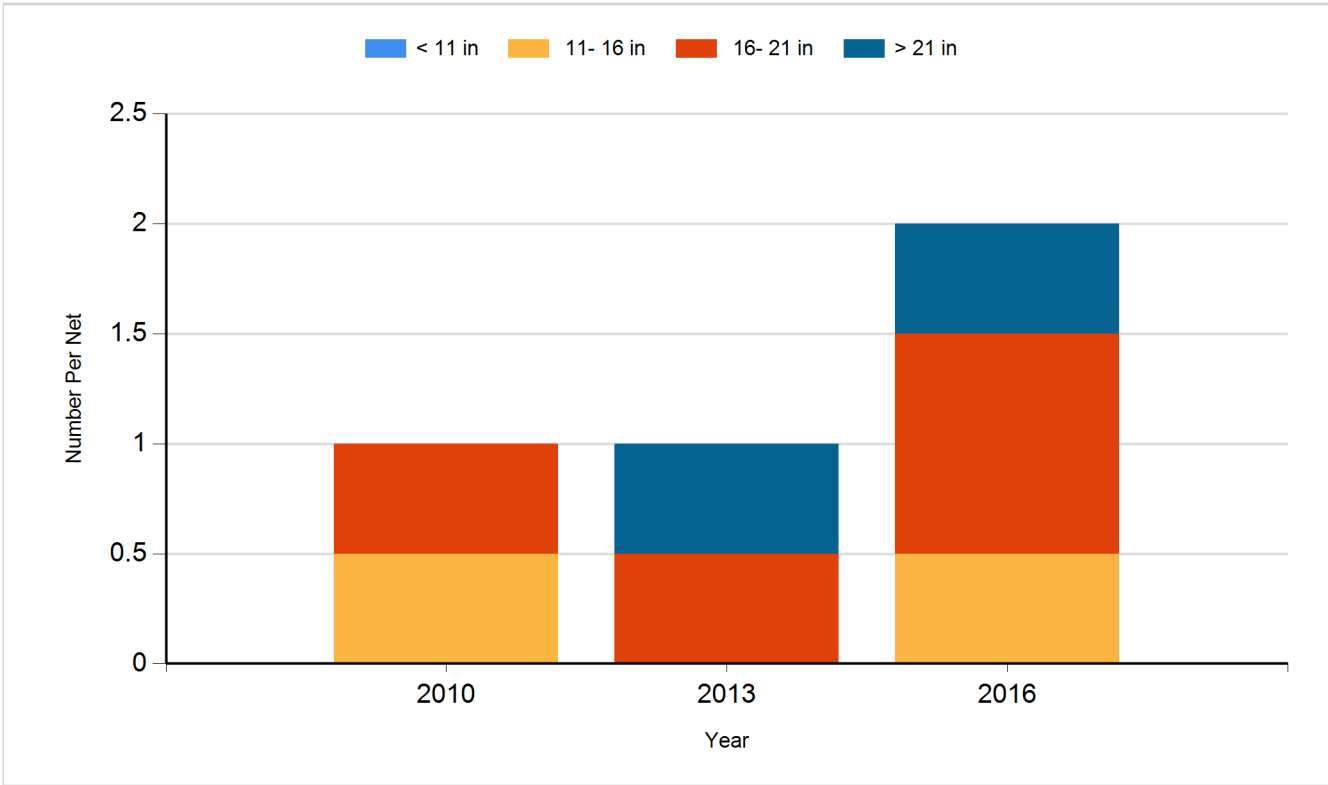
Species: Black Crappie  
Gear: frame net (std 3/4 in)



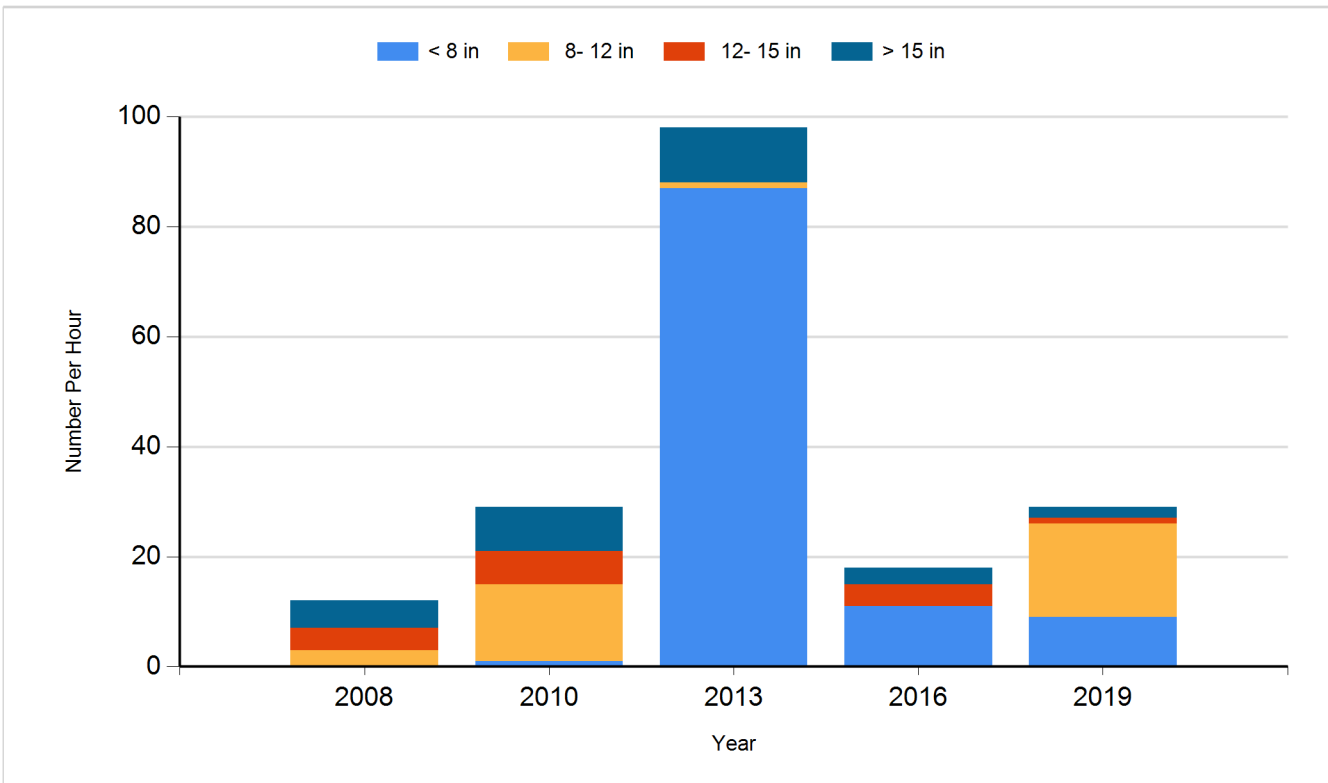
Species: Bluegill  
Gear: frame net (std 3/4 in)



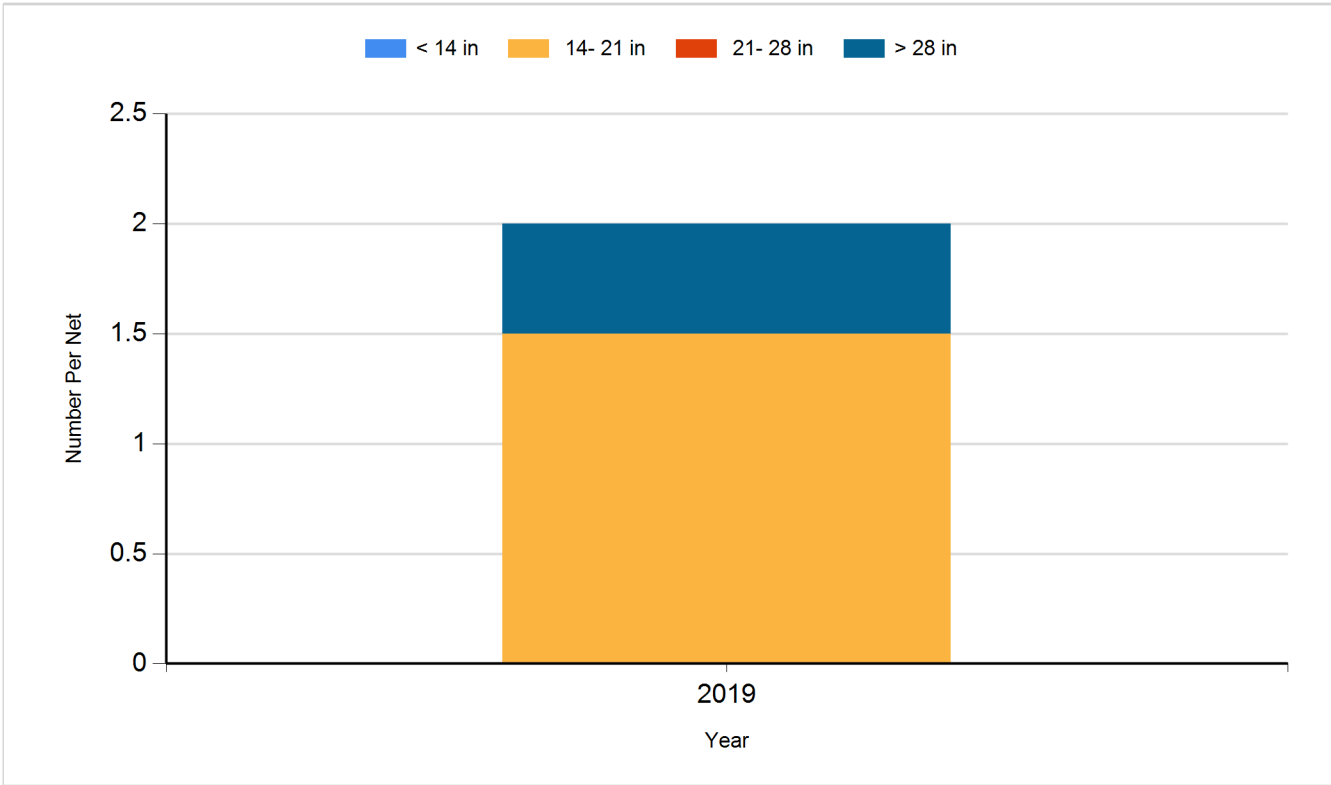
Species: Common Carp  
Gear: std exp gill net



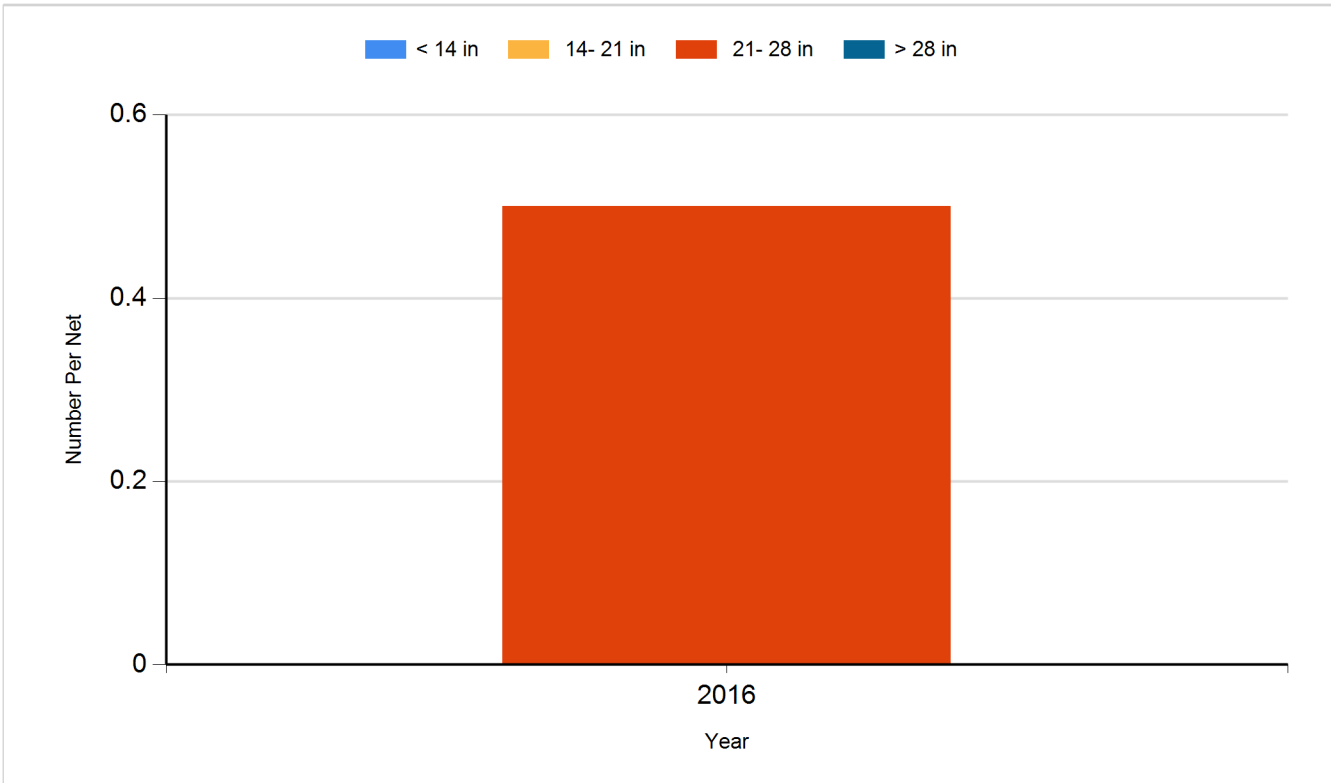
Species: Largemouth Bass  
Gear: boat shocker (night)



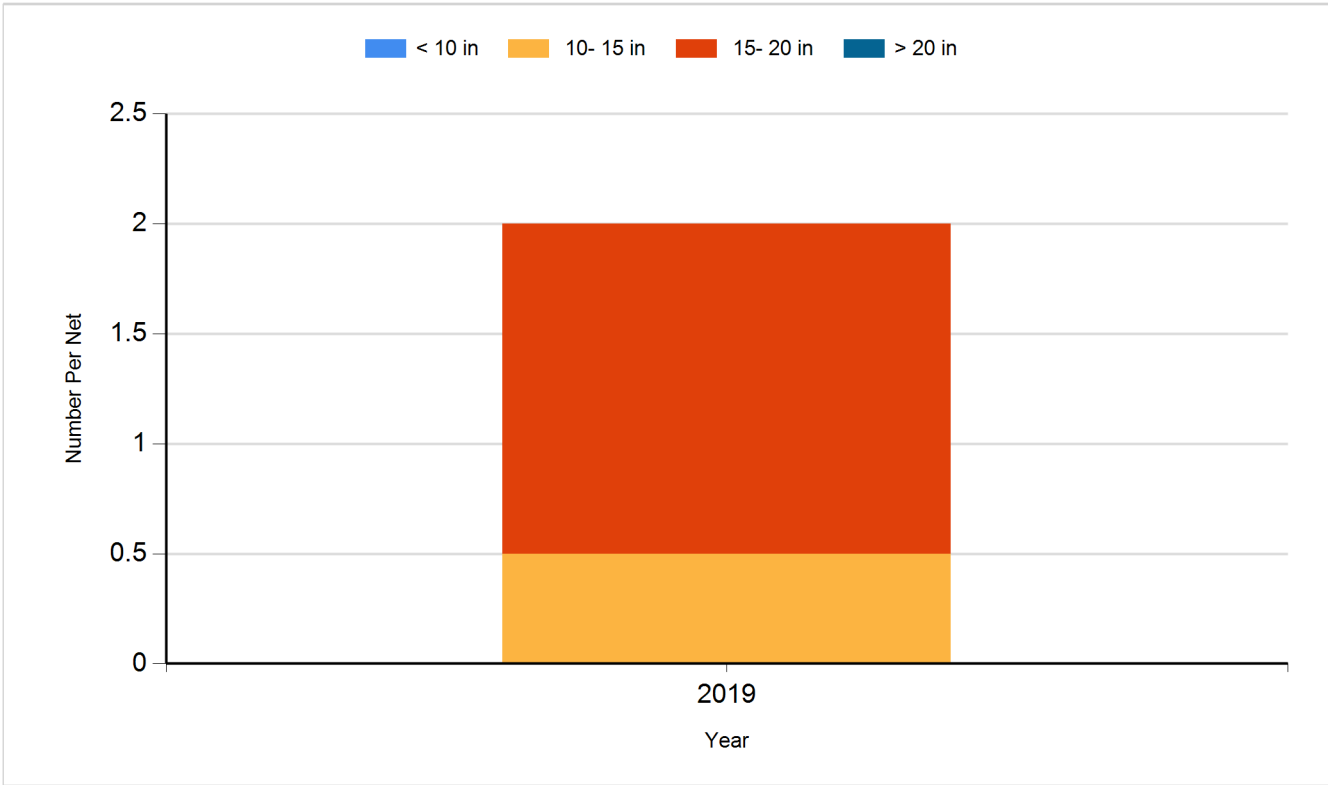
Species: Northern Pike  
Gear: AFS std gill net



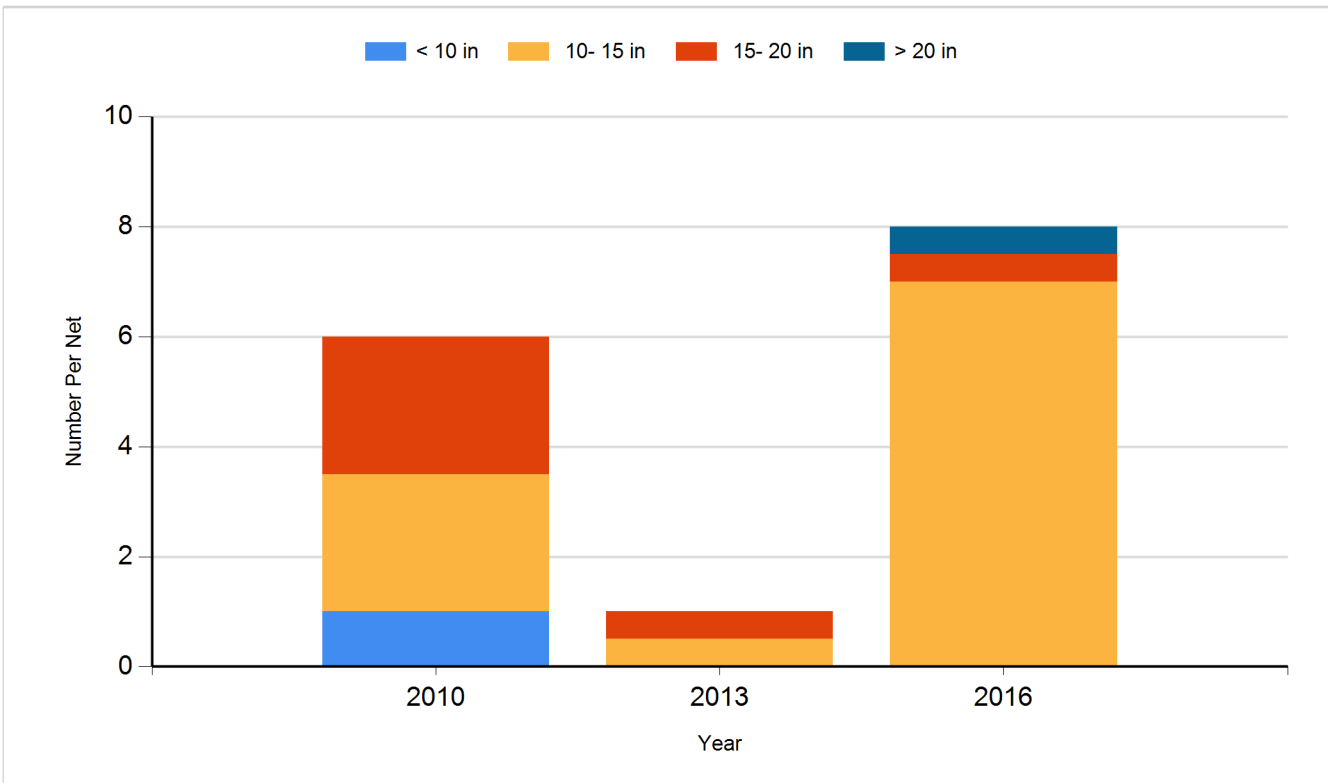
Species: Northern Pike  
Gear: std exp gill net



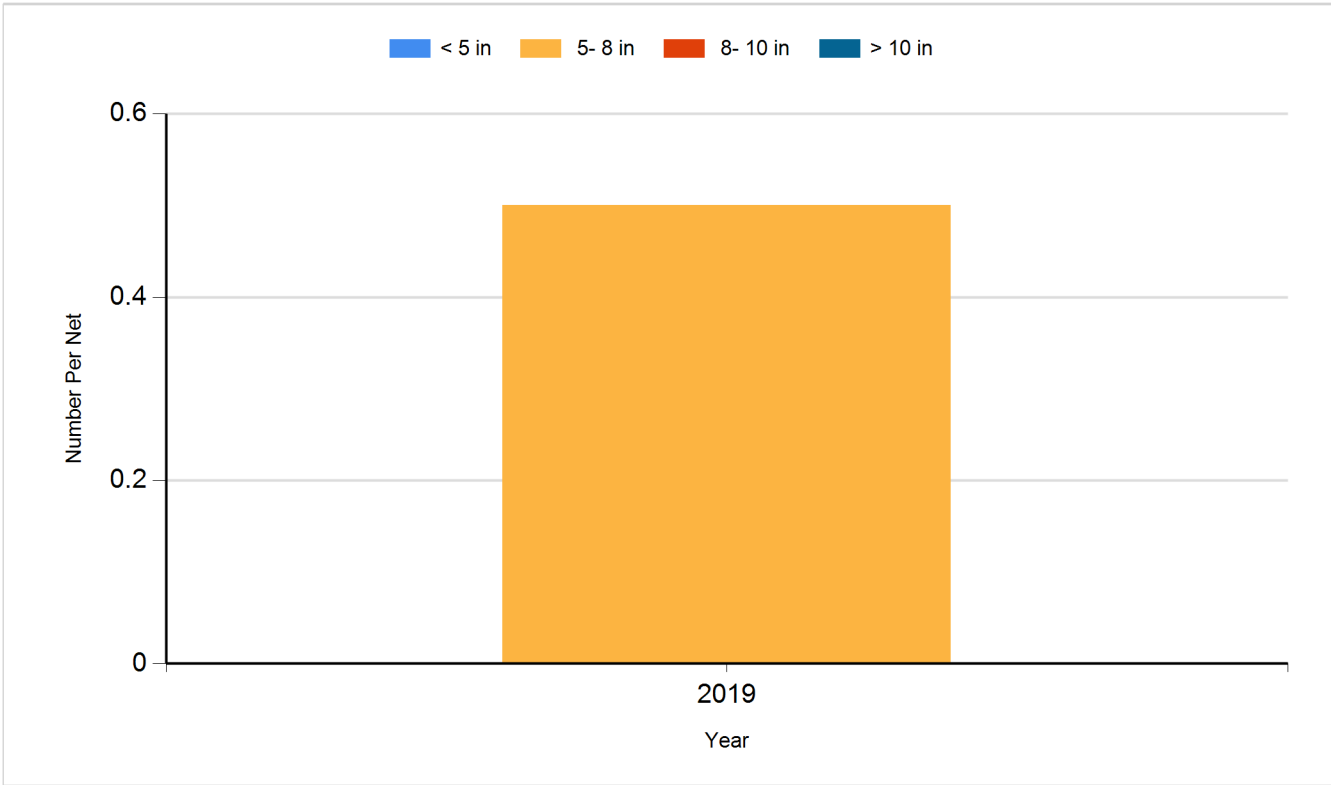
Species: Walleye  
Gear: AFS std gill net



Species: Walleye  
Gear: std exp gill net



Species: Yellow Perch  
Gear: AFS std gill net



## **Fish Stocking**

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

Year	Species	Size	Number
2008	Black Crappie	Adult	36
2008	Largemouth Bass	Juvenile	34
2010	Walleye	Small Fingerling	14,980
2013	Walleye	Large Fingerling	1,144
2015	Walleye	Large Fingerling	900
2017	Walleye	Large Fingerling	2,960
2019	Walleye	Small Fingerling	9,185