

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Hurley, Potter County

LLO-Lake-2201-000

2020

## Lake Information

**Name:** Hurley **Maximum Depth:** 29 Feet  
**County:** Potter **Mean Depth:** 12 Feet  
**Legal Description:** T11-R77-S28  
**Surface Area:** 97 Acres

## Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 02, 2020	2 net-nights
AFS std gill net	Jun 03, 2020	2 net-nights
boat shocker (night)	Sep 24, 2020	3600 seconds
frame net (std 3/4 in)	Jun 02, 2020	5 net-nights
frame net (std 3/4 in)	Jun 03, 2020	5 net-nights

## **Common Fish Species Present**

Yellow Perch

Walleye

Largemouth Bass

Bluegill

Black Bullhead

Black Crappie

Northern Pike

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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	5	1.3	0.8	100		0	100	14	
	Northern Pike	32	7.8	1.9	48	14	13	91	2	
	Walleye	1	0.3	0.4	0		0	92		
	Yellow Perch	145	36.3	7.9	5	3	0	101	1	
boat shocker (night)	Largemouth Bass	24	11.0	11.3	18		0	123	4	
	Walleye*	2	2.0	1.9	0		0	95	9	
frame net (std 3/4 in)	Black Bullhead	469	46.9	18.2	84	2	1	101	3	
	Black Crappie	116	11.6	3.9	93	4	3	103	1	
	Bluegill	118	11.8	3.8	63	6	16	5	124	1
	Largemouth Bass	1	0.1	0.1	0		0	99		
	Northern Pike	19	1.3	0.7	100		8	88	2	
	Yellow Perch	31	3.1	2.8	35	13	6	92	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
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
AFS std frame net	Black Bullhead							59.8				59.80
	Black Crappie							10.2				10.20
	Bluegill							2.8				2.80
	Largemouth Bass							0.1				0.10
	Northern Pike							0.9				0.90
	Walleye							0.2				0.20
	Yellow Perch							1.8				1.80
AFS std gill net	Black Bullhead							38.3			1.3	19.80
	Black Crappie							5.0			0.0	2.50
	Largemouth Bass							0.5			0.0	0.25
	Northern Pike							5.5			7.8	6.65
	Walleye							1.0			0.3	0.65
	Yellow Perch							1.5			36.3	18.90
boat shocker (night)	Largemouth Bass	8.0			22.0			32.0			11.0	18.25
	Walleye*	8.0			0.0			0.0			2.0	2.50
frame net (std 3/4 in)	Black Bullhead	9.8		10.0							46.9	22.23
	Black Crappie	1.0		0.2							11.6	4.27
	Bluegill	4.9		0.7							11.8	5.80
	Largemouth Bass	0.0		0.0							0.1	0.03
	Northern Pike	2.7		1.1							1.3	1.70
	Walleye	0.0		0.2							0.0	0.07
	Yellow Perch	0.9		0.1							3.1	1.37
std exp gill net	Black Bullhead	6.5		28.0								17.25
	Northern Pike	2.5		5.5								4.00
	Walleye	0.0		1.5								0.75
	Yellow Perch	0.0		1.0								0.50

## 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													
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020				
AFS std frame net	Black Bullhead	PSD									0					
		PSD-P									0					
		Wr									85					
	Black Crappie	PSD										0				
		PSD-P										0				
		Wr									117					
	Bluegill	PSD										86				
		PSD-P										4				
		Wr									115					
	Largemouth Bass	PSD										100				
		PSD-P										100				
		Wr									102					
	Northern Pike	PSD										67				
		PSD-P										11				
		Wr									79					
	Walleye	PSD										50				
		PSD-P										50				
		Wr									93					
Yellow Perch	PSD										89					
	PSD-P										0					
	Wr									103						
AFS std gill net	Black Bullhead	PSD									0				100	
		PSD-P									0				0	
		Wr									97				100	
	Black Crappie	PSD										0				
		PSD-P										0				
		Wr									110					
	Largemouth Bass	PSD										100				
		PSD-P										50				
		Wr									101					
	Northern Pike	PSD										95				48
		PSD-P										14				13
		Wr									84					91

Gear	Species	Index	Year											
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
AFS std gill net	Walleye	PSD								100		0		
		PSD-P								75		0		
		Wr								82		92		
	Yellow Perch	PSD									67		5	
		PSD-P									0		0	
		Wr									111		101	
boat shocker (night)	Largemouth Bass	PSD	63			18				100		18		
		PSD-P	63			18				88		0		
		Wr	130			122				111		123		
	Walleye	PSD	67										0	
		PSD-P	0										0	
		Wr	88										95	
frame net (std 3/4 in)	Black Bullhead	PSD	57		98								84	
		PSD-P	7		9								1	
		Wr	95		96								101	
	Black Crappie	PSD	80		100									93
		PSD-P	30		100									3
		Wr	102		98									103
	Bluegill	PSD	100		100									63
		PSD-P	31		100									16
		Wr	116		123									124
	Largemouth Bass	PSD												0
		PSD-P												0
		Wr												99
	Northern Pike	PSD	70		91									100
		PSD-P	15		9									8
		Wr	86		82									88
	Walleye	PSD			50									
		PSD-P			0									
		Wr			76									
	Yellow Perch	PSD	33		100									35
		PSD-P	33		0									6
		Wr	101		107									92
	std exp gill net	Black Bullhead	PSD	77		100								
			PSD-P	0		0								
			Wr	104		96								



Gear	Species	Index	Year										
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
std exp gill net	Northern Pike	PSD	80		100								
		PSD-P	20		9								
		Wr	86		82								
	Walleye	PSD			100								
		PSD-P			33								
		Wr			84								
	Yellow Perch	PSD			100								
		PSD-P			0								
		Wr			119								

## 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	2	3	88 (3.9)	129 (1)										
2017	3	4	100 (1.9)	133 (3.9)	155 (2.7)									
2016	4	2	101 (3.1)	131 (1)	160 (9.2)	188 (5.9)								
2015	5	7	110 (3.8)	144 (6.3)	171 (5)	194 (5.2)	210 (6)							
2014	6	10	109 (1.8)	137 (1.1)	163 (1.7)	184 (1.5)	204 (1.4)	222 (1.7)						
2013	7	4	103 (8.3)	135 (9.8)	163 (9.9)	189 (10.4)	208 (10)	224 (7)	240 (3.7)					
2012	8	1	94	105	133	152	180	193	221	242				
Weighted Mean		31	104	136	163	187	206	221	236	242				
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20		
2018	2	3												
2017	3	4												
2016	4	2												
2015	5	7												
2014	6	10												
2013	7	4												
2012	8	1												
Weighted Mean		31												

Species: Bluegill

Year Class	Age	N	Mean back-calculated length (SE) at age																	
			1	2	3	4	5	6	7	8	9	10								
2019	1	7	98 (2.4)																	
2018	2	14	87 (2.5)	121 (2.3)																
2017	3	7	70 (3.1)	104 (2)	136 (1.1)															
2016	4	13	94 (3.5)	122 (2.8)	143 (2.9)	159 (2.5)														
2015	5	2	96 (1.8)	117 (2.6)	146 (5.4)	169 (7.7)	176 (8)													
2014	6	9	93 (2.3)	125 (3.9)	149 (3.8)	163 (2.9)	174 (2.7)	185 (2.7)												
2013	7	4	99 (7.7)	129 (6.1)	147 (6.6)	170 (9)	187 (5)	201 (3.4)	211 (2.3)											
2012	8	3	92 (1.9)	120 (8.4)	138 (8.2)	157 (7.7)	174 (7.2)	188 (6.3)	200 (6.7)	212 (2.9)										
2011	9	4	92 (6.1)	130 (3.8)	146 (3.2)	166 (2.8)	178 (3.4)	192 (3.7)	203 (3.7)	213 (3.5)	223 (2.6)									
2010	10	3	94 (6.9)	122 (7.6)	139 (7.2)	157 (5.2)	174 (3.3)	184 (2.6)	195 (2.5)	206 (2.4)	215 (2.6)	224 (1.2)								
Weighted Mean		66	90	121	143	162	177	189	203	211	220	224								

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2019	1	7										
2018	2	14										
2017	3	7										
2016	4	13										
2015	5	2										
2014	6	9										
2013	7	4										
2012	8	3										
2011	9	4										
2010	10	3										
Weighted Mean		66										

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	1	5	94 (3.6)										
2018	2	5	90 (4.4)	188 (13)									
2017	3	1	96	219	298								
Weighted Mean		11	92	193	298								

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

Species: Walleye

Year Class	Age	N	Mean back-calculated length (SE) at age										
			1	2	3	4	5	6	7	8	9	10	
2016	4	1	206	261	312	347							
Weighted Mean		1	206	261	312	347							

Year Class	Age	N	Mean back-calculated length (SE) at age										
			11	12	13	14	15	16	17	18	19	20	
2016	4	1											
Weighted Mean		1											

Species: Yellow Perch

Year Class	Age	N	Mean back-calculated length (SE) at age										
			1	2	3	4	5	6	7	8	9	10	
2019	1	1	85										
2018	2	4	95 (6.1)	134 (3.8)									
2018	2	11	97 (2.3)	134 (2.8)									
2017	3	3	82 (3.8)	122 (4.5)	154 (4)								

2017	3	9	105 (2.3)	140 (2.3)	162 (1.8)							
2016	4	5	99 (1.6)	141 (5.8)	168 (3.6)	182 (2.9)						
2016	4	10	96 (2.6)	135 (3.9)	165 (3.6)	187 (1.9)						
2015	5	1	116	155	180	200	214					
2015	5	2	97 (9.1)	143 (19.6)	172 (17.9)	201 (4.4)	211 (5.1)					
2014	6	6	97 (4.9)	131 (6.9)	160 (6.7)	182 (5.7)	203 (3.9)	214 (3.4)				
2013	7	1	125	145	176	211	228	245	255			
2011	9	1	96	125	159	193	207	233	250	267	278	
Weighted Mean		54	98	136	164	188	208	220	253	267	278	

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2019	1	1										
2018	2	4										
2018	2	11										
2017	3	3										
2017	3	9										
2016	4	5										
2016	4	10										
2015	5	1										
2015	5	2										
2014	6	6										
2013	7	1										
2011	9	1										
Weighted Mean		54										

## 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+
2020	115		144 (3)	166 (4)	203 (3)	232 (24)	235 (63)	245 (17)	252 (1)		
2017	103	94 (1)		162 (102)							
2013	4				250 (2)				275 (2)		
2011	20			206 (14)	269 (4)	266 (2)					

### Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	118	108 (8)	133 (25)	148 (19)	168 (31)	179 (4)	187 (14)	217 (4)	222 (4)	227 (6)	232 (4)
2017	28		122 (4)	166 (5)	170 (15)	180 (2)	185 (1)				294 (1)
2013	14				226 (2)	226 (2)	220 (4)	233 (2)		246 (4)	
2011	98			163 (2)	180 (11)	190 (33)	194 (32)	194 (6)	208 (18)		

### Species: Largemouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	11	233 (5)	253 (5)	318 (1)							
2017	32			364 (3)	389 (9)	421 (6)	454 (2)	480 (2)	476 (4)	506 (4)	512 (2)
2014	68	200 (58)	240 (2)			418 (2)			470 (4)	480 (2)	
2011	14	239 (4)			408 (2)	414 (2)	438 (4)		481 (2)		

### Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	1				360 (1)						
2017	4			446 (1)		521 (1)		628 (2)			
2013	6			448 (4)	540 (2)						

### Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	145	137 (2)	149 (82)	166 (31)	192 (28)	226 (2)					
2017	5			204 (4)	216 (1)						
2013	4				210 (4)						

## **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).

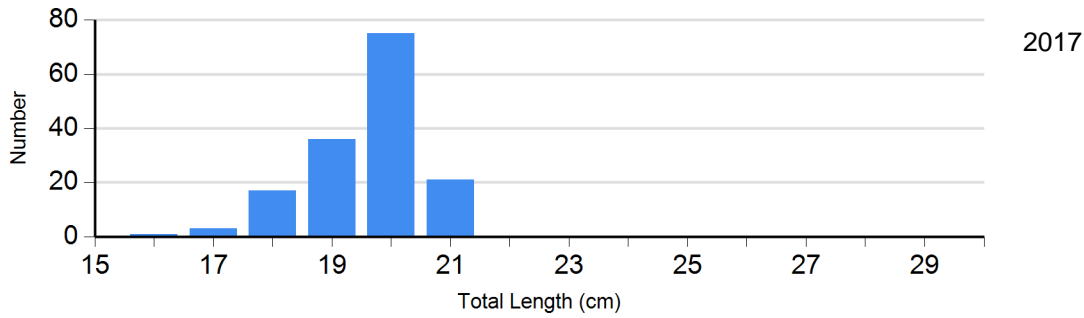
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2017	153	97 (0.7)	0		0		0	
	2020	0		5	100 (11.2)	0		0	
Black Crappie Frame Net	2017	102	117 (0.7)	0		0		0	
	2020	8	119 (1.7)	104	101 (0.6)	4	100 (0.2)	0	
Bluegill Frame Net	2017	4	122 (8.7)	23	112 (1.4)	0		1	146
	2020	44	127 (1.7)	55	126 (1.1)	19	116 (2.6)	0	
Largemouth Bass Electro Fishing	2017	0		4	114 (2.7)	24	111 (1.5)	4	106 (6.3)
	2020	9	124 (3.5)	2	119 (0.4)	0		0	
Northern Pike Gill Net	2017	1	79	18	84 (1.7)	3	88 (3.3)	0	
	2020	16	89 (1.3)	11	93 (4.8)	2	91 (8.2)	2	86 (1.7)
Walleye Gill Net	2017	0		1	77	2	83 (5.5)	1	86
	2020	1	92	0		0		0	
Yellow Perch Gill Net	2017	2	113 (0.9)	4	110 (3.4)	0		0	
	2020	138	102 (0.8)	7	93 (3.2)	0		0	



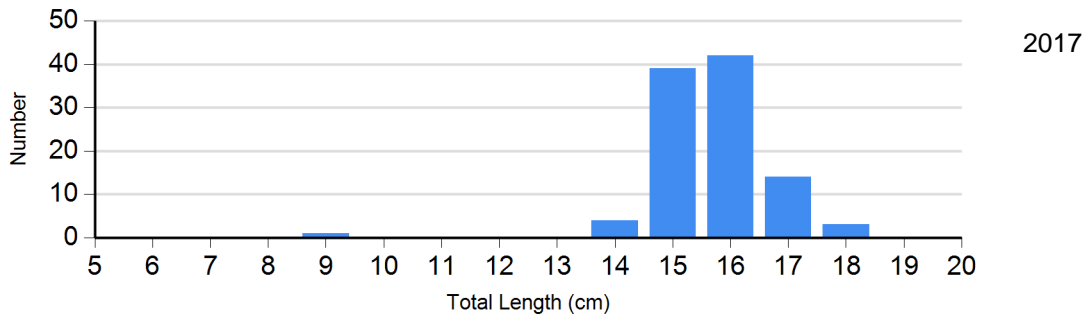
## Length Frequency Distribution

Length frequency histogram of species sampled by year.

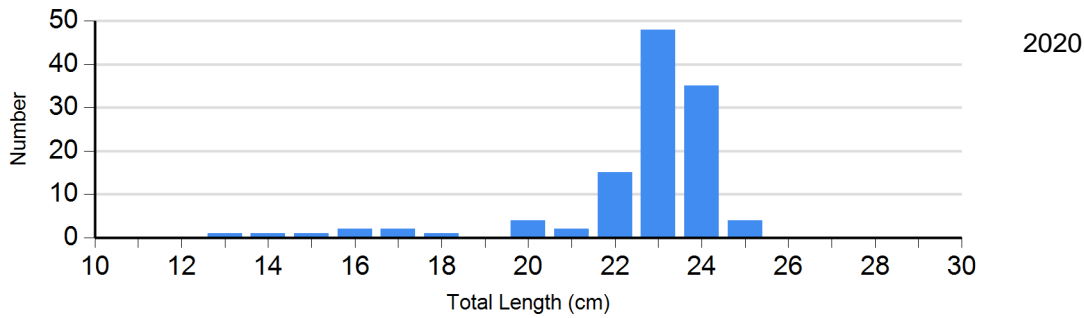
Species: Black Bullhead  
Gear: AFS std gill net



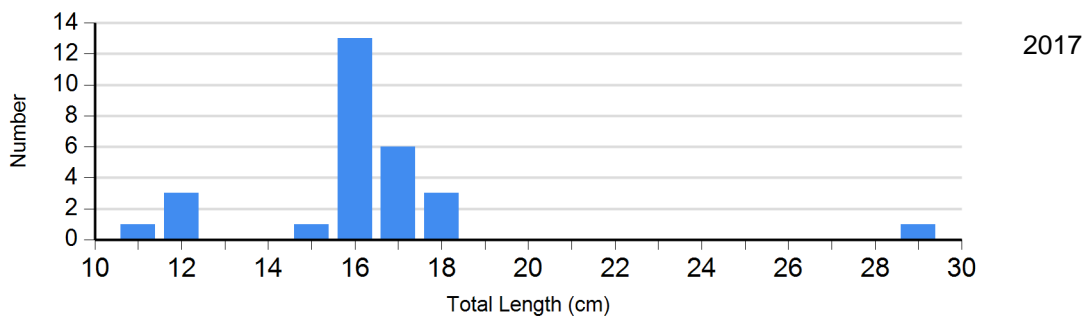
Species: Black Crappie  
Gear: AFS std frame net



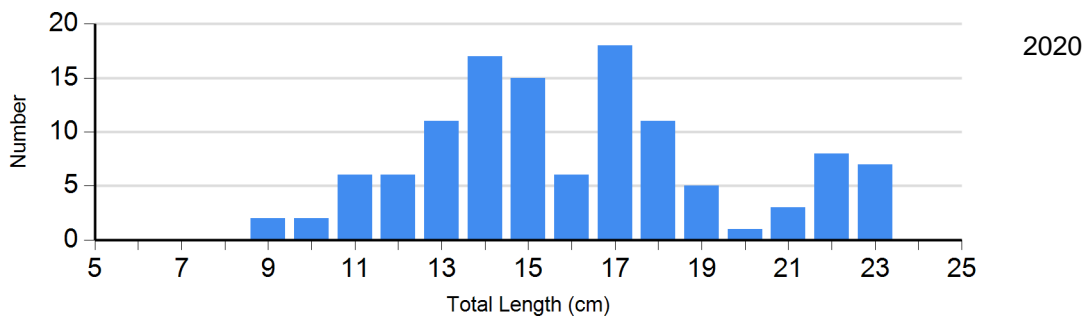
Species: Black Crappie  
Gear: frame net (std 3/4 in)



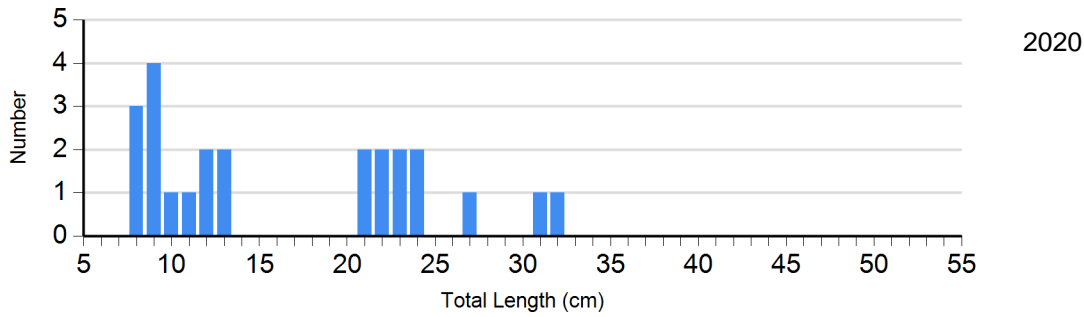
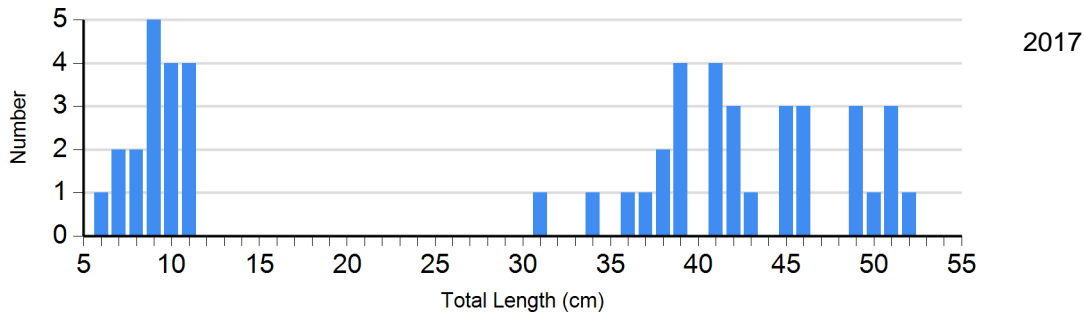
Species: Bluegill  
Gear: AFS std frame net



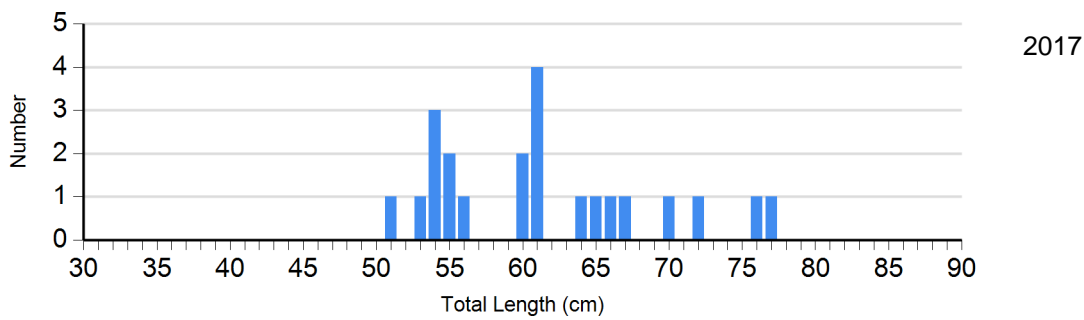
Species: Bluegill  
 Gear: frame net (std 3/4 in)

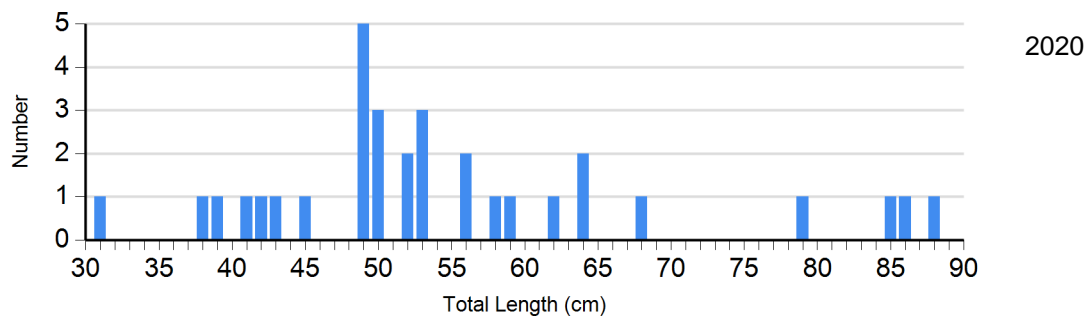


Species: Largemouth Bass  
 Gear: boat shocker (night)

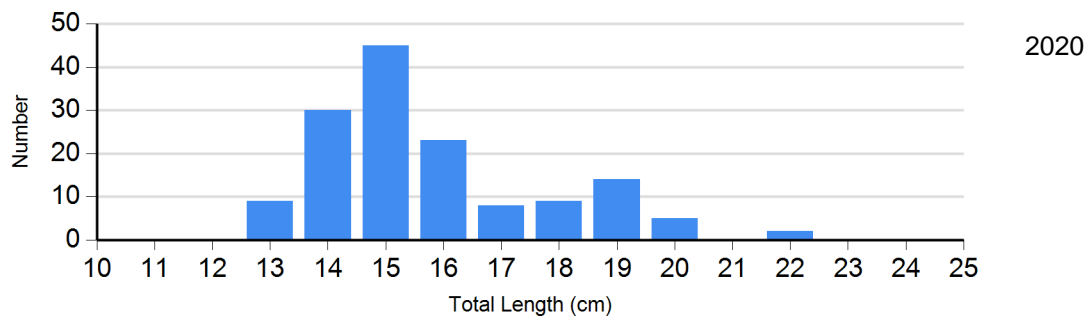


Species: Northern Pike  
 Gear: AFS std gill net





Species: Yellow Perch  
 Gear: AFS std gill net

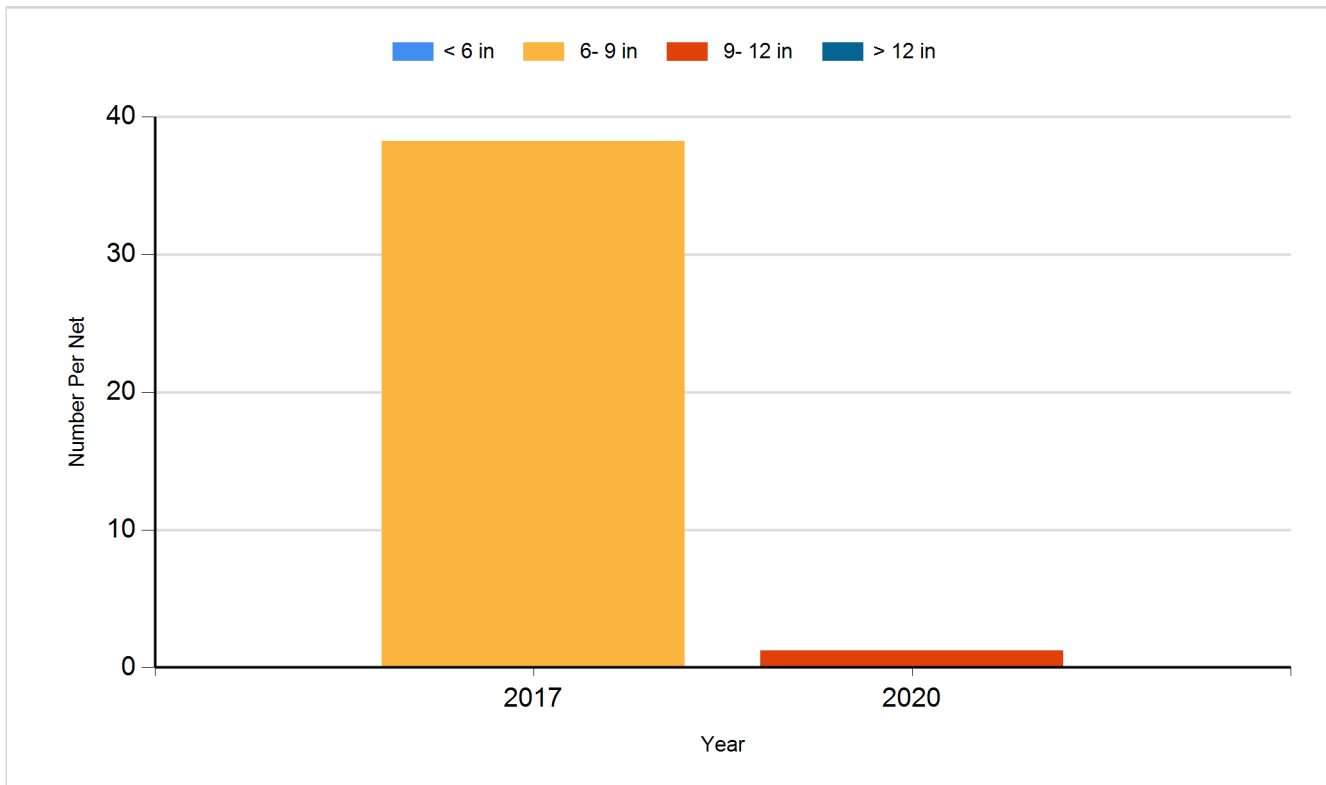


## Historic Fish Sizes and Relative Abundance

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

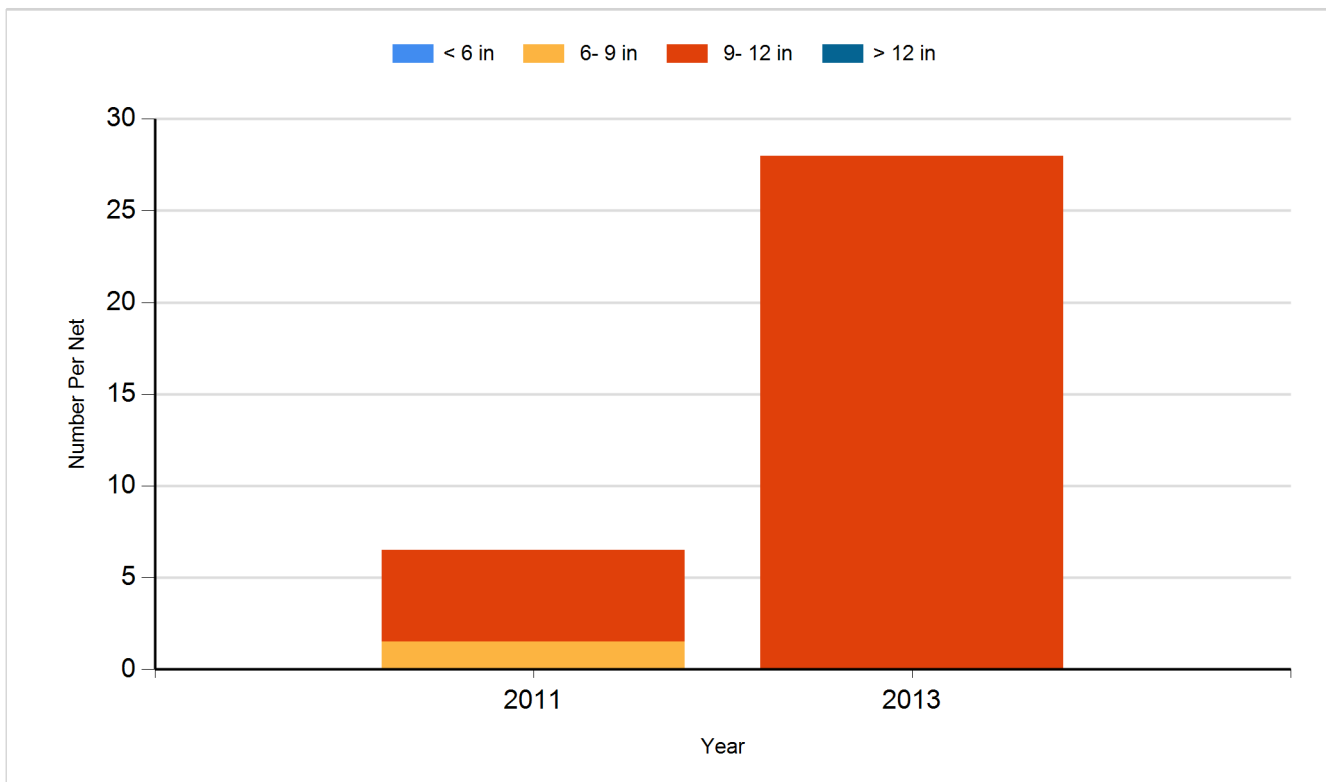
Species: Black Bullhead

Gear: AFS std gill net

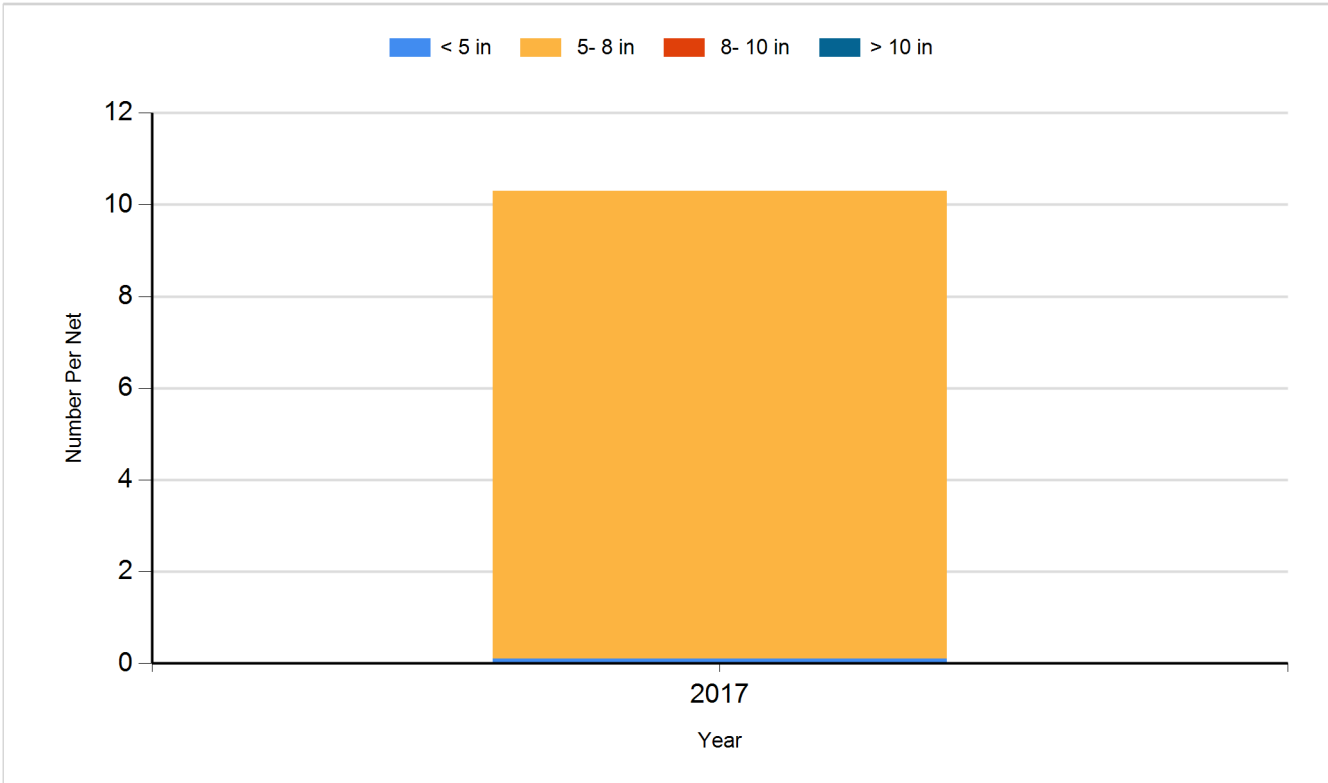


Species: Black Bullhead

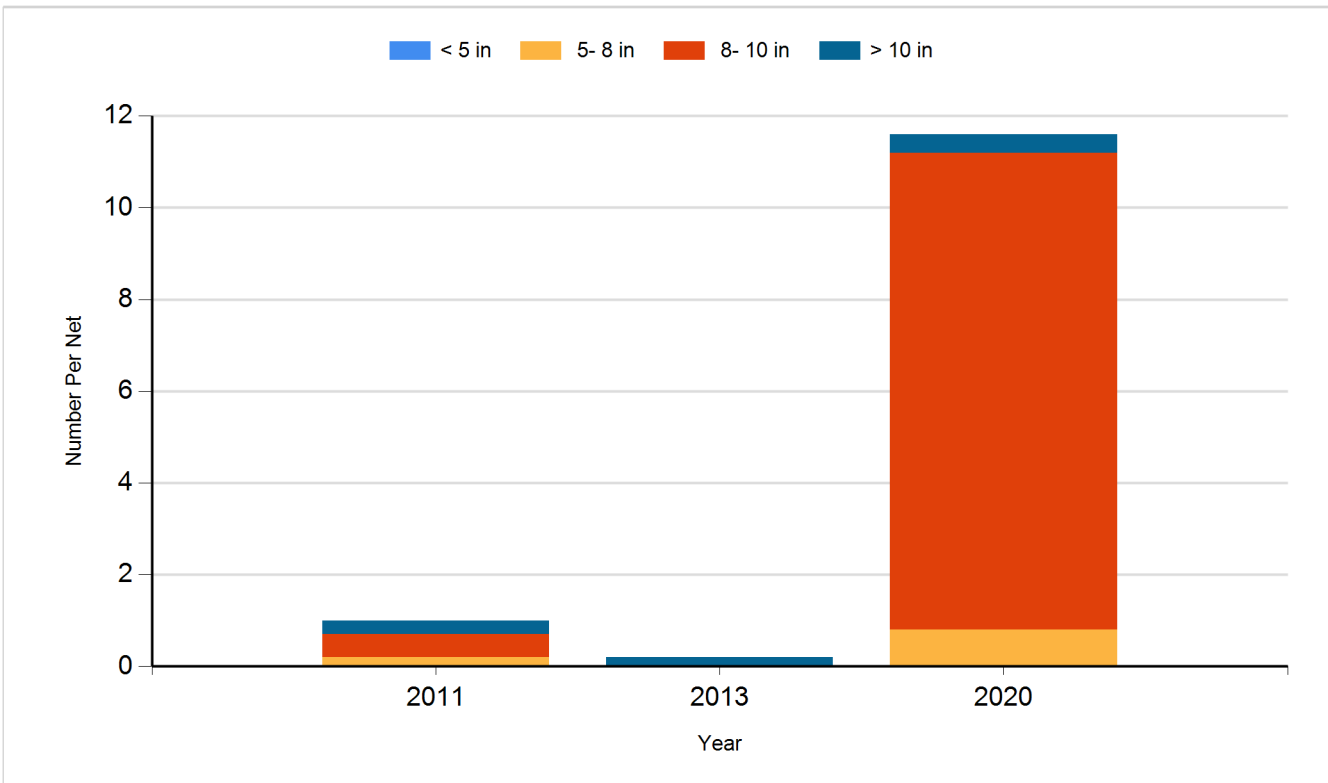
Gear: std exp gill net



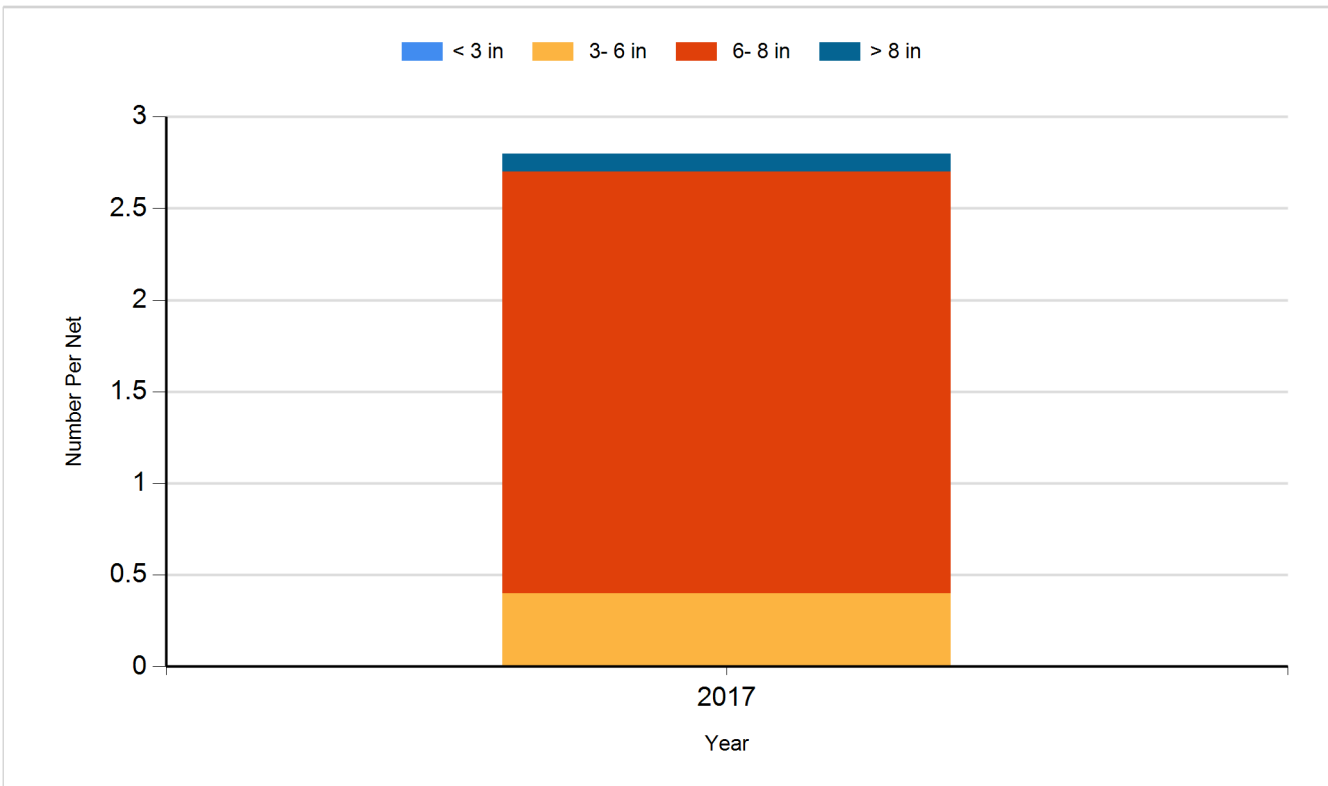
Species: Black Crappie  
Gear: AFS std frame net



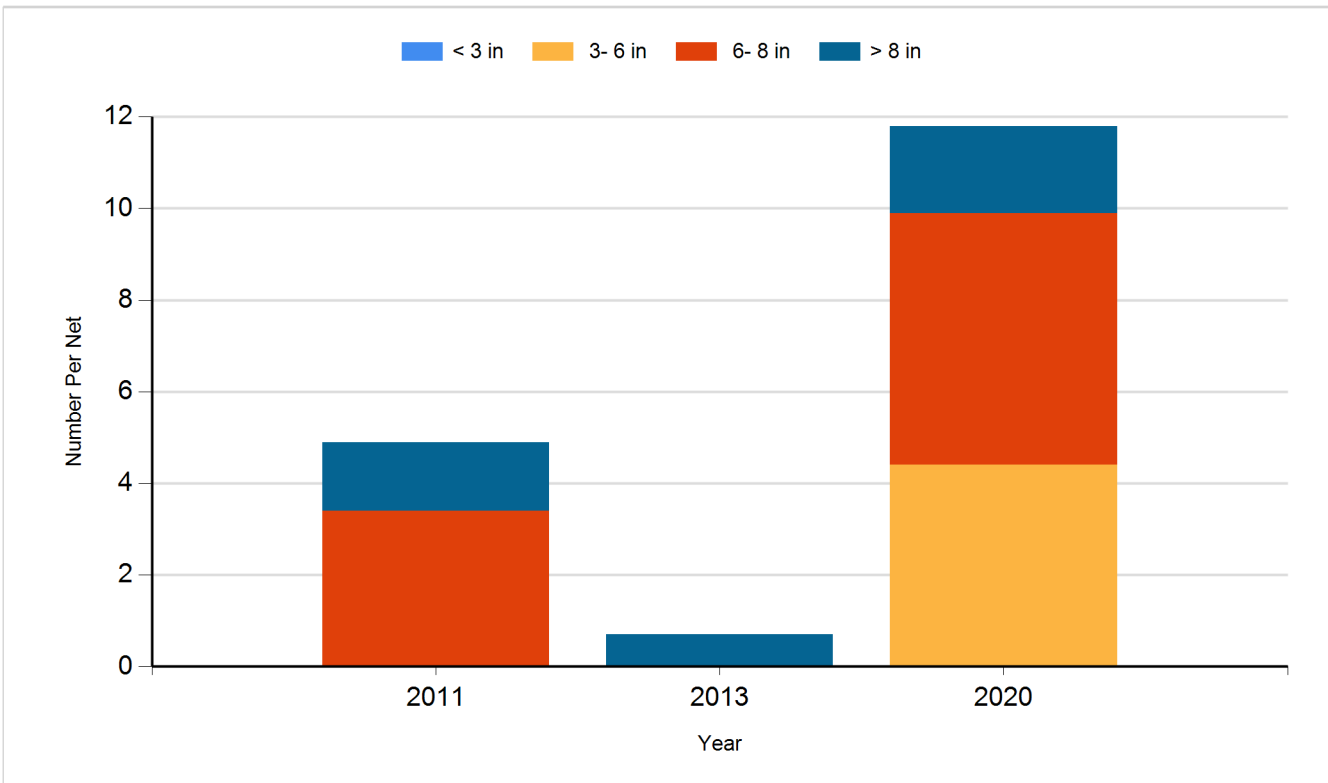
Species: Black Crappie  
Gear: frame net (std 3/4 in)



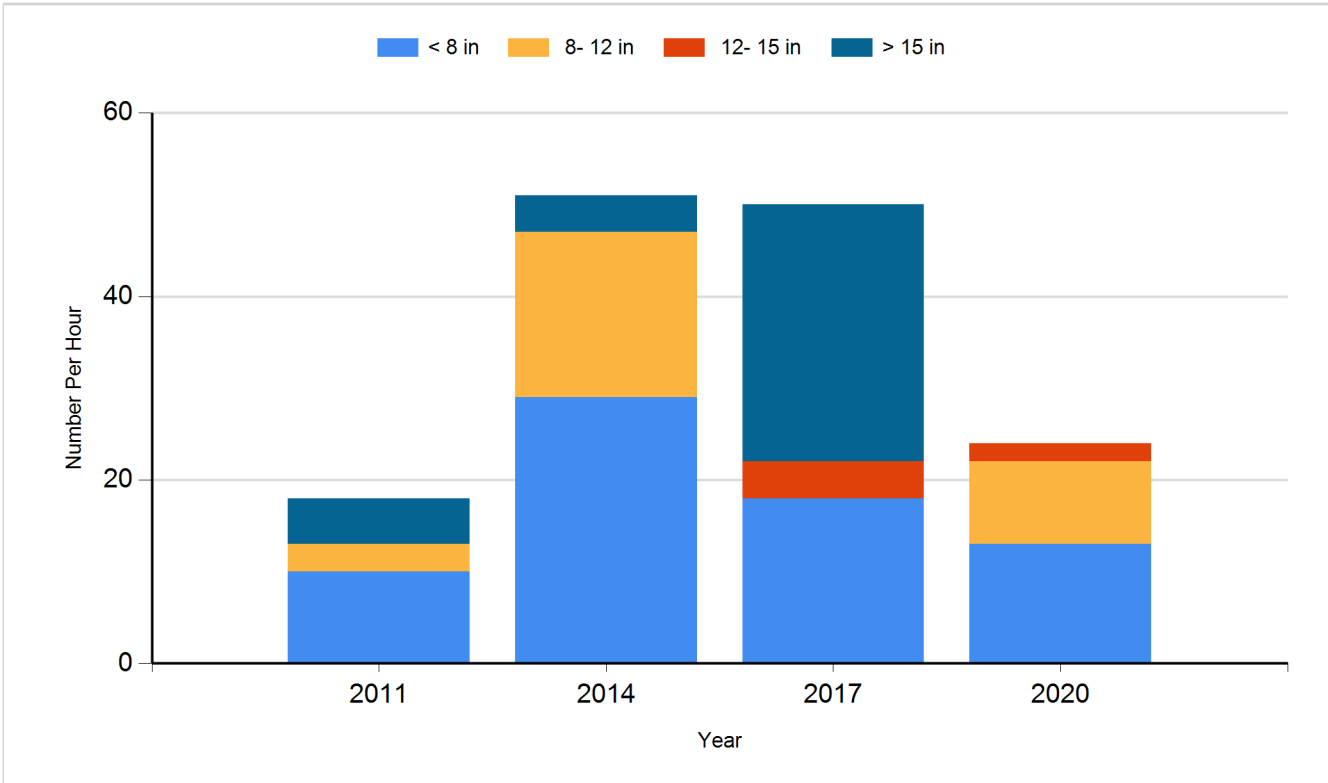
Species: Bluegill  
Gear: AFS std frame net



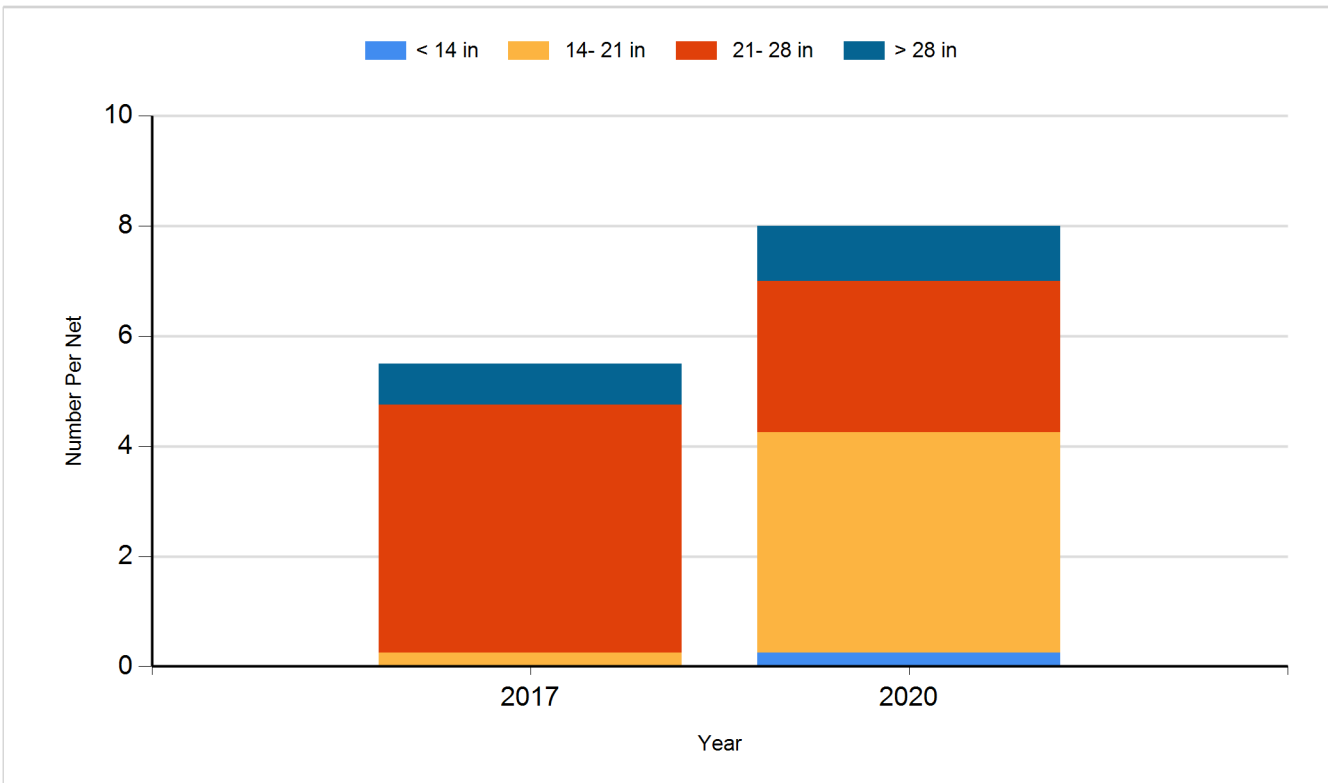
Species: Bluegill  
Gear: frame net (std 3/4 in)



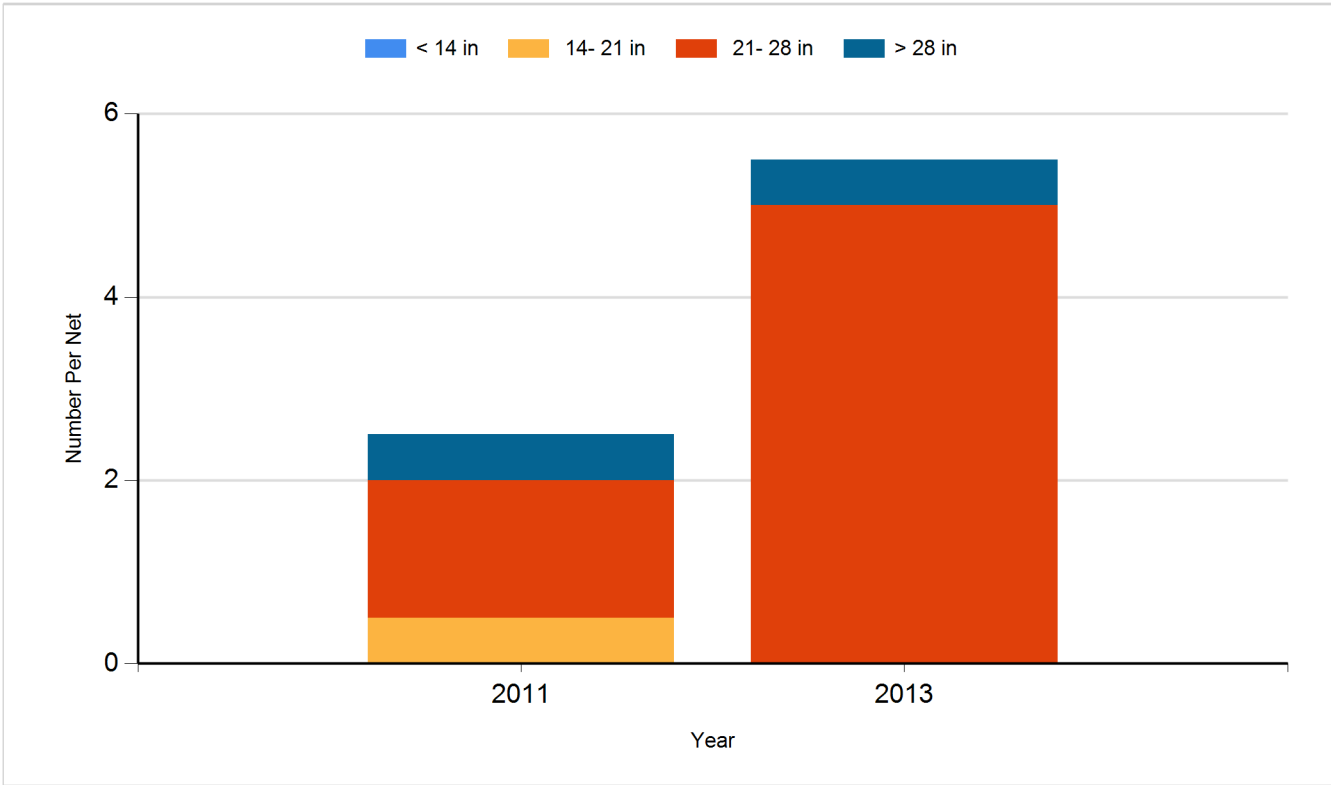
Species: Largemouth Bass  
Gear: boat shocker (night)



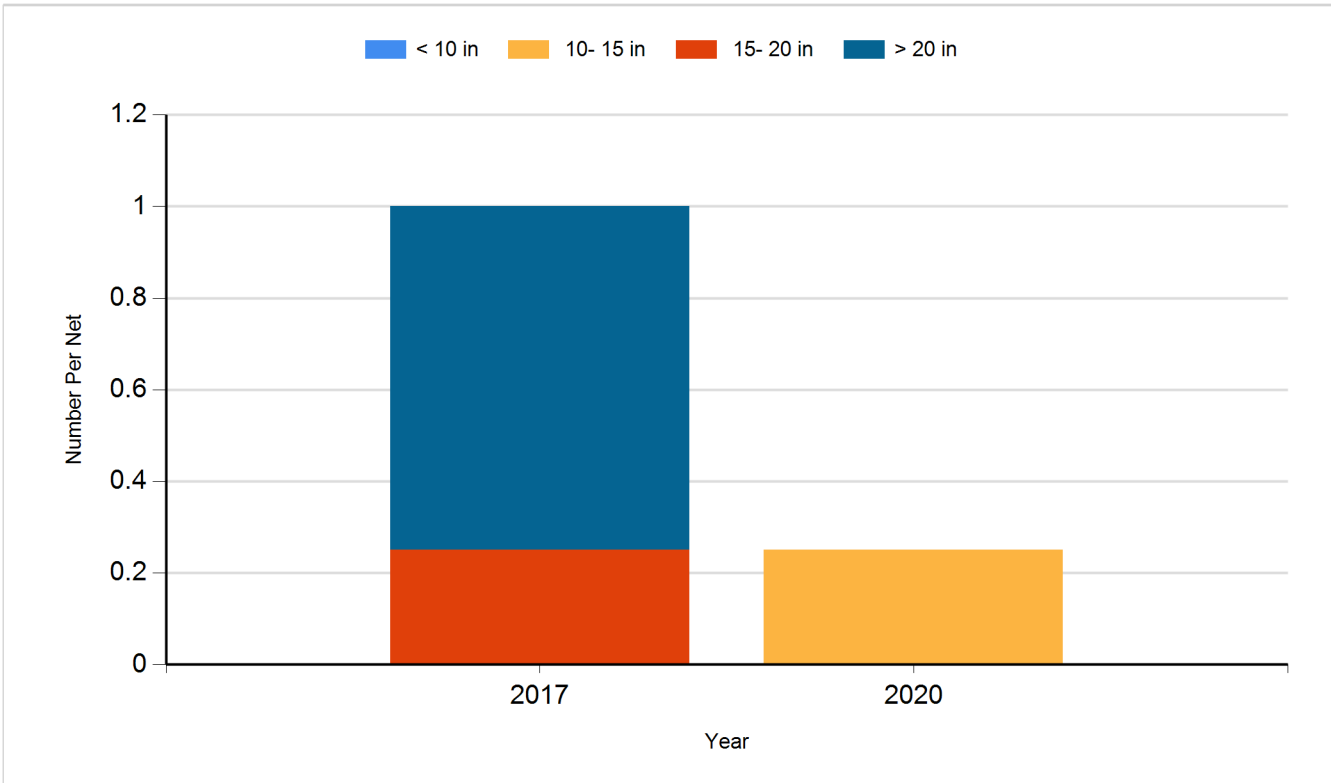
Species: Northern Pike  
Gear: AFS std gill net



Species: Northern Pike  
Gear: std exp gill net

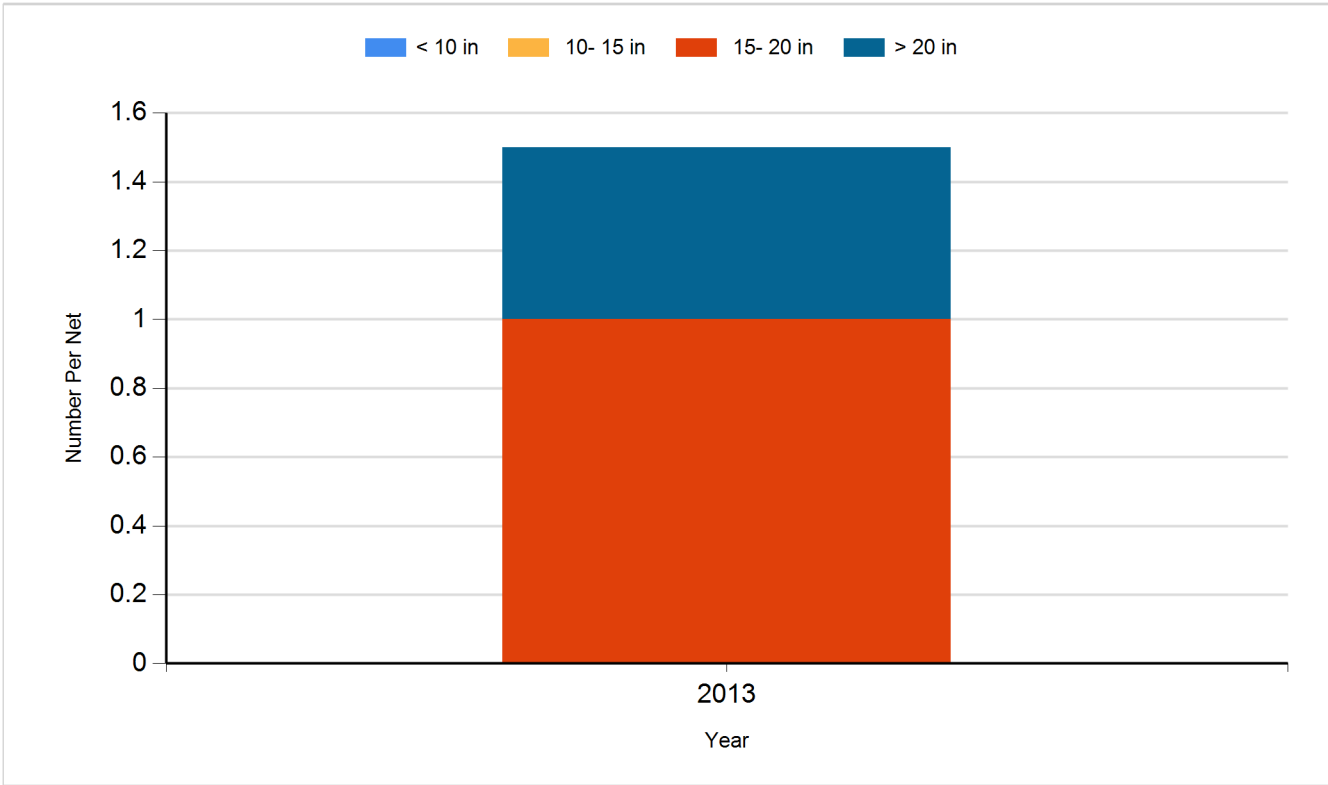


Species: Walleye  
Gear: AFS std gill net

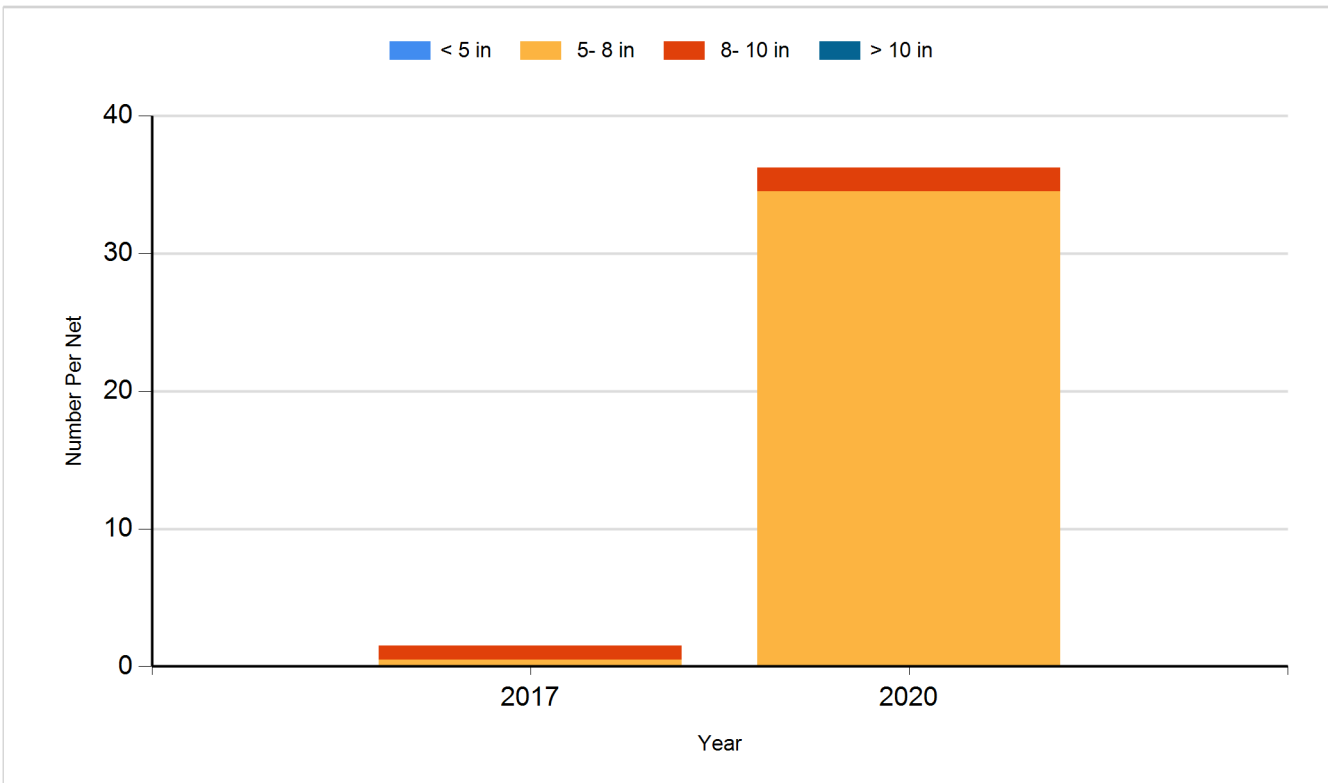




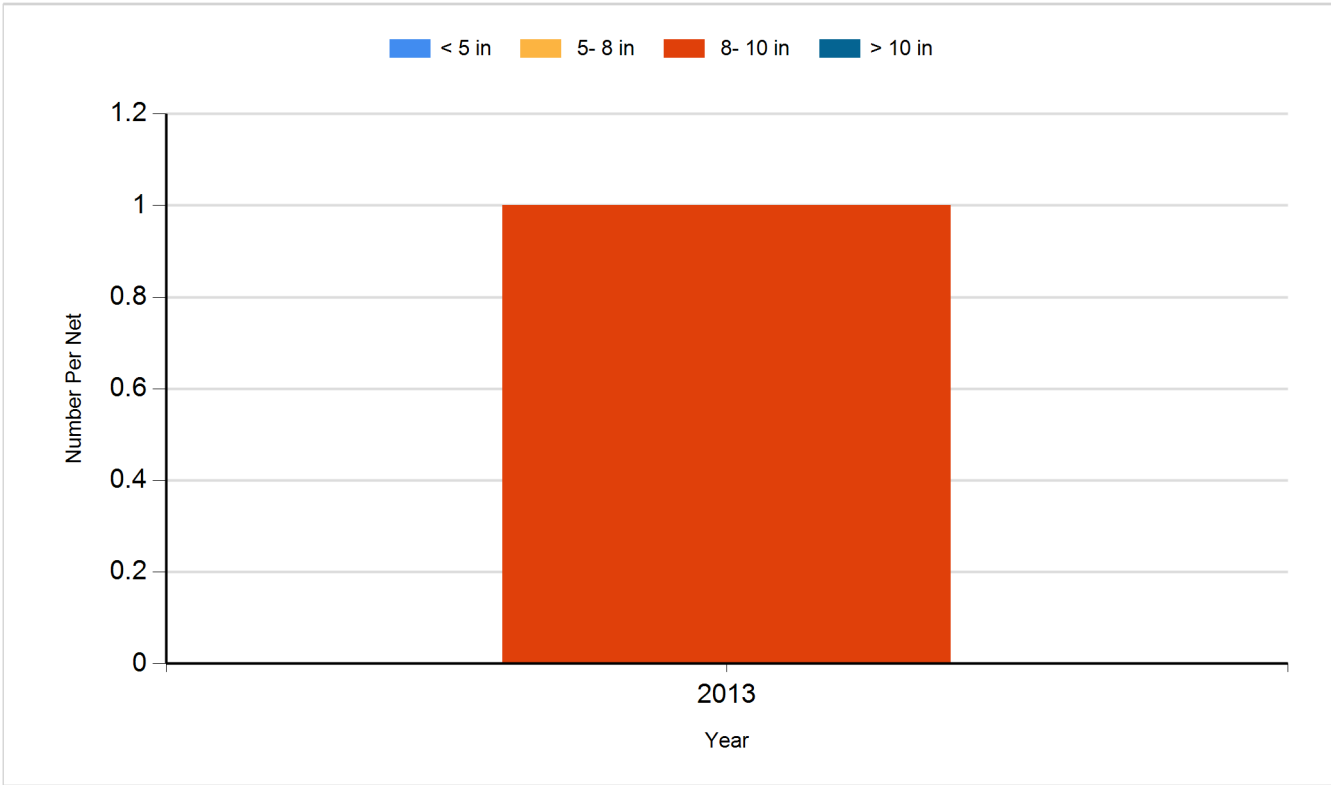
Species: Walleye  
Gear: std exp gill net



Species: Yellow Perch  
Gear: AFS std gill net



Species: Yellow Perch  
Gear: std exp gill net



## **Fish Stocking**

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

Year	Species	Size	Number
2010	Walleye	Small Fingerling	8,560
2012	Walleye	Large Fingerling	980
2013	Largemouth Bass	Large Fingerling	1,960
2014	Walleye	Large Fingerling	807
2016	Largemouth Bass	Adult	225
2017	Walleye	Large Fingerling	3,000
2019	Walleye	Large Fingerling	2,625