

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Pudwell, Corson County

GRA-Lake-511-000

2020

## Lake Information

**Name:** Pudwell **Maximum Depth:** 17 Feet  
**County:** Corson **Mean Depth:** 10 Feet  
**Legal Description:** T23-R23-S27  
**Surface Area:** 70 Acres

## Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 16, 2020	4 net-nights
boat shocker (night)	Sep 22, 2020	3600 seconds
frame net (std 3/4 in)	Jun 16, 2020	7 net-nights
frame net (std 3/4 in)	Jun 17, 2020	3 net-nights

## **Common Fish Species Present**

Largemouth Bass

Bluegill

Black Crappie

Yellow Perch

Northern Pike

Walleye

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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
AFS std gill net	Black Crappie	1	0.3	0.4	0		0	131	
	Largemouth Bass	1	0.0	0.0	0		0		
	Northern Pike	16	3.8	1.2	53	21	7	93	3
	Yellow Perch	19	4.8	2.7	47	18	5	117	3
boat shocker (night)	Largemouth Bass	62	9.0	11.6	0		0	123	2
	Walleye*	3	3.0	3.0	0		0	109	3
frame net (std 3/4 in)	Black Crappie	89	8.9	6.1	0		0	121	1
	Northern Pike	14	1.1	0.5	27		9	88	3
	Yellow Perch	17	1.7	1.8	88		24	109	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 gill net	Black Crappie									0.0	0.3	0.15
	Largemouth Bass									0.0	0.0	0.00
	Northern Pike									1.8	3.8	2.80
	Yellow Perch									0.3	4.8	2.55
boat shocker (night)	Largemouth Bass				17.0		41.0				9.0	22.33
	Walleye*				25.0		0.0				3.0	9.33
frame net (std 3/4 in)	Black Bullhead			0.2			0.2			0.0	0.0	0.10
	Black Crappie			3.4			7.1			0.0	8.9	4.85
	Bluegill			1.0			8.8			0.0	0.0	2.45
	Largemouth Bass			0.1			0.0			0.0	0.0	0.03
	Northern Pike			0.6			2.1			1.7	1.1	1.38
	Smallmouth Bass			0.1			0.0			0.0	0.0	0.03
	Walleye			0.3			1.1			0.0	0.0	0.35
	Yellow Perch			0.0			0.6			0.6	1.7	0.73
std exp gill net	Black Crappie			0.0			1.5					0.75
	Largemouth Bass			0.0			0.0					0.00
	Northern Pike			3.0			7.5					5.25
	Walleye			0.5			1.5					1.00
	Yellow Perch			0.5			17.5					9.00

## 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 gill net	Black Crappie	PSD												0	
		PSD-P												0	
		Wr												131	
	Largemouth Bass	PSD													0
		PSD-P													0
		Wr													
	Northern Pike	PSD											86	53	
		PSD-P											14	7	
		Wr											86	93	
Yellow Perch	PSD												0	47	
	PSD-P												0	5	
	Wr											106	117		
boat shocker (night)	Largemouth Bass	PSD				65		71						0	
		PSD-P				59		44						0	
		Wr				119		120						123	
	Walleye	PSD				60								0	
		PSD-P				24								0	
		Wr				89								109	
frame net (std 3/4 in)	Black Crappie	PSD			100			92				0	0		
		PSD-P			100			92				0	0		
		Wr			101			96						121	
	Bluegill	PSD			100			100							
		PSD-P			100			75							
		Wr			123			127							
	Largemouth Bass	PSD			100										
		PSD-P			100										
		Wr			95										
	Northern Pike	PSD			83			67				76	27		
		PSD-P			33			5				0	9		
		Wr			84			79				92	88		
	Walleye	PSD			100			100							
		PSD-P			100			73							
		Wr			80			80							

Gear	Species	Index	Year										
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
frame net (std 3/4 in)	Yellow Perch	PSD							50			0	88
		PSD-P							0			0	24
		Wr							93			105	109
std exp gill net	Black Crappie	PSD							0				
		PSD-P							0				
		Wr							118				
	Northern Pike	PSD				100				80			
		PSD-P				33				0			
		Wr				83				85			
	Walleye	PSD				0				67			
		PSD-P				0				33			
		Wr				99				78			
	Yellow Perch	PSD				100				6			
		PSD-P				0				0			
		Wr				103				105			



## **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	
2019	1	28	152 (2.6)										
Weighted Mean		28	152										
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20	
2019	1	28											
Weighted Mean		28											

### Species: Yellow Perch

Year Class	Age	Mean back-calculated length (SE) at age										
		N	1	2	3	4	5	6	7	8	9	10
2019	1	4	110 (2.3)									
2018	2	1	94	151								
2018	2	3	101 (7.9)	161 (6.2)								
2017	3	6	118 (7.9)	158 (5.3)	193 (1.9)							
2017	3	9	120 (6.1)	160 (4.8)	189 (2.6)							
2016	4	2	123 (14.1)	173 (6)	202 (.8)	221 (4.6)						
2015	5	1	119	153	174	208	233					
2015	5	4	123 (2.6)	161 (6.2)	191 (3.4)	216 (4.4)	235 (2.4)					
2014	6	1	140	183	199	221	234	256				
2014	6	3	130 (9.5)	170 (2.6)	195 (1.9)	215 (.7)	231 (3.5)	244 (2.5)				
2013	7	1	97	145	184	204	229	252	271			
Weighted Mean		35	117	161	191	215	233	248	271			

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2019	1	4										
2018	2	1										
2018	2	3										
2017	3	6										
2017	3	9										
2016	4	2										
2015	5	1										
2015	5	4										
2014	6	1										
2014	6	3										
2013	7	1										
Weighted Mean		35										

## 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	89	165 (89)									
2016	71		138 (3)	165 (3)		296 (5)	308 (22)	313 (25)	315 (3)	318 (9)	347 (1)
2013	34					267 (8)	271 (14)	294 (2)	300 (3)	313 (5)	312 (2)

### Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	89	75 (1)		193 (27)	220 (32)	229 (21)	241 (2)	275 (1)	273 (4)	267 (1)	
2013	10				240 (1)	250 (5)	265 (2)	280 (3)			

### Species: Largemouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	54	182 (15)	248 (2)	304 (19)		390 (1)		473 (1)	447 (5)	446 (7)	469 (4)
2014	39	168 (26)	219 (2)	345 (1)				435 (5)	443 (1)	453 (3)	475 (1)

### Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	3			392 (2)		543 (1)					
2013	1		297 (1)								

### 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	19	133 (4)	175 (3)	205 (10)		241 (1)	266 (1)				
2016	48	93 (12)	140 (11)	174 (23)	220 (2)						

## **Fish Condition**

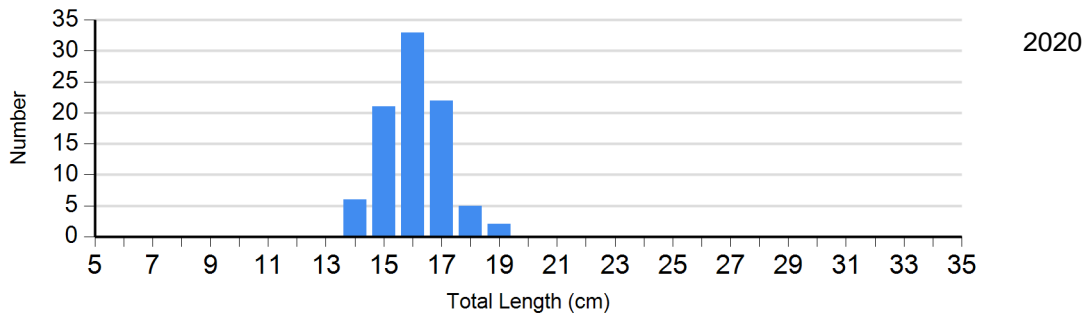
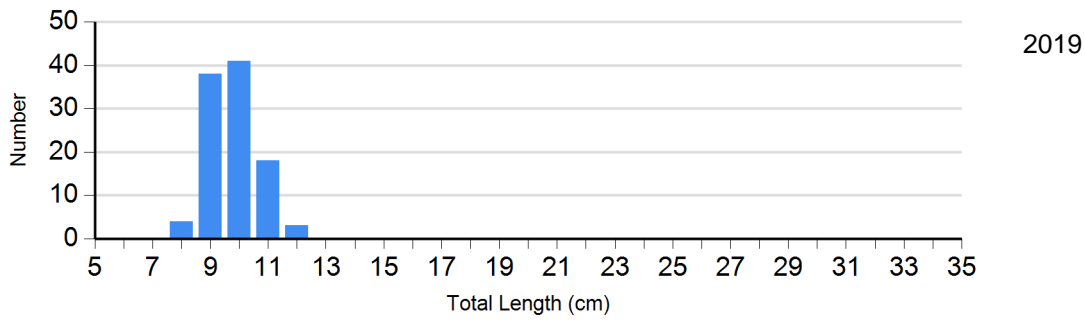
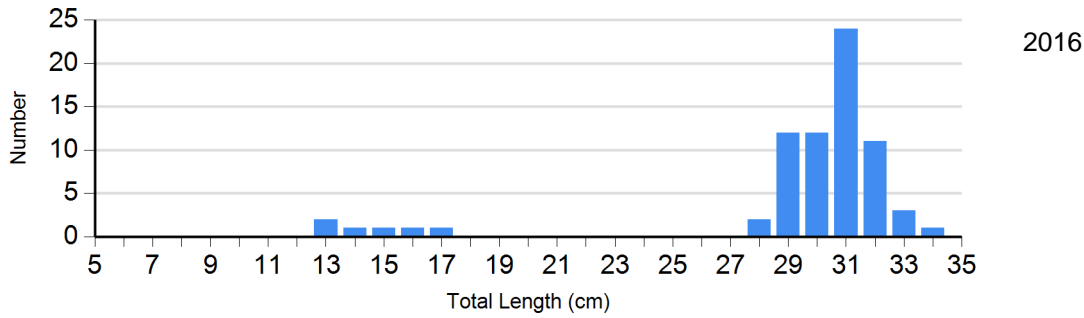
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2016	6	117 (5.2)	0		14	96 (2.2)	51	93 (1.0)
	2019	0		0		0		0	
	2020	89	121 (0.8)	0		0		0	
Bluegill Frame Net	2016	0		22	125 (2.4)	59	127 (1.3)	7	132 (4.1)
Largemouth Bass Electro Fishing	2016	12	129 (2.0)	11	123 (2.0)	18	111 (2.9)	0	
	2020	9	123 (1.8)	0		0		0	
Northern Pike Gill Net	2016	3	87 (2.6)	12	85 (2.2)	0		0	
	2019	1	98	5	88 (1.9)	0		1	68
	2020	7	93 (2.3)	7	94 (2.7)	1	75	0	
Walleye Gill Net	2016	1	85	1	84	1	66	0	
Yellow Perch Gill Net	2016	33	106 (1.7)	2	89 (4.8)	0		0	
	2019	1	106	0		0		0	
	2020	10	122 (3.2)	8	112 (2.7)	1	105	0	

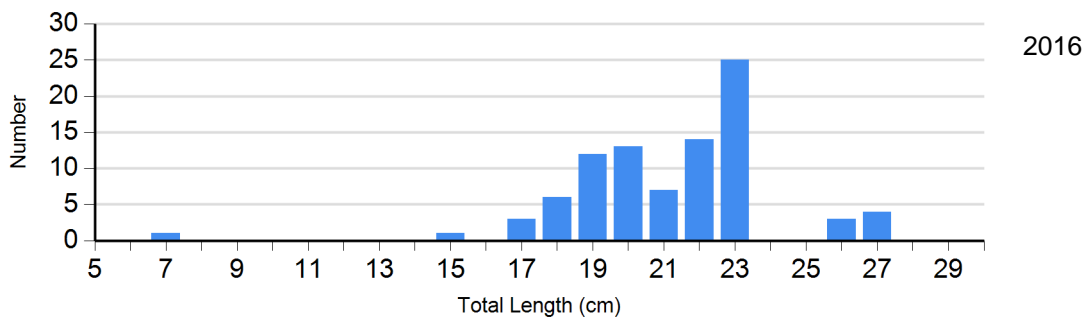
## Length Frequency Distribution

Length frequency histogram of species sampled by year.

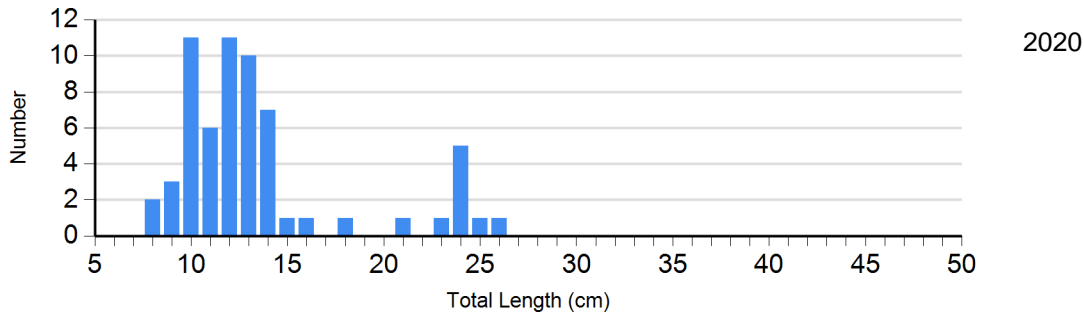
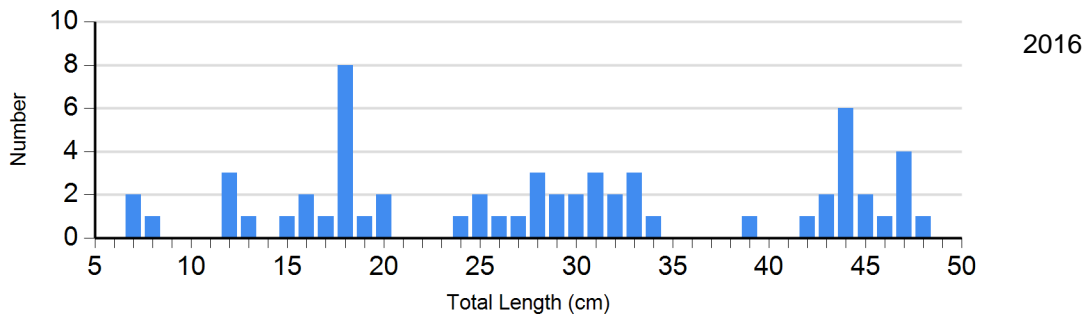
Species: Black Crappie  
Gear: frame net (std 3/4 in)



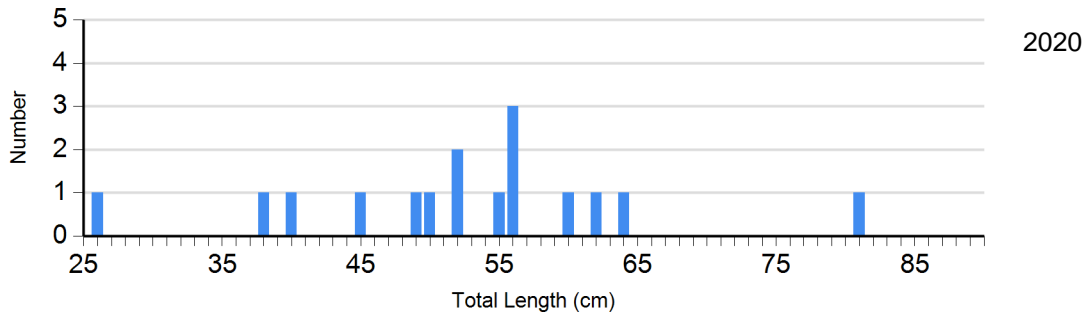
Species: Bluegill  
Gear: frame net (std 3/4 in)



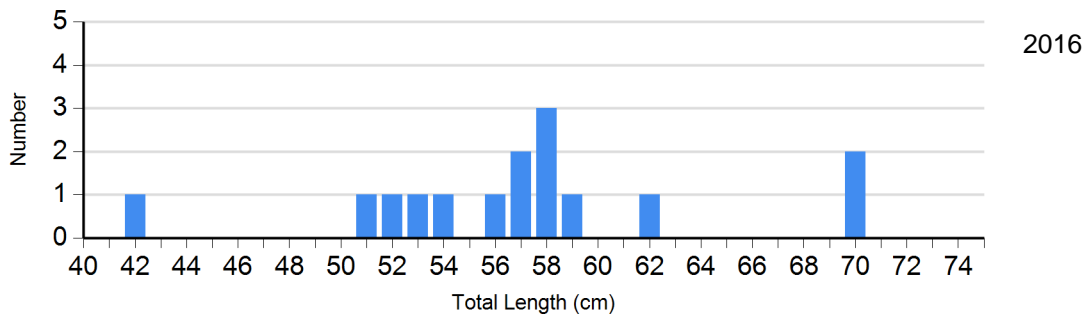
Species: Largemouth Bass  
 Gear: boat shocker (night)



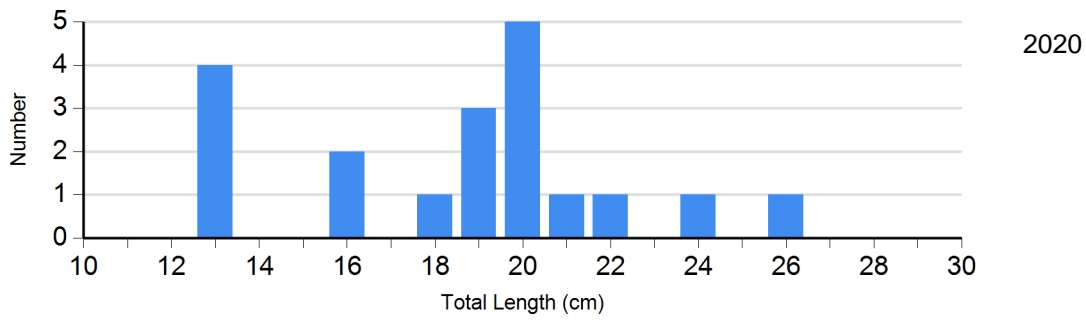
Species: Northern Pike  
 Gear: AFS std gill net



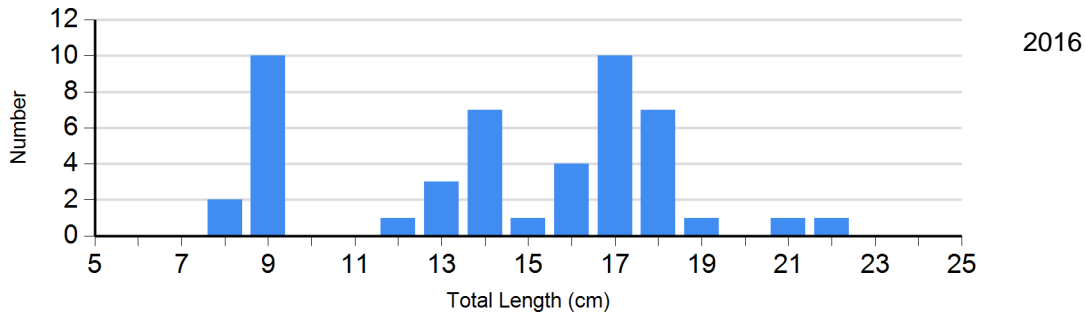
Species: Northern Pike  
 Gear: std exp gill net



Species: Yellow Perch  
Gear: AFS std gill net



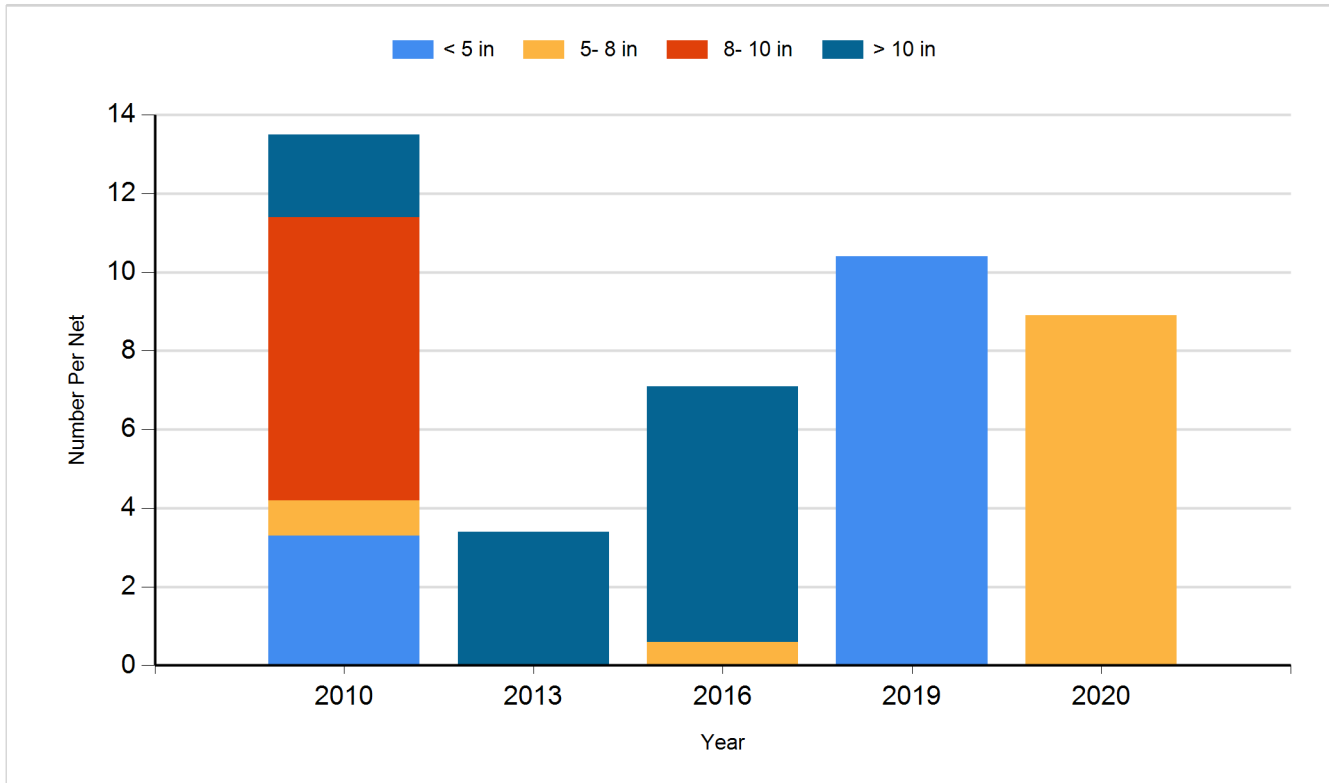
Species: Yellow Perch  
Gear: std exp gill net



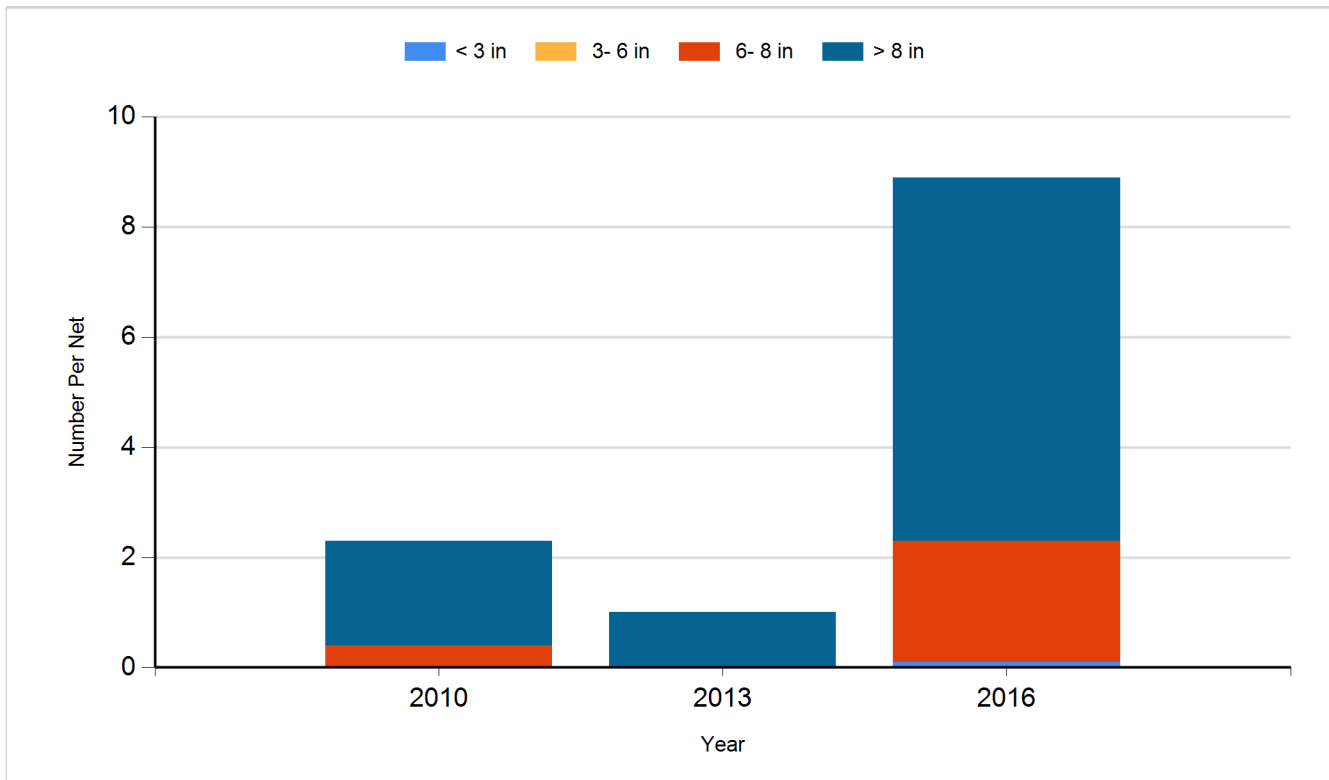
## Historic Fish Sizes and Relative Abundance

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

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

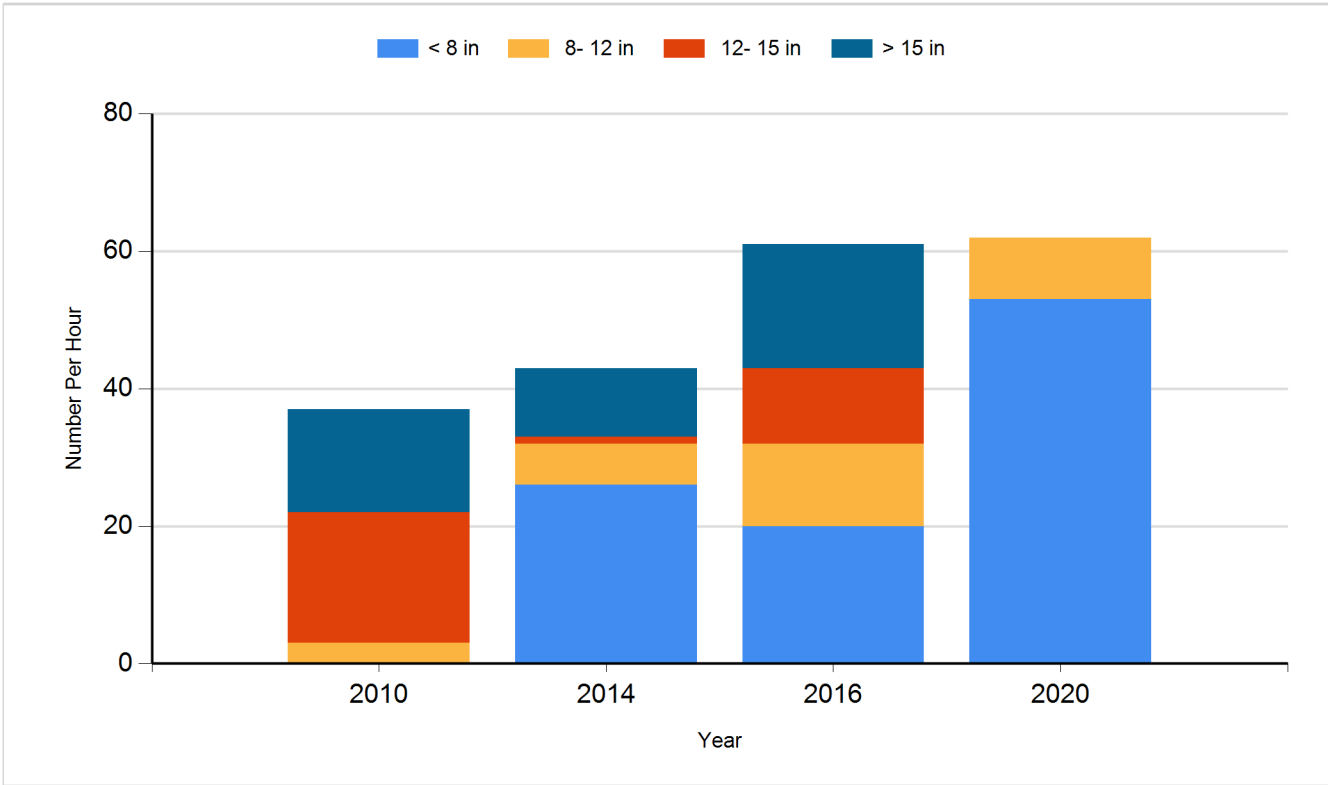


Species: Bluegill  
Gear: frame net (std 3/4 in)

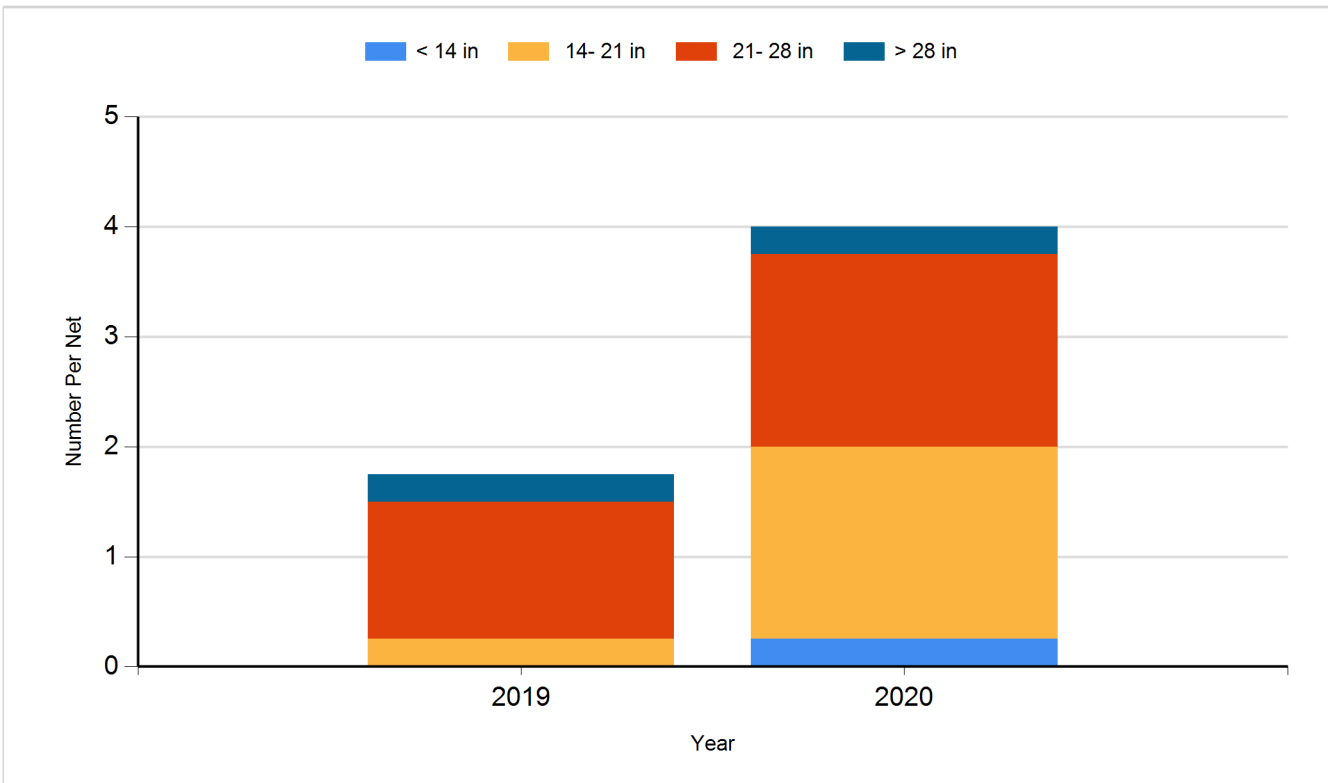




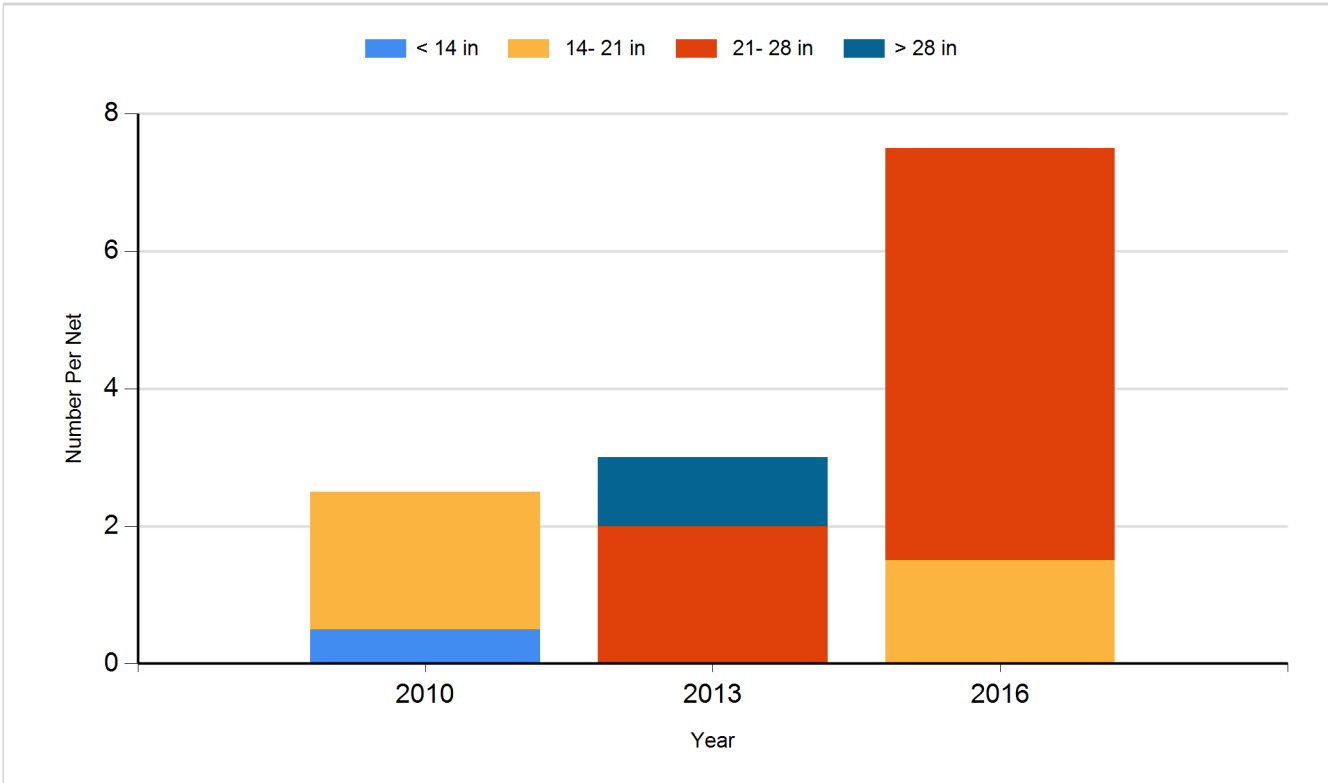
Species: Largemouth Bass  
Gear: boat shocker (night)



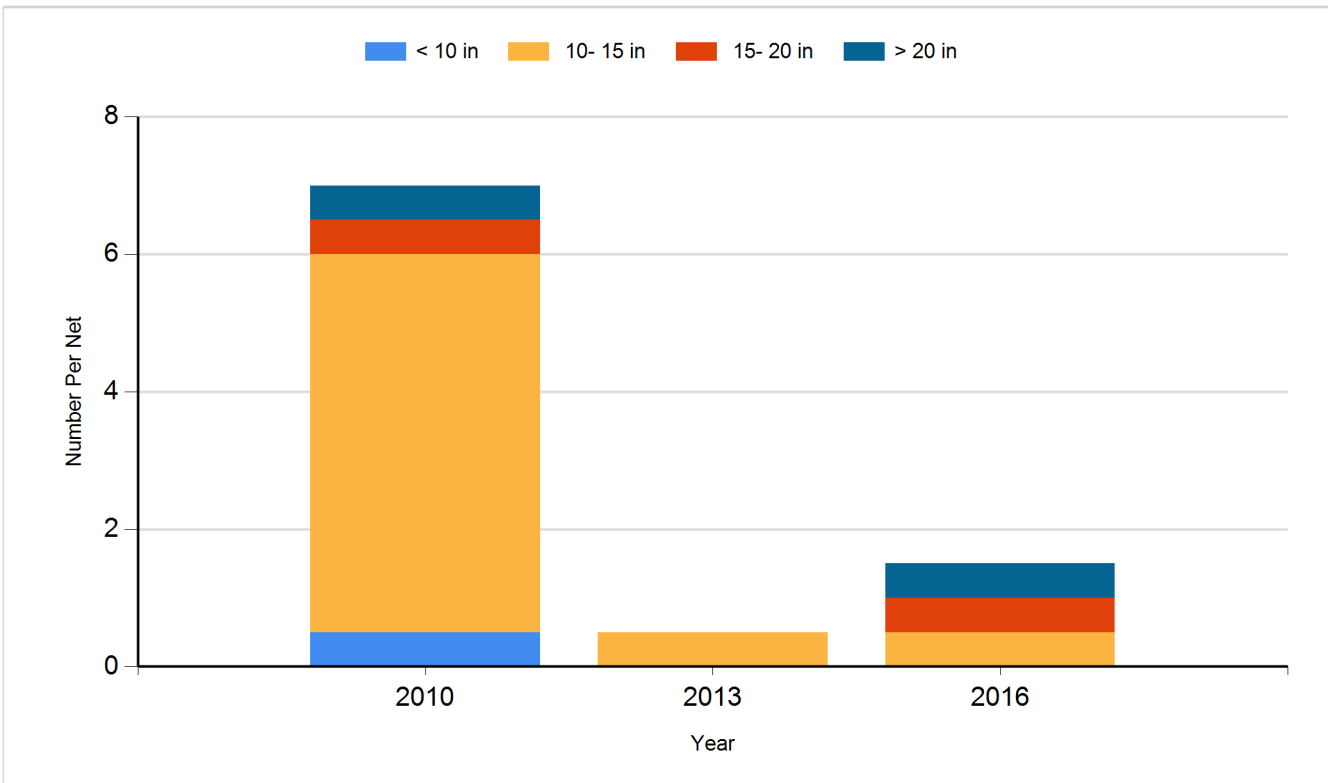
Species: Northern Pike  
Gear: AFS std gill net



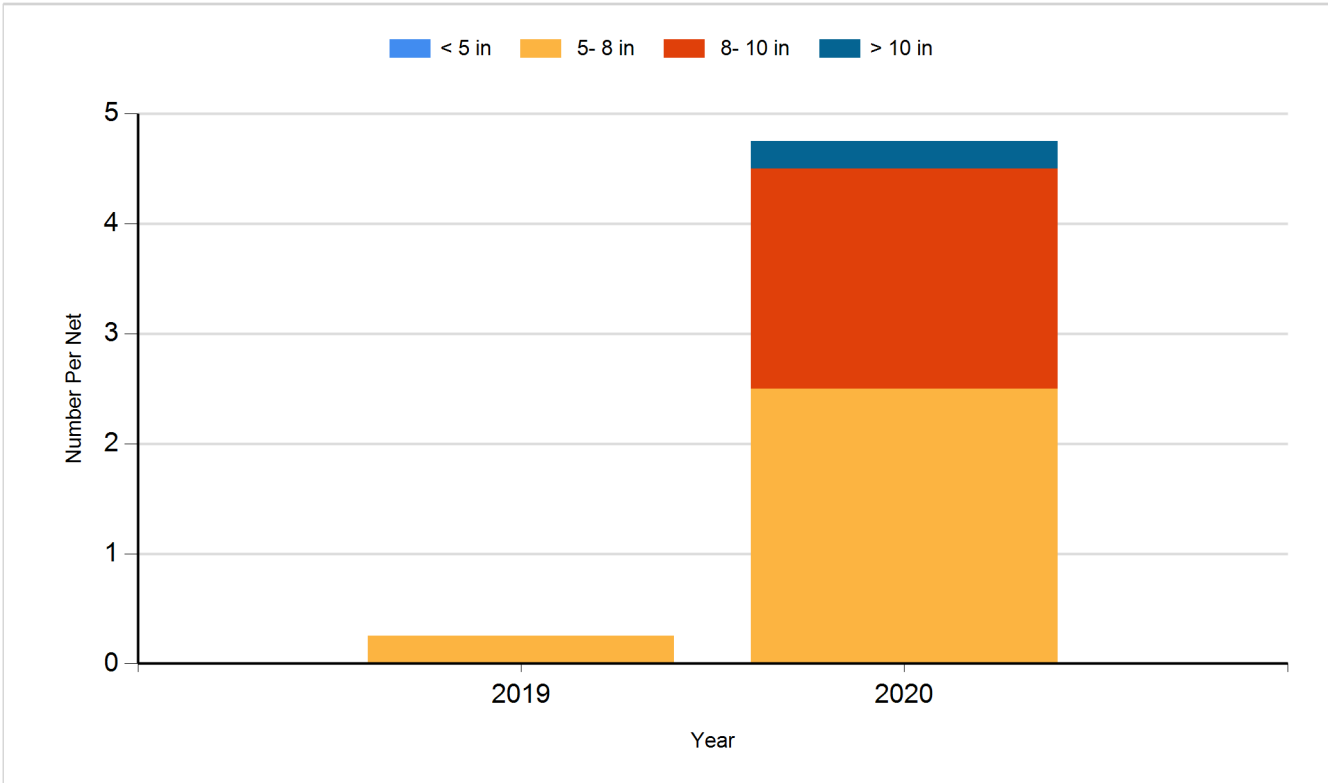
Species: Northern Pike  
Gear: std exp gill net



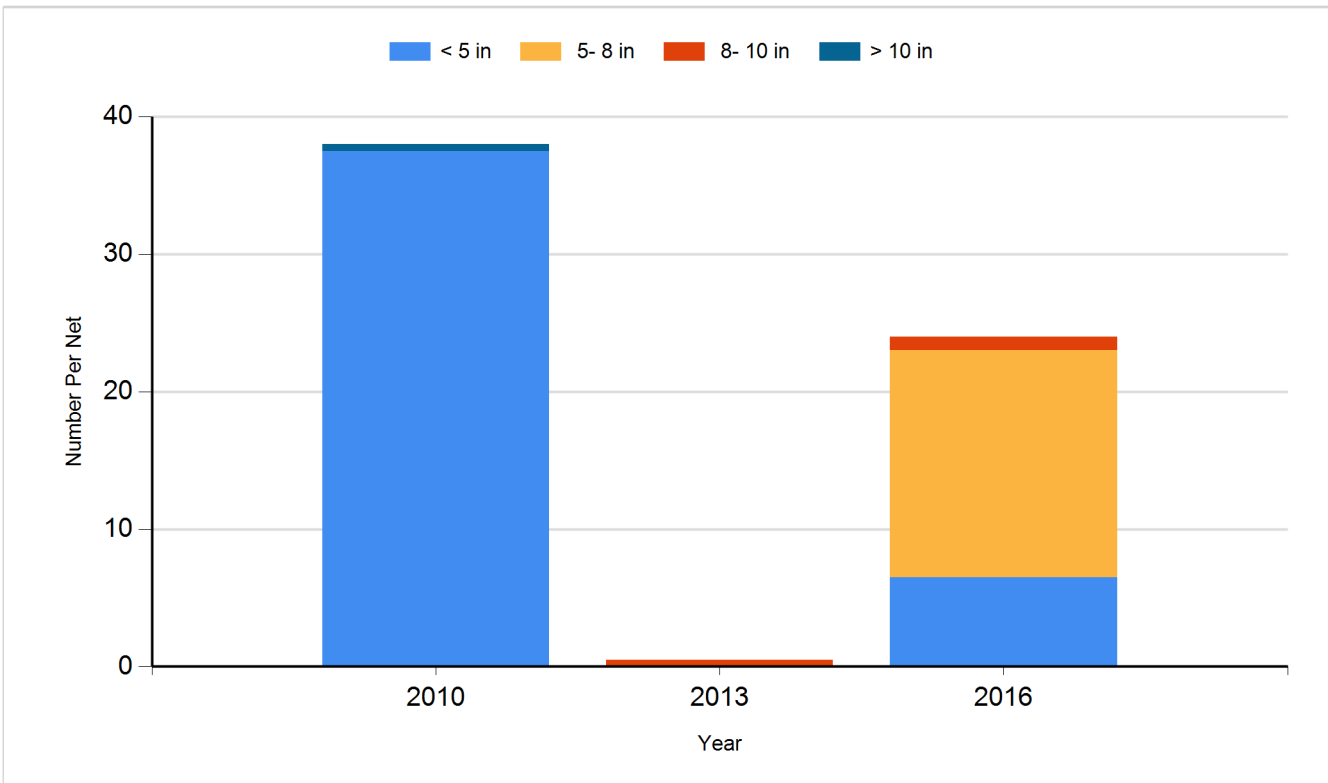
Species: Walleye  
Gear: std exp gill net



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
2013	Walleye	Large Fingerling	920
2015	Walleye	Large Fingerling	1,890
2017	Walleye	Large Fingerling	4,480
2019	Bluegill	Adult	48
2019	Largemouth Bass	Adult	149
2019	Largemouth Bass	Juvenile	105
2019	Walleye	Large Fingerling	3,396
2019	Yellow Perch	Adult	17
2020	Largemouth Bass	Juvenile	112