

**SOUTH DAKOTA STATEWIDE FISHERIES SURVEY**  
**Buffalo South, Marshall County**  
**UJA-Lake-917-000**  
**2022**

**Lake Information**

<b>Name:</b>	Buffalo South	<b>Maximum Depth:</b>	14 Feet
<b>County:</b>	Marshall	<b>Mean Depth:</b>	8 Feet
		<b>OHWM Elevation:</b>	1,835
<b>Surface Area:</b>	2,112 Acres	<b>Outlet Elevation:</b>	1,835

**Surveys and Investigations**

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

Gear	Date	Effort
fall night EF-WAE	Sep 26, 2022	3600 seconds

## **Common Fish Species Present**

Yellow Perch

Walleye

Northern Pike

Largemouth Bass

Bluegill

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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



## 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 frame net	Black Bullhead					57.8							57.80
	Black Crappie					0.6							0.60
	Bluegill					8.5							8.50
	Common Carp					0.1							0.10
	Largemouth Bass					0.1							0.10
	Northern Pike					0.2							0.20
	Smallmouth Bass					0.1							0.10
	Walleye					0.2							0.20
	White Sucker					0.3							0.30
	Yellow Perch					0.3							0.30
AFS std gill net	Black Bullhead					21.3		3.5		6.4			10.40
	Black Crappie					1.4		1.6		2.9			1.97
	Bluegill					1.4		0.6		1.5			1.17
	Common Carp					0.1		0.1		0.0			0.07
	Golden Shiner					0.0		0.0		0.0			0.00
	Largemouth Bass					0.3		0.3		0.2			0.27
	Northern Pike					4.1		2.1		2.8			3.00
	Walleye					3.5		5.3		3.3			4.03
	White Sucker					5.5		1.3		2.4			3.07
	Yellow Perch					2.9		5.6		18.0			8.83
boat shocker (day)	Largemouth Bass							11.0					11.00
boat shocker (night, AC)	Largemouth Bass	33.0		27.8									30.40
fall night EF-WAE*	Walleye										193.0	193.0	0
frame net (std 3/4 in)	Black Bullhead	14.1		19.3				22.8		11.8			17.00
	Black Crappie	5.2		1.4				4.5		6.8			4.48
	Bluegill	10.1		9.6				21.8		59.6			25.28
	Common Carp	0.0		0.0				0.0		0.0			0.00
	Northern Pike	0.2		0.5				0.3		1.6			0.65
	Smallmouth Bass	0.1		0.1				0.0		0.0			0.05
	Walleye	0.2		0.2				0.1		0.4			0.23
	Western Painted Turtle	0.0		0.0				0.0		0.0			0.00
	White Sucker	0.0		0.0				0.3		0.2			0.13

## CPUE

Gear	Species	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg
frame net (std 3/4 in)	Yellow Perch	0.9		2.0				0.2		2.0		1.28
std exp gill net	Black Bullhead	41.0		25.0								33.00
	Black Crappie	0.5		0.3								0.40
	Bluegill	0.8		0.0								0.40
	Emerald Shiner	0.0		0.0								0.00
	Golden Shiner	0.0		0.0								0.00
	Largemouth Bass	0.0		0.0								0.00
	Northern Pike	14.8		4.5								9.65
	Walleye	3.0		6.2								4.60
	White Sucker	4.8		7.7								6.25
	Yellow Perch	26.0		19.3								22.65

## 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 frame net	Bluegill	PSD					33							
		PSD-P					25							
		Wr					105							
	Largemouth Bass	PSD					50							
		PSD-P					0							
		Wr					121							
	Northern Pike	PSD					75							
		PSD-P					25							
		Wr					72							
	Walleye	PSD					67							
		PSD-P					0							
		Wr					88							
	Yellow Perch	PSD					33							
		PSD-P					17							
		Wr					88							
AFS std gill net	Bluegill	PSD					94			57		100		
		PSD-P					65			57		11		
		Wr					118			120		120		
	Largemouth Bass	PSD					75			100		50		
		PSD-P					25			67		50		
		Wr					119			115		126		
	Northern Pike	PSD					39			68		67		
		PSD-P					6			4		9		
		Wr					85			90		84		
	Walleye	PSD					43			81		68		
		PSD-P					14			16		48		
		Wr					89			91		88		
	Yellow Perch	PSD					6			0		13		
		PSD-P					0			0		0		
		Wr					102			106		101		
boat shocker (day)	Largemouth Bass	PSD								100				
		PSD-P									27			



Gear	Species	Index	Year										
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
boat shocker (day)	Largemouth Bass	Wr								114			
boat shocker (night, AC)	Largemouth Bass	PSD	48		61								
		PSD-P	24		21								
		Wr	111		113								
frame net (std 3/4 in)	Bluegill	PSD	99		45					6		87	
		PSD-P	64		45					2		11	
		Wr	118		121					105		112	
	Northern Pike	PSD	50		13					100		52	
		PSD-P	0		0					20		14	
		Wr	79		80					87		76	
	Walleye	PSD	0		50					100		63	
		PSD-P	0		50					0		63	
		Wr	86		130					82		86	
	Yellow Perch	PSD	25		85					0		19	
		PSD-P	0		3					0		0	
		Wr	92		88					90		91	
	std exp gill net	Bluegill	PSD	100									
			PSD-P	60									
			Wr	107									
Northern Pike		PSD	48		37								
		PSD-P	4		15								
		Wr	84		83								
Walleye		PSD	17		32								
		PSD-P	6		8								
		Wr	88		88								
Yellow Perch		PSD	10		29								
		PSD-P	0		0								
		Wr	102		100								

## Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	1073		96 (6)	165 (21)	167 (756)	190 (193)	191 (27)		248 (60)		261 (10)
2019	372		95 (79)	130 (165)	126 (121)		228 (5)			241 (1)	265 (1)
2017	212	50 (13)	85 (146)	150 (3)	197 (31)		225 (1)	248 (2)	241 (4)	248 (10)	243 (1)
2015	166	85 (12)	108 (80)	140 (2)	214 (5)	207 (1)		231 (41)	235 (21)	234 (7)	
2013	182			167 (25)	183 (20)	203 (80)	216 (50)	234 (1)	257 (2)	232 (6)	

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	2			315 (1)	347 (1)						
2015	28		244 (9)	262 (2)	370 (11)	371 (3)	427 (1)			463 (1)	463 (1)
2013	33		239 (16)	320 (7)	356 (2)		415 (3)		451 (1)	475 (3)	476 (1)

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	40		316 (10)	348 (2)	470 (2)	552 (2)	523 (2)	519 (10)	504 (5)	672 (2)	638 (5)
2019	64		316 (1)	371 (12)	397 (6)	451 (27)	501 (11)	453 (1)	496 (1)	505 (1)	655 (4)
2017	42		252 (1)	319 (18)	393 (14)	424 (1)		448 (2)	536 (1)	608 (1)	675 (4)
2015	44	168 (3)	270 (23)	346 (5)	404 (5)	387 (5)	540 (1)	525 (1)			645 (1)
2013	18		275 (5)	313 (10)	461 (1)	451 (1)					671 (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+
2021	216		144 (5)	170 (184)	204 (27)						
2019	75		139 (17)	143 (57)	175 (1)						
2017	35		134 (2)	147 (16)	182 (16)			233 (1)			

Mean Length (expanded sample number) at capture by age

Year	N	1	2	3	4	5	6	7	8	9	10+
2015	139	97 (13)	133 (41)	162 (3)		199 (8)	196 (60)	211 (14)			
2013	157			155 (2)	159 (64)	178 (87)	197 (3)		204 (1)		

## **Fish Condition**

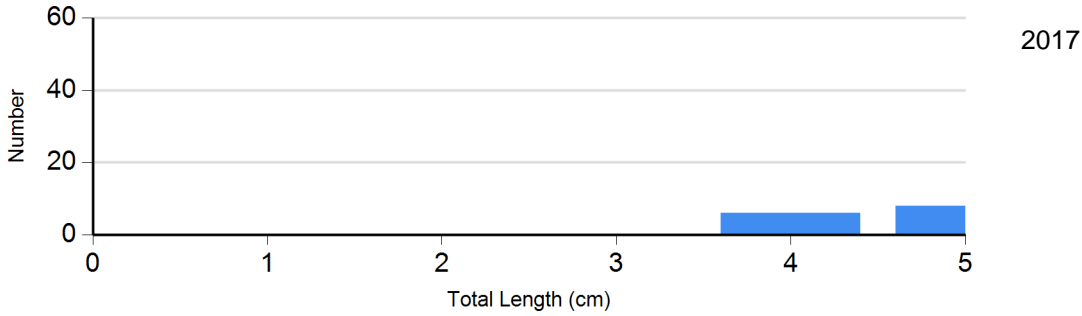
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Bluegill Frame Net	2019	350	105 (0.7)	14	112 (2.1)	6	101 (3.7)	1	95
	2021	138	116 (1.7)	814	112 (0.5)	81	112 (1.0)	40	112 (1.1)
Largemouth Bass Electro Fishing	2019	0		8	115 (4.7)	3	112 (6.4)	0	
Northern Pike Gill Net	2019	8	93 (2.2)	16	89 (1.5)	1	82	0	
	2021	11	83 (1.2)	19	84 (3.1)	2	79 (1.4)	1	92
Walleye Gill Net	2019	12	91 (1.4)	42	91 (0.8)	7	92 (2.3)	3	88 (2.0)
	2021	13	92 (1.6)	8	84 (2.5)	14	88 (1.6)	5	89 (2.5)
Yellow Perch Gill Net	2019	67	106 (1.1)	0		0		0	
	2021	189	102 (0.6)	27	95 (1.3)	0		0	

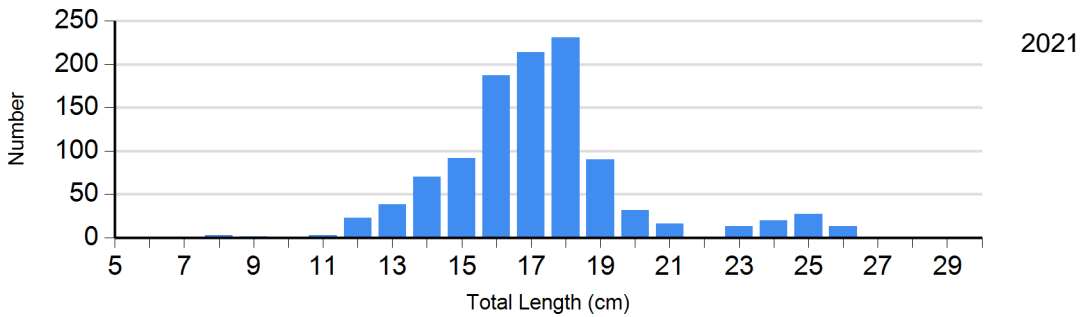
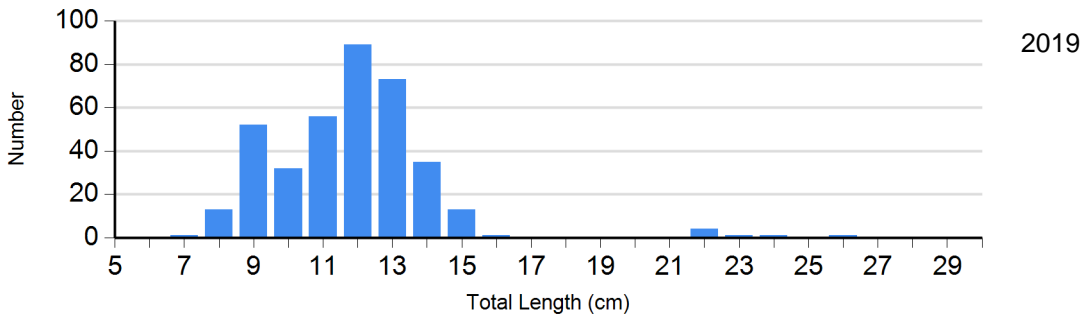
## Length Frequency Distribution

Length frequency histogram of species sampled by year.

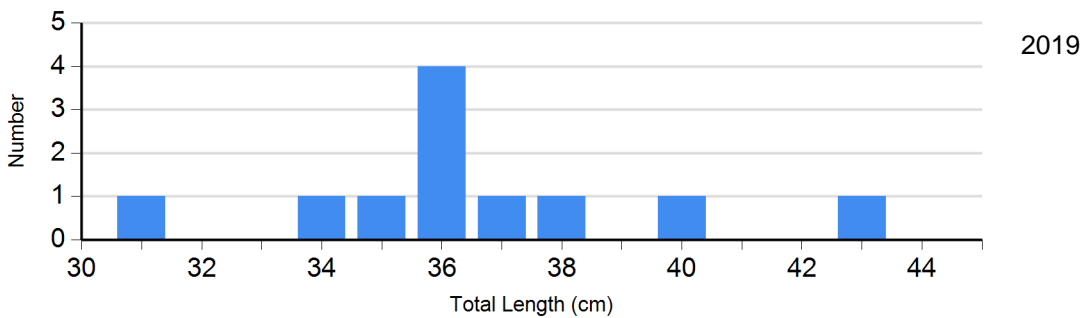
Species: Bluegill  
Gear: AFS std frame net



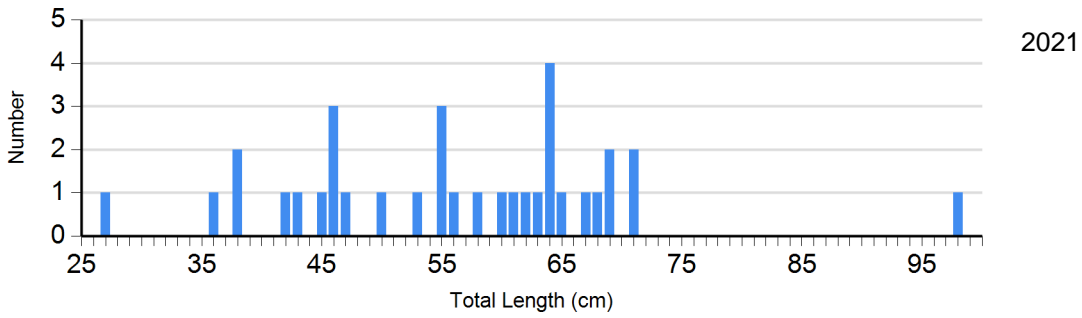
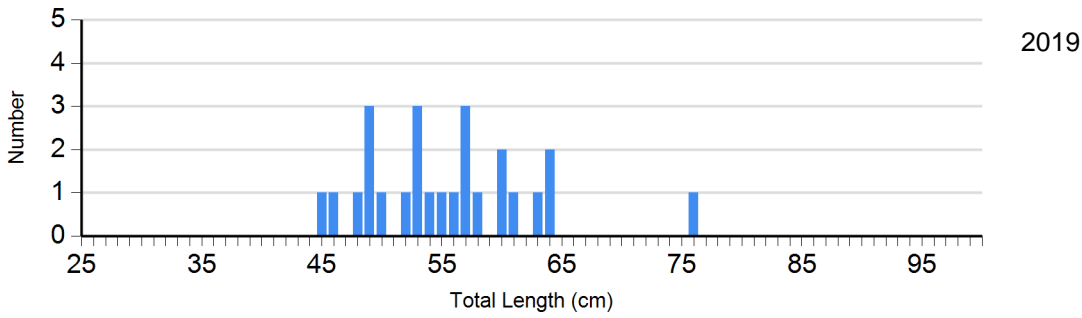
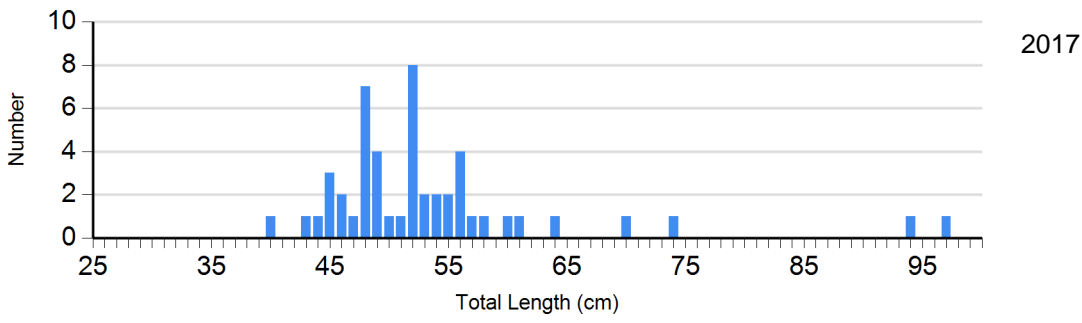
Species: Bluegill  
Gear: frame net (std 3/4 in)



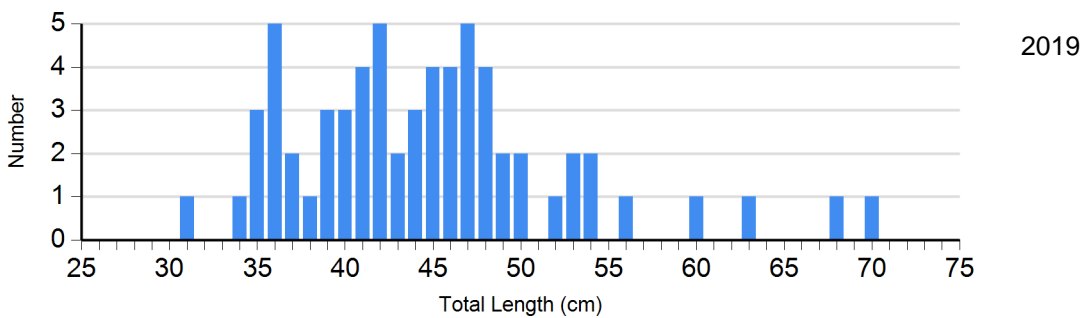
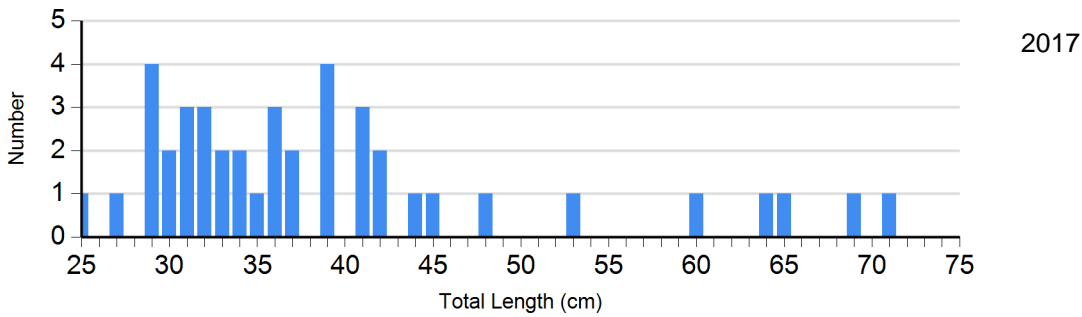
Species: Largemouth Bass  
Gear: boat shocker (day)

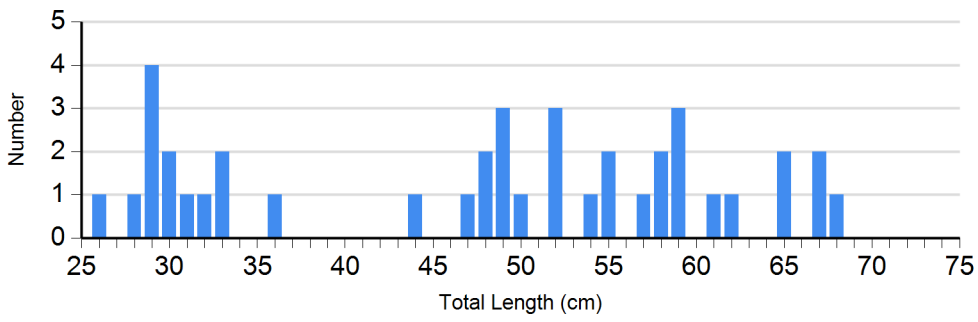


Species: Northern Pike  
Gear: AFS std gill net



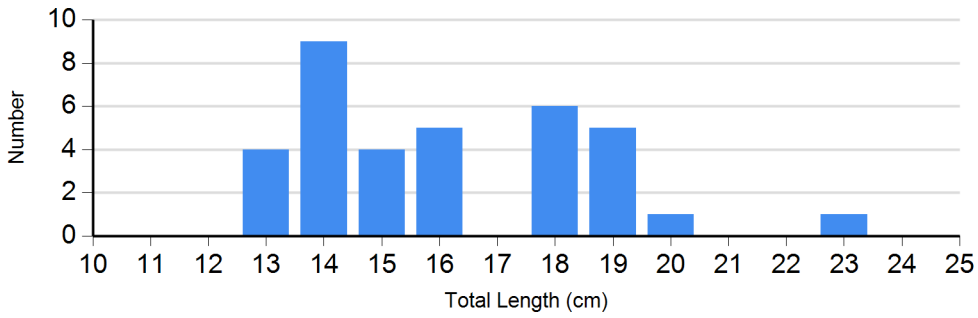
Species: Walleye  
Gear: AFS std gill net



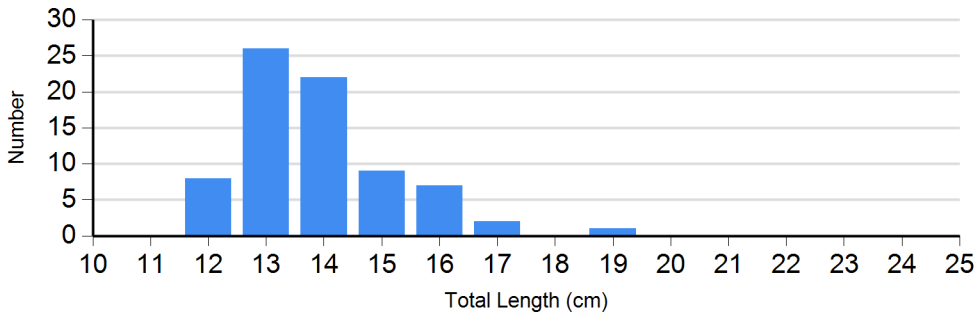


2021

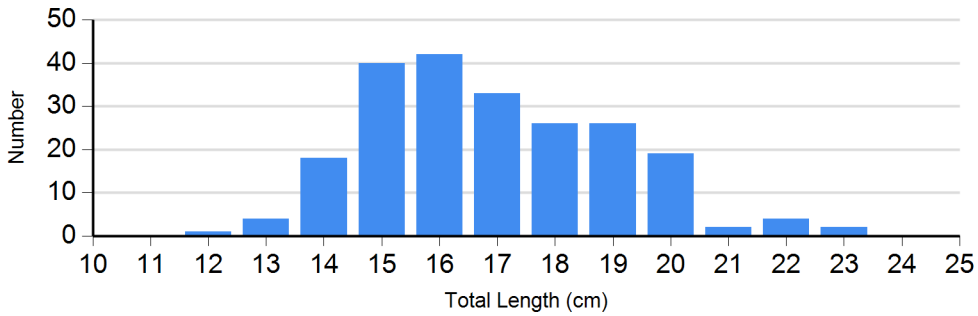
Species: Yellow Perch  
Gear: AFS std gill net



2017



2019



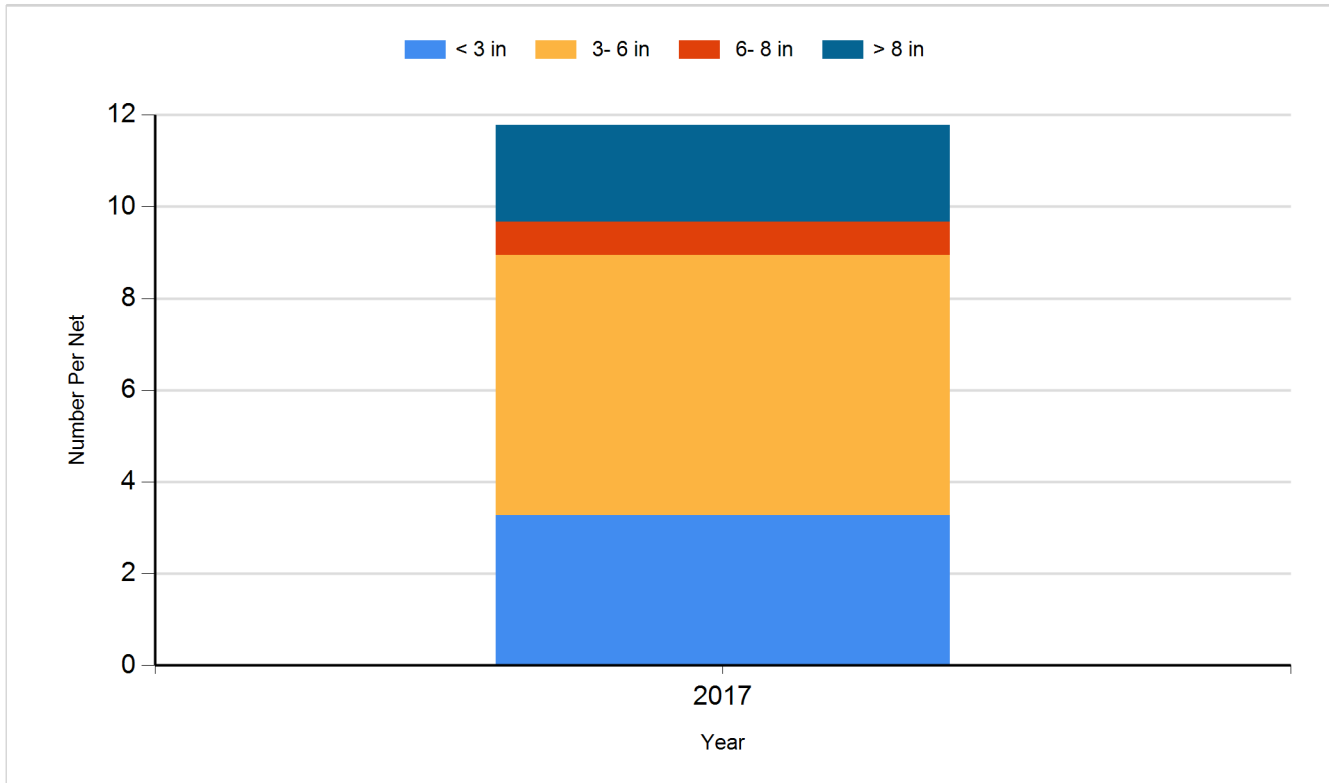
2021

## Historic Fish Sizes and Relative Abundance

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

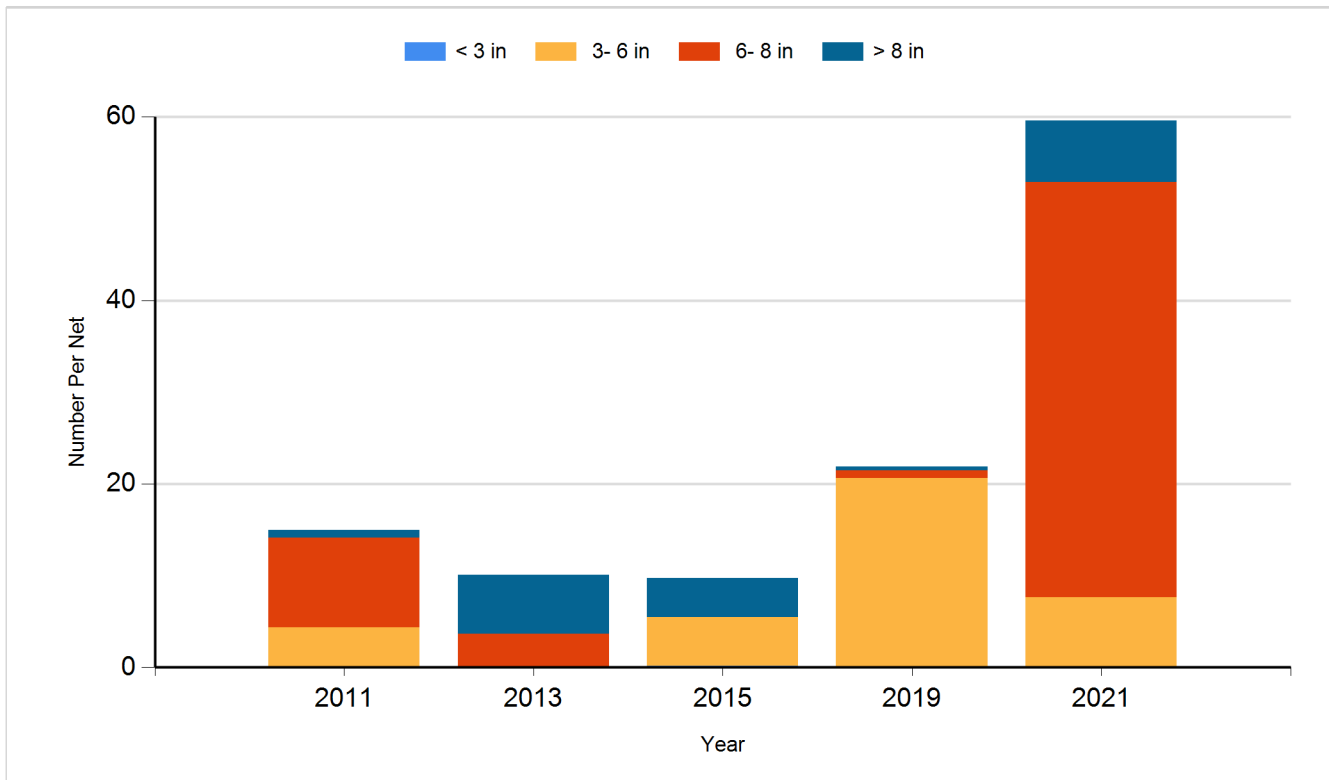
Species: Bluegill

Gear: AFS std frame net



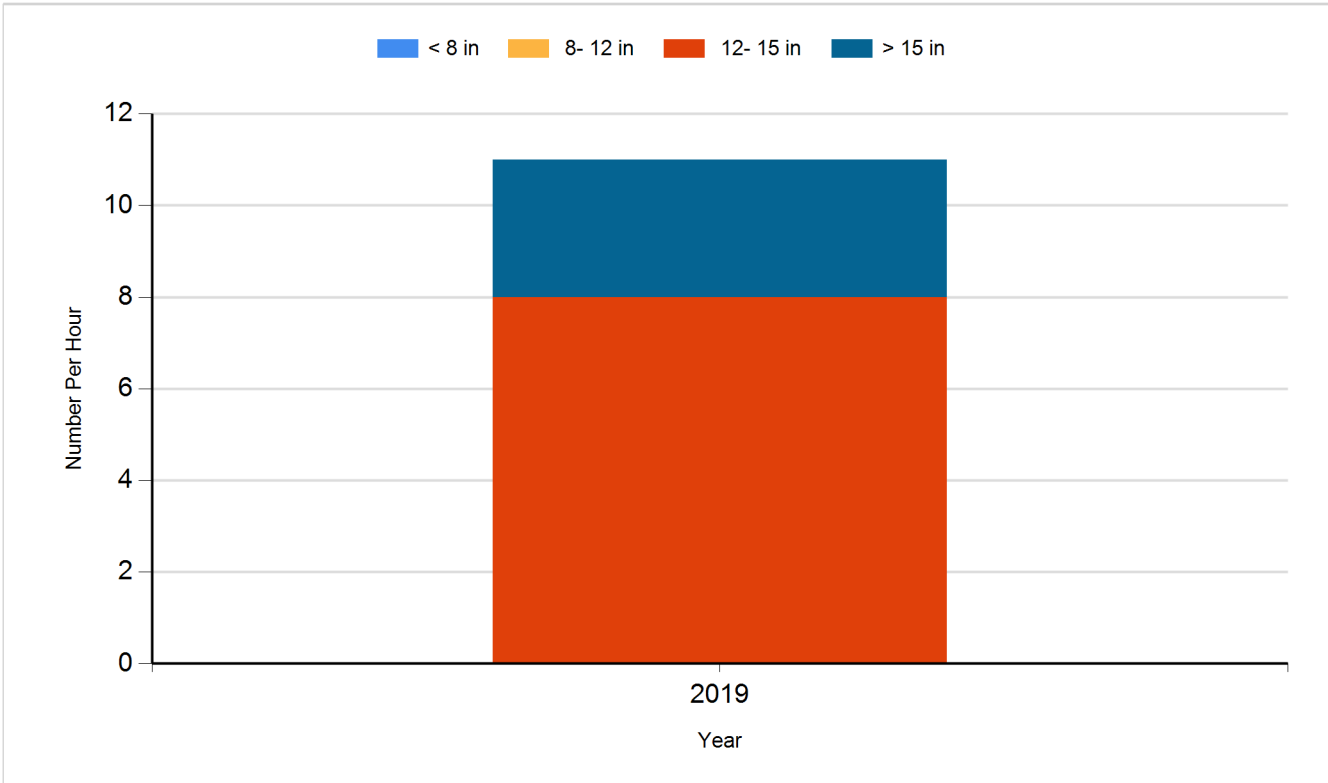
Species: Bluegill

Gear: frame net (std 3/4 in)

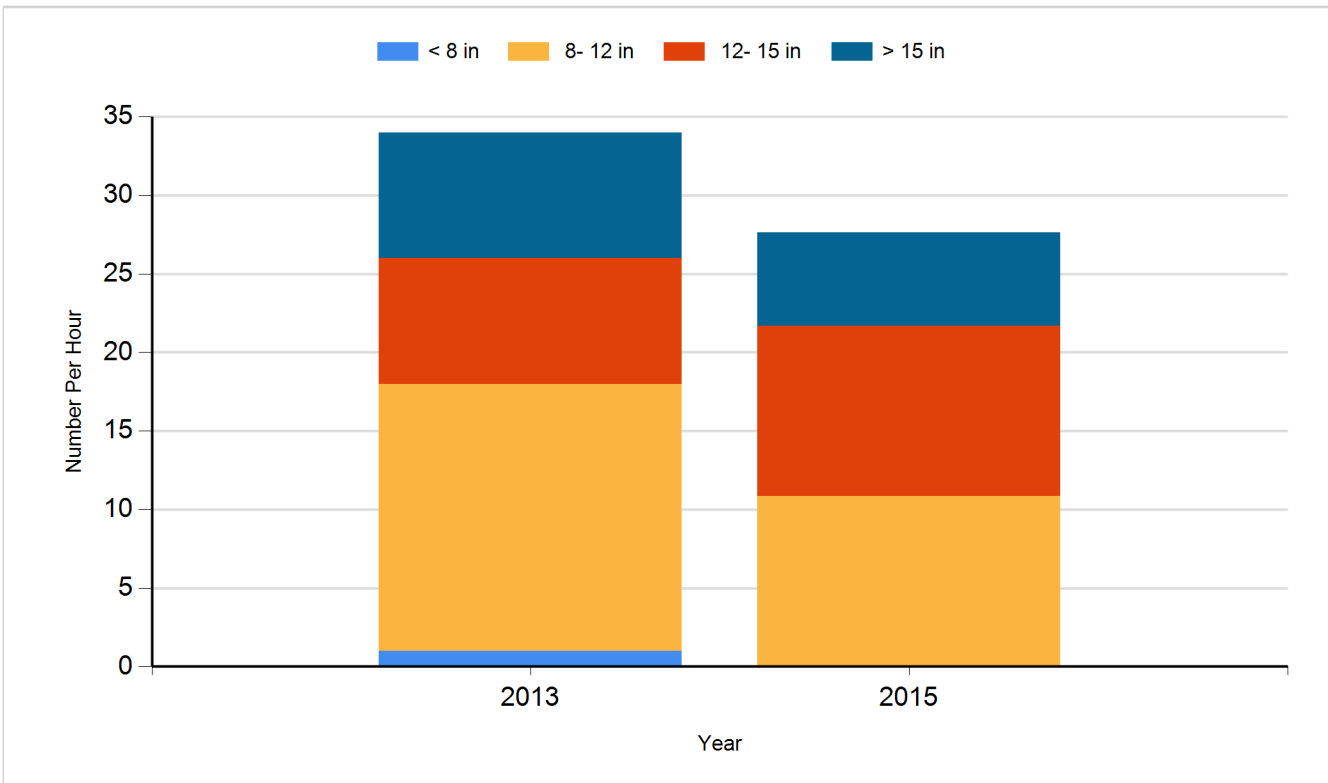




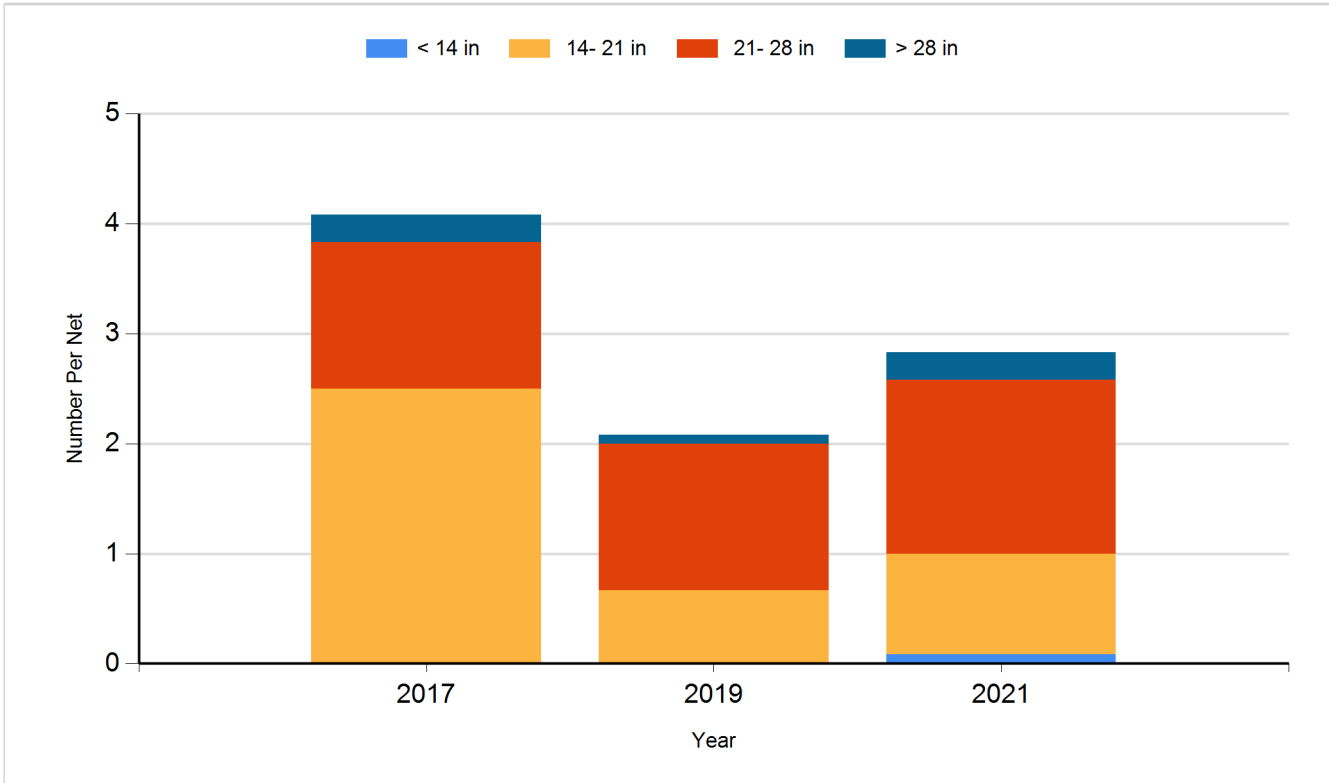
Species: Largemouth Bass  
Gear: boat shocker (day)



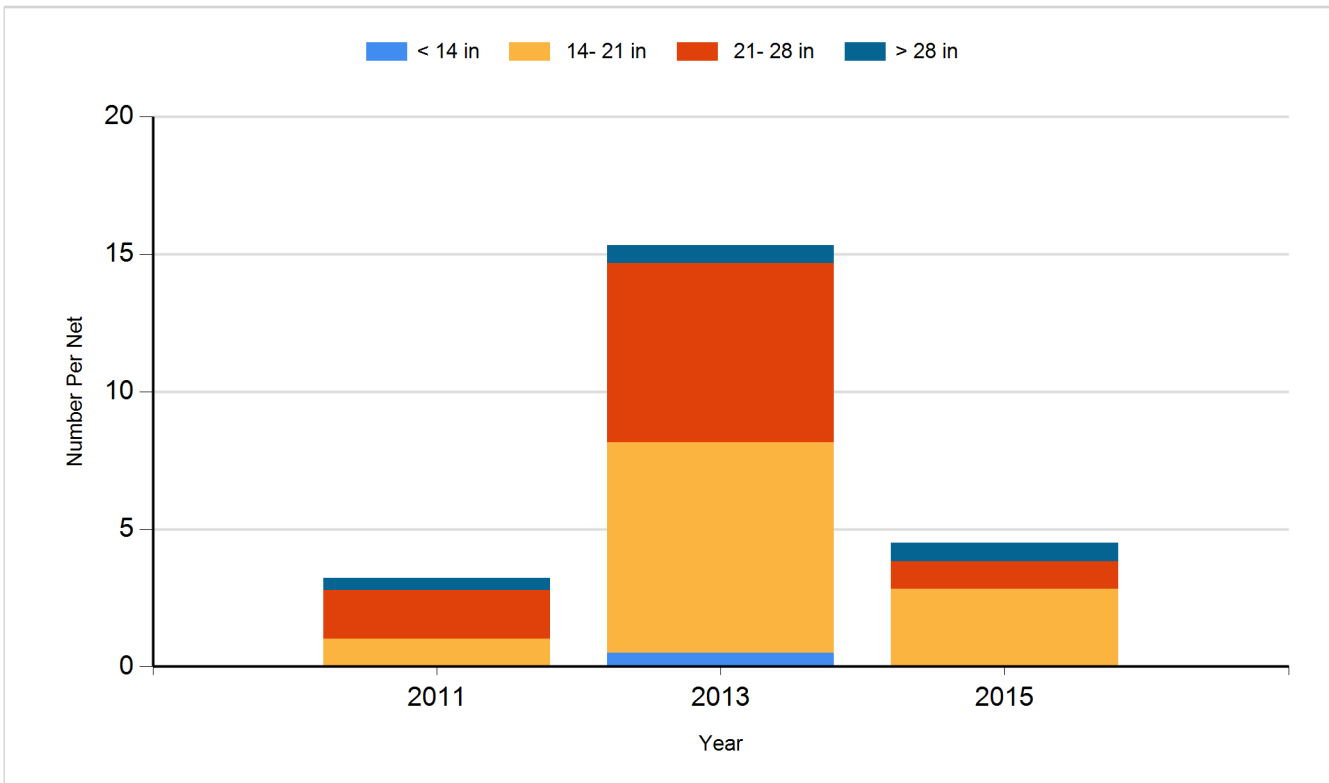
Species: Largemouth Bass  
Gear: boat shocker (night, AC)



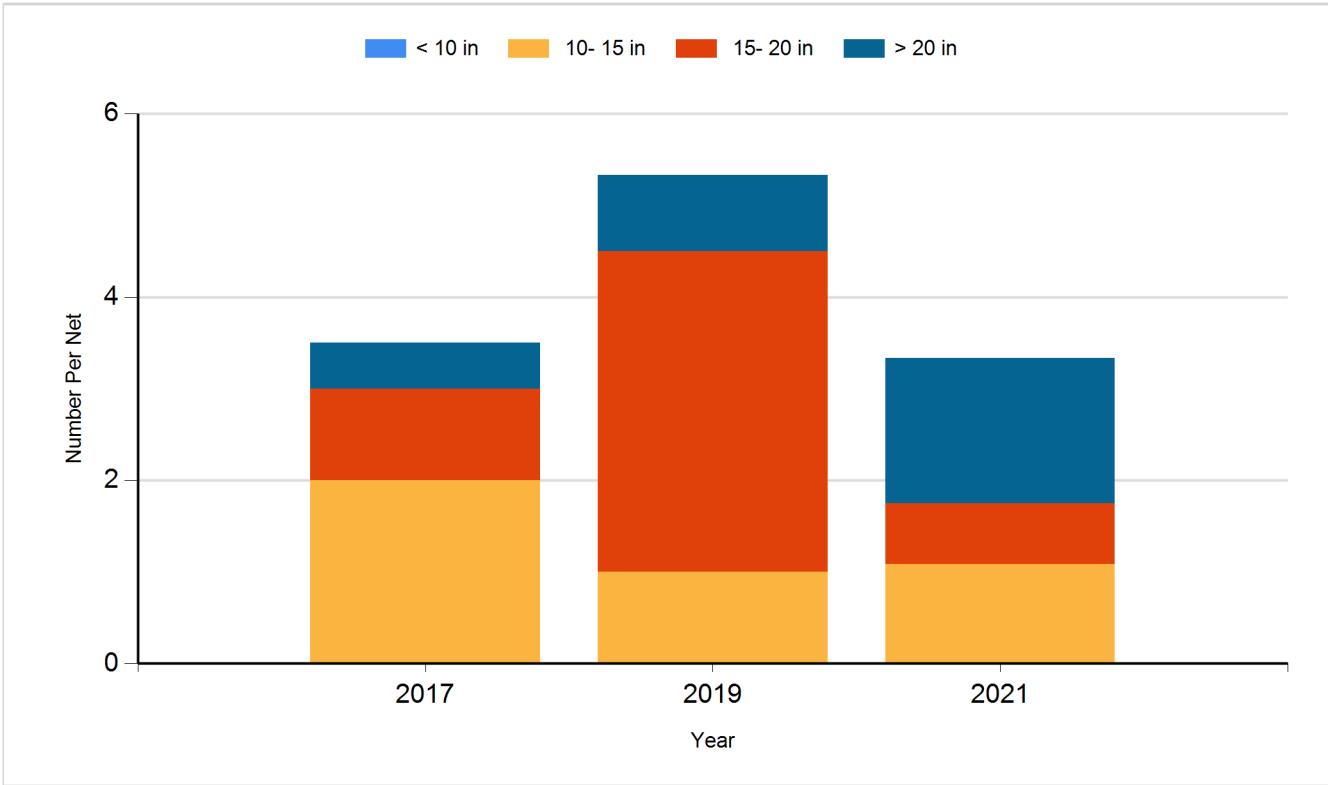
Species: Northern Pike  
Gear: AFS std gill net



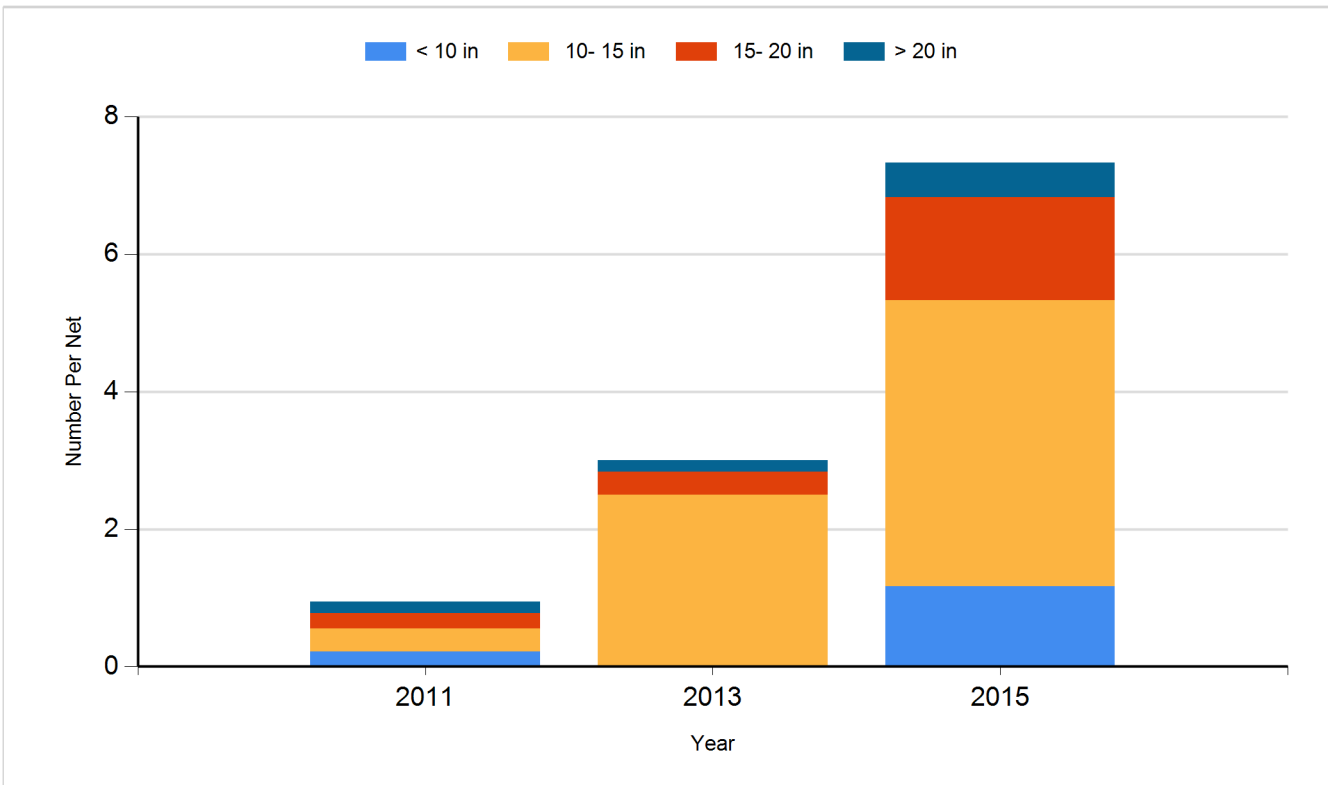
Species: Northern Pike  
Gear: std exp gill net



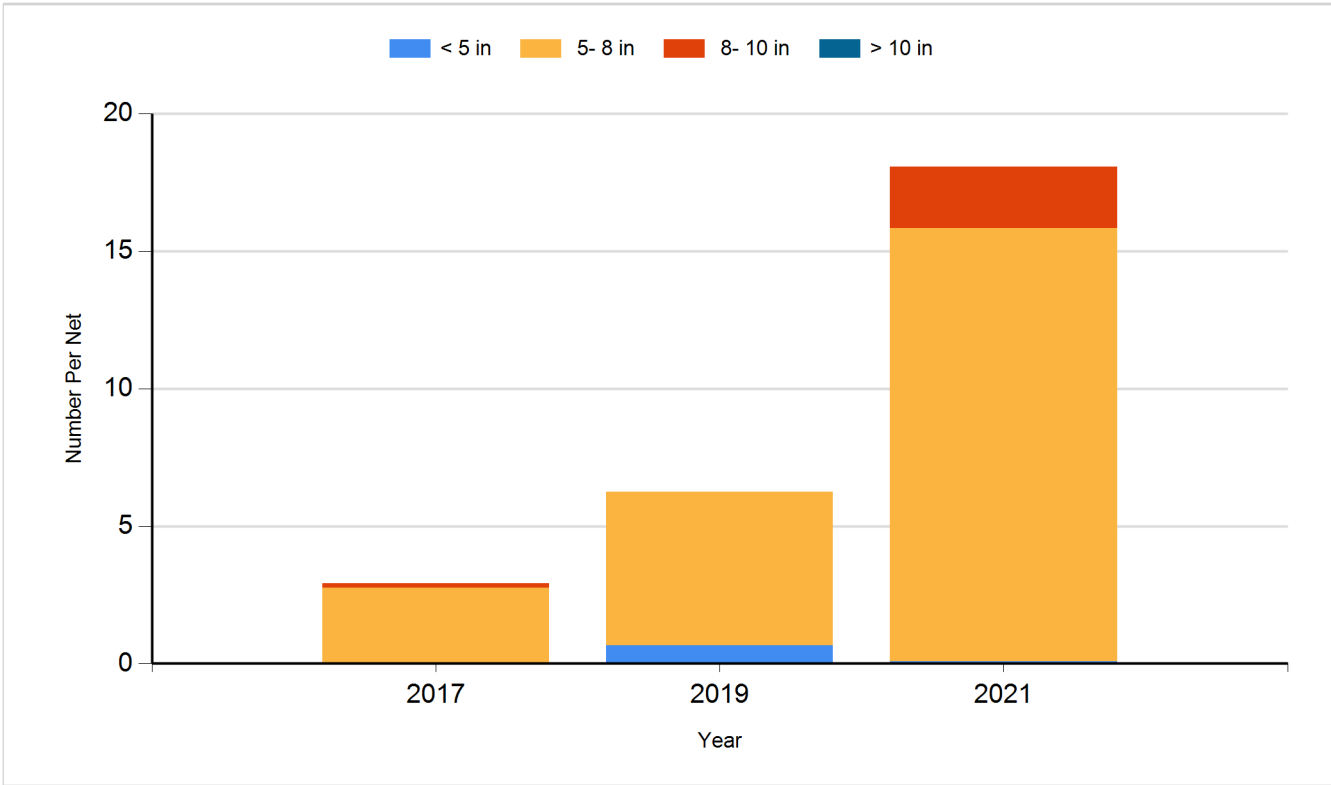
Species: Walleye  
Gear: AFS std gill net



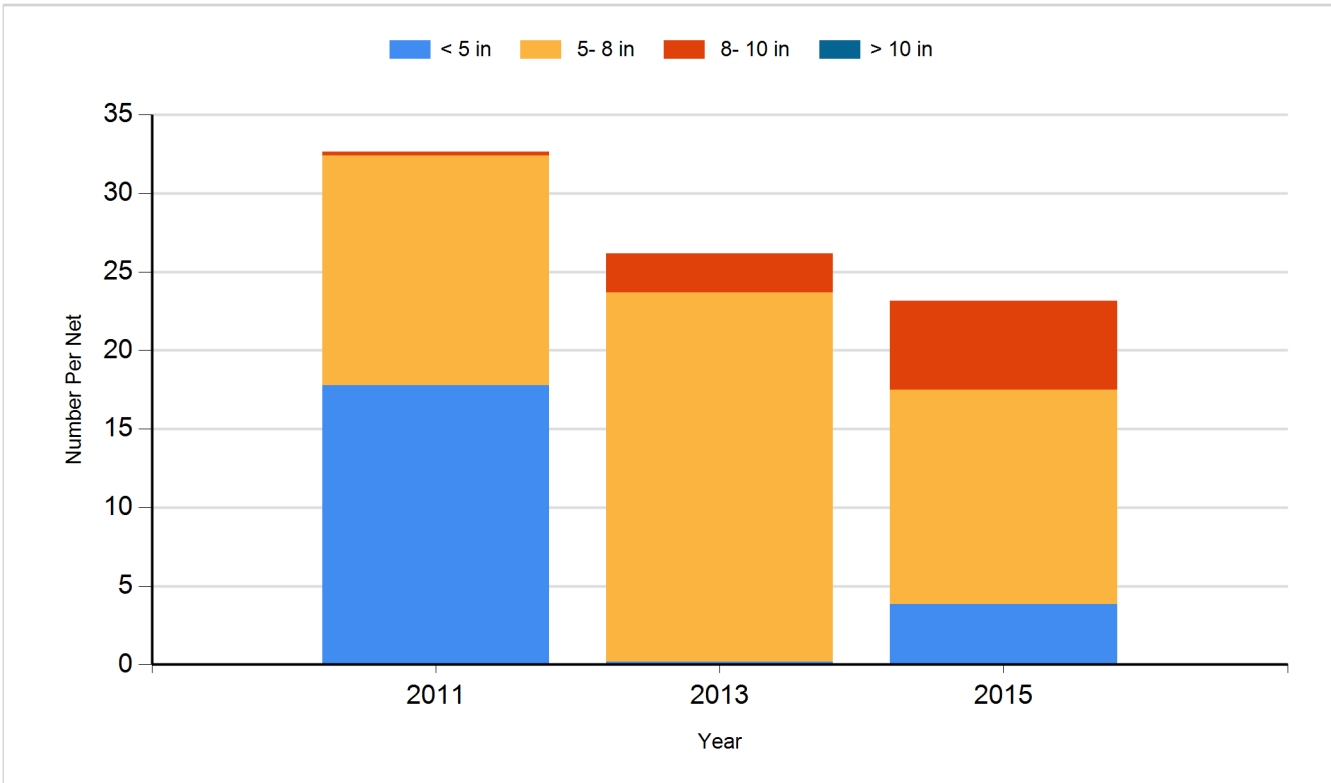
Species: Walleye  
Gear: std exp gill net



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
2012	Walleye	Small Fingerling	213,730
2014	Walleye	Small Fingerling	177,750
2016	Largemouth Bass	Adult	67
2016	Walleye	Fingerling	178,000
2018	Walleye	Small Fingerling	179,920
2021	Walleye	Juvenile	207,460
2022	Walleye	Juvenile	89,428