

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Brakke, Lyman County

MED-Lake-667-000

2022

Lake Information

Name: Brakke **Maximum Depth:** 17 Feet
County: Lyman **Mean Depth:** 5 Feet
Legal Description: T105-R76-S21
Surface Area: 115 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 21, 2022	1 net-nights
AFS std gill net	Jun 22, 2022	1 net-nights
boat shocker (night)	Oct 18, 2022	3600 seconds
frame net (std 3/4 in)	Jun 21, 2022	5 net-nights
frame net (std 3/4 in)	Jun 22, 2022	5 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Walleye

Yellow Perch

Northern Pike

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	24	11.5	16.9	9		4		113	3
	Northern Pike	7	3.5	1.5	100		71		89	3
	Walleye	14	6.5	7.7	92		23		85	2
	Yellow Perch	15	7.5	1.5	33		0		101	3
boat shocker (night)	Largemouth Bass	98	54.0	18.9	72	9	24	9	111	1
frame net (std 3/4 in)	Black Bullhead	2	0.2	0.2	50		0		97	6
	Black Crappie	489	48.9	19.1	81	2	24	3	98	1
	Bluegill	328	32.8	7.8	59	4	43	4	102	1
	Largemouth Bass	3	0.3	0.2	100		100		90	1
	Northern Pike	15	1.5	0.6	100		60	21	89	3
	Walleye	8	0.8	0.3	88		25		89	5
	Yellow Perch	9	0.9	0.7	33		0		98	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.

* **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 Crappie							3.5			11.5	7.50
	Northern Pike							2.5			3.5	3.00
	Walleye							2.0			6.5	4.25
	Yellow Perch							7.0			7.5	7.25
boat shocker (night)	Largemouth Bass	9.0			20.0			62.0			54.0	36.25
frame net (std 3/4 in)	Black Bullhead	0.1			0.0			0.0			0.2	0.08
	Black Crappie	5.7			43.4			52.5			48.9	37.63
	Bluegill	10.0			10.7			29.3			32.8	20.70
	Largemouth Bass	0.1			0.6			0.0			0.3	0.25
	Northern Pike	1.7			1.0			0.4			1.5	1.15
	Walleye	0.5			0.1			1.8			0.8	0.80
	Yellow Perch	0.3			0.8			3.3			0.9	1.33
std exp gill net	Black Crappie	0.0			227.5							113.75
	Bluegill	0.0			2.5							1.25
	Northern Pike	1.5			1.5							1.50
	Walleye	1.0			0.0							0.50
	Yellow Perch	3.0			21.0							12.00

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											
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022		
AFS std gill net	Black Crappie	PSD								29			9	
		PSD-P								0			4	
		Wr								93			113	
	Northern Pike	PSD									40			100
		PSD-P									20			71
		Wr									81			89
	Walleye	PSD									25			92
		PSD-P									0			23
		Wr									87			85
	Yellow Perch	PSD									57			33
		PSD-P									0			0
		Wr									98			101
	boat shocker (night)	Largemouth Bass	PSD	89			40				13			72
			PSD-P	67			15				8			24
			Wr	113			110				112			111
Walleye		PSD	100			20								
		PSD-P	85			7								
		Wr	95			92								
frame net (std 3/4 in)	Black Bullhead	PSD	0										50	
		PSD-P	0										0	
		Wr	91										97	
	Black Crappie	PSD	65			35				87			81	
		PSD-P	23			1				20			24	
		Wr	99			98				87			98	
	Bluegill	PSD	99			31				99			59	
		PSD-P	69			4				51			43	
		Wr	102			140				105			102	
	Largemouth Bass	PSD	100			100							100	
		PSD-P	100			83							100	
		Wr	89			105							90	
	Northern Pike	PSD	94			90				75			100	
		PSD-P	35			30				25			60	

Gear	Species	Index	Year										
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
frame net (std 3/4 in)	Northern Pike	Wr	86			87			83			89	
		PSD	100			100			72			88	
		PSD-P	100			100			33			25	
	Yellow Perch	Wr	85			68			83			89	
		PSD	33			0			70			33	
		PSD-P	0			0			9			0	
		Wr	80			100			97			98	
std exp gill net	Black Crappie	PSD	0			35							
		PSD-P	0			2							
	Bluegill	PSD				0							
		PSD-P				0							
		Wr				177							
	Northern Pike	PSD	100			100							
		PSD-P	0			33							
		Wr	87			100							
	Walleye	PSD	100										
		PSD-P	100										
		Wr	85										
	Yellow Perch	PSD	17			2							
		PSD-P	0			0							
		Wr	90			100							

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								
2021	1	1	99																	
2020	2	16	73 (1.6)	116 (2.5)																
2019	3	11	75 (1.9)	149 (4.6)	194 (3)															
2018	4	16	72 (1.5)	132 (3)	185 (3.9)	216 (3.7)														
2017	5	10	80 (2.7)	135 (5.3)	190 (5.5)	218 (3.5)	244 (3.8)													
Weighted Mean		54	75	131	189	217	244													
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20								
2021	1	1																		
2020	2	16																		
2019	3	11																		
2018	4	16																		
2017	5	10																		
Weighted Mean		54																		

Species: Bluegill

Year Class	Age	N	Mean back-calculated length (SE) at age											
			1	2	3	4	5	6	7	8	9	10		
2021	1	4	77 (4.7)											
2020	2	23	54 (2.4)	103 (3.8)										
2019	3	14	54 (1.2)	105 (2.9)	151 (3.5)									
2018	4	10	53 (1.9)	120 (4.8)	167 (6.6)	193 (2.4)								
2017	5	2	50 (5.9)	110 (12.1)	155 (12.7)	201 (5)	214 (4.1)							
Weighted Mean		53	55	107	157	194	214							
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20		
2021	1	4												
2020	2	23												
2019	3	14												
2018	4	10												
2017	5	2												
Weighted Mean		53												

Species: Largemouth Bass

Year Class	Age	N	Mean back-calculated length (SE) at age																	
			1	2	3	4	5	6	7	8	9	10								
2021	1	3	78 (3.6)																	
2020	2	29	76 (1.5)	136 (4.2)																
2019	3	11	65 (2.1)	145 (12.2)	210 (15.2)															
2018	4	14	73 (2.6)	145 (8.3)	221 (8.1)	294 (5.1)														
2017	5	9	77 (4.3)	144 (8.3)	221 (8.3)	302 (7.6)	349 (7.3)													
2016	6	5	67 (4)	135 (7.8)	214 (17.6)	291 (16.2)	351 (17.9)	396 (11.1)												
2015	7	2	58 (3.7)	106 (6.6)	176 (15.3)	271 (6.4)	344 (34.9)	383 (40.8)	412 (36.5)											
2014	8	1	54	92	198	274	374	425	457	489										
Weighted Mean		74	73	139	215	294	350	396	427	489										
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20								
2021	1	3																		
2020	2	29																		
2019	3	11																		
2018	4	14																		
2017	5	9																		
2016	6	5																		
2015	7	2																		
2014	8	1																		
Weighted Mean		74																		

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	489	134 (6)	146 (82)	223 (108)	237 (196)	256 (97)					
2019	533	110 (8)	151 (42)	205 (83)	232 (253)	247 (69)	258 (78)				
2016	437	110 (3)	162 (234)	202 (169)		236 (27)	254 (4)				
2013	101		123 (55)	192 (11)	237 (22)	271 (12)	265 (1)				

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	328	106 (13)	131 (129)	176 (54)	211 (126)	223 (7)					
2019	293		163 (43)	191 (120)	206 (11)	226 (47)	230 (73)				
2016	106	86 (62)	128 (12)	176 (30)		226 (1)		257 (1)			
2013	100			178 (22)	204 (41)	213 (4)	222 (18)	234 (6)	232 (5)	224 (4)	

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	97	155 (5)	180 (46)	282 (12)	344 (17)	384 (10)	428 (6)	440 (3)	521 (1)		
2019	78	206 (59)	242 (10)	302 (4)	373 (3)	431 (1)	482 (1)				
2016	18	236 (1)	262 (9)	307 (5)		430 (3)					
2013	10	154 (1)	279 (1)	369 (3)	420 (2)	475 (1)	464 (2)				

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	14	215 (1)		340 (1)		433 (10)					598 (2)
2013	2							562 (1)			562 (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+
2013	6		154 (5)				242 (1)				

Fish Condition

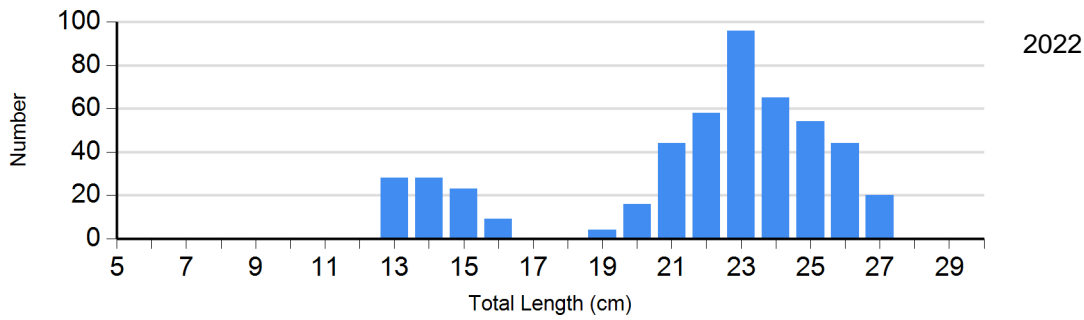
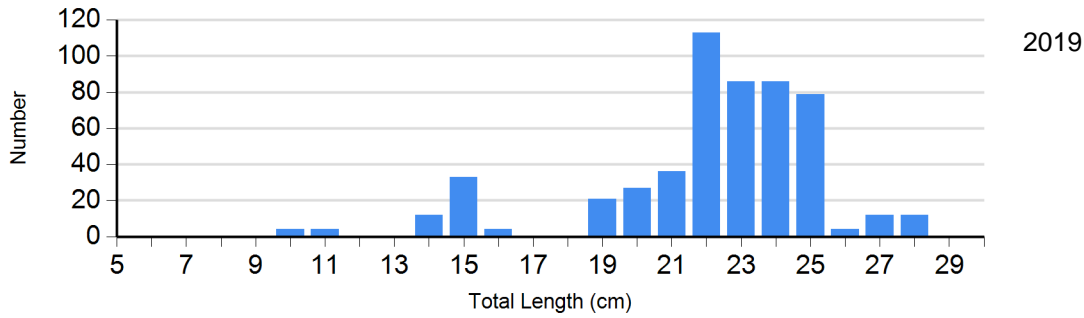
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2019	70	99 (1.5)	348	86 (0.6)	107	81 (1.4)	0	
	2022	92	109 (1.9)	279	96 (0.6)	118	91 (0.9)	0	
Bluegill Frame Net	2019	2	111	143	108 (1.1)	148	102 (1.1)	0	
	2022	133	104 (1.5)	53	103 (1.1)	142	99 (0.9)	0	
Largemouth Bass Electro Fishing	2019	54	111 (0.9)	3	114 (2.7)	5	119 (3.1)	0	
	2022	15	107 (1.6)	26	115 (1.3)	12	109 (2.3)	1	106
Northern Pike Gill Net	2019	3	86 (3.1)	1	87	1	61	0	
	2022	0		2	87 (1.4)	3	86 (4.3)	2	95 (1.1)
Walleye Gill Net	2019	3	86 (3.4)	1	91	0		0	
	2022	1	86	9	86 (1.8)	2	83 (3.7)	1	80
Yellow Perch Gill Net	2019	6	98 (1.1)	8	97 (1.9)	0		0	
	2022	10	102 (2.6)	5	98 (2.6)	0		0	

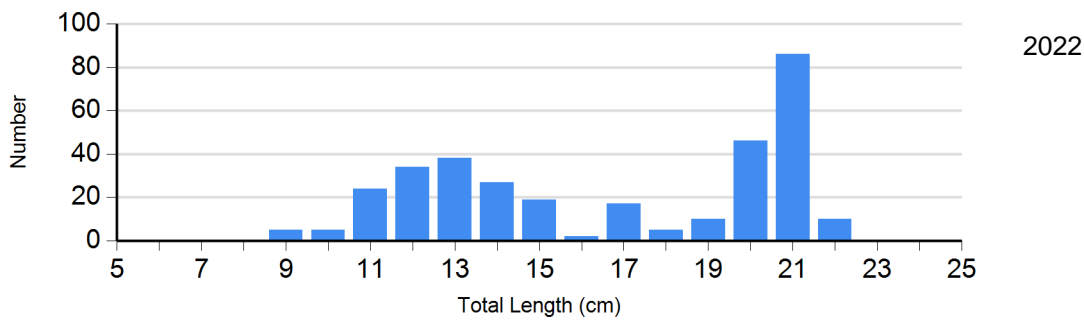
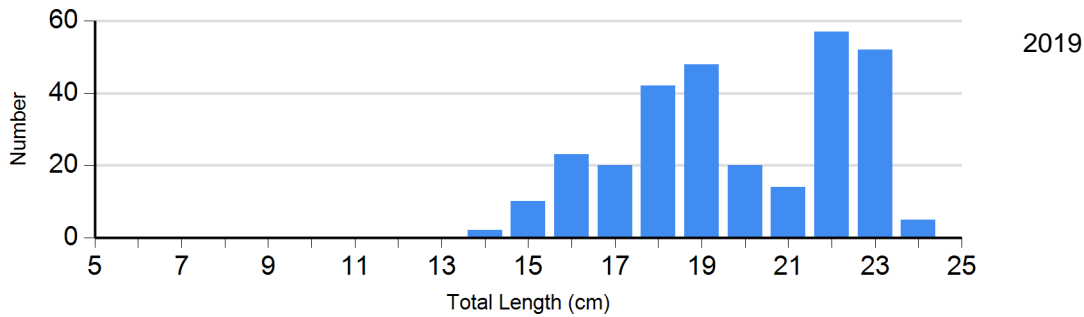
Length Frequency Distribution

Length frequency histogram of species sampled by year.

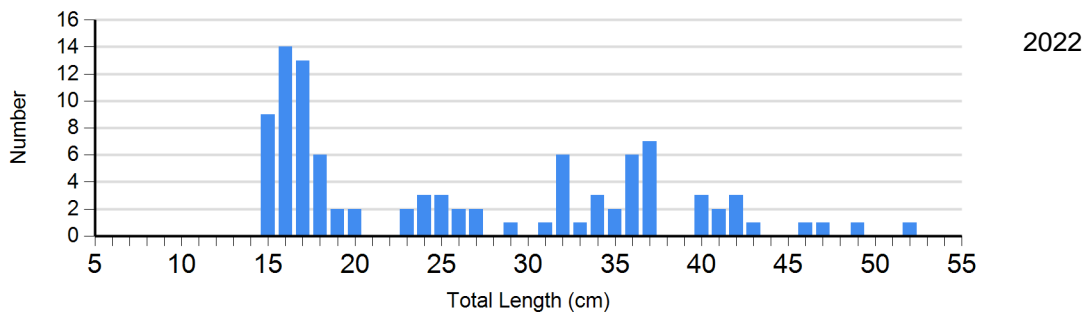
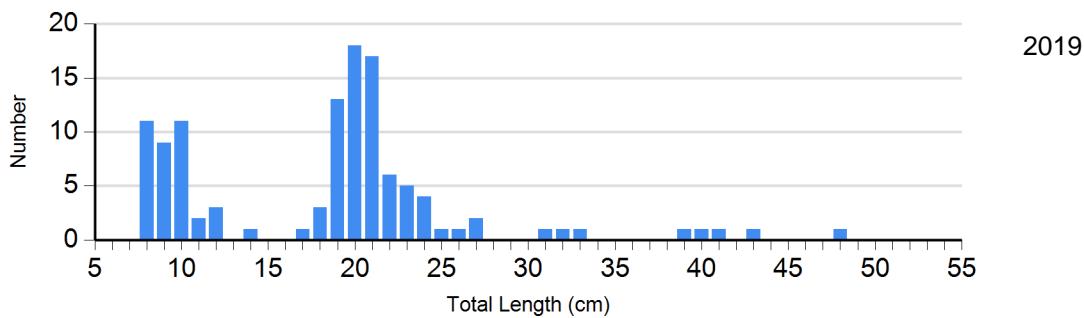
Species: Black Crappie
Gear: frame net (std 3/4 in)



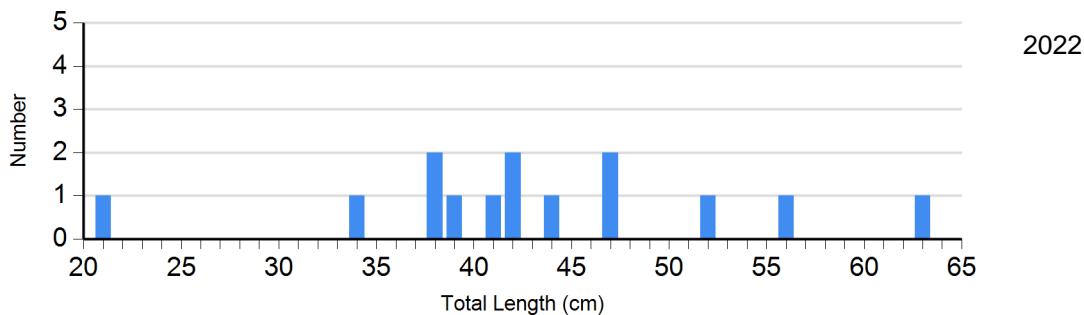
Species: Bluegill
Gear: frame net (std 3/4 in)



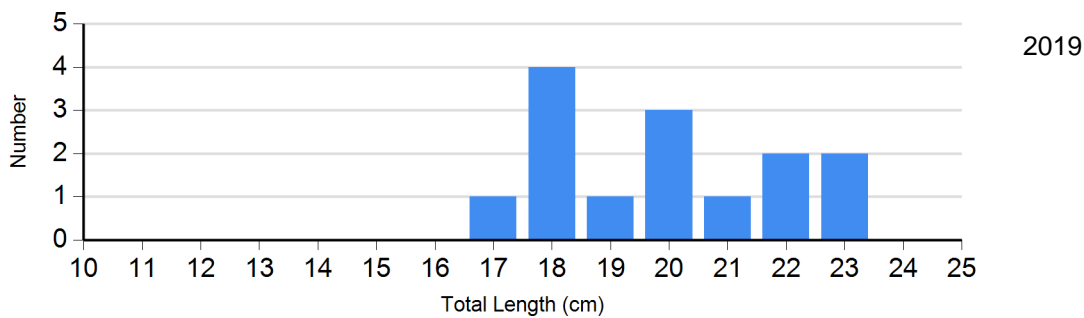
Species: Largemouth Bass
 Gear: boat shocker (night)

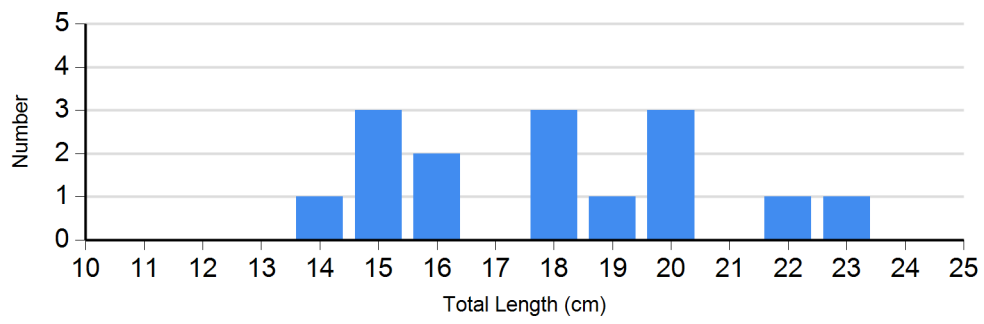


Species: Walleye
 Gear: AFS std gill net



Species: Yellow Perch
 Gear: AFS std gill net



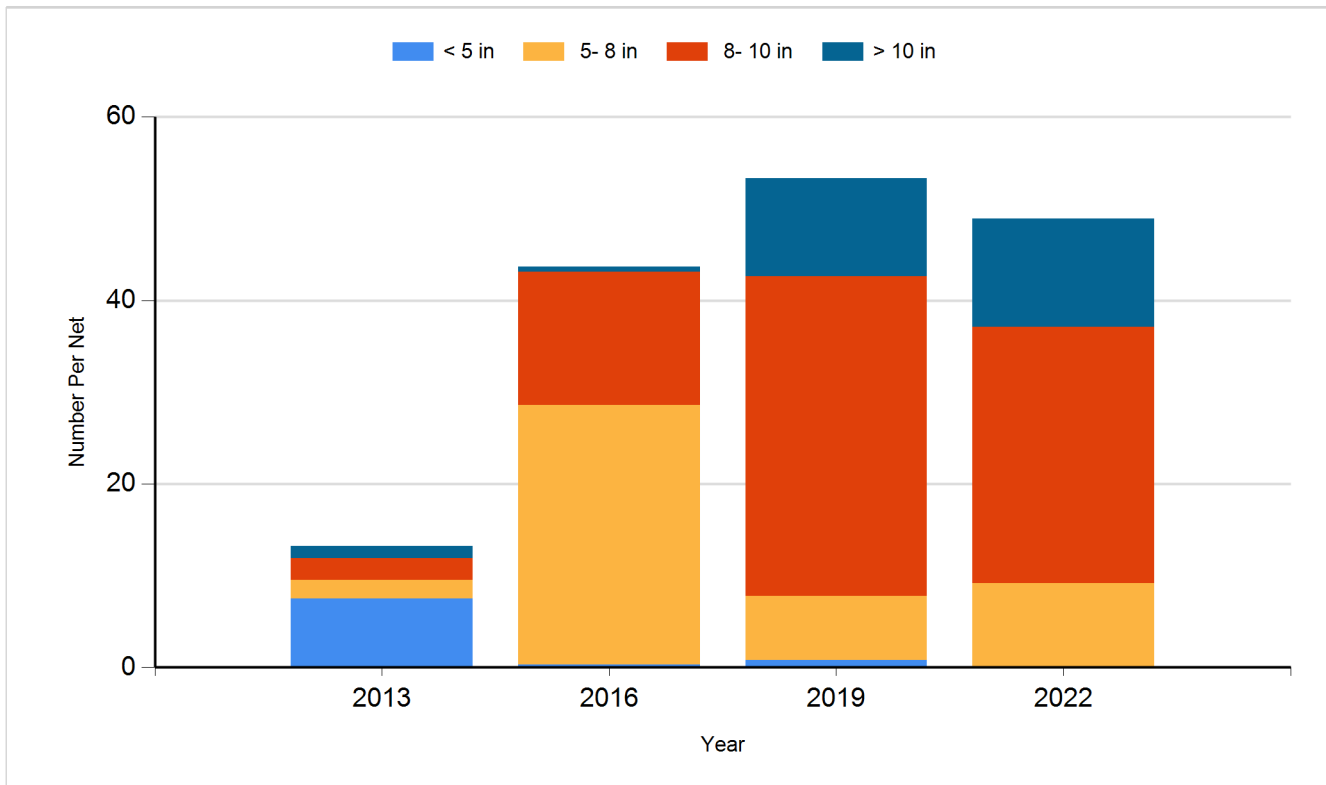


2022

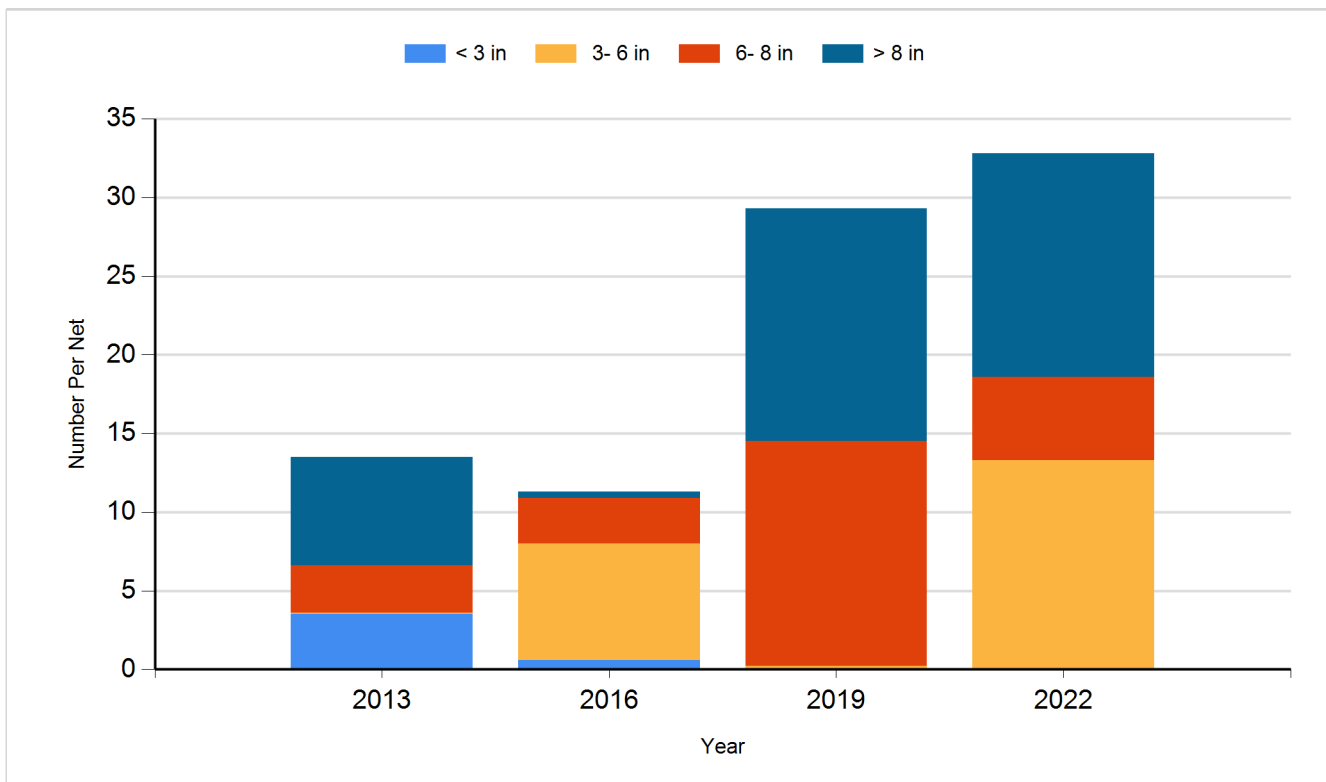
Historic Fish Sizes and Relative Abundance

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

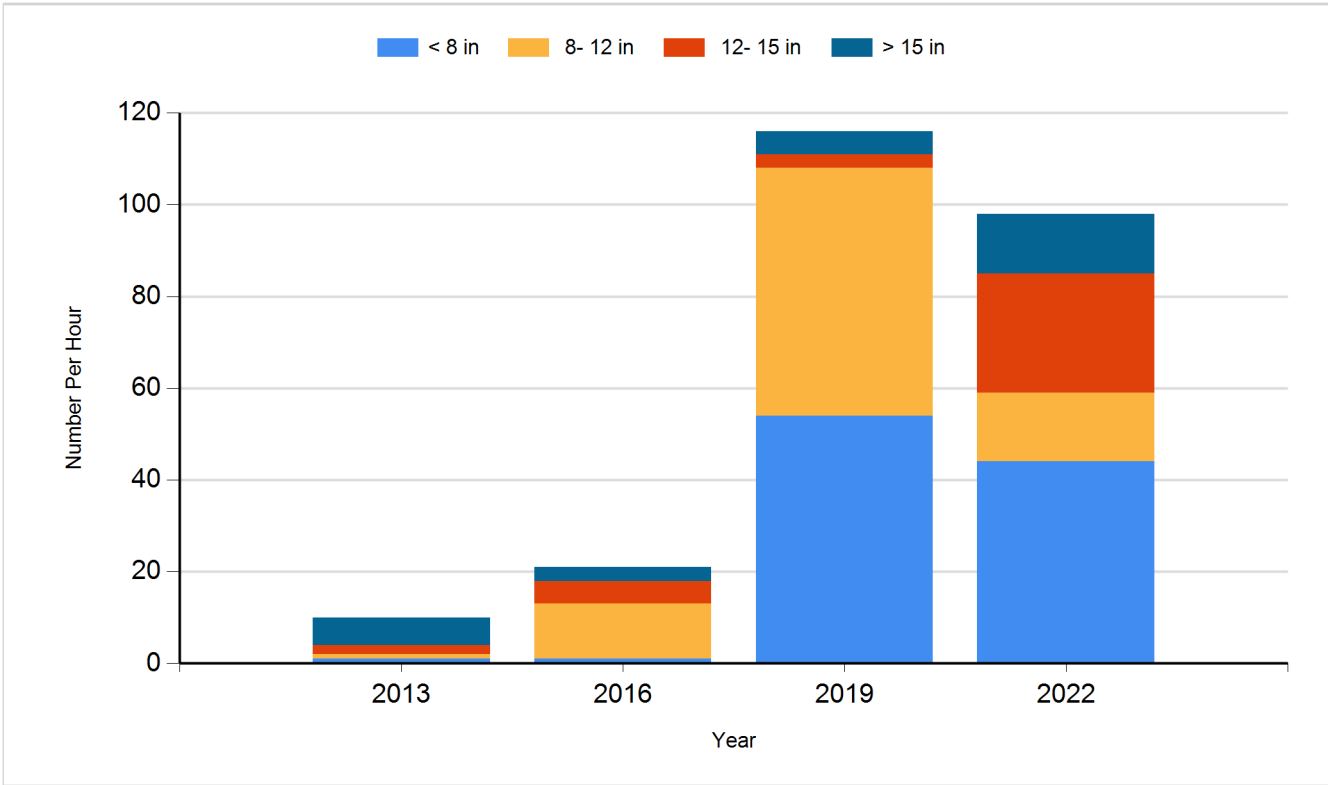
Species: Black Crappie
Gear: frame net (std 3/4 in)



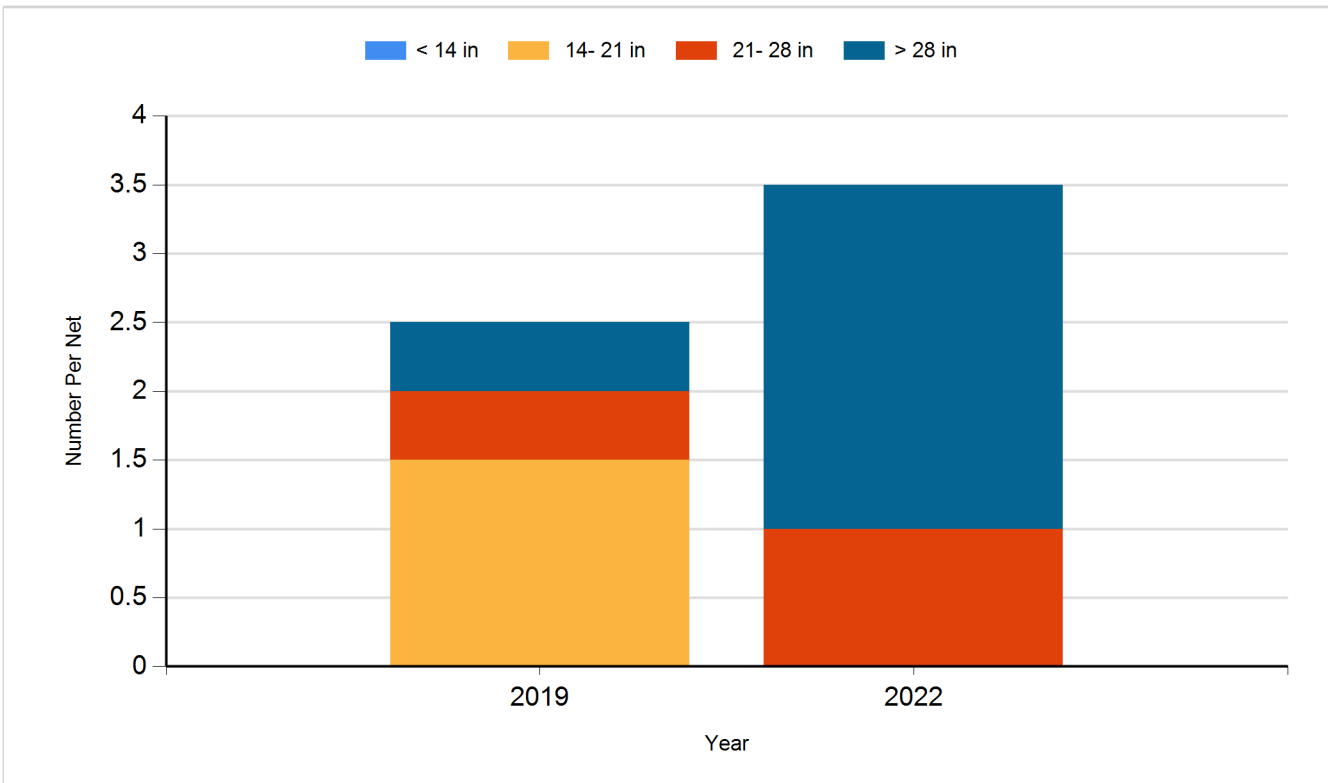
Species: Bluegill
Gear: frame net (std 3/4 in)



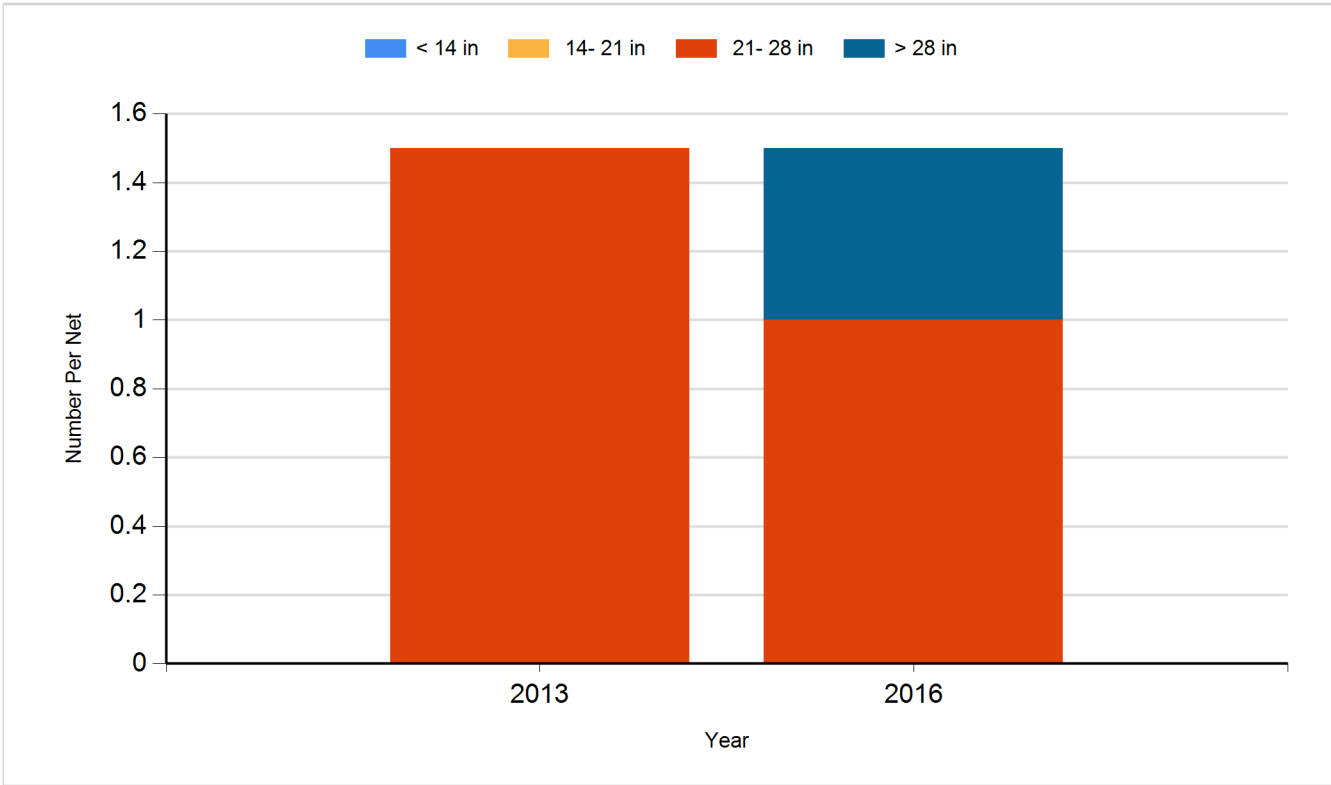
Species: Largemouth Bass
Gear: boat shocker (night)



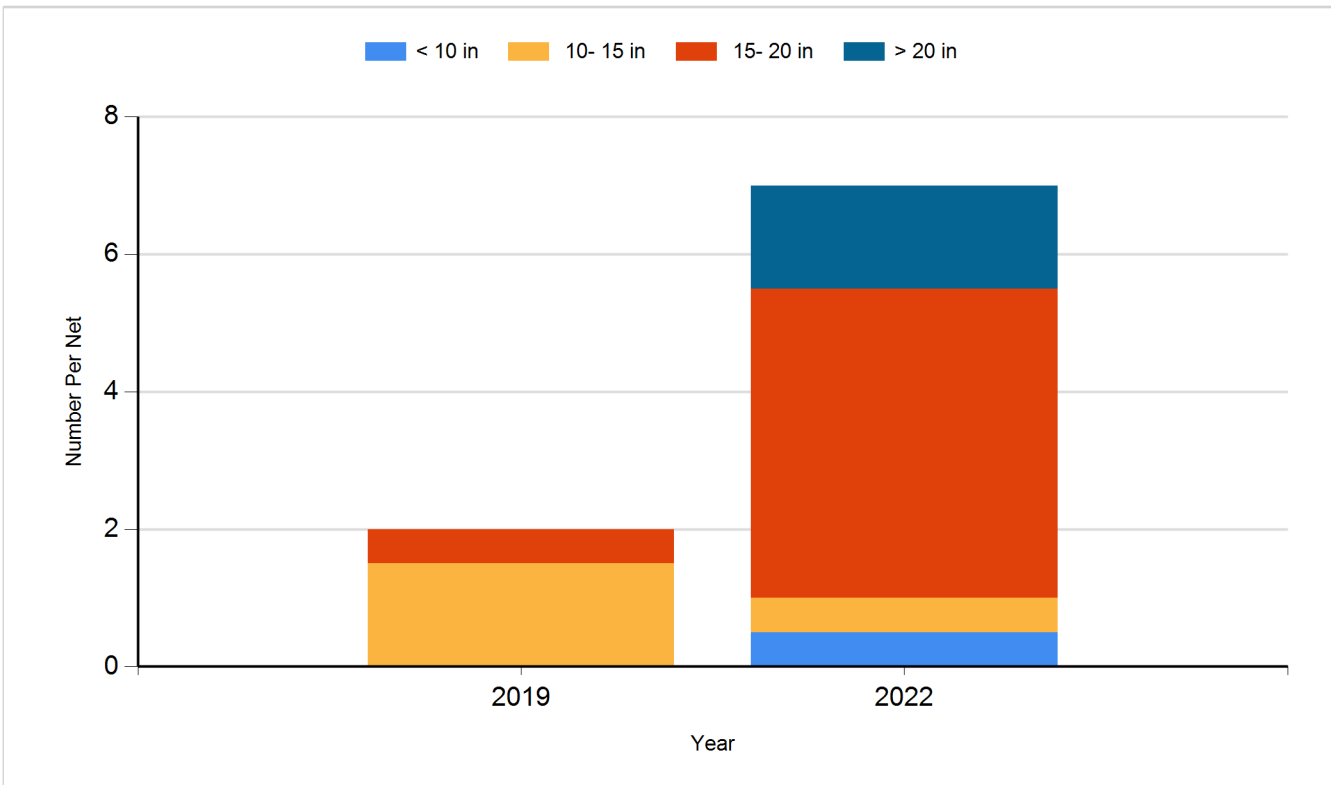
Species: Northern Pike
Gear: AFS std gill net



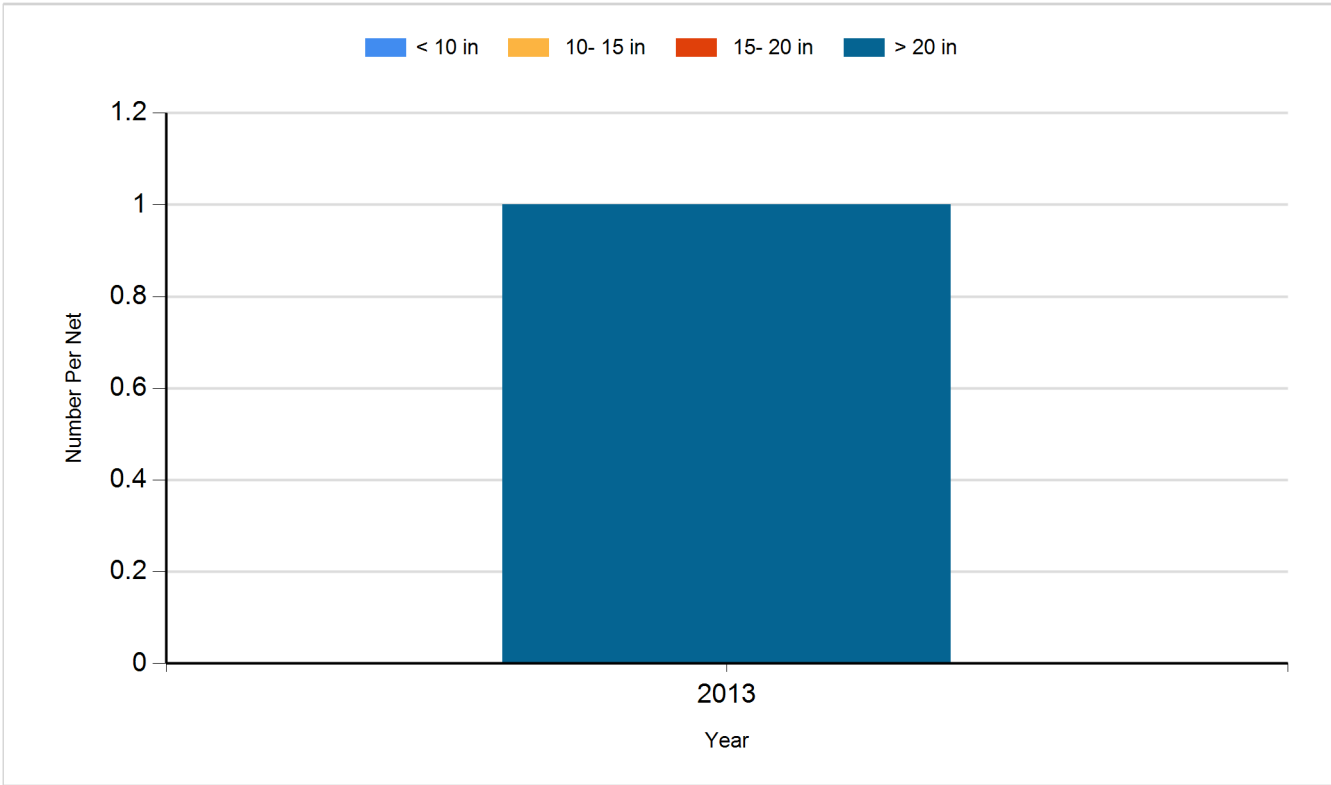
Species: Northern Pike
Gear: std exp gill net



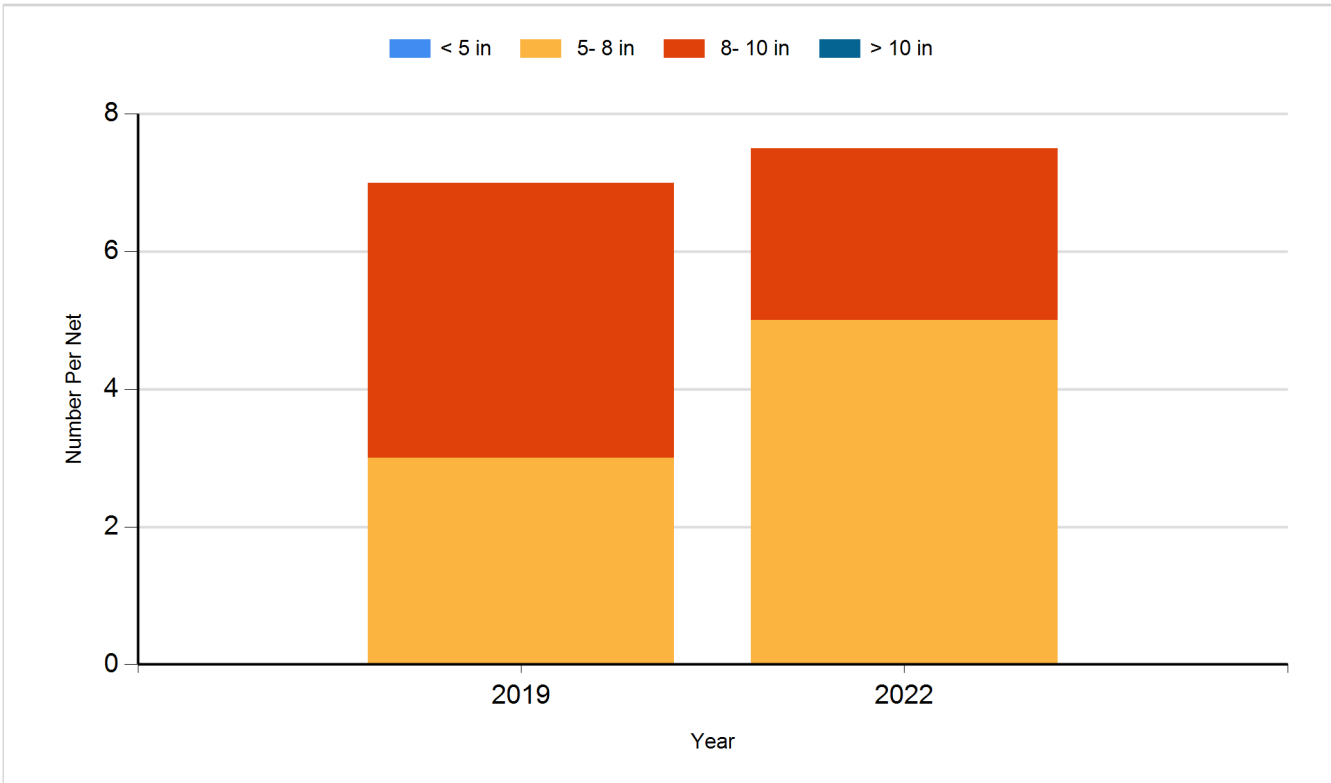
Species: Walleye
Gear: AFS std gill net



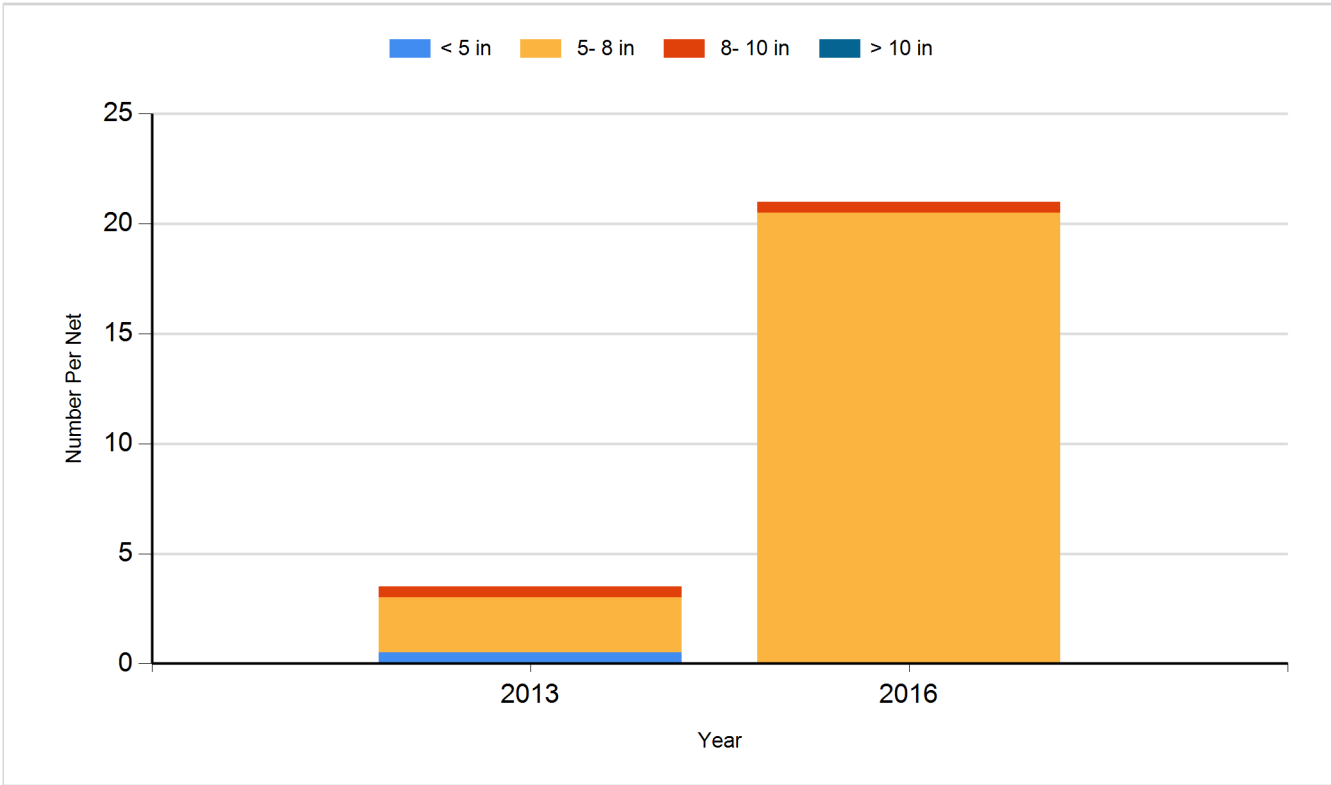
Species: Walleye
Gear: std exp gill net



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
2013	Walleye	Large Fingerling	3,089
2015	Walleye	Large Fingerling	864
2017	Walleye	Large Fingerling	2,720
2019	Walleye	Small Fingerling	9,185
2021	Walleye	Juvenile	1,152
2022	Walleye	Juvenile	3,150