

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Alice, Deuel County

UMN-Lake-710-000

2022

Lake Information

Name: Alice **Maximum Depth:** 12 Feet
County: Deuel **OHWM Elevation:** 1,692
Surface Area: 1,104 Acres **Outlet Elevation:** 1,689

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 12, 2022	4 net-nights
AFS std gill net	Jul 13, 2022	4 net-nights
AFS std gill net	Jul 14, 2022	4 net-nights
frame net (std 3/4 in)	Jul 12, 2022	4 net-nights
frame net (std 3/4 in)	Jul 13, 2022	3 net-nights
frame net (std 3/4 in)	Jul 14, 2022	4 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Rudd

Black Bullhead

Green Sunfish

Sunfish Hybrid

Northern Pike

Common Carp

White Sucker

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	38	3.2	0.8	100		97		92	2
	Common Carp	1	0.1	0.1	0		0		116	
	Northern Pike	10	0.8	0.4	100		70		84	3
	Rudd	132	11.0	2.1	82	5	66	6		
	Walleye	112	9.3	1.7	88	5	74	6	87	1
	White Sucker	3	0.3	0.2	100		100		100	8
	Yellow Perch	529	44.1	5.3	3	1	0		97	1
frame net (std 3/4 in)	Black Bullhead	23	2.1	1.0	91		87		92	4
	Common Carp	4	0.4	0.3	100		75		105	1
	Green Sunfish	33	3.0	1.6	3		0		115	4
	Northern Pike	4	0.4	0.2	100		50		84	4
	Rudd	396	29.7	11.0	84	3	82	3		
	Sunfish Hybrid	25	2.3	0.9	0		0		121	5
	Walleye	8	0.7	0.4	88		88		79	3
Yellow Perch	410	36.1	12.8	8	2	0		90	1	

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				13.8								13.80
	Common Carp				0.2								0.20
	Northern Pike				0.8								0.80
	Rudd				28.7								28.70
	Walleye				1.9								1.90
	White Sucker				0.1								0.10
	Yellow Perch				0.2								0.20
AFS std gill net	Black Bullhead				16.8			12.3			3.2		10.77
	Common Carp				0.0			0.1			0.1		0.07
	Northern Pike				1.3			0.5			0.8		0.87
	Rudd				18.2			2.3			11.0		10.50
	Walleye				4.8			4.3			9.3		6.13
	White Sucker				0.1			0.2			0.3		0.20
	Yellow Perch				23.6			7.0			44.1		24.90
frame net (std 3/4 in)	Black Bullhead	2.4						26.3			2.1		10.27
	Common Carp	0.2						0.2			0.4		0.27
	Green Sunfish	0.1						0.1			3.0		1.07
	Northern Pike	2.9						0.2			0.4		1.17
	Rudd	9.9						42.8			29.7		27.47
	Sunfish Hybrid	0.0						0.0			2.3		0.77
	Walleye	0.2						0.8			0.7		0.57
	White Sucker	0.2						0.0			0.0		0.07
	Yellow Perch	10.3						0.0			36.1		15.47
std exp gill net	Black Bullhead	3.2											3.20
	Northern Pike	17.5											17.50
	Walleye	13.0											13.00
	Yellow Perch	49.8											49.80

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	Black Bullhead	PSD				100								
		PSD-P				90								
		Wr				97								
	Common Carp	PSD				100								
		PSD-P				100								
		Wr				118								
	Northern Pike	PSD				80								
		PSD-P				13								
		Wr				72								
	Rudd	PSD				65								
		PSD-P				59								
	Walleye	PSD				76								
		PSD-P				62								
		Wr				80								
	White Sucker	PSD				100								
		PSD-P				100								
		Wr				116								
	Yellow Perch	PSD				67								
PSD-P					0									
Wr					91									
AFS std gill net	Black Bullhead	PSD				100				100			100	
		PSD-P				90				100			97	
		Wr				98				103			92	
	Common Carp	PSD									100		0	
		PSD-P									100		0	
		Wr									97		116	
	Northern Pike	PSD				93					83		100	
		PSD-P				27					17		70	
		Wr				74					83		84	
	Rudd	PSD				99					96		82	
		PSD-P				83					89		66	
	Walleye	PSD				93					96		88	
		PSD-P				84					63		74	

Gear	Species	Index	Year										
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
AFS std gill net	Walleye	Wr				82			91			87	
		White Sucker	PSD			100			100			100	
			PSD-P			100			0			100	
	Yellow Perch	Wr				99			102			100	
		PSD	PSD			75			14			3	
			PSD-P			4			1			0	
		Wr				106			115			97	
	frame net (std 3/4 in)	Black Bullhead	PSD	68						100			91
			PSD-P	14						99			87
Wr			98						100			92	
Common Carp		PSD	100							67			100
		PSD-P	33							67			75
		Wr	108							114			105
Green Sunfish		PSD	0							0			3
		PSD-P	0							0			0
		Wr	108							124			115
Northern Pike		PSD	88							100			100
		PSD-P	6							0			50
		Wr	84							64			84
Rudd		PSD	66							98			84
		PSD-P	39							98			82
Walleye		PSD	100							67			88
		PSD-P	75							50			88
		Wr	84							87			79
White Sucker		PSD	100										
		PSD-P	100										
		Wr	100										
Yellow Perch		PSD	5										8
		PSD-P	5										0
		Wr	88										90
std exp gill net		Black Bullhead	PSD	5									
			PSD-P	5									
			Wr	108									
		Northern Pike	PSD	63									
	PSD-P		1										
	Wr		89										

Gear	Species	Index	Year										
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
std exp gill net	Walleye	PSD	97										
		PSD-P	8										
		Wr	95										
	Yellow Perch	PSD	1										
		PSD-P	1										
		Wr	104										

Length at Capture

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

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	112		334 (13)	469 (13)	542 (2)	538 (8)	562 (14)	549 (4)	635 (2)	632 (1)	646 (56)
2019	52	237 (1)	296 (2)	436 (9)	463 (5)		528 (2)		530 (5)		630 (28)
2016	58	198 (1)	300 (4)			447 (4)		594 (43)			684 (6)
2013	78		328 (2)		470 (71)				589 (1)	588 (3)	709 (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+
2022	529	138 (20)	180 (503)	228 (3)	241 (3)						
2019	89	140 (77)	224 (11)	276 (1)							
2016	285	140 (32)	184 (34)	223 (194)	246 (21)	242 (5)					
2013	320	108 (21)	159 (296)	297 (1)	328 (2)						

Fish Condition

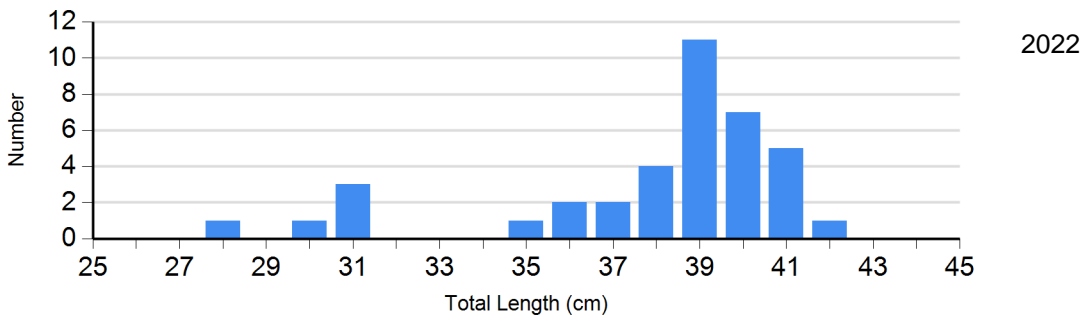
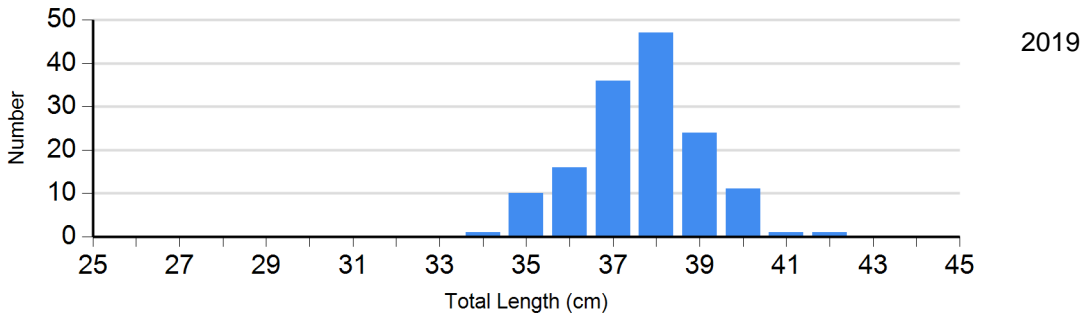
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2019	0		0		63	107 (1.2)	84	101 (1.1)
	2022	0		1	105	9	98 (3.2)	28	89 (2.0)
Common Carp Gill Net	2019	0		0		0		1	97
	2022	1	116	0		0		0	
Northern Pike Gill Net	2019	1	92	4	85 (5.5)	1	66	0	
	2022	0		3	85 (6.5)	7	83 (2.6)	0	
Walleye Gill Net	2019	2	97 (2.3)	17	93 (1.4)	16	91 (2.7)	16	88 (1.4)
	2022	13	92 (2.6)	16	89 (1.1)	43	88 (1.0)	40	82 (1.1)
White Sucker Gill Net	2019	0		2	102 (6.2)	0		0	
	2022	0		0		0		3	100 (6.4)
Yellow Perch Gill Net	2019	72	115 (0.9)	11	114 (1.9)	1	105	0	
	2022	513	97 (0.4)	15	95 (2.5)	1	93	0	

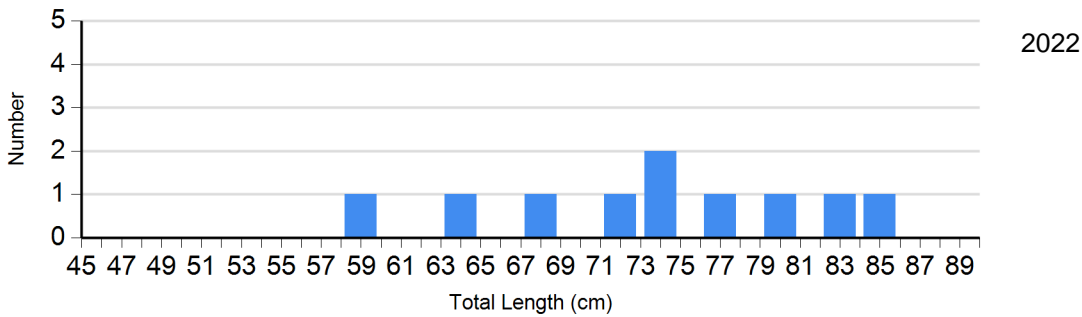
Length Frequency Distribution

Length frequency histogram of species sampled by year.

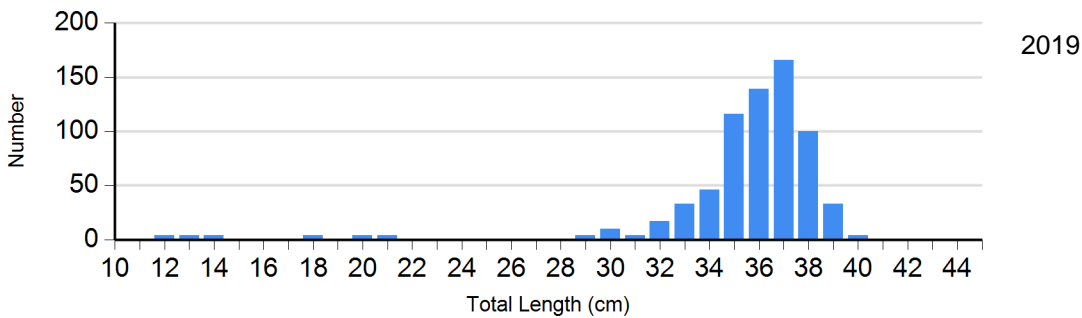
Species: Black Bullhead
Gear: AFS std gill net

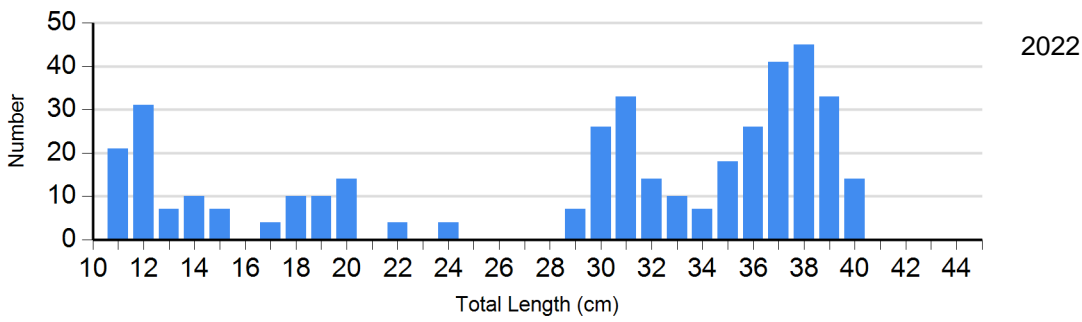


Species: Northern Pike
Gear: AFS std gill net

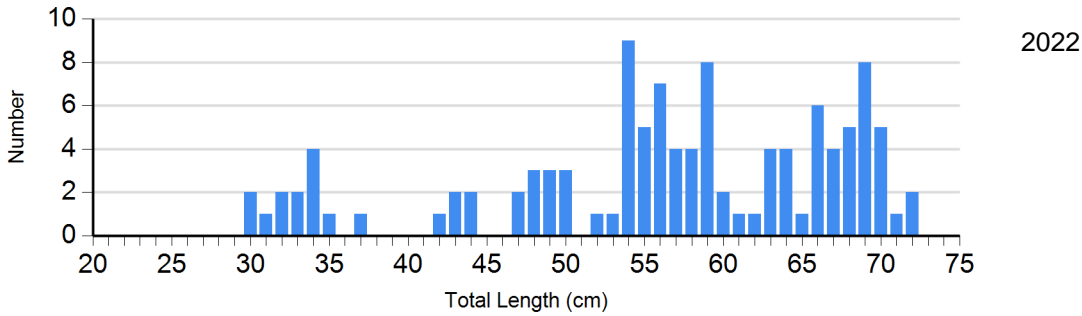
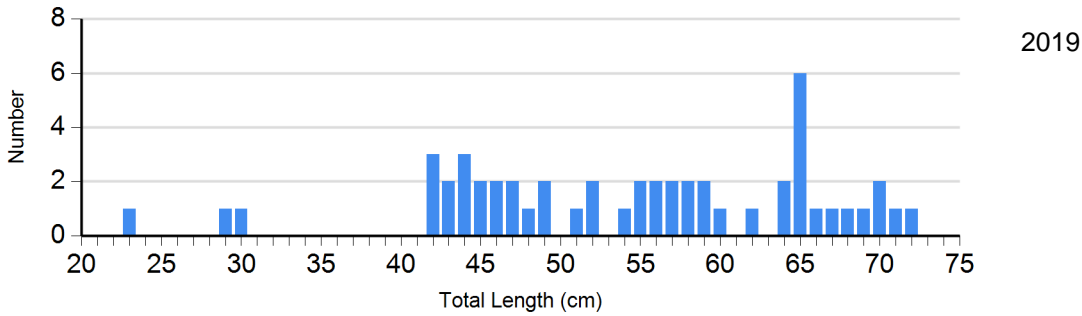


Species: Rudd
Gear: frame net (std 3/4 in)

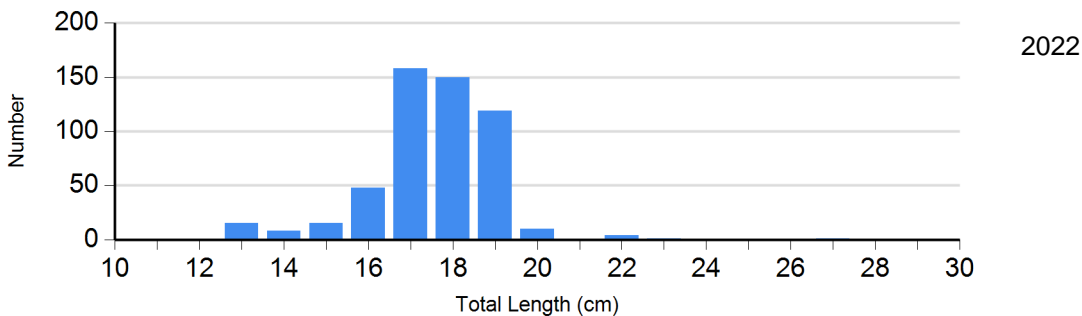
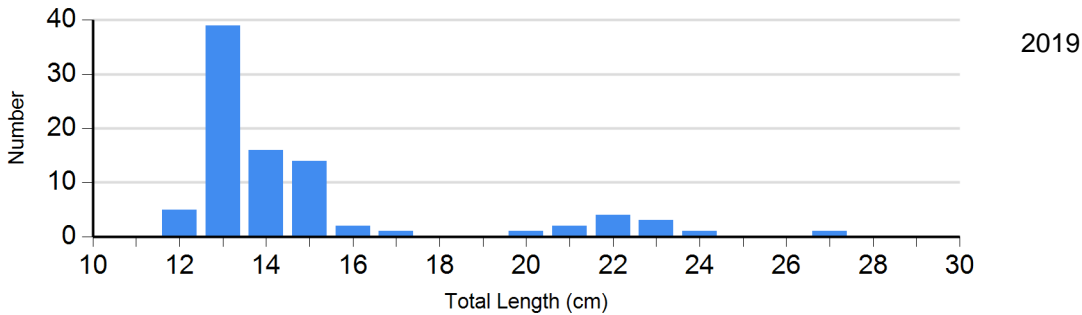




Species: Walleye
Gear: AFS std gill net



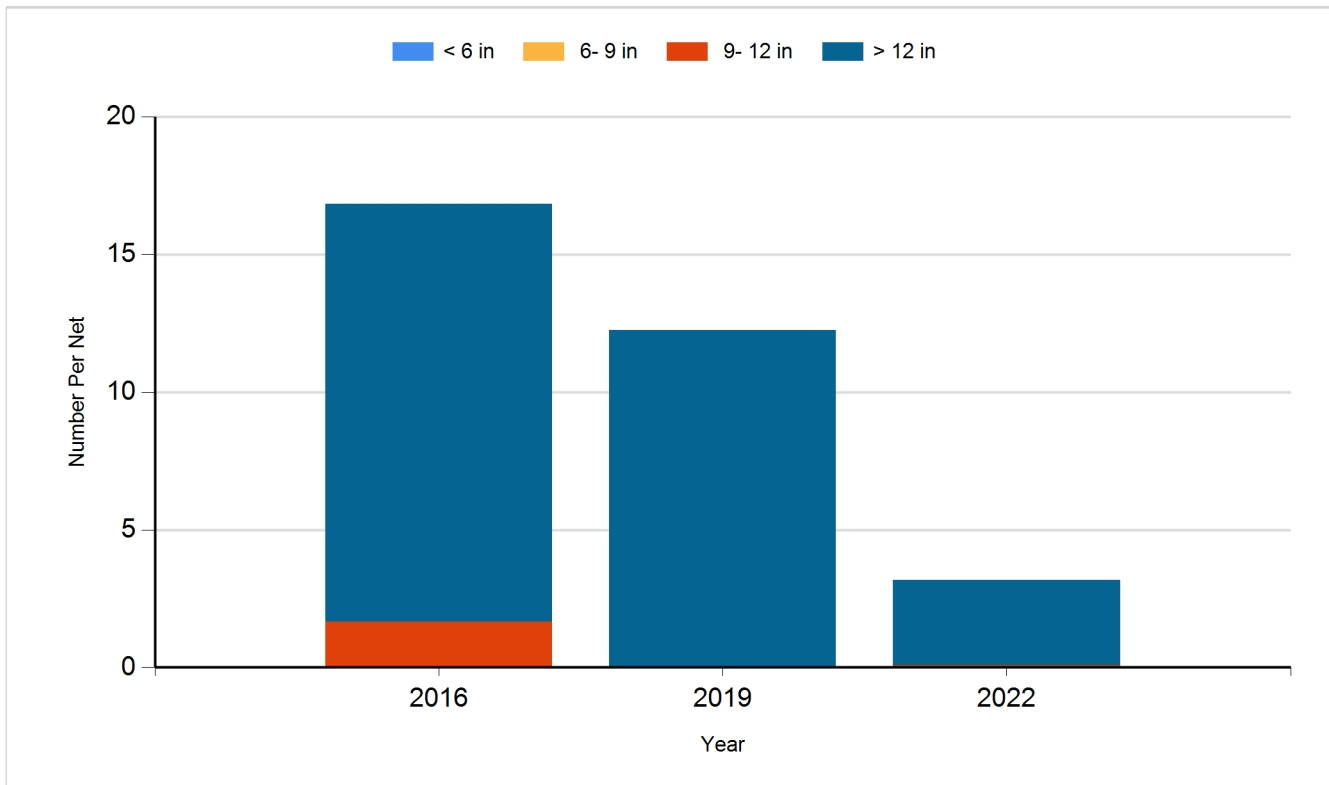
Species: Yellow Perch
Gear: AFS std gill net



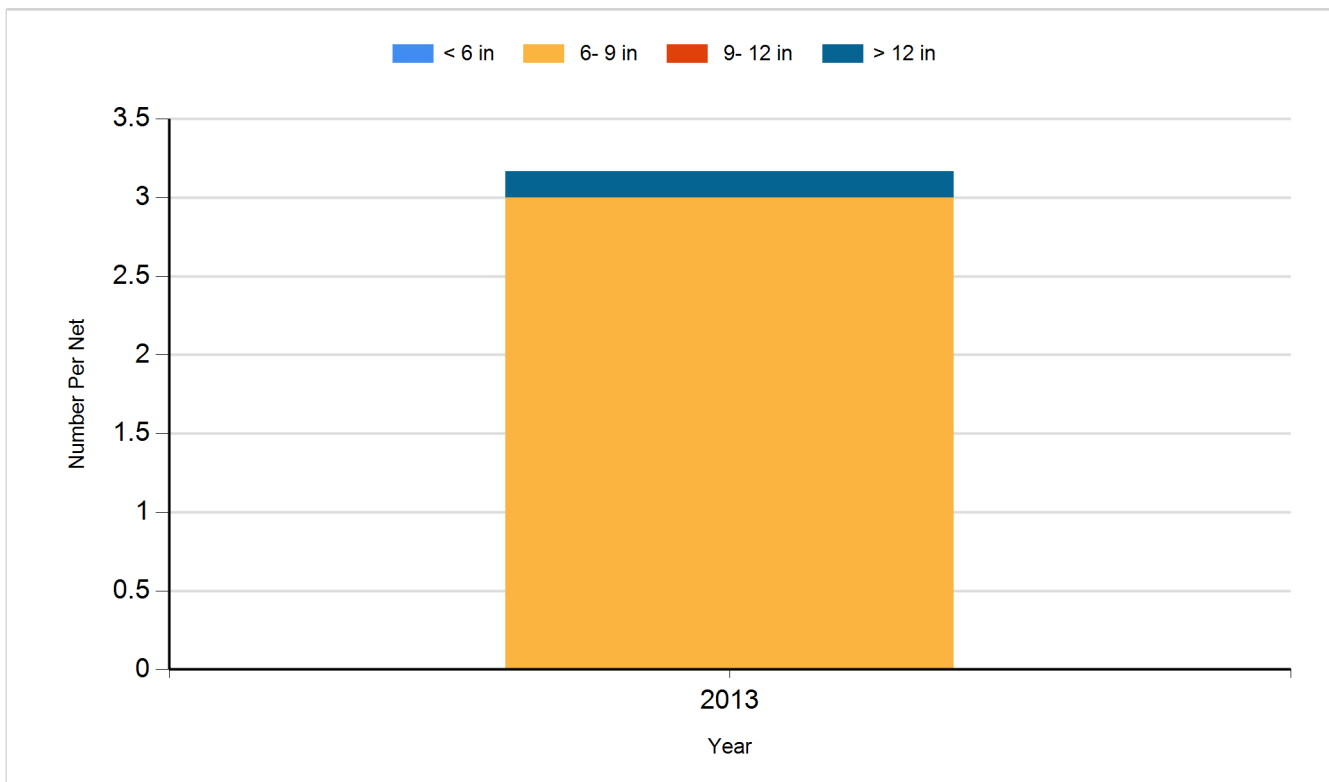
Historic Fish Sizes and Relative Abundance

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

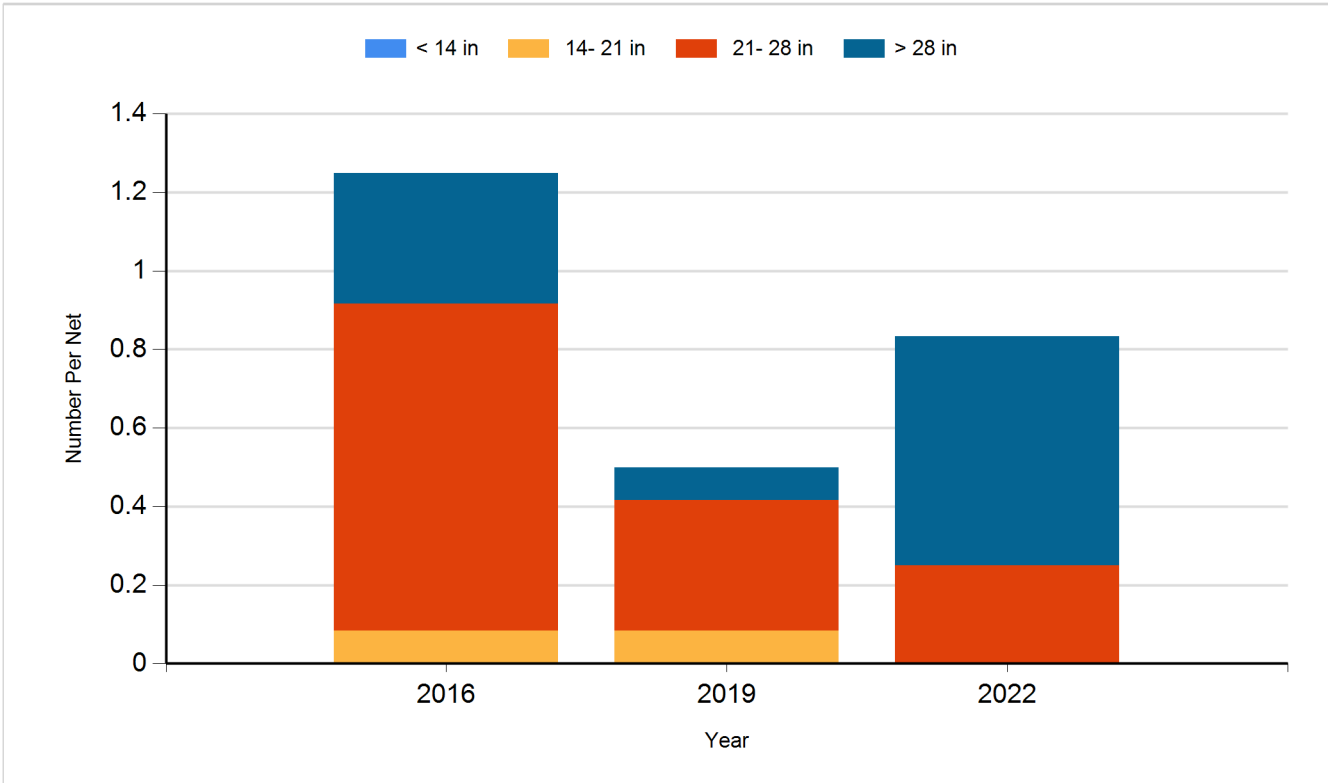
Species: Black Bullhead
Gear: AFS std gill net



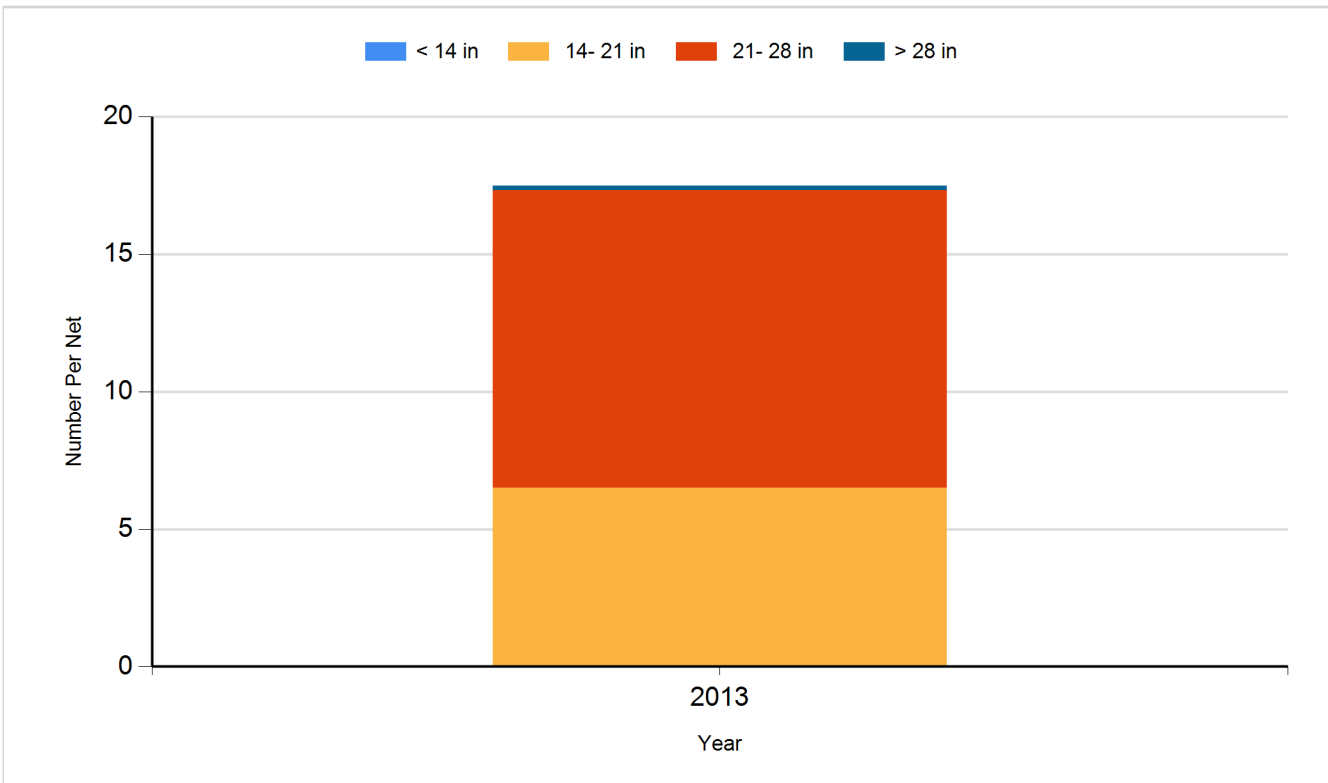
Species: Black Bullhead
Gear: std exp gill net



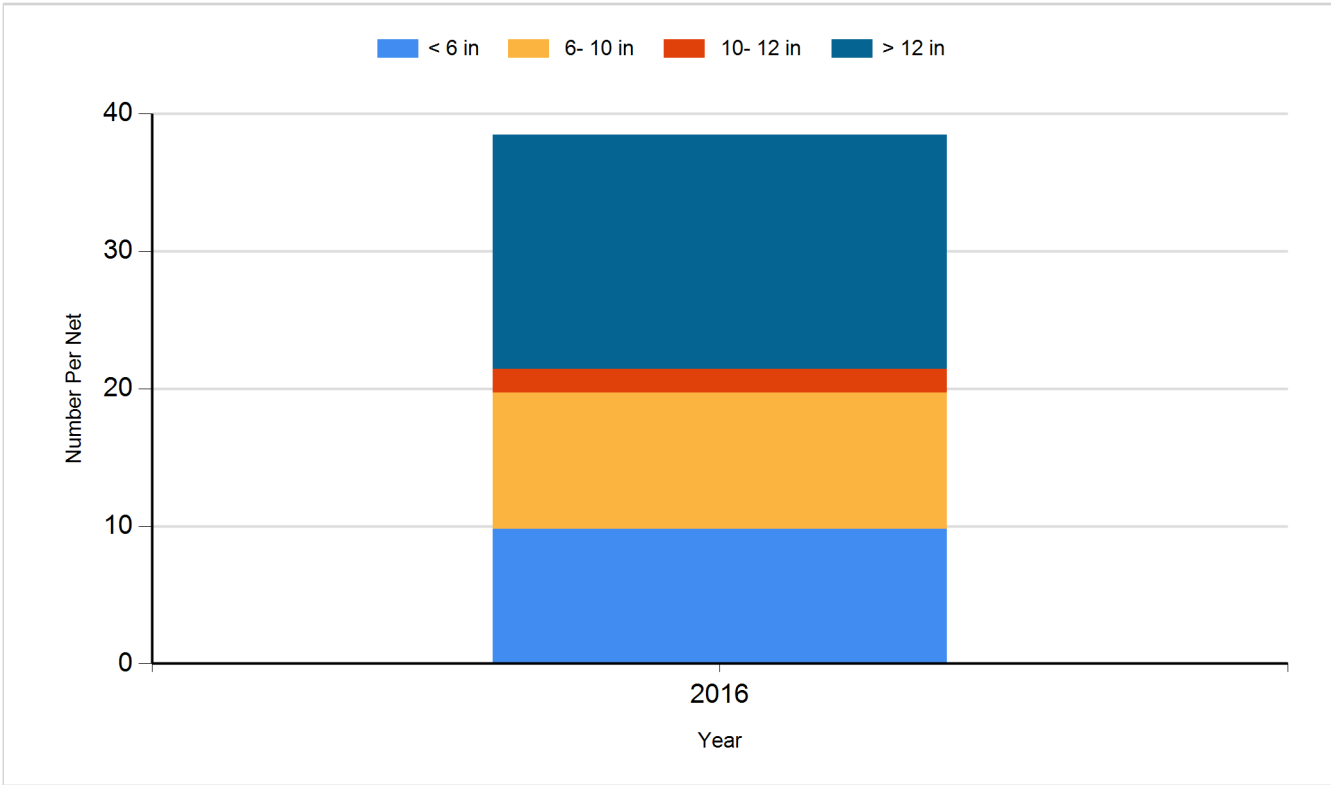
Species: Northern Pike
Gear: AFS std gill net



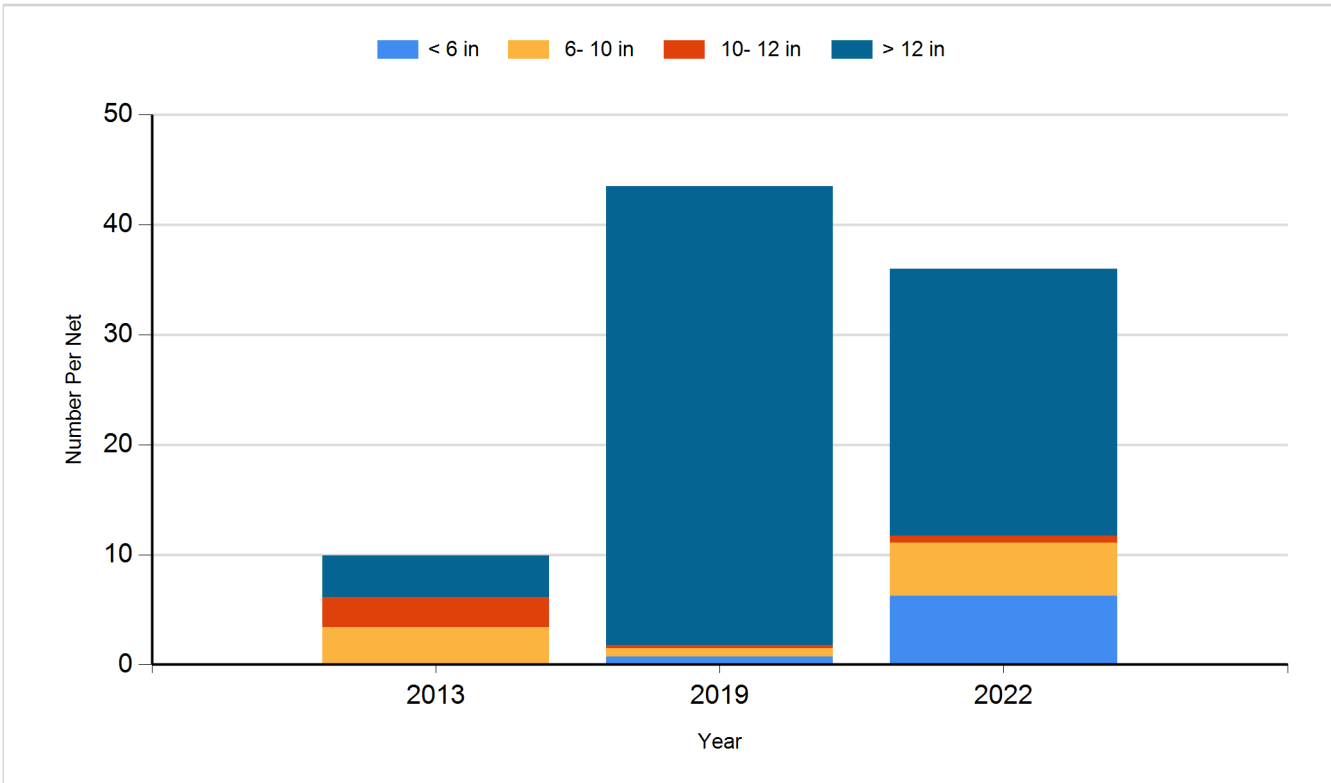
Species: Northern Pike
Gear: std exp gill net



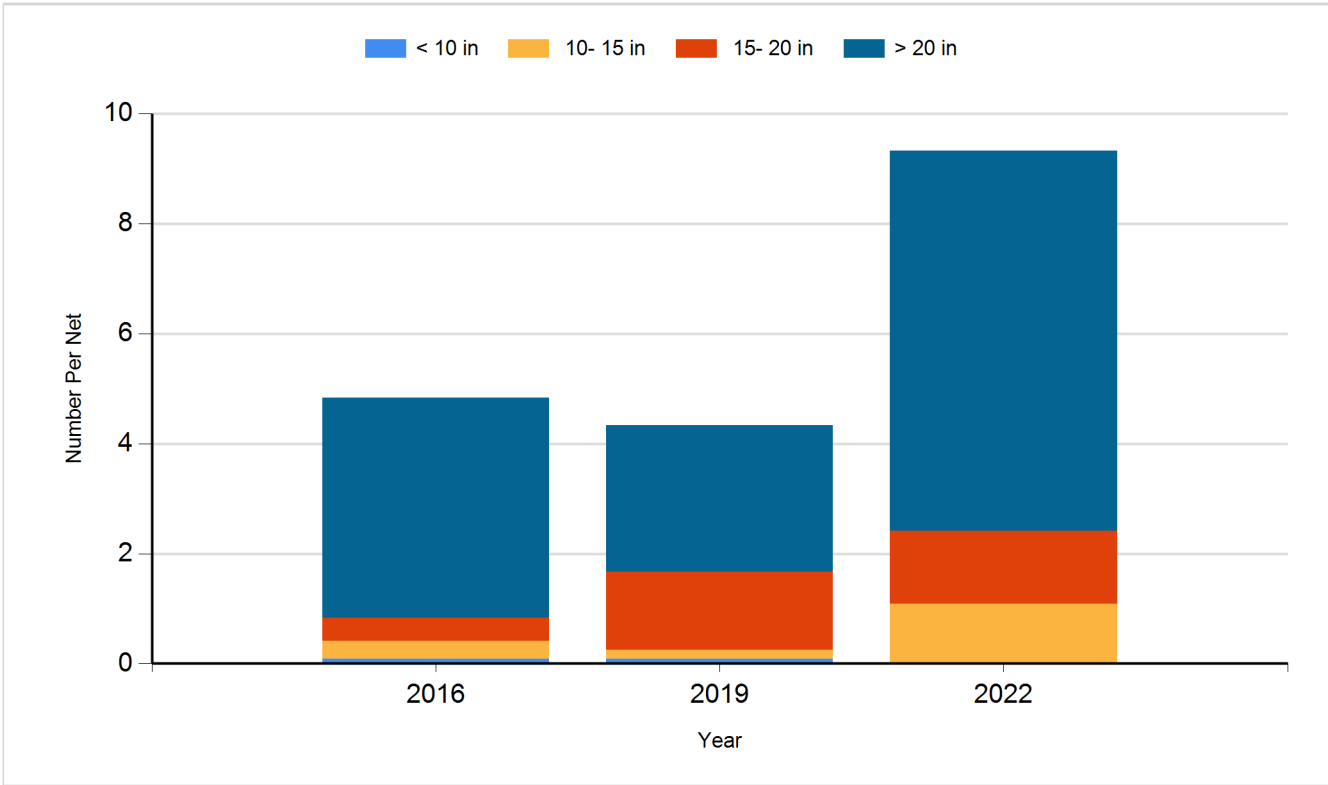
Species: Rudd
Gear: AFS std frame net



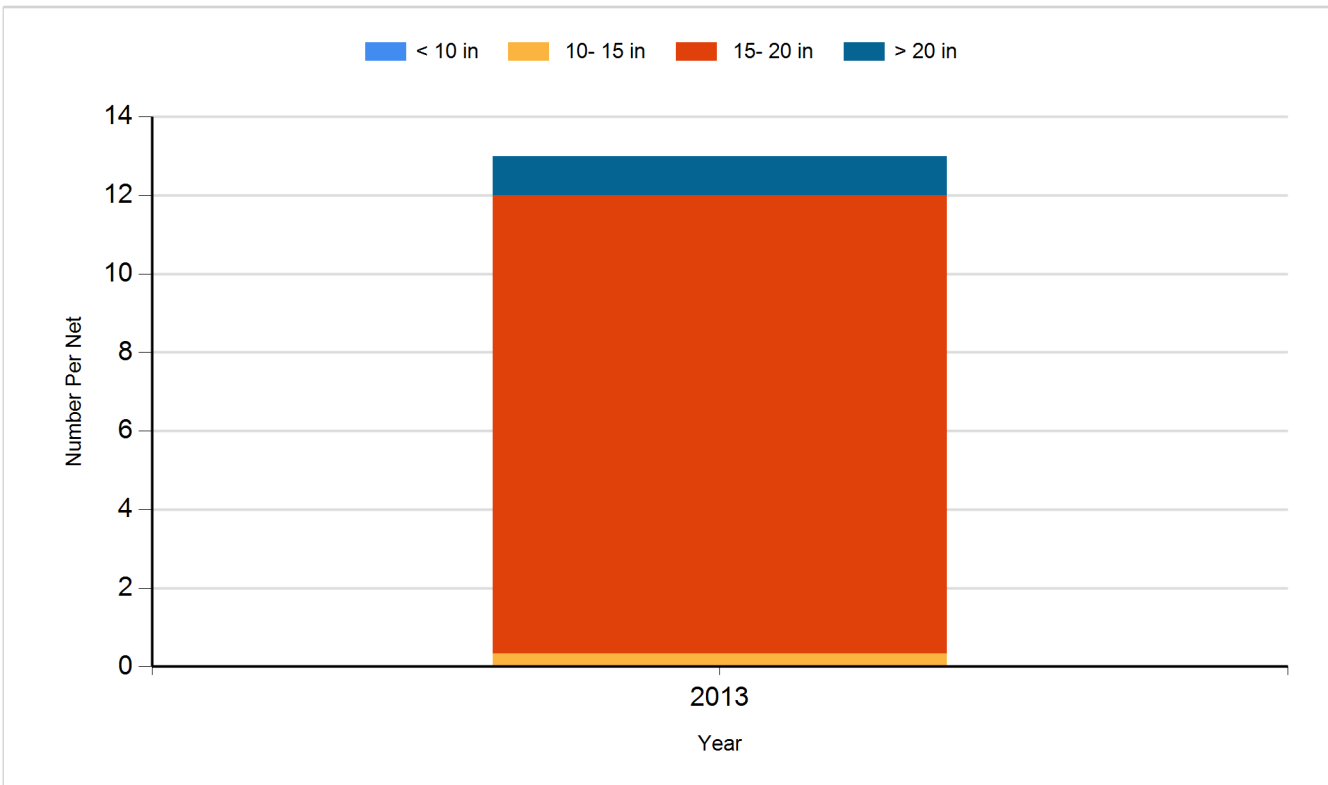
Species: Rudd
Gear: frame net (std 3/4 in)



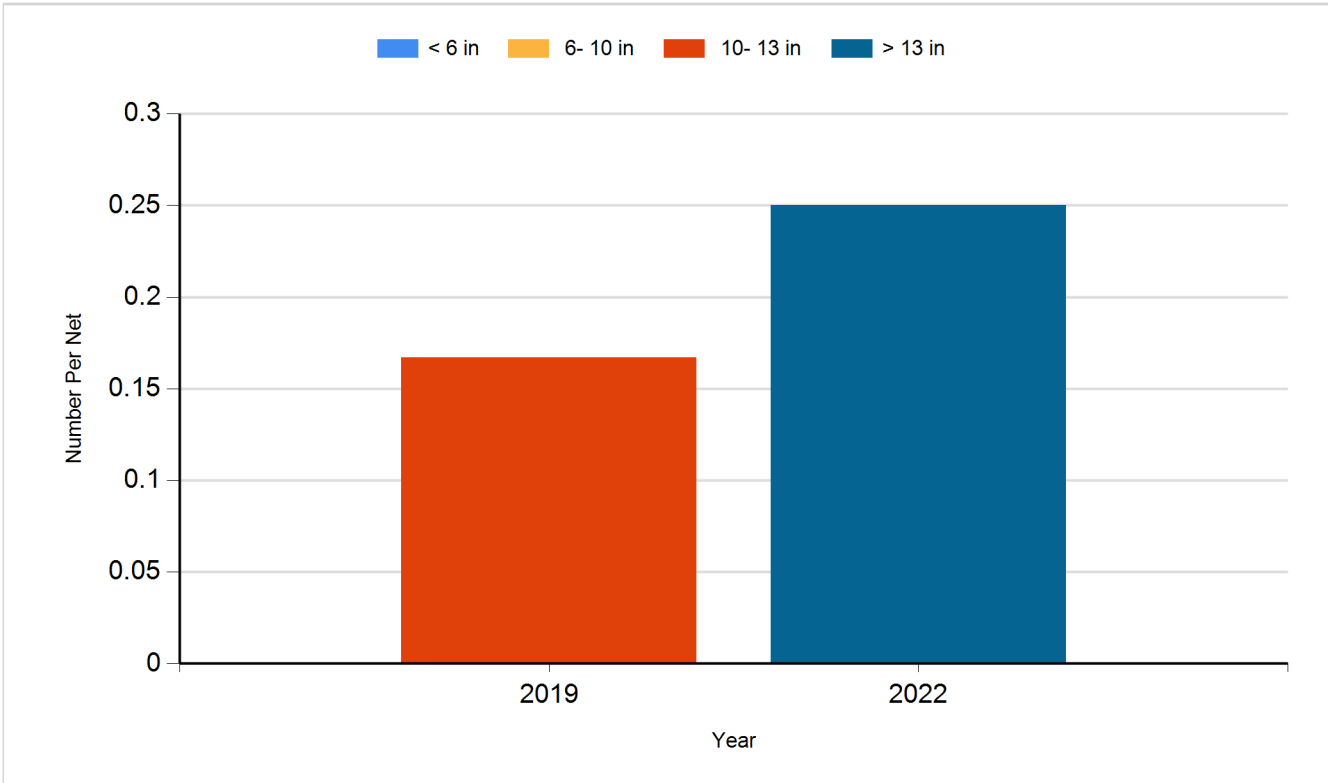
Species: Walleye
Gear: AFS std gill net



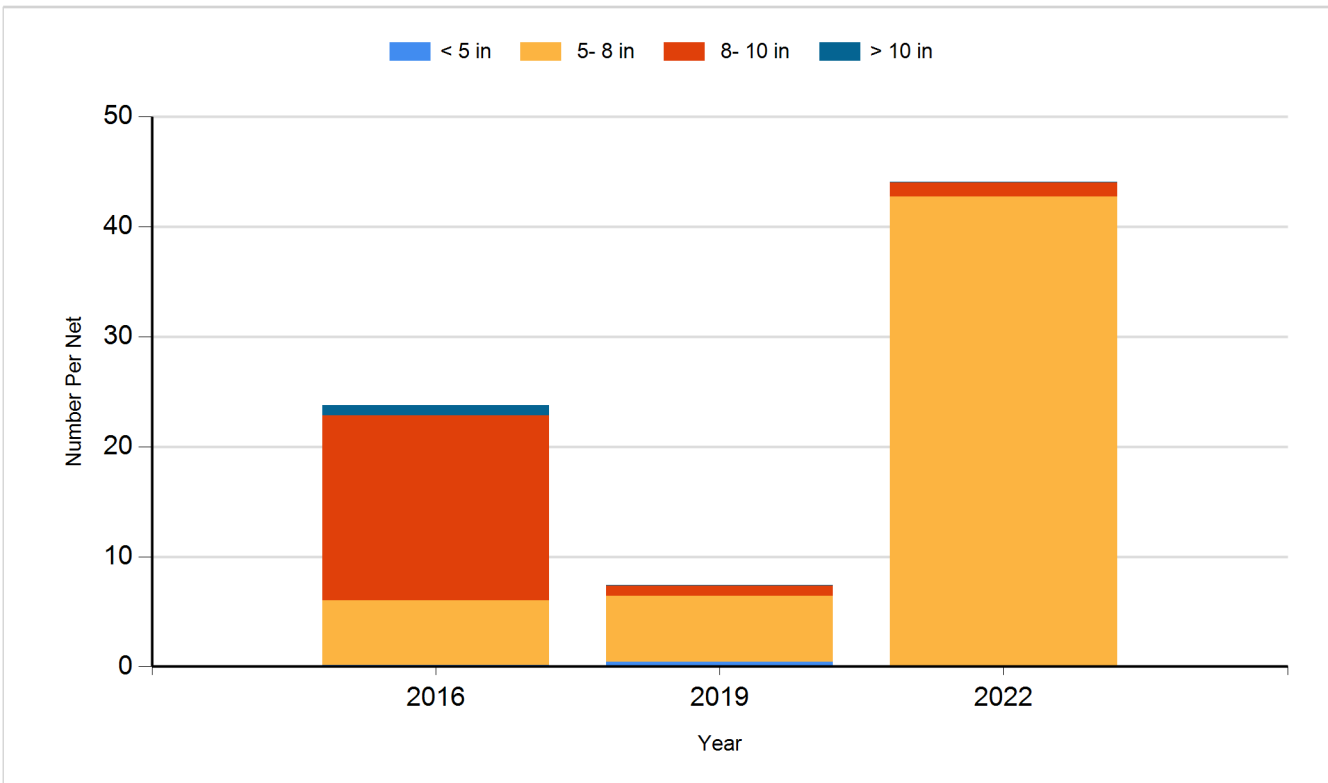
Species: Walleye
Gear: std exp gill net



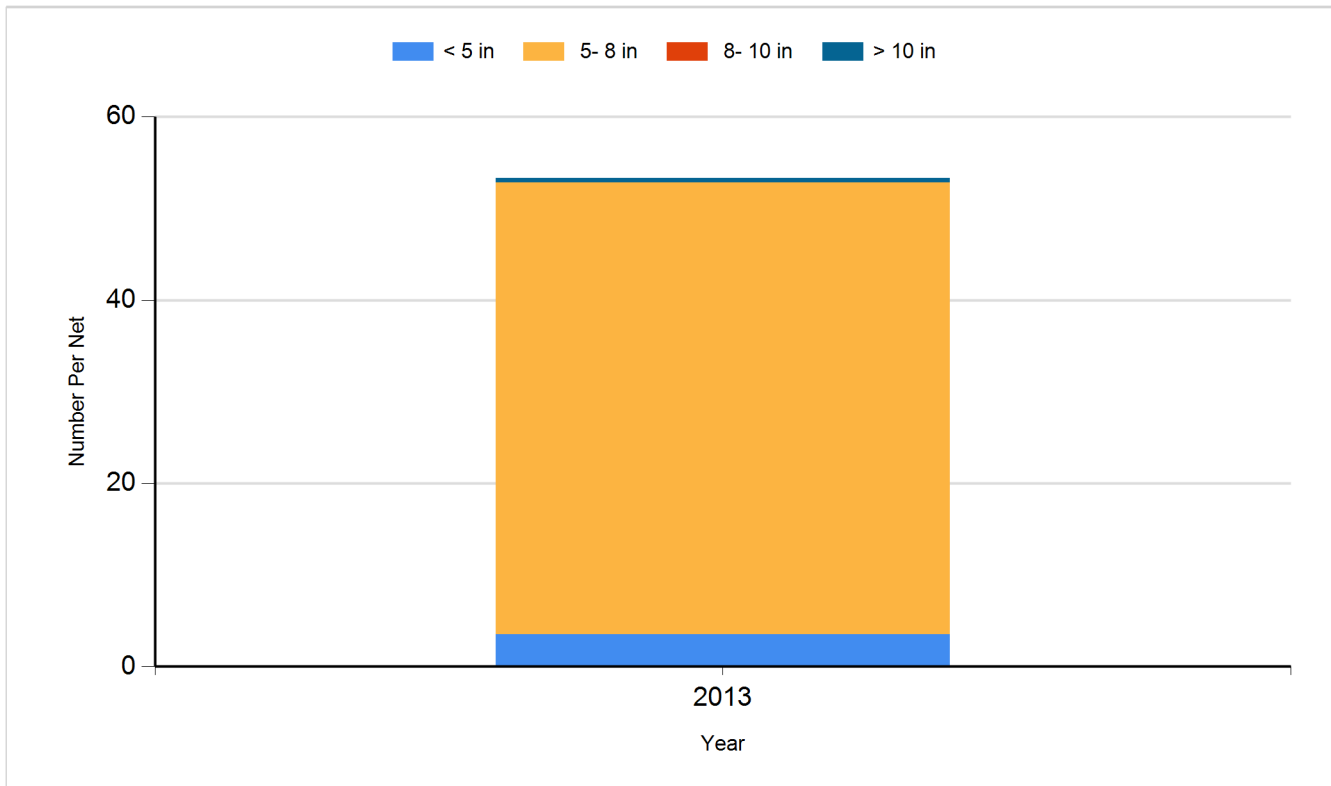
Species: White Sucker
Gear: AFS std gill net



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
2011	Walleye	Fry	500,000
2013	Walleye	Fry	575,000
2015	Walleye	Fry	570,000
2017	Walleye	Fry	575,000
2019	Walleye	Fry	575,000
2021	Walleye	Fry	600,000