

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Kettle, Marshall County

UJA-Lake-866-000

2024

Lake Information

Name:	Kettle	Maximum Depth:	18 Feet
County:	Marshall	Mean Depth:	10 Feet
Surface Area:	3,229 Acres		

Surveys and Investigations

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

Gear	Date	Effort
fall night EF-WAE	Oct 15, 2024	2400 seconds

Common Fish Species Present

Yellow Perch

Walleye

Northern Pike

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
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
AFS std gill net	Bigmouth Buffalo		0.0	0.0	0.0	0.0		0.0		0.0		0.00
	Black Bullhead		8.8	0.6	1.7	2.8		5.8		5.1		4.13
	Black Crappie		1.3	0.7	5.1	0.0		0.3		0.8		1.37
	Bluegill		0.5	0.2	0.3	0.2		0.1		0.0		0.22
	Common Carp		0.8	0.3	1.1	0.3		1.3		0.1		0.65
	Largemouth Bass		0.0	0.0	0.1	0.0		0.0		0.0		0.02
	Northern Pike		2.4	1.3	1.7	0.7		2.8		2.1		1.83
	Smallmouth Bass		0.2	0.1	0.3	0.4		0.2		0.3		0.25
	Walleye		2.6	5.1	6.1	2.0		6.5		3.0		4.22
	White Bass		0.1	0.0	0.0	0.1		0.5		0.8		0.25
	White Sucker		0.8	0.6	0.7	0.1		2.3		1.4		0.98
Yellow Perch		19.2	12.2	27.3	14.5		28.9		38.9		23.50	
boat shocker (night)	Walleye*	75.0	38.0									56.50
fall night EF- WAE*	Walleye								37.0	1.5		19.25
frame net (std 3/4 in)	Bigmouth Buffalo							0.0		0.0		0.00
	Black Bullhead							77.3		12.8		45.05
	Black Crappie							1.9		8.5		5.20
	Bluegill							41.8		3.8		22.80
	Bluegill X Gr. Sunfish Hybrid							0.0		0.0		0.00
	Common Carp							0.5		0.5		0.50
	Green Sunfish							0.0		0.9		0.45
	Largemouth Bass							0.1		0.1		0.10
	Northern Pike							1.1		0.5		0.80
	Smallmouth Bass							0.1		0.8		0.45
	Sunfish Hybrid							2.0		0.0		1.00
	Walleye							0.3		0.4		0.35
	White Bass							0.0		1.8		0.90
	White Sucker							0.0		0.2		0.10
Yellow Perch							15.4		77.6		46.50	
std exp gill net	Black Bullhead	45.2										45.20
	Black Crappie	26.0										26.00
	Bluegill	0.2										0.20

CPUE

Gear	Species	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg
std exp gill net	Common Carp	0.0										0.00
	Largemouth Bass	0.0										0.00
	Northern Pike	1.8										1.80
	Smallmouth Bass	0.0										0.00
	Walleye	6.3										6.30
	White Bass	0.0										0.00
	White Sucker	0.2										0.20
	Yellow Perch	28.8										28.80

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									
			2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AFS std gill net	Northern Pike	PSD		97	100	85	100		79		84	
		PSD-P		21	31	5	13		6		0	
		Wr		86	77	90	94		89		94	
	Walleye	PSD		74	90	84	92		72		69	
		PSD-P		61	75	48	63		21		19	
		Wr		93	88	95	102		92		97	
	Yellow Perch	PSD		1	8	12	3		17		9	
		PSD-P		0	0	0	0		2		0	
		Wr		99	102	100	108		100		98	
boat shocker (night)	Walleye	PSD	0	0								
		PSD-P	0	0								
		Wr	97	100								
frame net (std 3/4 in)	Northern Pike	PSD							88		100	
		PSD-P							19		13	
		Wr							87		82	
	Walleye	PSD							100		100	
		PSD-P							25		86	
		Wr							89		92	
	Yellow Perch	PSD							7		6	
		PSD-P							1		1	
		Wr							88		89	
std exp gill net	Northern Pike	PSD	100									
		PSD-P	9									
		Wr	91									
	Walleye	PSD	26									
		PSD-P	24									
		Wr	98									
	Yellow Perch	PSD	5									
		PSD-P	0									
		Wr	98									

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+
2023	36	288 (9)	397 (10)	473 (7)	484 (3)		597 (1)		644 (1)	605 (2)	628 (3)
2021	78	296 (21)	419 (40)	476 (1)		600 (2)	561 (1)	556 (1)			638 (12)
2019	24	336 (2)	435 (5)	507 (3)	541 (2)	550 (4)			565 (1)		614 (7)
2018	73	346 (12)	432 (21)	467 (3)	530 (12)	553 (1)	584 (1)	593 (2)	657 (1)	639 (2)	626 (18)
2017	61	302 (6)	398 (2)	492 (6)	521 (2)		535 (4)	599 (4)	625 (2)	592 (7)	620 (28)
2016	31	292 (8)	436 (3)	520 (1)		526 (3)	545 (1)	568 (2)	573 (1)		598 (12)
2015	40	311 (30)			518 (4)	514 (1)		632 (1)		557 (4)	

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2023	467	156 (408)	210 (59)								
2021	345	159 (277)	218 (63)	277 (4)	283 (1)						
2019	174	160 (132)	178 (41)	224 (1)							
2018	327	157 (256)	198 (66)	211 (5)							
2017	146	158 (129)	209 (17)								
2016	231	150 (170)	171 (43)	154 (18)							
2015	258	134 (227)	192 (31)								

Fish Condition

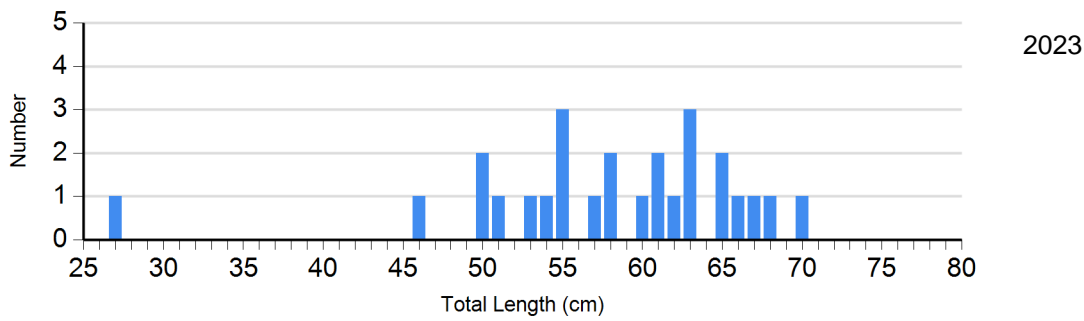
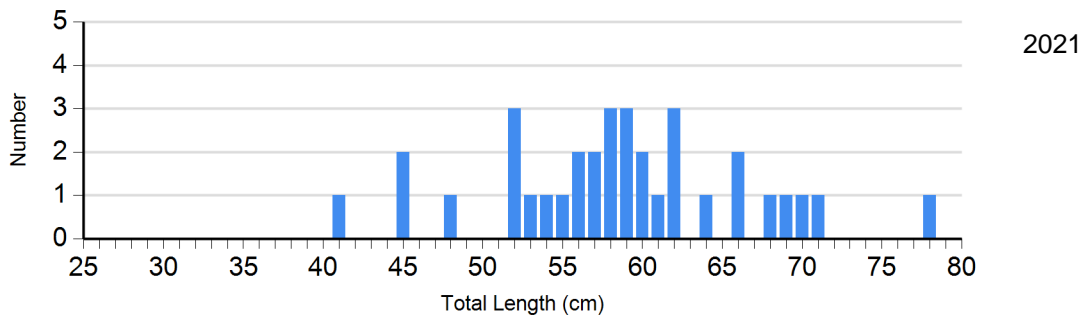
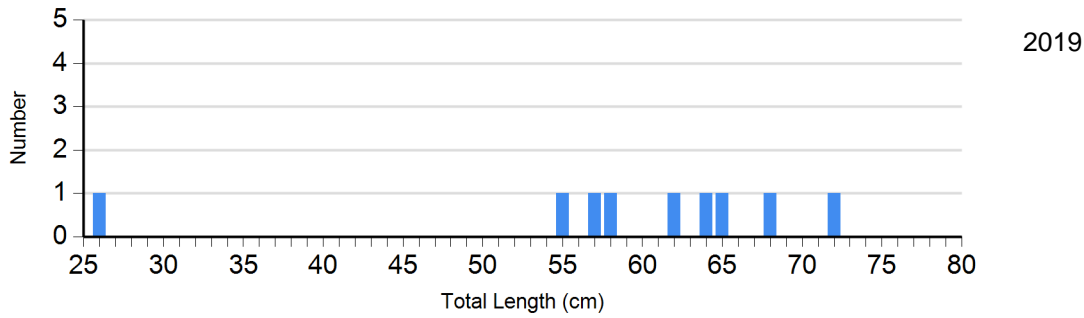
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2021	7	91 (1.4)	25	88 (1.1)	2	93 (1.6)	0	
	2023	4	99 (1.7)	21	93 (1.1)	0		0	
Walleye Gill Net	2021	22	91 (1.3)	40	92 (1.1)	9	95 (1.4)	7	96 (2.0)
	2023	11	101 (1.9)	18	97 (1.3)	3	91 (2.0)	4	91 (4.9)
Yellow Perch Gill Net	2021	288	101 (0.6)	52	97 (0.9)	7	98 (3.0)	0	
	2023	424	98 (0.5)	43	92 (1.0)	0		0	

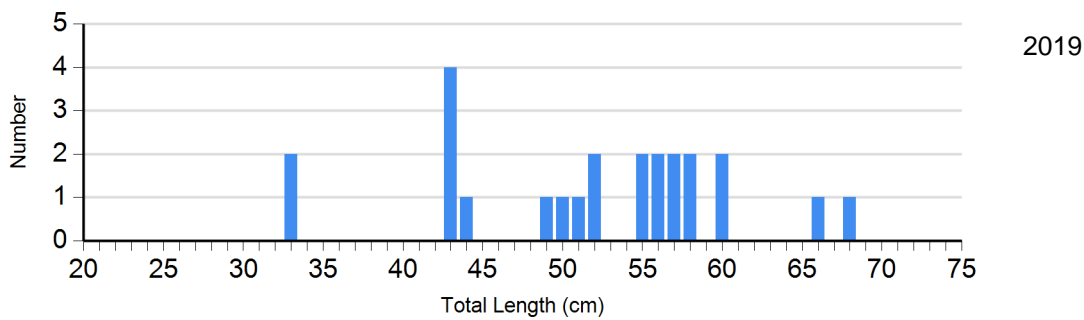
Length Frequency Distribution

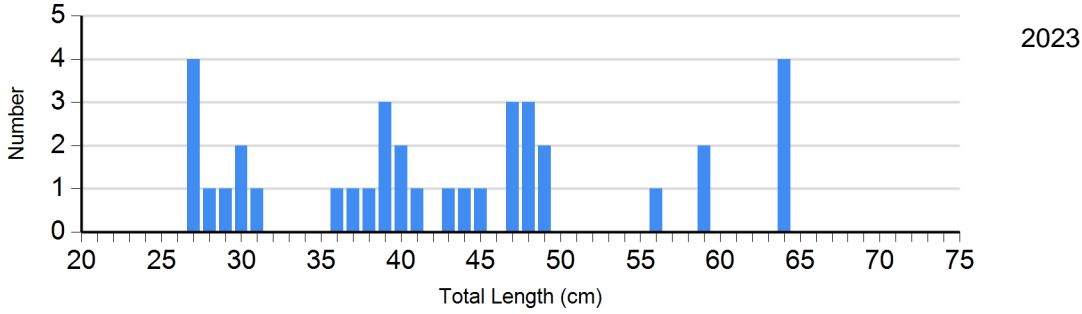
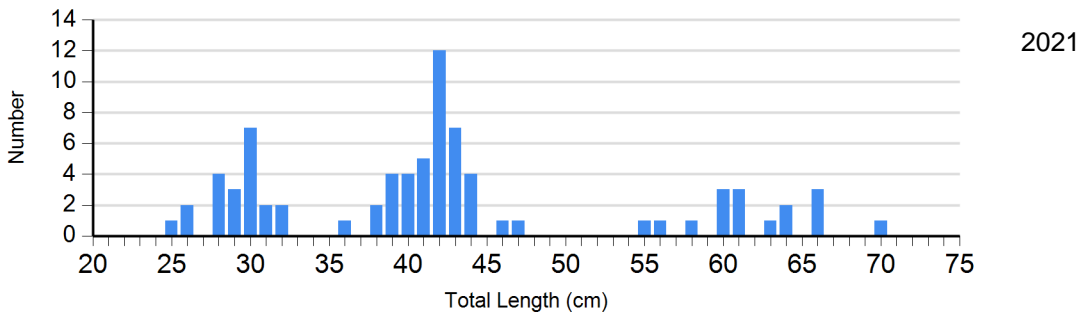
Length frequency histogram of species sampled by year.

Species: Northern Pike
Gear: AFS std gill net

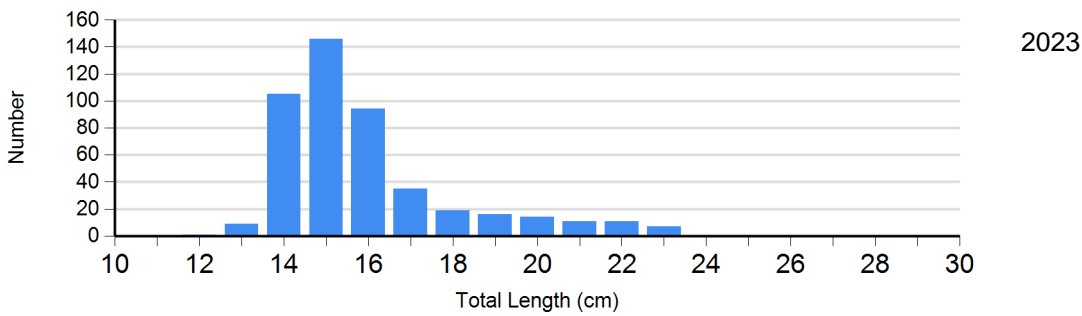
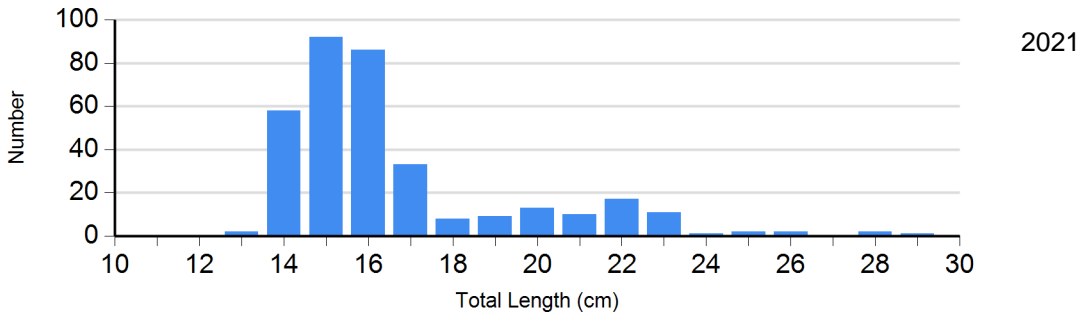
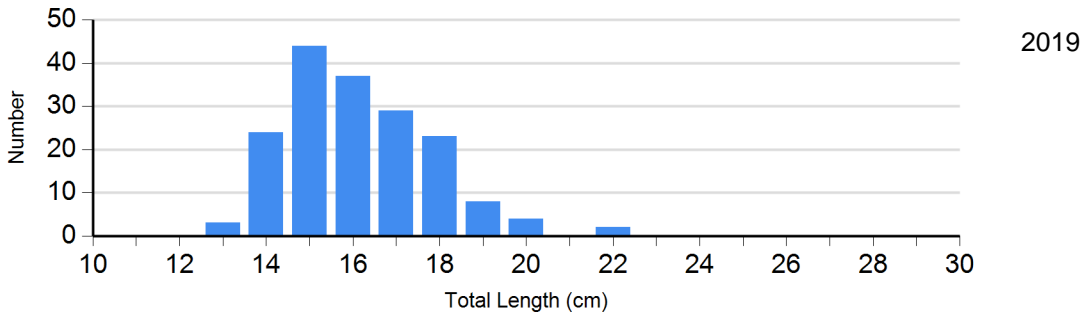


Species: Walleye
Gear: AFS std gill net





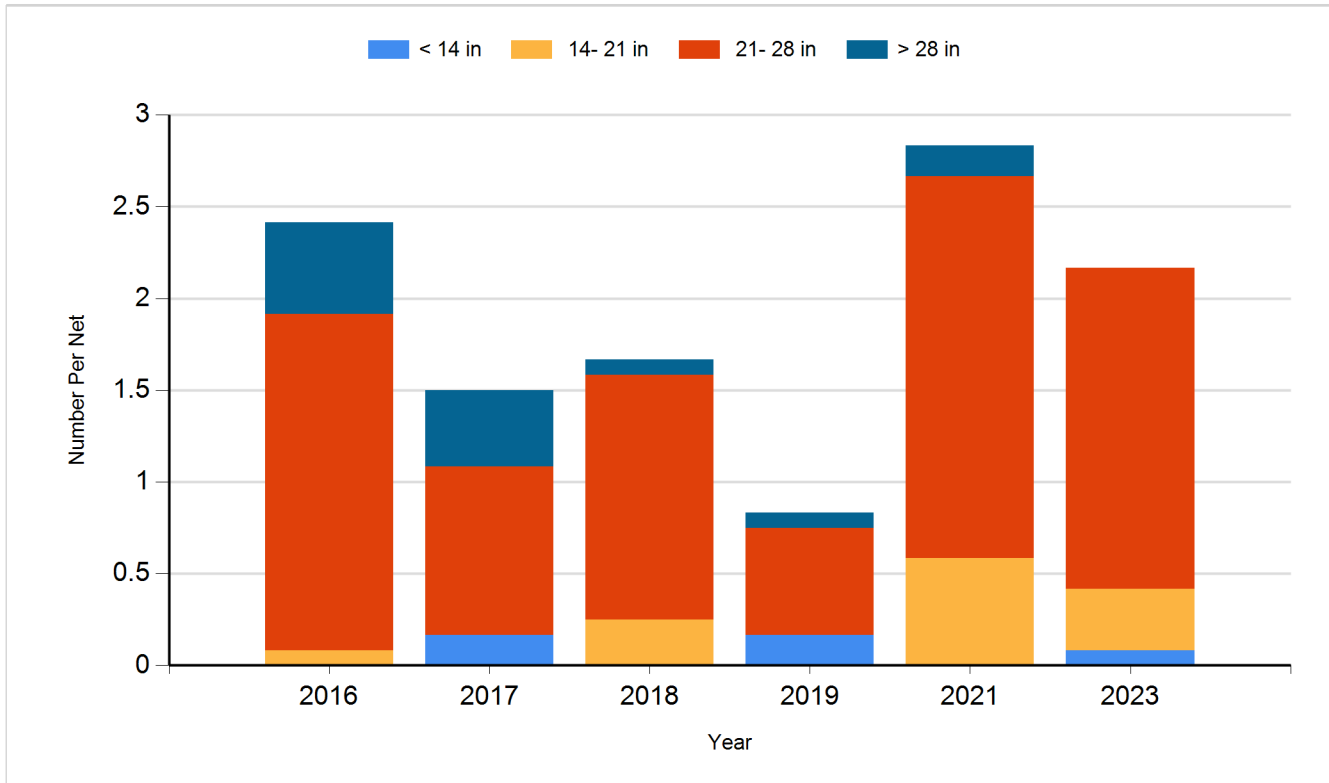
Species: Yellow Perch
 Gear: AFS std gill net



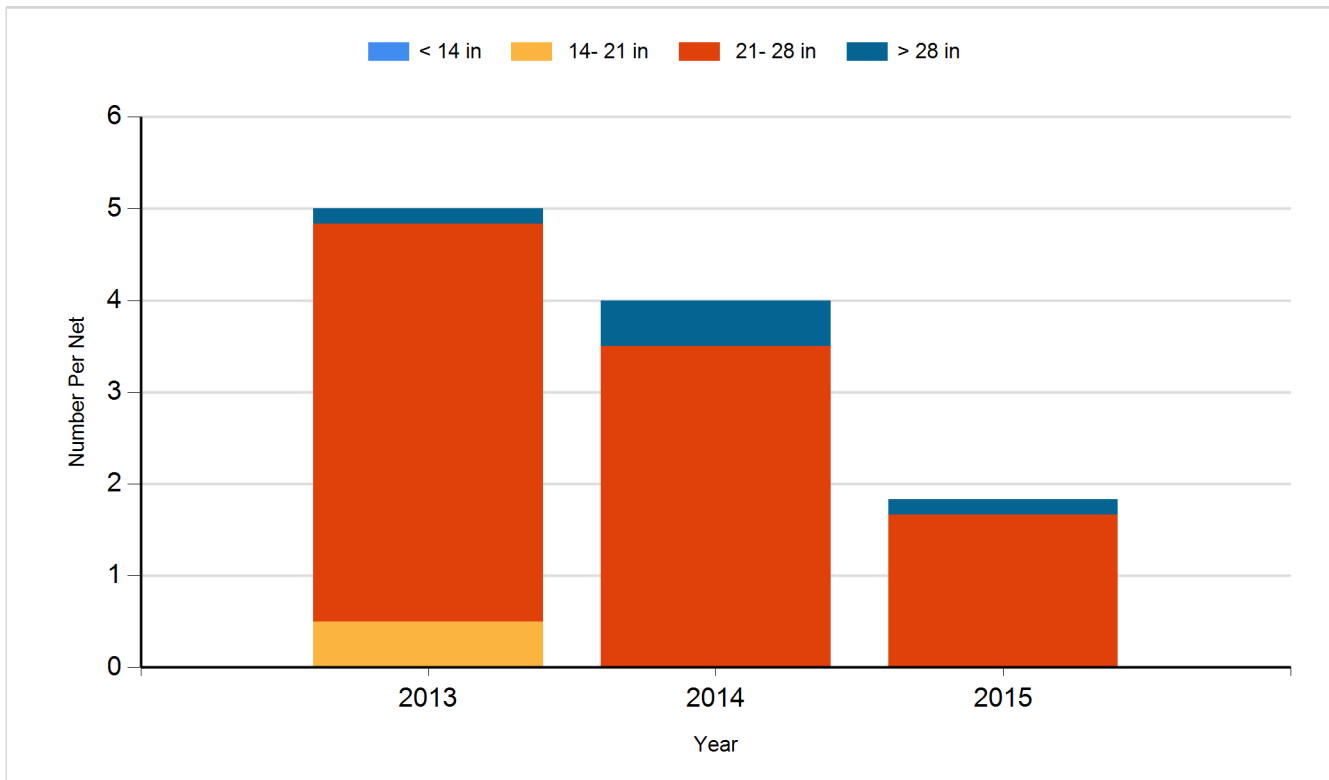
Historic Fish Sizes and Relative Abundance

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

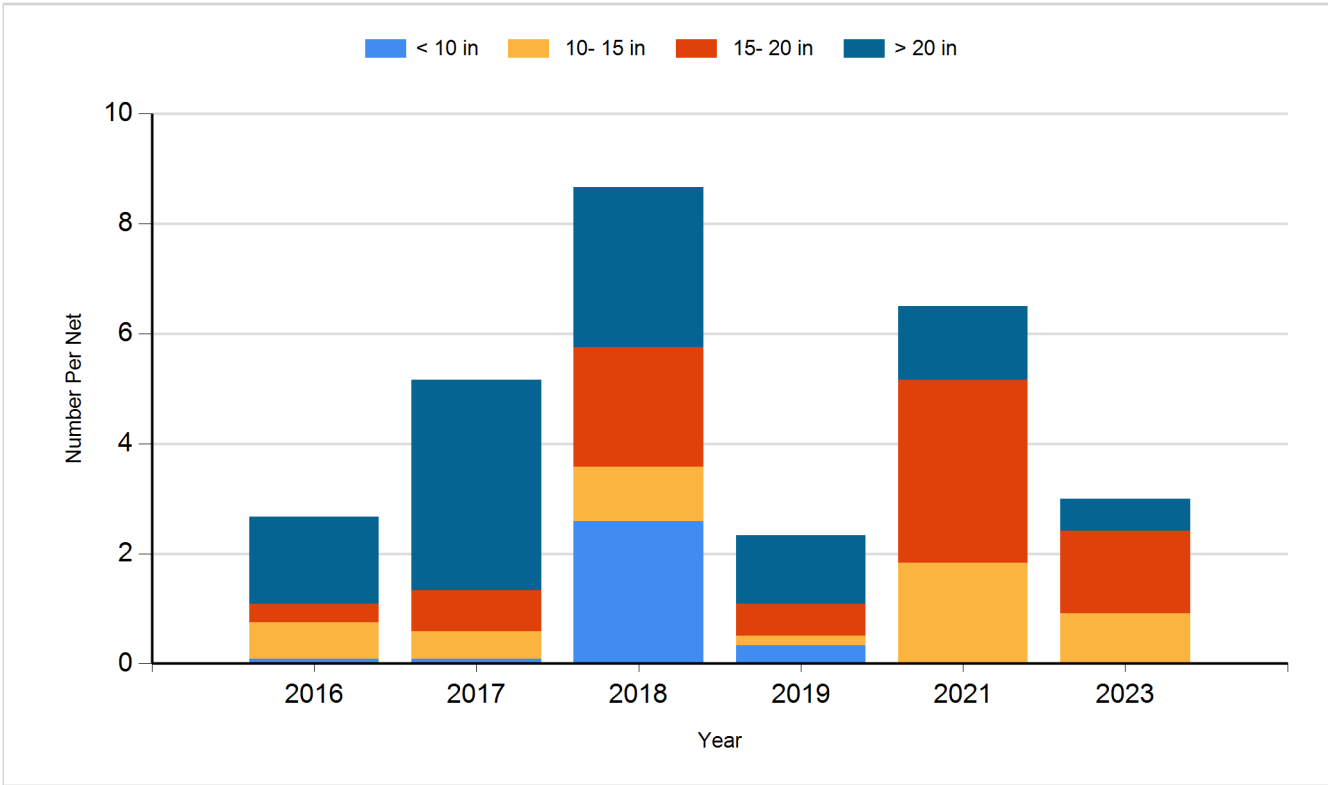
Species: Northern Pike
Gear: AFS std gill net



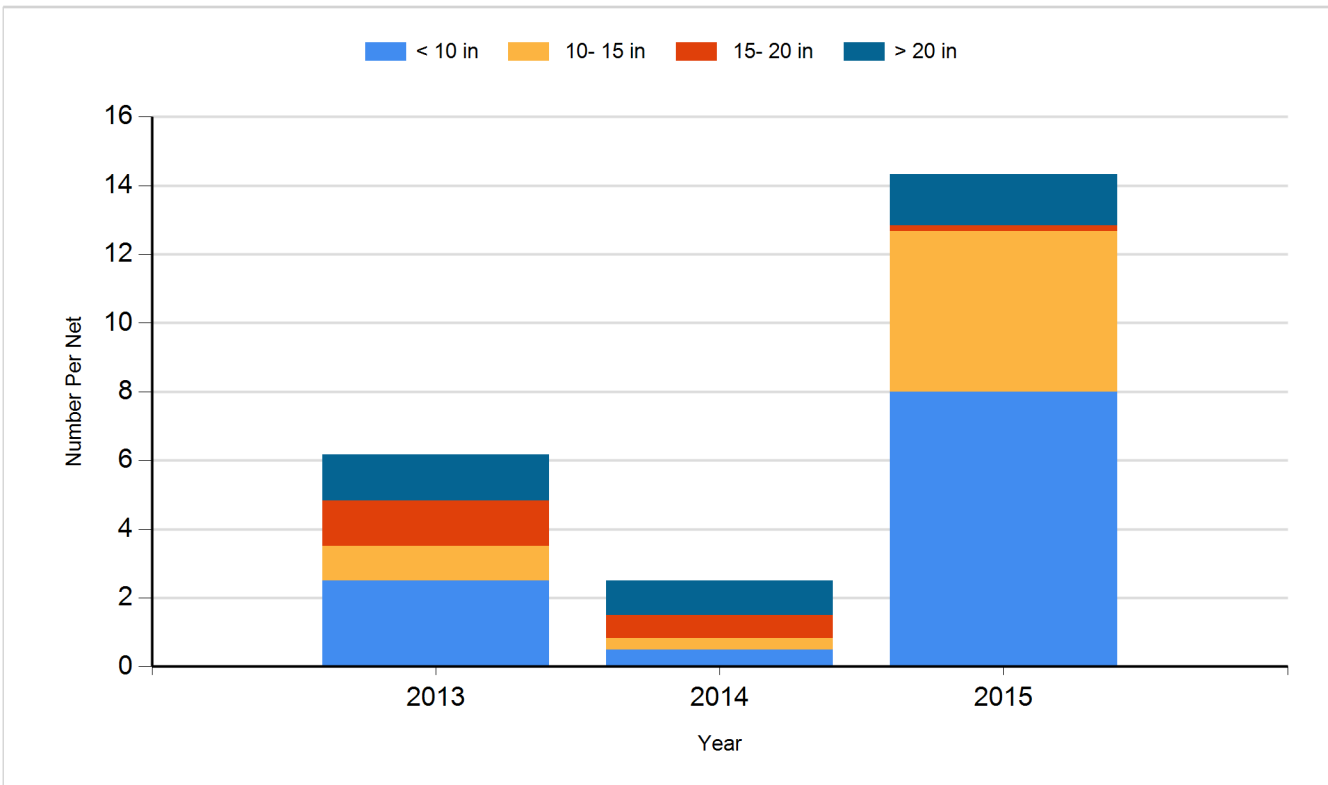
Species: Northern Pike
Gear: std exp gill net



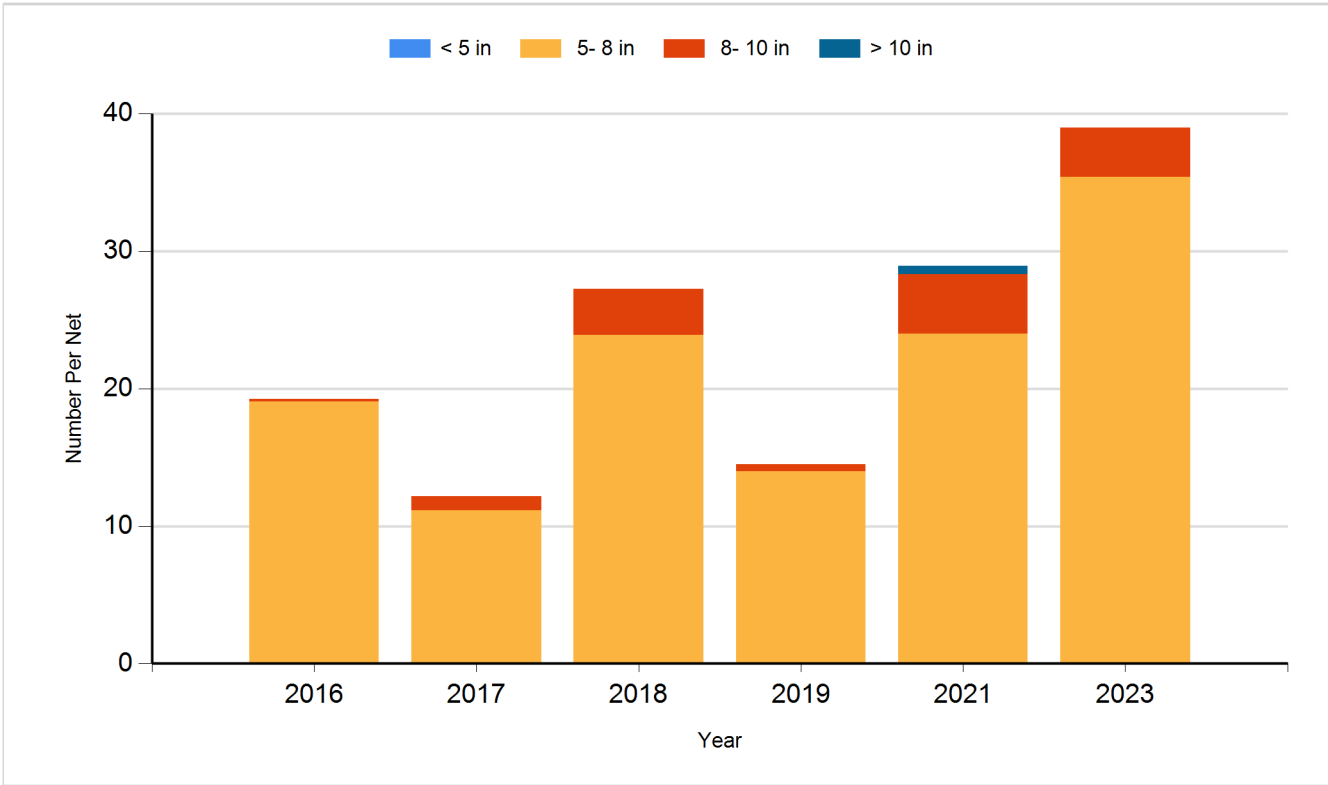
Species: Walleye
Gear: AFS std gill net



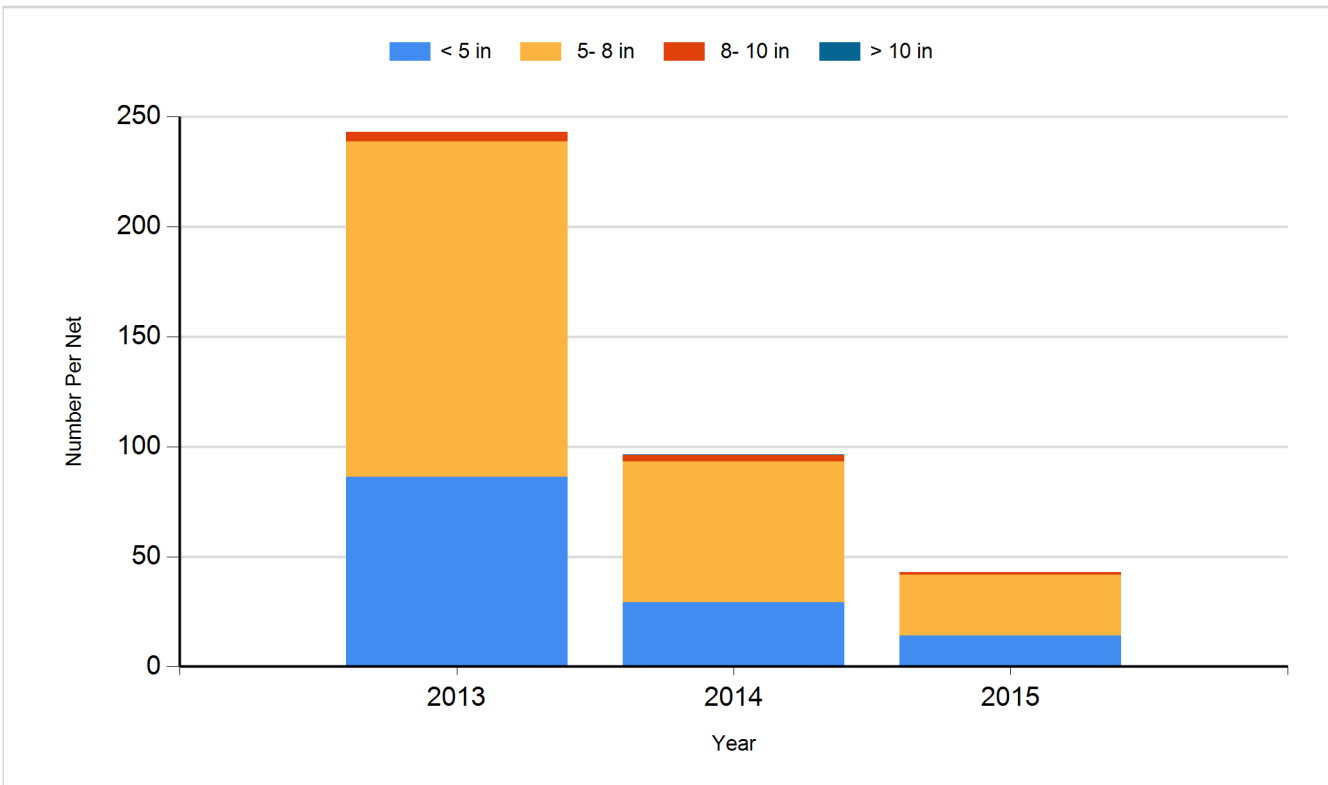
Species: Walleye
Gear: std exp gill net



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	Fry	1,350,000
2014	Walleye	Large Fingerling	5,165
2015	Walleye	Small Fingerling	270,120
2018	Walleye	Fry	1,350,000
2021	Walleye	Fry	1,400,000
2023	Walleye	Juvenile	189,635