Summit Lake Survey Summary

Summit Lake, located 1.0 mile south and 1.5 miles east of Summit, is primarily managed for walleye and yellow perch, but other fish species (e.g., northern pike and smallmouth bass) also contribute to the fishery.

- **Northern pike.** Fewer northern pike were sampled in 2018 than in 2010 and 2014. Relative abundance was considered moderate with a mean gill net CPUE of 1.2. Sampled northern pike ranged in length from 22.4 to 32.3 inches.

- **Walleye.** Walleye numbers were considerably lower than those observed in 2010 and 2014. In 2018, only two walleyes (13.6 inches and 23.1 inches) were captured by gill nets.

- **Yellow Perch**. Yellow perch were the most abundant fish species in the 2018 gill net catch. At 53.5/gill net, relative abundance was considered high. Sampled yellow perch ranged in length from 4.7 to 10.3 inches; three year classes (2015 – 2017) comprised the entire sample. Those from the 2016 cohort, which had a mean length of 7.3 inches, were the most numerous.

For more detailed results see the computer generated South Dakota Statewide Fisheries Survey for Summit Lake (below).

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Summit, Grant County
UMN-Lake-697-000
2018

Lake Information

Name: Summit

County: Grant

Surface Area: 202 Acres

Maximum Depth: 13 Feet

Mean Depth: 8 Feet

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 28, 2018	3 net-nights
AFS std gill net	Jun 29, 2018	3 net-nights

Common Fish Species Present

Northern Pike

Yellow Perch

Walleye

Smallmouth Bass

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.
- s**td 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.

$$CPUE = \frac{number\ of\ fish}{effort}$$

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.

$$PSD = \left(\frac{number\ of fish \geq quality\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

$$PSD - P = \left(\frac{number\ of fish\ \geq preferred\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

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.

$$Wr = \left(\frac{W}{Ws}\right) \text{x } 100$$

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).

	Stock		Quality		Preferred		Memorable		Trophy	
Species Name	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)
Bigmouth Buffalo	11	28	18	46	24	61	30	76	37	94
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
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Common Carp	11	28	16	41	21	53	26	66	33	84
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Gizzard Shad	7	18	11	28						
Green Sunfish	3	8	6	15	8	20	10	25	12	30
Lake Herring	5	13	8	20	11	28	14	35	17	43
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
Rock Bass	4	10	7	18	9	23	11	28	13	33
Rudd	6	15	10	25	12	30	15	38	19	48
Saugeye	9	23	14	35	18	46	22	56	27	69
Shorthead Redhorse	6	15	10	25	13	33	16	41	20	51
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
White Sucker	6	15	10	25	13	33	16	41	20	51
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**

		Abundance		Stock Density Indices				Condition	
Gear	Species	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Black Bullhead	0.2	0.2	0		0		89	
	Northern Pike	1.2	1.0	100		86		85	3
	Smallmouth Bass	0.7	0.5	100		100		109	3
	Walleye	0.3	0.3	50		50		100	4
	Yellow Perch	53.5	8.5	12	3	0		112	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.

		CPUE										
Gear	Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Avg
AFS std gill net	Black Bullhead										0.2	0.2
	Northern Pike										1.2	1.2
	Smallmouth Bass										0.7	0.7
	Walleye										0.3	0.3
	Yellow Perch										53.5	53.5
frame net (std 3/4 in)	Black Bullhead		0.2				393.2					196.7
	Bluegill		2.6				0.0					1.3
	Northern Pike		0.2				0.7					0.5
	Smallmouth Bass		1.0				0.3					0.7
	Walleye		0.4				0.2					0.3
	Yellow Perch		0.7				1.6					1.2
std exp gill net	Black Bullhead		0.0				103.3					51.7
	Northern Pike		3.3				2.0					2.7
	Smallmouth Bass		0.3				1.0					0.7
	Walleye		12.3				7.0					9.7
	Yellow Perch		3.3				50.0					26.7

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.

			Year									
Gear	Species	Index	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AFS std gill net	Northern Pike	PSD										100
		PSD-P										86
		Wr										85
	Walleye	PSD										50
		PSD-P										50
		Wr										100
	Yellow Perch	PSD										12
		PSD-P										0
		Wr										112
std exp gill net	Northern Pike	PSD		30				100				
		PSD-P		0				17				
		Wr		97				81				
	Walleye	PSD		49				52				
		PSD-P		0				29				
		Wr		102				89				
	Yellow Perch	PSD		100				63				
		PSD-P		20				0				
		Wr		111				101				

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+
2018	2		346 (1)							586 (1)	
2014	25	174 (3)		316 (6)	381 (7)	544 (4)	528 (4)				669 (1)
2010	53	221 (16)	334 (17)	397 (20)							

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	330	134 (79)	185 (241)	237 (10)							
2014	169	99 (13)		125 (8)	193 (70)	217 (76)	242 (1)				
2010	281	93 (271)	218 (8)	270 (2)							

Fish Condition

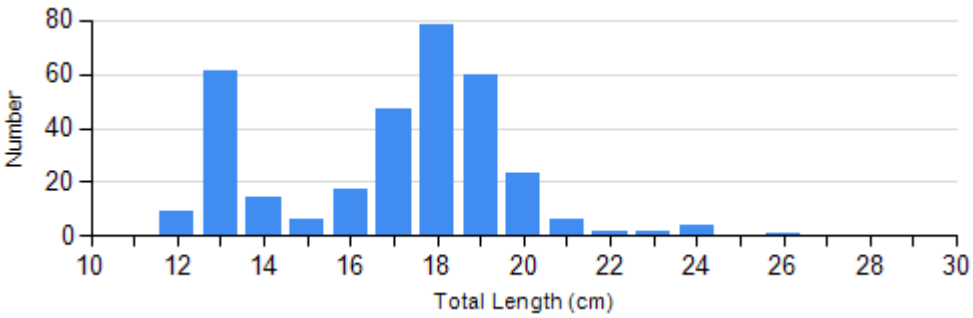
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2014	0		5	82 (2.6)	1	78	0	
	2018	0		1	96	6	83 (1.8)	0	
Walleye Gill Net	2014	10	91 (1.4)	5	89 (0.9)	5	86 (2.8)	1	91
	2018	1	97	0		1	103	0	
Yellow Perch Gill Net	2014	55	103 (0.6)	95	100 (0.6)	0		0	
	2018	283	113 (0.5)	37	107 (1.1)	1	96	0	

Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Yellow Perch
Gear: AFS std gill net

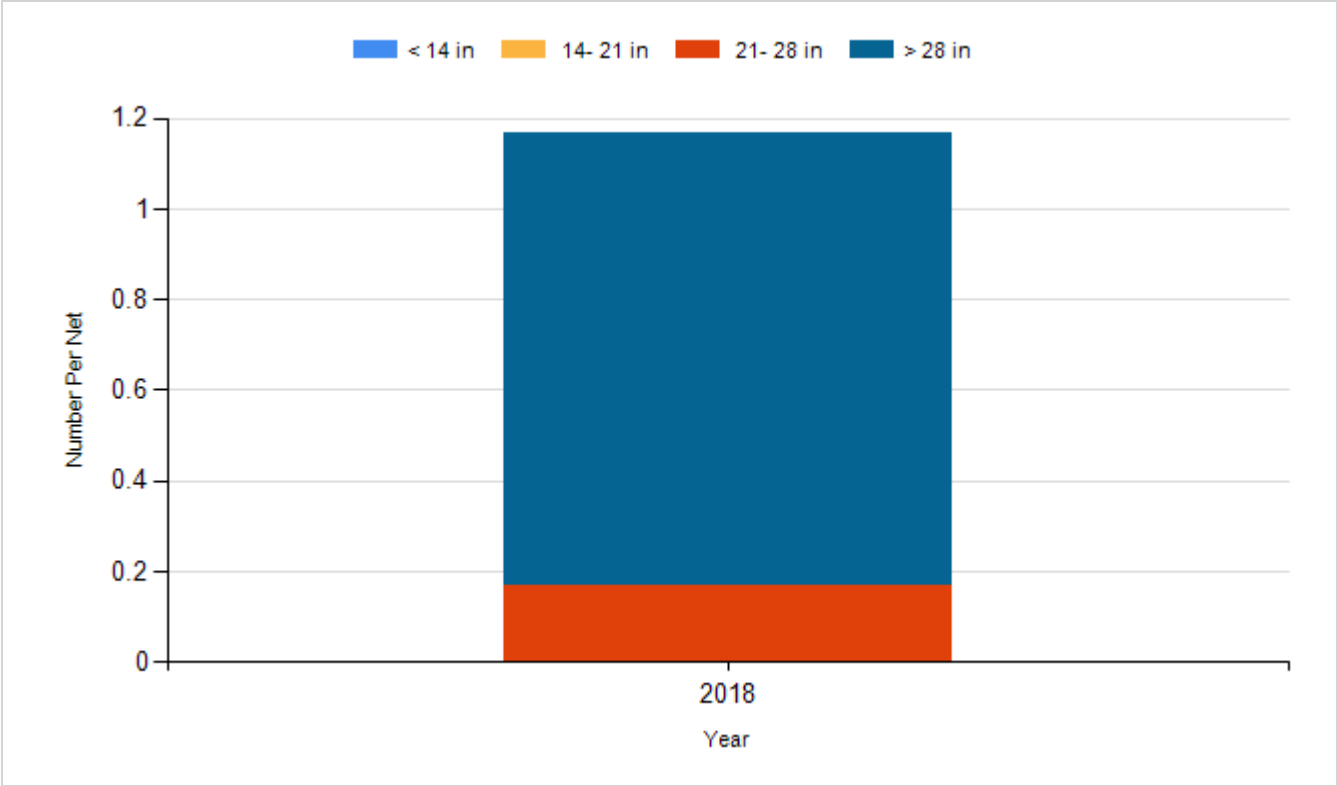


2018

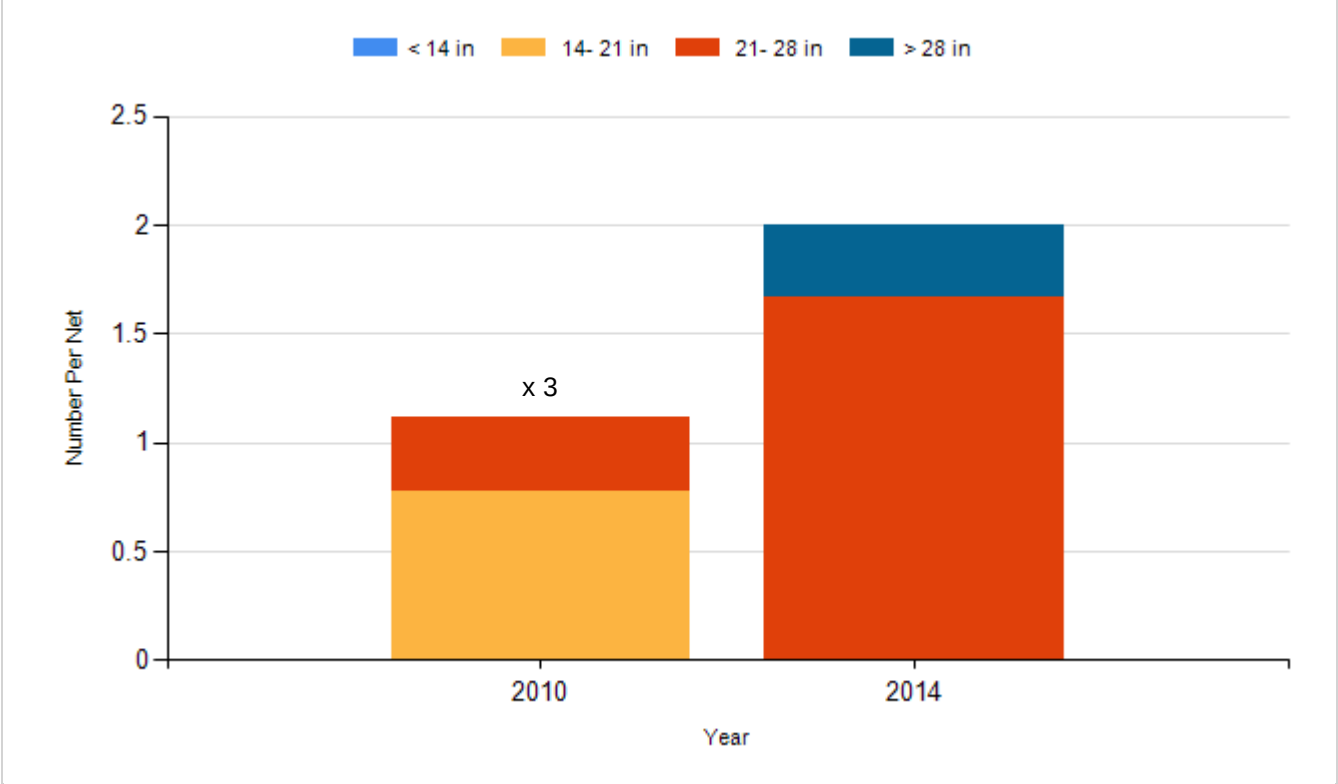
Historic Fish Sizes and Relative Abundance

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

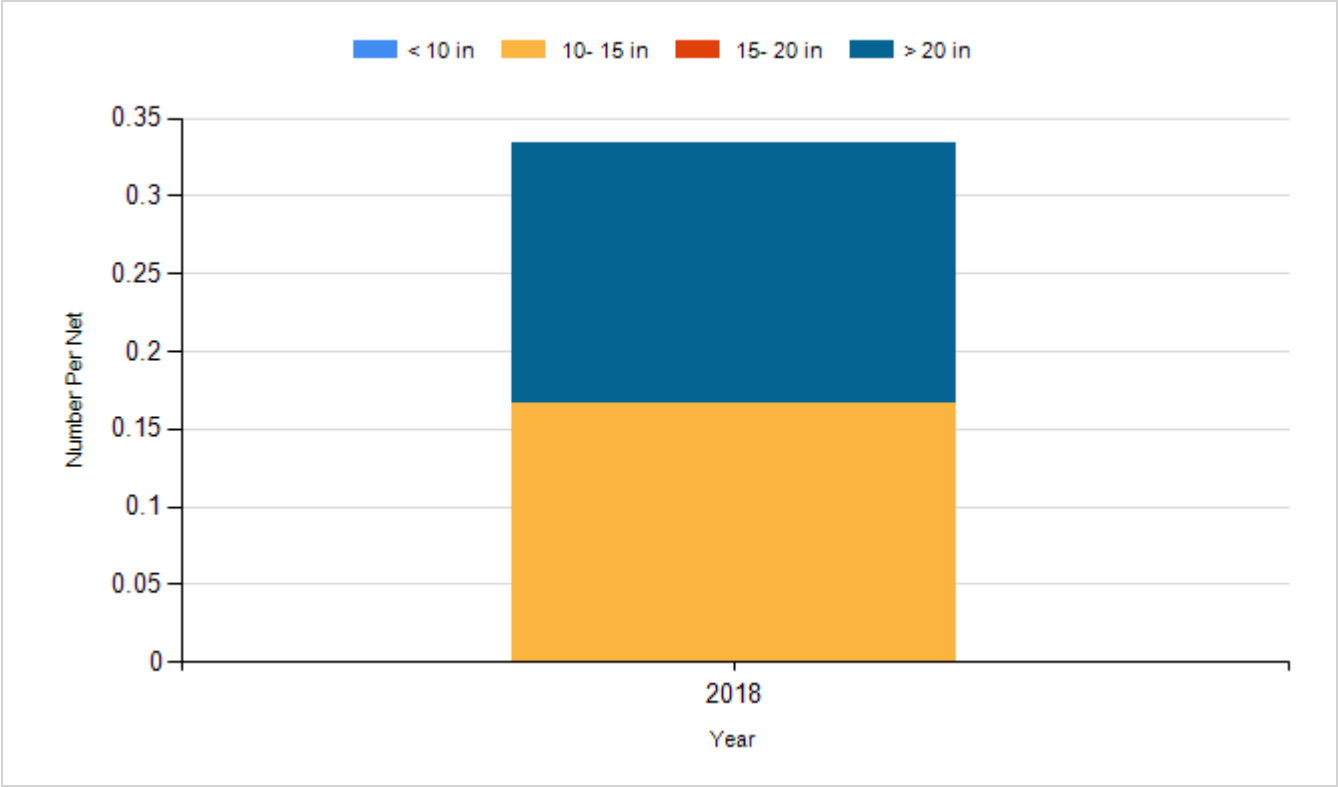
Species: Northern Pike
Gear: AFS std gill net



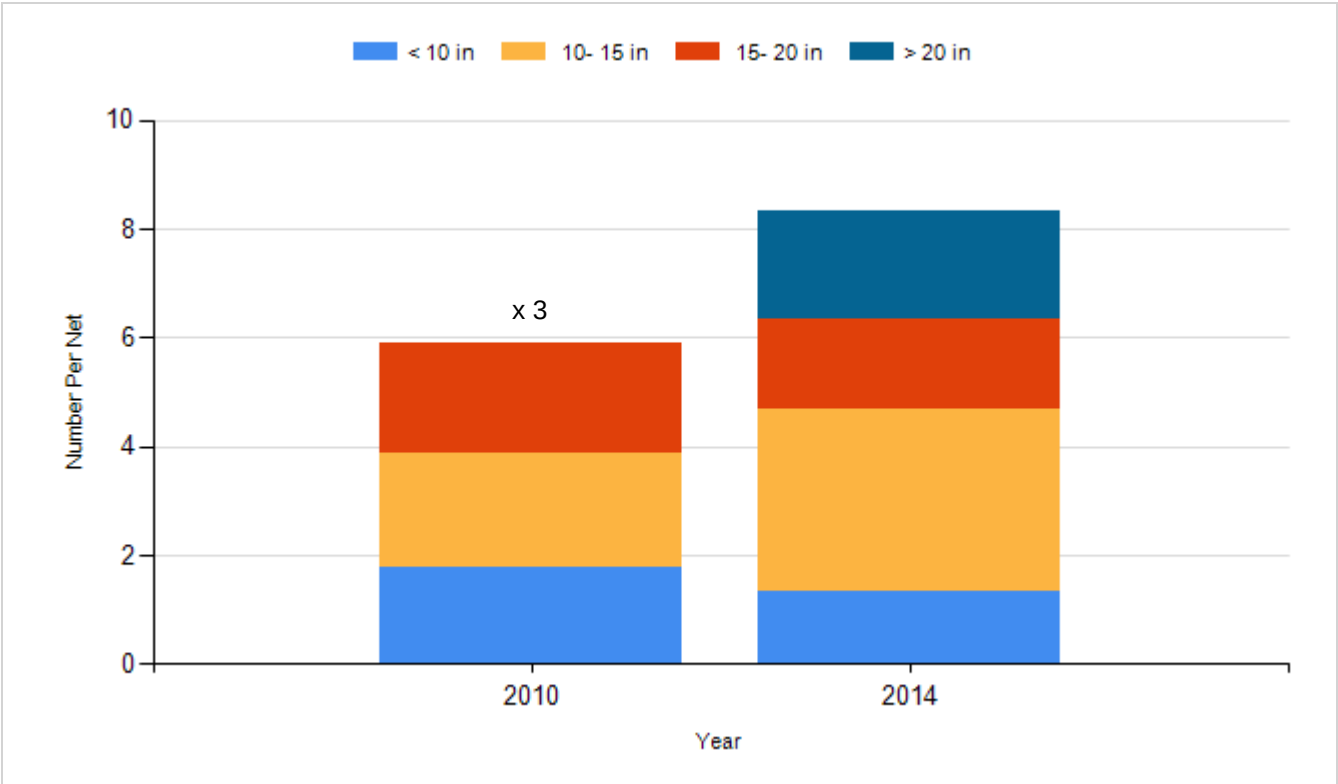
Species: Northern Pike
Gear: std exp gill net



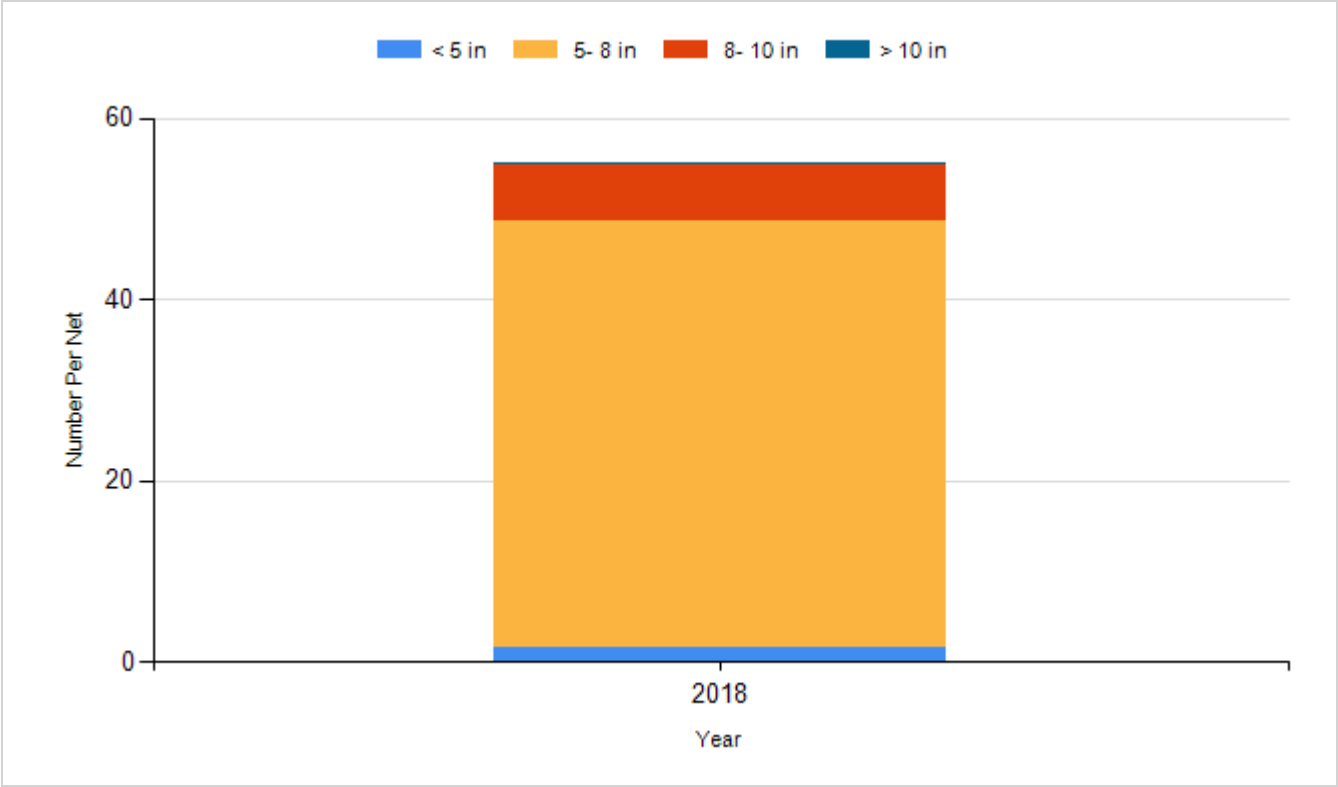
Species: Walleye
Gear: AFS std gill net



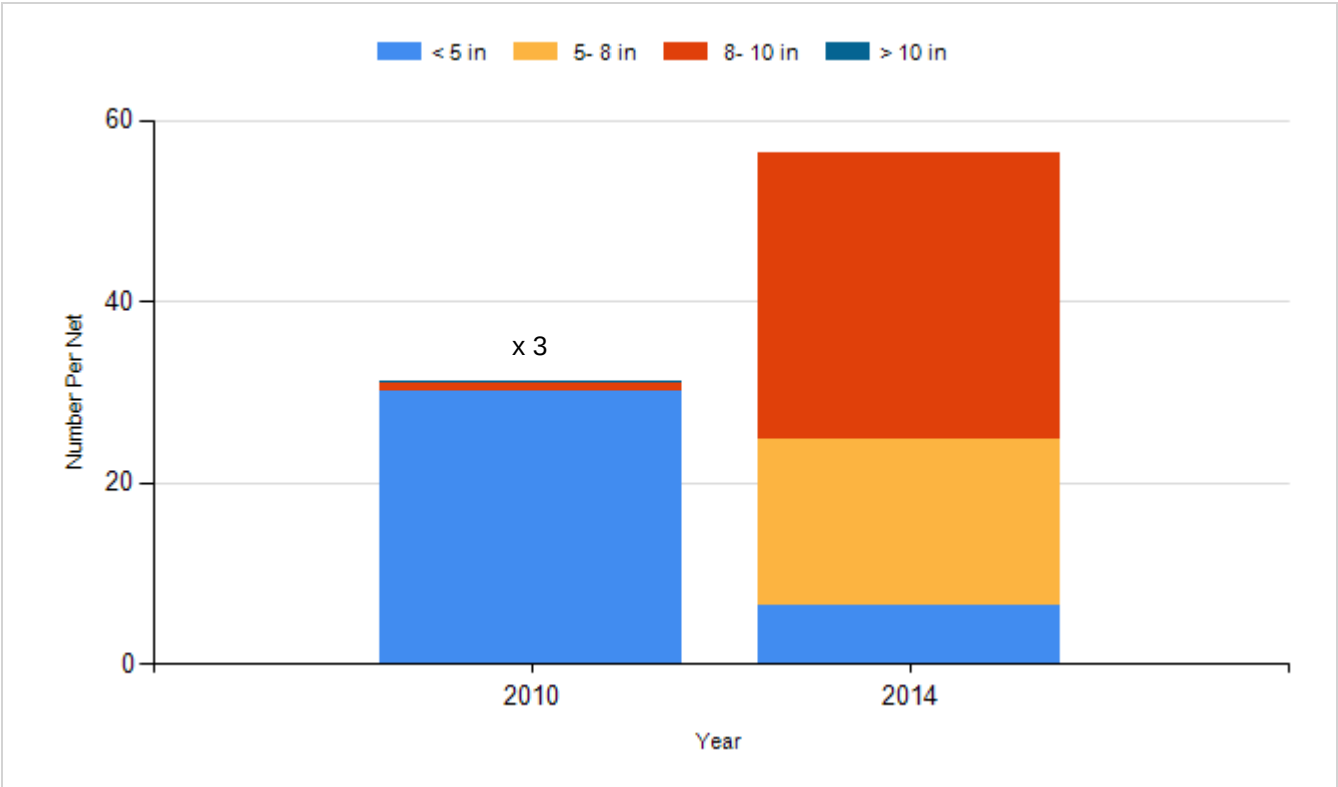
Species: Walleye
Gear: std exp gill net



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
2007	Walleye	Fry	174,000
2008	Bluegill	Adult	1,275
2010	Black Crappie	Fingerling	10,080
2010	Walleye	Fry	175,000
2012	Walleye	Fry	85,000
2014	Walleye	Fry	100,000
2016	Walleye	Small Fingerling	18,040
2017	Saugeye	Fry	100,000