Note: Curlyleaf pondweed and rudd, aquatic invasive species, are present in Lake Alice. Care should be taken by all user groups to prevent their spread to other waters. For more information regarding these and other aquatic invasive species please visit https://sdleastwanted.sd.gov/

Lake Alice Survey Summary

Lake Alice, located 2.0 miles east of the Tunnerville corner, is primarily managed for walleye and yellow perch but other fish species (e.g., northern pike) also contribute to the fishery.

- **Rudd**. Rudd numbers have increased in each of the last three surveys. In 2019, rudd were the most abundant species in the frame net catch and relative abundance was considered high (42.8/frame net). Those sampled ranged in length from 4.8 to 15.9 inches, most (>95%) were 12.0 inches or longer.

- **Walleye.** At 4.3/gill net, relative abundance was considered low to moderate in 2019. Gill net captured walleyes ranged in length from 9.1 to 28.3 inches, of those that were at least 10.0 inches 96% were ≥15.0 inches and 63% were 20.0 inches or longer. Individuals from 10 year classes contributed to the catch, those from the 2009 (age-10) cohort were the most abundant accounting for 48% of walleyes in the sample. The 2009 year class has comprised a high proportion (48% to 91%) of the total catch in each of the last four surveys. Walleyes appear to be growing well with 2019 mean length at capture values of 17.2 and 18.2 inches at ages 3 and 4.

- **Yellow perch**. Fewer yellow perch were sampled in 2019 than 2016. At 7.0/gill net, relative abundance was considered low. Sampled yellow perch ranged in length from 4.7 to 10.6 inches, with individuals from three consecutive year classes (2016 – 2018) contributing to the total catch. Those from the 2018 (age-1) cohort, which had a mean length at capture of 5.5 inches, were the most abundant accounting for 87% of fish in the sample.

For more detailed results see the computer generated South Dakota Statewide Fisheries Survey for Alice (Deuel; below).

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Alice, Deuel County
UMN-Lake-710-000
2019

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	Jun 24, 2019	4 net-nights
AFS std gill net	Jun 25, 2019	4 net-nights
AFS std gill net	Jun 26, 2019	4 net-nights
frame net (std 3/4 in)	Jun 24, 2019	6 net-nights
frame net (std 3/4 in)	Jun 25, 2019	5 net-nights
frame net (std 3/4 in)	Jun 26, 2019	5 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Rudd

Black Bullhead

Northern Pike

White Sucker

Common Carp

Green Sunfish

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)
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**

			Abundance		Stock Density Indices				Condition	
Gear	Species	Sample Size (n)*	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Black Bullhead	147	12.3	4.0	100		100		103	1
	Common Carp	1	0.1	0.1	100		100		97	
	Northern Pike	6	0.5	0.3	83		17		83	7
	Rudd	28	2.3	1.3	96		89			
	Walleye	52	4.3	1.0	96		63	10	91	1
	White Sucker	2	0.2	0.2	100		0		102	8
	Yellow Perch	89	7.0	1.8	14	6	1		115	1
frame net (std 3/4 in)	Black Bullhead	429	26.3	8.4	100		99		100	1
	Common Carp	3	0.2	0.1	67		67		114	
	Green Sunfish	2	0.1	0.1	0		0		124	
	Northern Pike	3	0.2	0.1	100		0		64	13
	Rudd	696	42.8	31.3	98	1	98	1		
	Walleye	12	0.8	0.4	67		50	25	87	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.

*** AFS standard frame nets used in 2016**

		CPUE										
Gear	Species	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
AFS std gill net	Black Bullhead							16.8			12.3	14.6
	Common Carp							0.0			0.1	0.1
	Northern Pike							1.3			0.5	0.9
	Rudd							18.2			2.3	10.3
	Walleye							4.8			4.3	4.6
	White Sucker							0.1			0.2	0.2
	Yellow Perch							23.6			7.0	15.3
frame net (std 3/4 in)*	Black Bullhead	0.3			2.4			13.8			26.3	10.7
	Common Carp	0.6			0.2			0.2			0.2	0.3
	Green Sunfish	0.1			0.1			0.0			0.1	0.1
	Northern Pike	0.7			2.9			0.8			0.2	1.2
	Rudd	2.2			9.9			28.7			42.8	20.9
	Walleye	2.9			0.2			1.9			0.8	1.4
	White Sucker	0.2			0.2			0.1			0.0	0.1
	Yellow Perch	1.2			10.3			0.2			0.0	2.9
std exp gill net	Black Bullhead	0.0			3.2							1.6
	Common Carp	0.1			0.0							0.1
	Northern Pike	0.2			17.5							8.9
	Walleye	0.3			13.0							6.7
	White Sucker	0.1			0.0							0.1
	Yellow Perch	3.3			49.8							26.6

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	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AFS std gill net	Walleye	PSD							93			96
		PSD-P							84			63
		Wr							82			91
	Yellow Perch	PSD							75			14
		PSD-P							4			1
		Wr							106			115
std exp gill net	Walleye	PSD	80			97						
		PSD-P	20			8						
		Wr	86			95						
	Yellow Perch	PSD	2			1						
		PSD-P	2			1						
		Wr	117			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+
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)
2010	40	204 (36)				464 (1)	531 (3)				

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
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)						
2010	59	162 (58)		266 (1)							

Fish Condition

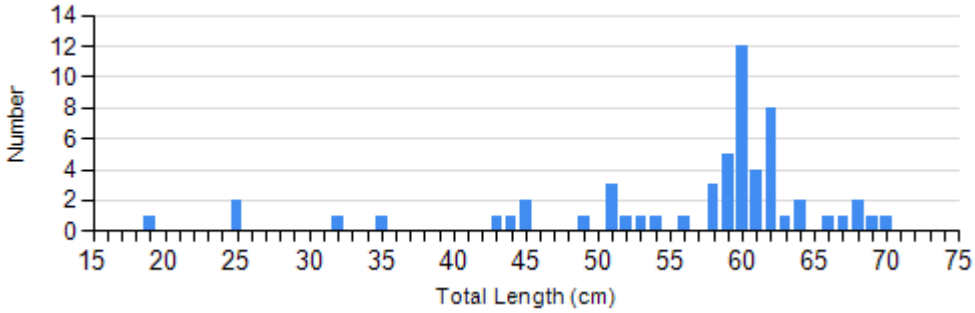
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Walleye Gill Net	2016	4	89 (1.6)	5	82 (0.6)	39	81 (0.7)	9	78 (1.4)
	2019	2	97 (2.3)	17	93 (1.4)	16	91 (2.7)	16	88 (1.4)
Yellow Perch Gill Net	2016	70	108 (0.8)	202	105 (0.5)	11	99 (2.5)	0	
	2019	72	115 (0.9)	11	114 (1.9)	1	105	0	

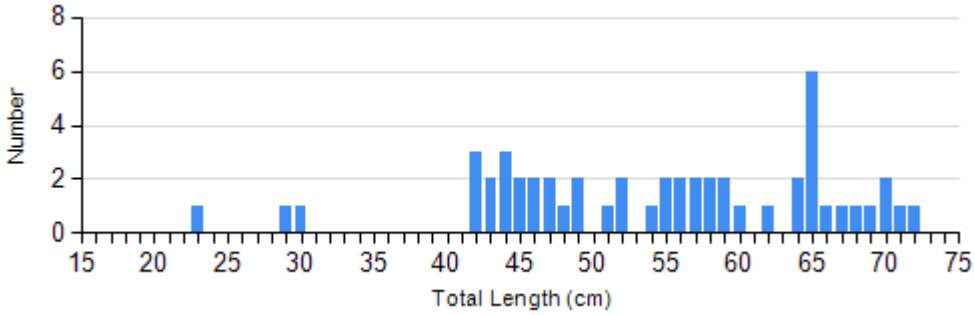
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net

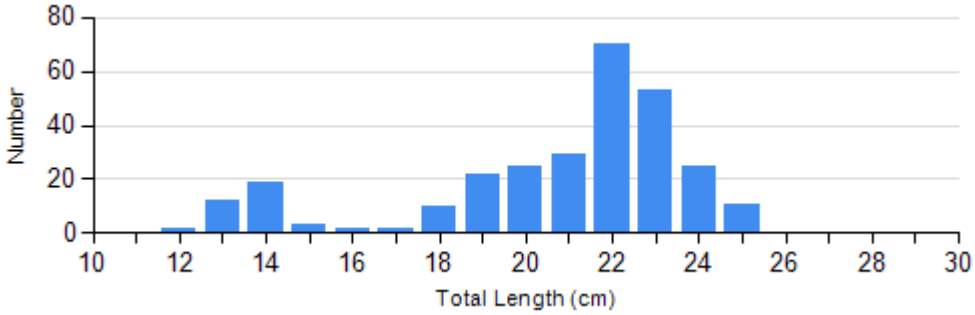


2016

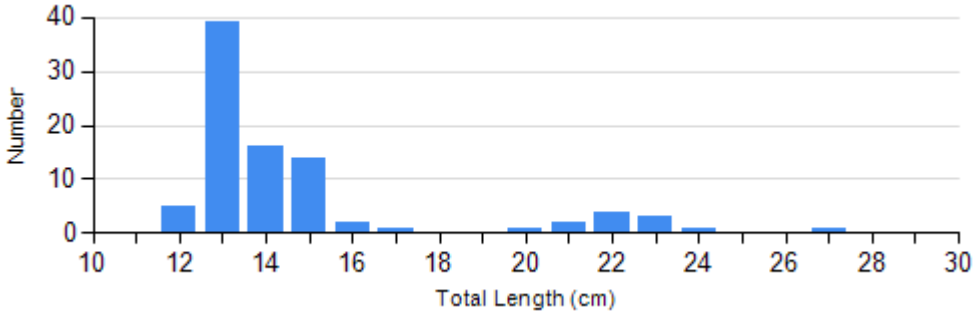


2019

Species: Yellow Perch
Gear: AFS std gill net



2016

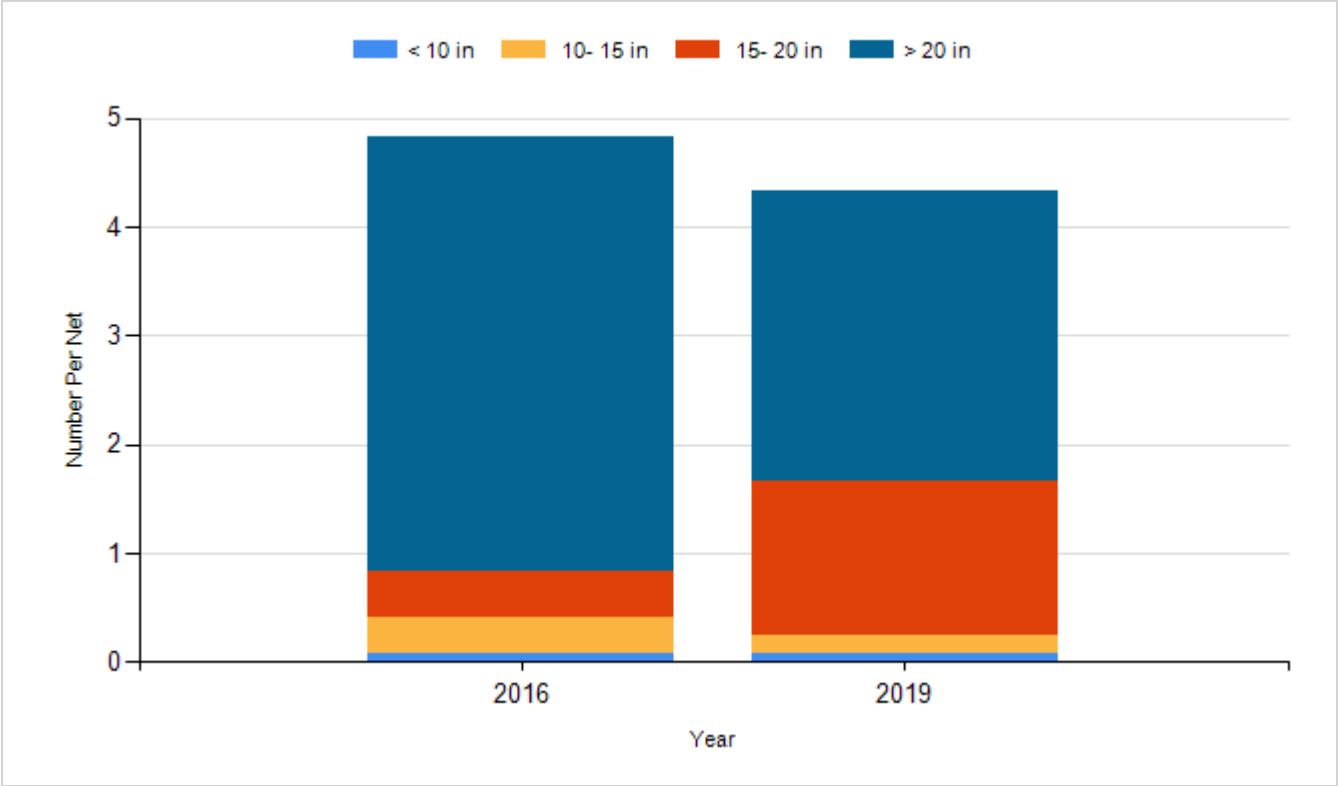


2019

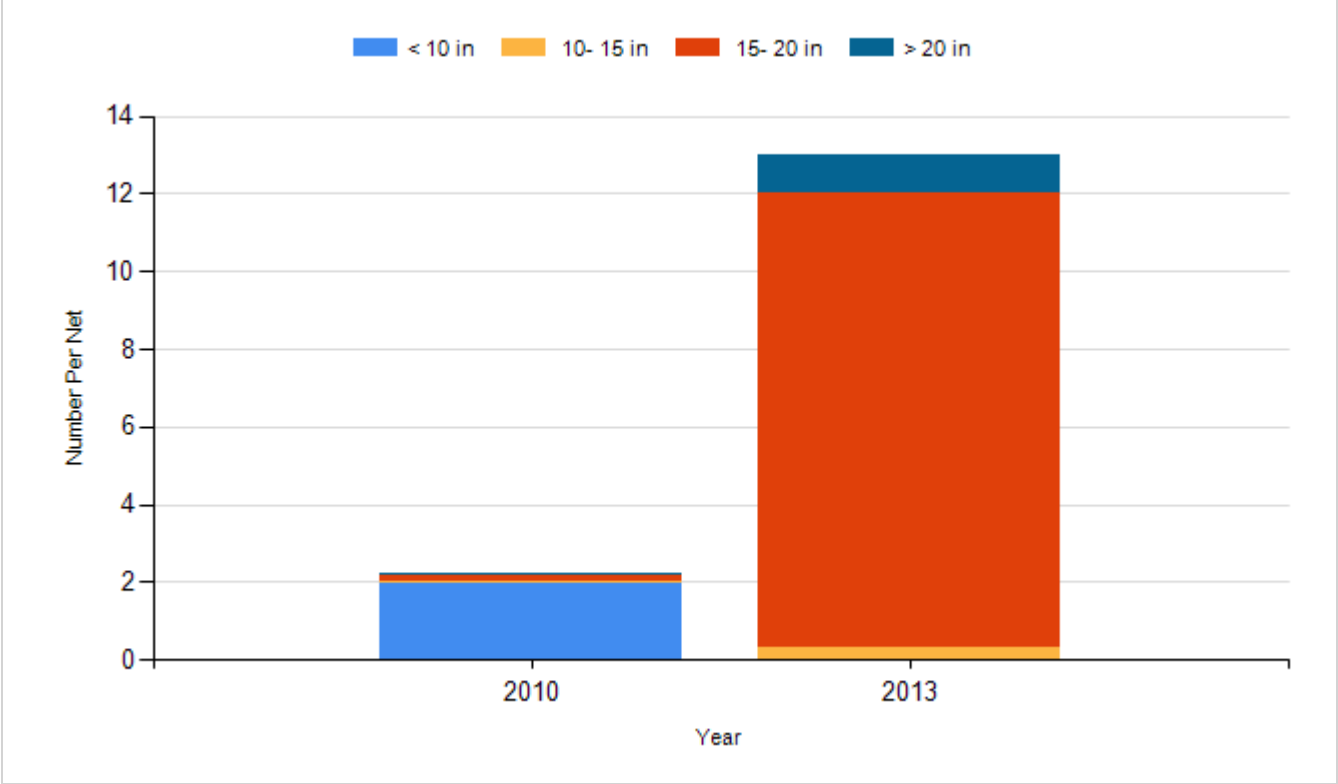
Historic Fish Sizes and Relative Abundance

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

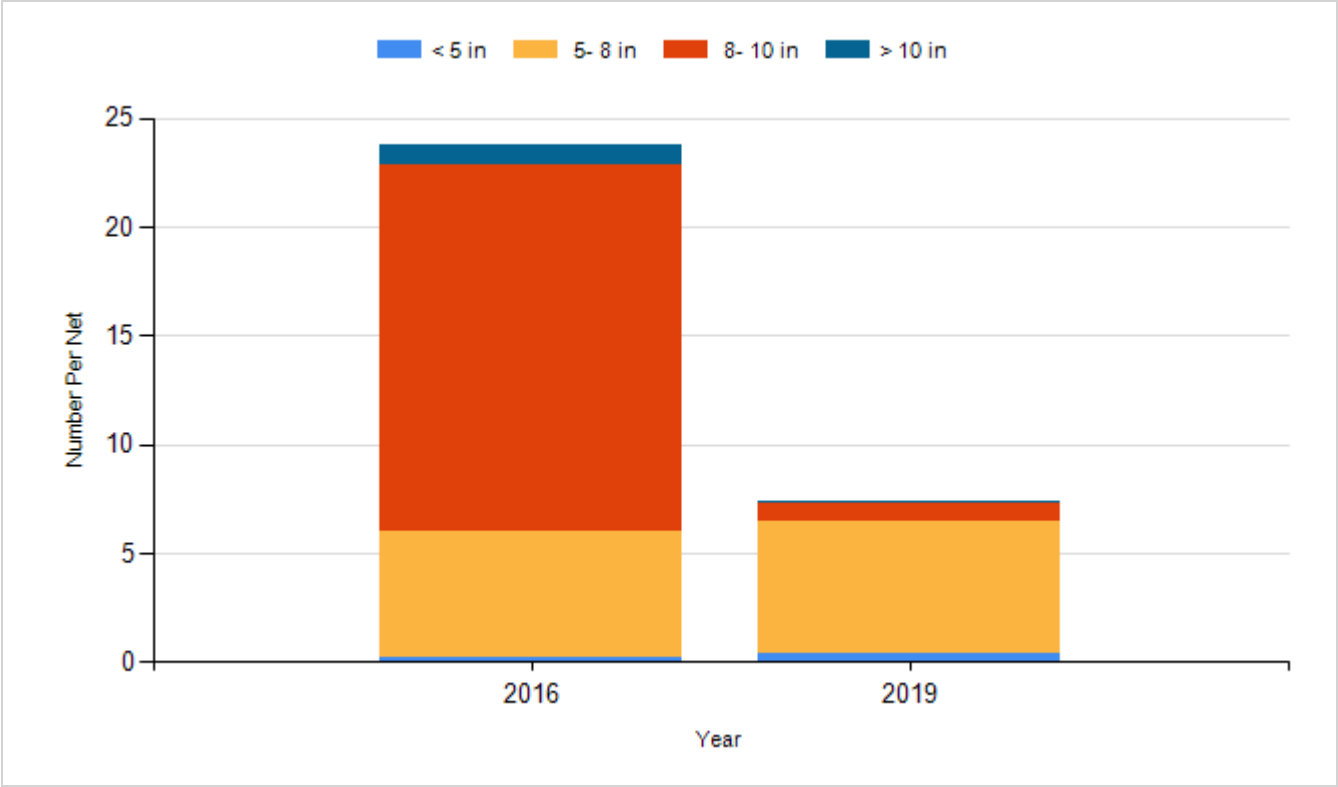
Species: Walleye
Gear: AFS std gill net



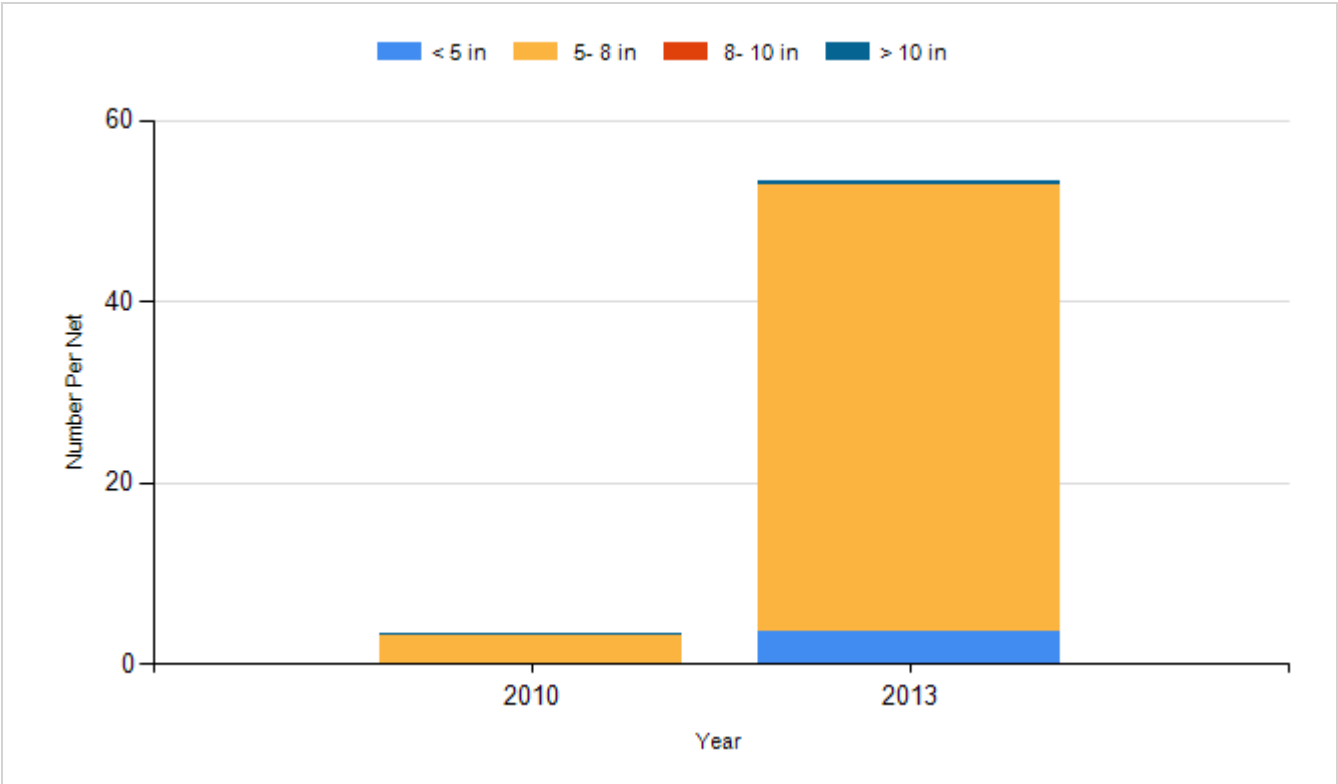
Species: Walleye
Gear: std exp gill net



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
2009	Walleye	Fry	575,000
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