Blue Dog Survey Summary

Blue Dog Lake, located 0.5 miles north of Waubay, is primarily managed as a walleye fishery but other fish species (e.g., northern pike, smallmouth bass, white bass, yellow perch) are present and contribute to the fishery.

- **Walleye.** Slightly fewer walleyes were sampled in 2020 than in 2017. At 7.7/gill net, relative abundance of walleyes ≥10.0 inches was moderate to high. A wide length range of walleyes (6.3 to 27.6 inches) was sampled, as 11 year classes (2007 and 2010 – 2019) were represented. Of those that were at least 10.0 inches, 33% were ≥ 15.0 inches and 5% were ≥20.0 inches. Individuals from the 2016 (age-4) and 2018 (age-2) cohorts were the most abundant accounting for more than half (57%) of walleyes in the sample. Growth is variable with mean length at capture at age 4 from 14.0 to 17.5 inches in surveys conducted since 2011. In 2020, the mean length at capture of age-4 fish was 14.0 inches.

- **Yellow perch**. Relative abundance of yellow perch (11.5/gill net) was considered moderate in 2020. Sampled yellow perch ranged in length from 4.7 to 11.8 inches, 38% were ≥8.0 inches and 15% were ≥10.0 inches. Individuals from seven consecutive year classes (2013 – 2019) contributed to the catch, those from the 2018 (age-2) cohort were the most abundant and accounted for 71% of fish sampled. Yellow perch growth appears to be moderate with age-3 yellow perch having mean length at capture values from 8.0 to 9.4 inches in surveys conducted since 2011. In 2020, the mean length at capture of age-3 fish was 9.3 inches.

For more detailed results see the computer generated South Dakota Statewide Fisheries Survey for Blue Dog (Day; below).

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Blue Dog, Day County
UBS-Lake-411-003
2020

Lake Information

Name:	Blue Dog	**Maximum Depth:**	8 Feet
County:	Day	**Mean Depth:**	6 Feet
		OHWM Elevation:	1,801
Surface Area:	1,616 Acres	**Outlet Elevation:**	1,800

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 01, 2020	4 net-nights
AFS std gill net	Jul 02, 2020	4 net-nights
AFS std gill net	Jun 30, 2020	4 net-nights

Common Fish Species Present

Walleye

Northern Pike

Yellow Perch

White Sucker

White Bass

Common Carp

Rock Bass

Black Crappie

Smallmouth Bass

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 Crappie	2	0.1	0.1	0		0		115	
	Common Carp	2	0.2	0.2	100		100		102	7
	Northern Pike	16	1.2	0.4	29		0		81	3
	Rock Bass	1	0.1	0.1	100		0		107	
	Smallmouth Bass	2	0.0	0.0	0		0			
	Walleye	103	7.7	2.1	33	7	5		84	1
	White Bass	8	0.7	0.6	100		75		95	2
	White Sucker	9	0.8	0.3	100		100		100	4
	Yellow Perch	139	11.5	2.4	38	6	15	4	105	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	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Avg
AFS std gill net	Black Bullhead							0.1			0.0	0.05
	Black Crappie							0.4			0.1	0.25
	Common Carp							0.7			0.2	0.45
	Emerald Shiner							0.0			0.0	0.00
	Gizzard Shad							1.3			0.0	0.65
	Northern Pike							1.3			1.2	1.25
	Rock Bass							0.1			0.1	0.10
	Smallmouth Bass							0.0			0.0	0.00
	Walleye							9.2			7.7	8.45
	White Bass							0.9			0.7	0.80
	White Sucker							1.1			0.8	0.95
	Yellow Perch							2.1			11.5	6.80
frame net (std 3/4 in)	Black Bullhead	0.5			2.1							1.30
	Black Crappie	1.1			1.7							1.40
	Channel Catfish	0.1			0.0							0.05
	Common Carp	0.1			0.1							0.10
	Northern Pike	0.7			0.5							0.60
	Orangespotted Sunfish	0.0			0.0							0.00
	Rock Bass	1.2			1.9							1.55
	Smallmouth Bass	0.1			0.4							0.25
	Walleye	1.2			1.6							1.40
	White Bass	0.6			1.4							1.00
	White Sucker	0.1			0.0							0.05
	Yellow Perch	1.6			0.6							1.10
std exp gill net	Black Crappie	0.2			0.7							0.45
	Common Carp	0.1			0.7							0.40
	Green Sunfish	0.0			0.2							0.10
	Northern Pike	2.1			1.2							1.65
	Rock Bass	0.1			0.0							0.05
	Spottail Shiner	0.0			0.0							0.00
	Walleye	4.0			17.3							10.65
	White Bass	0.3			1.5							0.90
	White Sucker	1.7			1.7							1.70
	Yellow Perch	10.4			17.8							14.10

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	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AFS std gill net	Walleye	PSD							66			33
		PSD-P							19			5
		Wr							85			84
	Yellow Perch	PSD							64			38
		PSD-P							40			15
		Wr							95			105
std exp gill net	Walleye	PSD	50			23						
		PSD-P	7			4						
		Wr	90			80						
	Yellow Perch	PSD	34			79						
		PSD-P	9			36						
		Wr	112			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+
2020	103	181 (4)	272 (30)	324 (14)	356 (29)	425 (12)	450 (3)	471 (2)	474 (1)	484 (3)	600 (5)
2017	110		274 (27)	387 (25)	445 (12)	450 (5)	481 (23)	521 (14)	569 (1)	586 (1)	681 (2)
2014	117	189 (12)	275 (5)	302 (46)	372 (45)	424 (4)	560 (1)		505 (2)		655 (2)
2011	132	219 (71)	309 (7)	378 (17)	406 (20)	440 (8)	460 (5)	600 (1)	505 (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+
2020	139	129 (3)	181 (98)	235 (16)	243 (7)	274 (12)	308 (1)	285 (2)			
2017	25		185 (10)	240 (6)	255 (1)		298 (4)	283 (3)	294 (1)		
2014	109	127 (4)	156 (18)	227 (34)	252 (37)	258 (11)	305 (2)	300 (3)			
2011	218	131 (81)	191 (80)	202 (47)	293 (13)						

Fish Condition

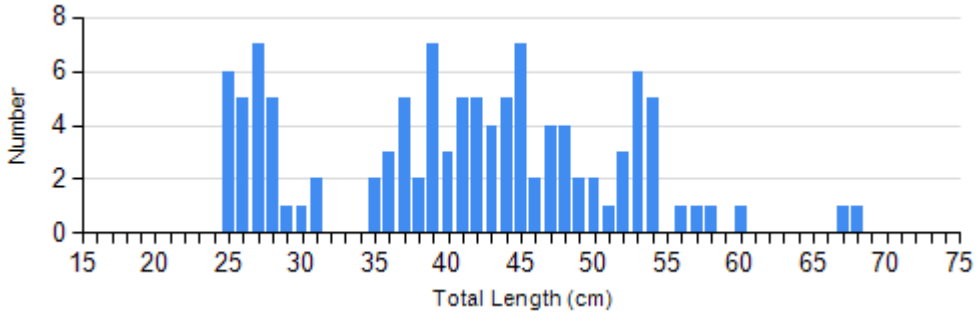
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2017	37	82 (0.6)	52	86 (0.7)	19	89 (1.9)	2	90 (7.6)
	2020	62	84 (0.6)	25	84 (1.3)	3	94 (1.9)	2	75 (5.5)
Yellow Perch Gill Net	2017	9	100 (2.0)	6	97 (1.2)	9	90 (2.3)	1	81
	2020	86	106 (0.7)	31	106 (1.3)	20	99 (1.4)	1	90

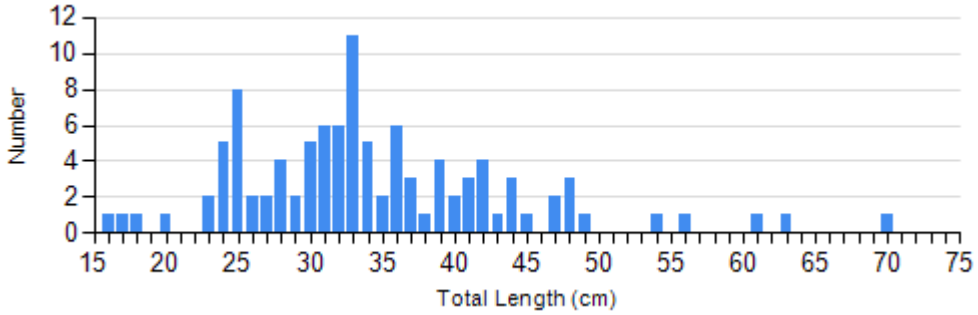
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Walleye
Gear: AFS std gill net

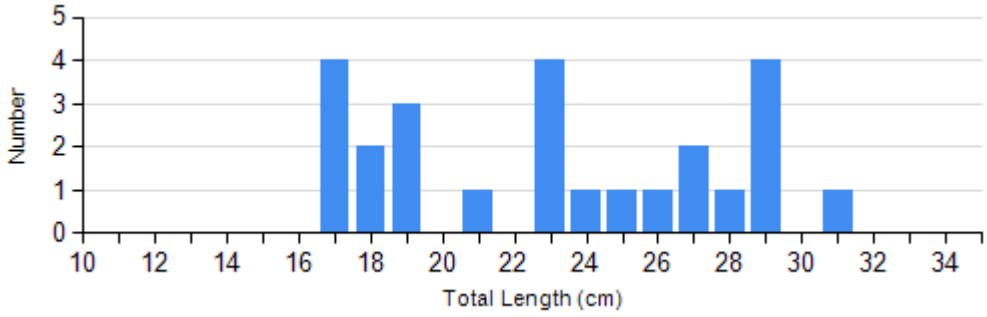


2017

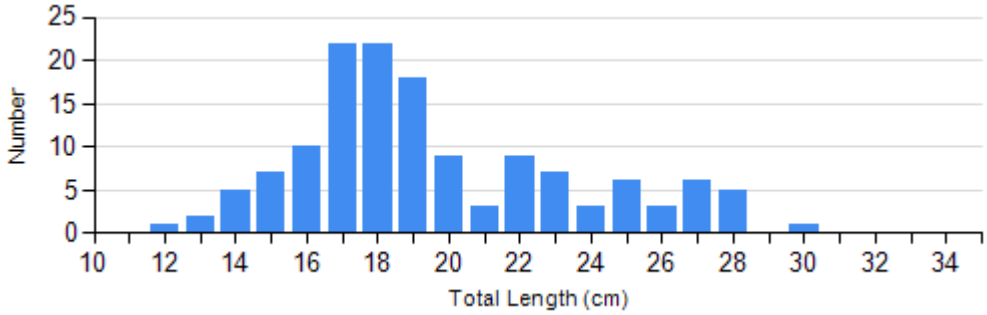


2020

Species: Yellow Perch
Gear: AFS std gill net



2017

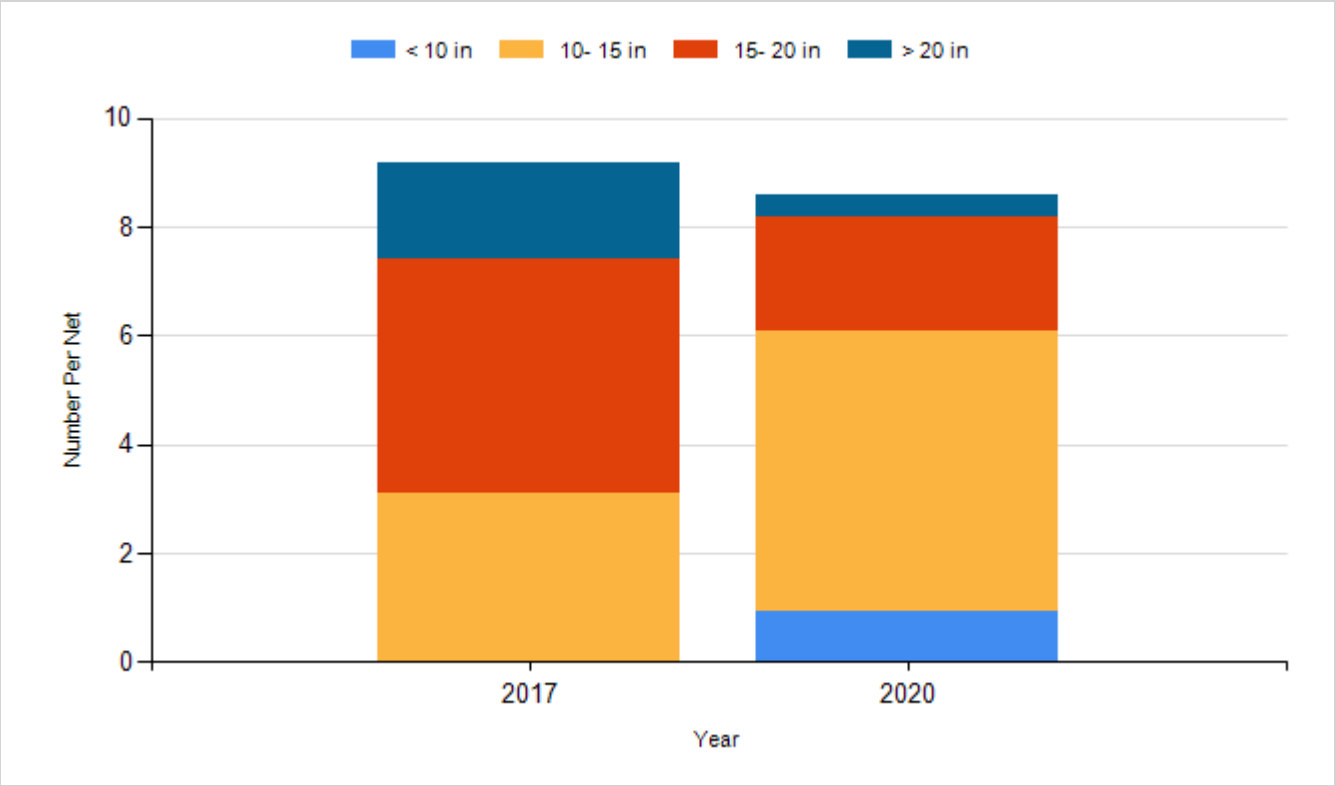


2020

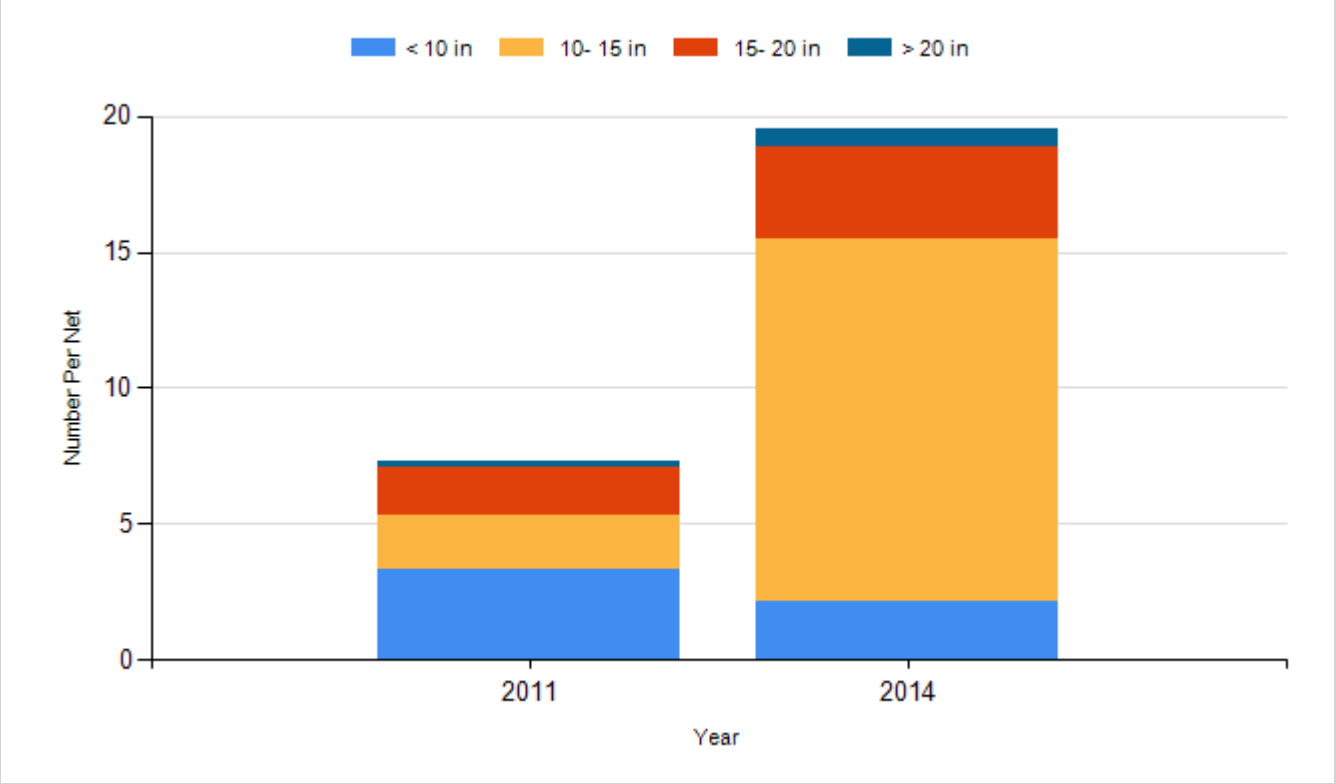
Historic Fish Sizes and Relative Abundance

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

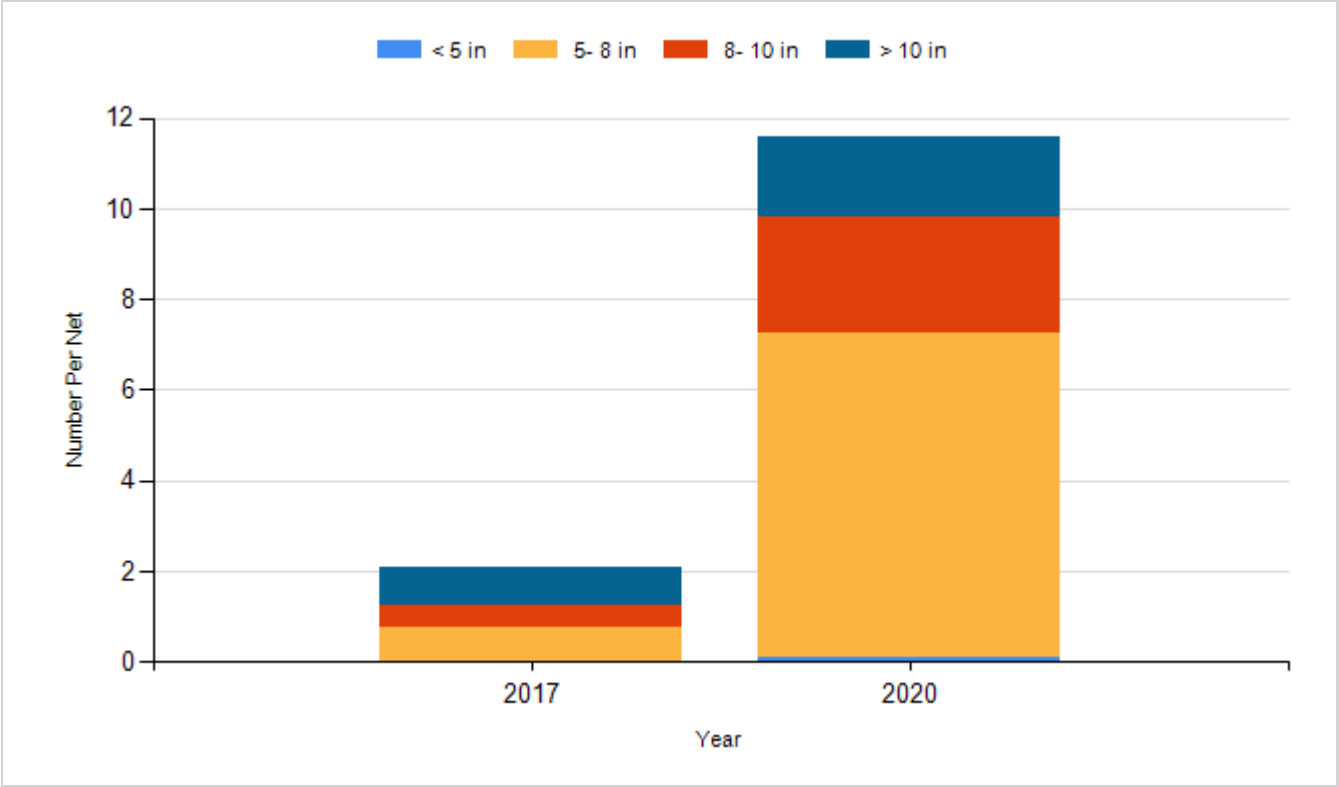
Species: Walleye
Gear: AFS std gill net



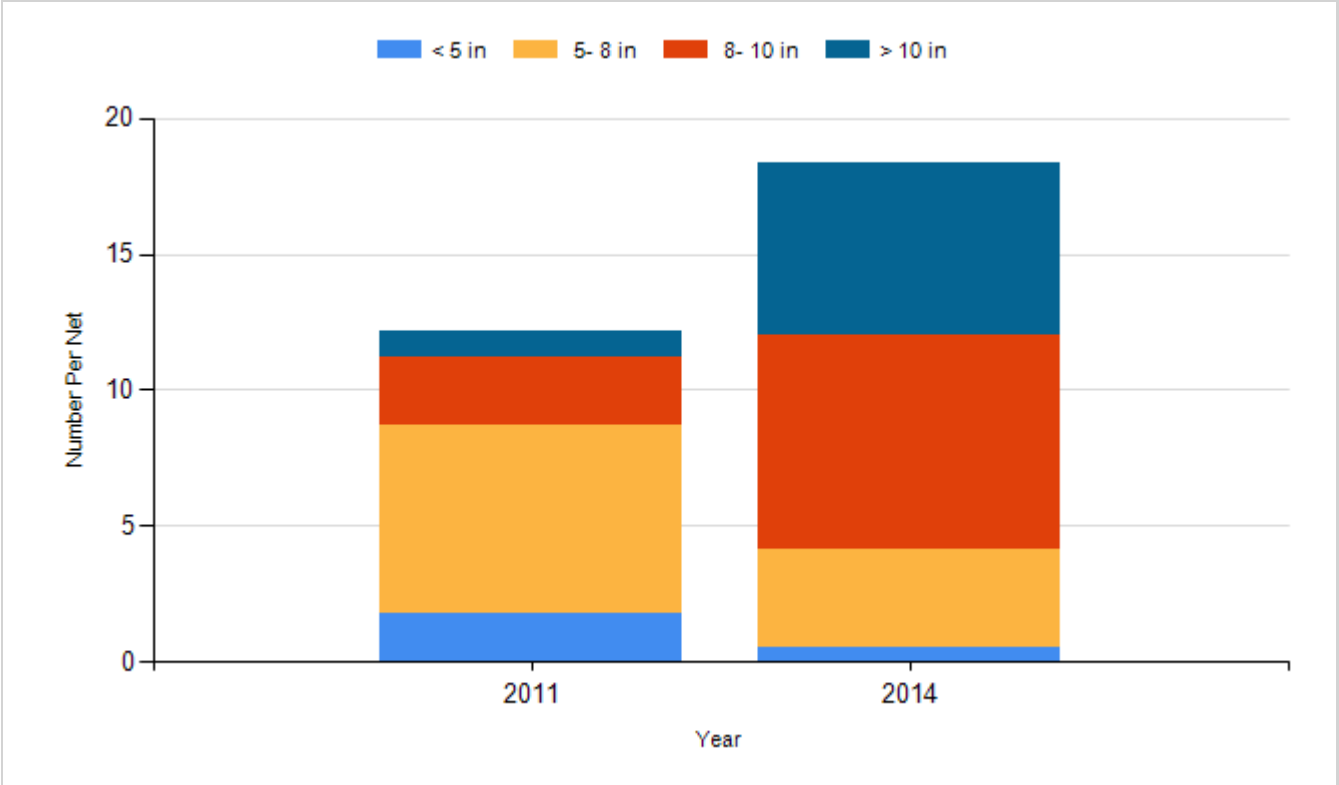
Species: Walleye
Gear: std exp gill net



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
2017	Walleye	Fingerling	22,500
2019	Walleye	Small Fingerling	61,225