Opitz Lake Survey Summary

Opitz Lake, located 5.0 miles west and 1.0 mile south of Eden, is managed as a walleye and yellow perch fishery but other fish species (e.g., northern pike, rock bass) are present and contribute to the fishery.

- **Walleye.** Fewer walleyes were sampled in 2021 than 2019. At 3.5 per gill net, relative abundance was considered low. Sampled walleyes ranged in length from 12.2 to 17.7 inches, less than half (40%) were 15.0 inches or longer. Three year classes (2011, 2016, and 2018) contributed to the catch. Individuals from the 2018 (age-3) cohort, which coincided with a fry stocking, were the most numerous accounting for nearly 70% of walleyes in the sample. Since 2012, the mean length at capture for age-3 fish has ranged from 12.8 to 15.2 inches. In 2021, the mean length at capture of age-3 fish was 14.4 inches. During Fall electrofishing (459/hr) a very strong 2021 year-class was found, which coincided with a fry stocking.

- **Yellow perch**. Yellow perch numbers have declined in each of the last four surveys. In 2021, the mean gill net CPUE was 3.3 and suggested low to moderate relative abundance for Opitz Lake. Sampled yellow perch ranged in length from 5.5 to 13.8 inches, 97% were $\geq$8.0 inches and 90% were $\geq$10.0 inches. Individuals from seven year classes (2011, 2012, 2013, and 2016 – 2018) were present, those from the 2013 (age-8) and 2016 (age-5) cohorts were the most abundant making up nearly 60% of fish in the sample. Growth appears to be good with mean length at capture values $\geq$9.0 inches at age 3 from 2012 – 2021. In 2021, the mean length at capture of age-3 fish was 10.2 inches.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Opitz, Day County
UJA-Lake-866-002
2021

Lake Information

Name:	Opitz		**Maximum Depth:**	23 Feet
County:	Day		**Mean Depth:**	14 Feet
Surface Area:	1,452 Acres			

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 22, 2021	4 net-nights
AFS std gill net	Jun 23, 2021	4 net-nights
AFS std gill net	Jun 24, 2021	4 net-nights
fall night EF-WAE	Oct 06, 2021	2400 seconds

<u>Common Fish Species Present</u>

Walleye

Northern Pike

Yellow Perch

Rock Bass

Common Carp

Black Bullhead

White Sucker

White Bass

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.

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

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

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.

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

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 (in)	Stock (cm)	Quality (in)	Quality (cm)	Preferred (in)	Preferred (cm)	Memorable (in)	Memorable (cm)	Trophy (in)	Trophy (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).

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	3	0.3	0.1	33		0		98	15
	Common Carp	6	0.5	0.2	100		100		97	4
	Northern Pike	2	0.2	0.1	100		0		90	3
	Rock Bass	41	3.4	1.1	83	6	17	6	111	1
	Smallmouth Bass	1	0.1	0.1	100		0		120	
	Walleye	42	3.5	0.6	40	8	0		85	1
	White Bass	1	0.1	0.1	100		100		97	
	White Sucker	1	0.1	0.1	100		100		99	
	Yellow Perch	39	3.3	0.7	97		90	5	106	2

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; AFS standard frame nets used in 2017

Gear	Species	CPUE										
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
AFS std gill net	Black Bullhead					0.8	0.4	0.2	0.0		0.3	0.34
	Common Carp					0.1	0.3	0.2	0.3		0.5	0.28
	Northern Pike					0.4	0.1	0.1	0.0		0.2	0.16
	Rock Bass					1.8	2.8	2.2	2.1		3.4	2.46
	Smallmouth Bass					0.2	0.0	0.0	0.0		0.1	0.06
	Walleye					5.6	3.3	7.4	5.2		3.5	5.00
	White Bass					0.0	0.0	0.0	0.0		0.1	0.02
	White Sucker					0.0	0.0	0.2	0.3		0.1	0.12
	Yellow Perch					14.3	13.8	11.7	9.4		3.3	10.50
fall night EF-WAE*	Walleye	167.0	144.0	75.0	0.0	360.0	0.0	327.0	3.0	0.0	459.0	153.50
frame net (std 3/4 in)**	Black Bullhead	0.2	4.9	7.0			1.1					3.30
	Black Crappie	0.1	0.9	0.3			0.0					0.33
	Common Carp	0.3	0.1	0.1			0.3					0.20
	Northern Pike	0.1	0.1	0.3			0.1					0.15
	Orangespotted Sunfish*	0.1	0.0	0.0			0.6					0.18
	Rock Bass	2.2	6.9	2.6			0.9					3.15
	Walleye	4.0	6.0	5.9			1.5					4.35
	White Sucker	0.1	0.0	0.0			0.0					0.03
	Yellow Perch	0.7	0.1	0.0			0.0					0.20
std exp gill net	Black Bullhead	0.0	0.5	0.3	0.7							0.38
	Common Carp	0.0	0.0	0.0	0.5							0.13
	Northern Pike	0.3	1.5	1.5	0.5							0.95
	Rock Bass	0.8	1.0	1.3	0.8							0.98
	Walleye	29.0	17.7	27.7	22.5							24.23
	Yellow Perch	6.0	18.2	34.2	33.8							23.05

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	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AFS std gill net	Walleye	PSD					27	55	11	6		40
		PSD-P					1	0	1	2		0
		Wr					82	80	82	83		85
	Yellow Perch	PSD					100	91	97	91		97
		PSD-P					93	84	59	66		90
		Wr					103	108	111	112		106
std exp gill net	Walleye	PSD	68	28	6	5						
		PSD-P	0	0	0	0						
		Wr	84	83	82	80						
	Yellow Perch	PSD	97	87	99	96						
		PSD-P	56	19	62	74						
		Wr	119	113	108	108						

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+
2021	42			365 (29)		408 (12)					403 (1)
2019	63	221 (2)		329 (54)		373 (2)	376 (3)	548 (1)	391 (1)		
2018	89		293 (63)		365 (5)	372 (7)	398 (2)	386 (10)			630 (1)
2017	66	205 (26)	317 (1)	355 (2)	385 (19)	384 (3)	386 (15)		405 (1)		
2016	67		320 (6)	349 (21)	374 (10)	380 (30)		520 (1)			
2015	143	201 (7)	276 (24)	324 (24)	356 (88)	395 (2)					
2014	185	212 (17)	288 (23)	339 (136)		420 (8)			425 (1)		
2013	112	185 (3)	283 (74)	356 (1)	396 (31)			453 (2)		485 (1)	
2012	309	201 (135)	320 (8)	386 (152)	404 (3)	465 (1)	436 (7)	465 (2)	457 (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+
2021	39	149 (1)		258 (9)	264 (2)	295 (13)			325 (10)	320 (2)	344 (2)
2019	114	138 (11)		244 (44)	273 (9)		300 (21)	299 (9)	307 (22)		
2018	140		220 (56)	267 (12)		294 (34)	297 (20)	303 (18)	342 (1)		
2017	166	141 (15)	231 (10)		272 (38)	289 (11)	298 (90)		325 (2)		
2016	171			254 (37)	277 (23)	300 (90)	309 (10)	305 (11)			
2015	203		197 (14)	229 (28)	274 (149)	278 (11)	325 (1)				
2014	205		213 (16)	254 (148)		278 (41)					
2013	109		211 (82)	249 (4)	265 (22)	257 (1)					
2012	36	150 (1)	203 (1)	249 (32)	275 (1)	275 (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).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Walleye Gill Net	2017	18	83 (1.2)	22	78 (0.9)	0		0	
	2018	79	82 (0.6)	9	78 (1.1)	0		1	82
	2019	58	83 (0.7)	3	82 (4.3)	1	97	0	
	2021	25	85 (0.8)	17	86 (0.9)	0		0	
Yellow Perch Gill Net	2017	15	111 (1.4)	12	119 (2.1)	92	110 (0.8)	47	101 (1.1)
	2018	4	120 (4.2)	54	117 (1.1)	47	109 (1.0)	35	102 (1.0)
	2019	10	114 (1.5)	28	120 (1.1)	44	112 (1.1)	31	105 (1.3)
	2021	1	117	3	119 (4.7)	13	110 (2.9)	22	102 (1.7)

Length Frequency Distribution

Length frequency histogram of species sampled by year.
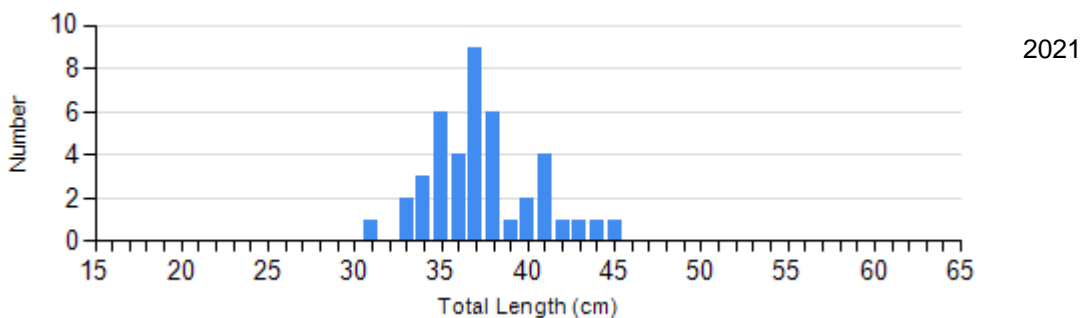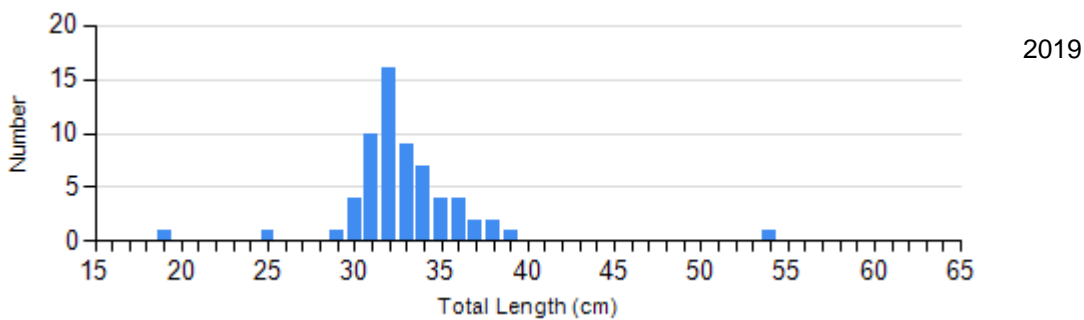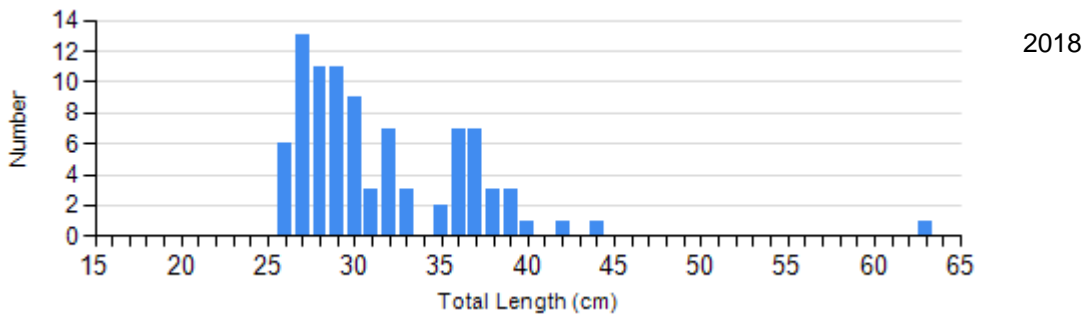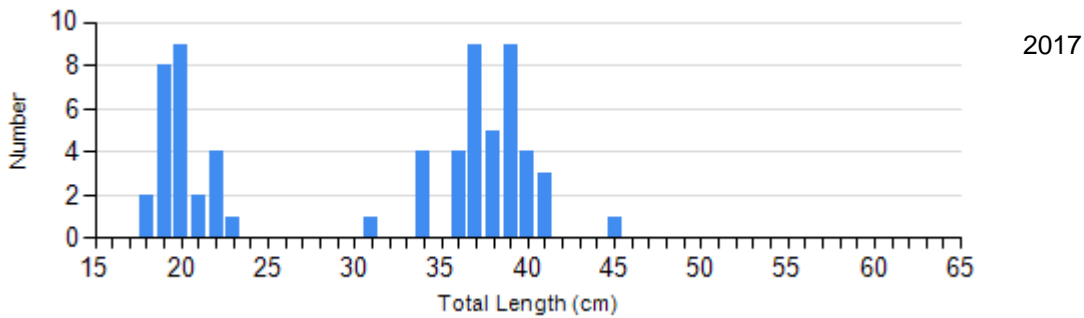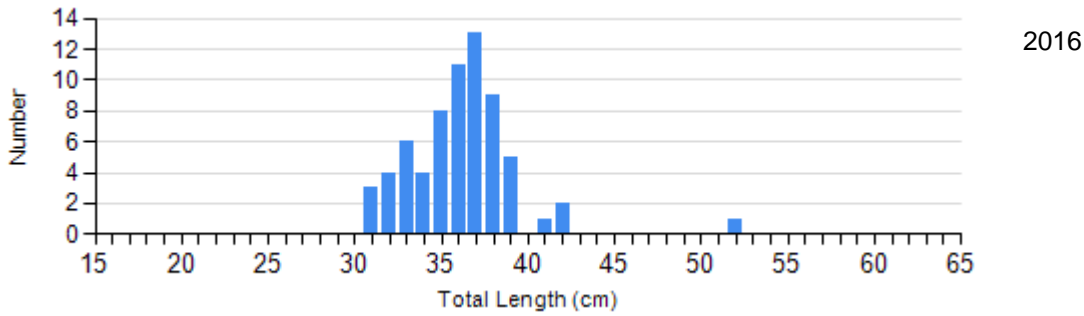
Species: Walleye
Gear: AFS std gill net

2016

2017

2018

2019

2021
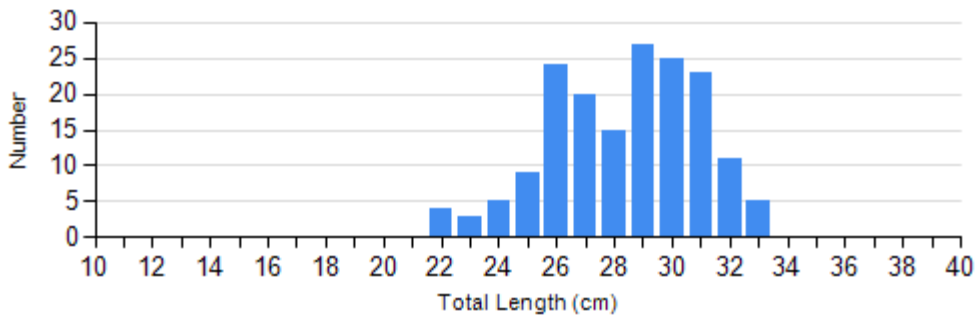
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Gear: AFS std gill net
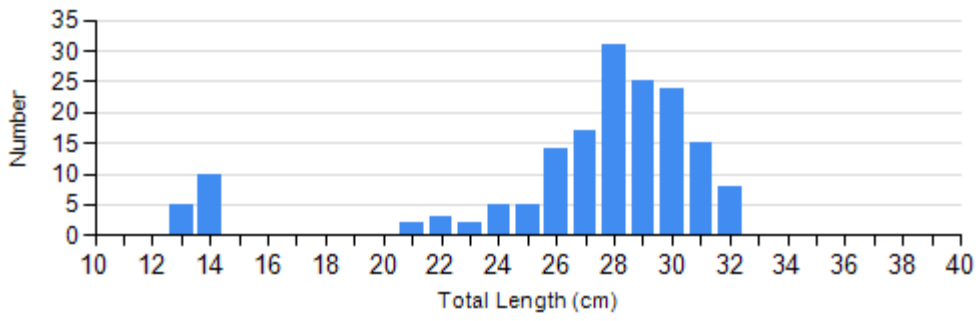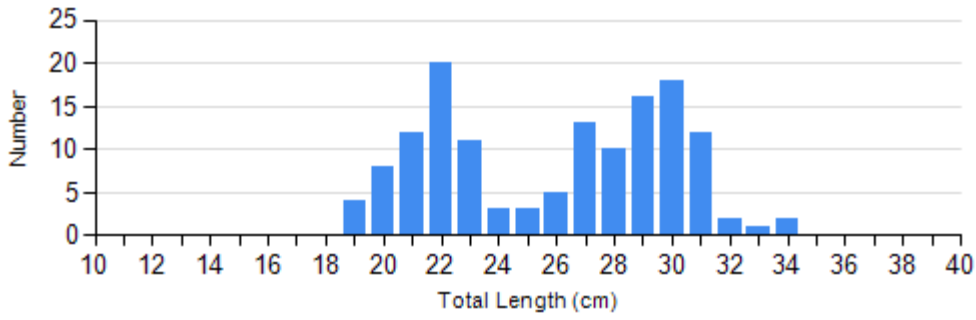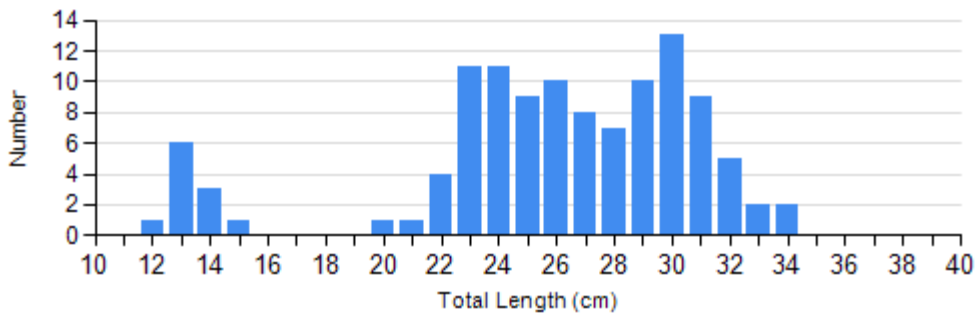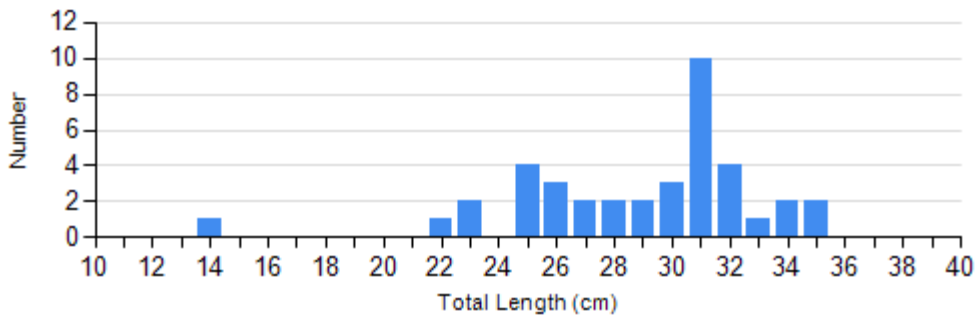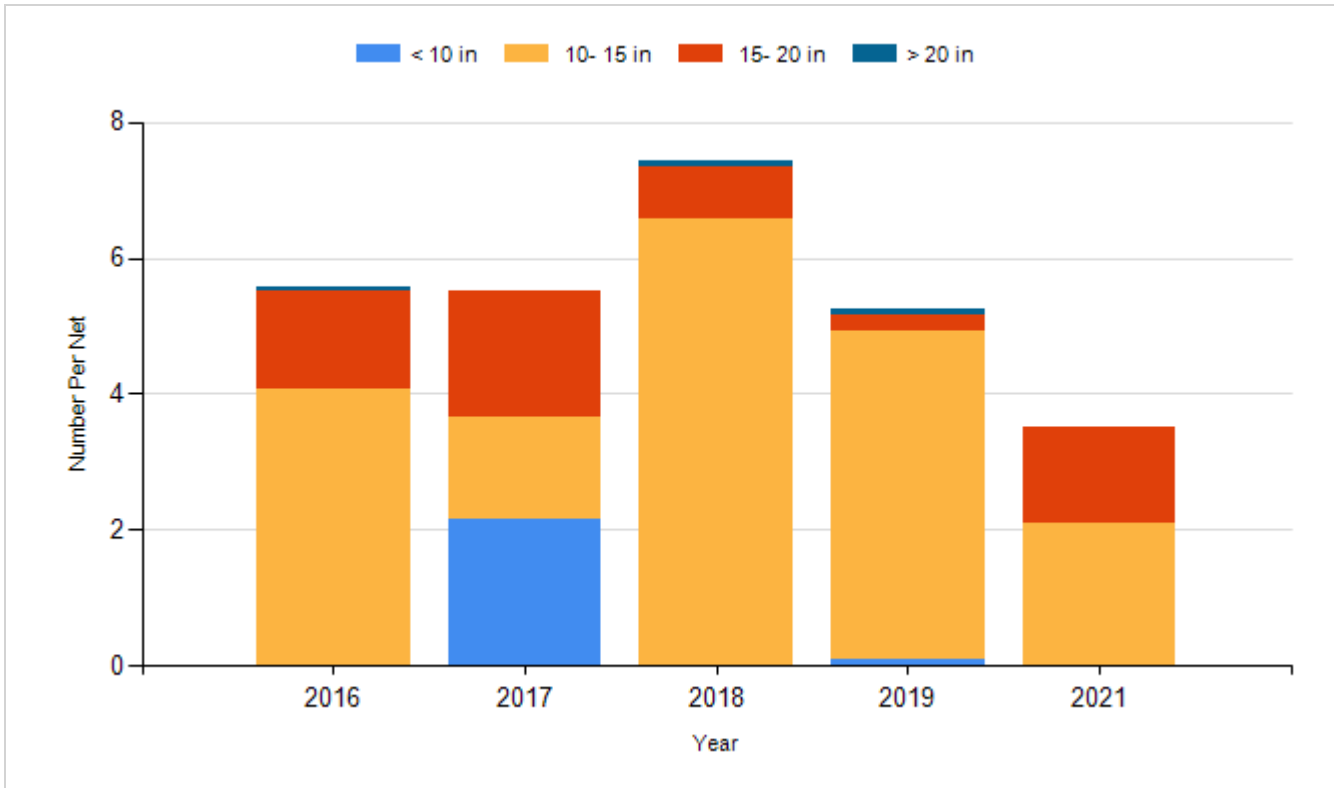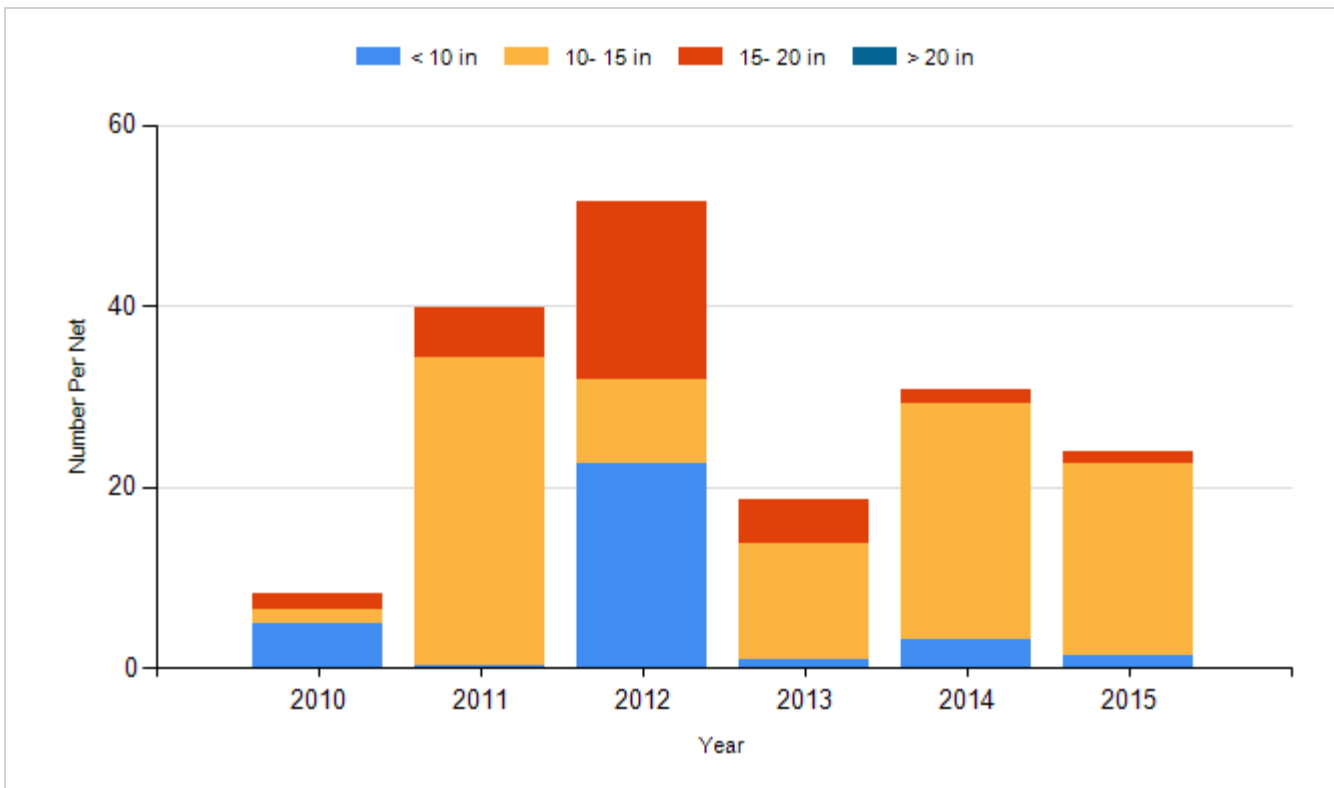
Historic Fish Sizes and Relative Abundance

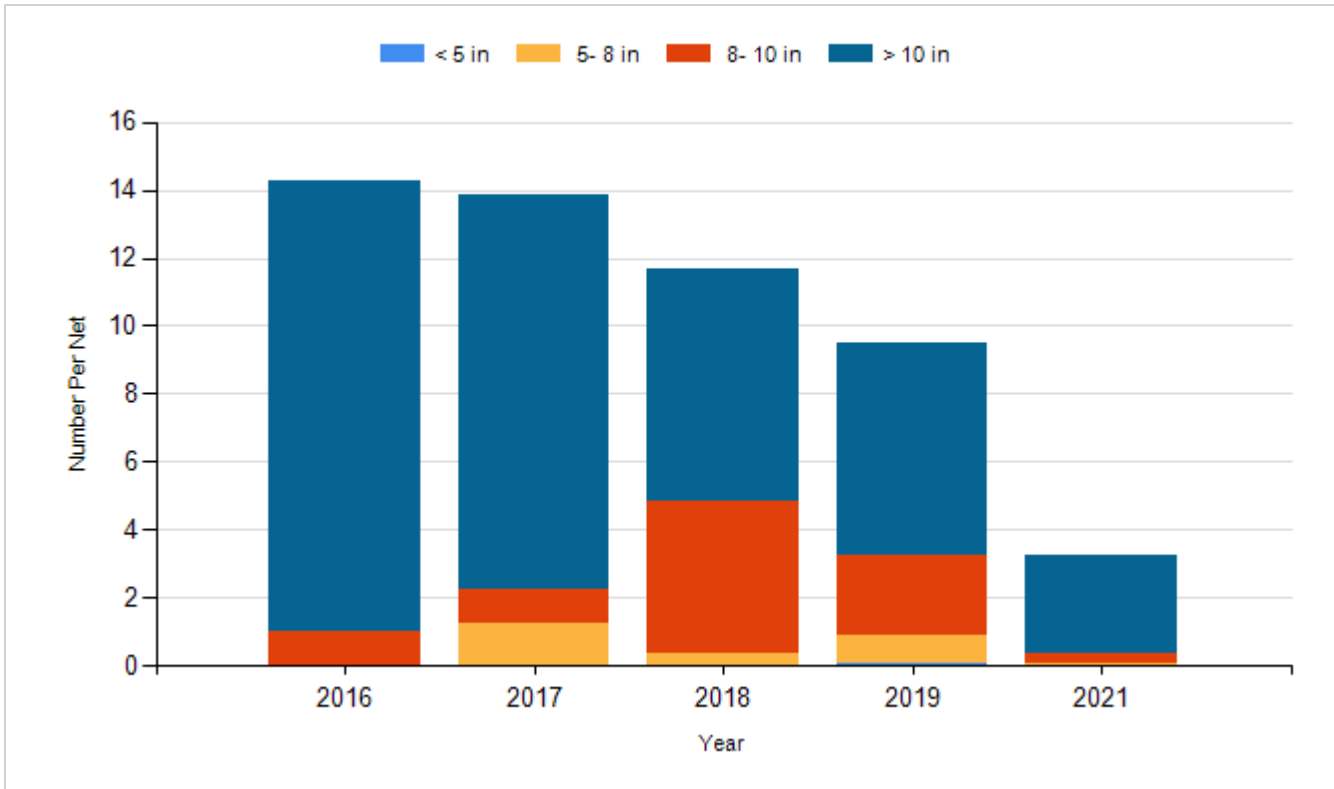Size distribution per net by color for species sampled by year.
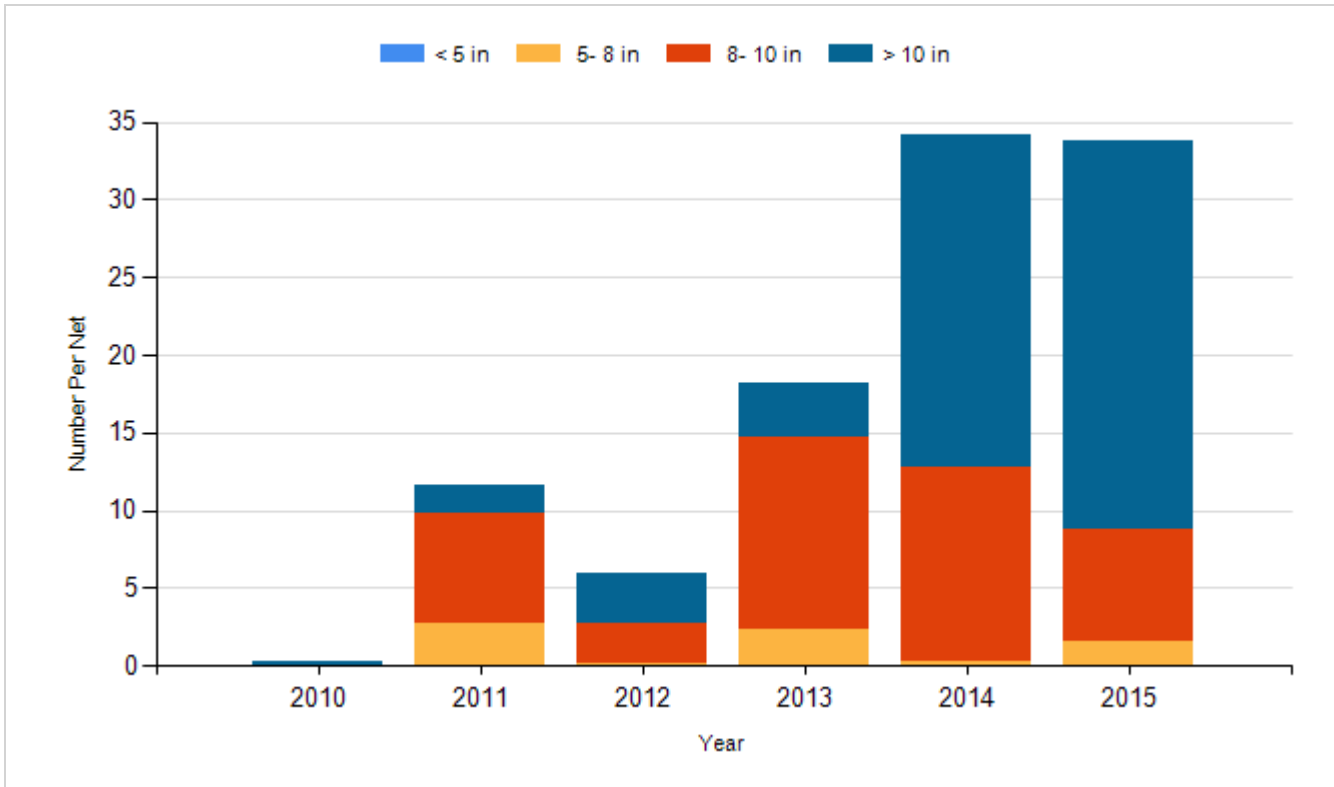
Species: Walleye
Gear: AFS std gill net

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
2011	Walleye	Fry	900,000
2016	Walleye	Fry	700,000
2018	Walleye	Fry	710,000
2021	Walleye	Fry	800,000