Enemy Swim Lake Survey Summary

Enemy Swim, located 1.5 miles east and 6.5 miles north of Waubay, is managed as a multiple-species fishery including panfish (i.e., black crappie, bluegill, and yellow perch), black bass (largemouth and smallmouth) and walleye.

- **Black crappie.** Black crappies were not abundant (0.7 per frame net) in 2021; those sampled ranged in length from 7.1 to 10.4 inches.

- **Bluegill.** Bluegill numbers were considerably higher in 2021 than in 2020. At 85.4 per frame net, relative abundance was considered high. Sampled bluegills ranged in length from 3.1 to 9.4 inches, 71% were ≥6.0 inches and 19% were ≥8.0 inches. Individuals from seven consecutive year classes (2012 – 2018) contributed to the catch. Bluegills from the 2016 (age-5) cohort were the most abundant accounting for 41% of fish in the sample. Meanwhile, those from the 2015 (age-6) and 2017 (age-4) year classes made up an additional 21% and 27%, respectively. Since 2012, mean length at capture values for age-5 bluegills have ranged from 5.4 to 7.8 inches. In 2021, age-5 bluegills had a mean length of 7.0 inches.

- **Largemouth/Smallmouth bass.** Spring electrofishing was not completed in 2021.

- **Walleye.** Although walleye numbers were higher in 2021 than in 2020, relative abundance remained low (3.4 per gill net). Sampled walleyes ranged in length from 7.5 to 23.2 inches, of those that were at least 10.0 inches 63% were ≥15.0 inches and 29% were ≥20.0 inches. Ten cohorts (2009, 2010, 2011, 2013, and 2015 – 2020) contributed to the catch, none were particularly strong. Individuals from the 2019 (age 2) year class were the most abundant accounting for 12 of the 43 walleyes sampled. Although sample sizes are low, the 2021 sample seems to suggest good walleye growth with mean length at captures at age 3 and age 4 of 15.9 and 18.0 inches.

- **Yellow perch**. Yellow perch were the most abundant species in the 2021 gill net catch. At 18.9 per gill net, relative abundance was considered moderate to high for Enemy Swim Lake. Sampled yellow perch ranged in length from 4.3 to 9.4 inches, of those that were at least 5.0 inches 4% were ≥8.0 inches. The entire sample was comprised of fish from three cohorts (2017 – 2019). Individuals from the 2018 (age 3) year class, which had a mean length at capture of 6.5 inches, were the most numerous accounting for 65% of yellow perch in the sample.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Enemy Swim, Day County
UBS-Lake-196-000
2021

Lake Information

Name:	Enemy Swim	**Maximum Depth:**	26 Feet
County:	Day	**Mean Depth:**	16 Feet
		OHWM Elevation:	1,854
Surface Area:	2,186 Acres	**Outlet Elevation:**	1,854

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 13, 2021	4 net-nights
AFS std gill net	Jul 14, 2021	4 net-nights
AFS std gill net	Jul 15, 2021	4 net-nights
frame net (std 3/4 in)	Jul 13, 2021	6 net-nights
frame net (std 3/4 in)	Jul 14, 2021	7 net-nights
frame net (std 3/4 in)	Jul 15, 2021	7 net-nights

Common Fish Species Present

Bluegill

Black Crappie

Largemouth Bass

Walleye

Smallmouth Bass

Yellow Perch

Rock Bass

White Bass

Pumpkinseed

White Sucker

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	3	0.3	0.2	100		100		94	5
	Black Crappie	36	3.0	1.0	97		42	12	104	1
	Bluegill	189	15.8	5.7	90	3	11	3	108	1
	Common Carp	5	0.4	0.3	100		100		90	5
	Largemouth Bass	2	0.2	0.2	100		100		108	9
	Northern Pike	13	1.1	0.4	62		8		87	2
	Rock Bass	3	0.3	0.2	100		67		109	4
	Smallmouth Bass	53	4.4	1.1	43	10	23	9	96	1
	Walleye	43	3.4	0.7	63	11	29	11	86	2
	White Bass	41	3.4	2.2	100		100		86	1
	White Sucker	15	1.3	0.6	100		93		102	2
	Yellow Perch	228	18.9	4.1	4	2	0		93	1
frame net (std 3/4 in)	Black Bullhead	4	0.2	0.2	100		25		90	5
	Black Crappie	13	0.7	0.3	85		38		102	2
	Bluegill	1708	85.4	19.6	71	1	19	1	105	0
	Northern Pike	5	0.3	0.1	40		0		86	2
	Pumpkinseed	28	1.4	1.0	4		0		108	3
	Rock Bass	142	7.0	3.8	63	6	10	4	107	1
	Smallmouth Bass	159	5.3	1.6	15	5	2		98	1
	Walleye	2	0.1	0.1	0		0		83	2
	White Bass	2	0.1	0.1	100		100		82	4
	White Sucker	1	0.1	0.1	100		100		94	
	Yellow Perch	33	1.6	1.8	0		0		83	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.

***SDGFP standard gill nets used 2012 - 2015; avg calculated on data from 2016 – 2021; ** Includes day and night samples; *** Methods/Species that ignore stock length; ****AFS standard frame nets used in 2016 and 2017**

		CPUE										
Gear	Species	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
AFS std gill net*	Black Bullhead	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.3	0.12
	Black Crappie	4.0	8.5	3.5	1.3	0.8	0.3	0.1	0.2	0.3	3.0	0.78
	Bluegill	54.8	41.8	10.3	15.5	3.8	0.9	6.5	3.5	15.9	15.8	7.73
	Common Carp	1.2	0.0	0.2	0.2	0.8	0.3	0.1	0.6	0.7	0.4	0.48
	Largemouth Bass	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.1	0.0	0.2	0.12
	Northern Pike	3.7	1.0	1.7	0.2	1.2	1.3	0.3	0.3	0.4	1.1	0.77
	Pumpkinseed	0.2	0.3	0.2	0.3	0.3	0.1	0.0	0.0	0.0	0.0	0.07
	Rock Bass	0.7	2.7	2.0	0.7	0.2	0.1	0.6	0.5	0.1	0.3	0.30
	Smallmouth Bass	2.7	2.3	5.3	1.5	2.4	0.9	2.8	2.3	3.8	4.4	2.77
	Walleye	7.5	8.7	8.5	8.7	7.2	1.3	3.8	1.5	1.8	3.4	3.17
	White Bass	8.0	5.8	1.3	2.0	7.6	3.0	2.1	3.9	1.4	3.4	3.57
	White Sucker	1.5	2.2	4.7	1.8	2.2	3.5	1.6	1.1	0.6	1.3	1.72
	Yellow Perch	34.0	9.7	1.7	0.0	4.9	0.9	1.0	4.8	13.2	18.9	7.28
boat shocker**	Smallmouth Bass	299.0		82.0		86.0			32.0			124.75
boat shocker**	Largemouth Bass	67.2		224.3				21.2				104.23
fall night EF-WAE***	Walleye	3.0	116.0	8.0	20.0	38.5	9.0	11.0	15.0			27.56
frame net (std 3/4 in)****	Black Bullhead	0.3	0.2	0.7	0.2	0.1	0.3	0.3	0.3	0.3	0.2	0.29
	Black Crappie	2.1	5.7	1.2	0.3	2.6	0.2	4.1	0.6	2.2	0.7	1.97
	Bluegill	53.8	54.2	31.5	26.1	62.7	39.2	119.1	62.8	46.0	85.4	58.08
	Channel Catfish	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.01
	Common Carp	0.0	0.0	0.0	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.05
	Northern Pike	0.3	0.4	0.3	0.6	0.5	0.2	0.3	0.1	0.3	0.3	0.33
	Pumpkinseed	0.6	2.1	0.4	1.5	1.1	0.3	0.5	0.4	0.5	1.4	0.88
	Rock Bass	8.2	3.8	5.3	6.4	0.8	2.3	4.5	3.0	5.4	7.0	4.67
	Smallmouth Bass	4.6	3.4	3.3	2.0	0.6	0.5	0.8	2.6	5.2	5.3	2.83
	Walleye	1.2	0.7	0.8	0.8	1.0	0.6	0.1	0.1	0.2	0.1	0.56
	White Bass	0.2	0.1	0.2	0.3	0.3	0.0	0.5	0.4	0.7	0.1	0.28
	White Sucker	0.1	0.2	0.0	0.2	0.1	0.1	0.0	0.1	0.2	0.1	0.11
	Yellow Perch	0.9	1.1	0.5	0.3	1.4	0.1	3.8	0.7	1.0	1.6	1.14

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.

***SDGFP standard gill nets used 2012 – 2015; **AFS standard frame nets used in 2016 and 2017**

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
AFS std gill net*	Walleye	PSD	18	21	16	10	52	81	70	83	73	63
		PSD-P	9	17	4	2	1	6	4	11	27	29
		Wr	81	80	82	83	86	83	90	86	85	86
	Yellow Perch	PSD	3	2	10	0	7	18	0	0	0	4
		PSD-P	0	0	0	0	0	0	0	0	0	0
		Wr	94	92	92		95	87	94	97	100	93
frame net (std 3/4 in)**	Bluegill	PSD	78	68	46	42	43	3	20	17	19	71
		PSD-P	7	32	27	21	18	1	5	3	2	19
		Wr	110	104	103	105	104	107	104	103	110	105

Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Bluegill

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	1708			98 (133)	152 (454)	177 (694)	197 (361)	204 (47)	244 (15)	234 (7)	
2020	1003		91 (22)	117 (339)	126 (505)	158 (135)	201 (4)				
2019	1438		94 (21)	100 (455)	127 (917)	150 (20)	205 (24)				
2018	2513		85 (42)	110 (1952)	146 (208)	186 (252)	223 (16)	237 (16)	241 (19)		250 (11)
2017	2228		75 (1923)	123 (74)	125 (158)	136 (66)	204 (1)	249 (1)		245 (4)	242 (2)
2016	2140	68 (636)	100 (206)	95 (582)	161 (338)	198 (248)	215 (85)	243 (8)	233 (17)	256 (8)	246 (14)
2015	636	77 (6)	77 (3)	93 (327)	163 (122)	187 (61)	205 (22)	224 (81)	226 (10)	224 (5)	242 (1)
2014	757		96 (125)	109 (209)	144 (101)	196 (92)	200 (155)	198 (76)	234 (1)	234 (1)	
2013	1323	94 (12)	84 (91)	116 (328)	173 (124)	190 (249)	199 (431)	201 (77)	214 (14)		
2012	1291		94 (54)	126 (63)	158 (358)	176 (530)	190 (129)	193 (114)	198 (45)		

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	43	223 (4)	319 (12)	404 (7)	456 (3)	556 (1)	527 (3)		556 (2)		527 (11)
2020	28	214 (6)	322 (6)	420 (1)	447 (2)	477 (5)	485 (1)			528 (2)	575 (5)
2019	21	233 (4)	325 (2)	424 (2)	479 (3)		480 (4)		524 (1)	456 (1)	500 (4)
2018	47	218 (1)	316 (5)	366 (10)	380 (2)	434 (7)		443 (8)	420 (2)	462 (11)	672 (1)
2017	17		281 (2)	151 (1)	410 (4)		392 (3)		438 (7)		
2016	88	248 (2)	281 (4)	331 (11)	366 (1)	381 (28)	398 (7)	386 (36)			625 (1)
2015	54		256 (6)		329 (7)	360 (3)	354 (37)				681 (1)
2014	55	187 (4)		278 (4)		356 (45)					584 (2)
2013	56		224 (6)	288 (10)	334 (30)			559 (1)	565 (1)	559 (1)	581 (7)
2012	48	167 (3)	264 (1)	320 (40)				552 (1)		636 (1)	544 (2)

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	228		139 (14)	166 (149)	172 (65)						
2020	158		148 (118)	170 (40)							
2019	57		147 (57)								
2017	11			161 (4)	192 (2)	189 (3)		197 (1)	206 (1)		
2016	59	136 (1)	147 (40)	171 (13)	199 (2)		222 (1)	205 (1)	240 (1)		
2015	11	100 (10)	97 (1)								
2014	19	97 (7)	110 (2)		155 (1)	184 (3)	195 (6)				
2013	70	97 (11)	112 (1)	142 (2)	158 (21)	169 (32)	169 (4)				
2012	215	102 (2)	112 (7)	144 (20)	165 (168)	187 (18)					

Fish Condition

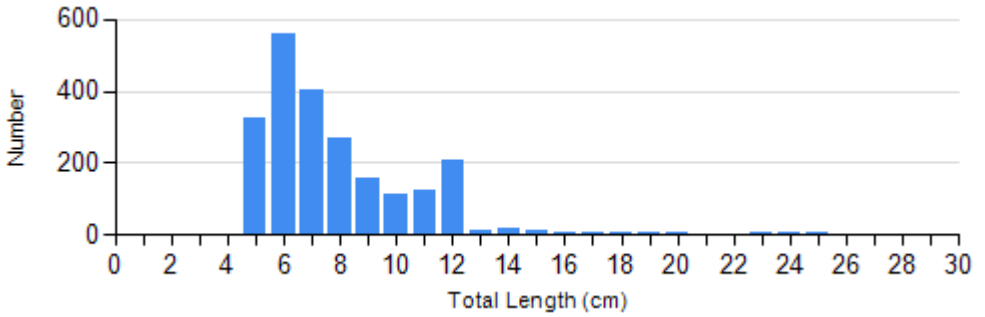
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Bluegill Frame Net	2017	908	106 (0.6)	23	111 (1.7)	7	106 (2.5)	2	95 (4.6)
	2018	1997	102 (0.5)	383	110 (0.7)	109	107 (1.0)	13	104 (3.5)
	2019	1195	101 (0.5)	208	113 (0.8)	40	114 (1.4)	1	
	2020	814	109 (0.6)	180	113 (1.7)	16	108 (1.2)	1	124
	2021	490	100 (0.7)	894	108 (0.4)	324	103 (0.5)	0	
Walleye Gill Net	2017	3	86 (3.7)	12	83 (1.6)	1	78	0	
	2018	14	94 (1.5)	30	88 (0.8)	1	87	1	79
	2019	3	85 (2.1)	13	87 (1.5)	2	81 (5.9)	0	
	2020	6	83 (1.3)	10	86 (1.8)	5	86 (3.3)	1	68
	2021	15	89 (2.7)	14	85 (1.3)	12	84 (1.4)	0	
Yellow Perch Gill Net	2017	9	88 (2.3)	2	86 (4.7)	0		0	
	2018	12	94 (2.1)	0		0		0	
	2019	57	97 (0.8)	0		0		0	
	2020	158	100 (0.6)	0		0		0	
	2021	217	93 (0.5)	10	93 (1.4)	0		0	

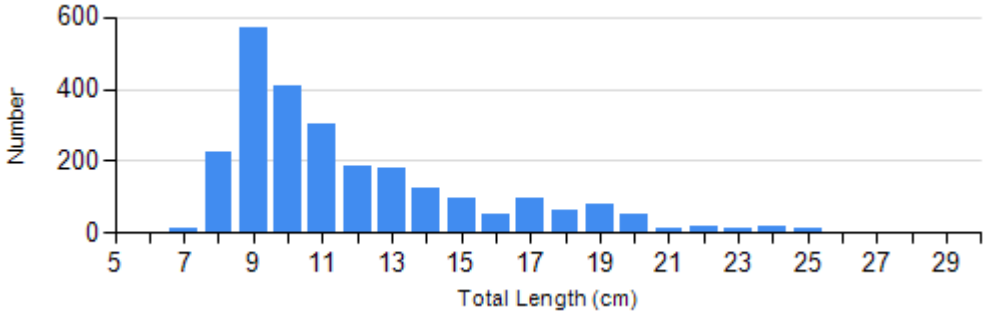
Length Frequency Distribution

Length frequency histogram of species sampled by year.

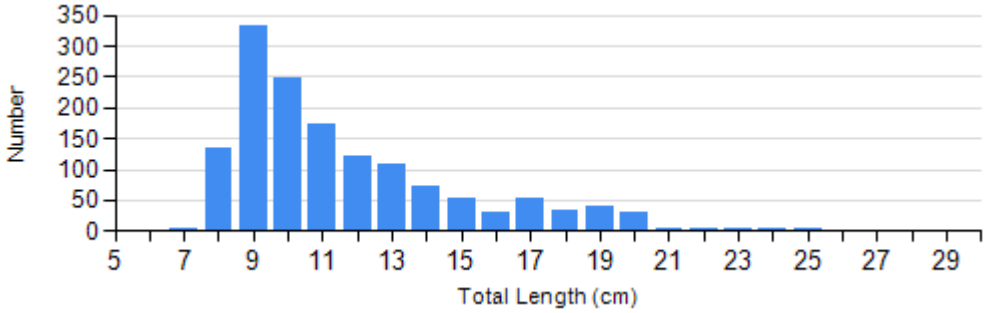
Species: Bluegill
Gear: frame net (std 3/4 in); *AFS standard frame nets used in 2017



2017



2018



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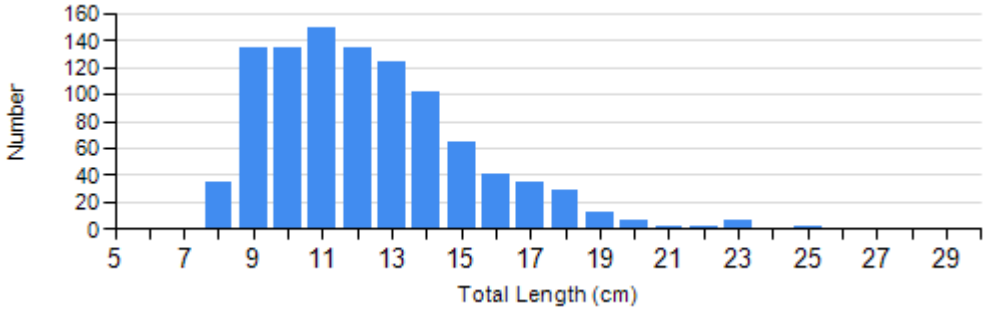
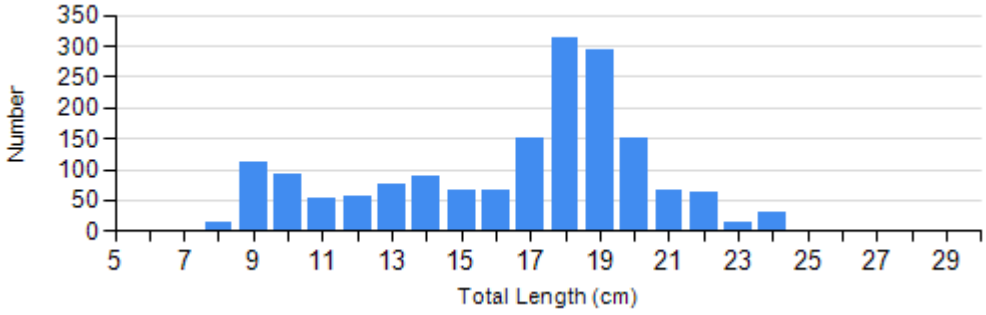
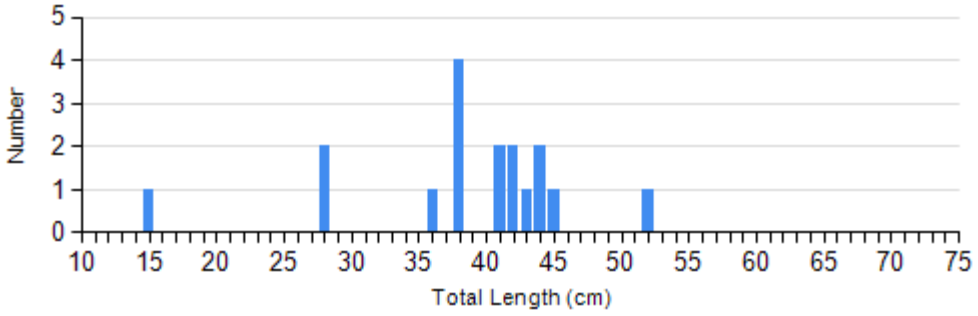


2020

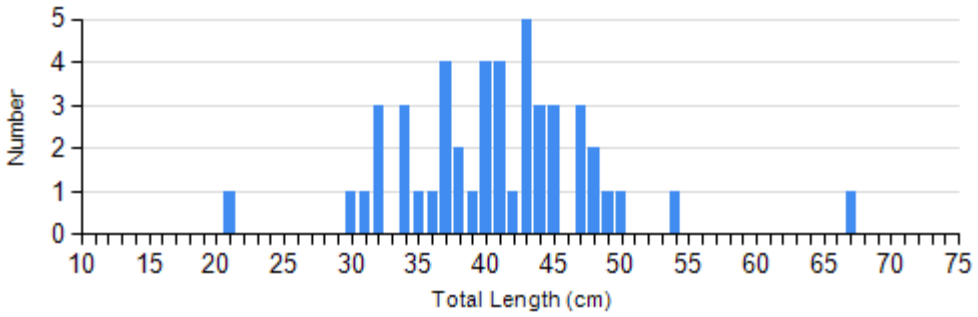


2021

Species: Walleye
Gear: AFS std gill net



2017



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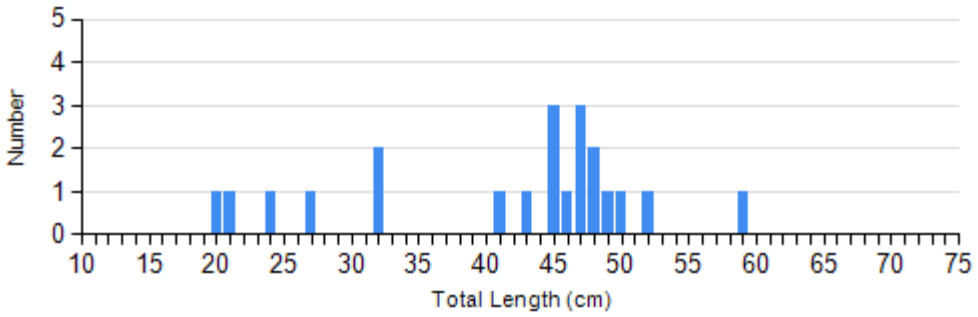
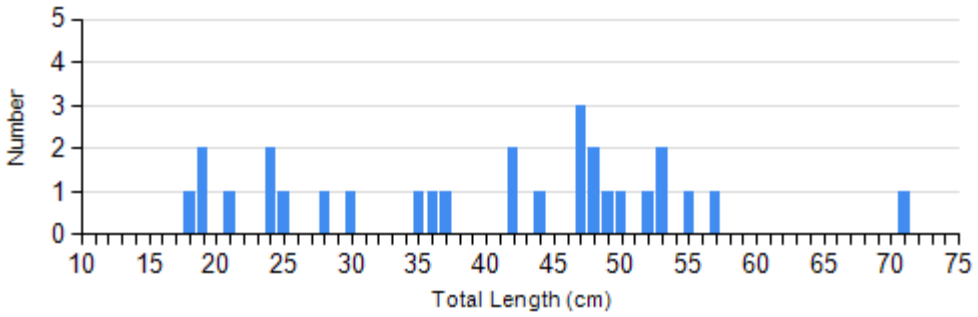
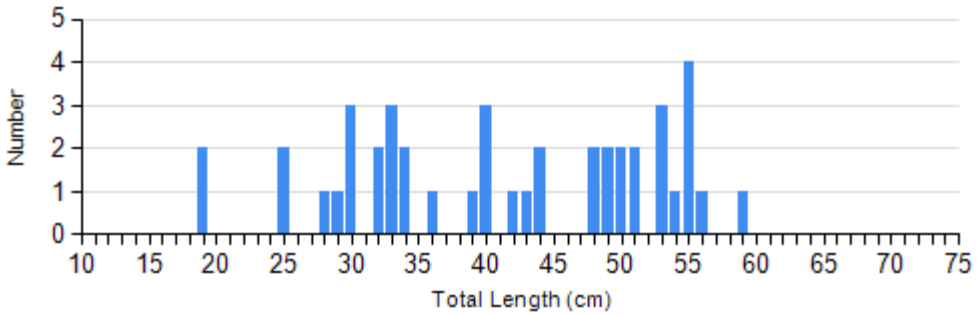


2019

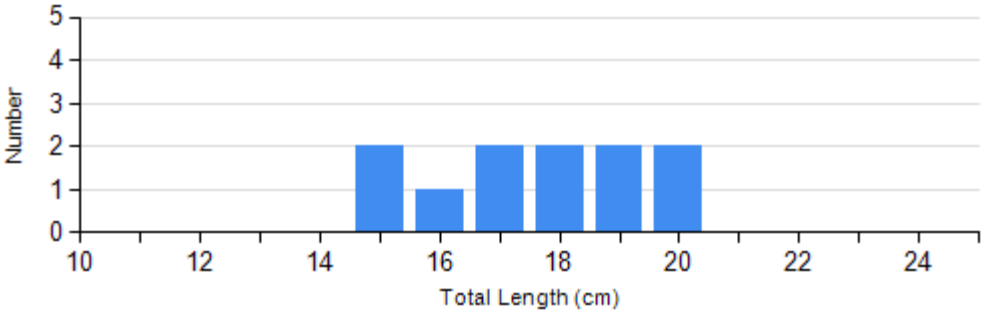


2020

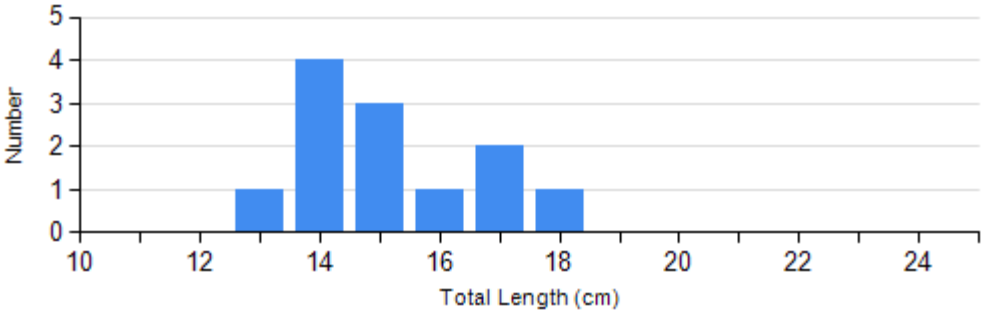


2021

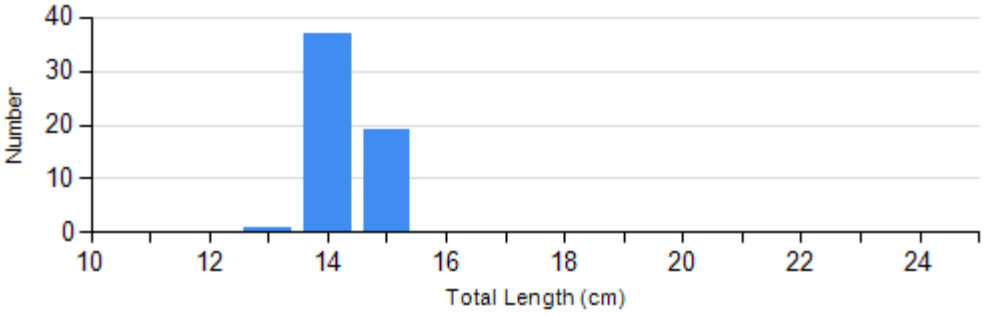
Species: Yellow Perch
Gear: AFS std gill net



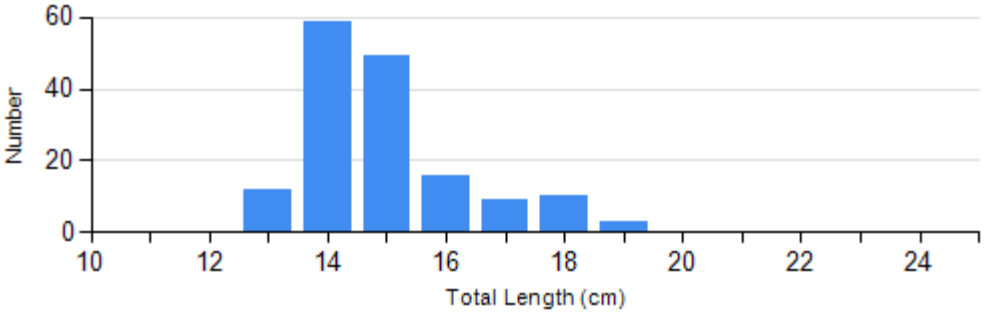
2017



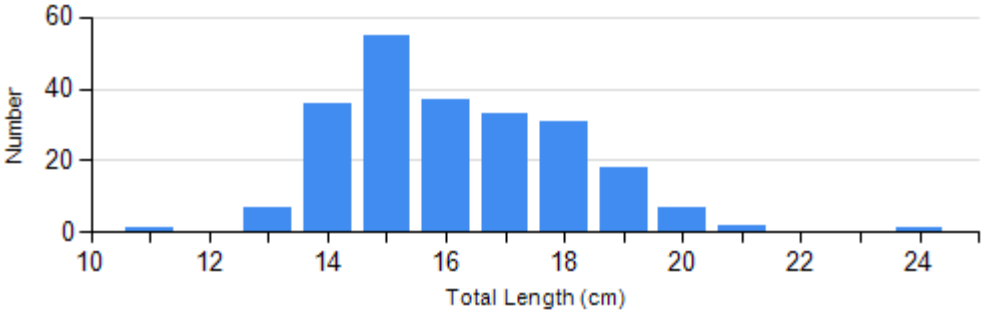
2018



2019



2020

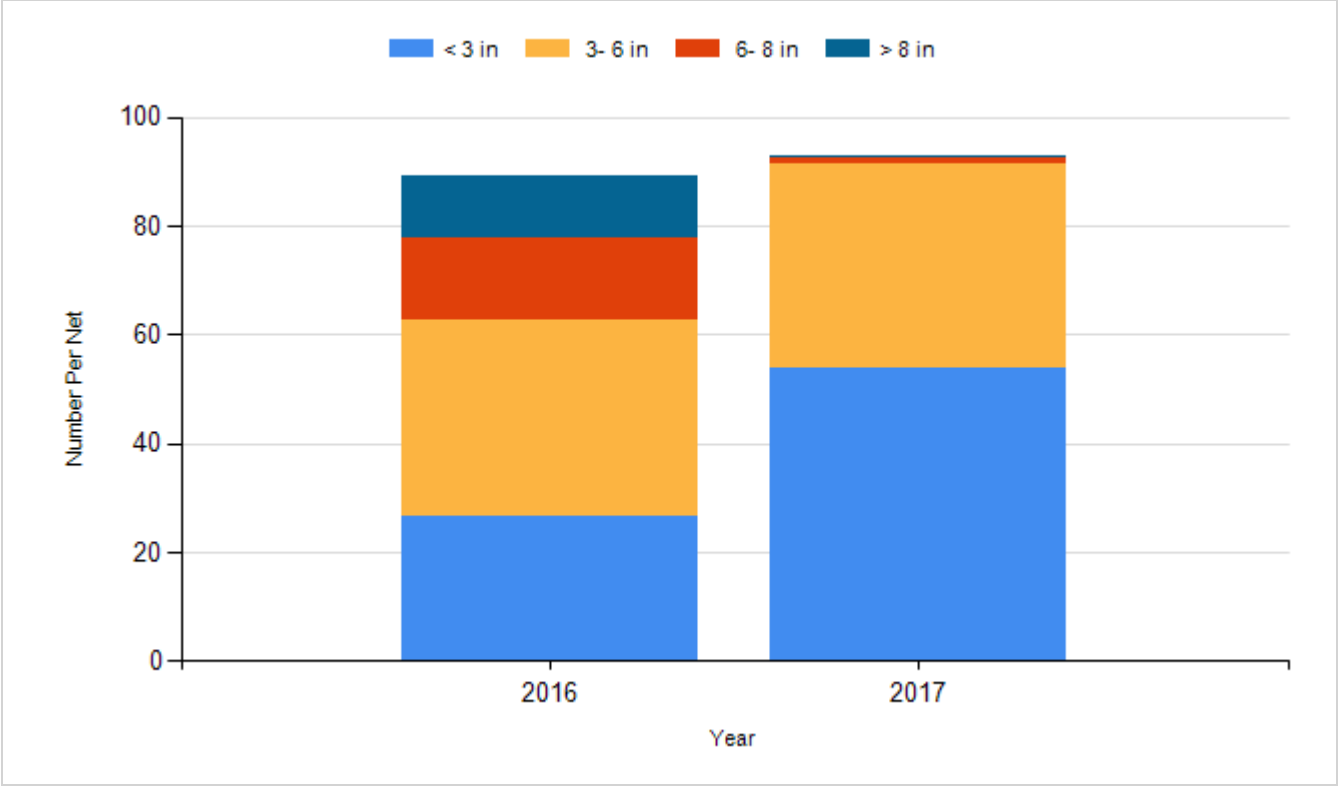


2021

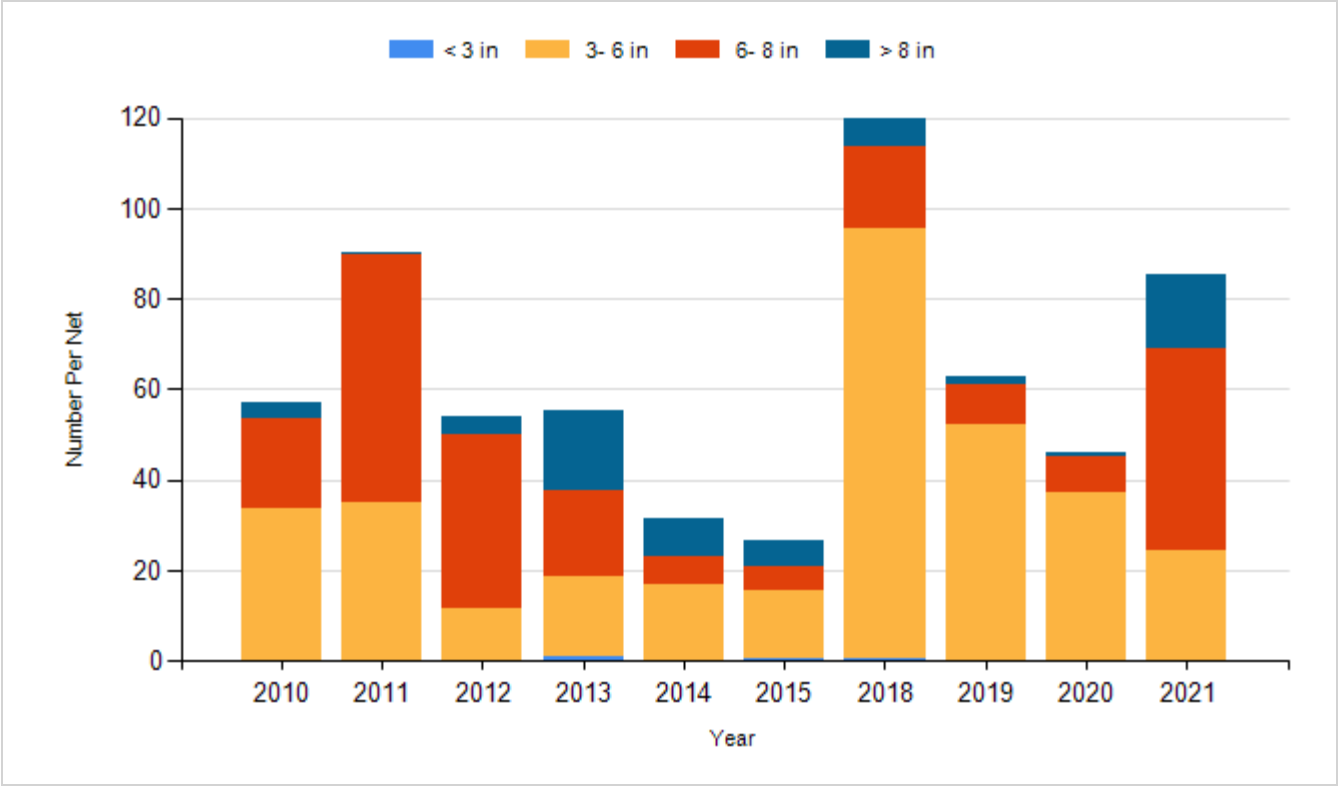
Historic Fish Sizes and Relative Abundance

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

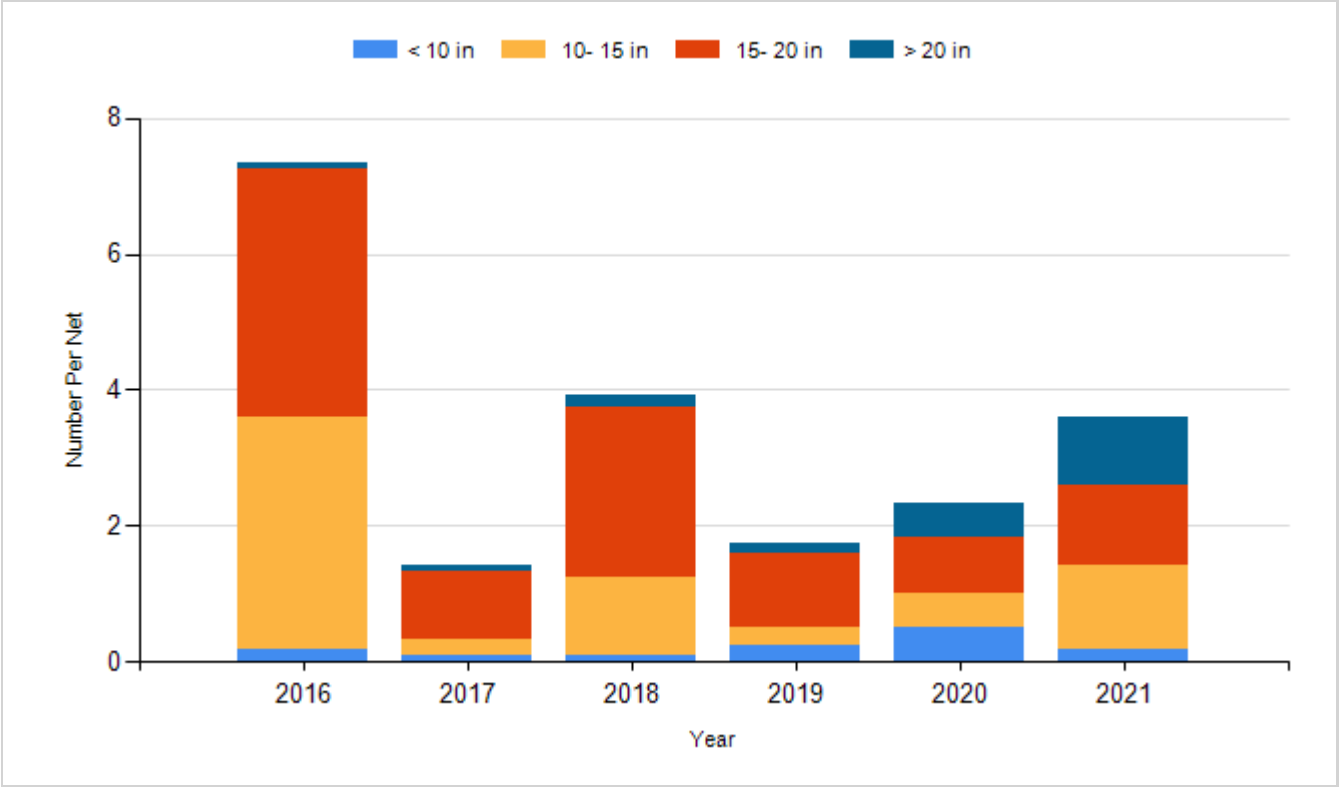
Species: Bluegill
Gear: AFS std frame net



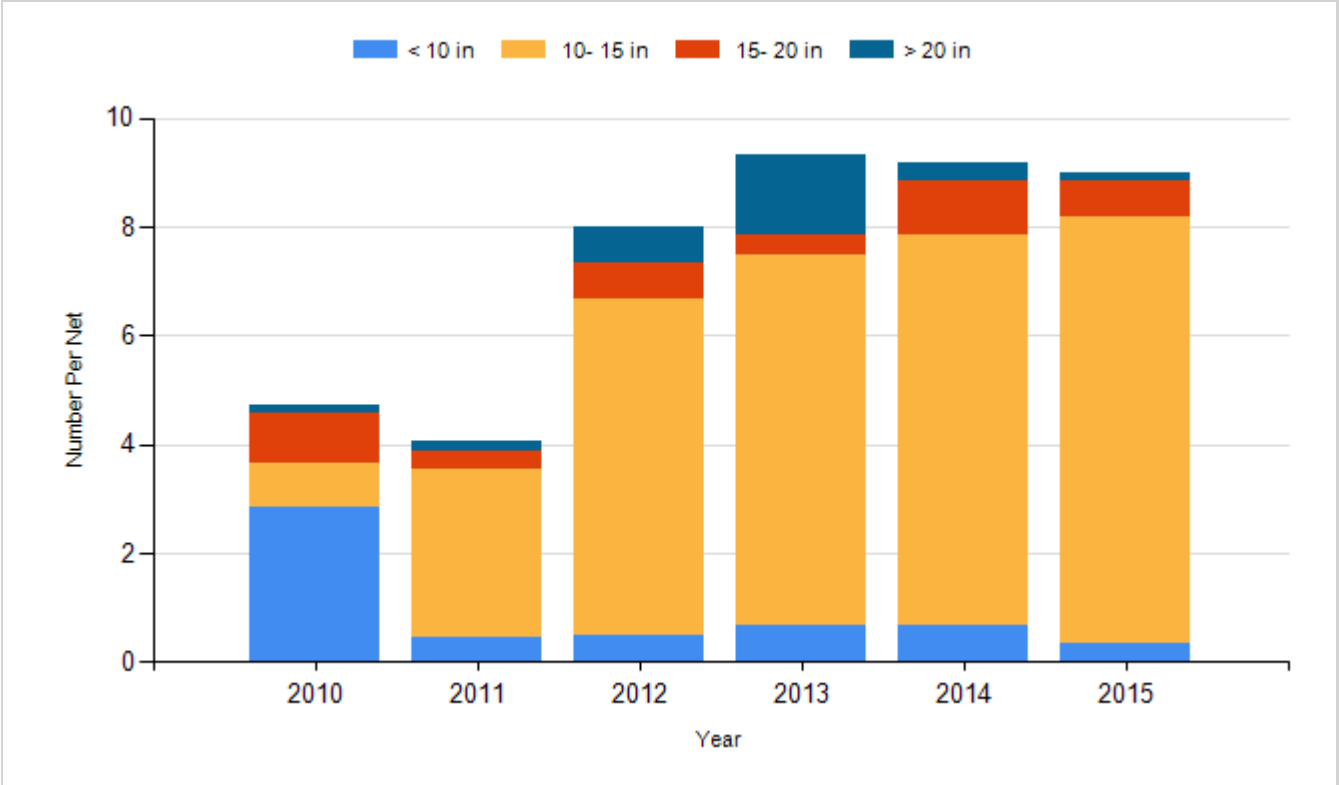
Species: Bluegill
Gear: frame net (std 3/4 in)



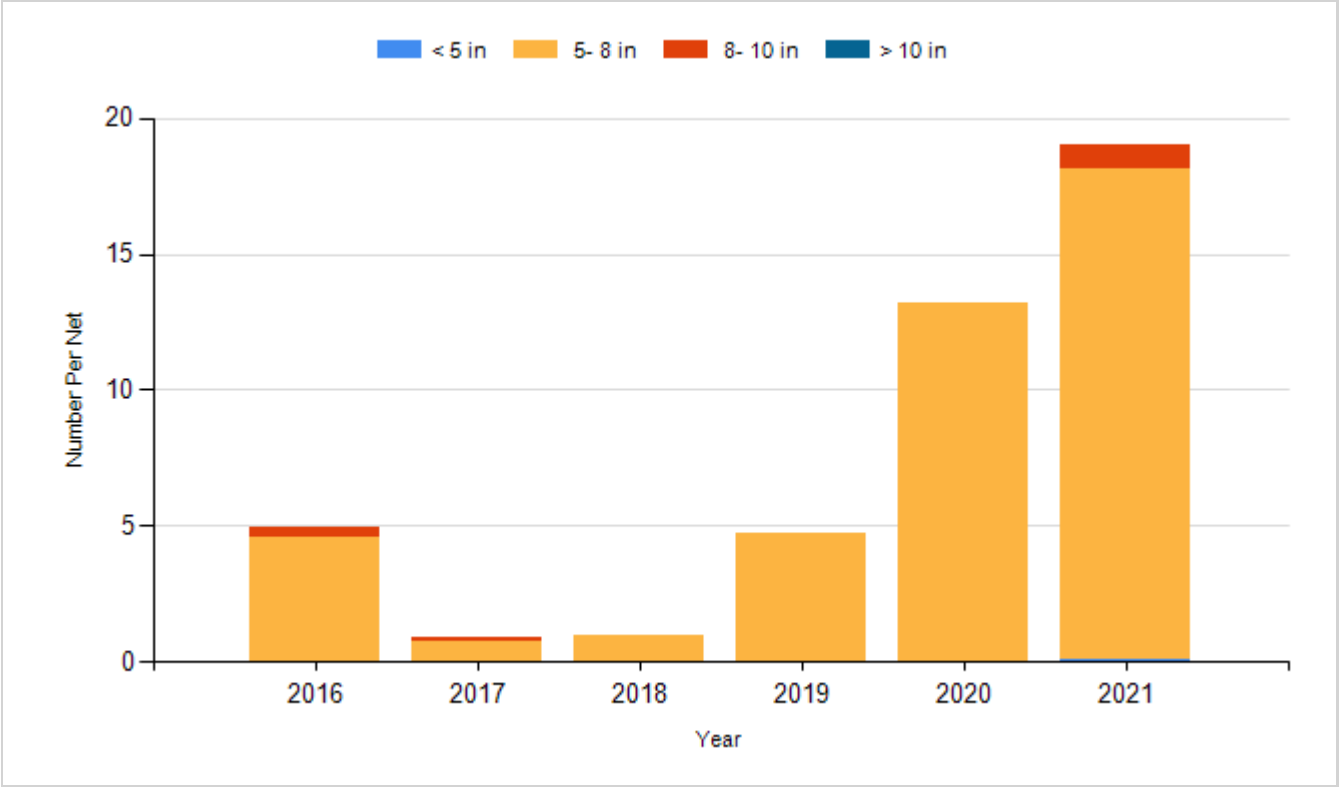
Species: Walleye
Gear: AFS std gill net



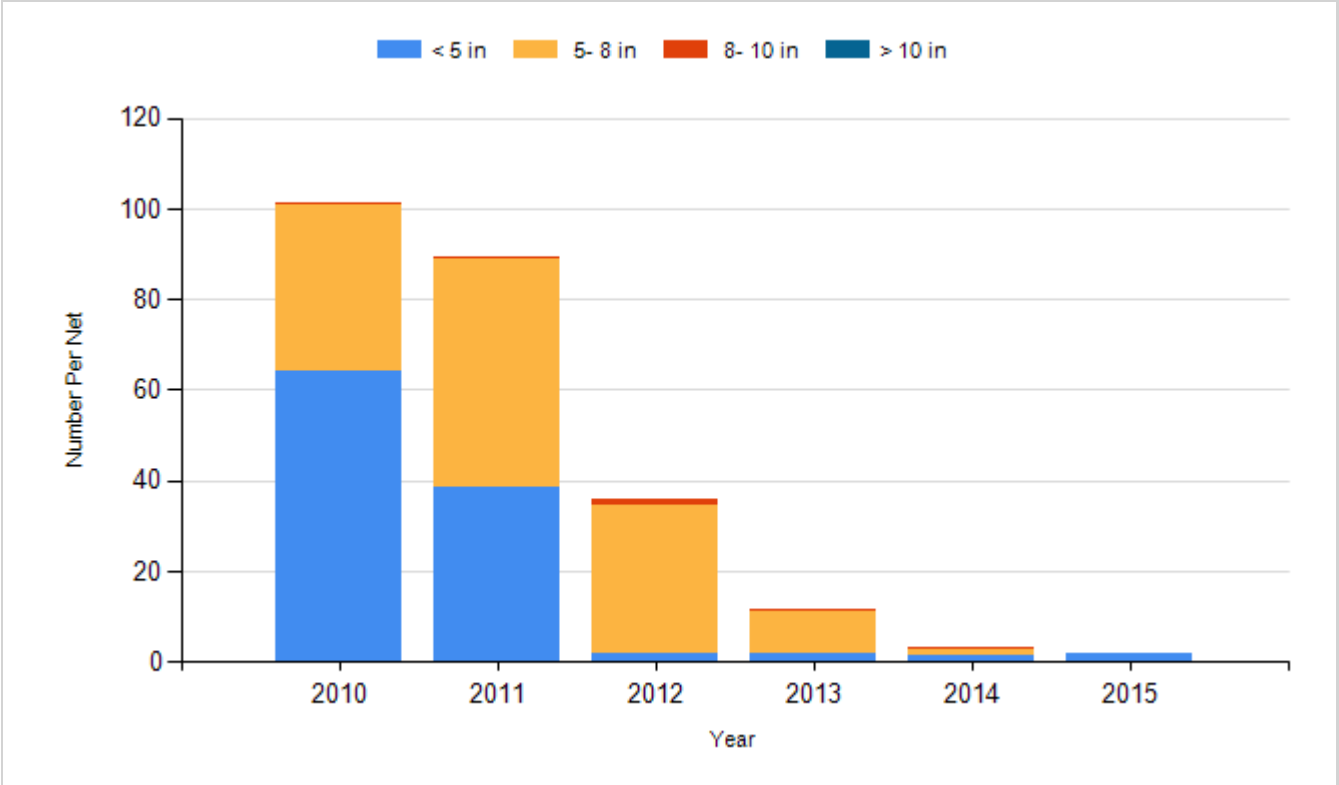
Species: Walleye
Gear: std exp gill net



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	Large Fingerling	38,634
2011	Walleye	Small Fingerling	235,640
2013	Walleye	Small Fingerling	217,450
2015	Walleye	Large Fingerling	13,264
2017	Walleye	Large Fingerling	900
2018	Walleye	Large Fingerling	48,484
2019	Walleye	Large Fingerling	3,800
2020	Walleye	Large Fingerling	4,610
2021	Walleye	Adult	42
2021	Walleye	Juvenile	22,819