Richmond Lake Survey Summary

Richmond Lake, located 5.0 miles north and 4.0 miles west of Aberdeen, is managed as a black crappie, bluegill, and walleye (includes saugeye) fishery; however, other fish species (e.g., channel catfish, northern pike, white bass, etc.) are present and contribute to the fishery.

- **Black crappie.** After a substantial increase in 2019**,** black crappie numbers were lower in 2020. At 7.6/frame net, relative abundance was considered low to moderate in 2020. Sampled black crappies ranged in length from 5.5 to 11.4 inches, 58% were ≥8.0 inches and 1% were ≥10.0 inches. Individuals from four year classes (2012, 2017, 2018, and 2019) were caught, those from the 2018 (age-2) cohort were the most numerous accounting for 98% of fish in the sample. The mean length at capture at age 2 was 7.9 inches.

- **Bluegill.** The 2020 frame net CPUE of 9.3 was the second lowest recorded since 2011 and suggests low relative abundance. Sampled bluegills ranged in length from 5.1 to 7.9 inches, 95% were ≥6.0 inches and 4% were ≥8.0 inches. Individuals from three year classes (2016 – 2018) contributed to the catch, those from the 2017 (age-3) cohort were the most abundant accounting for more than 64% of bluegills in the sample. Growth appears to be good with mean length at capture exceeding 7.0 inches by age 3. In 2020, the mean length at capture of age- 3 fish was 7.3 inches.

- **Channel catfish.** The opportunity exists for anglers to catch channel catfish from Richmond Lake. In 2020, gill nets sampled 5 individuals, all were 24.0 inches or longer.

- **Walleye.** At 1.0/gill net, relative abundance of walleyes (includes saugeye) ≥10.0 inches was low. Sampled walleyes ranged in length from 9.1 to 21.7 inches; four year classes (2016 2019) were present. All four cohorts contributing to the gill net catch coincided with recent saugeye stockings (2016 – 2019) and each was represented by nine or fewer individuals.

- **Yellow Perch**. Yellow perch were the second most abundant fish species in the 2020 gill net catch (18.9/gill net). Sampled yellow perch ranged in length from 5.5 to 9.4 inches, 45% were ≥8.0 inches. Four consecutive year classes (2016 – 2019) were present. Fish from the 2018 (age-2) cohort were the most abundant accounting for 97% of yellow perch in the sample. Age-2 individuals had a mean length at capture of 7.8 inches.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Richmond, Brown County
UJA-Lake-831-800
2020

Lake Information

Name: Richmond

County: Brown

Surface Area: 741 Acres

Maximum Depth: 23 Feet

Mean Depth: 8 Feet

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 04, 2020	4 net-nights
AFS std gill net	Aug 05, 2020	4 net-nights
AFS std gill net	Aug 06, 2020	4 net-nights
fall night EF-WAE	Oct 08, 2020	2400 seconds
frame net (std 3/4 in)	Aug 04, 2020	6 net-nights
frame net (std 3/4 in)	Aug 05, 2020	6 net-nights
frame net (std 3/4 in)	Aug 06, 2020	6 net-nights

Common Fish Species Present

Walleye

Largemouth Bass

Bluegill

Black Crappie

Black Bullhead

Yellow Perch

Common Carp

White Bass

Channel Catfish

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	323	26.9	4.7	7	2	0		92	1
	Black Crappie	4	0.3	0.3	75		0		109	2
	Bluegill	1	0.1	0.1	100		0		119	
	Channel Catfish	5	0.4	0.2	100		100		93	4
	Common Carp	74	6.2	2.0	16	6	1		91	1
	Walleye	21	1.0	0.4	42	24	17		82	2
	White Sucker	4	0.3	0.3	100		100		97	3
	Yellow Perch	227	18.9	5.6	45	5	0		100	1
fall night EF-WAE*	Walleye	2	3.0	4.9					91	7
frame net (std 3/4 in)	Black Bullhead	73	4.1	2.0	27	8	0		83	1
	Black Crappie	136	7.6	3.0	58	6	1		104	1
	Bluegill	167	9.3	6.1	95	3	4	2	112	1
	Channel Catfish	13	0.7	0.4	46	23	31		104	5
	Common Carp	51	2.8	1.9	31	10	12	7	89	1
	Northern Pike	4	0.2	0.1	33		33		81	5
	Sunfish Hybrid	1	0.0	0.0						
	Walleye	17	0.7	0.4	8		8		74	3
	White Bass	55	3.1	1.7	100		85	7	86	1
	White Sucker	2	0.1	0.1	100		100		95	13
	Yellow Perch	391	21.7	12.2	66	3	0		90	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.

*** Methods/Species that ignore stock length; **AFS standard nets used in 2016 and 2017**

		CPUE										
Gear	Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Avg
AFS std gill net	Black Bullhead						42.5	28.8	16.2	14.0	26.9	25.68
	Black Crappie						0.6	0.1	0.2	1.3	0.3	0.50
	Bluegill						0.1	0.3	0.6	0.2	0.1	0.26
	Channel Catfish						2.2	0.9	0.4	1.3	0.4	1.04
	Common Carp						2.3	1.1	4.1	4.0	6.2	3.54
	Northern Pike						0.1	0.2	0.1	0.4	0.0	0.16
	Walleye						2.4	0.2	1.1	4.3	1.0	1.80
	White Bass						2.8	1.0	0.3	0.4	0.0	0.90
	White Sucker						0.0	0.1	0.0	0.1	0.3	0.10
	Yellow Perch						1.8	8.3	5.0	15.8	18.9	9.96
fall night EF-WAE*	Walleye	34.0	0.0	0.0	0.0	0.0	10.5	36.0	109.0	112.5	3.0	30.50
frame net (std 3/4 in)**	Black Bullhead	39.1	236.3	229.2	99.2	65.2	85.5	196.0	36.4	68.9	4.1	105.99
	Black Crappie	5.9	8.8	8.1	14.3	9.4	9.8	2.2	6.1	31.7	7.6	10.39
	Bluegill	60.7	51.3	20.0	33.6	17.9	4.8	10.6	36.5	20.0	9.3	26.47
	Channel Catfish	0.9	0.1	0.3	0.4	0.7	0.5	0.7	0.1	1.3	0.7	0.57
	Common Carp	0.1	0.4	0.2	0.8	0.6	1.0	0.4	0.7	1.1	2.8	0.81
	Green Sunfish	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.7	0.1	0.0	0.09
	Largemouth Bass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
	Northern Pike	0.6	0.4	0.1	0.2	0.7	0.3	0.4	0.4	0.3	0.2	0.36
	Pumpkinseed	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01
	Rock Bass	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
	Smallmouth Bass	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01
	Walleye	2.2	0.8	1.0	2.2	3.3	2.4	1.4	0.4	1.5	0.7	1.59
	White Bass	17.6	5.2	4.0	2.7	3.7	6.4	6.7	0.3	4.2	3.1	5.39
	White Sucker	0.1	0.2	0.2	0.0	0.2	0.4	0.3	0.3	0.2	0.1	0.20
	Yellow Perch	0.9	1.2	0.3	1.9	0.9	0.3	0.0	9.5	47.3	21.7	8.40
std exp gill net	Black Bullhead	8.2	108.5	109.0	90.7	51.6						73.60
	Black Crappie	0.1	1.0	2.2	0.7	1.0						1.00
	Bluegill	0.2	1.3	1.0	0.2	0.0						0.54
	Channel Catfish	0.7	2.2	1.5	0.2	0.2						0.96
	Common Carp	0.1	1.7	1.5	0.8	1.4						1.10
	Northern Pike	0.2	0.7	1.0	0.5	0.4						0.56
	Walleye	2.8	5.8	4.0	1.8	7.2						4.32
	White Bass	0.4	2.0	1.5	0.2	0.2						0.86
	White Sucker	0.0	0.2	0.2	0.3	0.2						0.18
	Yellow Perch	1.8	11.8	8.3	11.3	8.8						8.40

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.

****AFS standard nets used in 2016 and 2017**

			Year									
Gear	Species	Index	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AFS std gill net	Walleye	PSD						52	0	15	29	42
		PSD-P						3	0	8	2	17
		Wr						87	83	95	86	82
	Yellow Perch	PSD						82	57	80	6	45
		PSD-P						50	21	10	1	0
		Wr						102	106	103	102	100
frame net (std 3/4 in)**	Black Crappie	PSD	23	66	64	85	96	84	82		14	58
		PSD-P	2	0	0	0	5	24	26		3	1
		Wr	101	108	106	99	100	107	102		110	104
	Bluegill	PSD	89	78	98	99	96	97	91		60	95
		PSD-P	6	17	29	35	65	38	15		2	4
		Wr	110	114	112	111	113	119	121		111	112
std exp gill net	Walleye	PSD	30	54	21	27	17					
		PSD-P	2	6	8	0	0					
		Wr	90	84	84	84	93					
	Yellow Perch	PSD	31	61	56	84	93					
		PSD-P	3	0	0	9	30					
		Wr	98	101	97	103	111					

Length at Capture

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

Species: Black Crappie

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	136	145 (1)	201 (133)	239 (1)					293 (1)		
2019	563	162 (493)	218 (51)	257 (8)	267 (12)						
2018	109	169 (74)	222 (11)	241 (18)	269 (2)	264 (1)		275 (3)			
2017	39		195 (10)	225 (11)	240 (2)		251 (11)	258 (6)			
2016	176	157 (17)	203 (46)	228 (8)	250 (7)	247 (76)	244 (20)			234 (3)	
2015	168	136 (4)	201 (6)	234 (19)	231 (114)	242 (26)					
2014	257		143 (1)	184 (1)	205 (151)	221 (81)	218 (24)				
2013	146		192 (51)	217 (95)							

Species: Bluegill

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	167		162 (58)	185 (107)	206 (2)						
2019	360	105 (59)	153 (264)	182 (32)	205 (5)						
2018	657	121 (291)	160 (290)	198 (43)	211 (25)	217 (4)		233 (4)			
2017	190	111 (15)	166 (91)	191 (64)	208 (10)	227 (2)	217 (2)	213 (6)			
2016	87		163 (24)	183 (36)	220 (4)	223 (18)	220 (4)	232 (2)			
2015	322	98 (8)	162 (56)	182 (14)	206 (160)	219 (24)	218 (20)	216 (41)			
2014	605	95 (1)	149 (8)	183 (170)	196 (271)	201 (115)	221 (40)			241 (1)	
2013	360	122 (1)	166 (114)	186 (114)	207 (121)	195 (8)	226 (3)	226 (3)			
2012	923	120 (193)	172 (391)	190 (56)	200 (240)	204 (40)		220 (4)			
2011	1090	118 (71)	158 (247)	182 (656)	197 (73)	210 (25)	216 (20)				

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	21	231 (9)	297 (7)	488 (4)	552 (1)						
2019	52	294 (37)	419 (9)	462 (4)				482 (1)		574 (1)	
2018	13	305 (10)	376 (2)					571 (1)			
2017	3	217 (1)		282 (1)	378 (1)						
2016	31		272 (10)	348 (7)	411 (4)	435 (9)	531 (1)				
2015	51	234 (21)	300 (14)	335 (6)	348 (6)	410 (3)		489 (1)			
2014	16	211 (4)	253 (1)	304 (8)	396 (1)	366 (1)	406 (1)				
2013	38	217 (4)	248 (20)	310 (9)	468 (2)	493 (1)	547 (2)				
2012	37	220 (2)	309 (13)		410 (16)	455 (5)					640 (1)
2011	55	249 (8)		361 (37)	380 (7)	426 (2)					637 (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+
2020	227	150 (4)	198 (220)	232 (2)	243 (1)						
2019	190	156 (179)	209 (3)	240 (8)							
2018	60	166 (3)	216 (40)	239 (9)		256 (5)		249 (2)		293 (1)	
2017	100	166 (42)	225 (29)	195 (1)	254 (15)		273 (11)	295 (1)	275 (1)		
2016	22	168 (3)	174 (1)	242 (6)	238 (2)	275 (7)	274 (3)				
2015	44		205 (8)	216 (6)	240 (27)	272 (1)	272 (2)				
2014	68	169 (4)		216 (45)	237 (12)	248 (8)					
2013	50		191 (22)	221 (18)	229 (10)						
2012	69	147 (11)	193 (20)	216 (38)							
2011	32	149 (3)	194 (26)	233 (2)				297 (1)			

Fish Condition

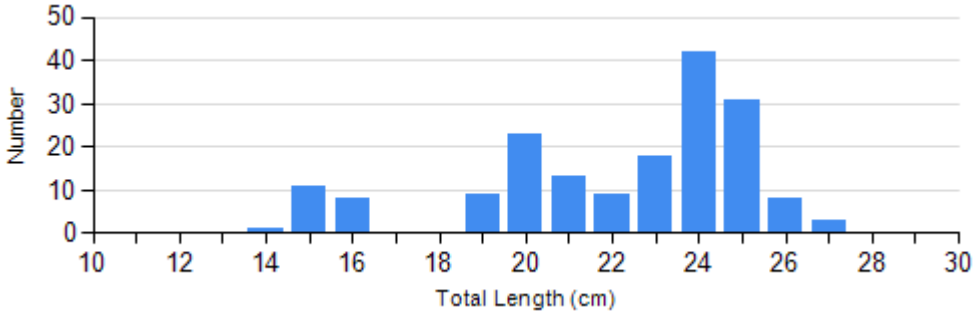
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2016	29	121 (3.0)	105	106 (0.9)	42	100 (1.3)	0	
	2017	7	111 (2.6)	22	103 (1.2)	10	95 (1.9)	0	
	2018	74	125 (1.1)	27	120 (1.3)	8	112 (1.9)	0	
	2019	493	112 (0.4)	58	104 (1.0)	19	101 (1.5)	0	
	2020	57	106 (2.5)	78	103 (0.6)	1	87	0	
Bluegill Frame Net	2016	3	120 (4.3)	51	124 (1.2)	33	111 (1.5)	0	
	2017	17	124 (5.9)	144	122 (0.9)	29	110 (1.8)	0	
	2018	330	115 (0.7)	282	114 (0.7)	45	117 (1.4)	0	
	2019	143	113 (0.9)	210	110 (0.6)	7	103 (3.5)	0	
	2020	8	114 (2.5)	153	112 (1.0)	6	112 (5.0)	0	
Walleye Gill Net	2016	14	86 (2.0)	14	88 (1.0)	1	87	0	
	2017	2	83 (4.6)	0		0		0	
	2018	11	95 (1.8)	1	94	1	96	0	
	2019	37	83 (0.7)	14	94 (2.0)	1	90	0	
	2020	7	78 (1.4)	3	86 (2.7)	2	87 (4.1)	0	
Yellow Perch Gill Net	2016	4	105 (3.8)	7	107 (3.6)	11	98 (1.5)	0	
	2017	43	109 (1.8)	36	105 (1.3)	21	100 (1.6)	0	
	2018	12	110 (2.8)	42	101 (0.8)	6	103 (2.2)	0	
	2019	179	103 (0.7)	9	93 (2.6)	2	88 (2.5)	0	
	2020	125	101 (0.6)	102	98 (0.8)	0		0	

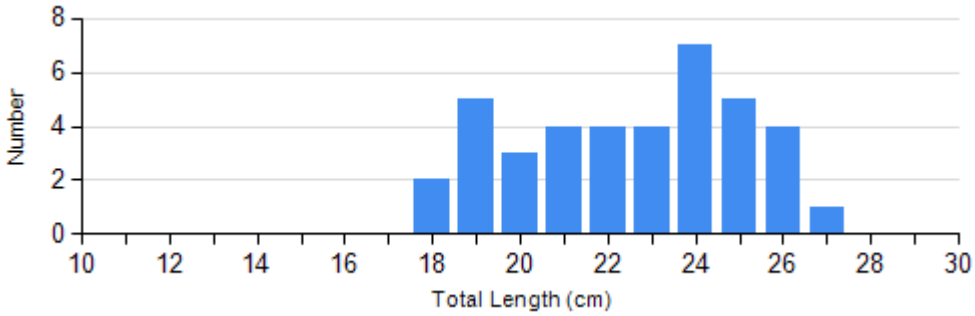
Length Frequency Distribution

Length frequency histogram of species sampled by year.

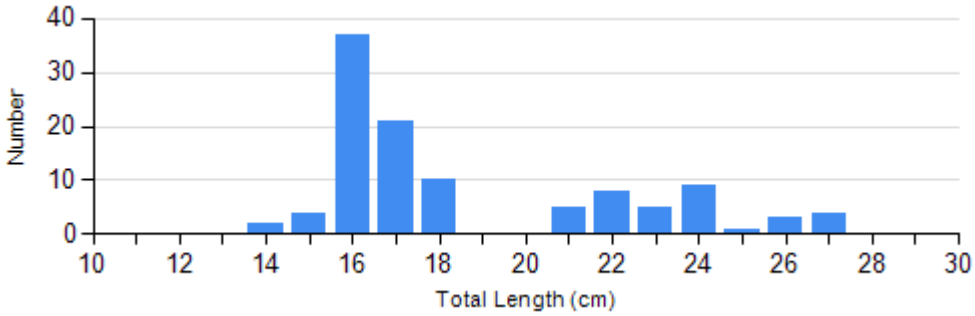
Species: Black Crappie
Gear: frame net (std 3/4 in); **AFS standard nets used in 2016-17



2016



2017



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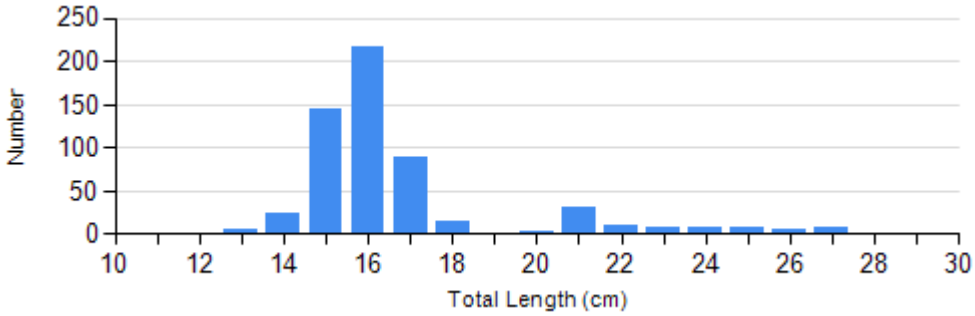

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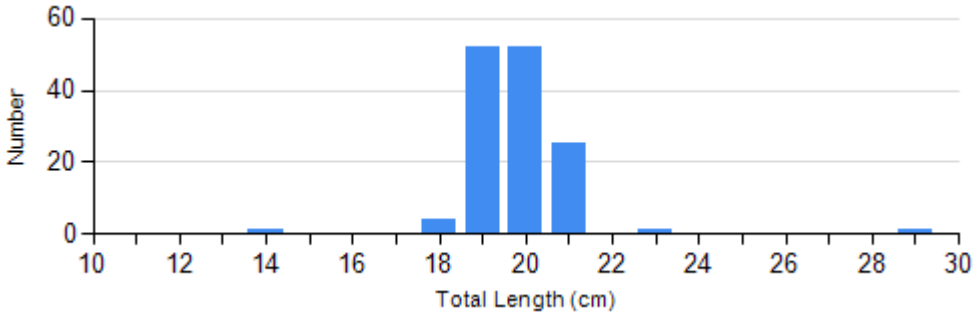
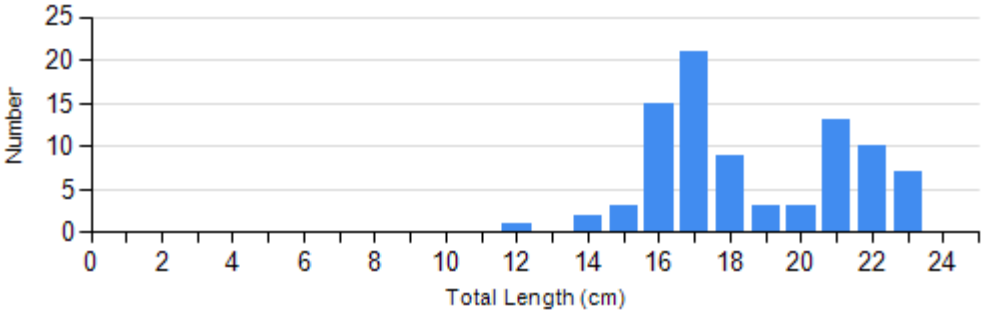
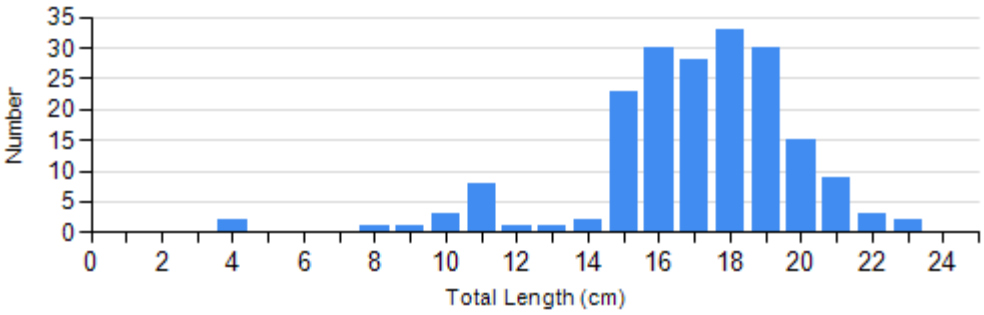


2020

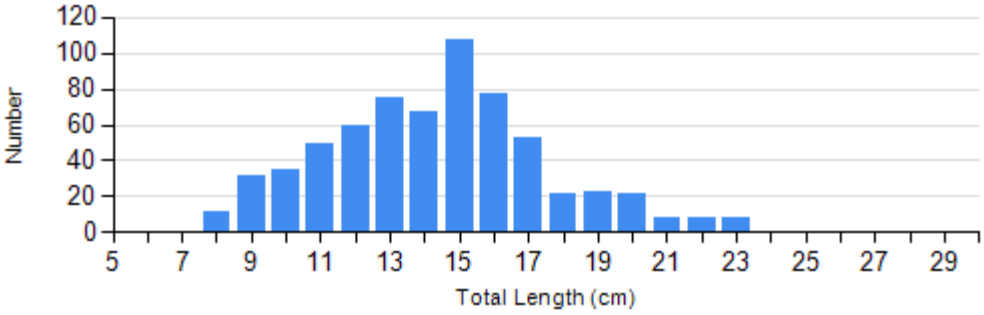
Species: Bluegill
Gear: frame net (std 3/4 in); **AFS standard nets used in 2016-17



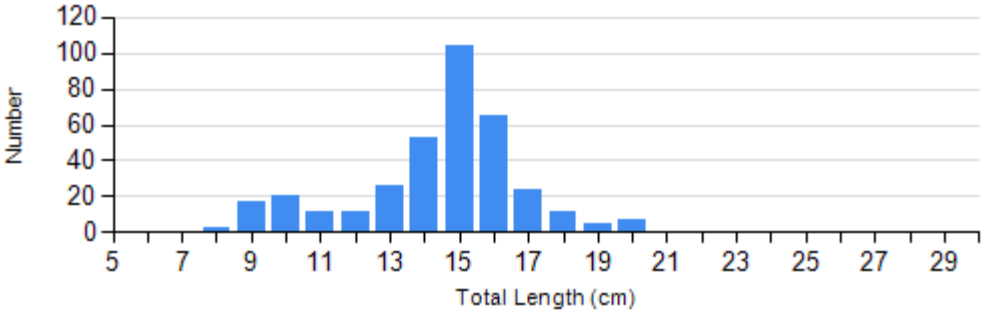
2016



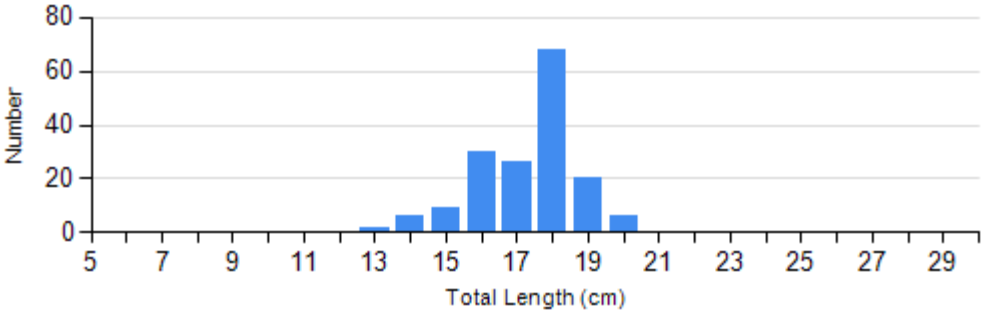
2017



2018



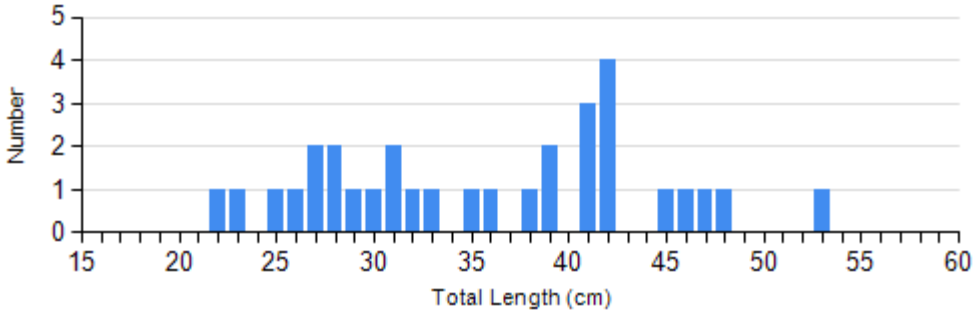
2019



2020

Species: Walleye
Gear: AFS std gill net

2016



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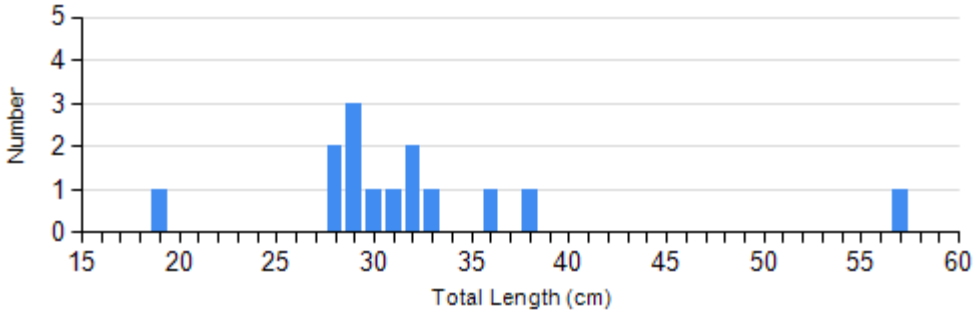

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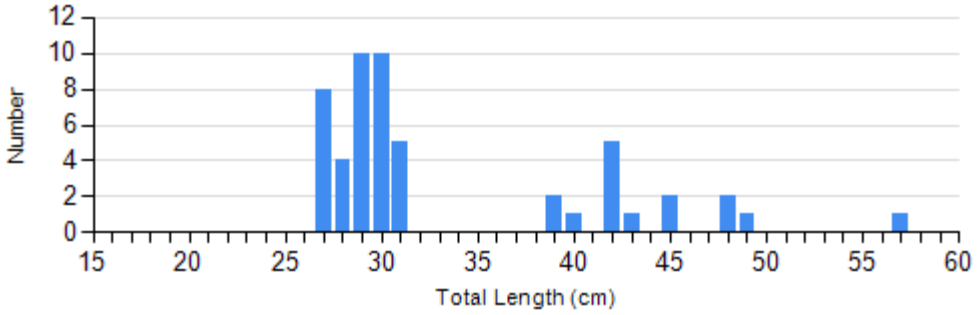
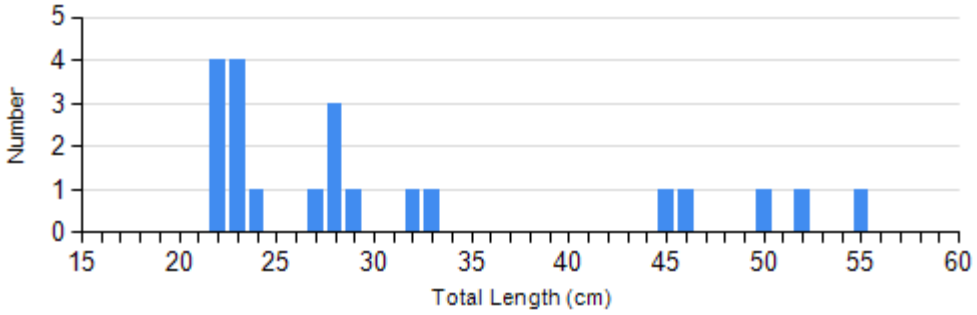
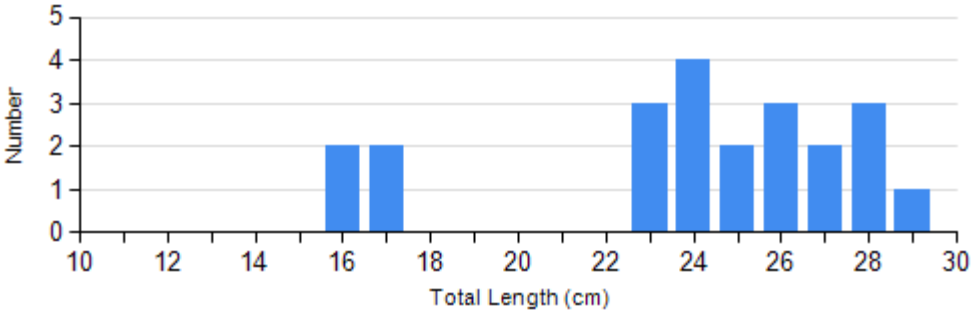


2020

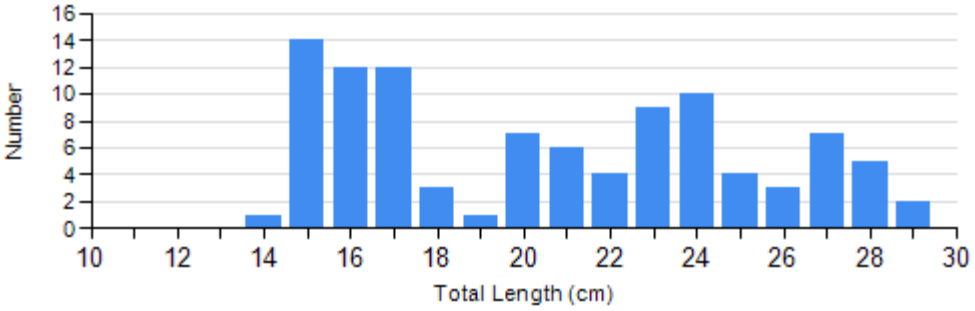


Species: Yellow Perch
Gear: AFS std gill net

2016



2017



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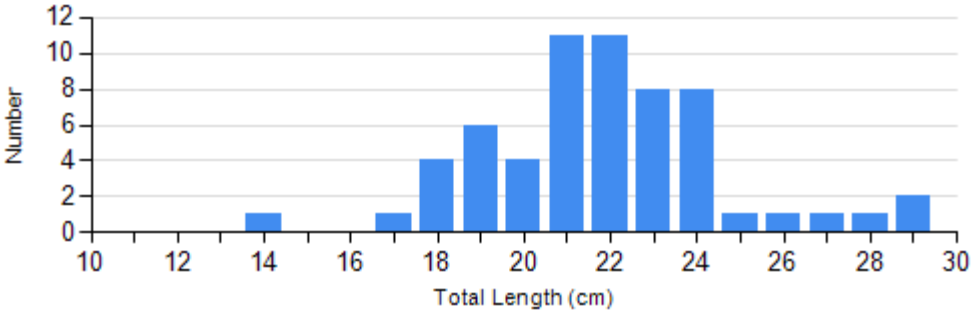

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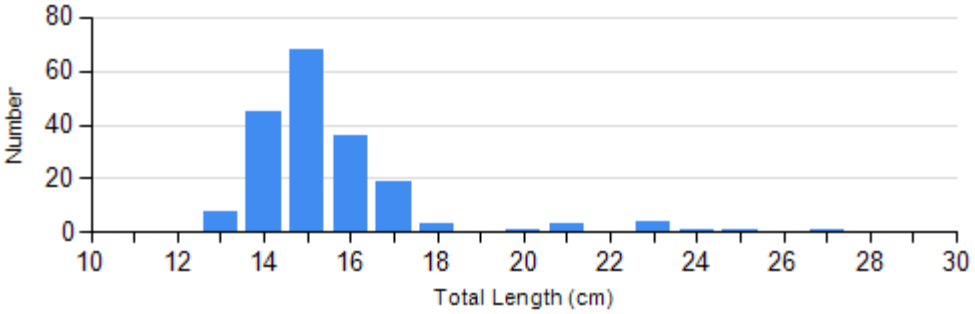
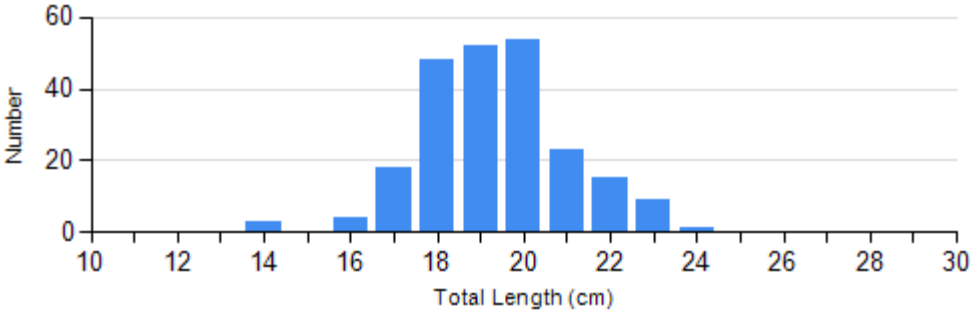


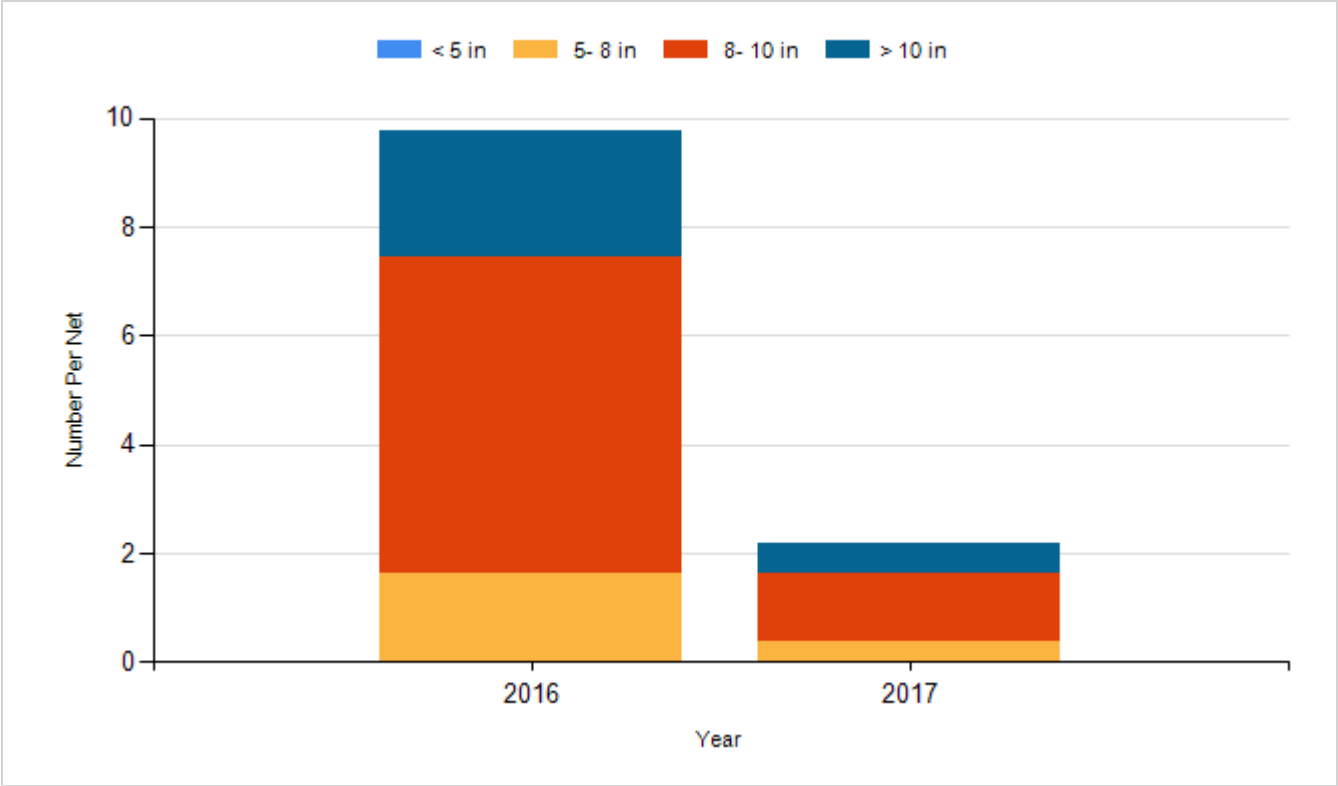
2020



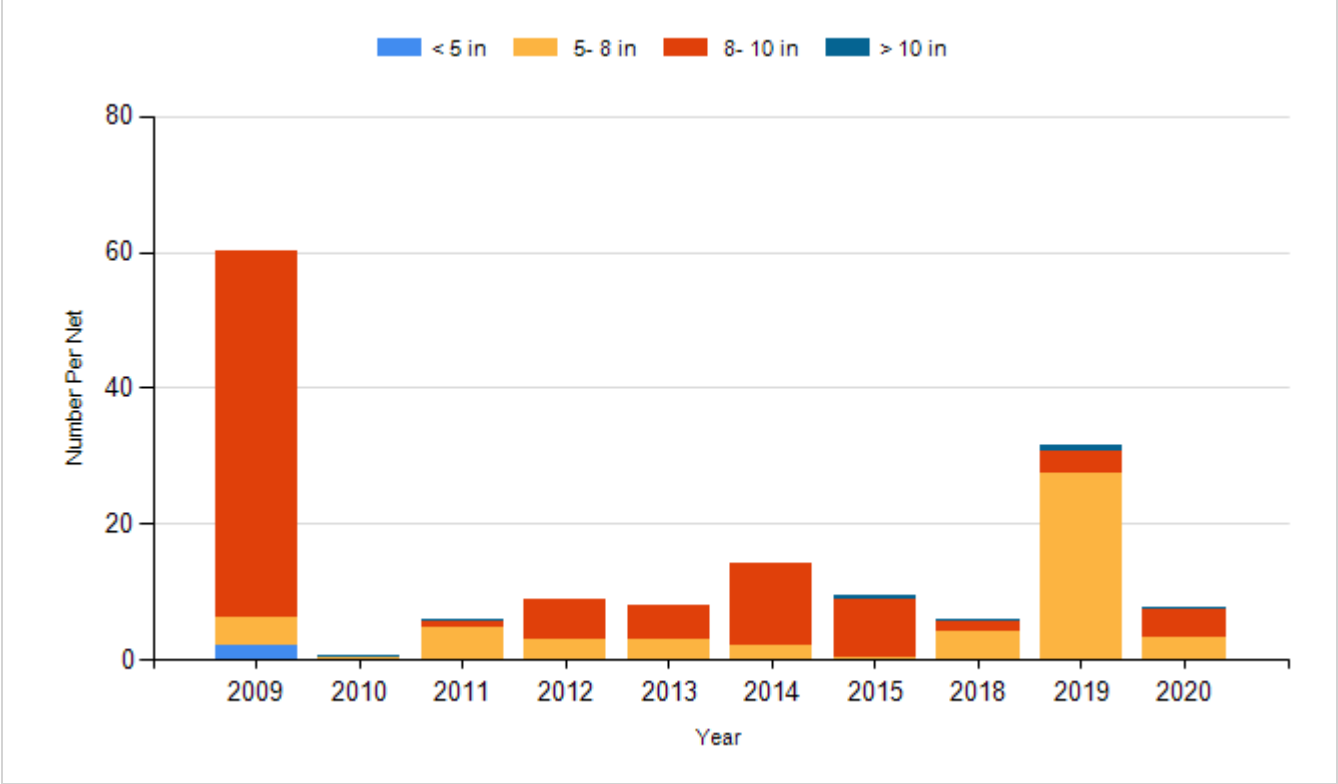
Historic Fish Sizes and Relative Abundance

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

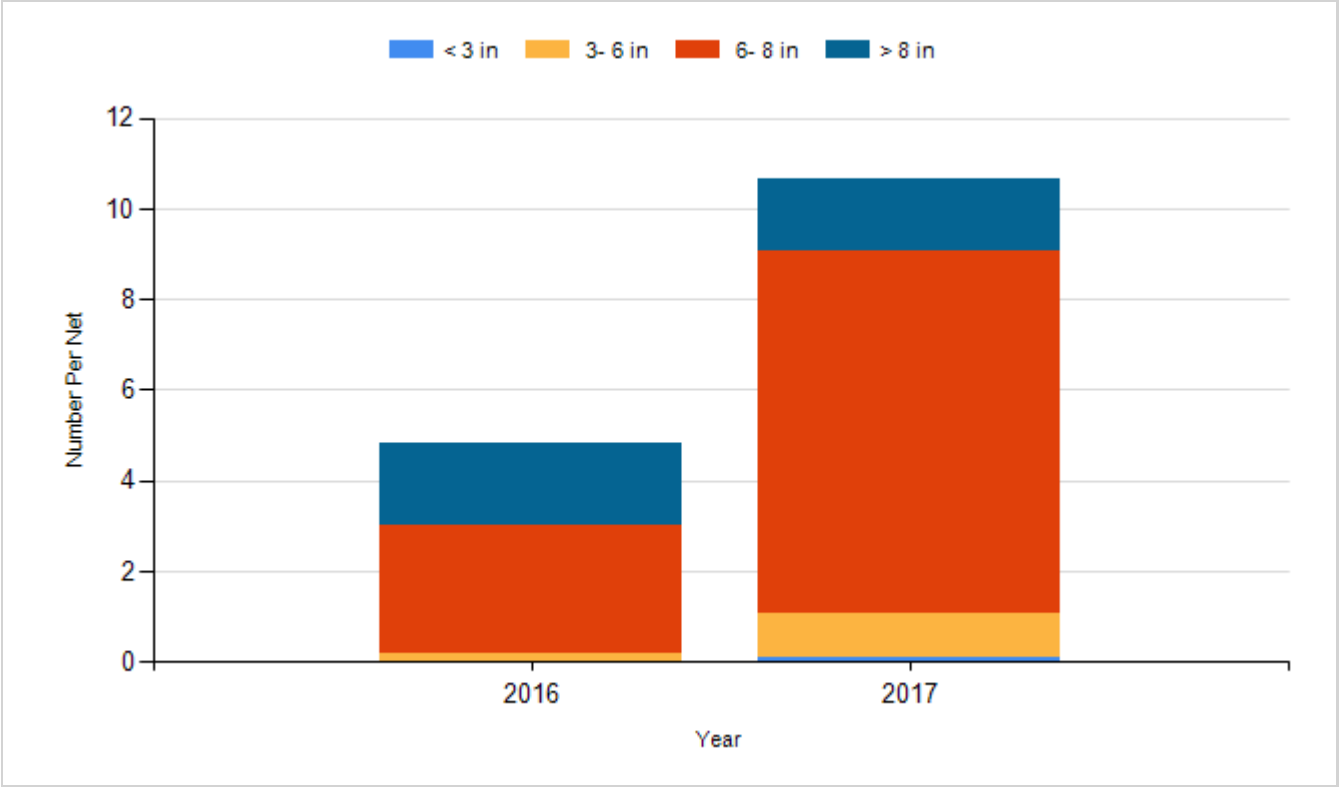
Species: Black Crappie
Gear: AFS std frame net



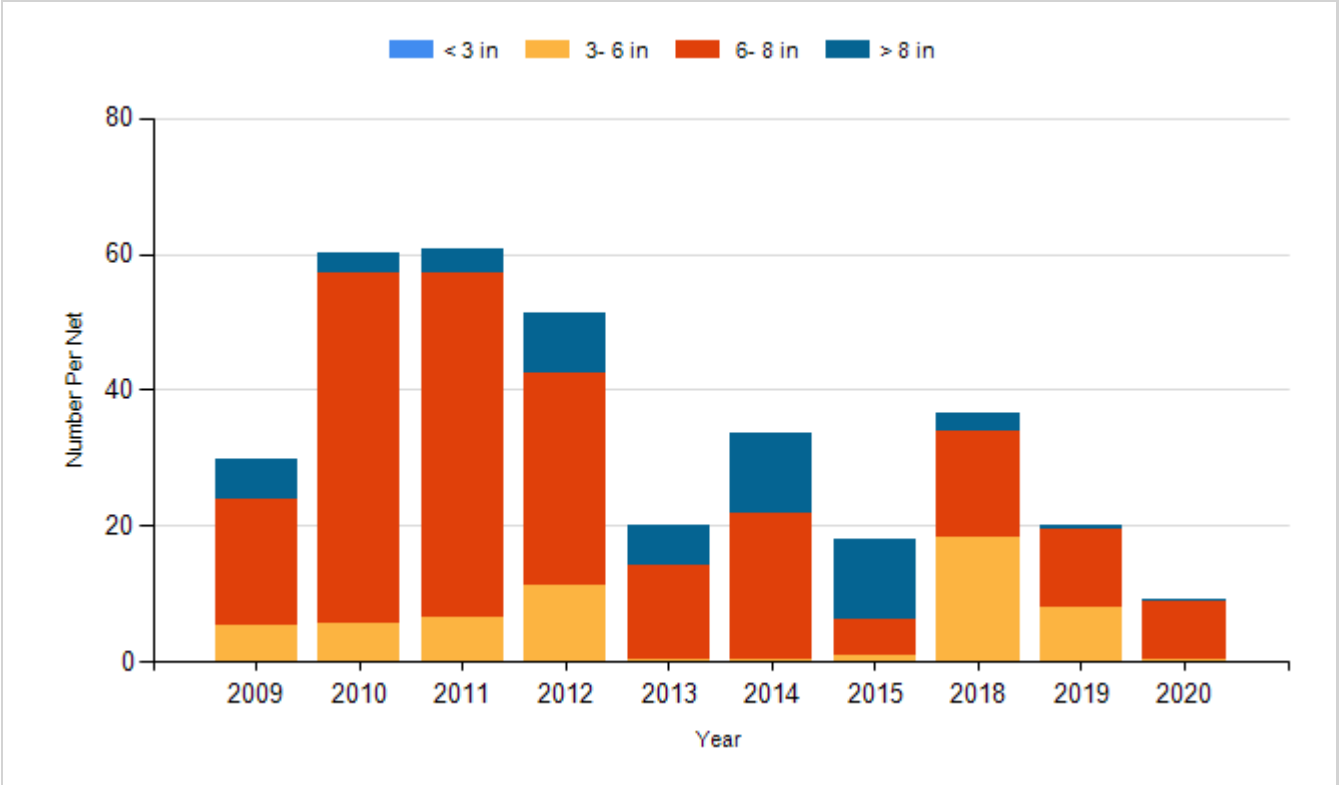
Species: Black Crappie
Gear: frame net (std 3/4 in)



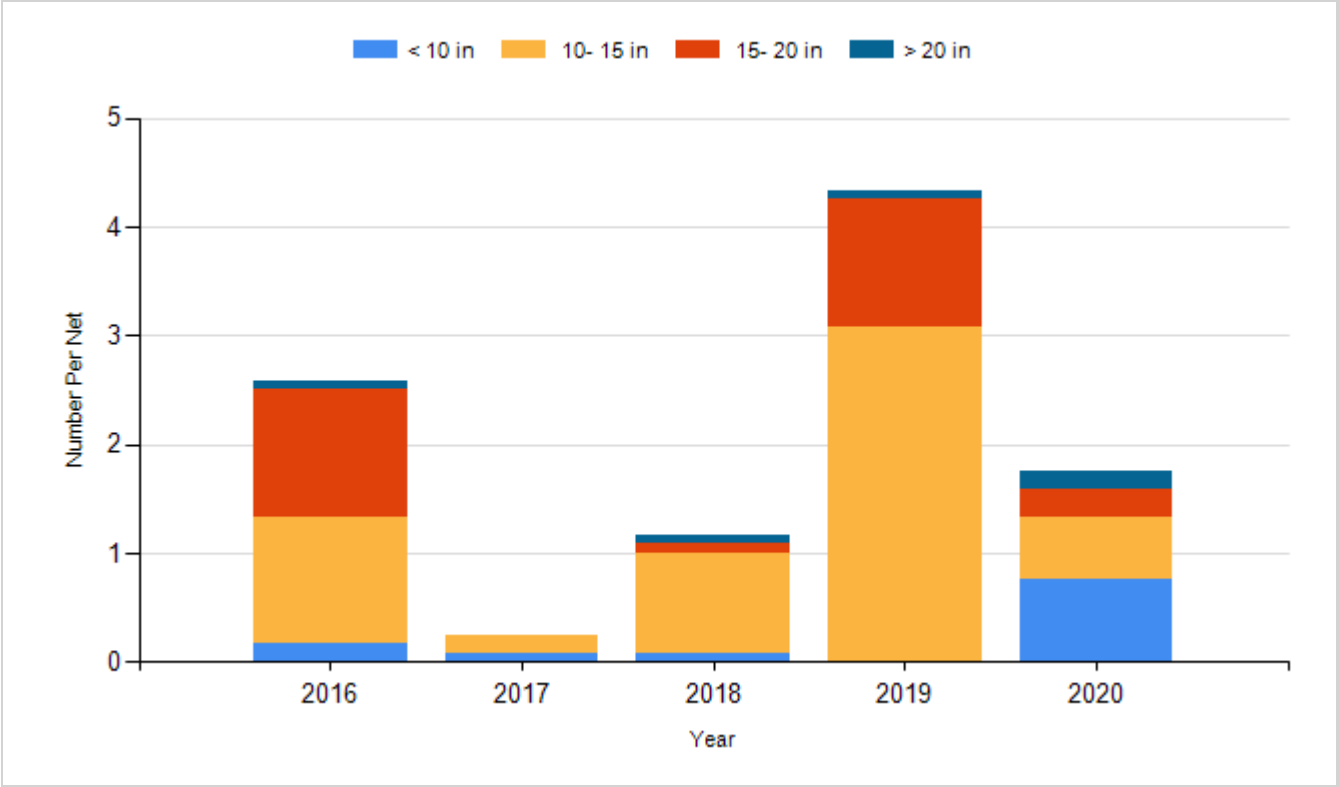
Species: Bluegill
Gear: AFS std frame net



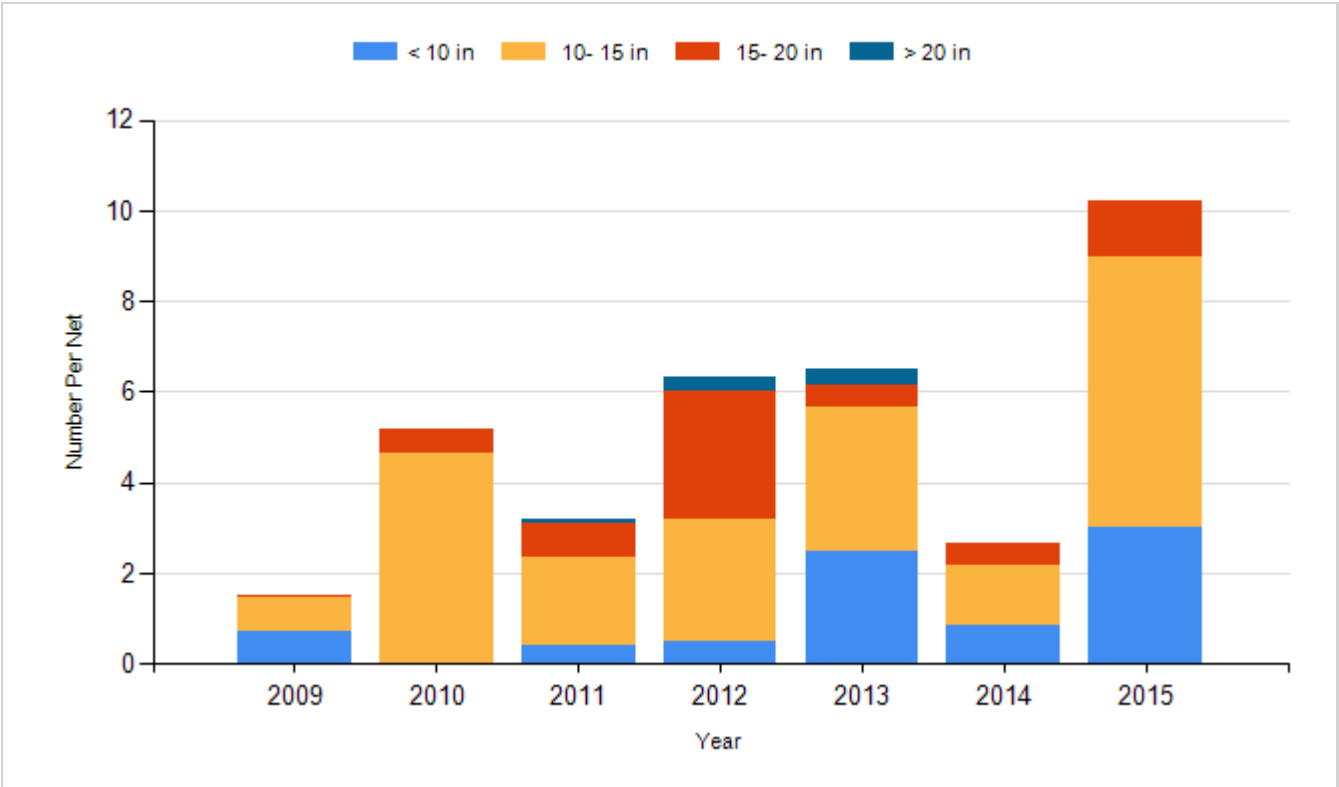
Species: Bluegill
Gear: frame net (std 3/4 in)



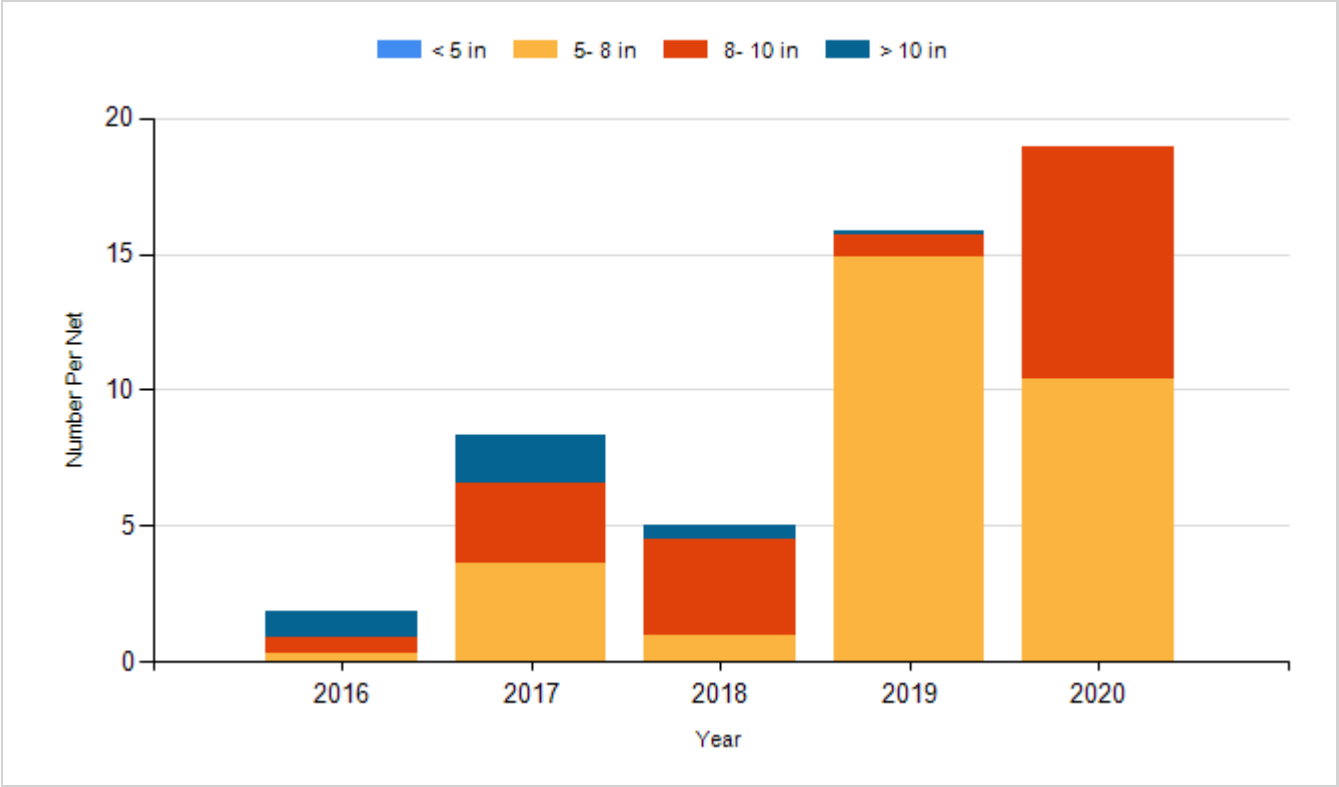
Species: Walleye
Gear: AFS std gill net



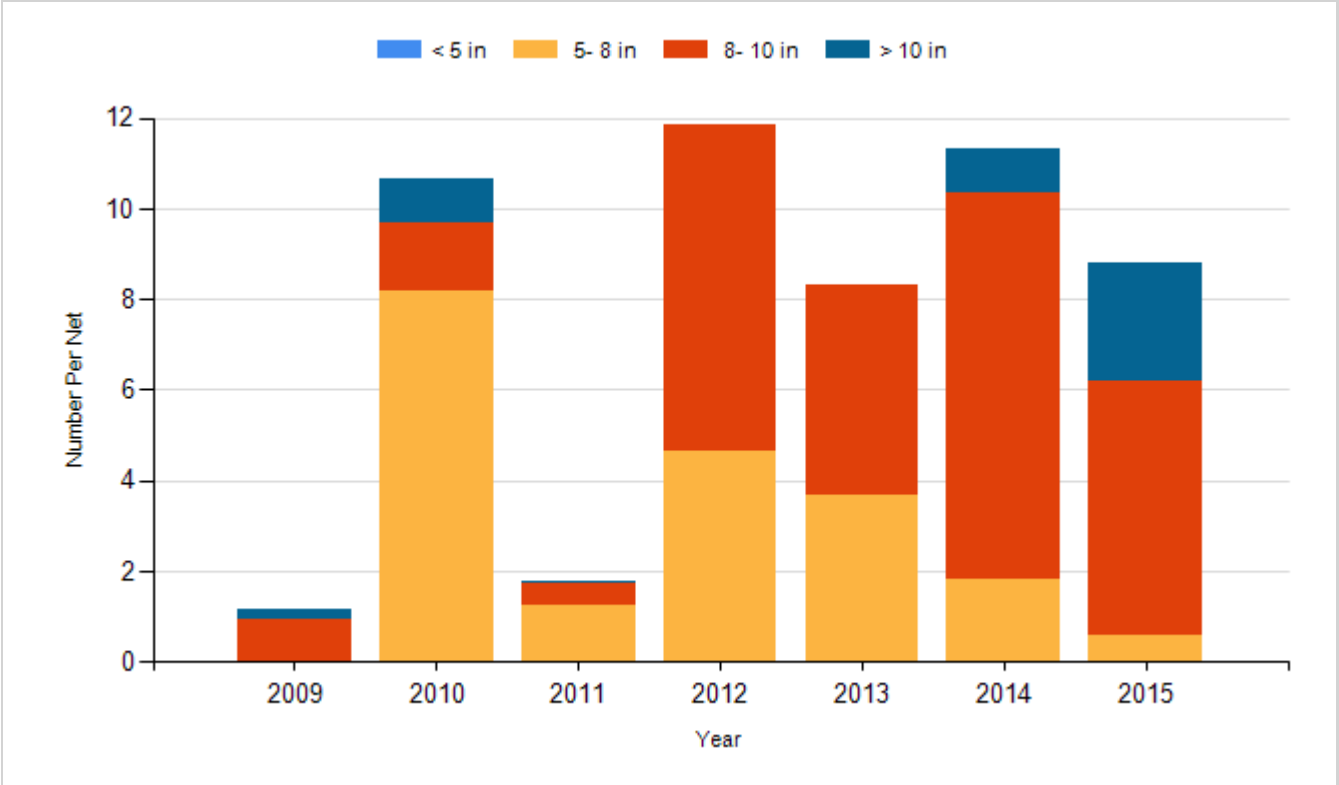
Species: Walleye
Gear: std exp gill net



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
2010	Walleye	Large Fingerling	11,788
2011	Walleye	Large Fingerling	15,240
2012	Walleye	Large Fingerling	10,173
2013	Walleye	Large Fingerling	27,344
2014	Walleye	Large Fingerling	18,420
2016	Saugeye	Large Fingerling	6,030
2017	Saugeye	Small Fingerling	60,320
2018	Saugeye	Small Fingerling	62,640
2019	Saugeye	Small Fingerling	62,350