Clear Lake Survey Summary

Clear Lake, located 6.0 miles southeast of Lake City, is managed as a multiple species fishery including panfish (i.e., bluegill and yellow perch), black bass (largemouth and smallmouth) and walleye; other fish species (e.g., black crappie, northern pike, etc.) also contribute to the fishery.

Spring electrofishing, which is used to monitor black bass populations, was not conducted in 2019. Thus, the following summary focuses on those fish species assessed using frame nets (i.e., bluegill) and gill nets (i.e., northern pike, walleye, and yellow perch).

- **Bluegill.** At 94.8/frame net, bluegills were the most abundant fish species in the frame net catch and relative abundance was considered high. Sampled bluegills ranged in length from 3.1 to 8.7 inches, 30% were ≥6.0 inches and 5% were 8.0 inches or longer. Individuals from seven year classes (2010, and 2012 – 2017) contributed to the catch, those from cohorts produced in 2015 (age 4) and 2016 (age 3) were the most abundant accounting for 75% of sampled bluegill. Growth has slowed in recent years; currently, bluegill mean length at capture values are not reaching 8.0 inches until age 6.

- **Northern pike.** Although not a primary management species, northern pike tend to be abundant during most years. At 2.2/gill net, relative abundance was moderate to high in 2019. Sampled northern pike ranged in length from 18.9 to 32.7 inches.

- **Walleye.** Walleyes were not abundant (2.8/gill net). Gill net captured walleyes ranged in length from 9.4 to 24.8 inches, of those that were at least 10.0 inches 82% were ≥15.0 inches and 33% were 20.0 inches or longer. Walleyes from nine year classes (2001, 2008 – 2011, 2013 – 2015, and 2017) contributed to the catch, each was represented by nine or fewer individuals. The oldest walleye sampled was from the 2001 cohort at 18 years old. Growth tends to moderate with mean length at capture values that approach or surpass 15.0 inches by age 4. In 2019, the mean length at capture of age-4 fish was 16.7 inches.

- **Yellow perch**. Yellow perch CPUE was substantially higher in 2019 than 2018. At 24.8/gill net, relative abundance was considered moderate to high. Sampled yellow perch ranged in length from 4.3 to 7.9 inches; most (93%) were from the 2017 (age-2) cohort, which had a mean length of 5.4 inches.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Clear, Marshall County
UJA-Lake-917-001
2019

Lake Information

Name:	Clear	**Maximum Depth:**	20 Feet
County:	Marshall	**Mean Depth:**	12 Feet
		OHWM Elevation:	1,824
Surface Area:	1,217 Acres	**Outlet Elevation:**	1,823

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 15, 2019	4 net-nights
AFS std gill net	Jul 16, 2019	4 net-nights
AFS std gill net	Jul 18, 2019	4 net-nights
fall night EF-WAE	Sep 24, 2019	3600 seconds
frame net (std 3/4 in)	Jul 15, 2019	6 net-nights
frame net (std 3/4 in)	Jul 16, 2019	5 net-nights
frame net (std 3/4 in)	Jul 17, 2019	1 net-nights
frame net (std 3/4 in)	Jul 18, 2019	6 net-nights

Common Fish Species Present

Walleye

Smallmouth Bass

Northern Pike

Largemouth Bass

Yellow Perch

Bluegill

Black Crappie

Black Bullhead

White Sucker

Common Carp

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	71	5.8	1.7	64	8	14	6	103	2
	Black Crappie	26	1.9	0.7	39	16	26	15	106	2
	Bluegill	45	3.8	1.3	7		0		110	1
	Common Carp	1	0.1	0.1	100		100		82	
	Largemouth Bass	4	0.3	0.2	67		33		121	7
	Northern Pike	26	2.2	0.6	92		8		90	2
	Smallmouth Bass	35	2.9	2.4	89		86		93	2
	Walleye	34	2.8	0.6	82	11	33	13	90	1
	White Sucker	2	0.2	0.2	100		100		94	6
	Yellow Perch	316	24.8	9.0	1		0		102	1
fall night EF-WAE*	Walleye	40	40.0	33.7					93	1
frame net (std 3/4 in)	Black Bullhead	63	3.5	1.0	87	6	59	9	86	2
	Black Crappie	23	1.2	0.6	33	17	14		105	3
	Bluegill	1707	94.8	26.7	30	1	5	1	103	1
	Largemouth Bass	15	0.1	0.1	0		0		105	
	Northern Pike	12	0.7	0.3	67		8		86	5
	Smallmouth Bass	20	0.8	0.4	87		73		95	4
	Walleye	11	0.5	0.3	33		0		86	2
	Yellow Perch	41	2.1	0.9	8		0		88	3

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	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
AFS std gill net	Black Bullhead							15.0	9.8	6.4	5.8	9.3
	Black Crappie							1.3	1.3	3.1	1.9	1.9
	Bluegill							2.0	1.5	0.8	3.8	2.0
	Channel Catfish							0.0	0.1	0.0	0.0	0.0
	Common Carp							0.1	0.1	0.2	0.1	0.1
	Largemouth Bass							0.1	0.1	0.1	0.3	0.2
	Northern Pike							2.2	3.5	1.2	2.2	2.3
	Smallmouth Bass							1.5	1.9	2.4	2.9	2.2
	Walleye							5.1	2.6	2.8	2.8	3.3
	White Sucker							0.8	2.3	0.3	0.2	0.9
	Yellow Perch							7.5	0.5	4.5	24.8	9.3
boat shocker	Largemouth Bass		54.0		92.0							73.0
boat shocker	Smallmouth Bass		83.0		31.0		28.0					47.3
fall night EF-WAE*	Walleye	21.0	340.8	13.5	51.0	3.0	17.0	1.5	0.0	1.5	40.0	48.9
frame net (std 3/4 in)**	Black Bullhead	0.6		7.2	29.7	26.4		7.8	3.6	9.1	3.5	11.0
	Black Crappie	0.3		5.2	10.7	2.4		1.9	2.3	3.3	1.2	3.4
	Bluegill	13.1		18.6	39.0	22.9		15.2	19.9	68.3	94.8	36.5
	Common Carp	0.0		0.1	0.0	0.0		0.6	0.9	0.1	0.0	0.2
	Largemouth Bass	0.0		0.0	0.1	0.0		0.0	0.2	0.1	0.1	0.1
	Northern Pike	0.2		1.8	0.6	1.1		0.8	0.8	0.6	0.7	0.8
	Smallmouth Bass	5.1		3.4	2.4	1.1		0.1	0.3	0.2	0.8	1.7
	Walleye	0.2		0.2	0.4	0.5		0.0	0.2	0.0	0.5	0.3
	White Sucker	0.2		0.1	0.1	0.0		0.0	0.0	0.1	0.0	0.1
	Yellow Perch	16.5		10.4	3.9	1.8		9.9	1.3	6.0	2.1	6.5
std exp gill net	Bigmouth Buffalo	0.0	0.0	0.0	0.0	0.2	0.0					0.0
	Black Bullhead	0.0	0.1	7.5	20.3	21.7	10.3					10.0
	Black Crappie	0.0	0.3	14.0	6.2	11.7	1.5					5.6
	Bluegill	0.2	0.0	1.0	0.3	2.5	1.5					0.9
	Common Carp	0.0	0.1	0.0	0.0	0.0	0.0					0.0
	Northern Pike	0.4	0.9	3.3	3.8	6.0	5.5					3.3
	Smallmouth Bass	2.6	0.8	2.0	4.3	3.3	3.0					2.7
	Walleye	1.6	2.3	4.2	10.7	9.2	10.8					6.5
	White Sucker	1.1	1.1	5.2	1.3	2.2	1.3					2.0
	Yellow Perch	27.6	40.8	84.8	40.5	25.5	7.0					37.7

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	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
AFS std gill net	Northern Pike	PSD							69	76	71	92
		PSD-P							0	5	7	8
		Wr							90	85	91	90
	Walleye	PSD							70	84	73	82
		PSD-P							11	16	24	33
		Wr							93	87	91	90
	Yellow Perch	PSD							9	17	4	1
		PSD-P							2	0	0	0
		Wr							94	90	90	102
frame net (std 3/4 in)*	Bluegill	PSD	11		70	43	48		25	8	16	30
		PSD-P	2		10	4	26		3	2	3	5
		Wr	113		119	108	111		108	104	99	103
std exp gill net	Northern Pike	PSD	63	69	35	52	50	55				
		PSD-P	13	13	10	9	8	3				
		Wr	96	89	88	87	87	84				
	Walleye	PSD	72	32	32	22	15	37				
		PSD-P	14	10	16	3	2	5				
		Wr	91	88	90	89	86	88				
	Yellow Perch	PSD	0	0	14	32	36	24				
		PSD-P	0	0	0	0	2	0				
		Wr	105	99	99	95	92	93				

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+
2019	1707		93 (209)	121 (847)	153 (445)	180 (110)	204 (71)	204 (18)		224 (9)	
2018	1093		100 (627)	138 (348)	163 (37)	191 (58)	216 (15)	222 (8)			
2017	369	95 (154)	111 (165)	144 (28)	178 (12)	198 (9)	213 (3)				
2016	611	61 (362)	97 (98)	138 (108)	177 (27)	191 (12)	227 (6)				
2014	413	91 (84)	109 (80)	142 (45)	189 (135)	195 (59)	230 (10)	255 (1)			
2013	718	49 (1)	120 (435)	184 (267)	212 (5)	226 (10)					
2012	334	91 (12)	155 (282)	209 (39)		244 (1)					
2010	239	77 (2)	115 (211)	164 (15)	195 (10)	224 (1)					

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	34		291 (7)		425 (6)	473 (2)	462 (4)		523 (9)	627 (2)	550 (4)
2018	33		325 (1)	354 (10)	406 (4)	434 (5)	522 (1)	506 (10)		668 (1)	656 (1)
2017	31		301 (2)	370 (4)	420 (6)	435 (1)	498 (15)	582 (1)	493 (1)		582 (1)
2016	61		277 (2)	339 (16)	384 (4)	456 (36)	505 (1)			639 (1)	693 (1)
2015	70	149 (1)	241 (5)	324 (7)	373 (52)	420 (1)	481 (3)	575 (1)			
2014	60	187 (5)		345 (51)	394 (1)	461 (2)				589 (1)	
2013	67		279 (42)	359 (5)	394 (17)		481 (1)				652 (2)
2012	29	194 (4)	313 (3)	348 (15)		472 (1)		561 (3)	483 (1)		573 (2)
2011	45	190 (1)	272 (31)	429 (2)	461 (4)		514 (6)	481 (1)			
2010	38	195 (11)	306 (2)	383 (11)		470 (9)			500 (1)	615 (1)	577 (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	316		137 (293)	152 (17)	187 (6)						
2018	55		149 (5)	157 (38)	160 (9)	187 (2)			243 (1)		
2017	6		142 (1)	151 (2)	165 (1)	187 (1)	230 (1)				
2016	90		134 (2)	153 (69)	178 (11)	215 (1)	235 (6)	235 (1)			
2015	114	93 (3)	115 (72)	151 (27)		210 (11)	237 (1)				
2014	233	98 (13)	125 (101)	159 (14)	192 (53)	208 (28)	230 (18)	221 (7)			
2013	345	99 (81)	123 (34)	166 (93)	188 (59)	216 (77)					
2012	576	102 (67)	148 (243)	178 (110)	193 (158)						
2011	1176	98 (419)	142 (342)	164 (415)							
2010	747	100 (161)	139 (563)	164 (24)							

Fish Condition

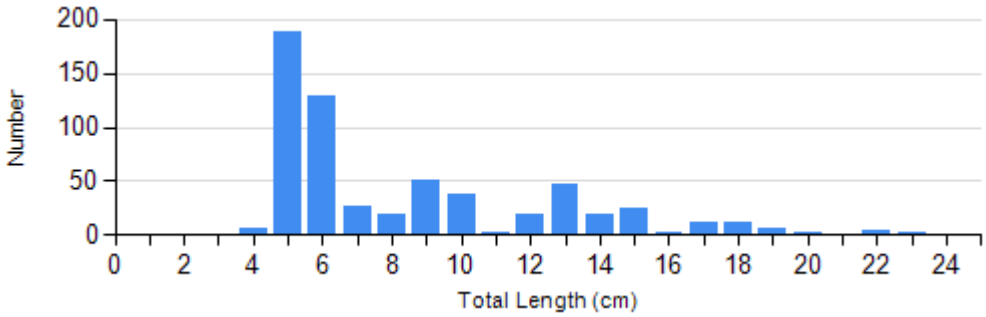
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2016	194	106 (1.1)	57	114 (1.2)	8	113 (2.1)	0	
	2017	330	103 (0.6)	21	104 (1.2)	8	106 (2.8)	0	
	2018	919	99 (0.5)	136	101 (0.8)	38	95 (1.3)	0	
	2019	1194	101 (0.6)	433	106 (1.0)	80	107 (1.7)	0	
Northern Pike Gill Net	2015	15	86 (1.3)	17	82 (1.2)	1	82	0	
	2016	8	93 (1.2)	18	89 (1.3)	0		0	
	2017	10	85 (1.3)	30	85 (1.2)	2	81 (1.4)	0	
	2018	4	101 (0.9)	9	87 (2.9)	1	86	0	
	2019	2	91 (1.4)	22	91 (1.3)	2	88 (2.8)	0	
Walleye Gill Net	2015	41	87 (0.6)	21	89 (0.9)	3	96 (8.7)	0	
	2016	18	91 (1.1)	36	94 (0.9)	5	91 (2.5)	2	89 (3.0)
	2017	5	86 (1.5)	21	87 (1.1)	5	89 (2.8)	0	
	2018	9	89 (1.7)	16	95 (1.4)	6	88 (2.5)	2	86 (2.5)
	2019	6	87 (2.6)	16	90 (1.2)	10	90 (2.3)	1	96
Yellow Perch Gill Net	2015	32	94 (1.4)	10	89 (1.7)	0		0	
	2016	82	95 (0.9)	6	91 (3.8)	2	89 (1.0)	0	
	2017	5	92 (3.1)	1	81	0		0	
	2018	52	90 (0.9)	2	92 (3.0)	0		0	
	2019	296	103 (0.7)	2	85	0		0	

Length Frequency Distribution

Length frequency histogram of species sampled by year.
***AFS standard gill net used 2016 and 2017**

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



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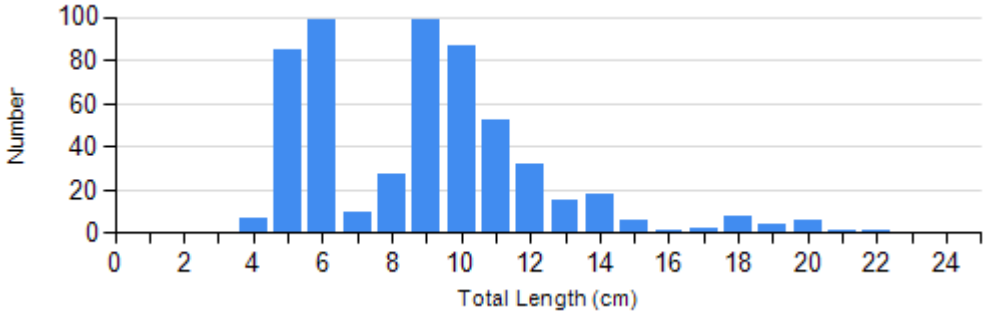

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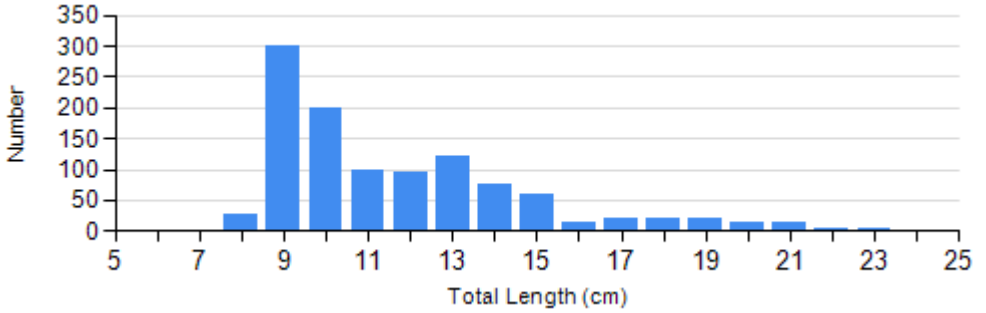

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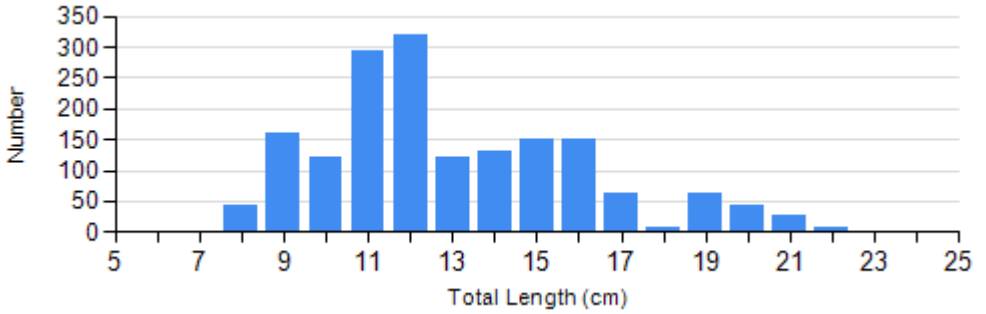
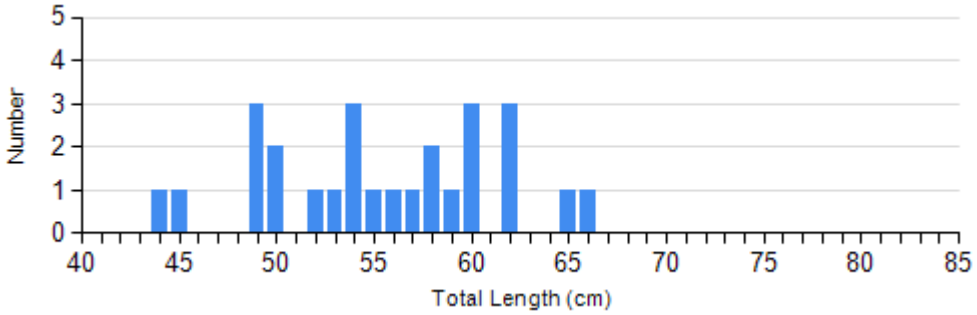


2019

Species: Northern Pike
Gear: AFS std gill net



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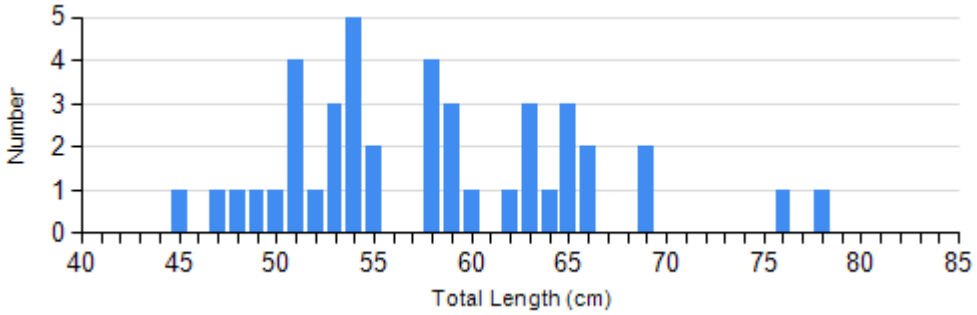

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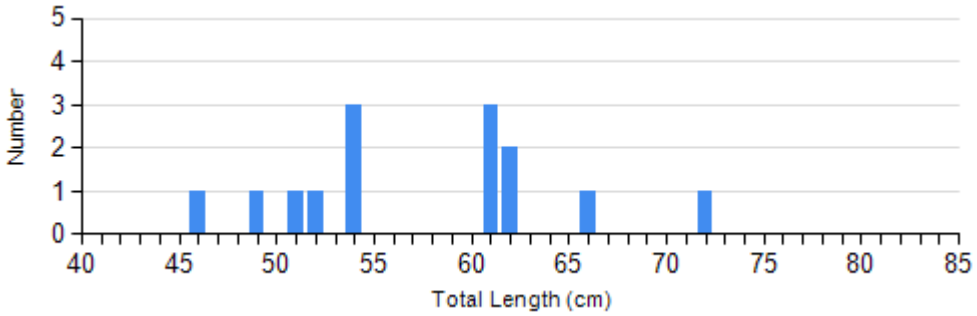

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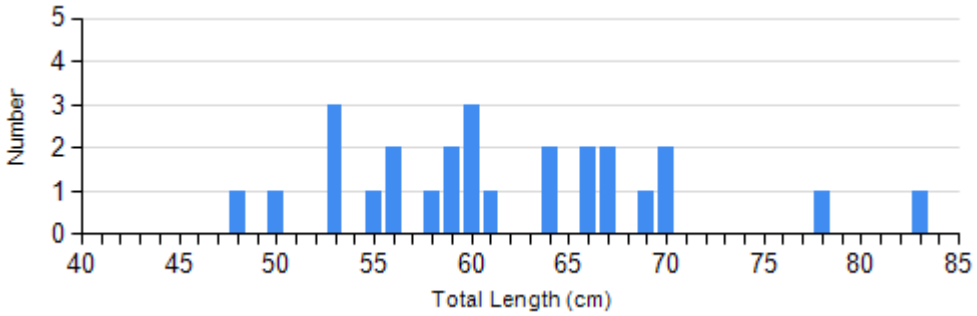
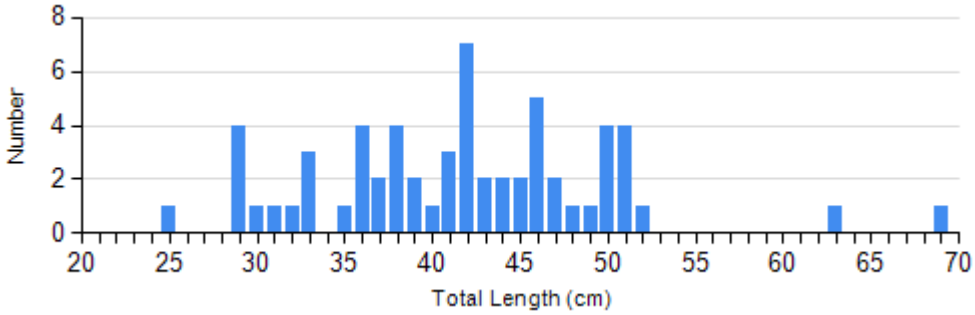
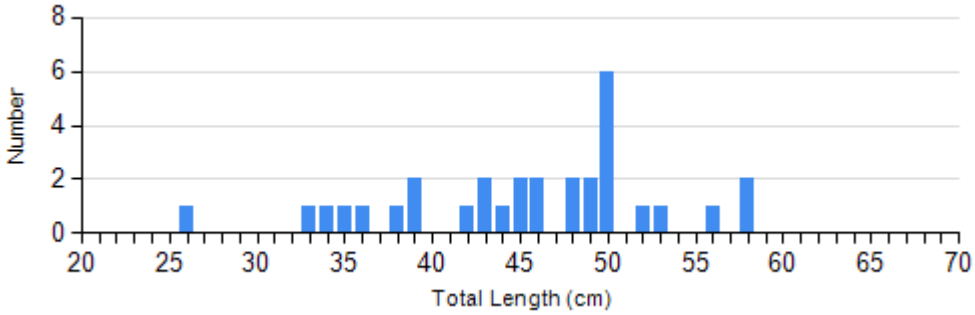


2019

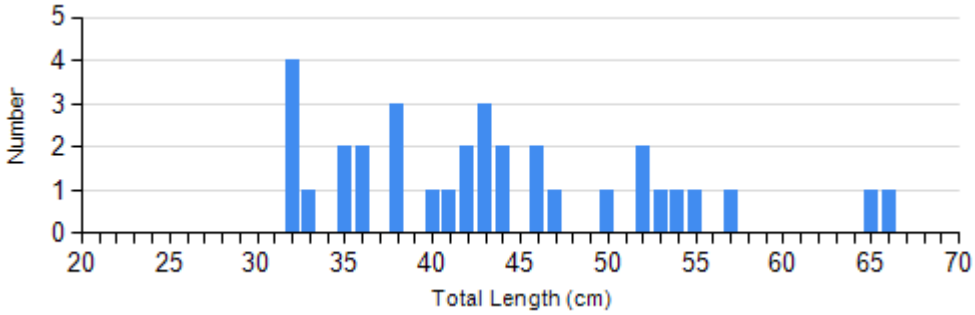
Species: Walleye
Gear: AFS std gill net



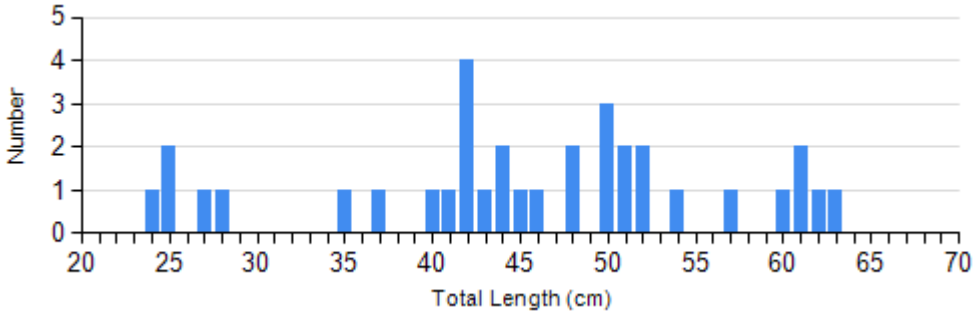
2016



2017

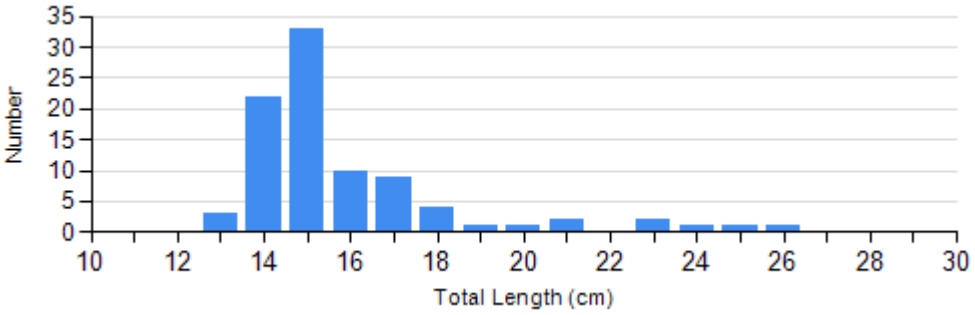


2018

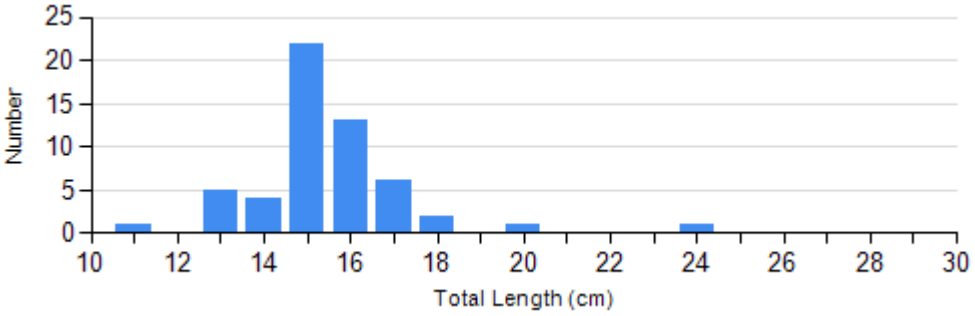


2019

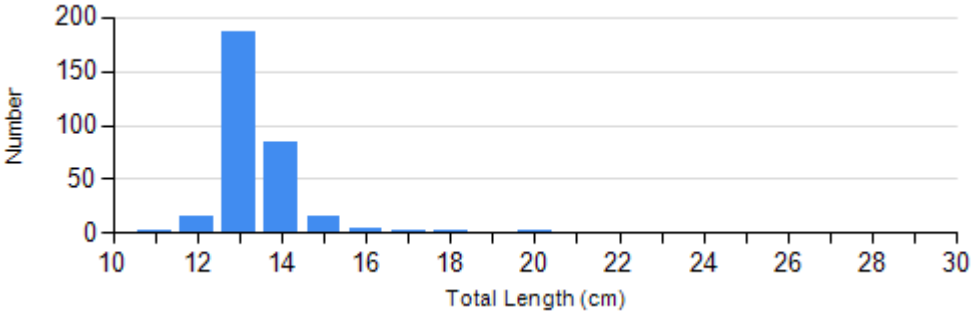
Species: Yellow Perch
Gear: AFS std gill net



2016



2018

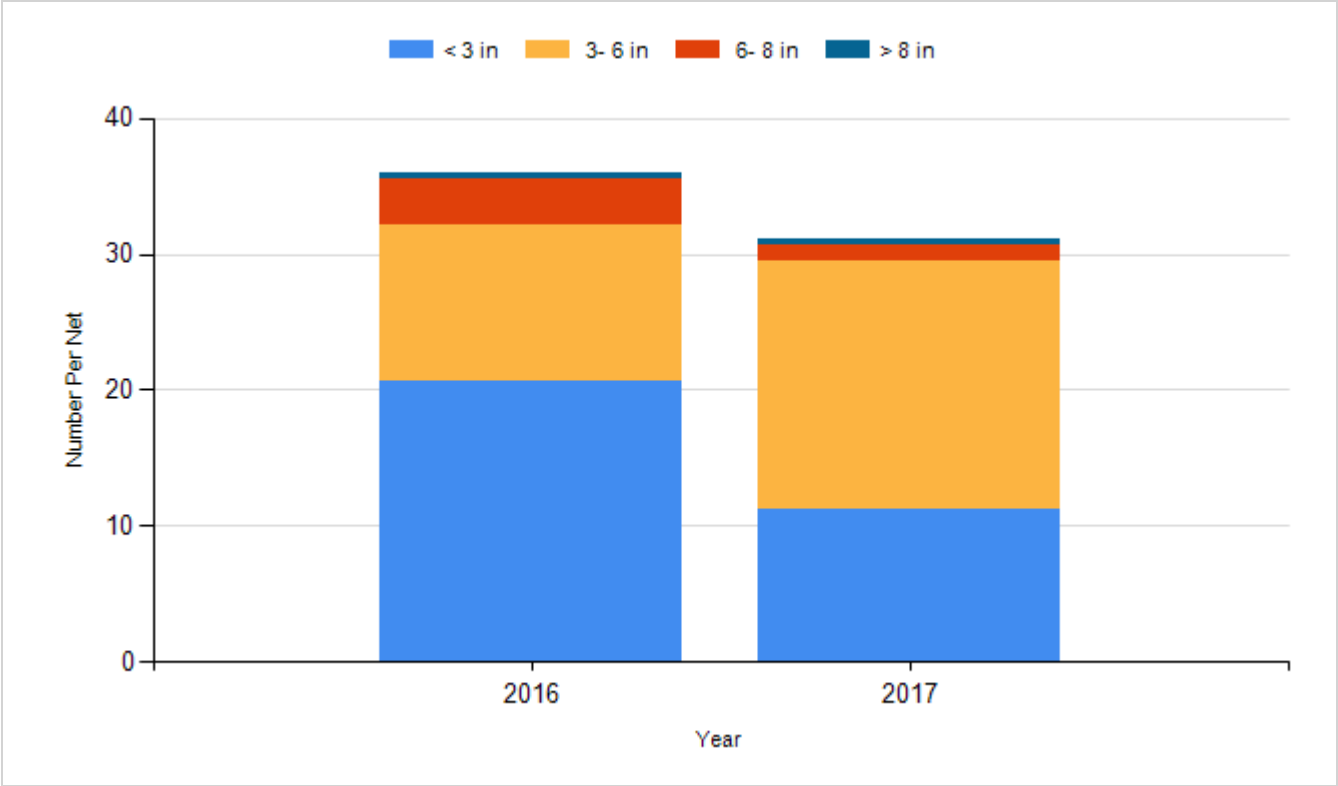


2019

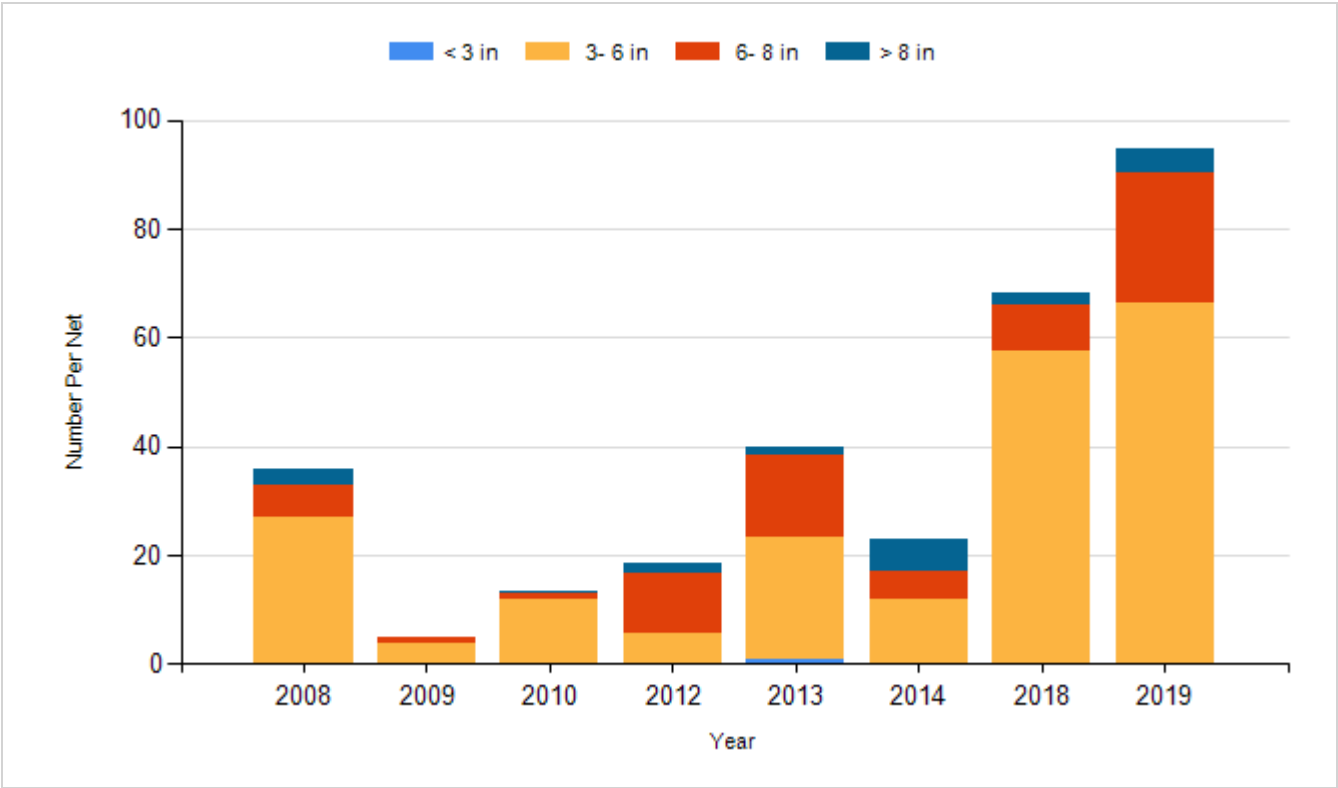
Historic Fish Sizes and Relative Abundance

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

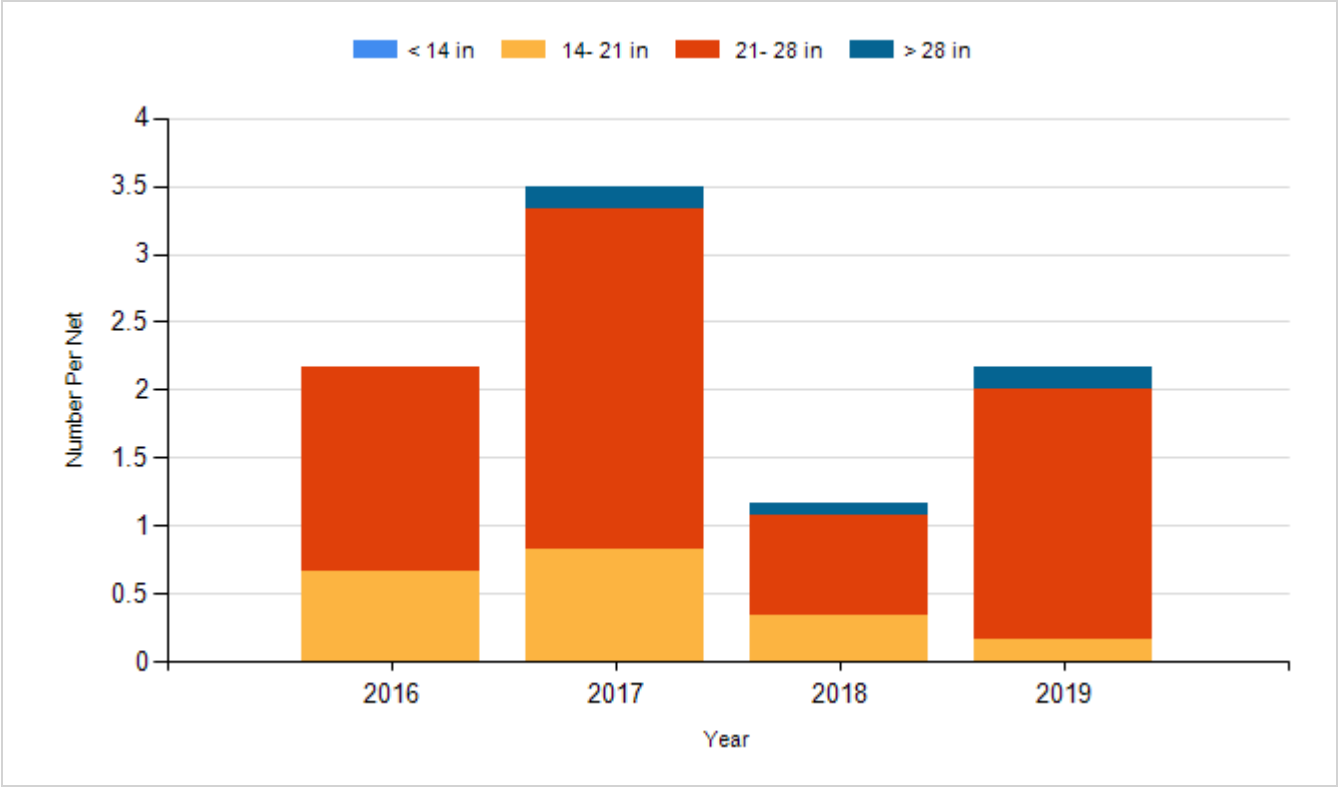
Species: Bluegill
Gear: AFS std frame net



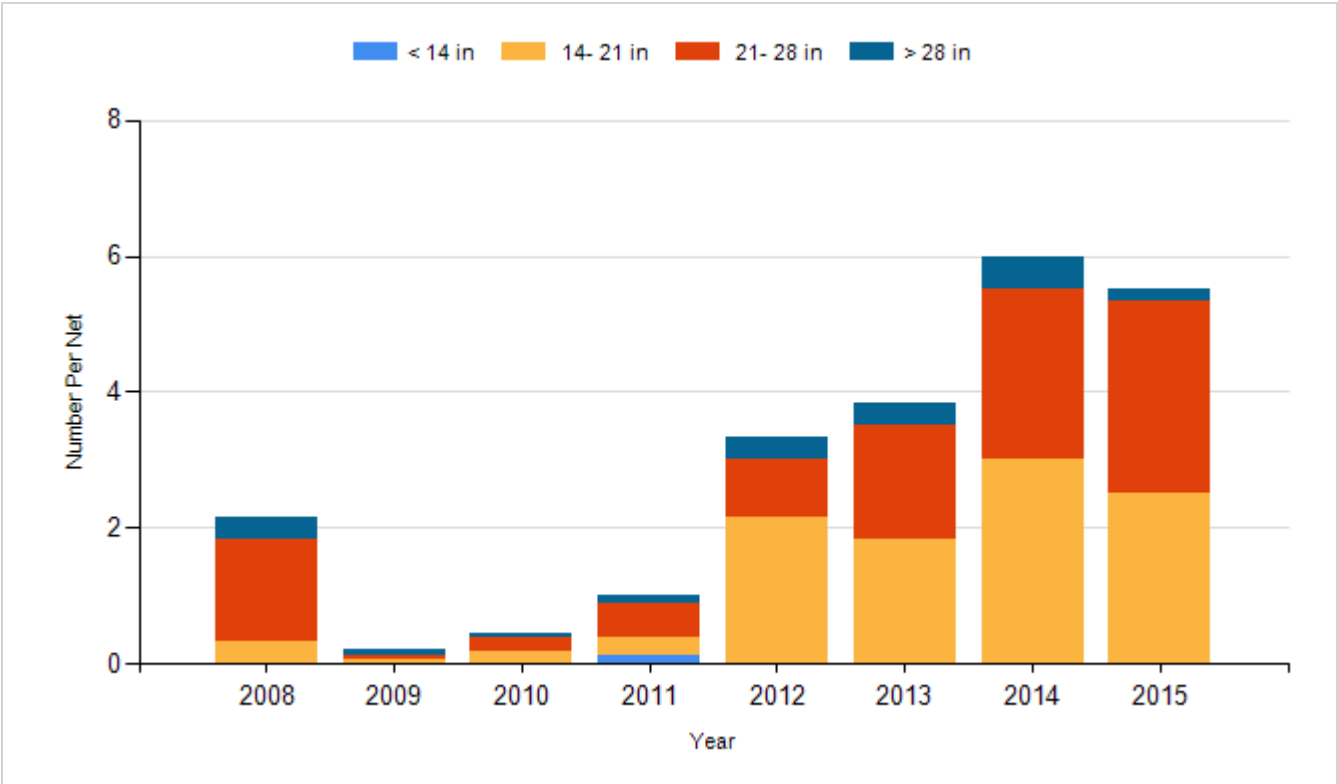
Species: Bluegill
Gear: frame net (std 3/4 in)



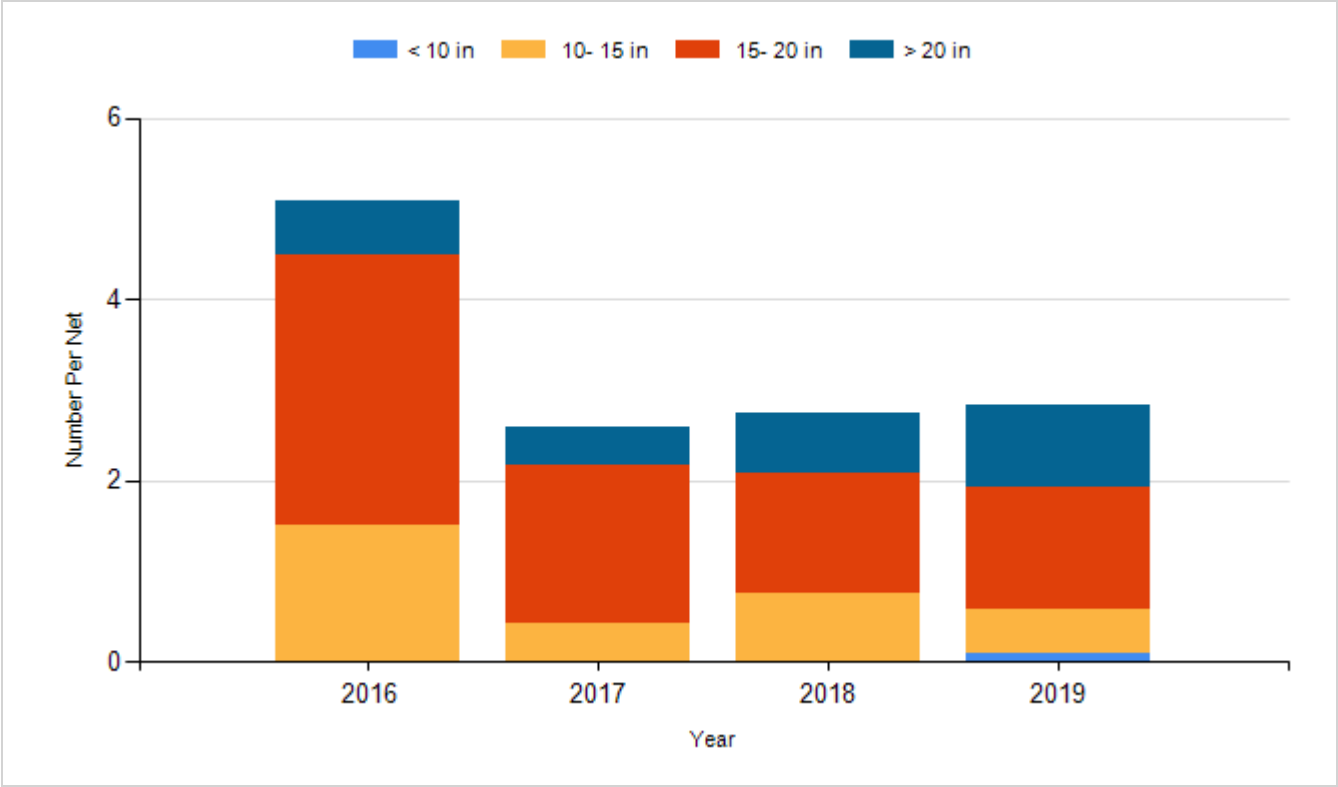
Species: Northern Pike
Gear: AFS std gill net



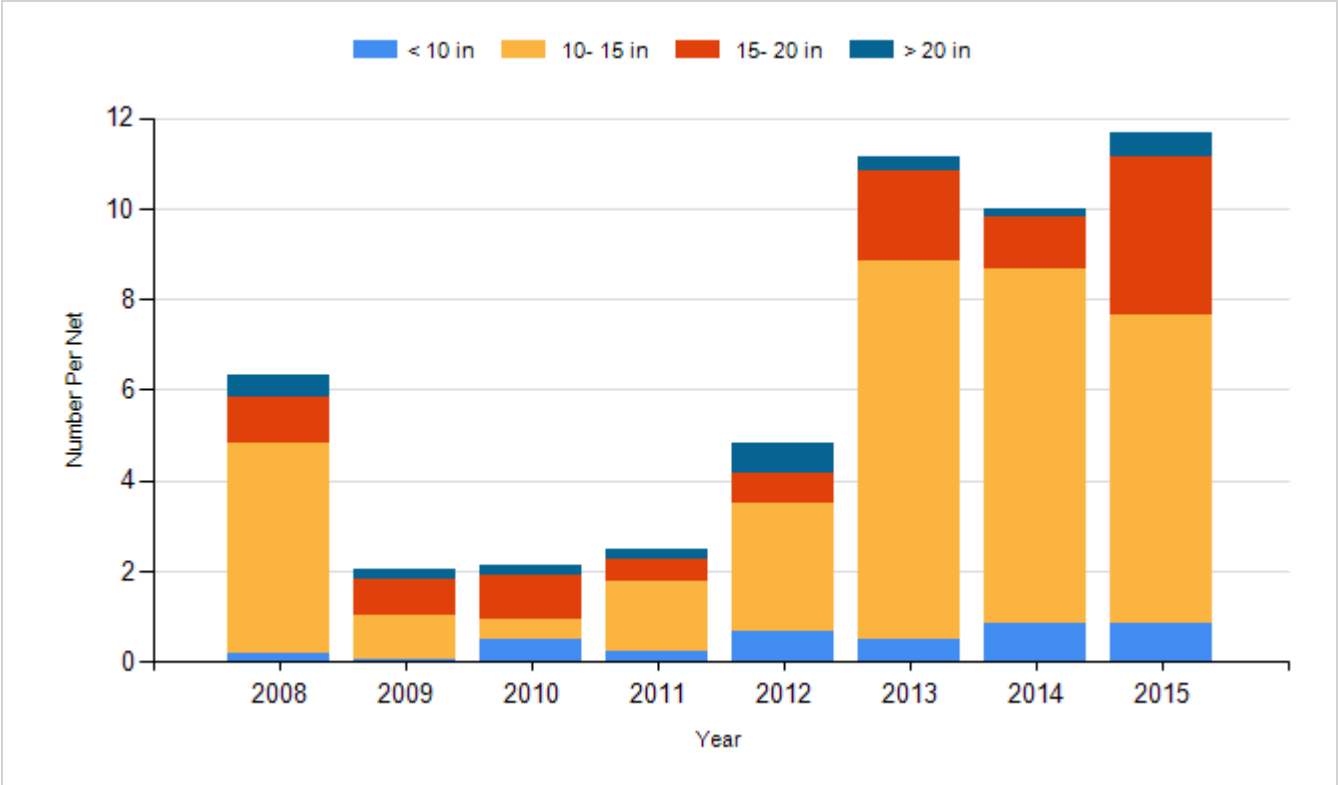
Species: Northern Pike
Gear: std exp gill net



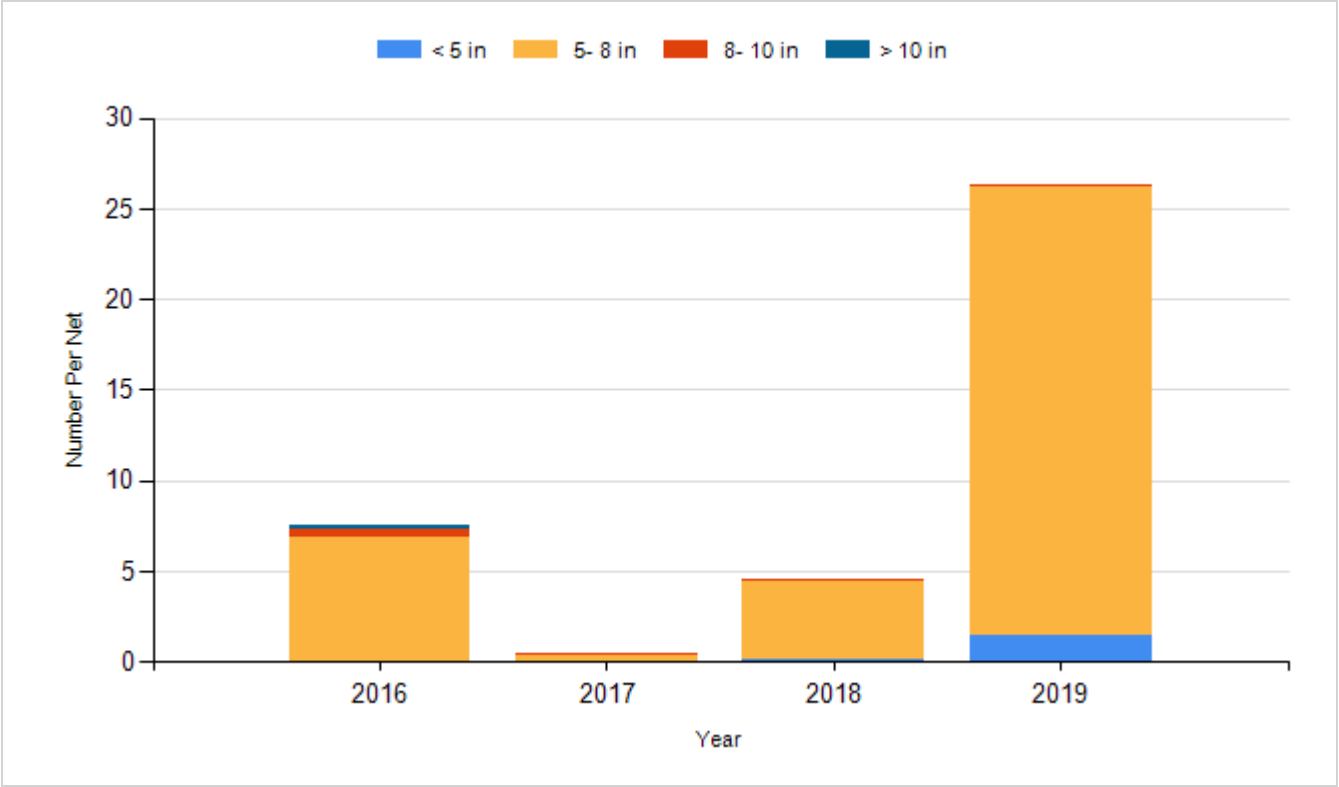
Species: Walleye
Gear: AFS std gill net



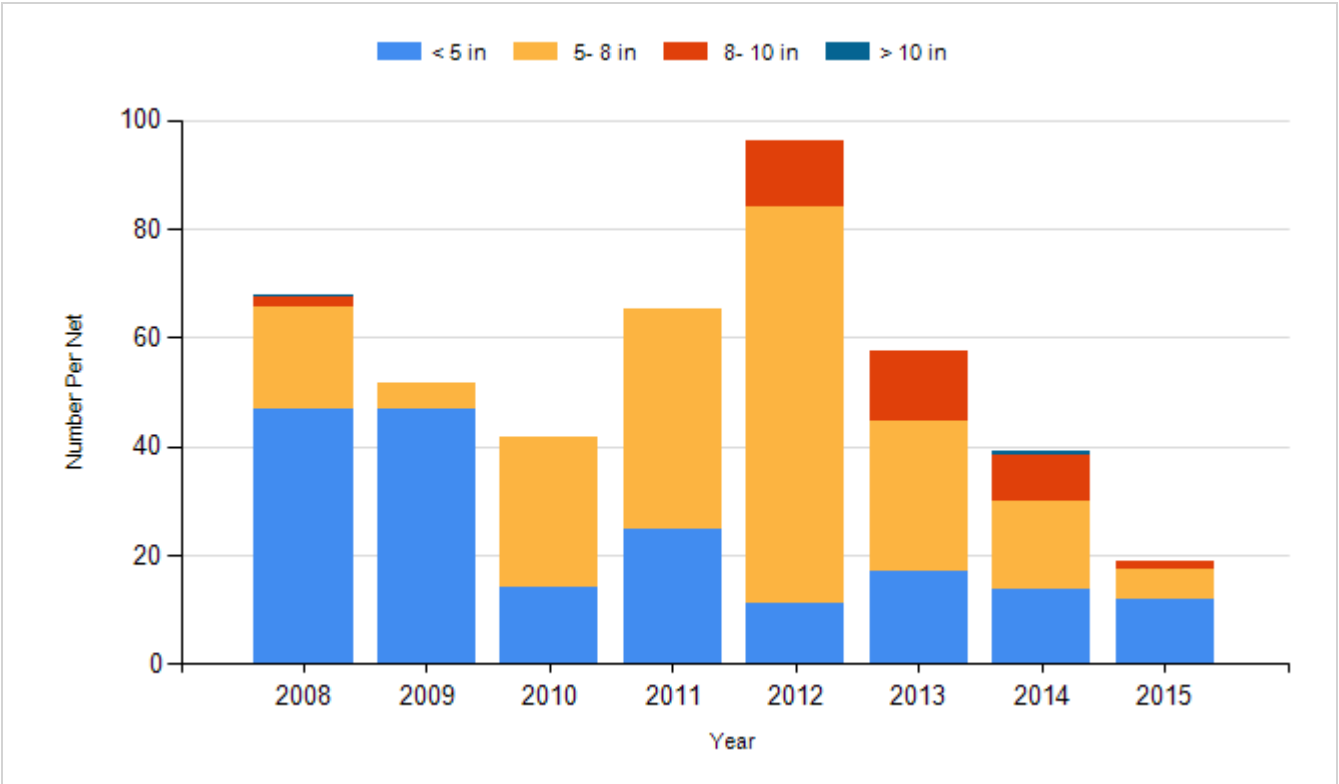
Species: Walleye
Gear: std exp gill net



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	600,000
2011	Walleye	Fry	600,000
2012	Walleye	Fry	600,000
2013	Walleye	Fry	600,000
2014	Walleye	Fry	542,000
2014	Walleye	Large Fingerling	24,879
2015	Walleye	Fry	550,000
2016	Walleye	Fry	550,000
2017	Walleye	Large Fingerling	48,564
2019	Walleye	Large Fingerling	18,798