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 population in select waters, was not conducted in 2018. Spring electrofishing is included in fish sampling efforts every other year at Clear Lake (next survey scheduled for 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 68.3/frame net, bluegills were the most abundant fish species in the frame net catch and relative abundance was considered high. Sampled bluegill ranged in length from 3.1 to 9.1 inches; most (84%) were less than 6.0 inches. Six consecutive year classes (2011-2016) were represented. Younger bluegill from cohorts produced in 2016 (age 2) and 2015 (age 3) accounted for nearly 90% of the total catch. Growth appears to have slowed in recent years ; currently, bluegills begin to surpass 8.0 inches at age 5 and mean length at capture values generally exceed 8.0 inches by age 6.

- **Northern pike.** Although not listed as a primary management species, northern pike tend to be abundant during most years. However, fewer northern pike were caught in 2018 than previous surveys dating back to 2012. At 1.2/gill net, relative abundance was considered low to moderate; those sampled ranged in length from 18.1 to 28.3 inches.

- **Walleye.** Walleyes were not abundant (2.8/gill net). Gill net captured walleyes ranged in length from 12.6 to 26.0 inches; most (>70%) exceeded 15.0 inches. Eight year classes (1998, 2009, and 2011 – 2016), each represented by 10 or fewer individuals were present. Growth tends to be moderate with mean length at capture values that approach or surpass 15.0 inches by age 4.

- **Yellow perch**. Although yellow perch numbers were higher than 2017, relative abundance remains low (4.5/gill net). Sampled yellow perch ranged in length from 4.3 to 9.4 inches; five year classes (2010 and 2013 – 2016) were present. Those from the 2015 (age 3) cohort, which had a mean length of 6.2 inches, accounted for 69% of yellow perch in the sample.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Clear, Marshall County
UJA-Lake-917-001
2018

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 16, 2018	4 net-nights
AFS std gill net	Jul 18, 2018	4 net-nights
AFS std gill net	Jul 19, 2018	4 net-nights
fall night EF-WAE	Sep 24, 2018	2400 seconds
frame net (std 3/4 in)	Jul 16, 2018	4 net-nights
frame net (std 3/4 in)	Jul 18, 2018	6 net-nights
frame net (std 3/4 in)	Jul 19, 2018	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)
Bigmouth Buffalo	11	28	18	46	24	61	30	76	37	94
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
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Common Carp	11	28	16	41	21	53	26	66	33	84
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Gizzard Shad	7	18	11	28						
Green Sunfish	3	8	6	15	8	20	10	25	12	30
Lake Herring	5	13	8	20	11	28	14	35	17	43
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
Rock Bass	4	10	7	18	9	23	11	28	13	33
Rudd	6	15	10	25	12	30	15	38	19	48
Saugeye	9	23	14	35	18	46	22	56	27	69
Shorthead Redhorse	6	15	10	25	13	33	16	41	20	51
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
White Sucker	6	15	10	25	13	33	16	41	20	51
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	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Black Bullhead	6.4	2.4	82	6	81	7	92	2
	Black Crappie	3.1	1.0	51	12	24	11	102	2
	Bluegill	0.8	0.4	0		0		108	6
	Common Carp	0.2	0.2	50		50		106	18
	Largemouth Bass	0.1	0.1	100		0		125	
	Northern Pike	1.2	0.3	71		7		91	3
	Smallmouth Bass	2.4	1.1	83		66	14	103	2
	Walleye	2.8	0.8	73	12	24	12	91	1
	White Sucker	0.3	0.3	100		100		96	4
	Yellow Perch	4.5	1.4	4		0		90	1
fall night EF-WAE*	Walleye	0.0						76	
frame net (std 3/4 in)	Black Bullhead	9.1	3.3	86	4	84	4	85	1
	Black Crappie	3.3	1.4	57	10	25	9	95	1
	Bluegill	68.3	24.2	16	1	3	1	99	1
	Common Carp	0.1	0.1	100		100			
	Largemouth Bass	0.1	0.1	100		50		112	6
	Northern Pike	0.6	0.2	80		20		78	2
	Smallmouth Bass	0.2	0.1	67		67		91	6
	White Sucker	0.1	0.1	100		100		103	
	Yellow Perch	6.0	4.2	5		0		84	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; **Day/night samples combined;AFS std frame nets used in 2016 and 2017**

		CPUE										
Gear	Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Avg
AFS std gill net	Black Bullhead								15.0	9.8	6.4	10.4
	Black Crappie								1.3	1.3	3.1	1.9
	Bluegill								2.0	1.5	0.8	1.4
	Channel Catfish								0.0	0.1	0.0	0.0
	Common Carp								0.1	0.1	0.2	0.1
	Largemouth Bass								0.1	0.1	0.1	0.1
	Northern Pike								2.2	3.5	1.2	2.3
	Smallmouth Bass								1.5	1.9	2.4	1.9
	Walleye								5.1	2.6	2.8	3.5
	White Sucker								0.8	2.3	0.3	1.1
	Yellow Perch								7.5	0.5	4.5	4.2
fall night EF-WAE	Walleye	361.8	21.0	340.8	13.5	51.0	3.0	17.0	1.5	0.0	0.0	81.0
boat shocker (night)	Largemouth Bass	58.5		54.0		92.0						68.2
boat shocker	Smallmouth Bass	89.5		83.0		31.0**		28.0**				57.9
frame net (std 3/4 in)***	Black Bullhead	0.6	0.6		7.2	29.7	26.4		7.8	3.6	9.1	10.6
	Black Crappie	0.0	0.3		5.2	10.7	2.4		1.9	2.3	3.3	3.3
	Bluegill	4.8	13.1		18.6	39.0	22.9		15.2	19.9	68.3	25.2
	Common Carp	0.0	0.0		0.1	0.0	0.0		0.6	0.9	0.1	0.2
	Largemouth Bass	0.0	0.0		0.0	0.1	0.0		0.0	0.2	0.1	0.1
	Northern Pike	0.4	0.2		1.8	0.6	1.1		0.8	0.8	0.6	0.8
	Smallmouth Bass	0.8	5.1		3.4	2.4	1.1		0.1	0.3	0.2	1.7
	Walleye	0.2	0.2		0.2	0.4	0.5		0.0	0.2	0.0	0.2
	White Sucker	0.5	0.2		0.1	0.1	0.0		0.0	0.0	0.1	0.1
	Yellow Perch	2.5	16.5		10.4	3.9	1.8		9.9	1.3	6.0	6.5
std exp gill net	Bigmouth Buffalo	0.0	0.0	0.0	0.0	0.0	0.2	0.0				0.0
	Black Bullhead	0.2	0.0	0.2	7.5	20.3	21.7	10.3				8.6
	Black Crappie	0.0	0.0	1.0	14.0	6.2	11.7	1.5				4.9
	Bluegill	0.0	0.7	0.0	1.0	0.3	2.5	1.5				0.9
	Common Carp	0.2	0.0	0.2	0.0	0.0	0.0	0.0				0.1
	Northern Pike	0.7	1.3	2.7	3.3	3.8	6.0	5.5				3.3
	Smallmouth Bass	4.0	7.8	2.5	2.0	4.3	3.3	3.0				3.8
	Walleye	6.0	4.8	6.8	4.2	10.7	9.2	10.8				7.5
	White Sucker	1.8	3.3	3.3	5.2	1.3	2.2	1.3				2.6
	Yellow Perch	15.0	82.8	122.3	84.8	40.5	25.5	7.0				54.0

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 std frame nets used in 2016 and 2017**

			Year									
Gear	Species	Index	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AFS std gill net	Northern Pike	PSD								69	76	71
		PSD-P								0	5	7
		Wr								90	85	91
	Walleye	PSD								70	84	73
		PSD-P								11	16	24
		Wr								93	87	91
	Yellow Perch	PSD								9	17	4
		PSD-P								2	0	0
		Wr								94	90	90
frame net (std 3/4 in)*	Bluegill	PSD	24	11		70	43	48		25	8	16
		PSD-P	0	2		10	4	26		3	2	3
		Wr	123	113		119	108	111		108	104	99
std exp gill net	Northern Pike	PSD	75	63	69	35	52	50	55			
		PSD-P	50	13	13	10	9	8	3			
		Wr	90	96	89	88	87	87	84			
	Walleye	PSD	53	72	32	32	22	15	37			
		PSD-P	11	14	10	16	3	2	5			
		Wr	94	91	88	90	89	86	88			
	Yellow Perch	PSD	0	0	0	14	32	36	24			
		PSD-P	0	0	0	0	0	2	0			
		Wr	101	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+
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)					
2009	83	71 (1)	113 (58)	159 (24)							

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
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)
2009	37		289 (16)		409 (15)	459 (2)			555 (1)		623 (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+
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)							
2009	932	97 (842)	138 (90)								

Fish Condition

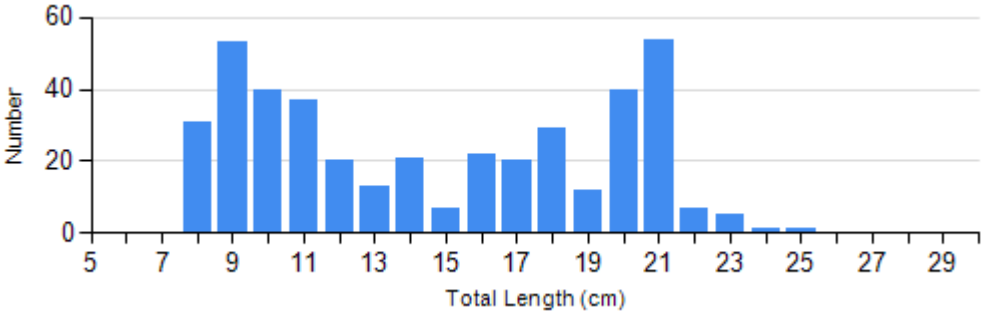
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2014	215	112 (0.9)	90	111 (1.2)	107	107 (0.8)	1	112
	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	
Northern Pike Gill Net	2014	18	89 (1.1)	15	85 (0.8)	3	80 (4.1)	0	
	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	
Walleye Gill Net	2014	47	86 (1.8)	7	84 (2.3)	1	103	0	
	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)
Yellow Perch Gill Net	2014	98	94 (0.8)	52	90 (0.8)	3	85 (2.1)	0	
	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	

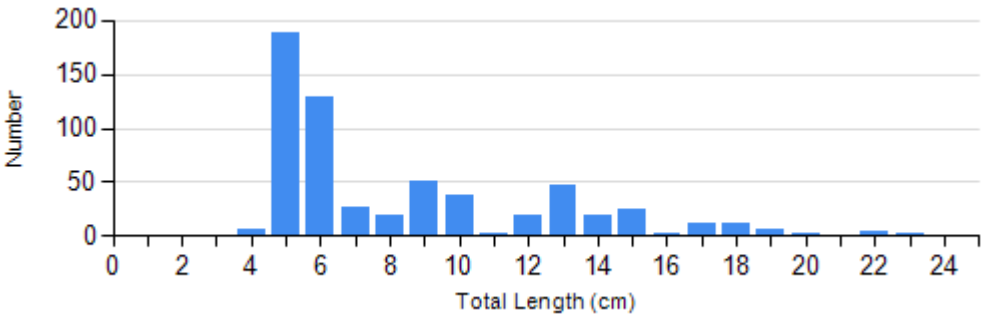
Length Frequency Distribution

Length frequency histogram of species sampled by year.
***AFS std frame nets used**

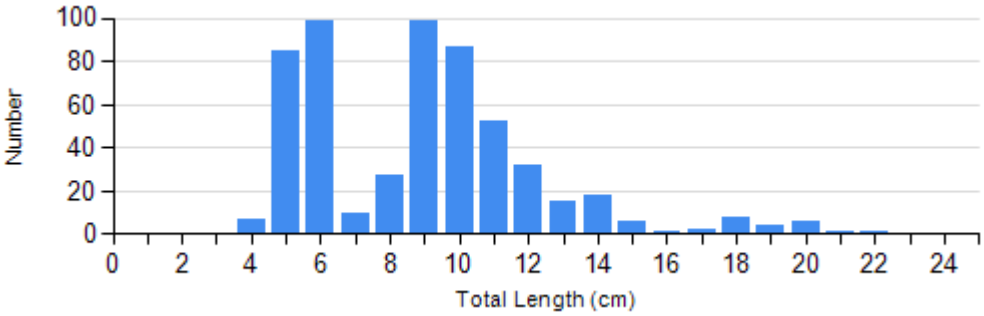
Species: Bluegill
Gear: frame net (std 3/4 in)



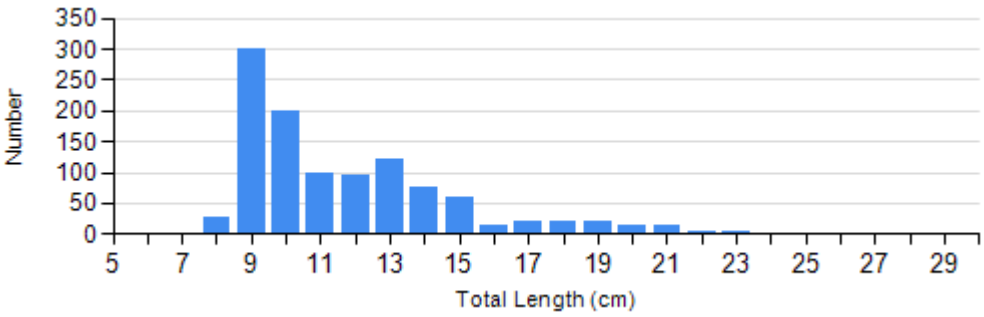
2014



2016*

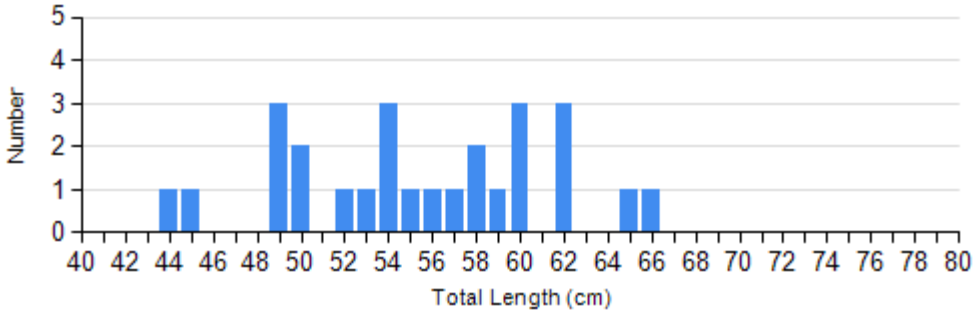


2017*

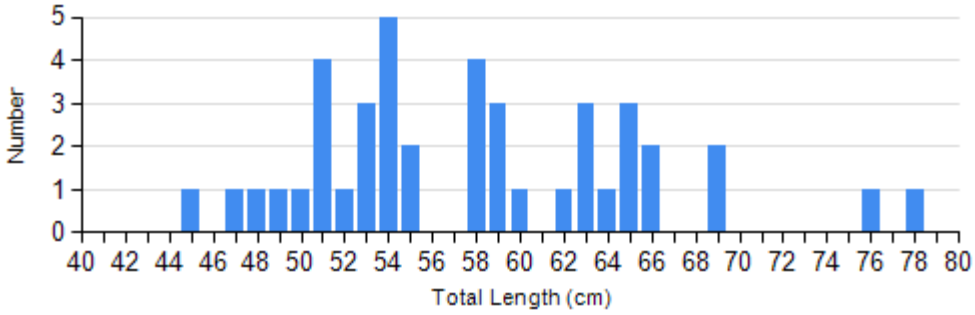


2018

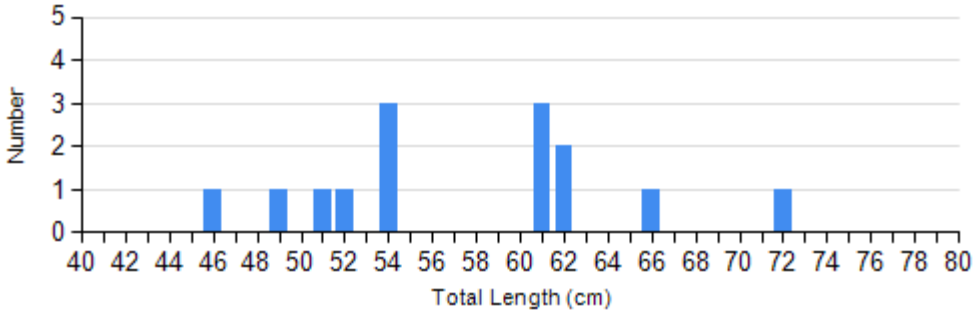
Species: Northern Pike
Gear: AFS std gill net



2016

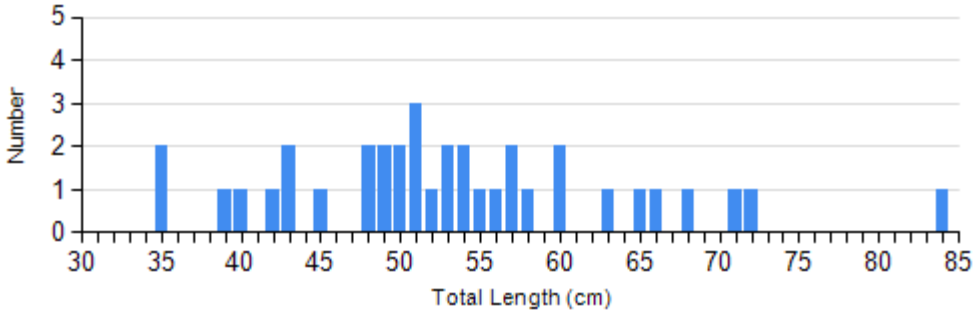


2017

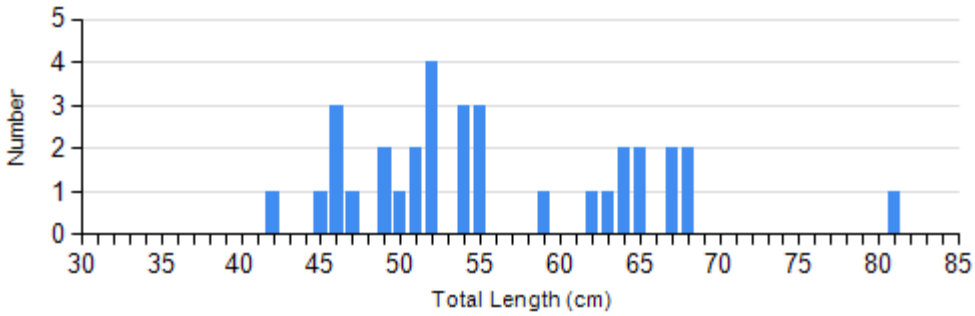


2018

Species: Northern Pike
Gear: std exp gill net



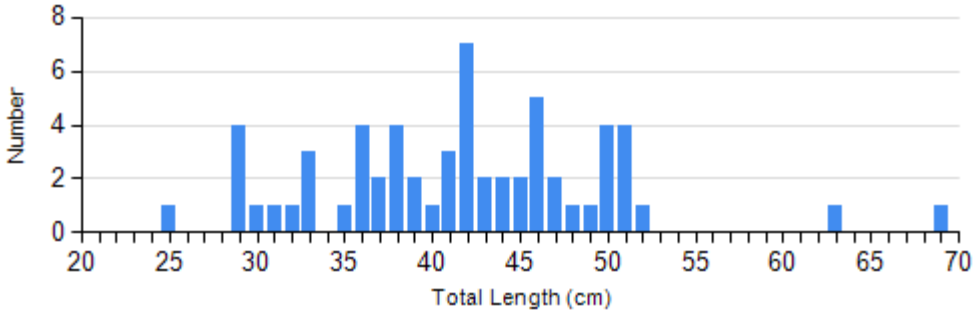
2014



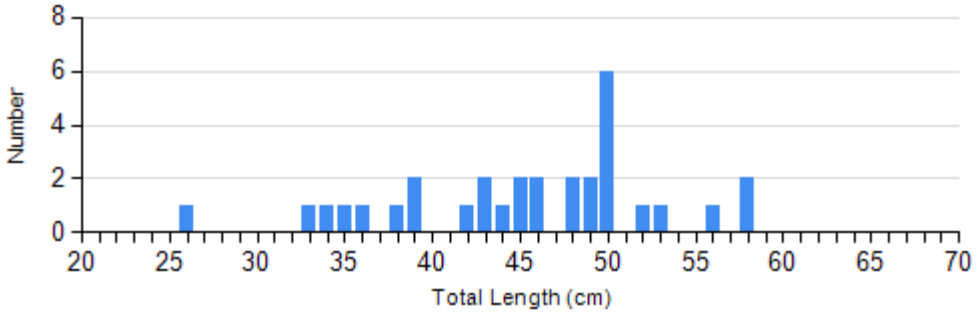
2015

Species: Walleye
Gear: AFS std gill net

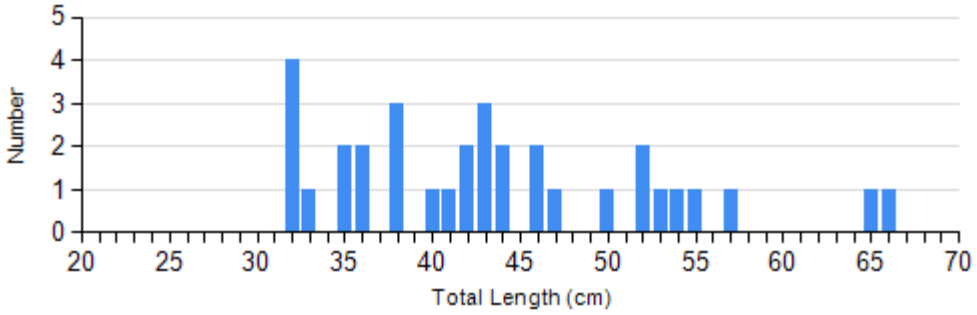
2016



2017

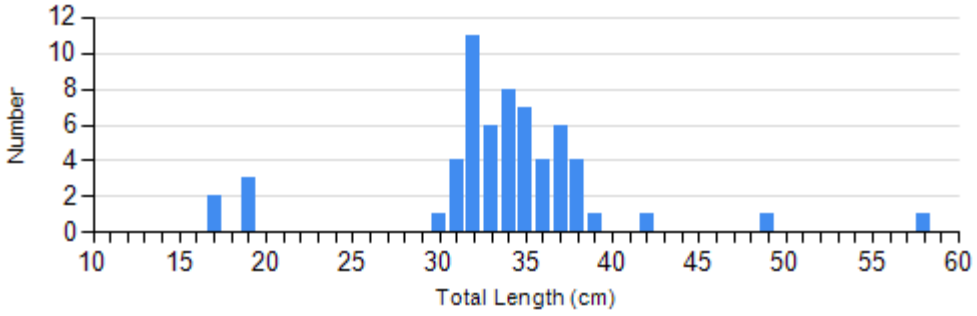


2018

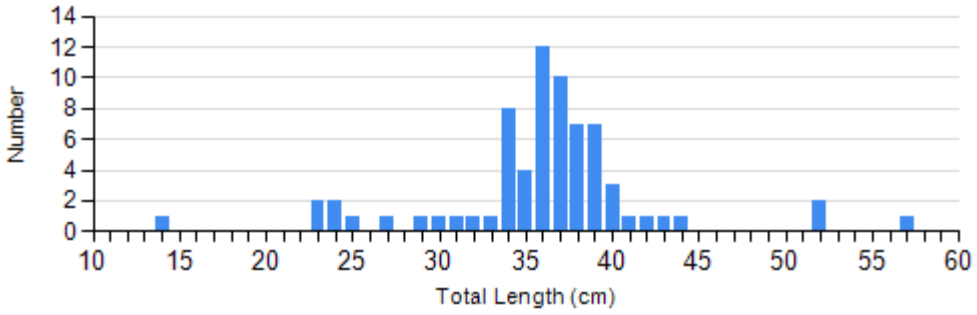


Species: Walleye
Gear: std exp gill net

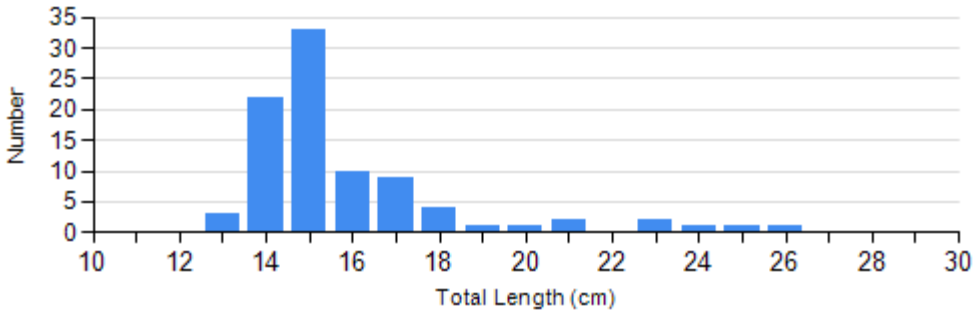
2014



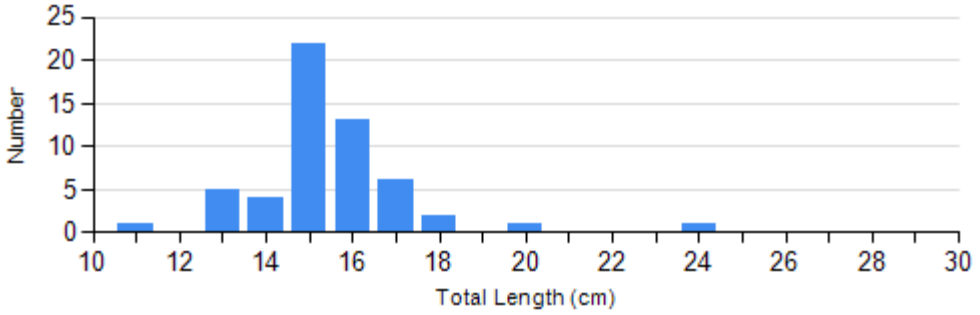
2015



Species: Yellow Perch
Gear: AFS std gill net

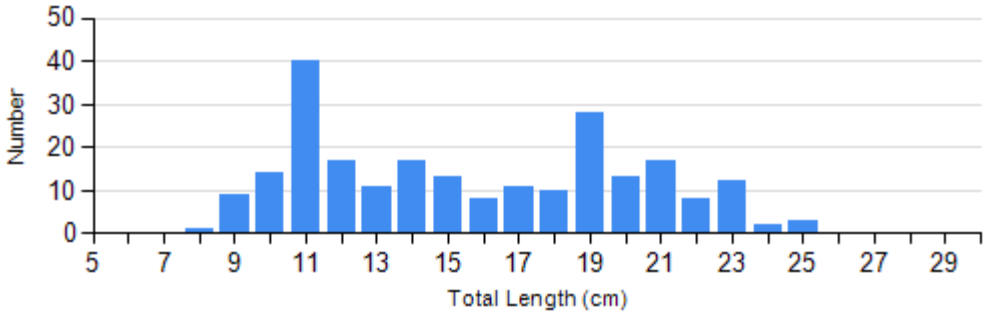


2016

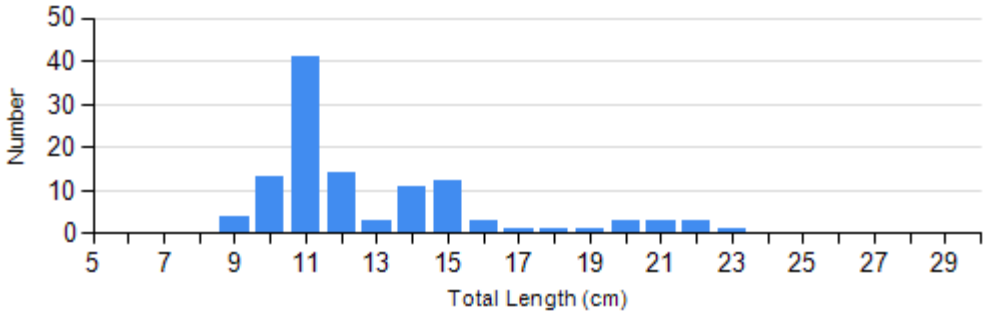


2018

Species: Yellow Perch
Gear: std exp gill net



2014

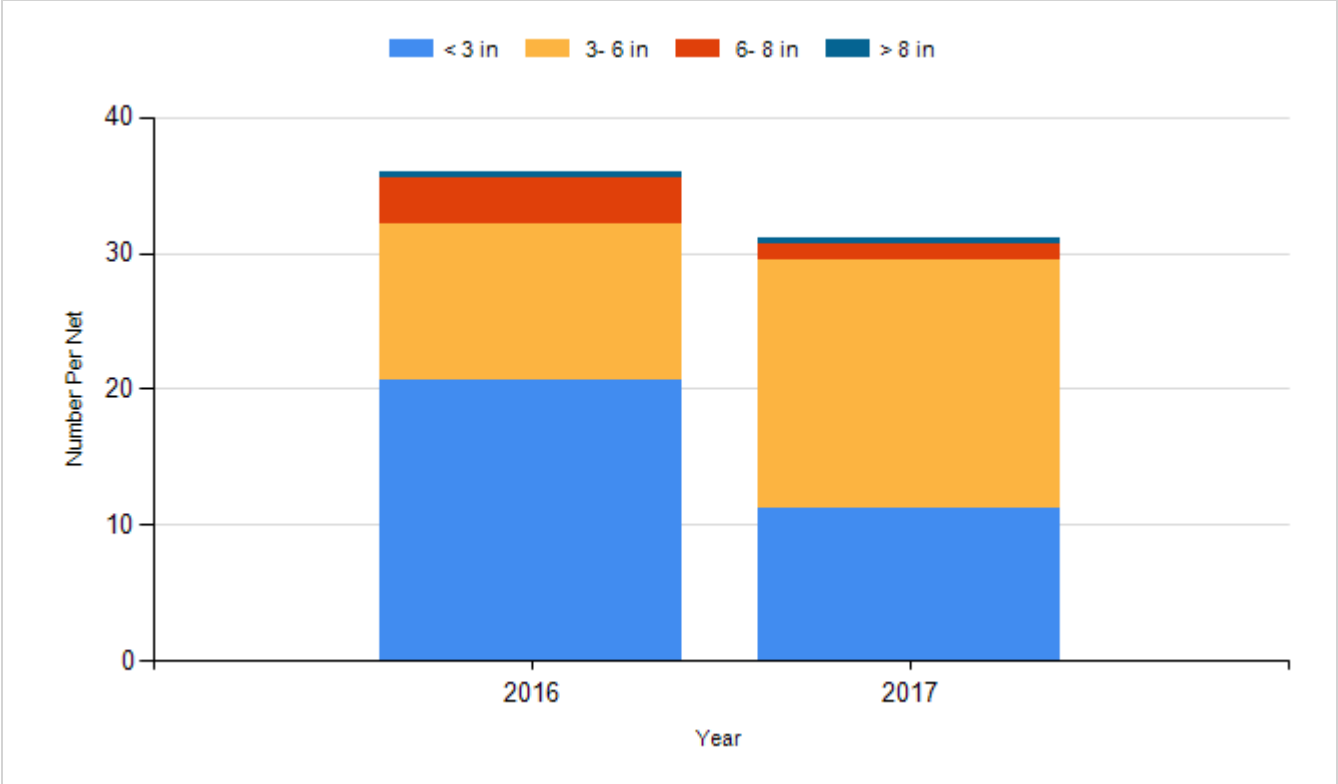


2015

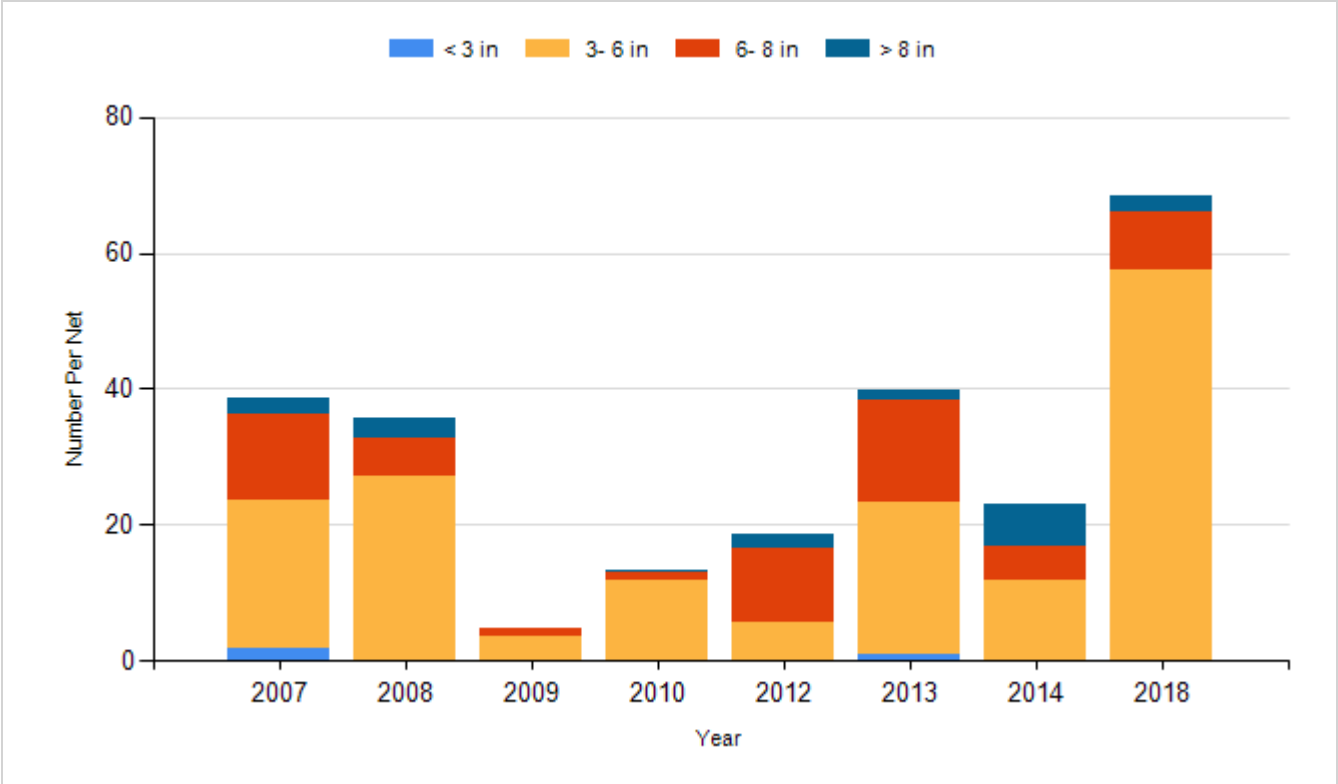
Historic Fish Sizes and Relative Abundance

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

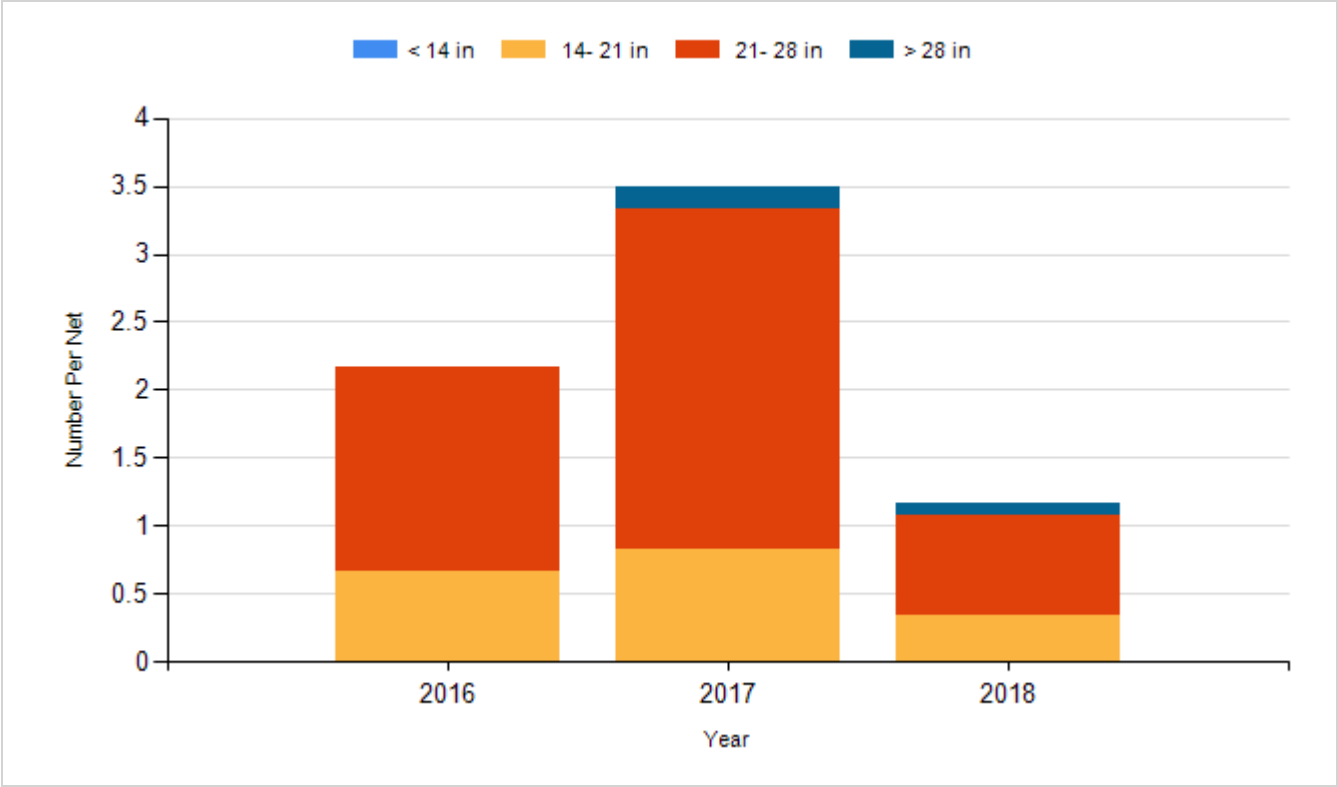
Species: Bluegill
Gear: AFS std frame net



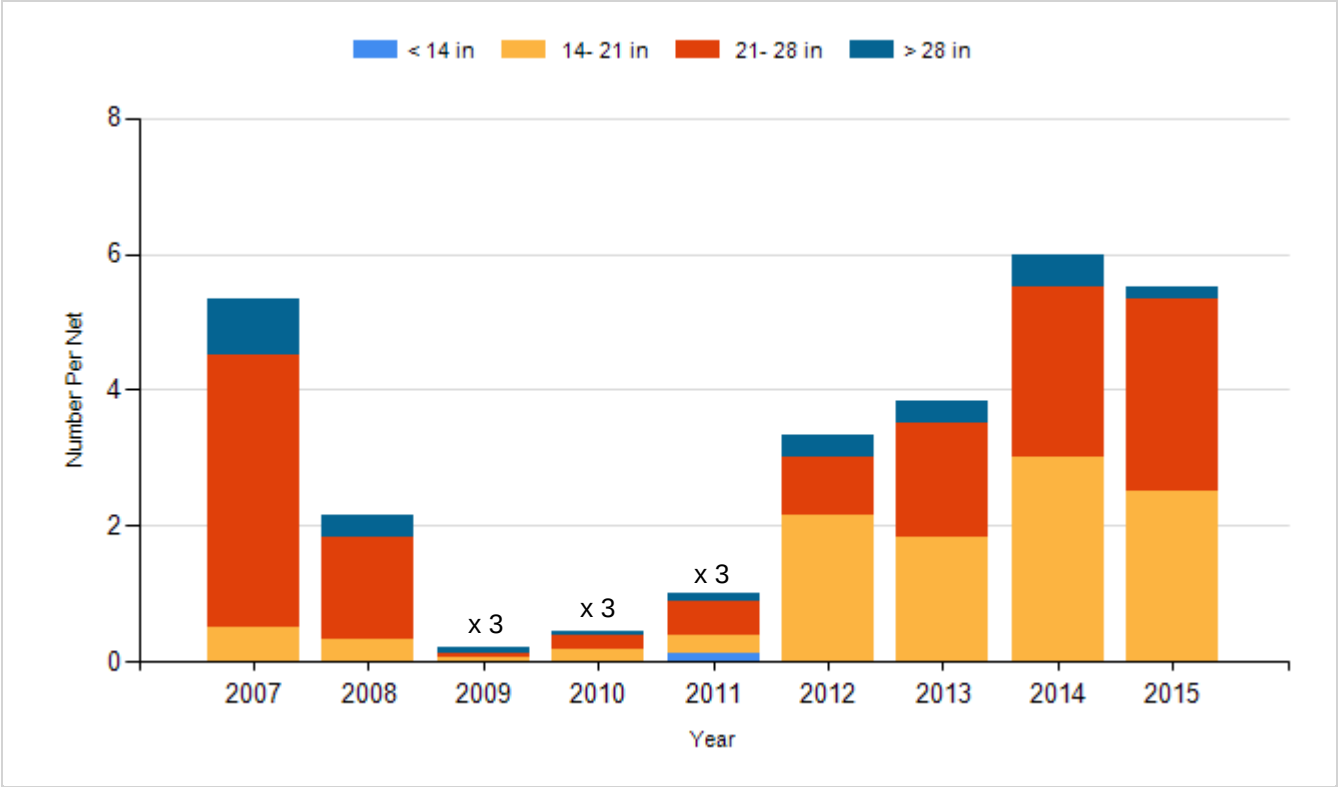
Species: Bluegill
Gear: frame net (std 3/4 in)



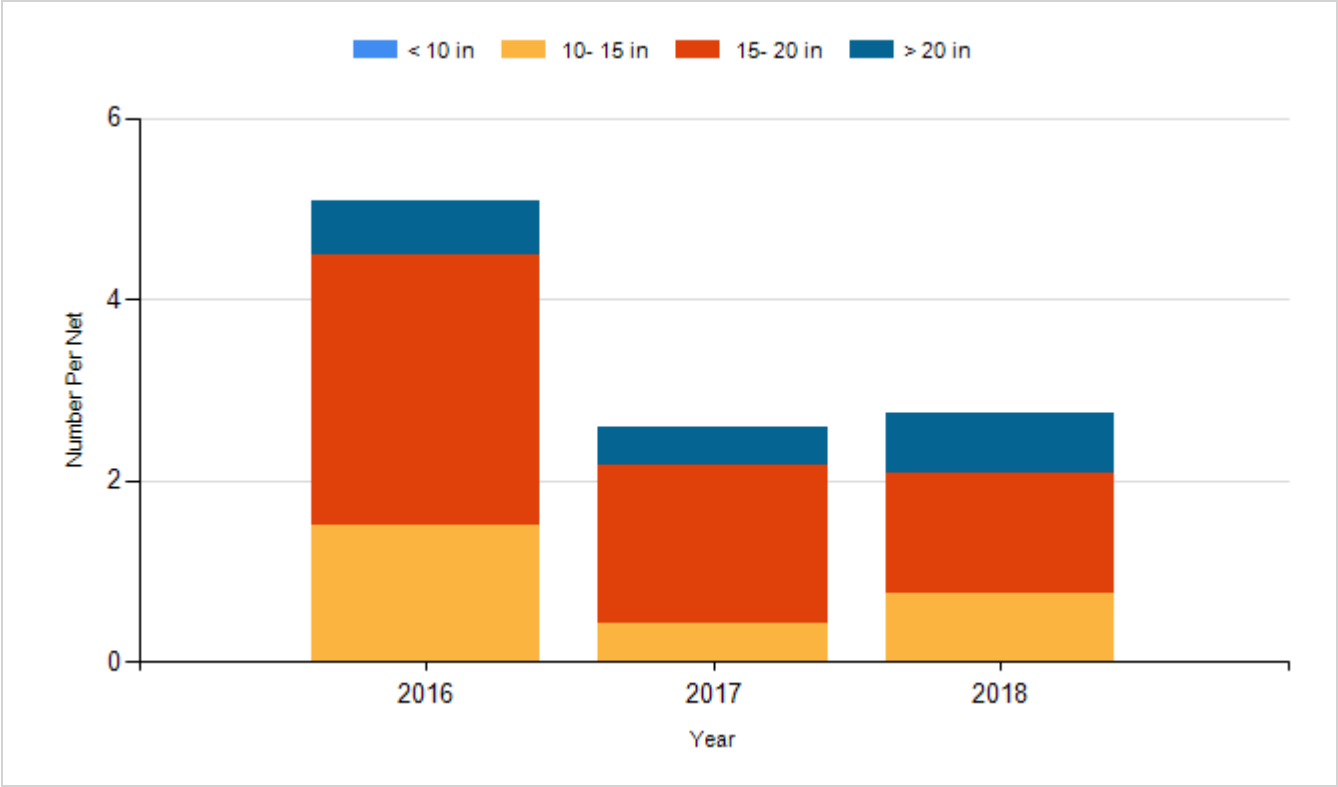
Species: Northern Pike
Gear: AFS std gill net



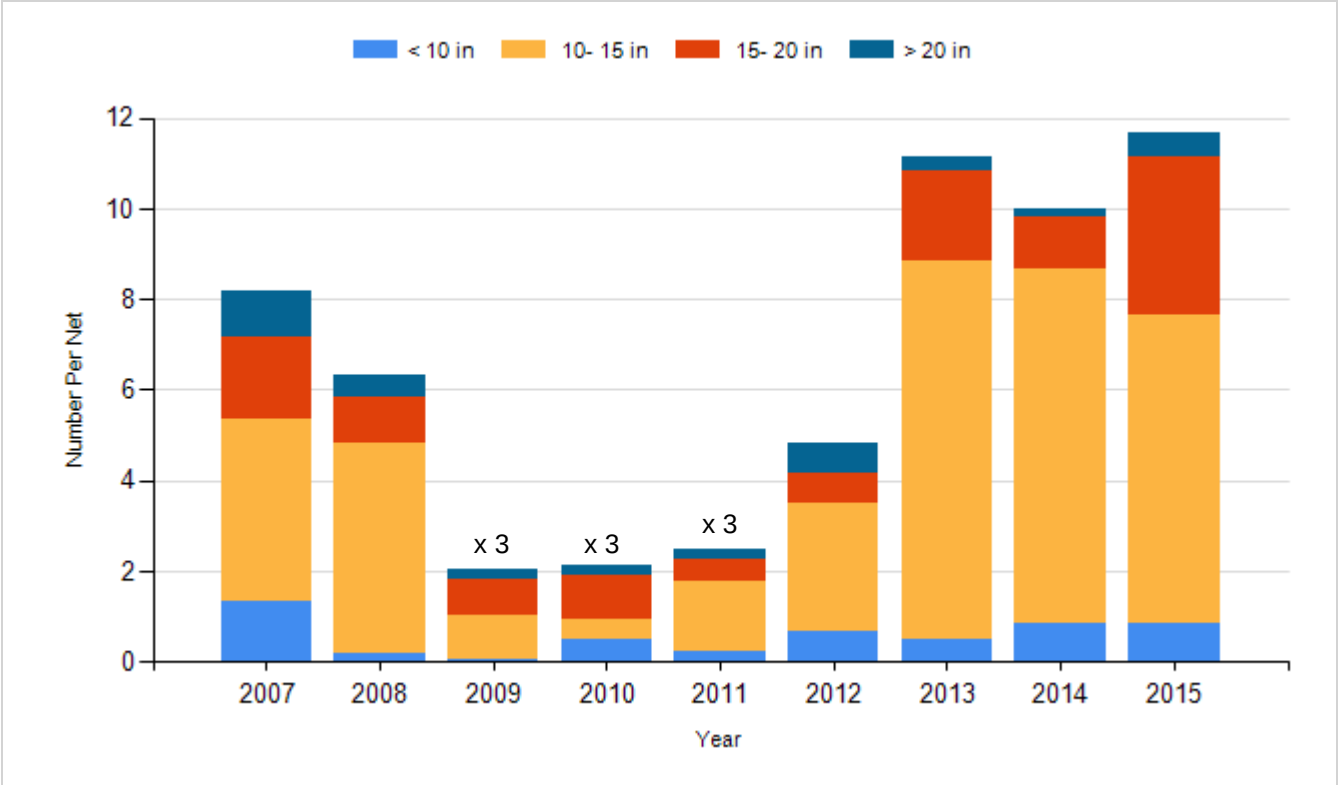
Species: Northern Pike
Gear: std exp gill net



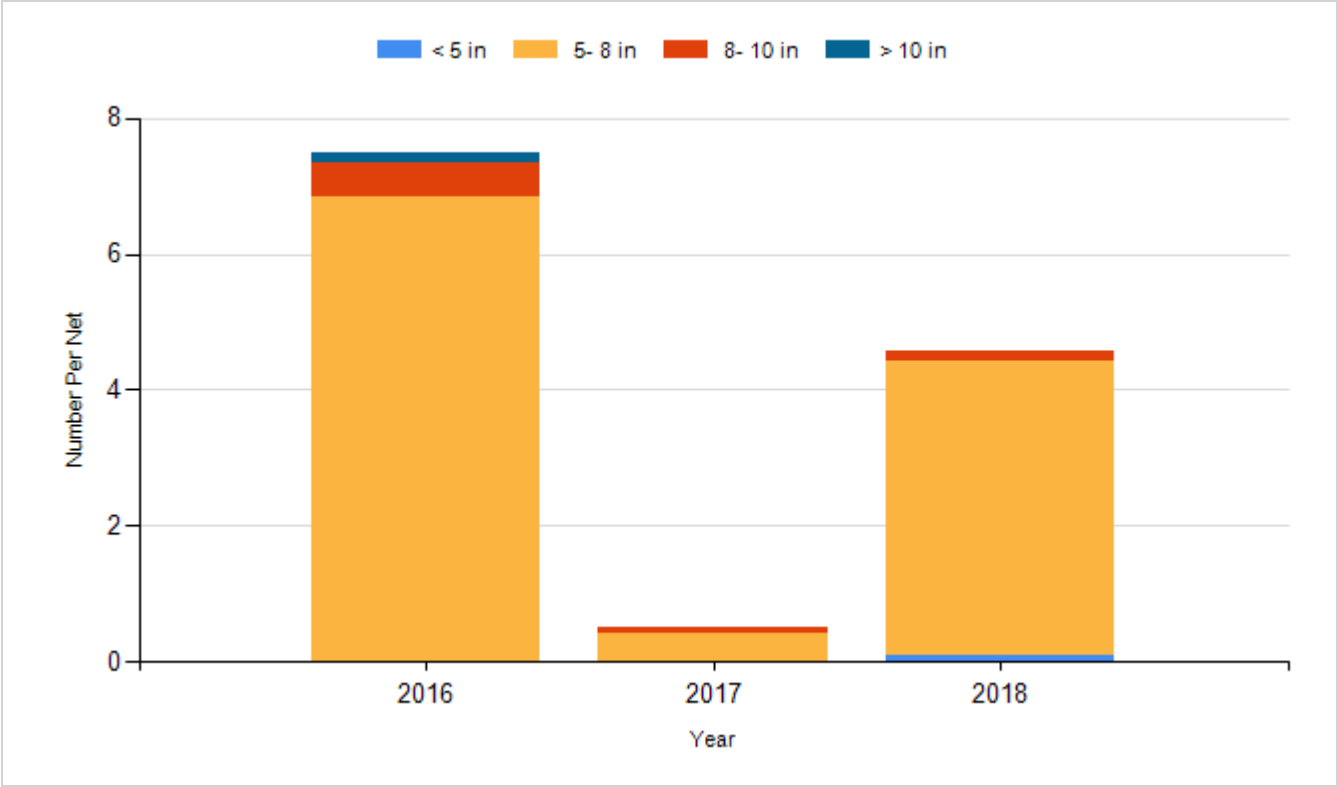
Species: Walleye
Gear: AFS std gill net



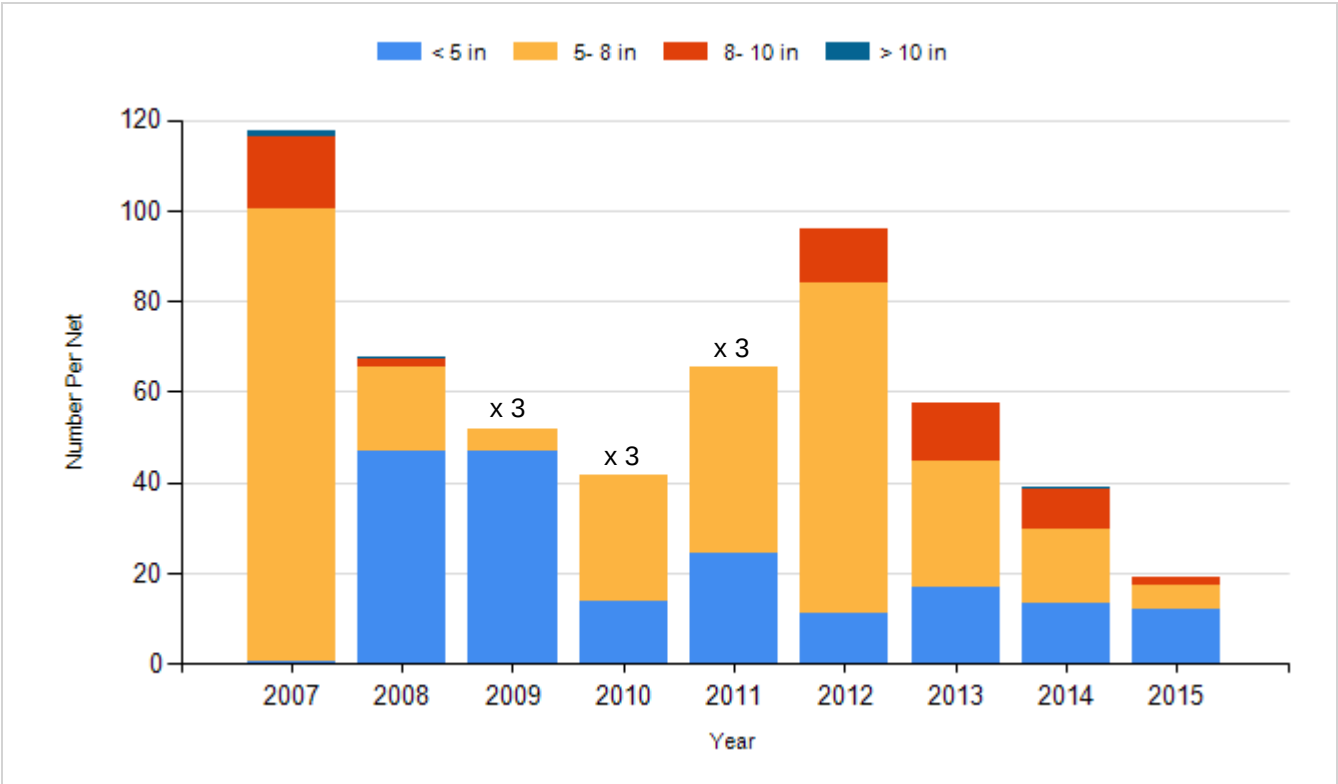
Species: Walleye
Gear: std exp gill net



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