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 (i.e., largemouth and smallmouth bass) and walleye. Other fish species (e.g., black crappie, northern pike, etc.) are present and contribute to the fishery.

Spring electrofishing, which is used to monitor black bass populations, was not conducted in 2021. 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.** Although fewer bluegills were sampled in 2021 than in 2019, relative abundance remained high (51.4 per frame net). Sampled bluegills ranged in length from 3.9 to 9.4 inches, 82% were ≥6.0 inches and 2% were ≥8.0 inches. Nine year-classes (2010 and 2012 – 2019) contributed to the catch. Individuals from the 2017 (age-4) cohort were the most abundant accounting for 60% of bluegills in the sample, while those from the 2016 (age-5) year class made up an additional 27%. Since 2013, the mean length at capture of age-4 fish has ranged from 5.9 to 8.3 inches, while age-5 fish had mean length at capture values from 7.1 to 8.9 inches. In 2021, the mean length at capture of age-4 and age-5 fish was 6.5 and 7.1 inches.

- **Northern pike.** Northern pike are not a primary management species at Clear Lake, but they tend to be abundant during most years. In 2021, relative abundance was high (3.1 per gill net). Northern pike from 13.4 to 33.1 inches were netted, most (86%) were ≥21.0 inches and 5% were ≥28.0 inches.

- **Walleye.** More walleyes were sampled in 2021 than in 2019. At 3.6 per gill net, relative abundance was considered low to moderate for Clear Lake. Gill net captured walleyes ranged in length from 8.3 to 28.3 inches; of those that were at least 10.0 inches 67% were ≥15.0 inches and 49% were ≥20.0 inches. Twelve year-classes contributed to the catch, none were particularly strong. Walleyes from cohorts produced in 2011 (age 10), 2017 (age 4), and 2019 (age 2); all of which, coincided with stocking events were the most abundant accounting for 64% of fish in the sample. The oldest walleye sampled was from the 2005 (age-16) year class. Growth tends to moderate with mean length at capture values that approach or surpass 15.0 inches by age 4. In 2021, the mean length at capture of age-4 fish was 15.5 inches.

- **Yellow perch**. Yellow perch were not abundant (1.5 per gill net). In 2021, gill nets collected 18 yellow perch that ranged in length from 5.5 to 7.1 inches and represented three cohorts (2016 – 2018).

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
2021

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 20, 2021	4 net-nights
AFS std gill net	Jul 21, 2021	4 net-nights
AFS std gill net	Jul 22, 2021	4 net-nights
fall night EF-WAE	Oct 04, 2021	1800 seconds
frame net (std 3/4 in)	Jul 20, 2021	6 net-nights
frame net (std 3/4 in)	Jul 21, 2021	6 net-nights
frame net (std 3/4 in)	Jul 22, 2021	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).

			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	119	9.9	2.8	98		27	6	91	2
	Black Crappie	59	4.9	1.0	98		12	7	100	1
	Bluegill	69	5.8	1.6	91	5	1		107	3
	Common Carp	1	0.1	0.1	100		0		105	
	Largemouth Bass	3	0.3	0.2	67		67		120	9
	Northern Pike	38	3.1	0.7	86	9	5		84	1
	Smallmouth Bass	34	2.8	0.7	71	12	50	13	94	2
	Walleye	51	3.6	0.9	67	11	49	11	83	1
	White Sucker	7	0.6	0.3	100		100		100	3
	Yellow Perch	18	1.5	0.9	0		0		91	2
frame net (std 3/4 in)	Black Bullhead	74	4.1	1.5	96		61	8	88	2
	Black Crappie	51	2.8	1.3	100		6		97	1
	Bluegill	926	51.4	13.3	82	2	2	1	105	1
	Common Carp	1	0.1	0.1	0		0		116	
	Largemouth Bass	3	0.2	0.2	67		0		103	7
	Northern Pike	34	1.9	0.6	29	12	0		75	2
	Smallmouth Bass	33	1.8	0.8	66	13	50	14	86	2
	Walleye	5	0.2	0.2	50		25		76	1
	White Sucker	3	0.2	0.1	100		100		93	8
	Yellow Perch	8	0.4	0.3	25		0		100	7

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.

*** 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					15.0	9.8	6.4	5.8		9.9	9.38
	Black Crappie					1.3	1.3	3.1	1.9		4.9	2.50
	Bluegill					2.0	1.5	0.8	3.8		5.8	2.78
	Channel Catfish					0.0	0.1	0.0	0.0		0.0	0.02
	Common Carp					0.1	0.1	0.2	0.1		0.1	0.12
	Largemouth Bass					0.1	0.1	0.1	0.3		0.3	0.18
	Northern Pike					2.2	3.5	1.2	2.2		3.1	2.44
	Smallmouth Bass					1.5	1.9	2.4	2.9		2.8	2.30
	Walleye					5.1	2.6	2.8	2.8		3.6	3.38
	White Sucker					0.8	2.3	0.3	0.2		0.6	0.84
	Yellow Perch					7.5	0.5	4.5	24.9		1.5	7.78
boat shocker*	Largemouth Bass		92.0							88.8		90.40
boat shocker*	Smallmouth Bass		31.0		28.0							29.50
fall night EF-WAE**	Walleye	13.5	51.0	3.0	17.0	1.5	0.0	0.0	40.0		0.0	18.44
frame net (std 3/4 in)***	Black Bullhead	7.2	29.7	26.4		7.8	3.6	9.1	3.5		4.1	13.33
	Black Crappie	5.2	10.7	2.4		1.9	2.3	3.6	1.2		2.8	4.32
	Bluegill	18.6	39.0	22.9		15.2	19.9	67.8	95.3		51.4	49.17
	Common Carp	0.1	0.0	0.0		0.6	0.9	0.1	0.0		0.1	0.05
	Largemouth Bass	0.0	0.1	0.0		0.0	0.2	0.1	0.1		0.2	0.08
	Northern Pike	1.8	0.6	1.1		0.8	0.8	0.6	0.7		1.9	1.12
	Smallmouth Bass	3.4	2.4	1.1		0.1	0.3	0.2	0.8		1.8	1.62
	Walleye	0.2	0.4	0.5		0.0	0.2	0.0	0.5		0.2	0.30
	White Sucker	0.1	0.1	0.0		0.0	0.0	0.1	0.0		0.2	0.08
	Yellow Perch	10.4	3.9	1.8		9.9	1.3	6.0	2.1		0.4	4.10
std exp gill net	Bigmouth Buffalo	0.0	0.0	0.2	0.0							0.05
	Black Bullhead	7.5	20.3	21.7	10.3							14.95
	Black Crappie	14.0	6.2	11.7	1.5							8.35
	Bluegill	1.0	0.3	2.5	1.5							1.33
	Common Carp	0.0	0.0	0.0	0.0							0.00
	Northern Pike	3.3	3.8	6.0	5.5							4.65
	Smallmouth Bass	2.0	4.3	3.3	3.0							3.15
	Walleye	4.2	10.7	9.2	10.8							8.73
	White Sucker	5.2	1.3	2.2	1.3							2.50
	Yellow Perch	84.8	40.5	25.5	7.0							39.45

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 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	Northern Pike	PSD					69	76	71	92		86
		PSD-P					0	5	7	8		5
		Wr					90	85	91	90		84
	Walleye	PSD					70	84	73	82		67
		PSD-P					11	16	24	33		49
		Wr					93	87	91	90		83
	Yellow Perch	PSD					9	17	4	1		0
		PSD-P					2	0	0	0		0
		Wr					94	90	90	102		91
frame net (std 3/4 in)*	Bluegill	PSD	70	43	48		25	8		23		82
		PSD-P	10	4	26		3	2		4		2
		Wr	119	108	111		108	104		103		105
std exp gill net	Northern Pike	PSD	35	52	50	55						
		PSD-P	10	9	8	3						
		Wr	88	87	87	84						
	Walleye	PSD	32	22	15	37						
		PSD-P	16	3	2	5						
		Wr	90	89	86	88						
	Yellow Perch	PSD	14	32	36	24						
		PSD-P	0	0	2	0						
		Wr	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+
2021	926		113 (9)	140 (85)	164 (556)	180 (246)	193 (17)	216 (4)	219 (8)	222 (4)	245 (1)
2019	1714		93 (374)	119 (823)	151 (346)	181 (92)	204 (56)	205 (14)		224 (9)	
2018	1084		101 (555)	138 (395)	162 (48)	192 (66)	216 (15)	218 (5)			
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)					

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2021	51	271 (1)	240 (13)	311 (3)	393 (11)		559 (2)	511 (3)	556 (1)	551 (2)	625 (15)
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)

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	18			151 (4)	166 (13)	148 (1)					
2019	315		138 (262)	157 (39)	182 (14)						
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)						

Fish Condition

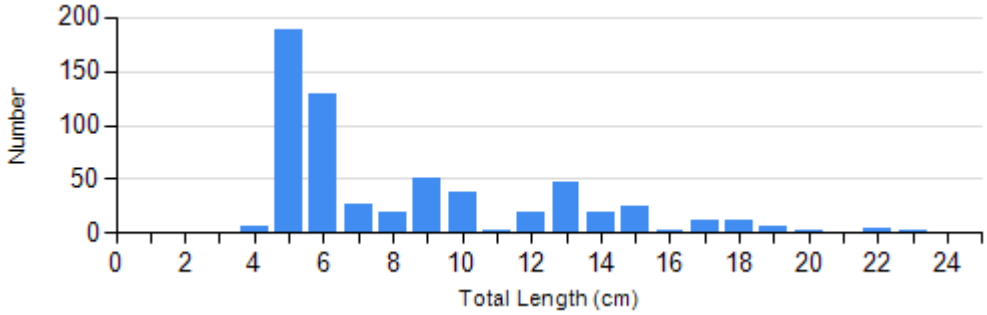
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	330	103 (0.6)	21	104 (1.2)	8	106 (2.8)	0	
	2018	869	99 (0.5)	177	101 (0.8)	38	95 (1.3)	0	
	2019	1326	101 (0.6)	321	106 (1.0)	68	107 (1.6)	0	
	2021	171	105 (0.6)	733	105 (0.7)	22	96 (0.6)	0	
Northern Pike Gill Net	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	
	2021	5	80 (1.9)	30	84 (1.2)	2	85	0	
Walleye Gill Net	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
	2021	14	83 (1.4)	8	81 (1.9)	12	82 (2.0)	9	85 (1.4)
Yellow Perch Gill Net	2017	5	92 (3.1)	1	81	0		0	
	2018	52	90 (0.9)	2	92 (3.0)	0		0	
	2019	297	103 (0.6)	2	85	0		0	
	2021	18	91 (1.4)	0		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 net used in 2016 and 2017



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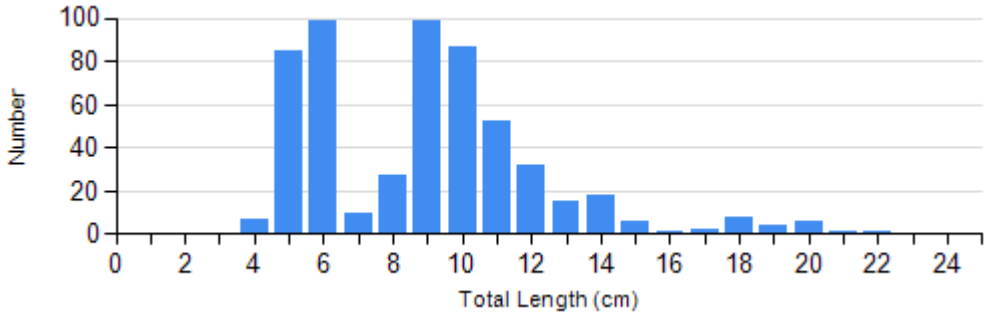

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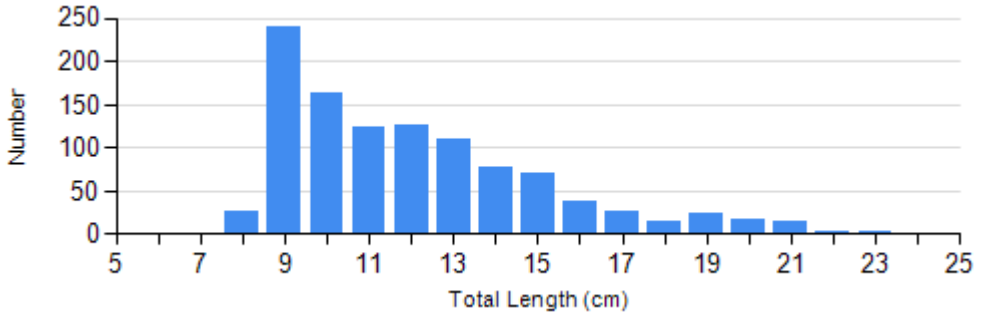

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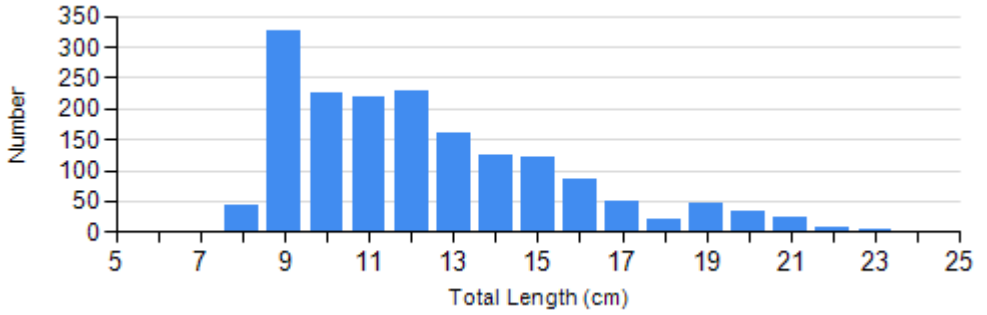

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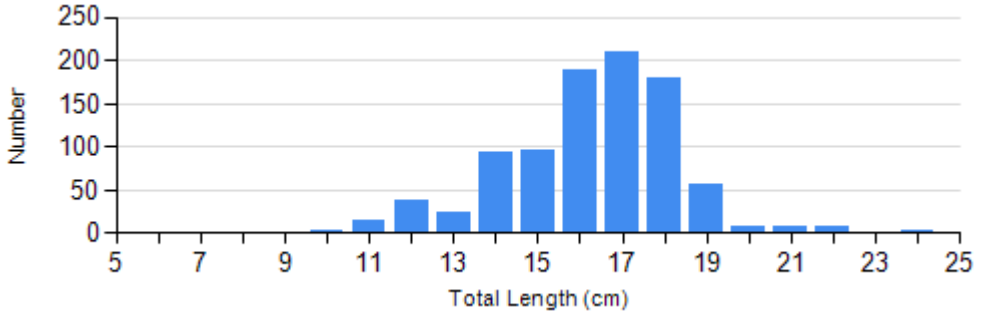
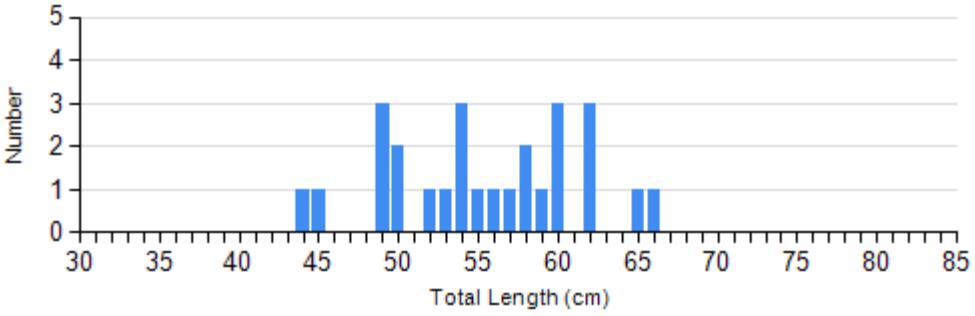


2021

Species: Northern Pike
Gear: AFS std gill net



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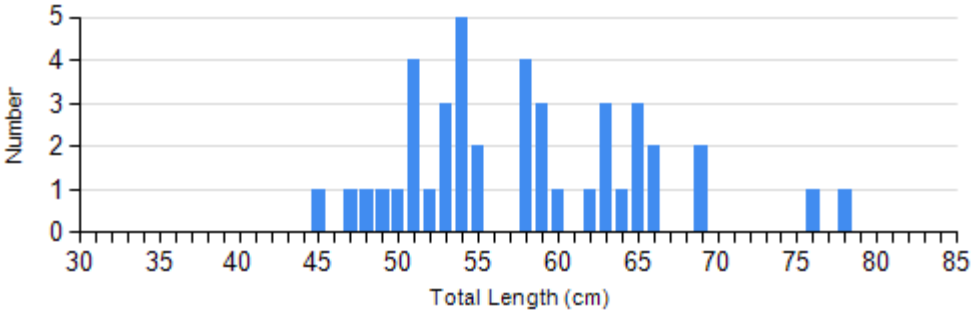

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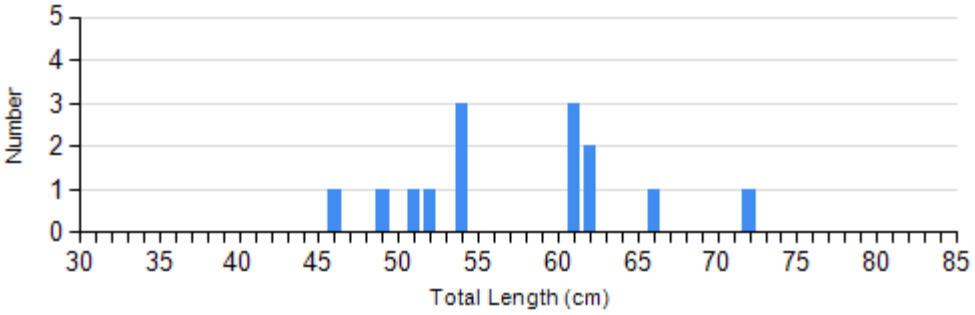

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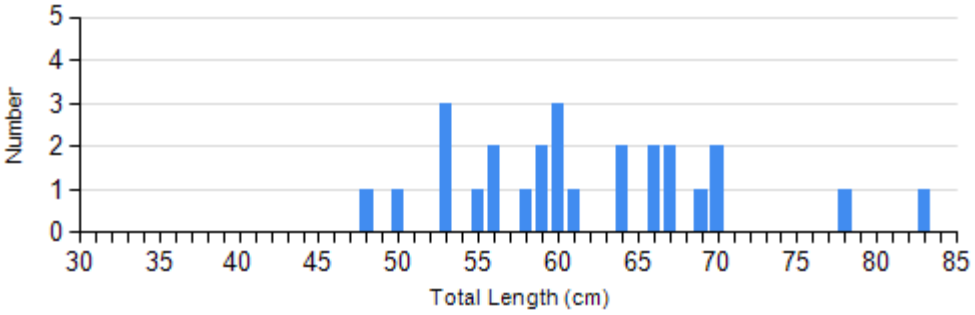

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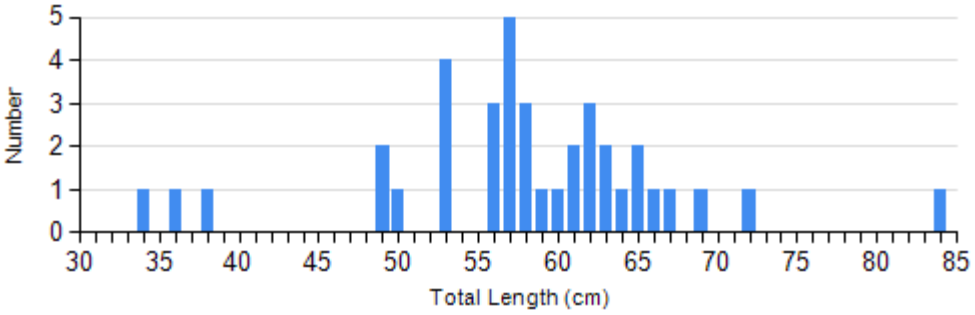
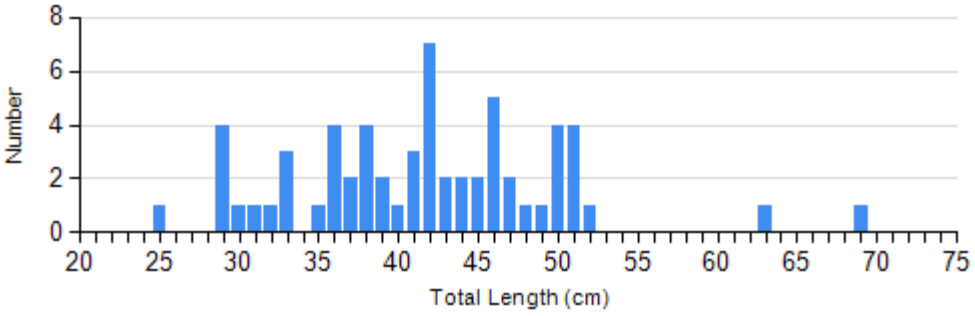
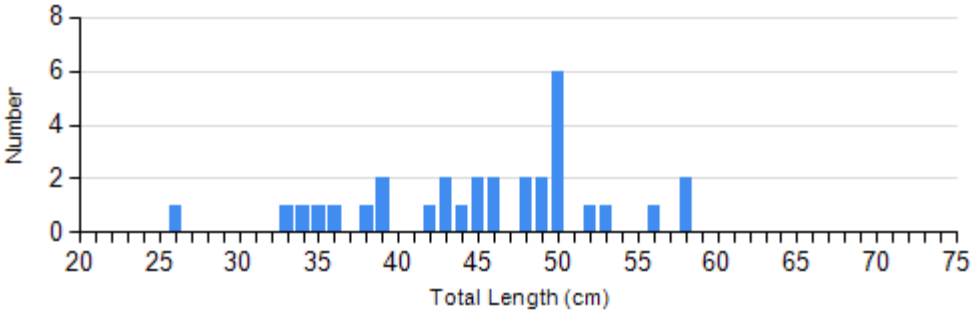


2021

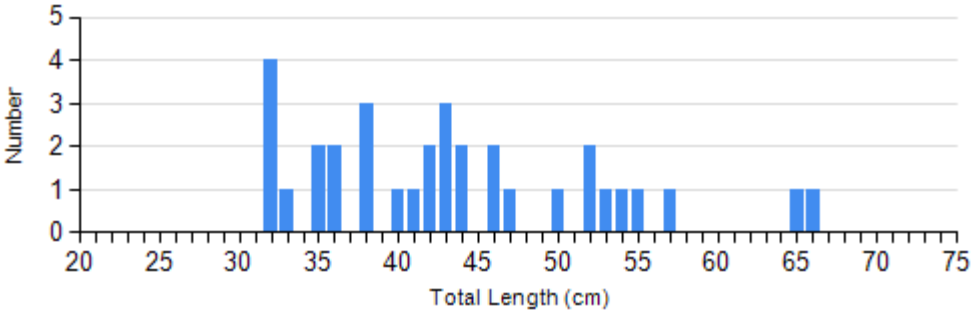
Species: Walleye
Gear: AFS std gill net



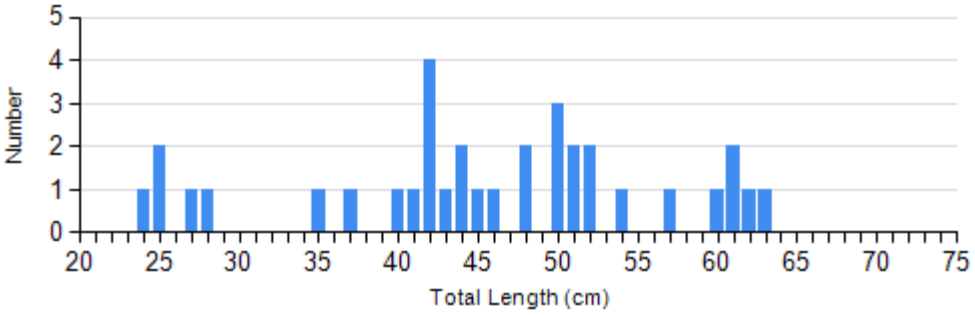
2016



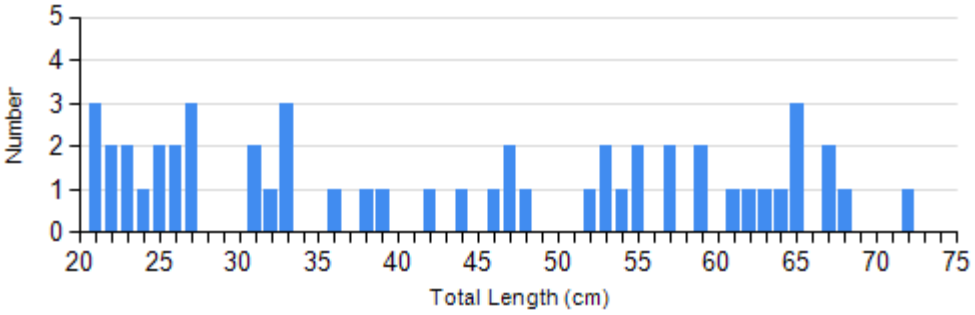
2017



2018

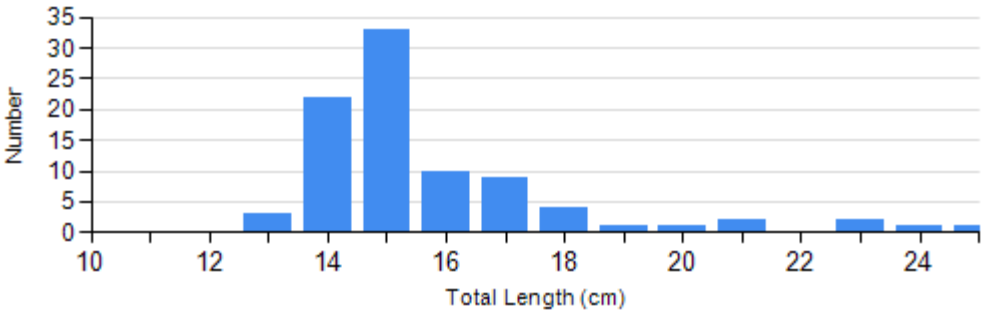


2019

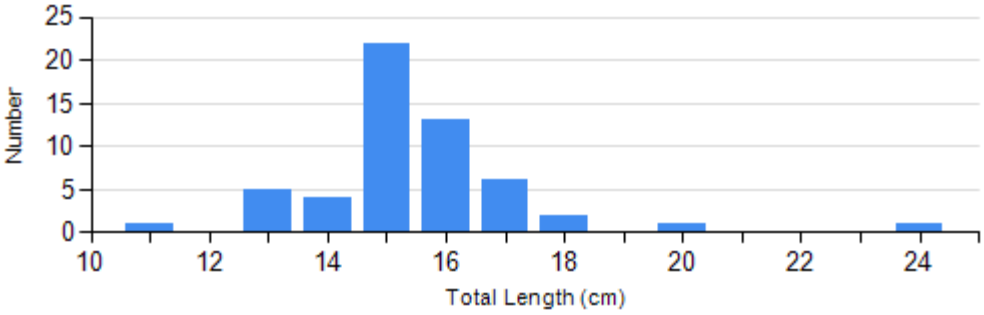


2021

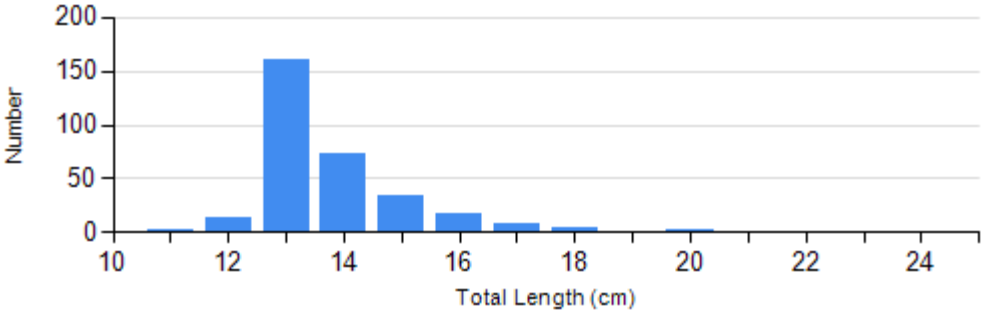
Species: Yellow Perch
Gear: AFS std gill net



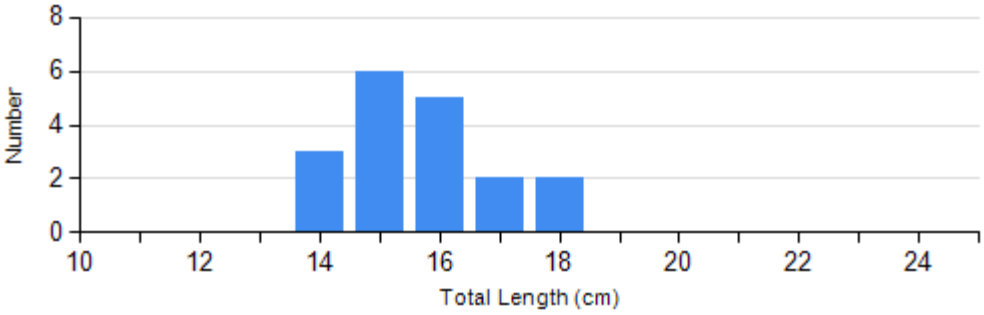
2016



2018



2019

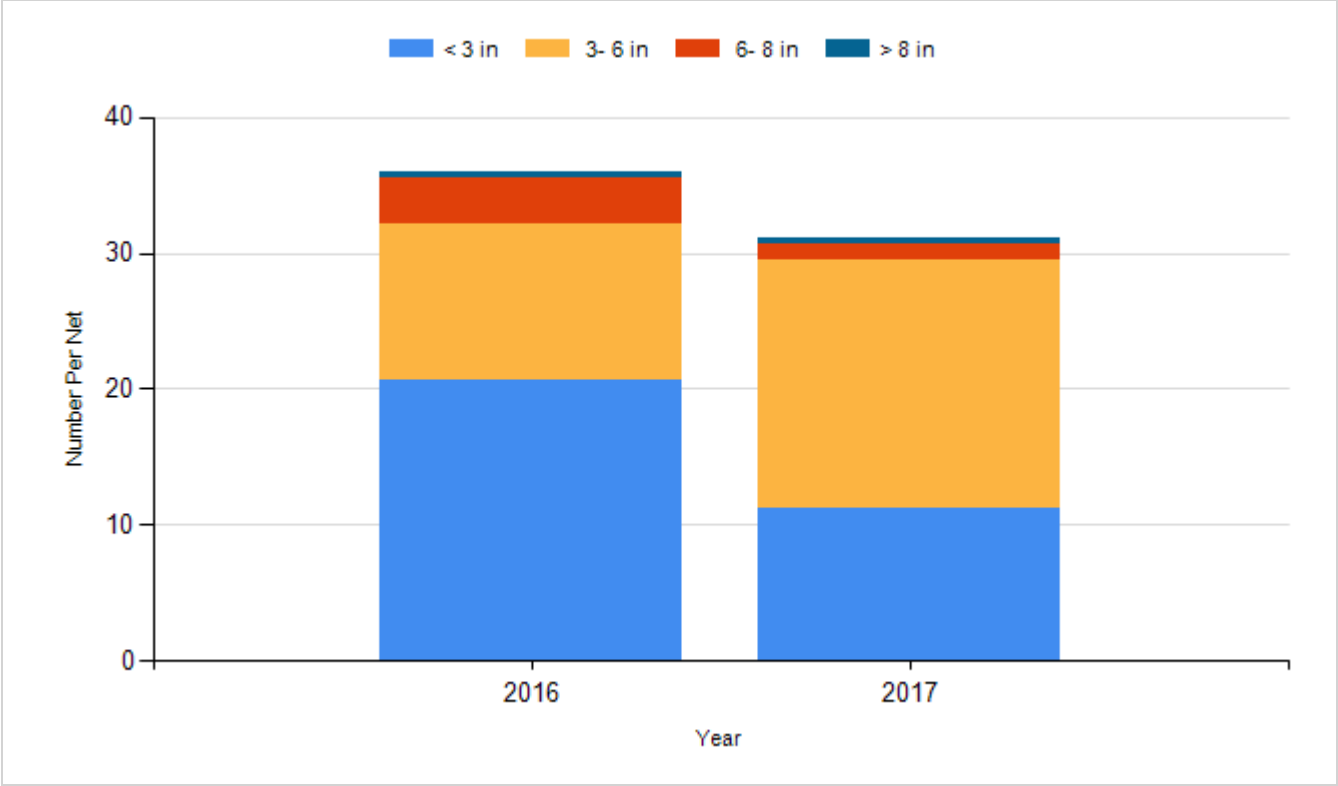


2021

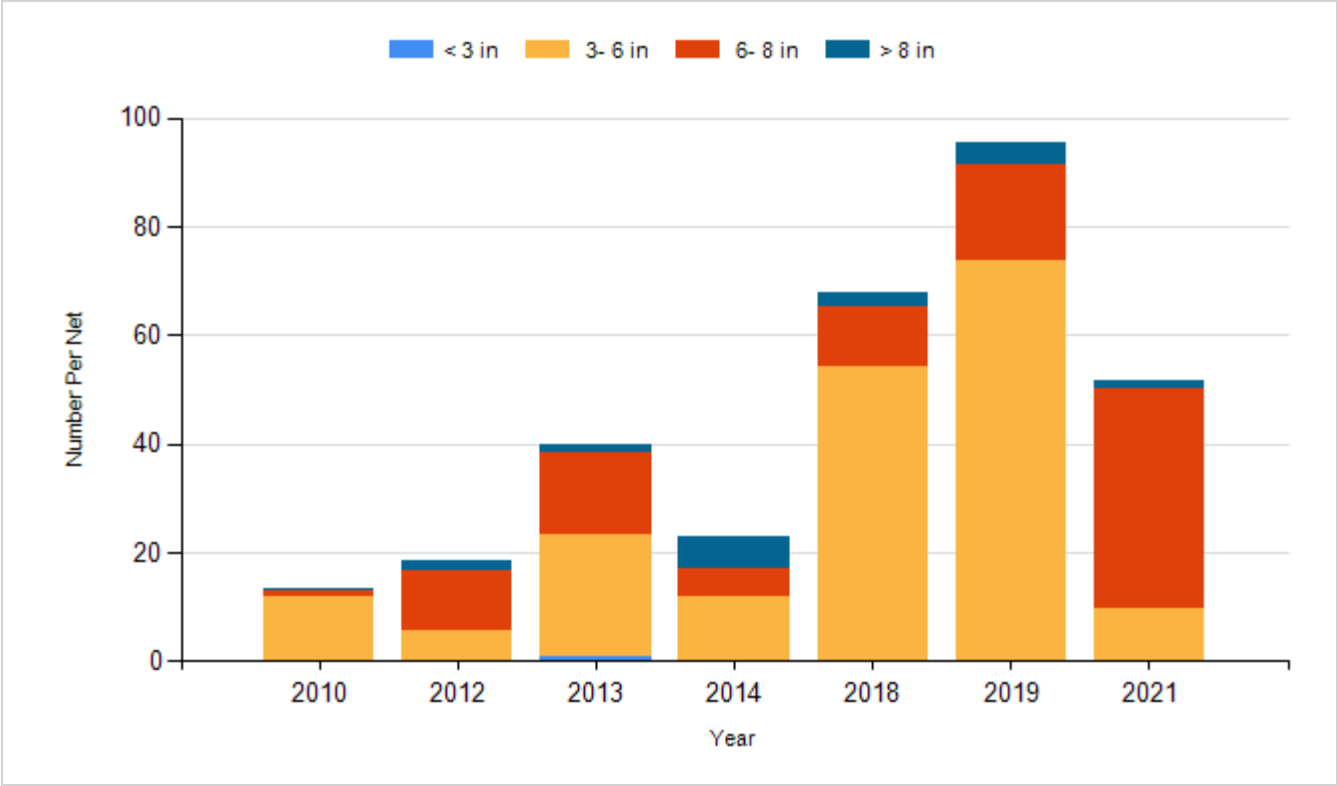
Historic Fish Sizes and Relative Abundance

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

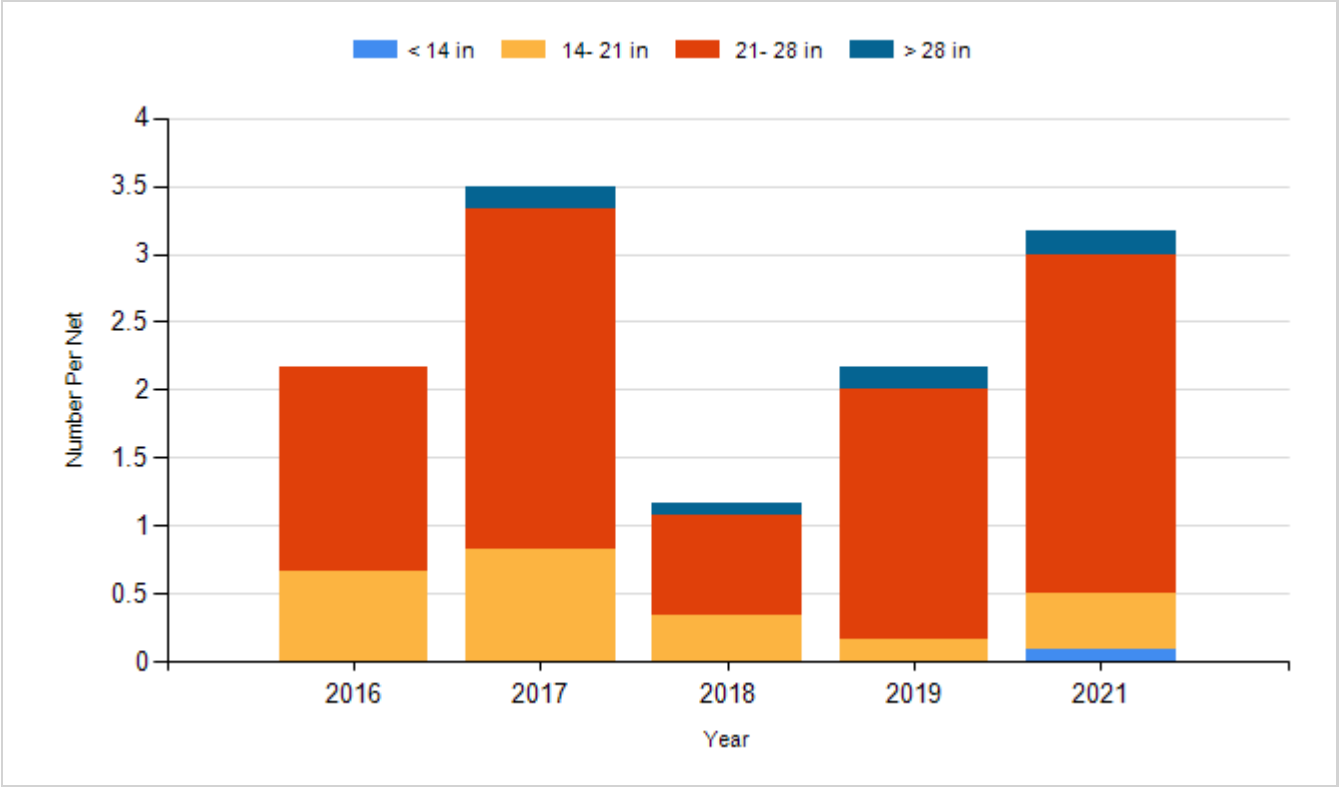
Species: Bluegill
Gear: AFS std frame net



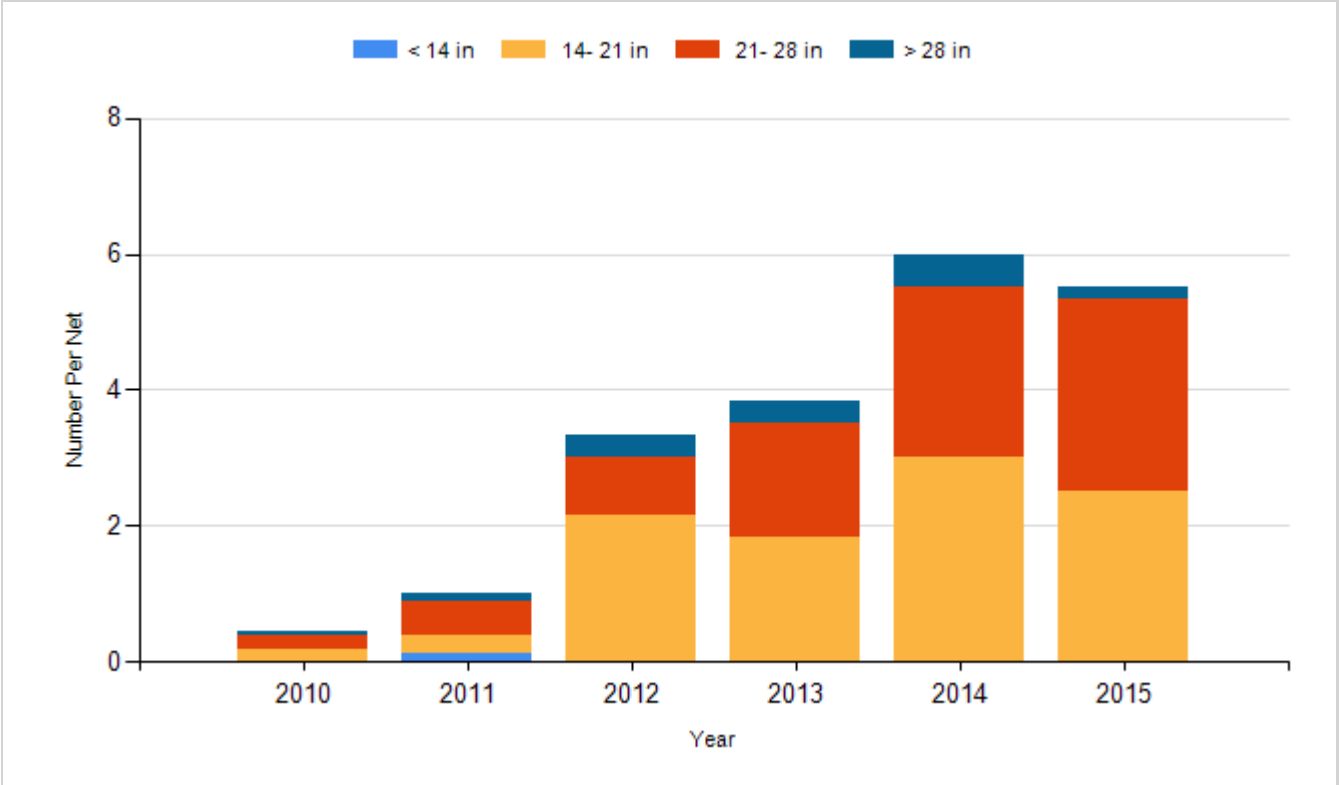
Species: Bluegill
Gear: frame net (std 3/4 in)



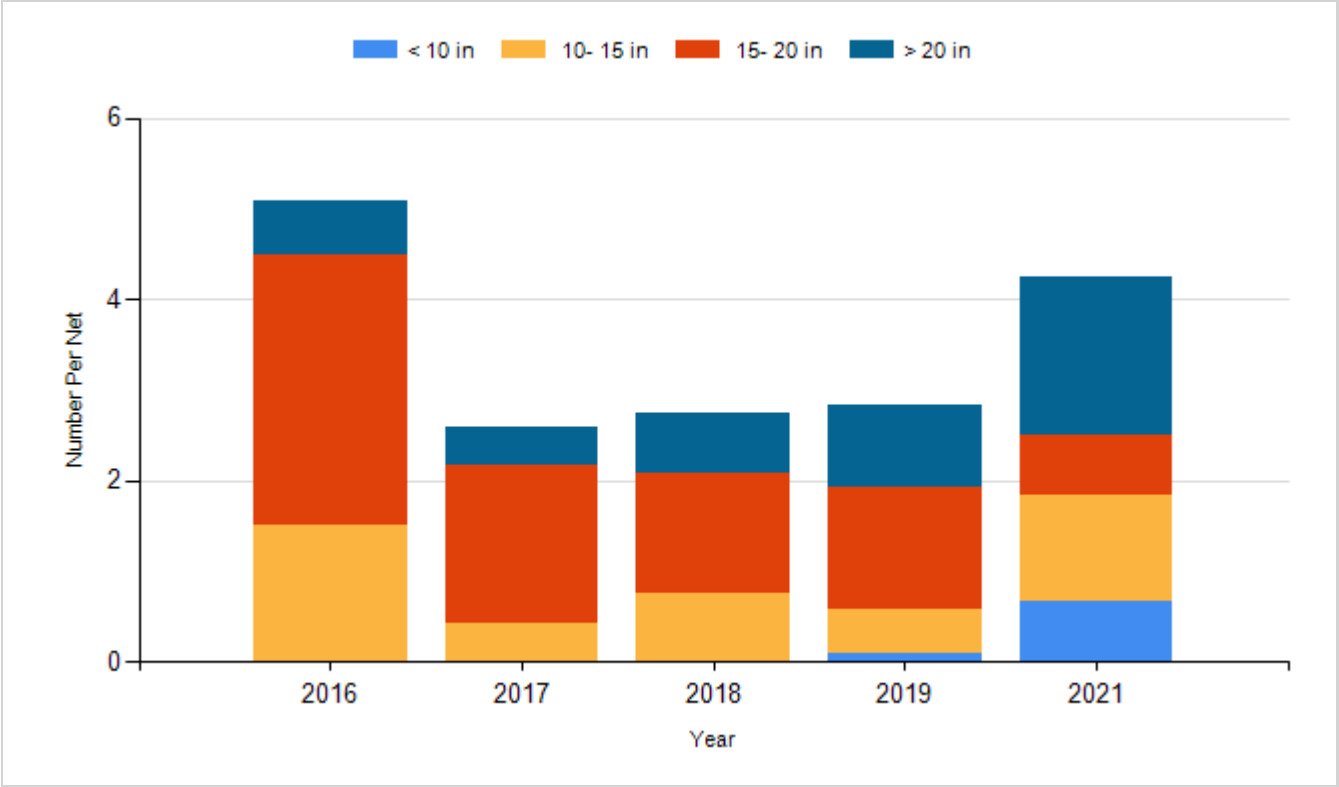
Species: Northern Pike
Gear: AFS std gill net



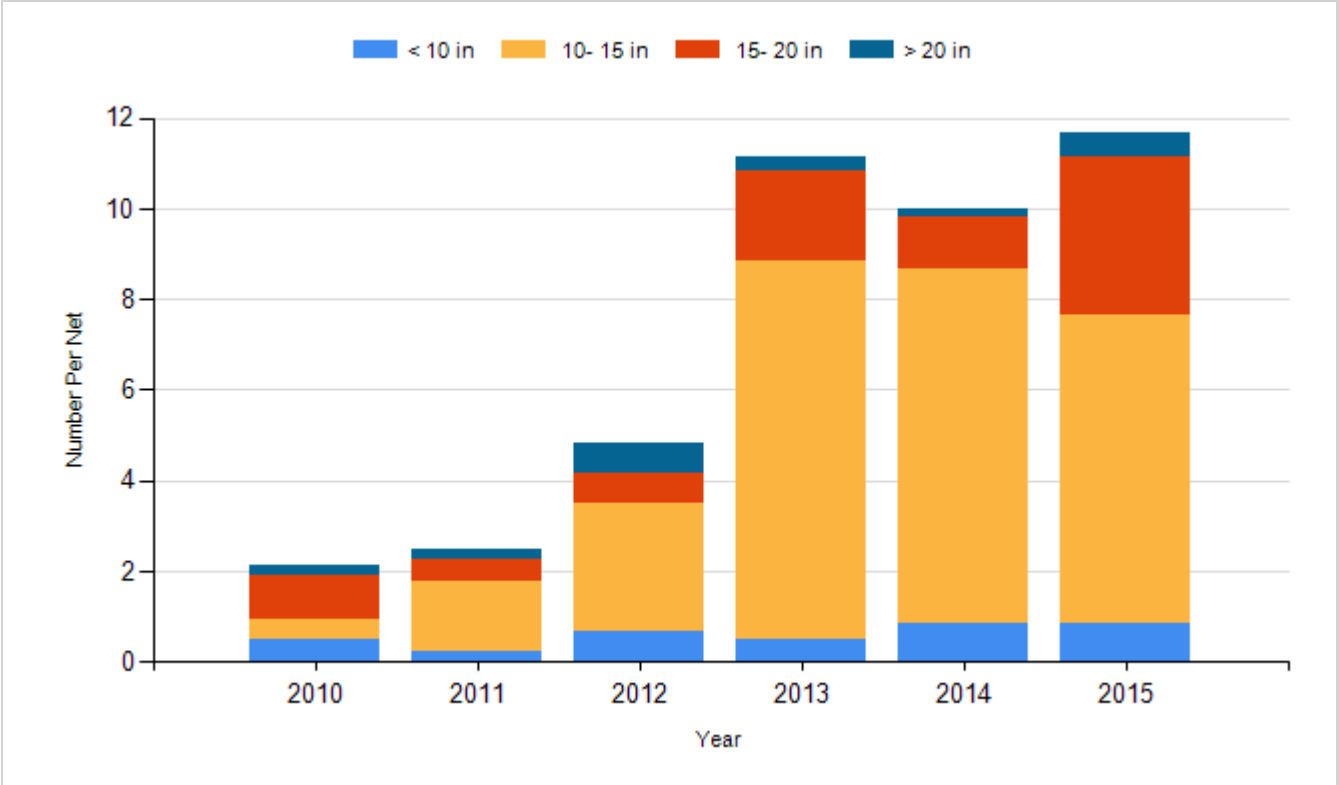
Species: Northern Pike
Gear: std exp gill net



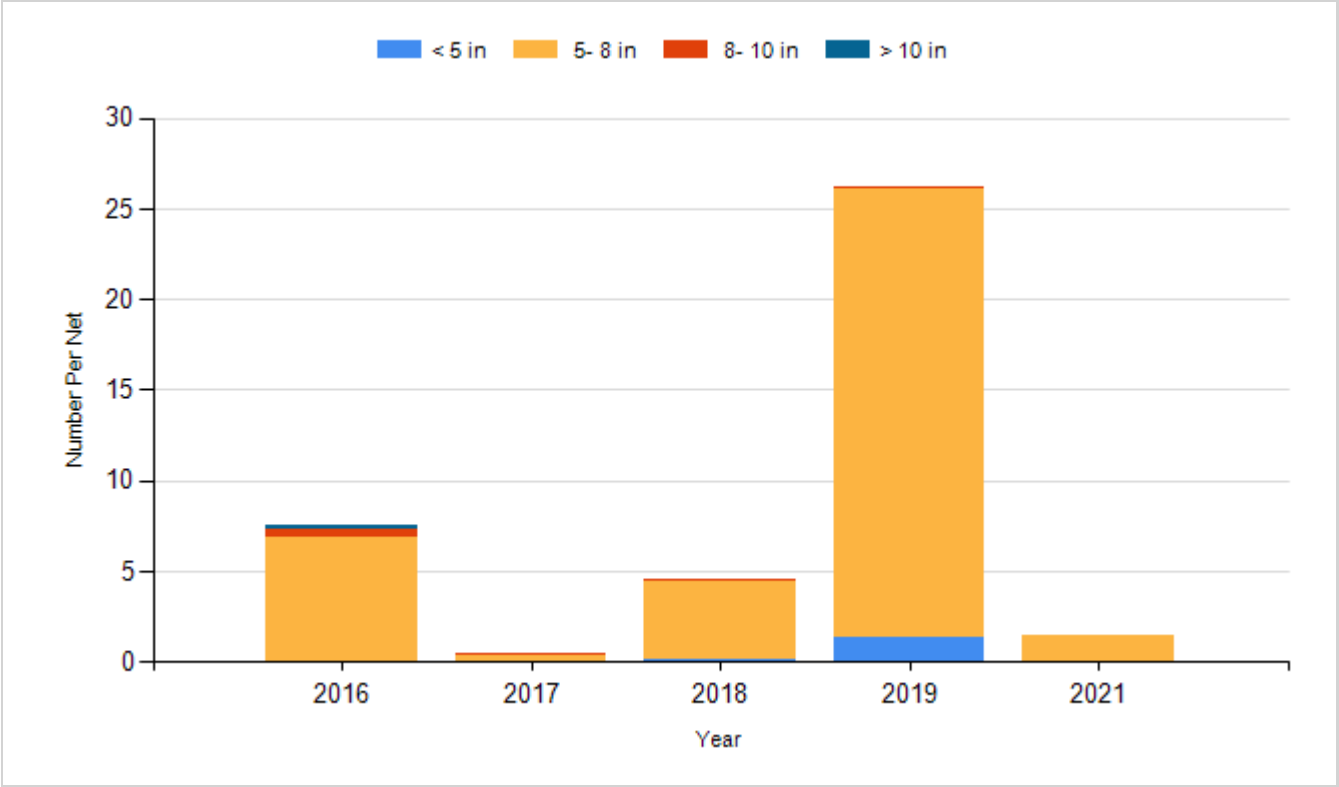
Species: Walleye
Gear: AFS std gill net



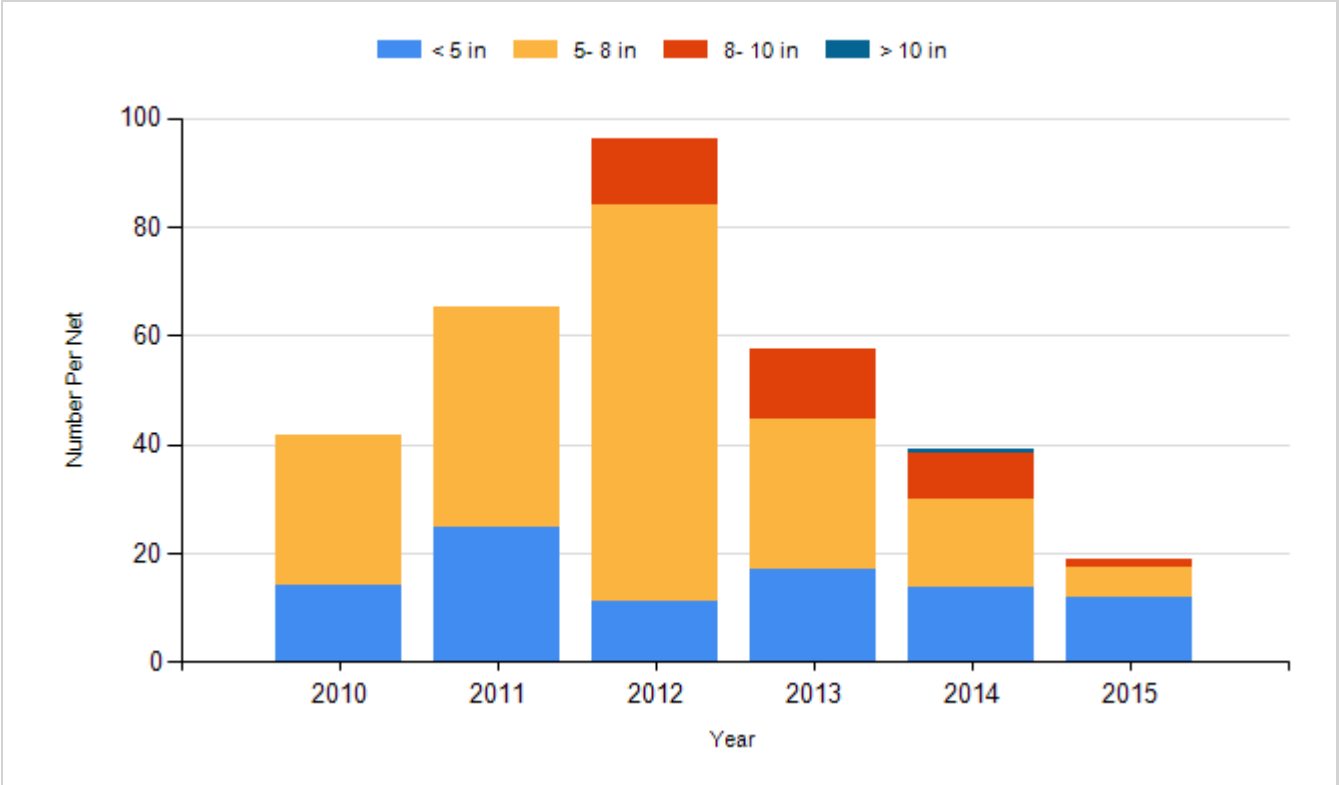
Species: Walleye
Gear: std exp gill net



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
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
2021	Walleye	Juvenile	11,768