Note: Curlyleaf pondweed and zebra mussels are present in Roy Lake. Care should be taken by all user groups to prevent their spread to other waters. For more information regarding this and other aquatic invasive species please visit https://sdleastwanted.sd.gov/

Roy Lake Survey Summary

Roy Lake, located 2.0 miles south and 1.0 miles west 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), northern pike, and walleye; other fish species are present and contribute to the fishery.

- **Black crappie.** Although not abundant (4.8 per frame net), more black crappies were sampled in 2024 than in previous surveys from 2015 – 2021. Sampled black crappies ranged in length from 3.5 to 12.6 inches, of those at least 5.0 inches, 37% were ≥ 8.0 inches and 21% were ≥ 10.0 inches. Individuals from seven consecutive year classes (2017 – 2023) contributed to the catch. Fish from the 2022 (age-2) cohort, which had a mean length of capture of 6.2 inches, were the most abundant accounting for 63% of black crappies in the sample.

- **Bluegill.** More bluegills were sampled by frame nets in 2024 than in 2021. In 2024, the mean frame net CPUE of 23.4 suggested high relative abundance. Sampled bluegills ranged in length from 3.1 to 9.1 inches, of those that were at least 3.0 inches, 56% were ≥ 6.0 inches and 4% were ≥ 8.0 inches. Individuals from eight year classes (2016 – 2023) contributed to the catch. Those from cohorts produced in 2020 (age 4), 2021 (age 3), and 2022 (age 2) were the most numerous accounting for > 90% of bluegills in the sample. Since 2015, mean length at capture at age 4 has ranged from 6.5 to 7.2 inches. In 2024, the mean length at capture of age-4 fish was 7.1 inches.

- **Northern pike.** Northern pike numbers were higher in 2024 than in 2022. At 4.5 per gill net, relative abundance was high. Northern pike from 14.6 to 29.9 inches were netted, 57% were ≥ 21.0 inches and 6% were ≥ 28.0 inches.

- **Walleye.** Walleyes were not abundant (1.7 per gill net) in 2024. Gill net captured walleyes ranged in length from 8.3 to 26.8 inches, of those that were at least 10.0 inches, 47% were ≥ 15.0 inches and 16% were ≥ 20.0 inches. Eight year classes contributed to the catch, most (8 of 9) were represented by 7 or fewer individuals. Those from the naturally produced 2022 (age-2) cohort were the most abundant accounting 53% of the walleyes in the sample. The oldest walleye collected was from the 2011 (age-13) year class. Although sample sizes are low, walleye growth appears to be good with mean length at captures > 16.0 inches at age 4 in surveys conducted since 2015.

- **Yellow perch**. Yellow perch were the most abundant species in the 2024 gill net catch. At 11.8 per gill net, relative abundance was considered moderate for Roy Lake. Sampled yellow perch ranged in length from 4.7 to 9.1 inches, of those at least 5.0 inches, only 2% were ≥ 8.0 inches. The entire sample was comprised of fish from three year classes (2019, 2021, and 2022), most (87%) were from the 2021 (age-3) cohort, which had a mean length at capture of 6.1inches.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Roy, Marshall County
UJA-Lake-866-001
2024

Lake Information

Name:	Roy	**Maximum Depth:**	21 Feet
County:	Marshall	**Mean Depth:**	10 Feet
		OHWM Elevation:	1,796
Surface Area:	2,113 Acres	**Outlet Elevation:**	1,795

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 16, 2024	4 net-nights
AFS std gill net	Jul 17, 2024	4 net-nights
AFS std gill net	Jul 18, 2024	4 net-nights
fall night EF-WAE	Sep 19, 2024	2400 seconds
frame net (std 3/4 in)	Jul 16, 2024	6 net-nights
frame net (std 3/4 in)	Jul 17, 2024	6 net-nights
frame net (std 3/4 in)	Jul 18, 2024	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	17	1.4	0.5	88		82		86	2
	Black Crappie	22	1.8	0.7	43	17	38	17	109	2
	Bluegill	31	2.6	0.9	84		26	12	113	2
	Common Carp	3	0.3	0.2	100		100		85	
	Largemouth Bass	7	0.4	0.3	80		80		120	5
	Northern Pike	54	4.5	1.0	57	10	6		86	1
	Smallmouth Bass	18	1.5	0.9	89		89		99	3
	Walleye	34	2.7	1.2	47	13	16	10	89	1
	White Sucker	20	1.7	0.7	100		80		104	2
	Yellow Perch	143	11.8	2.7	2		0		95	1
frame net (std 3/4 in)	Black Bullhead	176	9.2	3.1	98		88	4	82	1
	Black Crappie	91	4.8	1.6	37	7	21	6	107	1
	Bluegill	421	23.4	5.1	56	3	4	1	108	1
	Common Carp	1	0.1	0.1	100		100		96	
	Largemouth Bass	3	0.0	0.0	0		0			
	Northern Pike	47	2.5	0.5	42	11	2		84	2
	Smallmouth Bass	6	0.3	0.3	67		33		101	2
	Walleye	2	0.1	0.1	50		50		86	
	White Sucker	2	0.1	0.1	100		100		105	8
	Yellow Perch	33	1.8	1.1	3		3		92	2

10-Year Catch Per Unit Effort by Gear and Species

Catch per unit effort (CPUE) and average (Avg) of species across 10 years using different gear types.

***SDGFP standard gill nets used 2015 (Avg excludes 2015); **Methods/Species that ignore stock length; ***AFS standard frame nets used in 2017 (Avg excludes 2017)**

		CPUE										
Gear	Species	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg
AFS std gill net*	Black Bullhead	0.3	1.3	0.9	2.1	0.4		0.5	0.4		1.4	1.00
	Black Crappie	0.2	0.3	0.2	0.8	1.4		1.3	1.5		1.8	1.04
	Bluegill	0.7	0.3	0.3	1.1	0.4		0.8	2.9		2.6	1.20
	Common Carp	0.2	0.0	0.0	0.1	0.4		0.7	0.3		0.3	0.26
	Largemouth Bass	0.0	0.1	0.0	0.1	0.4		0.4	0.6		0.4	0.29
	Northern Pike	6.0	3.2	2.3	1.7	1.0		1.2	3.9		4.5	2.54
	Smallmouth Bass	2.3	2.6	4.2	1.1	1.2		0.5	2.8		1.5	1.99
	Walleye	6.5	2.4	3.4	2.2	3.6		3.7	1.8		2.7	2.83
	White Sucker	5.0	2.8	2.8	1.9	0.7		1.3	2.8		1.7	2.00
	Yellow Perch	23.3	7.4	2.8	4.2	8.3		6.8	7.7		11.8	7.00
boat shocker	Largemouth Bass		44.0				60.0					52.00
boat shocker	Smallmouth Bass		3.0						25.0			14.00
fall night EF-WAE**	Walleye	27.0	87.0	24.5	38.0		37.2	1.5	38.1	4.5	0.0	23.86
frame net (std 3/4 in)***	Black Bullhead	3.0		1.4				6.2			9.2	6.13
	Black Crappie	0.3		0.2				1.1			4.8	2.07
	Bluegill	56.6		22.5				14.2			23.4	31.40
	Common Carp	0.0		0.2				0.0			0.1	0.03
	Green Sunfish	0.2		2.0				0.0			0.0	0.07
	Largemouth Bass	0.0		0.1				0.1			0.0	0.03
	Northern Pike	0.5		0.7				1.6			2.5	1.53
	Smallmouth Bass	0.3		0.0				0.1			0.3	0.23
	Walleye	0.0		0.1				0.0			0.1	0.03
	White Sucker	0.2		0.0				0.1			0.1	0.13
	Yellow Perch	2.0		7.8				6.7			1.8	3.50

10-Year Size Structure and Condition Statistics by Gear and Species

Species proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) collected by different gear types across 10 years. ***SDGFP standard gill nets used 2015; **AFS standard frame nets used in 2017**

			Year									
Gear	Species	Index	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AFS std gill net*	Northern Pike	PSD	81	89	82	65	58		36	64		57
		PSD-P	6	5	4	5	0		14	6		6
		Wr	88	89	89	92	94		88	85		86
	Walleye	PSD	77	76	90	69	65		61	52		47
		PSD-P	8	34	34	38	35		36	14		16
		Wr	90	91	87	94	90		88	90		89
	Yellow Perch	PSD	3	2	0	4	1		4	5		2
		PSD-P	0	1	0	0	0		0	0		0
		Wr	92	97	102	95	96		99	99		95
frame net (std 3/4 in)**	Black Crappie	PSD	33		0				21			37
		PSD-P	33		0				11			21
		Wr	103		113				111			107
	Bluegill	PSD	2		4				24			56
		PSD-P	0		0				3			4
		Wr	113		112				110			108

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+
2024	91	110 (2)	157 (57)	238 (16)	273 (5)	299 (5)	296 (1)	317 (5)			

Species: Bluegill

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2024	411	98 (15)	120 (127)	149 (98)	181 (159)	204 (2)	219 (7)	223 (2)	223 (2)		
2021	259	79 (5)	110 (193)	165 (17)	183 (33)	197 (11)	194 (2)				
2017	1046	72 (643)	110 (379)	153 (17)	164 (7)						
2015	1358	87 (44)	107 (1291)	159 (14)	168 (8)	232 (2)					

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2024	34	210 (1)	329 (18)	442 (2)	465 (1)	466 (7)	477 (1)		627 (1)		653 (3)
2022	24	197 (3)		358 (13)	415 (1)	492 (3)	557 (2)				565 (2)
2021	48	197 (2)	282 (18)	322 (1)	426 (9)	502 (4)		616 (1)	599 (1)	540 (1)	601 (11)
2019	45	182 (1)	293 (15)	412 (11)		487 (5)	559 (2)		549 (7)	575 (2)	538 (2)
2018	28	213 (2)	326 (8)	397 (3)	466 (3)		521 (2)	524 (4)	557 (3)	526 (1)	612 (2)
2017	42	215 (1)		395 (13)	450 (1)		511 (16)	510 (4)	547 (4)		661 (3)
2016	30		285 (6)	371 (2)	455 (1)	476 (9)	486 (4)	597 (2)	626 (1)		637 (5)
2015	42	194 (3)	282 (2)	356 (7)	427 (23)	443 (4)	575 (1)				678 (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+
2024	143		137 (15)	154 (125)		220 (3)					
2022	93		136 (10)	152 (58)	182 (15)	194 (10)					
2021	81		144 (9)	153 (40)	170 (30)	204 (1)					
2019	101		145 (77)	167 (19)	183 (1)	193 (4)					
2018	50		141 (9)	160 (32)	175 (8)	205 (1)					
2017	34		138 (10)	157 (23)	186 (1)						
2016	89		140 (27)	153 (37)	165 (22)	195 (1)	249 (2)				
2015	728	99 (187)	112 (423)	153 (113)	194 (2)	219 (3)					

Fish Condition

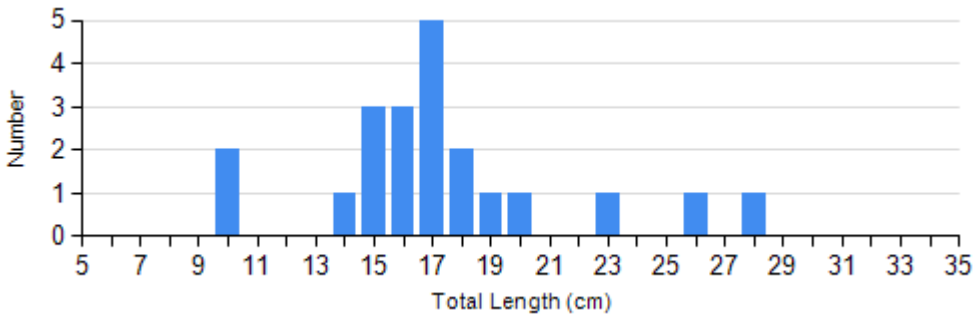
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2021	15	113 (3.0)	2	113 (2.2)	2	102 (3.0)	0	
	2024	54	109 (1.1)	14	106 (1.6)	11	102 (1.7)	7	96 (2.0)
Bluegill Frame Net	2021	195	109 (0.9)	54	112 (1.2)	7	110 (2.0)	0	
	2024	187	109 (1.0)	216	108 (0.6)	18	106 (1.5)	0	
Northern Pike Gill Net	2021	9	87 (1.4)	3	92 (3.3)	2	88 (0.3)	0	
	2022	17	88 (1.4)	27	83 (1.2)	2	87 (5.0)	1	92
	2024	23	87 (1.0)	28	85 (1.5)	3	88 (6.0)	0	
Walleye Gill Net	2021	17	90 (1.1)	11	85 (1.7)	13	88 (2.2)	3	89 (6.6)
	2022	10	87 (1.4)	8	93 (1.6)	3	91 (2.6)	0	
	2024	17	87 (1.2)	10	89 (1.5)	3	92 (4.3)	2	99 (5.2)
Yellow Perch Gill Net	2021	78	99 (1.0)	3	95 (2.7)	0		0	
	2022	87	99 (0.8)	5	90 (2.0)	0		0	
	2024	139	96 (0.6)	3	83 (3.6)	0		0	

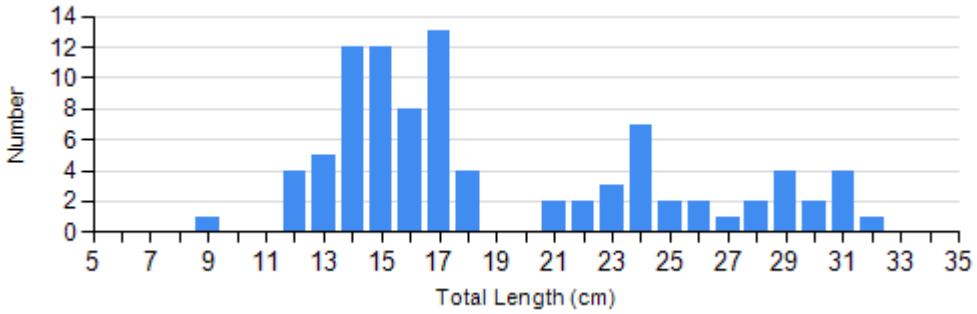
Length Frequency Distribution

Length frequency histogram of species sampled by year.

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

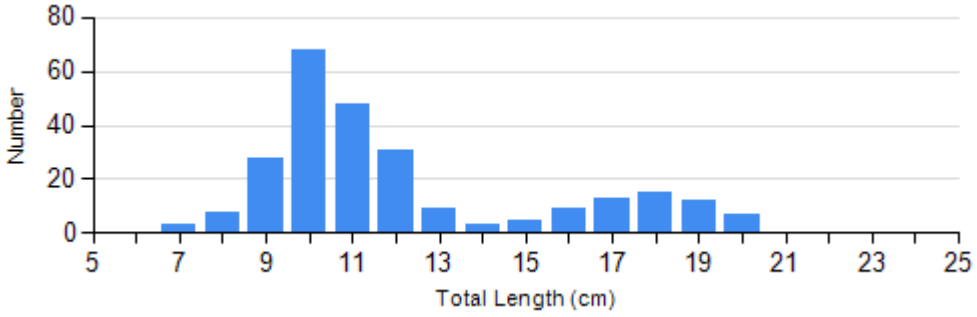


2021

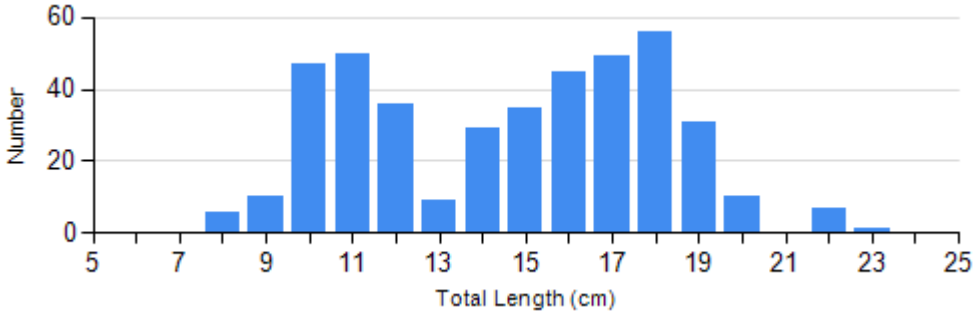


2024

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

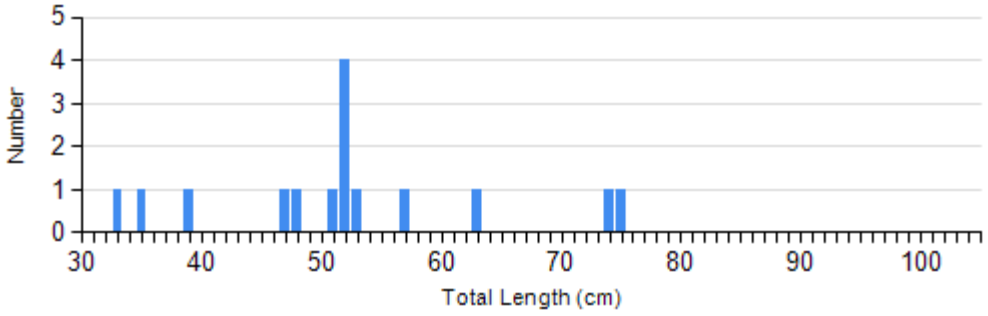


2021

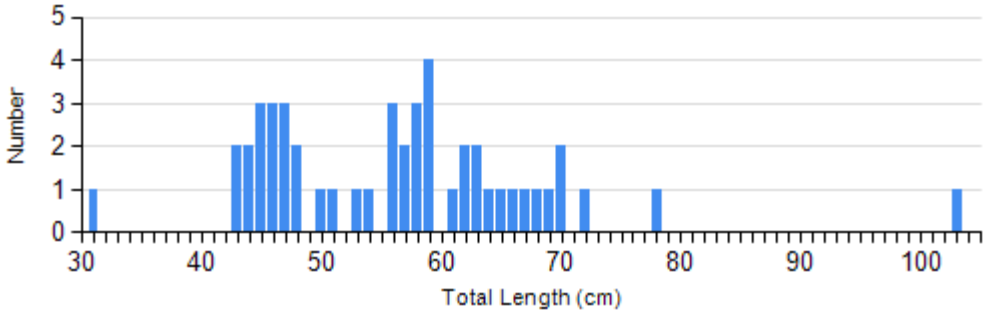


2024

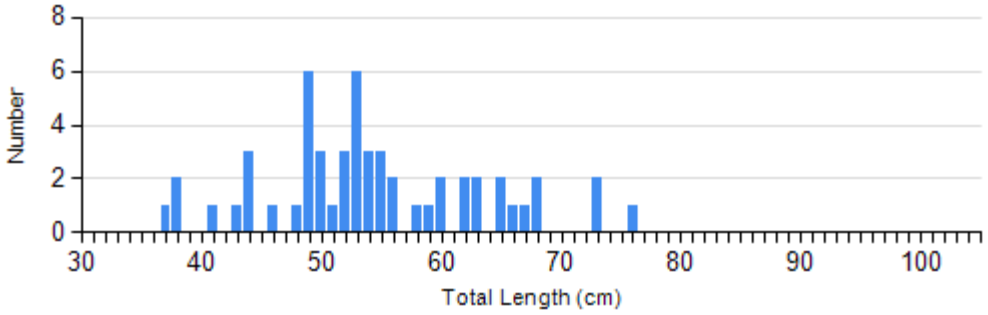
Species: Northern Pike
Gear: AFS std gill net



2021

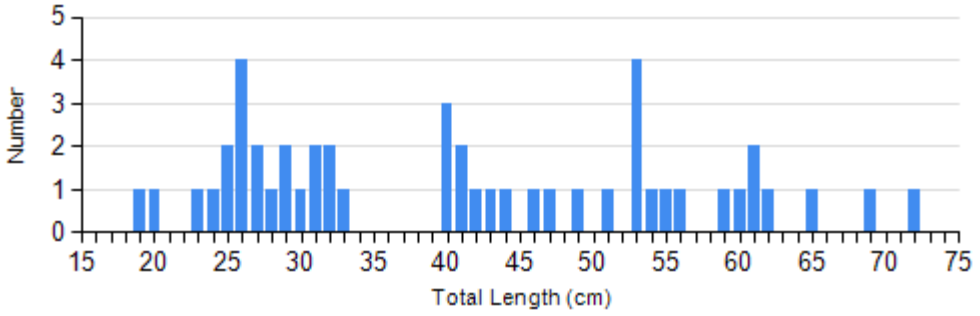


2022

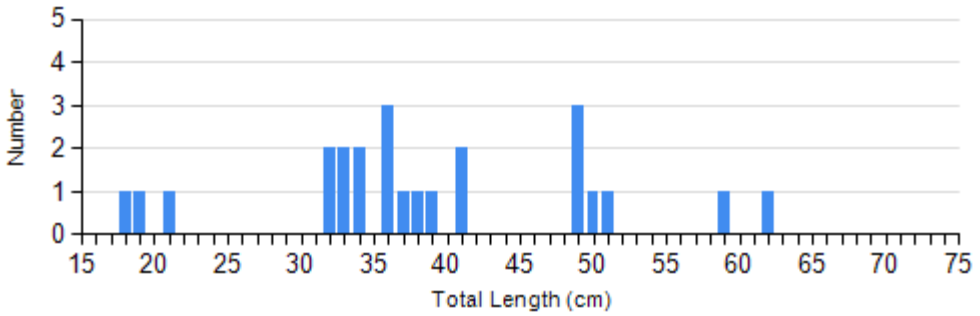


2024

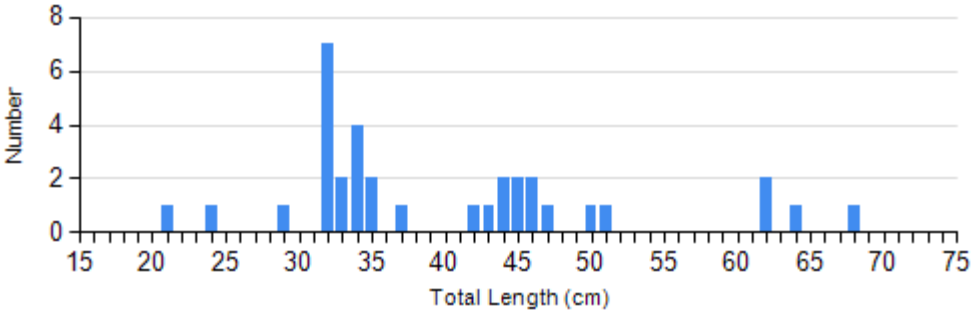
Species: Walleye
Gear: AFS std gill net



2021

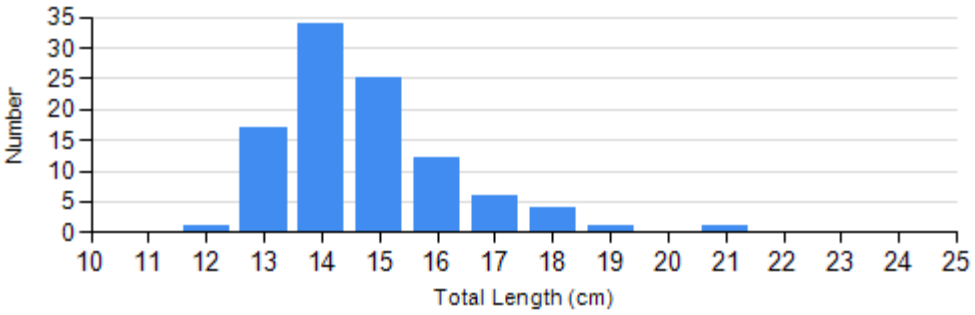


2022

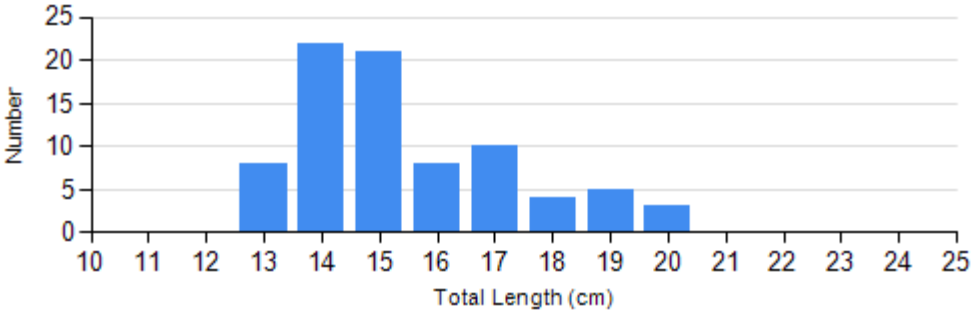


2024

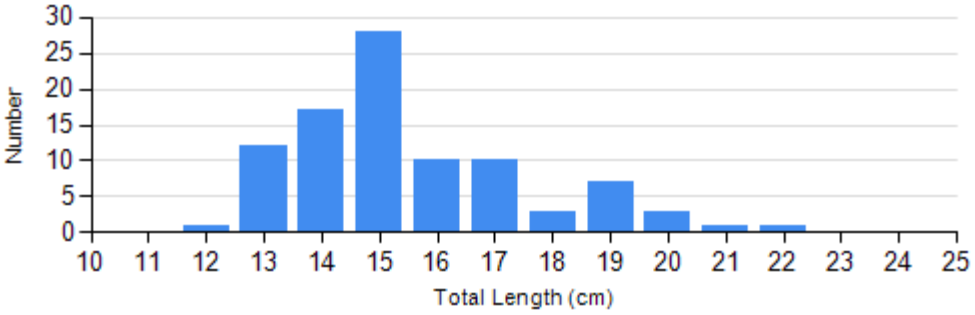
Species: Yellow Perch
Gear: AFS std gill net



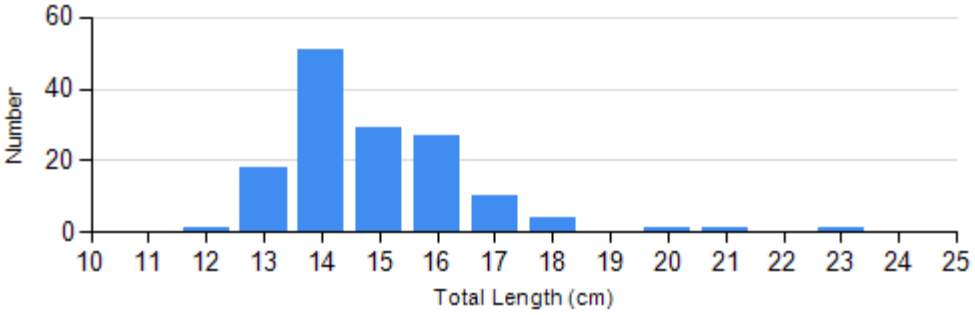
2019



2021



2022

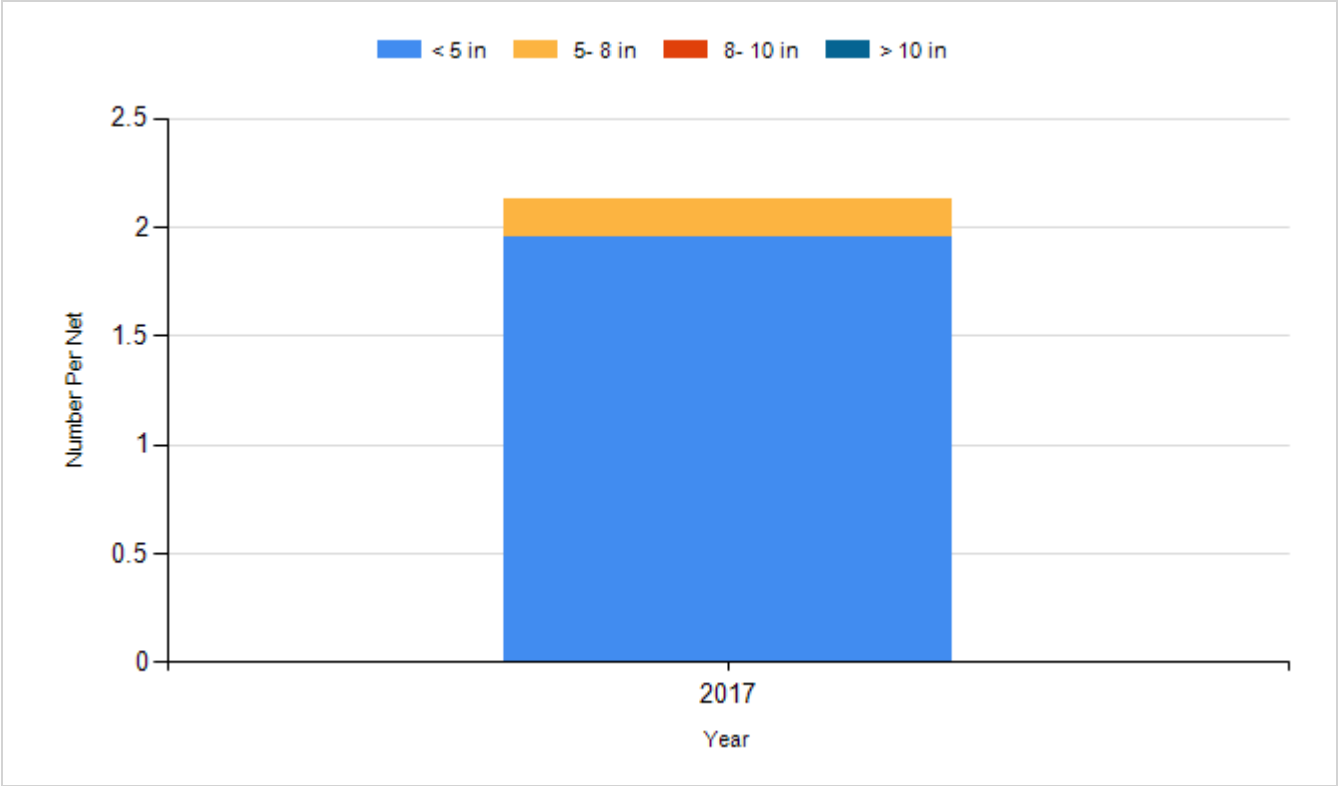


2024

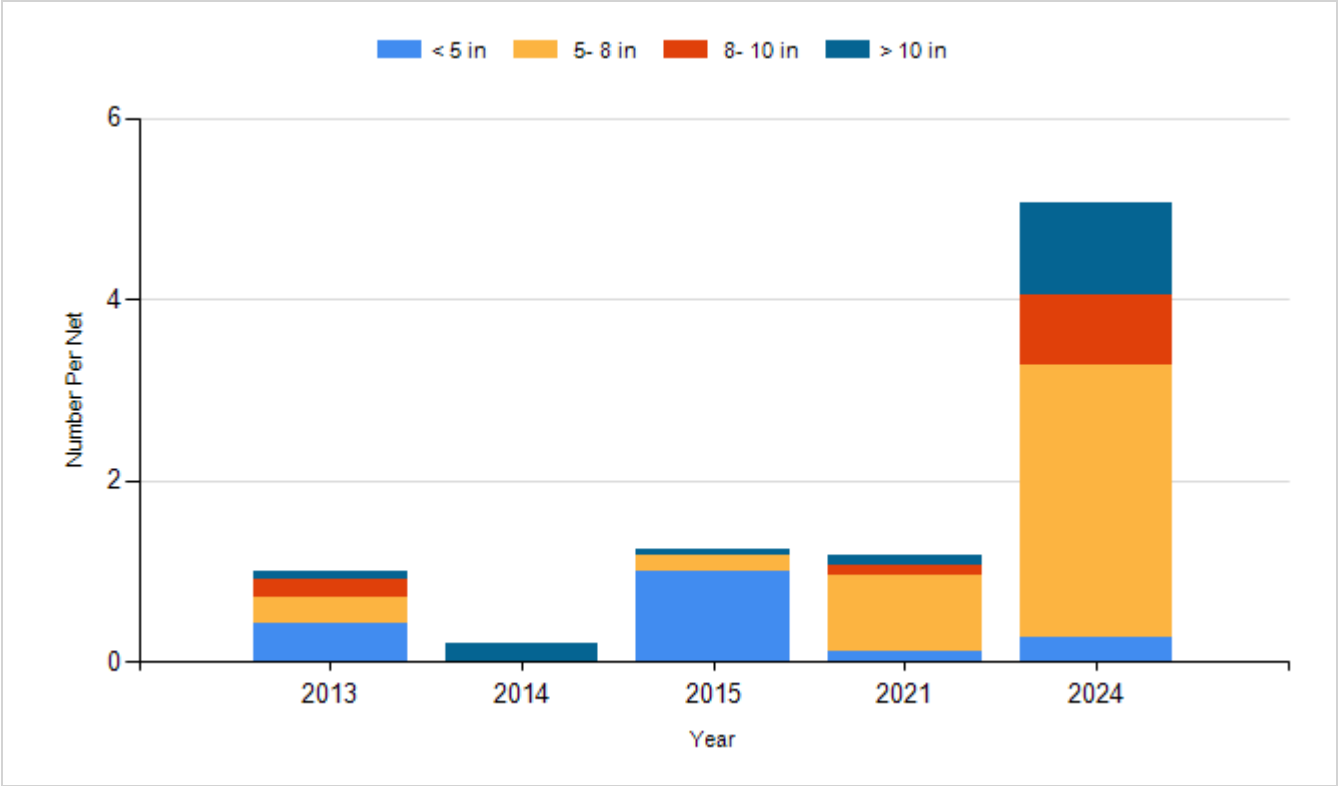
Historic Fish Sizes and Relative Abundance

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

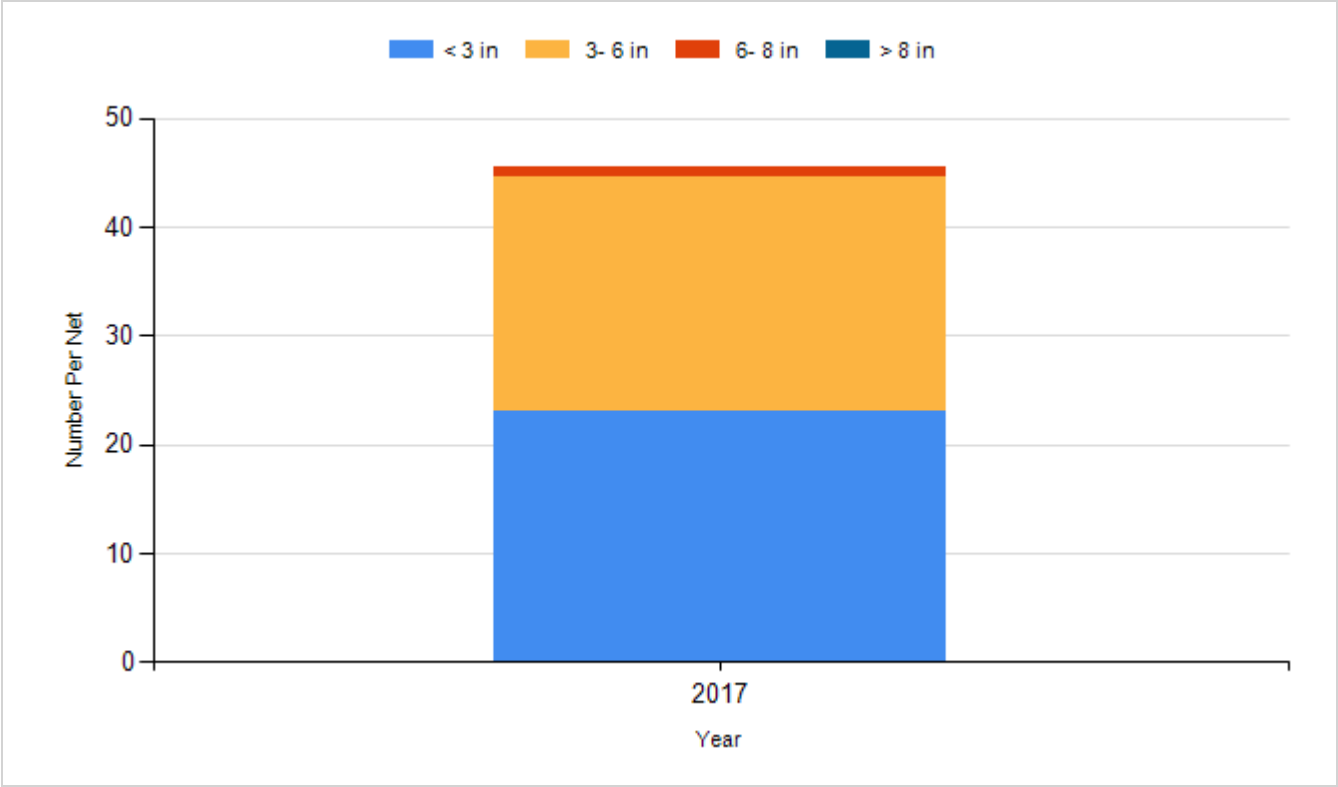
Species: Black Crappie
Gear: AFS std frame net



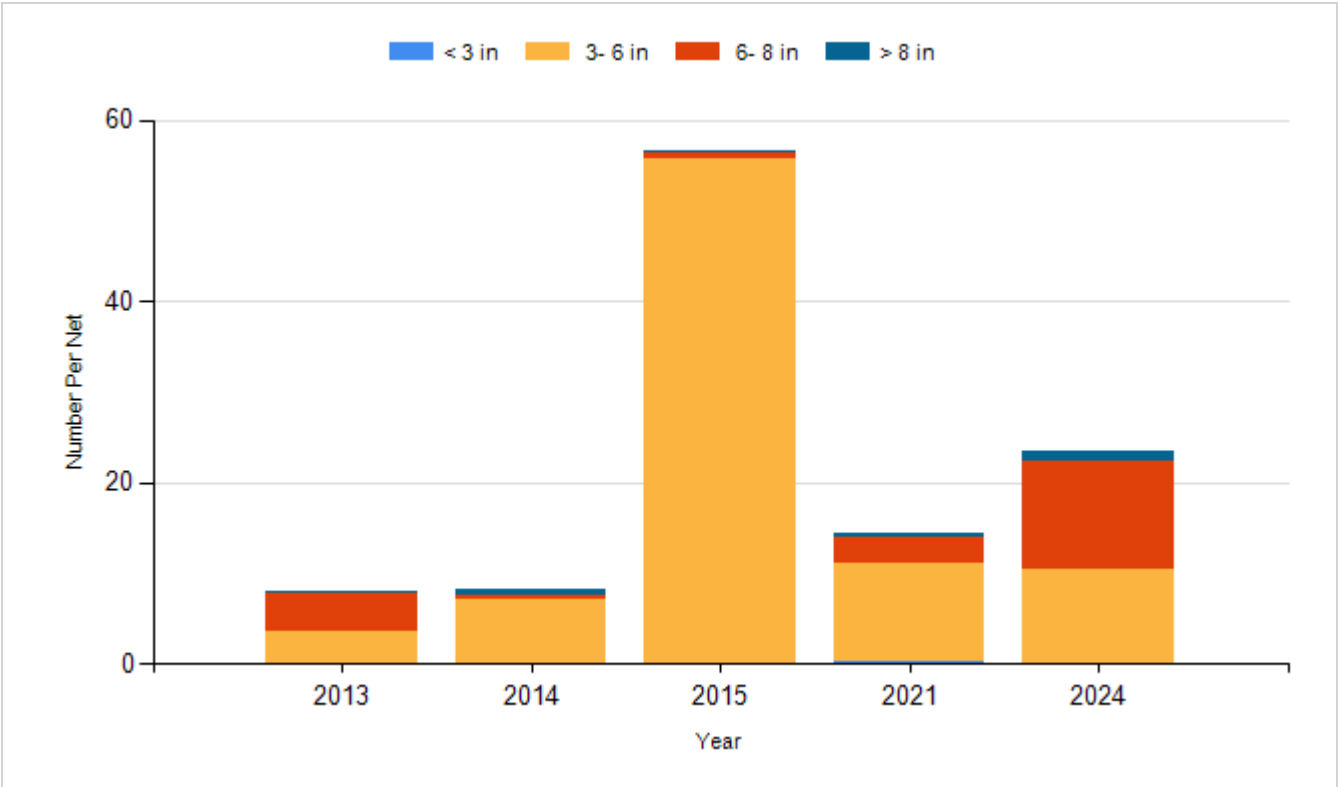
Species: Black Crappie
Gear: frame net (std 3/4 in)



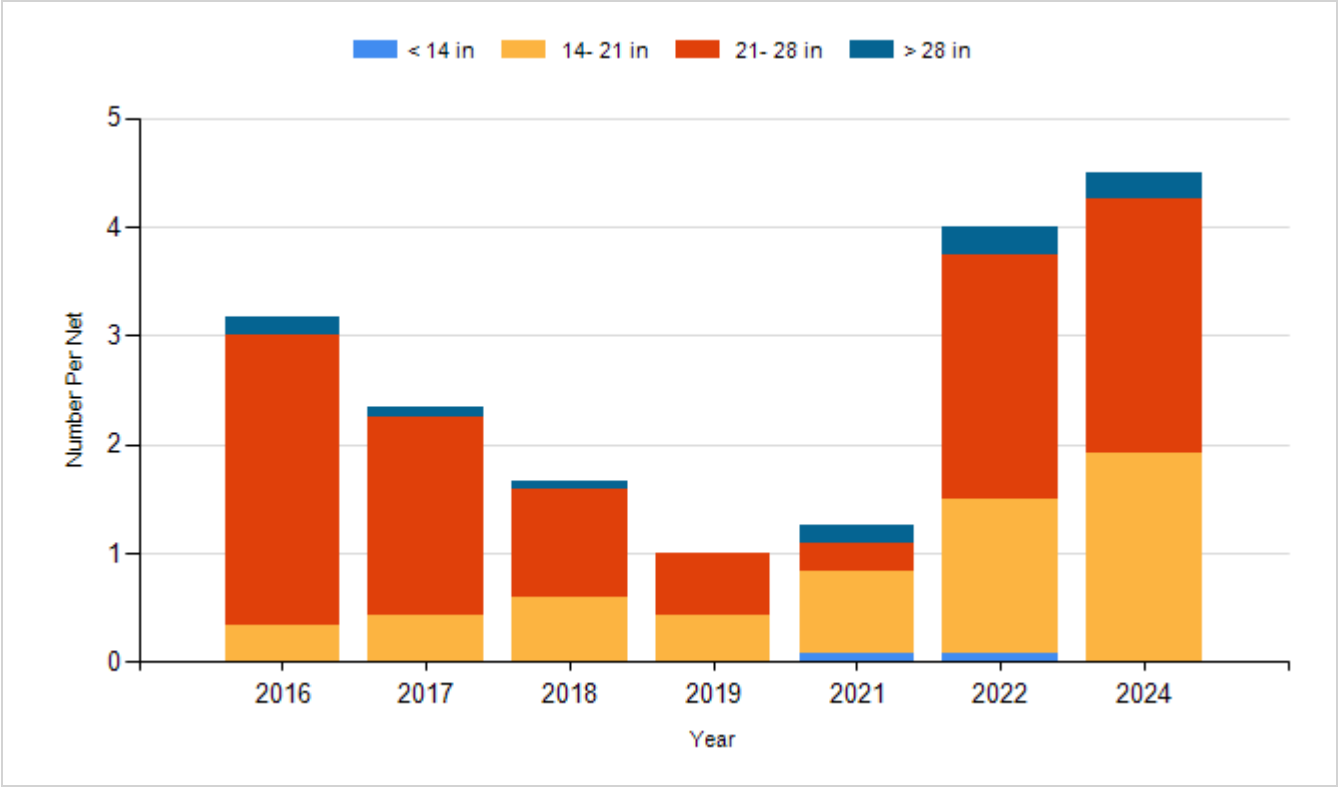
Species: Bluegill
Gear: AFS std frame net



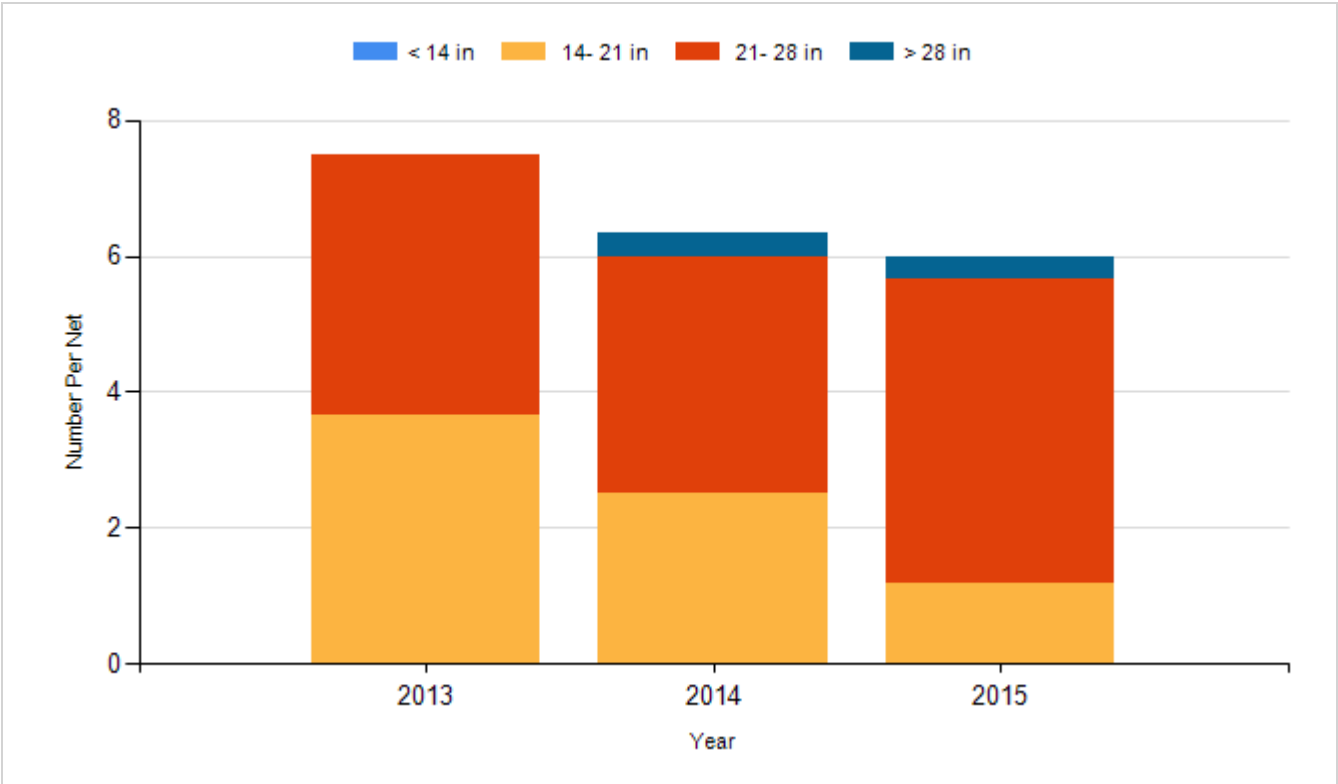
Species: Bluegill
Gear: frame net (std 3/4 in)



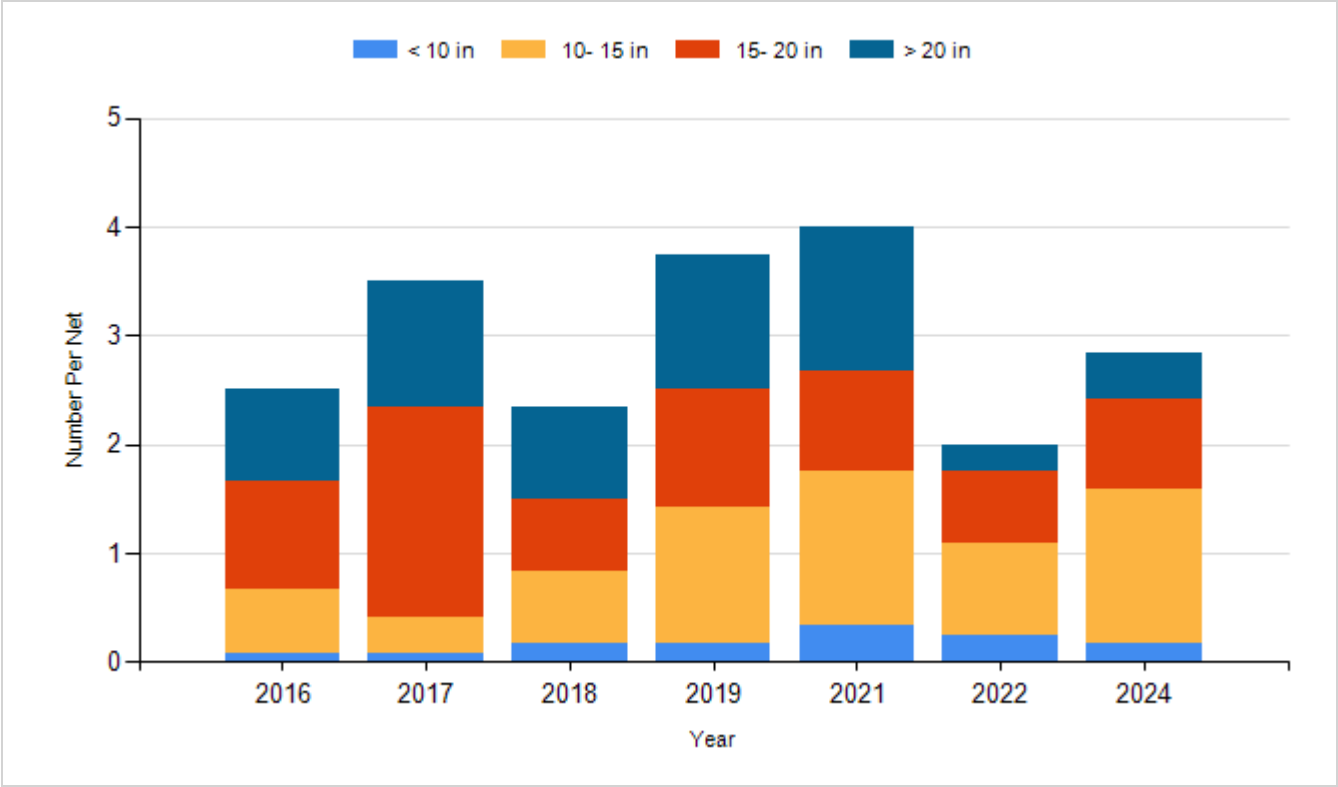
Species: Northern Pike
Gear: AFS std gill net



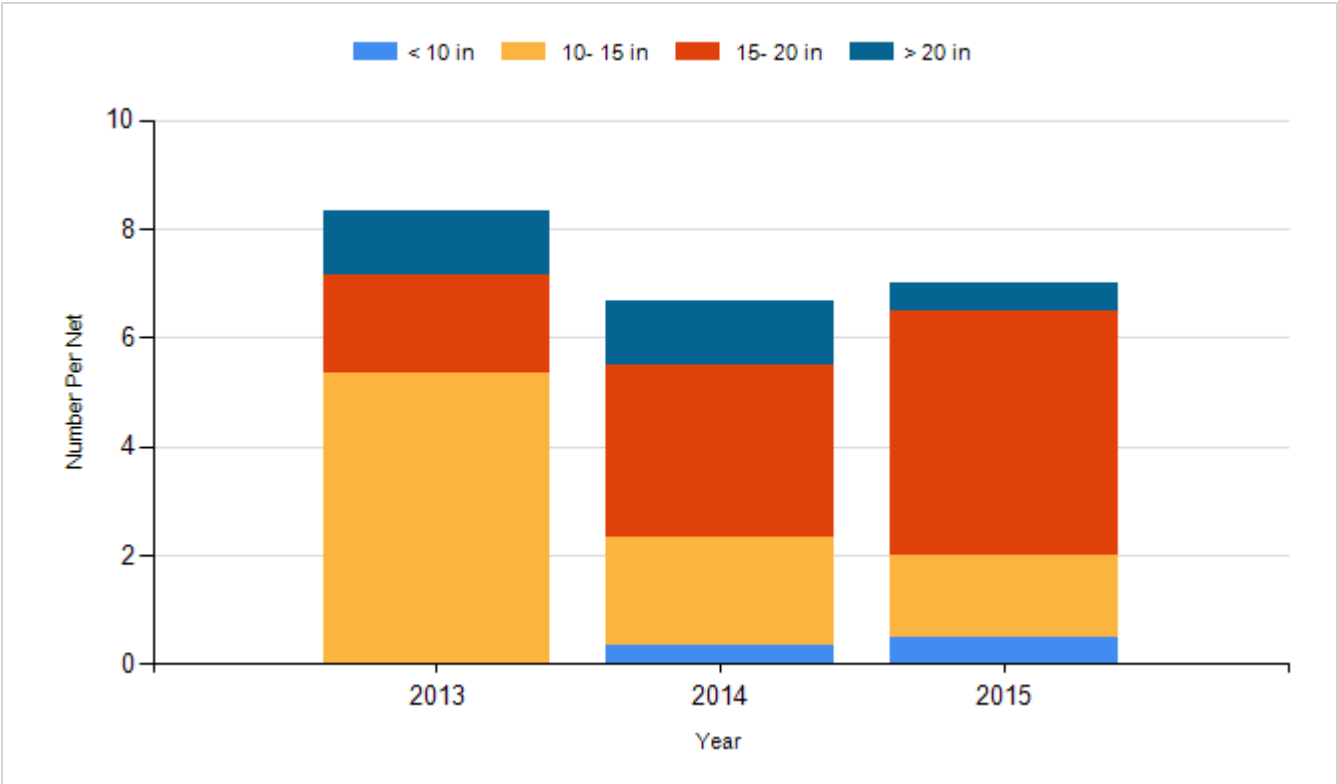
Species: Northern Pike
Gear: std exp gill net



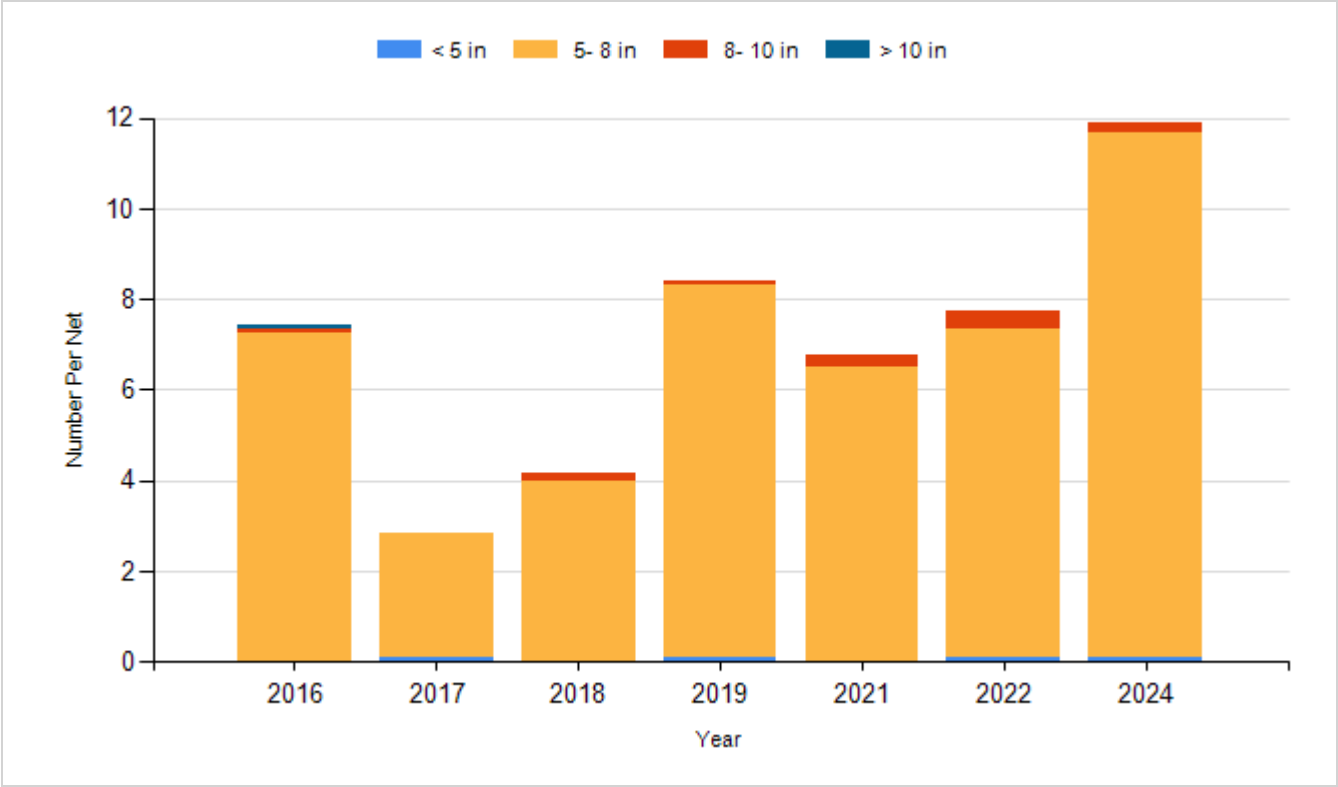
Species: Walleye
Gear: AFS std gill net



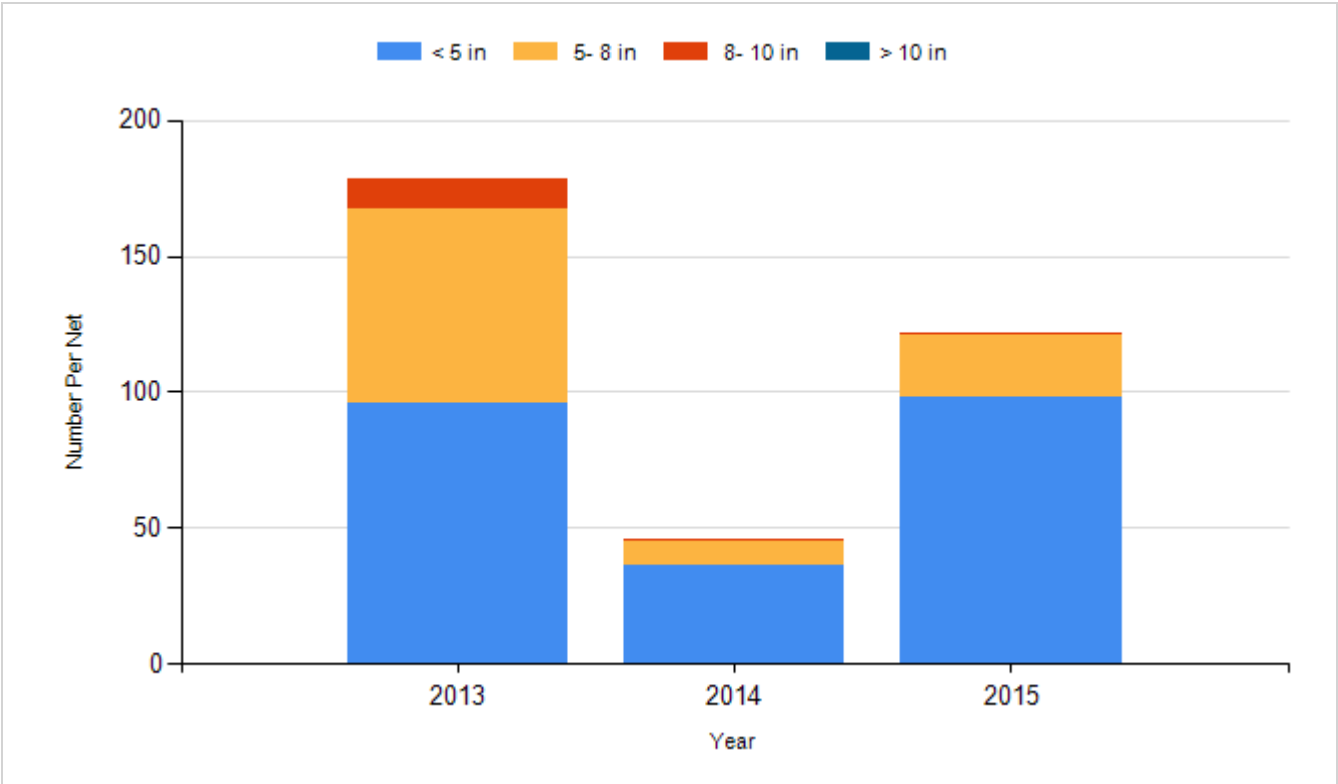
Species: Walleye
Gear: std exp gill net



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
2013	Walleye	Fry	850,000
2016	Walleye	Fry	1,000,000
2018	Walleye	Fry	1,030,000
2019	Walleye	Fry	1,030,000
2023	Walleye	Fry	1,030,000
2024	Walleye	Juvenile	147,200