Lake Sinai Survey Summary

Lake Sinai, located 1 mile west and 1 ½ miles north of Sinai, SD, is managed as a walleye, yellow perch, and muskellunge fishery; other fish species (e.g., black crappie, bluegill, northern pike, smallmouth bass, white bass) provide additional angling opportunities.

- **Walleye**. Walleye abundance in 2024 increased slightly for a second year in a row to a catch rate of 1.9 fish per gill net but is still well below the 2017-2020 net catches. Netted fish ranged from 7.5 to 28.0 inches long with 84% measuring >15 inches and 22% measuring >25 inches in length. Walleyes from six different years were represented, but none of these year classes were dominant in spite of frequent stockings of hatchery-reared walleye fry and fingerlings. The lake received a double stocking of both fry and fingerlings in 2024; however, some fall sampling suggested that success of even that large stocking is limited. Survival of stocked walleye and natural reproduction were excellent immediately after the flooding in the early 1990s, however, that initial pulse of productivity that comes with inundating dry ground and terrestrial vegetation appears to have diminished substantially in the past 30 years. This change is evident in many similar waters across eastern South Dakota, but the recent downturn in the Sinai walleye population seems unusual for a lake of that size and quality. However, it is typical for walleye and other gamefish populations to rebound strongly after a trough in abundance.

- **Yellow Perch**. Gill netting efforts produced a catch rate of 2.2 yellow perch per net in 2024. Relative abundance was higher than the previous two years (0.3 fish per net in both 2022 and 2023) and close to the long term mean (2.3 fish per net). Sampled fish ranged from 4.7 to 8.7 inches in length with approximately 31% measuring greater than 8 inches. A mean relative weight score of 102 indicates the yellow perch population is in good condition.

- **Muskellunge.** Fisheries staff began stocking muskellunge into Lake Sinai in 2011 to provide additional angling opportunity. Periodic stocking occurs every few years in order to maintain the current population. This year's sampling efforts produced one muskellunge measuring 38.2 inches long. Musky catches are quite rare in standard sampling gears (only 5 sampled in the past decade).

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Sinai, Brookings County
MBS-Lake-232-000
2024

Lake Information

Name: Sinai

County: Brookings

Legal Description: T109N- R52W-Sec 3-4, 8-10

Surface Area: 1,778 Acres

Maximum Depth: 33 Feet

Mean Depth: 17 Feet

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 09, 2024	12 net-nights
AFS std gill net	Jul 10, 2024	12 net-nights
frame net (std 3/4 in)	Jul 09, 2024	5 net-nights
frame net (std 3/4 in)	Jul 10, 2024	5 net-nights

Common Fish Species Present

Muskellunge

Walleye

White Bass

Smallmouth Bass

Yellow Perch

Northern Pike

Common Carp

Yellow Bullhead

Black Crappie

Bluegill

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	Common Carp	20	0.8	0.2	100		100			
	Northern Pike	1	0.0	0.1	100		100		84	
	Smallmouth Bass	9	0.3	0.3	38		13		92	5
	Walleye	53	1.9	0.4	84	9	44	11	79	1
	White Bass	53	2.2	0.9	98		42	10	82	1
	Yellow Perch	54	2.2	0.5	31	10	0		102	2
frame net (std 3/4 in)	Black Crappie	4	0.4	0.3	100		100		97	8
	Bluegill	3	0.3	0.2	100		67		130	8
	Channel Catfish	1	0.1	0.1	100		100		87	
	Common Carp	4	0.4	0.3	100		100			
	Muskellunge	1	0.1	0.1	100		100		70	
	Northern Pike	12	1.2	0.5	100		0		81	3
	Smallmouth Bass	46	4.1	2.1	56	12	46	12	89	3
	Walleye	9	0.9	0.4	78		67		71	3
	White Bass	44	4.4	2.3	100		93		76	1
	Yellow Bullhead	6	0.6	0.4	100		100			
	Yellow Perch	2	0.2	0.3	100		0		103	23

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**

		CPUE										
Gear	Species	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg
AFS std frame net	Black Bullhead			1.7								1.70
	Black Crappie			1.9								1.90
	Common Carp			0.7								0.70
	Smallmouth Bass			1.9								1.90
	Walleye			0.9								0.90
	White Bass			2.0								2.00
	Yellow Bullhead			0.7								0.70
AFS std gill net	Black Bullhead			0.7	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.11
	Black Crappie			0.8	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.13
	Channel Catfish			0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.01
	Common Carp			0.3	0.6	0.2	0.6	0.5	0.0	0.5	0.8	0.44
	Muskellunge			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
	Northern Pike			0.2	0.0	0.3	0.1	0.1	0.4	0.1	0.0	0.15
	Smallmouth Bass			0.7	1.8	0.3	0.7	0.2	0.1	0.3	0.3	0.55
	Walleye			4.7	4.2	2.8	2.9	1.6	1.1	1.5	1.9	2.59
	White Bass			1.0	0.9	1.2	0.8	3.2	0.7	1.3	2.2	1.41
	White Sucker			0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.04
	Yellow Bullhead			0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.03
	Yellow Perch			2.5	5.3	1.8	3.0	3.0	0.3	0.3	2.2	2.30
fall night EF-WAE*	Walleye	79.0										79.00
frame net (std 3/4 in)	Black Bullhead	44.4	6.6		2.5	1.4	0.2	0.7	0.3	0.2	0.0	6.26
	Black Crappie	11.5	6.7		3.9	0.9	0.9	0.3	0.6	0.6	0.4	2.87
	Bluegill	2.6	0.4		0.2	0.0	0.0	0.2	1.6	0.9	0.3	0.69
	Channel Catfish	0.0	0.0		0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.02
	Common Carp	0.2	0.4		0.6	0.8	0.2	0.5	1.0	0.1	0.4	0.47
	Green Sunfish	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
	Muskellunge	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.03
	Northern Pike	0.3	0.8		0.7	0.1	0.5	0.8	0.6	0.6	1.2	0.62
	Smallmouth Bass	2.7	6.1		4.4	4.6	2.4	7.2	2.5	1.5	4.1	3.94
	Sunfish Hybrid	0.1	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.01
	Walleye	1.6	1.2		4.3	2.2	1.4	0.8	1.0	0.9	0.9	1.59
	White Bass	0.0	1.1		10.3	3.7	11.0	6.6	6.9	3.1	4.4	5.23
	Yellow Bullhead	1.1	1.4		1.4	1.1	2.0	0.1	1.1	0.5	0.6	1.03

		CPUE										
Gear	Species	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Avg
frame net (std 3/4 in)	Yellow Perch	1.8	0.0		0.1	0.1	0.2	0.0	0.0	0.0	0.2	0.27
std exp gill net	Black Bullhead	40.0	12.4									26.20
	Black Crappie	2.0	3.6									2.80
	Bluegill	0.0	0.0									0.00
	Common Carp	0.0	0.4									0.20
	Northern Pike	1.0	0.6									0.80
	Smallmouth Bass	1.7	2.0									1.85
	Walleye	18.0	7.8									12.90
	White Sucker	0.0	0.0									0.00
	Yellow Perch	24.3	12.8									18.55

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.

			Year									
Gear	Species	Index	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AFS std frame net	Black Crappie	PSD			100							
		PSD-P			95							
		Wr			91							
	Common Carp	PSD			100							
		PSD-P			86							
	Smallmouth Bass	PSD			95							
		PSD-P			37							
		Wr			89							
	Walleye	PSD			56							
		PSD-P			56							
		Wr			84							
	White Bass	PSD			100							
		PSD-P			85							
		Wr			92							
	Yellow Bullhead	PSD			100							
		PSD-P			100							
AFS std gill net	Black Crappie	PSD			88	100		0	100			
		PSD-P			88	0		0	100			
		Wr			95	110			87			
	Common Carp	PSD			100	100	100	100	100		100	100
		PSD-P			100	86	50	100	60		100	100
	Muskellunge	PSD									0	
		PSD-P									0	
		Wr									85	
	Northern Pike	PSD			100		100	100	100	75	100	100
		PSD-P			100		67	0	0	0	0	100
		Wr			91		96	85	82	81	88	84
	Smallmouth Bass	PSD			71	57	67	75	0	0	38	38
		PSD-P			71	48	67	38	0	0	0	13
		Wr			91	102	86	87	89	103	83	92
	Walleye	PSD			70	34	52	26	38	55	89	84
		PSD-P			28	18	30	9	6	18	26	44
		Wr			84	87	78	81	80	79	82	79

			Year									
Gear	Species	Index	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
AFS std gill net	White Bass	PSD			90	100	100	78	81	43	73	98
		PSD-P			50	82	93	78	53	43	67	42
		Wr			95	95	89	87	86	84	80	82
	Yellow Bullhead	PSD					100	100				
		PSD-P					100	100				
	Yellow Perch	PSD			64	51	86	61	97	67	0	31
		PSD-P			24	11	41	31	33	0	0	0
		Wr			98	111	107	97	104	96	95	102
frame net (std 3/4 in)	Black Crappie	PSD	20	92		97	89	100	67	100	100	100
		PSD-P	14	47		85	44	56	33	80	83	100
		Wr	104	94		97	101	90	103	88	126	97
	Bluegill	PSD	12	100		0			100	62	67	100
		PSD-P	8	0		0			50	8	33	67
		Wr	118	109		130			130	119	127	130
	Common Carp	PSD	100	100		100	100	100	80	100	100	100
		PSD-P	50	100		50	100	100	40	88	100	100
	Muskellunge	PSD								0	50	100
		PSD-P								0	0	100
		Wr									85	70
	Northern Pike	PSD	100	100		100	100	20	25	80	100	100
		PSD-P	67	14		57	0	20	13	40	17	0
		Wr	83	83		86	79	85	77	97	79	81
	Smallmouth Bass	PSD	15	38		68	72	75	67	85	73	56
		PSD-P	11	24		52	37	54	33	40	40	46
		Wr	94	90		93	90	86	84	81	89	89
	Walleye	PSD	100	73		65	41	43	63	75	89	78
		PSD-P	31	27		40	27	36	25	75	56	67
		Wr	84	74		86	85	76	80	74	82	71
	White Bass	PSD		80		100	100	95	98	98	90	100
		PSD-P		80		93	97	92	48	95	90	93
		Wr		91		98	87	87	82	78	76	76
	Yellow Bullhead	PSD	100	100		100	100	100	100	100	100	100
		PSD-P	18	85		100	91	100	100	100	100	100
	Yellow Perch	PSD	39			100	100	50		0		100
		PSD-P	0			0	0	50		0		0
		Wr	92			80	99	95				103

			Year									
Gear	Species	Index	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
std exp gill net	Black Crappie	PSD	17	78								
		PSD-P	0	0								
		Wr	113	96								
	Common Carp	PSD		100								
		PSD-P		100								
	Northern Pike	PSD	100	100								
		PSD-P	33	33								
		Wr	85	83								
	Smallmouth Bass	PSD	40	50								
		PSD-P	40	30								
		Wr	90	86								
	Walleye	PSD	83	46								
		PSD-P	13	26								
		Wr	85	81								
	Yellow Perch	PSD	11	77								
		PSD-P	0	8								
		Wr	99	98								

Length at Capture

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

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2024	32		241 (9)				480 (3)	469 (5)	528 (4)	536 (7)	691 (4)
2023	34	194 (1)	313 (3)		409 (9)	476 (2)	433 (6)	455 (4)			604 (10)
2022	11			318 (2)	380 (3)	367 (3)			426 (1)		685 (2)
2021	16		278 (6)	336 (3)	383 (3)	395 (1)	421 (2)				672 (1)
2020	36	204 (1)	302 (8)	329 (7)	365 (10)	385 (5)	575 (1)			565 (2)	536 (2)
2019	32		282 (5)	335 (10)	374 (3)	435 (2)		446 (1)	478 (1)	617 (6)	676 (4)
2018	50	210 (2)	297 (22)	356 (11)	416 (4)			533 (4)	553 (6)		714 (1)
2017	52	231 (5)	346 (14)	420 (11)	444 (2)		491 (3)	518 (12)		689 (2)	623 (3)
2016	61	204 (22)	298 (18)	367 (4)		506 (6)	520 (10)			637 (1)	
2015	55	209 (1)	340 (10)		469 (10)	470 (29)			541 (4)		593 (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+
2021	30			227 (16)	253 (4)	265 (8)	244 (2)		304 (1)		
2015	75	103 (2)	179 (73)								

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).

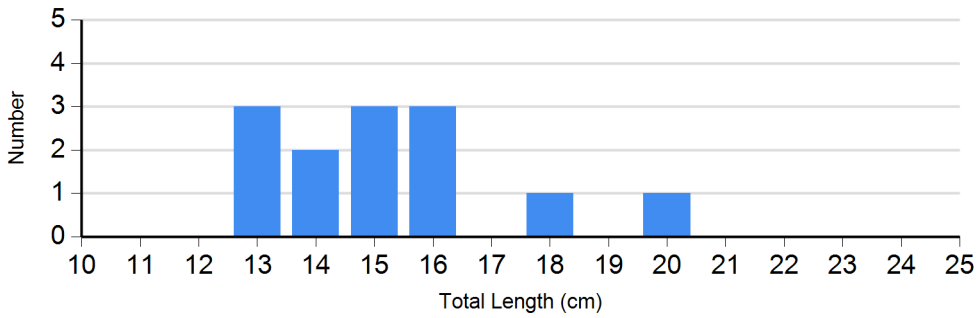
		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2020	0		4	99 (2.7)	2	87 (3.6)	3	80 (2.2)
	2021	1	108	1	102	1	98	0	
	2022	0		1	85	4	89 (4.3)	0	
	2023	0		1	307	2	90 (2.8)	3	91 (3.2)
	2024	0		0		3	102 (4.6)	1	82
Bluegill Frame Net	2021	0		1	148	1	112	0	
	2022	5	120 (6.3)	7	118 (4.6)	1	118	0	
	2023	3	123 (5.8)	3	133 (9.6)	3	125 (7.2)	0	
	2024	0		1	125	2	133 (9.0)	0	
Muskellunge Frame Net	2022	0		0		0		0	
	2023	1	81	1	89	0		0	
	2024	0		0		1	70	0	
Northern Pike Gill Net	2020	0		1	85	0		0	
	2021	0		1	82	0		0	
	2022	1	75	3	83 (3.2)	0		0	
	2023	0		2	88 (6.8)	0		0	
	2024	0		0		1	84	0	
Walleye Gill Net	2020	26	80 (0.9)	6	83 (2.9)	1	100	2	84 (5.9)
	2021	10	81 (1.0)	5	79 (2.4)	0		1	80
	2022	5	82 (1.6)	4	78 (0.9)	0		2	75 (6.1)
	2023	4	78 (2.0)	22	84 (1.4)	3	83 (2.3)	6	79 (1.9)
	2024	7	82 (3.3)	18	81 (1.5)	10	78 (2.0)	10	72 (1.4)
White Bass Gill Net	2020	2	86	0		6	87 (3.6)	1	88
	2021	6	89 (2.0)	9	89 (1.1)	15	83 (1.1)	2	81 (2.0)

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
White Bass Gill Net	2022	4	87 (1.3)	0		2	85 (5.3)	1	75
	2023	8	79 (2.8)	2	78 (1.8)	18	81 (0.9)	2	80
	2024	1	90	30	83 (1.2)	20	80 (1.0)	2	71 (1.7)
Yellow Perch Gill Net	2020	14	96 (0.9)	11	100 (2.6)	11	96 (2.5)	0	
	2021	1	114	19	104 (1.8)	9	104 (2.3)	1	92
	2022	1	100	2	93 (7.7)	0		0	
	2023	8	95 (4.5)	0		0		0	
	2024	36	104 (1.6)	16	97 (1.9)	0		0	

Length Frequency Distribution

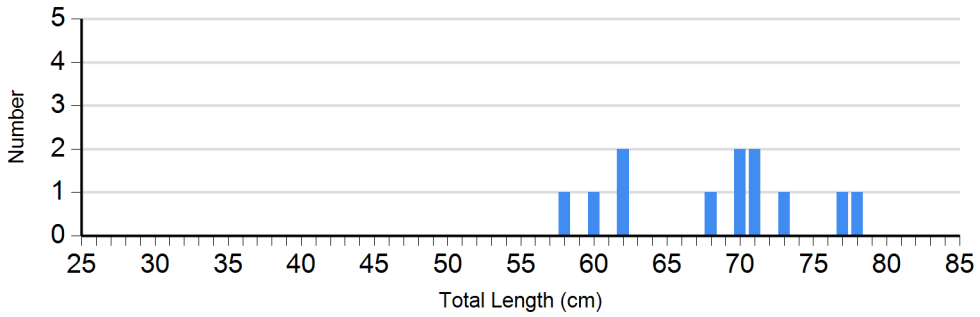
Length frequency histogram of species sampled by year.

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

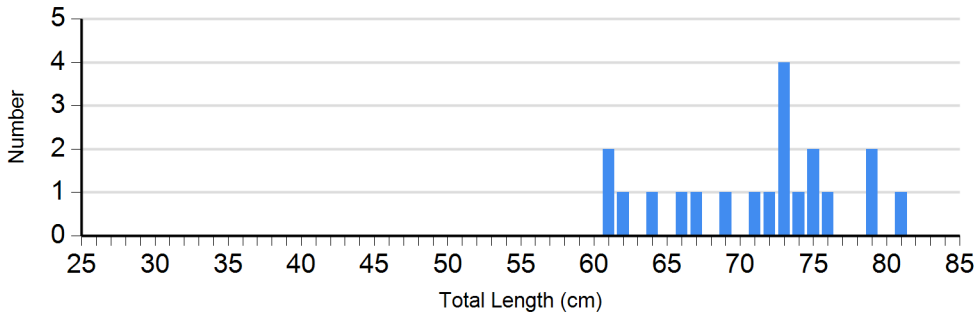


2022

Species: Common Carp
Gear: AFS std gill net

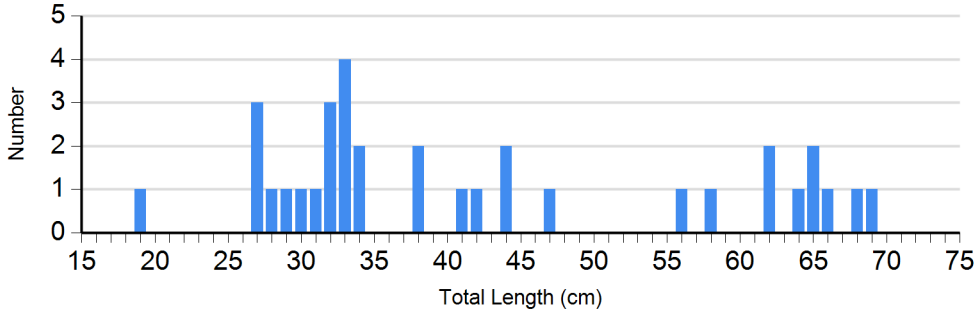


2023

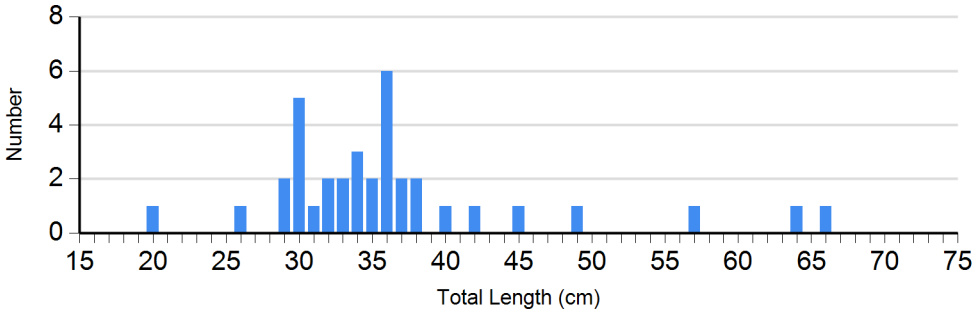


2024

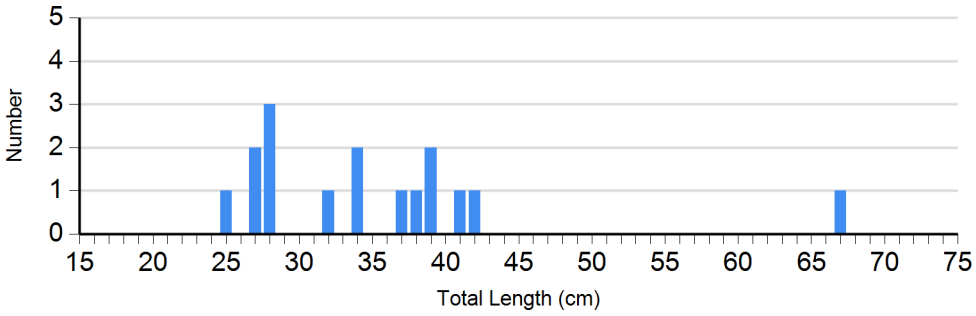
Species: Walleye
Gear: AFS std gill net



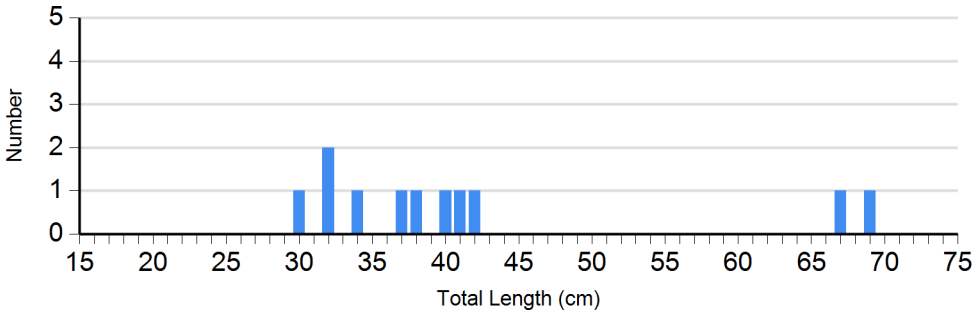
2019



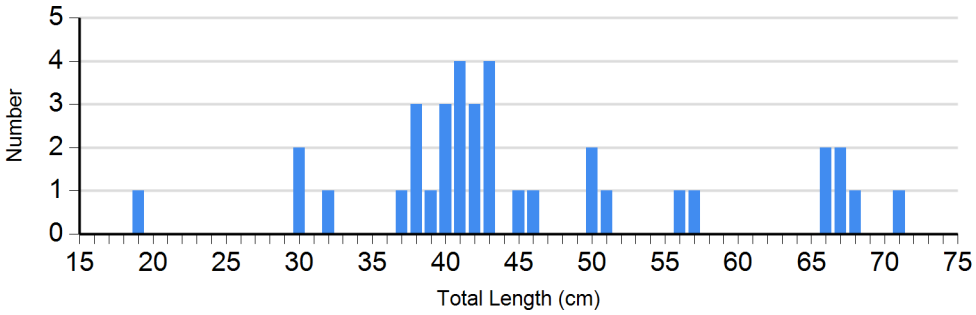
2020



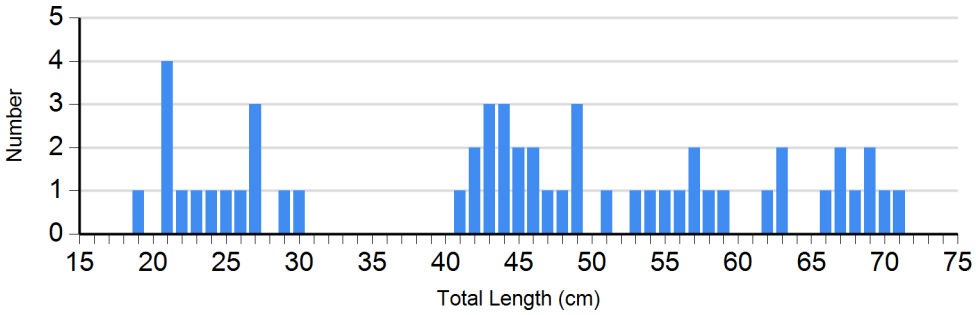
2021



2022

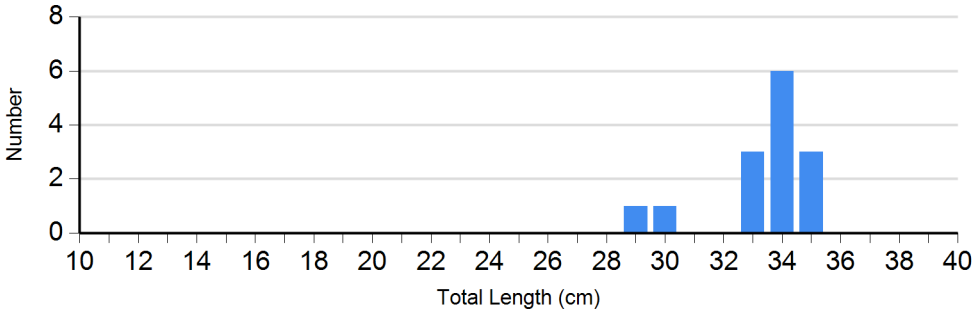


2023

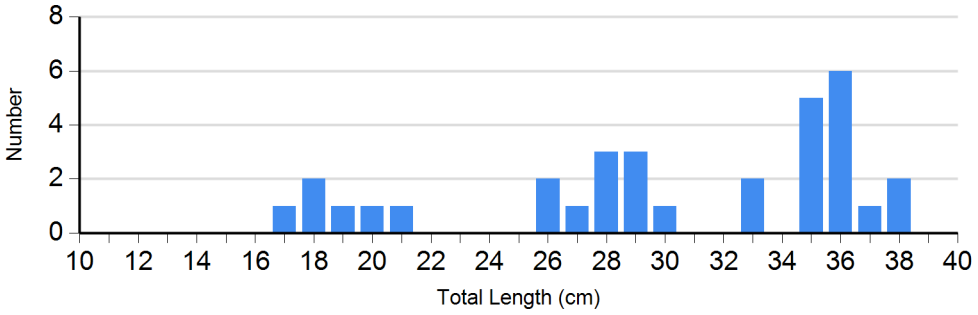


2024

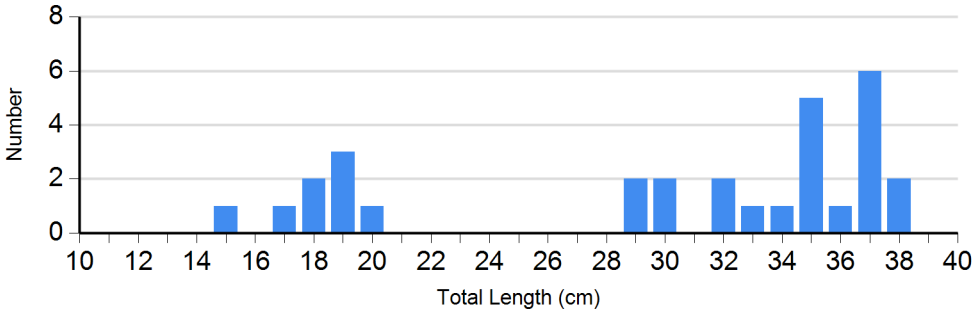
Species: White Bass
Gear: AFS std gill net



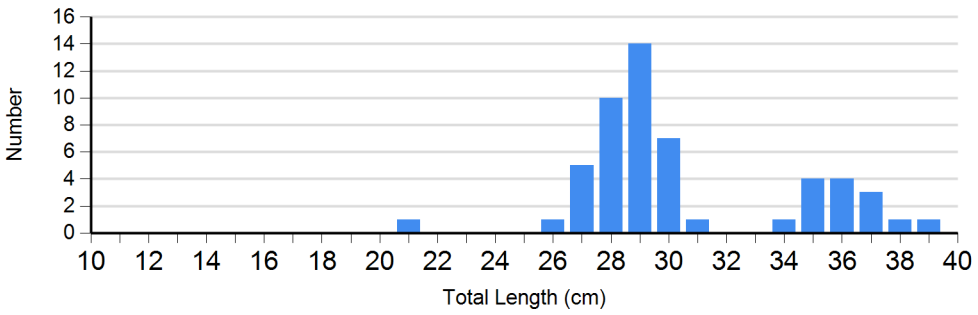
2019



2021

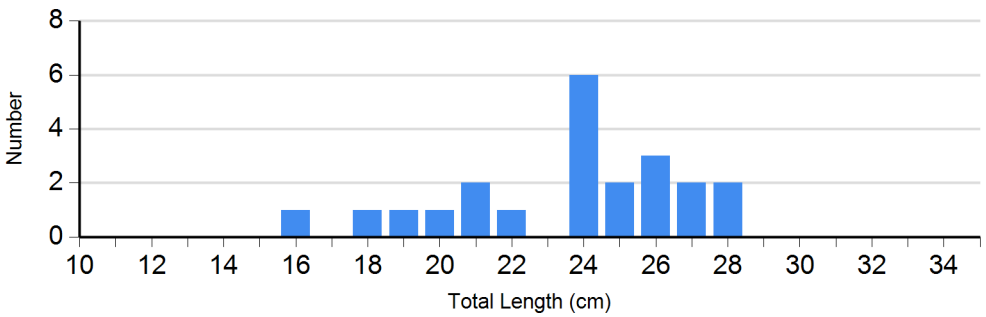


2023

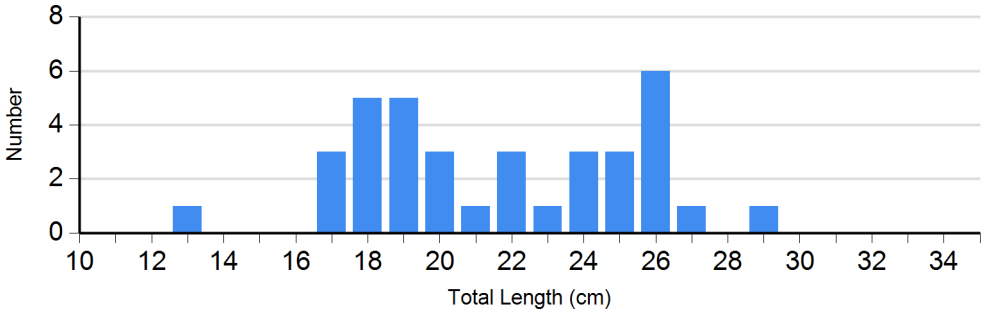


2024

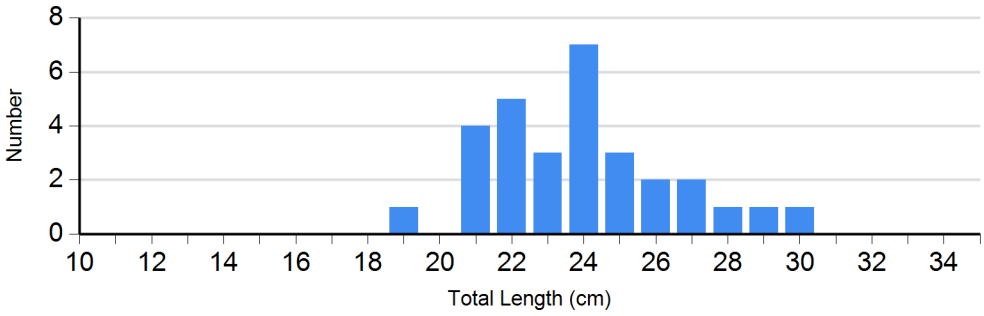
Species: Yellow Perch
Gear: AFS std gill net



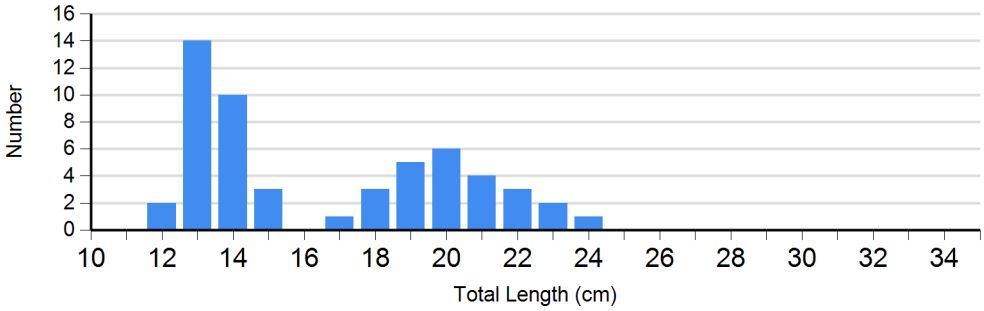
2019



2020



2021

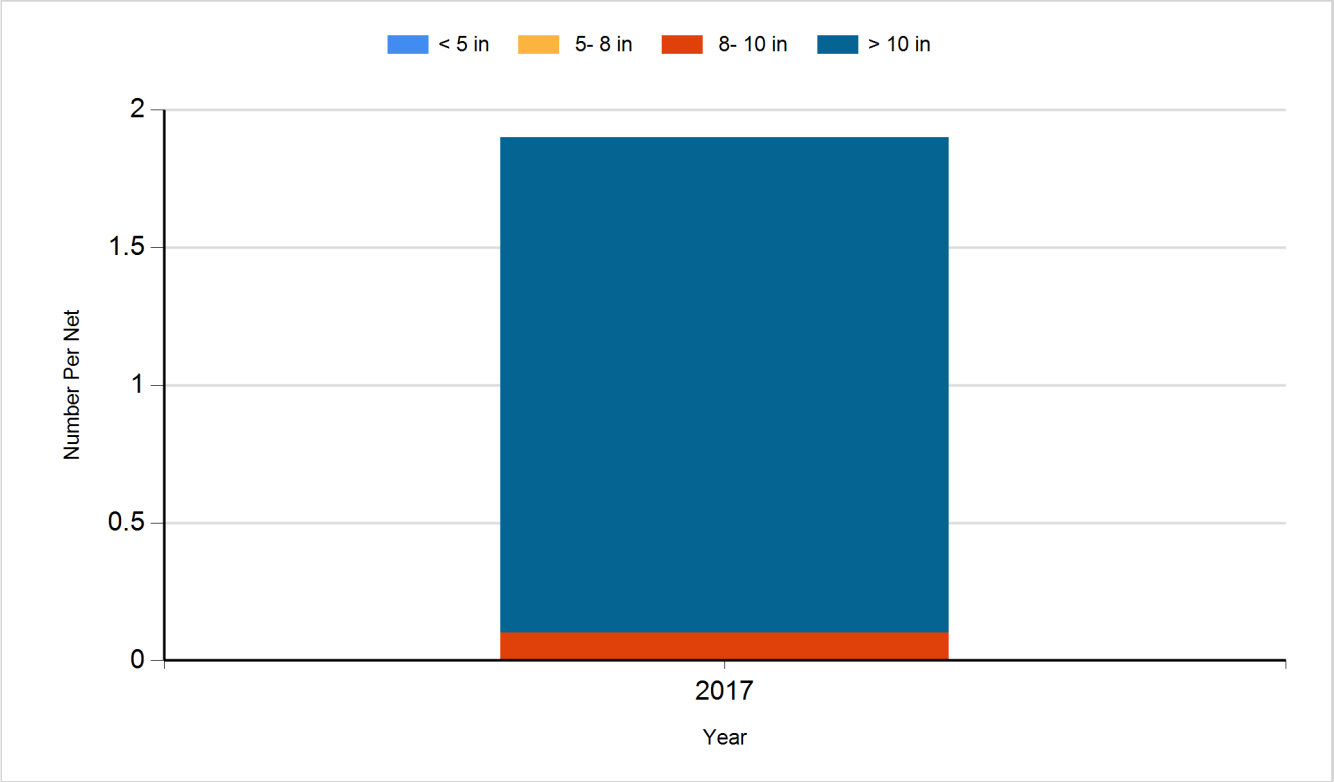


2024

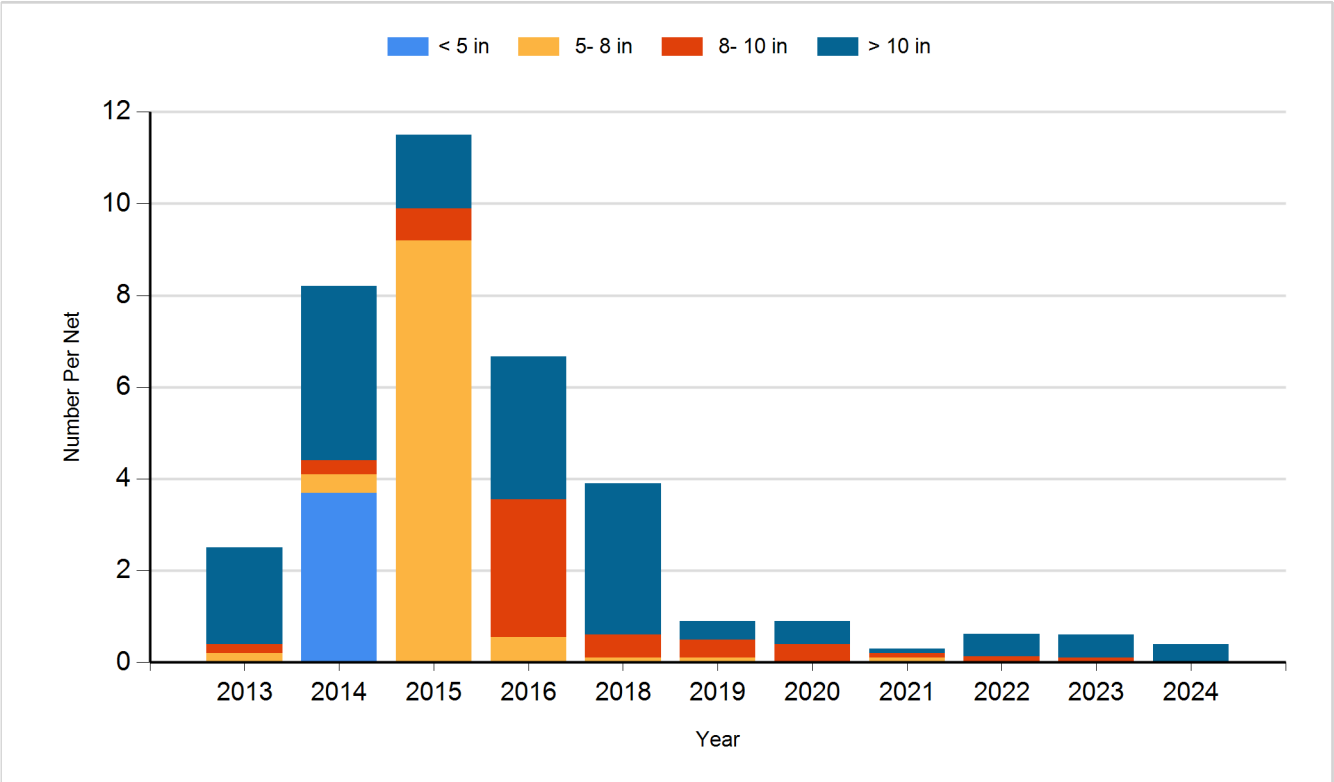
Historic Fish Sizes and Relative Abundance

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

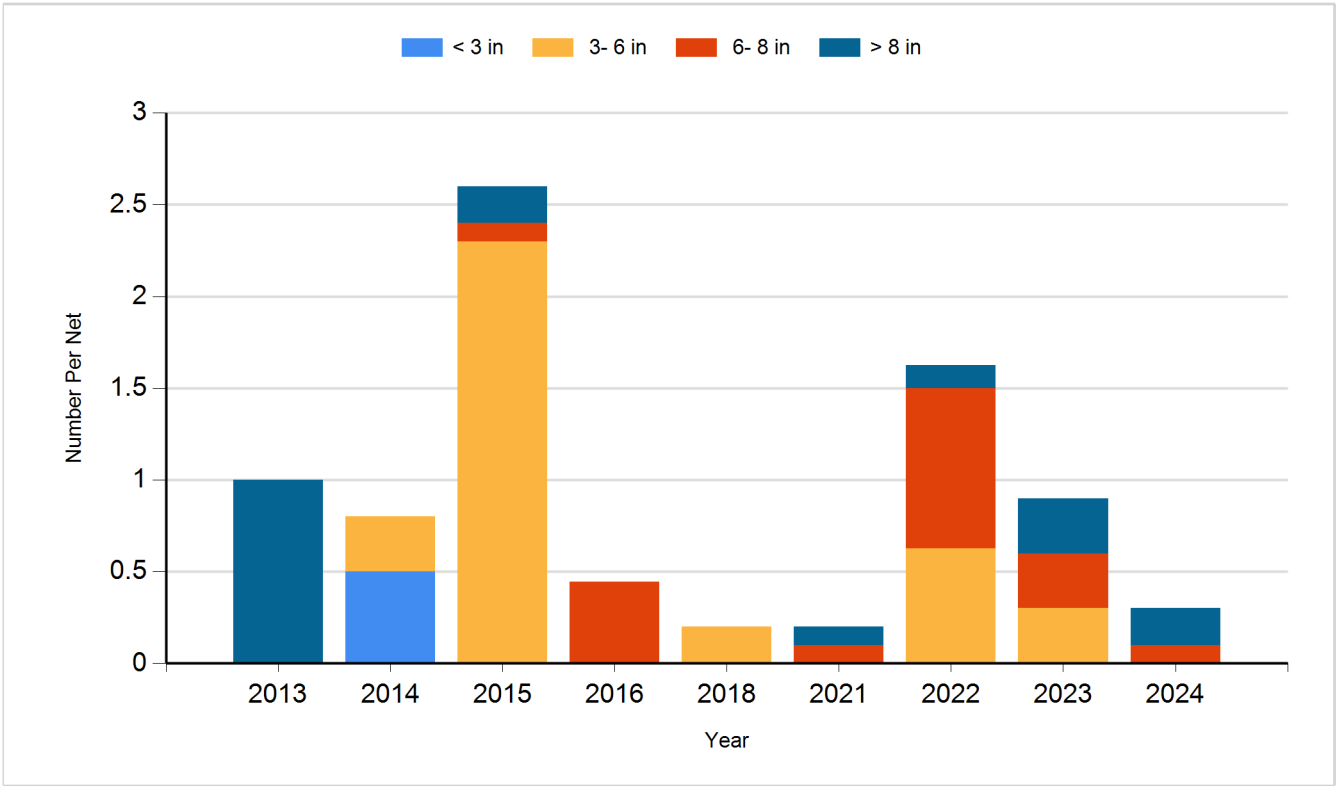
Species: Black Crappie
Gear: AFS std frame net



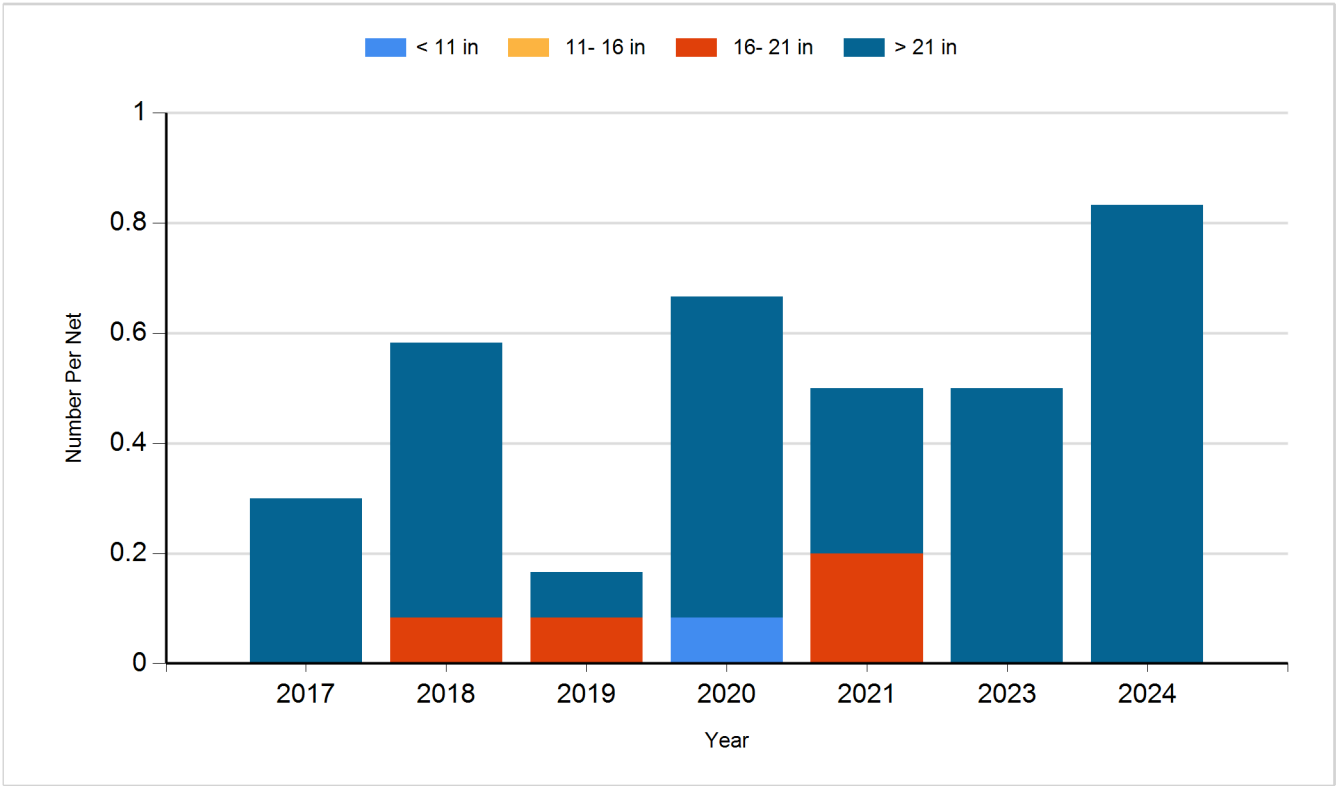
Species: Black Crappie
Gear: frame net (std 3/4 in)



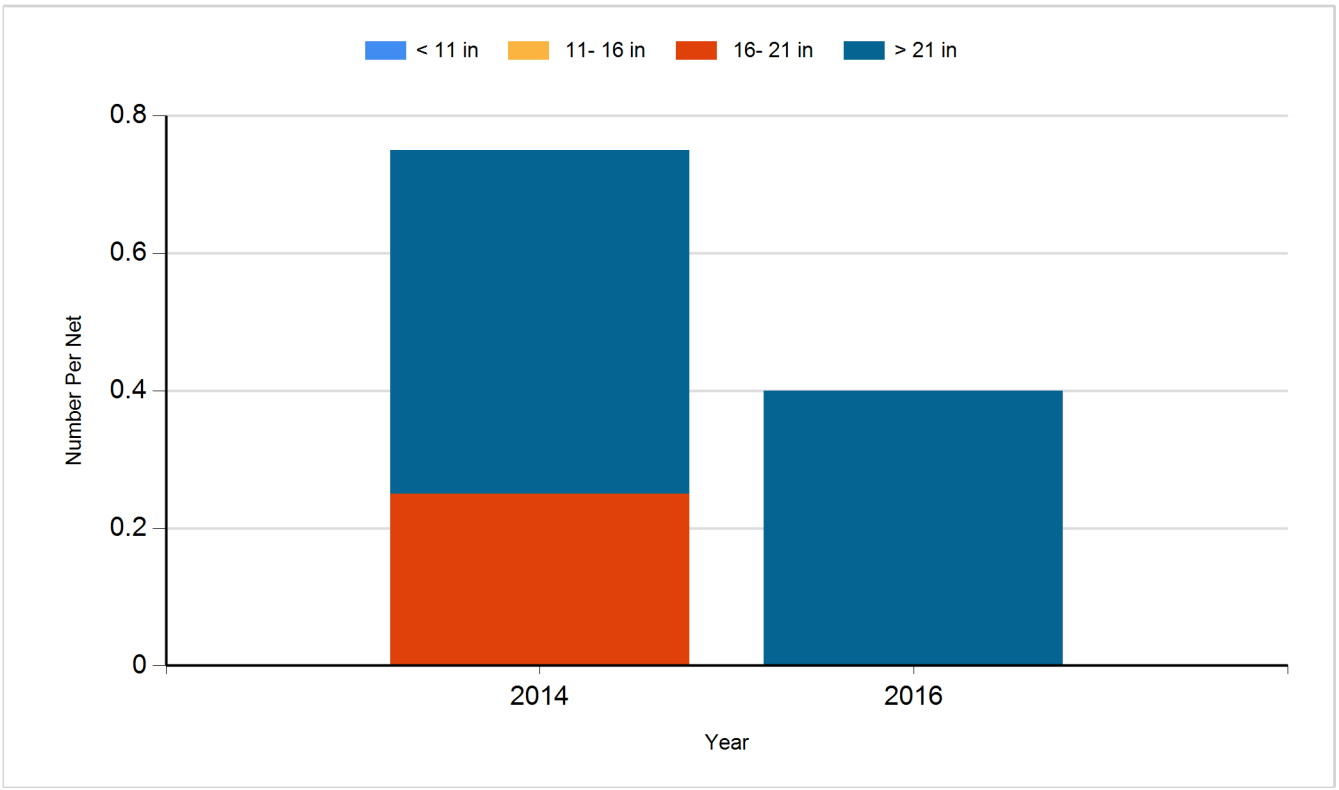
Species: Bluegill
Gear: frame net (std 3/4 in)



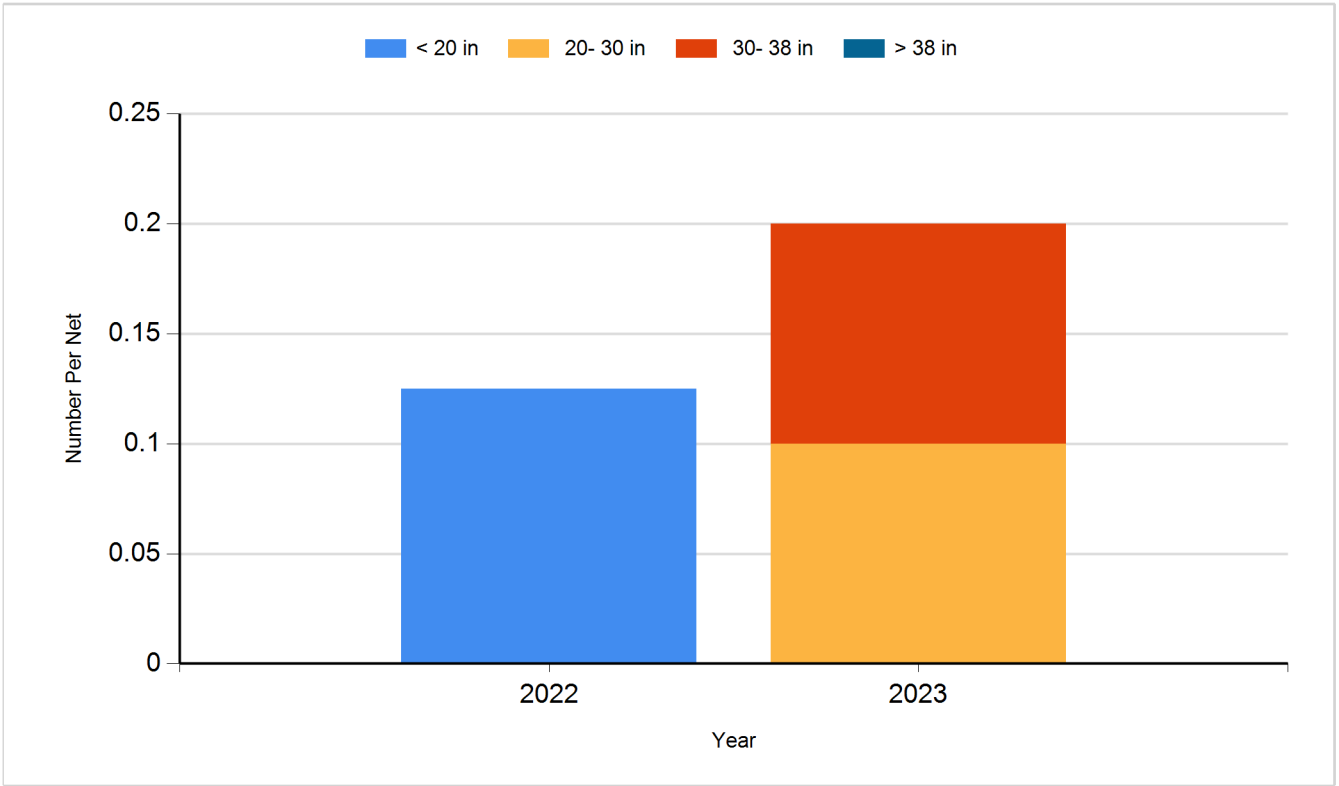
Species: Common Carp
Gear: AFS std gill net



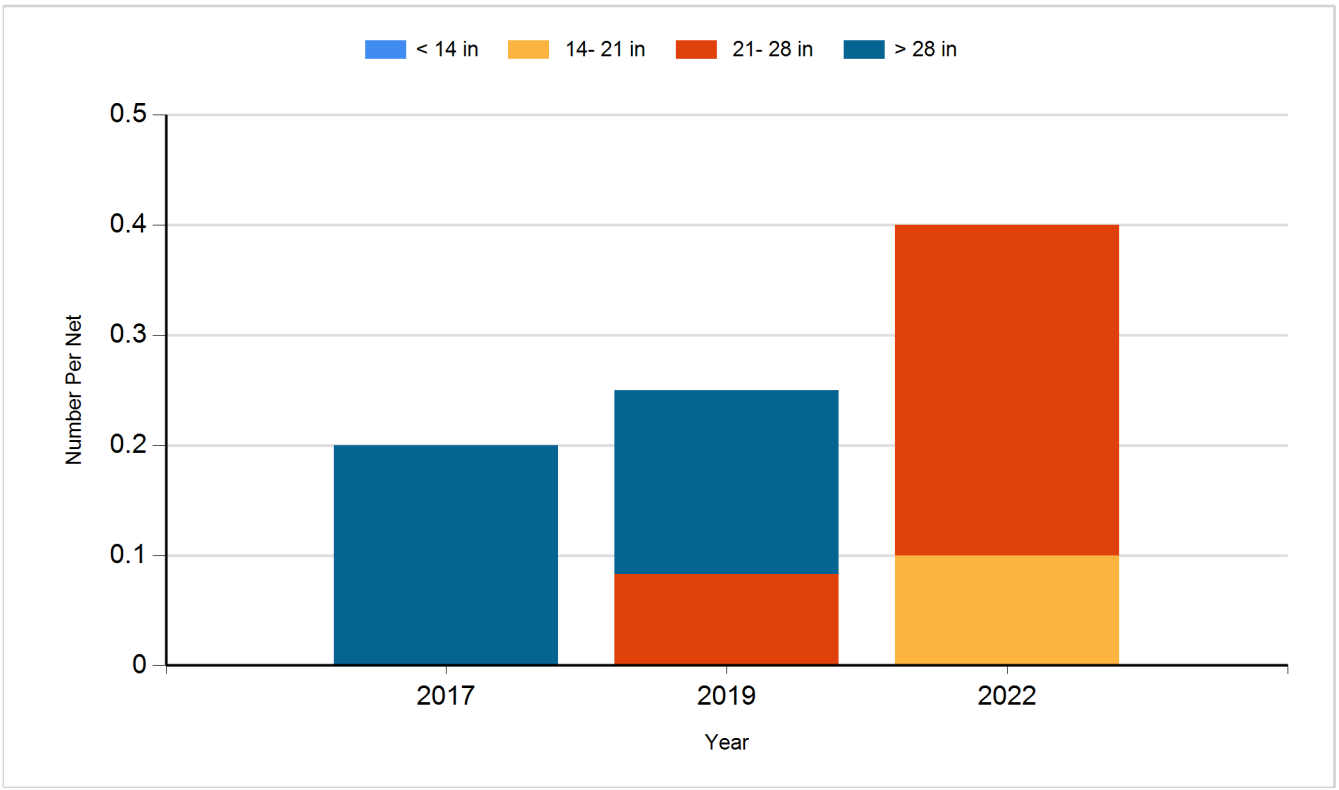
Species: Common Carp
Gear: std exp gill net



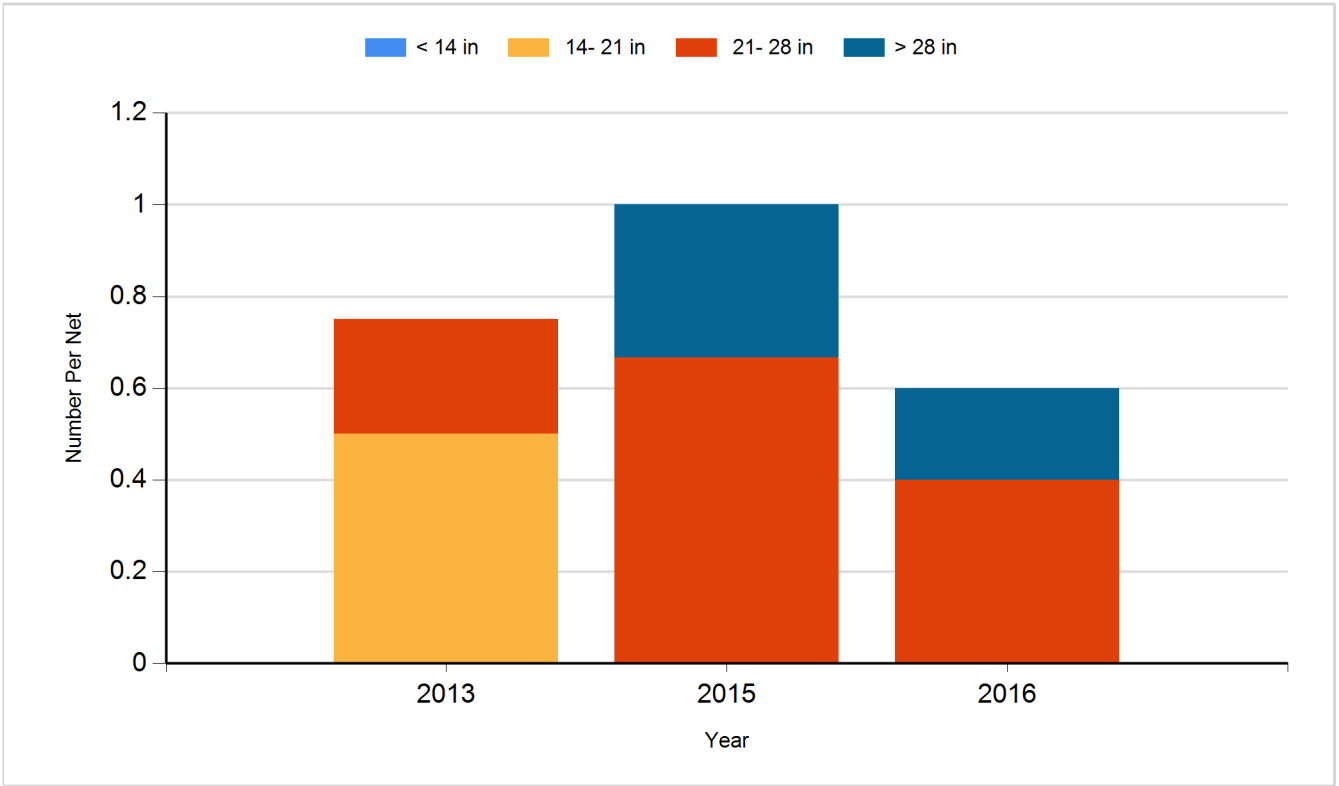
Species: Muskellunge
Gear: frame net (std 3/4 in)



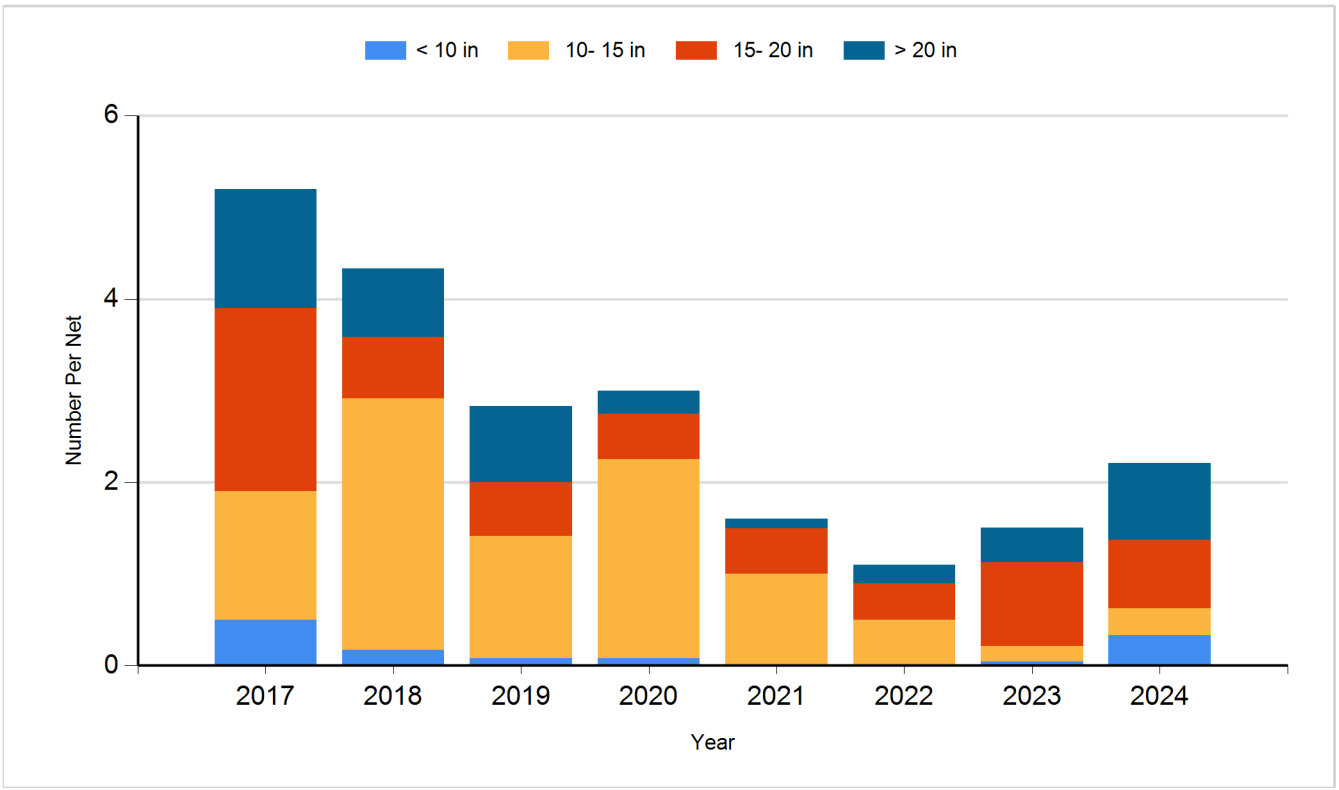
Species: Northern Pike
Gear: AFS std gill net



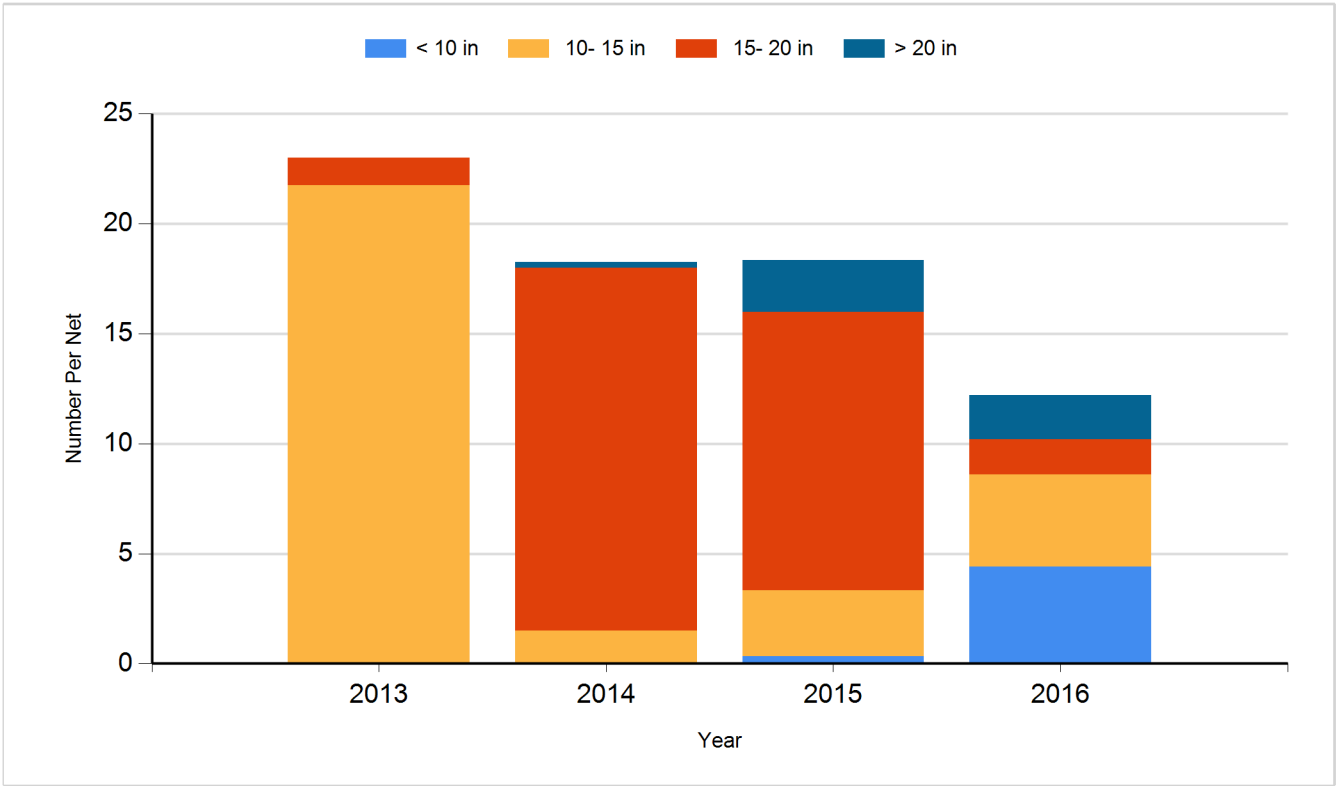
Species: Northern Pike
Gear: std exp gill net



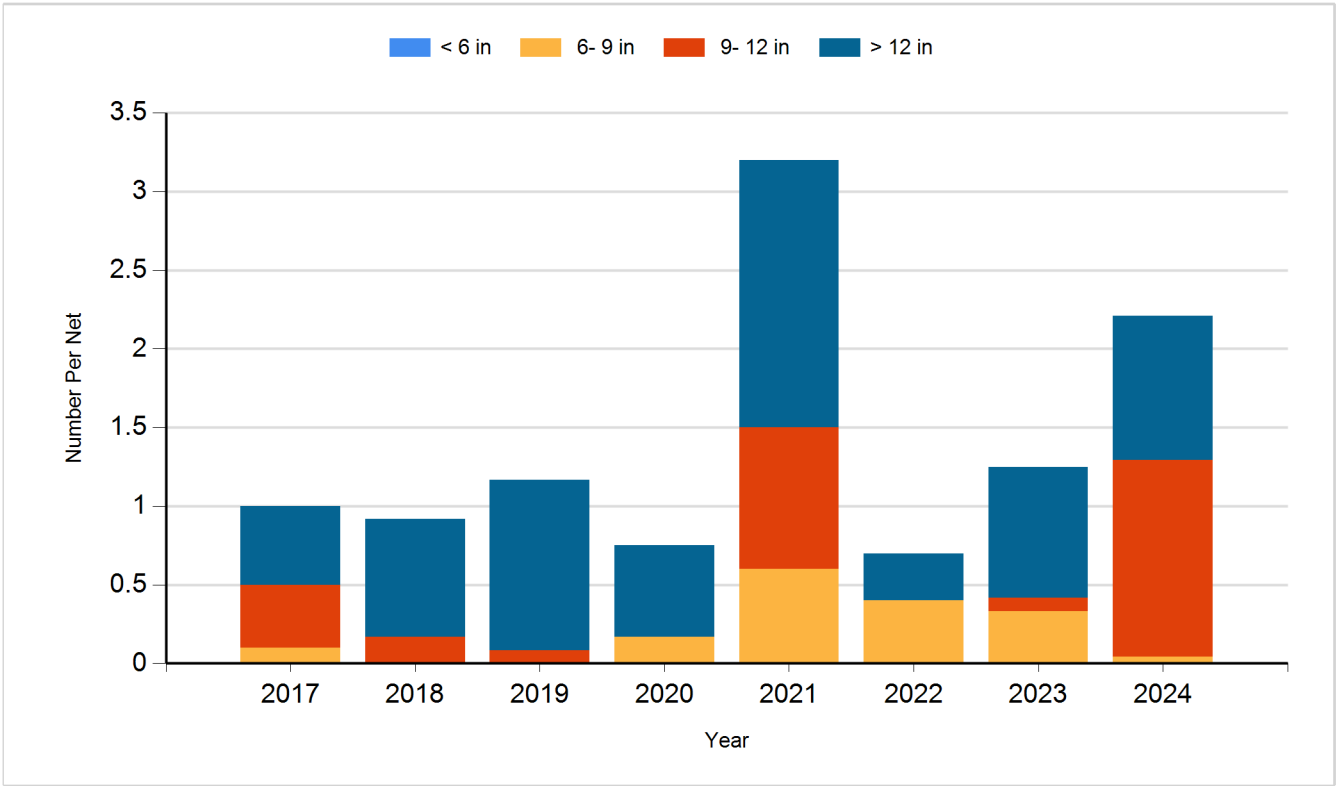
Species: Walleye
Gear: AFS std gill net



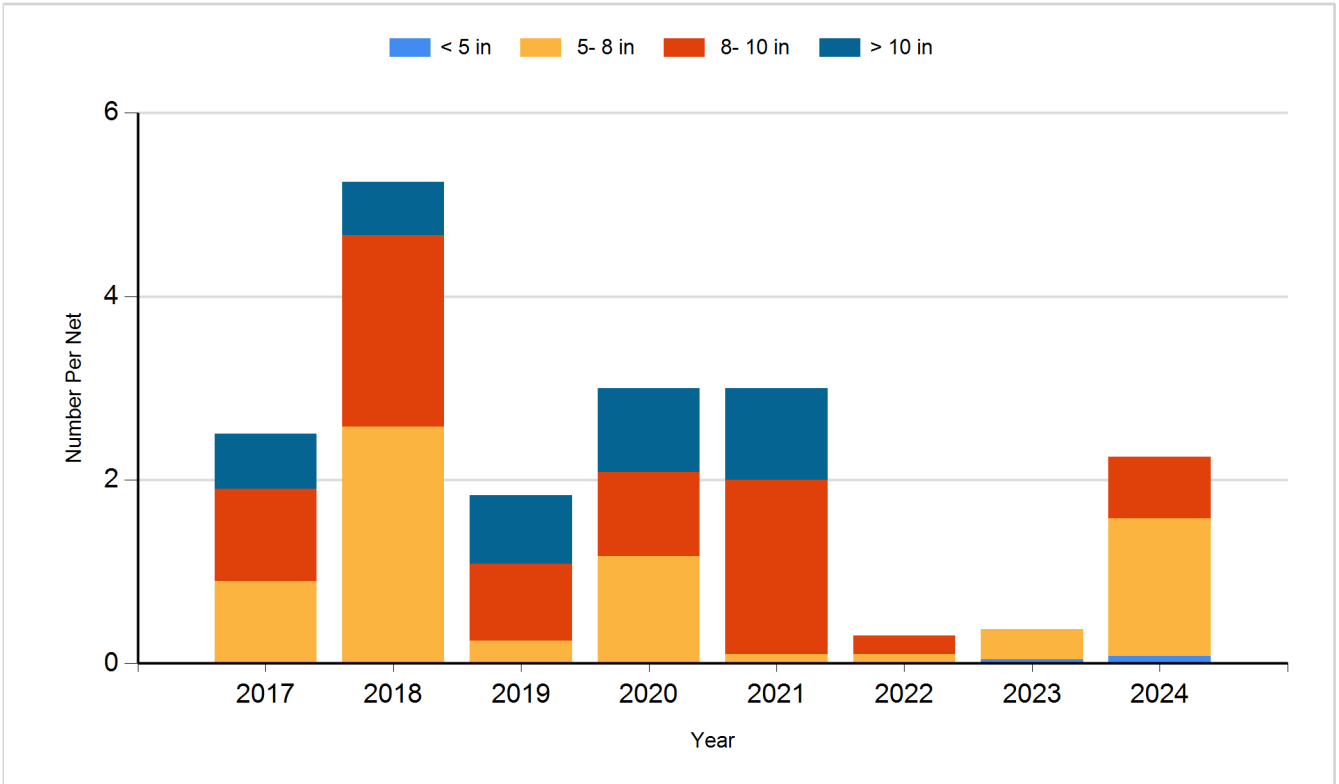
Species: Walleye
Gear: std exp gill net



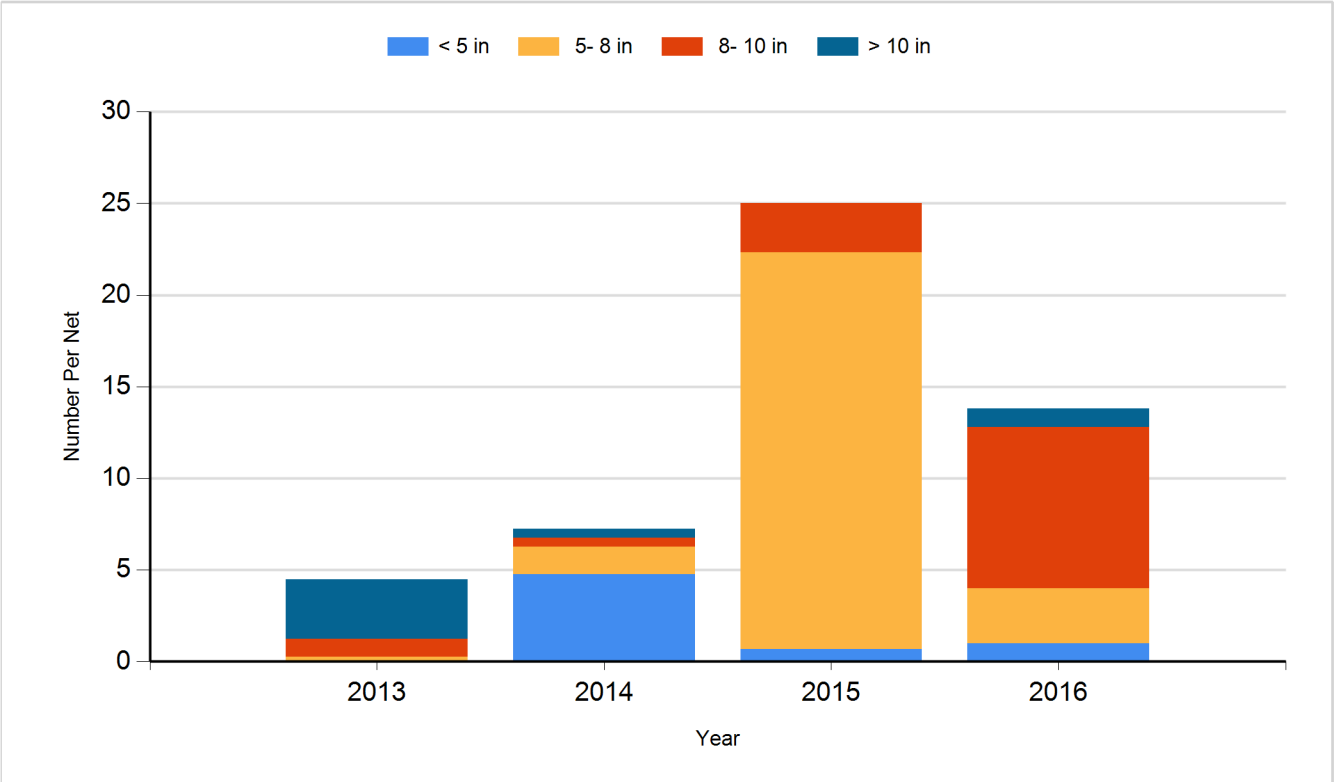
Species: White Bass
Gear: AFS std gill net



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	Muskellunge	Fingerling	780
2014	Muskellunge	Large Fingerling	965
2015	Muskellunge	Large Fingerling	1,720
2015	Walleye	Small Fingerling	118,400
2017	Muskellunge	Large Fingerling	3,206
2017	Walleye	Small Fingerling	121,030
2019	Walleye	Small Fingerling	117,220
2021	Muskellunge	Juvenile	1,400
2022	Walleye	Juvenile	150,150
2023	Muskellunge	Adult	86
2024	Walleye	Fry	900,000
2024	Walleye	Juvenile	120,290