Hwy 81 West Lake Survey Summary

Hwy 81 West Lake, located 5 miles south and 2 miles west of Arlington, SD, is managed as a walleye, yellow perch, and muskellunge fishery; other fish species (e.g., bluegill, black crappie, largemouth bass, northern pike, smallmouth bass and white bass) are also present.

- **Walleye**. Walleye abundance increased to 3.5 fish per gill net in 2023. Relative abundance was higher than the previous four years and the long term mean of 3.0 fish per net. Netted fish ranged from 7.5 to 27.6 inches with 55% measuring as quality length fish (>15 inches), 26% as preferred (>20 inches), and 17% as memorable (>25 inches). The sample was represented by at least ten different year classes of fish. The 2018 naturally-produced cohort (age 5) dominated catches, though, comprising 37% of all fish sampled. Older fish (>10 years) also accounted for a large proportion of the catch (22%). Highway 81 West Lake regularly produces some of the oldest walleye in the region. Growth was excellent again with fish averaging 16.6 inches by age 3 and 17.7 by age 4. The largest year class in this year's sample (age 5) was naturally reproduced in 2018.

- **Yellow Perch**. Sampling efforts produced 8.4 yellow perch per gill net in 2023, which is slightly less than the previous year (10.8 fish per net in 2022) and the long term mean (10.9 fish per net). Netted fish ranged from 5.1 to 11.8 inches with approximately 36% measuring >8 inches in length. These quality length and larger fish accounted for a much smaller proportion of catches the previous year (2%). The population remains quite young, though, with age 1 and age 2 fish dominating the sample (57 and 43% of fish sampled, respectively). Growth is fast with fish averaging 8.5 inches by age 2. Highway 81 West Lake might be worth a look for any angler targeting quality sized (>8 inches) yellow perch in the southeast region.

- **Muskellunge.** A recent graduate project on Hwy 81 West Lake (occurring in 2019 and 2020) involved the capture and tagging of adult muskellunge. Sampling efforts produced 50 fish ranging from 30.5 to 49 inches with approximately 60% measuring >40 inches. In comparison, very few muskellunge are captured during regular summer fish surveys. Muskellunge were first stocked into Hwy 81 West Lake in 2005 with subsequent stockings occurring every several years.

For more detailed results see the computer-generated South Dakota Statewide Fisheries Survey for Hwy 81 West Lake (below).

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Hwy 81 West, Kingsbury County
MBS-Lake-233-000
2023

Lake Information

Name: Hwy 81 West

County: Kingsbury

Surface Area: 1,580 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 01, 2023	10 net-nights
AFS std gill net	Aug 02, 2023	10 net-nights
frame net (std 3/4 in)	Aug 01, 2023	5 net-nights
frame net (std 3/4 in)	Aug 02, 2023	5 net-nights

Common Fish Species Present

Walleye

Muskellunge

Yellow Perch

Bluegill

White Bass

Northern Pike

Smallmouth Bass

Black Crappie

Pumpkinseed

Sunfish Hybrid

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 Crappie	1	0.1	0.1	0		0		138	
	Bluegill	3	0.2	0.2	0		0		128	18
	Common Carp	29	0.2	0.1	100		75			
	Northern Pike	22	1.1	0.3	95		23	15	92	10
	Smallmouth Bass	13	0.7	0.6	77		54	23	113	3
	Walleye	81	3.5	1.1	99		43	9	85	1
	White Bass	74	3.7	1.6	97		89	6	91	1
	Yellow Perch	168	8.4	2.6	35	5	1		108	1
frame net (std 3/4 in)	Black Crappie	4	0.4	0.3	0		0		99	15
	Bluegill	144	14.4	7.6	1		0		162	4
	Common Carp	16	0.1	0.1	100		100			
	Muskellunge	2	0.2	0.2	100		100			
	Northern Pike	33	3.2	0.8	94		34	13	81	2
	Pumpkinseed	3	0.3	0.3	0		0		172	55
	Smallmouth Bass	26	1.9	0.7	47	18	47	18	104	3
	Sunfish Hybrid	2	0.2	0.2	0		0		159	
	Walleye	12	1.2	0.7	92		67		80	3
	White Bass	5	0.5	0.4	100		100		84	3
	Yellow Bullhead	1	0.1	0.1	100		100		112	
	Yellow Perch	18	1.8	1.0	39	19	0		91	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.

*** Methods/Species that ignore stock length**

		CPUE										
Gear	Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
AFS std gill net	Black Crappie								0.0	0.0	0.1	0.03
	Bluegill								0.0	0.0	0.2	0.07
	Common Carp								0.4	0.1	0.2	0.23
	Northern Pike								0.5	0.4	1.1	0.67
	Smallmouth Bass								1.1	0.0	0.7	0.60
	Walleye								2.8	2.6	3.5	2.97
	White Bass								7.4	5.2	3.7	5.43
	Yellow Perch								13.4	10.7	8.4	10.83
frame net (std 3/4 in)	Black Bullhead								1.1	0.0	0.0	0.37
	Black Crappie								2.0	0.1	0.4	0.83
	Bluegill								11.8	3.9	14.4	10.03
	Common Carp								2.8	0.3	0.1	1.07
	Largemouth Bass								0.0	0.0	0.0	0.00
	Muskellunge								0.2	0.0	0.2	0.13
	Northern Pike								2.9	1.1	3.2	2.40
	Pumpkinseed								0.0	0.0	0.3	0.10
	Smallmouth Bass								2.6	0.9	1.9	1.80
	Sunfish Hybrid								0.0	0.1	0.2	0.10
	Walleye								0.9	0.3	1.2	0.80
	White Bass								8.8	0.3	0.5	3.20
	Yellow Bullhead								2.1	0.5	0.1	0.90
	Yellow Perch								3.2	3.2	1.8	2.73

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std gill net	Black Crappie	PSD										0
		PSD-P										0
		Wr										138
	Bluegill	PSD										0
		PSD-P										0
		Wr										128
	Northern Pike	PSD								20	100	95
		PSD-P								0	25	23
		Wr								91	79	92
	Smallmouth Bass	PSD								36		77
		PSD-P								9		54
		Wr								102		113
	Walleye	PSD								79	96	99
		PSD-P								43	38	43
		Wr								83	86	85
	White Bass	PSD								92	100	97
		PSD-P								70	100	89
		Wr								94	95	91
	Yellow Perch	PSD								22	1	35
		PSD-P								13	0	1
		Wr								100	107	108
frame net (std 3/4 in)	Black Crappie	PSD								90	100	0
		PSD-P								45	100	0
		Wr								108	107	99
	Bluegill	PSD								3	0	1
		PSD-P								1	0	0
		Wr								138	165	162
	Muskellunge	PSD								100		100
		PSD-P								100		100
	Northern Pike	PSD								83	91	94
		PSD-P								7	9	34
		Wr								84	81	81
	Smallmouth Bass	PSD								73	67	47

			Year									
Gear	Species	Index	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
frame net (std 3/4 in)	Smallmouth Bass	PSD-P								58	67	47
		Wr								99	100	104
	Walleye	PSD								100	67	92
		PSD-P								67	33	67
		Wr								80	84	80
	White Bass	PSD								100	100	100
		PSD-P								99	100	100
		Wr								86	91	84
	Yellow Perch	PSD								81	0	39
		PSD-P								69	0	0
		Wr								97	115	91

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+
2023	81	235 (12)	263 (1)	421 (3)	449 (11)	465 (30)	553 (3)	556 (1)	564 (1)	635 (2)	645 (18)
2022	27	205 (1)		408 (6)	445 (10)		492 (1)		597 (1)	615 (2)	600 (6)
2021	35	212 (7)	403 (4)	400 (12)	463 (1)		524 (1)	524 (1)	538 (3)		612 (6)

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2023	168	162 (97)	217 (70)		307 (1)						
2021	131	163 (105)	239 (9)	272 (15)	315 (1)	333 (1)					

Fish Condition

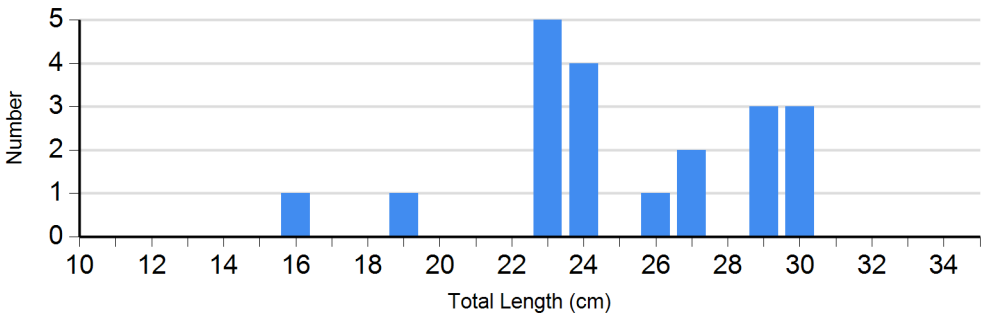
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2	106 (1.6)	9	112 (1.8)	6	108 (2.8)	3	98 (3.2)
	2022	0		0		0		1	107
	2023	4	99 (11.9)	0		0		0	
Bluegill Frame Net	2021	114	139 (1.9)	3	124 (9.2)	1	123	0	
	2022	39	165 (4.6)	0		0		0	
	2023	142	162 (3.1)	2	164	0		0	
Northern Pike Gill Net	2021	4	92 (3.2)	1	86	0		0	
	2022	0		3	83 (4.3)	1	70	0	
	2023	1	249	16	86 (1.7)	4	78 (5.7)	1	86
Walleye Gill Net	2021	6	90 (3.1)	10	89 (1.6)	10	75 (2.4)	2	74 (0.5)
	2022	1	83	15	88 (1.4)	7	85 (4.8)	3	75 (7.2)
	2023	1	99	38	86 (0.7)	18	86 (2.9)	12	81 (1.7)
White Bass Gill Net	2021	6	98 (4.1)	16	94 (1.9)	34	96 (0.7)	18	86 (0.9)
	2022	0		0		38	97 (1.3)	14	90 (1.4)
	2023	2		6	91	27	92 (1.3)	39	91 (1.2)
Yellow Perch Gill Net	2021	105	100 (0.7)	12	103 (3.5)	15	98 (1.9)	2	91 (0.1)
	2022	106	107 (0.8)	1		0		0	
	2023	110	114 (1.2)	57	101 (0.8)	0		1	107

Length Frequency Distribution

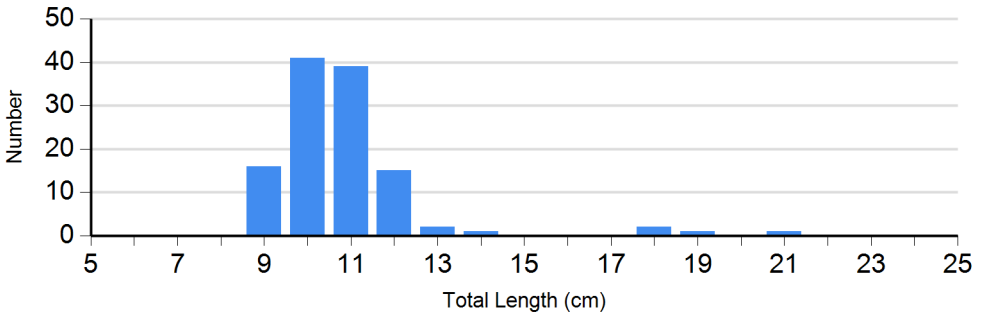
Length frequency histogram of species sampled by year.

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

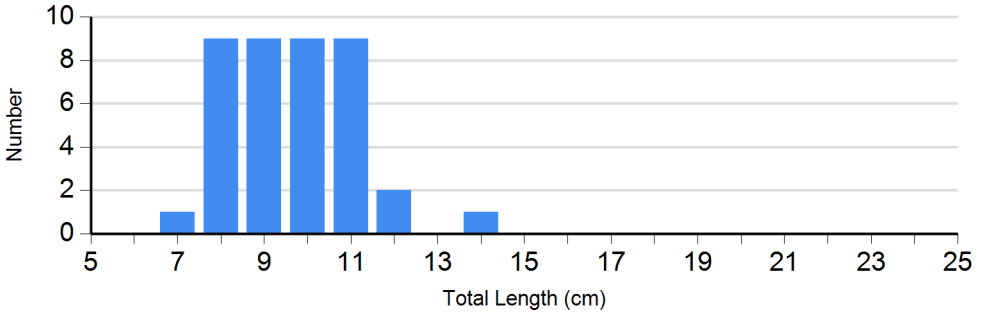


2021

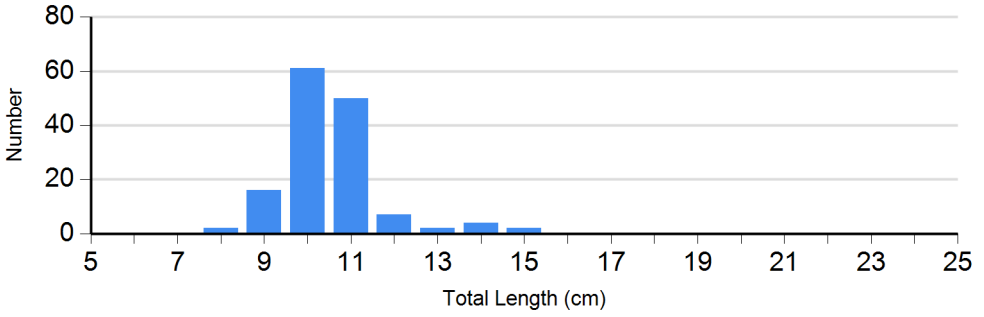
Species: Bluegill
Gear: frame net (std 3/4 in)



2021

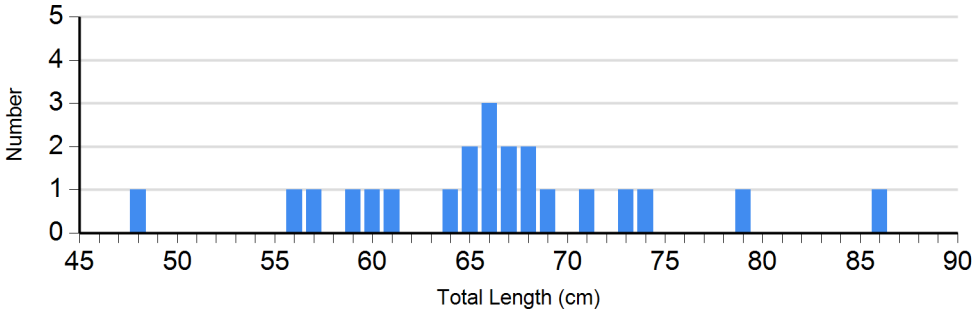


2022



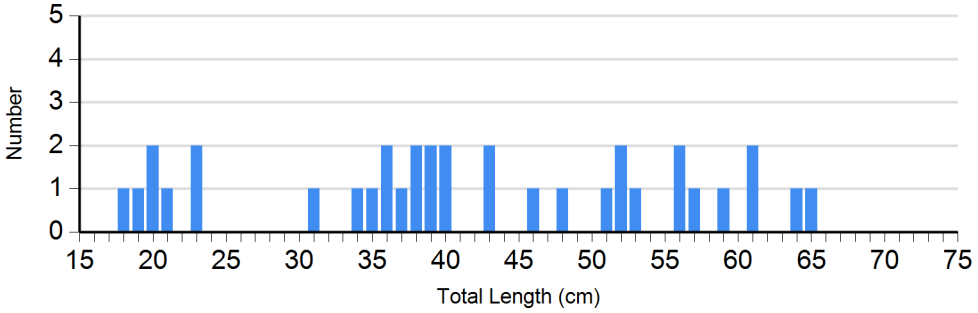
2023

Species: Northern Pike
Gear: AFS std gill net

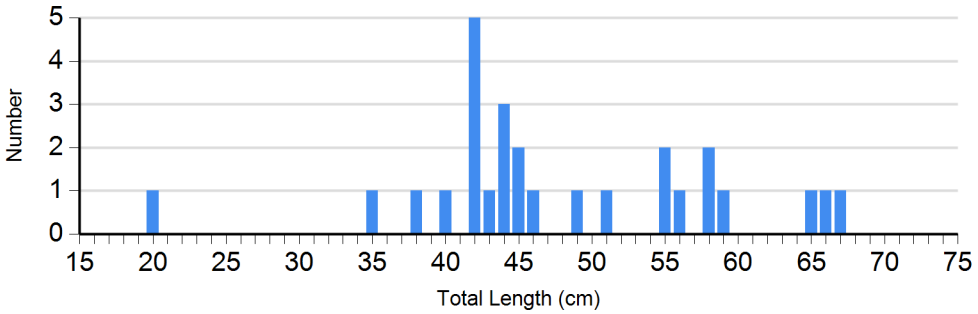


2023

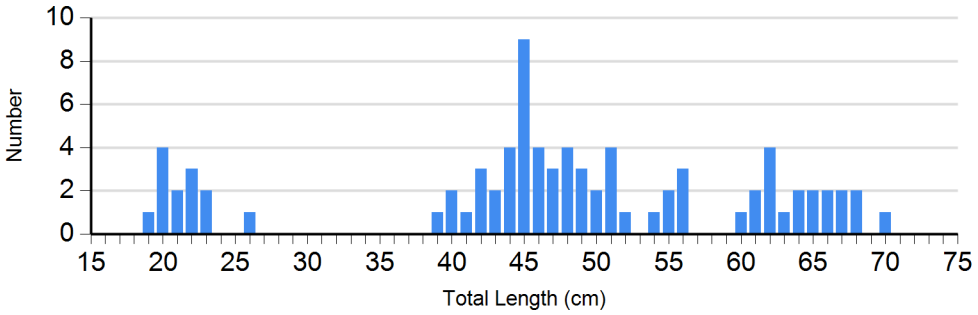
Species: Walleye
Gear: AFS std gill net



2021

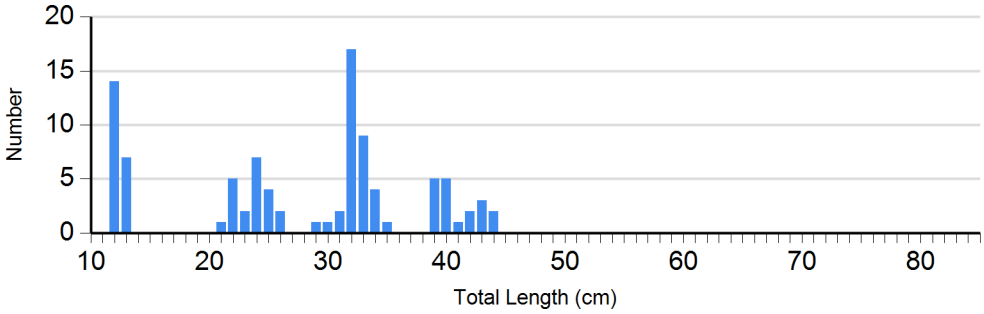


2022

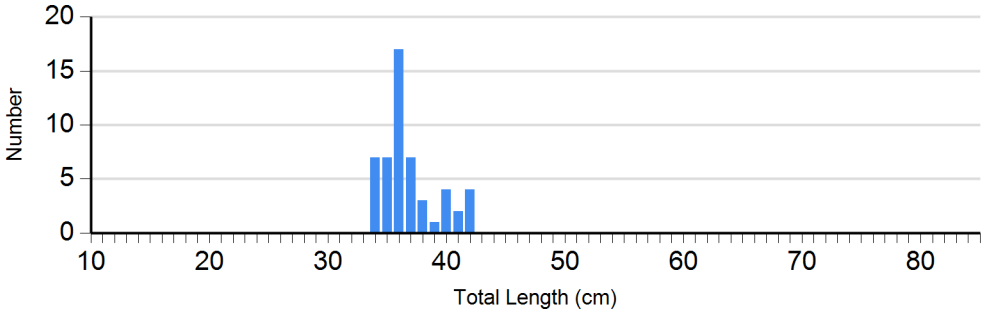


2023

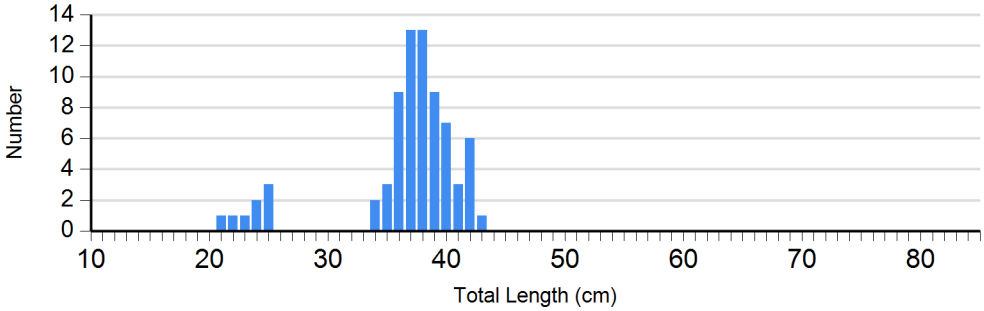
Species: White Bass
Gear: AFS std gill net



2021

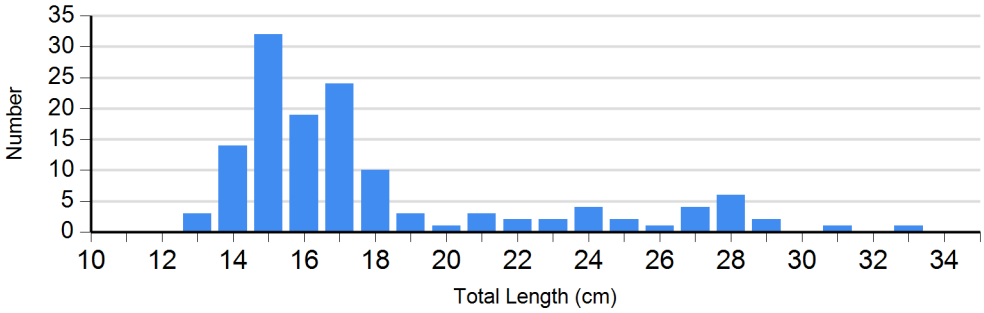


2022

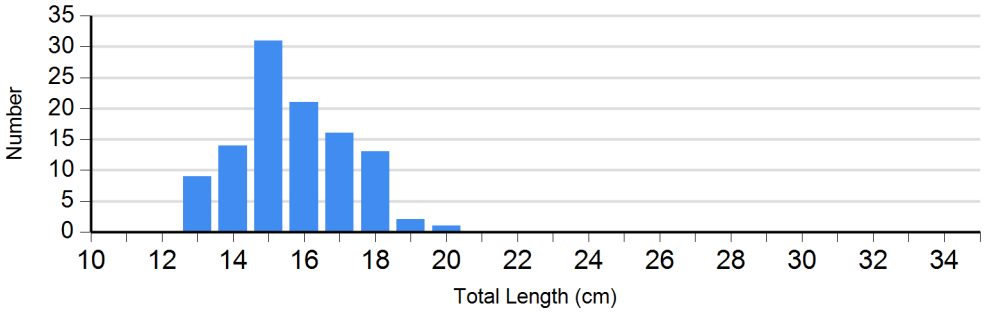


2023

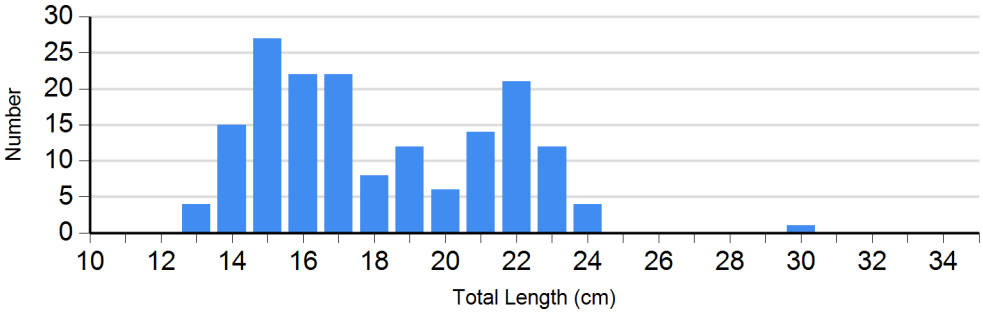
Species: Yellow Perch
Gear: AFS std gill net



2021



2022

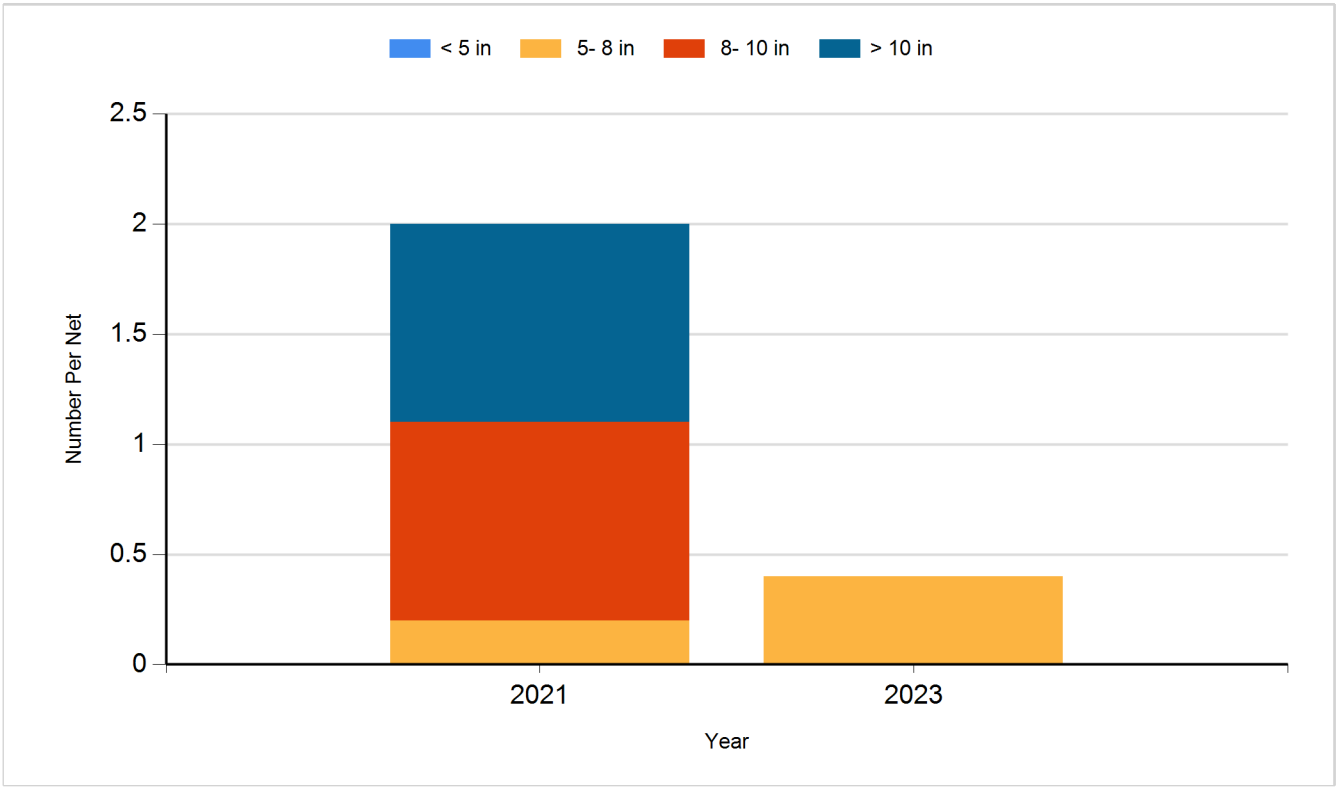

30
25
20
15
10
5
0
Number
10
12
14
16
18
20
22
24
26
28
30
32
34
Total Length (cm)

2023

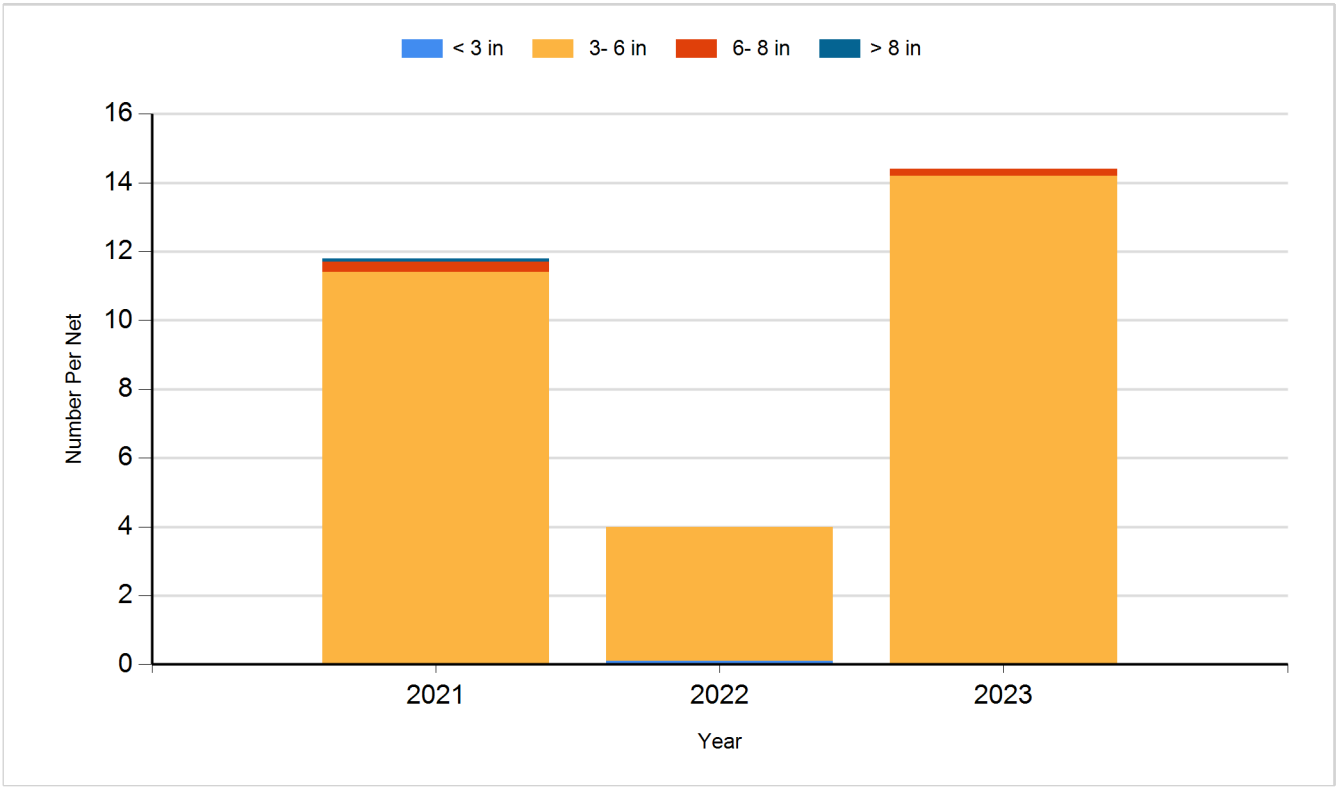
Historic Fish Sizes and Relative Abundance

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

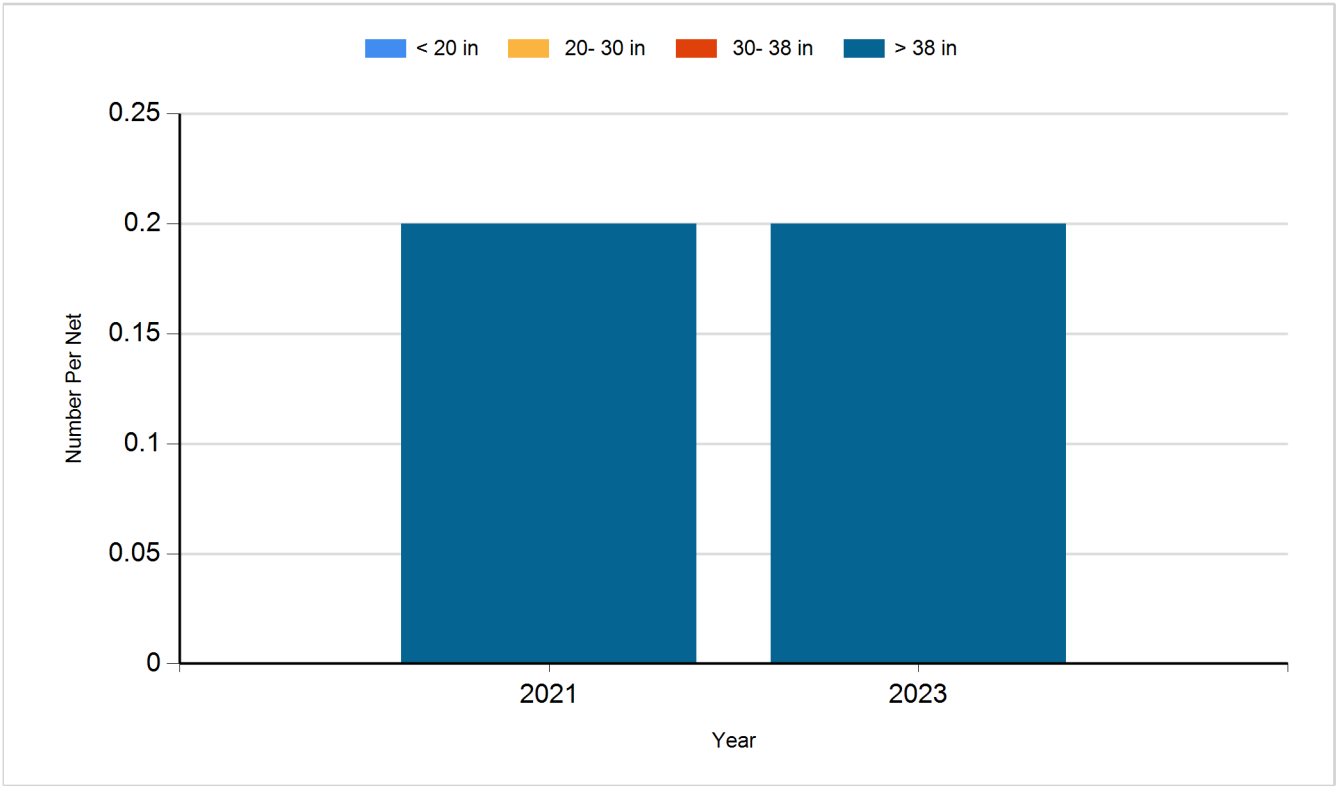
Species: Black Crappie
Gear: frame net (std 3/4 in)



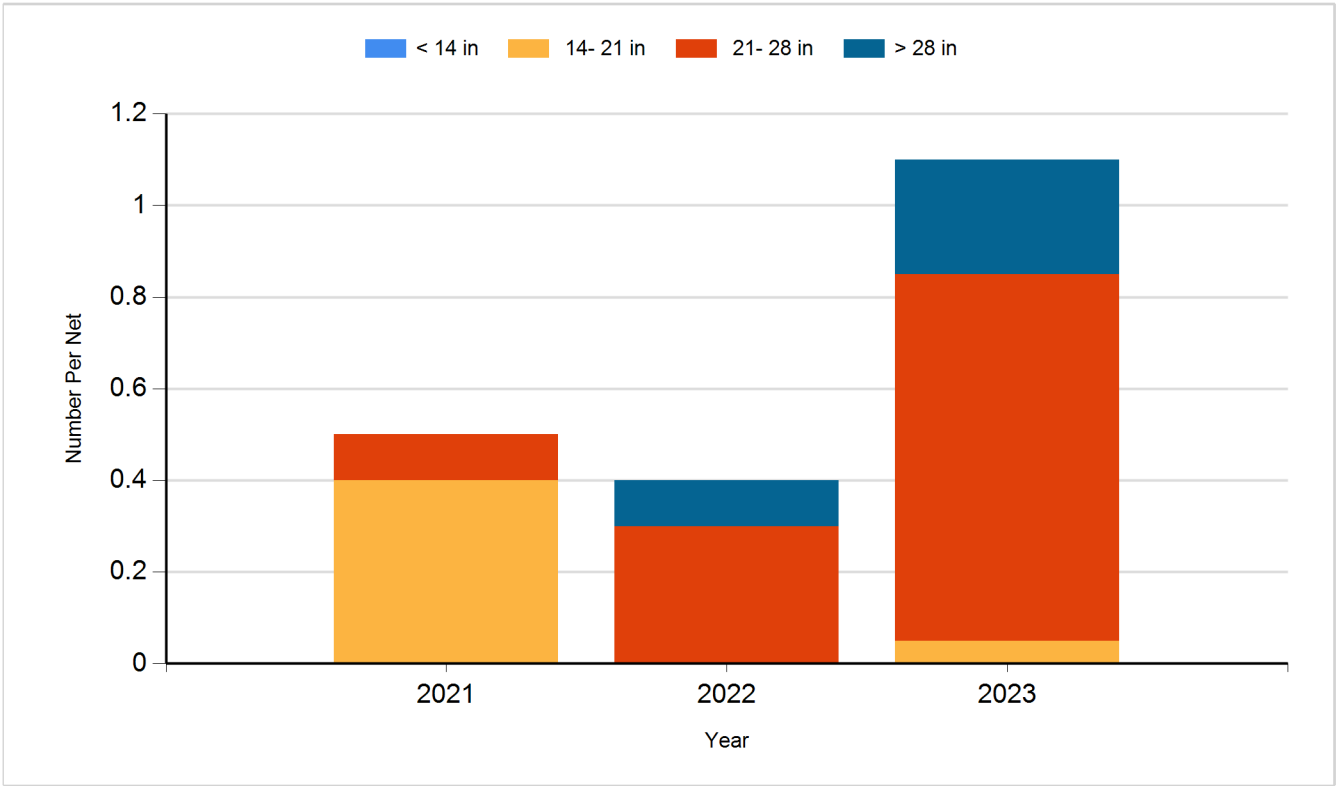
Species: Bluegill
Gear: frame net (std 3/4 in)



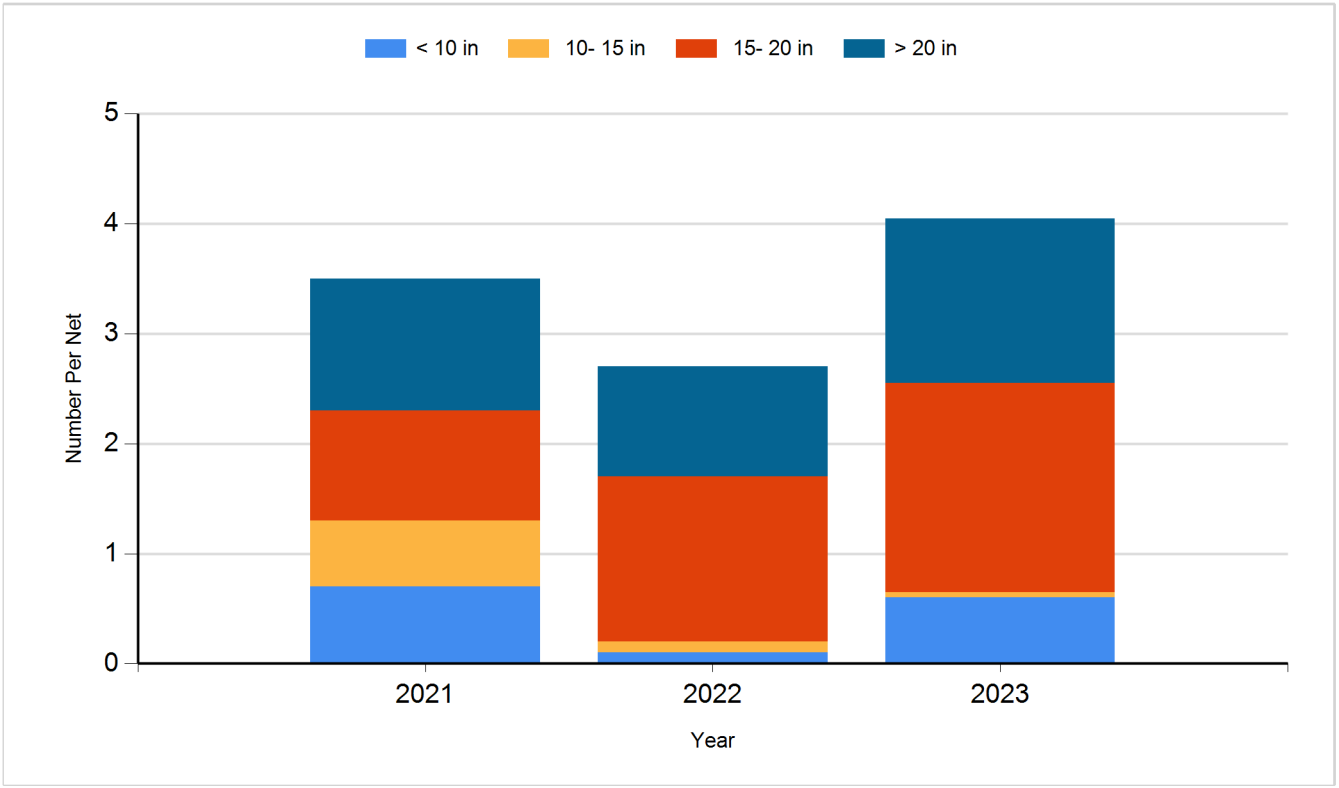
Species: Muskellunge
Gear: frame net (std 3/4 in)



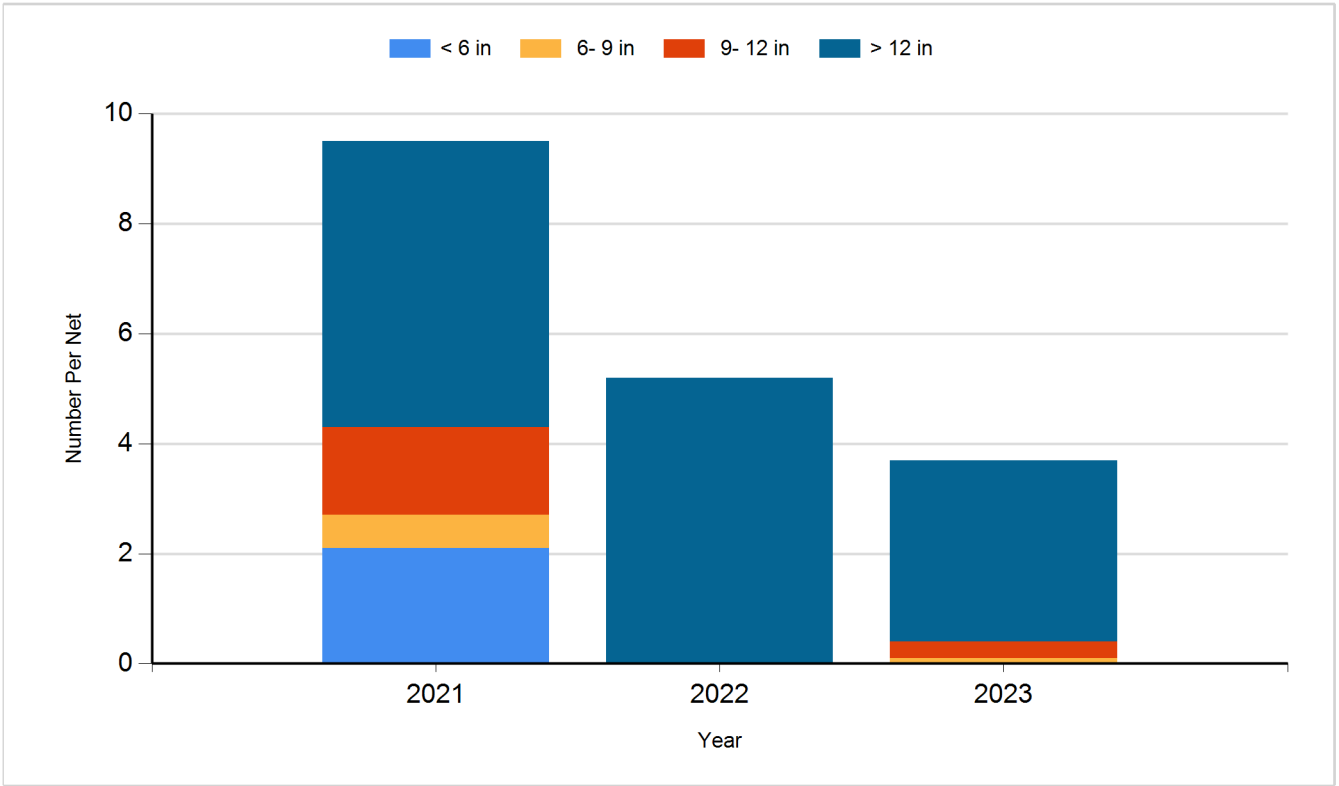
Species: Northern Pike
Gear: AFS std gill net



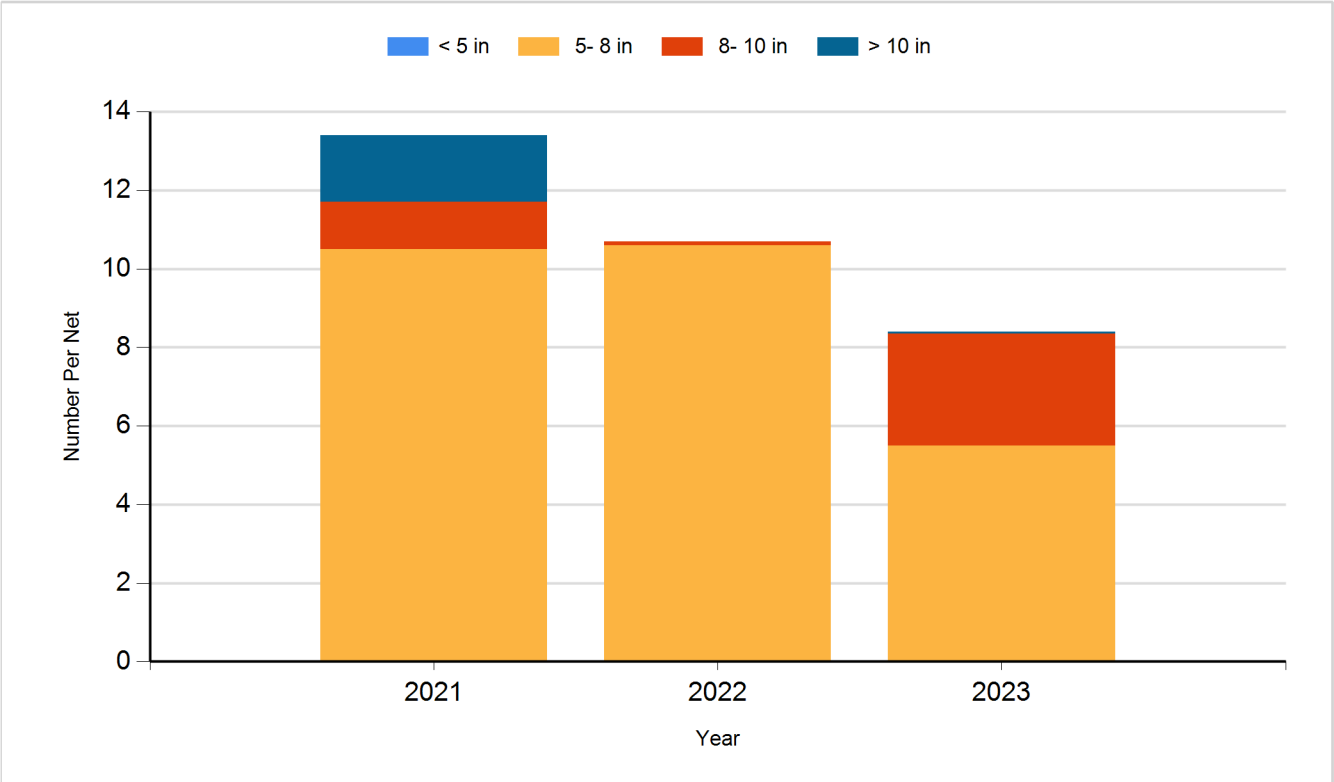
Species: Walleye
Gear: AFS std gill net



Species: White Bass
Gear: AFS std gill net



Species: Yellow Perch
Gear: AFS std gill net



Fish Stocking

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2022	Muskellunge	Juvenile	1,356