Hwy 81 East Lake Survey Summary

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

- **Walleye**. Walleye abundance increased to 5.7 fish per gill net in 2023, resulting in one of the highest catch rates in the region. Relative abundance was higher than the previous four sample years and the long term mean (3.1 fish per net). Netted fish ranged in length from 10.6 to 26.8 inches with most (74%) measuring >15 inches. A large proportion (50%) also measured >20 inches. The sample was comprised of at least 7 different year classes of fish, but a few stood out amongst others. Age 4 and age 5 fish accounted for almost half of all fish sampled (18 and 24%, respectively). Growth of these two cohorts (produced in 2018 and 2019) is excellent with fish averaging 19.1 inches in length by age 4 and 20.3 inches by age 5. A mean condition score of 91 also indicates that these fish are healthy.

- **Yellow Perch**. Gill netting efforts produced the highest yellow perch catch rate in the region (21.8 fish per net in 2023). Relative abundance was considerably higher than the previous several sample years and the long term mean (9.1 fish per net). Sampled fish ranged in length from 5.1 to 13.0 inches with about half (58%) measuring >8 inches. A mean relative weight score of 94 indicates they were in good condition. Highway 81 East Lake is worth a look for any angler targeting yellow perch in the southeast region.

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

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Hwy 81 East, Brookings County
MBS-Lake-233-001
2023

Lake Information

Name: Hwy 81 East

County: Brookings

Surface Area: 462 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 09, 2023	6 net-nights

Common Fish Species Present

Walleye

Yellow Perch

Black Bullhead

Common Carp

Yellow Bullhead

White Bass

Smallmouth Bass

Black Crappie

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	13	2.0	1.9	58	24	0			
	Black Crappie	3	0.5	0.5	100		67		108	5
	Common Carp	30	1.7	0.8	80		60			
	Smallmouth Bass	4	0.7	1.0	50		0		108	5
	Walleye	34	5.7	1.4	74	12	50	13	91	2
	White Bass	15	0.7	0.6	100		100		95	5
	Yellow Bullhead	4	0.7	0.3	100		100			
	Yellow Perch	131	21.8	9.9	56	6	1		94	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**

		CPUE										
Gear	Species	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
AFS std gill net	Black Bullhead								1.0		2.0	1.50
	Black Crappie								0.0		0.5	0.25
	Common Carp								2.8		1.7	2.25
	Northern Pike								0.2		0.0	0.10
	Smallmouth Bass								0.5		0.7	0.60
	Walleye								2.3		5.7	4.00
	White Bass								0.5		0.7	0.60
	Yellow Bullhead								0.0		0.7	0.35
	Yellow Perch								10.7		21.8	16.25

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 Bullhead	PSD								67		58
		PSD-P								0		0
	Black Crappie	PSD										100
		PSD-P										67
		Wr										108
	Common Carp	PSD								94		80
		PSD-P								41		60
	Smallmouth Bass	PSD								33		50
		PSD-P								33		0
		Wr								95		108
	Walleye	PSD								57		74
		PSD-P								21		50
		Wr								84		91
	White Bass	PSD								100		100
		PSD-P								100		100
		Wr								84		95
	Yellow Bullhead	PSD										100
		PSD-P										100
	Yellow Perch	PSD								61		56
		PSD-P								11		1
		Wr								100		94

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	34	286 (7)	355 (3)		484 (6)	516 (8)	586 (1)		625 (2)		616 (7)

Fish Condition

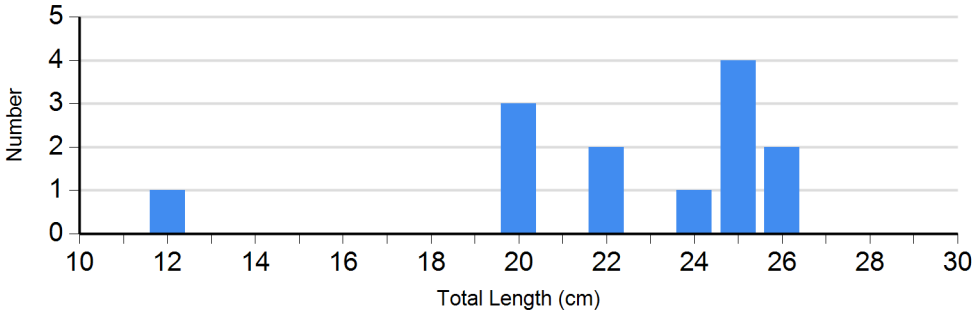
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Walleye Gill Net	2021	6	90 (1.4)	5	85 (1.9)	1	87	2	65 (1.1)
	2023	9	97 (1.7)	8	89 (1.1)	13	92 (2.3)	4	82 (5.0)
White Bass Gill Net	2021	0		0		2	89 (2.0)	1	75
	2023	0		0		0		4	95 (3.6)
Yellow Perch Gill Net	2021	25	100 (1.5)	32	101 (1.2)	7	97 (2.1)	0	
	2023	58	96 (0.9)	72	93 (0.6)	0		1	91

Length Frequency Distribution

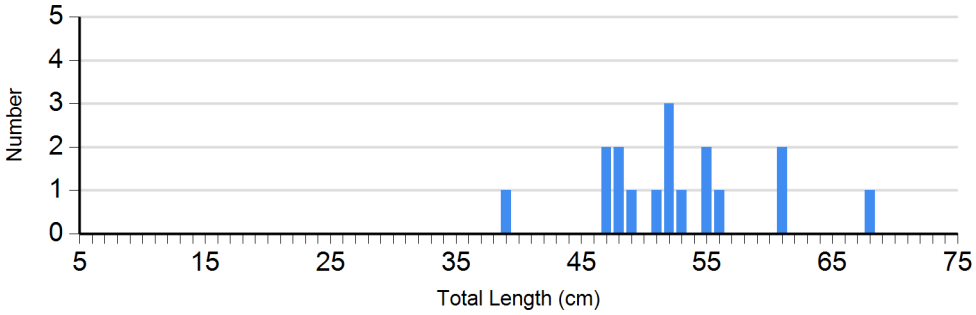
Length frequency histogram of species sampled by year.

Species: Black Bullhead
Gear: AFS std gill net

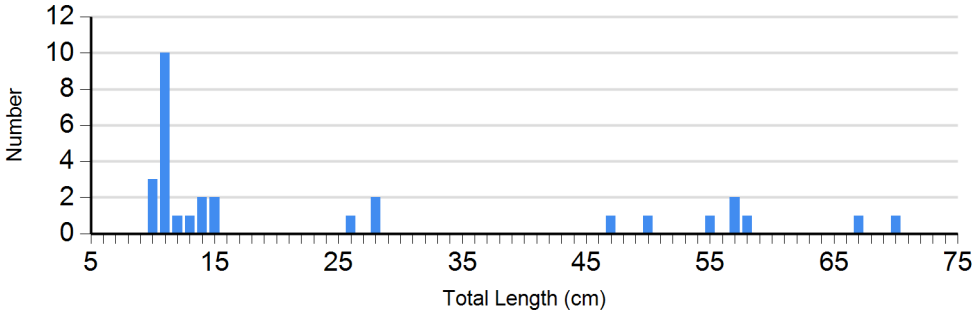


2023

Species: Common Carp
Gear: AFS std gill net

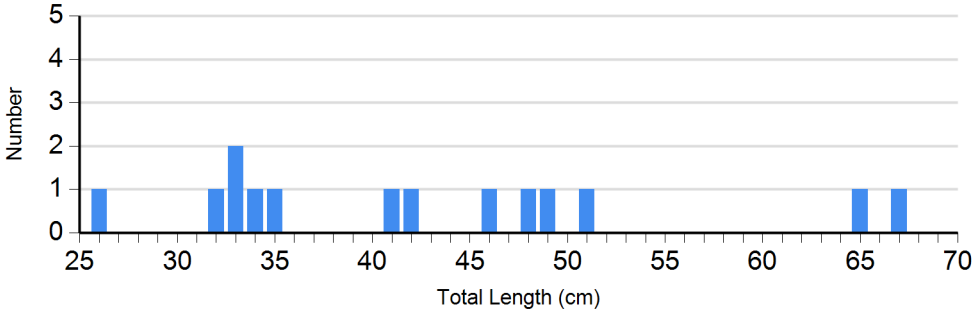


2021

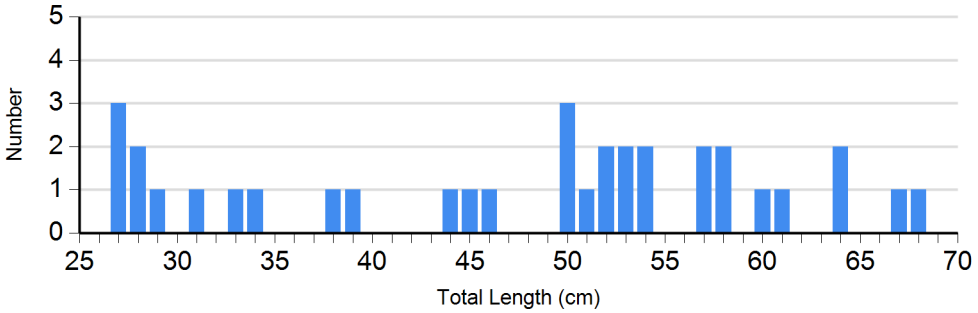


2023

Species: Walleye
Gear: AFS std gill net

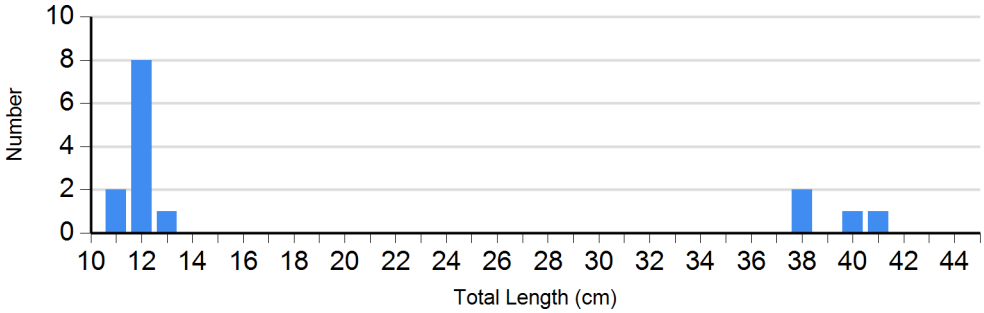


2021



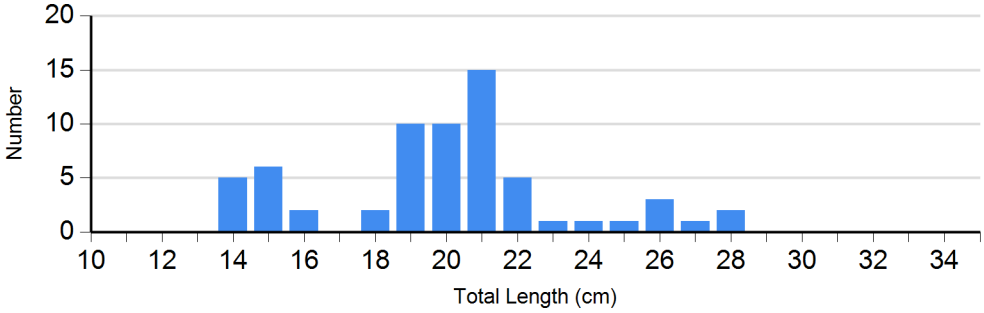
2023

Species: White Bass
Gear: AFS std gill net

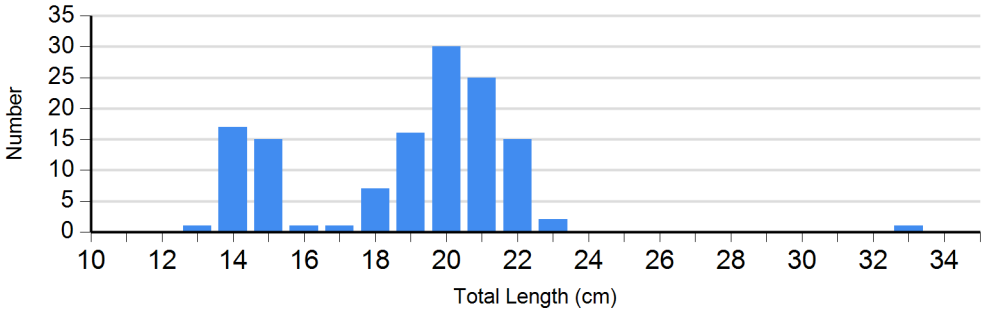


2023

Species: Yellow Perch
Gear: AFS std gill net



2021

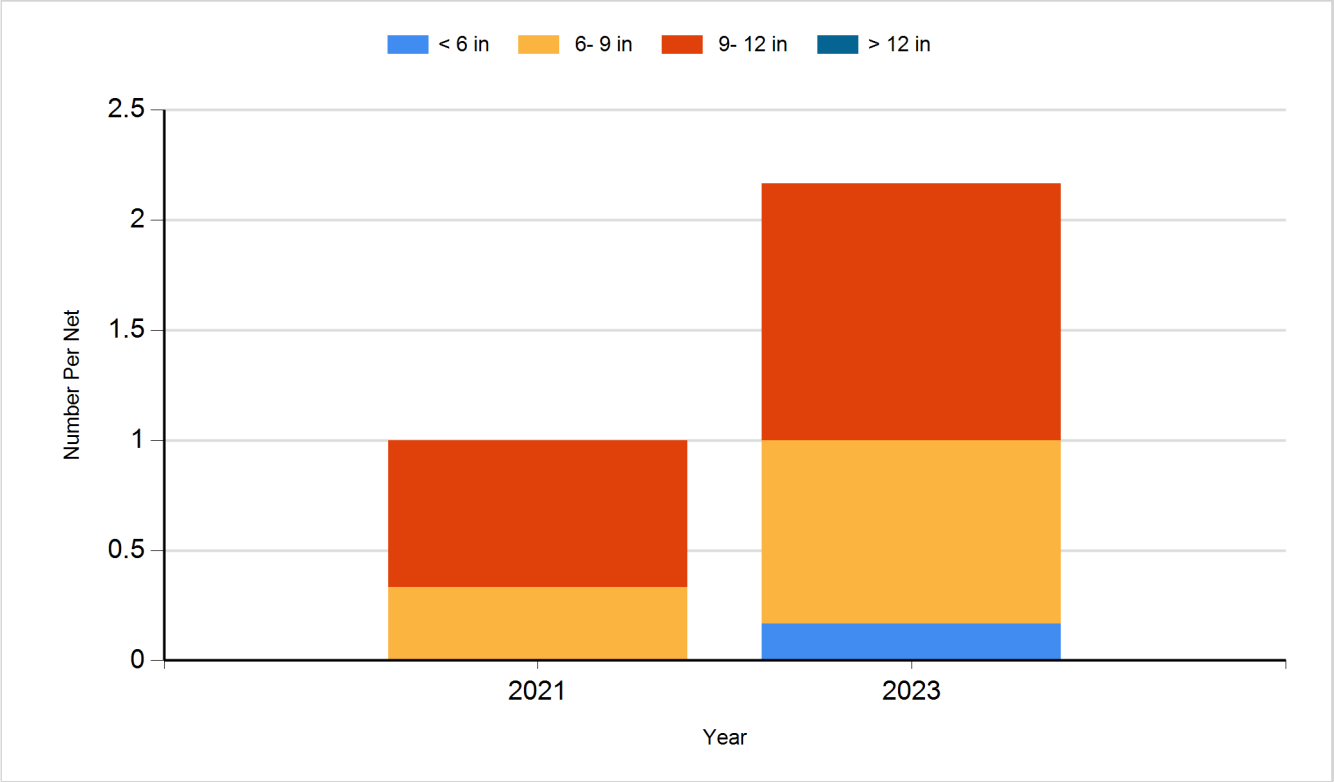


2023

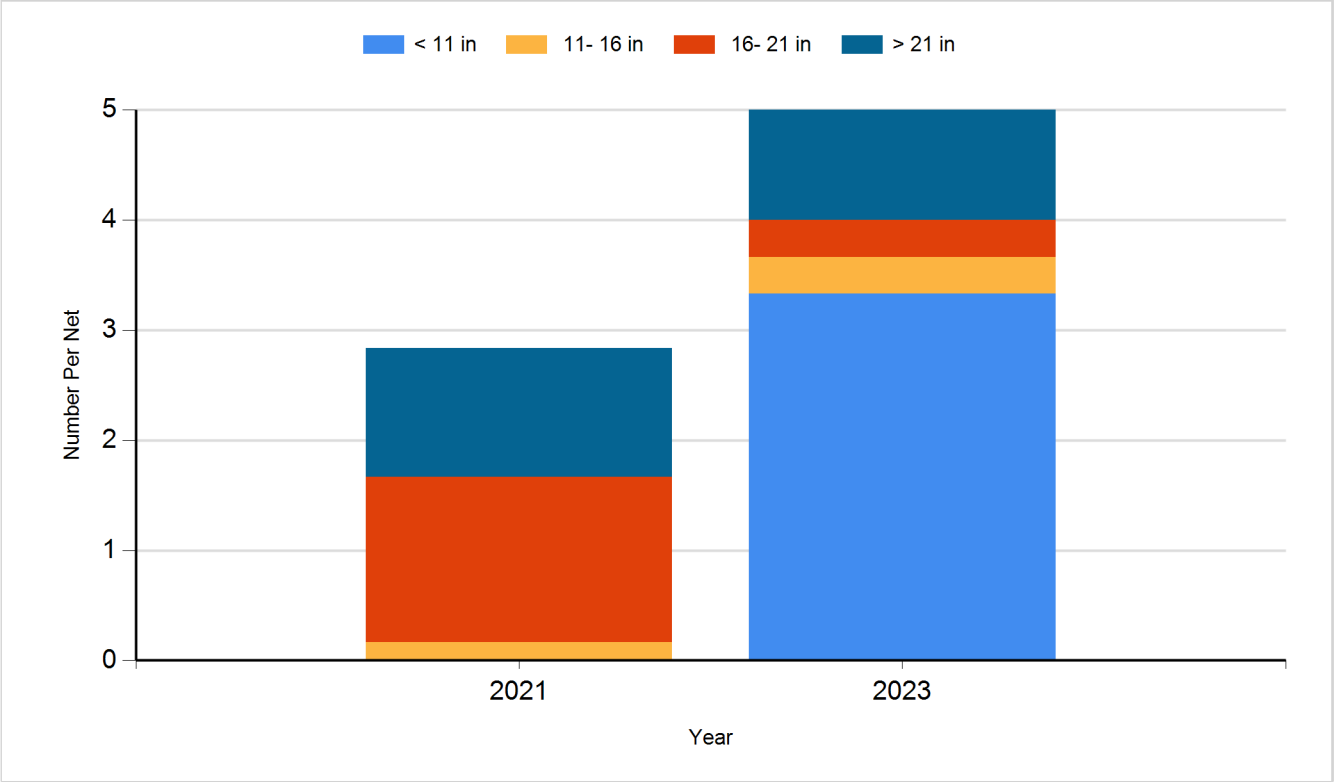
Historic Fish Sizes and Relative Abundance

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

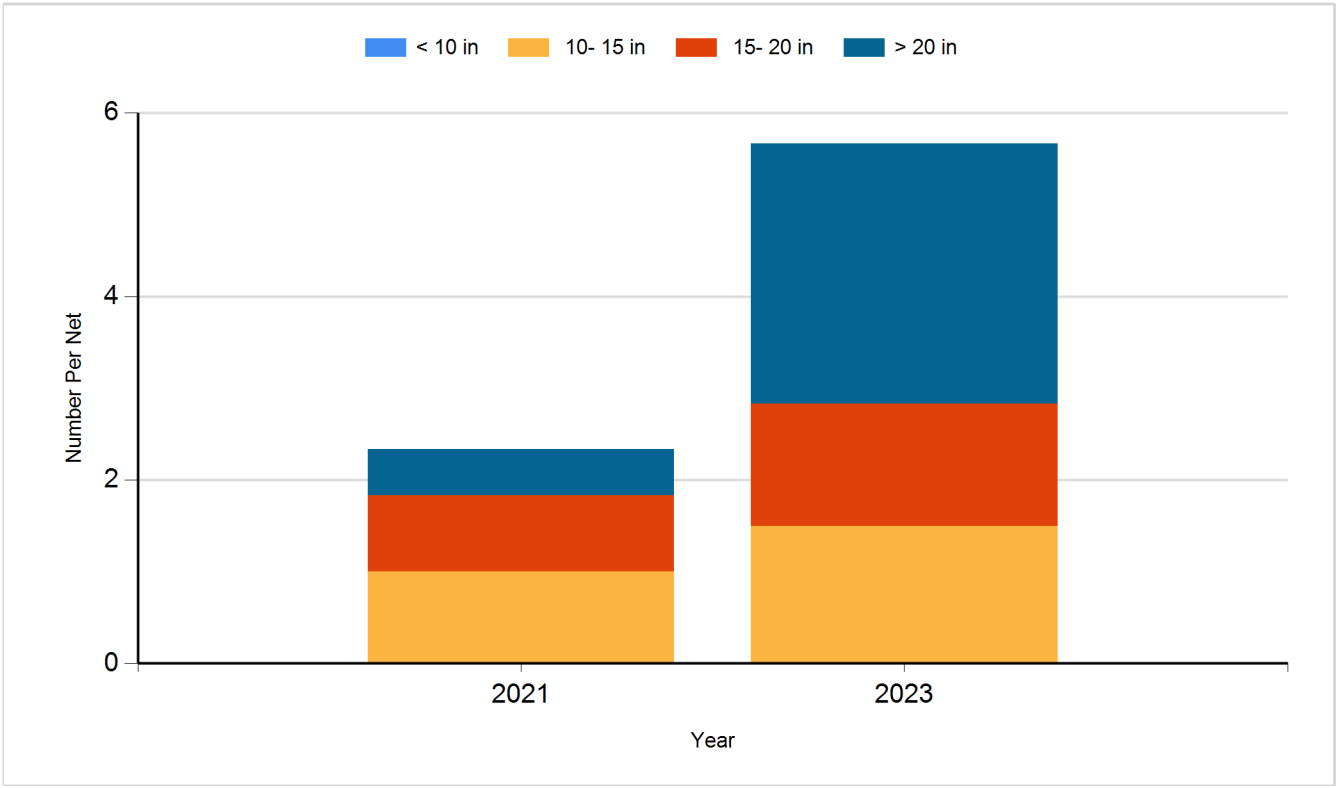
Species: Black Bullhead
Gear: AFS std gill net



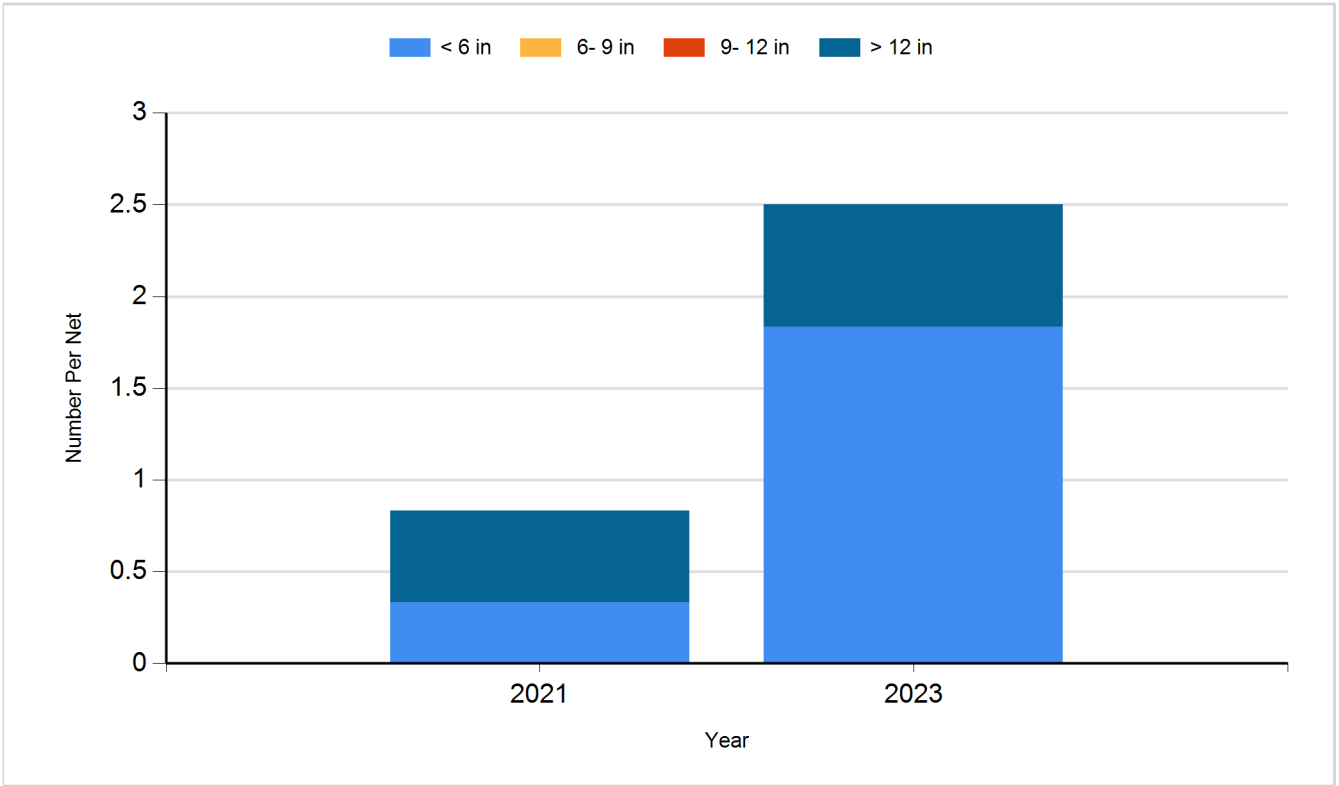
Species: Common Carp
Gear: AFS std gill net



Species: Walleye
Gear: AFS std gill net



Species: White Bass
Gear: AFS std gill net



Species: Yellow Perch
Gear: AFS std gill net