SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Vermillion East, McCook County
VER-Lake-62-000
2022

Lake Information

Name: Vermillion East

County: McCook

Legal Description: T102N-R53W-Sec. 14-15, 22-23, 26-27, 33-35

Surface Area: 530 Acres

Maximum Depth: 23 Feet

Mean Depth: 12 Feet

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 07, 2022	10 net-nights
frame net (std 3/4 in)	Jun 07, 2022	10 net-nights

Common Fish Species Present

Walleye

Black Crappie

White Crappie

Common Carp

Freshwater Drum

Bluegill

White Sucker

Northern Pike

Channel Catfish

Black Bullhead

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	3	0.3	0.3	100		67		107	12
	Channel Catfish	19	1.9	0.6	84		26		105	6
	Common Carp	63	6.3	1.9	68	9	10	6		
	Freshwater Drum	32	3.2	0.8	94		59	13		
	Northern Pike	28	2.8	0.6	61	14	4		86	2
	Walleye	10	1.0	0.6	60		10		84	2
	White Sucker	29	2.9	1.0	100		100			
frame net (std 3/4 in)	Bigmouth Buffalo	2	0.2	0.2	100		0			
	Black Bullhead	12	1.2	0.6	92		0			
	Black Crappie	196	19.6	11.0	100		53	5	108	1
	Bluegill	32	3.2	1.5	81	11	50	14	121	4
	Channel Catfish	2	0.2	0.2	100		100		100	4
	Common Carp	27	2.7	1.3	85		15			
	Freshwater Drum	2	0.2	0.2	100		50			
	Northern Pike	7	0.7	0.5	57		14		87	3
	Walleye	6	0.5	0.6	100		60		80	4
	White Bass	1	0.1	0.1	100		100		94	
	White Crappie	79	7.9	2.2	73	7	35	8	106	2
	White Sucker	9	0.9	0.6	100		100			

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	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg
AFS std gill net	Black Crappie										0.3	0.30
	Channel Catfish										1.9	1.90
	Common Carp										6.3	6.30
	Freshwater Drum										3.2	3.20
	Northern Pike										2.8	2.80
	Walleye										1.0	1.00
	White Sucker										2.9	2.90
frame net (std 3/4 in)	Bigmouth Buffalo										0.2	0.20
	Black Bullhead										1.2	1.20
	Black Crappie										19.6	19.60
	Bluegill										3.2	3.20
	Channel Catfish										0.2	0.20
	Common Carp										2.7	2.70
	Freshwater Drum										0.2	0.20
	Northern Pike										0.7	0.70
	Walleye										0.5	0.50
	White Bass										0.1	0.10
	White Crappie										7.9	7.90
	White Sucker										0.9	0.90

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	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AFS std gill net	Black Crappie	PSD										100
		PSD-P										67
		Wr										107
	Channel Catfish	PSD										84
		PSD-P										26
		Wr										105
	Common Carp	PSD										68
		PSD-P										10
	Northern Pike	PSD										61
		PSD-P										4
		Wr										86
	Walleye	PSD										60
		PSD-P										10
		Wr										84
	White Sucker	PSD										100
		PSD-P										100
frame net (std 3/4 in)	Black Bullhead	PSD										92
		PSD-P										0
	Black Crappie	PSD										100
		PSD-P										53
		Wr										108
	Bluegill	PSD										81
		PSD-P										50
		Wr										121
	Channel Catfish	PSD										100
		PSD-P										100
		Wr										100
	Common Carp	PSD										85
		PSD-P										15
	Northern Pike	PSD										57
		PSD-P										14
		Wr										87
	Walleye	PSD										100

			Year									
Gear	Species	Index	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
frame net (std 3/4 in)	Walleye	PSD-P										60
		Wr										80
	White Crappie	PSD										73
		PSD-P										35
		Wr										106
	White Sucker	PSD										100
		PSD-P										100

Fish Condition

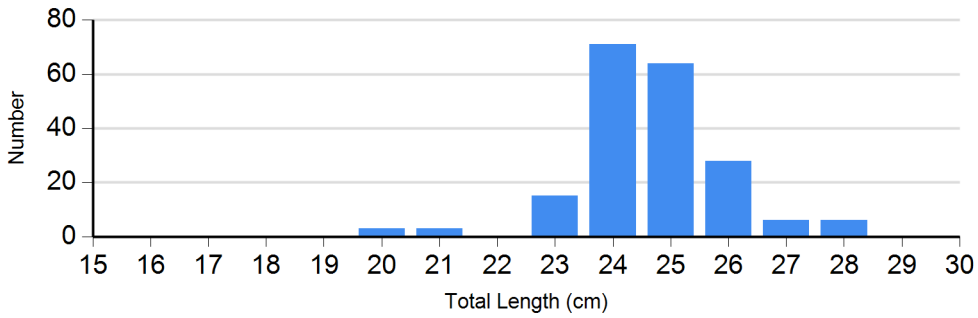
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2022	0		92	111 (0.9)	104	105 (1.2)	0	
Bluegill Frame Net	2022	6	117 (4.0)	10	118 (7.8)	16	124 (3.2)	0	
Channel Catfish Gill Net	2022	3	98 (5.2)	11	107 (7.6)	4	104 (7.3)	1	106
Northern Pike Gill Net	2022	11	87 (1.1)	16	85 (1.5)	1	108	0	
Walleye Gill Net	2022	4	86 (1.9)	5	82 (2.2)	1	84	0	
White Crappie Frame Net	2022	21	114 (1.4)	30	107 (1.7)	23	99 (1.3)	5	92 (2.5)

Length Frequency Distribution

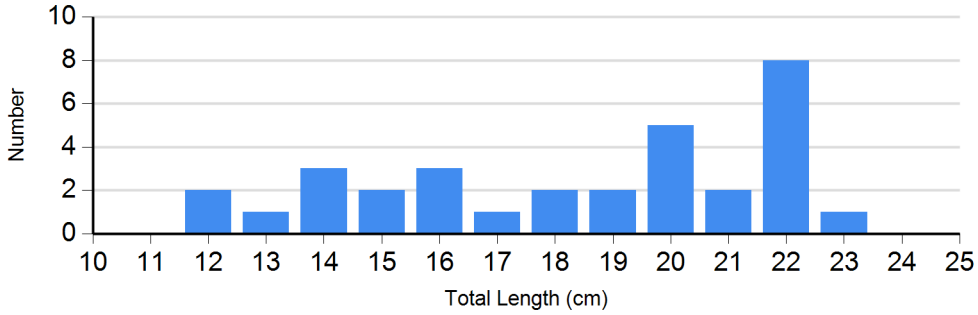
Length frequency histogram of species sampled by year.

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



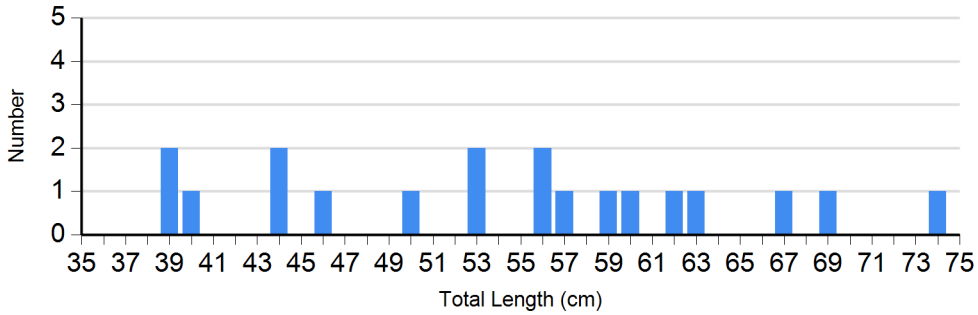
2022

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



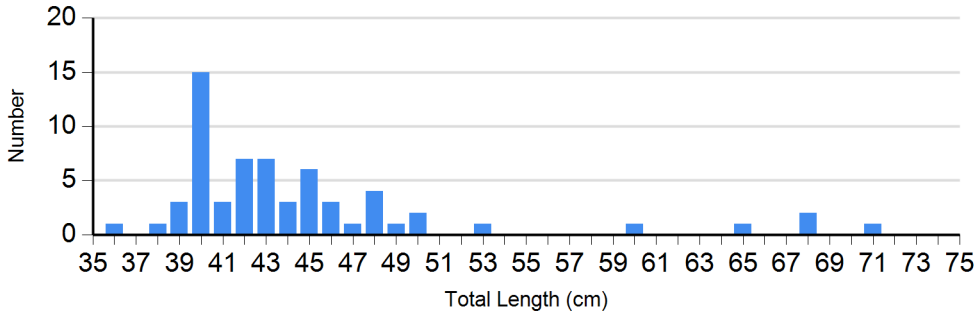
2022

Species: Channel Catfish
Gear: AFS std gill net



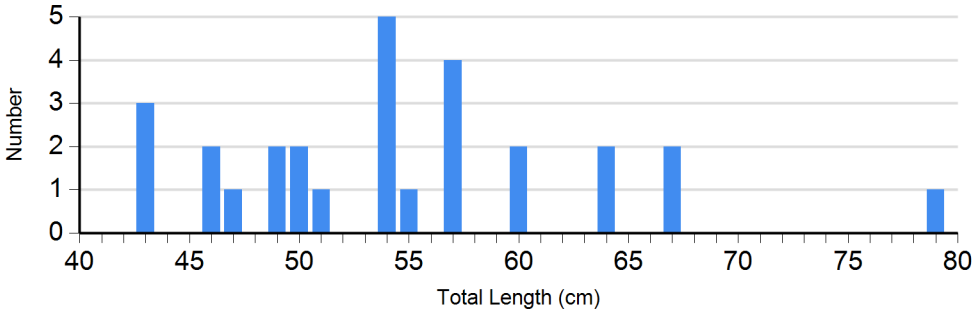
2022

Species: Common Carp
Gear: AFS std gill net



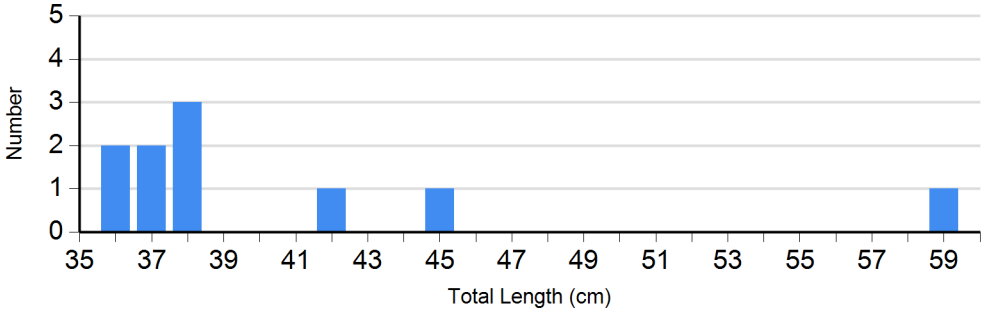
2022

Species: Northern Pike
Gear: AFS std gill net



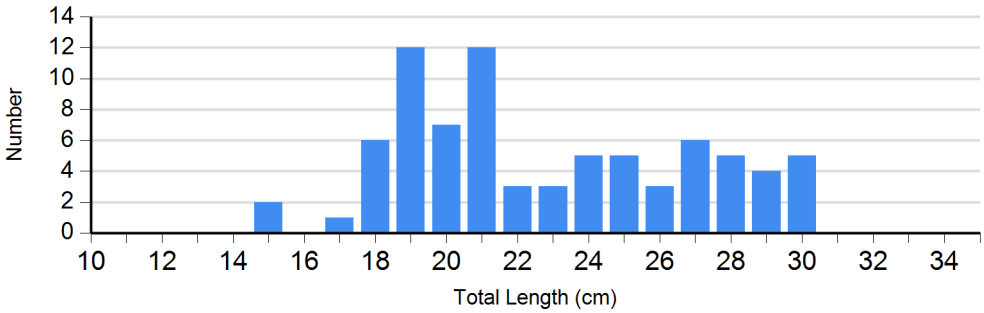
2022

Species: Walleye
Gear: AFS std gill net



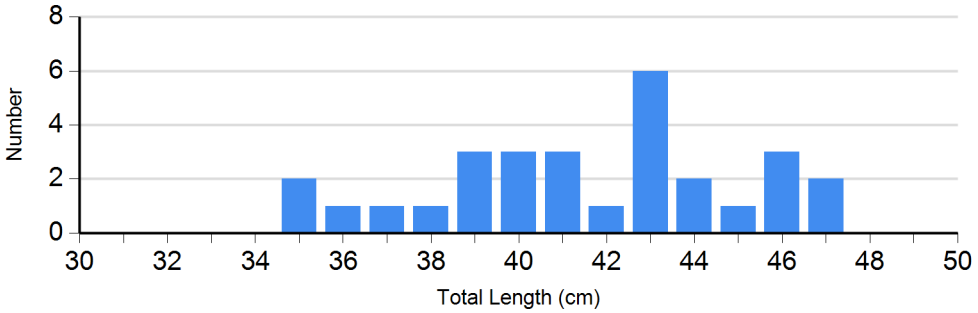
2022

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



2022

Species: White Sucker
Gear: AFS std gill net

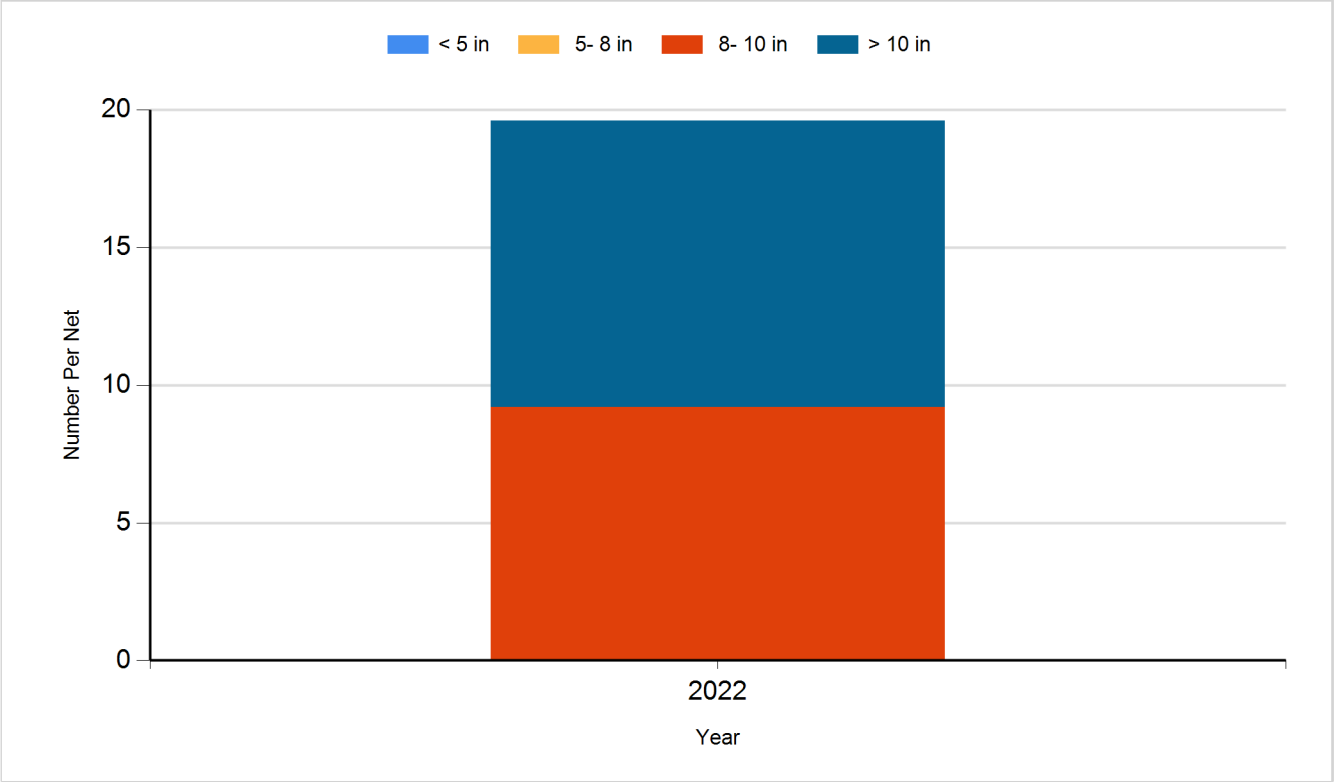


2022

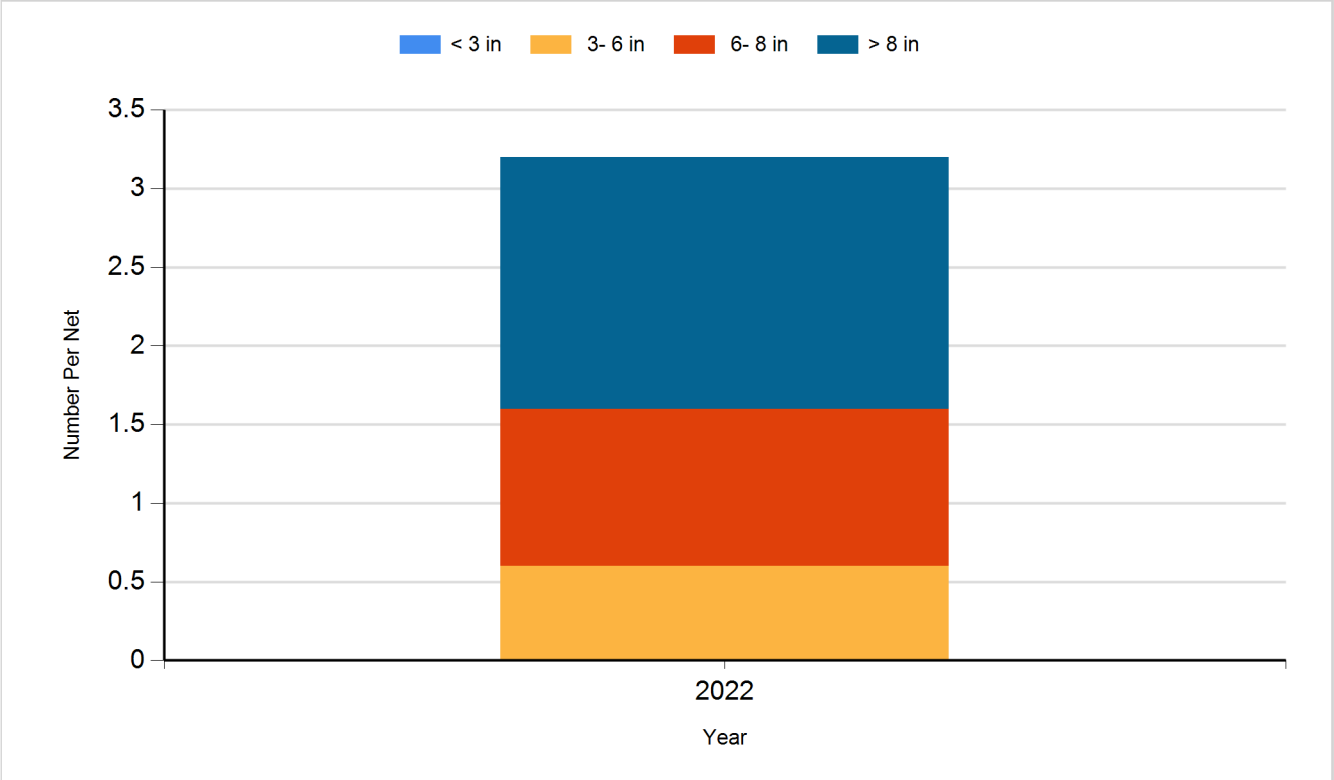
Historic Fish Sizes and Relative Abundance

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

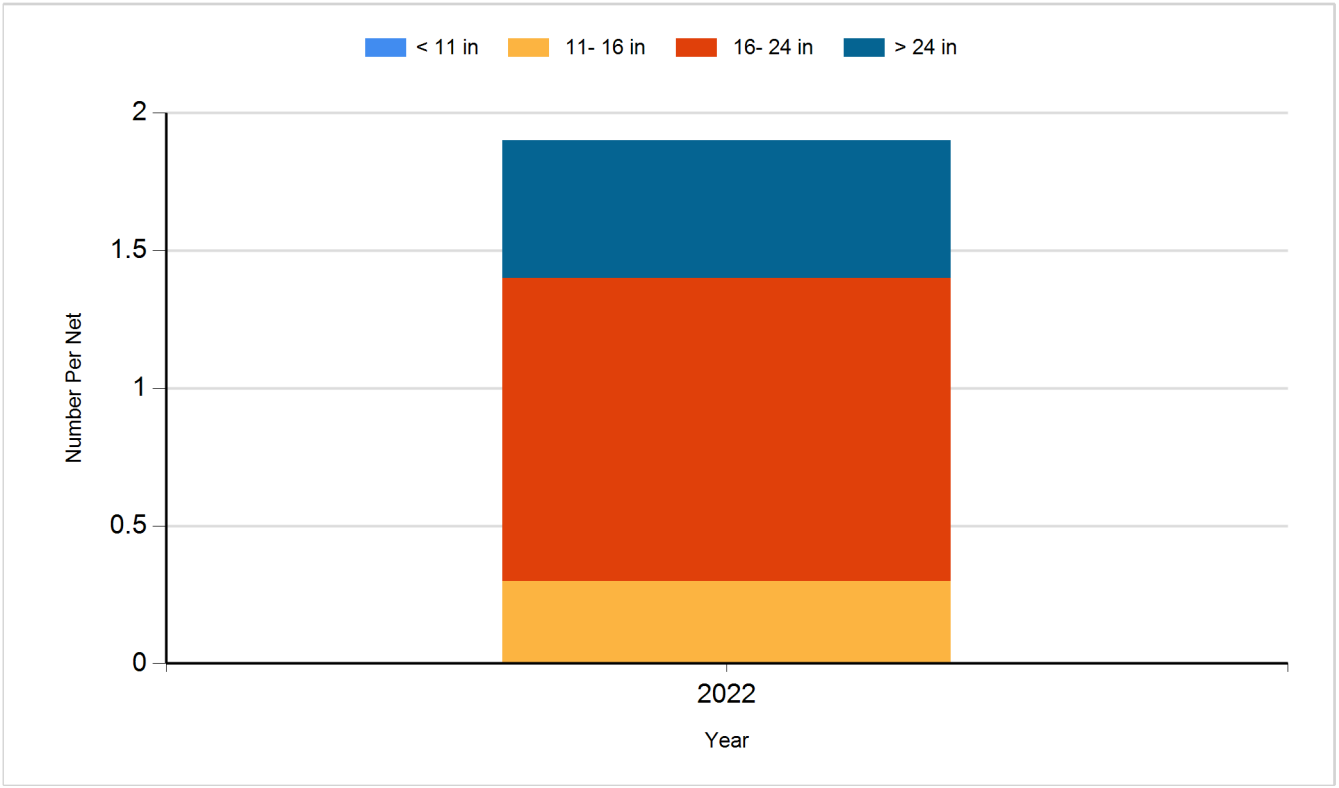
Species: Black Crappie
Gear: frame net (std 3/4 in)



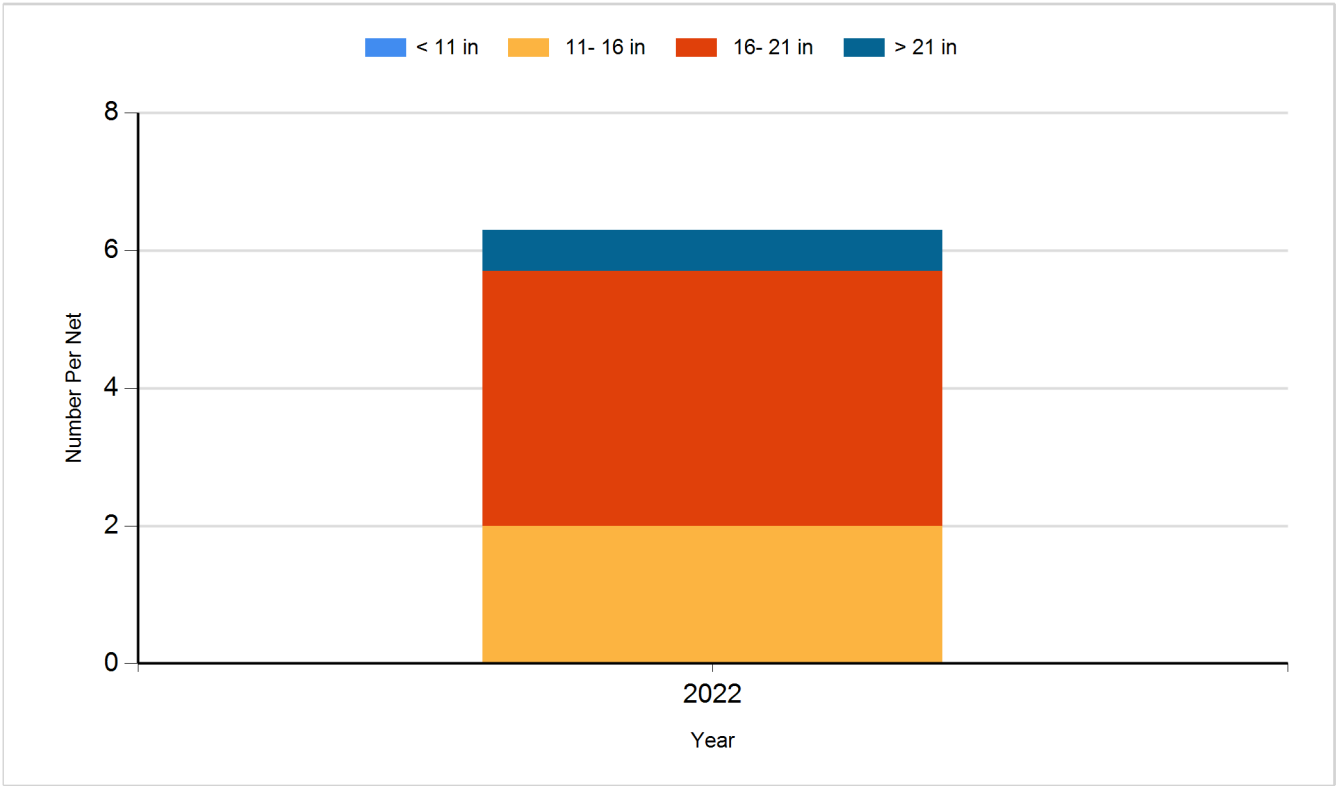
Species: Bluegill
Gear: frame net (std 3/4 in)



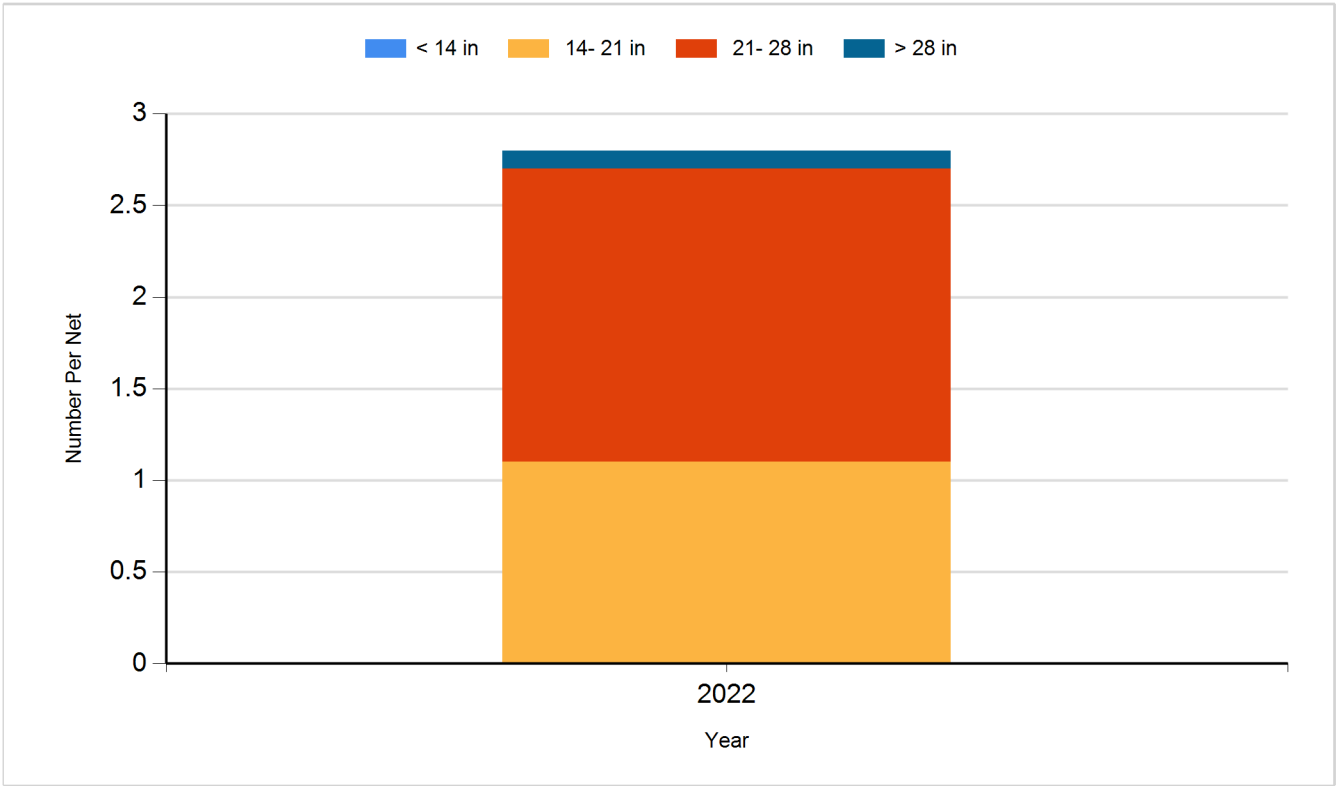
Species: Channel Catfish
Gear: AFS std gill net



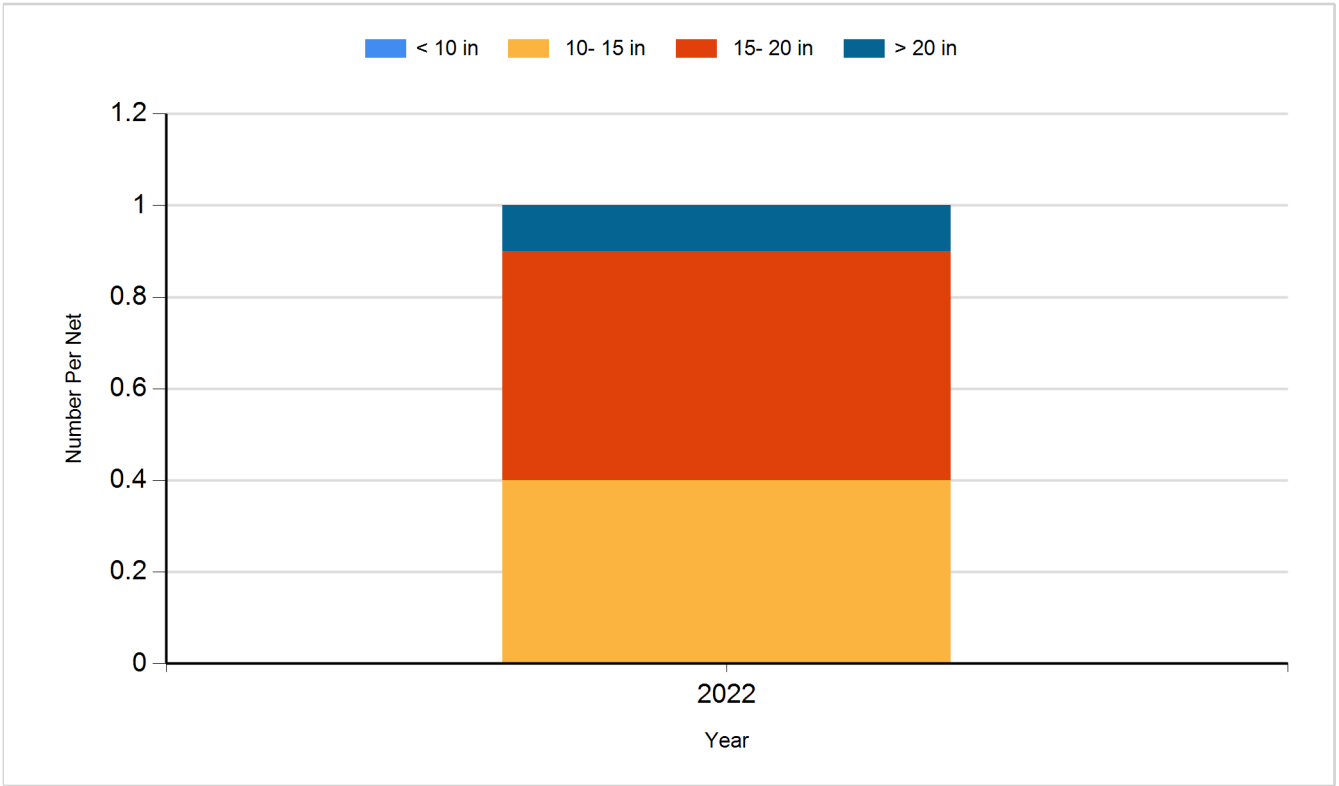
Species: Common Carp
Gear: AFS std gill net



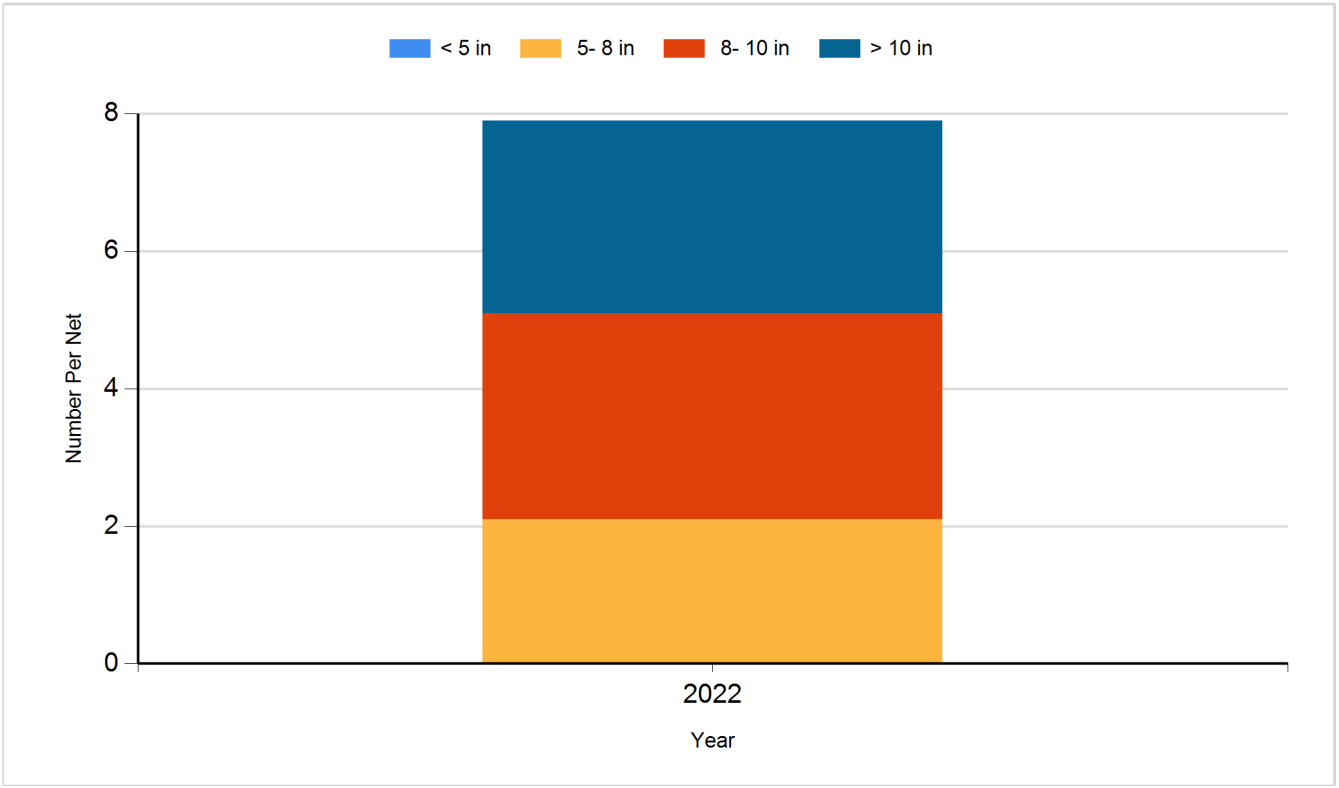
Species: Northern Pike
Gear: AFS std gill net



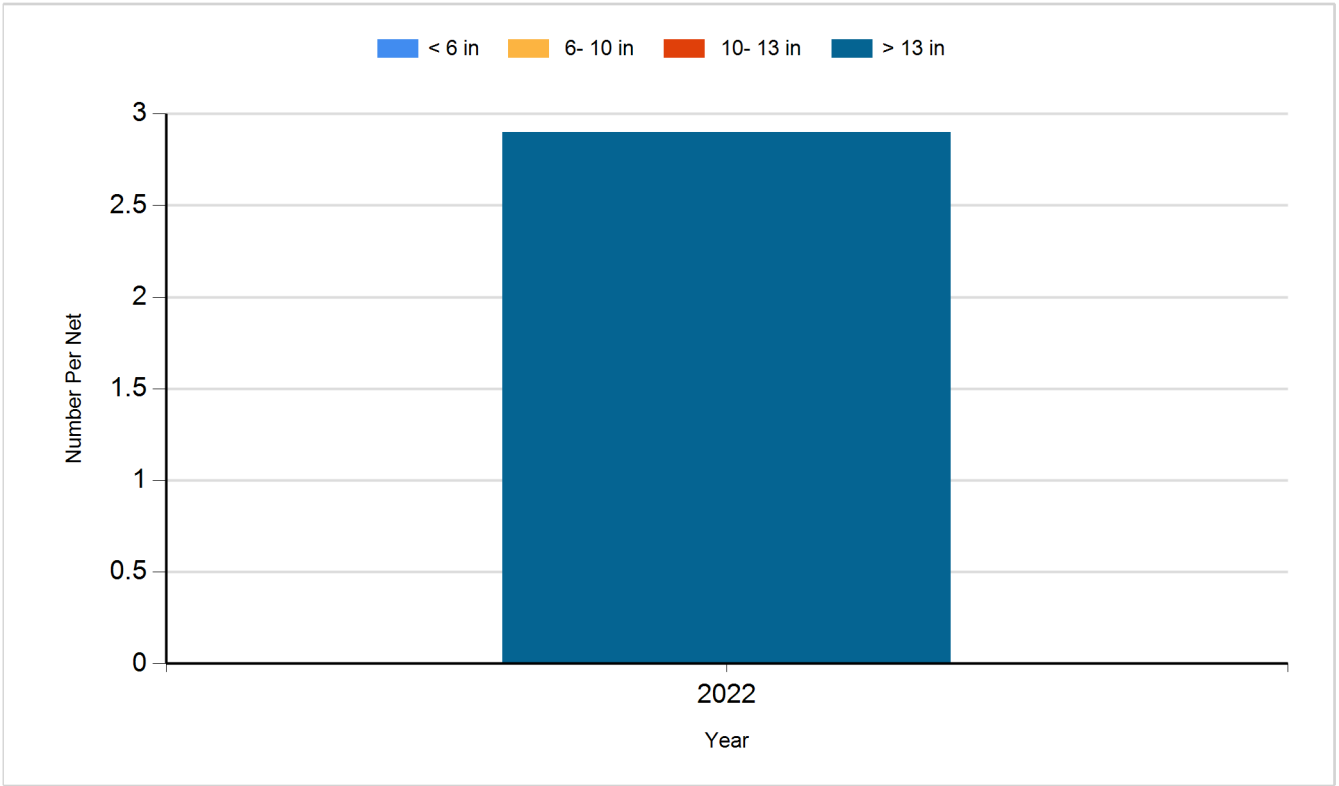
Species: Walleye
Gear: AFS std gill net



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



Species: White Sucker
Gear: AFS std gill net



Fish Stocking

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

Year	Species	Size	Number
2011	Walleye	Large Fingerling	196
2011	Yellow Perch	Adult	737
2012	Black Crappie	Juvenile	1,073
2012	Yellow Perch	Fingerling	4,725
2012	Yellow Perch	Juvenile	8,136
2013	Walleye	Small Fingerling	50,530
2014	Walleye	Large Fingerling	10,207
2015	Walleye	Small Fingerling	36,240
2017	Walleye	Small Fingerling	36,250