

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Sinai, Brookings County

MBS-Lake-232-000

2024

## Lake Information

**Name:** Sinai **Maximum Depth:** 33 Feet  
**County:** Brookings **Mean Depth:** 17 Feet  
**Legal Description:** T109N- R52W-Sec 3-4, 8-10  
**Surface Area:** 1,778 Acres

## 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

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## 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.
- **std 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.

$$CPUE = \frac{\text{number of fish}}{\text{effort}}$$

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.

$$PSD = \left( \frac{\text{number of fish} \geq \text{quality length}}{\text{number of fish} \geq \text{stock length}} \right) \times 100$$

$$PSD - P = \left( \frac{\text{number of fish} \geq \text{preferred length}}{\text{number of fish} \geq \text{stock length}} \right) \times 100$$

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.

$$Wr = \left( \frac{W}{W_s} \right) \times 100$$

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).

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(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**

Gear	Species	Sample Size (n)	Abundance		Stock Density Indices			Condition		
			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

Gear	Species	CPUE										Avg
		2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
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.

Gear	Species	Index	Year												
			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	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			



Gear	Species	Index	Year									
			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
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	

Gear	Species	Index	Year															
			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).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		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)

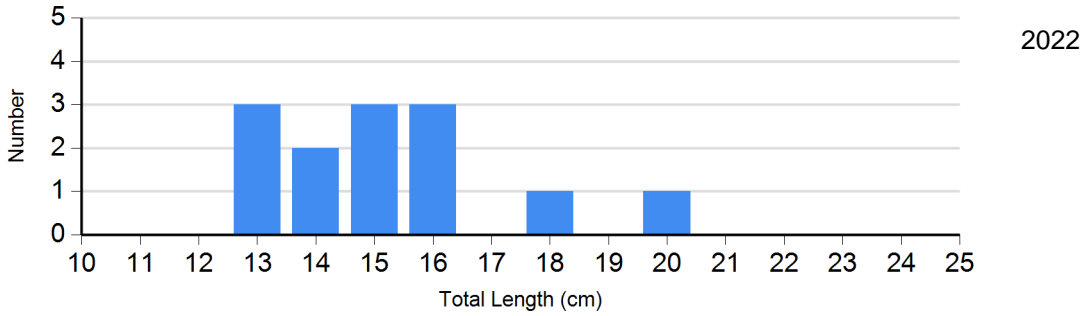
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
White Bass Gill Net	2022	4	87 (1.3)	0		2	85 (5.3)	1	75
	2023	8	79 (2.8)	2	78 (1.8)	18	81 (0.9)	2	80
	2024	1	90	30	83 (1.2)	20	80 (1.0)	2	71 (1.7)
Yellow Perch Gill Net	2020	14	96 (0.9)	11	100 (2.6)	11	96 (2.5)	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.

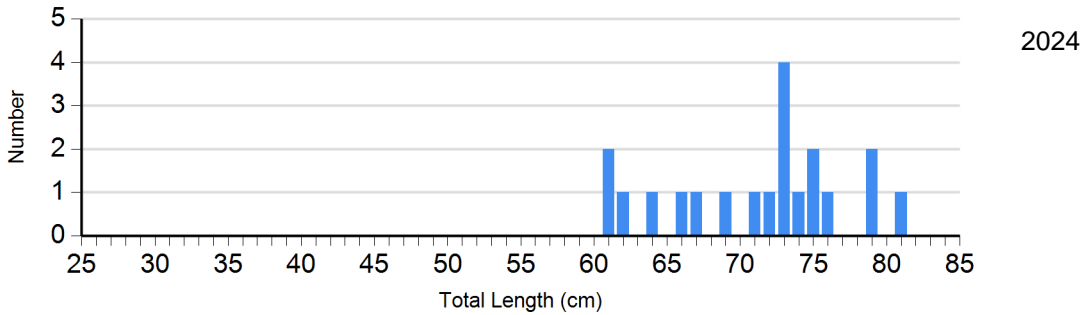
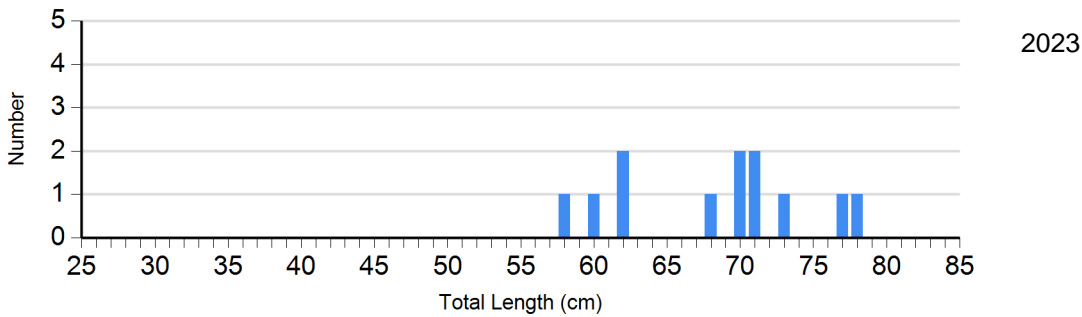
Species: Bluegill

Gear: frame net (std 3/4 in)



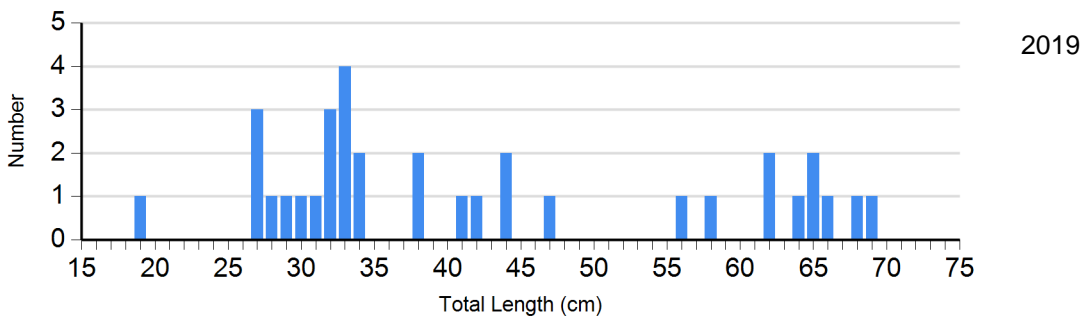
Species: Common Carp

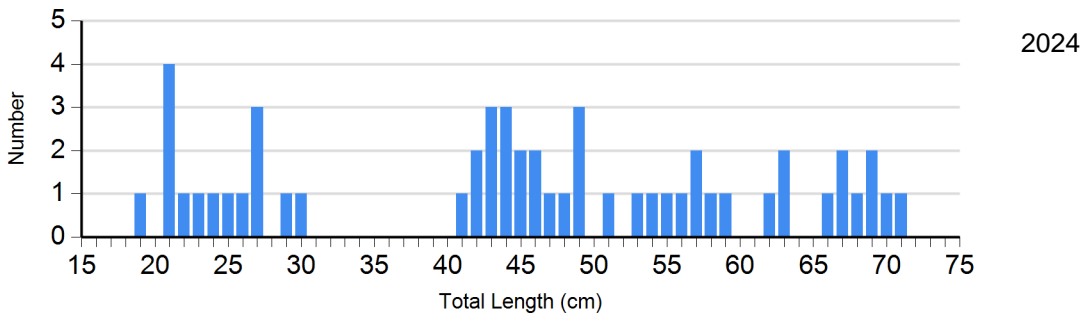
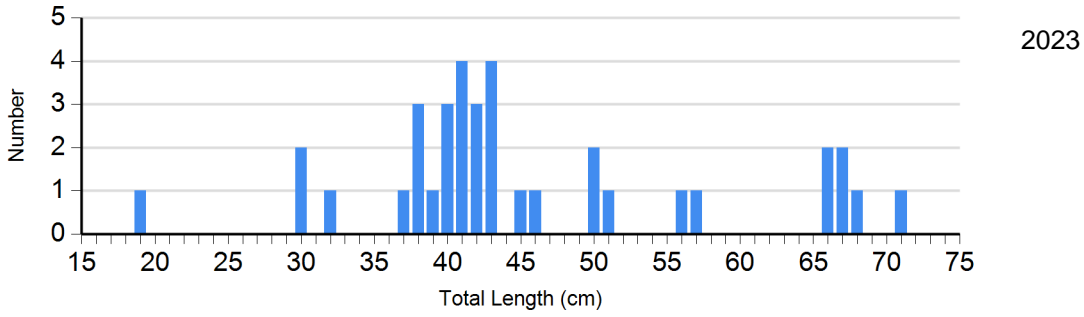
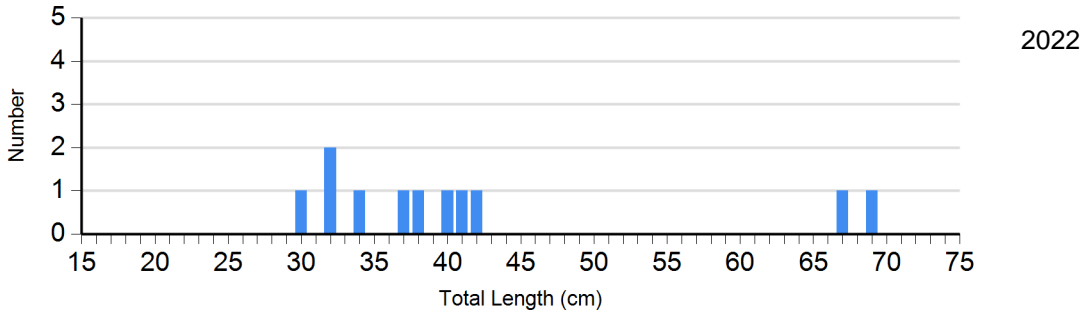
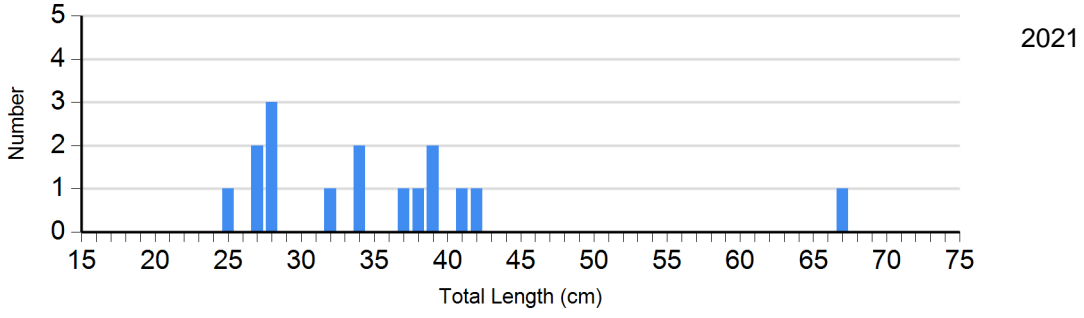
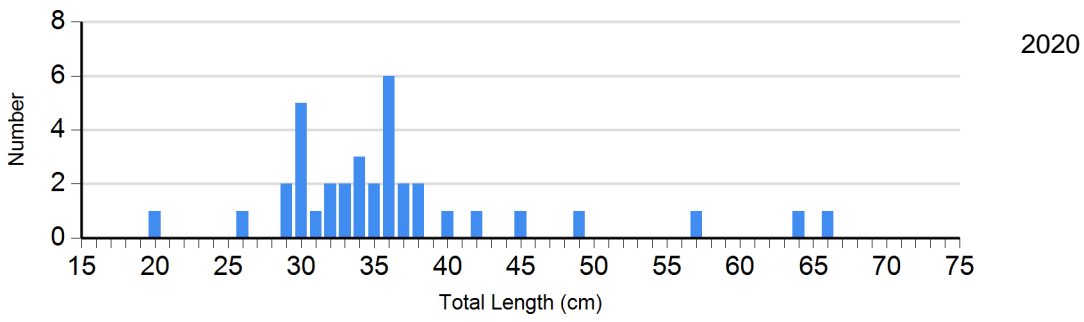
Gear: AFS std gill net



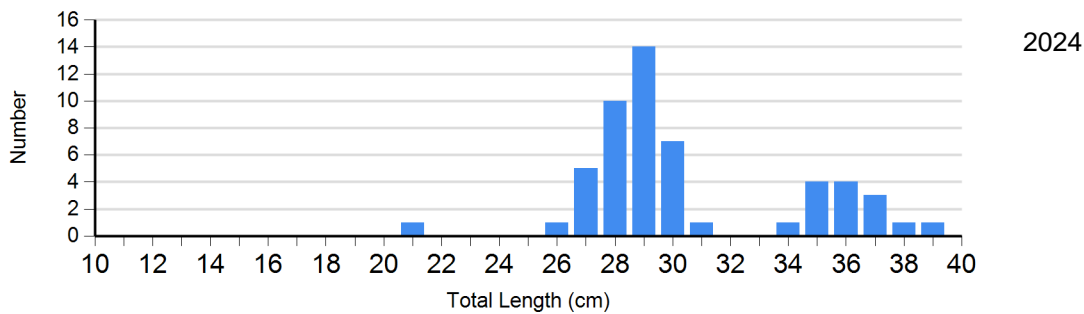
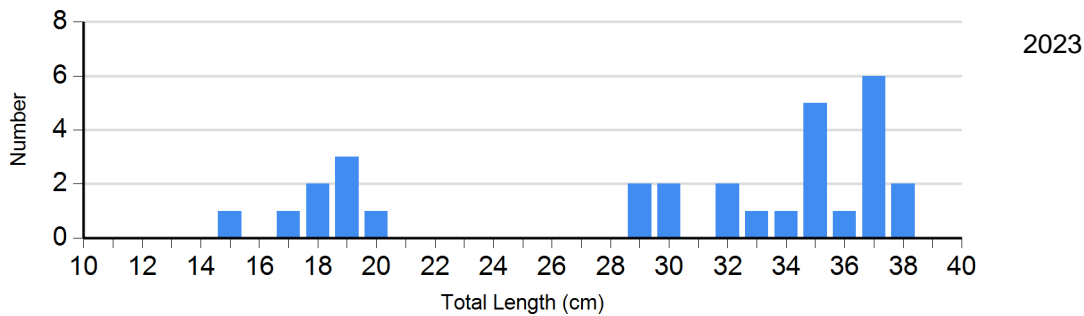
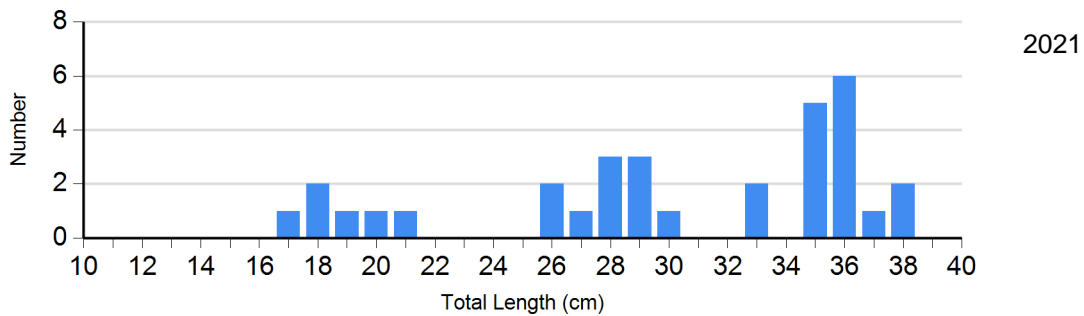
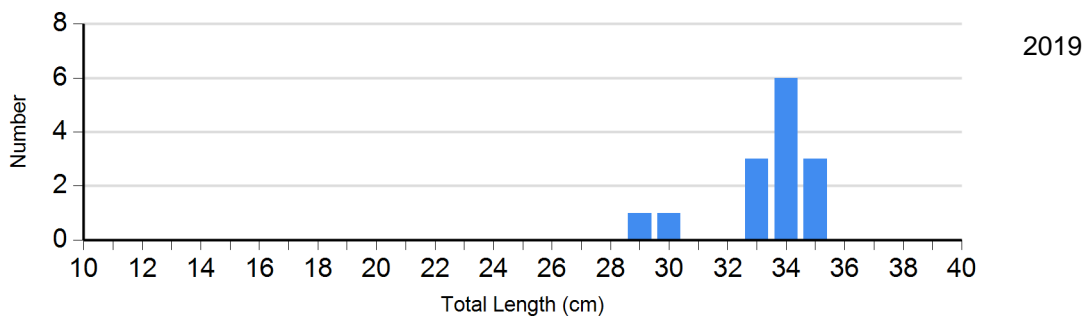
Species: Walleye

Gear: AFS std gill net

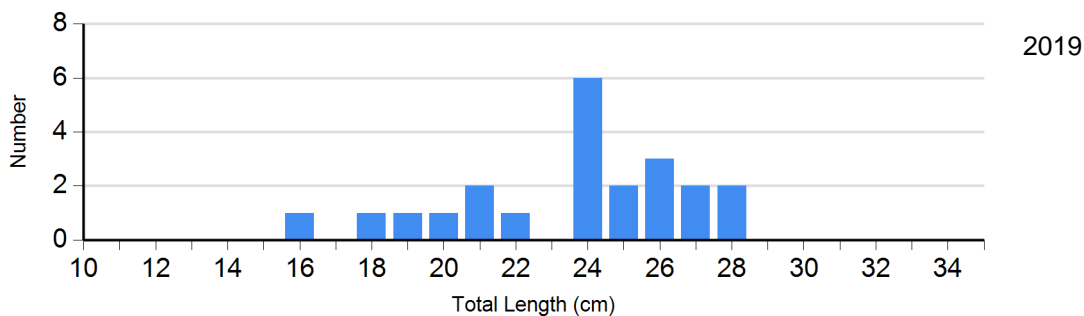




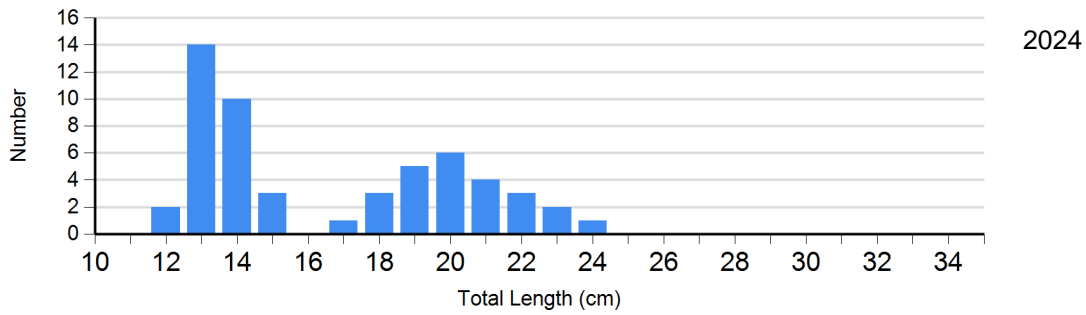
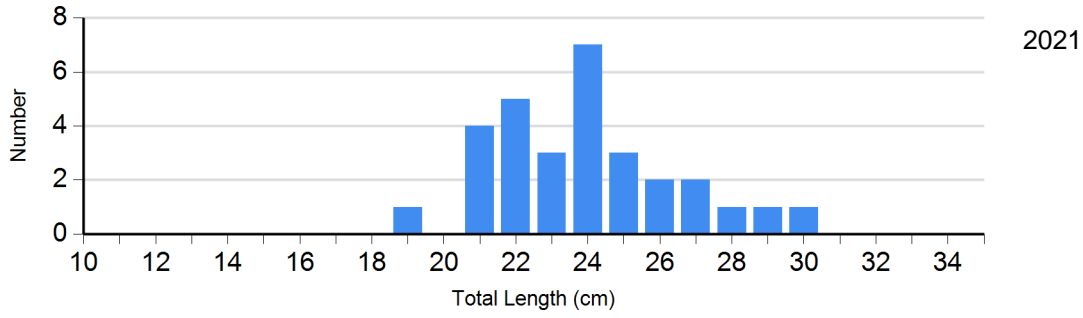
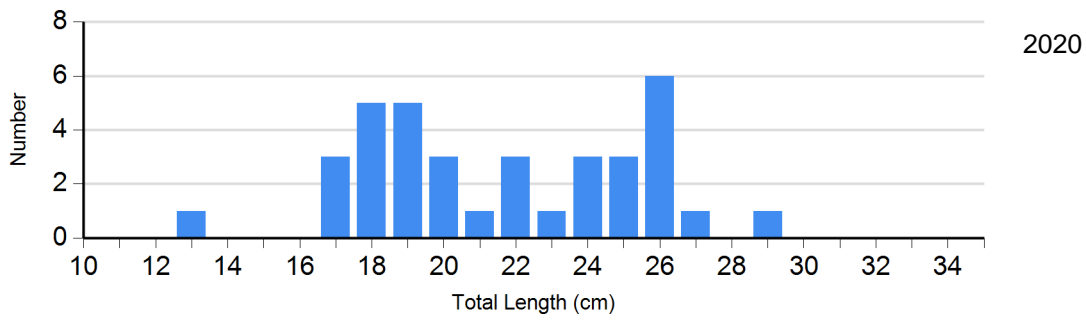
Species: White Bass  
 Gear: AFS std gill net



Species: Yellow Perch  
 Gear: AFS std gill net



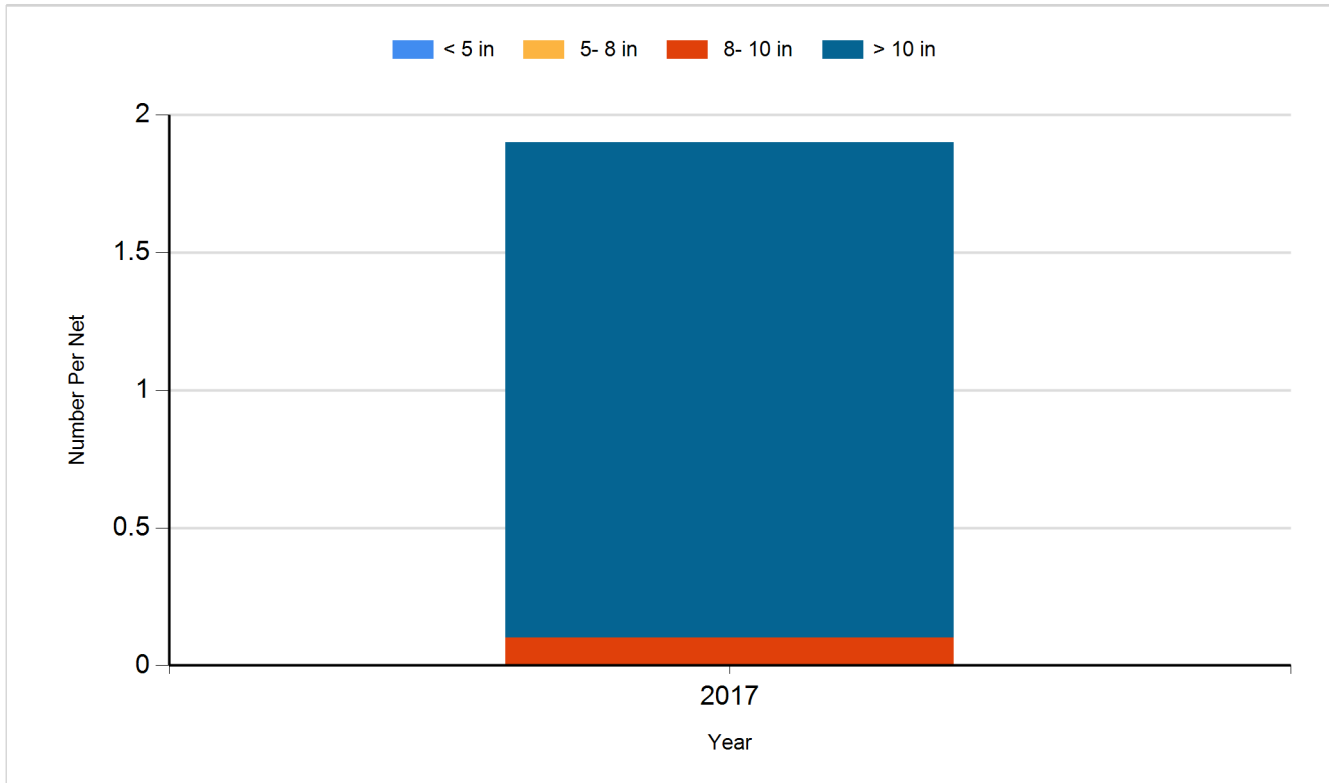




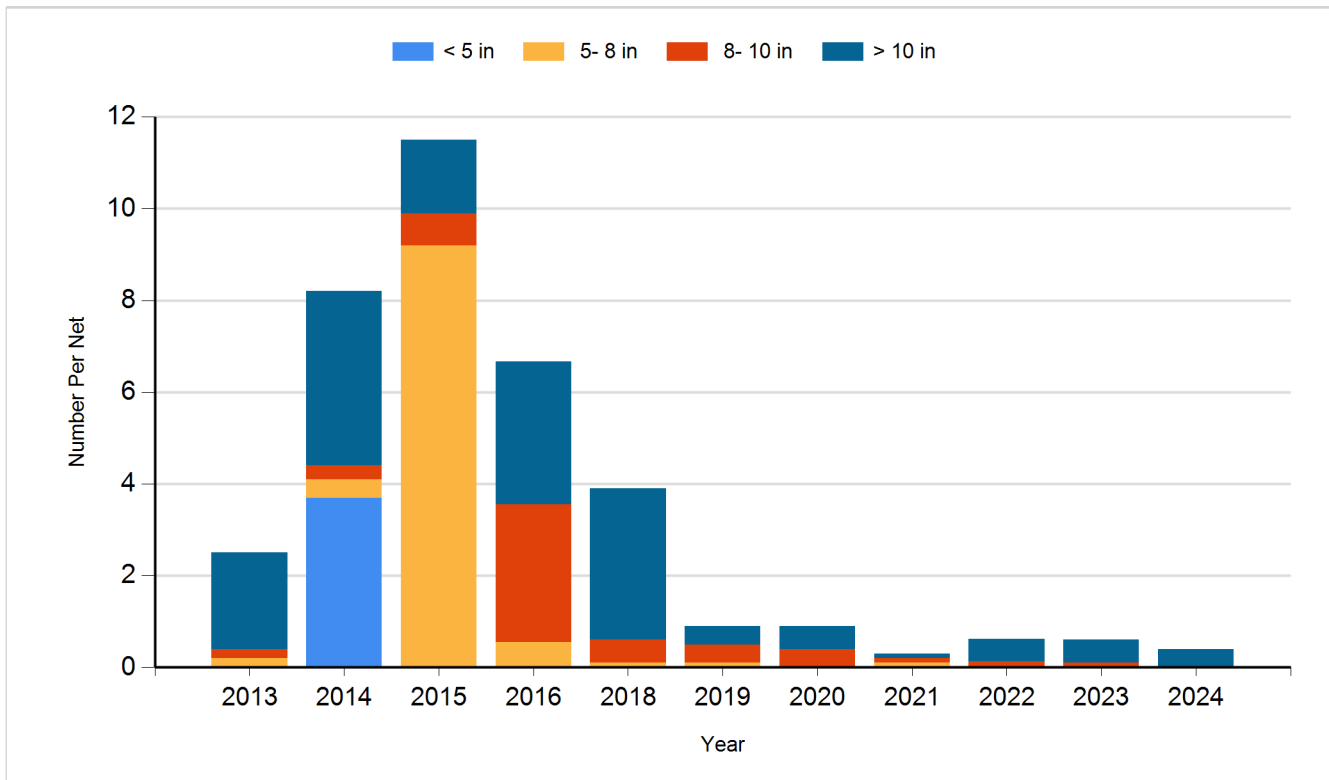
## Historic Fish Sizes and Relative Abundance

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

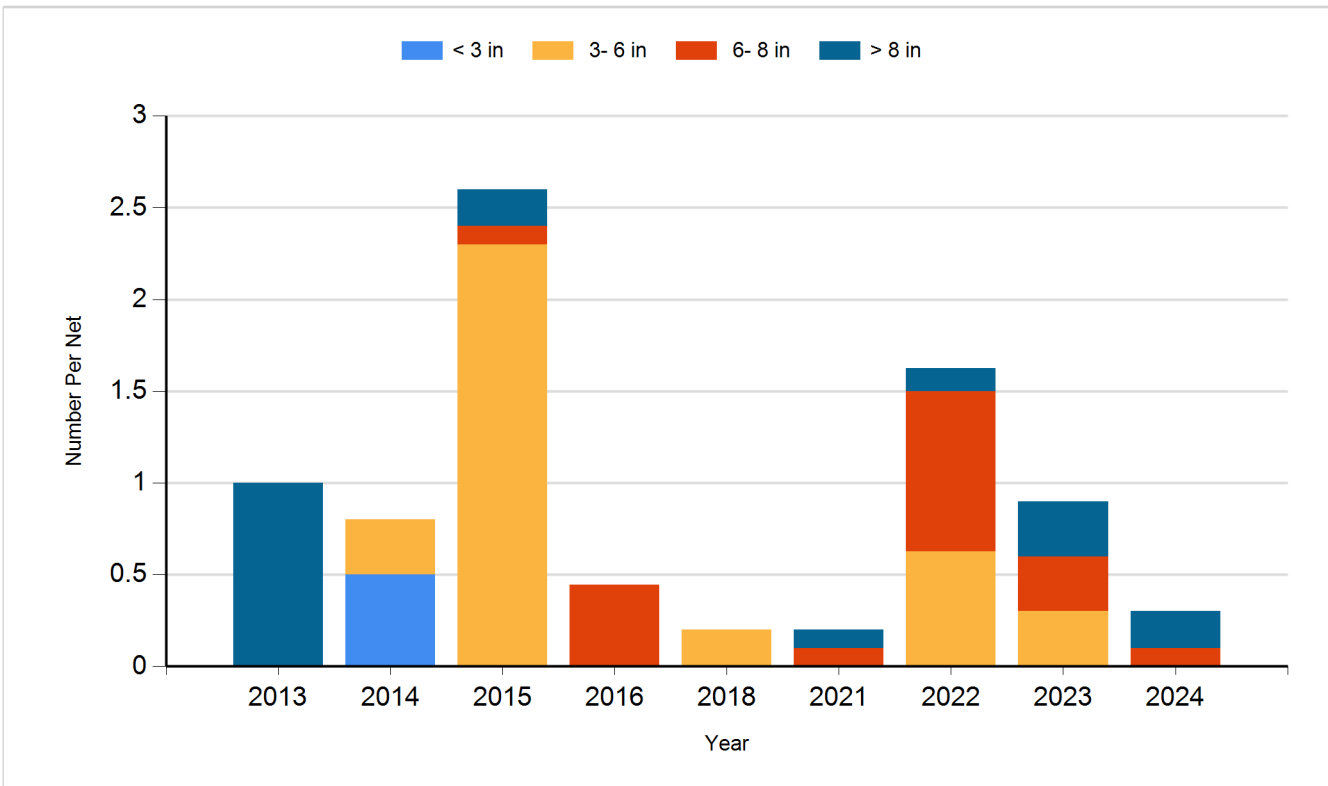
Species: Black Crappie  
Gear: AFS std frame net



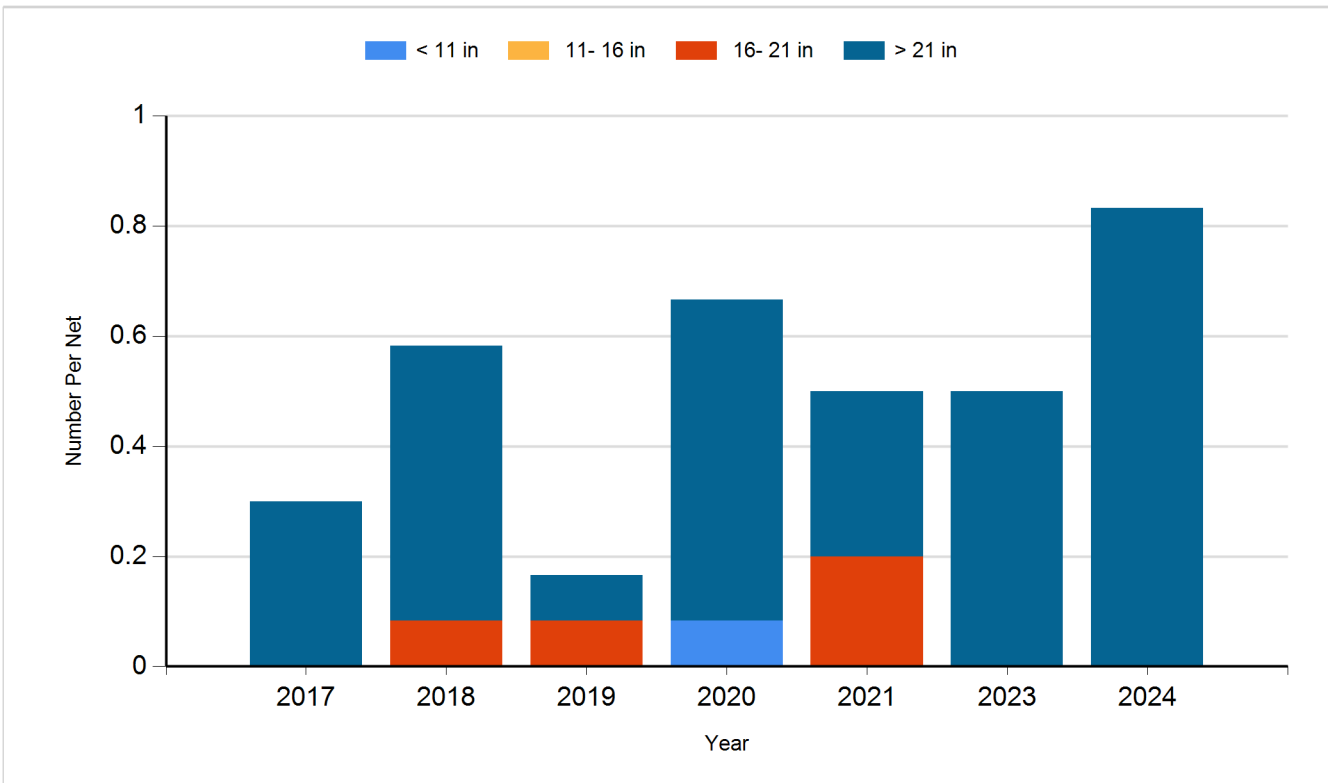
Species: Black Crappie  
Gear: frame net (std 3/4 in)



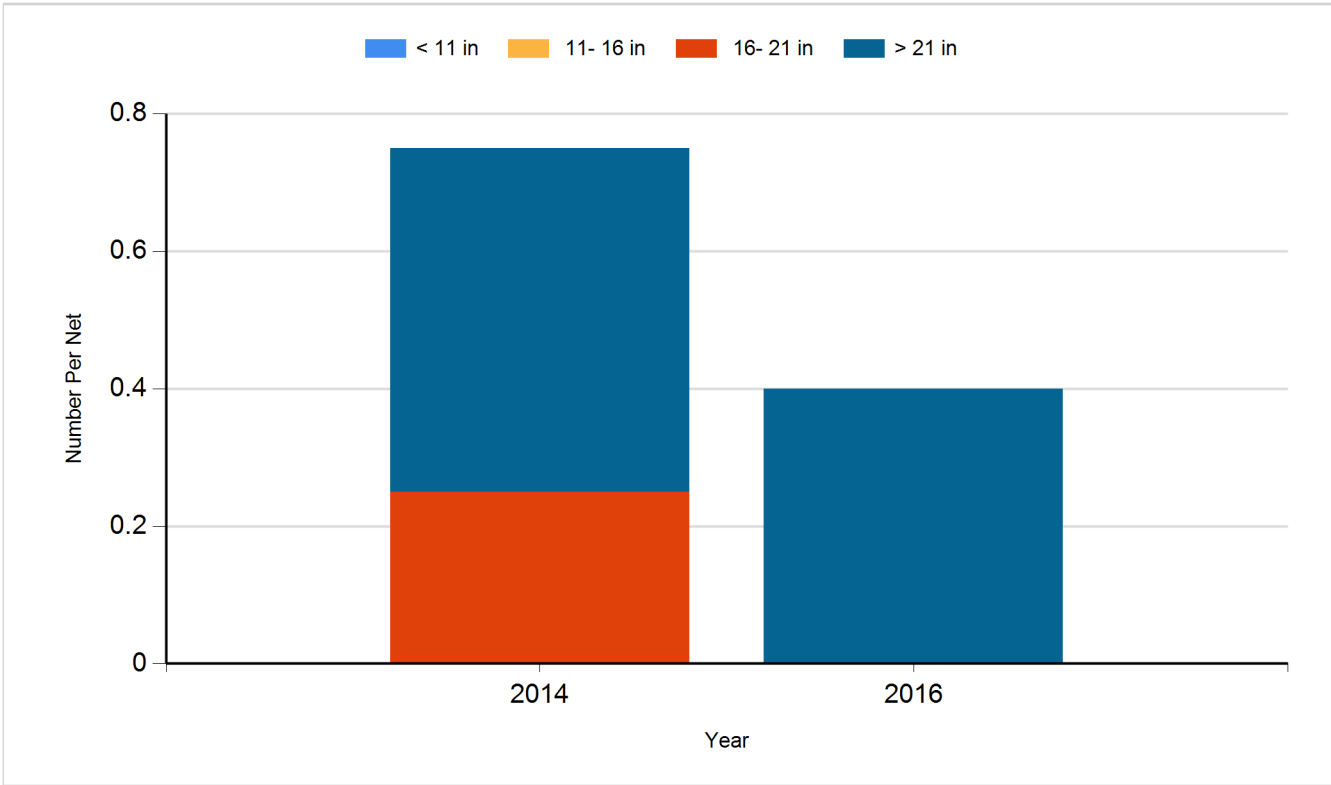
Species: Bluegill  
Gear: frame net (std 3/4 in)



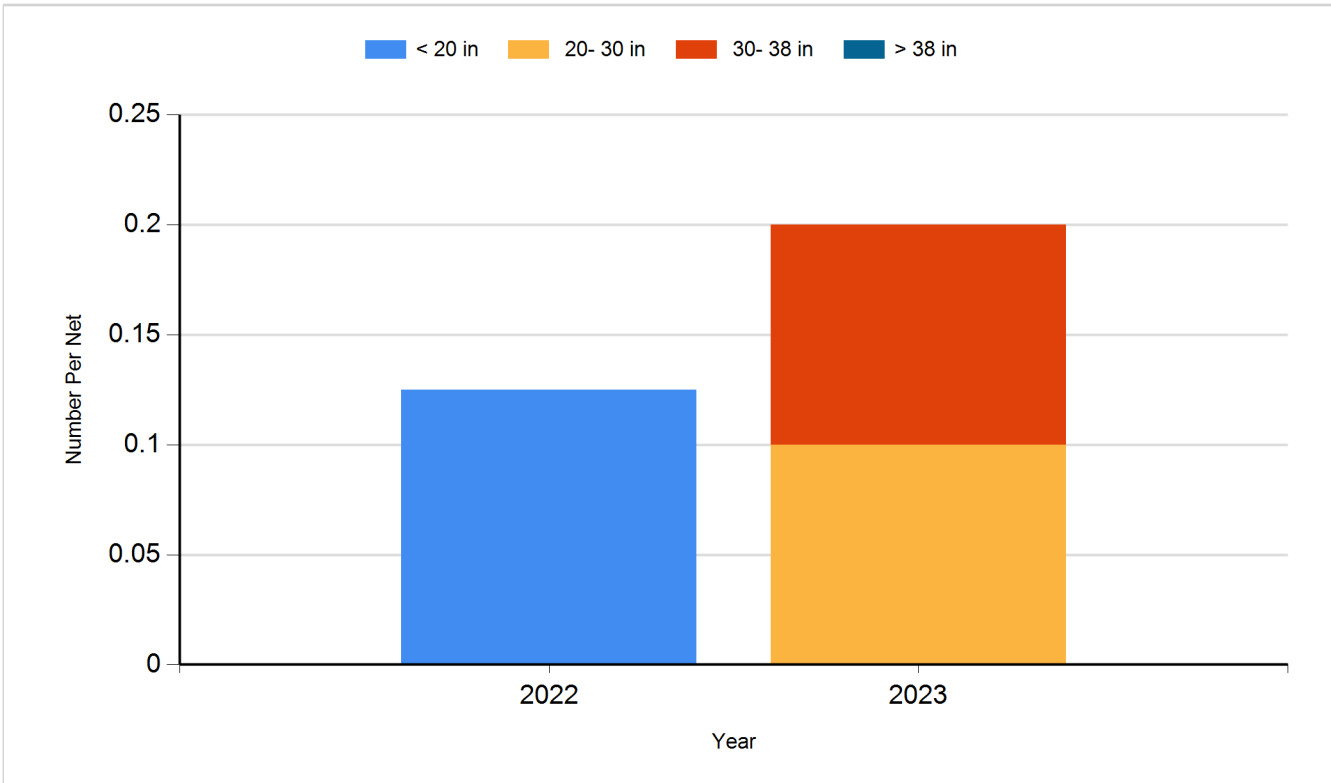
Species: Common Carp  
Gear: AFS std gill net



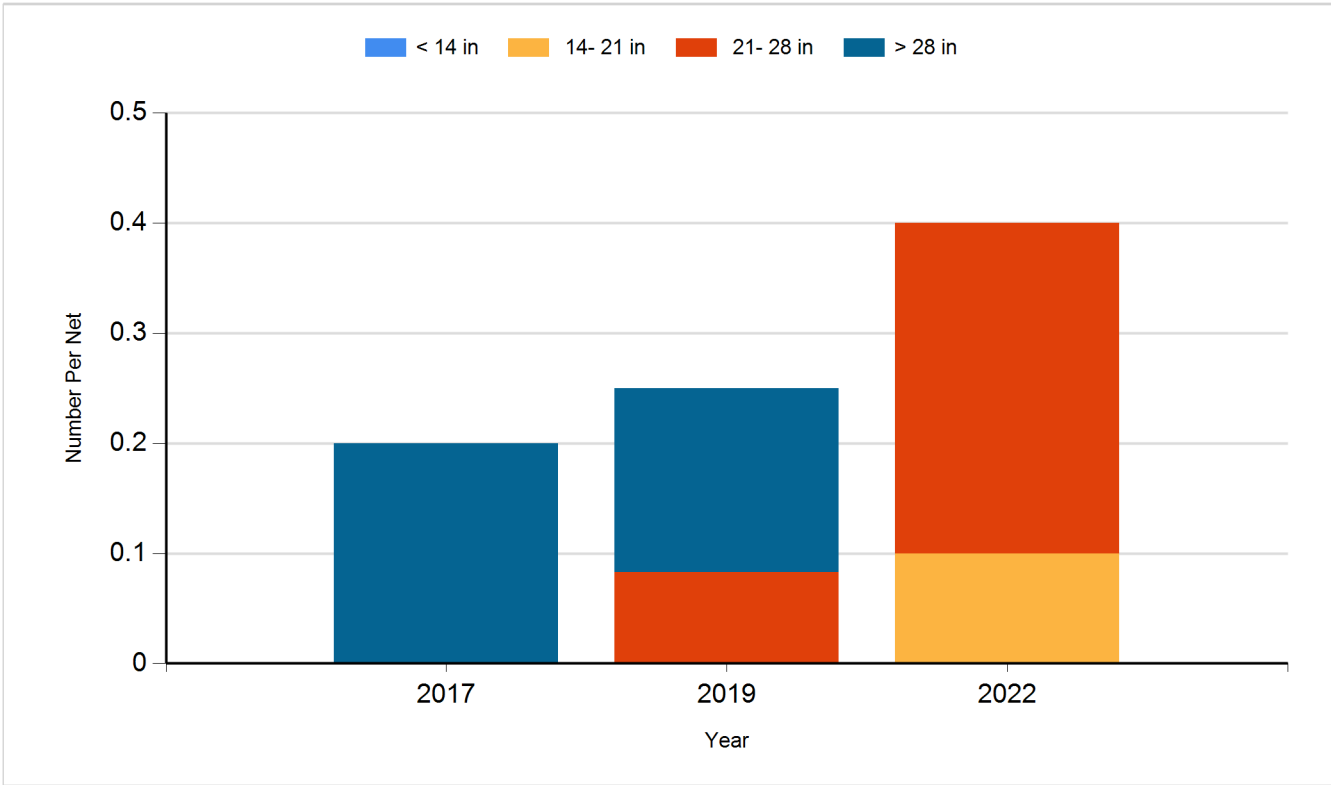
Species: Common Carp  
Gear: std exp gill net



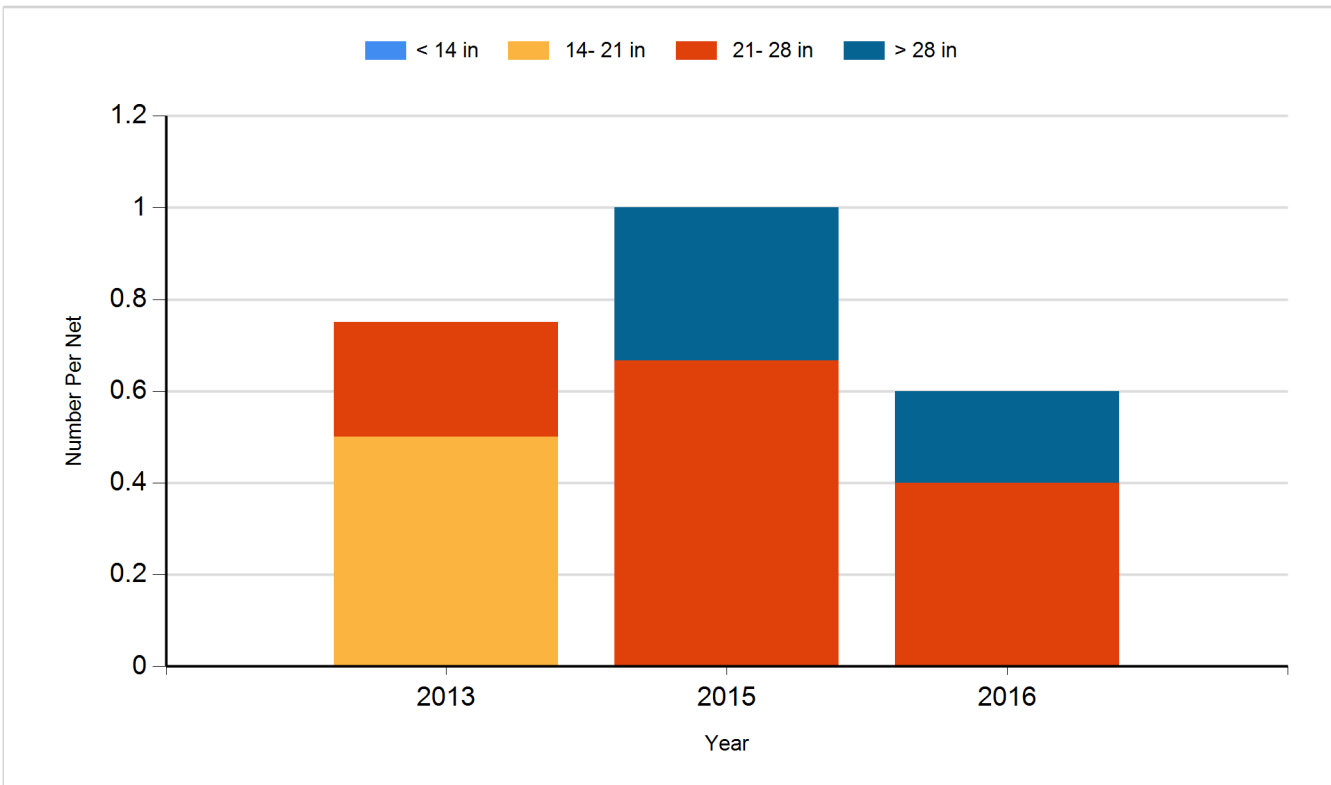
Species: Muskellunge  
Gear: frame net (std 3/4 in)



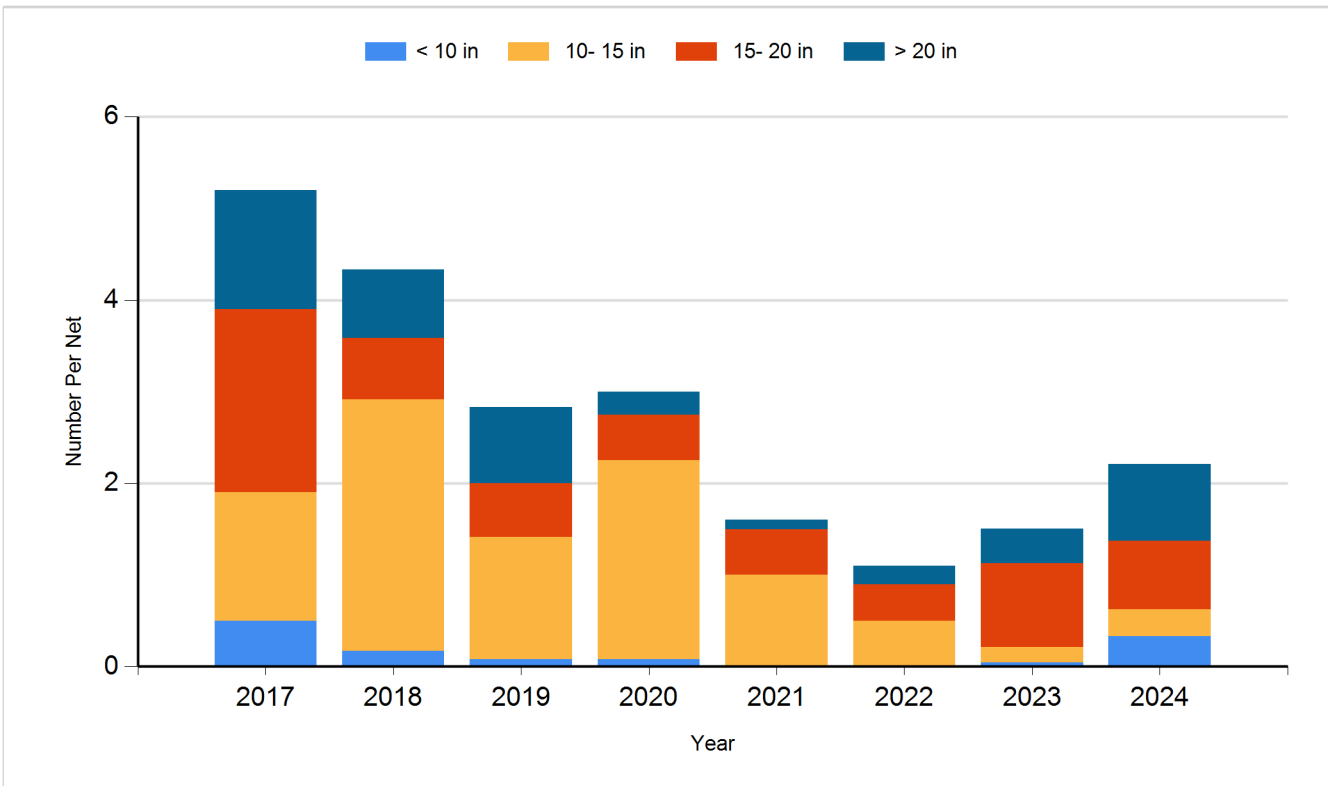
Species: Northern Pike  
Gear: AFS std gill net



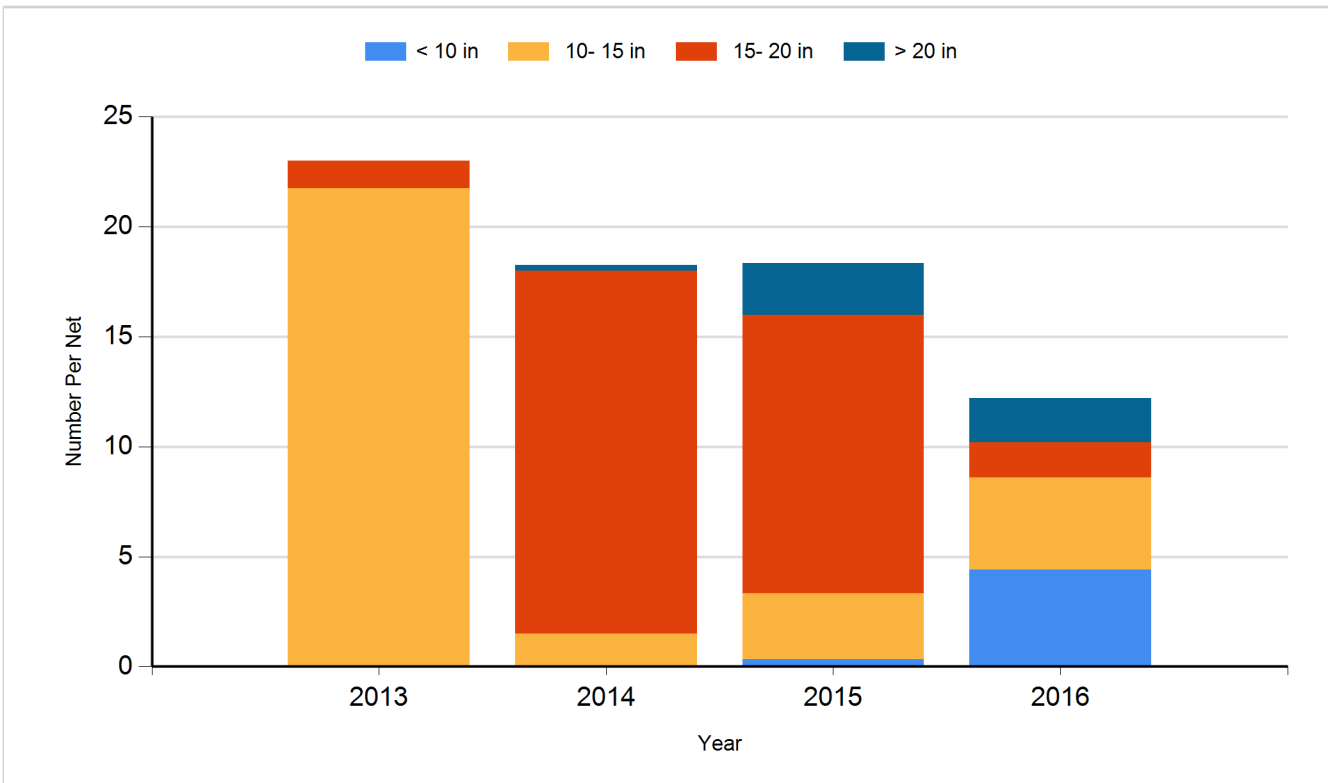
Species: Northern Pike  
Gear: std exp gill net



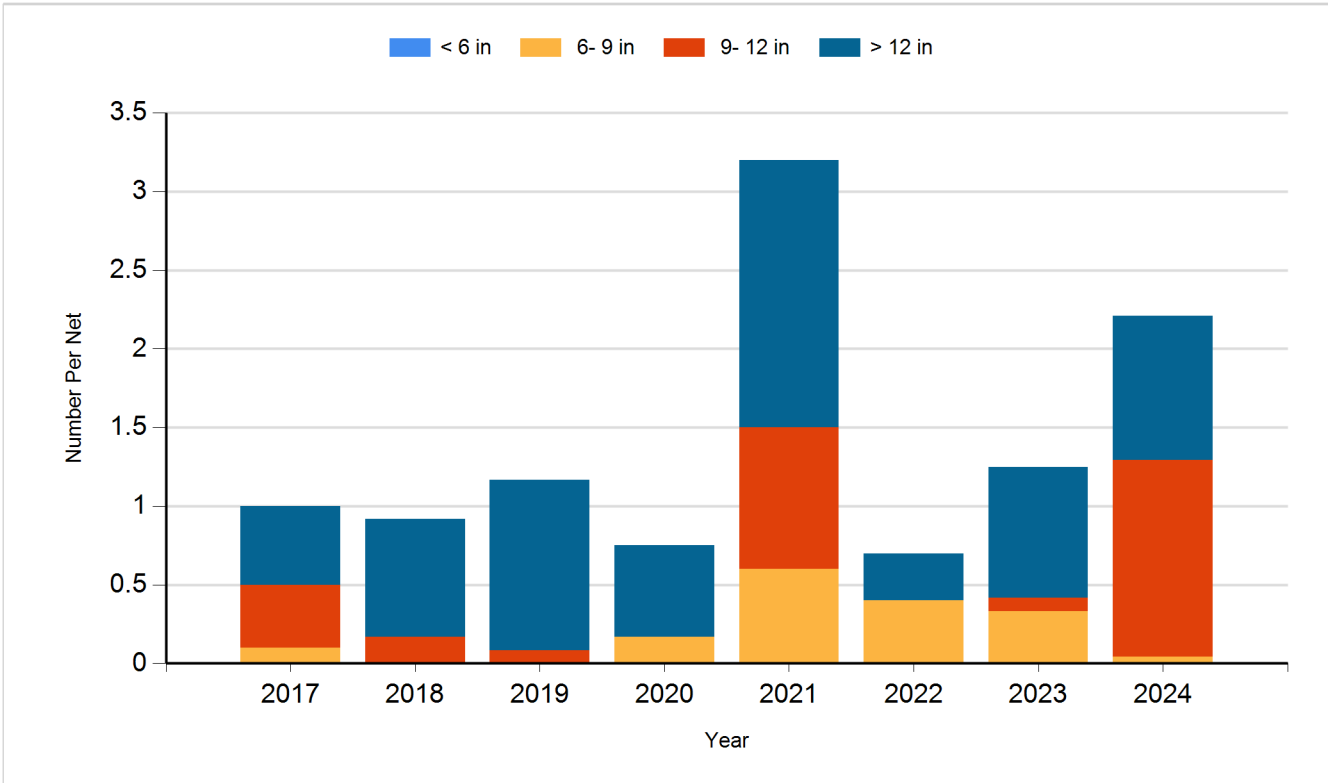
Species: Walleye  
Gear: AFS std gill net



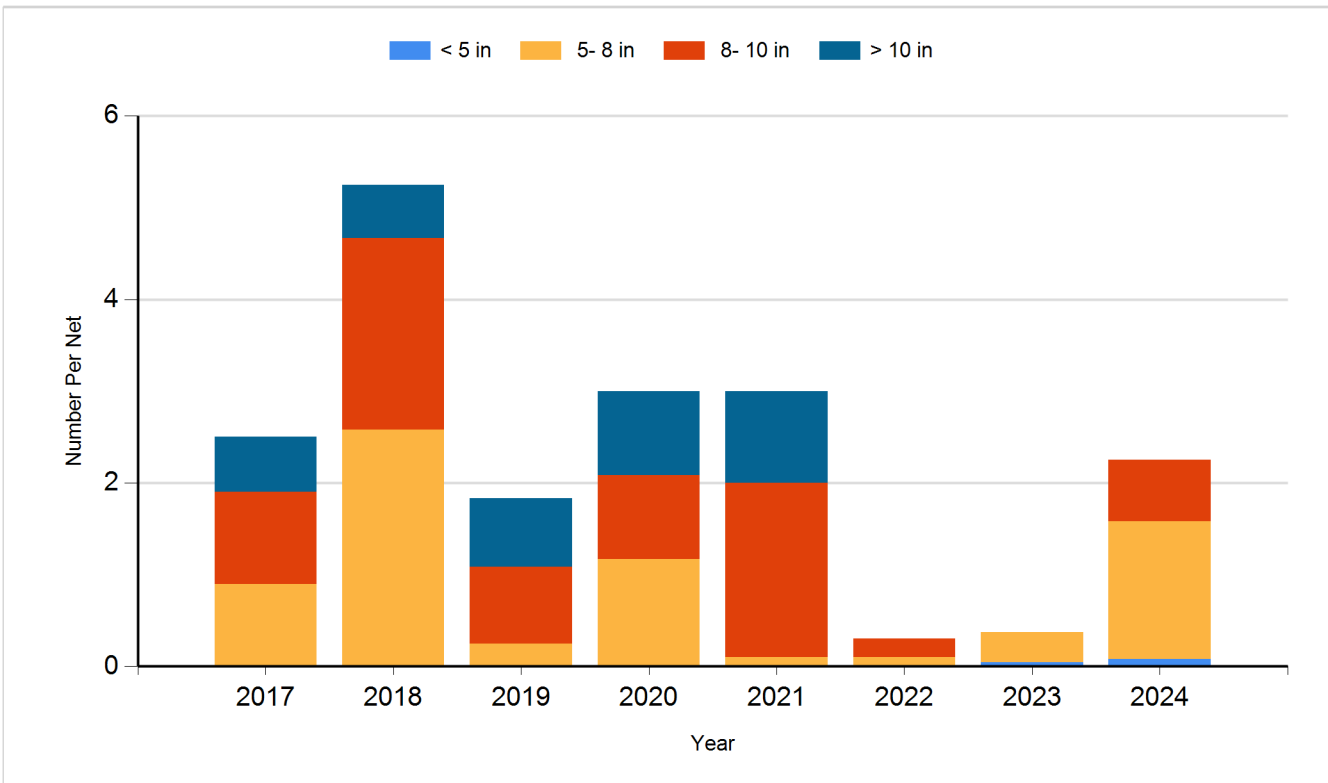
Species: Walleye  
Gear: std exp gill net



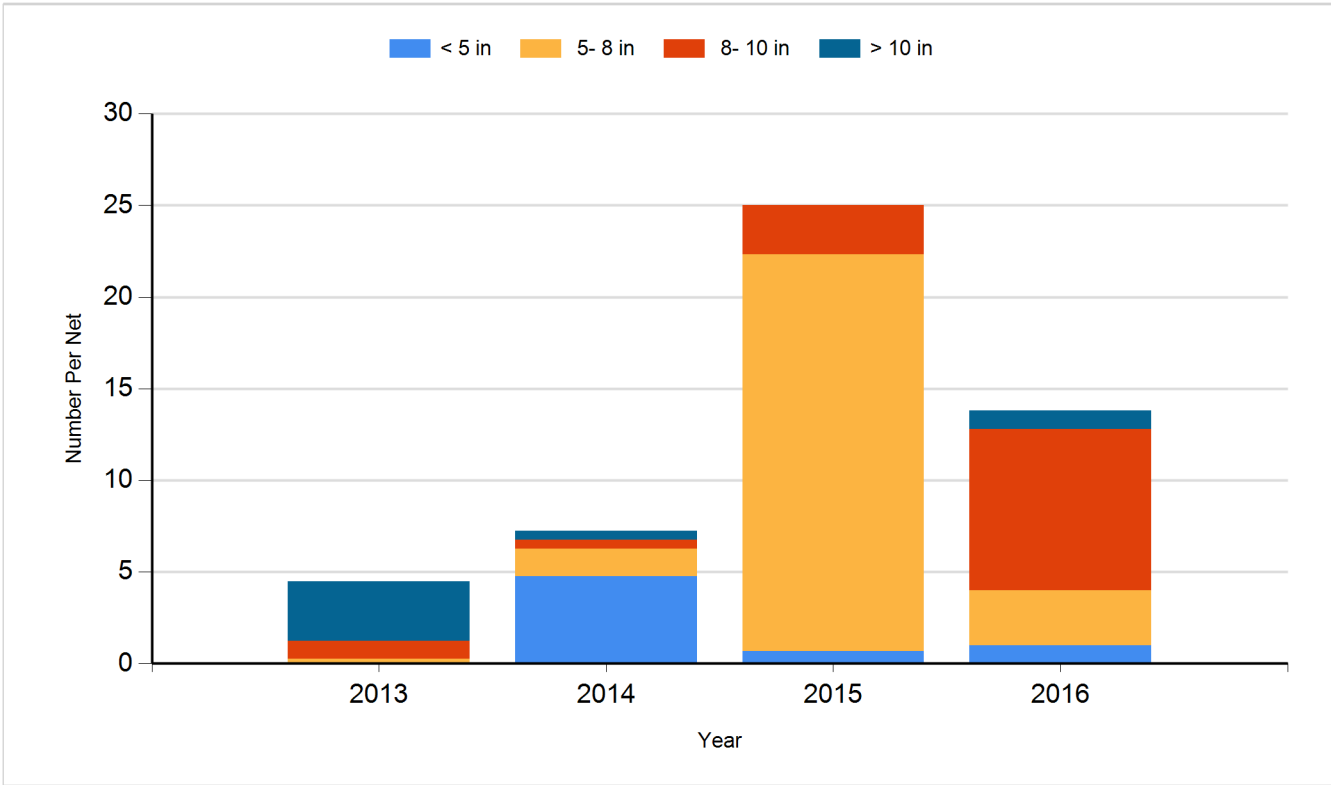
Species: White Bass  
Gear: AFS std gill net



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