SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Sinai, Brookings County
MBS-Lake-232-000
2022

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 06, 2022	10 net-nights
frame net (std 3/4 in)	Jul 06, 2022	8 net-nights

Common Fish Species Present

Muskellunge

Walleye

White Bass

Smallmouth Bass

Bluegill

Yellow Bullhead

Common Carp

Northern Pike

Black Crappie

Yellow Perch

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	Northern Pike	4	0.4	0.2	75		0		81	4
	Smallmouth Bass	1	0.1	0.1	0		0		103	
	Walleye	11	1.1	0.4	55		18		79	2
	White Bass	7	0.7	0.6	43		43		84	3
	Yellow Perch	3	0.3	0.2	67		0		96	6
frame net (std 3/4 in)	Black Bullhead	2	0.3	0.2	100		100			
	Black Crappie	5	0.6	0.4	100		80		88	4
	Bluegill	13	1.6	1.2	62		8		119	4
	Common Carp	8	1.0	0.7	100		88			
	Muskellunge	1	0.0	0.0	0		0			
	Northern Pike	5	0.6	0.4	80		40		97	24
	Smallmouth Bass	21	2.5	0.8	85		40	18	81	2
	Walleye	8	1.0	0.5	75		75		74	3
	White Bass	55	6.9	2.9	98		95		78	1
	Yellow Bullhead	9	1.1	0.8	100		100			
	Yellow Perch	1	0.0	0.0	0		0			

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 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	0.15
	Black Crappie					0.8	0.1	0.0	0.0	0.1	0.0	0.17
	Channel Catfish					0.0	0.0	0.0	0.1	0.0	0.0	0.02
	Common Carp					0.3	0.6	0.2	0.6	0.5	0.0	0.37
	Northern Pike					0.2	0.0	0.3	0.1	0.1	0.4	0.18
	Smallmouth Bass					0.7	1.8	0.3	0.7	0.2	0.1	0.63
	Walleye					4.7	4.2	2.8	2.9	1.6	1.1	2.88
	White Bass					1.0	0.9	1.2	0.8	3.2	0.7	1.30
	White Sucker					0.1	0.0	0.0	0.1	0.1	0.0	0.05
	Yellow Bullhead					0.0	0.0	0.1	0.1	0.0	0.0	0.03
	Yellow Perch					2.5	5.3	1.8	3.0	3.0	0.3	2.65
fall night EF-WAE*	Walleye	55.5	94.5	79.0								76.33
frame net (std 3/4 in)	Black Bullhead	2.5	10.0	44.4	6.6		2.5	1.4	0.2	0.7	0.3	7.62
	Black Crappie	2.5	4.5	11.5	6.7		3.9	0.9	0.9	0.3	0.6	3.53
	Bluegill	1.0	0.3	2.6	0.4		0.2	0.0	0.0	0.2	1.6	0.70
	Channel Catfish	0.0	0.0	0.0	0.0		0.0	0.0	0.1	0.0	0.0	0.01
	Common Carp	1.4	0.0	0.2	0.4		0.6	0.8	0.2	0.5	1.0	0.57
	Green Sunfish	0.1	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.01
	Muskellunge	0.0	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	0.8		0.7	0.1	0.5	0.8	0.6	0.44
	Smallmouth Bass	2.9	0.9	2.7	6.1		4.4	4.6	2.4	7.2	2.5	3.74
	Sunfish Hybrid	0.0	0.0	0.1	0.0		0.0	0.0	0.0	0.0	0.0	0.01
	Walleye	1.3	2.8	1.6	1.2		4.3	2.2	1.4	0.8	1.0	1.84
	White Bass	0.0	0.0	0.0	1.1		10.3	3.7	11.0	6.6	6.9	4.40
	Yellow Bullhead	0.0	0.2	1.1	1.4		1.4	1.1	2.0	0.1	1.1	0.93
	Yellow Perch	0.0	0.3	1.8	0.0		0.1	0.1	0.2	0.0	0.0	0.28

		CPUE										
Gear	Species	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg
std exp gill net	Black Bullhead	0.3	1.5	40.0	12.4							13.55
	Black Crappie	0.0	0.0	2.0	3.6							1.40
	Bluegill	0.0	0.3	0.0	0.0							0.08
	Common Carp	0.0	0.8	0.0	0.4							0.30
	Green Sunfish	0.0	0.0	0.0	0.0							0.00
	Northern Pike	0.8	0.0	1.0	0.6							0.60
	Smallmouth Bass	0.3	1.3	1.7	2.0							1.33
	Walleye	23.0	18.3	18.0	7.8							16.78
	White Sucker	0.3	0.0	0.0	0.0							0.08
	Yellow Perch	4.5	2.5	24.3	12.8							11.03

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 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	
		PSD-P					100	86	50	100	60	
	Northern Pike	PSD					100		100	100	100	75
		PSD-P					100		67	0	0	0
		Wr					91		96	85	82	81
	Smallmouth Bass	PSD					71	57	67	75	0	0
		PSD-P					71	48	67	38	0	0
		Wr					91	102	86	87	89	103
	Walleye	PSD					70	34	52	26	38	55
		PSD-P					28	18	30	9	6	18
		Wr					84	87	78	81	80	79
	White Bass	PSD					90	100	100	78	81	43
		PSD-P					50	82	93	78	53	43
		Wr					95	95	89	87	86	84

			Year									
Gear	Species	Index	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AFS std gill net	Yellow Bullhead	PSD							100	100		
		PSD-P							100	100		
	Yellow Perch	PSD					64	51	86	61	97	67
		PSD-P					24	11	41	31	33	0
		Wr					98	111	107	97	104	96
frame net (std 3/4 in)	Black Crappie	PSD	92	91	20	92		97	89	100	67	100
		PSD-P	84	84	14	47		85	44	56	33	80
		Wr	102	99	104	94		97	101	90	103	88
	Bluegill	PSD	100	0	12	100		0			100	62
		PSD-P	100	0	8	0		0			50	8
		Wr	126	114	118	109		130			130	119
	Common Carp	PSD	93		100	100		100	100	100	80	100
		PSD-P	0		50	100		50	100	100	40	88
		Wr	106									
	Muskellunge	PSD										0
		PSD-P										0
	Northern Pike	PSD	50		100	100		100	100	20	25	80
		PSD-P	0		67	14		57	0	20	13	40
		Wr	78		83	83		86	79	85	77	97
	Smallmouth Bass	PSD	52	78	15	38		68	72	75	67	85
		PSD-P	14	78	11	24		52	37	54	33	40
		Wr	98	106	94	90		93	90	86	84	81
	Walleye	PSD	54	61	100	73		65	41	43	63	75
		PSD-P	46	11	31	27		40	27	36	25	75
		Wr	91	89	84	74		86	85	76	80	74
	White Bass	PSD				80		100	100	95	98	98
		PSD-P				80		93	97	92	48	95
		Wr				91		98	87	87	82	78
	Yellow Bullhead	PSD		100	100	100		100	100	100	100	100
		PSD-P		100	18	85		100	91	100	100	100
		Wr		111								
	Yellow Perch	PSD		67	39			100	100	50		0
		PSD-P		33	0			0	0	50		0
		Wr		91	92			80	99	95		
std exp gill net	Black Crappie	PSD		0	17	78						
		PSD-P		0	0	0						

			Year									
Gear	Species	Index	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
std exp gill net	Black Crappie	Wr			113	96						
	Bluegill	PSD		100								
		PSD-P		0								
		Wr		123								
	Common Carp	PSD		100		100						
		PSD-P		67		100						
	Northern Pike	PSD	33		100	100						
		PSD-P	0		33	33						
		Wr	76		85	83						
	Smallmouth Bass	PSD	100	60	40	50						
		PSD-P	0	20	40	30						
		Wr	108	101	90	86						
	Walleye	PSD	5	92	83	46						
		PSD-P	0	1	13	26						
		Wr	87	91	85	81						
	Yellow Perch	PSD	94	40	11	77						
		PSD-P	72	20	0	8						
		Wr	110	106	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+
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)
2014	73	260 (5)		408 (22)	429 (43)			471 (2)	547 (1)		
2013	92		294 (14)	343 (75)	455 (1)	416 (1)		424 (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)								
2014	29	119 (25)		248 (3)	265 (1)						
2013	18		231 (5)	260 (4)	274 (8)		322 (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).

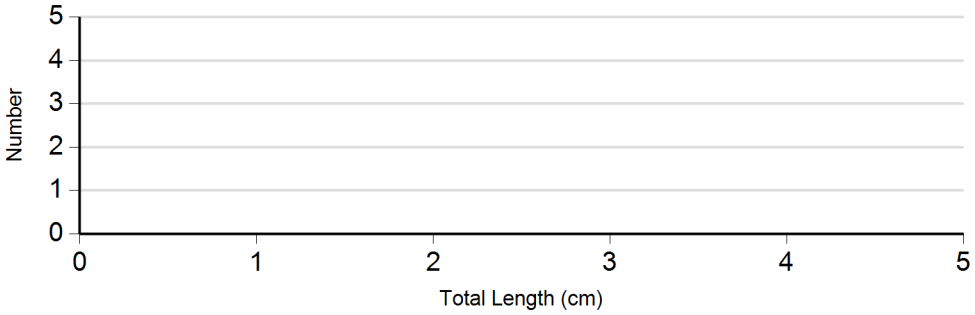
		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2018	1	99	5	106 (2.9)	16	95 (1.5)	17	96 (1.7)
	2019	1	120	4	102 (4.0)	2	100 (2.7)	2	88 (7.7)
	2020	0		4	99 (2.7)	2	87 (3.6)	3	80 (2.2)
	2021	1	108	1	102	1	98	0	
	2022	0		1	85	4	89 (4.3)	0	
Bluegill Frame Net	2018	2	130 (3.0)	0		0		0	
	2021	0		1	148	1	112	0	
	2022	5	120 (6.3)	7	118 (4.6)	1	118	0	
Muskellunge Frame Net	2022	0		0		0		0	
Northern Pike Gill Net	2019	0		1	89	2	100 (9.4)	0	
	2020	0		1	85	0		0	
	2021	0		1	82	0		0	
	2022	1	75	3	83 (3.2)	0		0	
Walleye Gill Net	2018	33	87 (1.4)	8	83 (2.1)	8	92 (2.5)	1	89
	2019	16	81 (1.7)	7	77 (1.3)	4	75 (2.2)	6	74 (2.6)
	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)
White Bass Gill Net	2018	0		2	94 (3.1)	9	95 (1.6)	0	
	2019	0		1	85	13	89 (1.0)	0	
	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)
	2022	4	87 (1.3)	0		2	85 (5.3)	1	75

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Yellow Perch Gill Net	2018	31	112 (1.9)	25	111 (1.6)	7	105 (2.9)	0	
	2019	3	155 (49.8)	10	102 (3.0)	9	97 (2.4)	0	
	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	

Length Frequency Distribution

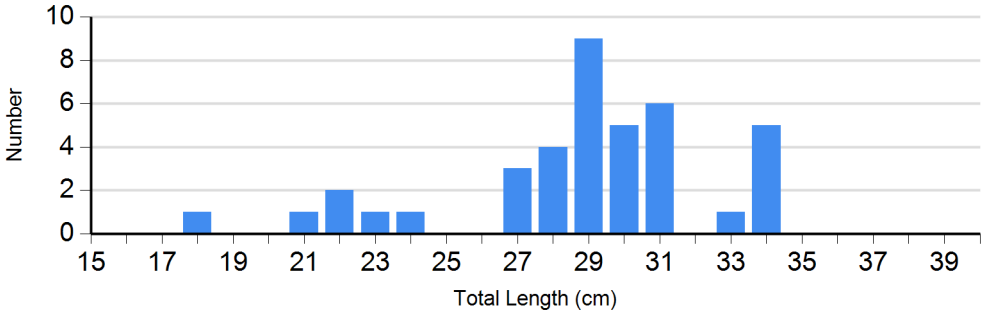
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net



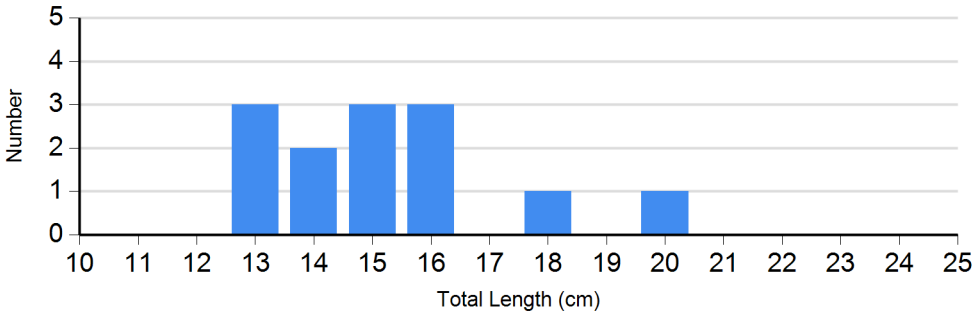
2017

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



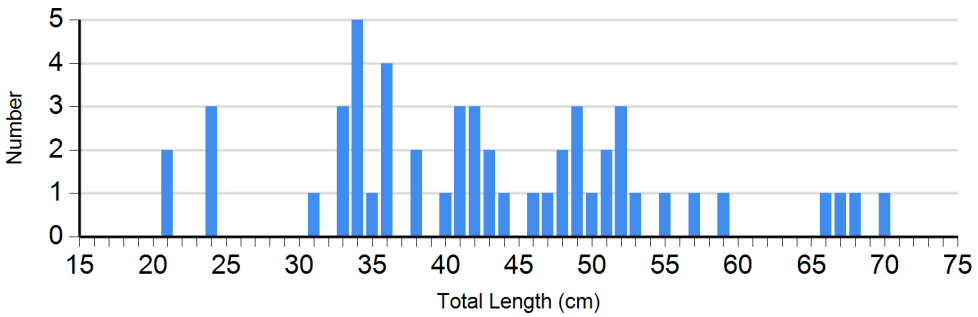
2018

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

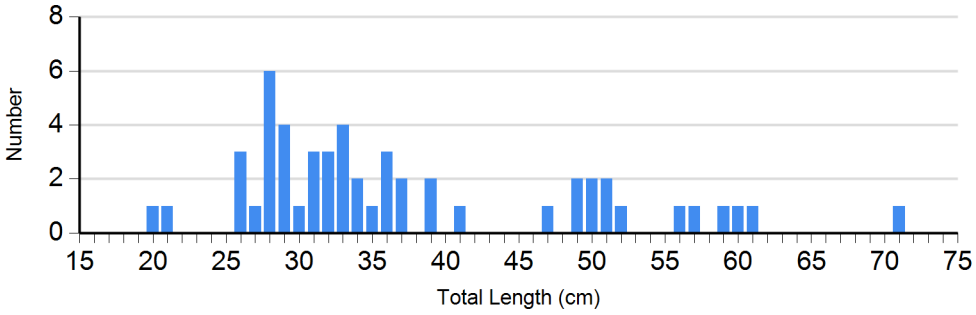


2022

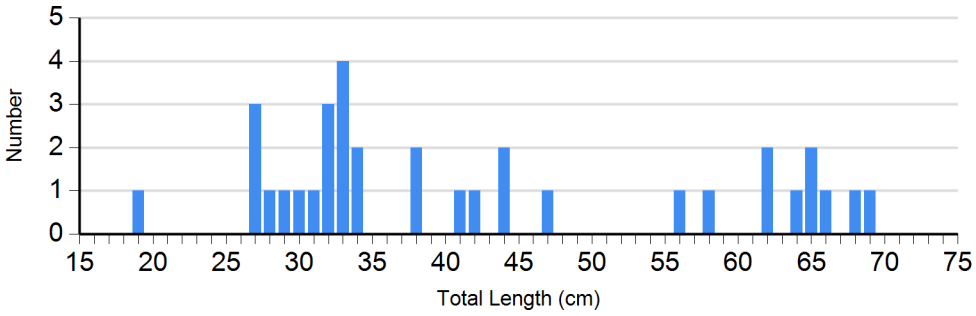
Species: Walleye
Gear: AFS std gill net



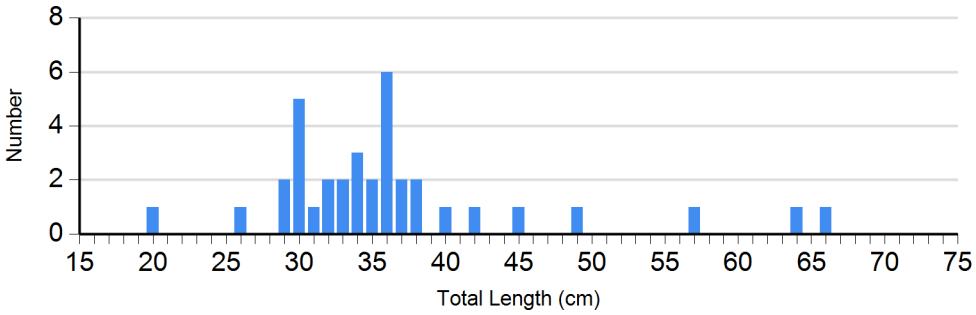
2017



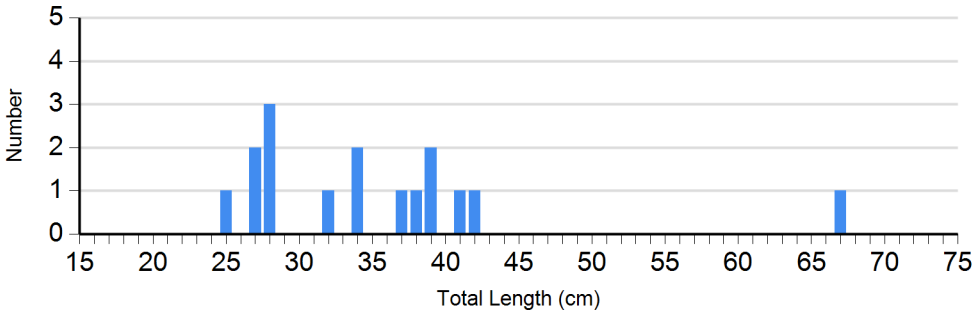
2018



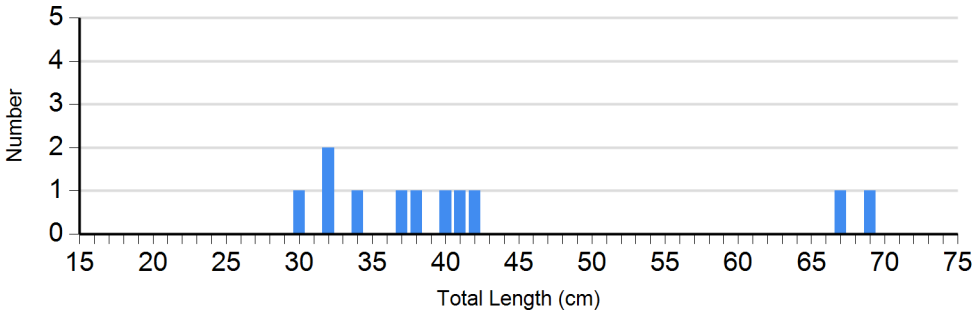
2019



2020

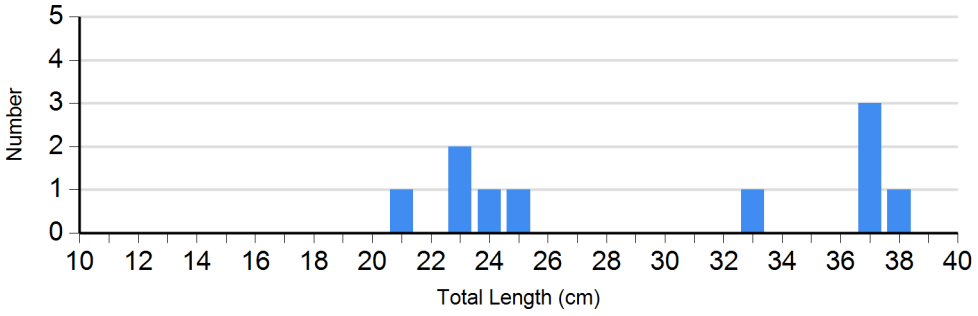


2021

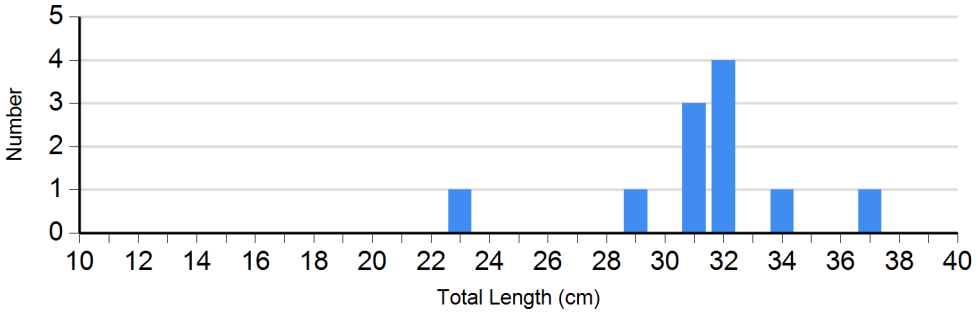


2022

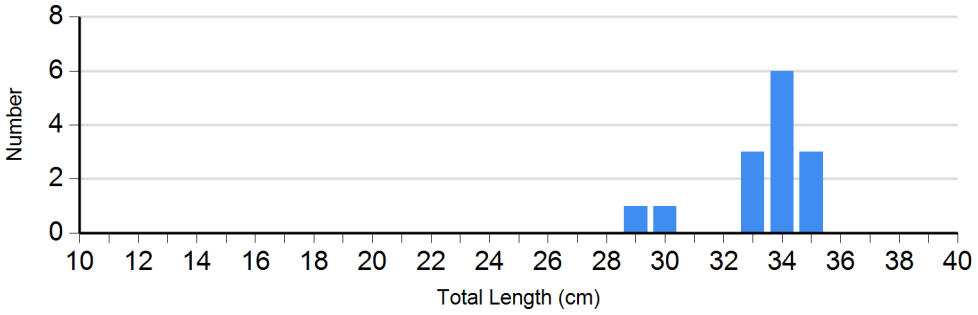
Species: White Bass
Gear: AFS std gill net



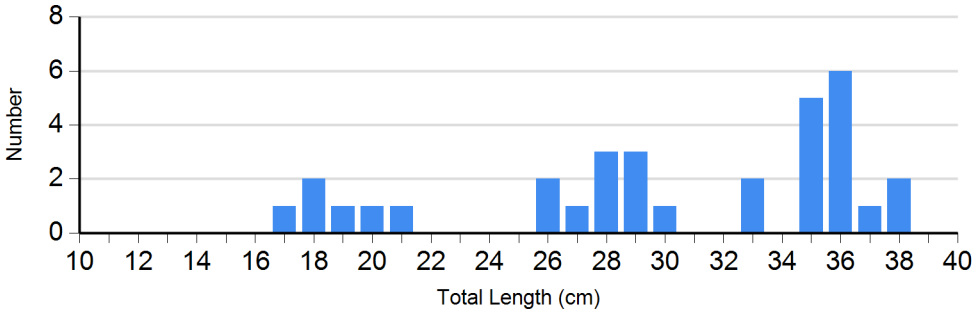
2017



2018

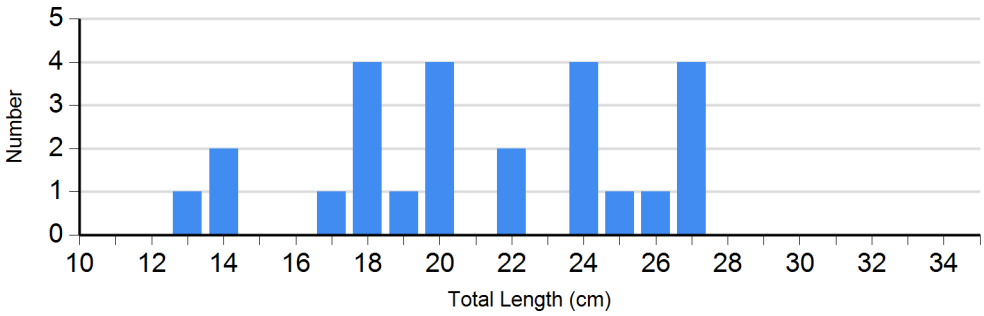


2019

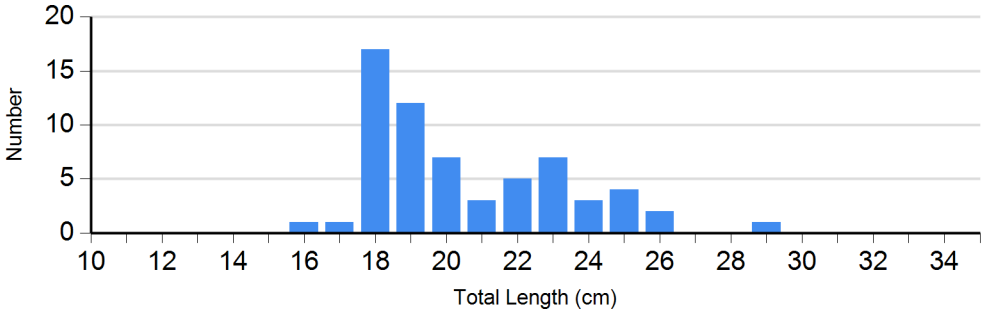


2021

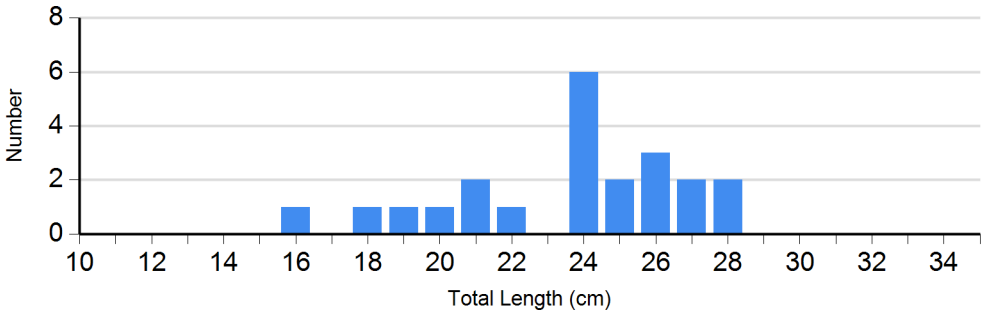
Species: Yellow Perch
Gear: AFS std gill net



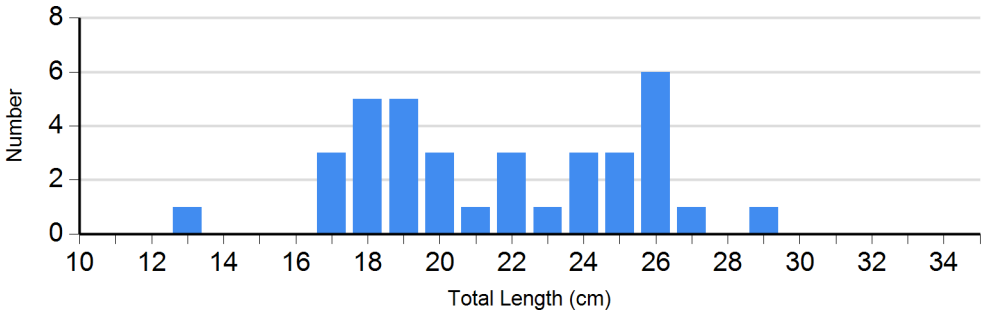
2017



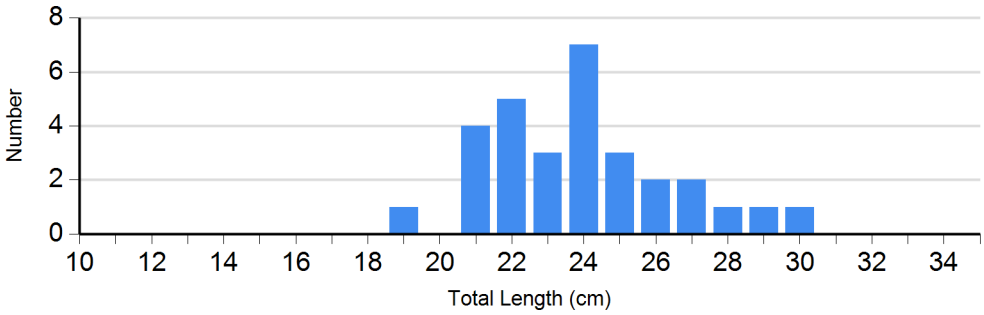
2018



2019



2020

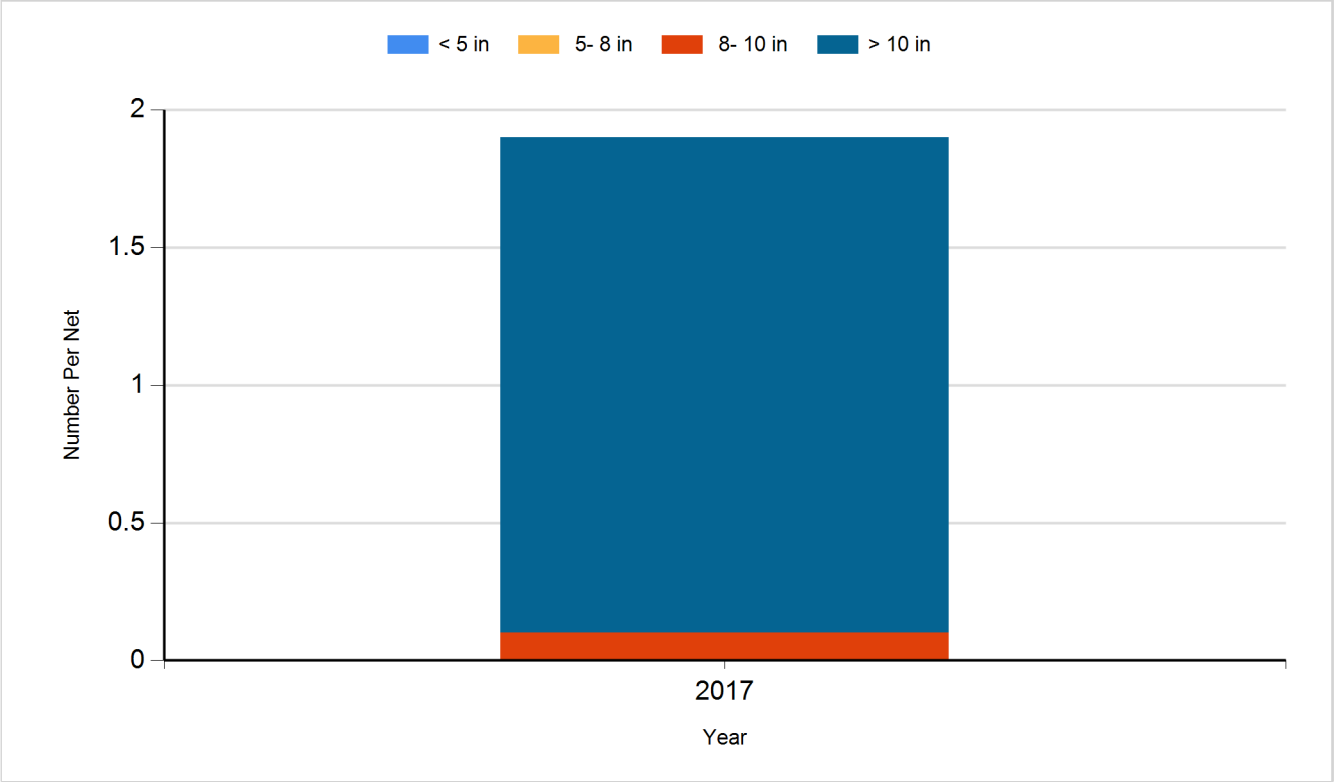


2021

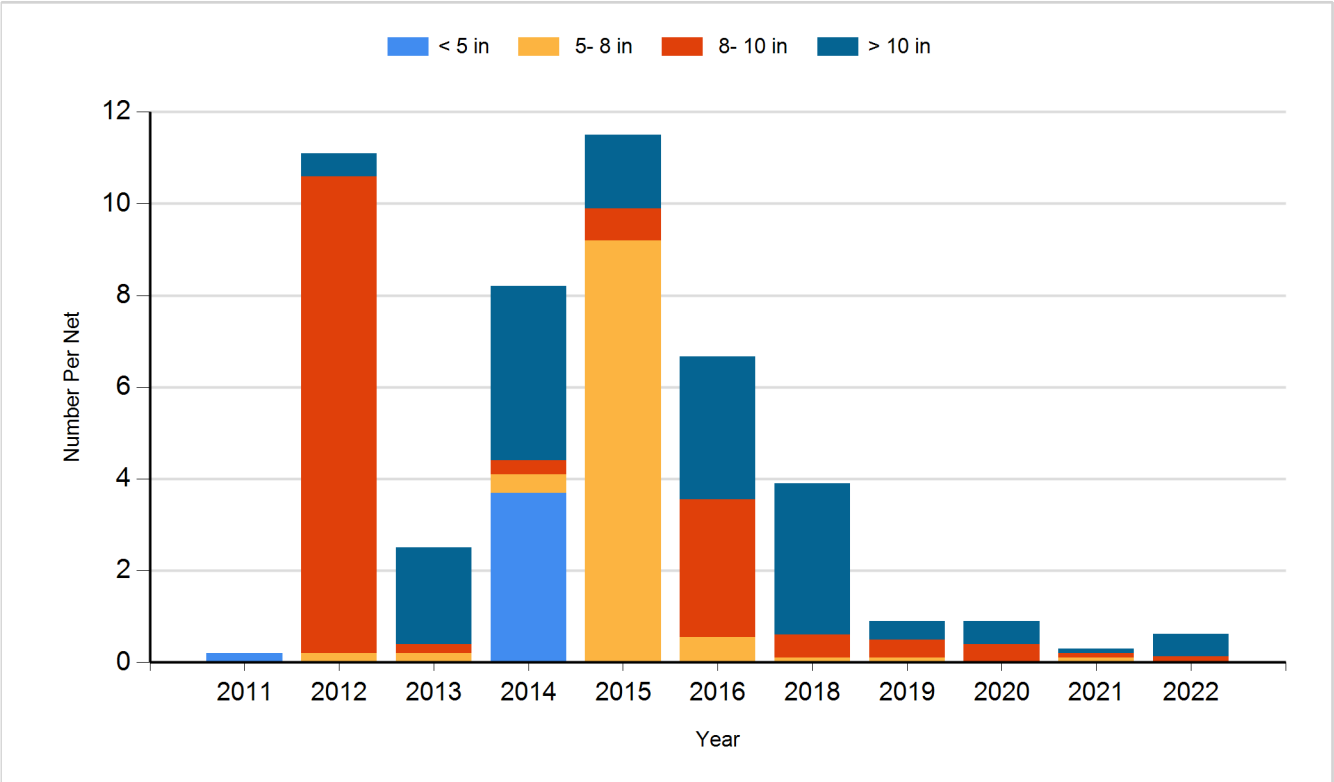
Historic Fish Sizes and Relative Abundance

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

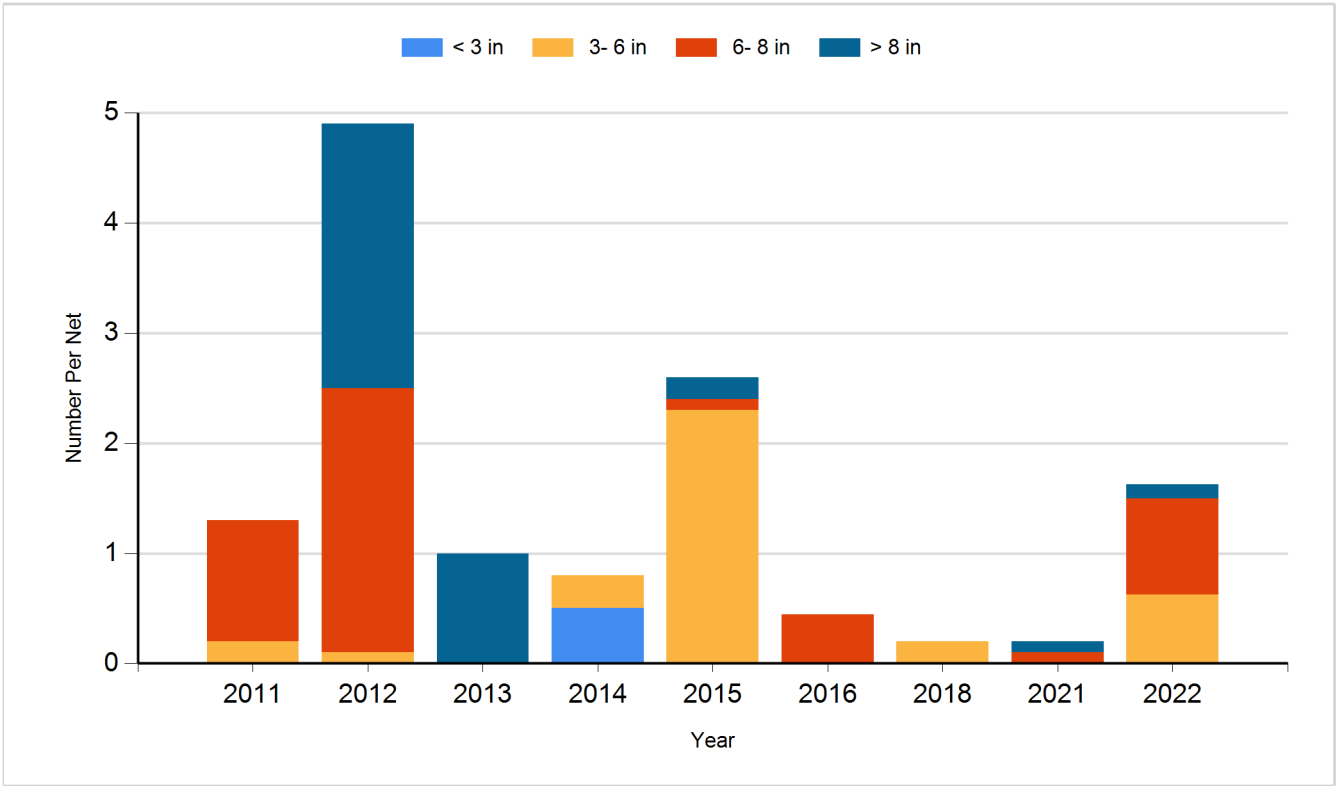
Species: Black Crappie
Gear: AFS std frame net



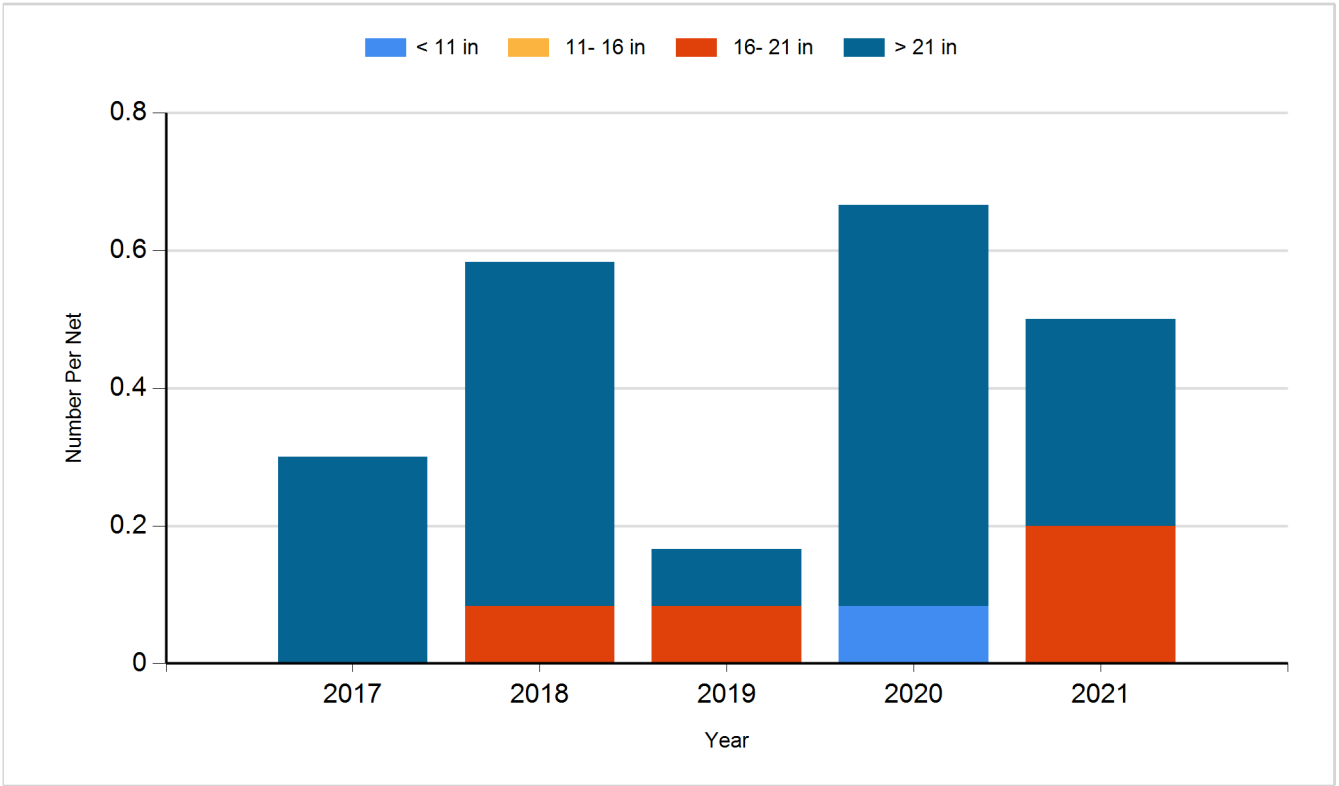
Species: Black Crappie
Gear: frame net (std 3/4 in)



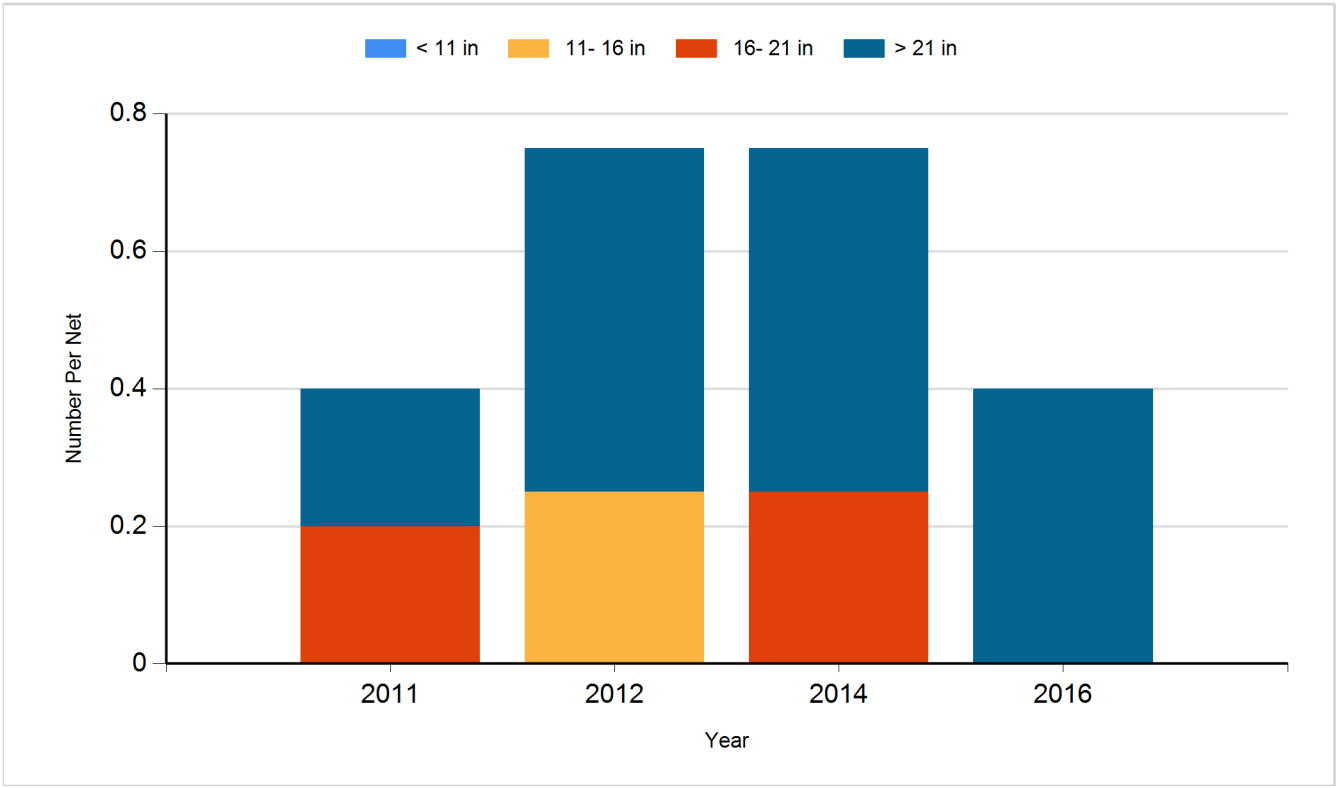
Species: Bluegill
Gear: frame net (std 3/4 in)



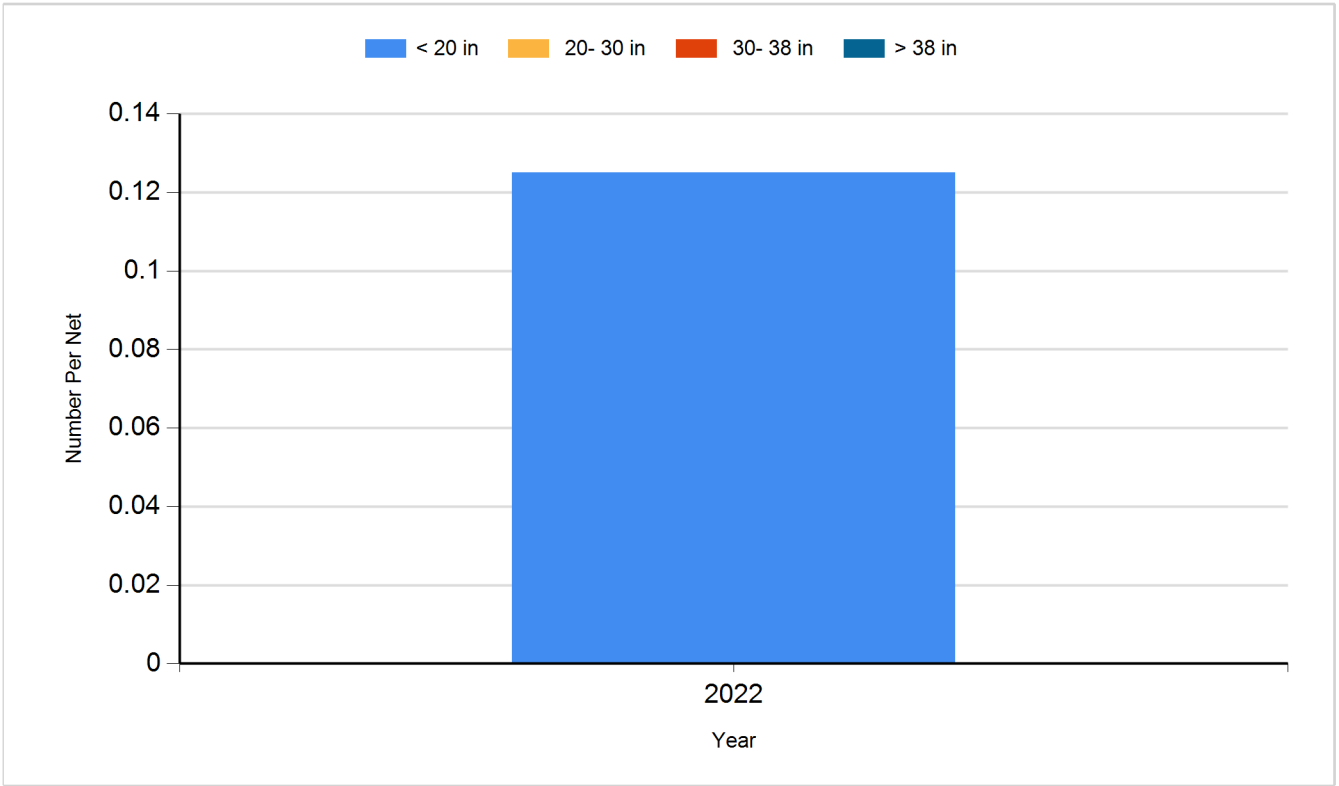
Species: Common Carp
Gear: AFS std gill net



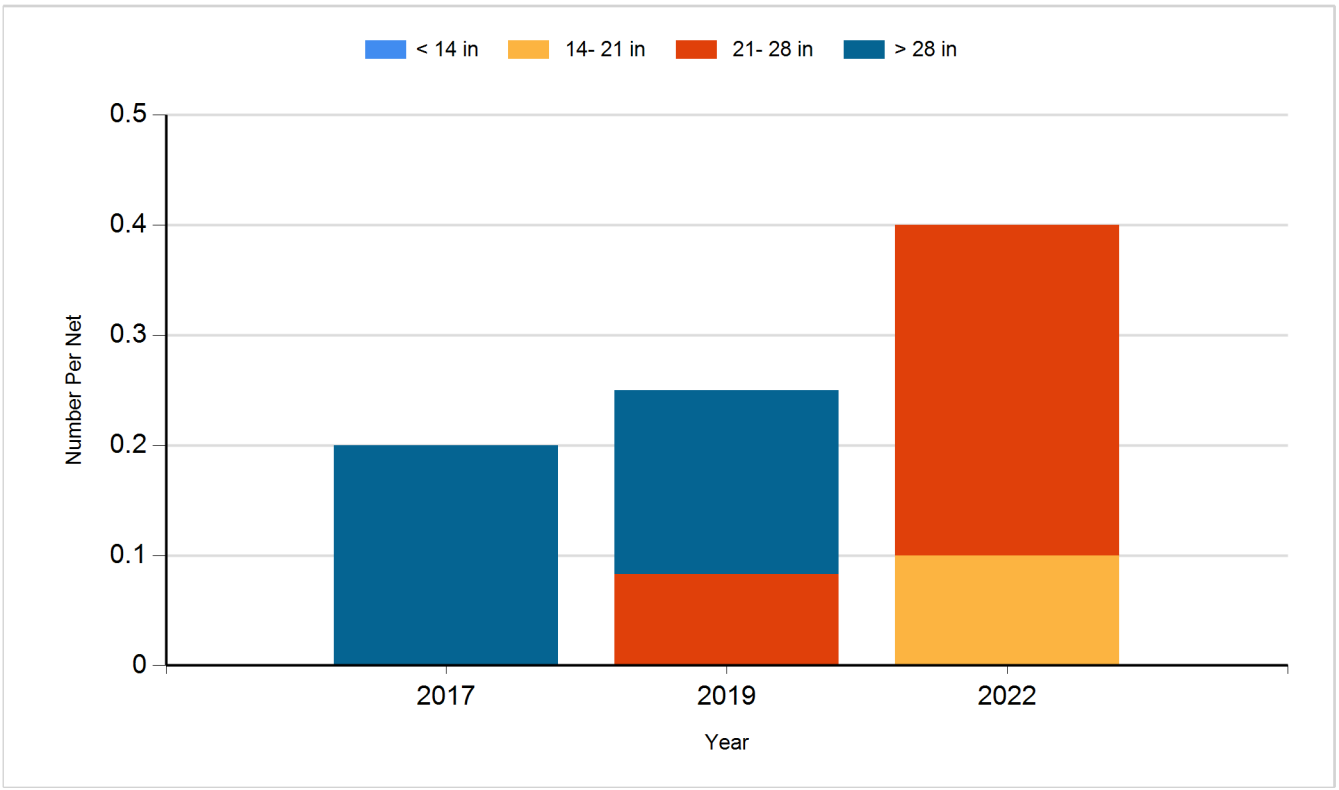
Species: Common Carp
Gear: std exp gill net



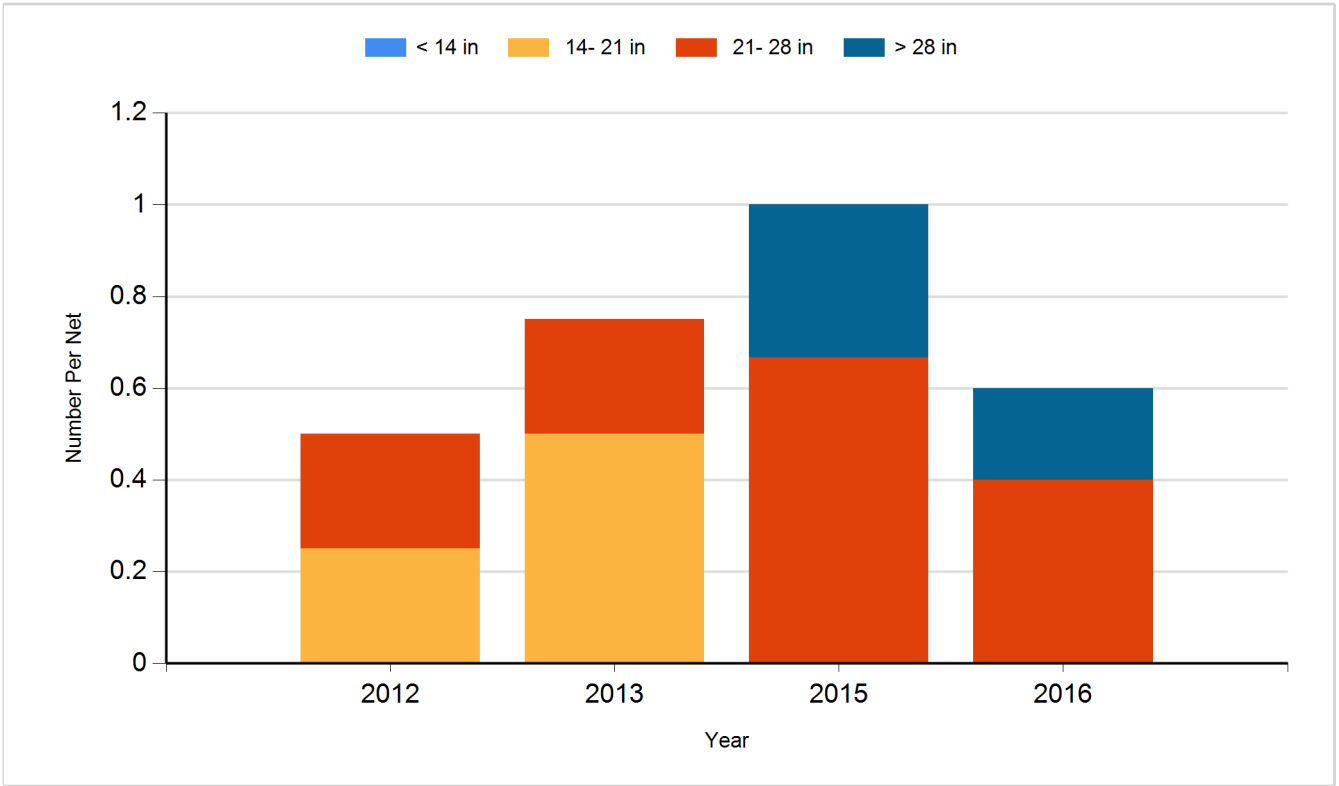
Species: Muskellunge
Gear: frame net (std 3/4 in)



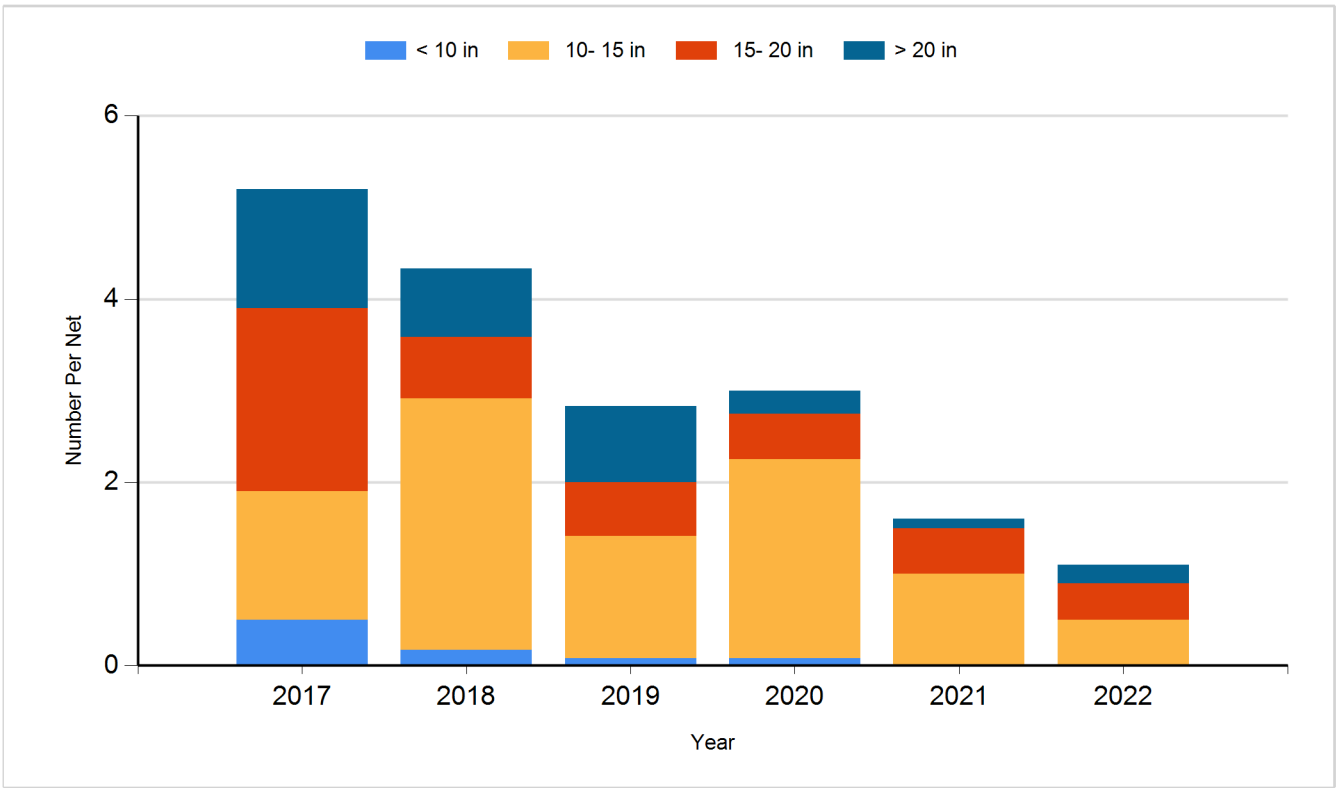
Species: Northern Pike
Gear: AFS std gill net



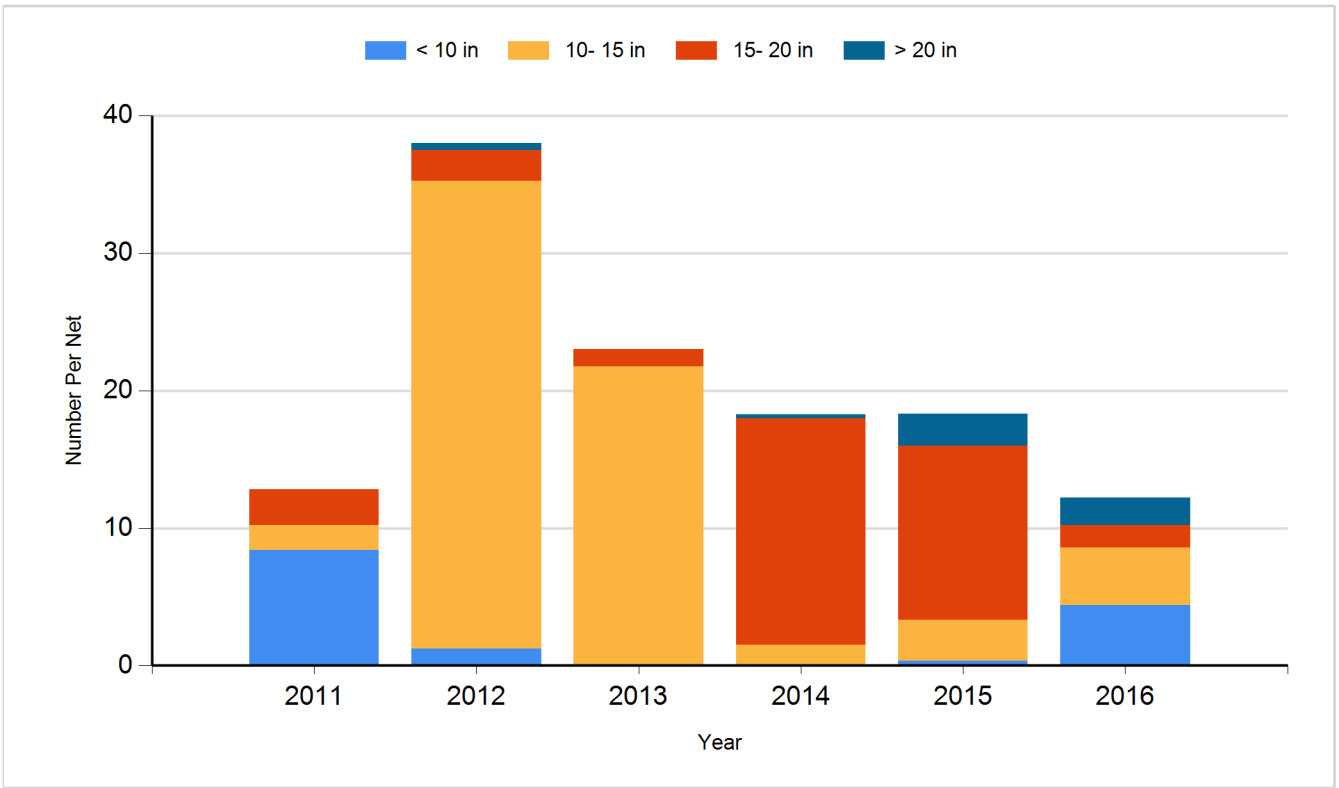
Species: Northern Pike
Gear: std exp gill net



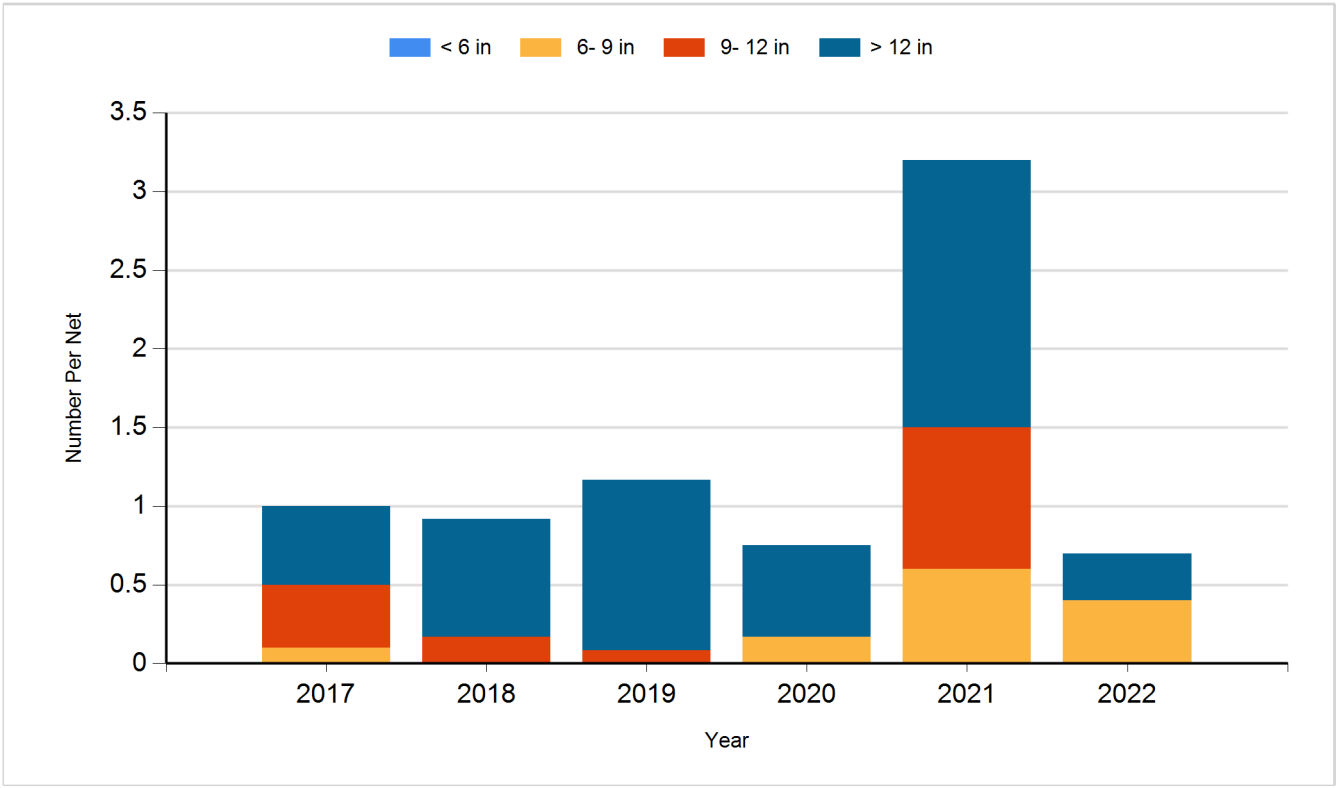
Species: Walleye
Gear: AFS std gill net



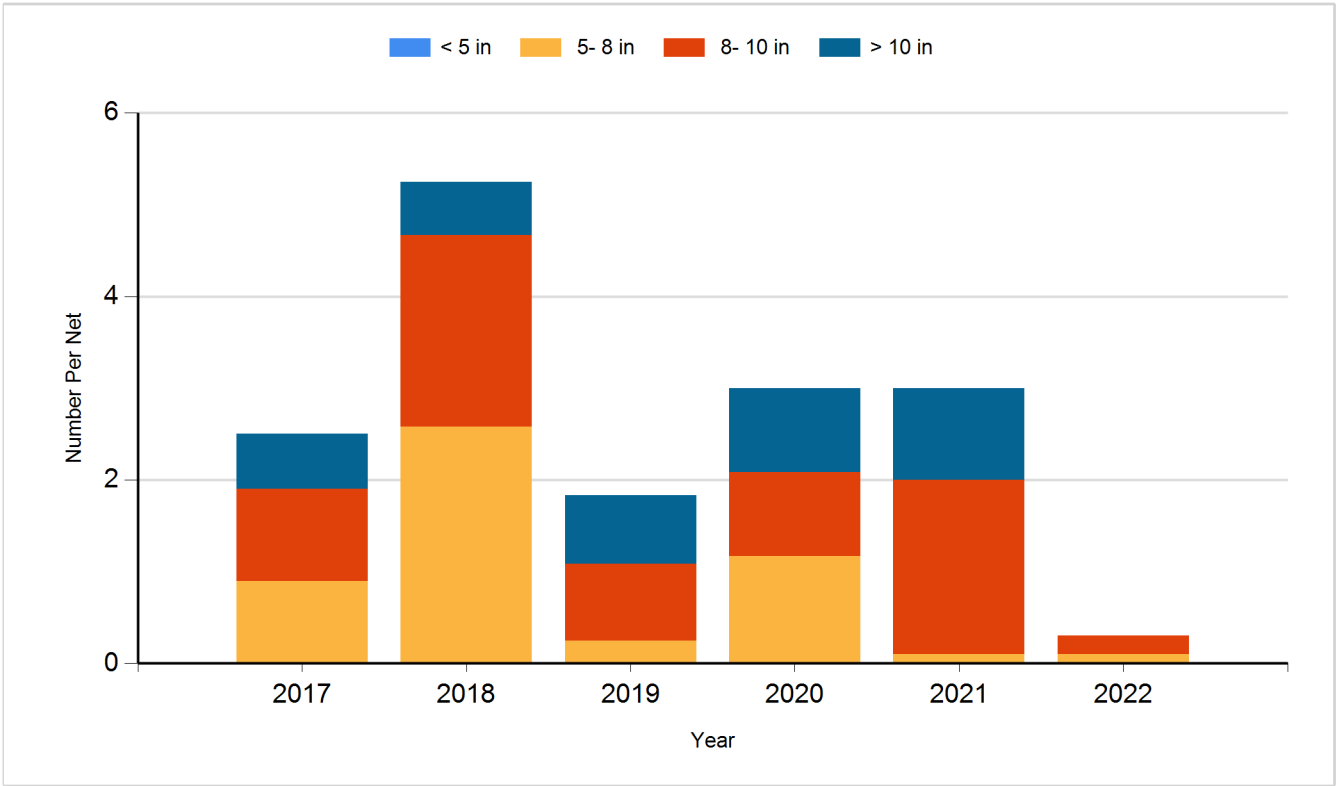
Species: Walleye
Gear: std exp gill net



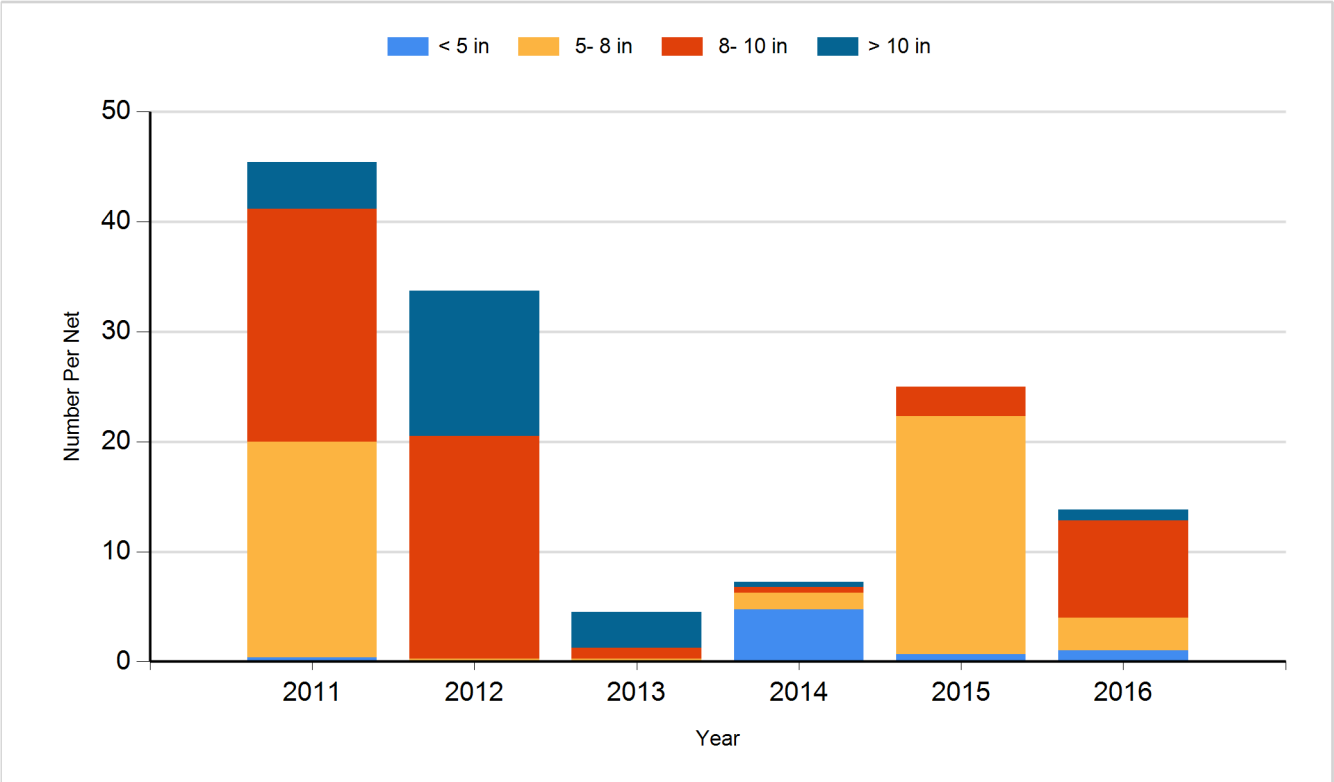
Species: White Bass
Gear: AFS std gill net



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
2011	Muskellunge	Large Fingerling	1,223
2012	Muskellunge	Adult	2
2013	Muskellunge	Fingerling	780
2014	Muskellunge	Large Fingerling	1,719
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