

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Waubay, Day County

UBS-Lake-411-000

2022

## Lake Information

**Name:** Waubay **Maximum Depth:** 31 Feet  
**County:** Day **Mean Depth:** 13 Feet  
**OHWM Elevation:** 1,787  
**Surface Area:** 16,943 Acres

## Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 16, 2022	4 net-nights
AFS std gill net	Aug 17, 2022	4 net-nights
AFS std gill net	Aug 18, 2022	4 net-nights
AFS std gill net	Aug 19, 2022	4 net-nights

## **Common Fish Species Present**

Northern Pike

Walleye

Smallmouth Bass

Yellow Perch

White Bass

Rock Bass

Common Carp

Black Bullhead

White Sucker

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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	Black Bullhead	13	0.8	0.5	100		77		115	3
	Common Carp	12	0.8	0.2	100		100		98	2
	Rock Bass	15	0.9	0.6	87		7		106	2
	Smallmouth Bass	19	0.9	0.6	60	21	40	21	98	3
	Walleye	163	9.4	2.0	20	5	5	3	84	1
	White Bass	84	5.3	1.8	100		100		95	1
	White Sucker	3	0.2	0.2	100		100		104	5
	Yellow Perch	121	7.5	1.8	78	5	34	6	109	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

Gear	Species	CPUE										Avg
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
AFS std gill net	Black Bullhead				0.4	0.3	0.3	0.4	5.7	4.3	0.8	1.74
	Black Crappie				0.0	0.0	0.0	0.0	0.2	0.5	0.0	0.10
	Bluegill				0.0	0.1	0.0	0.1	0.0	0.7	0.0	0.13
	Common Carp				0.1	0.5	0.3	1.0	0.8	2.0	0.8	0.79
	Lake Herring				0.3	0.1	0.1	0.0	0.1	0.0	0.0	0.09
	Northern Pike				0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.03
	Rock Bass				0.4	0.8	0.3	0.9	0.5	0.7	0.9	0.64
	Smallmouth Bass				1.3	1.3	0.9	0.6	0.3	2.6	0.9	1.13
	Walleye				6.3	4.6	5.9	7.9	8.1	10.6	9.4	7.54
	White Bass				13.2	12.9	6.9	7.3	2.4	4.4	5.3	7.49
	White Sucker				0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.06
Yellow Perch				5.4	8.3	6.4	10.3	9.5	14.4	7.5	8.83	
boat shocker (day)	Smallmouth Bass							16.0				16.00
boat shocker (night)	Walleye*	1.0	15.0	1.2	1.5	7.0						5.14
boat shocker (night, DC)	Smallmouth Bass	62.8		8.0								35.40
fall night EF-WAE*	Walleye							10.5	9.0			9.75
frame net (std 3/4 in)	Black Bullhead	3.5	2.0									2.75
	Black Crappie	1.5	2.6									2.05
	Bluegill	0.4	0.3									0.35
	Common Carp	0.3	0.2									0.25
	Northern Pike	0.3	0.6									0.45
	Rock Bass	2.6	1.2									1.90
	Smallmouth Bass	6.2	3.5									4.85
	Walleye	2.5	2.8									2.65
	White Bass	3.8	2.5									3.15
	White Sucker	0.1	0.0									0.05
	Yellow Perch	0.0	0.0									0.00
std exp gill net	Black Bullhead	4.1	1.4	0.1								1.87
	Bluegill	0.0	0.0	0.0								0.00
	Common Carp	0.0	0.5	0.1								0.20
	Lake Herring	0.4	0.3	0.3								0.33
	Northern Pike	0.5	1.0	0.4								0.63

## CPUE

Gear	Species	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg
std exp gill net	Rock Bass	1.3	2.0	0.4								1.23
	Smallmouth Bass	0.3	0.3	0.0								0.20
	Walleye	11.8	19.3	14.1								15.07
	White Bass	17.6	8.1	23.9								16.53
	White Sucker	0.3	0.1	0.0								0.13
	Yellow Perch	21.9	18.5	19.5								

## 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									
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AFS std gill net	Black Bullhead	PSD				100	100	100	83	29	99	100
		PSD-P				100	100	25	50	5	9	77
		Wr				94	90	104	95	106	102	115
	Common Carp	PSD				100	63	100	81	25	94	100
		PSD-P				100	63	100	75	25	22	100
		Wr				103	100	102	98	109	99	98
	Northern Pike	PSD				100	100					
		PSD-P				100	0					
		Wr				91	83					
	Rock Bass	PSD				100	100	50	71	29	73	87
		PSD-P				0	31	0	7	0	18	7
		Wr				109	109	112	111	114	107	106
	Smallmouth Bass	PSD				50	86	40	50	75	64	60
		PSD-P				20	48	40	30	75	45	40
		Wr				100	91	101	99	95	99	98
	Walleye	PSD				28	81	52	72	80	33	20
		PSD-P				5	3	1	3	7	11	5
		Wr				86	88	89	88	87	83	84
	White Bass	PSD				100	99	100	89	100	100	100
		PSD-P				100	99	98	88	100	99	100
		Wr				98	92	98	95	95	95	95
White Sucker	PSD					100				100	100	
	PSD-P					100				100	100	
	Wr					97				102	104	
Yellow Perch	PSD				71	62	88	12	61	74	78	
	PSD-P				38	37	34	9	1	18	34	
	Wr				109	109	109	111	112	108	109	
boat shocker (day)	Smallmouth Bass	PSD							63			
		PSD-P							25			
		Wr							96			
boat shocker (night)	Walleye	PSD	0	0	0	0	0					
		PSD-P	0	0	0	0	0					



Gear	Species	Index	Year									
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
boat shocker (night)	Walleye	Wr		96	83	93	96					
boat shocker (night, DC)	Smallmouth Bass	PSD	52		88							
		PSD-P	21		38							
		Wr	89		85							
frame net (std 3/4 in)	Black Bullhead	PSD	73	100								
		PSD-P	37	94								
		Wr	86	90								
	Common Carp	PSD	100	100								
		PSD-P	38	100								
		Wr	93	99								
	Northern Pike	PSD	70	89								
		PSD-P	30	50								
		Wr	77	80								
	Rock Bass	PSD	65	76								
		PSD-P	15	5								
		Wr	104	105								
	Smallmouth Bass	PSD	40	56								
		PSD-P	17	25								
		Wr	91	93								
	Walleye	PSD	48	11								
		PSD-P	9	1								
		Wr	78	80								
	White Bass	PSD	100	100								
		PSD-P	97	100								
		Wr	87	90								
	White Sucker	PSD	100	100								
		PSD-P	100	100								
		Wr	94	94								
	Yellow Perch	PSD	100									
		PSD-P	0									
		Wr	127									
	std exp gill net	Black Bullhead	PSD	58	100	100						
			PSD-P	12	82	0						
			Wr	105	108	127						
Common Carp		PSD		100	100							
		PSD-P		100	100							

Gear	Species	Index	Year									
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
std exp gill net	Common Carp	Wr		92	119							
	Northern Pike	PSD	100	100	100							
		PSD-P	25	63	100							
		Wr	79	86	77							
	Rock Bass	PSD	80	94	100							
		PSD-P	0	0	0							
		Wr	105	107	111							
	Smallmouth Bass	PSD	50	50								
		PSD-P	50	0								
		Wr	88	92								
	Walleye	PSD	28	17	8							
		PSD-P	2	1	0							
		Wr	82	84	85							
	White Bass	PSD	100	100	100							
		PSD-P	99	100	99							
		Wr	93	98	97							
	White Sucker	PSD	100	100								
		PSD-P	100	100								
		Wr	109	98								
	Yellow Perch	PSD	79	87	83							
		PSD-P	36	41	38							
		Wr	115	115	117							

## Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Smallmouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	12		206 (2)	270 (4)	288 (4)	318 (2)					
2015	8			260 (1)	294 (1)	331 (5)		414 (1)			
2013	63		208 (5)	253 (29)	312 (15)	369 (8)	418 (1)	441 (4)	443 (1)		

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	163	225 (13)	295 (3)	343 (121)	414 (6)	397 (5)	477 (10)		576 (1)	645 (2)	575 (2)
2021	170	211 (1)	307 (112)	402 (7)	424 (8)	469 (22)		583 (6)	480 (2)	585 (2)	580 (10)
2020	187	225 (72)	354 (17)	388 (9)	427 (41)	445 (2)	458 (8)	475 (2)	482 (4)	484 (27)	467 (4)
2019	130	253 (10)	341 (13)	395 (72)		460 (6)	466 (1)	553 (1)	467 (24)		548 (3)
2018	96	264 (7)	327 (37)	430 (7)	402 (8)	444 (2)	472 (3)	434 (33)			
2017	92	223 (21)	354 (1)	394 (4)	479 (2)		410 (58)		410 (2)	445 (1)	668 (2)
2016	100		320 (6)	396 (1)	396 (1)	365 (83)	334 (1)	485 (4)			691 (3)
2015	117	215 (4)	280 (1)		332 (104)		387 (4)				417 (4)
2014	157	228 (3)		304 (120)		386 (21)	399 (3)			435 (9)	
2013	113	235 (4)	259 (61)	350 (2)	374 (28)	427 (2)		374 (3)	447 (11)	416 (1)	724 (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+
2022	121	145 (23)	202 (7)	241 (68)	263 (22)	283 (1)					
2021	231	147 (11)	205 (141)	244 (78)							316 (1)
2020	142	146 (37)	211 (104)		280 (1)						
2019	165	146 (145)		247 (9)	282 (6)	274 (1)	306 (2)	311 (1)			327 (1)
2018	102		211 (46)	242 (29)	257 (7)	281 (3)		296 (10)	274 (4)	295 (1)	
2017	133	152 (39)	207 (31)	247 (21)	269 (7)	273 (4)	279 (18)	300 (4)	286 (7)		

Mean Length (expanded sample number) at capture by age

Year	N	1	2	3	4	5	6	7	8	9	10+
2016	87	153 (22)	205 (7)	238 (18)	258 (16)	267 (21)	242 (4)				
2015	159	136 (17)	190 (14)	237 (38)	248 (56)	261 (14)	267 (19)	312 (1)			
2014	152	138 (9)	186 (12)	233 (62)	261 (33)	251 (31)	299 (3)	343 (1)	303 (1)		
2013	175	150 (5)	198 (51)	237 (39)	250 (62)	244 (4)	280 (10)		323 (1)	269 (4)	

## 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).

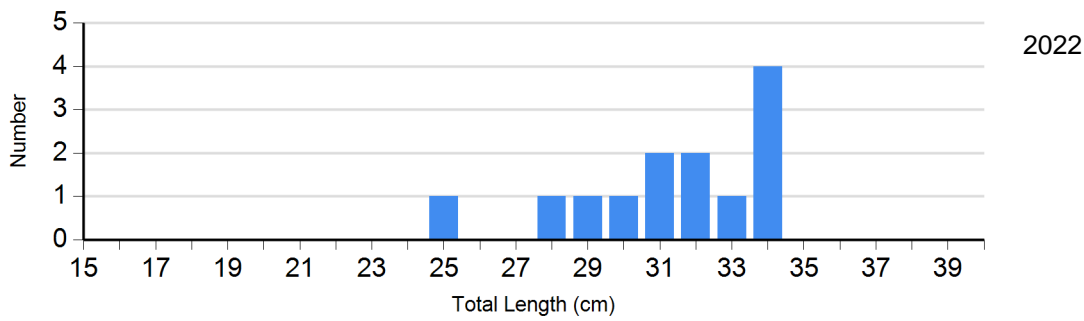
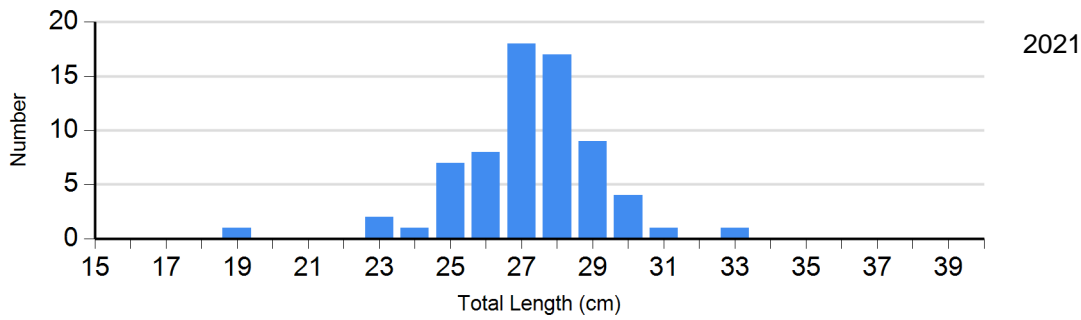
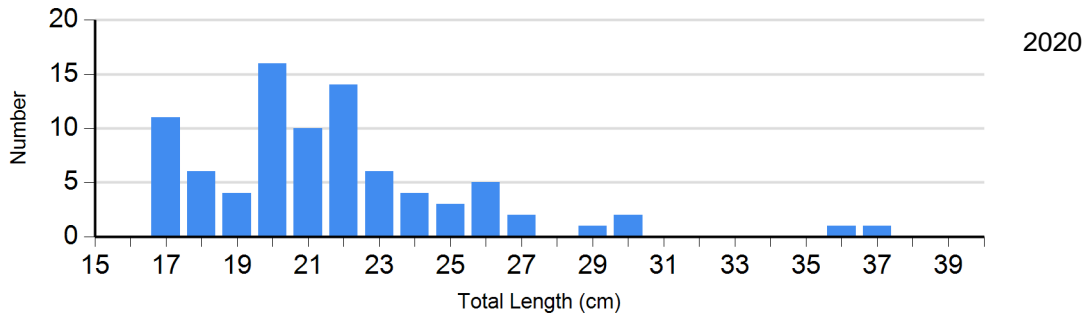
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2018	0		3	104 (8.5)	1	104	0	
	2019	1	95	2	104 (18.2)	1	93	2	89 (3.0)
	2020	61	106 (1.3)	21	107 (2.5)	4	100 (6.8)	0	
	2021	1	107	62	102 (1.1)	6	101 (2.1)	0	
	2022	0		3	122 (1.6)	10	113 (3.3)	0	
Common Carp Gill Net	2018	0		0		0		5	102 (3.9)
	2019	3	111 (2.6)	1	100	4	93 (5.0)	8	96 (3.0)
	2020	9	111 (1.1)	0		0		3	104 (7.3)
	2021	2	110 (1.5)	23	101 (1.4)	5	93 (1.7)	2	90 (1.3)
	2022	0		0		5	98 (2.7)	7	97 (2.0)
Smallmouth Bass Electro Fishing	2019	6	98 (3.2)	6	95 (3.9)	4	95 (0.9)	0	
Walleye Gill Net	2018	46	88 (0.8)	48	89 (0.9)	1	87	0	
	2019	36	88 (0.7)	87	87 (0.5)	3	86 (1.5)	1	90
	2020	24	85 (1.0)	89	87 (0.5)	9	87 (2.8)	0	
	2021	114	82 (0.5)	37	83 (0.8)	15	85 (1.7)	3	86 (3.3)
	2022	121	85 (0.6)	22	82 (1.2)	6	80 (1.6)	2	73 (5.1)
White Bass Gill Net	2018	0		2	97 (1.1)	39	98 (1.0)	69	99 (0.7)
	2019	13	100 (1.3)	1	105	41	96 (0.5)	61	94 (0.6)
	2020	0		0		11	96 (2.5)	25	94 (1.0)
	2021	0		1	94	39	96 (0.6)	31	94 (0.9)
	2022	0		0		27	98 (0.8)	57	94 (0.7)
White Sucker Gill Net	2021	0		0		1	102	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 Sucker Gill Net	2022	0		0		1	109	2	101 (4.4)
Yellow Perch Gill Net	2018	12	112 (2.9)	55	111 (1.0)	32	106 (1.6)	3	91 (3.0)
	2019	145	112 (0.7)	5	115 (3.8)	10	116 (3.1)	5	97 (3.9)
	2020	56	115 (1.7)	85	110 (1.0)	1		0	
	2021	61	113 (1.3)	128	107 (0.8)	41	105 (0.9)	1	106
	2022	26	108 (2.0)	53	111 (1.3)	41	106 (1.3)	0	

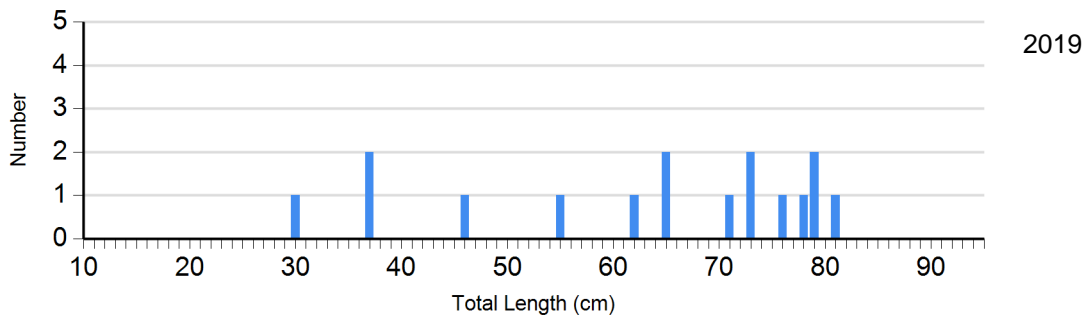
## Length Frequency Distribution

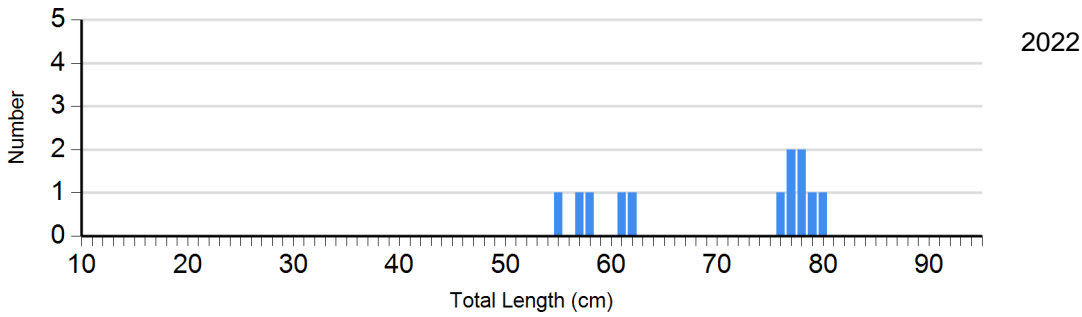
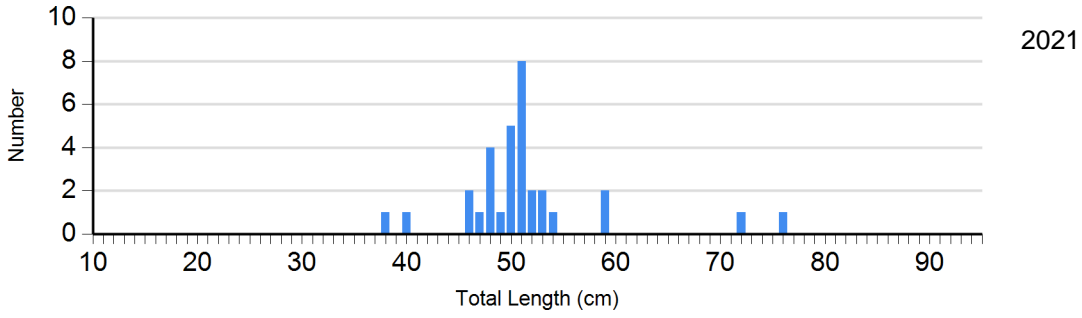
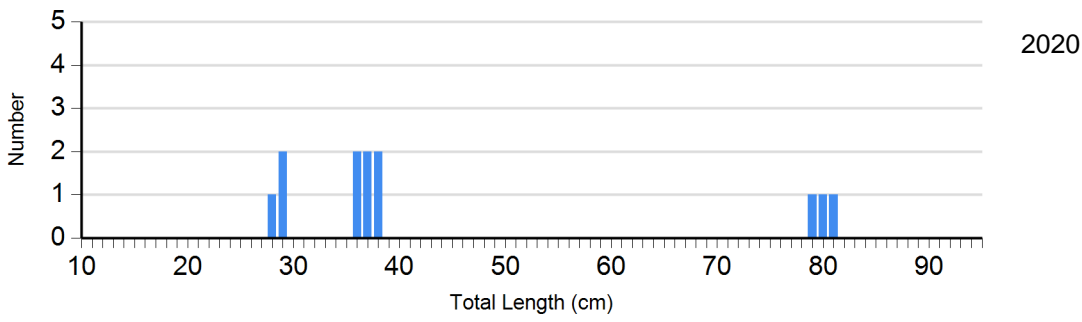
Length frequency histogram of species sampled by year.

Species: Black Bullhead  
Gear: AFS std gill net

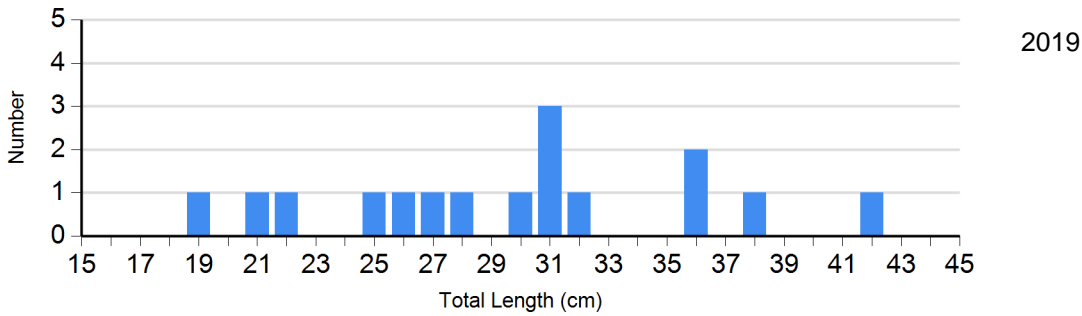


Species: Common Carp  
Gear: AFS std gill net

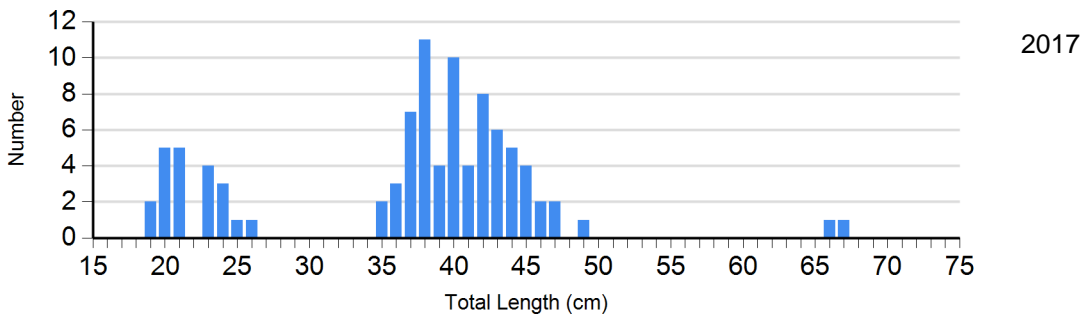




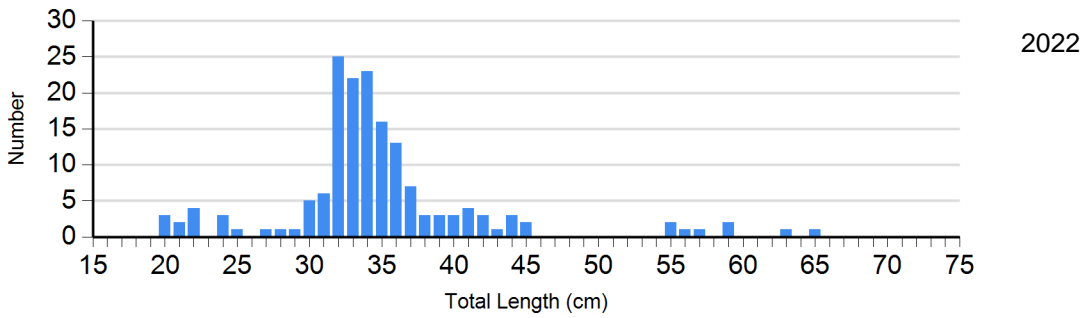
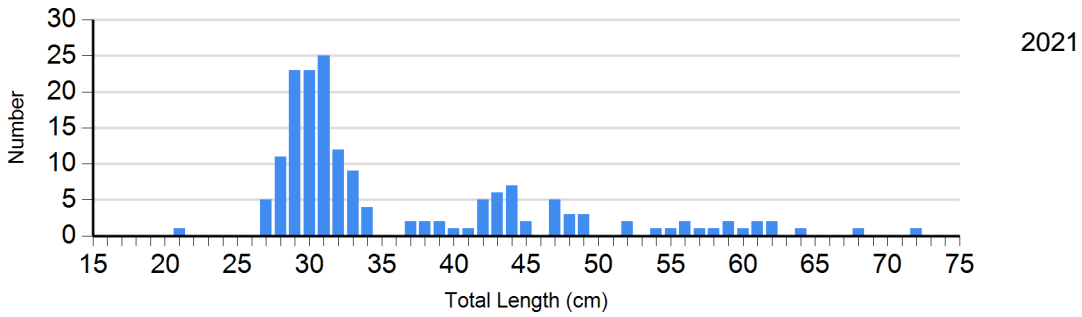
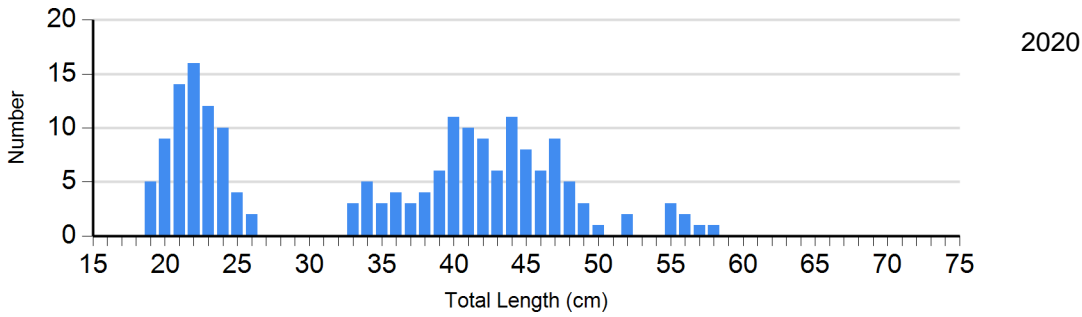
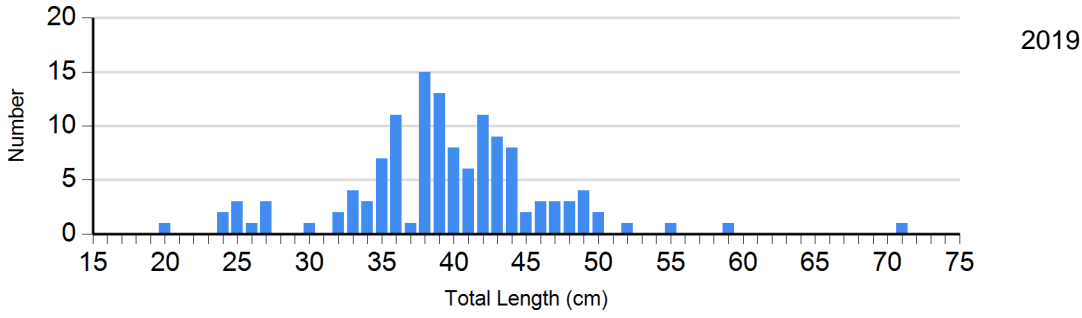
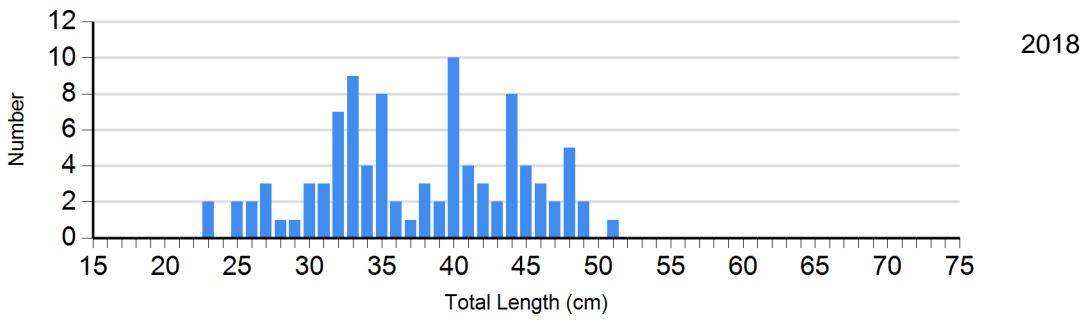
Species: Smallmouth Bass  
 Gear: boat shocker (day)



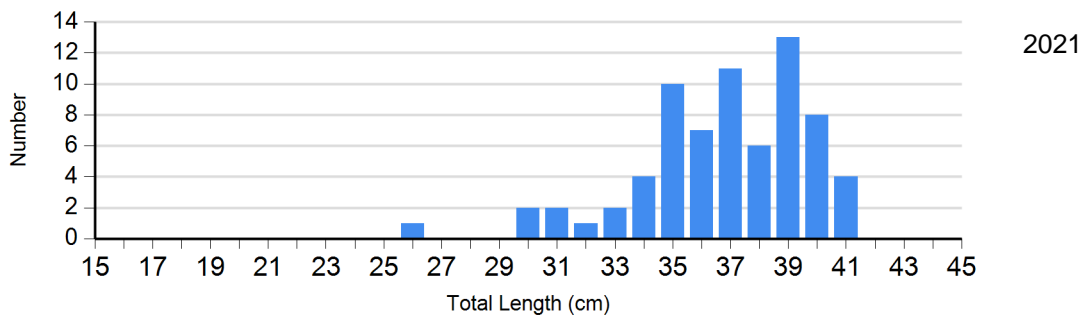
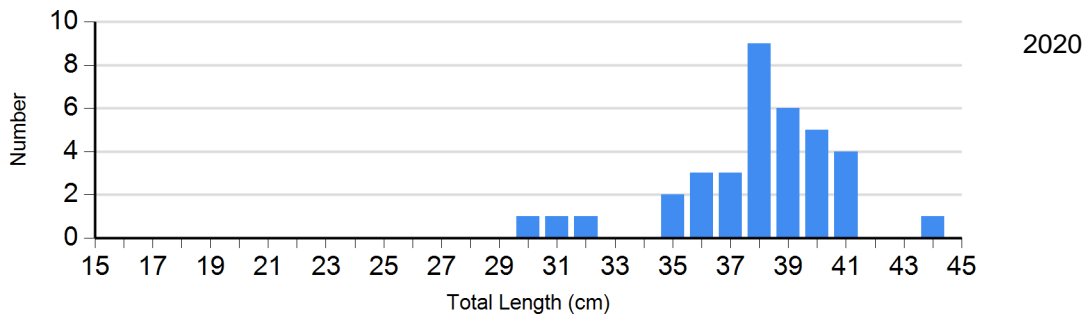
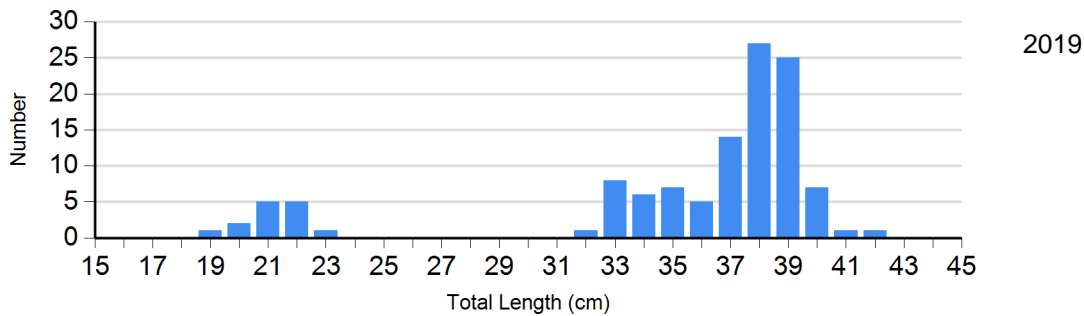
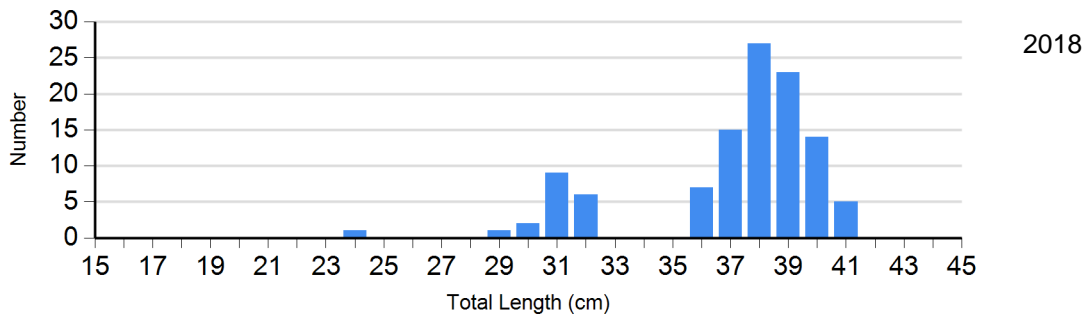
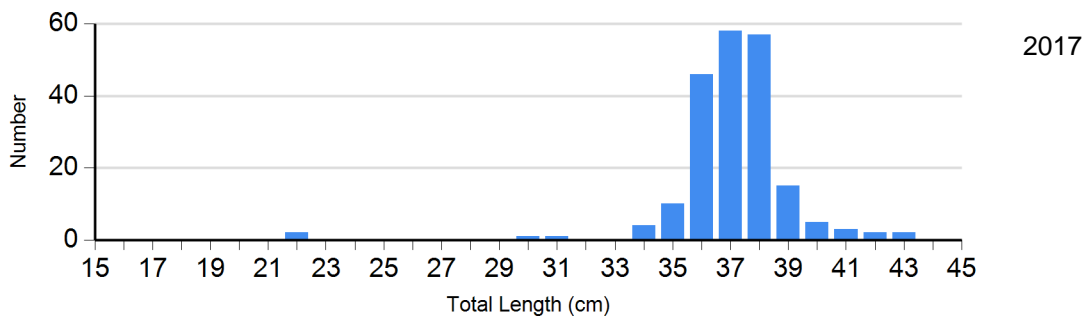
Species: Walleye  
 Gear: AFS std gill net

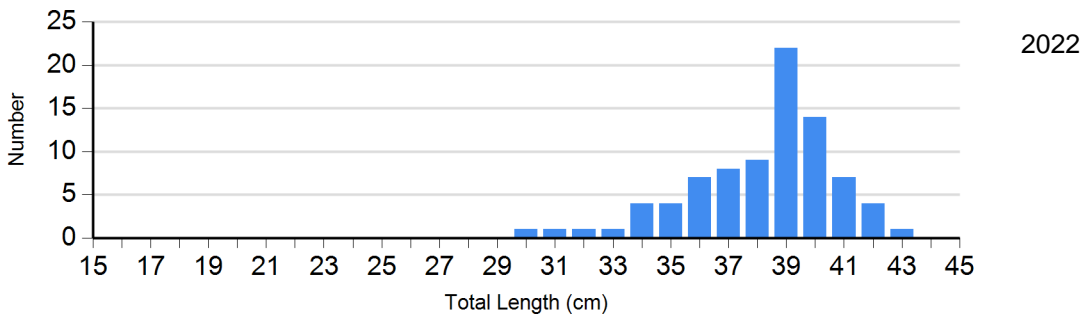




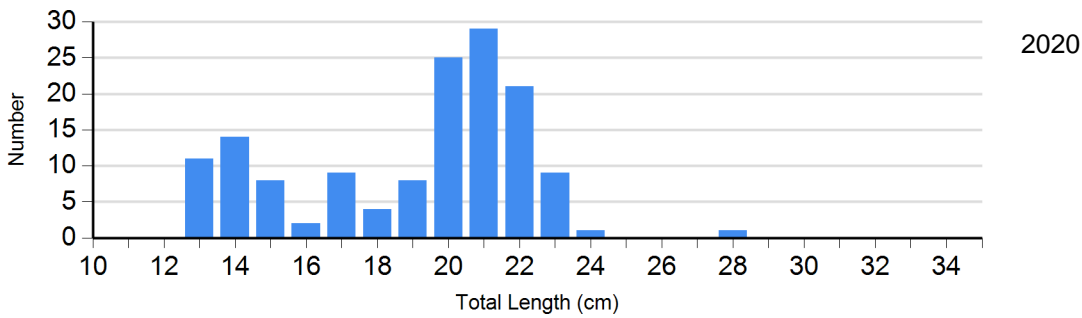
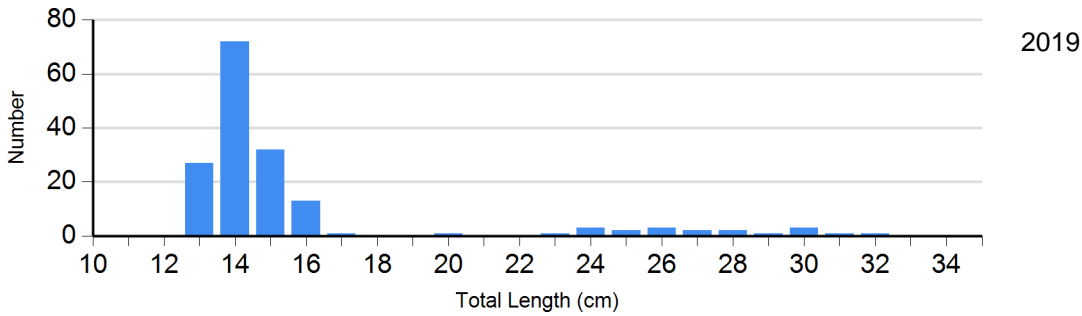
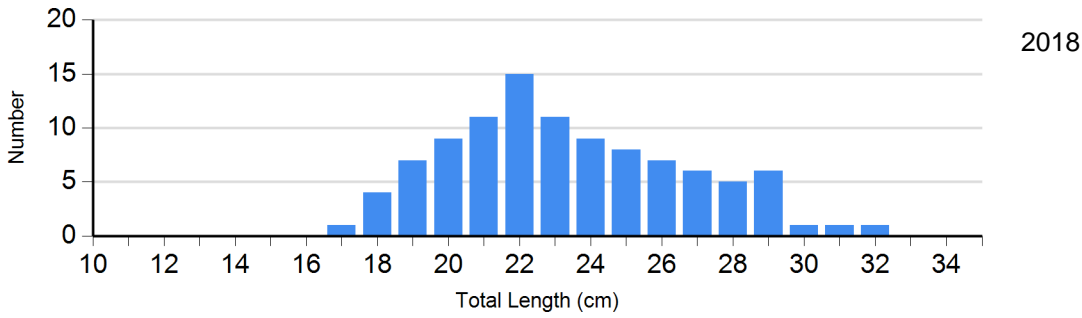
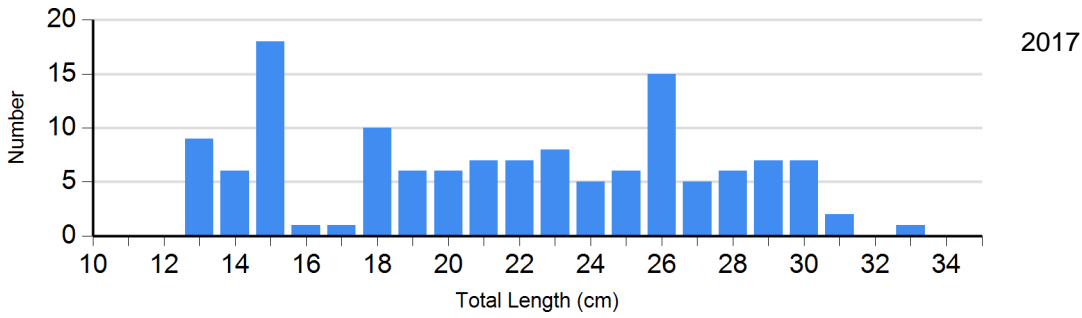


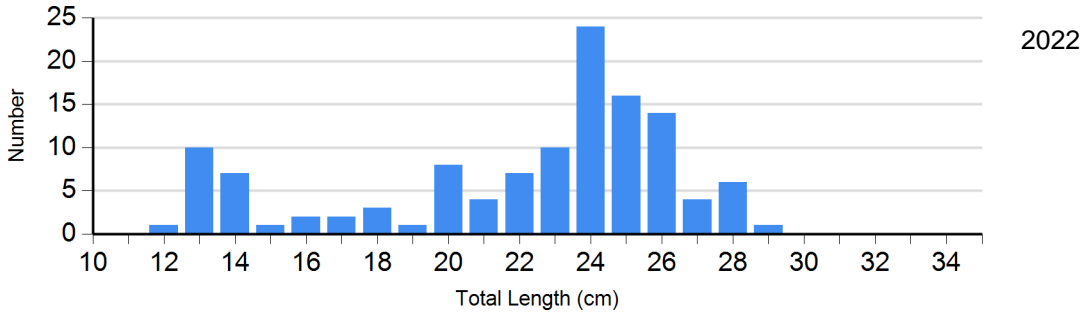
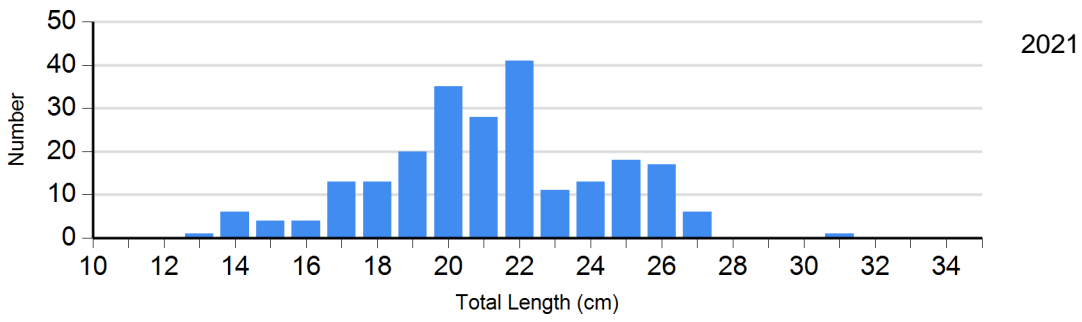
Species: White Bass  
Gear: AFS std gill net





Species: Yellow Perch  
Gear: AFS std gill net

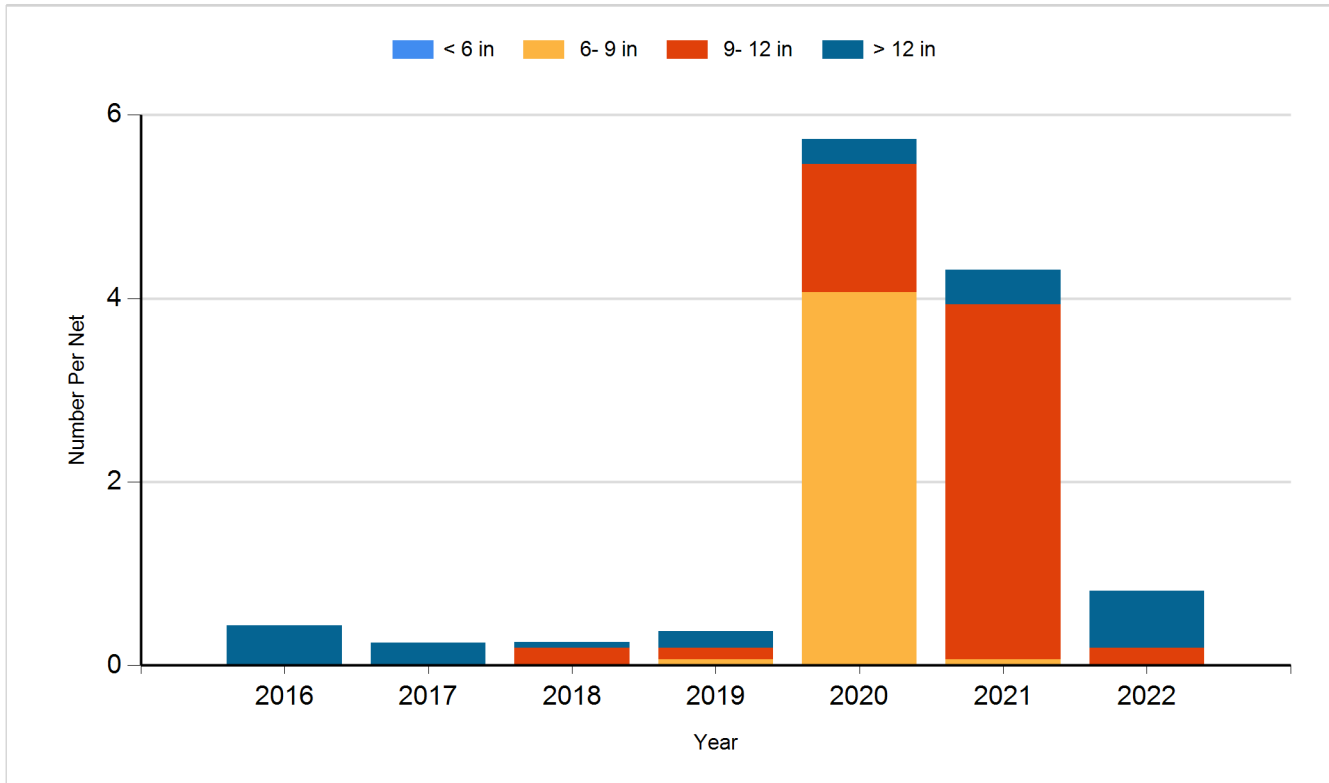




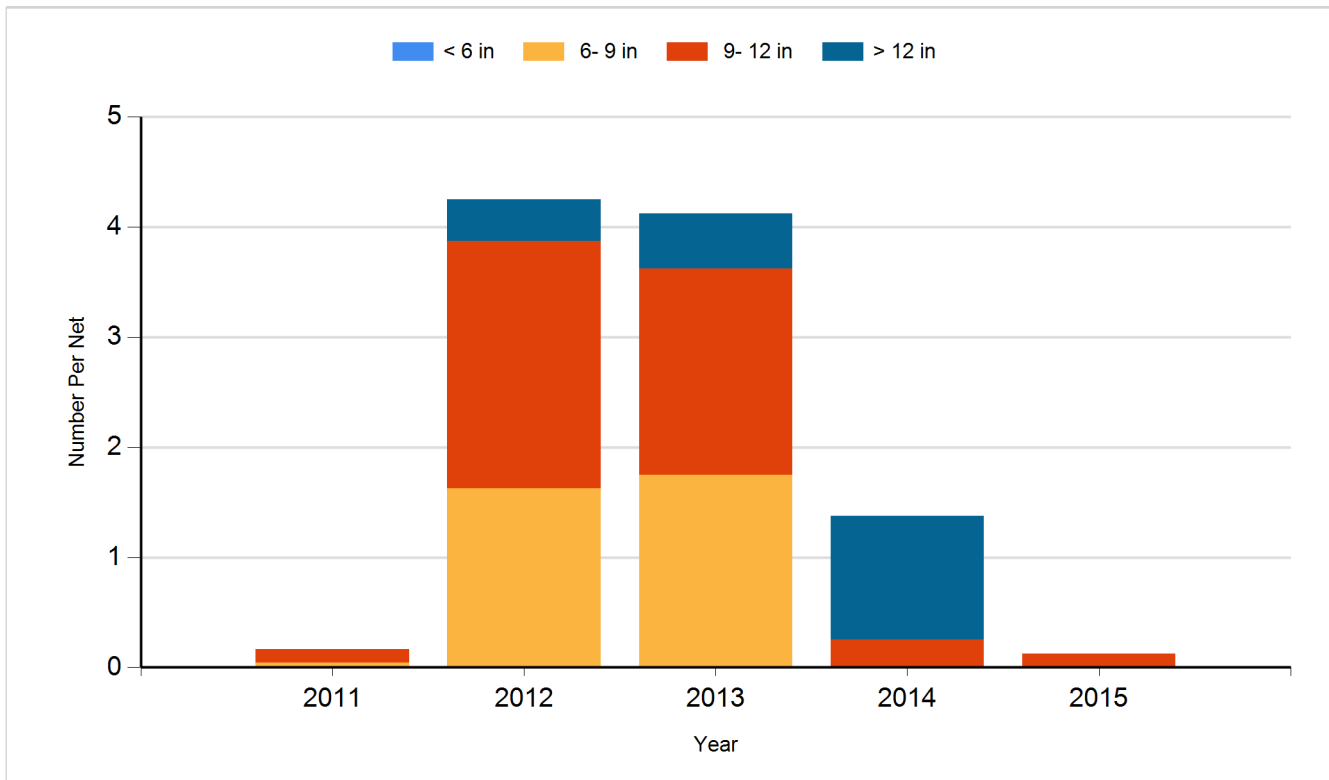
## Historic Fish Sizes and Relative Abundance

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

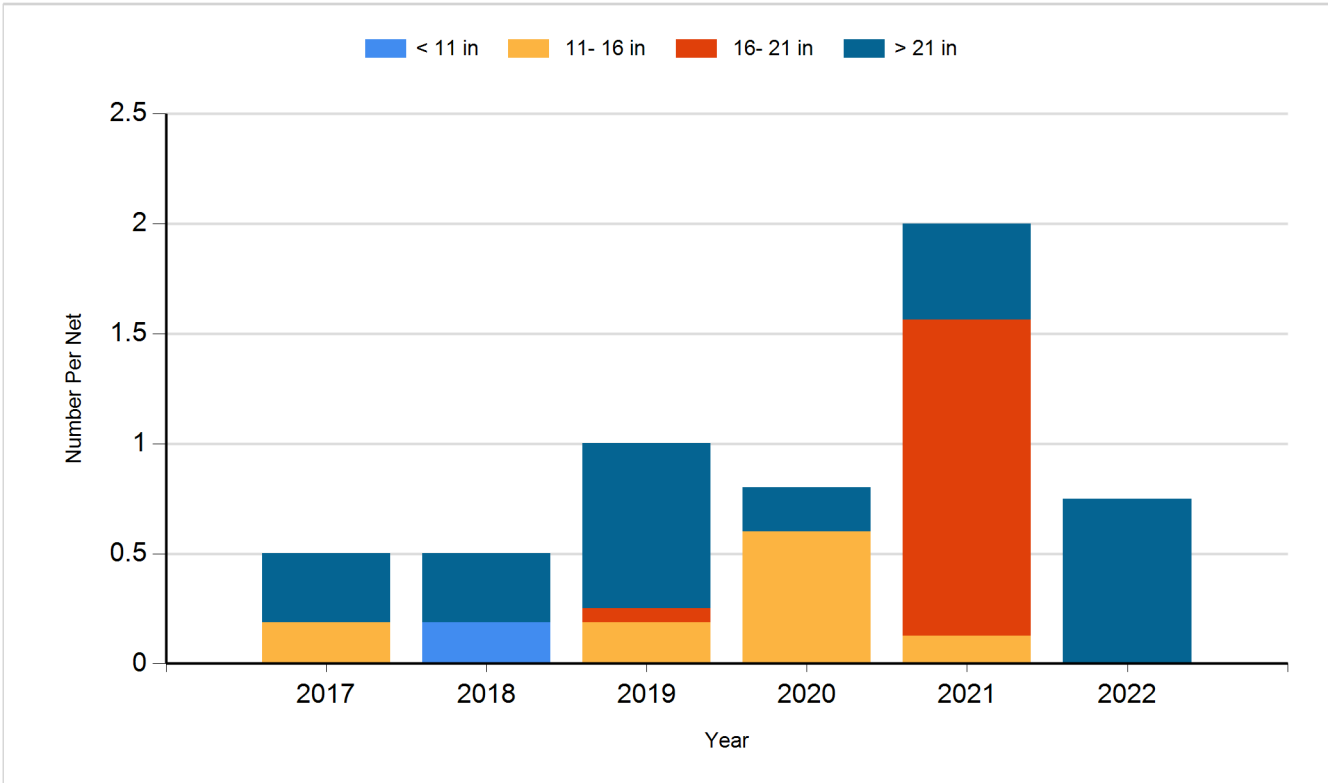
Species: Black Bullhead  
Gear: AFS std gill net



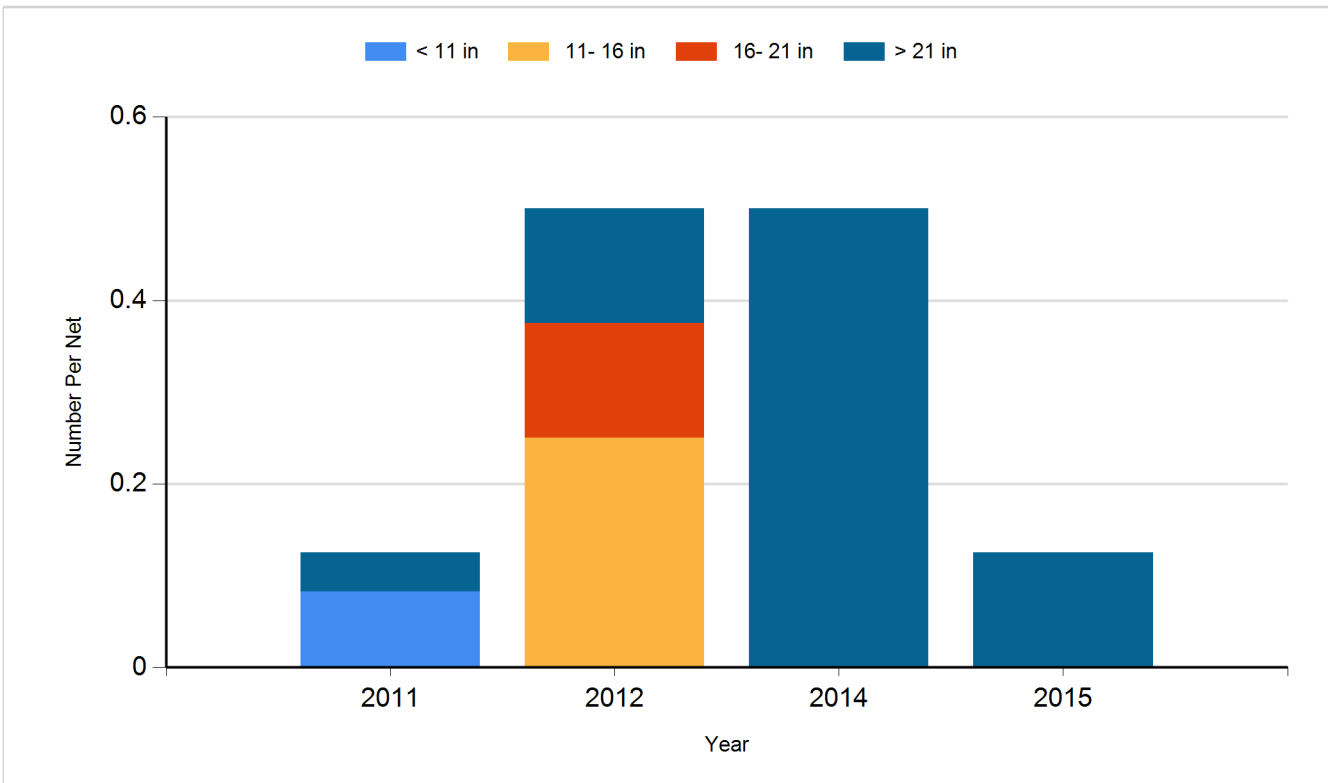
Species: Black Bullhead  
Gear: std exp gill net



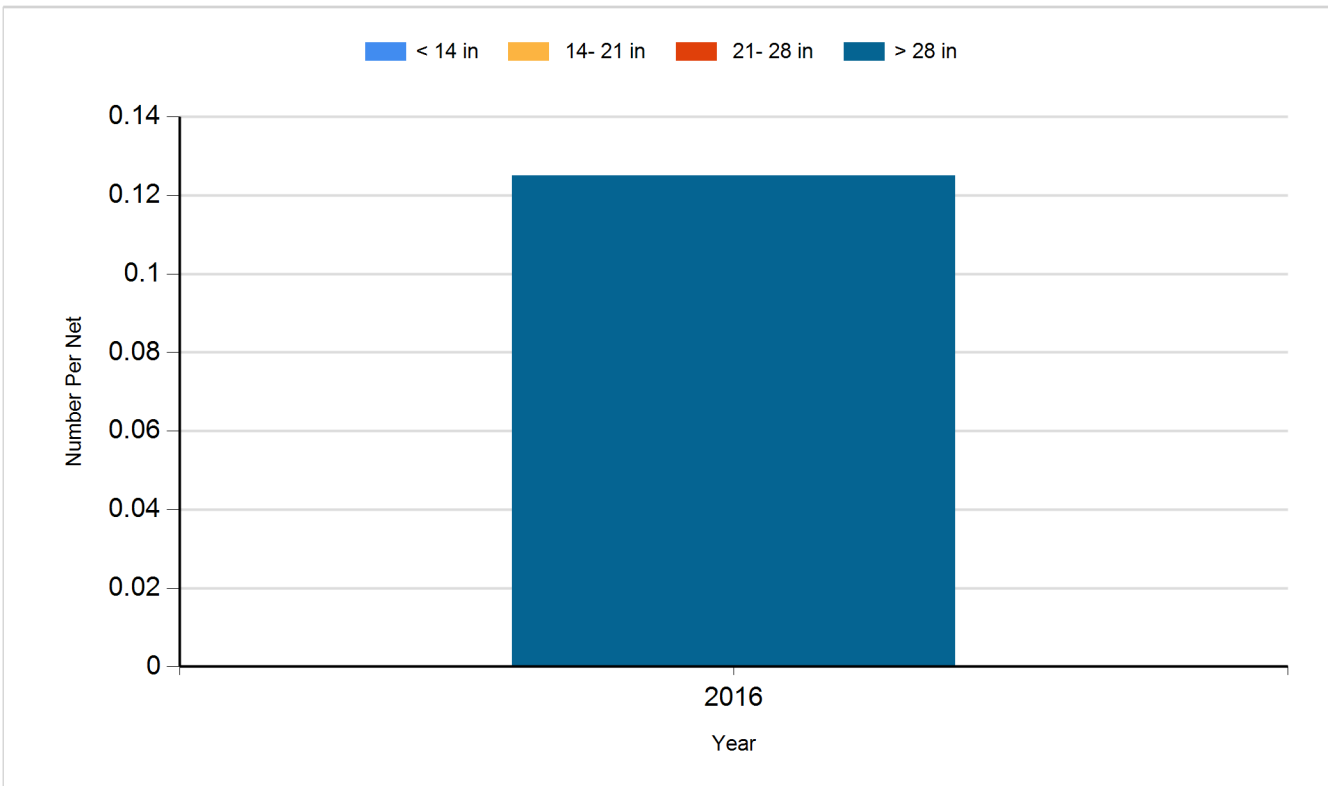
Species: Common Carp  
Gear: AFS std gill net



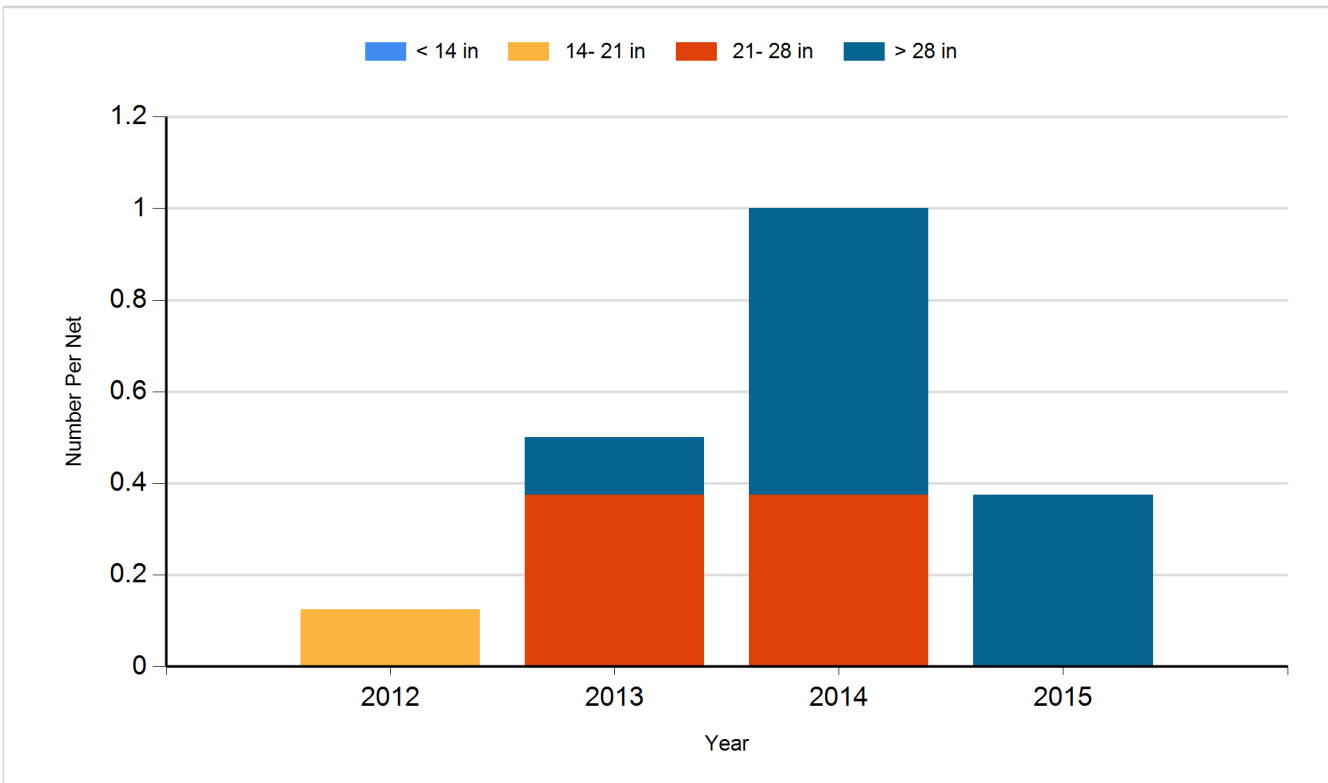
Species: Common Carp  
Gear: std exp gill net



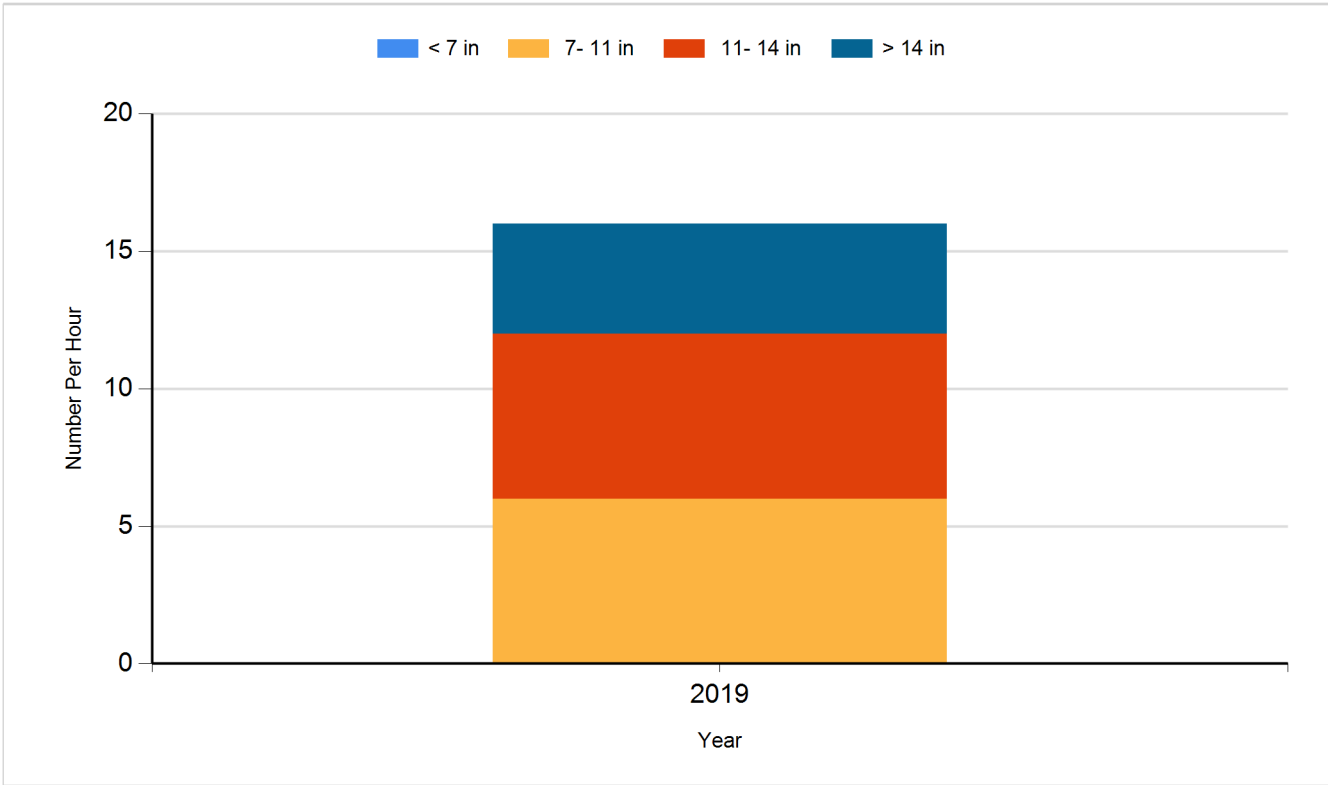
Species: Northern Pike  
Gear: AFS std gill net



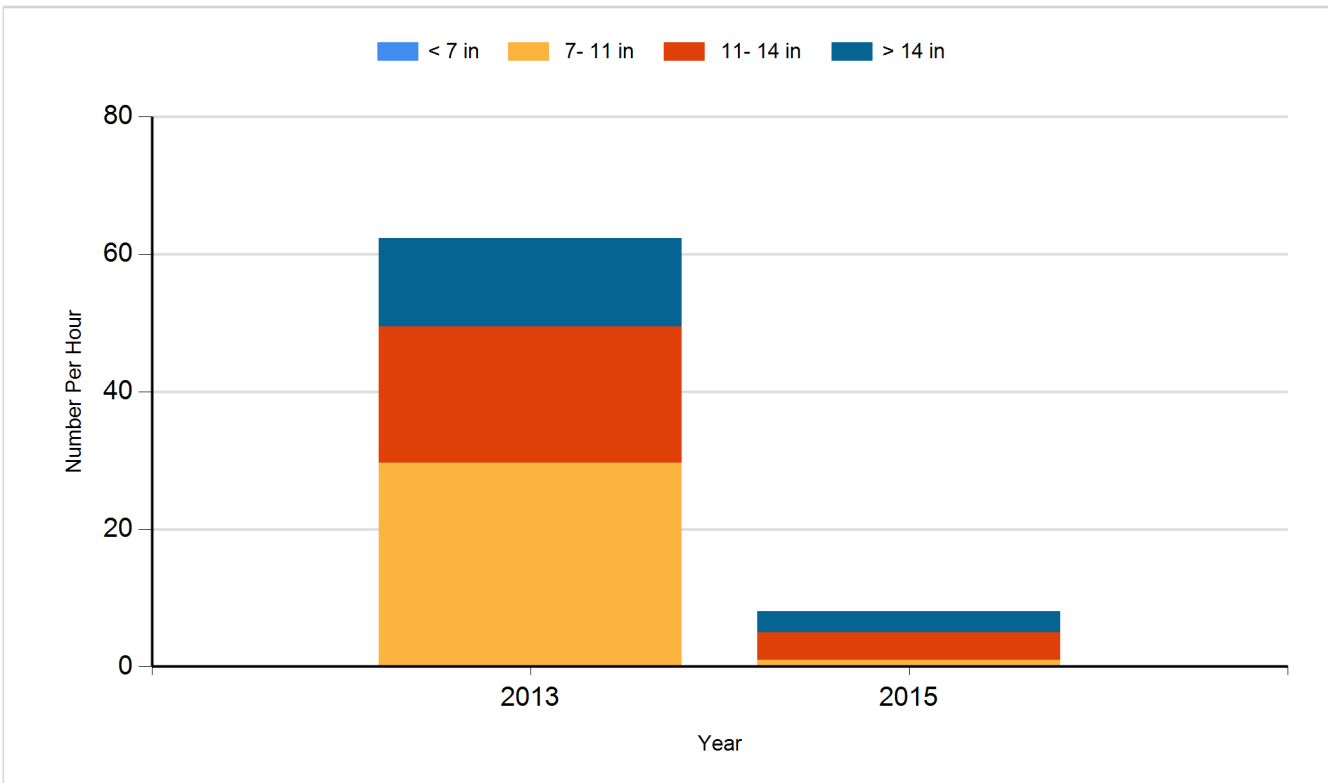
Species: Northern Pike  
Gear: std exp gill net



Species: Smallmouth Bass  
Gear: boat shocker (day)

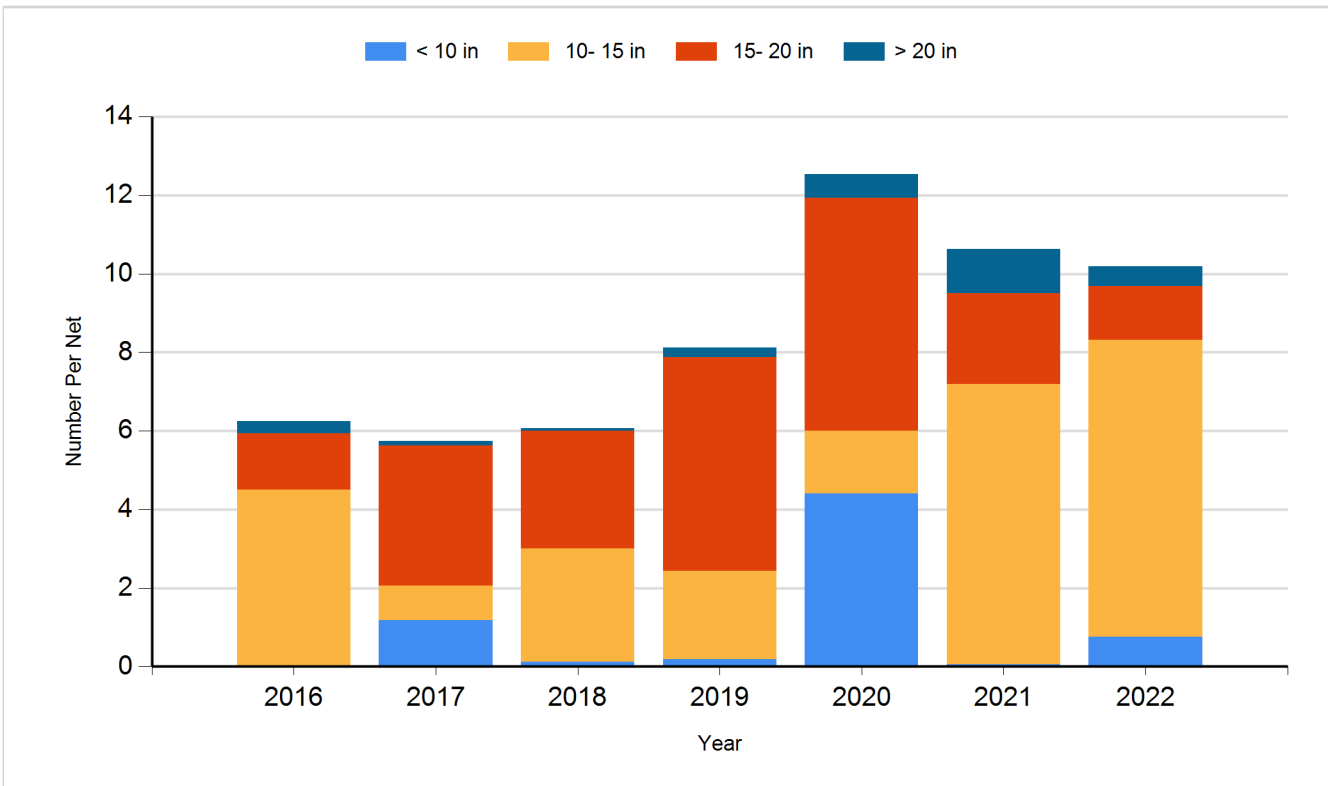


Species: Smallmouth Bass  
Gear: boat shocker (night, DC)

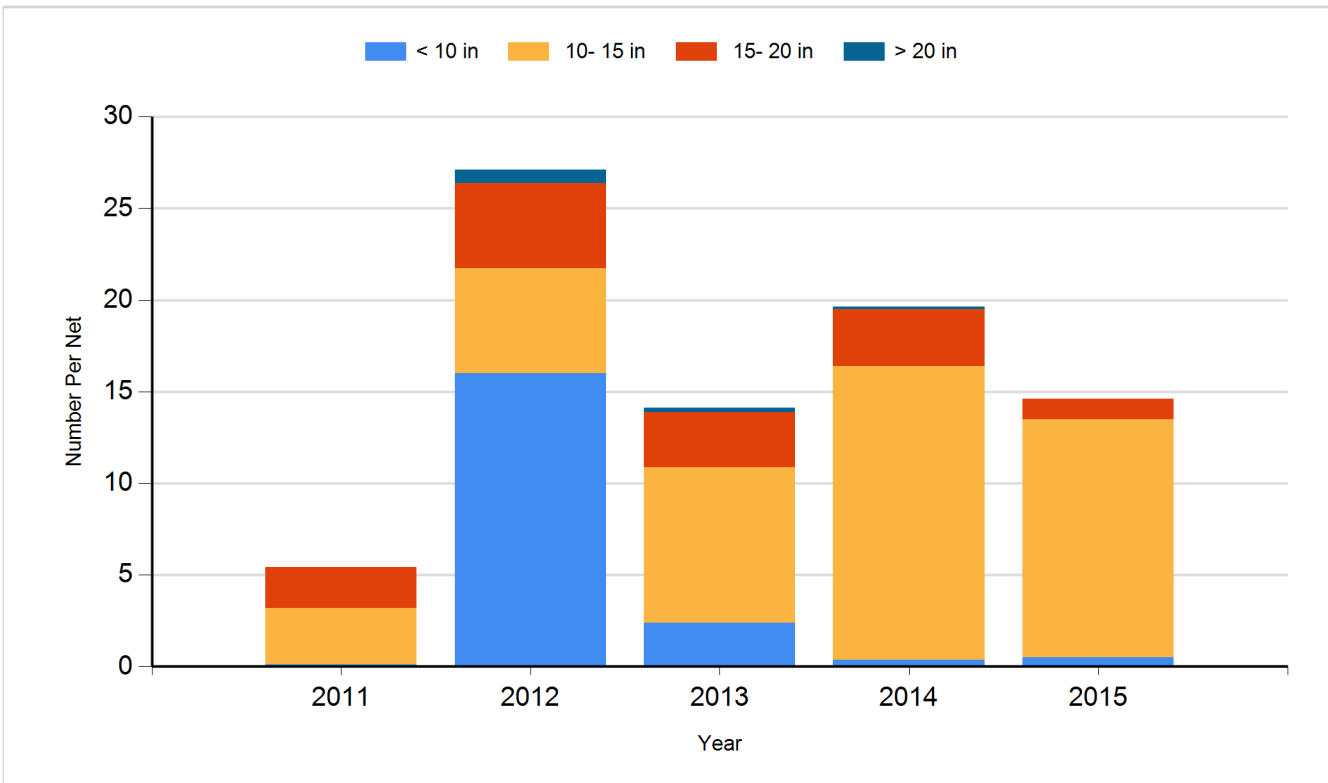




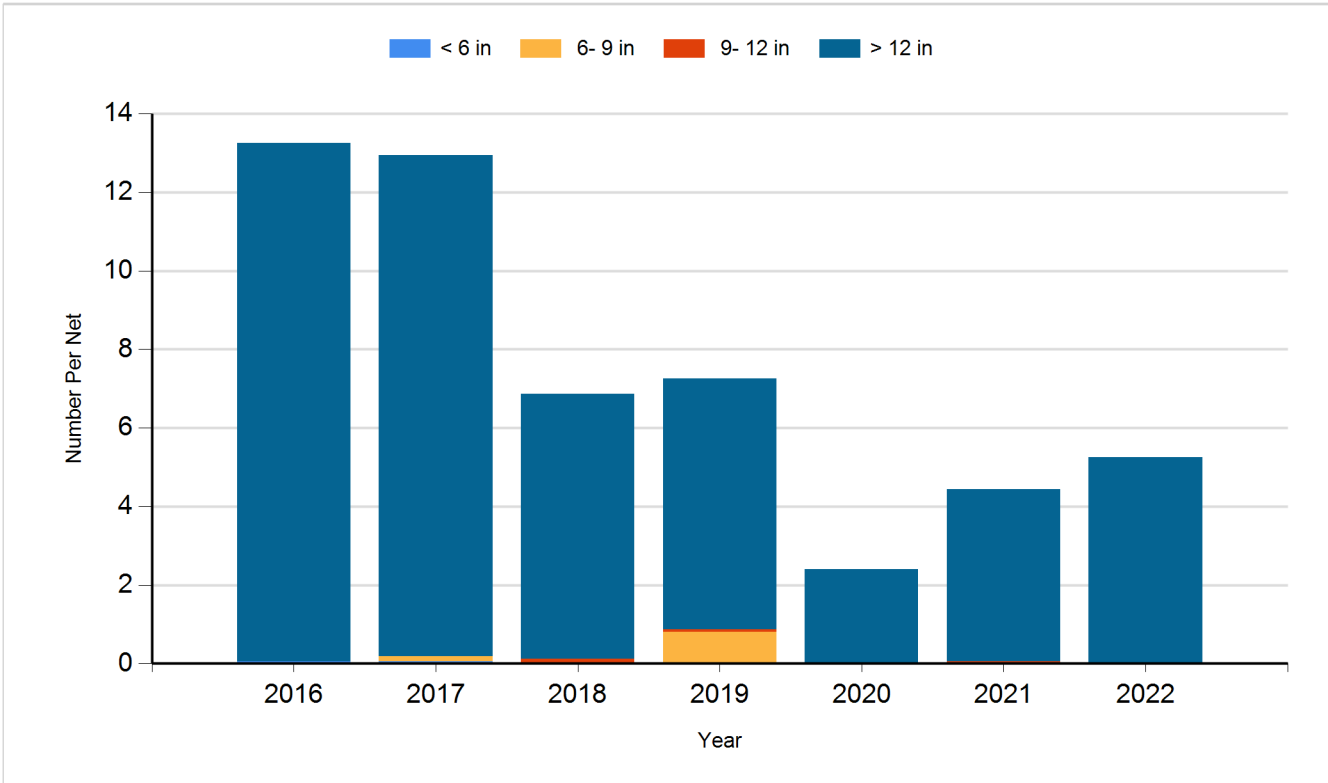
Species: Walleye  
Gear: AFS std gill net



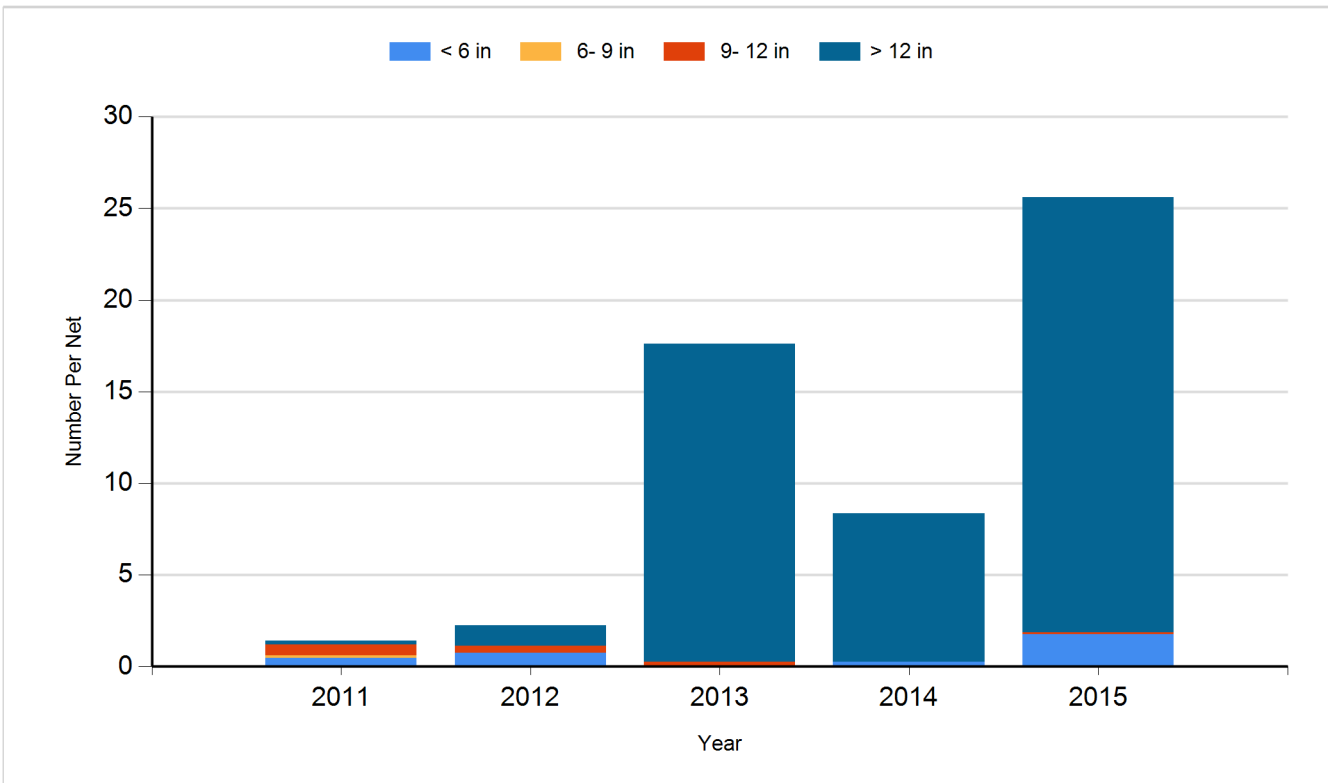
Species: Walleye  
Gear: std exp gill net



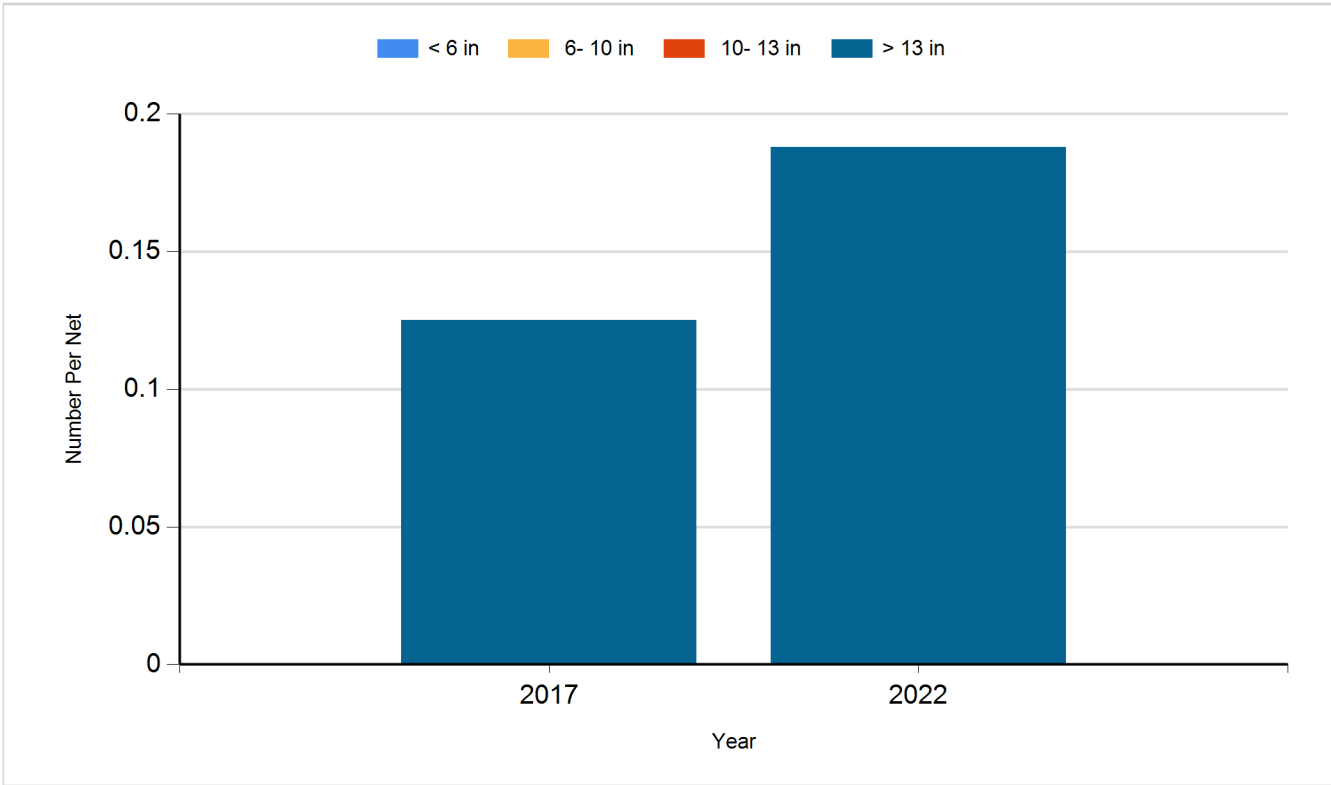
Species: White Bass  
Gear: AFS std gill net



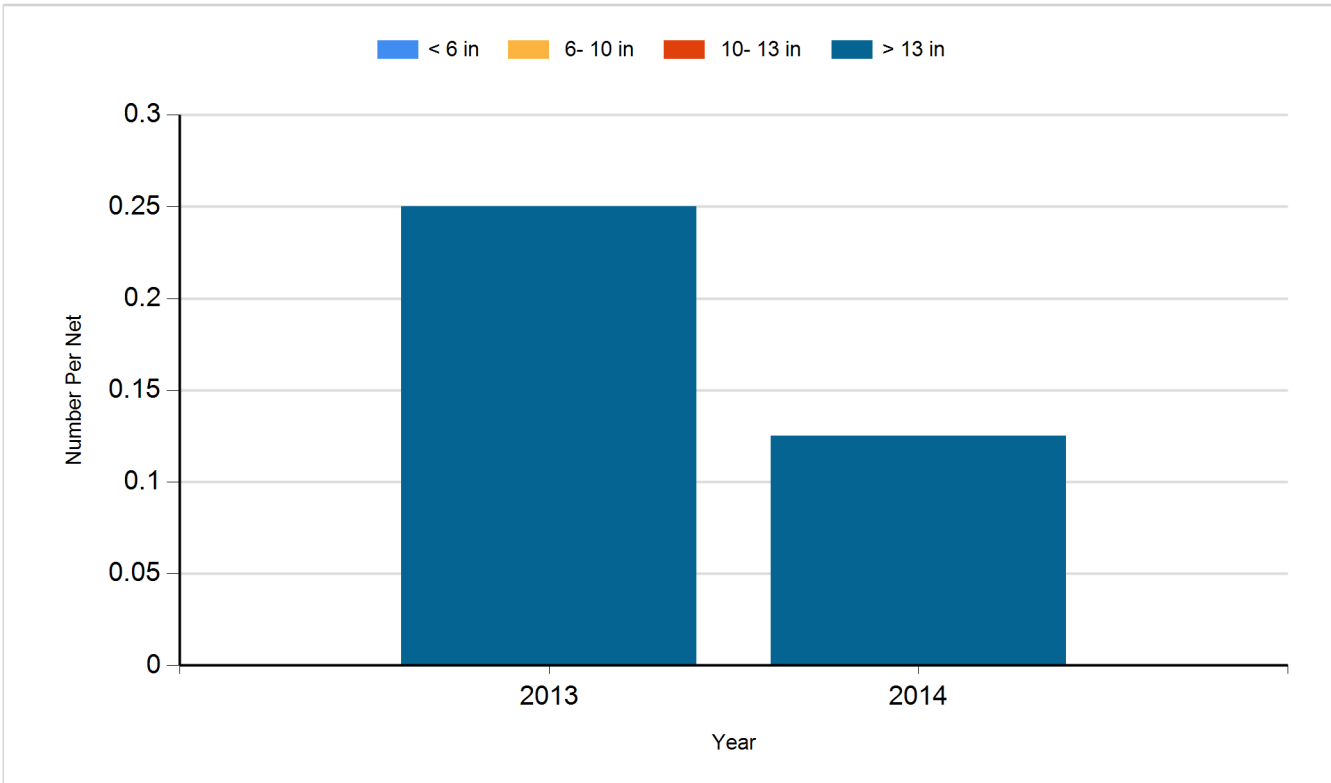
Species: White Bass  
Gear: std exp gill net



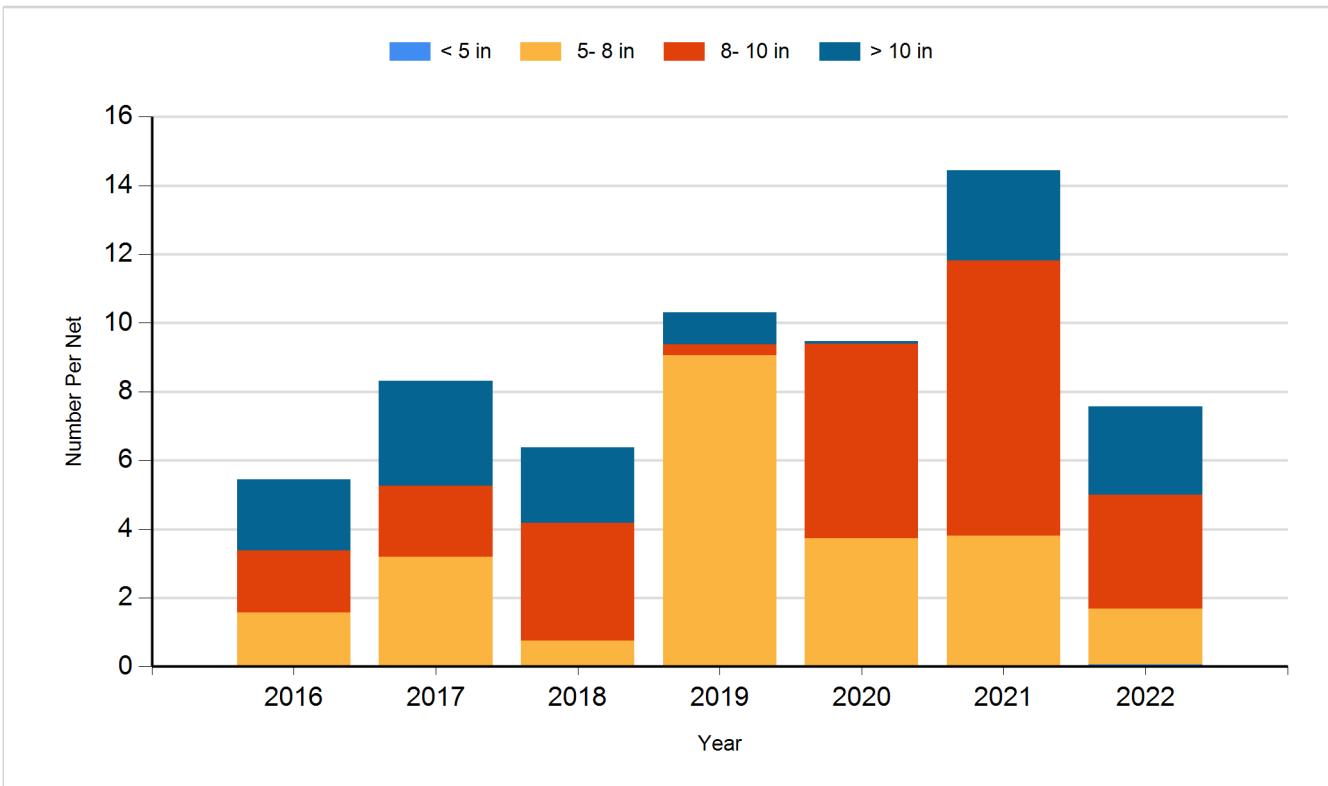
Species: White Sucker  
Gear: AFS std gill net



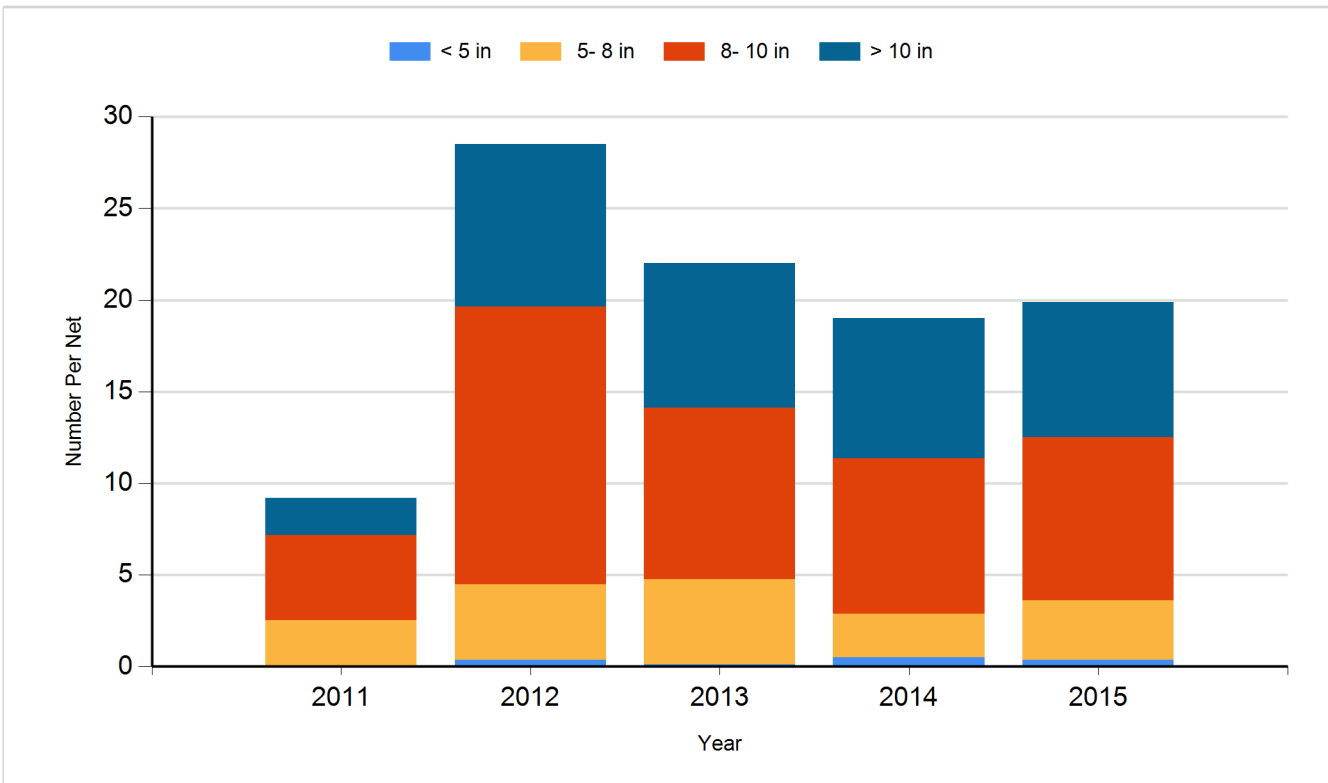
Species: White Sucker  
Gear: std exp gill net



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	Walleye	Fry	8,000,000
2012	Walleye	Fry	8,000,000
2014	Walleye	Fry	8,500,000
2016	Walleye	Fry	8,500,000
2017	Walleye	Fry	8,000,000
2019	Walleye	Fry	4,000,000
2021	Walleye		5,000,000
2021	Walleye	Fry	7,500,000
2021	Walleye	Juvenile	214,580