

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Brant, Lake County

LBS-Lake-135-001

2022

Lake Information

Name:	Brant	Maximum Depth:	14 Feet
County:	Lake	Mean Depth:	10 Feet
Legal Description:	T105N-R51W-Sec. 3, 4, 9, 10	OHWM Elevation:	1,598
Surface Area:	1,046 Acres	Outlet Elevation:	1,597

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 21, 2022	10 net-nights
frame net (std 3/4 in)	Jun 21, 2022	10 net-nights

Common Fish Species Present

Walleye

Yellow Perch

Black Bullhead

White Sucker

Smallmouth Bass

White Bass

Bluegill

Common Carp

Northern Pike

Bigmouth Buffalo

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.

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

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	Bigmouth Buffalo	6	0.6	0.5	83		17			
	Black Bullhead	75	7.5	2.5	87	6	28	8	94	1
	Black Crappie	2	0.2	0.3	100		100		89	0
	Bluegill	2	0.2	0.2	100		50		105	0
	Channel Catfish	1	0.1	0.1	0		0		105	
	Common Carp	14	1.4	0.7	86		57	22		
	Northern Pike	4	0.4	0.2	100		50		87	11
	Smallmouth Bass	5	0.5	0.4	80		20		87	4
	Walleye	13	1.0	0.7	60		10		79	3
	White Bass	56	5.6	1.2	98		98		88	1
	White Sucker	43	4.3	1.9	100		100			
	Yellow Perch	15	1.5	0.8	100		100		99	2
frame net (std 3/4 in)	Bigmouth Buffalo	2	0.2	0.2	100		100			
	Black Bullhead	761	76.1	16.4	100		57	2		
	Black Crappie	5	0.5	0.3	100		100		97	3
	Bluegill	15	1.5	0.7	100		100		120	3
	Common Carp	2	0.2	0.3	100		50			
	Northern Pike	8	0.8	0.4	63		50		95	9
	Smallmouth Bass	74	6.8	2.2	60	9	10	6	91	1
	White Bass	35	3.5	1.3	100		97		89	5
	White Sucker	82	8.2	3.0	100		100			
	Yellow Bullhead	3	0.3	0.3	100		67			

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 frame net	Bigmouth Buffalo					0.1							0.10
	Black Bullhead					16.5							16.50
	Black Crappie					9.5							9.50
	Bluegill					0.5							0.50
	Common Carp					0.1							0.10
	Smallmouth Bass					2.7							2.70
	Walleye					1.6							1.60
	White Bass					3.3							3.30
	White Sucker					2.2							2.20
Yellow Perch					0.2							0.20	
AFS std gill net	Bigmouth Buffalo					1.6	1.2	0.4		1.3	0.6		1.02
	Black Bullhead					21.0	2.8	2.5		7.7	7.5		8.30
	Black Crappie					2.0	0.2	0.0		0.0	0.2		0.48
	Bluegill					0.2	0.4	0.0		0.2	0.2		0.20
	Channel Catfish					0.0	0.3	0.0		0.2	0.1		0.12
	Common Carp					1.2	1.4	2.6		2.9	1.4		1.90
	Northern Pike					0.2	0.0	0.3		0.1	0.4		0.20
	Shorthead Redhorse					0.1	0.0	0.0		0.0	0.0		0.02
	Smallmouth Bass					0.7	4.3	0.4		0.3	0.5		1.24
	Walleye					2.7	1.8	2.0		2.6	1.0		2.02
	White Bass					4.7	3.9	4.2		5.3	5.6		4.74
	White Sucker					7.3	3.4	2.9		0.6	4.3		3.70
	Yellow Perch					6.7	4.0	4.6		4.3	1.5		4.22
fall night EF-WAE*	Walleye	27.0	85.5	30.5									47.67
frame net (std 3/4 in)	Bigmouth Buffalo	0.7	0.3	0.0	2.6		0.6	2.8		1.1	0.2		1.04
	Black Bullhead	41.1	48.6	41.7	306.8		13.3	9.7		11.5	76.1		68.60
	Black Crappie	2.4	1.5	1.3	4.7		8.5	2.9		5.5	0.5		3.41
	Bluegill	0.7	0.2	0.3	1.6		1.2	2.4		2.0	1.5		1.24
	Bluegill X Gr. Sunfish Hybrid	0.0	0.0	0.0	0.0		0.1	0.0		0.0	0.0		0.01
	Channel Catfish	0.2	0.1	0.1	0.0		0.1	0.0		0.0	0.0		0.06
	Common Carp	0.3	0.7	0.2	1.3		2.3	4.2		0.5	0.2		1.21
	Green Sunfish	0.0	0.0	0.1	0.0		0.0	0.0		0.0	0.0		0.01
	Northern Pike	1.8	1.9	1.4	1.6		1.3	0.9		3.6	0.8		1.66

		CPUE										
Gear	Species	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg
frame net (std 3/4 in)	Smallmouth Bass	1.2	1.4	1.1	17.0		8.5	2.5		10.1	6.8	6.08
	Sunfish Hybrid	0.0	0.2	0.0	0.2		0.0	0.0		0.4	0.0	0.10
	Walleye	0.1	0.2	0.0	1.4		0.7	0.1		0.9	0.0	0.43
	White Bass	3.0	1.8	1.3	3.9		0.9	0.5		1.2	3.5	2.01
	White Sucker	0.9	2.3	4.3	1.6		4.2	5.1		14.7	8.2	5.16
	Yellow Bullhead	0.2	0.0	0.1	0.0		0.1	0.0		0.4	0.3	0.14
	Yellow Perch	0.0	0.1	0.3	1.4		0.8	0.6		0.0	0.0	0.40
std exp gill net	Bigmouth Buffalo	0.3	1.0	0.0	0.2							0.38
	Black Bullhead	24.3	27.6	21.2	34.2							26.83
	Black Crappie	0.0	0.0	0.0	1.4							0.35
	Bluegill	0.0	0.2	0.2	0.4							0.20
	Channel Catfish	1.3	0.0	0.0	1.6							0.73
	Common Carp	0.7	0.4	0.6	2.2							0.98
	Northern Pike	1.7	1.8	0.4	0.2							1.03
	Smallmouth Bass	2.3	1.2	1.6	2.8							1.98
	Spottail Shiner	0.0	0.0	0.0	0.0							0.00
	Walleye	1.3	4.0	3.0	3.8							3.03
	White Bass	1.0	1.0	1.2	3.4							1.65
	White Sucker	2.7	6.8	5.2	2.6							4.33
	Yellow Perch	0.0	8.4	4.6	18.8							7.95

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 frame net	Bigmouth Buffalo	PSD						0						
		PSD-P						0						
	Black Bullhead	PSD						66						
		PSD-P						42						
	Bluegill	PSD						40						
		PSD-P						0						
	Wr							109						
		Common Carp	PSD					100						
			PSD-P						0					
	Smallmouth Bass	PSD						19						
		PSD-P						4						
		Wr						89						
	Walleye	PSD						6						
		PSD-P						0						
		Wr						78						
	White Bass	PSD						97						
		PSD-P						82						
		Wr						86						
	White Sucker	PSD						100						
		PSD-P						95						
Yellow Perch	PSD						100							
	PSD-P						100							
	Wr						84							
AFS std gill net	Bigmouth Buffalo	PSD						25	73	50		77	83	
		PSD-P						19	18	25		0	17	
	Black Bullhead	PSD						75	84	96		95	87	
		PSD-P						22	36	24		29	28	
	Wr												94	
		Bluegill	PSD					50	100			100	100	
			PSD-P						0	100			50	50
	Wr							92	109			119	105	
		Common Carp	PSD					100	100	88		48	86	
			PSD-P						17	38	54		45	57

Gear	Species	Index	Year									
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AFS std gill net	Northern Pike	PSD					100		33		0	100
		PSD-P					100		0		0	50
		Wr					109		81		83	87
	Smallmouth Bass	PSD					57	38	50		33	80
		PSD-P					43	15	0		0	20
		Wr					92	95	90		86	87
	Walleye	PSD					59	44	50		8	60
		PSD-P					11	25	20		8	10
		Wr					83	86	85		86	79
	White Bass	PSD					79	100	83		100	98
		PSD-P					43	89	81		83	98
		Wr					97	93	87		91	88
	White Sucker	PSD					100	97	97		100	100
		PSD-P					97	94	90		100	100
	Yellow Perch	PSD					60	97	93		98	100
PSD-P						45	44	83		67	100	
Wr						99	99	105		109	99	
frame net (std 3/4 in)	Bigmouth Buffalo	PSD	100	100		73		83	96		73	100
		PSD-P	25	25		62		17	39		27	100
		Wr	94									
	Black Bullhead	PSD	100	97	98	3		89	96		100	100
		PSD-P	25	57	42	2		63	73		56	57
		Wr	91									
	Bluegill	PSD	63	100	50	75		92	100		100	100
		PSD-P	50	100	25	38		92	63		60	100
		Wr	115	103	110	113		108	117		124	120
	Common Carp	PSD	100	75	100	8		91	90		100	100
		PSD-P	50	25	100	8		48	40		100	50
		Wr	94									
	Northern Pike	PSD	71	91	100	100		92	11		39	63
		PSD-P	24	13	18	31		31	0		11	50
		Wr	84	90	76	82		84	81		73	95
	Smallmouth Bass	PSD	21	82	31	8		16	52		33	60
		PSD-P	0	24	8	2		5	8		4	10
		Wr	99	104	98	101		86	88		91	91
	Walleye	PSD	100	100	0	43		29	0		11	
		PSD-P	0	50	0	29		29	0		0	

Gear	Species	Index	Year										
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
frame net (std 3/4 in)	Walleye	Wr	75	93		82		85	88		86		
	White Bass	PSD	100	100	100	97		100	100		100	100	
		PSD-P	100	100	100	59		100	100		83	97	
		Wr	87	91	85	94		83	81		89	89	
	White Sucker	PSD	100	100	100	100		100	100		100	100	
		PSD-P	100	96	98	100		93	94		100	100	
		Wr	94										
	Yellow Perch	PSD		0	33	79		100	100				
		PSD-P		0	33	43		75	83				
		Wr		127	94	100		89	105				
	std exp gill net	Bigmouth Buffalo	PSD	100	60		0						
			PSD-P	100	40		0						
Wr			97										
Black Bullhead		PSD	100	98	100	33							
		PSD-P	10	17	16	15							
		Wr	92										
Bluegill		PSD		0	100	50							
		PSD-P		0	0	50							
		Wr		114	107	127							
Common Carp		PSD	100	50	100	9							
		PSD-P	100	50	100	0							
		Wr	92										
Northern Pike		PSD	100	89	100	100							
		PSD-P	20	56	100	0							
		Wr	93	93	79	129							
Smallmouth Bass		PSD	43	50	50	14							
		PSD-P	0	33	38	0							
		Wr	87	108	100	91							
Walleye		PSD	75	35	67	0							
		PSD-P	25	10	40	0							
		Wr	88	89	85	85							
White Bass		PSD	100	100	100	100							
		PSD-P	100	100	100	24							
		Wr	81	93	84	98							
White Sucker		PSD	100	74	100	100							
		PSD-P	100	71	88	92							
		Wr	100										

Gear	Species	Index	Year										
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	
std exp gill net	Yellow Perch	PSD		19	26	73							
		PSD-P		5	4	24							
		Wr		108	101	105							

Length at Capture

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

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2013	8	125 (4)			225 (3)				265 (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	13	234 (3)		379 (7)		427 (2)		572 (1)			
2021	26		276 (16)	327 (8)							646 (2)
2019	29	212 (10)	324 (7)	384 (4)	446 (4)		457 (1)				591 (3)
2018	17	270 (8)	339 (2)	383 (1)	454 (2)	443 (1)					576 (3)
2017	30	247 (11)	384 (4)	437 (10)	482 (3)			551 (2)			
2016	30	255 (15)	297 (15)								
2015	32	203 (17)	351 (6)			469 (1)	540 (5)	588 (2)	471 (1)		
2014	20	266 (12)	293 (1)	398 (1)	465 (5)	578 (1)					
2013	4			396 (3)	541 (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	43	171 (1)	223 (12)	271 (20)		308 (9)			315 (1)		
2019	46	151 (3)	223 (3)	274 (25)	285 (7)	304 (7)	329 (1)				
2018	36	154 (1)	243 (26)	280 (6)	294 (2)	323 (1)					
2017	67	165 (27)	248 (16)	272 (23)				335 (1)			
2016	94	179 (28)	243 (64)	293 (2)							
2015	23	165 (17)	236 (5)	296 (1)							
2014	42	165 (34)	236 (5)	260 (2)	313 (1)						

Fish Condition

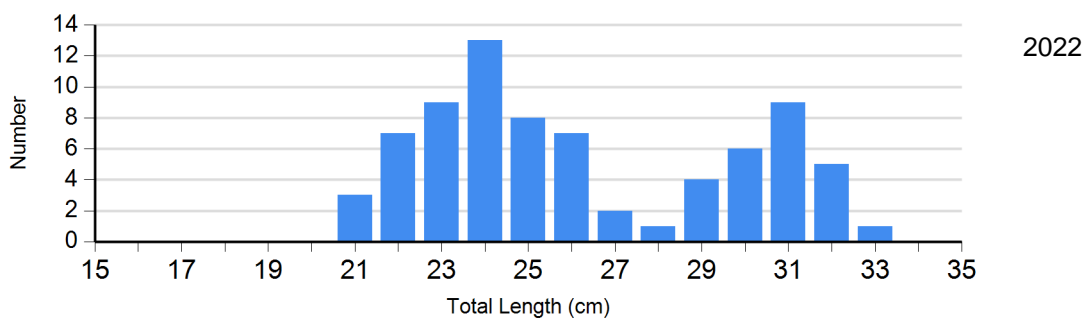
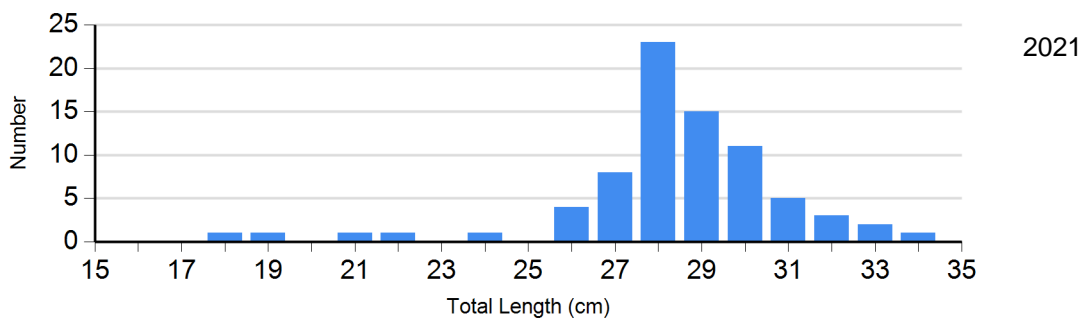
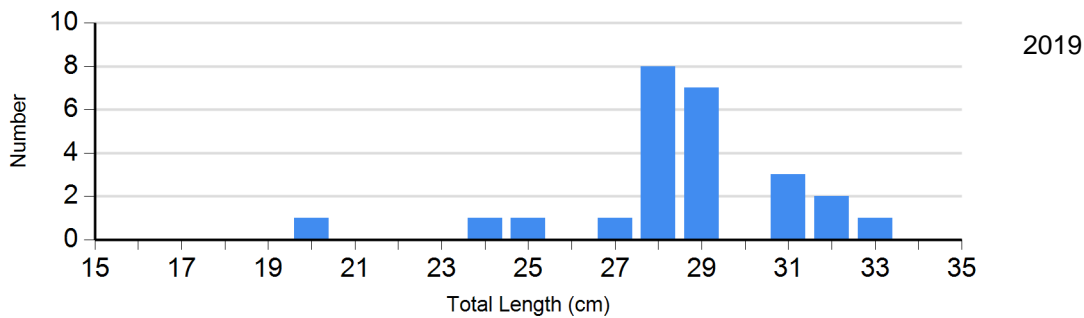
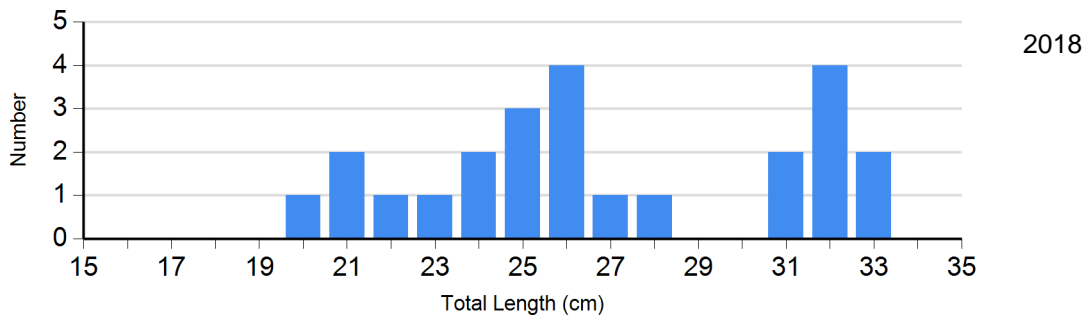
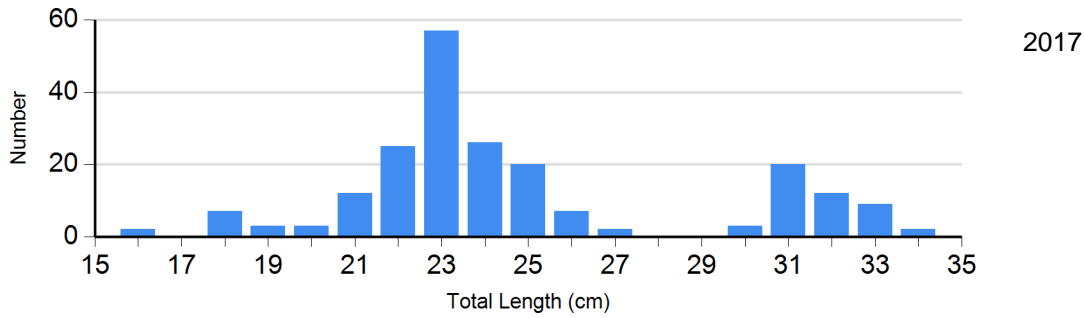
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2022	10	97	44	96 (1.0)	21	85 (2.7)	0	
Bluegill Frame Net	2018	1	106	0		11	108 (4.0)	0	
	2019	0		9	126 (4.7)	11	111 (2.5)	4	112 (13.7)
	2021	0		8	128 (6.2)	12	121 (2.6)	0	
	2022	0		0		12	121 (1.8)	3	115 (8.4)
Northern Pike Gill Net	2019	2	83 (1.0)	1	76	0		0	
	2021	1	83	0		0		0	
	2022	0		2	76 (2.6)	1	87	1	111
Walleye Gill Net	2018	9	89 (2.6)	3	81 (4.6)	3	84 (2.2)	1	83
	2019	10	84 (3.7)	6	80 (2.0)	3	96 (10.7)	1	100
	2021	24	87 (1.2)	0		1	85	1	66
	2022	4	74 (1.6)	5	80 (1.7)	1	95	0	
White Bass Gill Net	2018	0		4	128 (38.3)	28	89 (0.9)	3	80 (2.8)
	2019	7	92 (2.4)	1	86	31	87 (0.8)	3	71 (2.7)
	2021	0		9	94 (1.5)	41	91 (1.3)	3	83 (6.8)
	2022	1	96	0		45	89 (0.5)	10	82 (3.9)
Yellow Perch Gill Net	2018	1	96	19	100 (1.4)	15	99 (1.6)	1	85
	2019	3	128 (12.1)	5	107 (1.7)	31	104 (1.3)	7	100 (3.1)
	2021	1	100	13	109 (3.6)	21	112 (1.8)	8	104 (2.8)
	2022	0		0		7	103 (2.2)	8	94 (1.5)

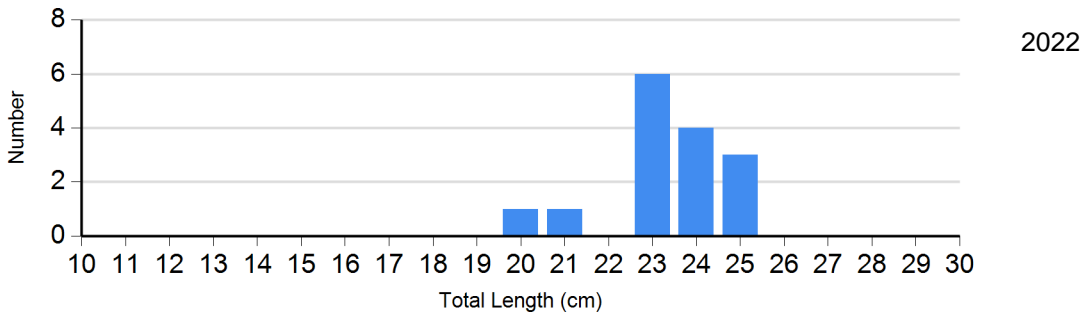
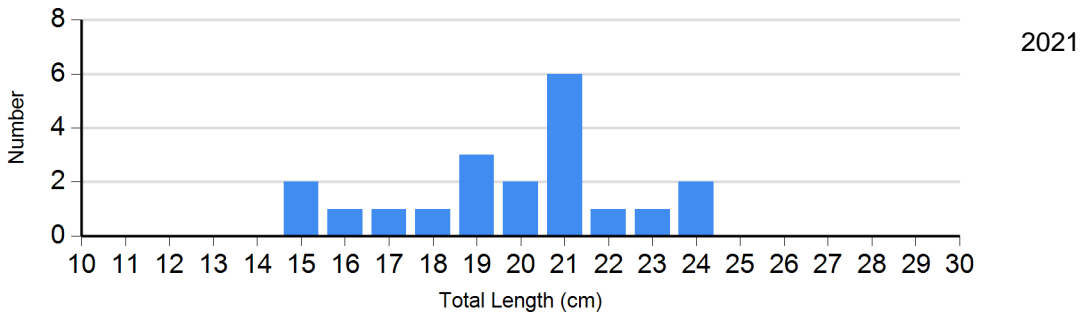
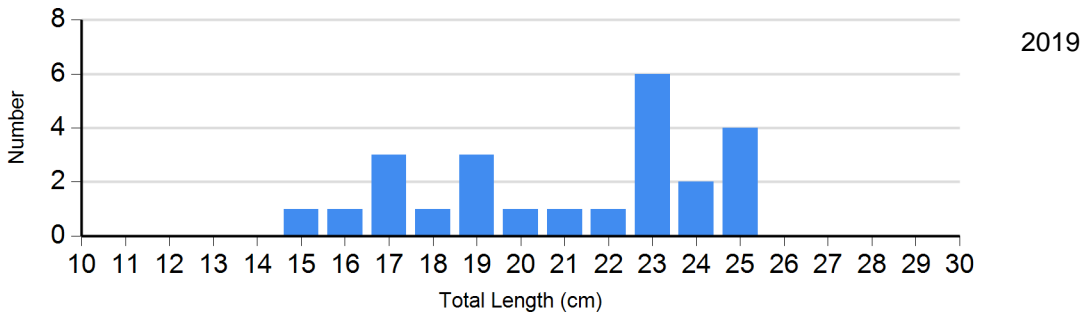
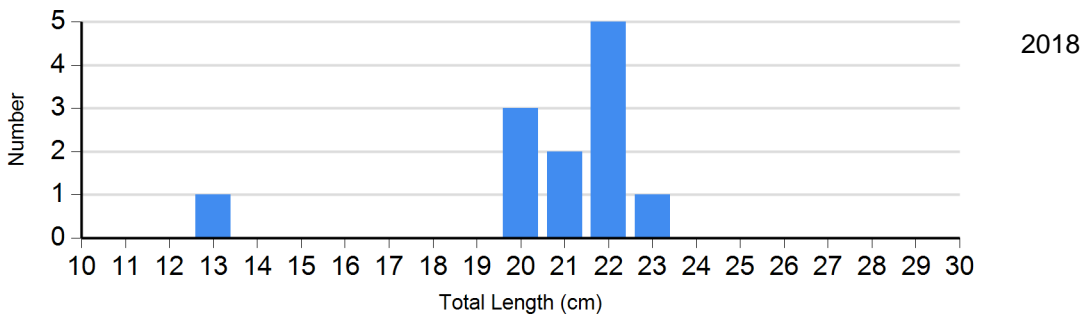
Length Frequency Distribution

Length frequency histogram of species sampled by year.

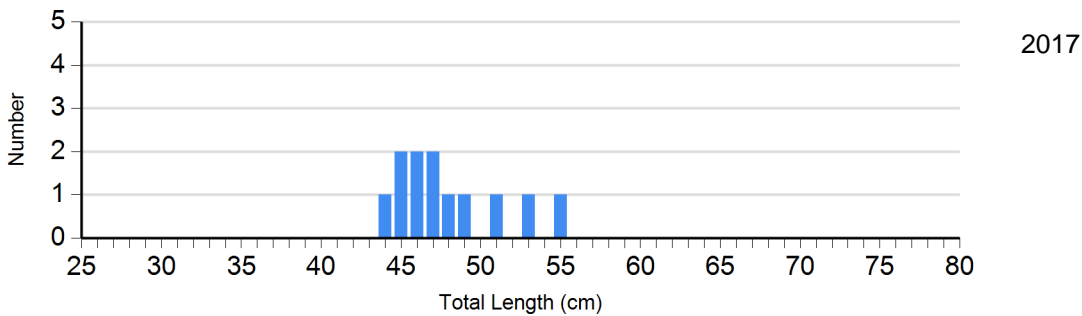
Species: Black Bullhead
Gear: AFS std gill net

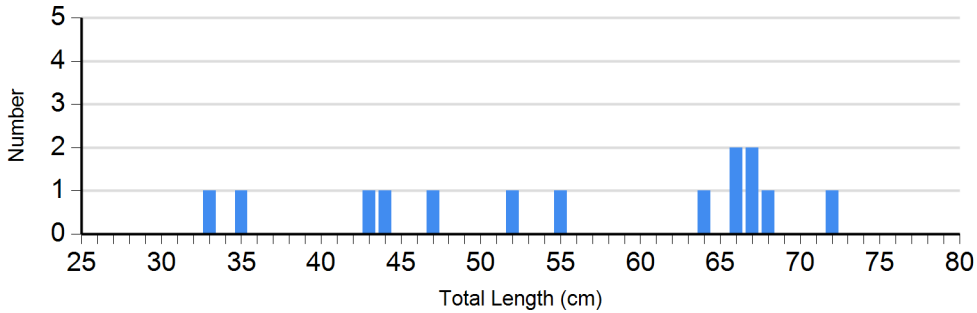
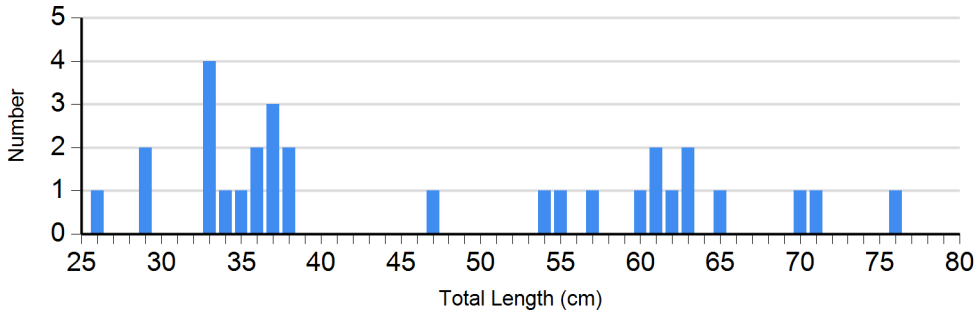
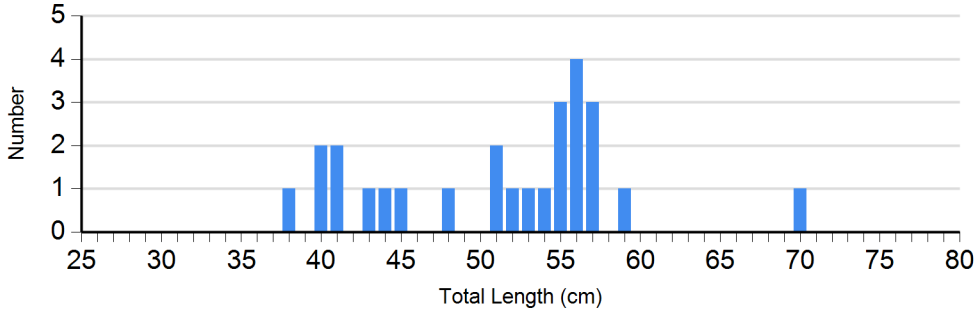
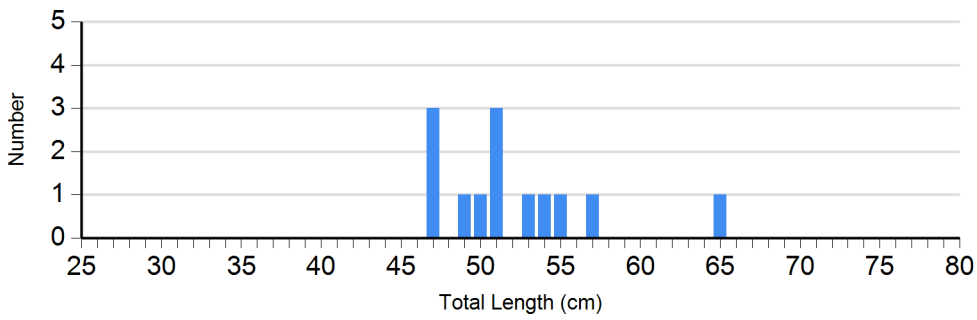


Species: Bluegill
 Gear: frame net (std 3/4 in)

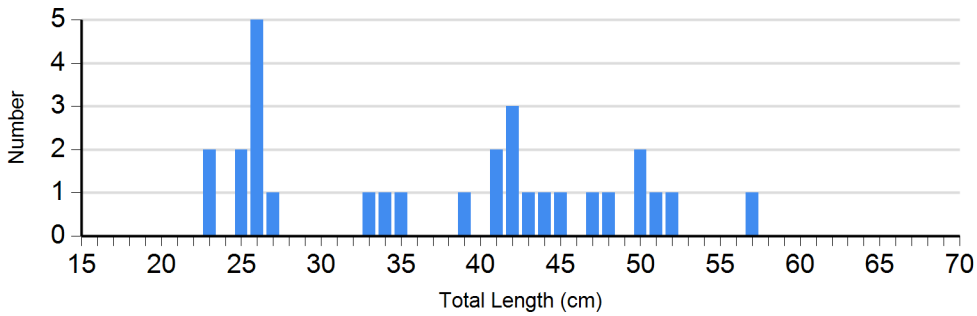


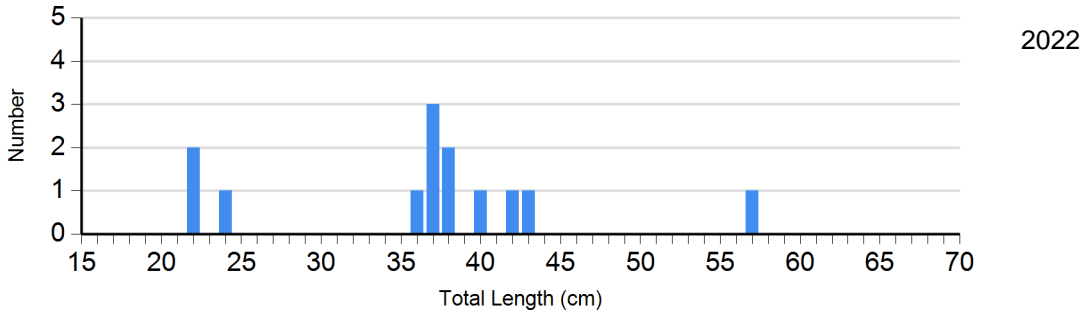
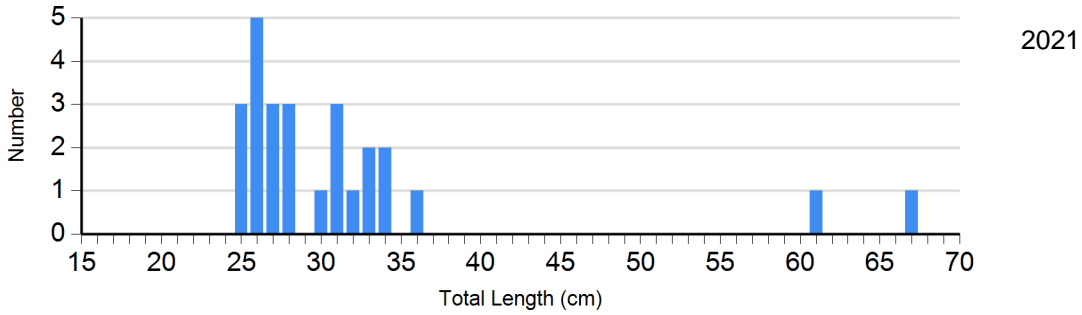
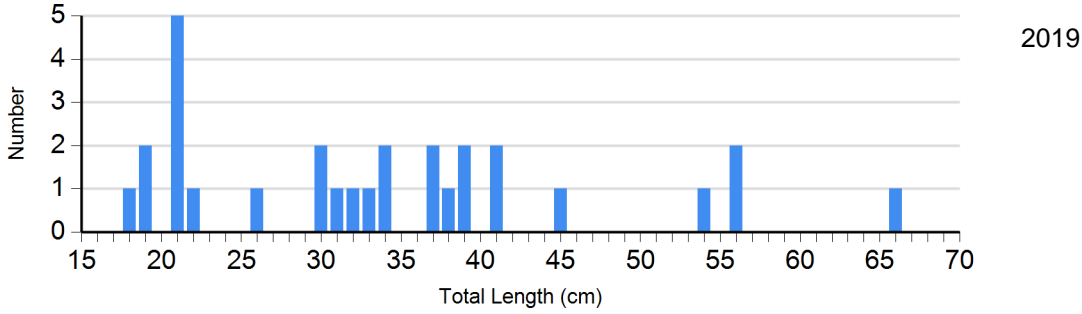
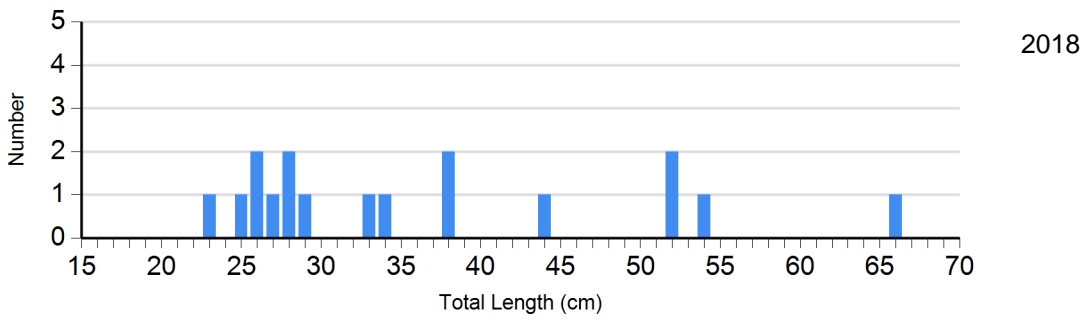
Species: Common Carp
 Gear: AFS std gill net



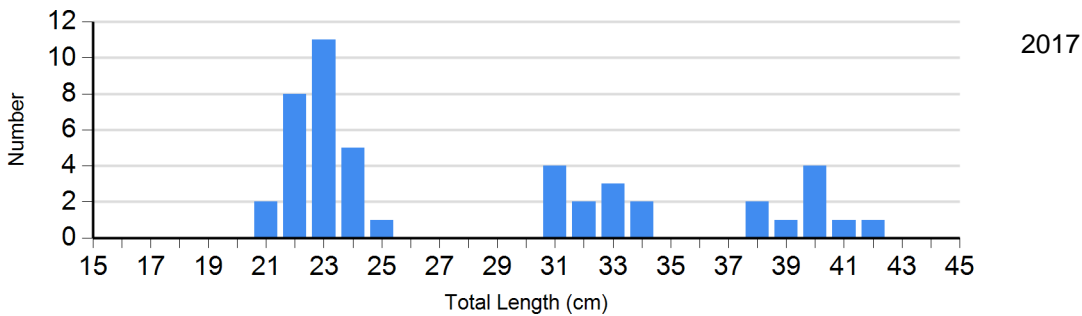


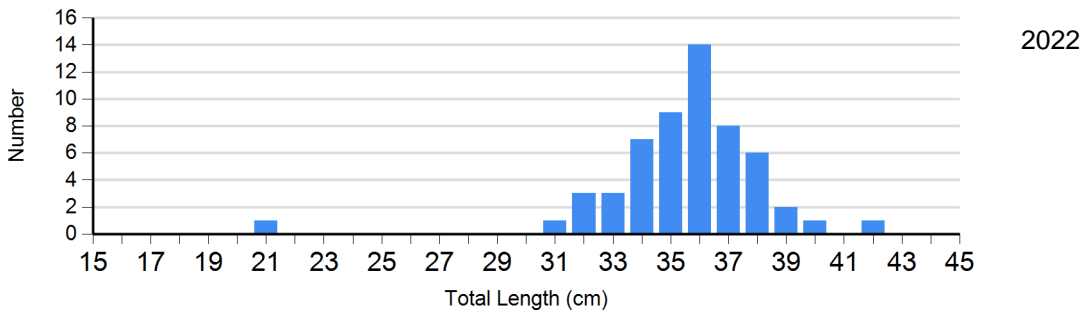
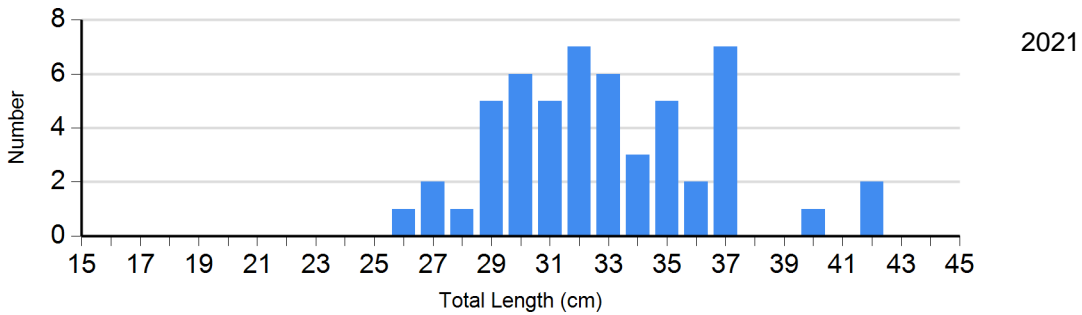
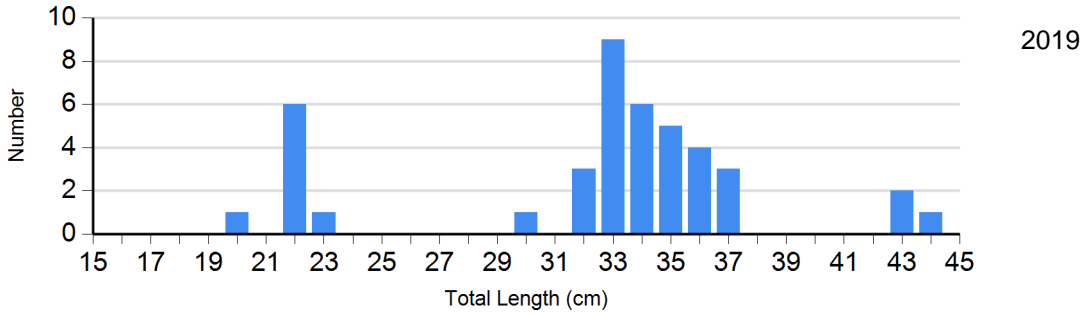
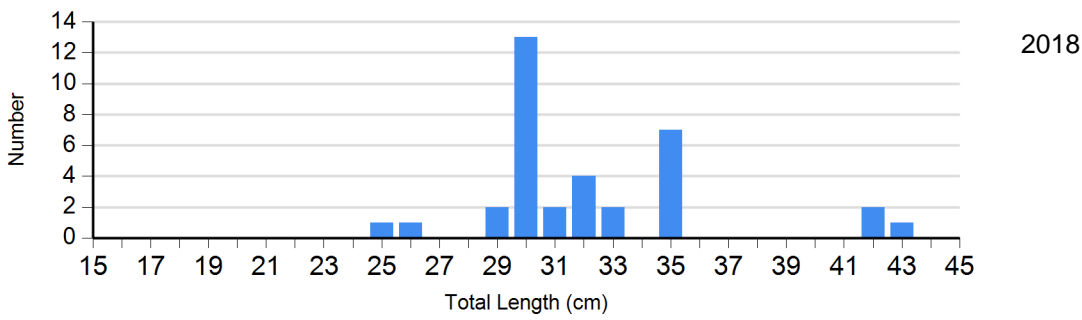
Species: Walleye
 Gear: AFS std gill net



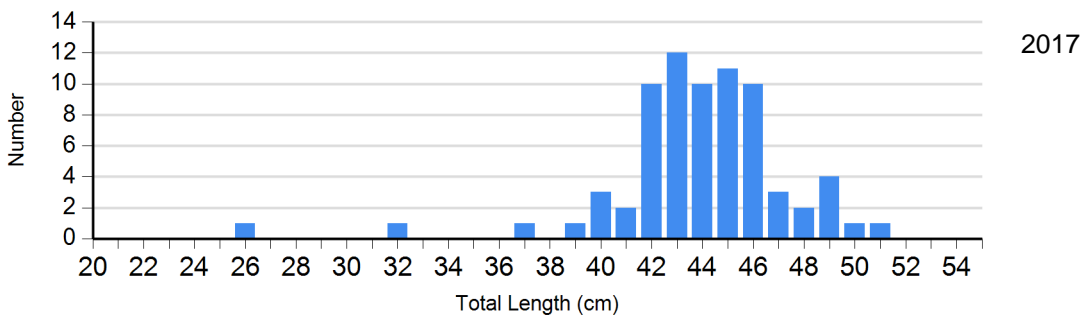


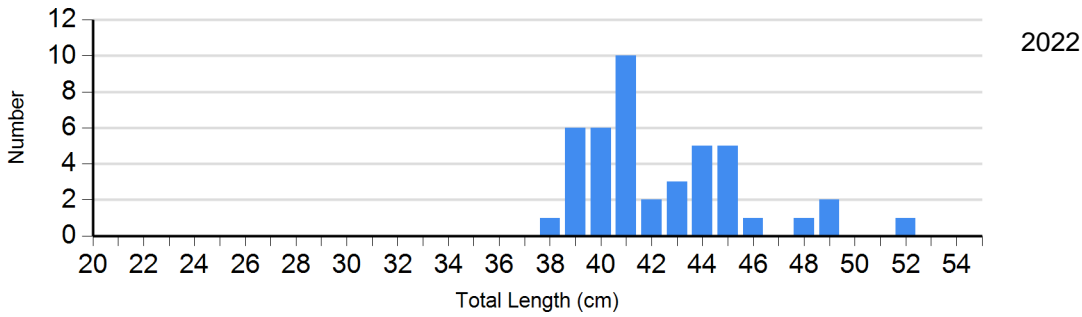
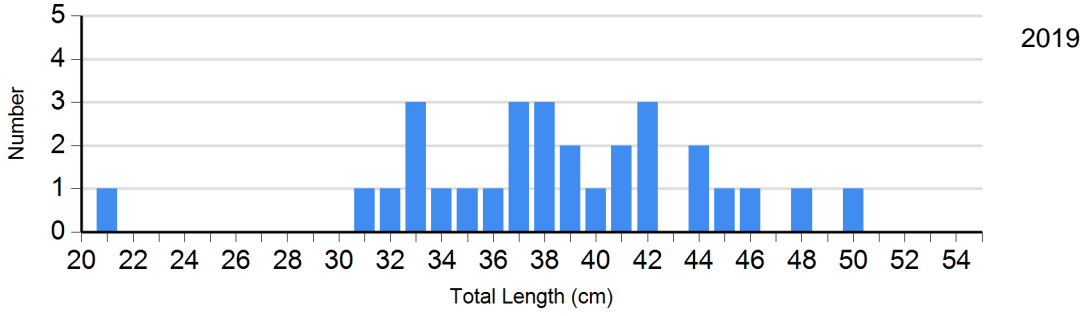
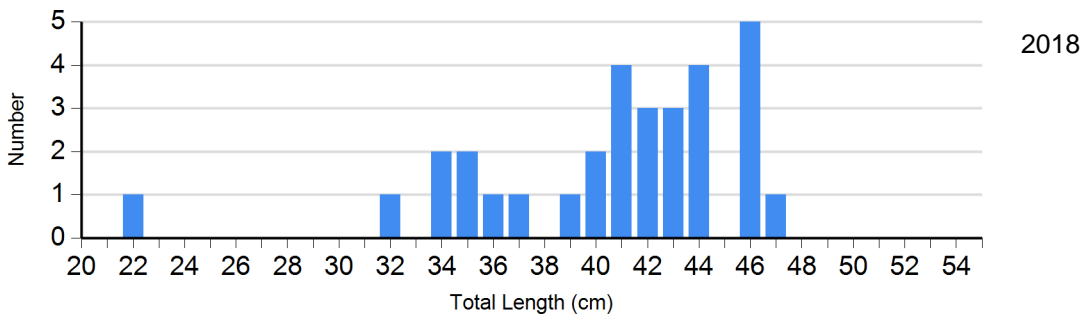
Species: White Bass
 Gear: AFS std gill net



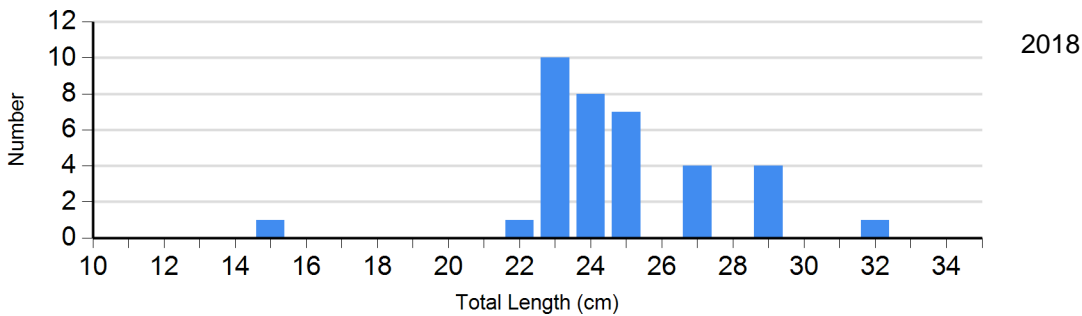
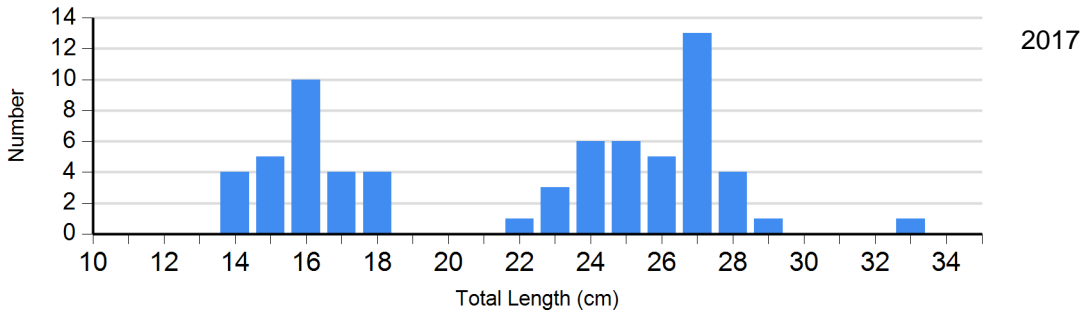


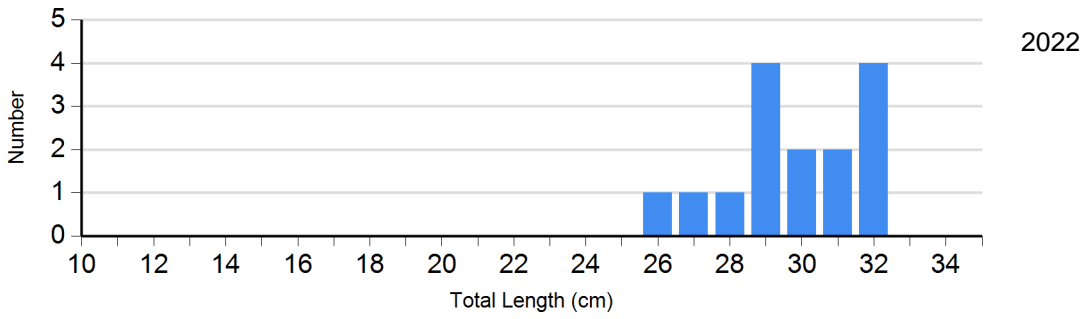
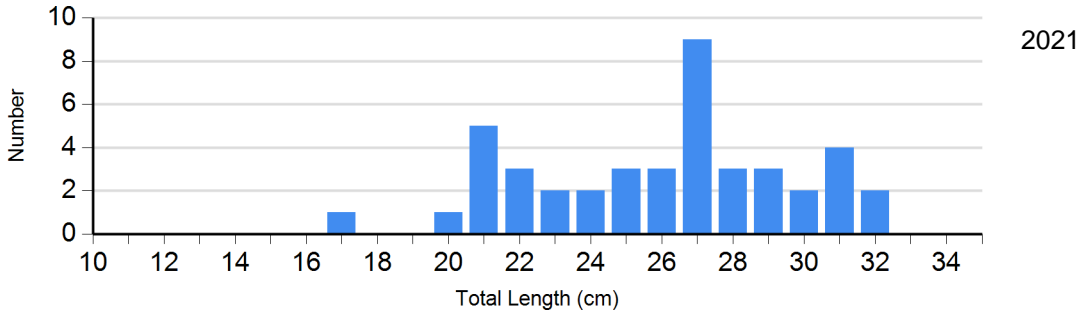
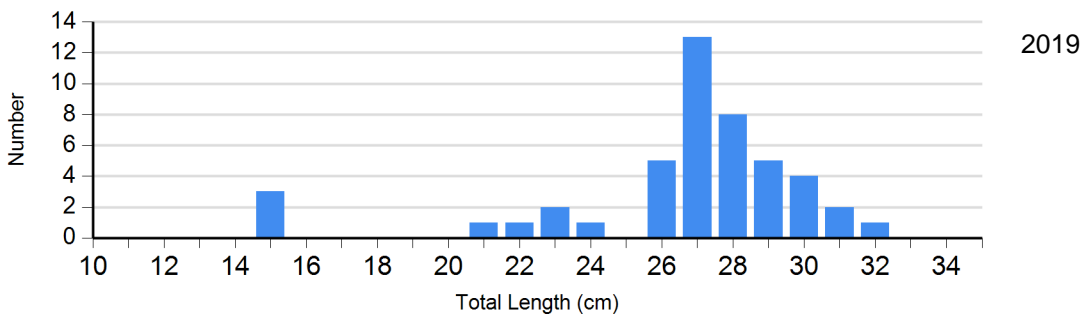
Species: White Sucker
 Gear: AFS std gill net





Species: Yellow Perch
 Gear: AFS std gill net

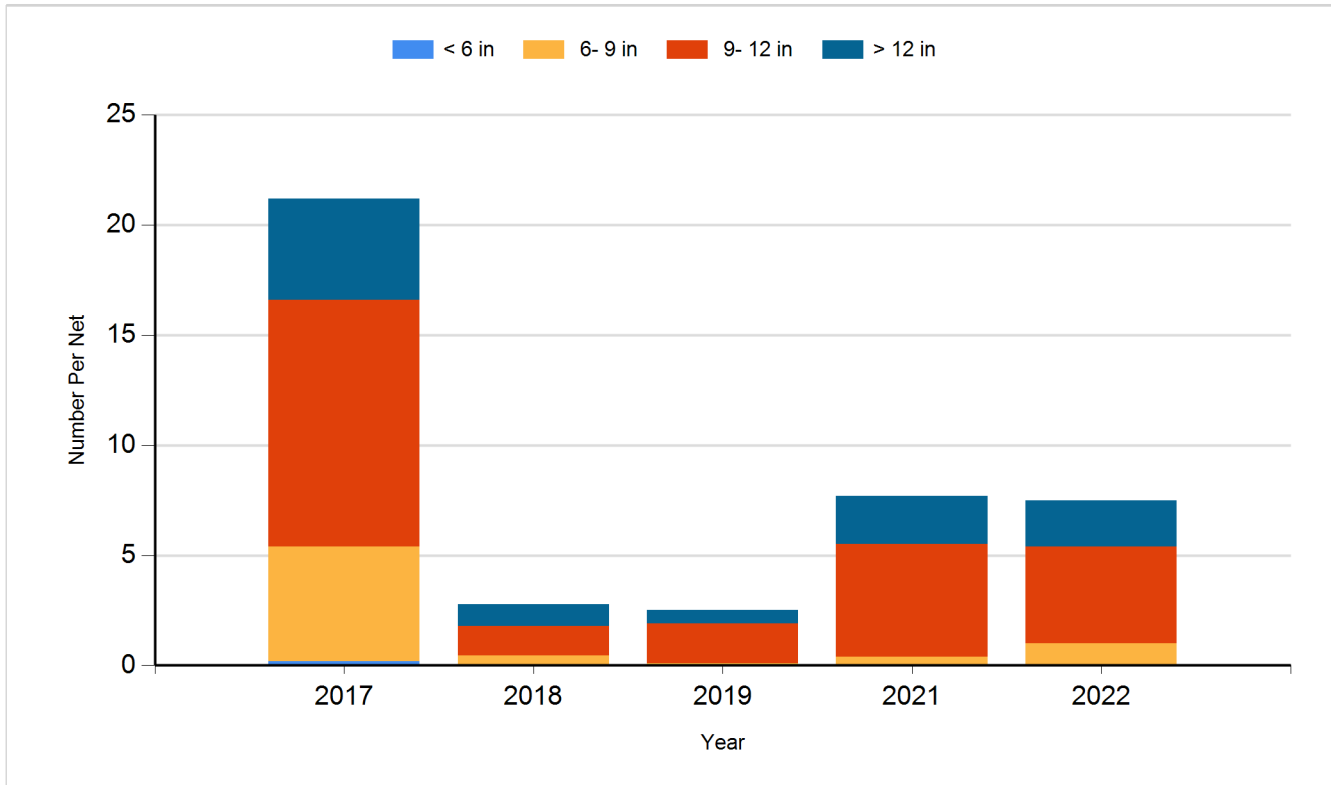




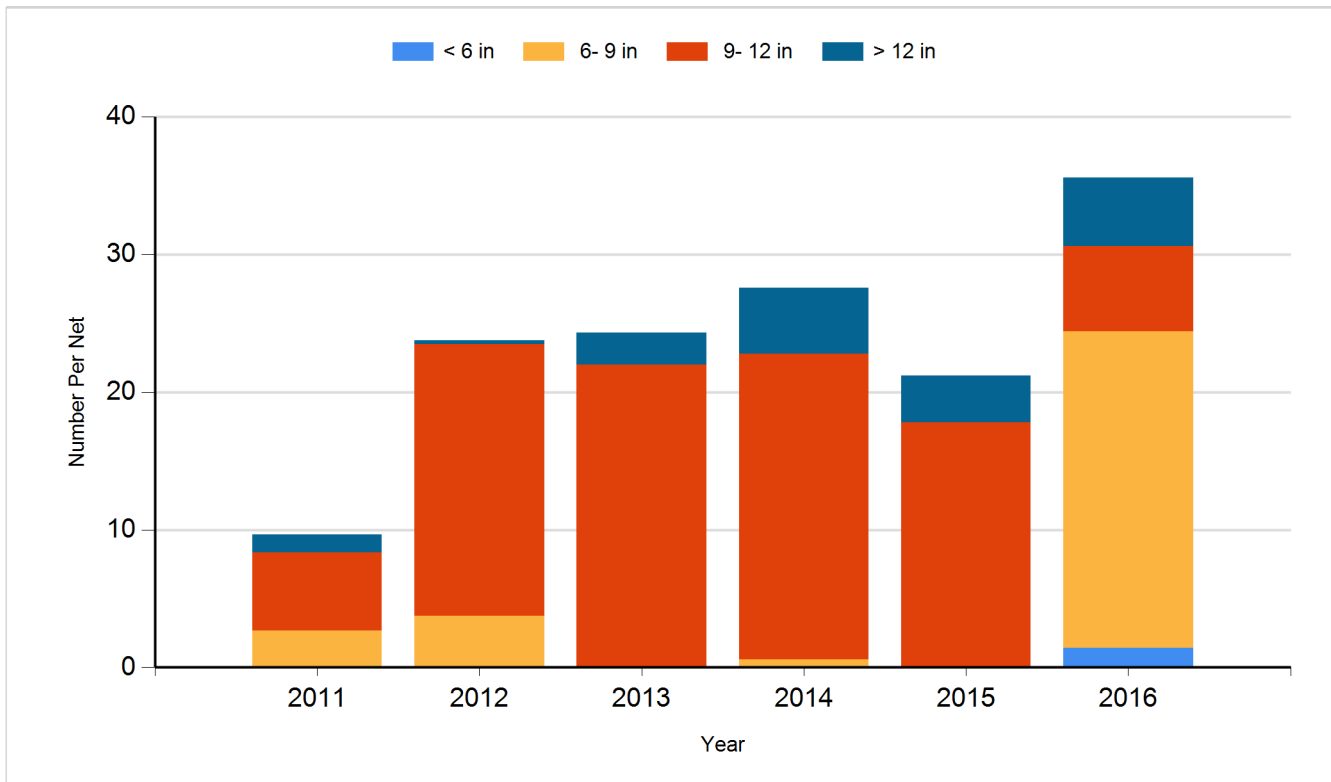
Historic Fish Sizes and Relative Abundance

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

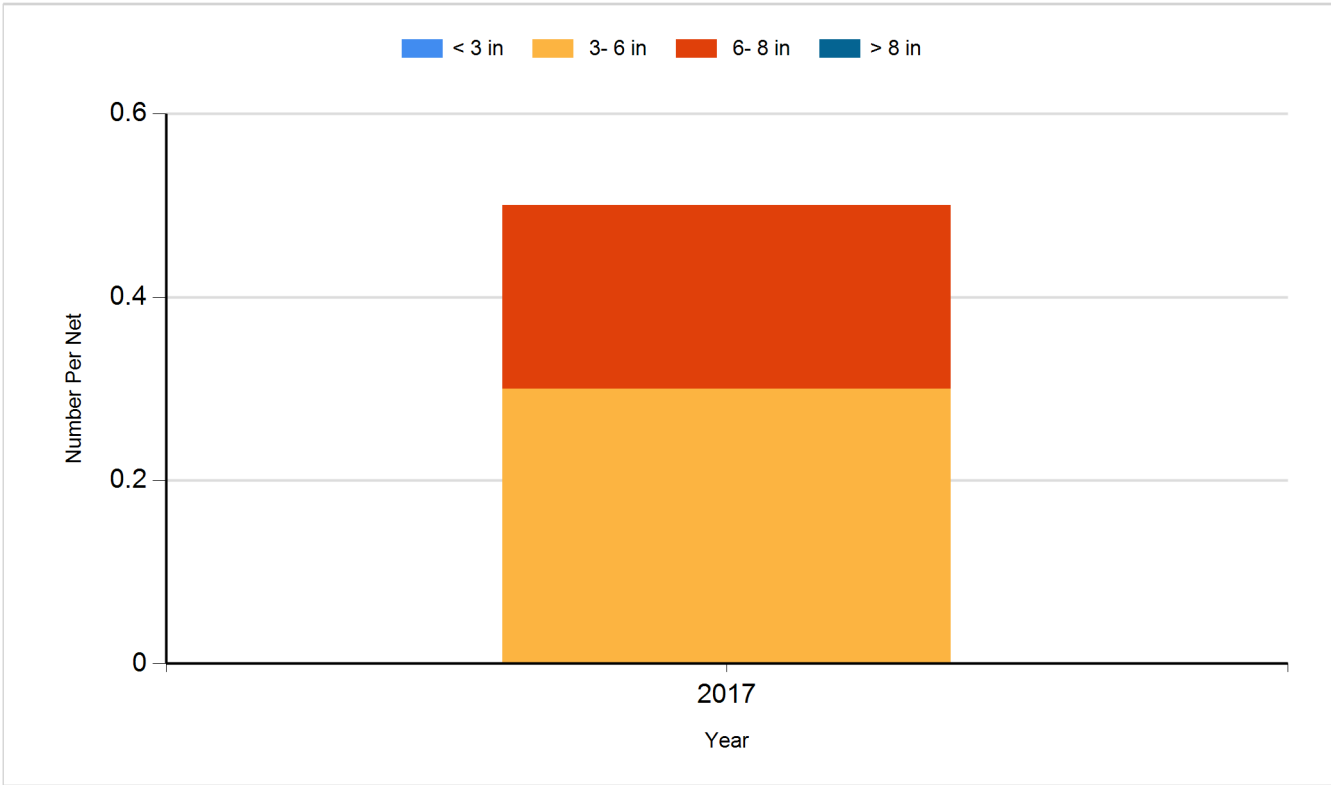
Species: Black Bullhead
Gear: AFS std gill net



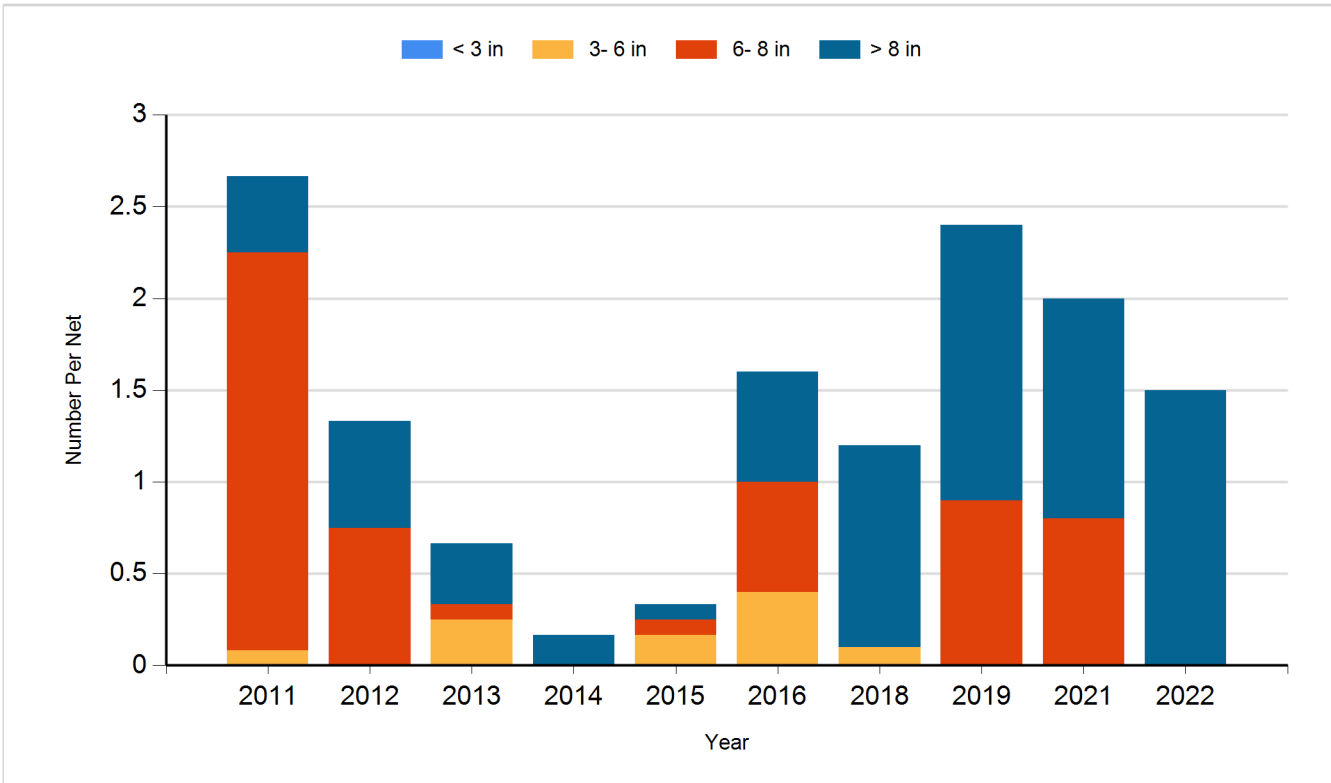
Species: Black Bullhead
Gear: std exp gill net



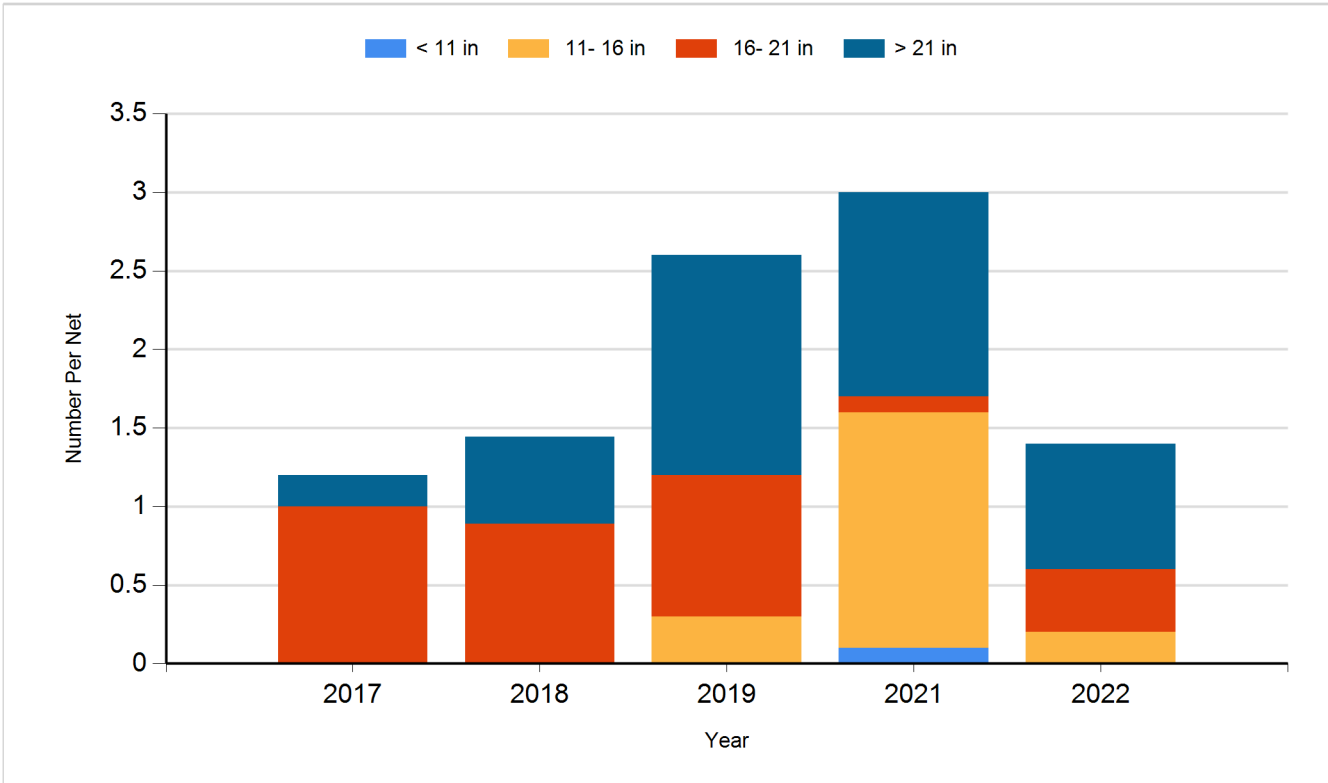
Species: Bluegill
Gear: AFS std frame net



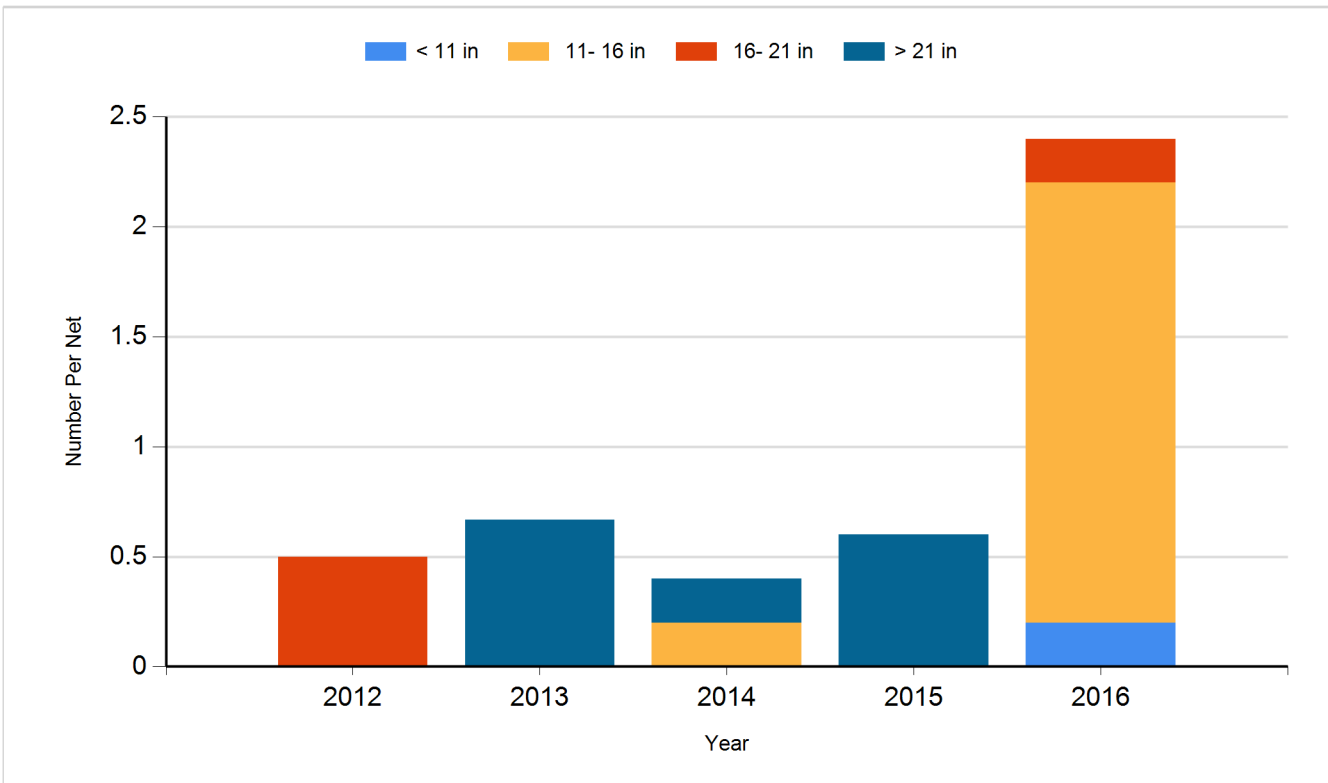
Species: Bluegill
Gear: frame net (std 3/4 in)



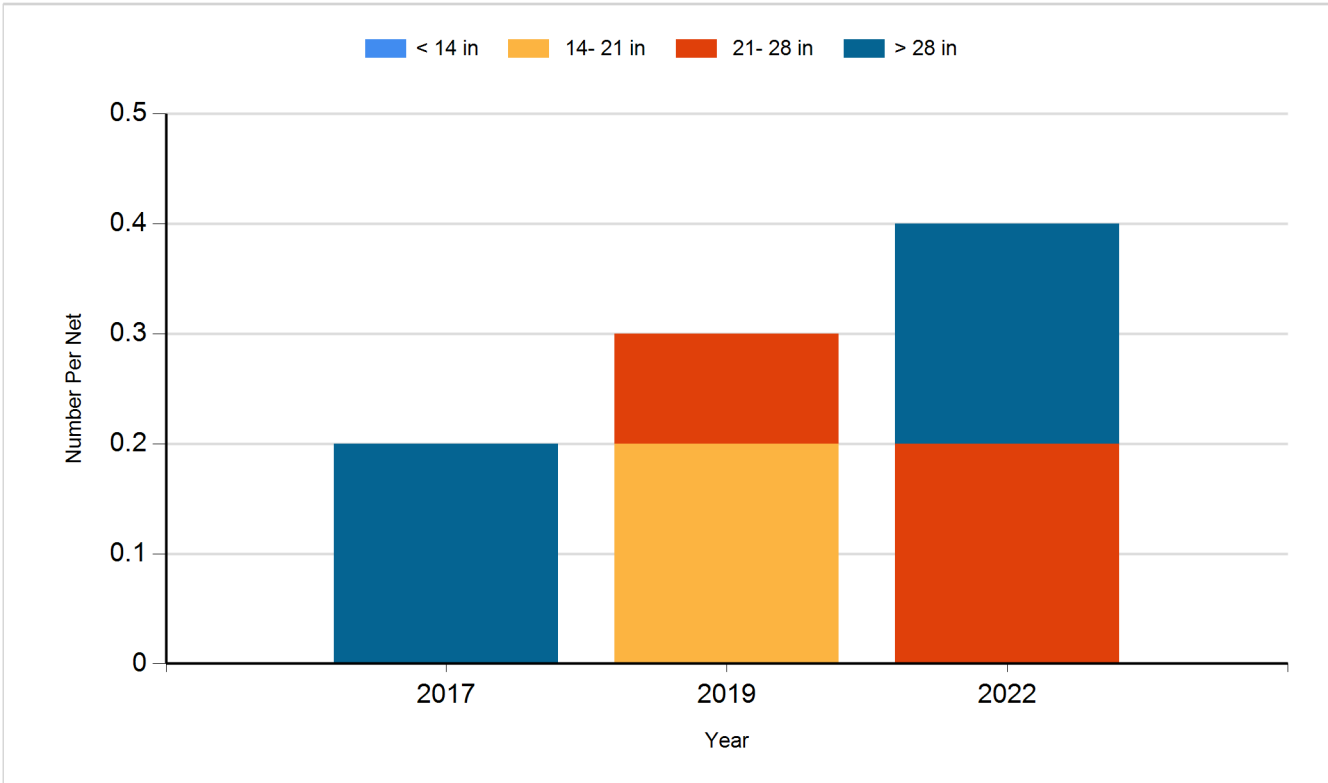
Species: Common Carp
Gear: AFS std gill net



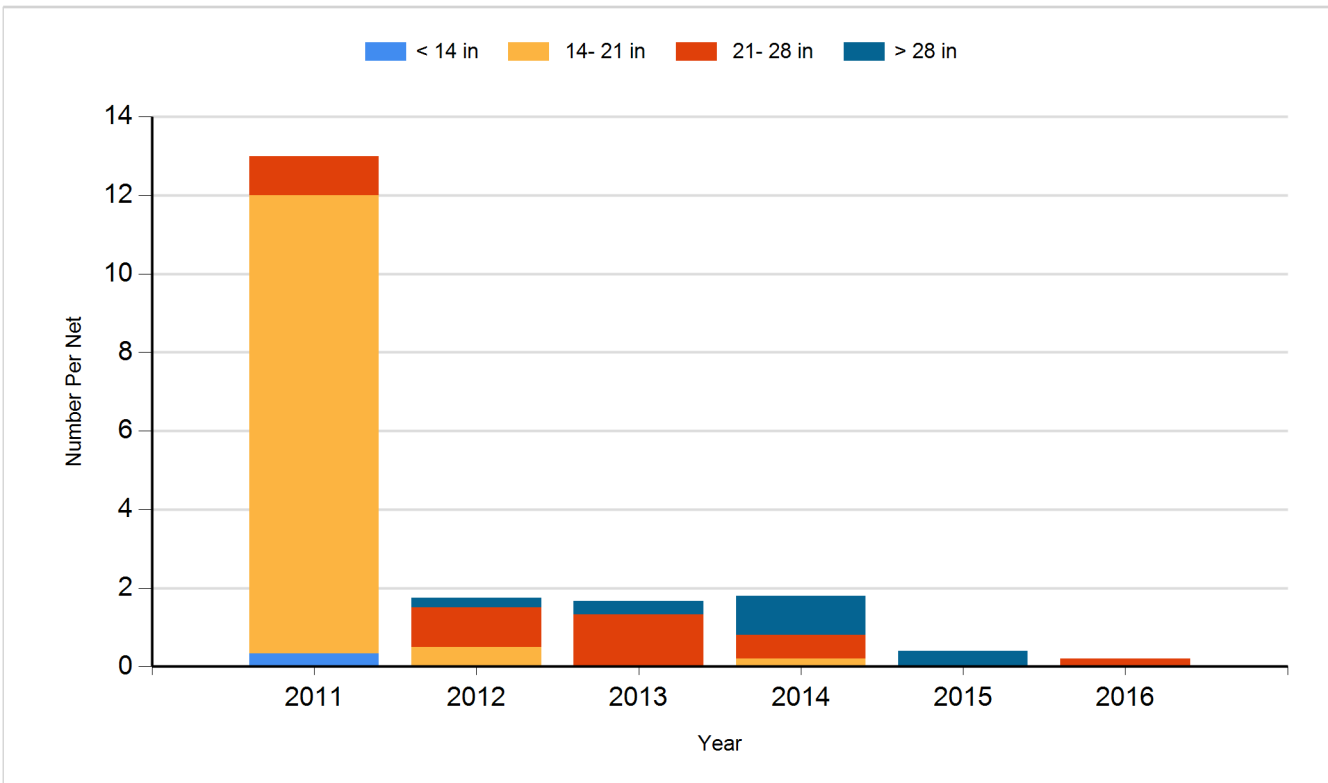
Species: Common Carp
Gear: std exp gill net



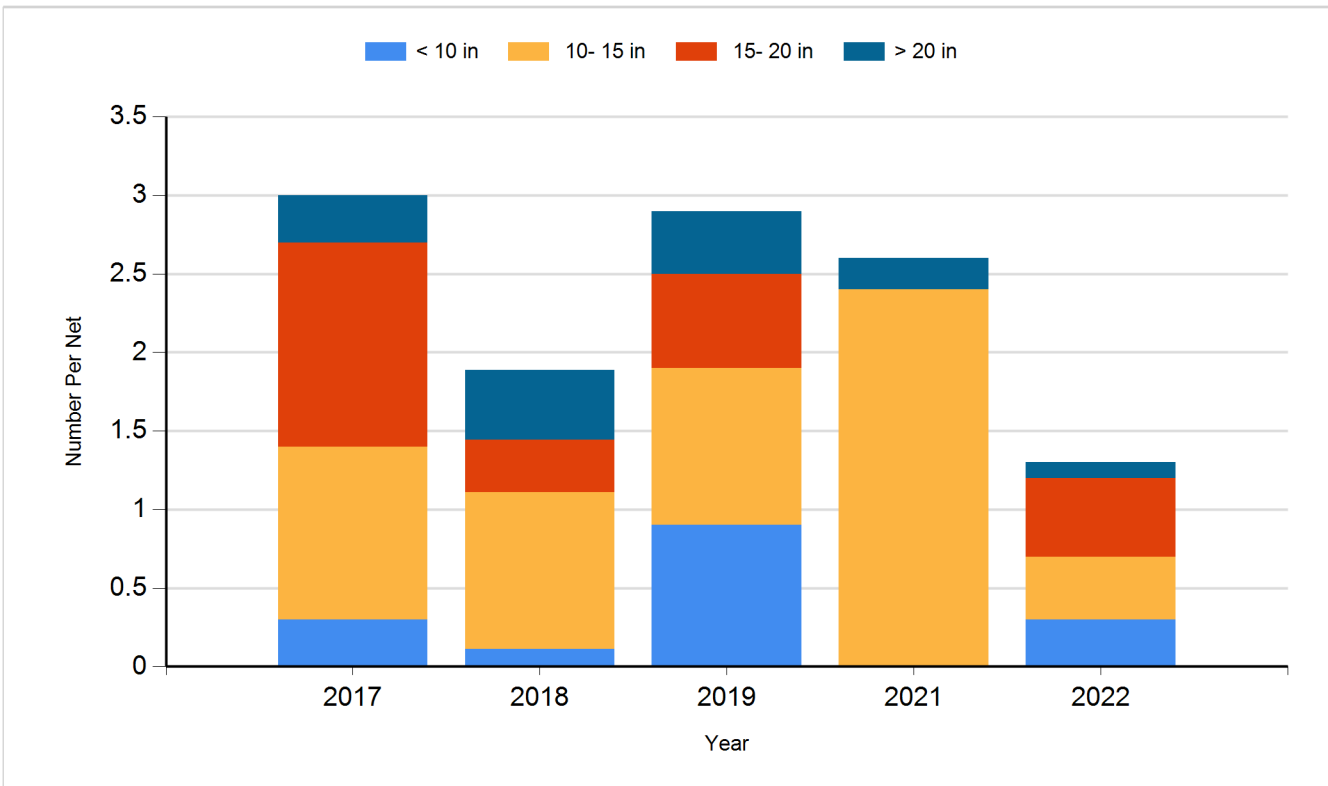
Species: Northern Pike
Gear: AFS std gill net



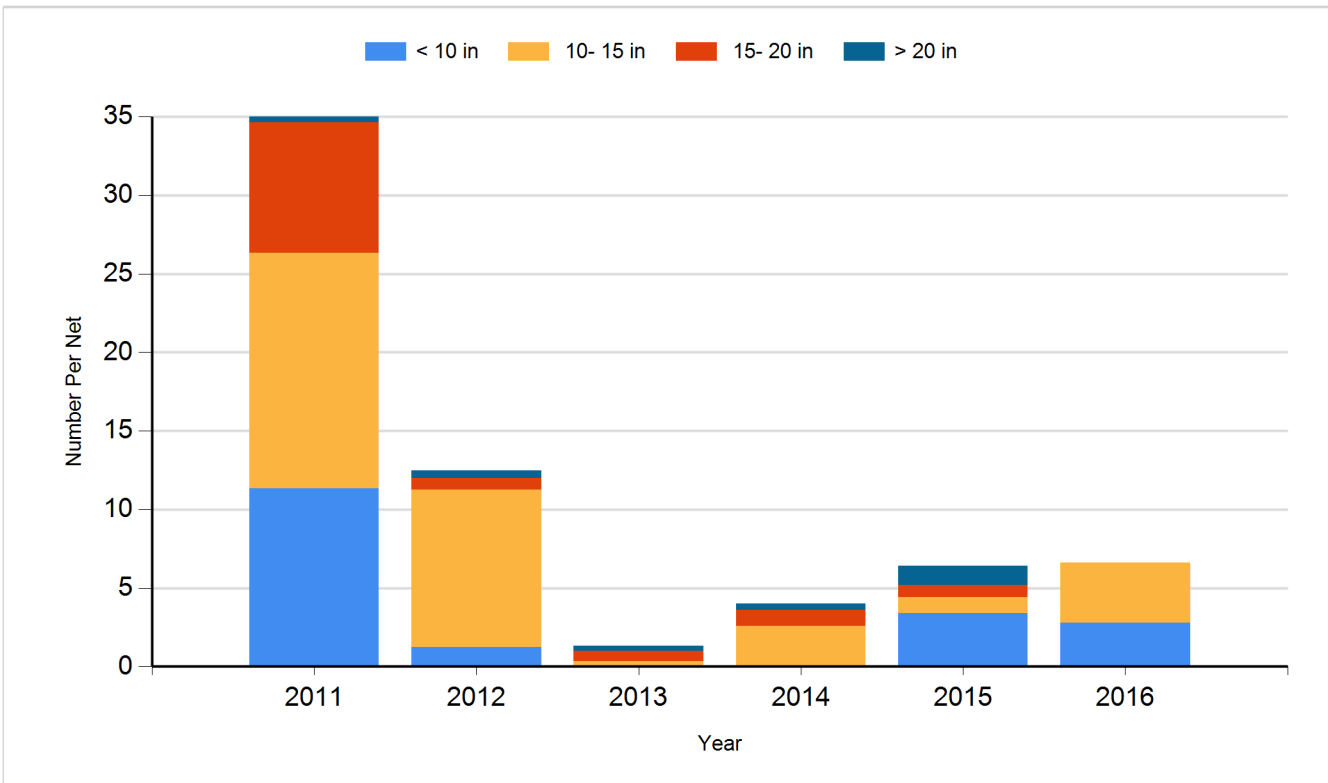
Species: Northern Pike
Gear: std exp gill net



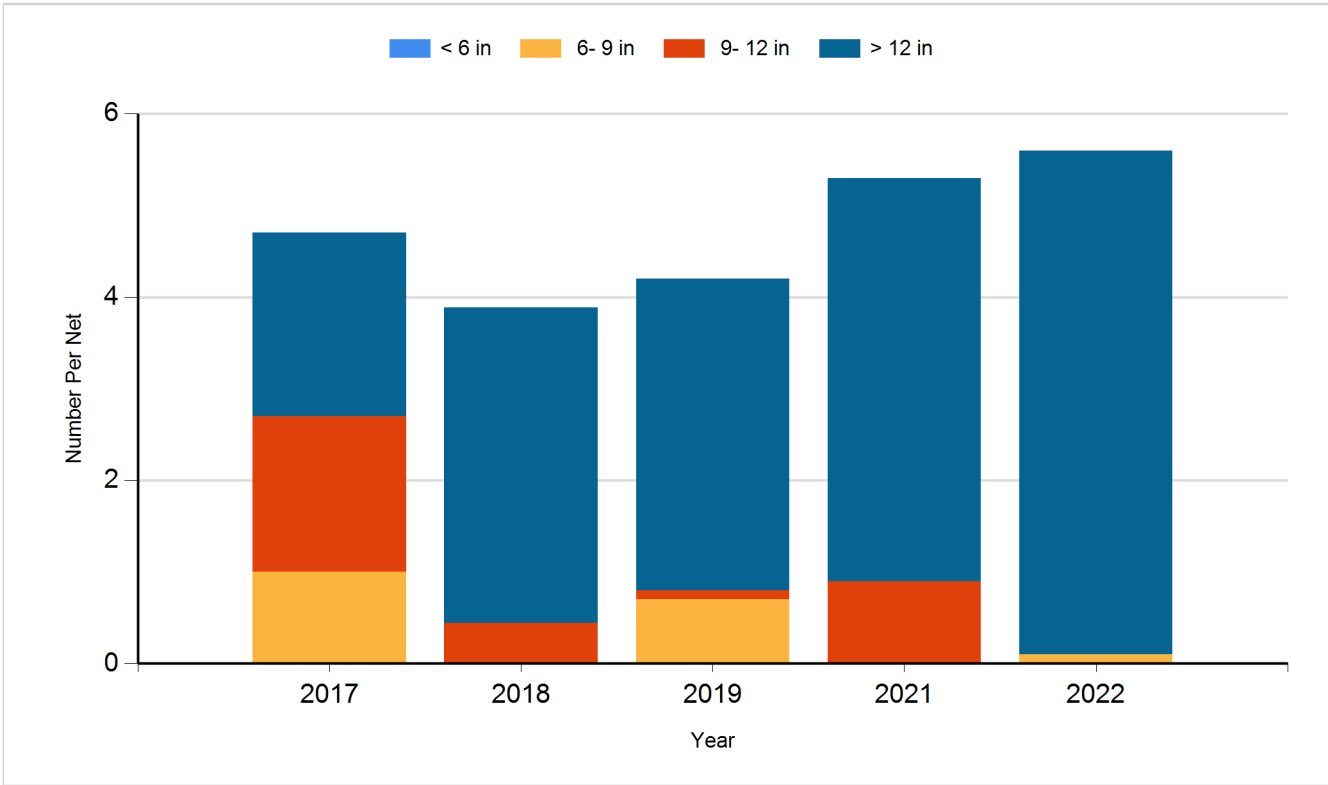
Species: Walleye
Gear: AFS std gill net



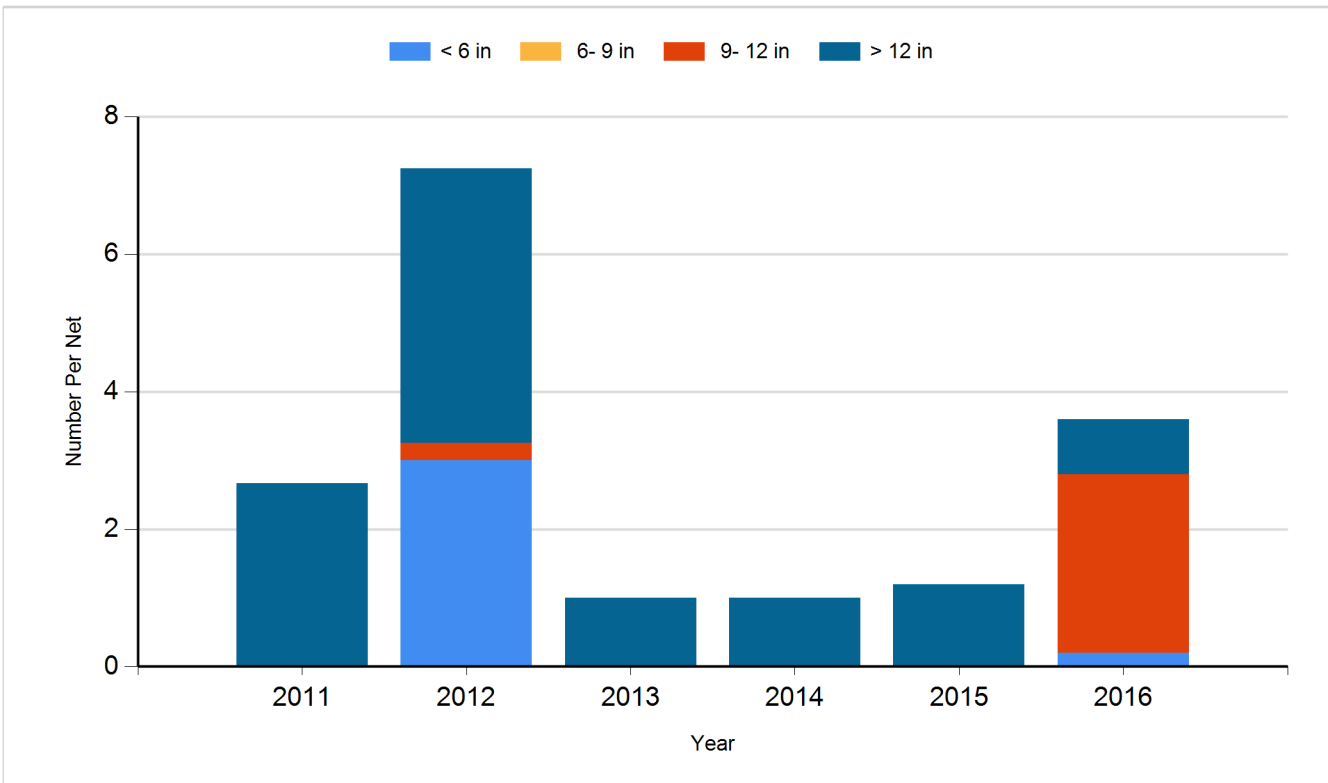
Species: Walleye
Gear: std exp gill net



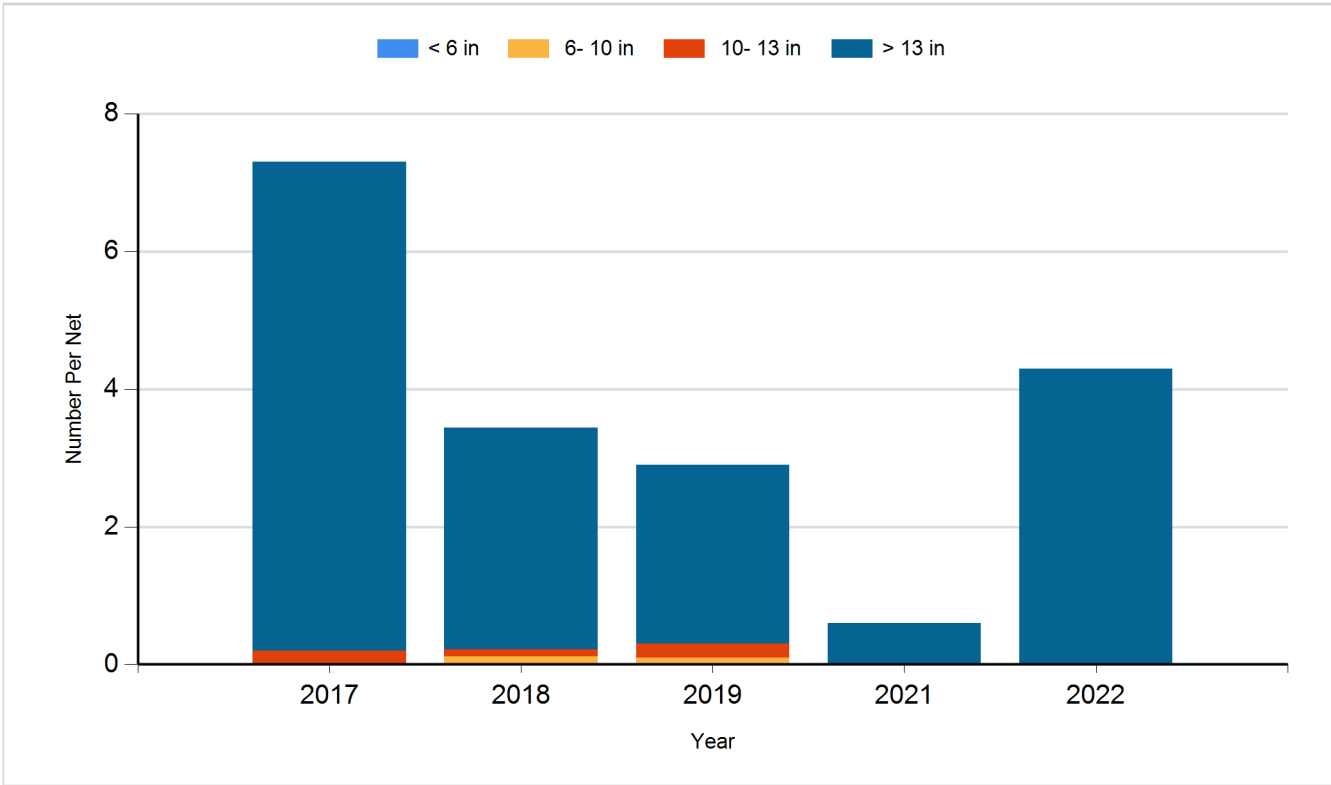
Species: White Bass
Gear: AFS std gill net



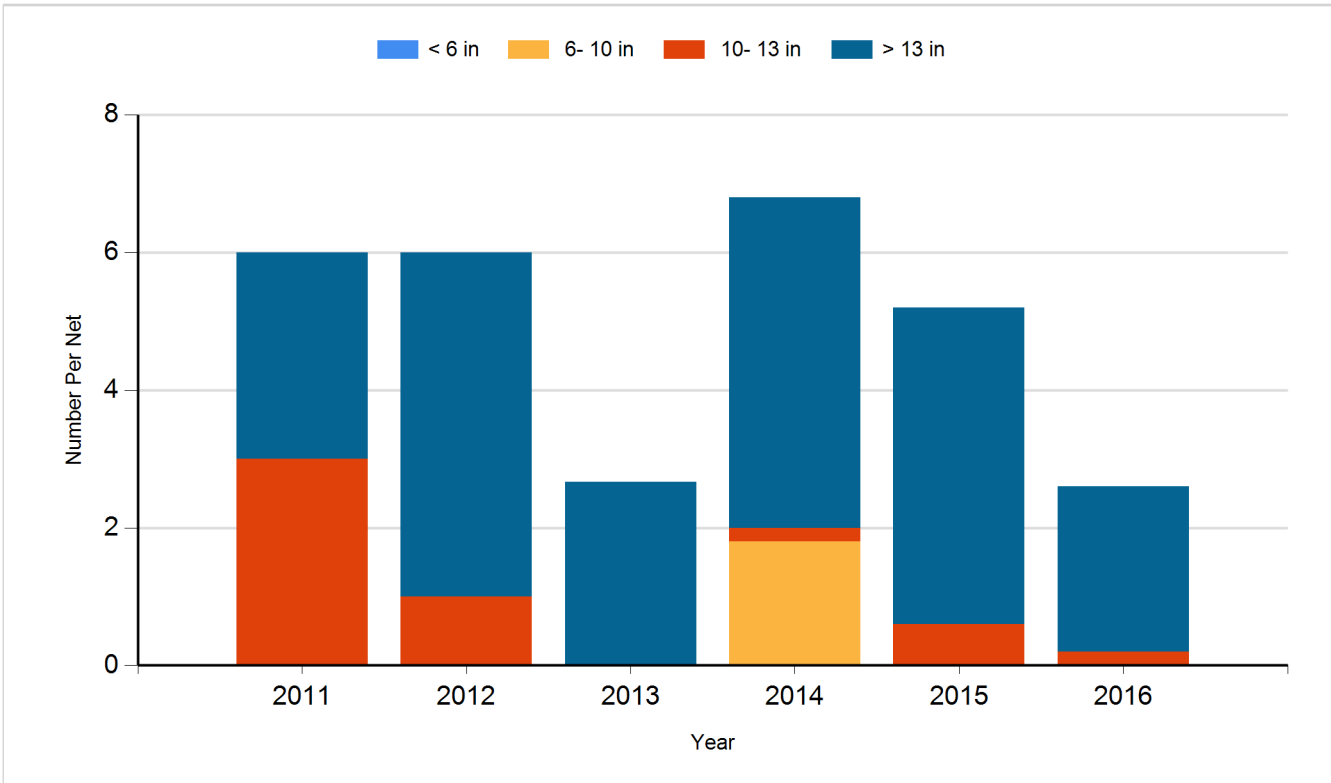
Species: White Bass
Gear: std exp gill net



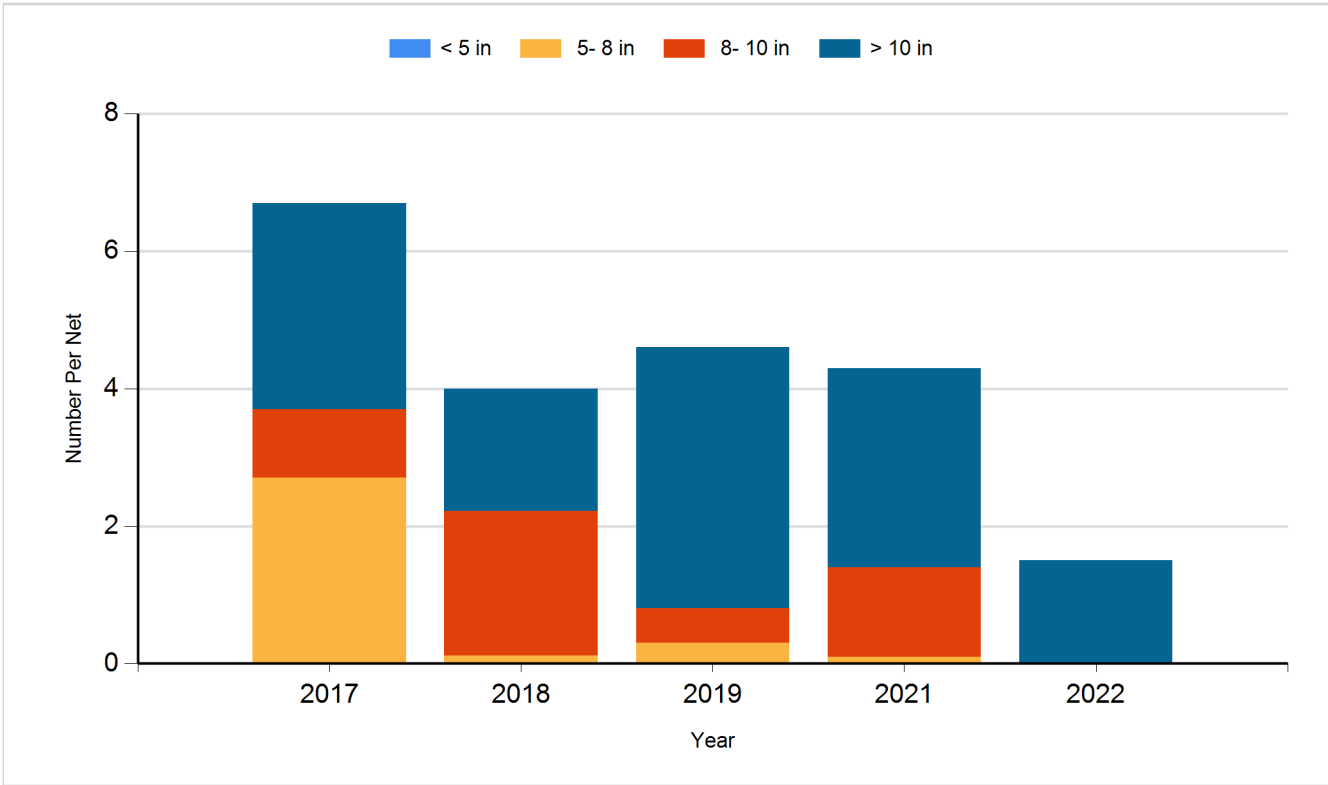
Species: White Sucker
Gear: AFS std gill net



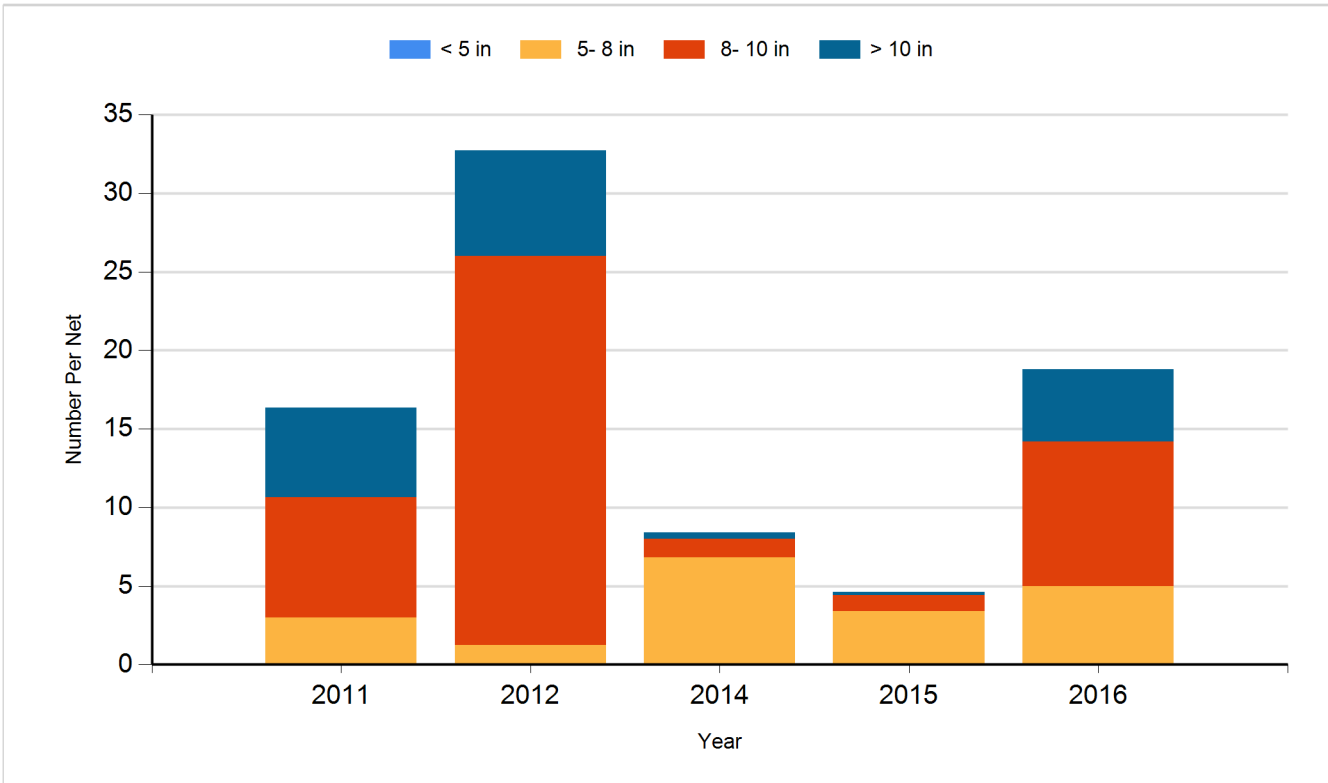
Species: White Sucker
Gear: std exp gill net



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
2013	Walleye	Small Fingerling	102,660
2014	Walleye	Small Fingerling	103,600
2014	Yellow Perch	Small Fingerling	499,000
2015	Walleye	Small Fingerling	68,320
2017	Walleye	Small Fingerling	70,490
2018	Walleye	Small Fingerling	72,900
2019	Walleye	Small Fingerling	73,030
2021	Walleye	Juvenile	73,920