

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Alvin, Lincoln County

LBS-Lake-180-000

2022

Lake Information

Name: Alvin **Maximum Depth:** 26 Feet
County: Lincoln **Mean Depth:** 9 Feet
Legal Description: T100N-R49W-Sec. 33,34
Surface Area: 105 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	May 25, 2022	4 net-nights
frame net (std 3/4 in)	May 25, 2022	5 net-nights

Common Fish Species Present

Largemouth Bass

Channel Catfish

Bluegill

Black Crappie

Walleye

Black Bullhead

River Carpsucker

White Sucker

Gizzard Shad

Sunfish Hybrid

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
AFS std gill net	Black Bullhead	36	9.0	6.1	78	11	0		
	Black Crappie	19	3.8	4.7	13		0	116	4
	Bluegill	4	1.0	0.9	25		0	107	13
	Channel Catfish	13	3.3	2.4	62		0	96	3
	Common Carp	9	0.5	0.8	100		50		
	Freshwater Drum	5	1.3	1.0	0		0		
	Gizzard Shad	9	2.3	3.2	100				
	River Carpsucker	43	10.8	6.1	95		77	10	
	Walleye	1	0.3	0.4	100		0		95
	White Sucker	40	10.0	6.1	80	10	48	12	
frame net (std 3/4 in)	Bigmouth Buffalo	2	0.4	0.4	100		0		
	Black Bullhead	99	19.8	8.0	93	4	0		
	Black Crappie	65	13.0	11.8	29	8	0	105	1
	Bluegill	38	7.2	2.8	39	12	0	104	2
	Channel Catfish	3	0.6	0.9	33		0	106	7
	Green Sunfish	2	0.4	0.6	0		0	115	16
	Orangespotted Sunfish	1	0.0	0.0					
	Sunfish Hybrid	9	1.8	2.1	22		0	111	2
	White Sucker	13	2.6	2.0	92		54	23	
	Yellow Bullhead	2	0.4	0.4	100		100		
Yellow Perch	1	0.2	0.3	0		0		86	

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	Black Bullhead					5.7							5.70
	Black Crappie					23.2							23.20
	Bluegill					2.0							2.00
	Channel Catfish					0.0							0.00
	Common Carp					0.1							0.10
	Gizzard Shad					2.7							2.70
	Green Sunfish					0.2							0.20
	Orangespotted Sunfish					0.0							0.00
	Pumpkinseed					0.1							0.10
	River Carpsucker					0.2							0.20
	Sunfish Hybrid					0.3							0.30
	Walleye					0.2							0.20
	White Crappie					3.6							3.60
	White Sucker					1.3							1.30
AFS std gill net	Bigmouth Buffalo					0.0	0.2			0.5	0.0		0.18
	Black Bullhead					9.5	12.7			10.8	9.0		10.50
	Black Crappie					2.2	0.3			2.3	3.8		2.15
	Bluegill					0.0	0.2			0.0	1.0		0.30
	Channel Catfish					3.2	3.0			3.3	3.3		3.20
	Common Carp					0.0	2.0			0.8	0.5		0.83
	Freshwater Drum					1.2	2.2			0.0	1.3		1.18
	Gizzard Shad					16.7	0.7			0.0	2.3		4.93
	Northern Pike					0.2	0.0			0.0	0.0		0.05
	River Carpsucker					4.3	12.3			20.8	10.8		12.05
	Walleye					0.3	0.3			0.5	0.3		0.35
	White Bass					0.0	0.2			0.0	0.0		0.05
	White Crappie					0.5	0.2			8.0	0.0		2.18
	White Sucker					1.0	3.0			12.8	10.0		6.70
Yellow Perch					0.2	1.5			0.0	0.0		0.43	
frame net (std 3/4 in)	Bigmouth Buffalo	0.2	0.5	0.1	0.1		0.0			0.2	0.4		0.21
	Black Bullhead	26.2	70.1	133.1	321.9		69.2			9.8	19.8		92.87
	Black Crappie	44.5	6.2	35.9	17.2		6.9			147.6	13.0		38.76
	Bluegill	4.1	3.2	60.5	49.0		1.8			10.6	7.2		19.49
	Channel Catfish	1.4	1.9	1.0	1.6		0.1			0.0	0.6		0.94

		CPUE										
Gear	Species	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg
frame net (std 3/4 in)	Common Carp	0.2	0.9	0.1	0.2		0.3			0.2	0.0	0.27
	Freshwater Drum	0.0	0.0	0.0	0.2		0.0			0.0	0.0	0.03
	Gizzard Shad	0.0	0.0	0.0	2.1		0.0			0.4	0.0	0.36
	Golden Shiner	0.0	0.0	0.0	0.0		0.0			0.0	0.0	0.00
	Green Sunfish	0.2	0.0	1.5	0.8		0.0			0.2	0.4	0.44
	Largemouth Bass	0.0	0.0	0.0	0.0		0.2			0.0	0.0	0.03
	Northern Pike	0.1	0.3	0.1	0.0		0.1			0.0	0.0	0.09
	Orangespotted Sunfish	0.0	0.0	0.0	0.0		0.0			0.0	0.0	0.00
	Pumpkinseed	0.1	0.0	0.0	0.1		0.0			0.0	0.0	0.03
	River Carpsucker	0.0	0.3	0.2	0.9		0.1			0.2	0.0	0.24
	Sunfish Hybrid	0.0	0.0	2.2	2.2		0.1			0.2	1.8	0.93
	Walleye	0.0	0.0	0.0	0.0		0.0			0.2	0.0	0.03
	White Crappie	0.1	0.8	3.6	3.3		2.3			112.8	0.0	17.56
	White Sucker	1.0	3.3	3.1	12.9		3.6			11.2	2.6	5.39
	Yellow Bullhead	0.0	0.6	0.0	0.0		0.0			0.4	0.4	0.20
Yellow Perch	0.0	0.2	0.0	0.1		1.3			0.0	0.2	0.26	
hoop net	Black Bullhead				28.0							28.00
	Black Crappie				0.7							0.70
	Bluegill				0.3							0.30
	Common Carp				1.7							1.70
spring day EF*	Largemouth Bass								6.0			6.00
std exp gill net	Black Bullhead		2.0	142.3	83.0							75.77
	Black Crappie		0.0	1.0	2.0							1.00
	Channel Catfish		5.3	12.7	4.3							7.43
	Common Carp		1.0	6.3	0.0							2.43
	Freshwater Drum		1.7	0.7	3.0							1.80
	Gizzard Shad		0.0	0.3	11.3							3.87
	Largemouth Bass		0.0	0.0	0.3							0.10
	Northern Pike		0.7	0.0	0.0							0.23
	River Carpsucker		1.3	1.3	10.3							4.30
	Walleye		0.0	0.3	0.0							0.10
	White Crappie		0.0	0.0	0.7							0.23
	White Sucker		2.0	4.0	6.0							4.00

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	Black Bullhead	PSD					0							
		PSD-P					0							
		Wr					92							
	Black Crappie	PSD					84							
		PSD-P					8							
		Wr												
	Bluegill	PSD					60							
		PSD-P					0							
		Wr					94							
	Channel Catfish	PSD					0							
		PSD-P					0							
		Wr												
	Gizzard Shad	PSD					19							
		Wr												
	River Carpsucker	PSD					100							
		PSD-P					100							
		Wr												
	Walleye	PSD					0							
PSD-P						0								
Wr						85								
White Sucker	PSD					100								
	PSD-P					85								
AFS std gill net	Black Bullhead	PSD					0	0			60	78		
		PSD-P					0	0			0	0		
		Wr												
	Black Crappie	PSD					69	100			11	13		
		PSD-P					15	50			0	0		
		Wr					87	96			126	116		
	Bluegill	PSD							100				25	
		PSD-P							0				0	
		Wr							93				107	
	Channel Catfish	PSD					47	61			85	62		
		PSD-P					5	17			15	0		
		Wr					95	93			88	96		
	Gizzard Shad	PSD					43	100			0	100		
		Wr												
	River Carpsucker	PSD					100	100			100	95		
		PSD-P					100	91			66	77		
	Walleye	PSD					50	100			0	100		
		Wr												

Gear	Species	Index	Year									
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AFS std gill net	Walleye	PSD-P					50	0			0	0
		Wr					92	87			91	95
	White Sucker	PSD					83	83			94	80
		PSD-P					83	56			33	48
frame net (std 3/4 in)	Black Bullhead	PSD	91	16	2	0		0			65	93
		PSD-P	0	0	0	0		0			0	0
		Wr	87									
	Black Crappie	PSD	6	77	8	12		100			33	29
		PSD-P	0	2	0	2		78			7	0
		Wr	109	93	100	95		93			113	105
	Bluegill	PSD	34	78	34	51		44			51	39
		PSD-P	0	3	0	0		0			0	0
		Wr	106	102	94	97		105			100	104
	Channel Catfish	PSD	50	42	20	44		100				33
		PSD-P	7	0	0	0		0				0
		Wr	97	88	82	103		88				106
	Gizzard Shad	PSD				86					100	
	Largemouth Bass	PSD		0				100				
		PSD-P		0				50				
		Wr						89				
	River Carpsucker	PSD		0	100	100		100			100	
		PSD-P		0	50	100		100			100	
	Walleye	PSD					0		0			0
		PSD-P					0		0			0
Wr											76	
White Sucker	PSD	100	82	97	100		94			98	92	
	PSD-P	100	67	65	77		75			39	54	
	Wr	95										
hoop net	Black Bullhead	PSD					0					
		PSD-P					0					
	Black Crappie	PSD					0					
		PSD-P					0					
		Wr					95					
	Bluegill	PSD					0					
		PSD-P					0					
		Wr					95					

Gear	Species	Index	Year									
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
spring day EF	Largemouth Bass	PSD										83
		PSD-P										17
		Wr										104
std exp gill net	Black Bullhead	PSD		50	0	0						
		PSD-P		0	0	0						
	Black Crappie	PSD			0	17						
		PSD-P			0	0						
		Wr				99						
	Channel Catfish	PSD		75	84	69						
		PSD-P		6	0	0						
		Wr		89	85	89						
	Gizzard Shad	PSD			0	91						
	Largemouth Bass	PSD				0						
		PSD-P				0						
		Wr				101						
	River Carpsucker	PSD		0	100	94						
		PSD-P		0	75	68						
	Walleye	PSD			100							
		PSD-P			0							
		Wr			93							
	White Sucker	PSD		67	100	94						
		PSD-P		33	33	39						

Length at Capture

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

Species: Black Crappie

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	65		162 (19)	194 (30)	211 (16)						
2021	605		156 (217)	196 (347)	223 (41)						
2018	72	96 (3)	209 (4)	229 (6)	262 (32)	268 (26)		281 (1)			
2017	235	90 (3)	184 (33)	215 (86)	234 (80)	252 (31)	251 (2)				
2016	172		162 (85)	193 (81)	258 (5)	254 (2)					
2015	409	124 (70)	176 (316)	224 (23)							
2014	70	125 (11)	207 (56)		248 (2)	239 (1)					
2013	445		173 (420)	212 (4)	228 (17)	226 (4)					

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2022	38	79 (3)	132 (21)	167 (10)	180 (3)	174 (1)					
2021	50		116 (21)	153 (28)	162 (2)						
2018	18		115 (3)	147 (3)	152 (6)	155 (5)					
2017	22	72 (2)	124 (6)	149 (2)	158 (7)	170 (3)	174 (2)				
2015	605		136 (378)	155 (154)	172 (59)	177 (15)					
2014	32	97 (4)	150 (7)	168 (16)	174 (4)	207 (1)					
2013	41		141 (35)	158 (6)							

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	2			427 (2)							

Fish Condition

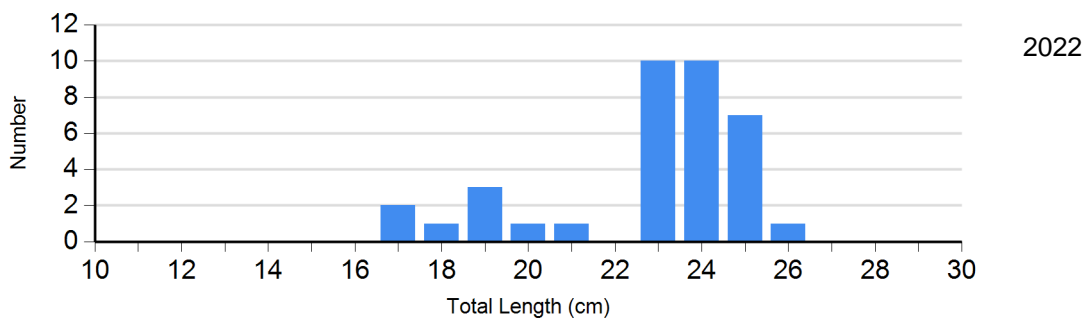
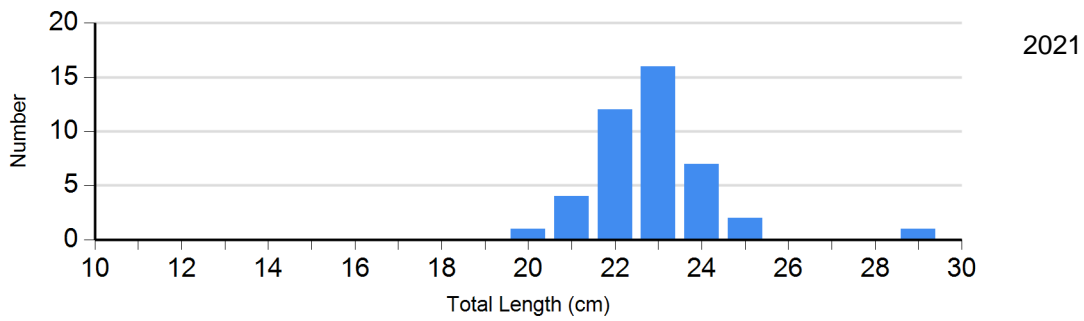
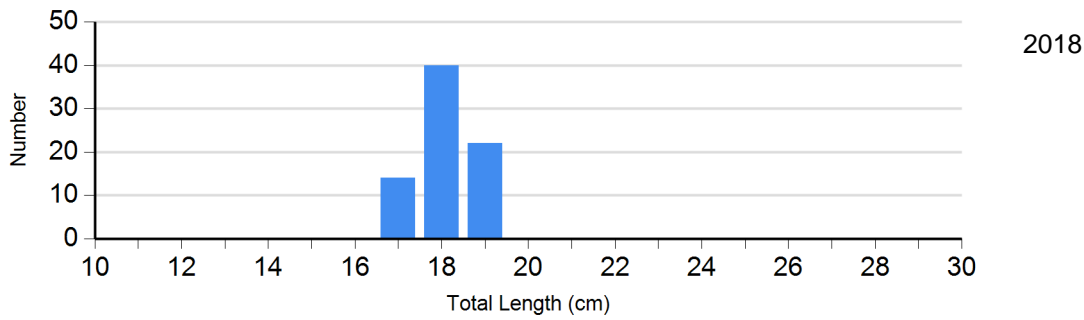
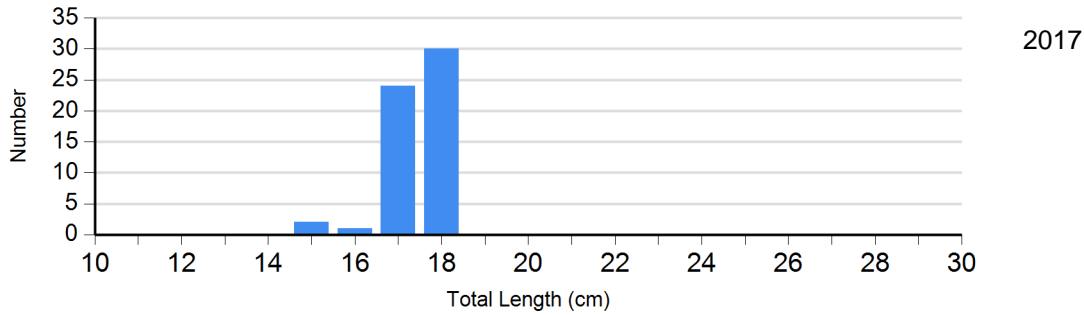
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2018	0		15	99 (2.3)	54	91 (0.7)	0	
	2021	493	116 (1.5)	196	101 (0.8)	33	90	16	
	2022	46	109 (1.2)	19	98 (1.5)	0		0	
Bluegill Frame Net	2018	10	107 (3.8)	8	102 (6.3)	0		0	
	2021	26	99 (3.5)	27	101 (1.4)	0		0	
	2022	22	104 (2.1)	14	103 (1.8)	0		0	
Channel Catfish Gill Net	2018	7	91 (4.4)	8	89 (5.4)	2	108 (8.2)	1	98
	2021	2	76	9	86 (2.0)	2	98 (16.6)	0	
	2022	5	94 (3.1)	8	98 (3.7)	0		0	
Largemouth Bass Electro Fishing	2021	1	96	4	106 (4.2)	1	105	0	
Walleye Gill Net	2018	0		2	87 (1.9)	0		0	
	2021	2	91 (6.8)	0		0		0	
	2022	0		1	95	0		0	

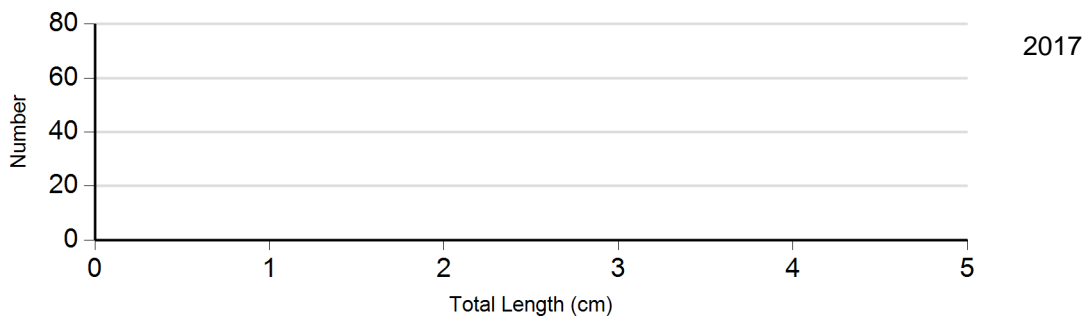
Length Frequency Distribution

Length frequency histogram of species sampled by year.

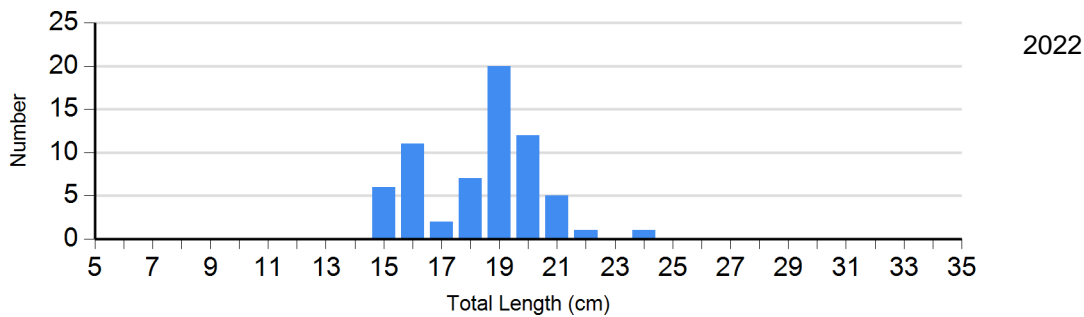
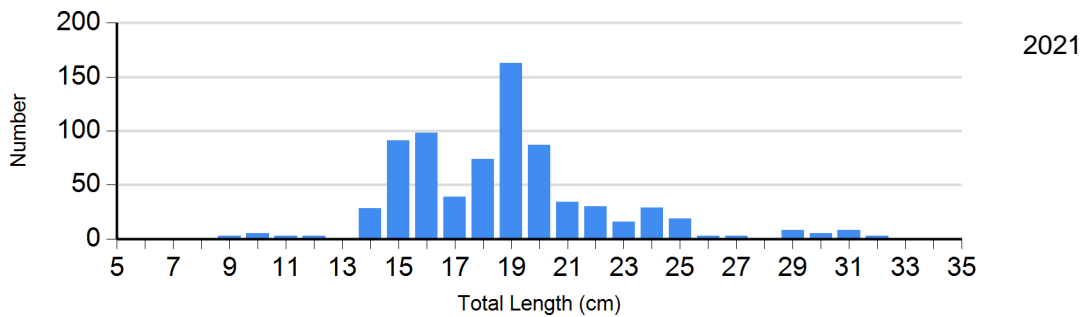
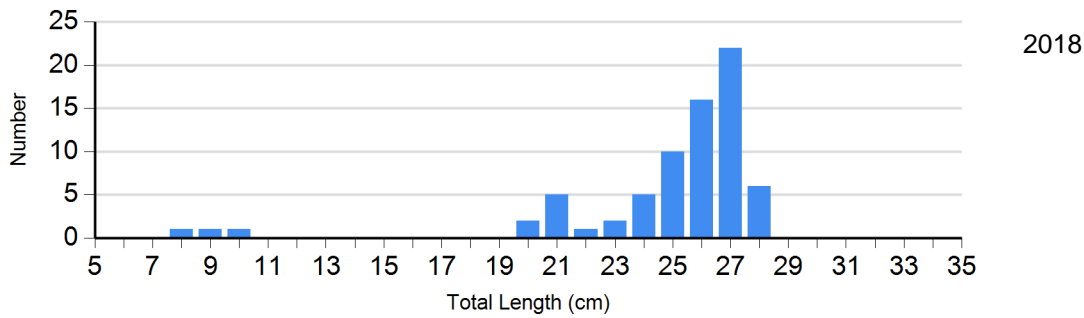
Species: Black Bullhead
Gear: AFS std gill net



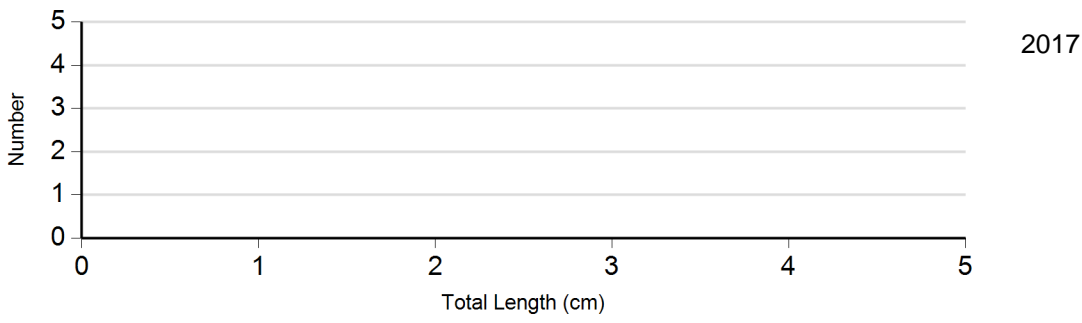
Species: Black Crappie
Gear: AFS std frame net



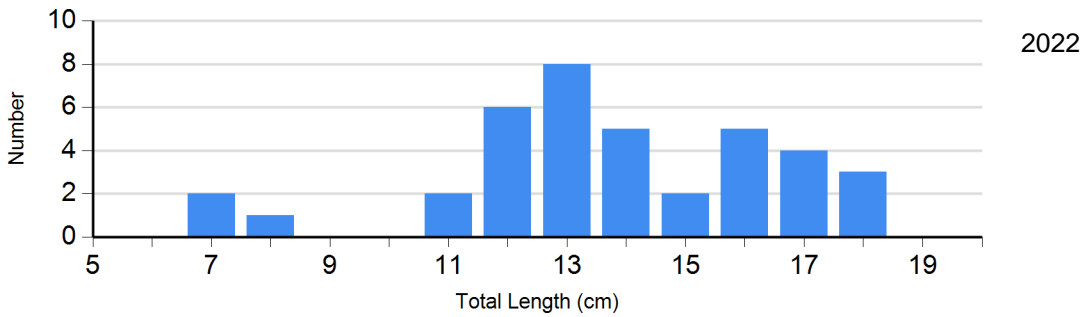
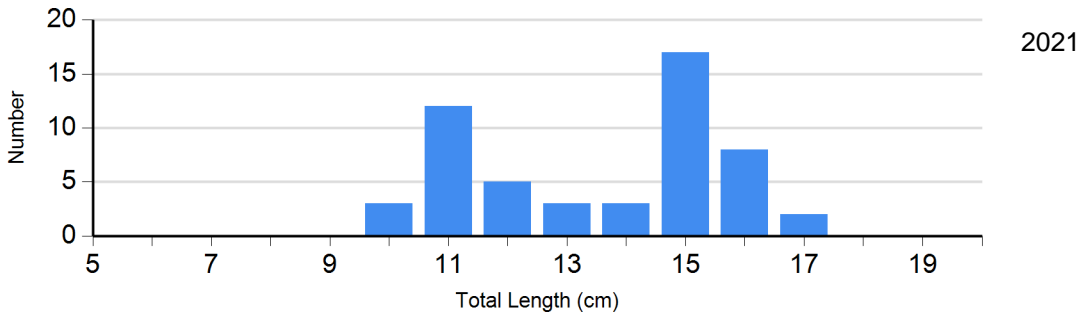
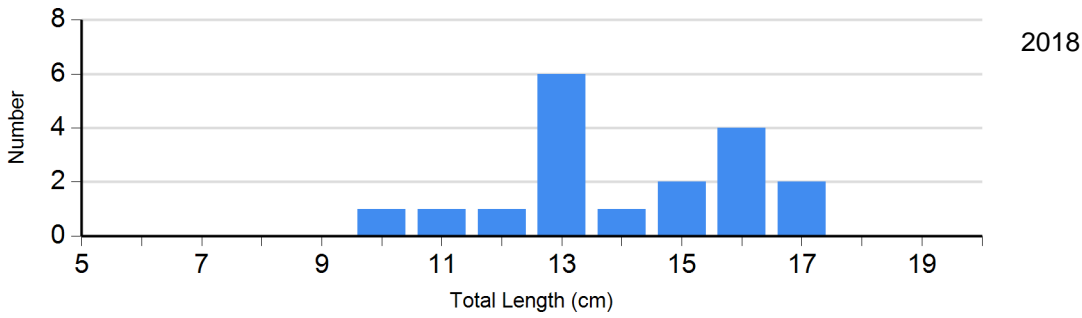
Species: Black Crappie
Gear: frame net (std 3/4 in)



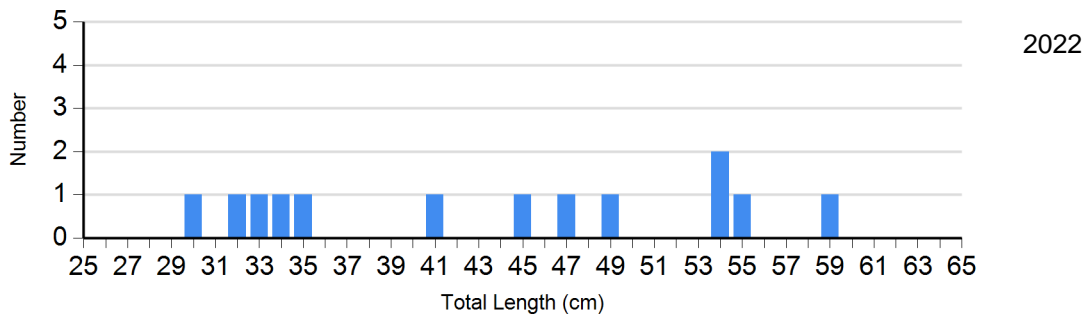
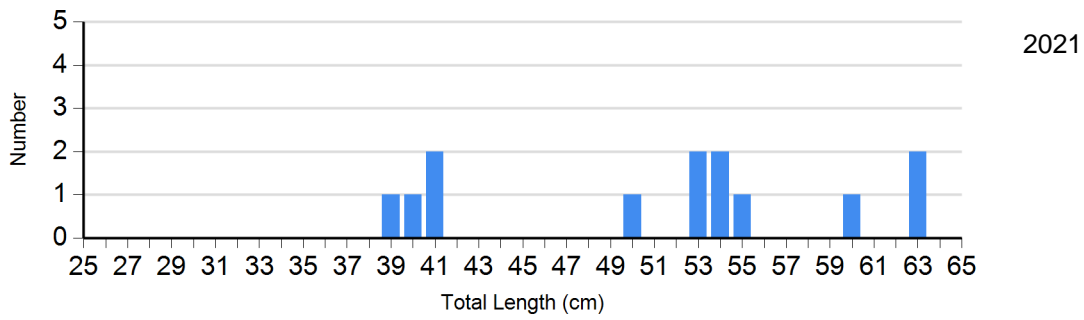
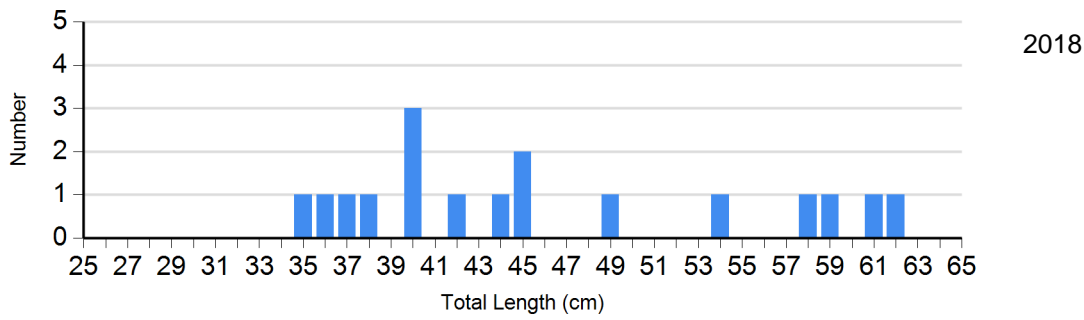
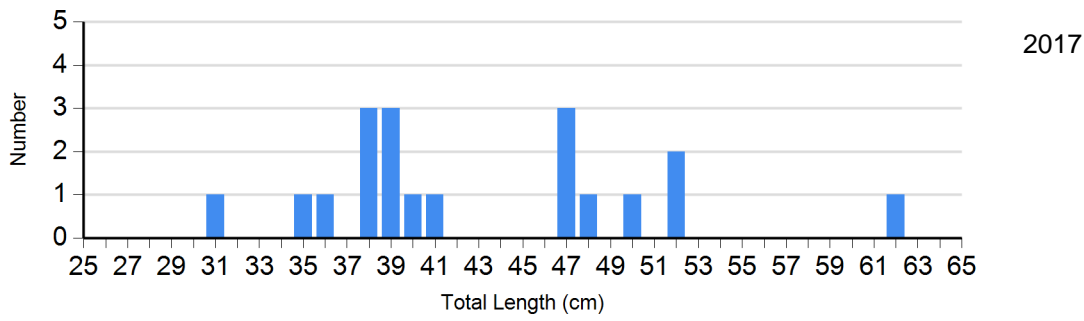
Species: Bluegill
Gear: AFS std frame net



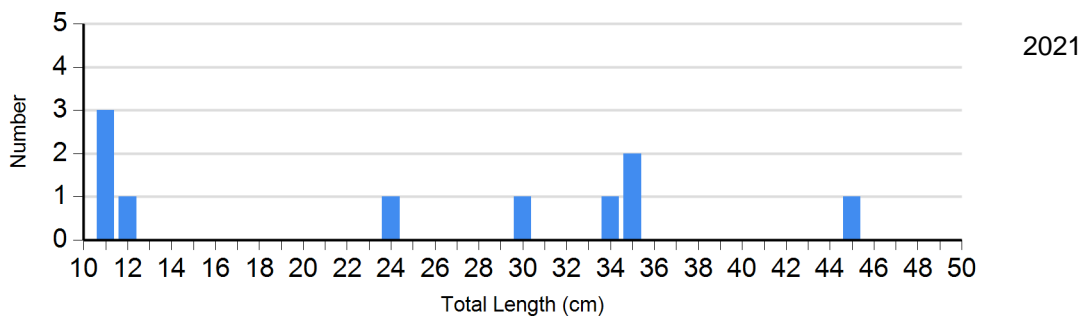
Species: Bluegill
Gear: frame net (std 3/4 in)



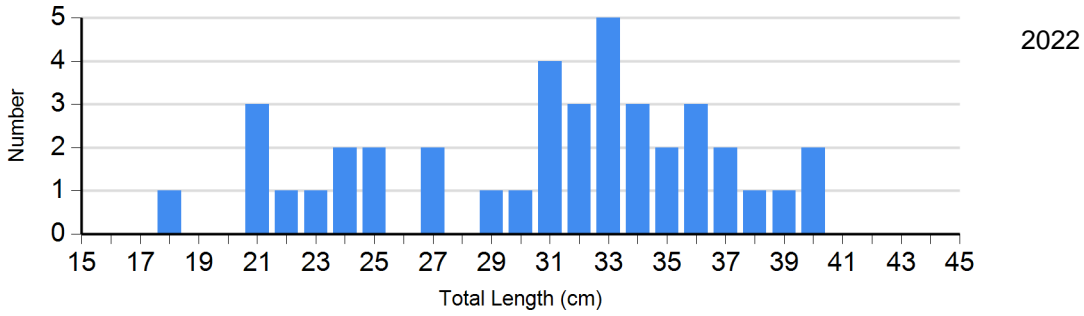
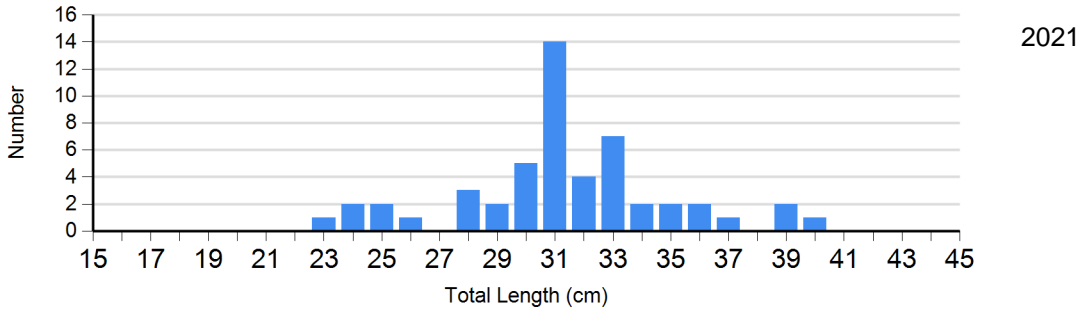
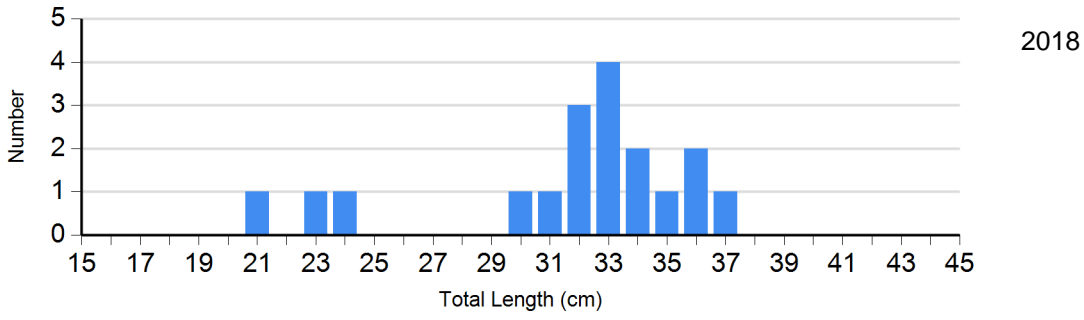
Species: Channel Catfish
 Gear: AFS std gill net



Species: Largemouth Bass
 Gear: spring day EF



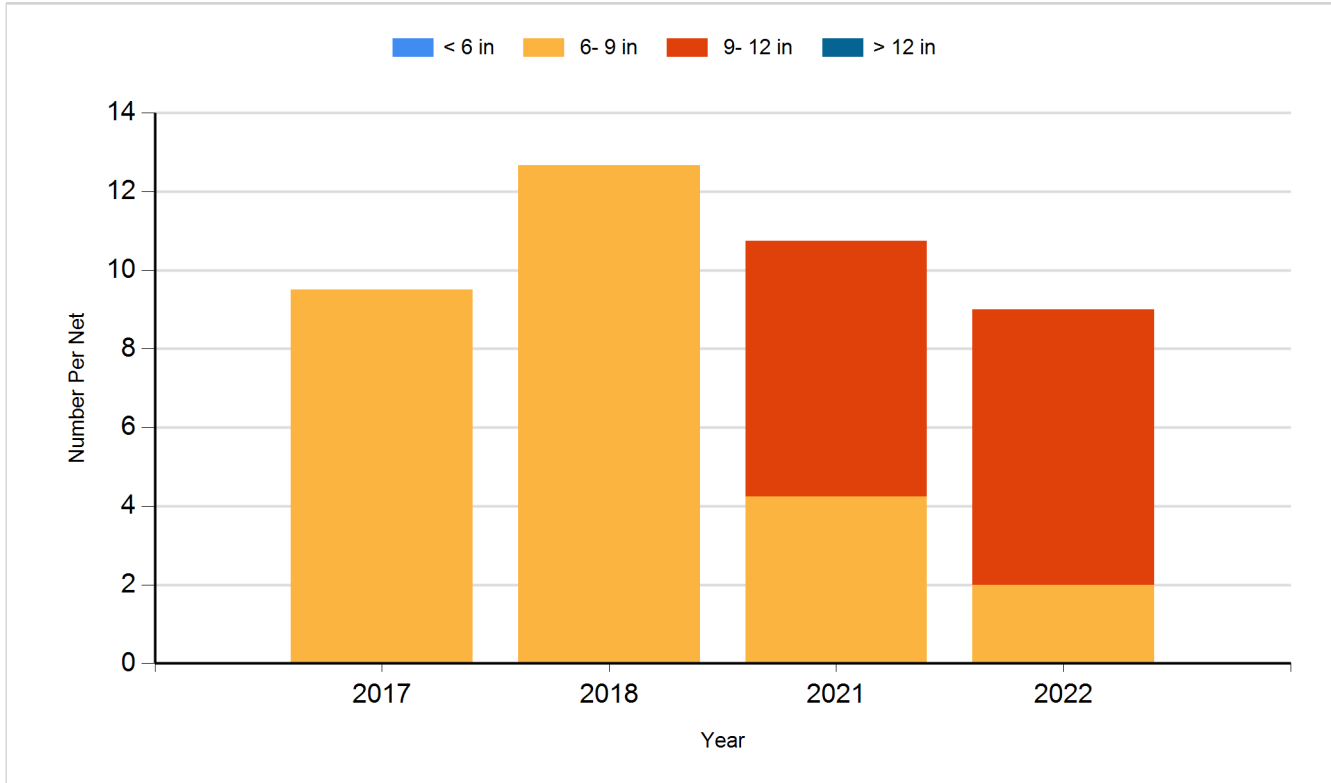
Species: White Sucker
Gear: AFS std gill net



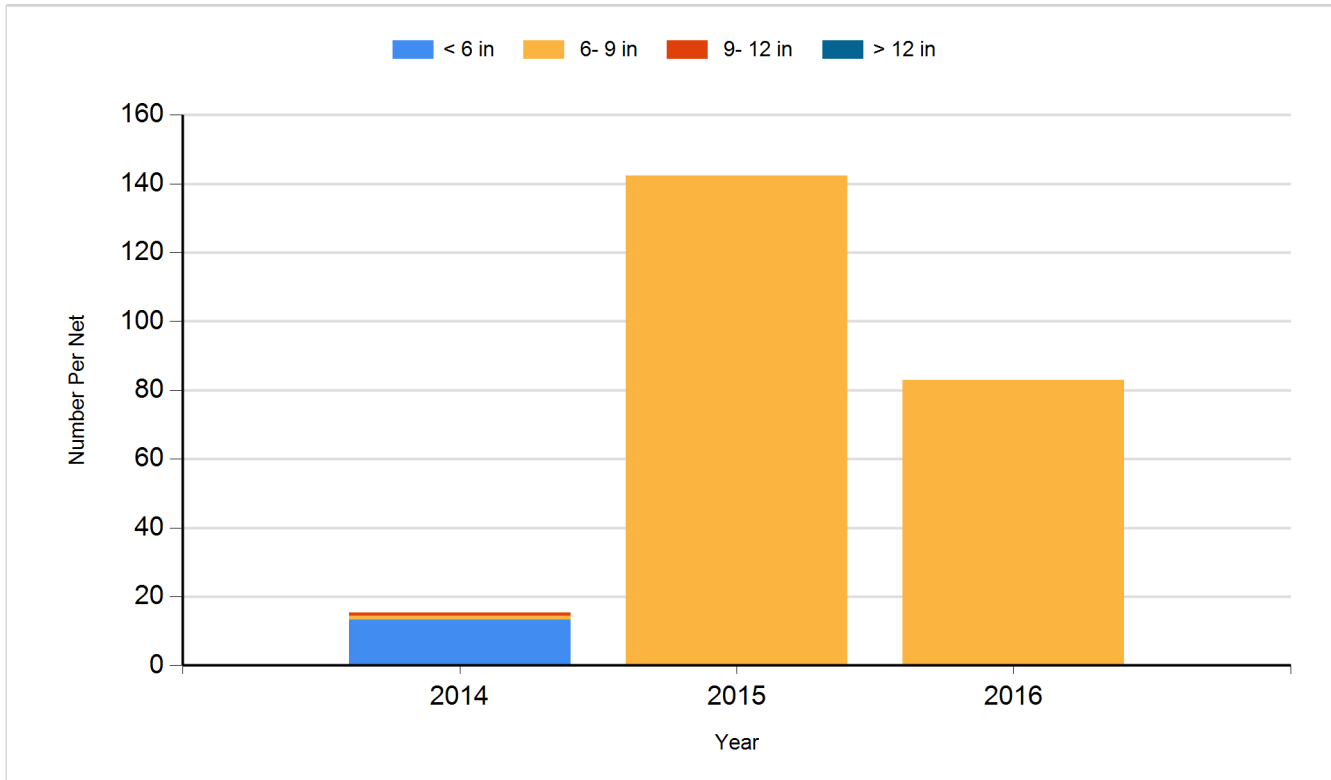
Historic Fish Sizes and Relative Abundance

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

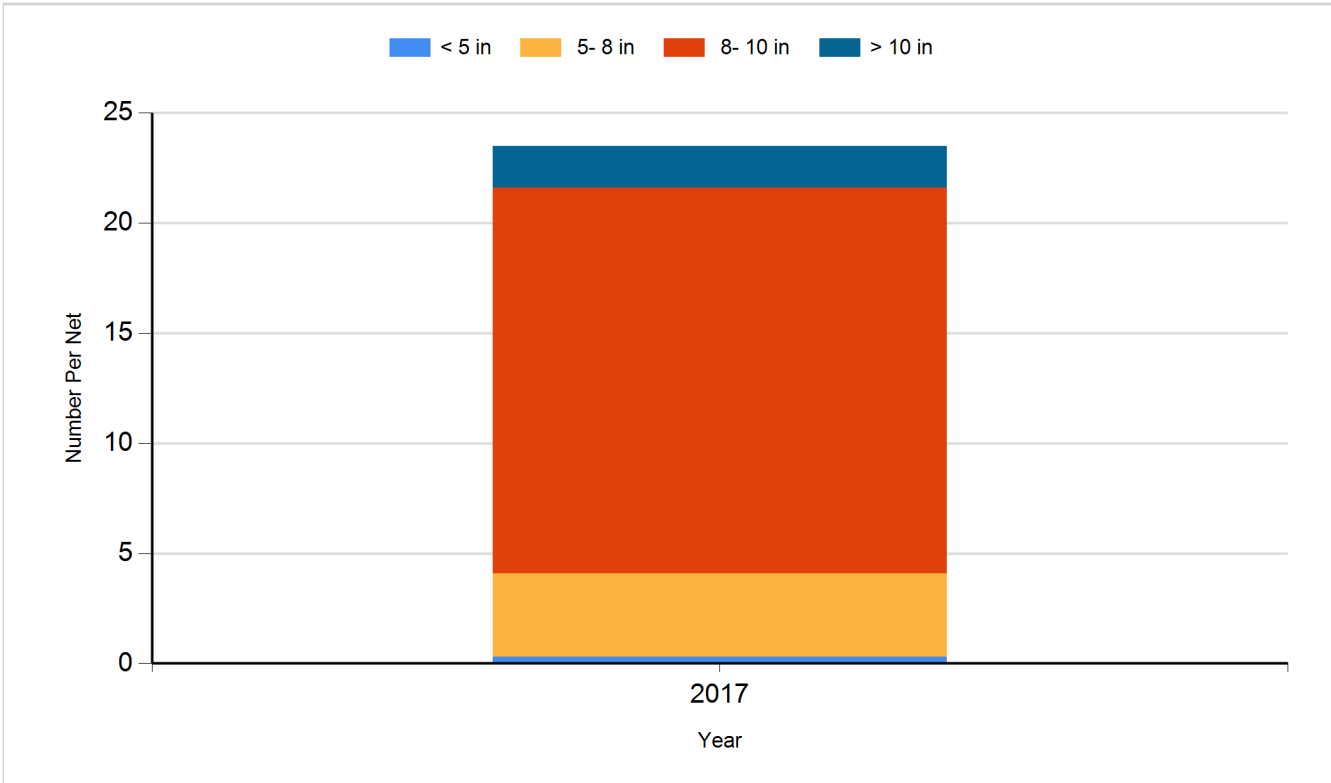
Species: Black Bullhead
Gear: AFS std gill net



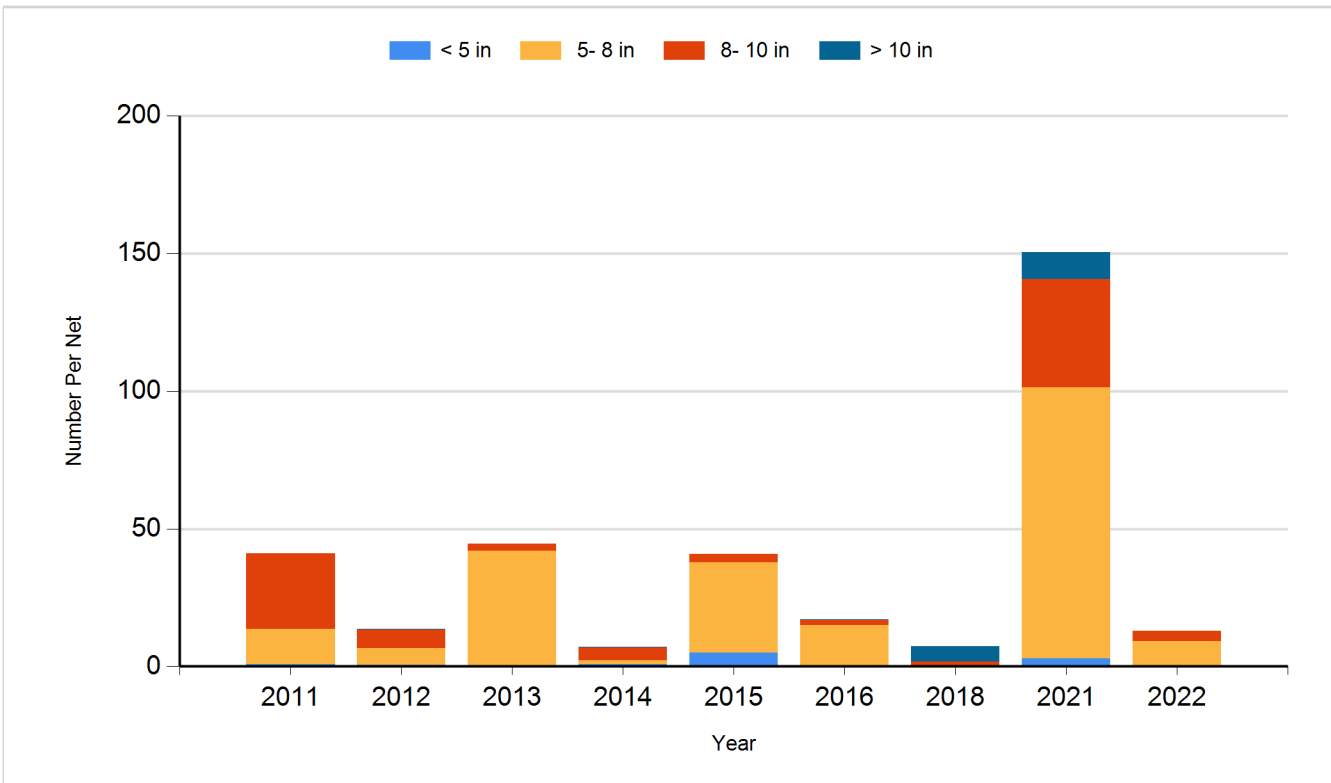
Species: Black Bullhead
Gear: std exp gill net



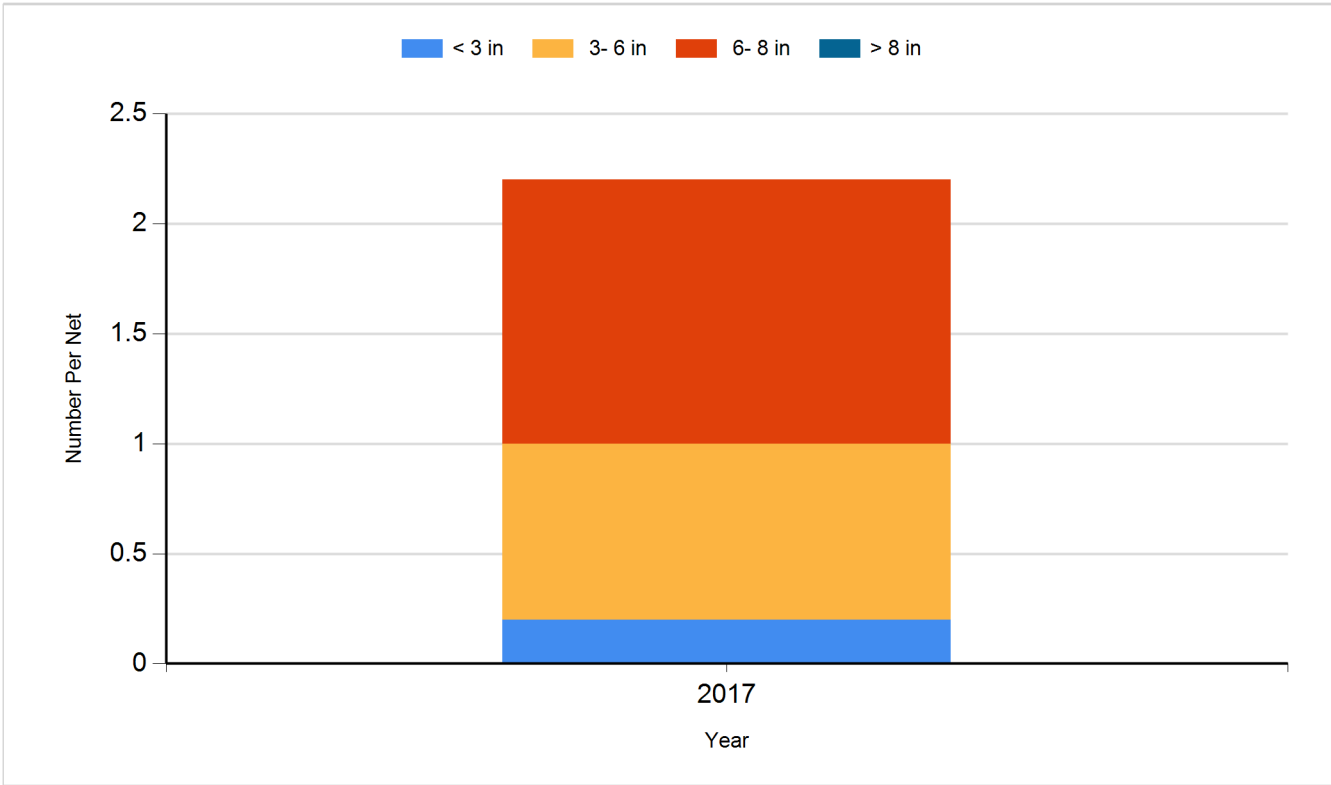
Species: Black Crappie
Gear: AFS std frame net



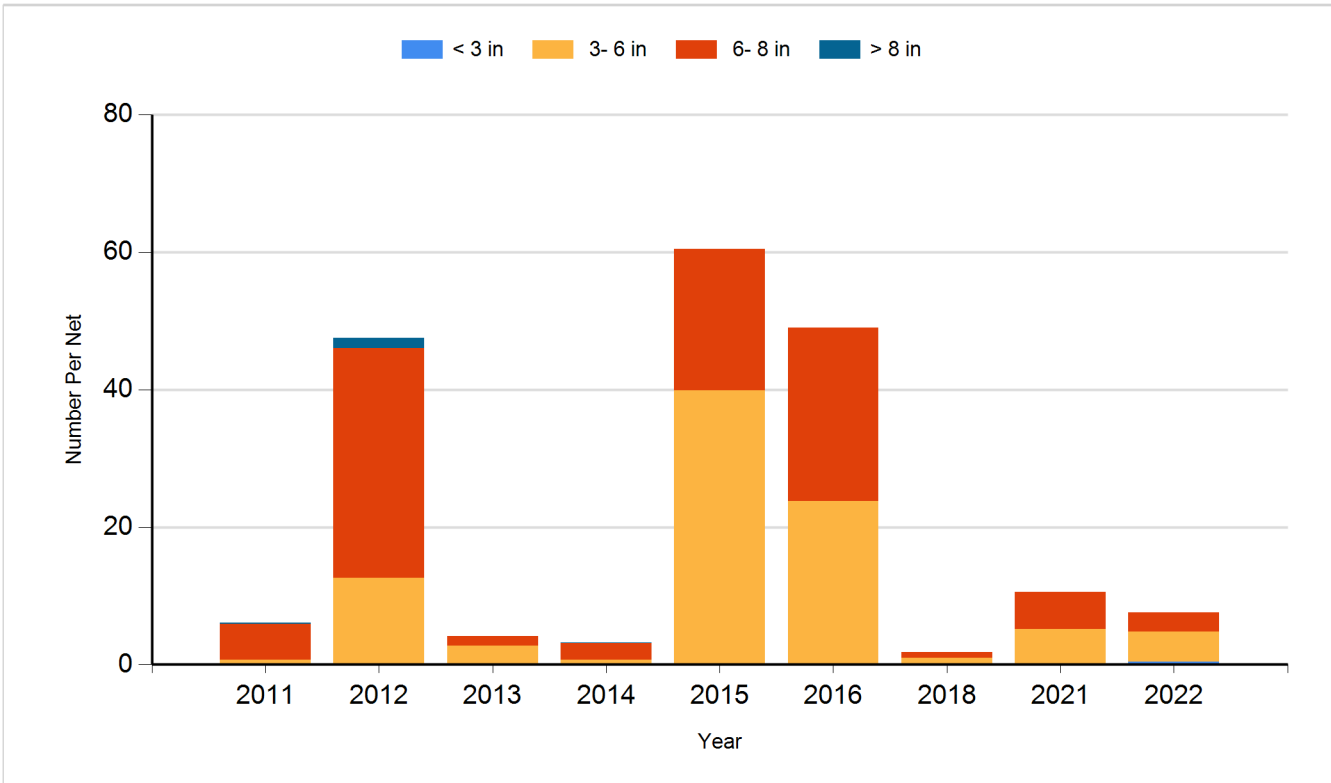
Species: Black Crappie
Gear: frame net (std 3/4 in)



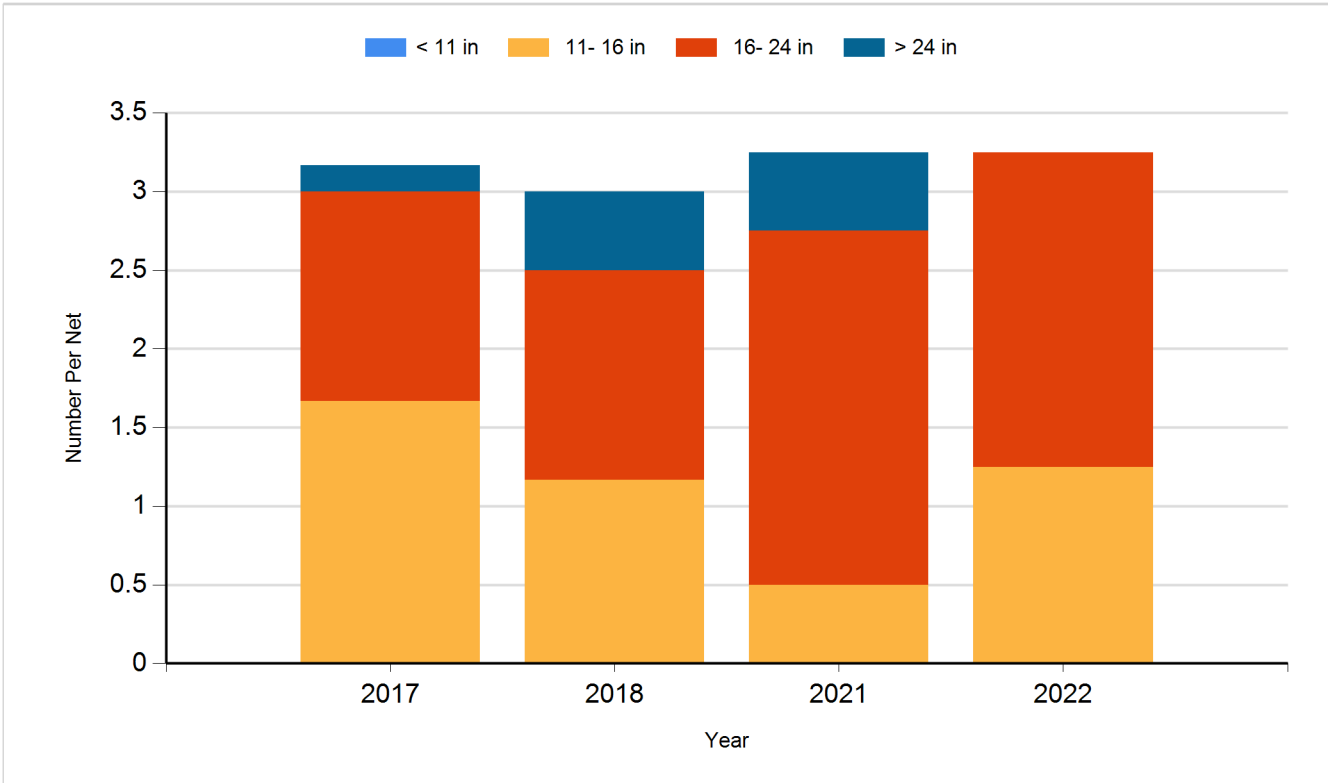
Species: Bluegill
Gear: AFS std frame net



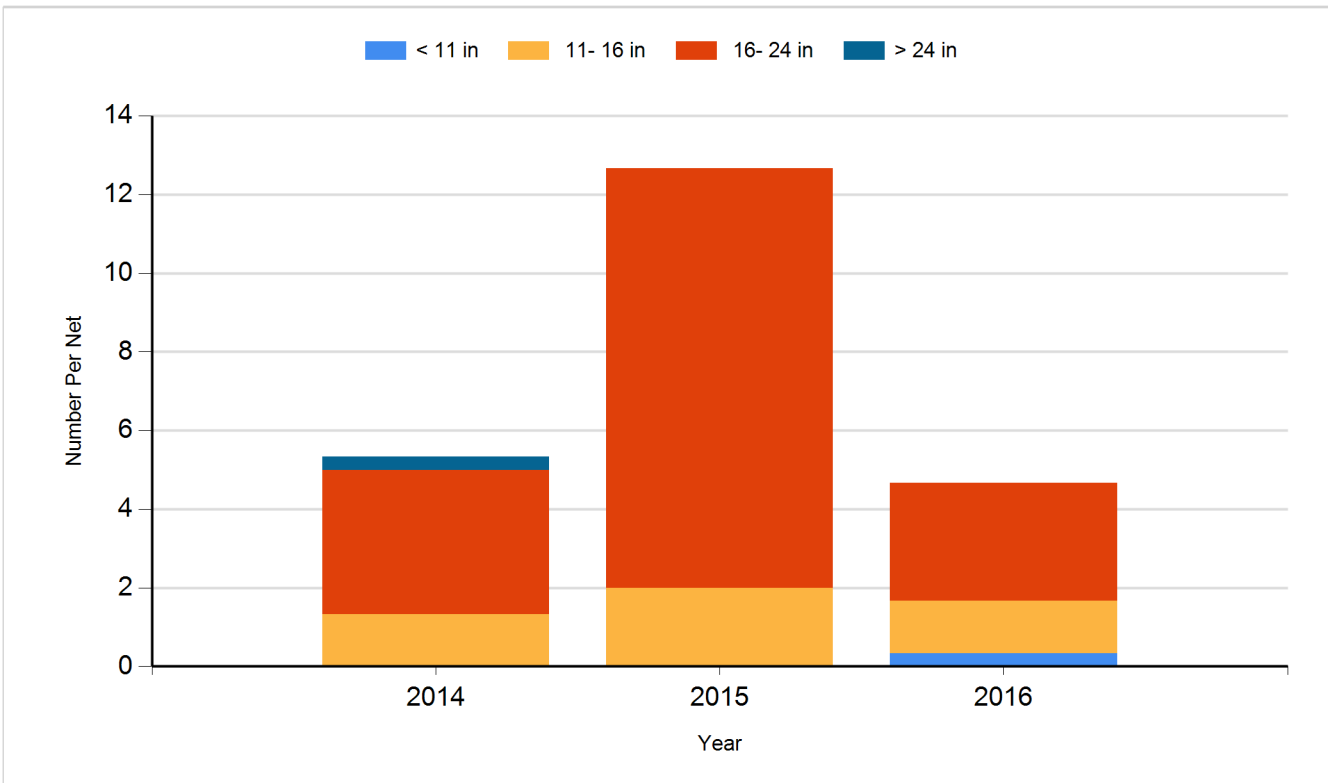
Species: Bluegill
Gear: frame net (std 3/4 in)



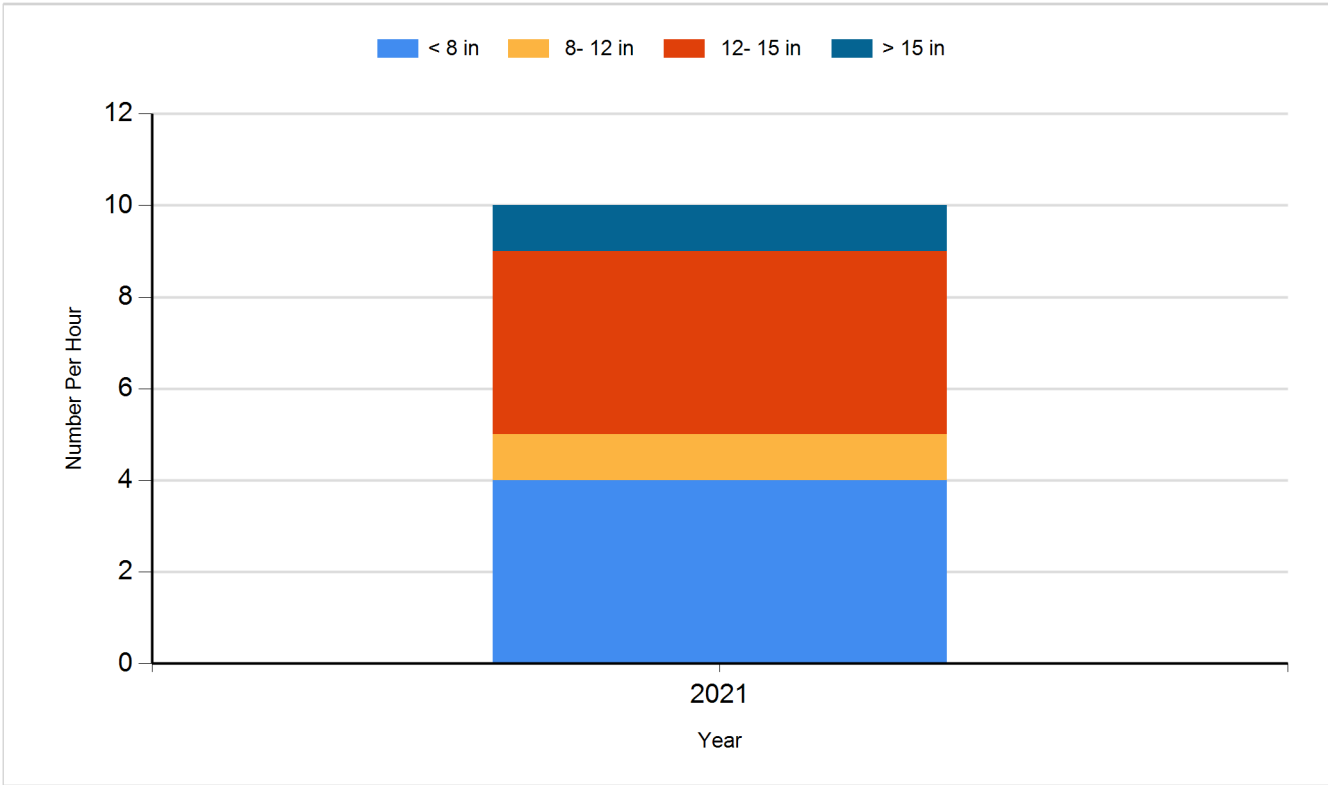
Species: Channel Catfish
Gear: AFS std gill net



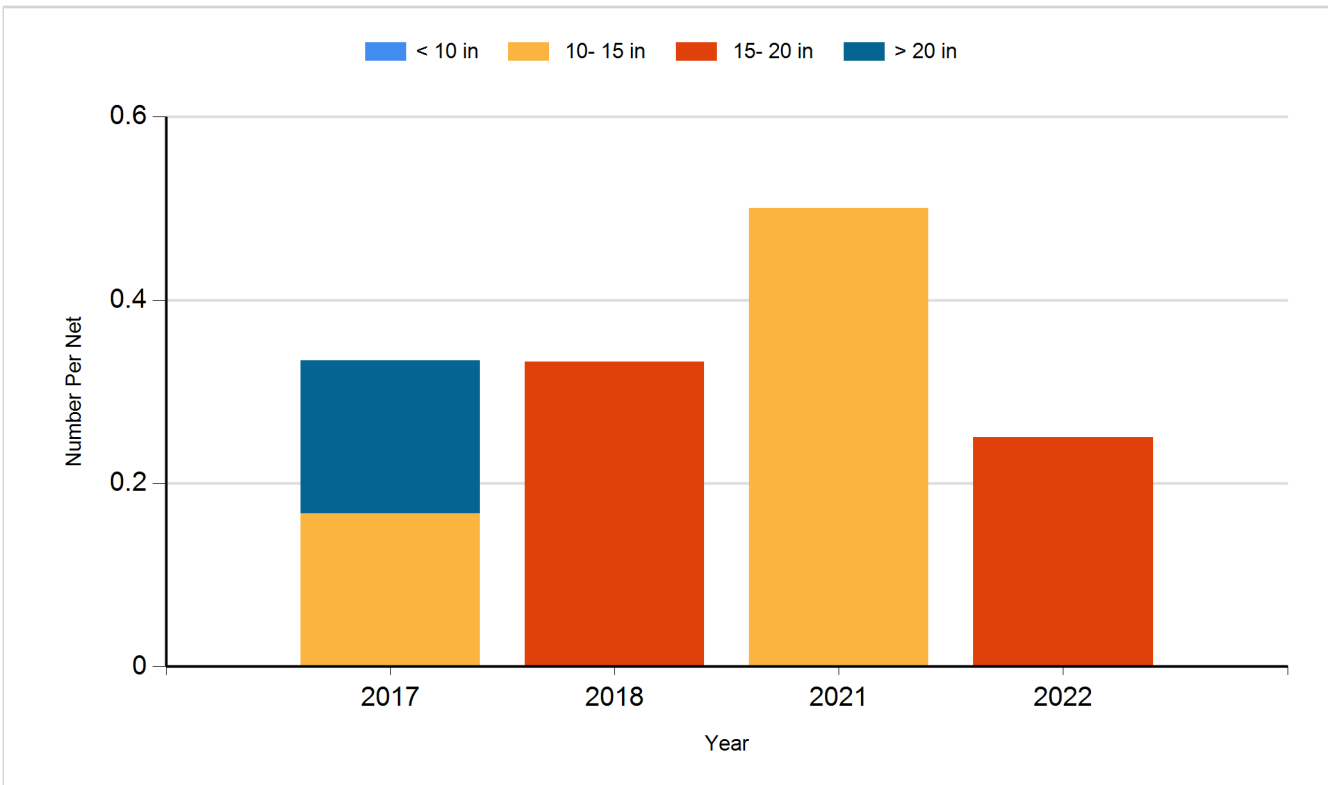
Species: Channel Catfish
Gear: std exp gill net



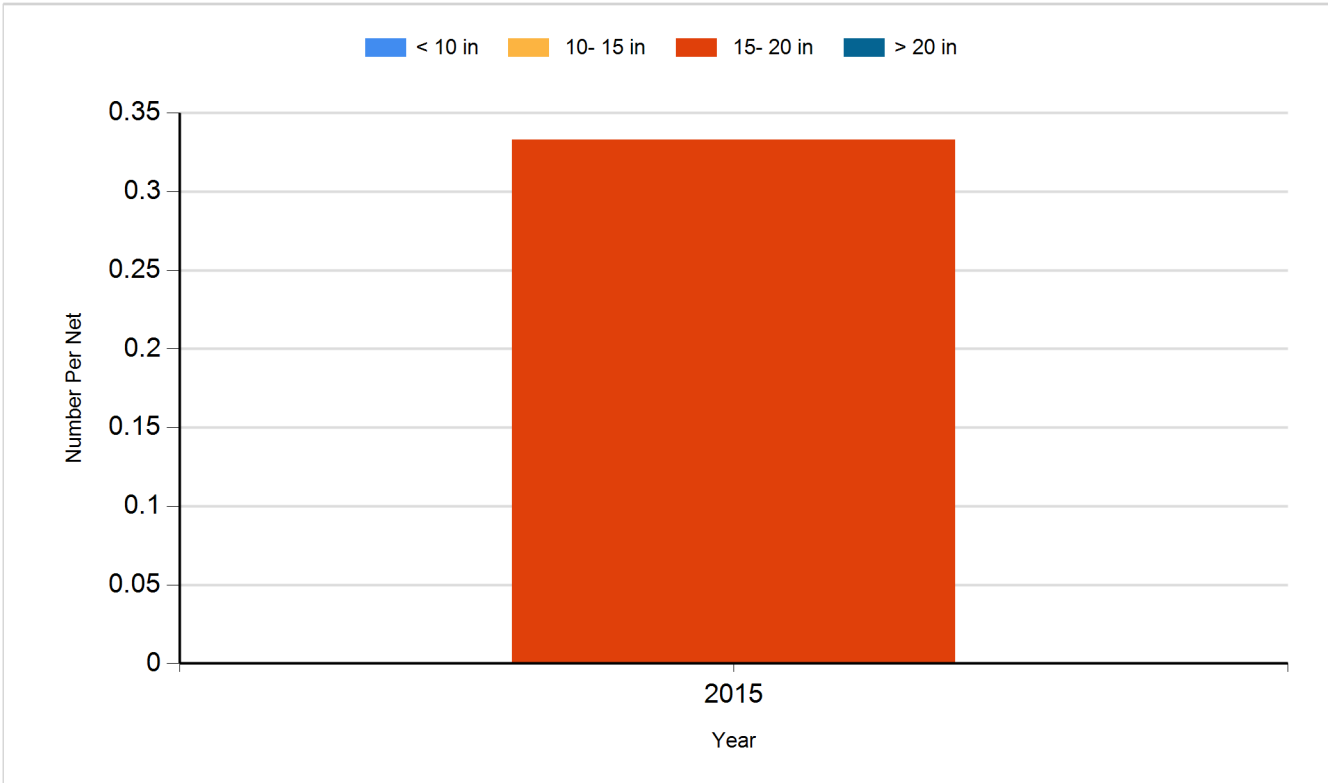
Species: Largemouth Bass
Gear: spring day EF



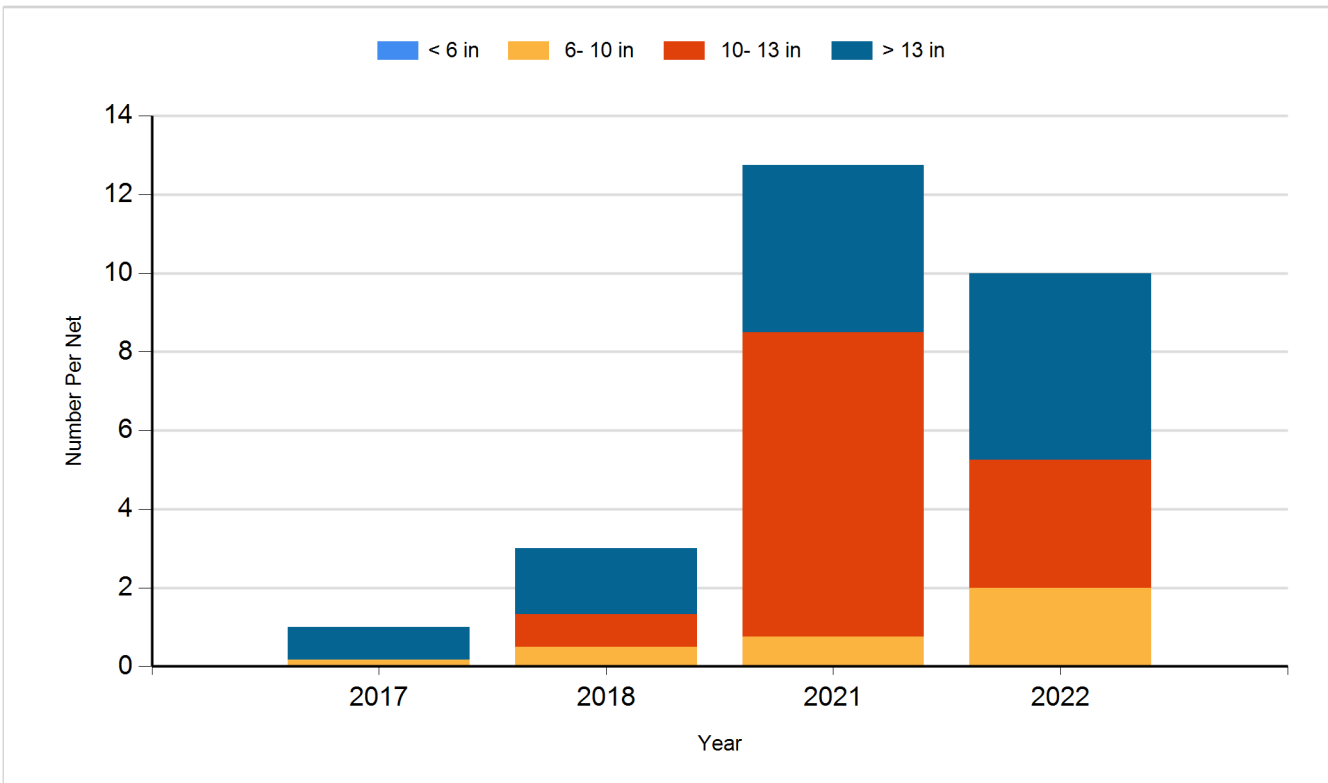
Species: Walleye
Gear: AFS std gill net



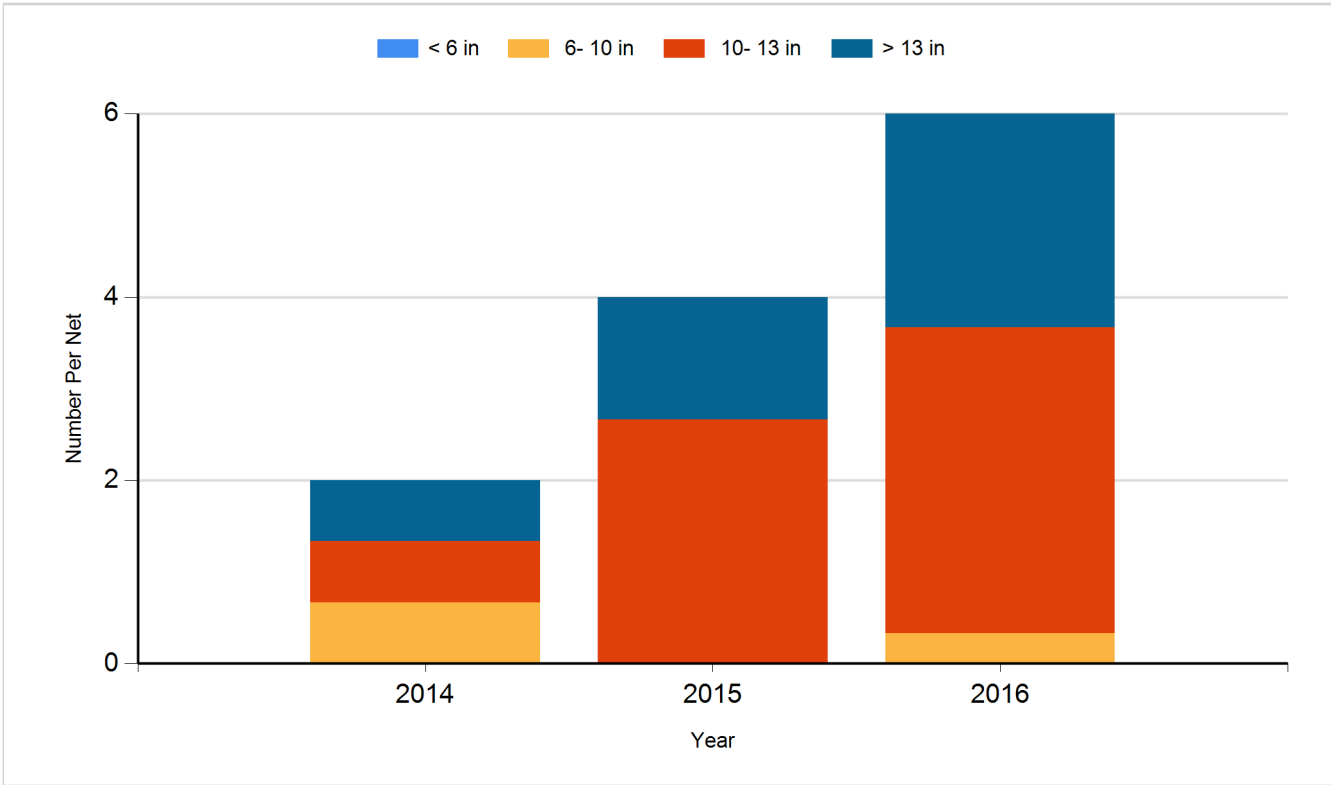
Species: Walleye
Gear: std exp gill net



Species: White Sucker
Gear: AFS std gill net



Species: White Sucker
Gear: std exp gill net



Fish Stocking

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

Year	Species	Size	Number
2011	Largemouth Bass	Fingerling	2,240
2012	Largemouth Bass	Adult	259
2013	Largemouth Bass	Large Fingerling	1,056
2013	Walleye	Adult	300
2014	Walleye	Fry	90,000
2015	Gizzard Shad	Adult	50
2015	Walleye	Small Fingerling	7,560
2016	Walleye	Juvenile	889
2017	Walleye	Juvenile	1,152
2017	Yellow Perch	Adult	5,525
2017	Yellow Perch	Small Fingerling	54,860
2018	Gizzard Shad	Adult	60
2019	Walleye	Small Fingerling	8,400
2021	Walleye	Fingerling	7,600