

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Curlew, Meade County

MCE-Lake-6-000

2022

## Lake Information

**Name:** Curlew  
**County:** Meade  
**Surface Area:** 123 Acres

## Surveys and Investigations

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

Gear	Date	Effort
boat shocker (day)	Sep 16, 2022	3560 seconds
frame net (std 3/4 in)	Jun 01, 2022	5 net-nights

## **Common Fish Species Present**

Largemouth Bass

Gizzard Shad

Black Crappie

Walleye

Smallmouth Bass

Black Bullhead

Common Carp

Channel Catfish

Bluegill

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## Terminology

Catch per unit effort (**CPUE**) refers to the relative abundance of a species. It is defined as the number of fish captured per unit of effort (i.e., number of fish captured per net-night or number of fish captured per hour electrofishing). In this report CPUE is typically given for only stock-length fish (see length categories table for stock lengths).

A statewide effort to help make netting efforts comparable to all waters sampled across the state, occurred in 2017, with a switch to American Fisheries Society gill nets. Past gill netting efforts were completed with different style/types of nets and are not comparable side by side.

- **AFS std gill net** – 80 ft experimental gill net containing eight panels (10 ft each) of varying monofilament meshes of 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25 and 2.50 inches.
- **std experimental gill net for non-Missouri River waters** - 150 ft experimental gill net containing six panels (25 ft each) of varying monofilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.
- **std experimental gill net for Missouri River reservoirs** – 300 ft experimental gill net containing six panels (50 ft each) of varying multifilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.

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

Population size structure is quantified using the indices proportional size distribution of quality-length fish (**PSD**) and proportional size distribution of preferred-length fish (**PSD-P**). These indices indicate the proportion of stock-length fish that are equal to or greater than a given length. Minimum lengths for stock, quality and preferred length fish are given in the length categories table.

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

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

Relative weight (**Wr**) is used to quantify fish plumpness. Relative weight is the ratio of what a fish weighs (*W*) compared to a length-specific standard weight (*Ws*) multiplied by 100. Relative weight values of 95-105 are commonly cited as optimum values, but values in the 80s are common during summer sampling in South Dakota.

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

Confidence intervals (CI) are provided for many of the estimates calculated in this report. The confidence interval provides a range in which the true mean is expected to fall. For example, with an 80% CI we are 80% confident that the interval contains the true value.

Length categories include stock (S), quality (Q), preferred (P), memorable (M) and trophy (T). Length categories for most species have been defined based on a percentage of the world record length for that species. Some species mentioned in this report do not have defined length categories. Length categories for species used in this report are provided in the following table. Measurements are the minimum total length for each category and are reported in inches (in) and centimeters (cm).

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)
Black Bullhead	6	15	9	23	12	30	15	38	18	46
Black Crappie	5	13	8	20	10	25	12	30	15	38
Bluegill	3	8	6	15	8	20	10	25	12	30
Brown Trout	8	20	12	30	16	40	20	50	18	46
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Lake Trout	12	30	20	50	26	65	31	80	39	100
Largemouth Bass	8	20	12	30	15	38	20	51	25	63
Muskellunge	20	51	30	76	38	97	42	107	50	127
Northern Pike	14	35	21	53	28	71	34	86	44	112
Pumpkinseed	3	8	6	15	8	20	10	25	12	30
Rainbow Trout	10	25	16	40	20	50	26	65	31	80
Rudd	6	15	10	25	12	30	15	38	19	48
Sauger	8	20	12	30	15	38	20	51	25	63
Smallmouth Bass	7	18	11	28	14	35	17	43	20	51
Walleye	10	25	15	38	20	51	25	63	30	76
White Bass	6	15	9	23	12	30	15	38	18	46
White Crappie	5	13	8	20	10	25	12	30	15	38
Yellow Bullhead	4	10	7	18	9	23	11	28	14	36
Yellow Perch	5	13	8	20	10	25	12	30	15	38

## Catch Summary of Stock Length Fish

Catch per unit effort (CPUE), proportional size distribution (PSD), proportional size distribution of preferred length fish (PSD-P), and relative weight (Wr) for species sampled in survey with 80% confidence interval (CI-80).

\* **Methods/Species that ignore stock length**

Gear	Species	Sample Size (n)	Abundance		Stock Density Indices			Condition		
			CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
boat shocker (day)	Largemouth Bass	26	23.8	15.7	91		4		107	2
	Smallmouth Bass	3	3.0	4.4	33		0		104	4
	Walleye*	160	163.5	84.4	54	12	15	9	91	1
frame net (std 3/4 in)	Black Bullhead	13	2.6	1.3	0		0		84	3
	Black Crappie	354	61.6	15.5	58	4	9	2	101	1
	Bluegill	1	0.2	0.3	0		0		115	
	Channel Catfish	1	0.2	0.3	0		0		89	
	Common Carp	2	0.4	0.4	50		0		87	6
	Walleye	2	0.4	0.4	50		0		89	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 gill net (1/2 inch)*	Black Bullhead							0.5					0.50
	Black Crappie							1.0					1.00
	Walleye							2.5					2.50
AFS std frame net	Black Bullhead					3.3							3.30
	Black Crappie					10.7							10.70
	Bluegill					4.5							4.50
	Common Carp					0.1							0.10
	Gizzard Shad					49.4							49.40
	Walleye					0.2							0.20
	White Sucker					0.9							0.90
AFS std gill net	Black Bullhead					1.3	0.5	0.0	12.8	2.0			3.32
	Black Crappie					3.8	2.0	0.0	0.5	2.0			1.66
	Channel Catfish					2.0	2.8	0.5	4.5	1.8			2.32
	Common Carp					1.0	0.3	0.3	2.5	3.5			1.52
	Gizzard Shad					20.3	3.0	0.3	0.5	2.8			5.38
	Largemouth Bass					0.0	0.0	0.0	0.5	0.8			0.26
	Walleye					0.8	5.5	1.5	3.3	2.3			2.68
	Yellow Perch					0.0	2.5	0.0	0.8	0.0			0.66
boat shocker (day)	Largemouth Bass									79.0	23.8		51.40
	Smallmouth Bass									14.0	3.0		8.50
	Walleye*									81.0	163.5		122.25
boat shocker (night)	Largemouth Bass		16.9	40.8	85.0	40.8	20.8	13.0	15.5				33.26
	Smallmouth Bass		1.2	9.6	5.0	2.4	7.5	0.0	12.5				5.46
	Walleye*		158.6	32.4	105.0	66.0	113.3	55.3	30.0				80.09
frame net (std 3/4 in)	Black Bullhead	65.9	56.5	82.9	31.2		11.9	10.6	11.3	38.4	2.6		34.59
	Black Crappie	87.5	39.3	48.0	48.9		29.1	62.5	89.3	228.1	61.6		77.14
	Bluegill	0.5	2.0	2.6	5.0		0.8	0.3	0.8	1.5	0.2		1.52
	Channel Catfish	0.0	0.0	0.4	0.6		0.2	1.0	0.3	0.1	0.2		0.31
	Common Carp	0.1	0.0	1.0	0.1		0.0	0.8	0.0	0.5	0.4		0.32
	Gizzard Shad	0.0	0.0	0.0	2.3		9.3	0.0	0.0	0.0	0.0		1.29
	Golden Shiner	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.00
	Largemouth Bass	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.00
	Northern Pike	0.0	0.0	0.1	0.0		0.1	0.0	0.0	0.0	0.0		0.02

		CPUE										
Gear	Species	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg
frame net (std 3/4 in)	Smallmouth Bass	0.0	0.0	0.0	0.0		0.0	0.1	0.0	1.5	0.0	0.18
	Walleye	0.0	0.8	0.3	0.3		4.6	2.1	2.5	1.4	0.4	1.38
	White Sucker	0.0	0.1	0.4	0.0		0.0	0.0	0.0	0.0	0.0	0.06
	Yellow Perch	3.0	0.3	0.5	2.0		0.5	0.4	0.0	0.6	0.0	0.81
rod and reel	Black Crappie					225.0						225.0 0
std exp gill net	Black Bullhead	3.1	0.5	23.0	13.5							10.03
	Black Crappie	2.9	17.0	3.5	5.0							7.10
	Channel Catfish	0.4	1.5	0.5	6.5							2.23
	Common Carp	0.1	0.5	0.5	0.0							0.28
	Gizzard Shad	0.0	1.5	32.0	25.5							14.75
	Golden Shiner	0.0	0.0	0.0	0.0							0.00
	Largemouth Bass	0.3	0.0	1.0	1.5							0.70
	Northern Pike	0.9	0.5	2.5	0.5							1.10
	Smallmouth Bass	0.0	0.0	0.5	0.0							0.13
	Walleye	8.4	17.0	7.5	11.5							11.10
	White Sucker	0.0	0.0	0.0	0.0							0.00
	Yellow Perch	1.1	4.5	3.0	0.0							2.15

## 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					6							
		PSD-P					0							
		Wr					88							
	Black Crappie	PSD					93							
		PSD-P					27							
		Wr					96							
	Bluegill	PSD					38							
		PSD-P					0							
		Wr					114							
	Common Carp	PSD					100							
		PSD-P					0							
		Wr					87							
	Gizzard Shad	PSD					2							
		Wr					86							
	Walleye	PSD					100							
PSD-P						50								
Wr						78								
AFS std gill net	Black Bullhead	PSD					0	50	0	0	0			
		PSD-P					0	0	0	0	0			
		Wr					74	120			88	79		
	Black Crappie	PSD					7	88			50	88		
		PSD-P					0	25			50	0		
		Wr					101	109			104	110		
	Channel Catfish	PSD					38	0	50	33	71			
		PSD-P					0	0	0	0	0			
		Wr					83	94	93	83	81			
	Common Carp	PSD					25	100	100	30	0			
		PSD-P					0	0	0	0	0			
		Wr					82	76	76	83	82			
	Gizzard Shad	PSD					6	92	100	100	82			
		Wr					87	104	79	98	98			
	Largemouth Bass	PSD									0	0		
		PSD-P									0	0		



Gear	Species	Index	Year											
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022		
AFS std gill net	Largemouth Bass	Wr								121	104			
		PSD					100	18	67	23	33			
	Walleye	PSD-P					33	18	0	0	11			
		Wr					79	97	89	86	88			
boat shocker (day)	Largemouth Bass	PSD										22	91	
		PSD-P										4	4	
		Wr										109	107	
	Smallmouth Bass	PSD										0	33	
		PSD-P										0	0	
		Wr										96	104	
	Walleye	PSD										67	54	
		PSD-P										8	15	
		Wr										96	91	
boat shocker (night)	Largemouth Bass	PSD		36	32	11	21	100	13	0				
		PSD-P		7	3	5	12	20	13	0				
		Wr		115	105	101	108	117	106	115				
	Smallmouth Bass	PSD		100	13	0	0	17	0	4				
		PSD-P		0	0	0	0	17	0	0				
		Wr		109	92	96	101	109		108				
	Walleye	PSD		32	100	74	67	38	36	19				
		PSD-P		3	26	22	21	12	10	8				
		Wr		100	98	90	92	95	96	93				
	frame net (std 3/4 in)	Black Bullhead	PSD	1	2	2	18		13	75	13	2	0	
PSD-P			0	0	0	0		0	0	0	0	0	0	
Wr			82	70	76	78		80	92	85	67	84		
Black Crappie		PSD	59	52	80	91		29	67	29	46	58		
		PSD-P	8	35	8	25		2	10	3	13	9		
		Wr	103	90	91	97		92	98	98	98	101		
Bluegill		PSD	25	6	67	36		13	33	20	58	0		
		PSD-P	0	0	0	0		0	0	0	0	0		
		Wr	107	99	106	99		103	110	112	106	115		
Channel Catfish		PSD		0	33	33		50	20	0	0	0		
		PSD-P		0	0	0		0	0	0	0	0		
		Wr			100	105		104	91	94	88	89		
Common Carp		PSD	100	0	75	0		0	100	0	0	50		
		PSD-P	0	0	13	0		0	0	0	0	0		

Gear	Species	Index	Year									
			2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
frame net (std 3/4 in)	Common Carp	Wr	92		81	81			81			87
		PSD			0	0		0				
		Wr						75				
	Smallmouth Bass	PSD							100		0	
		PSD-P							0		0	
		Wr							113		100	
	Walleye	PSD	0	100	50	100		89	57	27	45	50
		PSD-P	0	17	50	33		43	29	13	27	0
		Wr		85	107	94		86	93	87	91	89
rod and reel	Black Crappie	PSD						96				
		PSD-P						22				
std exp gill net	Black Bullhead	PSD	0	0	11	0						
		PSD-P	0	0	0	0						
		Wr	81	80	88	81						
	Black Crappie	PSD	0	3	86	60						
		PSD-P	0	3	29	20						
		Wr	100	92	92	96						
	Channel Catfish	PSD	100	100	100	62						
		PSD-P	0	33	0	8						
		Wr	104	102	90	85						
	Common Carp	PSD	100	100	100							
		PSD-P	0	100	0							
		Wr	85		80							
	Gizzard Shad	PSD	0	100	13	8						
		Wr		86	90							
	Largemouth Bass	PSD	75		0	0						
		PSD-P	75		0	0						
		Wr	89		96	97						
	Smallmouth Bass	PSD			0							
		PSD-P			0							
		Wr			75							
	Walleye	PSD	69	59	87	87						
		PSD-P	0	0	20	43						
		Wr	94	84	89	90						

## 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+
2015	784		131 (26)	212 (171)	216 (527)	252 (55)	252 (5)				
2014	544			180 (358)	255 (23)	261 (117)	274 (46)				
2013	1400		150 (572)	222 (331)	238 (332)	249 (165)					

Species: Largemouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	172	183 (8)	240 (146)	332 (8)	379 (4)	385 (2)	455 (2)	426 (2)			
2015	100	200 (78)	301 (12)	336 (10)							

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2020	13		299 (10)	390 (1)	438 (2)						
2019	5	202 (1)	362 (1)	405 (2)			502 (1)				
2018	21	276 (6)	345 (12)			565 (3)					
2016	42		342 (6)	500 (25)	511 (5)	565 (4)			596 (2)		
2015	30	276 (2)	409 (18)		535 (2)		496 (2)	531 (6)			
2014	80	217 (12)	324 (4)	379 (38)	414 (2)		439 (24)				
2013	144		299 (24)	348 (7)	375 (8)	411 (105)					

## 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).

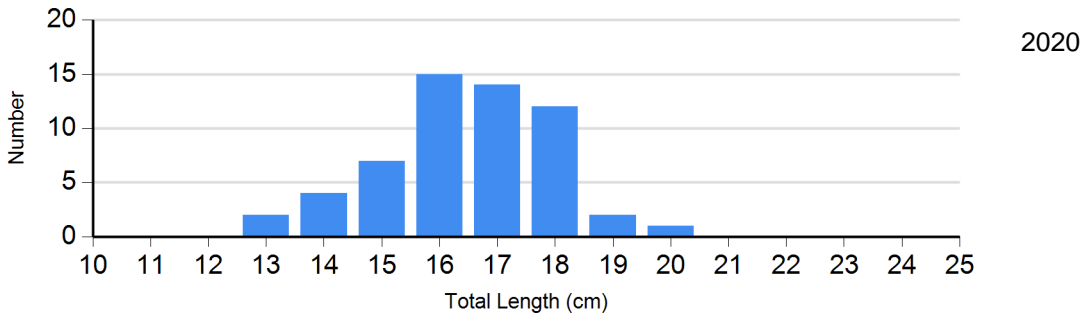
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2018	1	93	1	147	0		0	
	2019	0		0		0		0	
	2020	51	88 (1.3)	0		0		0	
	2021	8	79 (3.8)	0		0		0	
Black Crappie Frame Net	2018	208	93 (0.4)	76	84 (0.7)	7	84 (1.3)	0	
	2019	206	97 (0.9)	358	97 (0.4)	61	102 (0.6)	0	
	2020	382	107 (0.6)	136	89 (0.5)	18	83 (1.0)	0	
	2021	980	100 (0.4)	609	97 (0.6)	231	92 (0.9)	5	86
	2022	129	100 (0.7)	150	101 (0.9)	29	99 (3.4)	0	
Bluegill Frame Net	2018	7	107 (6.7)	1	80	0		0	
	2019	2	111 (5.0)	1	108	0		0	
	2020	4	112 (6.9)	1	114	0		0	
	2021	5	111 (4.7)	7	102 (5.1)	0		0	
	2022	1	115	0		0		0	
Channel Catfish Gill Net	2018	11	94 (2.1)	0		0		0	
	2019	1	93	1	93	0		0	
	2020	12	85 (1.5)	6	80 (1.7)	0		0	
	2021	2	87 (2.5)	5	79 (2.6)	0		0	
Common Carp Gill Net	2018	0		1	76	0		0	
	2019	0		1	76	0		0	
	2020	7	84 (1.7)	3	80 (1.0)	0		0	
	2021	14	82 (1.1)	0		0		0	
Largemouth Bass Electro Fishing	2018	0		16	118 (1.5)	4	116 (2.7)	0	
	2019	13	105 (1.7)	0		2	112 (1.4)	0	

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Largemouth Bass Electro Fishing	2020	31	115 (1.6)	0		0		0	
	2021	62	109 (0.7)	14	108 (1.3)	3	115 (1.6)	0	
	2022	2	109 (10.1)	20	107 (1.6)	1	105	0	
Smallmouth Bass Electro Fishing	2018	5	110 (0.6)	0		1	106	0	
	2020	24	108 (1.5)	1	94	0		0	
	2021	14	96 (1.5)	0		0		0	
	2022	2	106 (3.4)	1	99	0		0	
Walleye Gill Net	2018	18	98 (2.2)	0		4	96 (3.0)	0	
	2019	2	89 (3.8)	4	89 (1.2)	0		0	
	2020	10	88 (1.1)	3	81 (2.3)	0		0	
	2021	6	88 (2.4)	2	87 (2.0)	1	92	0	

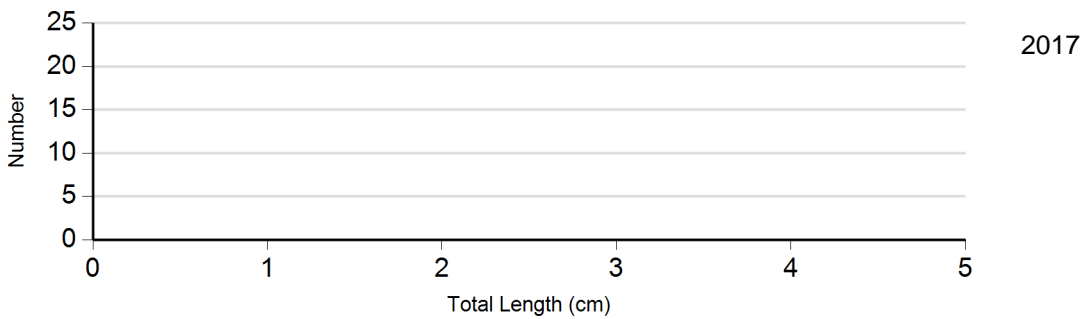
# Length Frequency Distribution

Length frequency histogram of species sampled by year.

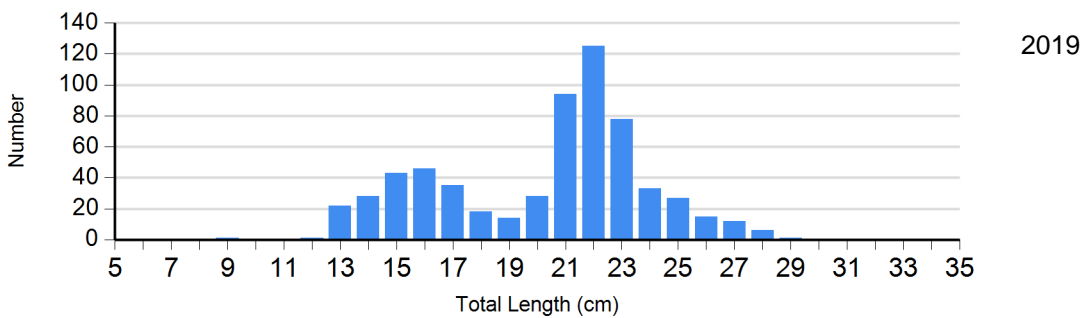
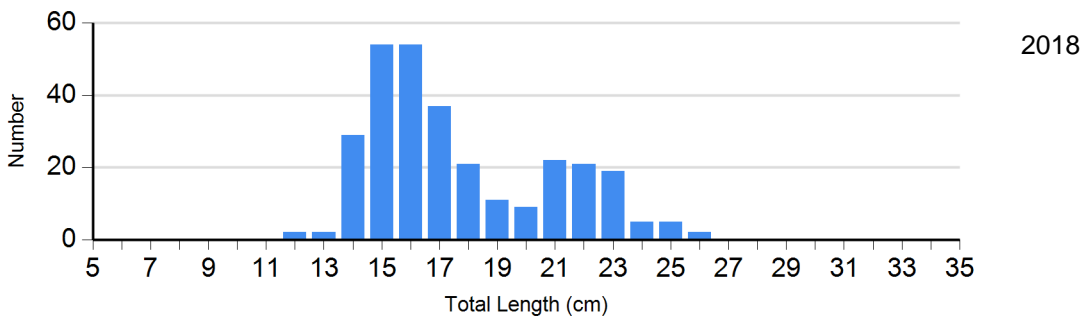
Species: Black Bullhead  
Gear: AFS std gill net

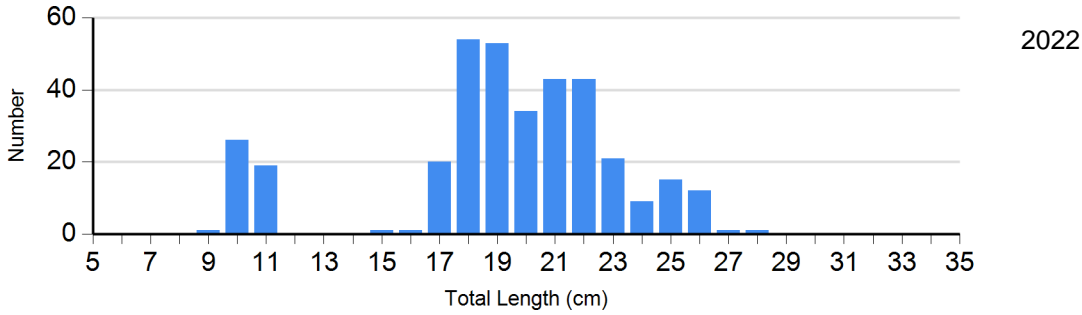
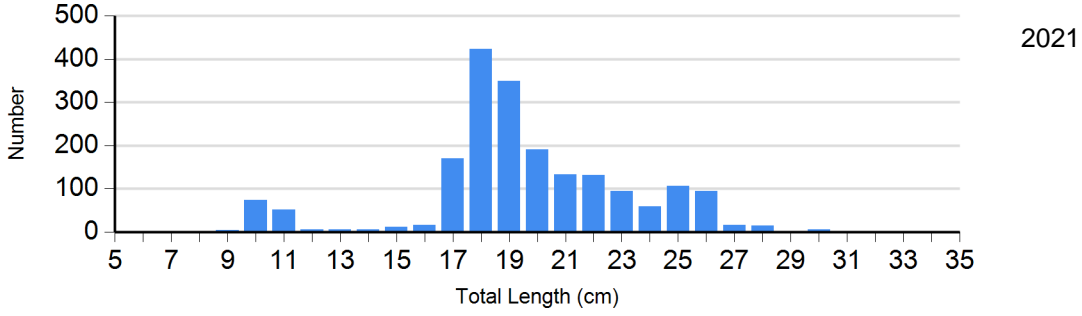
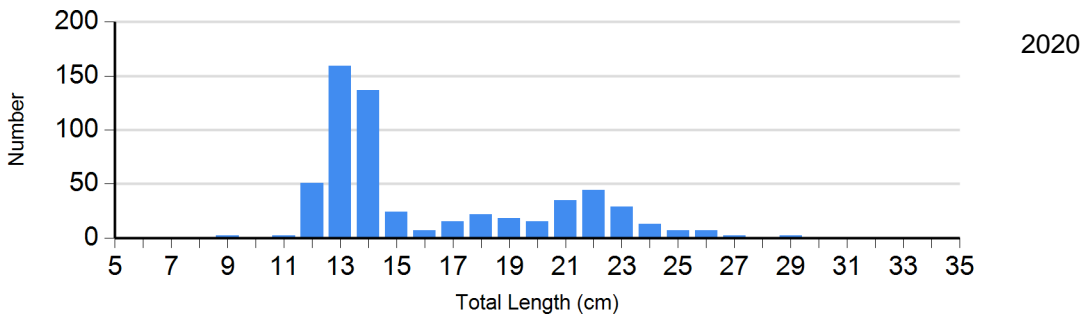


Species: Black Crappie  
Gear: AFS std frame net

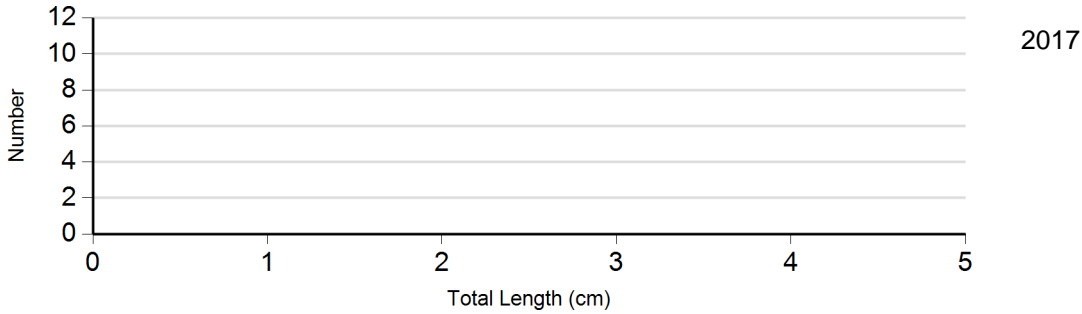


Species: Black Crappie  
Gear: frame net (std 3/4 in)

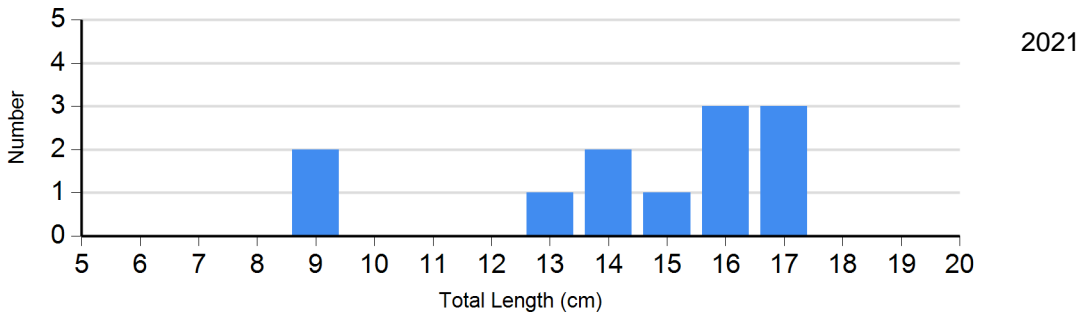




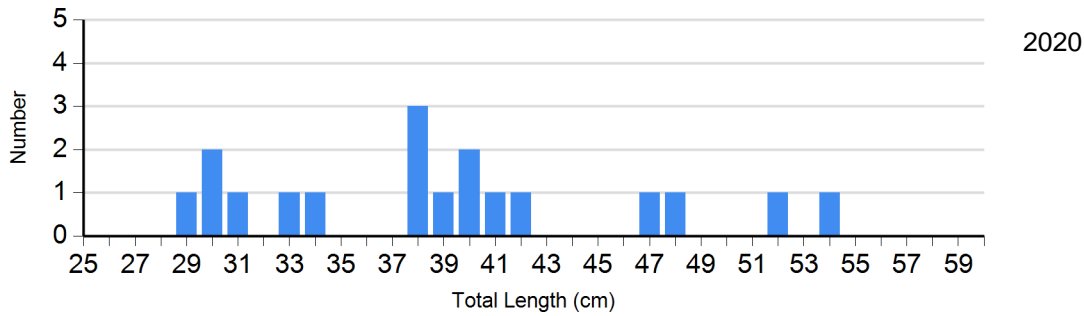
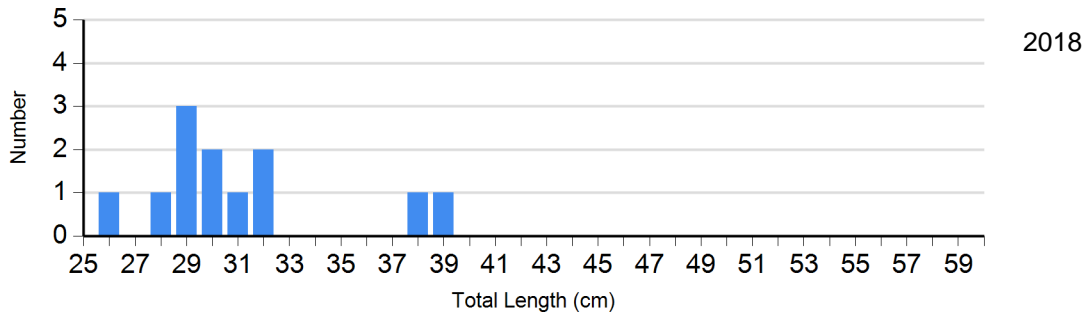
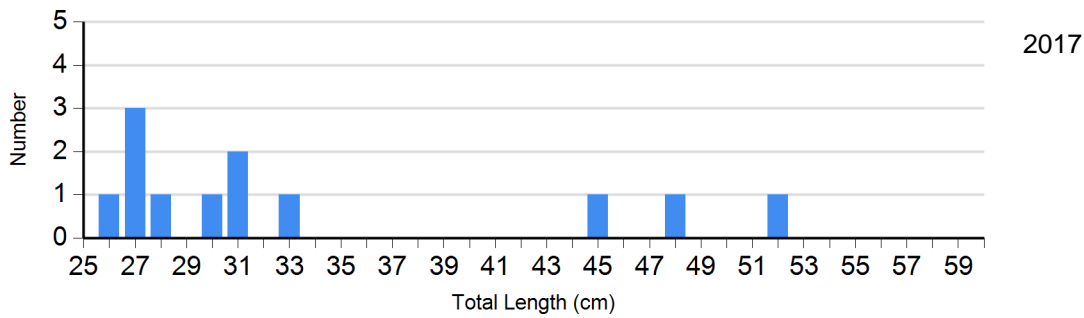
Species: Bluegill  
 Gear: AFS std frame net



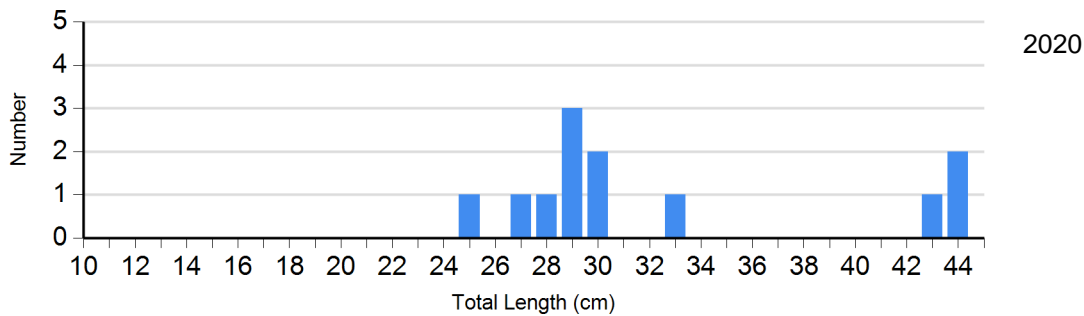
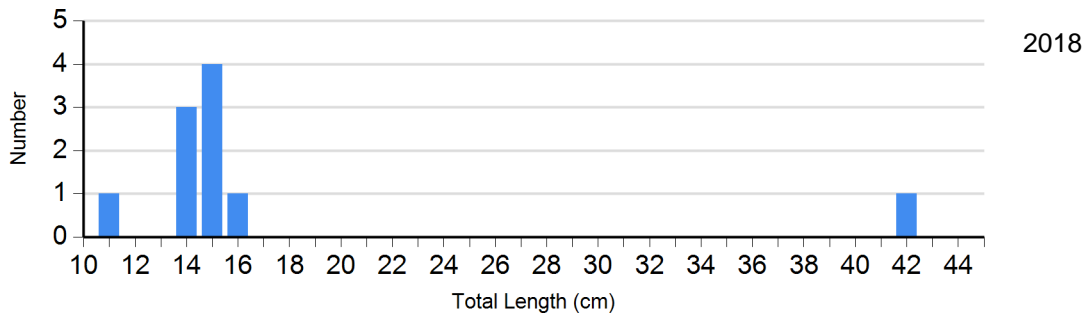
Species: Bluegill  
 Gear: frame net (std 3/4 in)



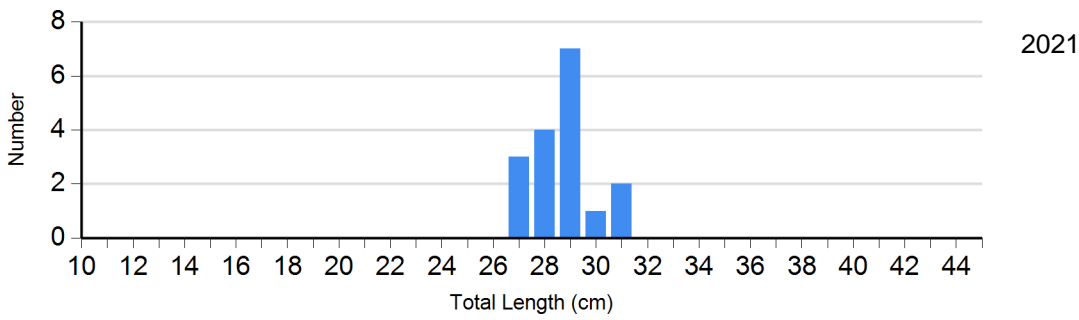
Species: Channel Catfish  
 Gear: AFS std gill net



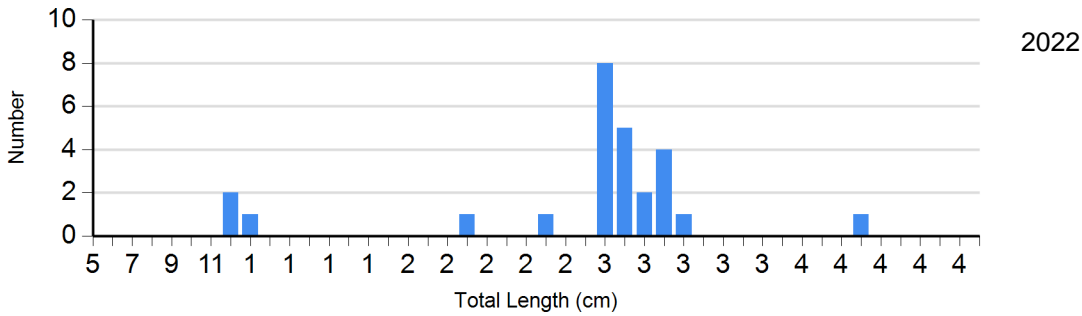
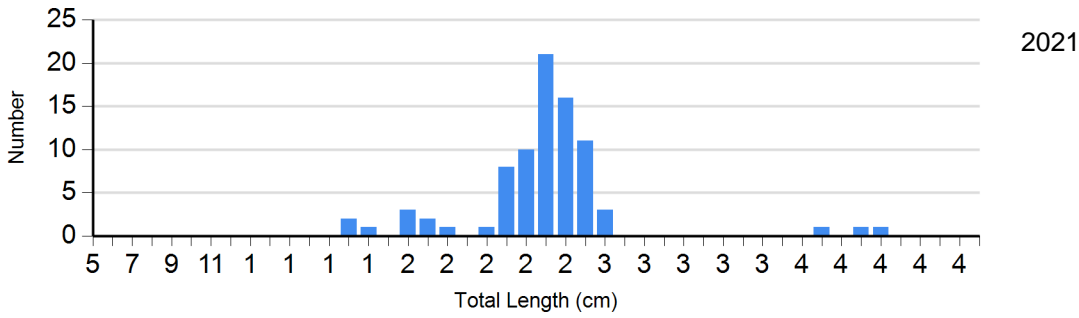
Species: Common Carp  
 Gear: AFS std gill net



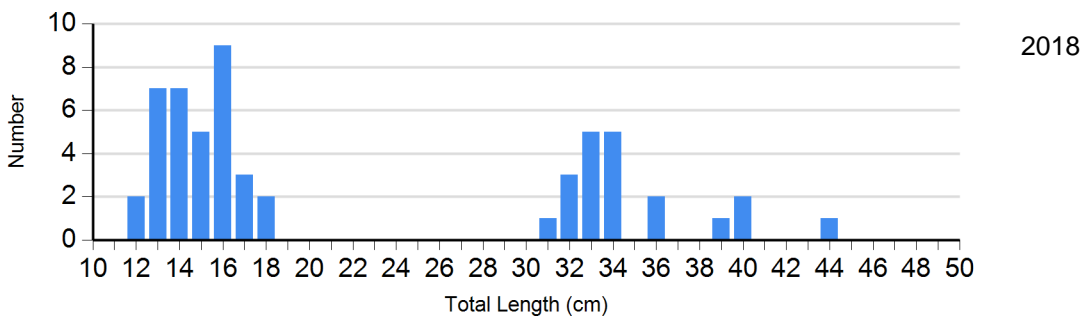
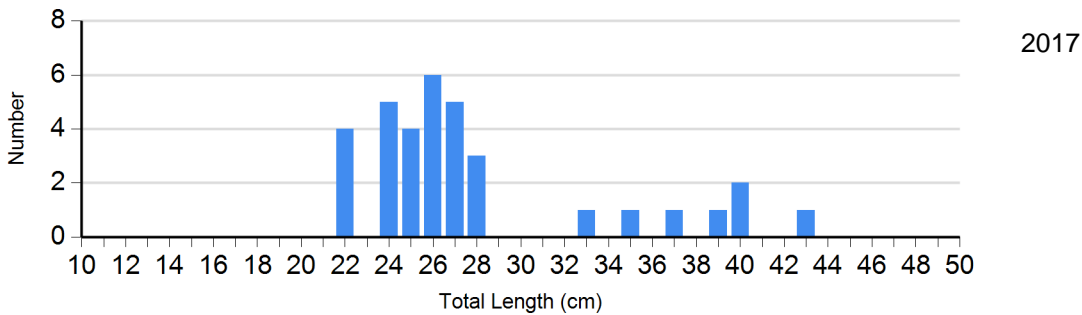


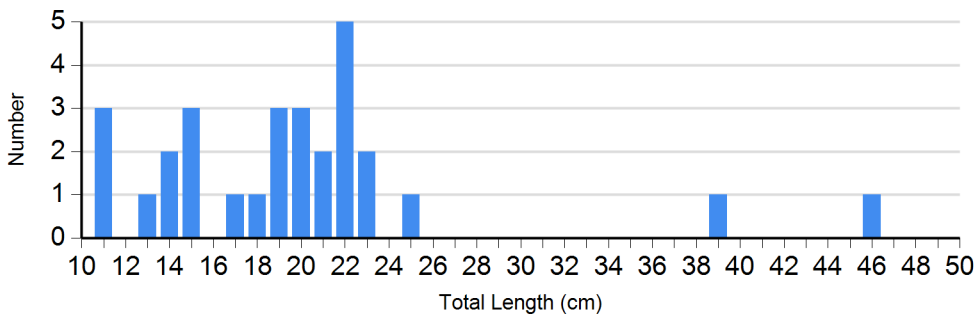


Species: Largemouth Bass  
Gear: boat shocker (day)

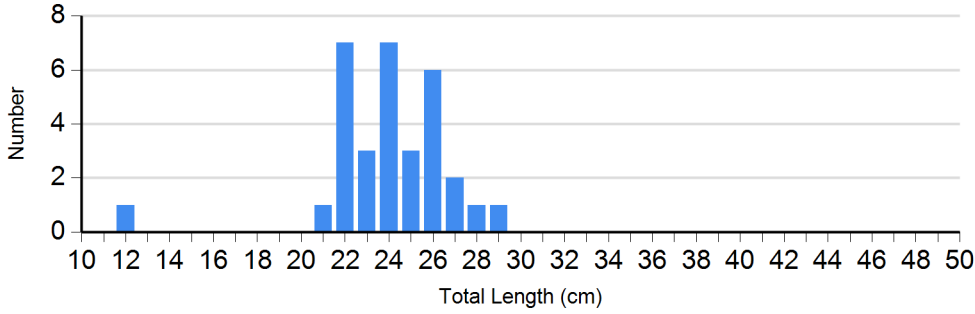


Species: Largemouth Bass  
Gear: boat shocker (night)



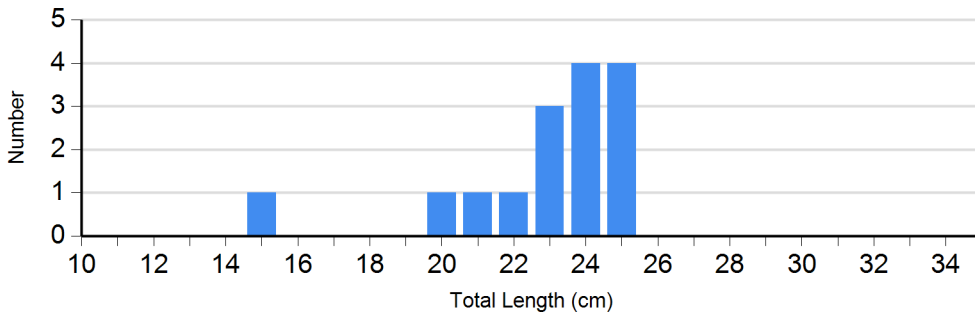


2019



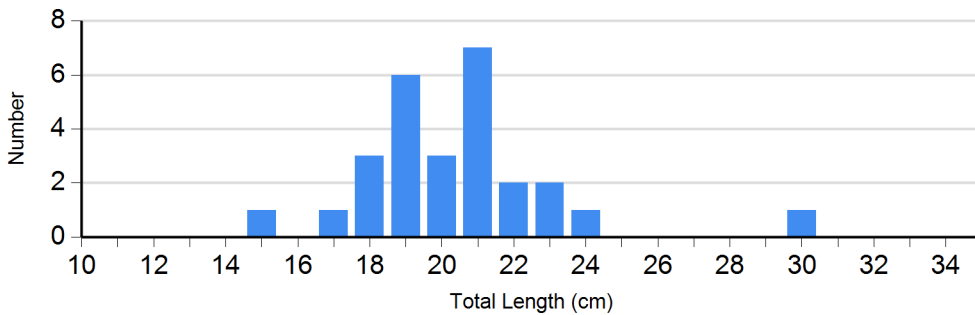
2020

Species: Smallmouth Bass  
Gear: boat shocker (day)



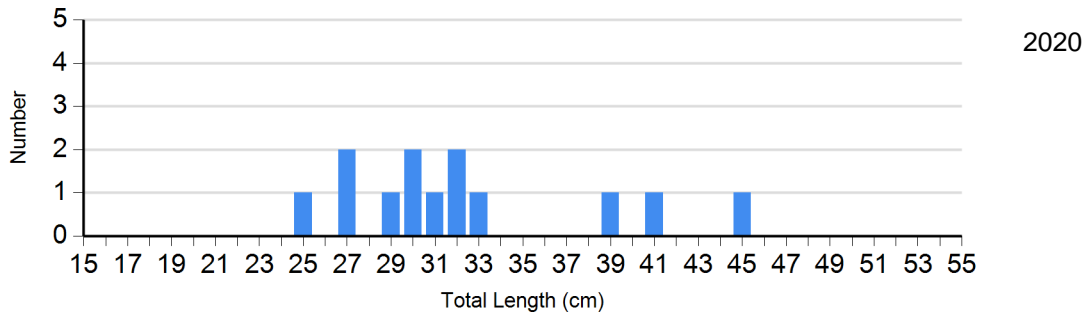
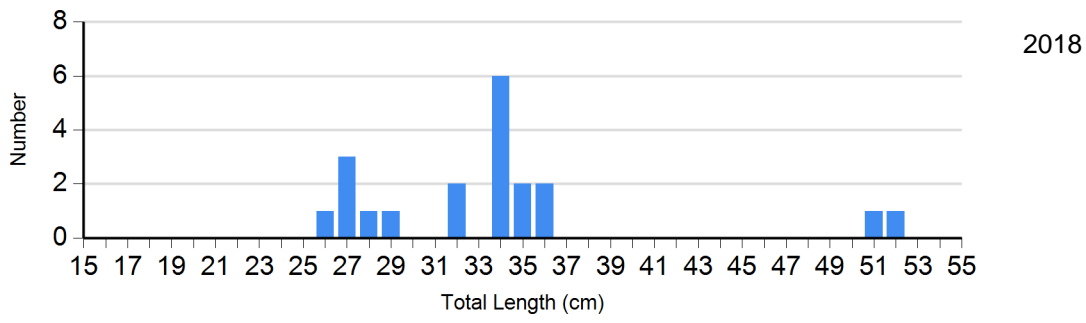
2021

Species: Smallmouth Bass  
Gear: boat shocker (night)



2020

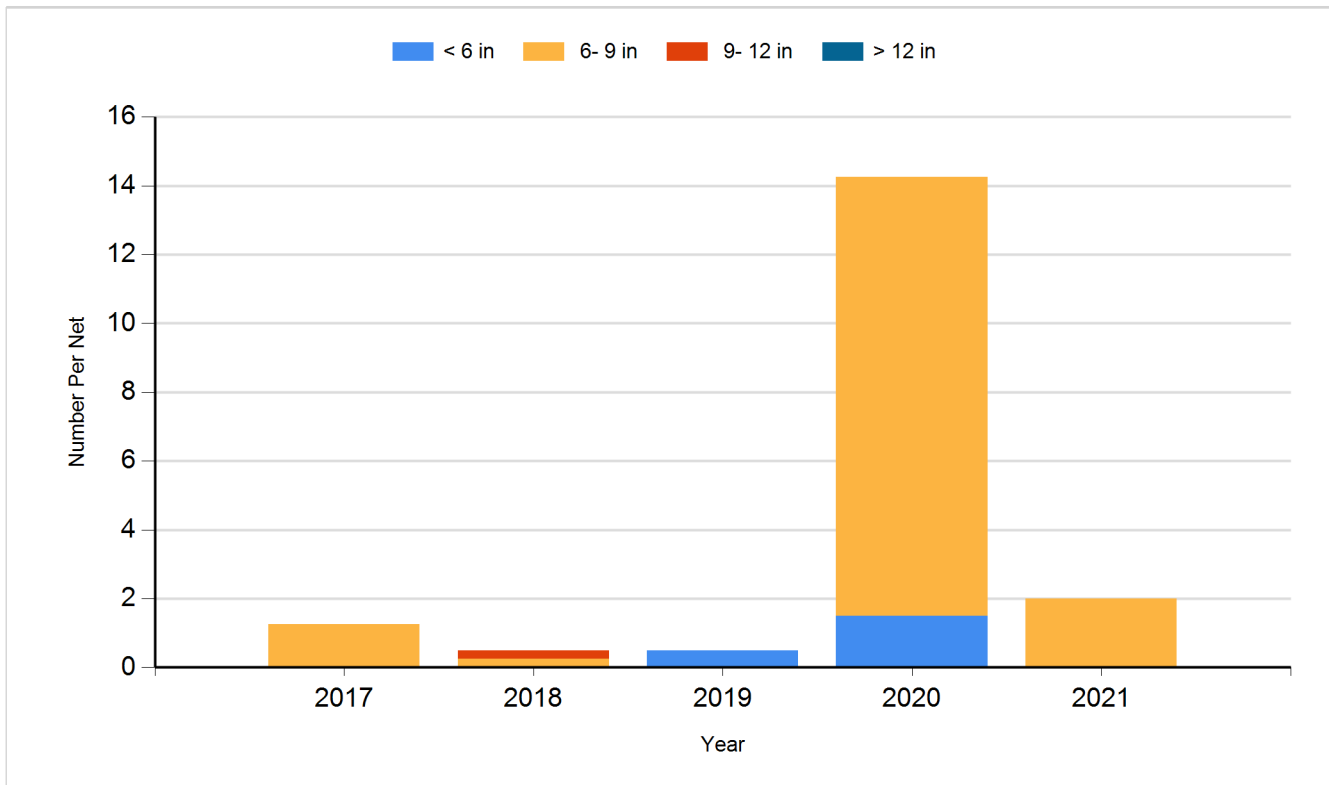
Species: Walleye  
Gear: AFS std gill net



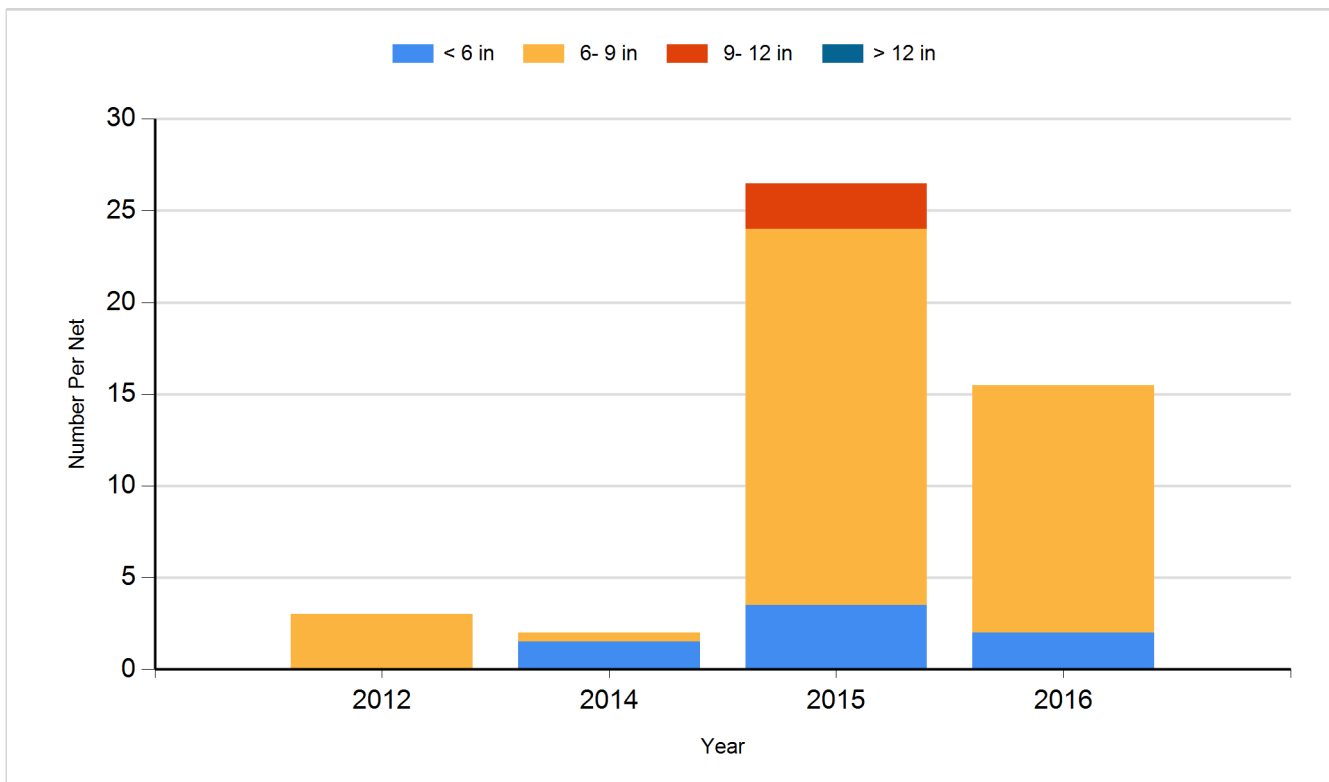
## Historic Fish Sizes and Relative Abundance

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

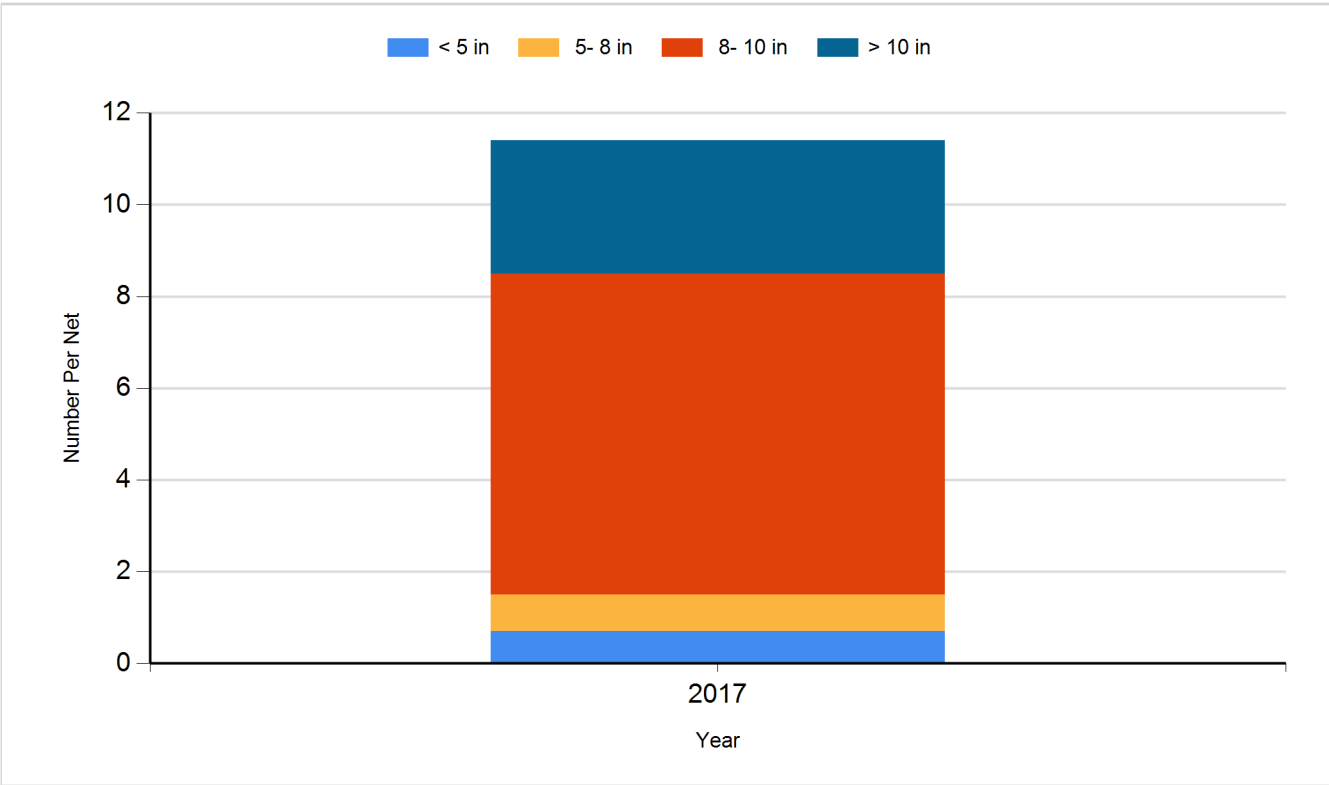
Species: Black Bullhead  
Gear: AFS std gill net



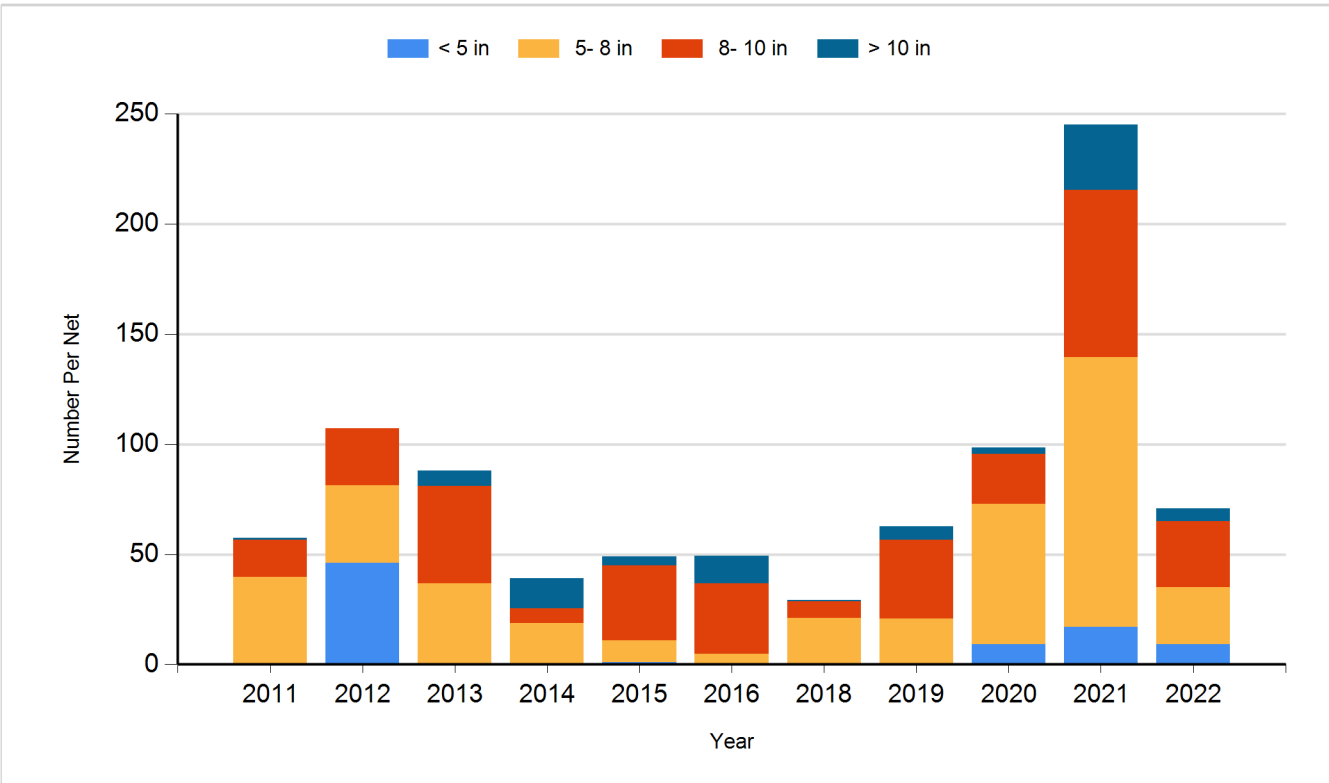
Species: Black Bullhead  
Gear: std exp gill net



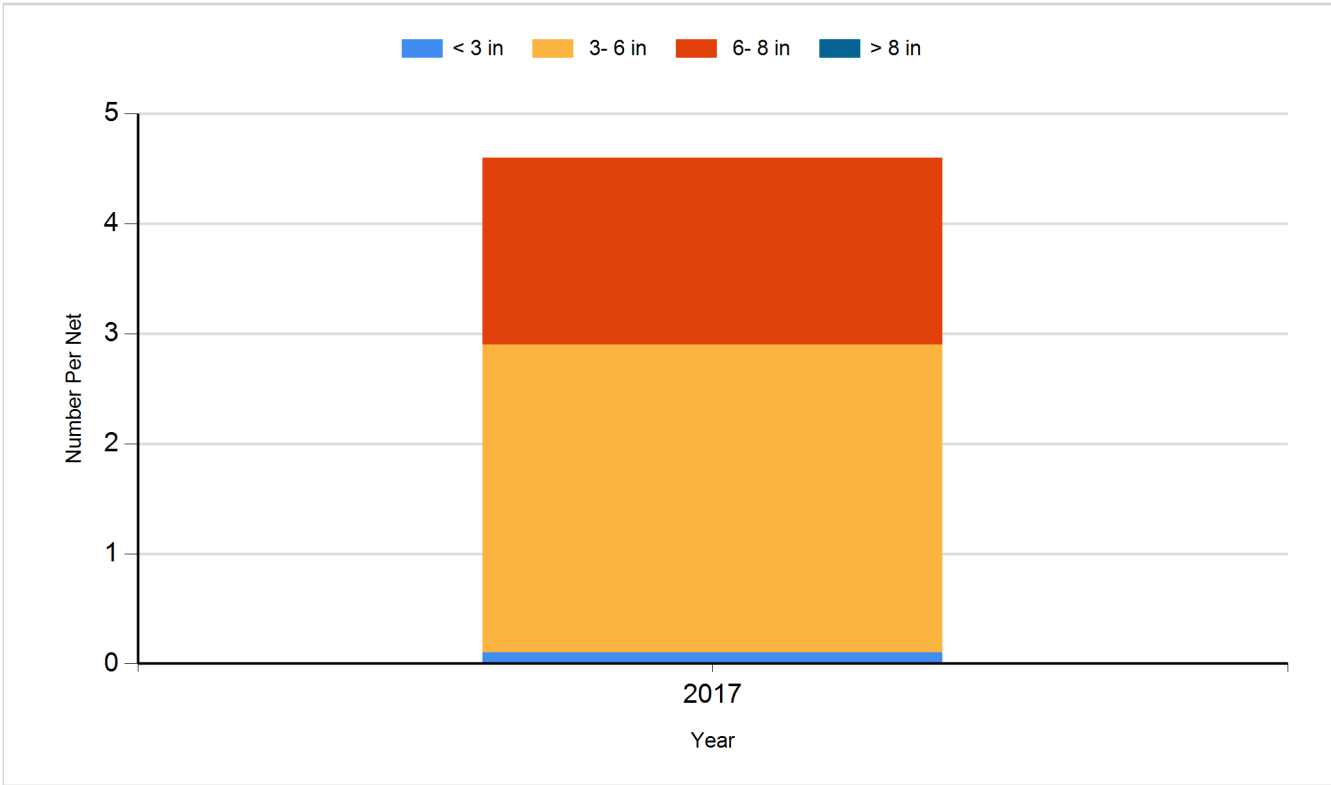
Species: Black Crappie  
Gear: AFS std frame net



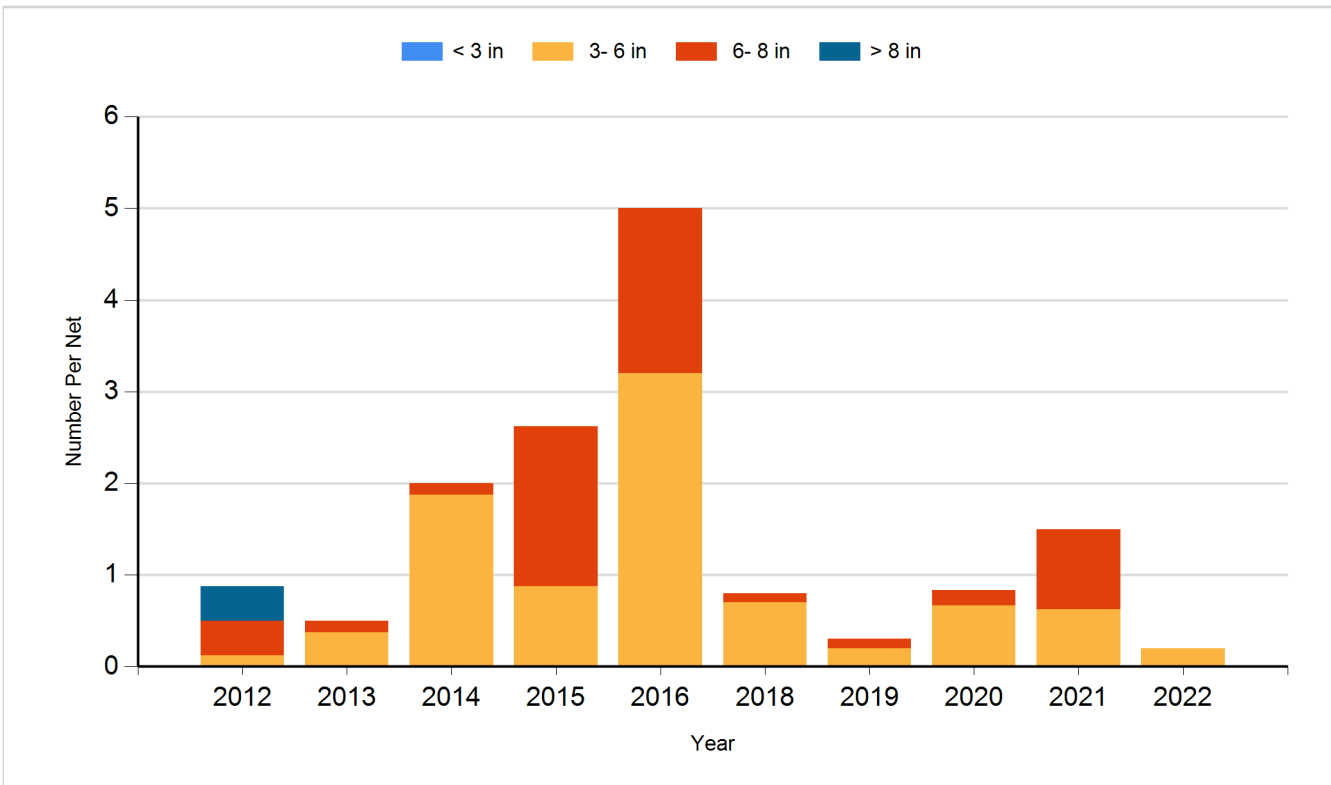
Species: Black Crappie  
Gear: frame net (std 3/4 in)



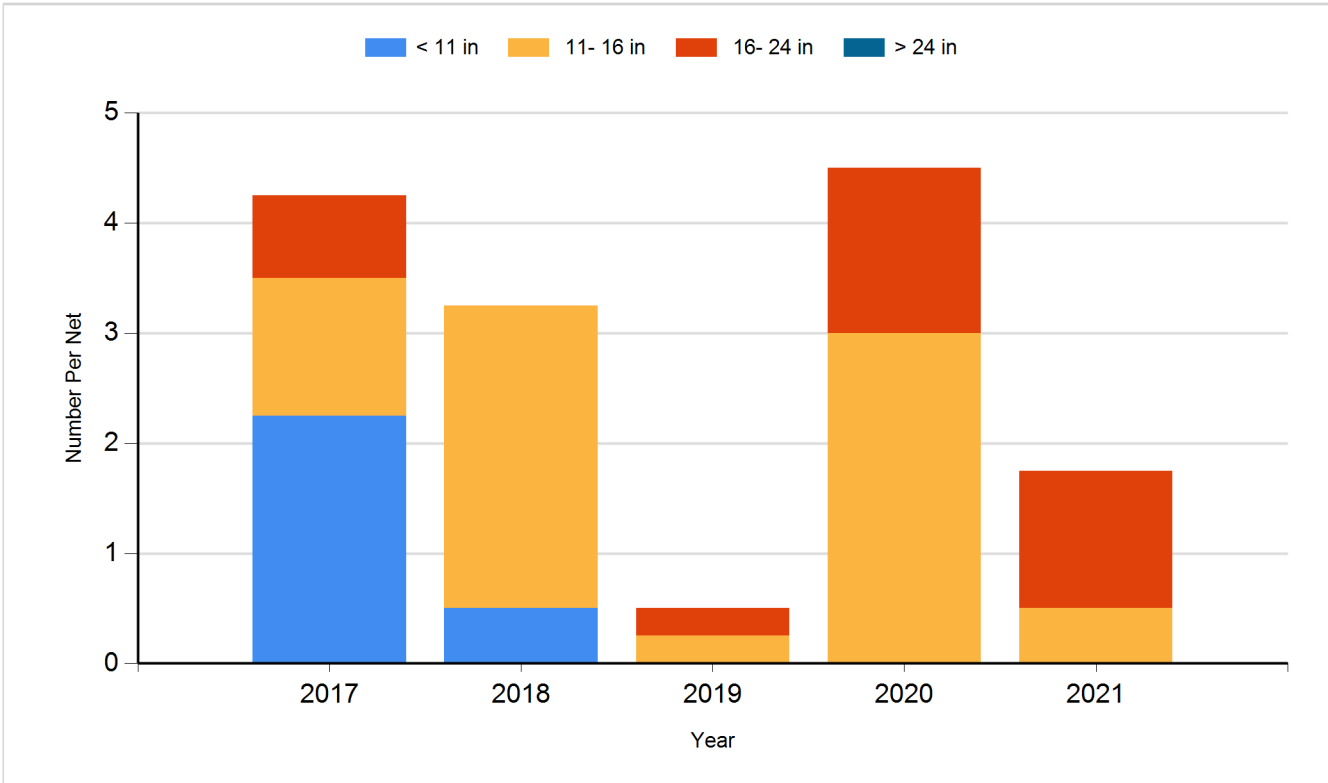
Species: Bluegill  
Gear: AFS std frame net



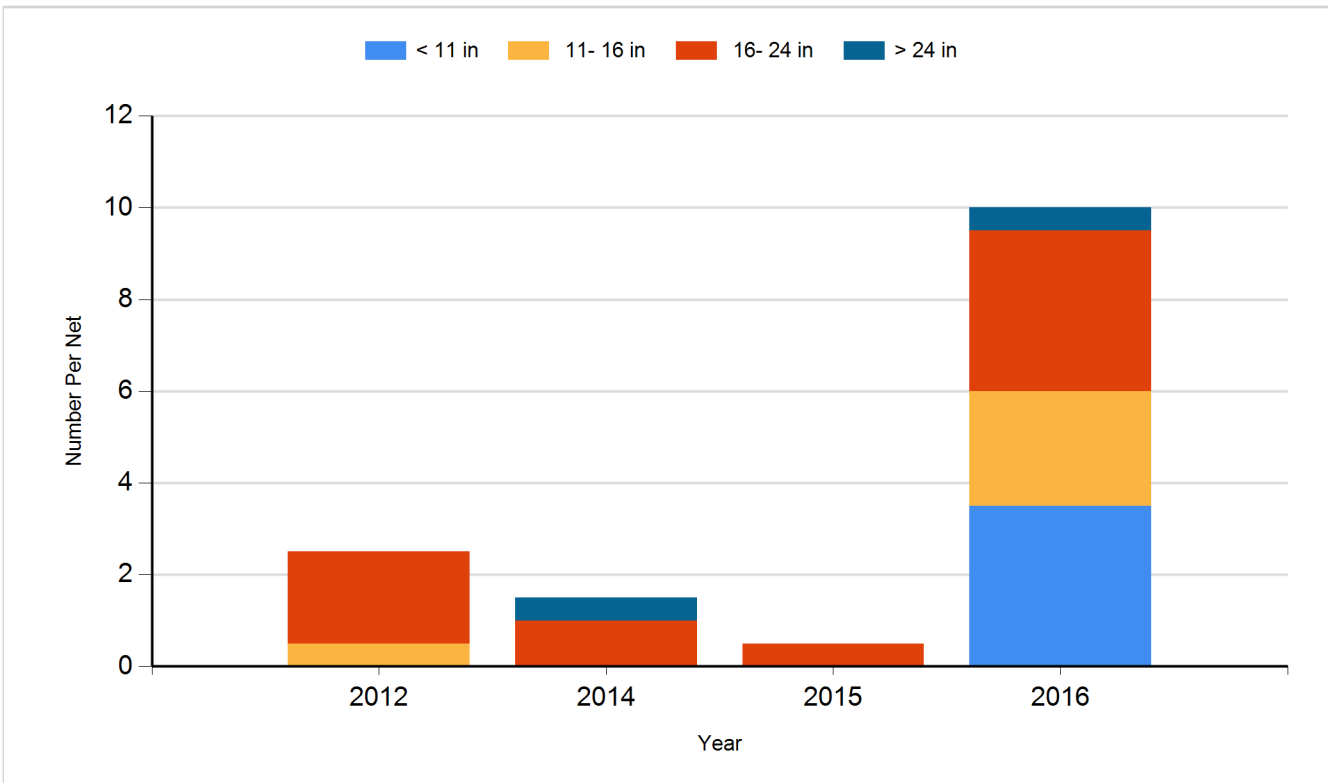
Species: Bluegill  
Gear: frame net (std 3/4 in)



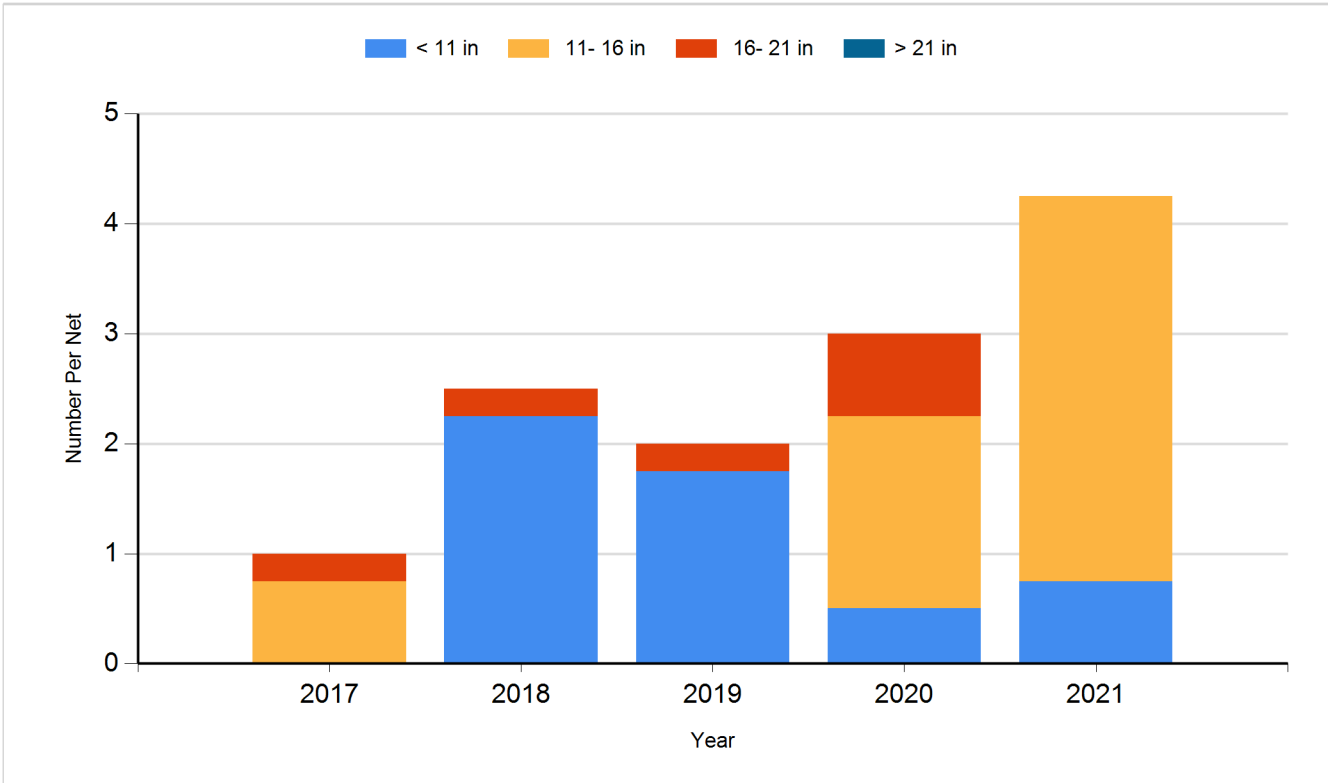
Species: Channel Catfish  
Gear: AFS std gill net



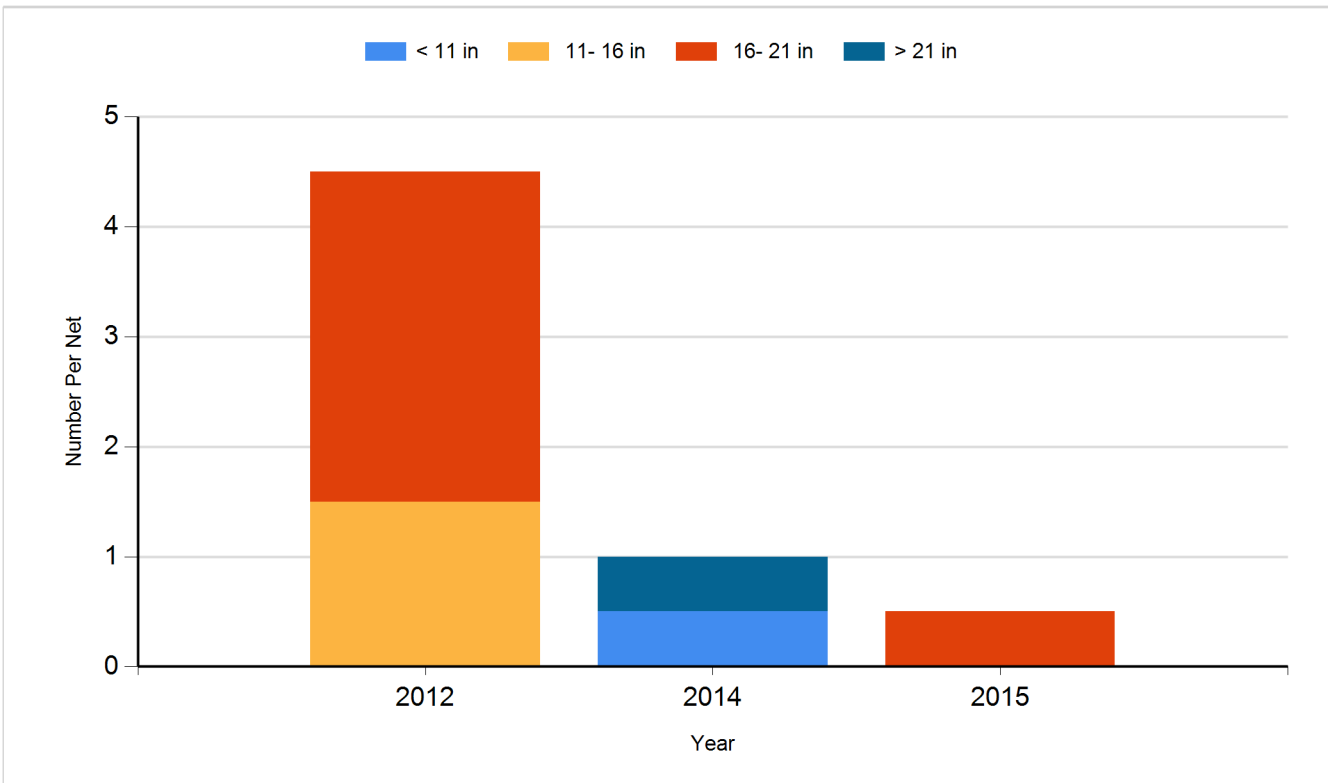
Species: Channel Catfish  
Gear: std exp gill net



Species: Common Carp  
Gear: AFS std gill net

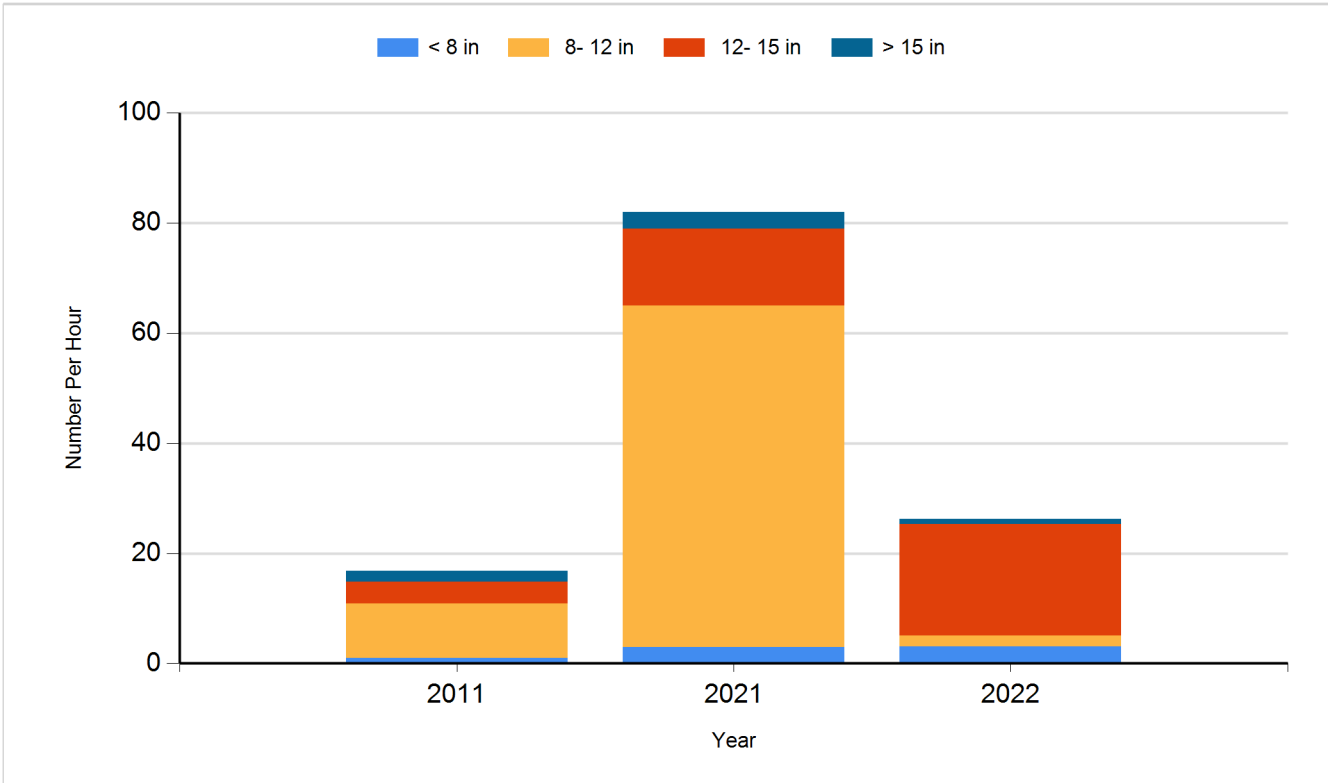


Species: Common Carp  
Gear: std exp gill net

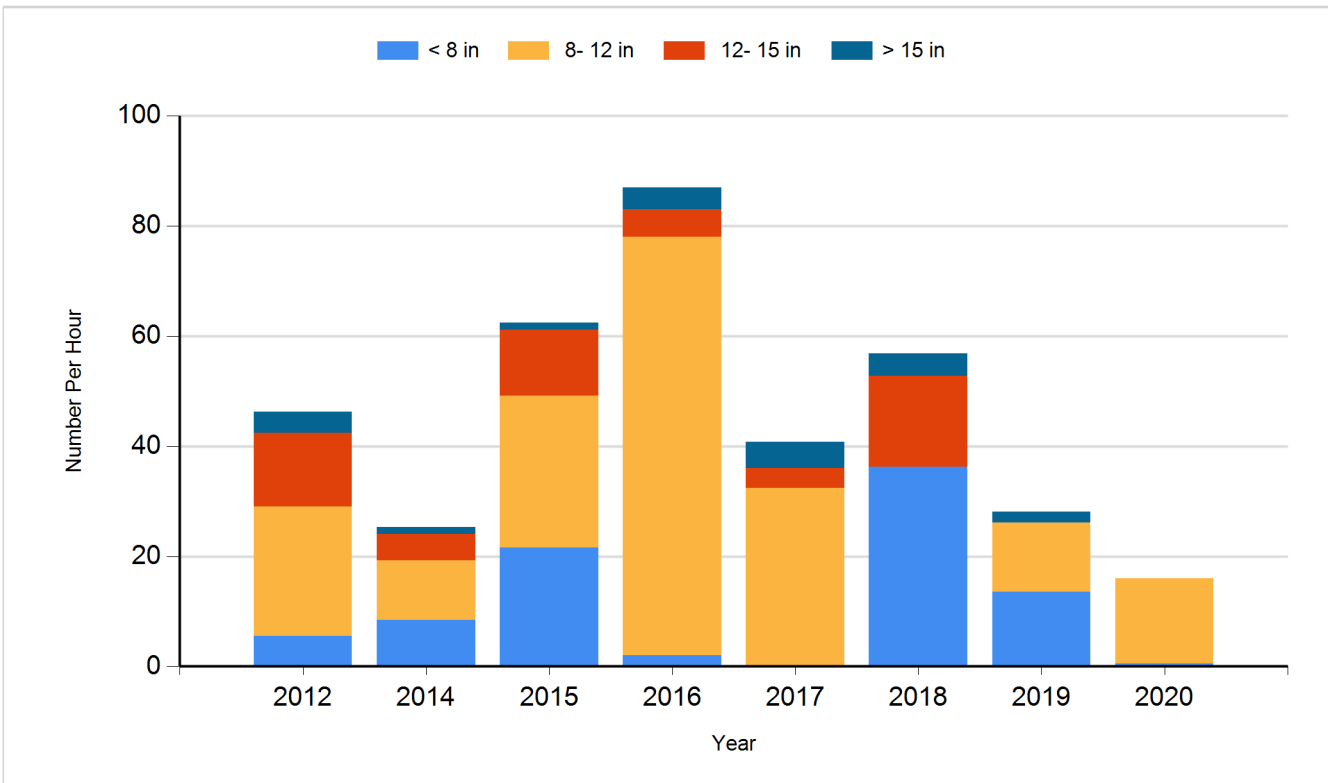




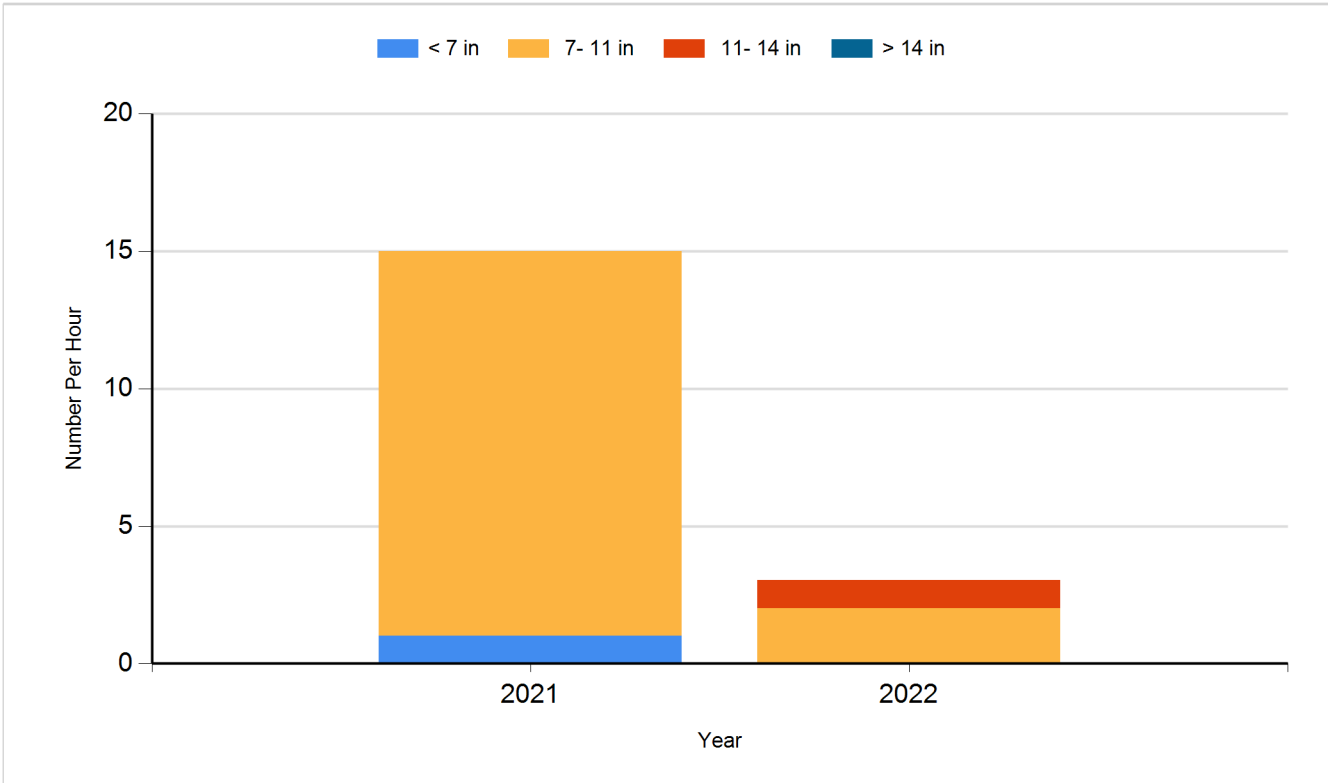
Species: Largemouth Bass  
Gear: boat shocker (day)



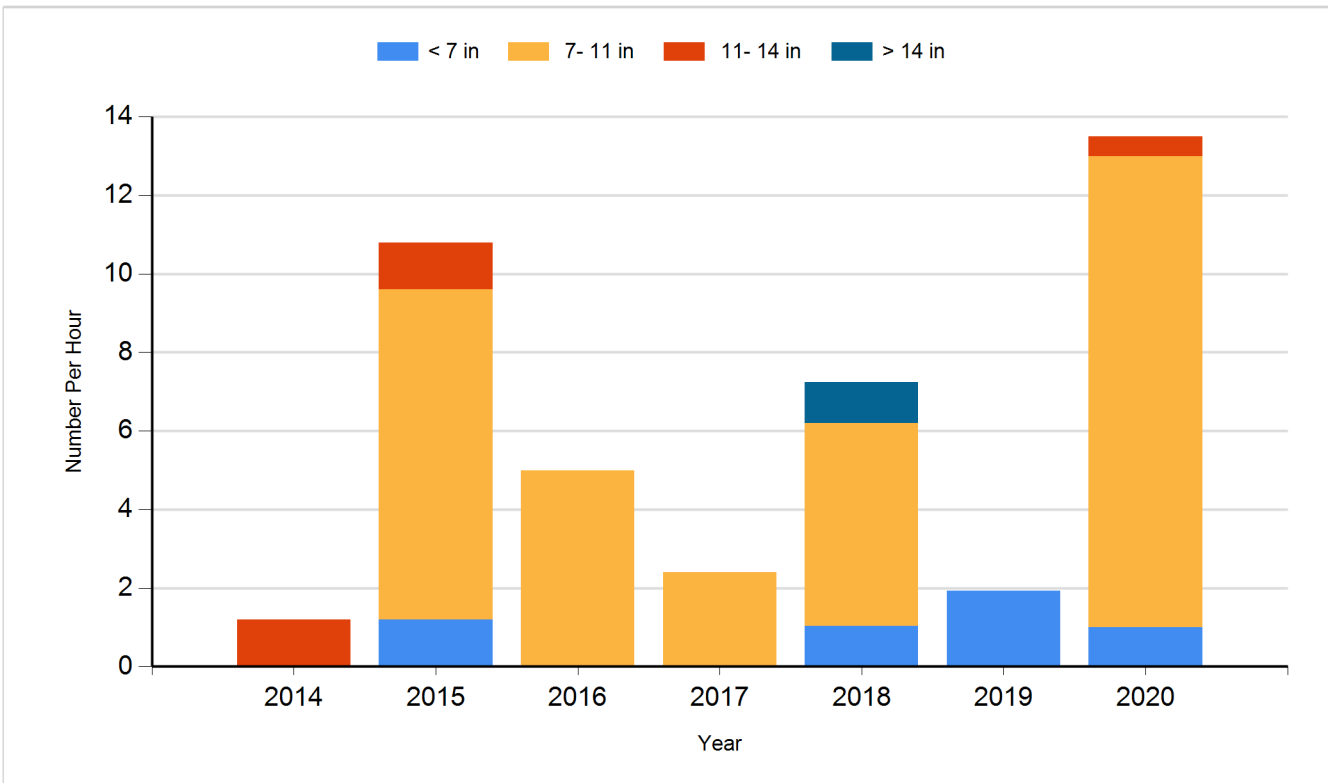
Species: Largemouth Bass  
Gear: boat shocker (night)



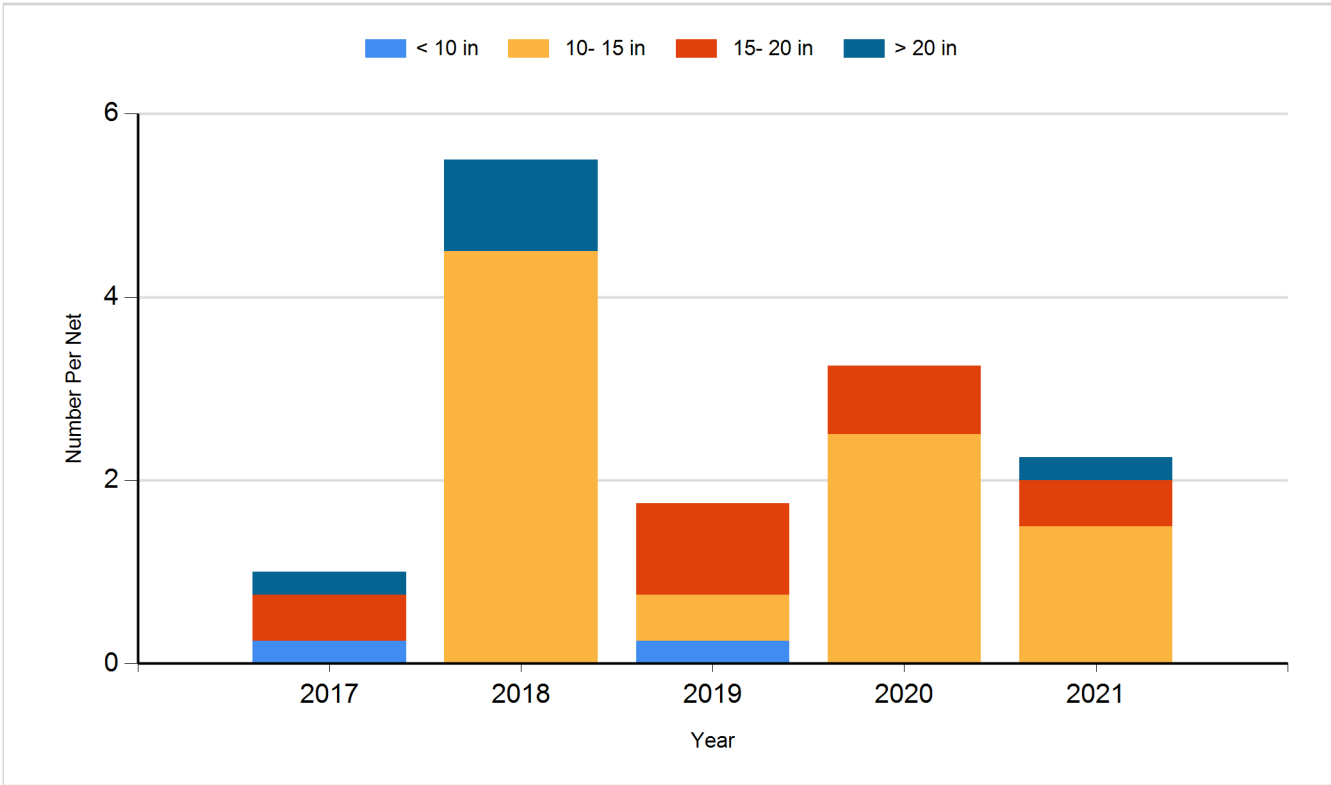
Species: Smallmouth Bass  
Gear: boat shocker (day)



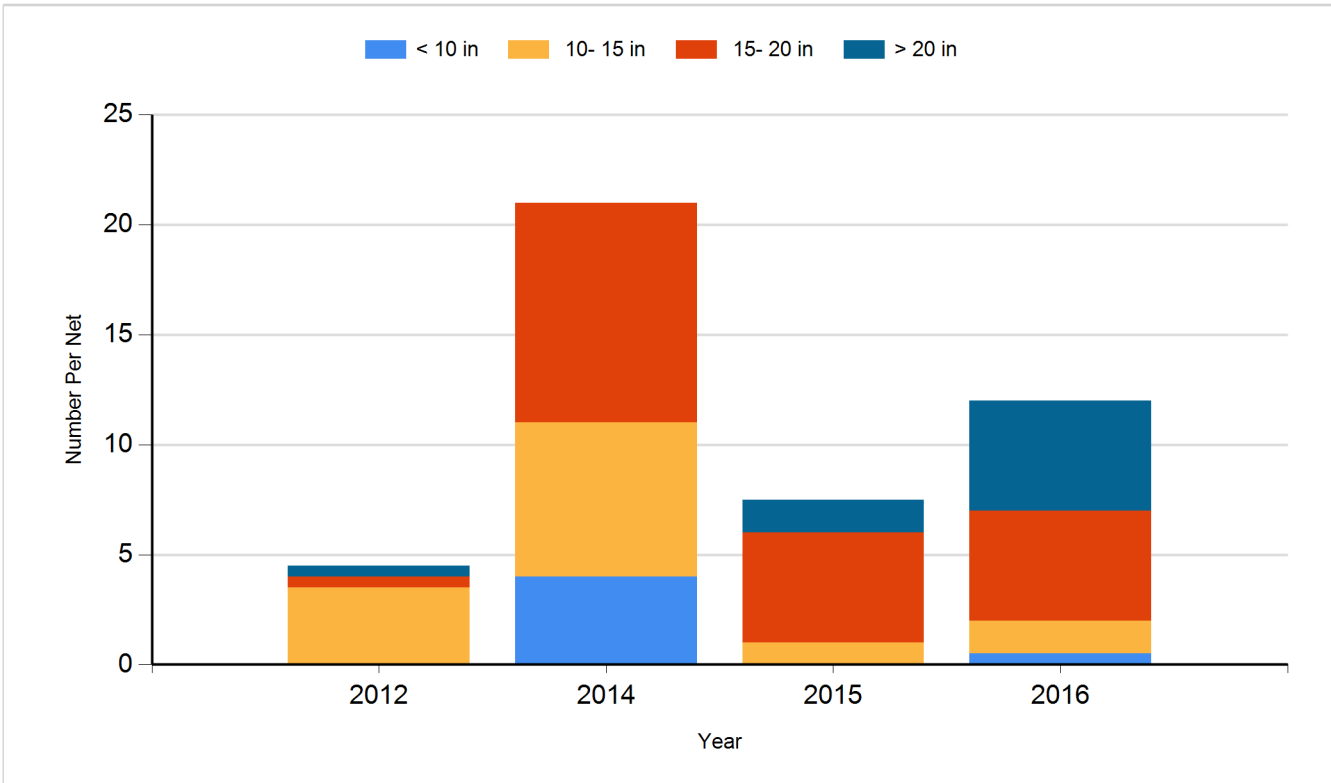
Species: Smallmouth Bass  
Gear: boat shocker (night)



Species: Walleye  
Gear: AFS std gill net



Species: Walleye  
Gear: std exp gill net



## **Fish Stocking**

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

Year	Species	Size	Number
2011	Channel Catfish	Adult	200
2011	Yellow Perch	Adult	1,398
2012	Gizzard Shad	Adult	54
2012	Largemouth Bass	Fingerling	13,320
2013	Gizzard Shad	Adult	35
2013	Walleye	Large Fingerling	4,000
2014	Channel Catfish	Adult	200
2014	Gizzard Shad	Adult	50
2014	Largemouth Bass	Juvenile	400
2014	Yellow Perch	Adult	650
2015	Gizzard Shad	Adult	13
2015	Smallmouth Bass	Adult	380
2015	Walleye	Fingerling	900
2016	Walleye	Fingerling	25,500
2017	Walleye	Small Fingerling	20,900
2018	Walleye	Small Fingerling	50,000
2019	Walleye	Small Fingerling	21,420
2021	Walleye	Small Fingerling	30,000
2022	Walleye	Juvenile	47,624