

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Bear Butte, Meade County

LBF-Lake-42-000

2021

## Lake Information

**Name:** Bear Butte

**County:** Meade

**Surface Area:** 228 Acres

## Surveys and Investigations

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

Gear	Date	Effort
boat shocker (day)	Oct 21, 2021	3600 seconds
frame net (std 3/4 in)	Jun 08, 2021	5 net-nights

## **Common Fish Species Present**

Northern Pike

Largemouth Bass

Yellow Perch

Black Crappie

Black Bullhead

Walleye

Bluegill

Green Sunfish

Channel Catfish

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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	25.0	14.7	40	15	8		117	3
	Walleye*	5	5.0	3.6	0		0		86	8
frame net (std 3/4 in)	Black Bullhead	2178	410.8	61.4	74	1	0		85	1
	Black Crappie	584	116.8	118.2	63	3	63	3	99	2
	Bluegill	6	1.2	0.9	33		0		128	3
	Channel Catfish	1	0.2	0.3	0		0		72	
	Green Sunfish	6	1.2	1.1	67		0		131	2
	Northern Pike	19	3.8	0.9	89		11		88	2
	Walleye	6	1.0	0.7	60		20		83	6
	Yellow Perch	25	5.0	1.7	100		64	15	88	2

## 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	
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		
AFS std frame net	Black Bullhead						58.8						58.80
	Black Crappie						9.0						9.00
	Bluegill						5.2						5.20
	Green Sunfish						0.4						0.40
	Walleye						0.1						0.10
	Yellow Perch						7.3						7.30
boat shocker (day)	Largemouth Bass											25.0	25.00
	Walleye*											5.0	5.00
boat shocker (night)	Largemouth Bass			2.4	9.0	14.0							8.47
	Smallmouth Bass			0.0	1.5	0.0							0.50
	Walleye*			1.2	22.5	13.0							12.23
frame net (std 3/4 in)	Black Bullhead	757.5	2,116.0	879.9	404.2	817.5		1,208.3	906.0	454.0	410.8	883.80	
	Black Crappie	123.3	10.6	26.8	6.2	22.2		6.7	40.3	2.5	116.8	39.49	
	Bluegill	0.0	0.4	0.0	0.3	1.0		0.0	0.0	0.0	1.2	0.32	
	Channel Catfish	0.0	0.0	0.0	0.0	0.1		0.2	0.3	0.0	0.2	0.09	
	Golden Shiner	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.00	
	Green Sunfish	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	1.2	0.13	
	Largemouth Bass	0.0	0.1	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.01	
	Northern Pike	0.5	0.4	0.1	0.6	0.1		2.2	2.8	0.0	3.8	1.17	
	Walleye	0.0	0.1	0.0	0.2	0.1		0.2	1.7	0.3	1.0	0.40	
	Yellow Perch	8.0	5.8	0.0	1.2	5.3		1.3	0.0	0.2	5.0	2.98	
std exp gill net	Black Bullhead	138.0	79.0	220.5								145.83	
	Black Crappie	7.0	1.0	0.0								2.67	
	Channel Catfish	13.0	3.5	1.5								6.00	
	Largemouth Bass	0.0	0.0	0.0								0.00	
	Northern Pike	2.0	2.0	1.0								1.67	
	Rainbow Trout	0.0	0.5	0.0								0.17	
	Yellow Perch	3.0	0.0	11.5								4.83	

## 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													
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021				
AFS std frame net	Black Bullhead	PSD								0						
		PSD-P								0						
		Wr									77					
	Black Crappie	PSD									87					
		PSD-P									69					
		Wr									106					
	Bluegill	PSD									69					
		PSD-P									4					
		Wr									117					
	Green Sunfish	PSD									50					
		PSD-P									25					
		Wr									117					
	Walleye	PSD									100					
		PSD-P									0					
		Wr									91					
	Yellow Perch	PSD									73					
		PSD-P									7					
		Wr									82					
boat shocker (day)	Largemouth Bass	PSD													40	
		PSD-P													8	
		Wr													117	
	Walleye	PSD													0	
		PSD-P													0	
		Wr													86	
boat shocker (night)	Largemouth Bass	PSD			50	0	64									
		PSD-P			0	0	7									
		Wr			120	110	109									
	Walleye	PSD			0	33	69									
		PSD-P			0	0	8									
		Wr			103	103	94									
frame net (std 3/4 in)	Black Bullhead	PSD	0	0	0	0	0			0	0	43	74			
		PSD-P	0	0	0	0	0			0	0	0	0			

Gear	Species	Index	Year									
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
frame net (std 3/4 in)	Black Bullhead	Wr		79	91	88	87		68	67	98	85
		PSD	91	92	100	100	96		100	100	100	63
	Black Crappie	PSD-P	0	0	0	13	95		73	60	100	63
		Wr	108	97	97	95	113		92	99	104	99
		PSD		100		100	90					33
	Bluegill	PSD-P		0		0	0					0
		Wr		107		130	138					128
		Channel Catfish	PSD					100		0	100	
	PSD-P						0		0	0		0
	Wr						79		89	86		72
	Green Sunfish	PSD										67
		PSD-P										0
		Wr										131
	Largemouth Bass	PSD		100								
		PSD-P		0								
		Wr		103								
	Northern Pike	PSD	100	67	100	100	100		85	94		89
		PSD-P	75	33	0	67	0		23	24		11
		Wr	88	87	74	79			84	95		88
	Walleye	PSD		0		100	100		100	90	100	60
		PSD-P		0		0	0		0	20	0	20
		Wr		76		89	96		88	91	93	83
	Yellow Perch	PSD	55	43		83	85		88		100	100
		PSD-P	2	0		17	19		25		100	64
Wr		83	81		85	91		62		105	88	
std exp gill net	Black Bullhead	PSD	0	0	0							
		PSD-P	0	0	0							
		Wr	91	83	87							
	Black Crappie	PSD	71	50								
		PSD-P	0	0								
		Wr	113	106								
	Channel Catfish	PSD	100	100	100							
		PSD-P	15	43	0							
		Wr	89	91	104							
	Largemouth Bass	PSD	0									
		PSD-P	0									
	Northern Pike	PSD	100	75	50							



Gear	Species	Index	Year									
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
std exp gill net	Northern Pike	PSD-P	0	25	0							
		Wr	95	104	81							
	Yellow Perch	PSD	67		35							
		PSD-P	0		0							
		Wr	79		94							

## Length at Capture

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

Species: Black Crappie

Year	N	Mean Length (expanded sample number) at capture by age									
		1	2	3	4	5	6	7	8	9	10+
2016	440		180 (18)				256 (10)	267 (126)	270 (286)		
2014	428			188 (2)	211 (32)	220 (394)					

## **Fish Condition**

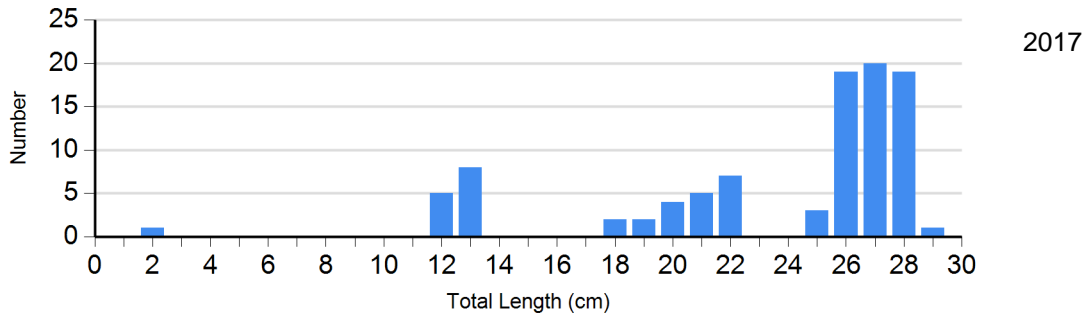
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2017	12	108 (5.6)	16	105 (1.8)	62	106 (0.9)	0	
	2018	0		11	89 (1.8)	28	93 (1.2)	1	94
	2019	0		96	100 (0.7)	145	99 (0.4)	1	
	2020	0		0		13	103 (1.2)	2	113 (2.3)
	2021	216	111 (1.0)	0		302	90 (0.7)	66	94 (2.3)
Bluegill Frame Net	2017	16	114 (4.4)	34	118 (2.0)	2	118 (5.0)	0	
	2021	4	128 (3.4)	2	129 (1.0)	0		0	
Largemouth Bass Electro Fishing	2021	15	111 (1.3)	8	122 (2.8)	2	135 (8.6)	0	

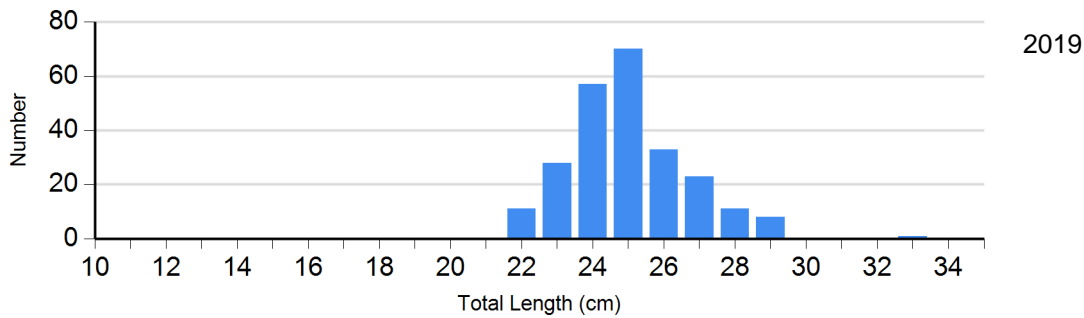
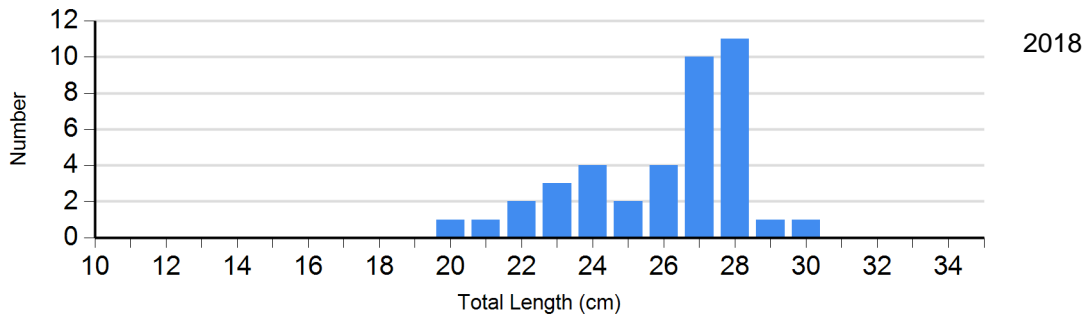
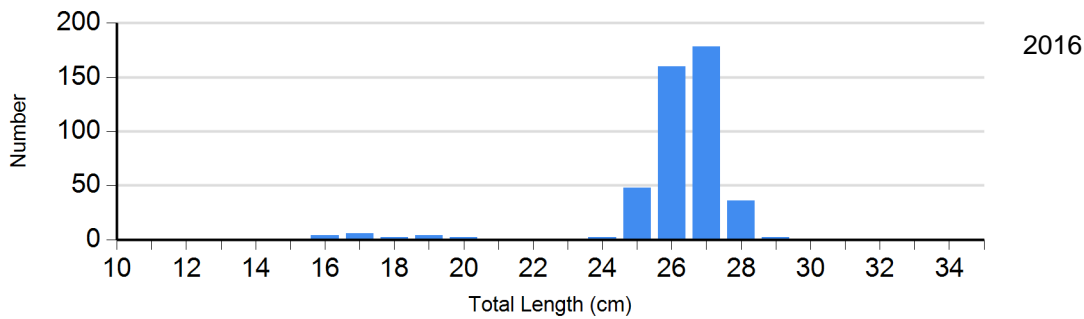
# Length Frequency Distribution

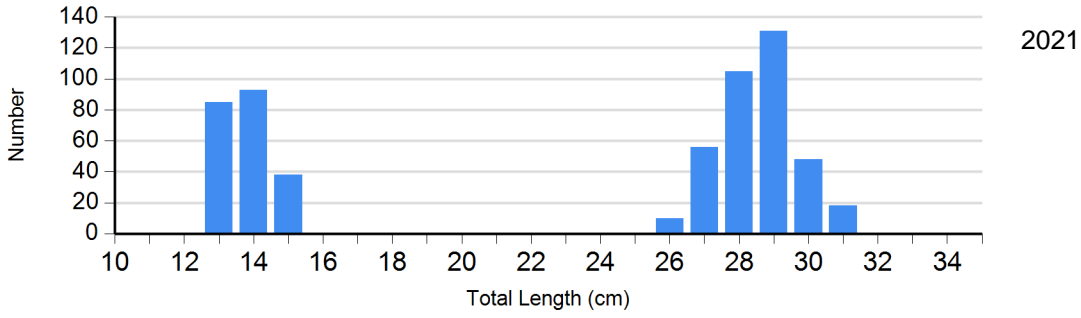
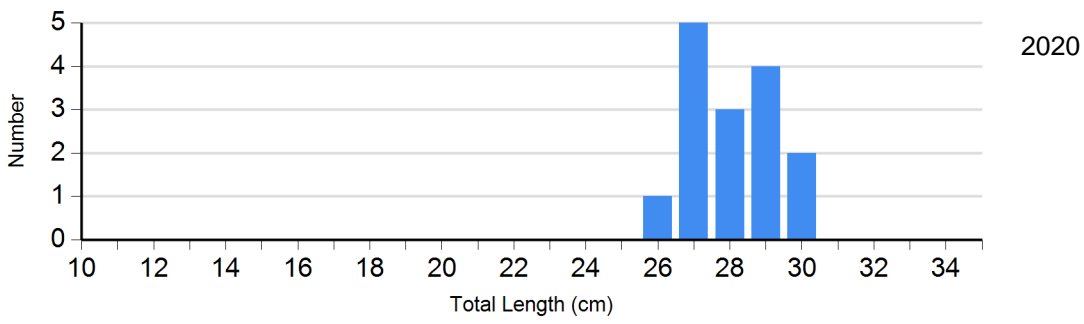
Length frequency histogram of species sampled by year.

Species: Black Crappie  
Gear: AFS std frame net

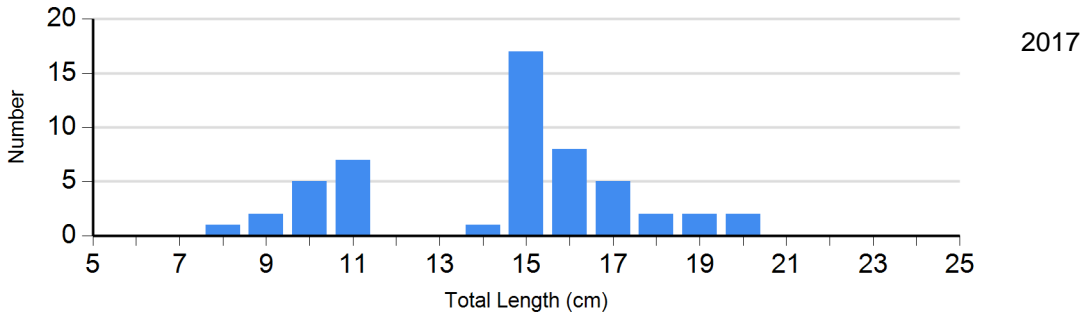


Species: Black Crappie  
Gear: frame net (std 3/4 in)

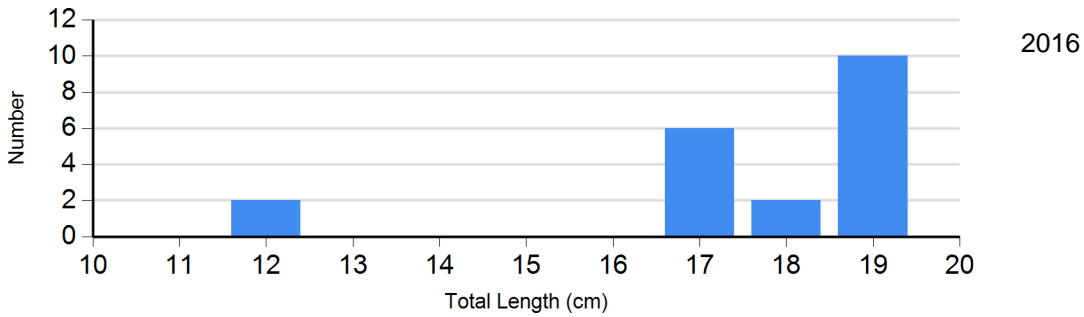




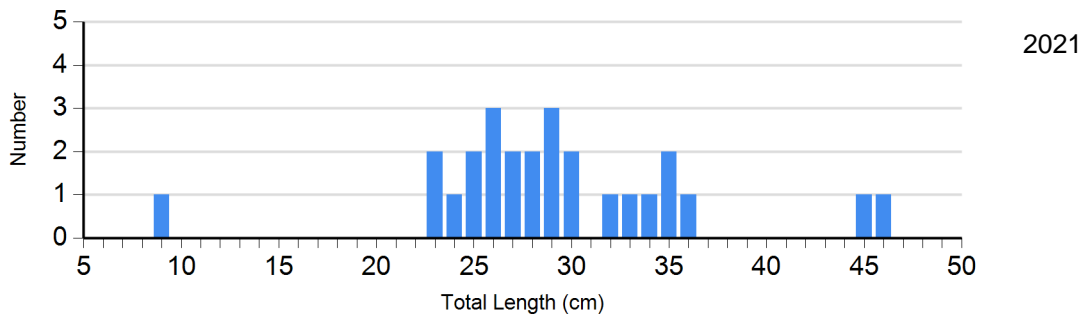
Species: Bluegill  
Gear: AFS std frame net



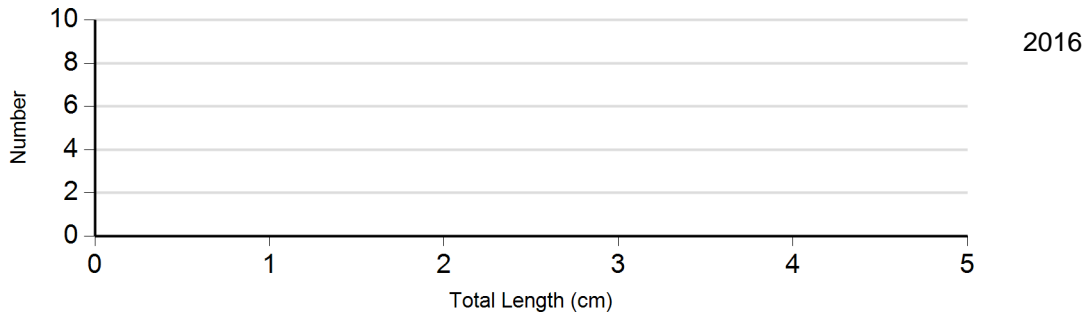
Species: Bluegill  
Gear: frame net (std 3/4 in)



Species: Largemouth Bass  
Gear: boat shocker (day)



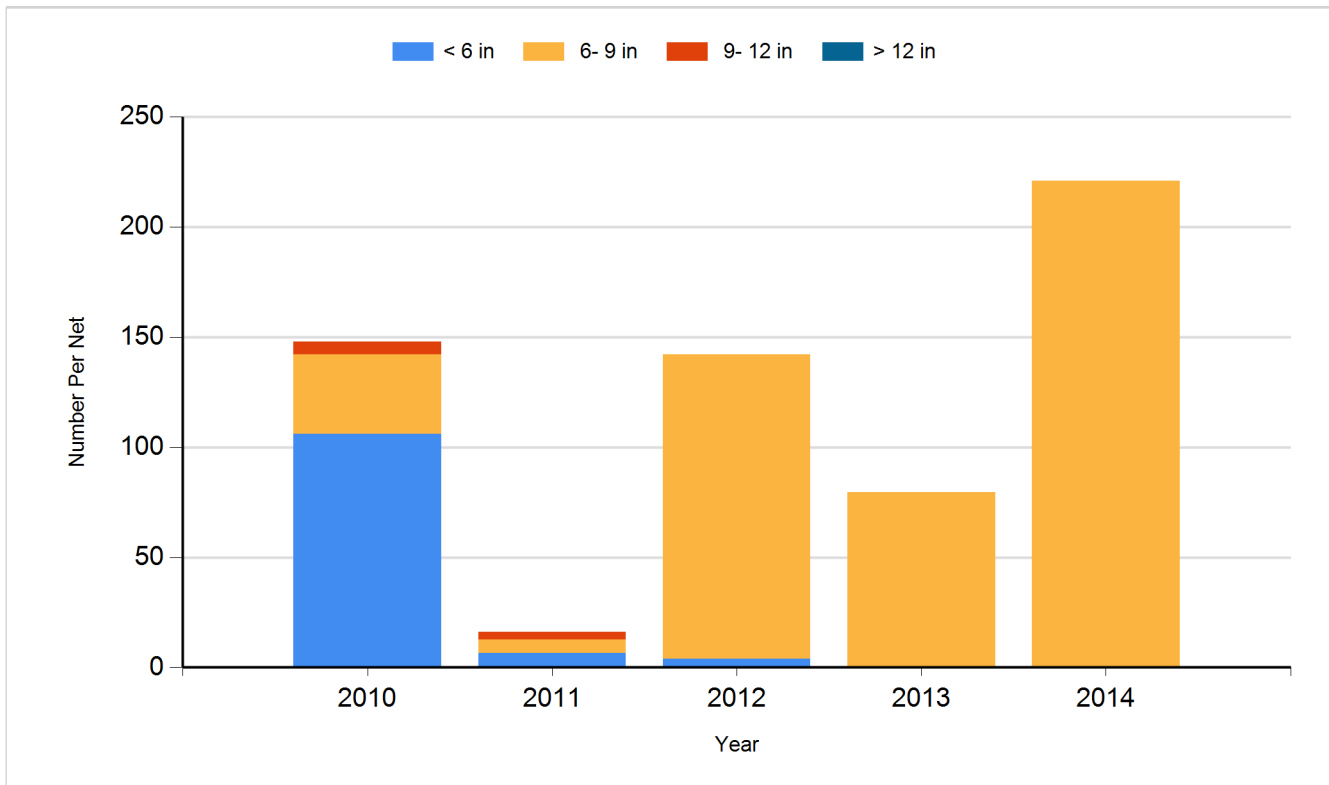
Species: Largemouth Bass  
Gear: boat shocker (night)



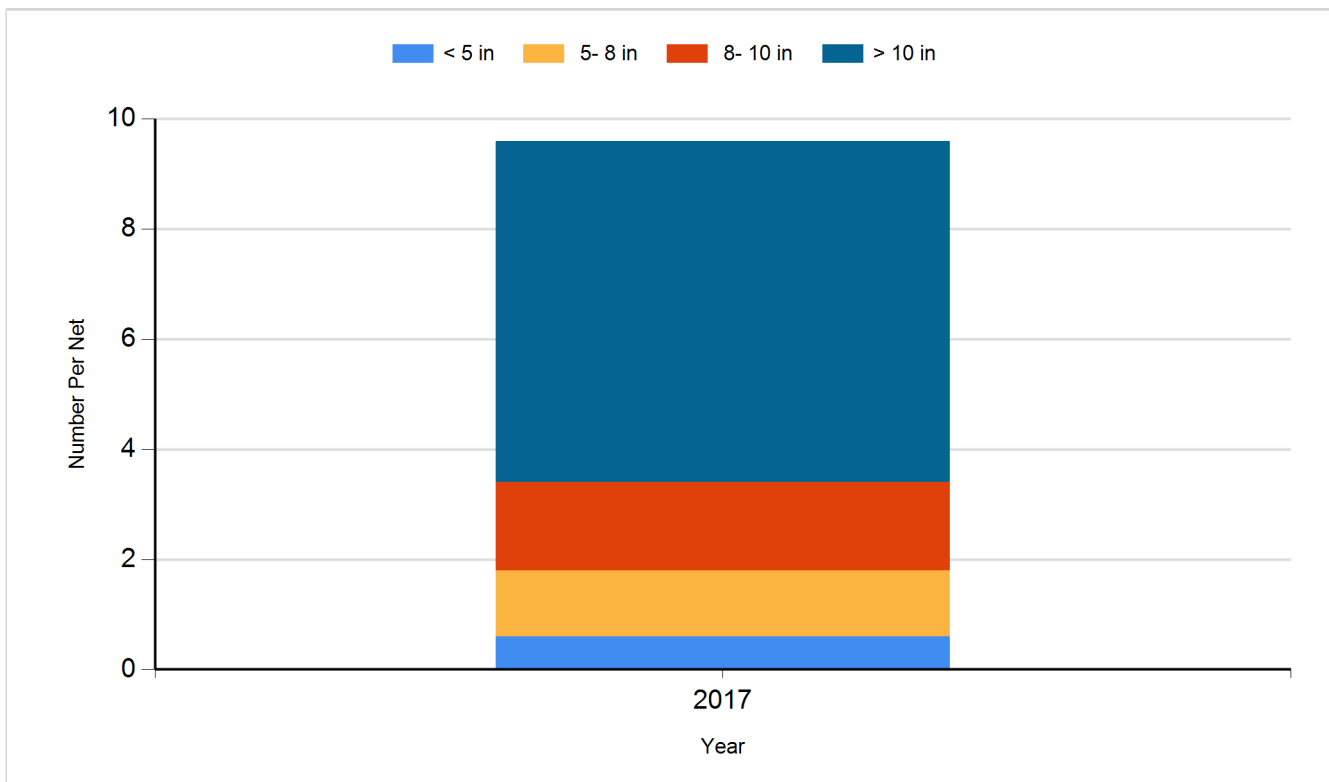
## Historic Fish Sizes and Relative Abundance

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

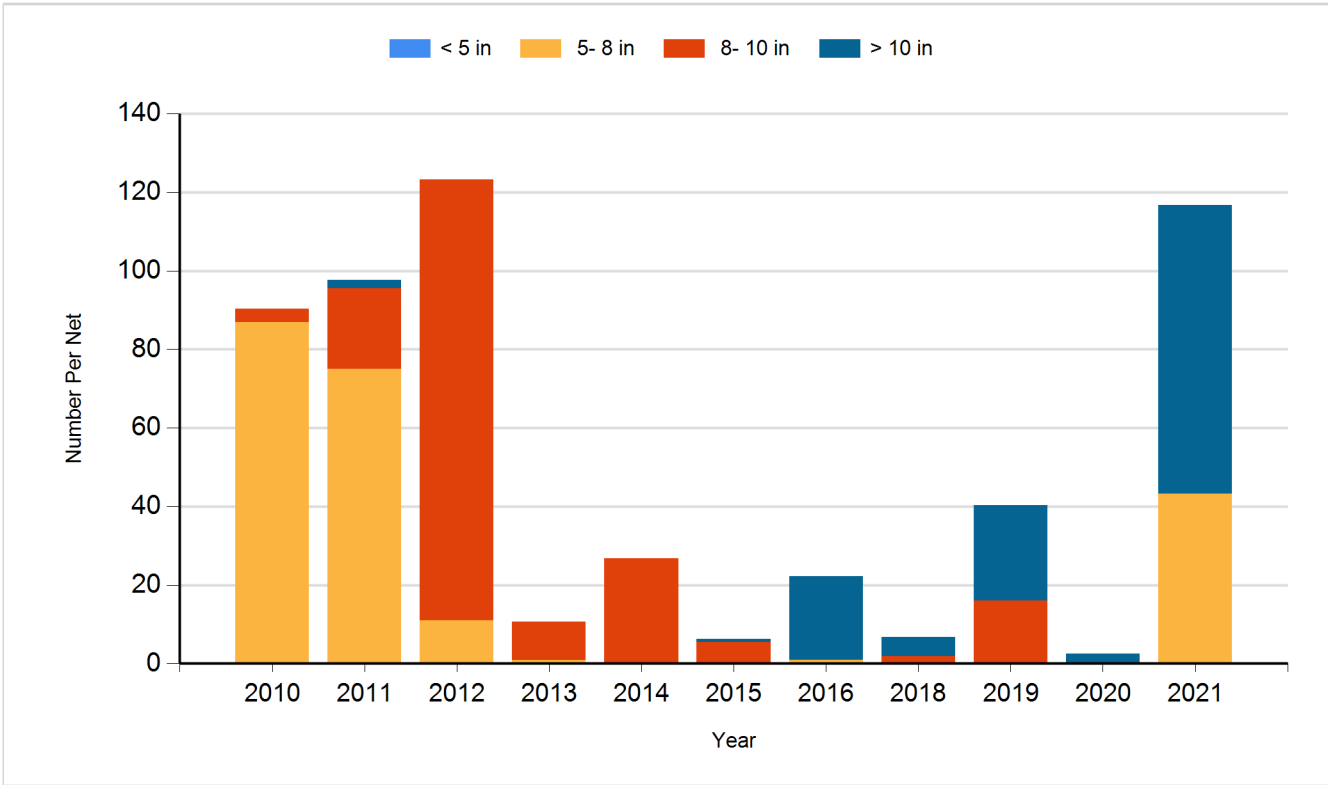
Species: Black Bullhead  
Gear: std exp gill net



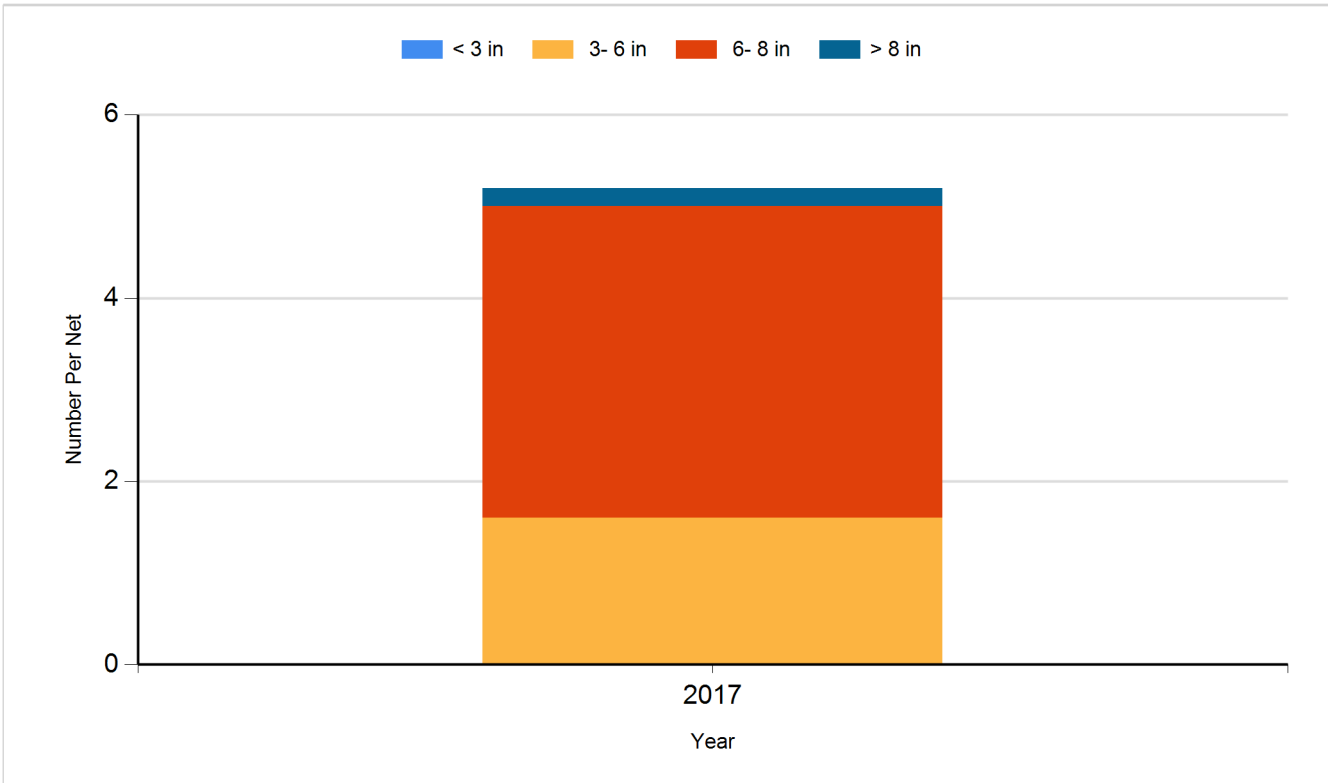
Species: Black Crappie  
Gear: AFS std frame net



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

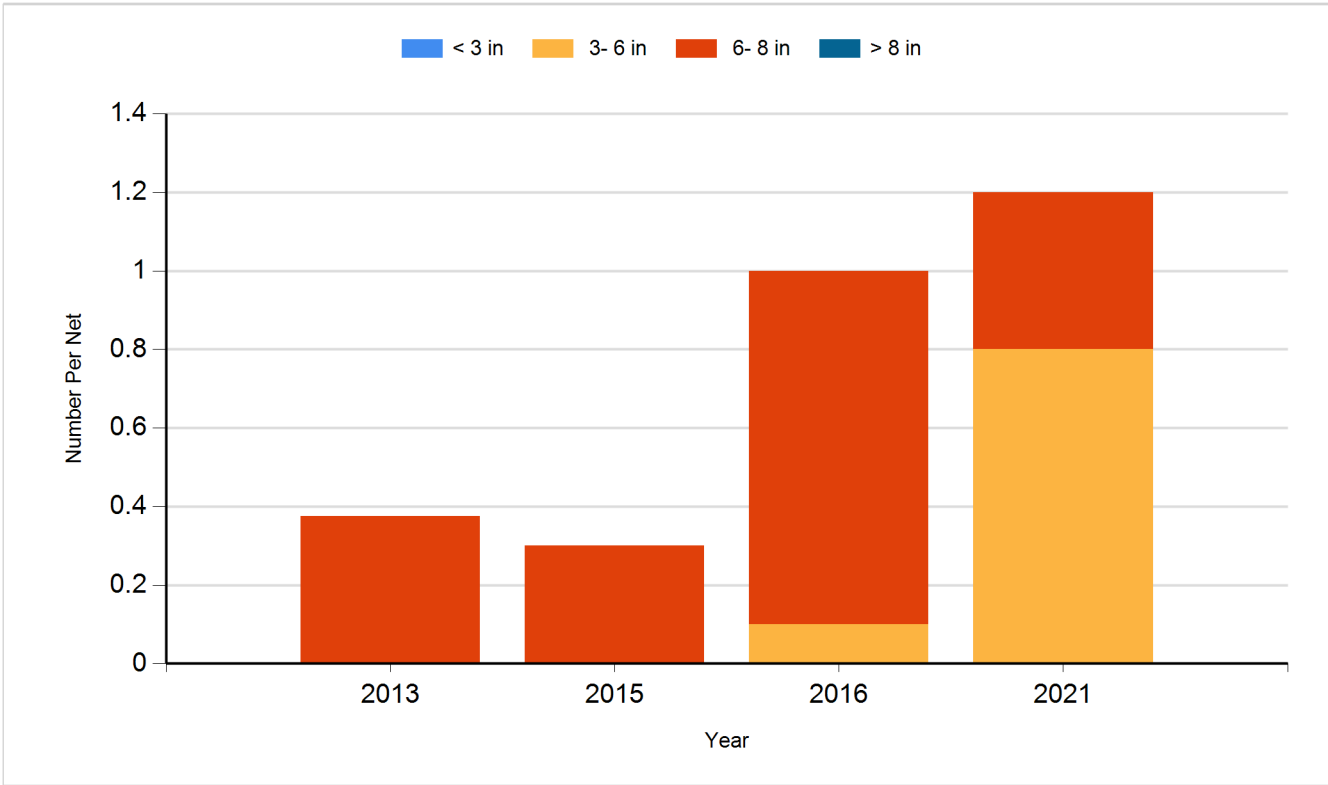


Species: Bluegill  
Gear: AFS std frame net

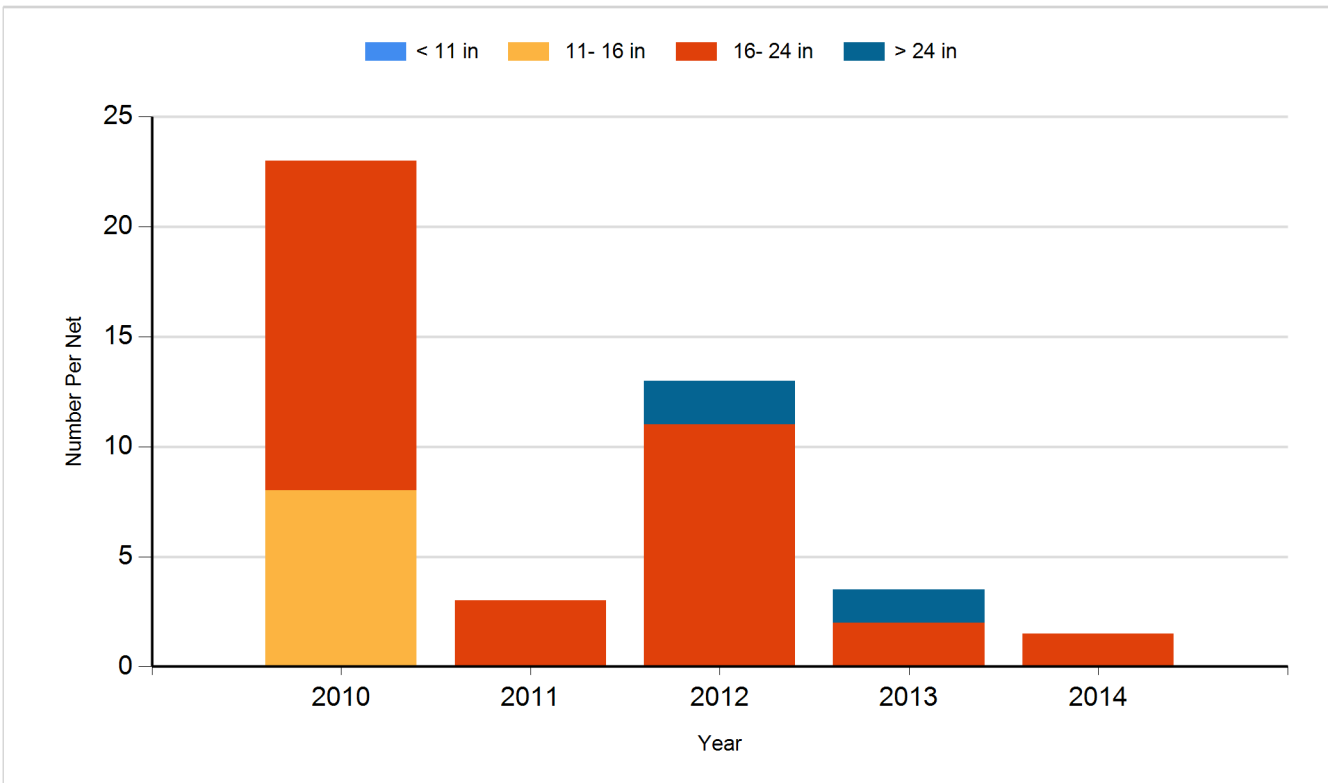




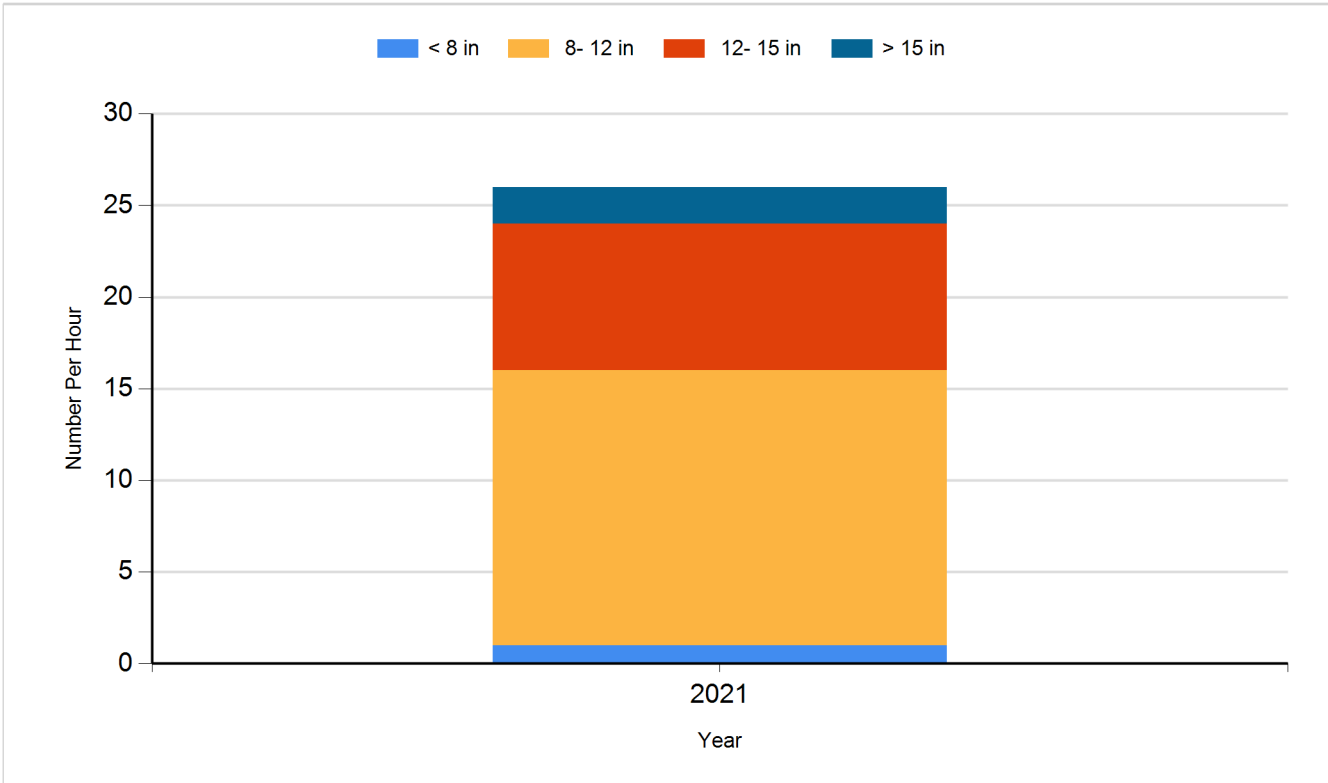
Species: Bluegill  
Gear: frame net (std 3/4 in)



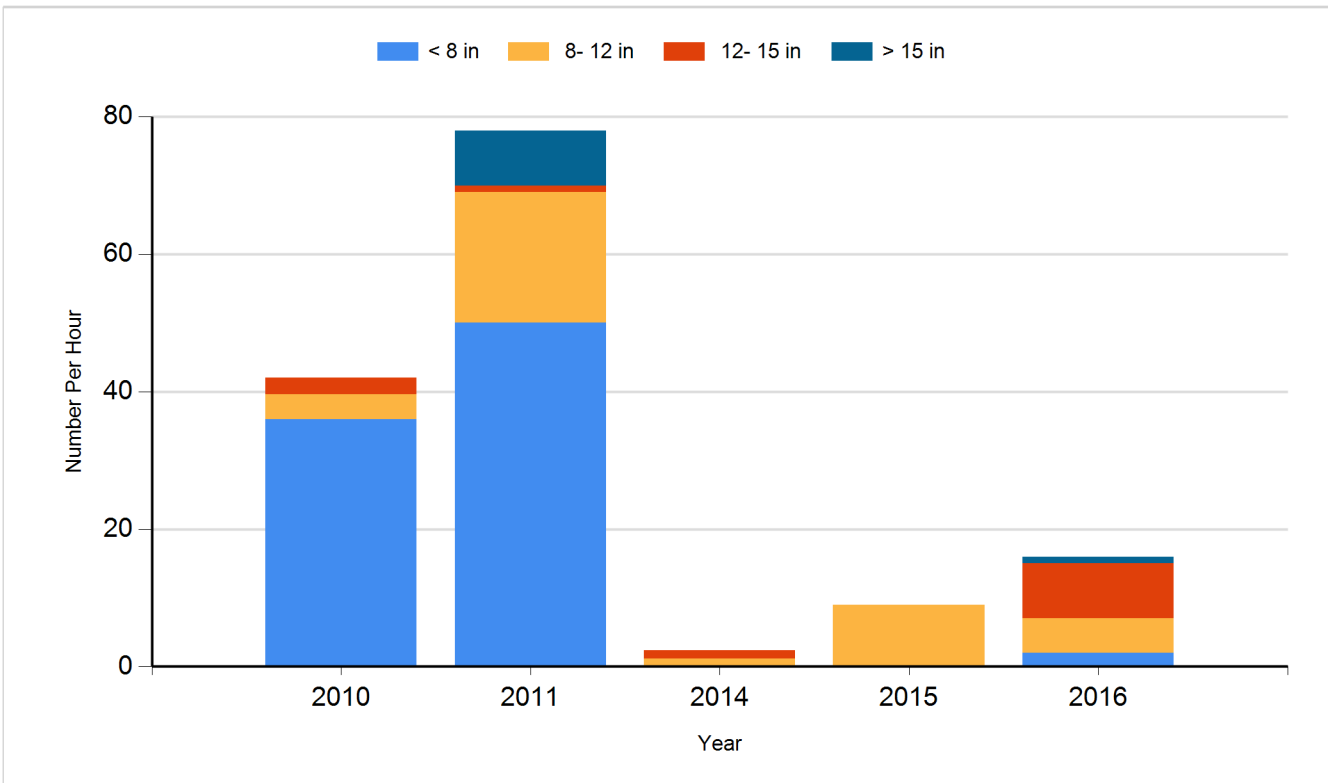
Species: Channel Catfish  
Gear: std exp gill net



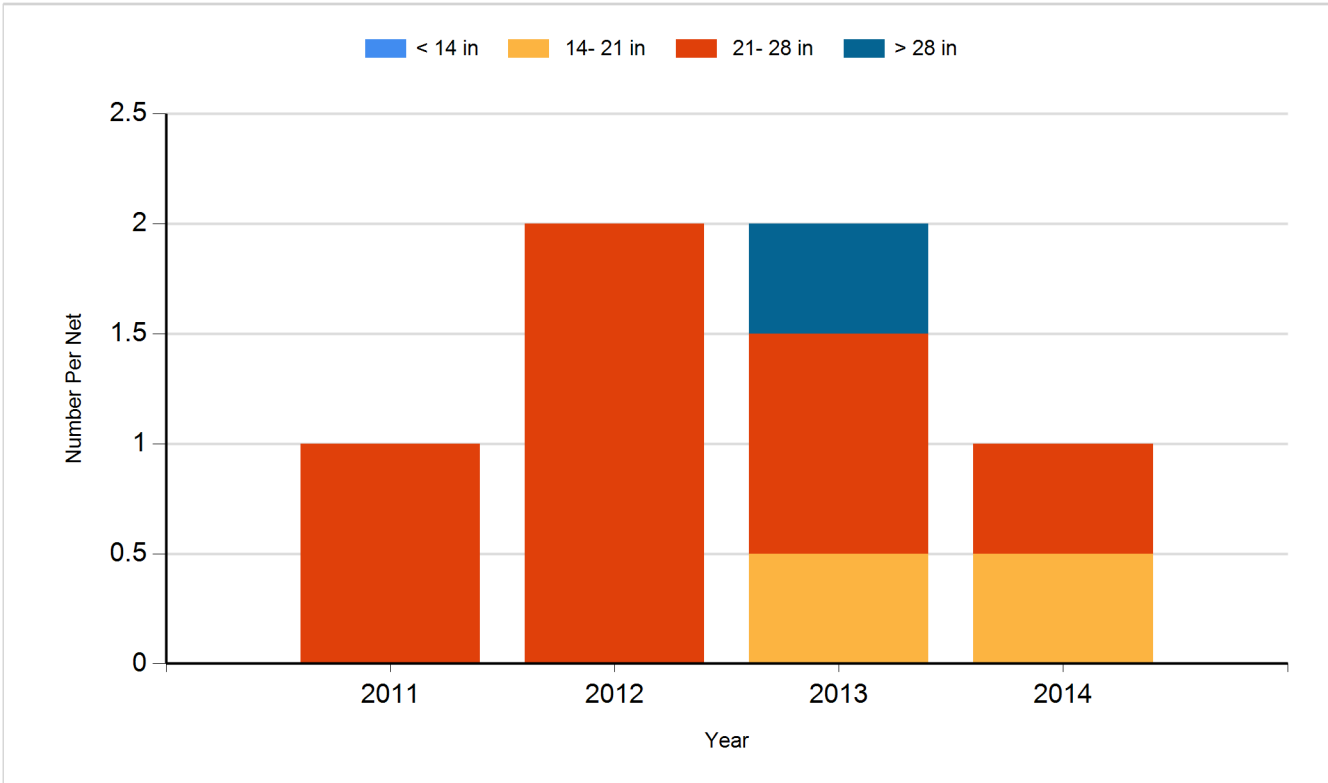
Species: Largemouth Bass  
Gear: boat shocker (day)



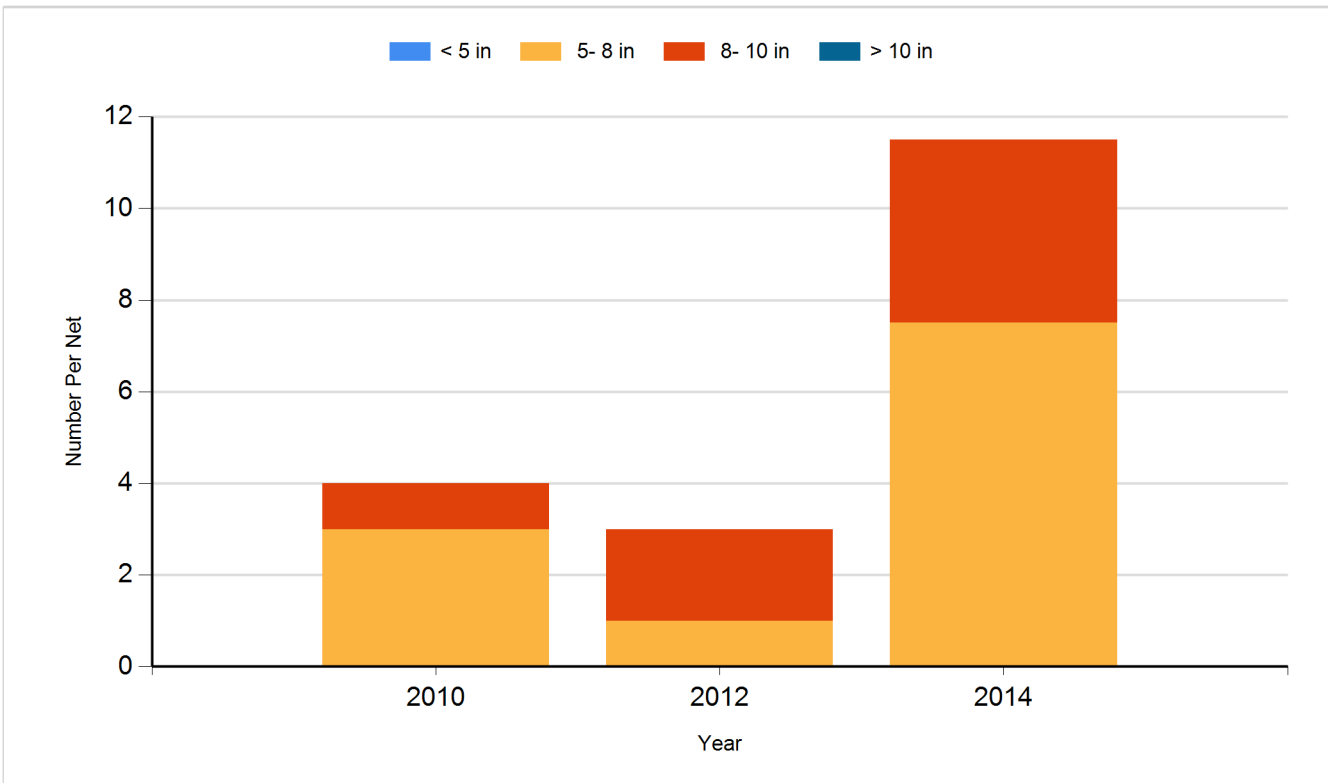
Species: Largemouth Bass  
Gear: boat shocker (night)



Species: Northern Pike  
Gear: std exp 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
2010	Golden Shiner	Adult	50
2010	Northern Pike	Adult	110
2010	Walleye	Small Fingerling	20,000
2010	Yellow Perch	Adult	900
2011	Channel Catfish	Adult	200
2011	Largemouth Bass	Adult	150
2011	Largemouth Bass	Fingerling	10,000
2011	Northern Pike	Fry	77,600
2011	Yellow Perch	Adult	700
2012	Largemouth Bass	Adult	378
2012	Yellow Perch	Adult	341
2014	Largemouth Bass	Adult	100
2014	Largemouth Bass	Fingerling	1,875
2014	Northern Pike	Adult	305
2014	Rainbow Trout	Catchable	100
2014	Walleye	Large Fingerling	3,238
2015	Channel Catfish	Adult	55
2015	Gizzard Shad	Adult	29
2015	Largemouth Bass	Adult	190
2015	Northern Pike	Adult	20
2015	Rainbow Trout (Ennis)	Catchable 11"	600
2015	Walleye	Fingerling	900
2016	Channel Catfish	Adult	180
2016	Gizzard Shad	Adult	32
2016	Rainbow Trout (Shasta)	Catchable 11"	963
2016	Walleye	Fingerling	25,500
2017	Gizzard Shad	Adult	199
2017	Northern Pike	Adult	138
2017	Rainbow Trout (Shasta)	Catchable 15"	1,000
2017	Walleye	Small Fingerling	29,700
2018	Channel Catfish	Adult	300
2018	Gizzard Shad	Adult	43
2018	Rainbow Trout (Erwin x Arlee)	Catchable	1,000
2019	Channel Catfish	Adult	240
2019	Gizzard Shad		20
2019	Gizzard Shad	Adult	25

2019	Northern Pike	Adult	26
2019	Rainbow Trout (Erwin x Arlee)	Catchable	1,000
2019	Walleye	Small Fingerling	32,130
2020	Gizzard Shad	Adult	18
2020	Largemouth Bass	Adult	60
2020	Rainbow Trout (Arlee)	Adult	1,000
2021	Bluegill	Adult	97
2021	Channel Catfish	Adult	210
2021	Gizzard Shad	Adult	54
2021	Green Sunfish	Adult	1
2021	Largemouth Bass	Adult	50
2021	Northern Pike	Adult	23
2021	Rainbow Trout (Trout Lodge)	Adult	1,744
2021	Smallmouth Bass	Adult	16
2021	Walleye	Adult	93
2021	Walleye	Fry	651,300
2021	Walleye	Small Fingerling	35,000
2021	Yellow Perch	Adult	10

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