SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Bear Butte, Meade County
LBF-Lake-42-000
2022

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
frame net (std 3/4 in)	Jun 02, 2022	5 net-nights

<u>Common Fish Species Present</u>

Yellow Perch

Northern Pike

Largemouth Bass

Black Crappie

Black Bullhead

Bluegill

Walleye

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.

- s**td 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.

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

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.

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

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

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 (in)	Stock (cm)	Quality (in)	Quality (cm)	Preferred (in)	Preferred (cm)	Memorable (in)	Memorable (cm)	Trophy (in)	Trophy (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
frame net (std 3/4 in)	Black Bullhead	1488	289.0	204.7	69	2	0		69	1
	Black Crappie	159	31.6	10.7	25	5	23	5	93	1
	Bluegill	6	1.2	1.1	50		0		114	2
	Northern Pike	21	4.2	1.6	100		19		91	1
	Walleye	1	0.2	0.3	100		0		94	
	Yellow Perch	21	4.2	2.0	90		29	16	83	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						
		2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Avg
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	2,116.0	879.9	404.2	817.5		1,208.3	906.0	454.0	421.8	289.0	832.97
	Black Crappie	10.6	26.8	6.2	22.2		6.7	40.3	2.5	115.4	31.6	29.14
	Bluegill	0.4	0.0	0.3	1.0		0.0	0.0	0.0	1.2	1.2	0.46
	Channel Catfish	0.0	0.0	0.0	0.1		0.2	0.3	0.0	0.2	0.0	0.09
	Green Sunfish	0.0	0.0	0.0	0.0		0.0	0.0	0.0	1.2	0.0	0.13
	Largemouth Bass	0.1	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.01
	Northern Pike	0.4	0.1	0.6	0.1		2.2	2.8	0.0	3.8	4.2	1.58
	Walleye	0.1	0.0	0.2	0.1		0.2	1.7	0.3	1.0	0.2	0.42
	Yellow Perch	5.8	0.0	1.2	5.3		1.3	0.0	0.2	5.0	4.2	2.56
std exp gill net	Black Bullhead	79.0	220.5									149.75
	Black Crappie	1.0	0.0									0.50
	Channel Catfish	3.5	1.5									2.50
	Largemouth Bass	0.0	0.0									0.00
	Northern Pike	2.0	1.0									1.50
	Rainbow Trout	0.5	0.0									0.25
	Yellow Perch	0.0	11.5									5.75

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	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
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					
	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	43	70	69
		PSD-P	0	0	0	0		0	0	0	0	0
		Wr	79	91	88	87		68	67	98	85	69
	Black Crappie	PSD	92	100	100	96		100	100	100	37	25
		PSD-P	0	0	13	95		73	60	100	36	23

Gear	Species	Index	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
frame net (std 3/4 in)	Black Crappie	Wr	97	97	95	113		92	99	104	99	93
	Bluegill	PSD	100		100	90					33	50
		PSD-P	0		0	0					0	0
		Wr	107		130	138					128	114
	Largemouth Bass	PSD	100									
		PSD-P	0									
		Wr	103									
	Northern Pike	PSD	67	100	100	100		85	94		89	100
		PSD-P	33	0	67	0		23	24		11	19
		Wr	87	74	79			84	95		88	91
	Walleye	PSD	0		100	100		100	90	100	60	100
		PSD-P	0		0	0		0	20	0	20	0
		Wr	76		89	96		88	91	93	83	94
	Yellow Perch	PSD	43		83	85		88		100	100	90
		PSD-P	0		17	19		25		100	64	29
		Wr	81		85	91		62		105	88	83
std exp gill net	Black Bullhead	PSD	0	0								
		PSD-P	0	0								
		Wr	83	87								
	Black Crappie	PSD	50									
		PSD-P	0									
		Wr	106									
	Northern Pike	PSD	75	50								
		PSD-P	25	0								
		Wr	104	81								
	Yellow Perch	PSD		35								
		PSD-P		0								
		Wr		94								

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+
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).

| | | Length Groups | | | | | | | |
| | | S-Q | | Q-P | | P-M | | M | |
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	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	362	111 (0.8)	6		146	90 (0.7)	63	94 (2.3)
	2022	119	92 (0.9)	3	89 (1.6)	18	99 (2.0)	18	98 (1.6)
Bluegill Frame Net	2021	4	128 (3.4)	2	129 (1.0)	0		0	
	2022	3	112 (1.2)	3	117 (1.2)	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
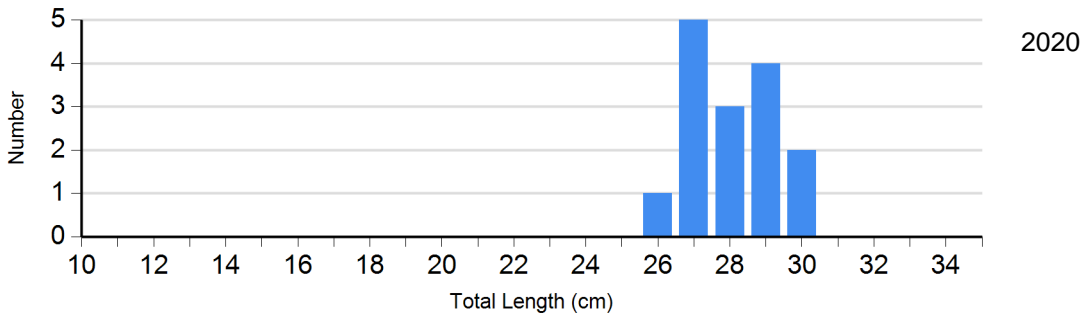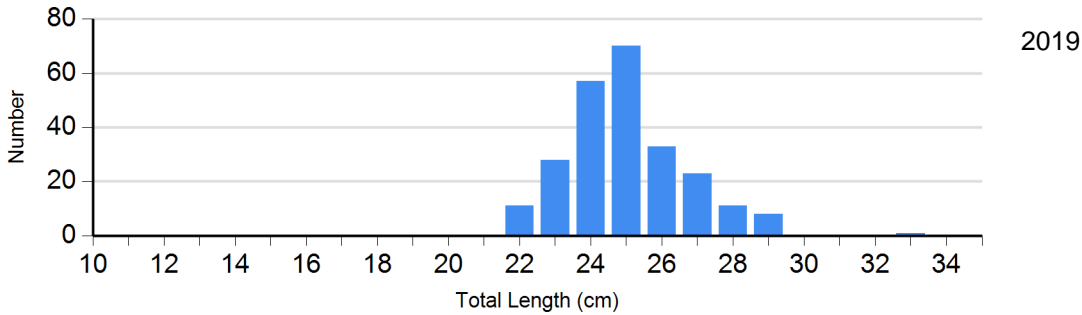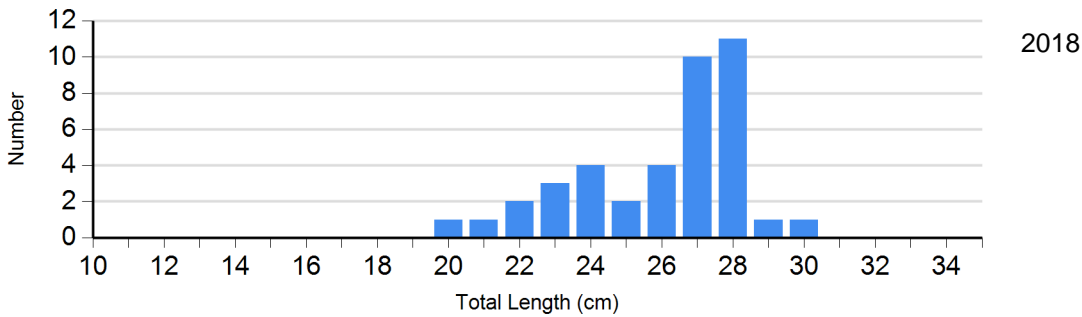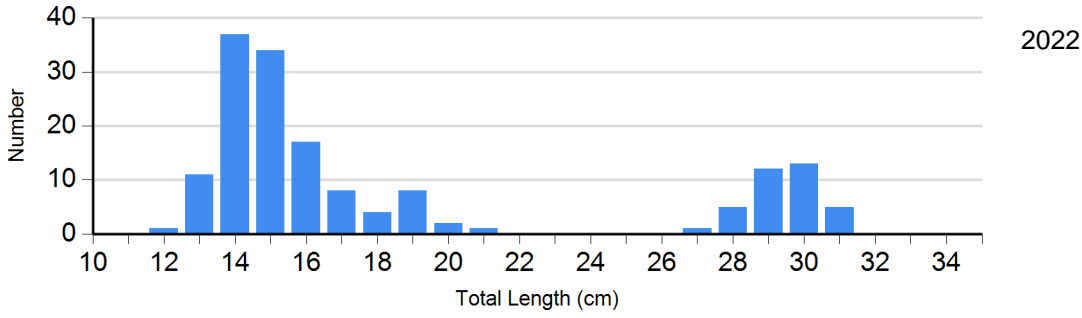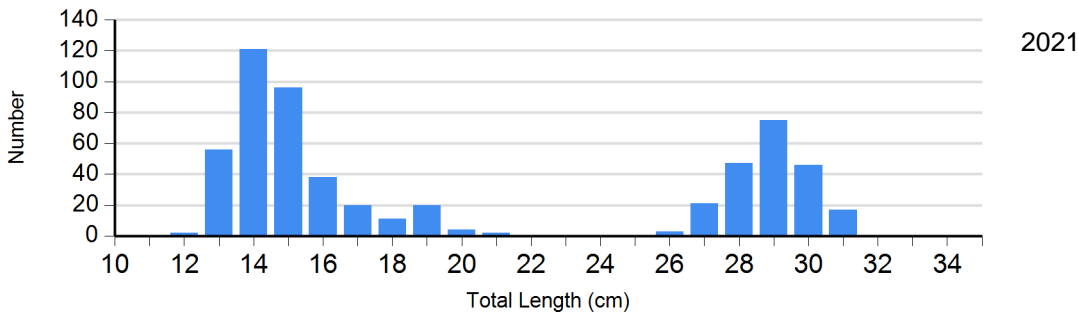
2017

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

2018

2019

2020

2021

2022

Species: Bluegill
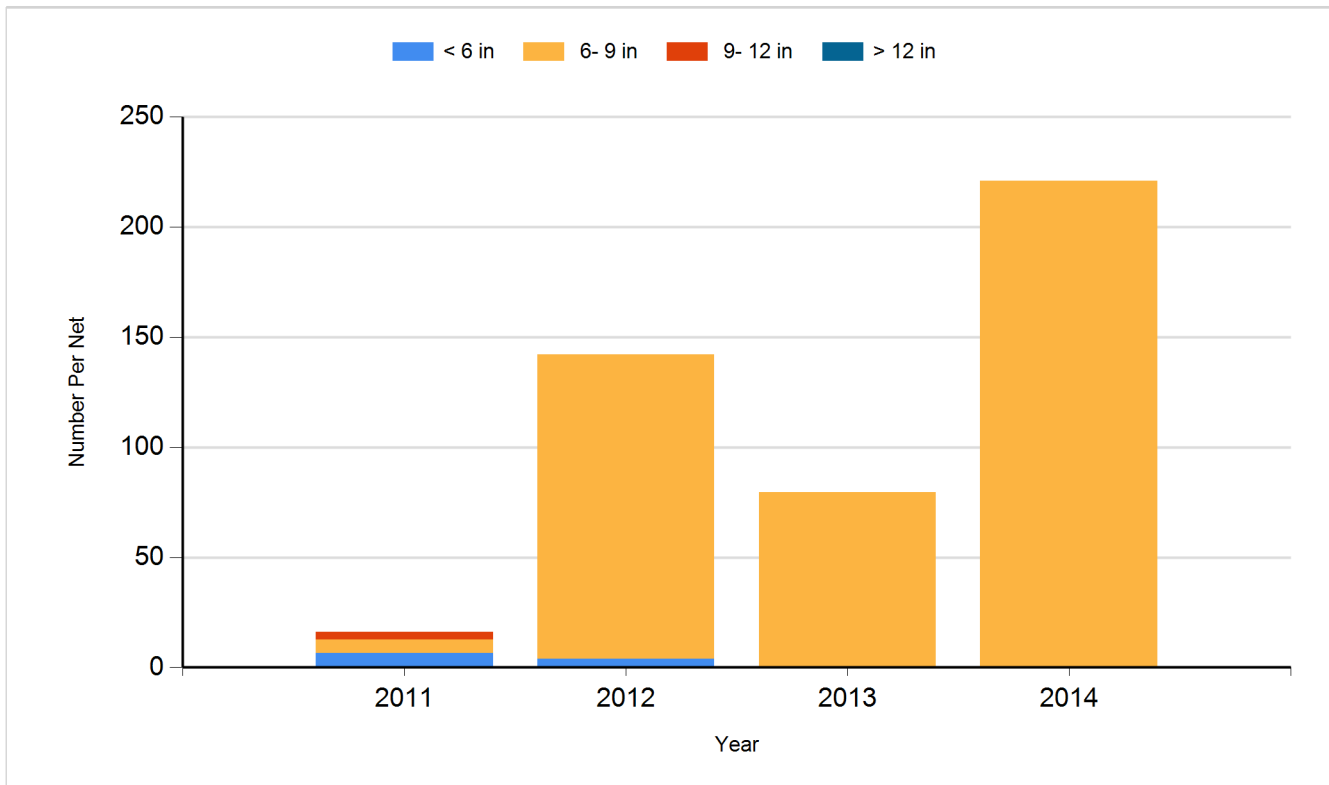Gear: AFS std frame net
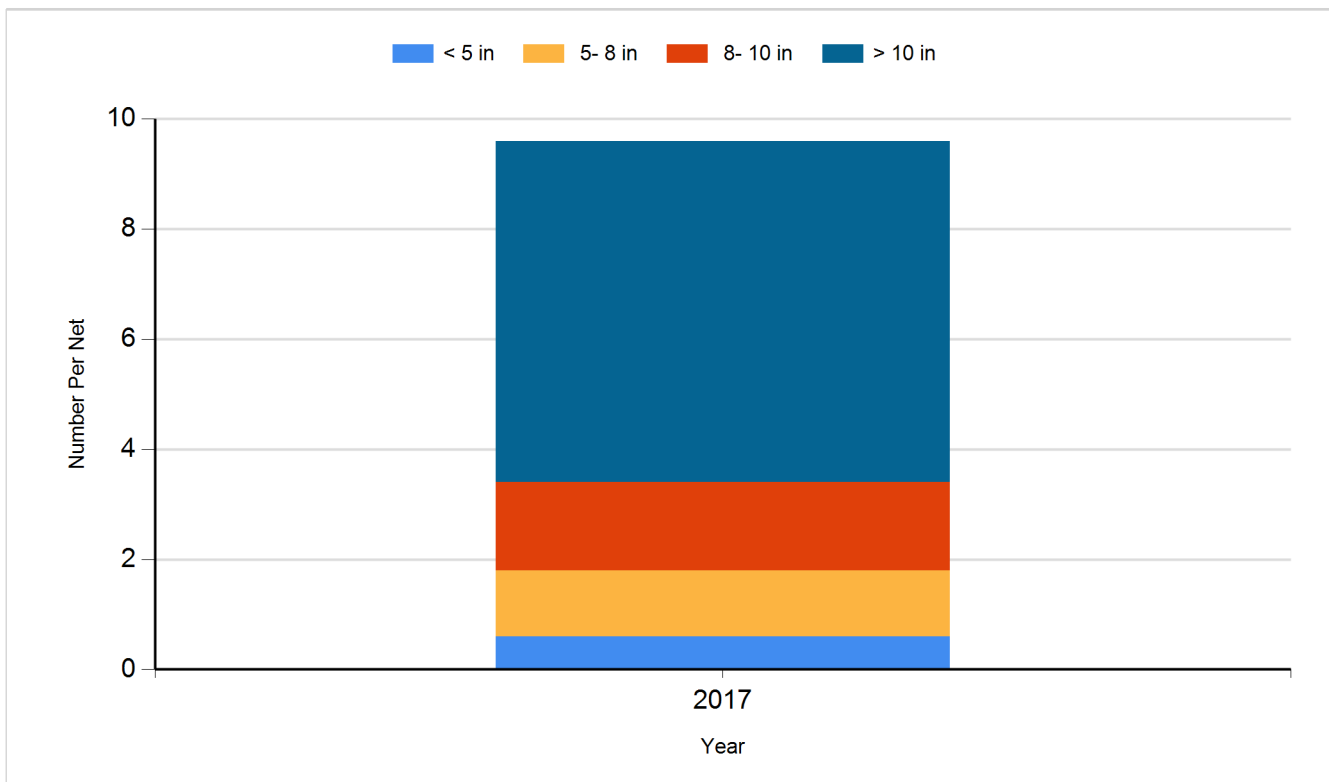
2017

Species: Largemouth Bass
Gear: boat shocker (day)

2021

Historic Fish Sizes and Relative Abundance

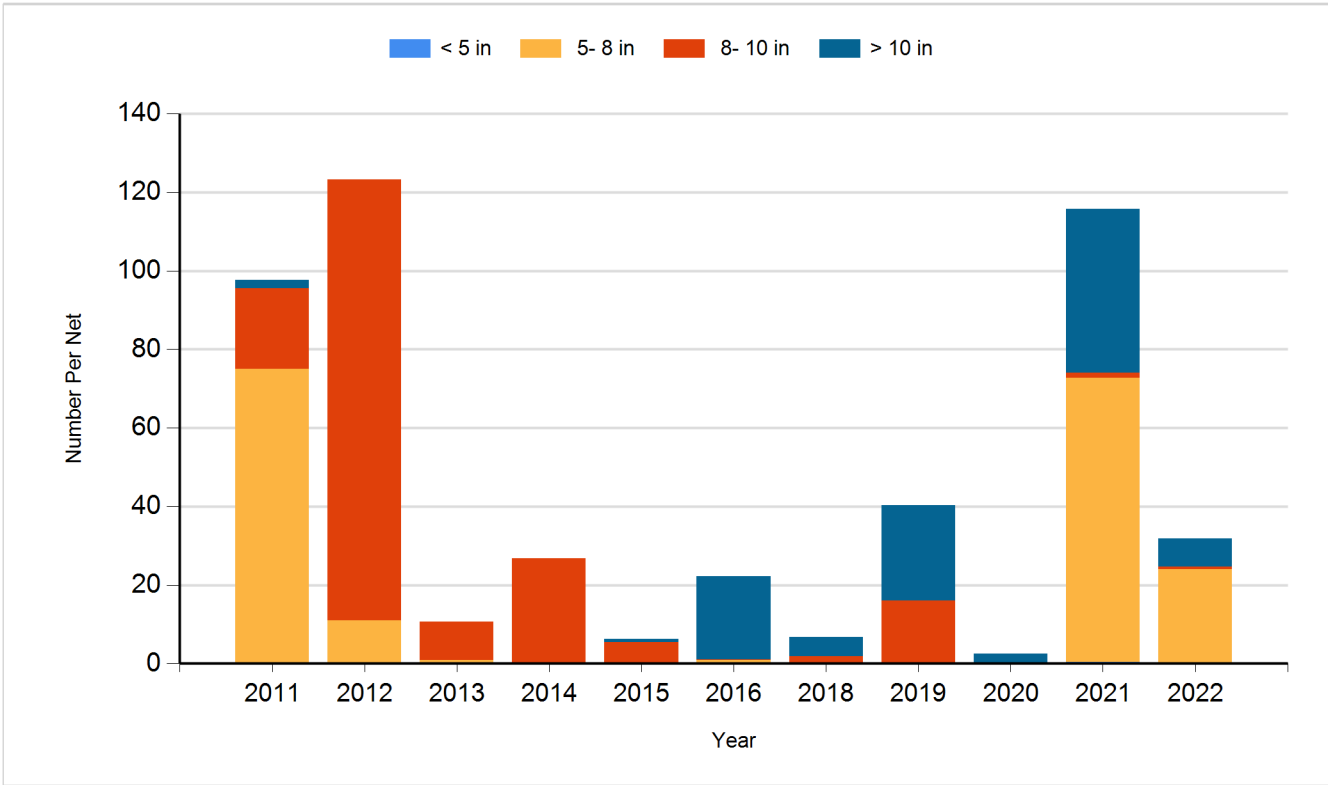Size distribution per net by color for species sampled by year.
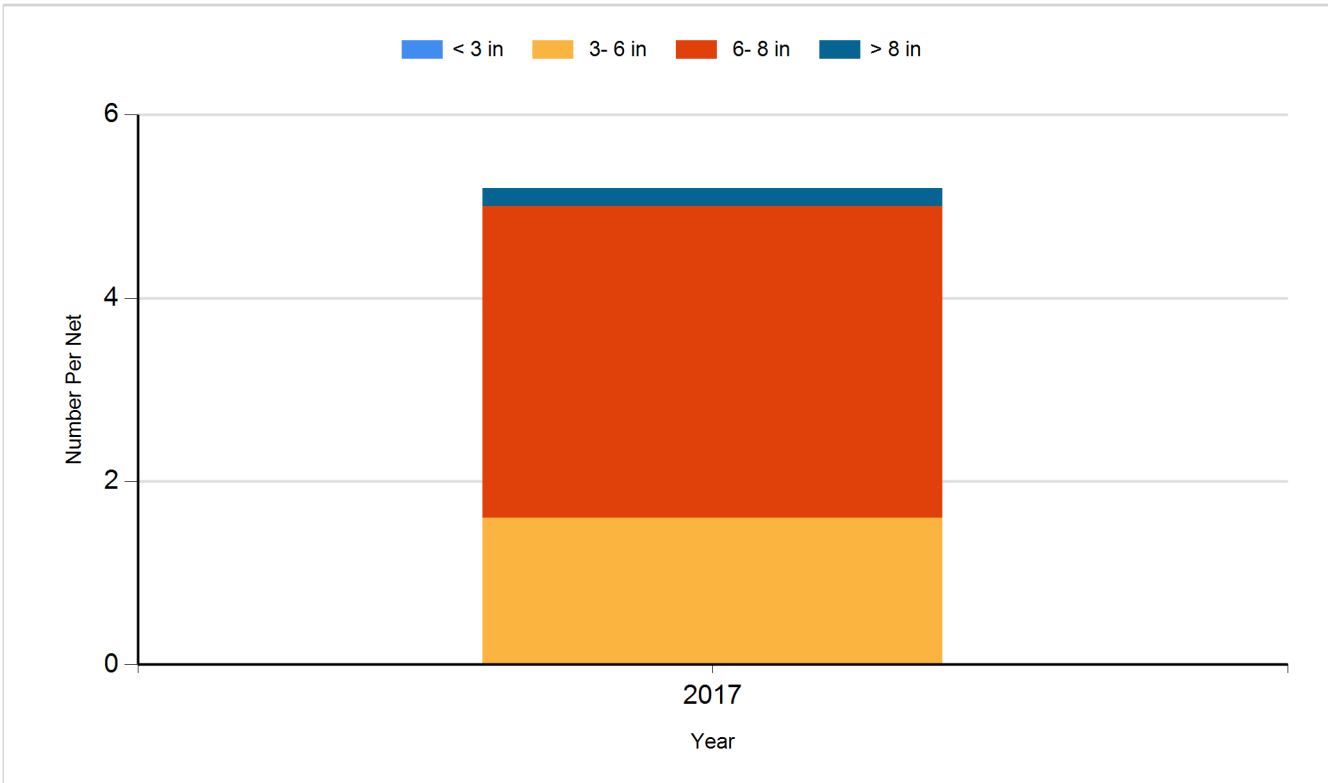
Species: Black Bullhead
Gear: std exp gill net
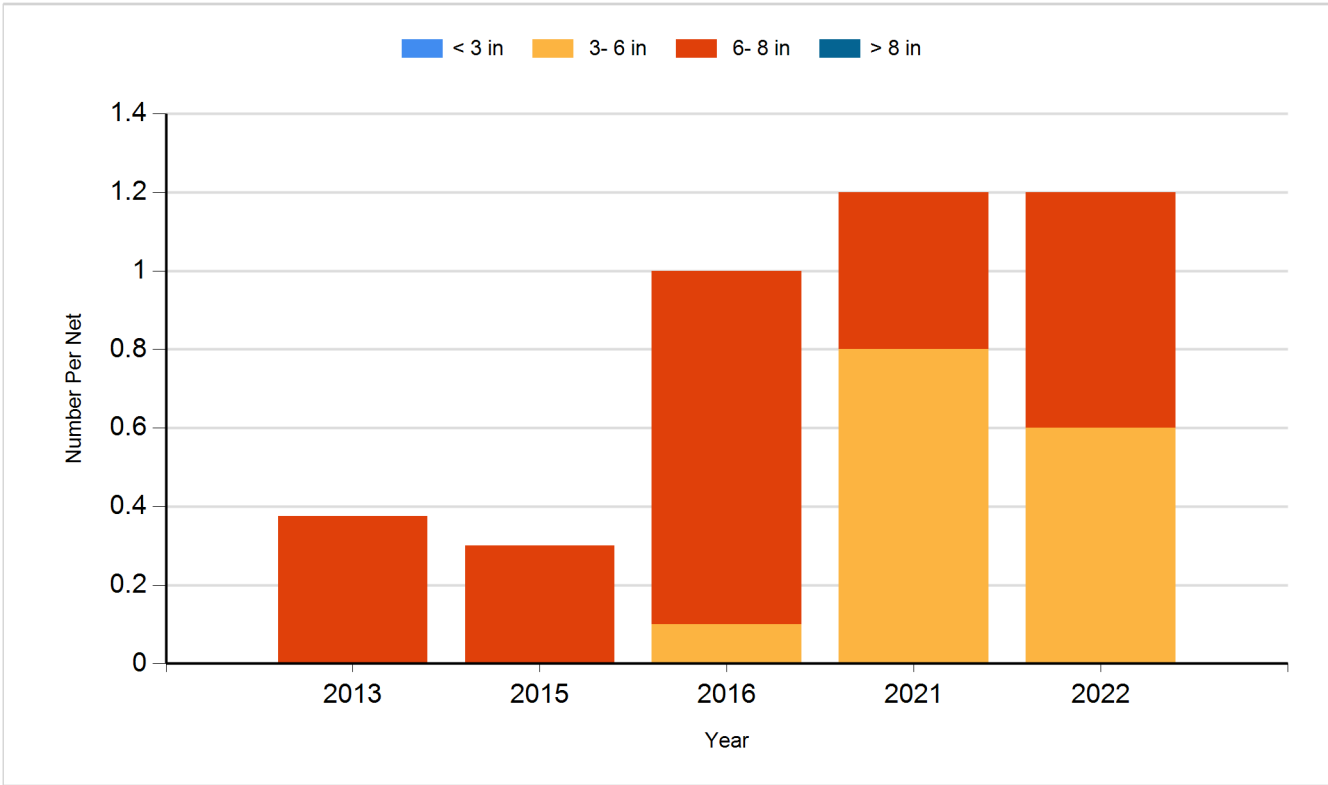

Species: Black Crappie
Gear: AFS std frame net

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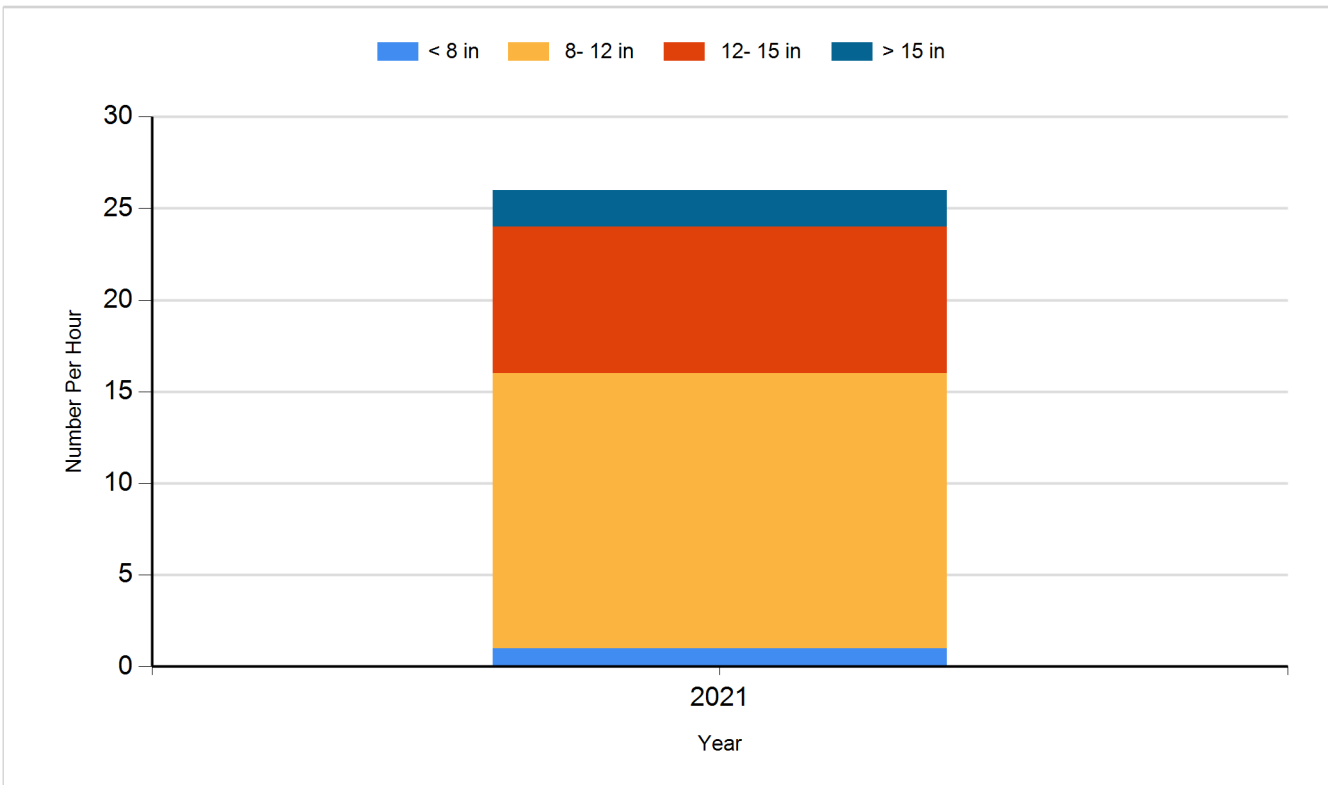Gear: frame net (std 3/4 in)
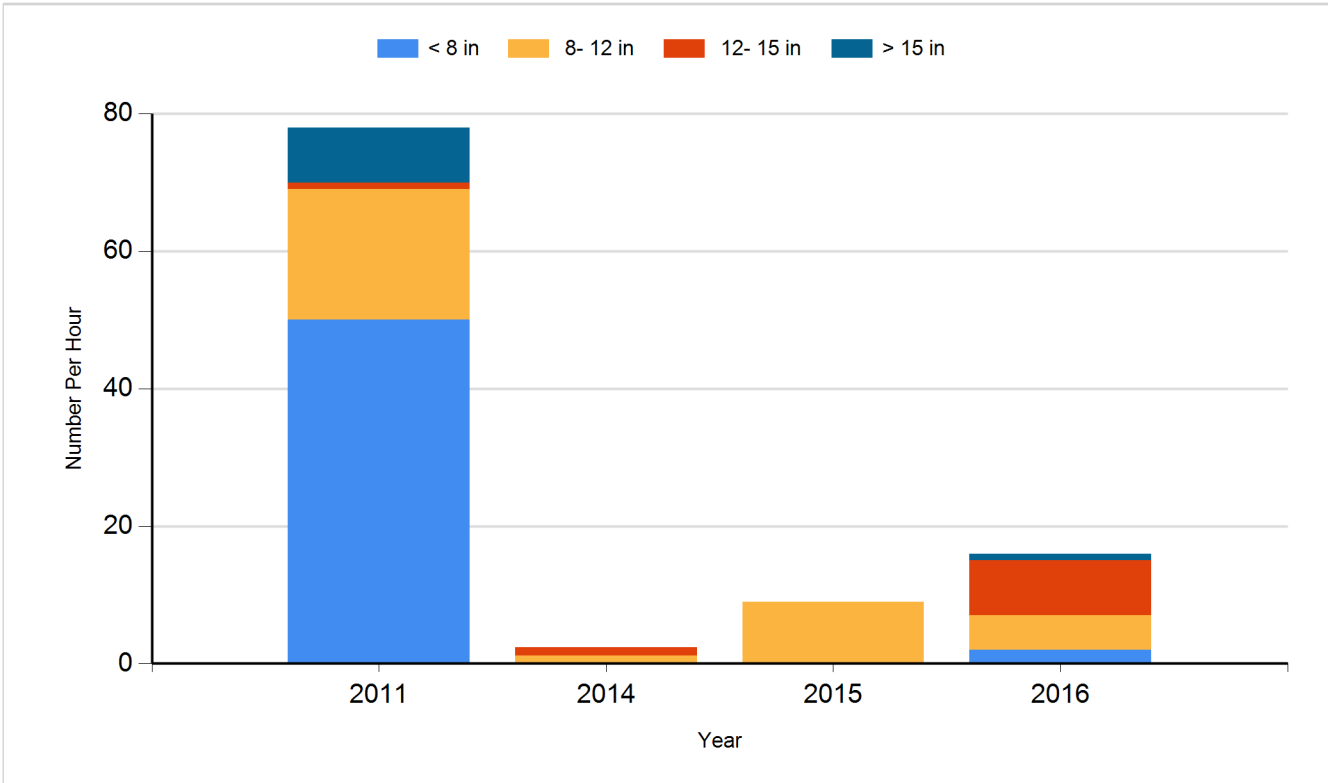

Species: Bluegill
Gear: AFS std frame net
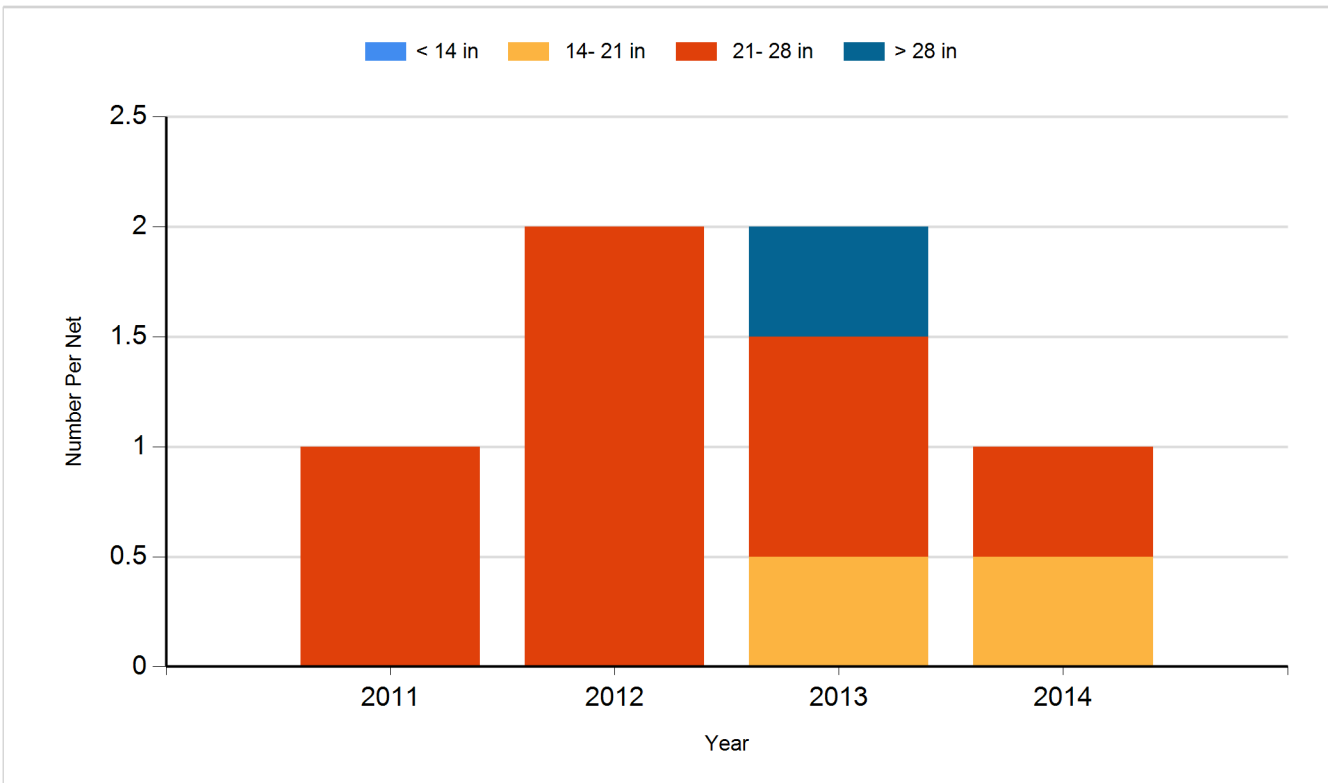
Species: Bluegill
Gear: frame net (std 3/4 in)

Species: Largemouth Bass
Gear: boat shocker (day)

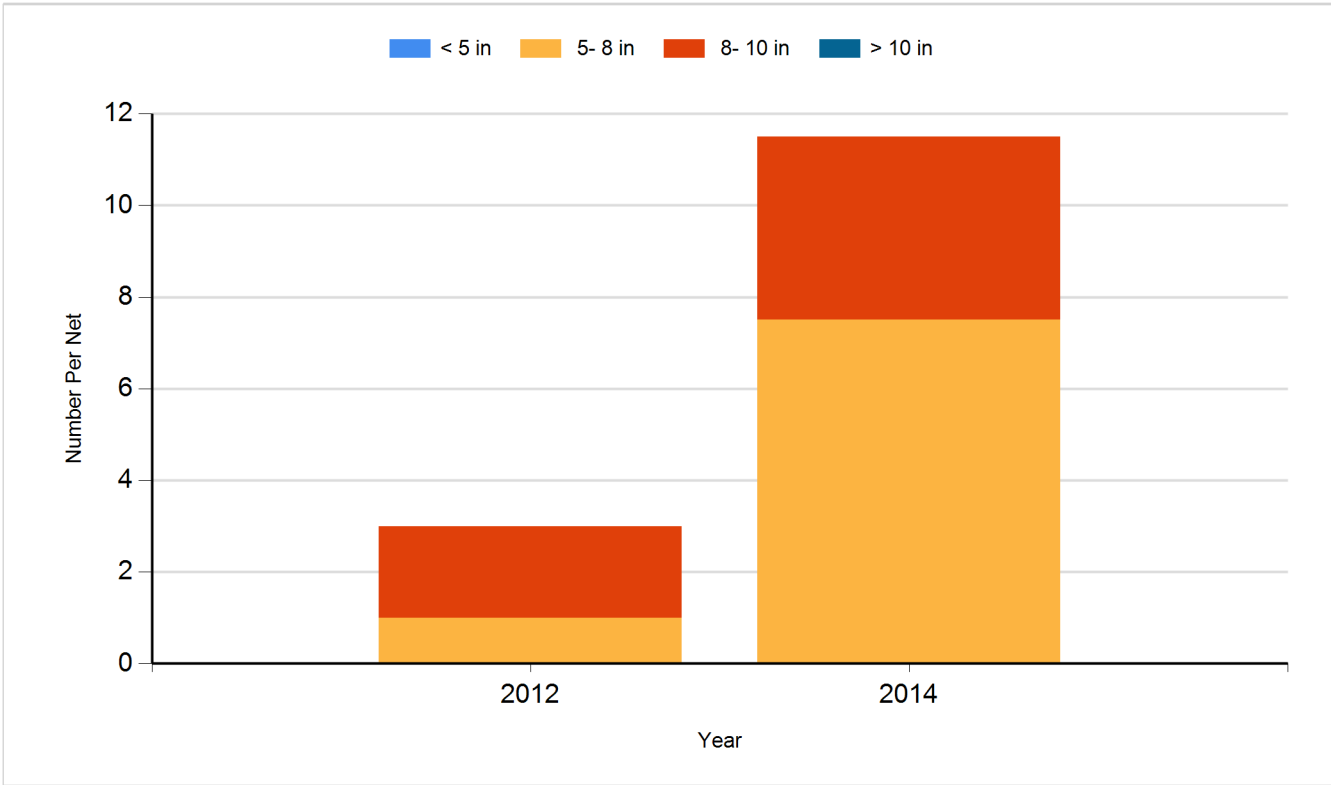Species: Largemouth Bass
Gear: boat shocker (night)

Species: Northern Pike
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	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
2022	Gizzard Shad	Adult	30
2022	Rainbow Trout (Gerrard)	Adult	1,088
2022	Walleye	Juvenile	33,738