

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Lemmon East, Perkins County

GRA-Lake-392-000

2020

Lake Information

Name: Lemmon East

County: Perkins

Surface Area: 162 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jul 28, 2020	2 net-nights
frame net (std 3/4 in)	Jul 28, 2020	6 net-nights

Common Fish Species Present

Northern Pike

Largemouth Bass

Yellow Perch

Black Bullhead

White Sucker

Bluegill

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
AFS std gill net	Black Bullhead	8	4.0	9.2	88		50	101	5	
	Northern Pike	12	3.0	3.1	83		0	102	2	
frame net (std 3/4 in)	Black Bullhead	983	151.2	65.2	11	1	1	0	93	1
	Bluegill	1	0.2	0.2	100		100		112	
	Northern Pike	17	2.2	1.2	92		0		93	2
	White Sucker	1	0.2	0.2	100		0		89	
	Yellow Perch	1	0.2	0.2	100		100		88	

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	
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
AFS std frame net	Black Bullhead							0.8					0.80
	Bluegill							0.5					0.50
	Largemouth Bass							0.2					0.20
	Northern Pike							0.4					0.40
	White Sucker							0.2					0.20
	Yellow Perch							0.2					0.20
AFS std gill net	Black Bullhead							41.8	14.0	5.5	4.0		16.33
	Largemouth Bass							0.5	0.0	0.0	0.0		0.13
	Northern Pike							3.0	1.5	2.5	3.0		2.50
	White Sucker							0.3	0.0	0.0	0.0		0.08
	Yellow Perch							0.8	0.5	1.5	0.0		0.70
boat shocker (night)	Largemouth Bass		334.0	8.0	90.0								144.00
	Smallmouth Bass		44.0	4.0	1.2								16.40
boat shocker (night, AC)	Largemouth Bass	3.0											3.00
frame net (std 3/4 in)	Black Bullhead	18.4	176.0	177.7	140.8	40.0			5.0	13.3	151.2		90.30
	Bluegill	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.2		0.03
	Golden Shiner	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	0.3	0.0			0.0	0.0	0.0		0.04
	Northern Pike	0.5	0.8	0.0	0.1	0.3			0.7	0.6	2.2		0.65
	Smallmouth Bass	0.0	0.0	0.3	0.0	0.0			0.0	0.0	0.0		0.04
	Walleye	0.0	0.0	0.0	0.0	0.0			0.0	0.1	0.0		0.01
	White Sucker	11.0	14.5	15.7	3.6	0.5			0.0	0.0	0.2		5.69
	Yellow Perch	2.5	3.3	0.3	1.1	0.6			0.3	0.4	0.2		1.09
std exp gill net	Black Bullhead	138.0	52.0	102.0	111.5	24.0							85.50
	Golden Shiner	0.0	0.0	0.0	0.0	0.0							0.00
	Largemouth Bass	0.0	0.0	0.0	0.0	3.5							0.70
	Northern Pike	1.0	2.0	3.0	1.5	11.0							3.70
	White Sucker	161.0	20.0	18.0	3.0	1.0							40.60
	Yellow Perch	4.0	11.0	54.0	21.0	21.5							22.30

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											
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
AFS std frame net	Black Bullhead	PSD									100			
		PSD-P									100			
		Wr									97			
	Bluegill	PSD									100			
		PSD-P									40			
		Wr									218			
	Largemouth Bass	PSD									100			
		PSD-P									50			
		Wr									94			
	Northern Pike	PSD									25			
		PSD-P									25			
		Wr									87			
	White Sucker	PSD									100			
		PSD-P									100			
		Wr									86			
Yellow Perch	PSD									100				
	PSD-P									100				
	Wr									99				
AFS std gill net	Black Bullhead	PSD								100	100	100	88	
		PSD-P								89	96	100	50	
		Wr								102	97	110	101	
	Largemouth Bass	PSD									50			
		PSD-P									0			
		Wr									113			
	Northern Pike	PSD									92	100	100	83
		PSD-P									58	33	40	0
		Wr									91	91	84	102
	White Sucker	PSD									100			
		PSD-P									100			
		Wr									81			
	Yellow Perch	PSD									100	100	100	
		PSD-P									67	100	100	

Gear	Species	Index	Year												
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020			
AFS std gill net	Yellow Perch	Wr								106	83	99			
boat shocker (night)	Largemouth Bass	PSD		8	100	7									
		PSD-P		0	0	3									
		Wr		123	132	122									
boat shocker (night, AC)	Largemouth Bass	PSD	0												
		PSD-P	0												
		Wr	145												
frame net (std 3/4 in)	Black Bullhead	PSD	76	10	11	86	97				100	100	11		
		PSD-P	22	0	0	0	3				100	100	1		
		Wr	102		94	83	91				89	90	93		
	Bluegill	PSD												100	
		PSD-P												100	
		Wr												112	
	Largemouth Bass	PSD				100									
		PSD-P				0									
		Wr				108									
	Northern Pike	PSD	25	100		100	0				50	100	92		
		PSD-P	0	33		0	0				0	80	0		
		Wr	107	108		84					90	89	93		
	White Sucker	PSD	10	83	98	100	100							100	
		PSD-P	7	5	57	100	100							0	
		Wr	87	92	91	91	93							89	
	Yellow Perch	PSD	45	8	0	100	100				50	33	100		
		PSD-P	10	8	0	44	60				50	0	100		
		Wr	86	94	101	100	113				99	89	88		
	std exp gill net	Black Bullhead	PSD	9	12	7	72	94							
			PSD-P	3	0	1	0	4							
			Wr		98	102	84	97							
Largemouth Bass		PSD					0								
		PSD-P					0								
		Wr					109								
Northern Pike		PSD	100	100	100	100	36								
		PSD-P	0	0	100	100	36								
		Wr	113	118	110	100	100								
White Sucker		PSD	27	80	100	100	100								

Gear	Species	Index	Year									
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
std exp gill net	White Sucker	PSD-P	5	10	72	100	100					
		Wr		99	92	96	112					
	Yellow Perch	PSD	100	27	22	86	84					
		PSD-P	75	9	0	31	60					
		Wr	107	98	103	107	112					

Length at Capture

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

Species: Yellow Perch

Year	N	Mean Length (expanded sample number) at capture by age									
		1	2	3	4	5	6	7	8	9	10+
2014	84	144 (8)	191 (4)	245 (70)	294 (2)						

Fish Condition

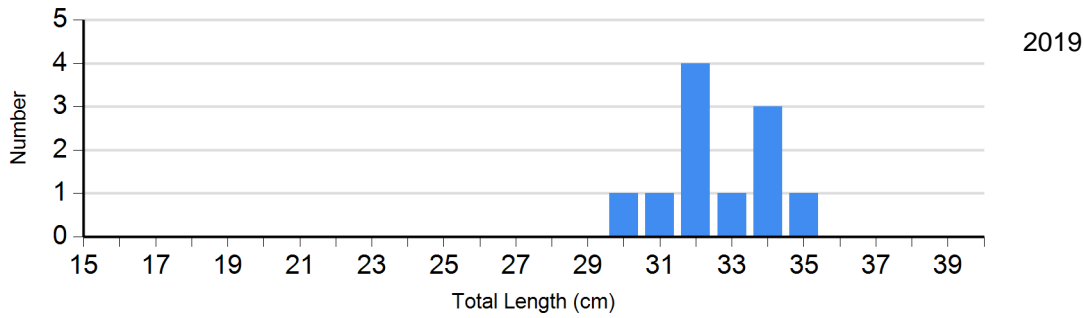
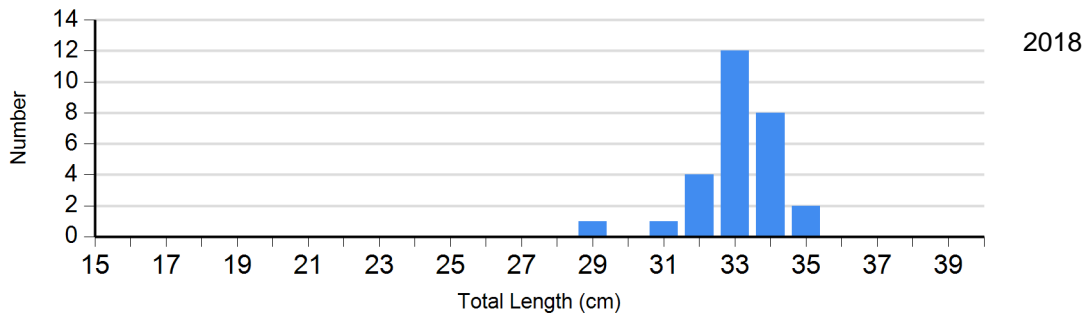
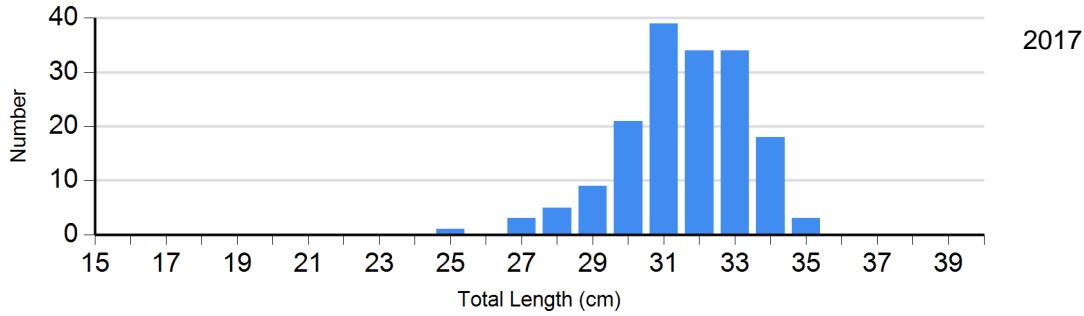
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2017	0		18	103 (2.4)	149	102 (0.9)	0	
	2018	0		1	101	27	97 (1.5)	0	
	2019	0		0		11	110 (3.8)	0	
	2020	1	92	3	109 (3.1)	4	97 (6.4)	0	
Bluegill Frame Net	2017	0		3	278 (152.8)	2	127 (9.6)	0	
	2020	0		0		1	112	0	
Northern Pike Gill Net	2017	1	95	4	87 (4.1)	1	100	6	91 (11.3)
	2018	0		2	82 (5.1)	1	108	0	
	2019	0		3	78 (3.8)	2	92 (1.2)	0	
	2020	1	100	5	102 (2.0)	0		0	
White Sucker Gill Net	2017	0		0		0		1	81
Yellow Perch Gill Net	2017	0		1	108	1	109	1	100
	2018	0		0		0		1	83
	2019	0		0		0		3	99 (6.3)

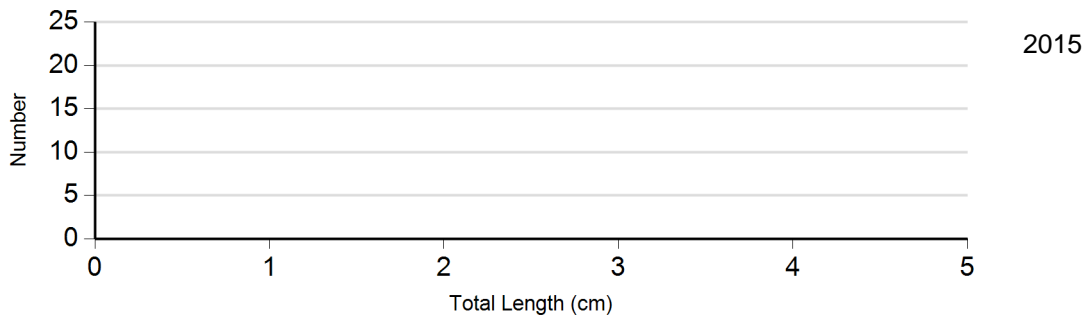
Length Frequency Distribution

Length frequency histogram of species sampled by year.

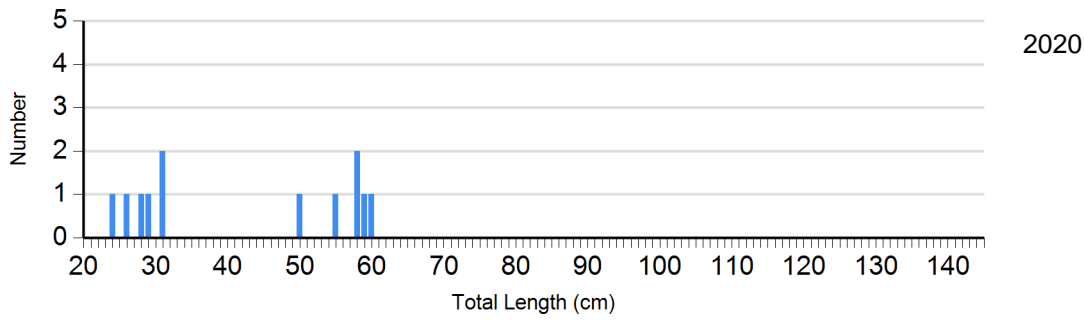
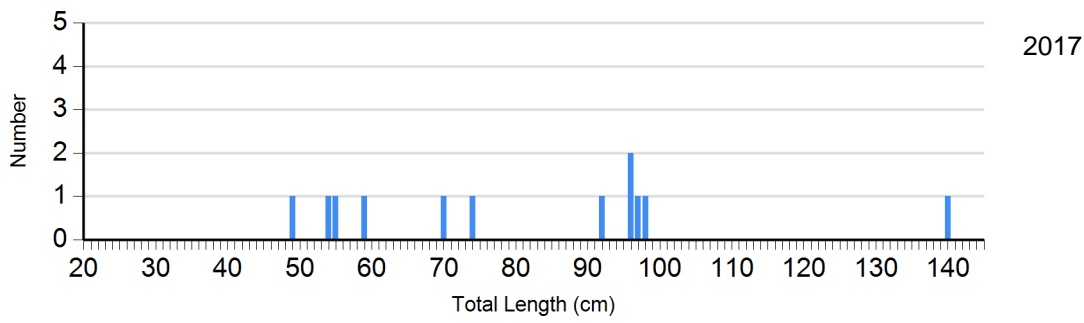
Species: Black Bullhead
Gear: AFS std gill net



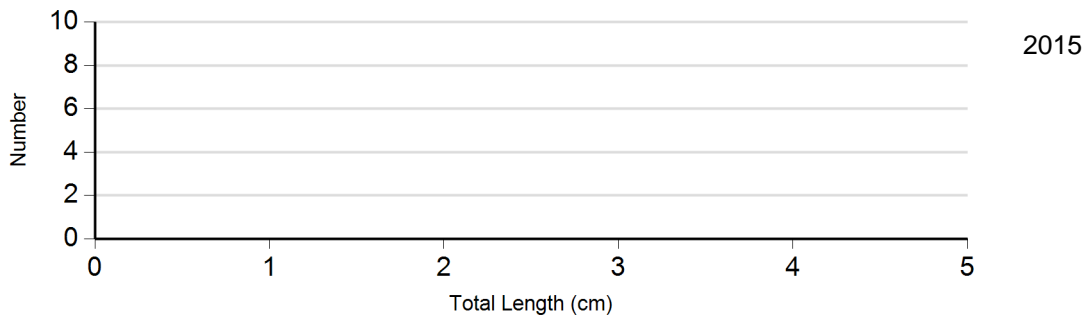
Species: Black Bullhead
Gear: std exp gill net



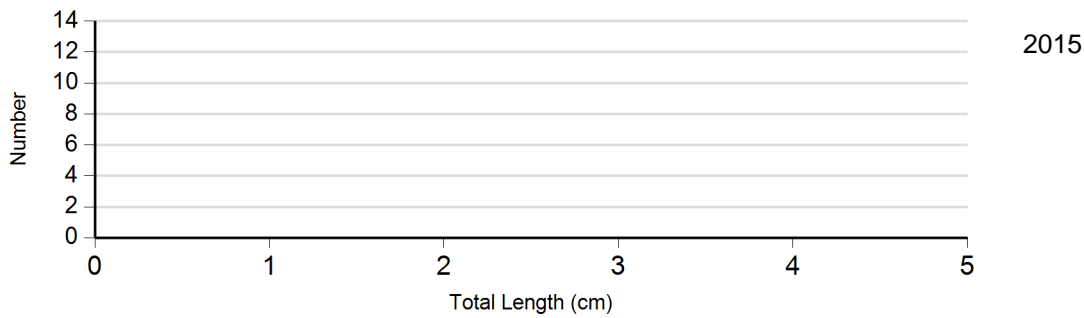
Species: Northern Pike
Gear: AFS std gill net



Species: Northern Pike
Gear: std exp gill net



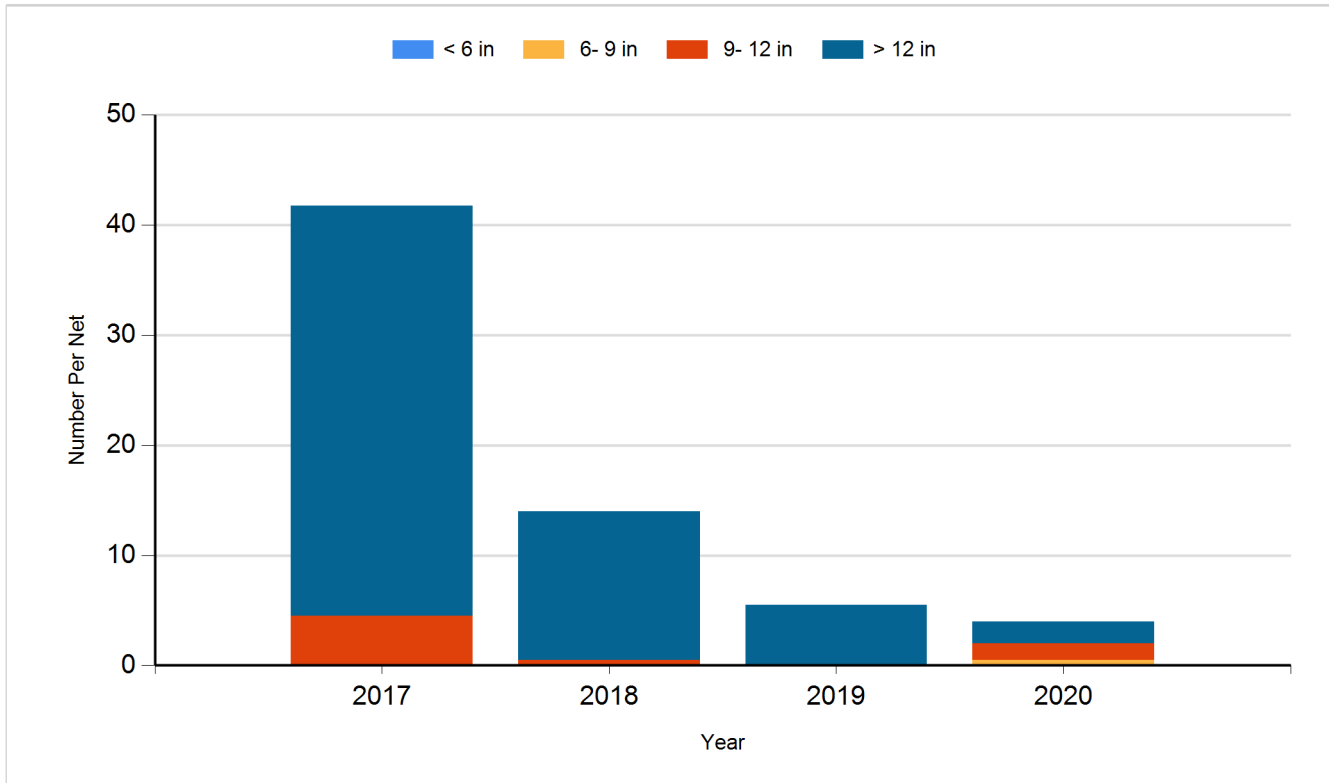
Species: Yellow Perch
Gear: std exp gill net



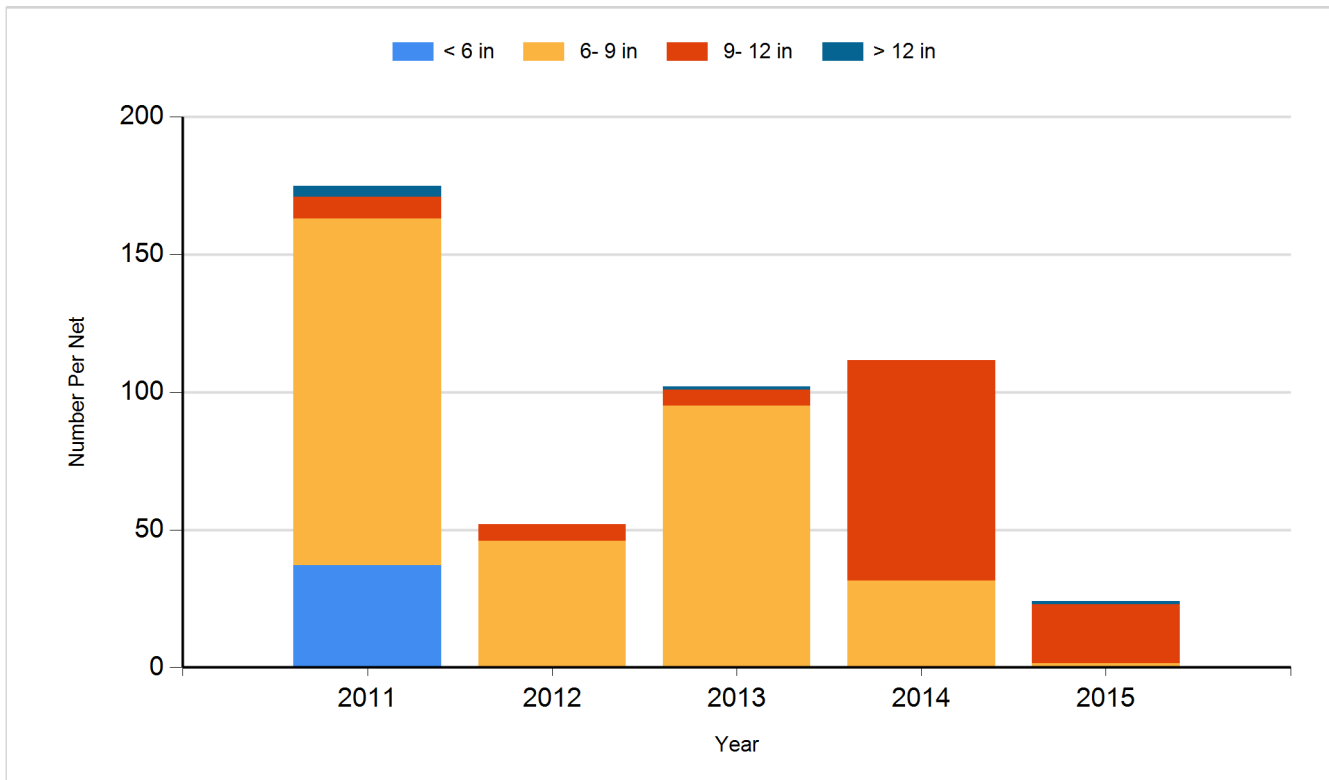
Historic Fish Sizes and Relative Abundance

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

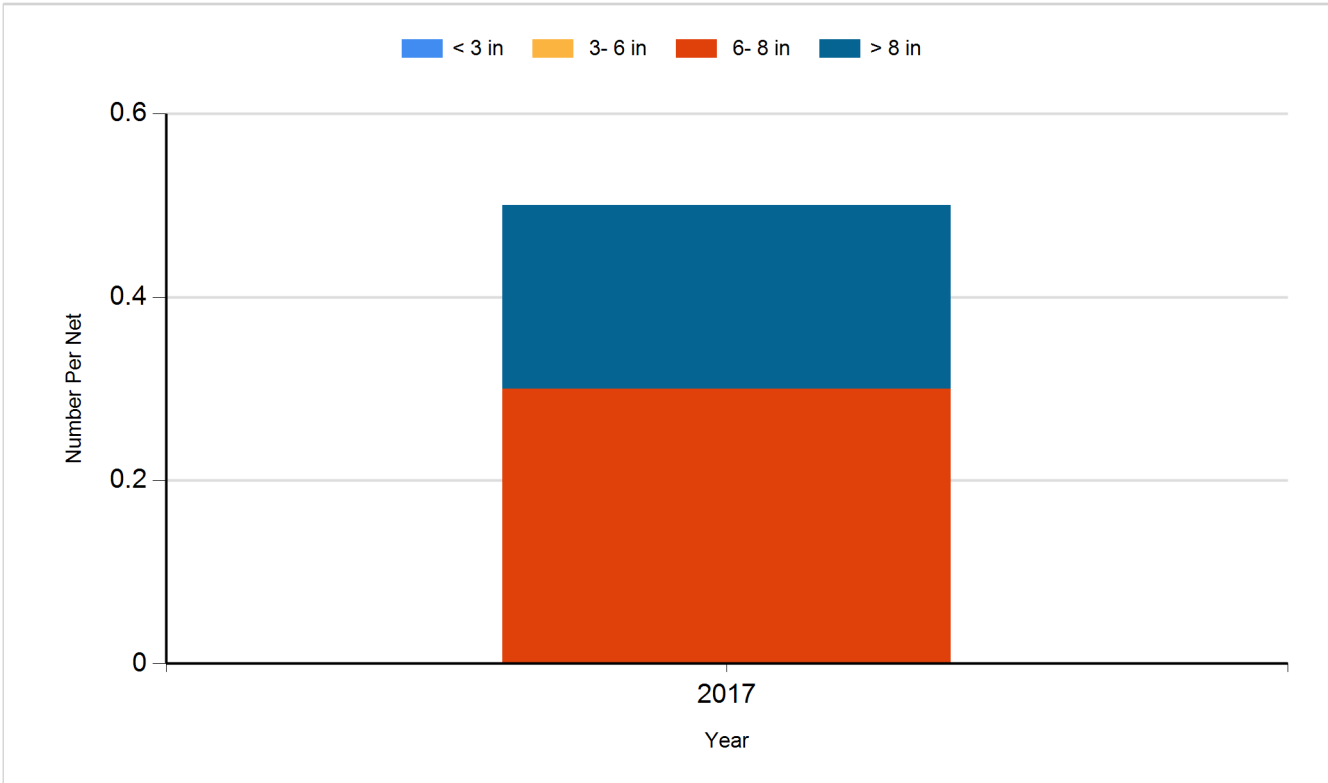
Species: Black Bullhead
Gear: AFS std gill net



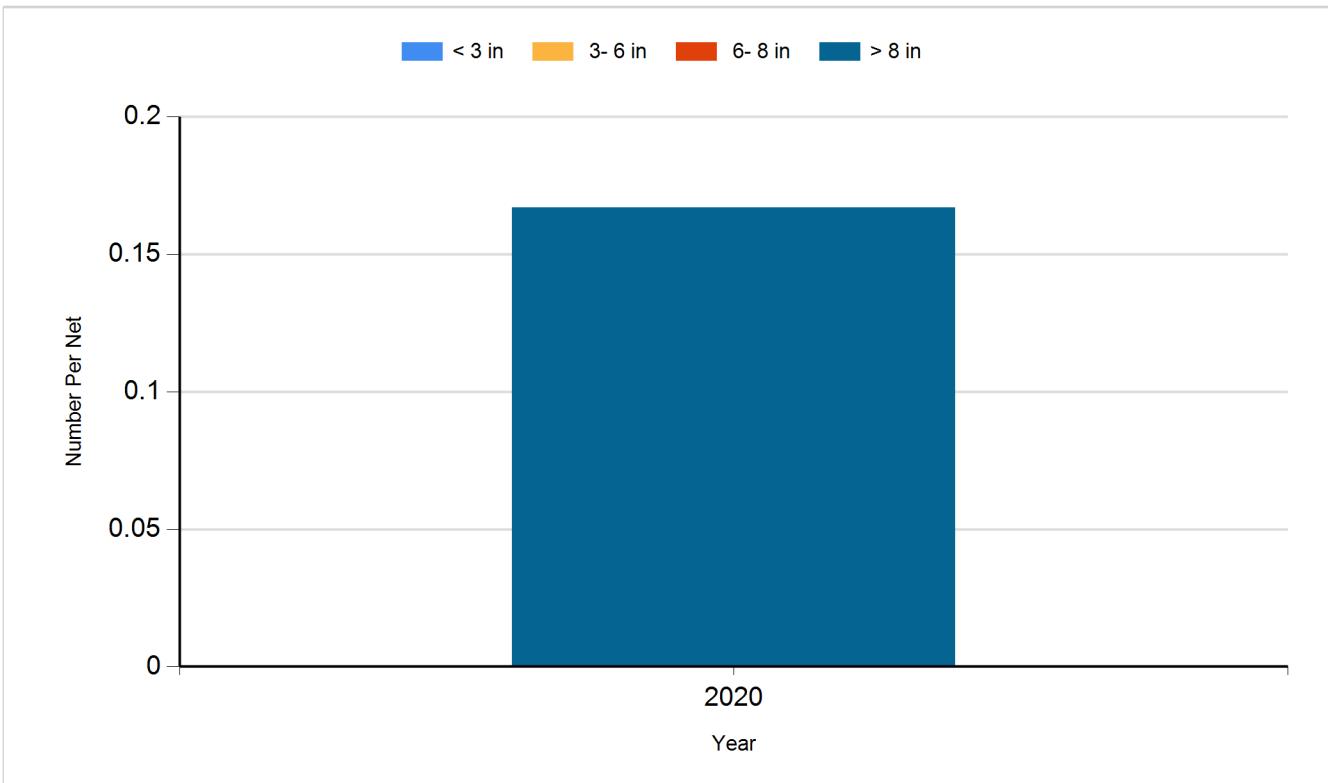
Species: Black Bullhead
Gear: std exp gill net



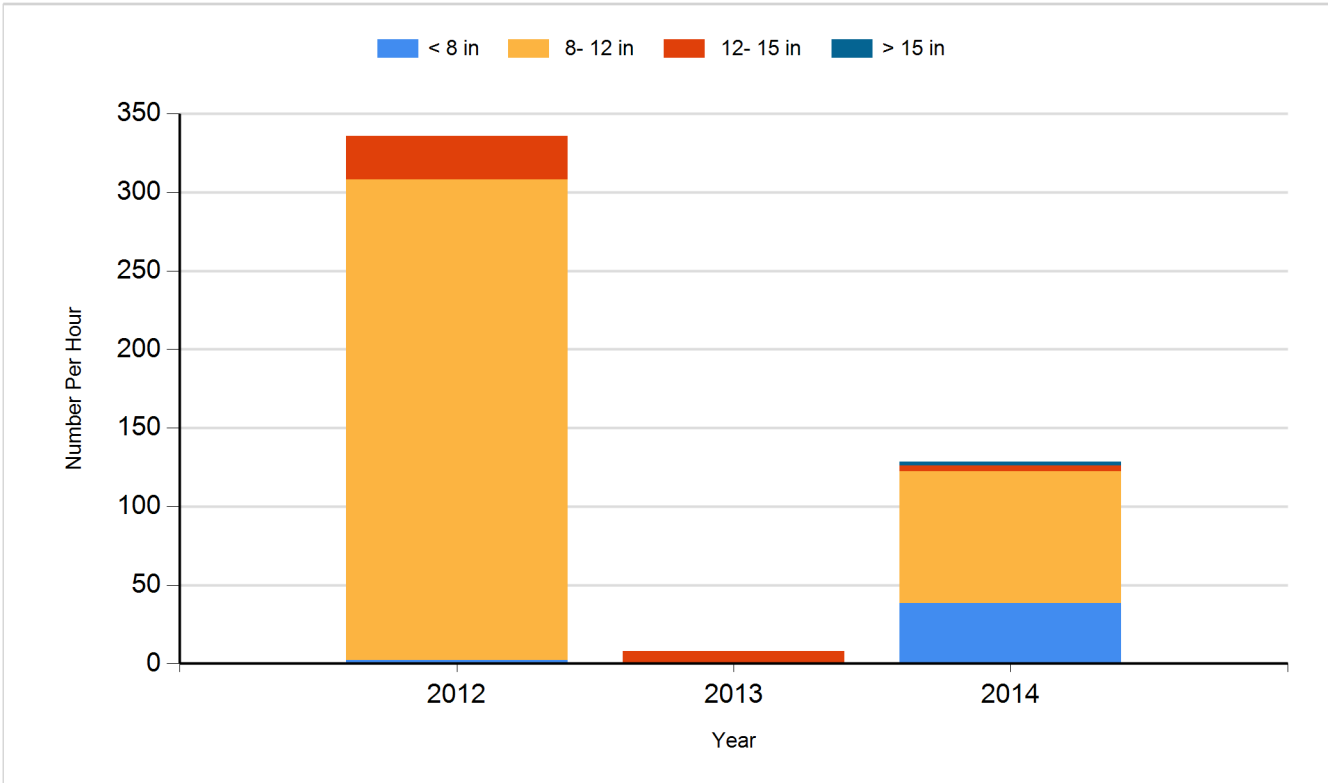
Species: Bluegill
Gear: AFS std frame net



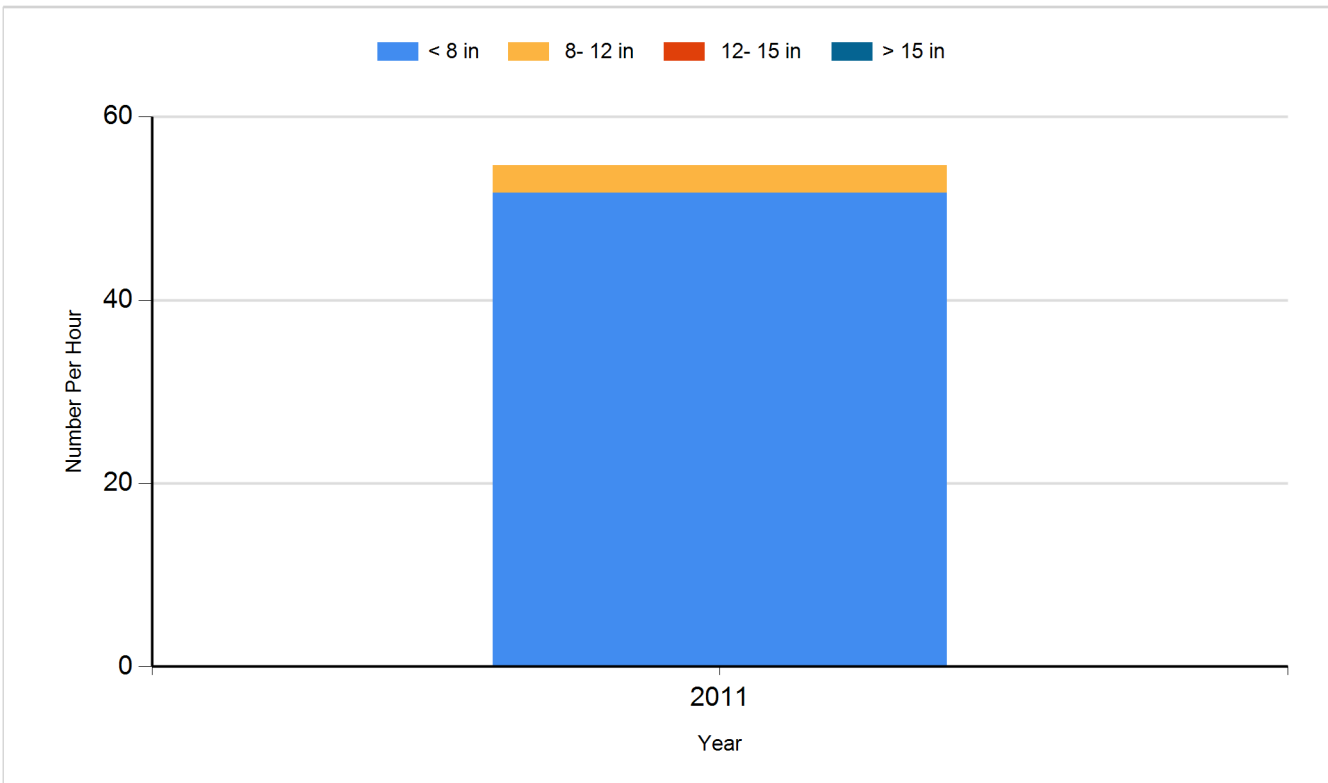
Species: Bluegill
Gear: frame net (std 3/4 in)



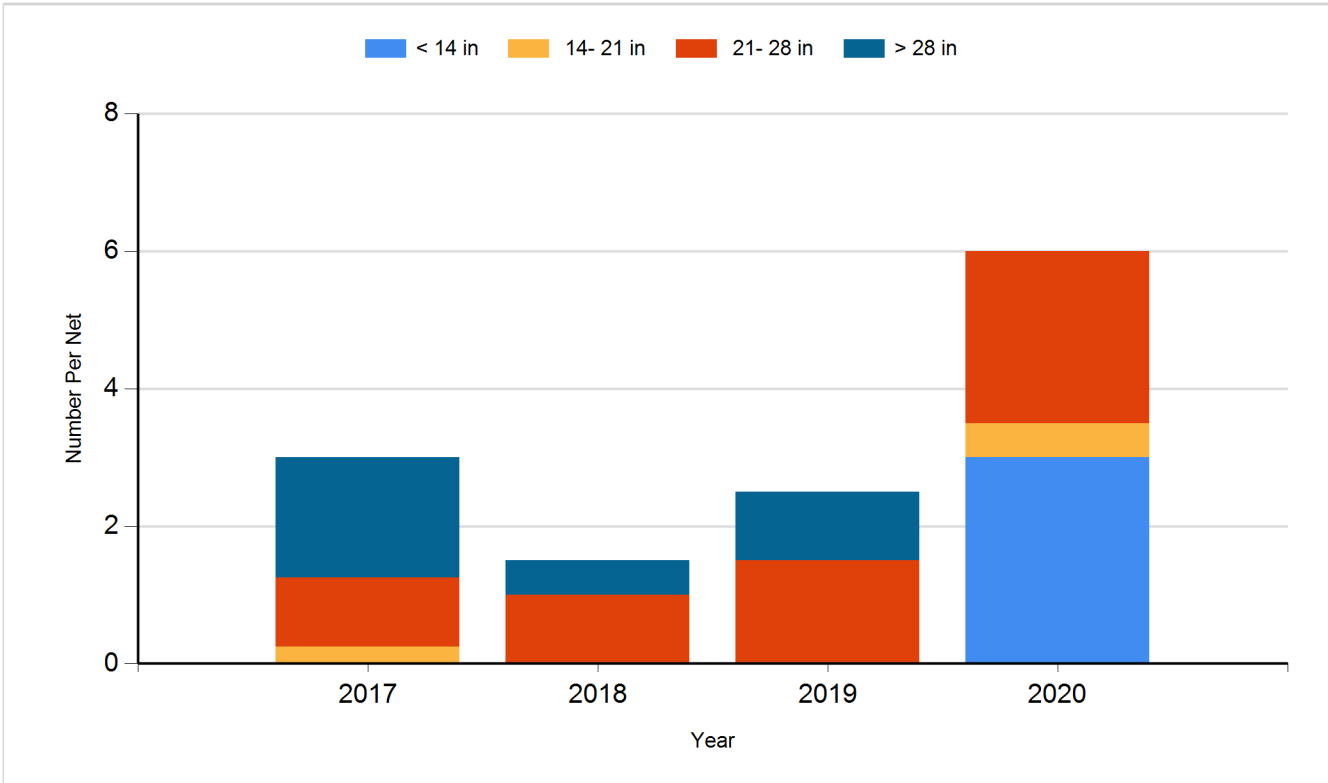
Species: Largemouth Bass
Gear: boat shocker (night)



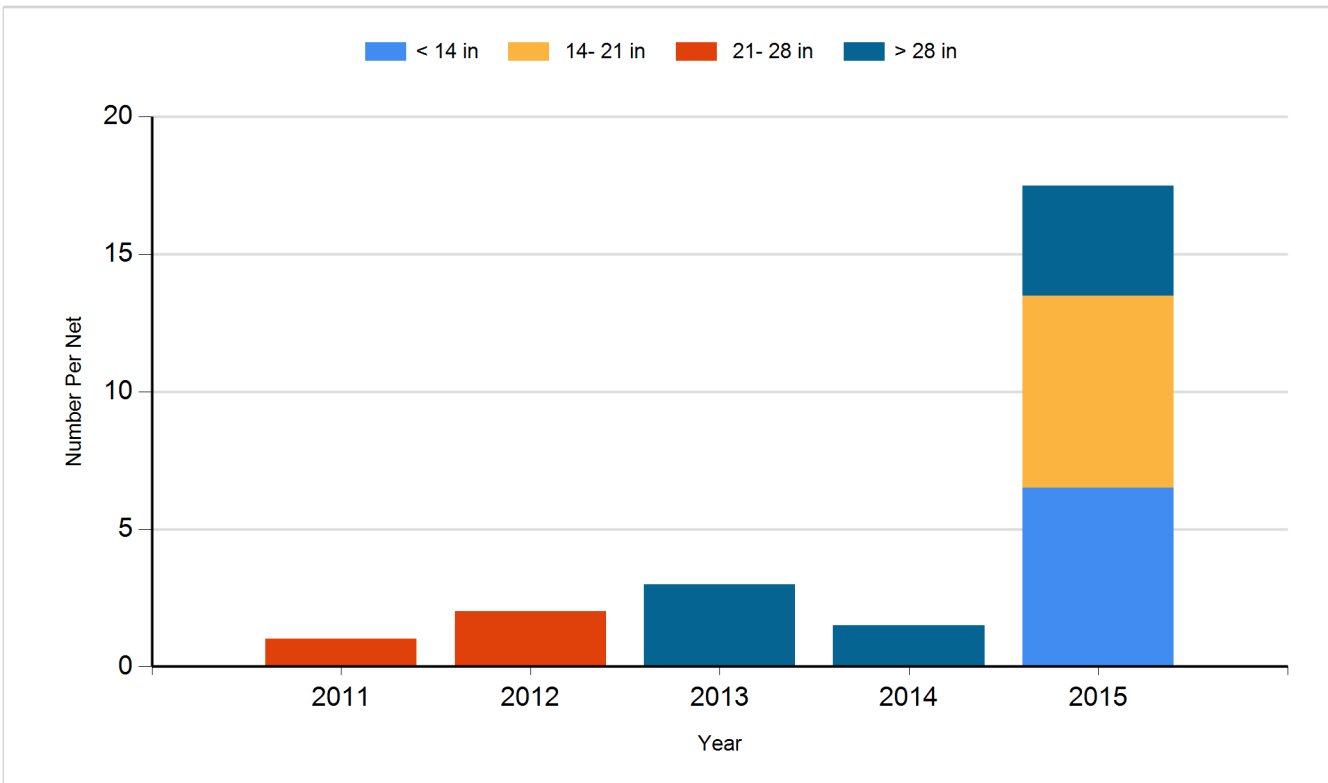
Species: Largemouth Bass
Gear: boat shocker (night, AC)



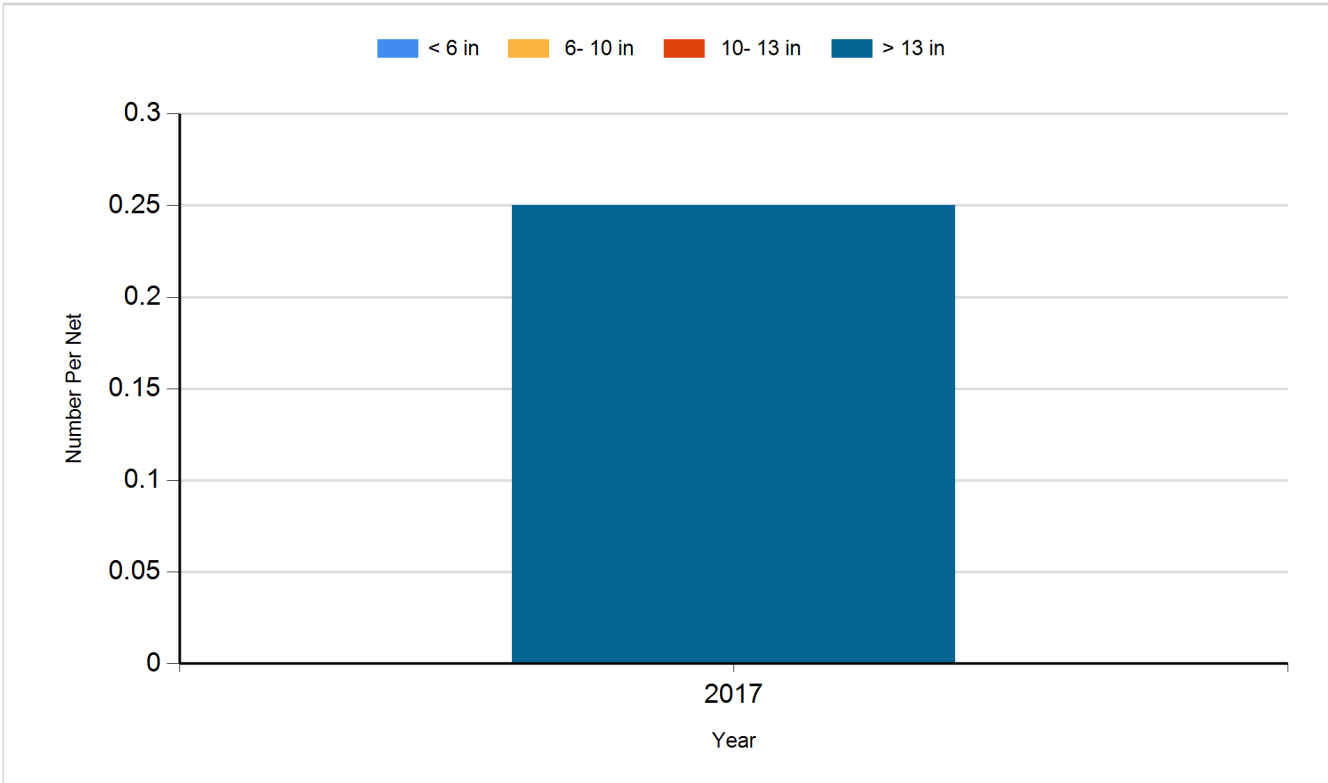
Species: Northern Pike
Gear: AFS std gill net



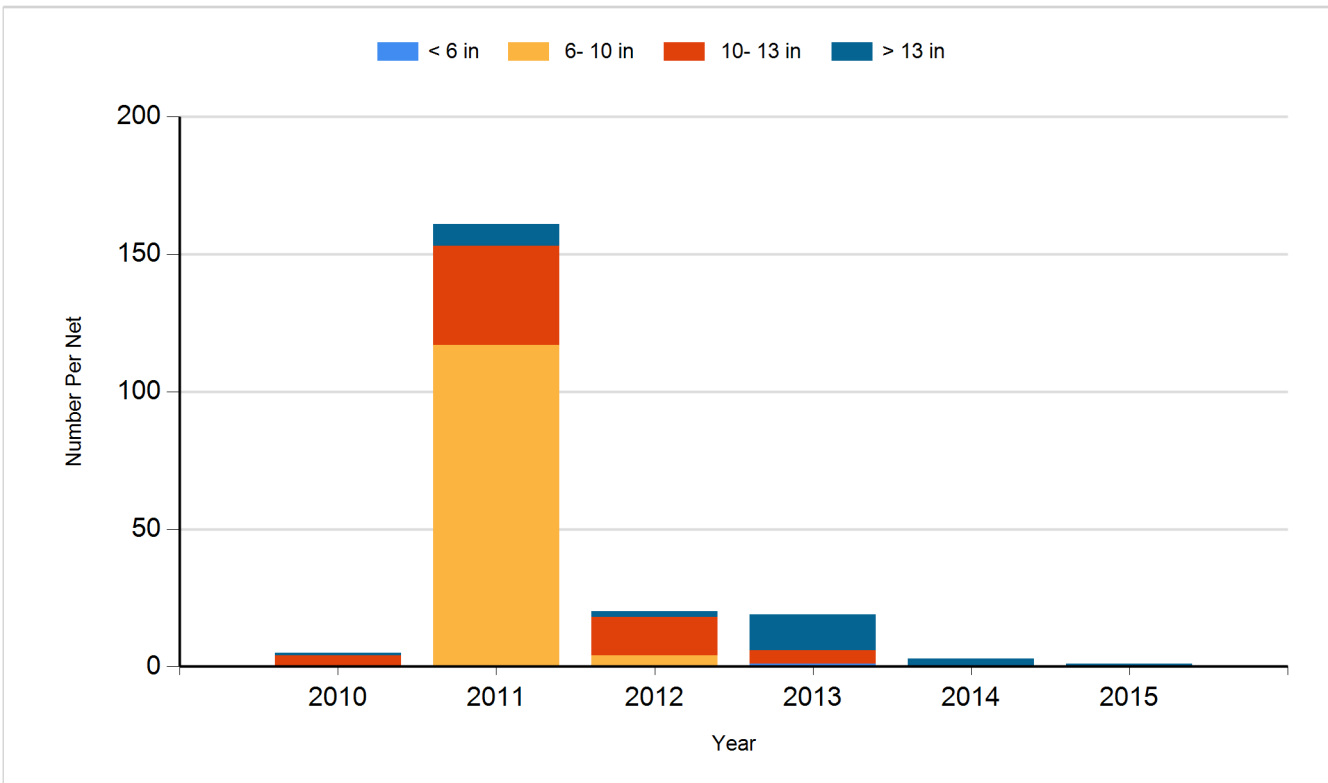
Species: Northern Pike
Gear: std exp gill net



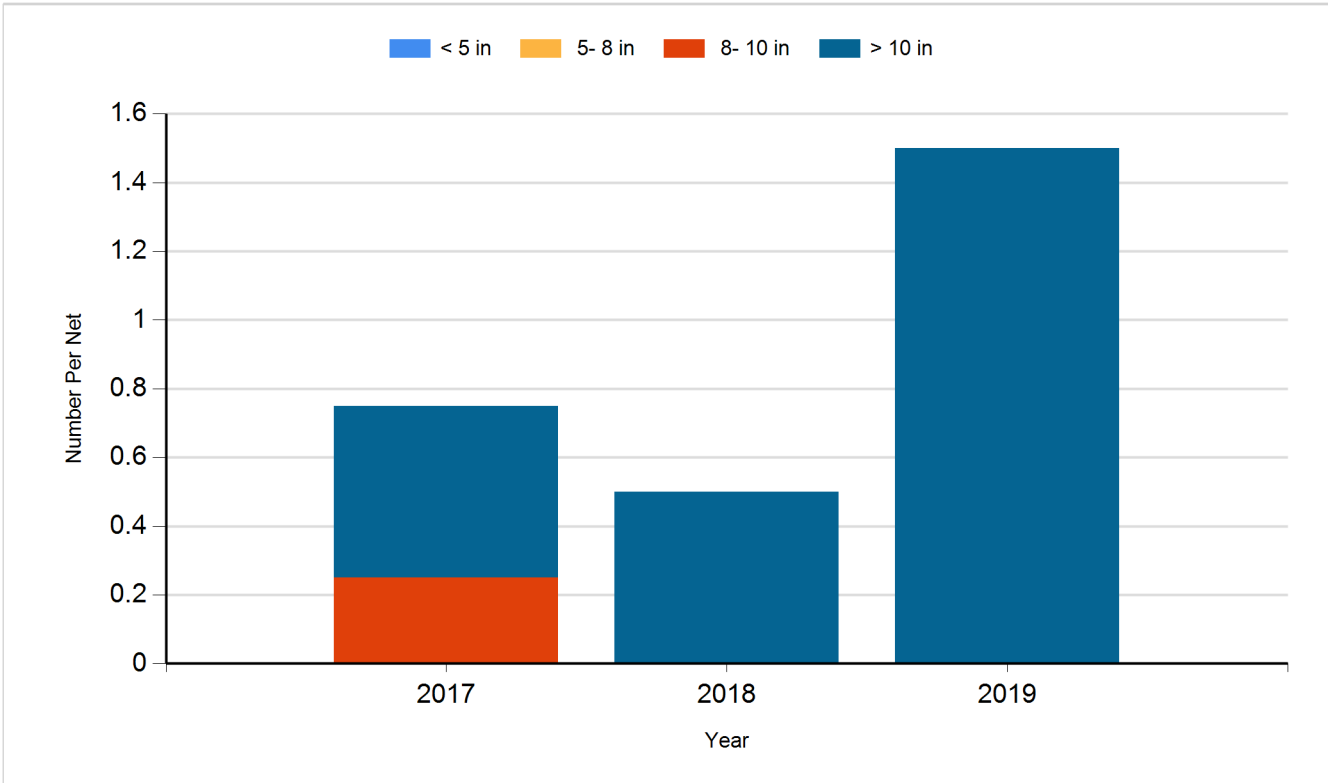
Species: White Sucker
Gear: AFS std gill net



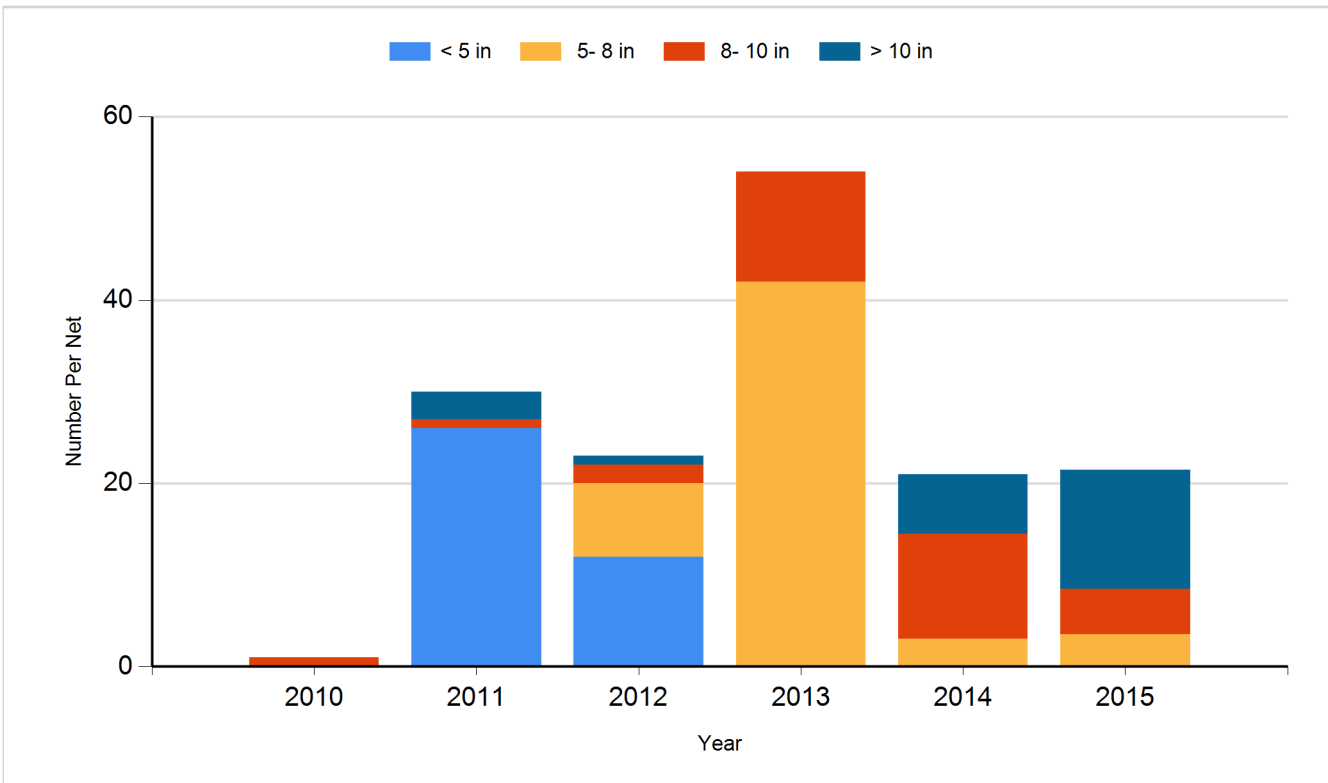
Species: White Sucker
Gear: std exp gill net



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
2010	Largemouth Bass	Fingerling	6,000
2010	Northern Pike	Fry	166,000
2010	Yellow Perch	Adult	400
2011	Golden Shiner	Adult	40
2011	Largemouth Bass	Fingerling	7,000
2011	Yellow Perch	Adult	385
2016	Bluegill	Adult	600
2019	Black Crappie	Adult	35
2019	Bluegill	Adult	67
2019	Largemouth Bass	Fingerling	1,500
2019	Northern Pike	Adult	50
2019	Yellow Perch	Adult	350
2020	Largemouth Bass	Small Fingerling	10,950
