

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Newell, Butte County

LBF-Lake-528-000

2018

Lake Information

Name: Newell
County: Butte
Surface Area: 154 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Aug 01, 2018	4 net-nights
boat shocker (night)	Sep 26, 2018	3600 seconds
frame net (std 3/4 in)	Jul 17, 2018	5 net-nights
frame net (std 3/4 in)	Jul 18, 2018	5 net-nights

Common Fish Species Present

Northern Pike

Largemouth Bass

Bluegill

Yellow Perch

Walleye

Smallmouth Bass

Rudd

White Sucker

Black Bullhead

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	Bluegill	5	1.3	0.8	60		20	106	4	
	Northern Pike	11	2.8	1.4	55		0	80	2	
	Rudd	3	0.5	0.5	100		100			
	Walleye	31	7.8	3.7	84		6	82	1	
	White Sucker	2	0.5	0.5	100		100	100	12	
	Yellow Perch	22	5.5	2.7	14		14	102	3	
boat shocker (night)	Largemouth Bass	27	24.0	6.5	92		67	15	110	3
	Walleye*	67	67.0	23.4	80		40		92	1
frame net (std 3/4 in)	Black Bullhead	4	0.4	0.2	100		100		100	7
	Bluegill	210	21.0	8.9	44	5	18	4	110	1
	Northern Pike	21	2.1	0.7	67	17	5		85	3
	Rudd	96	9.6	5.1	100		77	6		
	Smallmouth Bass	2	0.2	0.2	50		0		91	0
	Walleye	22	2.0	0.8	65	17	20		83	1
	White Sucker	3	0.3	0.2	100		100		87	8
	Yellow Perch	24	2.3	0.7	30	15	26	15	93	4

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.

Gear	Species	CPUE										Avg
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
AFS std frame net	Bluegill									2.4		2.4
	Northern Pike									0.2		0.2
	Rudd									3.0		3.0
	Smallmouth Bass									0.0		0.0
	Walleye									0.9		0.9
	White Sucker									0.7		0.7
	Yellow Perch									0.4		0.4
AFS std gill net	Bluegill									0.5	1.3	0.9
	Gizzard Shad									0.3		0.3
	Northern Pike									4.5	2.8	3.7
	Rudd									11.3	0.5	5.9
	Walleye									8.8	7.8	8.3
	White Sucker									1.5	0.5	1.0
	Yellow Perch									10.5	5.5	8.0
boat shocker (night)	Largemouth Bass				30.0		20.8	13.8	39.0	10.0	24.0	22.9
	Smallmouth Bass				1.2		1.0		1.0	1.0		1.1
	Walleye				46.8		123.8	101.0	38.0	29.0	67.0	67.6
boat shocker (night, AC)	Largemouth Bass		4.7	15.0								9.9
	Smallmouth Bass		0.7	1.0								0.9
	Walleye		77.5	68.0								72.8
frame net (std 3/4 in)	Black Bullhead		1.0	1.4	1.3						0.4	1.0
	Bluegill		8.3	5.5	21.5	29.1		17.3	28.9		21.0	18.8
	Golden Shiner		0.0									0.0
	Northern Pike		0.5	1.1	1.0	0.3		0.6	1.2		2.1	1.0
	Rudd		12.0	18.3	15.4	46.0		21.3	11.7		9.6	19.2
	Smallmouth Bass					0.1					0.2	0.2
	Walleye		2.3	0.6	0.6	1.1		1.0	1.1		2.0	1.2
	White Sucker		9.6	2.0	1.5	1.9		0.4	3.3		0.3	2.7
	Yellow Perch			0.3	0.1	0.9			0.2		2.3	0.8
std exp gill net	Black Bullhead			0.5								0.5
	Bluegill				0.5					1.0		0.8
	Gizzard Shad									0.0		0.0
	Northern Pike		2.5	1.0	3.5	4.5		3.0	3.5			3.0
	Rudd		2.0	0.0	37.0			25.5	18.5			16.6

		CPUE										
Gear	Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Avg
std exp gill net	Walleye		3.5	3.0	12.5	8.5		4.0	20.0			8.6
	White Sucker		0.5	0.5	2.5	3.0		3.5	1.5			1.9
	Yellow Perch		0.5		3.5	3.0		3.5	11.5			4.4

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												
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018			
AFS std frame net	Bluegill	PSD											33		
		PSD-P												13	
		Wr												108	
	Northern Pike	PSD												0	
		PSD-P												0	
		Wr												82	
	Smallmouth Bass	PSD												0	
		PSD-P												0	
	Walleye	PSD												67	
		PSD-P												11	
		Wr												82	
	White Sucker	PSD												100	
		PSD-P												100	
		Wr												95	
	Yellow Perch	PSD												25	
PSD-P													0		
Wr													92		
AFS std gill net	Bluegill	PSD											50	60	
		PSD-P											0	20	
		Wr											113	106	
	Northern Pike	PSD											39	55	
		PSD-P											6	0	
		Wr											87	80	
	Walleye	PSD											69	84	
		PSD-P											14	6	
		Wr											80	82	
	White Sucker	PSD											100	100	
		PSD-P											83	100	
		Wr											100	100	
	Yellow Perch	PSD											2	14	
		PSD-P											0	14	
		Wr											93	102	

Gear	Species	Index	Year									
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
boat shocker (night)	Largemouth Bass	PSD				32		83	71	33	80	92
		PSD-P				32		78	36	10	20	67
		Wr				112		111	115	117	119	110
	Smallmouth Bass	PSD				0		0		0	100	
		PSD-P				0		0		0	0	
		Wr				110		119		135	117	
	Walleye	PSD				23		67	42	42	75	80
		PSD-P				0		7	1	4	25	40
		Wr				100		93	86	99	97	92
boat shocker (night, AC)	Largemouth Bass	PSD		100	100							
		PSD-P		100	100							
		Wr		115	103							
	Smallmouth Bass	PSD		0	100							
		PSD-P		0	100							
		Wr		95	93							
	Walleye	PSD		25	15							
		PSD-P		4	0							
		Wr		85	90							
frame net (std 3/4 in)	Black Bullhead	PSD		88	45	100						100
		PSD-P		25	9	60						100
		Wr		98	87	82						100
	Bluegill	PSD		97	80	94	38		41	76		44
		PSD-P		42	30	20	10		7	8		18
		Wr		115	105	106	114		113	116		110
	Northern Pike	PSD		50	67	25	100		20	17		67
		PSD-P		0	22	0	0		20	0		5
		Wr		78	76	78	83		77	86		85
	Smallmouth Bass	PSD					100					50
		PSD-P					100					0
		Wr					94					91
	Walleye	PSD		83	60	0	75		75	64		65
		PSD-P		11	0	0	25		13	9		20
		Wr		79	85	81	80		80	80		83
	White Sucker	PSD		100	100	100	100		100	100		100
		PSD-P		100	100	100	100		100	100		100
		Wr		85	87	82	91		89	94		87

Gear	Species	Index	Year									
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
frame net (std 3/4 in)	Yellow Perch	PSD			50	100	50			0		30
		PSD-P			50	0	33			0		26
		Wr			85	88	88			90		93
std exp gill net	Black Bullhead	PSD			0							
		PSD-P			0							
		Wr			97							
	Bluegill	PSD				100					100	
		PSD-P				100					0	
		Wr				105					125	
	Northern Pike	PSD		60	50	71	11			17	14	
		PSD-P		0	0	14	0			17	0	
		Wr		76	80	84	81			78	83	
	Walleye	PSD		86	83	32	35			75	50	
		PSD-P		0	17	0	12			13	10	
		Wr		85	82	78	84			81	84	
	White Sucker	PSD		100	100	100	100			100	100	
		PSD-P		100	100	100	100			100	100	
		Wr		100	92	94	90			99	94	
	Yellow Perch	PSD		100		43	33			0	52	
		PSD-P		0		0	0			0	0	
		Wr		98		93	101			98	98	

Length at Capture

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

Species: Largemouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2015	18	219 (10)		349 (8)							

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	30		290 (1)	372 (8)	408 (7)	456 (6)	445 (2)	452 (1)	428 (1)	507 (4)	596 (1)
2017	36	221 (1)	306 (3)	371 (10)	400 (10)	455 (2)		512 (5)	449 (2)	533 (2)	517 (1)
2016	84	212 (4)	282 (10)	346 (28)	380 (12)	410 (2)	456 (6)	454 (14)	489 (8)		
2015	16			364 (4)	421 (2)		457 (6)	401 (2)	551 (2)		
2013	32		318 (8)	323 (8)	360 (6)	371 (4)		500 (2)	564 (2)		688 (2)
2012	50			330 (20)	353 (14)	407 (12)		419 (2)		462 (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).

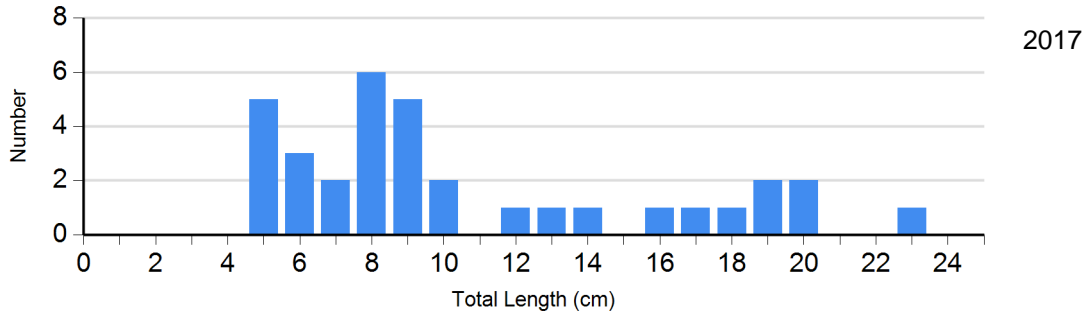
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Bluegill Frame Net	2015	162	115 (1.0)	94	113 (0.9)	20	101 (0.8)	0	
	2016	138	126 (1.4)	392	114 (0.6)	48	108 (0.3)	0	
	2017	16	111 (3.6)	5	105 (4.6)	3	96 (4.1)	0	
	2018	118	112 (1.4)	55	110 (1.5)	37	102 (1.2)	0	
Largemouth Bass Electro Fishing	2014	6	113 (3.9)	2	117 (0.0)	28	110 (1.2)	0	
	2015	8	124 (2.7)	10	117 (1.8)	10	104 (1.2)	0	
	2016	52	115 (1.8)	18	120 (3.7)	8	118 (1.7)	0	
	2017	2	118 (2.7)	6	121 (5.7)	2	114 (13.1)	0	
	2018	2	122 (8.6)	6	115 (3.8)	16	106 (2.9)	0	
Northern Pike Gill Net	2015	10	77 (2.1)	0		2	83 (0.0)	0	
	2016	12	84 (1.9)	2	75 (0.0)	0		0	
	2017	11	87 (1.5)	6	87 (3.1)	1	95	0	
	2018	5	79 (1.9)	6	82 (1.7)	0		0	
Smallmouth Bass Electro Fishing	2014	2	119 (0.0)	0		0		0	
	2016	2	135 (0.0)	0		0		0	
	2017	0		1	117	0		0	
Walleye Gill Net	2015	4	80 (2.9)	10	82 (1.2)	2	78 (0.0)	0	
	2016	40	84 (0.8)	32	85 (0.8)	8	78 (0.4)	0	
	2017	11	79 (1.1)	19	80 (1.0)	5	80 (1.6)	0	
	2018	5	82 (2.2)	24	83 (0.9)	1	78	1	67
White Sucker Gill Net	2015	0		0		0		14	99 (0.9)
	2016	0		0		2	98 (0.0)	4	91 (2.7)

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
White Sucker Gill Net	2017	0		1	106	1	115	4	95 (4.5)
	2018	0		0		0		2	100 (8.9)
Yellow Perch Gill Net	2015	14	98 (1.3)	0		0		0	
	2016	22	100 (2.9)	24	97 (1.4)	0		0	
	2017	41	93 (1.0)	1	93	0		0	
	2018	19	101 (2.8)	0		1	109	2	104 (5.6)

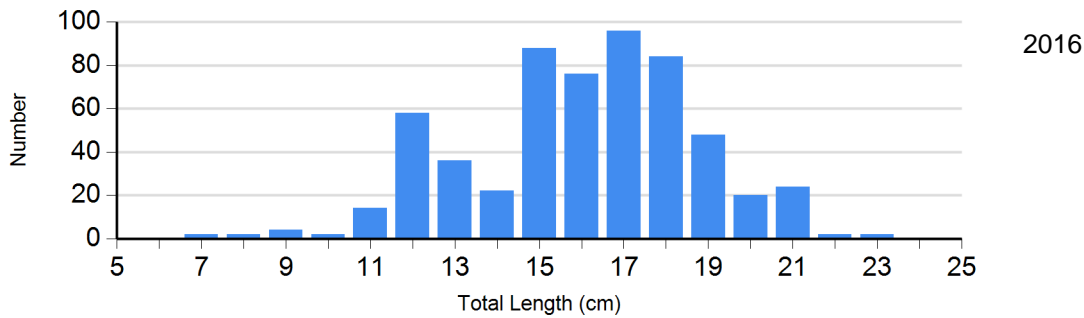
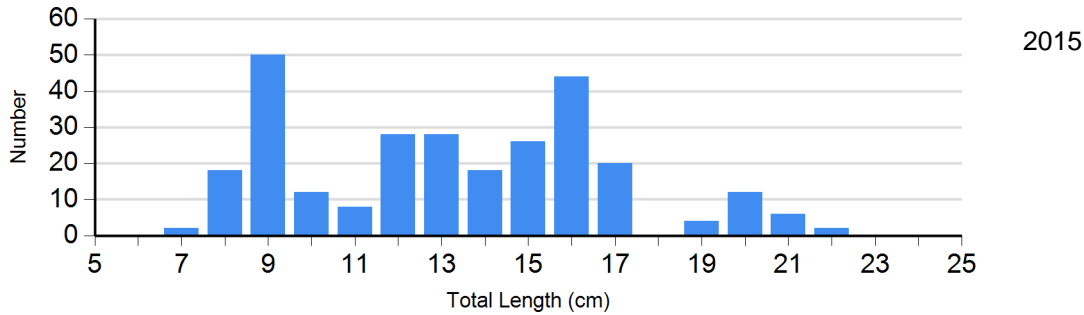
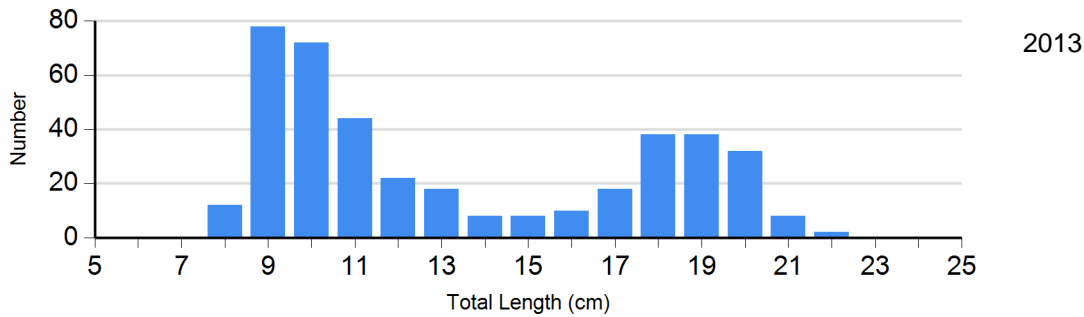
Length Frequency Distribution

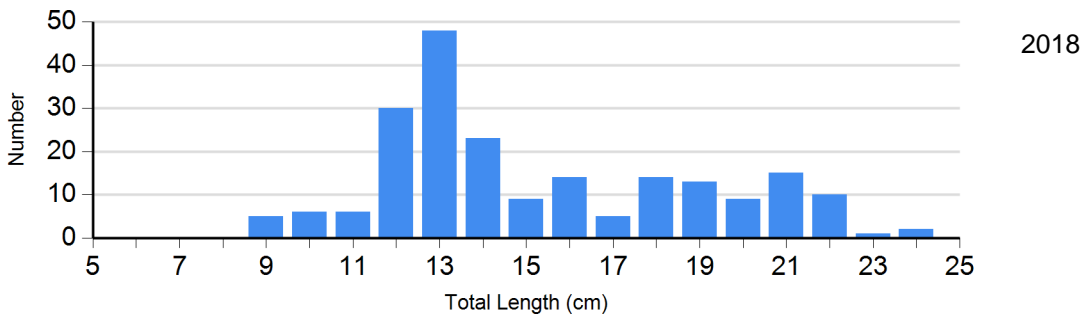
Length frequency histogram of species sampled by year.

Species: Bluegill
Gear: AFS std frame net

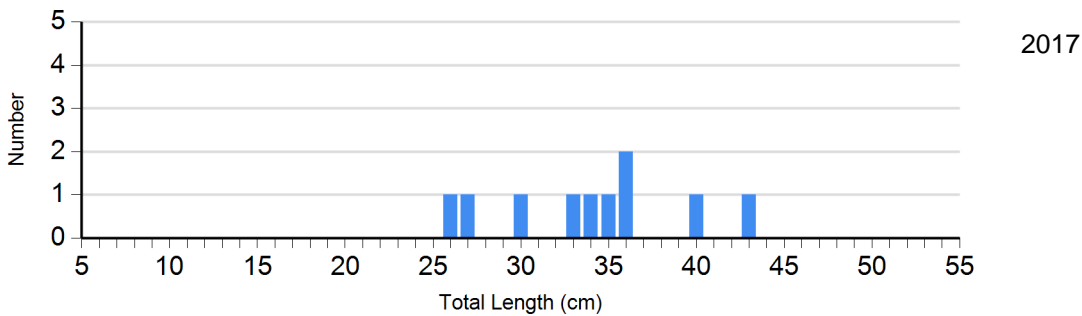
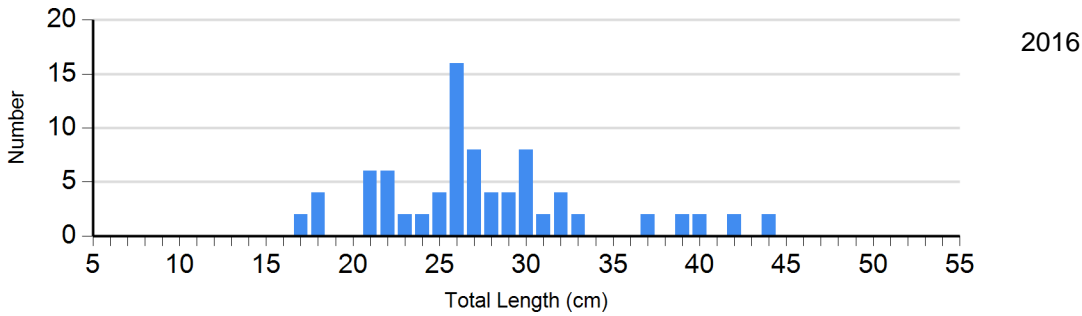
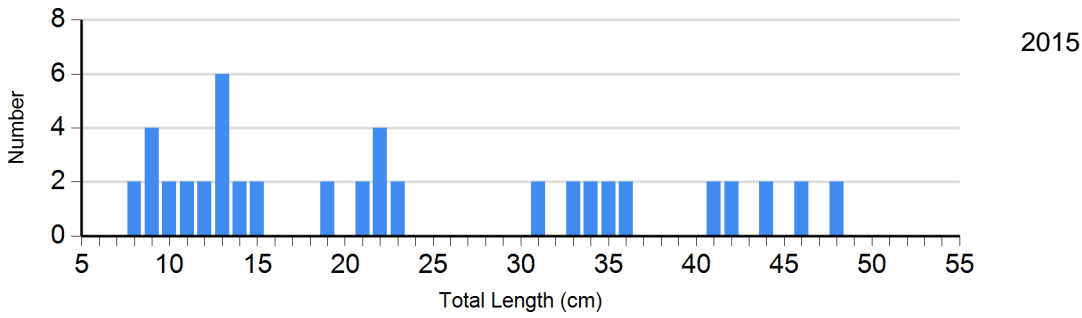
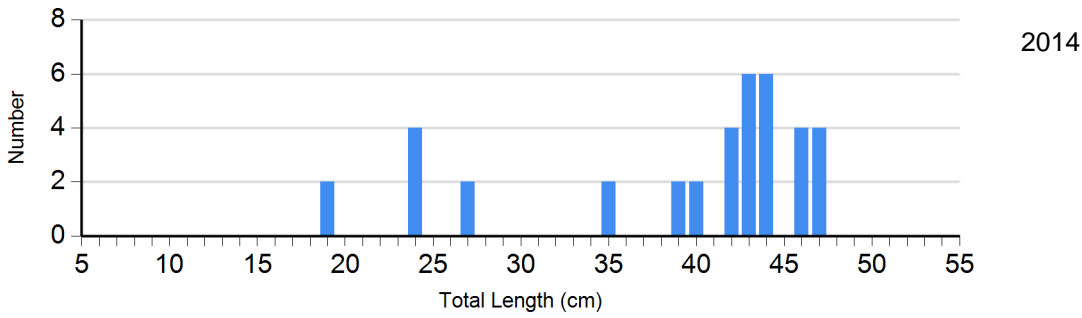


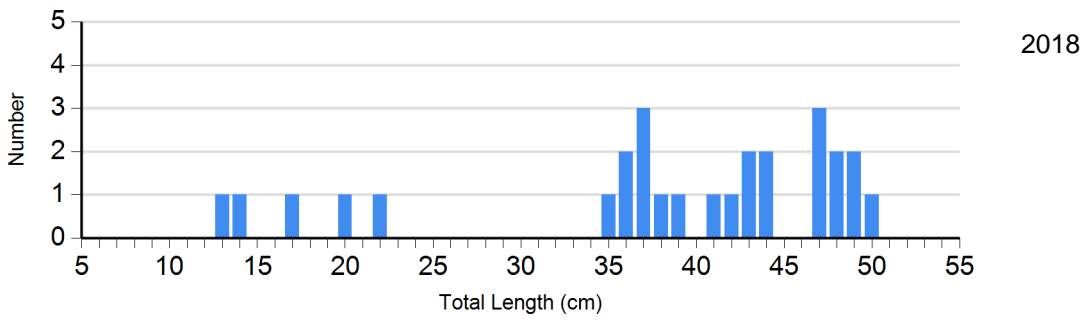
Species: Bluegill
Gear: frame net (std 3/4 in)



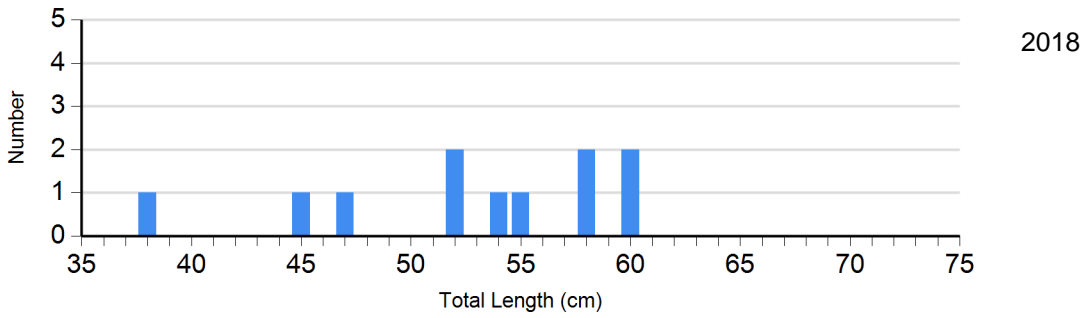
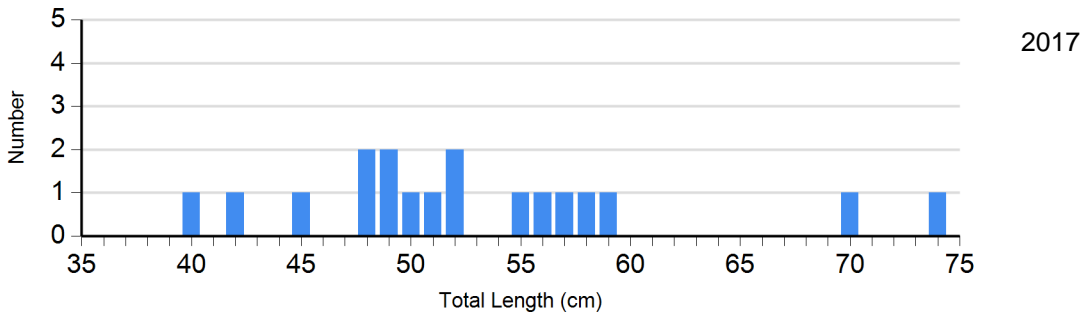


Species: Largemouth Bass
 Gear: boat shocker (night)

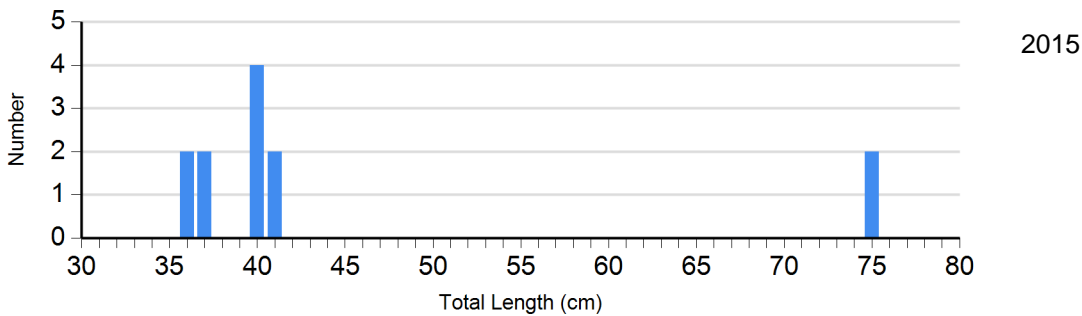
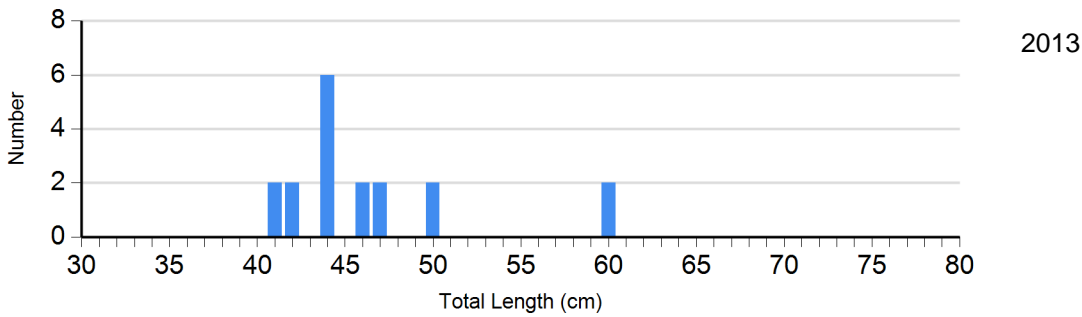


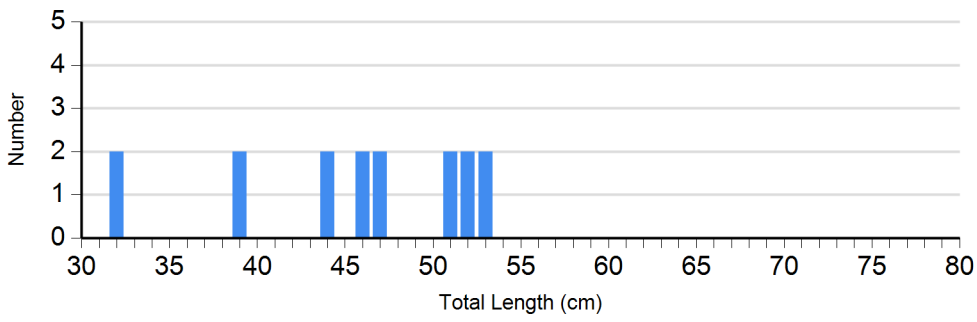


Species: Northern Pike
Gear: AFS std gill net



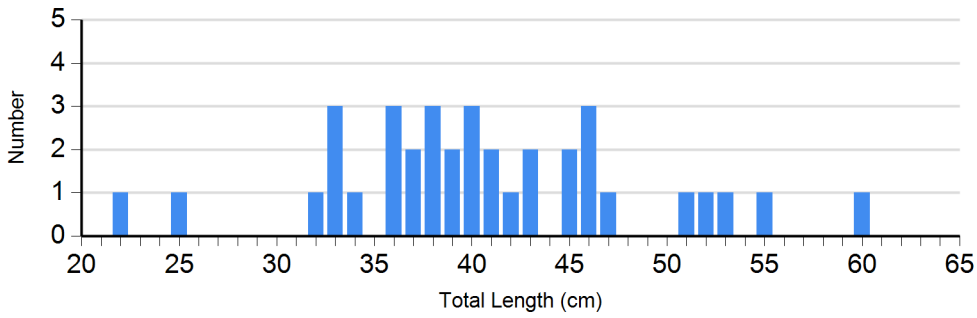
Species: Northern Pike
Gear: std exp gill net



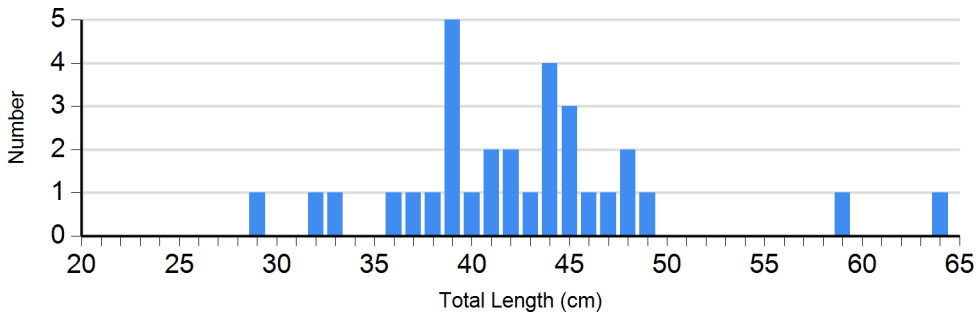


2016

Species: Walleye
Gear: AFS std gill net

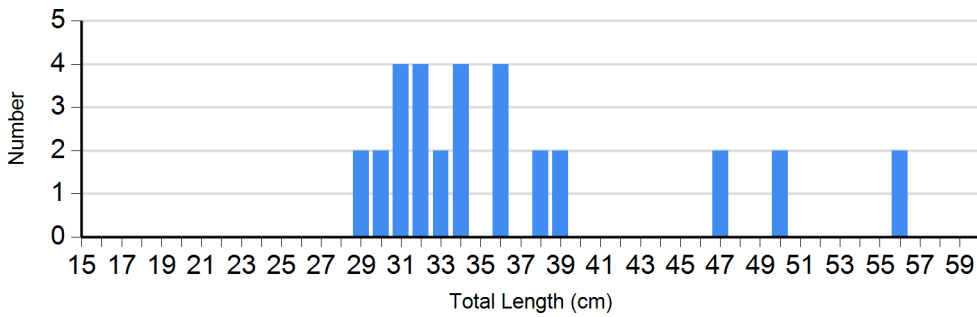


2017

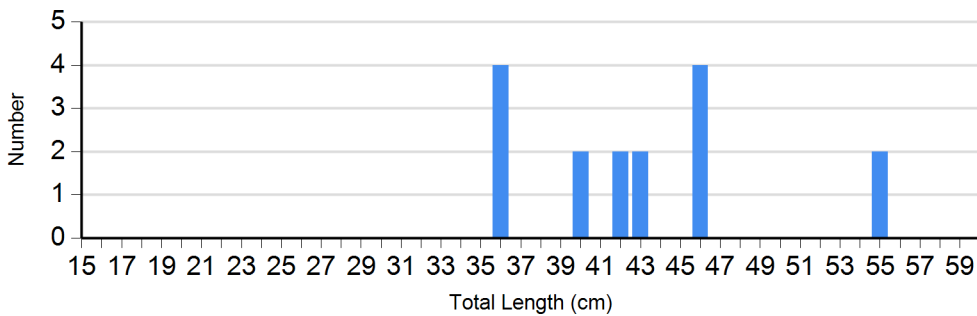


2018

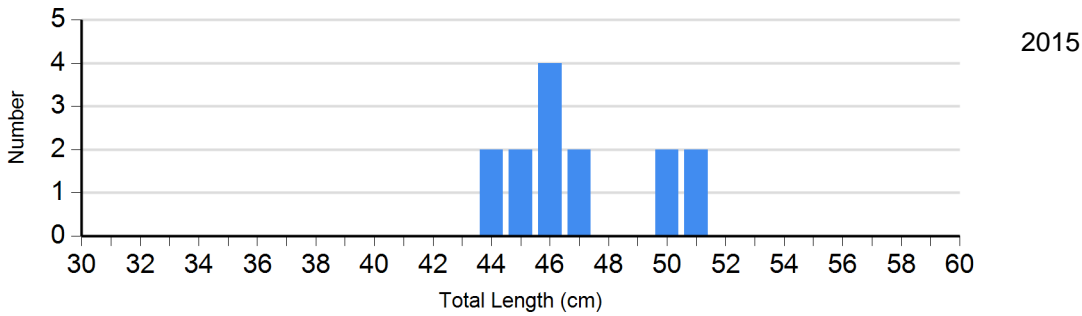
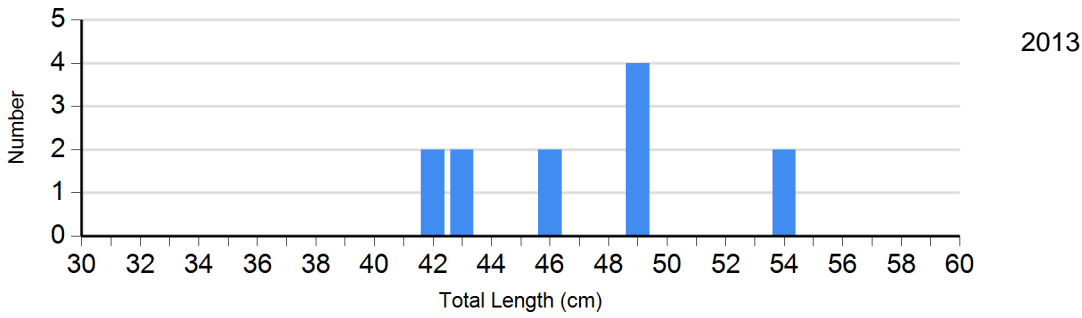
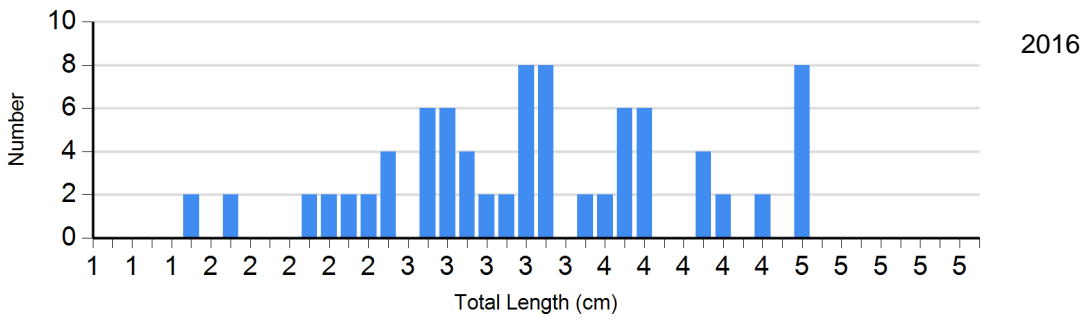
Species: Walleye
Gear: std exp gill net



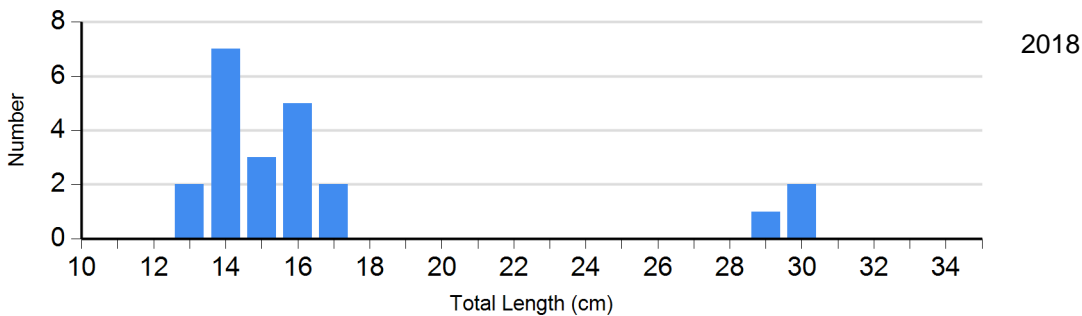
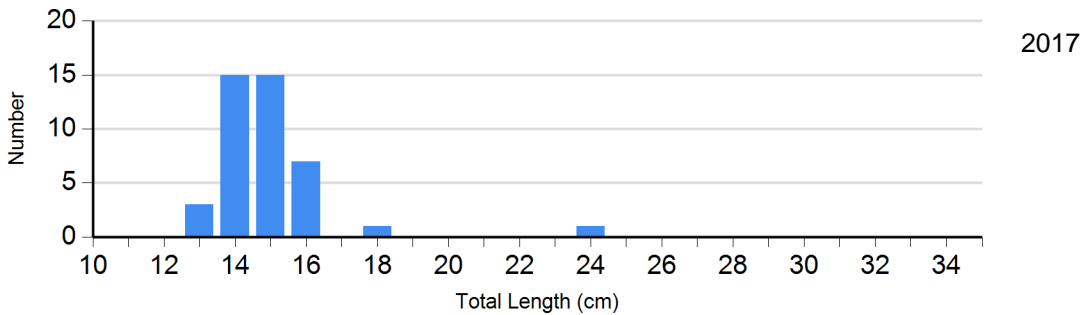
2013



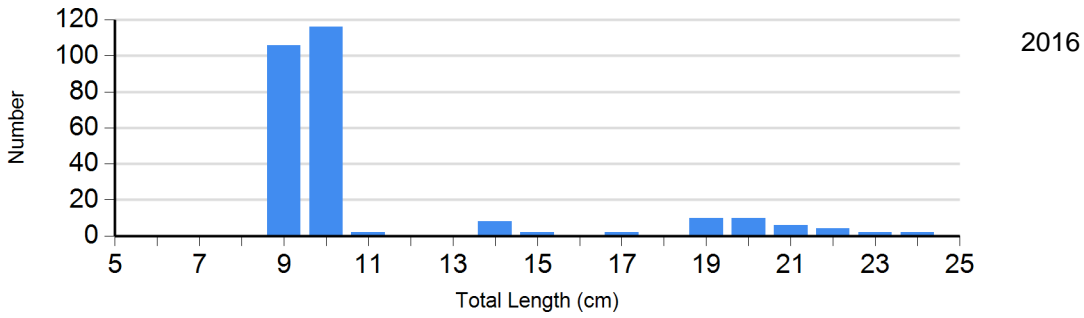
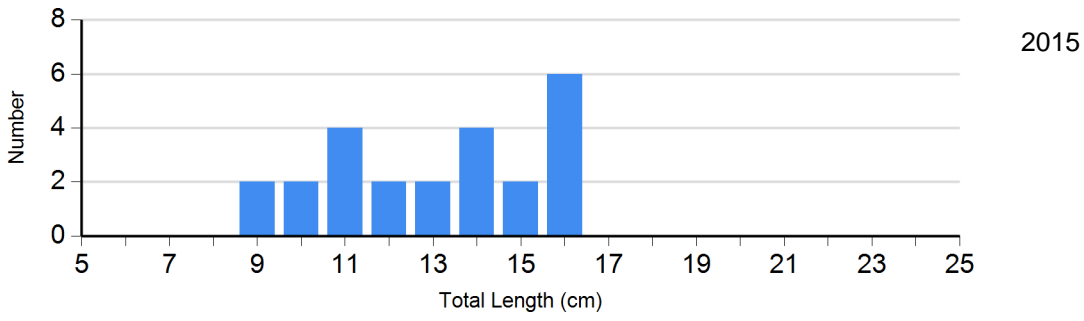
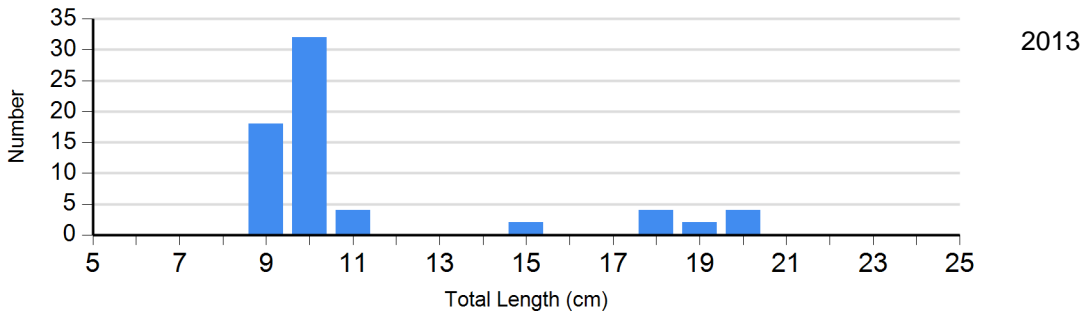
2015



Species: Yellow Perch
Gear: AFS std gill net



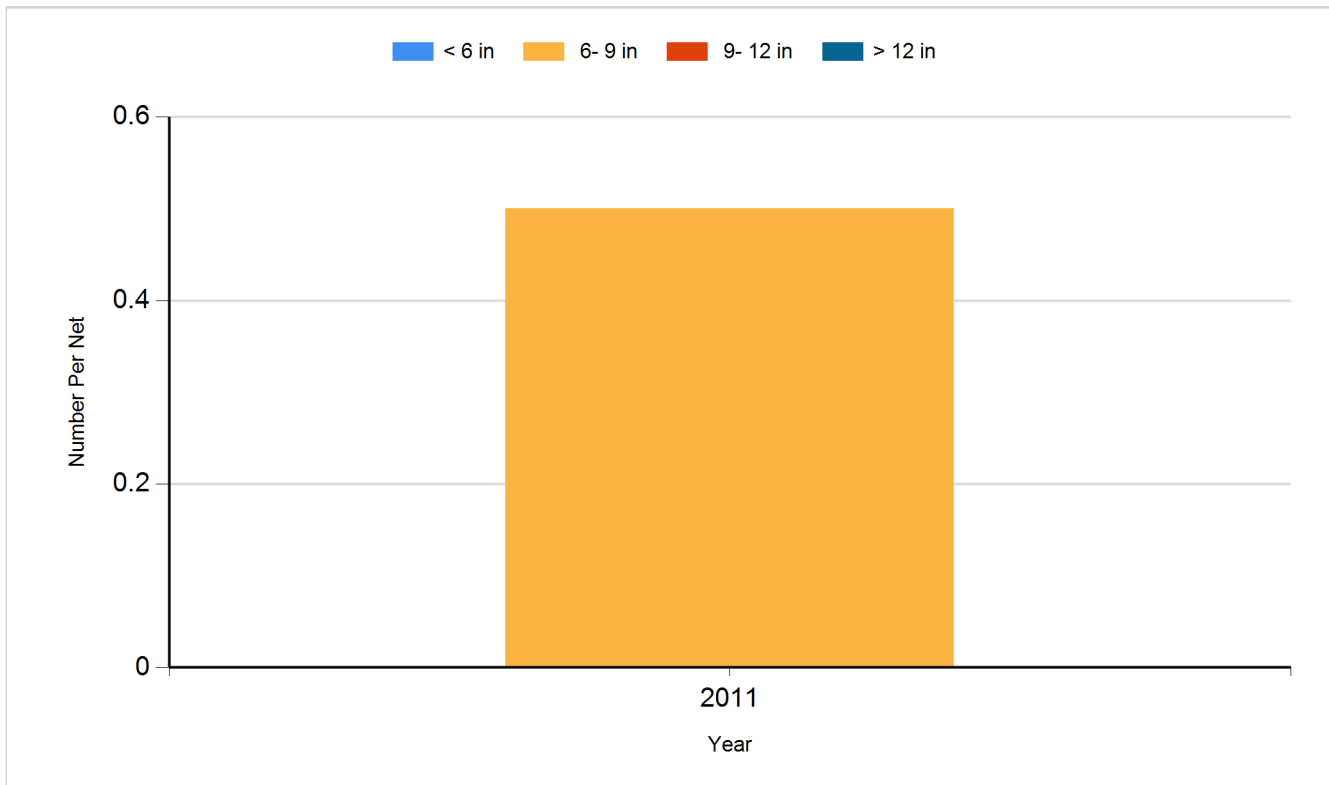
Species: Yellow Perch
Gear: std exp gill net



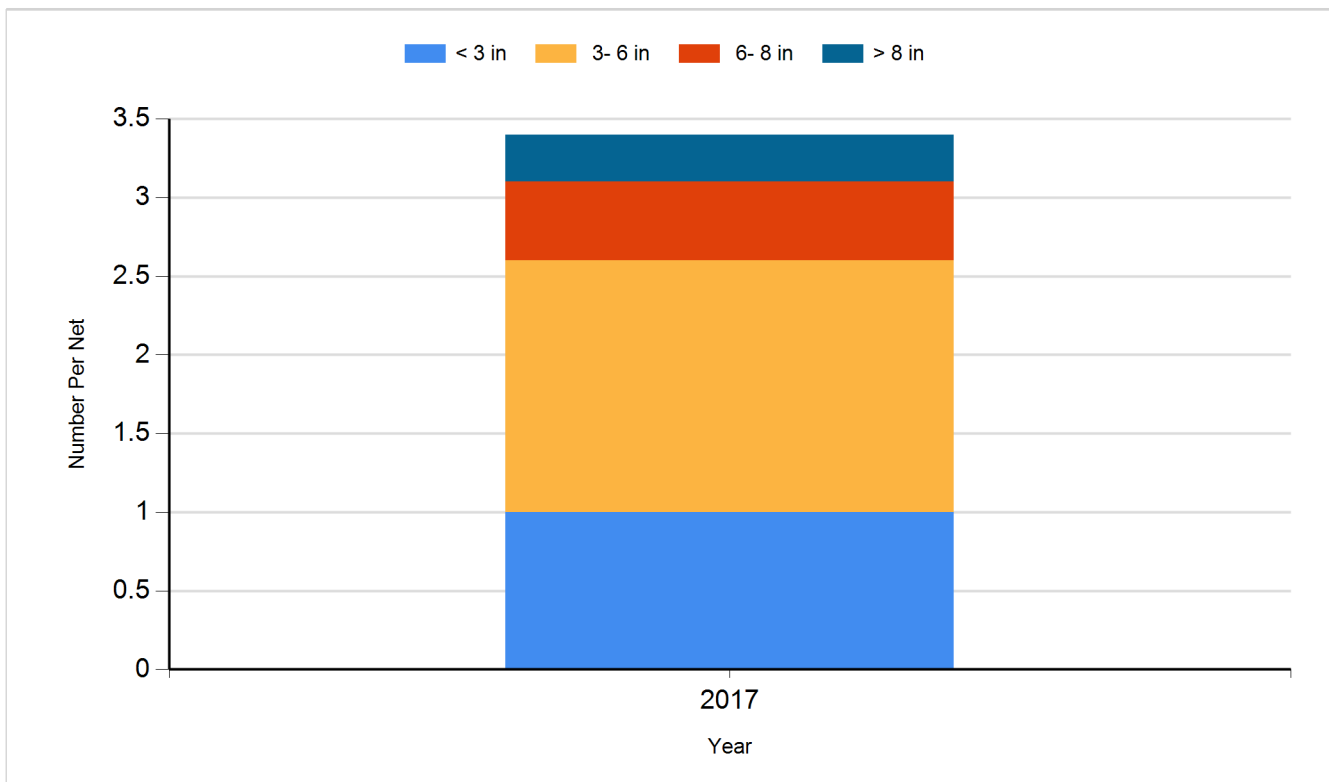
Historic Fish Sizes and Relative Abundance

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

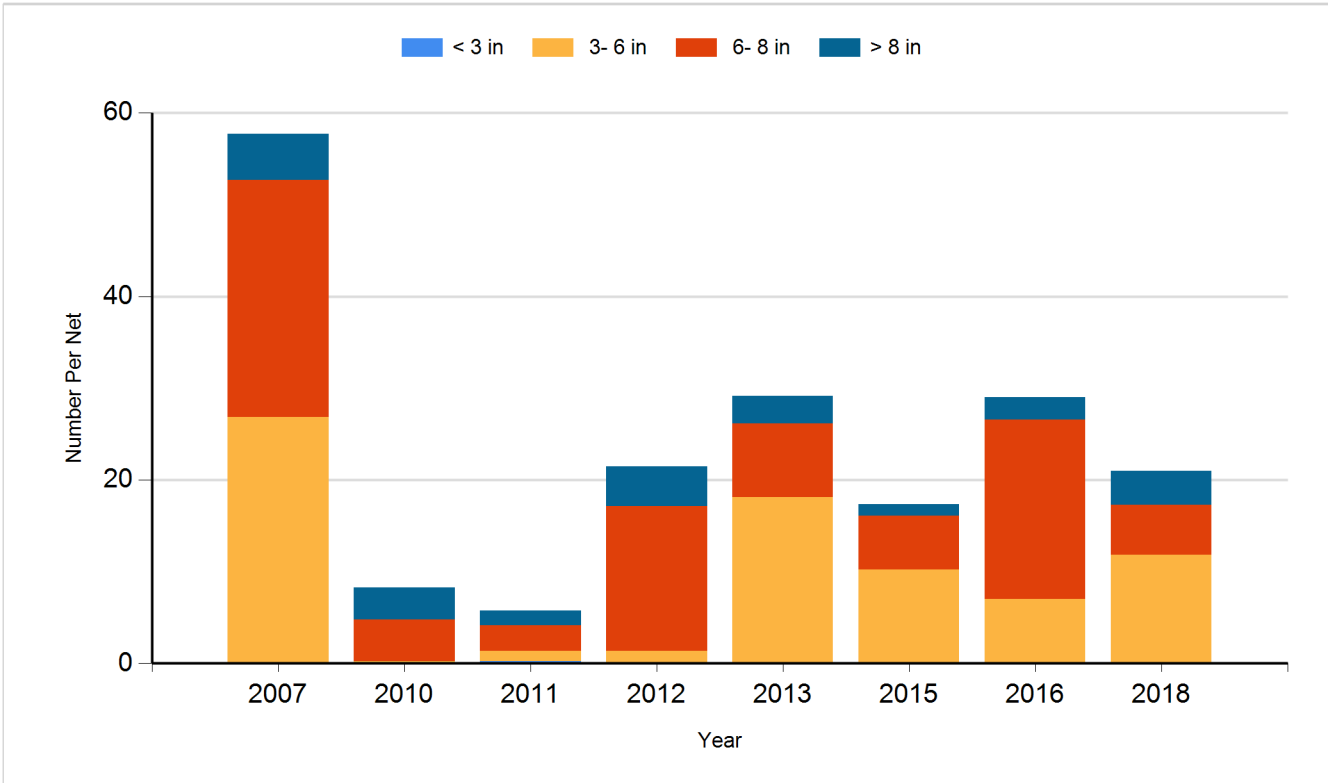
Species: Black Bullhead
Gear: std exp gill net



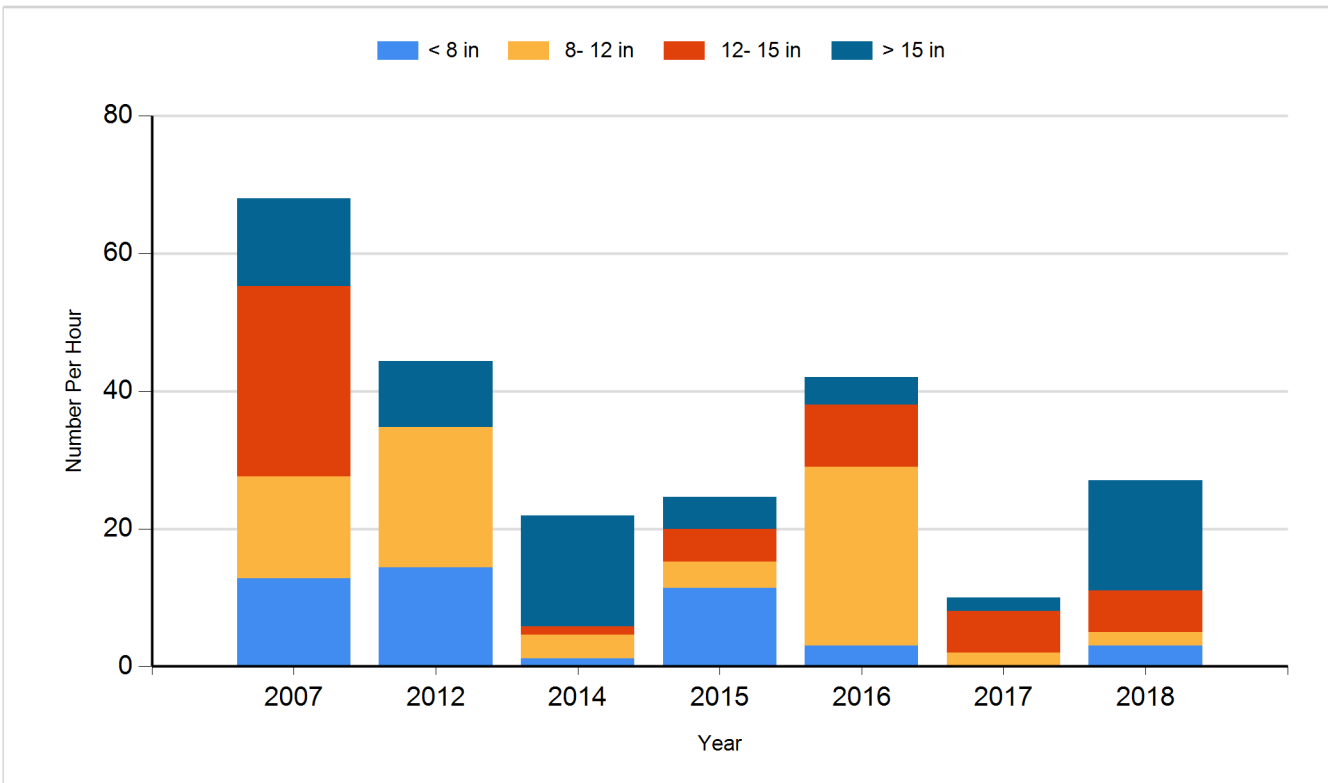
Species: Bluegill
Gear: AFS std frame net



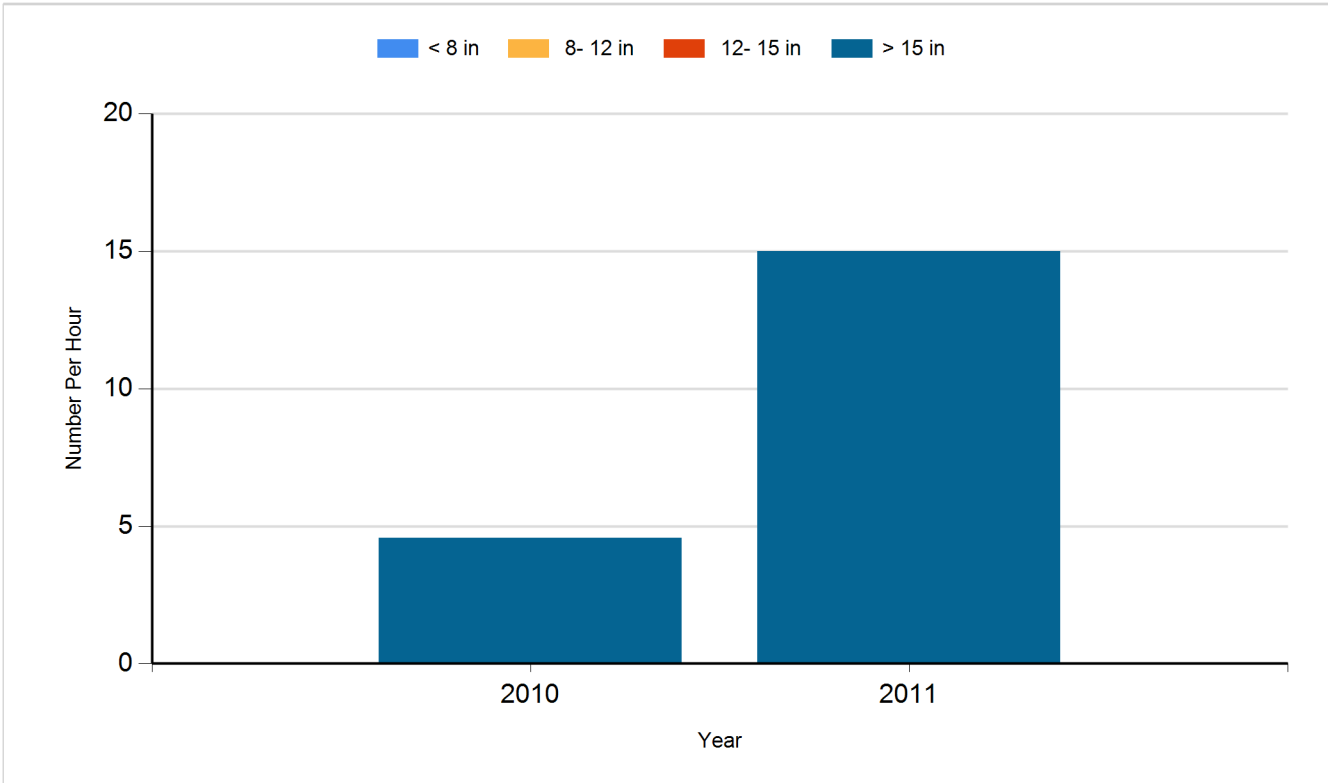
Species: Bluegill
Gear: frame net (std 3/4 in)



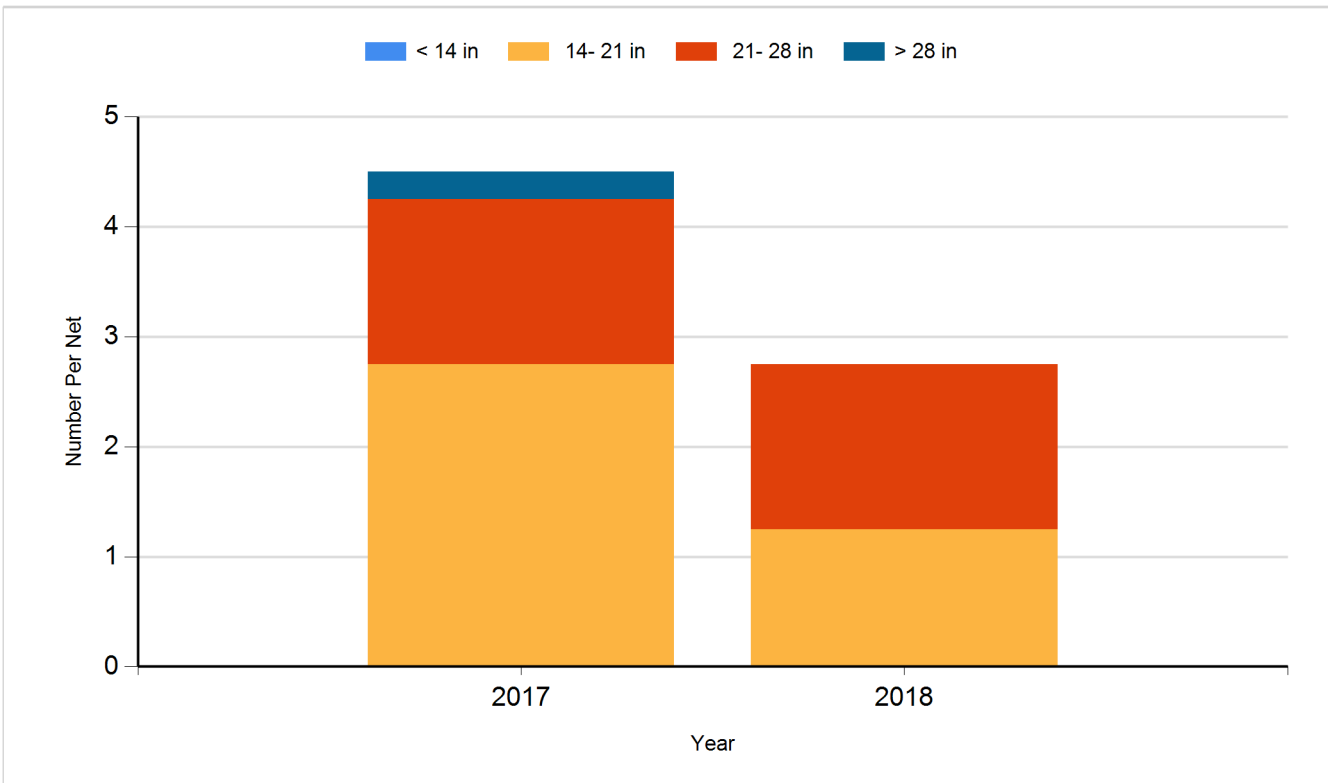
Species: Largemouth Bass
Gear: boat shocker (night)



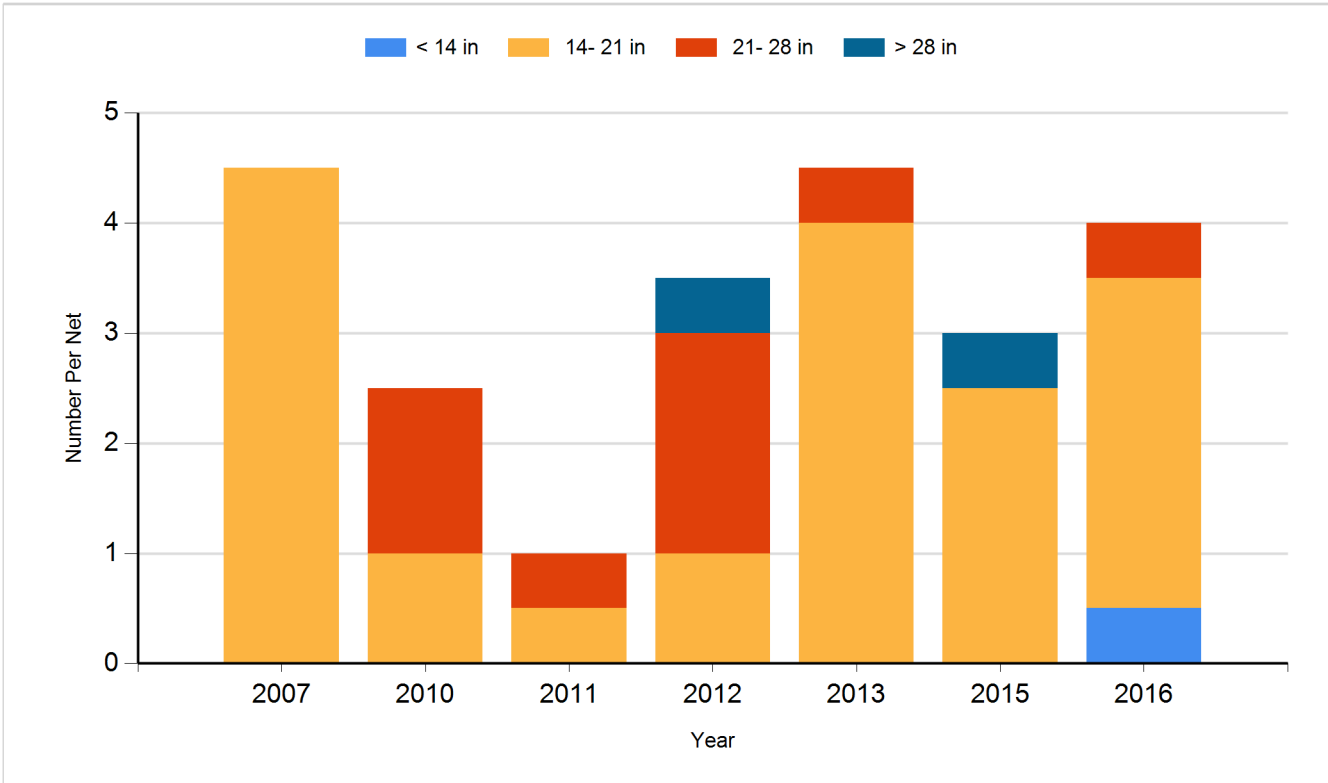
Species: Largemouth Bass
Gear: boat shocker (night, AC)



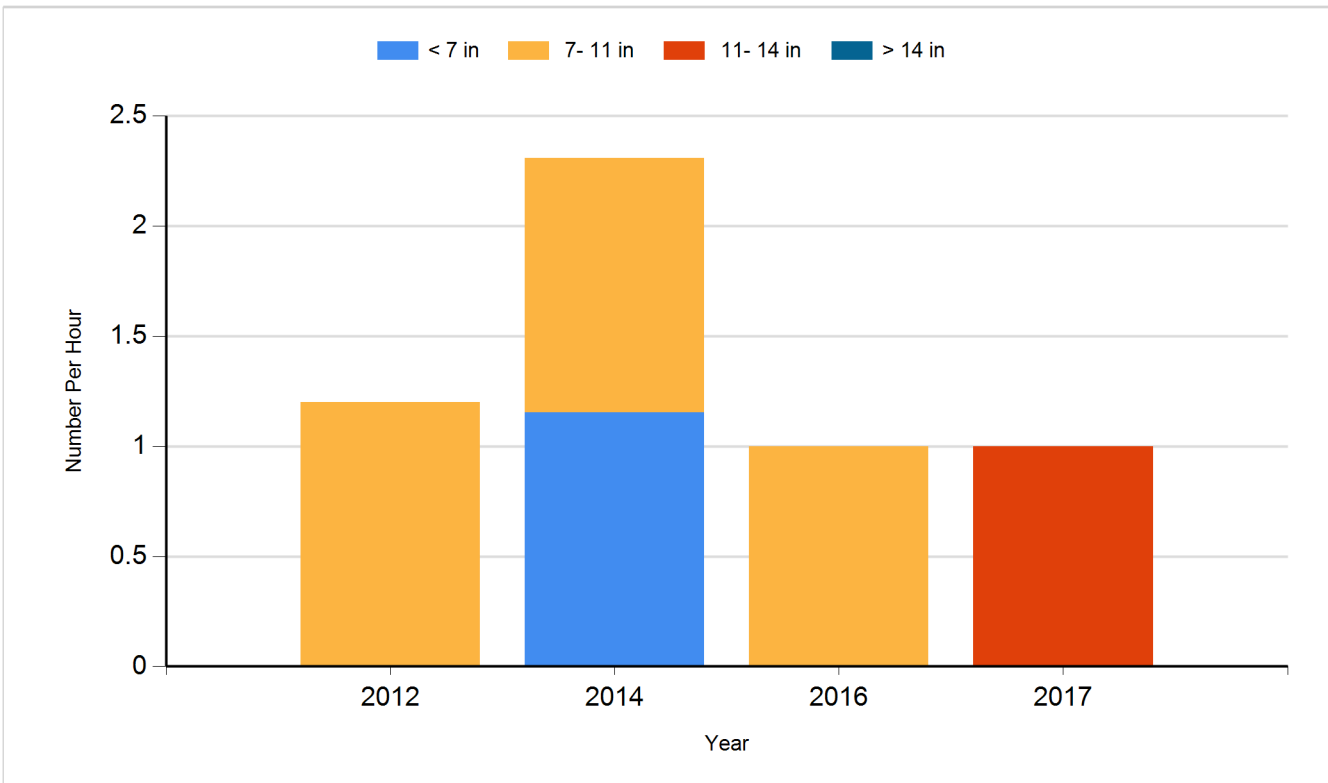
Species: Northern Pike
Gear: AFS std gill net



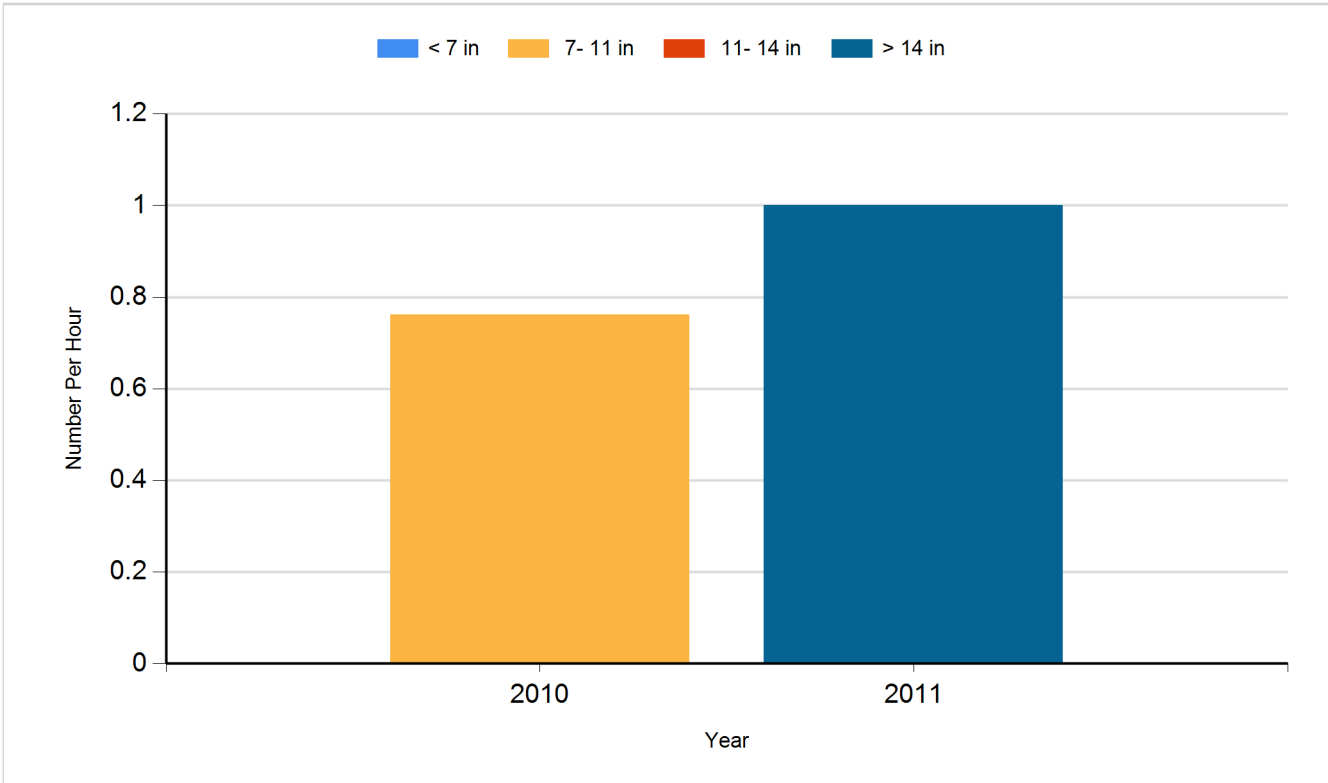
Species: Northern Pike
Gear: std exp gill net



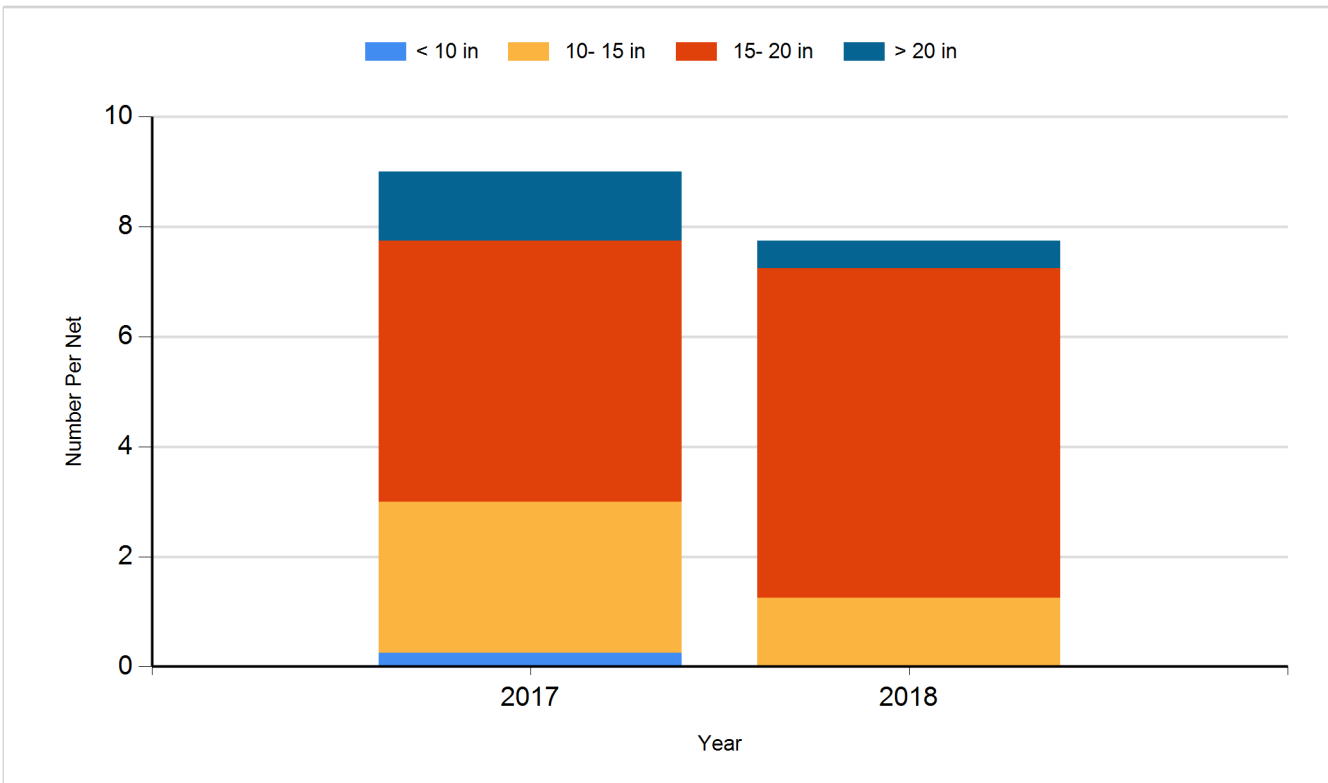
Species: Smallmouth Bass
Gear: boat shocker (night)



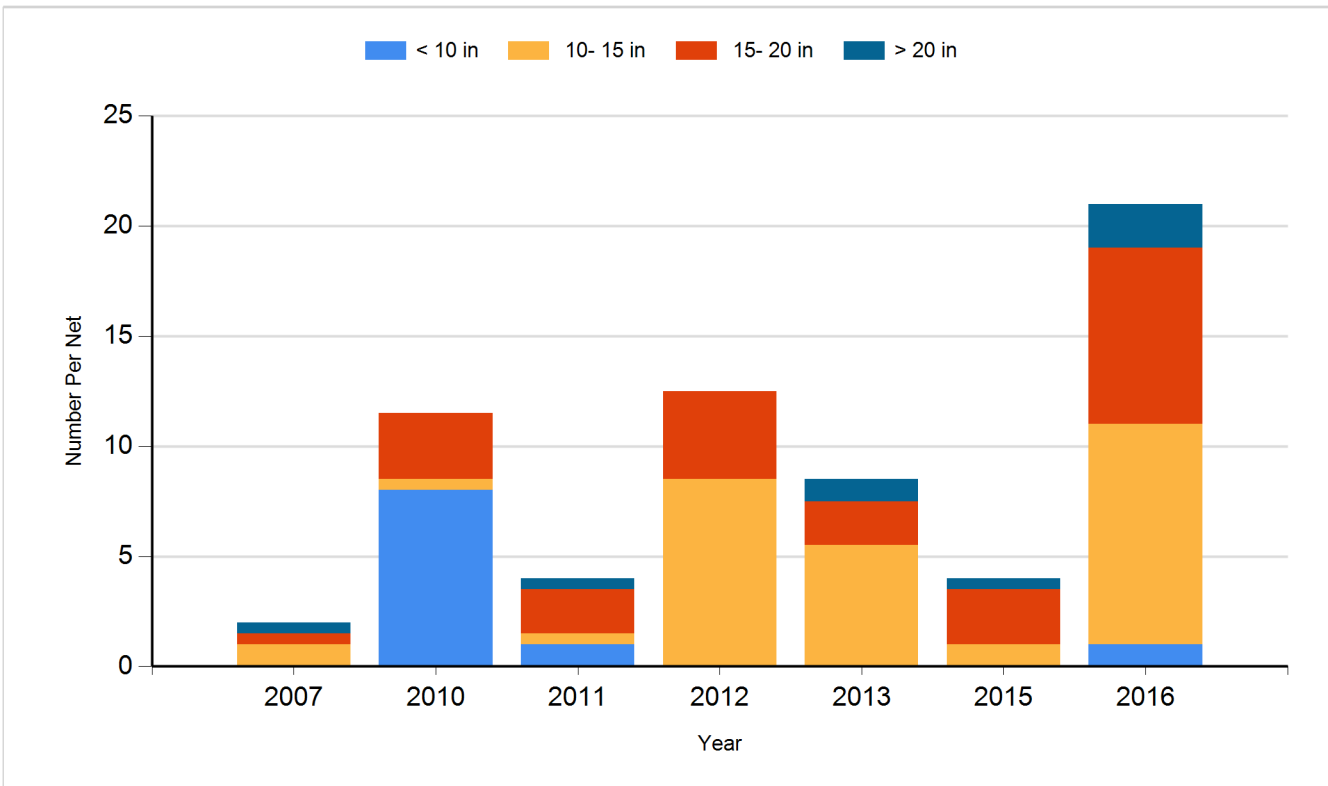
Species: Smallmouth Bass
Gear: boat shocker (night, AC)



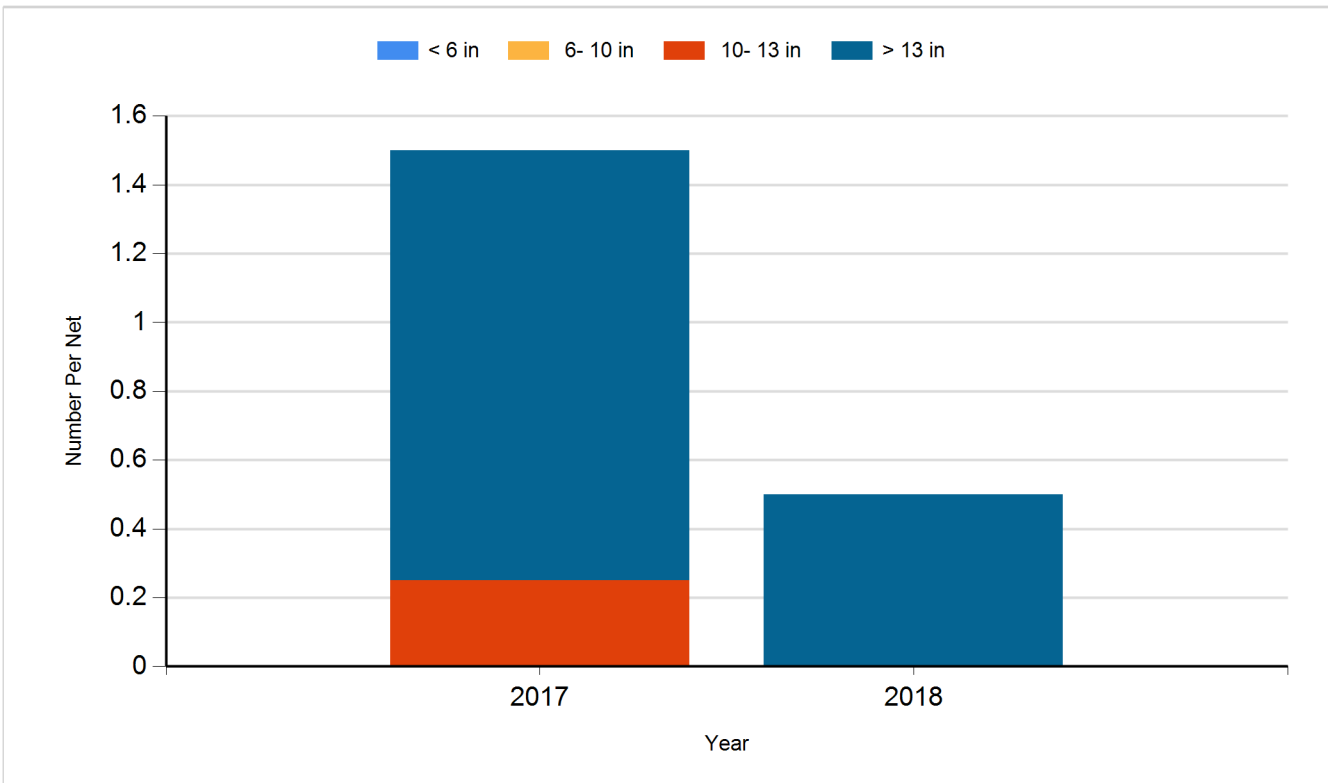
Species: Walleye
Gear: AFS std gill net



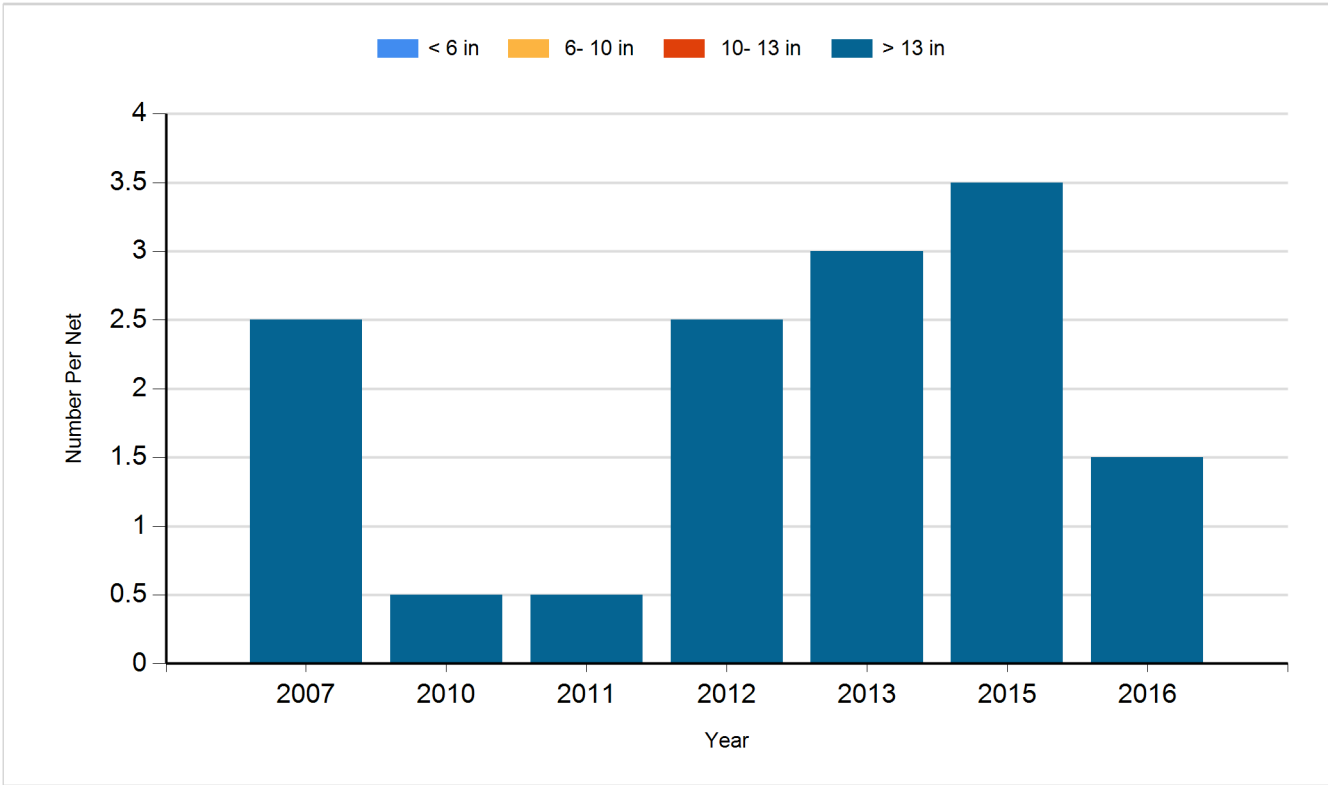
Species: Walleye
Gear: std exp gill net



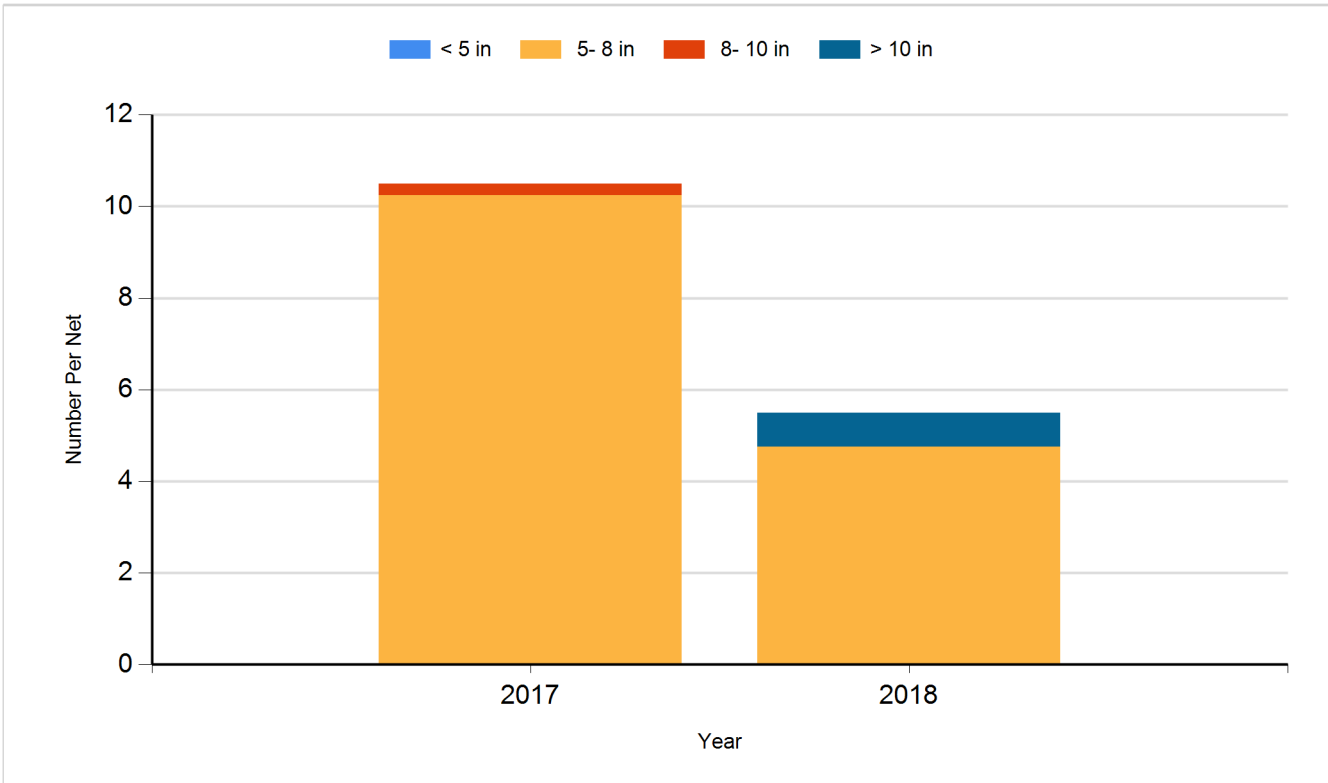
Species: White Sucker
Gear: AFS std gill net



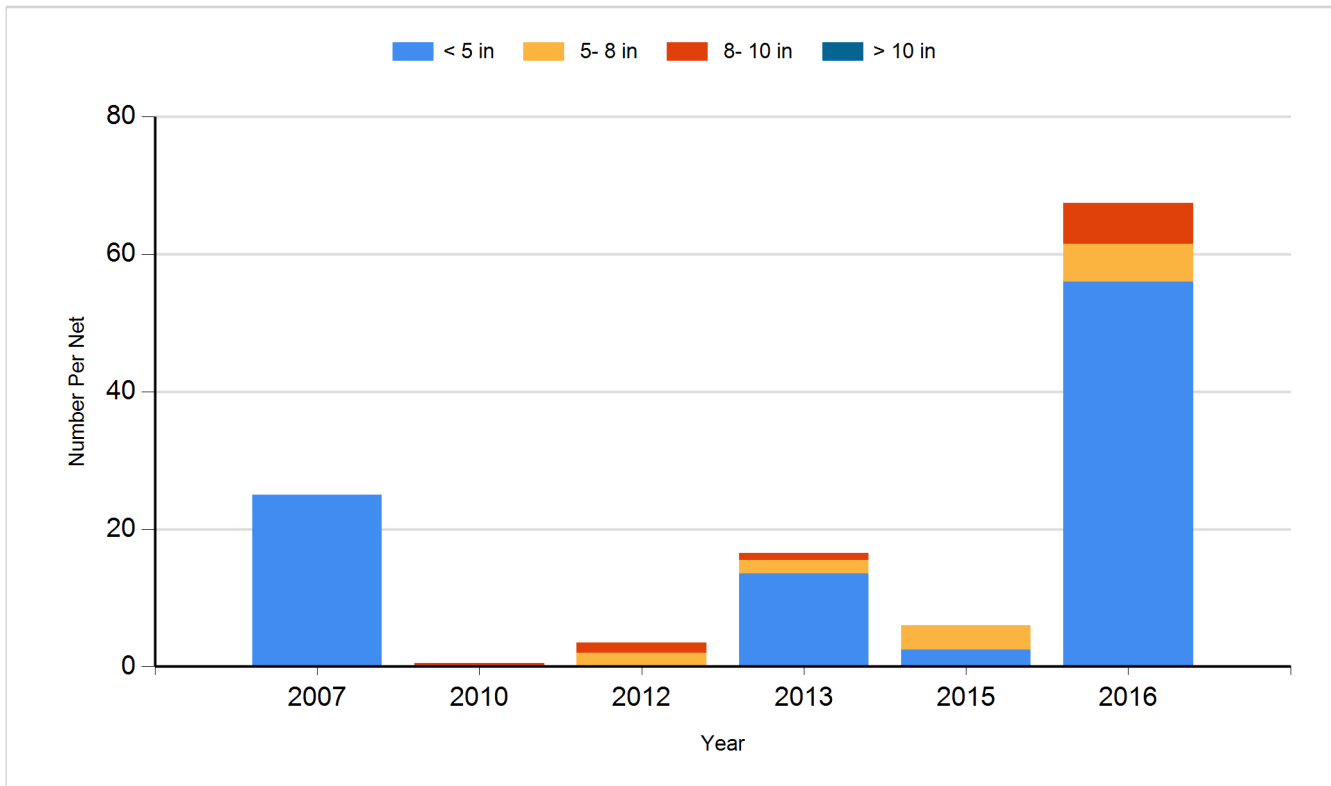
Species: White Sucker
Gear: std exp gill net



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
2007	Walleye	Fingerling	50,000
2008	Walleye	Small Fingerling	53,975
2009	Walleye	Fingerling	54,100
2012	Largemouth Bass	Adult	540
2012	Largemouth Bass	Fingerling	9,120
2012	Smallmouth Bass	Fingerling	5,130
2013	Largemouth Bass	Fingerling	11,970
2014	Largemouth Bass	Juvenile	750
2015	Largemouth Bass	Adult	230
2015	Largemouth Bass	Fingerling	3,690
2016	Gizzard Shad	Adult	37
2016	Largemouth Bass	Adult	424
2017	Gizzard Shad	Adult	125
2018	Gizzard Shad	Adult	76