

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Newell, Butte County

LBF-Lake-528-000

2020

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 gill net (1/2 inch)	Jul 21, 2020	4 net-nights
AFS std gill net	Jul 21, 2020	4 net-nights
frame net (std 3/4 in)	Jul 21, 2020	6 net-nights

Common Fish Species Present

Yellow Perch

Northern Pike

Largemouth Bass

Bluegill

Walleye

Smallmouth Bass

Rudd

White Sucker

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	Largemouth Bass	1	0.3	0.4	100		0		105	
	Northern Pike	25	6.3	1.2	84		12		79	2
	Rudd	27	6.5	3.3	62	15	50	15		
	Smallmouth Bass	1	0.3	0.4	100		100		95	
	Walleye	19	4.0	0.7	75		25		82	2
	White Sucker	3	0.8	0.8	100		100		108	6
	Yellow Perch	25	6.0	1.8	21	14	13		94	3
frame net (std 3/4 in)	Bluegill	48	7.7	1.8	26	10	2		108	2
	Northern Pike	4	0.7	0.5	100		25		81	7
	Rudd	9	1.5	1.0	100		78			
	Smallmouth Bass	1	0.0	0.0	0		0			
	Walleye	1	0.0	0.0	0		0			
	White Sucker	2	0.3	0.3	100		100		88	2
	Yellow Perch	3	0.5	0.5	67		0		88	6

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 gill net (1/2 inch)*	Northern Pike										1.0	1.00
	Rudd										3.8	3.75
	Yellow Perch										0.5	0.50
AFS std frame net	Bluegill							2.4				2.40
	Northern Pike							0.2				0.20
	Rudd							3.0				3.00
	Smallmouth Bass							0.0				0.00
	Walleye							0.9				0.90
	White Sucker							0.7				0.70
	Yellow Perch							0.4				0.40
AFS std gill net	Bluegill							0.5	1.3	0.8	0.0	0.65
	Gizzard Shad							0.3	0.0	1.3	0.0	0.40
	Largemouth Bass							0.0	0.0	0.0	0.3	0.08
	Northern Pike							4.5	2.8	0.5	6.3	3.53
	Rudd							11.3	0.5	0.8	6.5	4.78
	Smallmouth Bass							0.0	0.0	0.0	0.3	0.08
	Walleye							8.8	7.8	7.5	4.0	7.03
	White Sucker							1.5	0.5	0.5	0.8	0.83
	Yellow Perch							10.5	5.5	0.5	6.0	5.63
boat shocker (night)	Largemouth Bass		30.0		20.8	13.8	39.0	10.0	24.0			22.93
	Smallmouth Bass		1.2		1.0	0.0	1.0	1.0	0.0			0.70
	Walleye*		46.8		123.8	101.0	38.0	29.0	67.0			67.60
boat shocker (night, AC)	Largemouth Bass	15.0										15.00
	Smallmouth Bass	1.0										1.00
	Walleye*	68.0										68.00
frame net (std 3/4 in)	Black Bullhead	1.4	1.3	0.0		0.0	0.0		0.4	0.0	0.0	0.39
	Bluegill	5.5	21.5	29.1		17.3	28.9		21.1	11.6	7.7	17.84
	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		0.0	0.0		0.0	0.1	0.0	0.01
	Northern Pike	1.1	1.0	0.3		0.6	1.2		2.1	3.0	0.7	1.25
	Rudd	18.3	15.4	46.0		21.3	11.7		9.6	78.4	1.5	25.28
	Smallmouth Bass	0.0	0.0	0.1		0.0	0.0		0.2	0.0	0.0	0.04
	Walleye	0.6	0.6	1.1		1.0	1.1		2.0	0.6	0.0	0.88
	White Sucker	2.0	1.5	1.9		0.4	3.3		0.3	0.3	0.3	1.25

		CPUE										
Gear	Species	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Avg
frame net (std	Yellow Perch	0.3	0.1	0.9		0.0	0.2		2.3	0.3	0.5	0.58
std exp gill net	Black Bullhead	0.5	0.0	0.0		0.0	0.0					0.10
	Bluegill	0.0	0.5	0.0		0.0	1.0					0.30
	Gizzard Shad	0.0	0.0	0.0		0.0	0.0					0.00
	Northern Pike	1.0	3.5	4.5		3.0	3.5					3.10
	Rudd	0.0	37.0	0.0		25.5	18.5					16.20
	Walleye	3.0	12.5	8.5		4.0	20.0					9.60
	White Sucker	0.5	2.5	3.0		3.5	1.5					2.20
	Yellow Perch	0.0	3.5	3.0		3.5	11.5					4.30

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	Bluegill	PSD									33						
		PSD-P									13						
		Wr									108						
	Northern Pike	PSD										0					
		PSD-P										0					
		Wr									82						
	Rudd	PSD										97					
		PSD-P										53					
	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	33				
		PSD-P									0	20	0				
		Wr									113	106	106				
	Largemouth Bass	PSD															100
		PSD-P															0
		Wr															105
	Northern Pike	PSD										39	55	50	84		
		PSD-P										6	0	0	12		
		Wr										87	80	92	79		
	Rudd	PSD										100	100	100	62		
		PSD-P										67	100	67	50		
	Smallmouth Bass	PSD															100
		PSD-P															100
		Wr															95

Gear	Species	Index	Year									
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
AFS std gill net	Walleye	PSD							69	84	77	75
		PSD-P							14	6	17	25
		Wr							80	82	86	82
	White Sucker	PSD							100	100	100	100
		PSD-P							83	100	100	100
		Wr							100	100	108	108
	Yellow Perch	PSD							2	14	50	21
		PSD-P							0	14	0	13
		Wr							93	102	87	94
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									
		PSD-P	100									
		Wr	103									
	Smallmouth Bass	PSD	100									
		PSD-P	100									
		Wr	93									
	Walleye	PSD	15									
		PSD-P	0									
		Wr	90									
frame net (std 3/4 in)	Bluegill	PSD	80	94	38		41	76		45	68	26
		PSD-P	30	20	10		7	8		19	32	2
		Wr	105	106	114		113	116		110	108	108
	Largemouth Bass	PSD										100
		PSD-P										100
		Wr										114
	Northern Pike	PSD	67	25	100		20	17		67	75	100
		PSD-P	22	0	0		20	0		5	21	25
		Wr	76	78	83		77	86		85	91	81

Gear	Species	Index	Year									
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
frame net (std 3/4 in)	Rudd	PSD	76	62	85		98	77		100	100	100
		PSD-P	53	26	49		65	62		77	84	78
	Smallmouth Bass	PSD				100				50		0
		PSD-P				100				0		0
		Wr				94				91		
	Walleye	PSD	60	0	75		75	64		65	80	0
		PSD-P	0	0	25		13	9		20	40	0
		Wr	85	81	80		80	80		83	86	
	White Sucker	PSD	100	100	100		100	100		100	100	100
		PSD-P	100	100	100		100	100		100	100	100
		Wr	87	82	91		89	94		87	92	88
	Yellow Perch	PSD	50	100	50			0		30	100	67
		PSD-P	50	0	33			0		26	50	0
		Wr	85	88	88			90		93	90	88
	std exp gill net	Bluegill	PSD		100					100		
PSD-P				100					0			
Wr				105					125			
Northern Pike		PSD	50	71	11		17	14				
		PSD-P	0	14	0		17	0				
		Wr	80	84	81		78	83				
Rudd		PSD	0	73			78	81				
		PSD-P	0	45			27	57				
Walleye		PSD	83	32	35		75	50				
		PSD-P	17	0	12		13	10				
		Wr	82	78	84		81	84				
White Sucker		PSD	100	100	100		100	100				
		PSD-P	100	100	100		100	100				
		Wr	92	94	90		99	94				
Yellow Perch		PSD		43	33		0	52				
	PSD-P		0	0		0	0					
	Wr		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+
2020	18		250 (5)	332 (2)	400 (3)	451 (2)	488 (1)	507 (3)	535 (1)		664 (1)
2019	31	169 (2)	318 (6)	376 (1)	441 (8)	481 (8)	494 (1)		595 (1)	566 (1)	617 (3)
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).

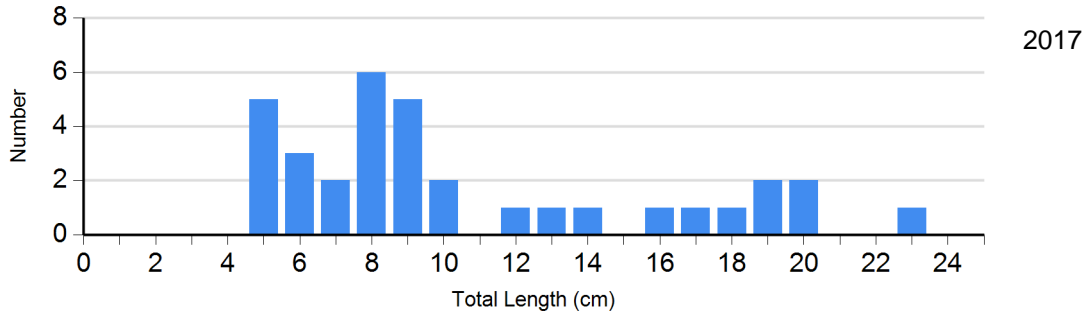
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Bluegill Frame Net	2016	138	126 (1.4)	392	114 (0.6)	48	108 (0.3)	0	
	2017	16	111 (3.6)	5	105 (4.6)	3	96 (4.1)	0	
	2018	117	112 (1.4)	54	110 (1.5)	40	102 (1.2)	0	
	2019	30	117 (1.9)	33	106 (2.4)	30	105 (1.3)	0	
	2020	34	107 (1.7)	11	109 (2.3)	1	99	0	
Largemouth Bass Electro Fishing	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	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	
	2019	1	93	1	92	0		0	
	2020	4	80 (2.1)	18	78 (1.3)	3	85 (5.6)	0	
Smallmouth Bass Electro Fishing	2016	2	135 (0.0)	0		0		0	
	2017	0		1	117	0		0	
Walleye Gill Net	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
	2019	7	85 (1.3)	18	87 (0.9)	3	84 (2.8)	2	86 (9.2)
	2020	4	80 (1.6)	8	84 (2.3)	3	86 (6.1)	1	70
White Sucker Gill Net	2016	0		0		2	98 (0.0)	4	91 (2.7)
	2017	0		1	106	1	115	4	95 (4.5)
	2018	0		0		0		2	100 (8.9)

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	2019	0		0		1	111	1	104
	2020	0		0		0		3	108 (4.8)
Yellow Perch Gill Net	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)
	2019	1	92	1	82	0		0	
	2020	19	97 (1.7)	2	93 (3.1)	1	82	2	77 (7.8)

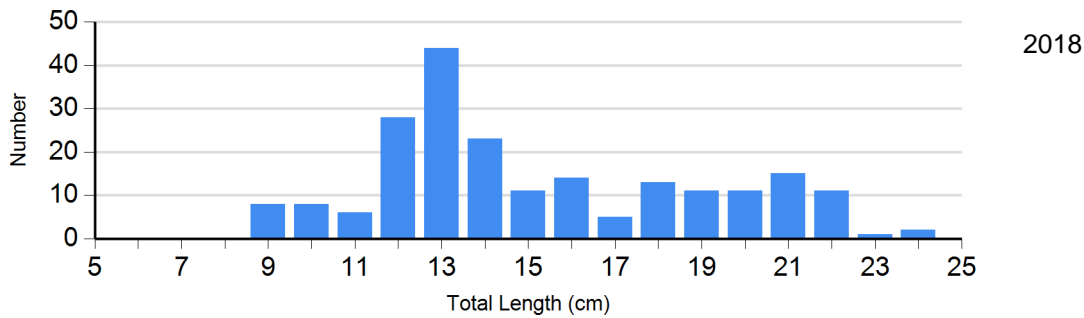
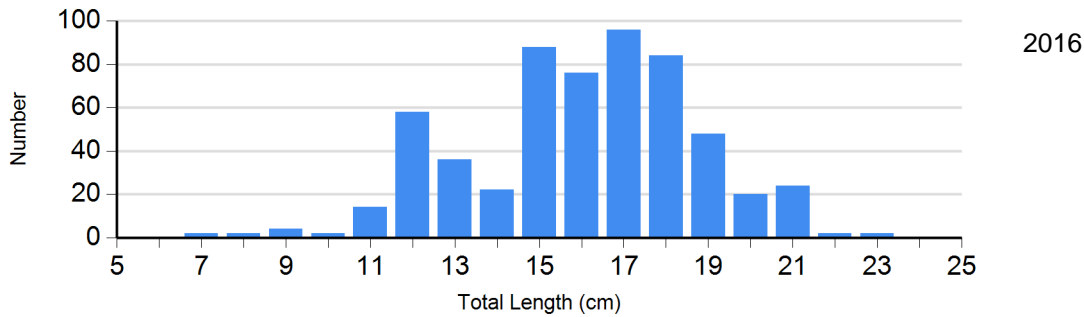
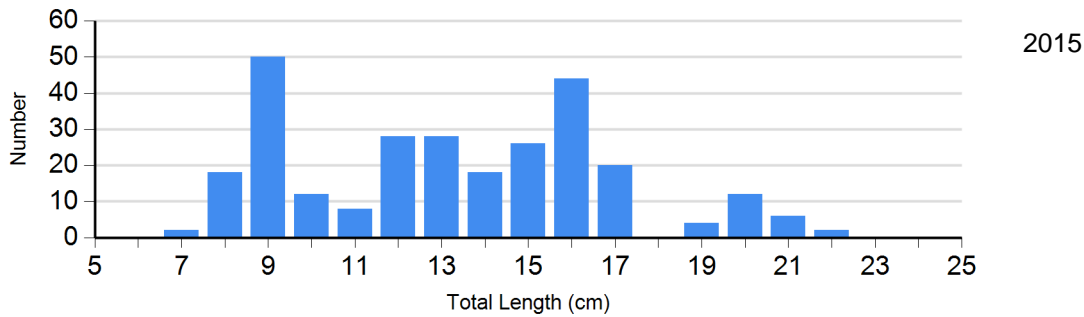
Length Frequency Distribution

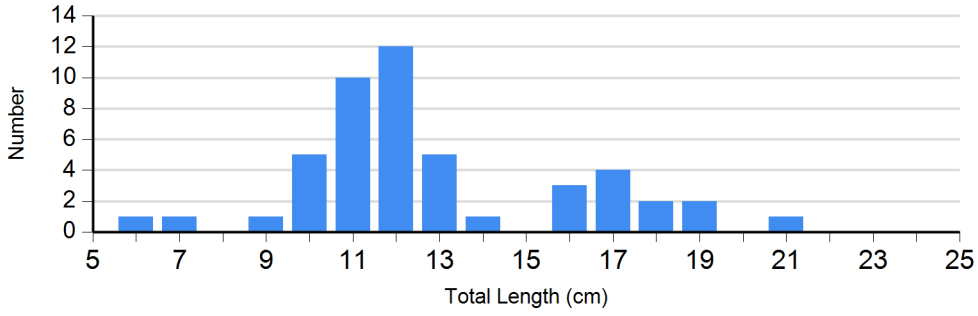
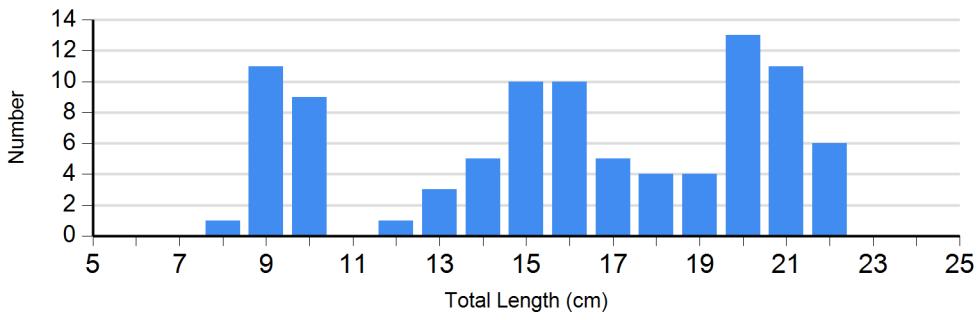
Length frequency histogram of species sampled by year.

Species: Bluegill
Gear: AFS std frame net

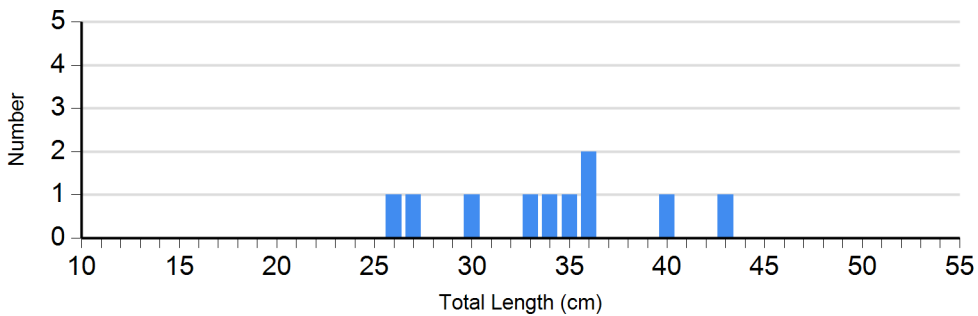
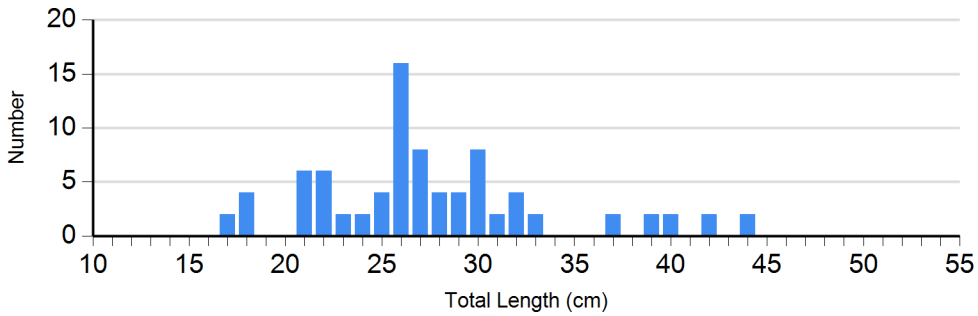
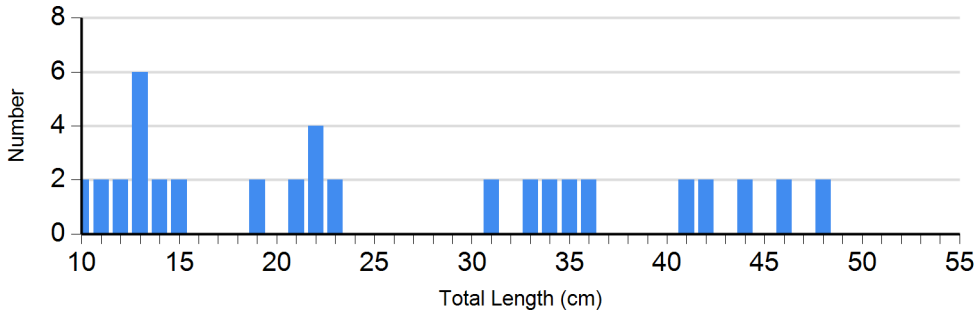


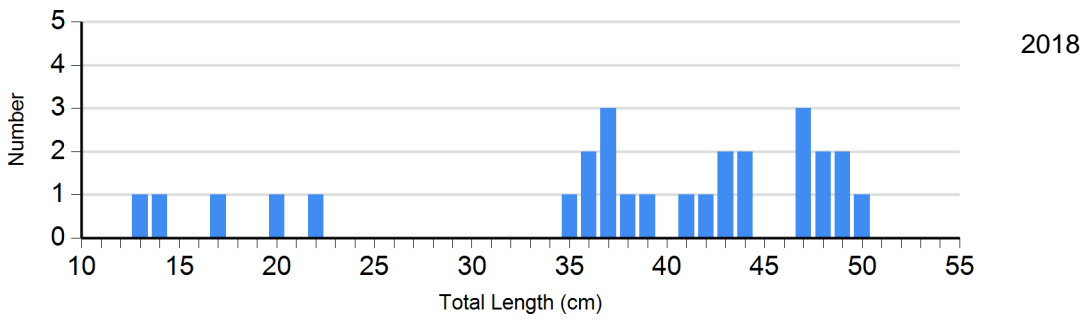
Species: Bluegill
Gear: frame net (std 3/4 in)



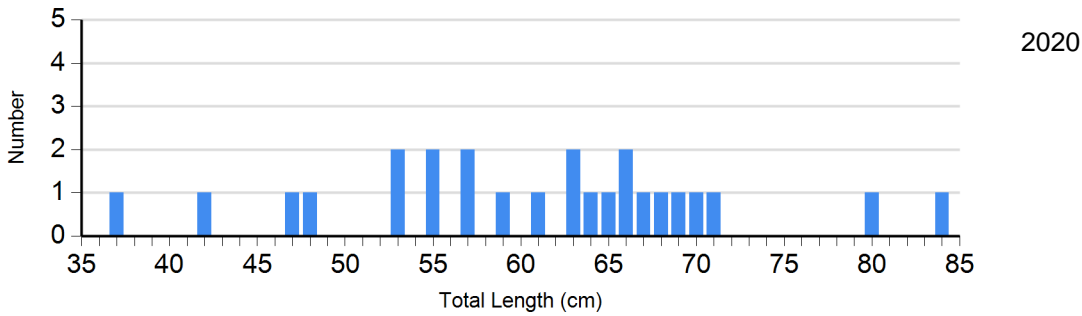
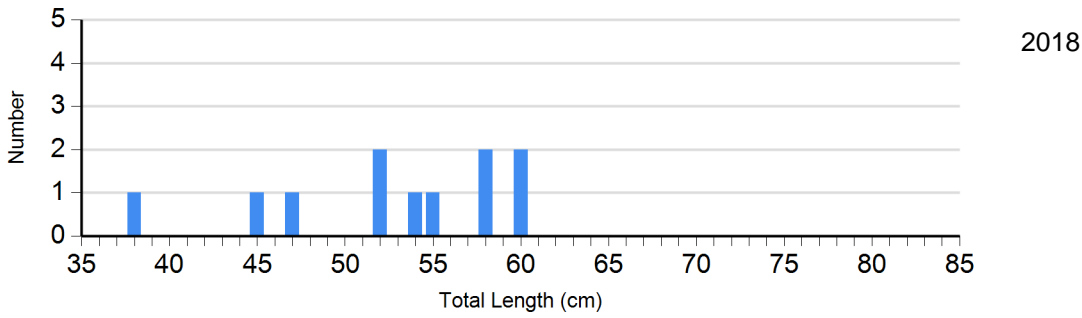
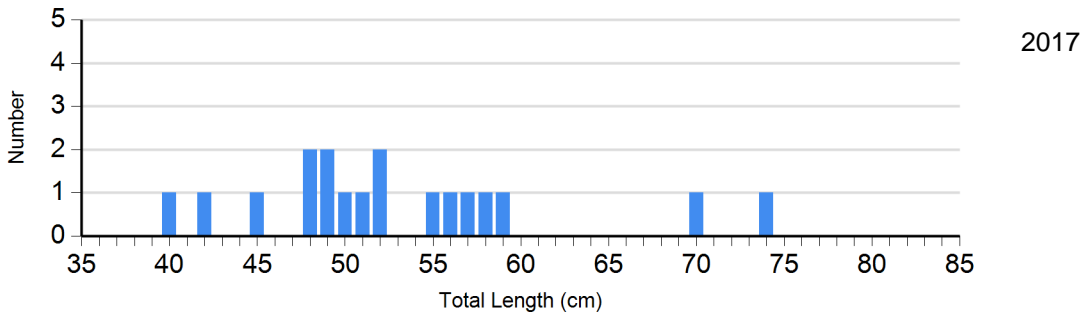


Species: Largemouth Bass
Gear: boat shocker (night)

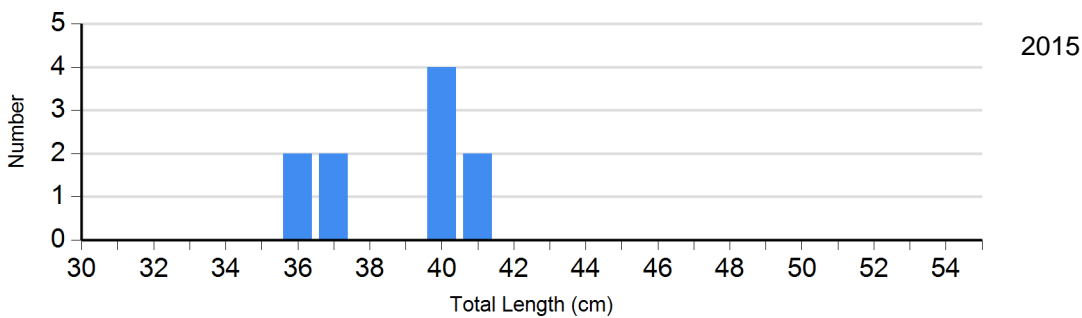


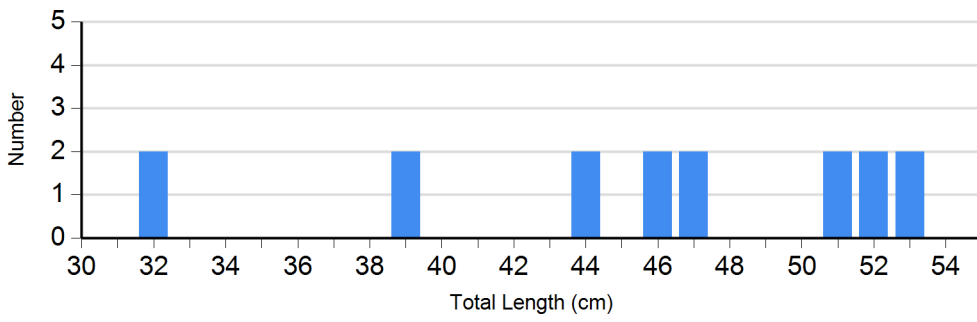


Species: Northern Pike
Gear: AFS std gill net



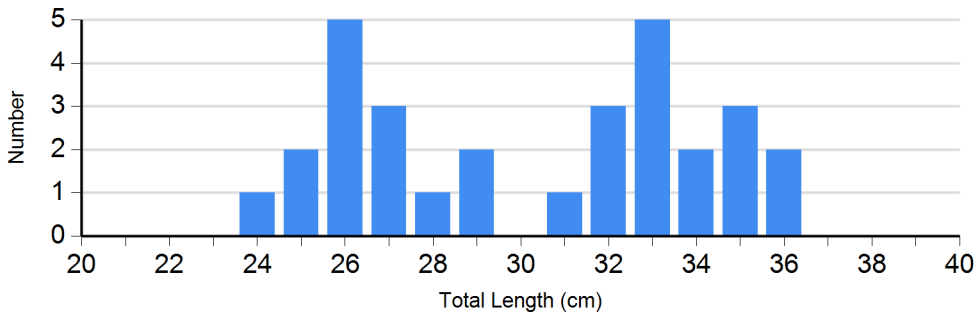
Species: Northern Pike
Gear: std exp gill net





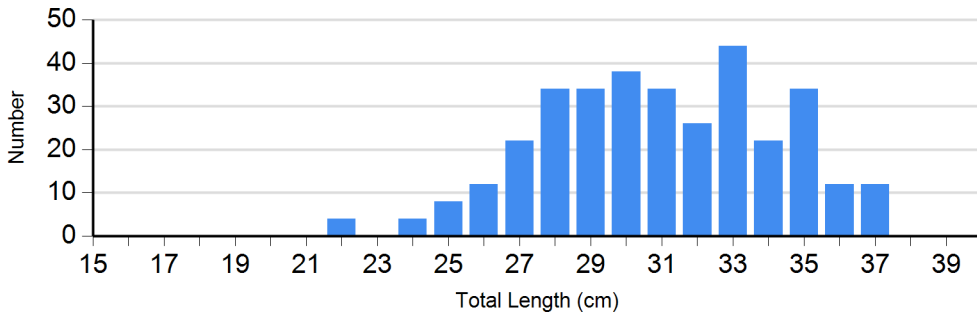
2016

Species: Rudd
Gear: AFS std frame net

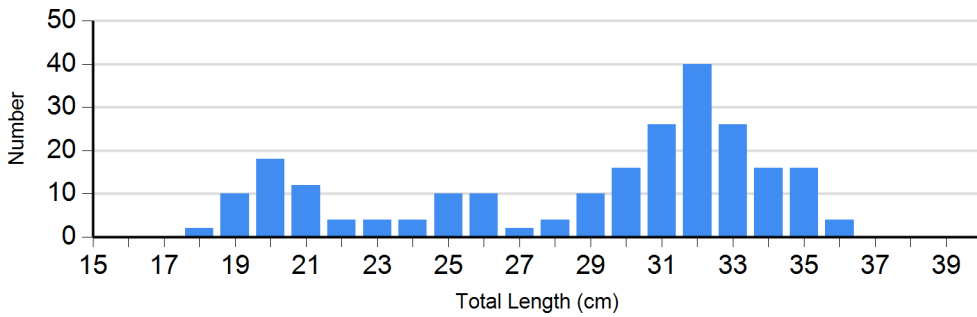


2017

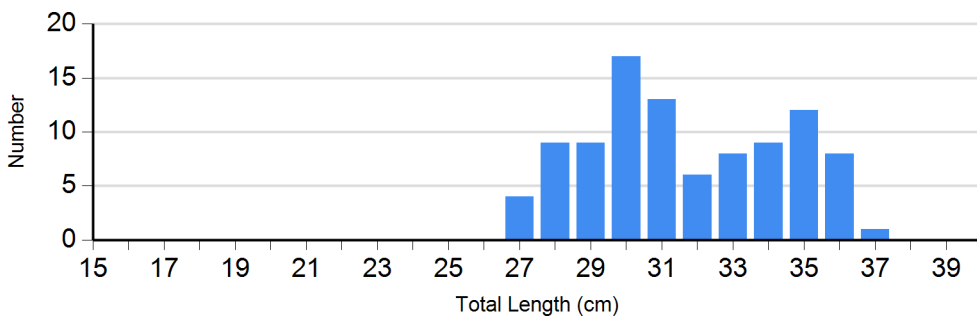
Species: Rudd
Gear: frame net (std 3/4 in)



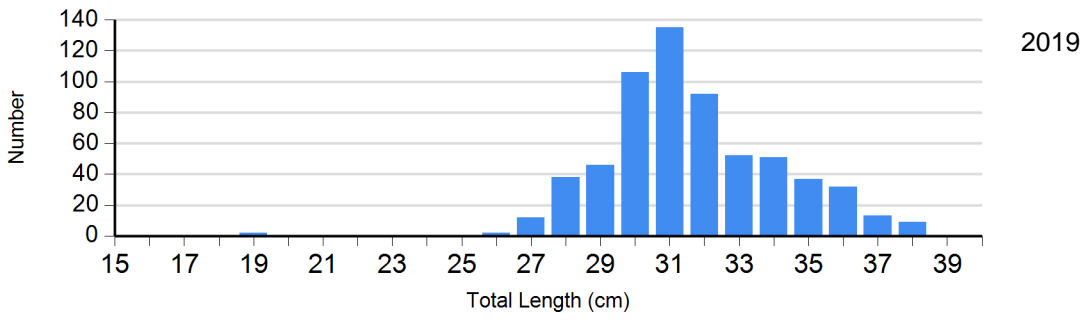
2015



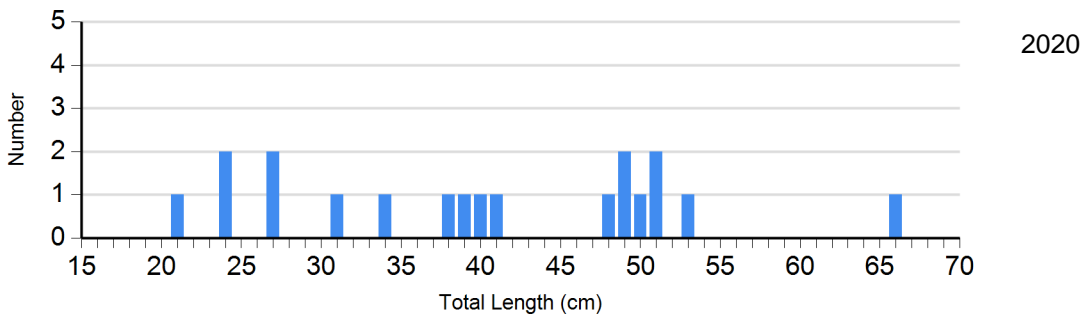
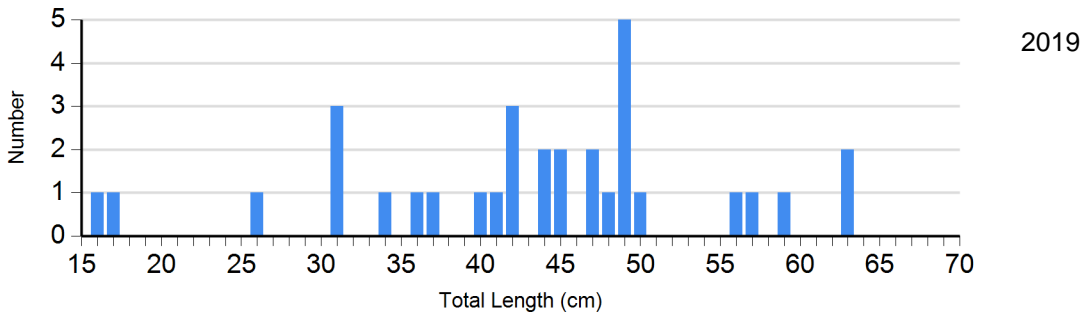
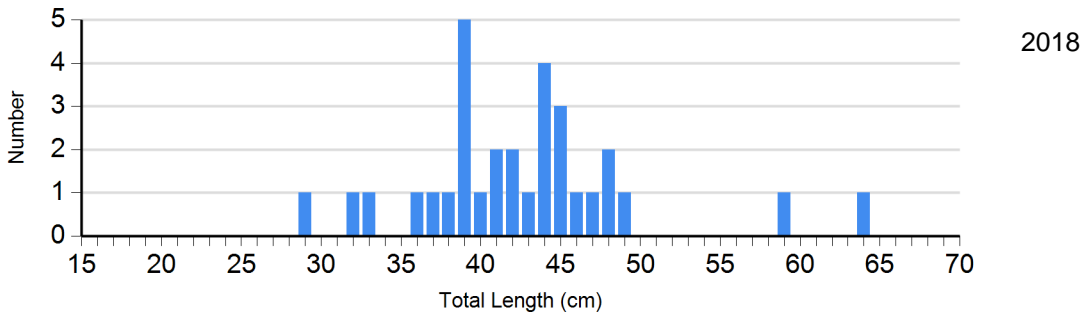
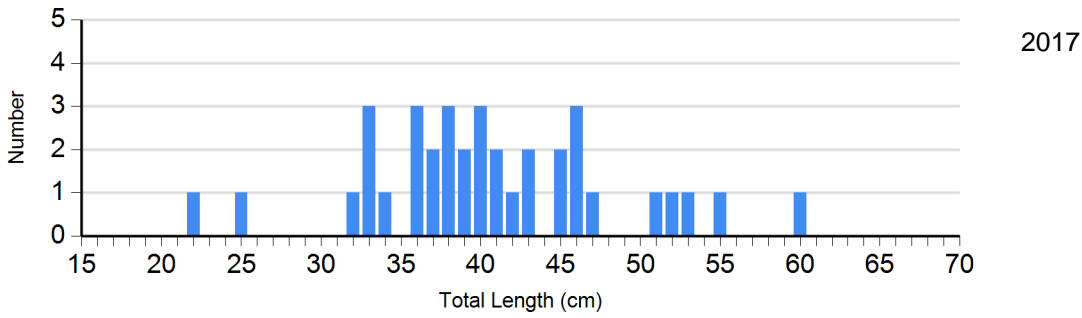
2016



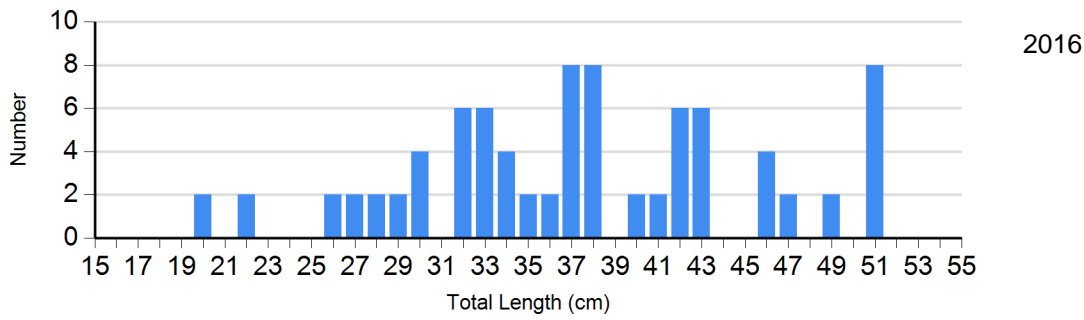
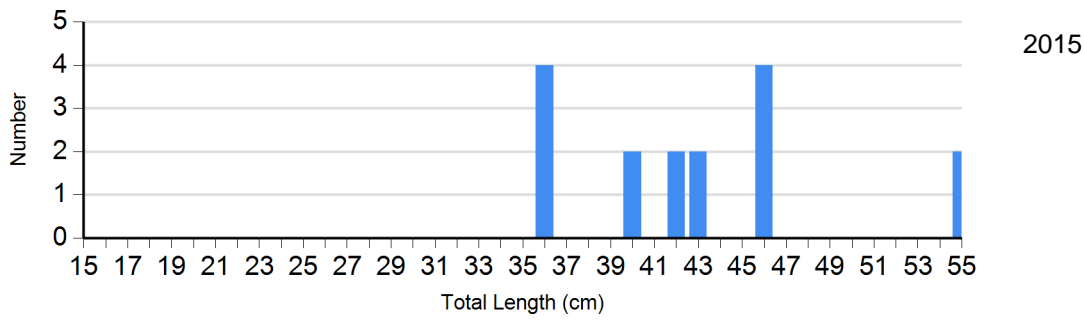
2018



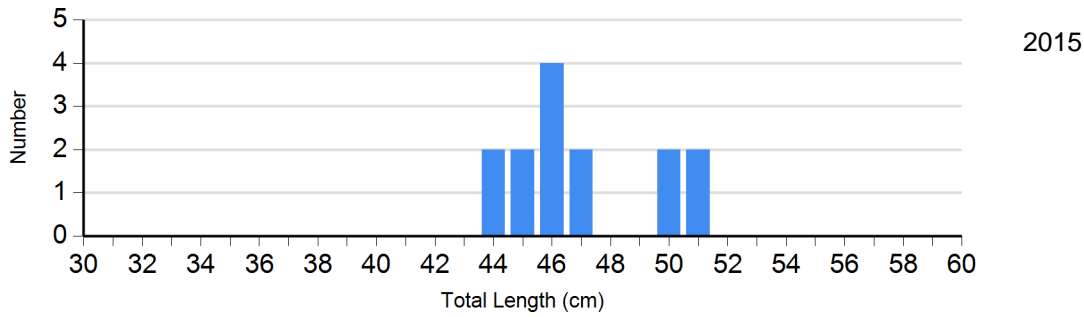
Species: Walleye
Gear: AFS std gill net



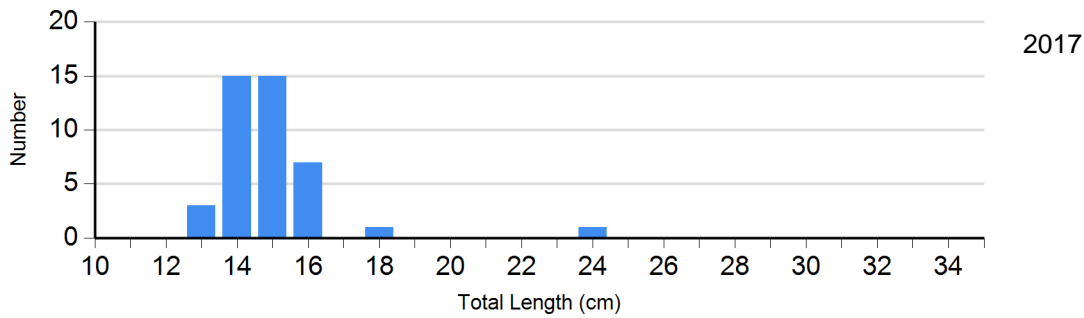
Species: Walleye
 Gear: std exp gill net

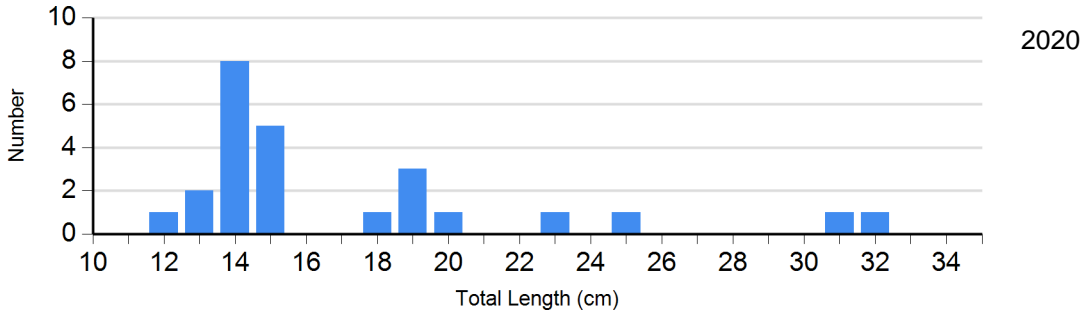
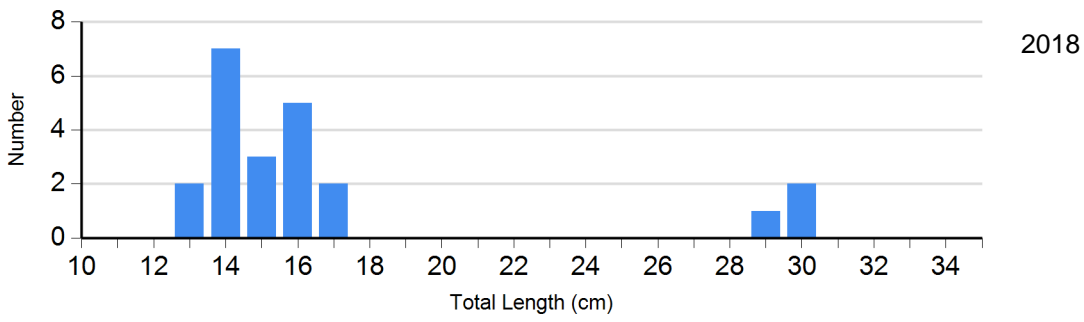


Species: White Sucker
 Gear: std exp gill net

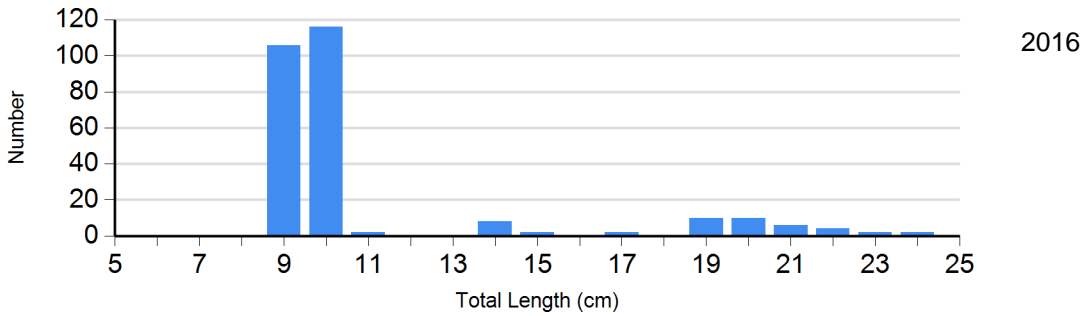
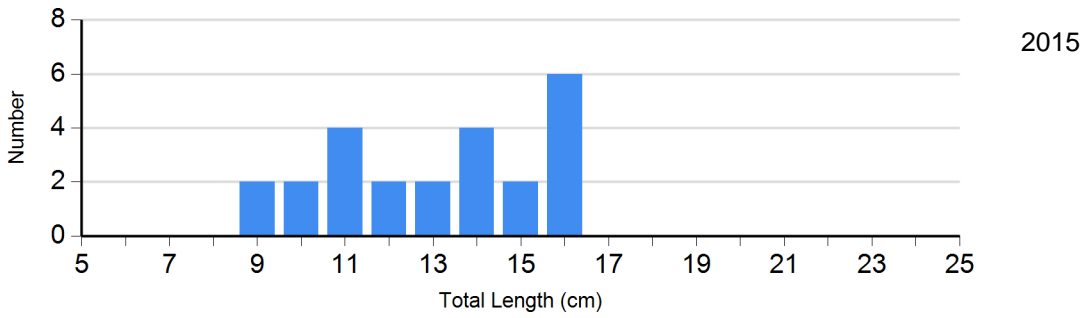


Species: Yellow Perch
 Gear: AFS std gill net





Species: Yellow Perch
 Gear: std exp gill net

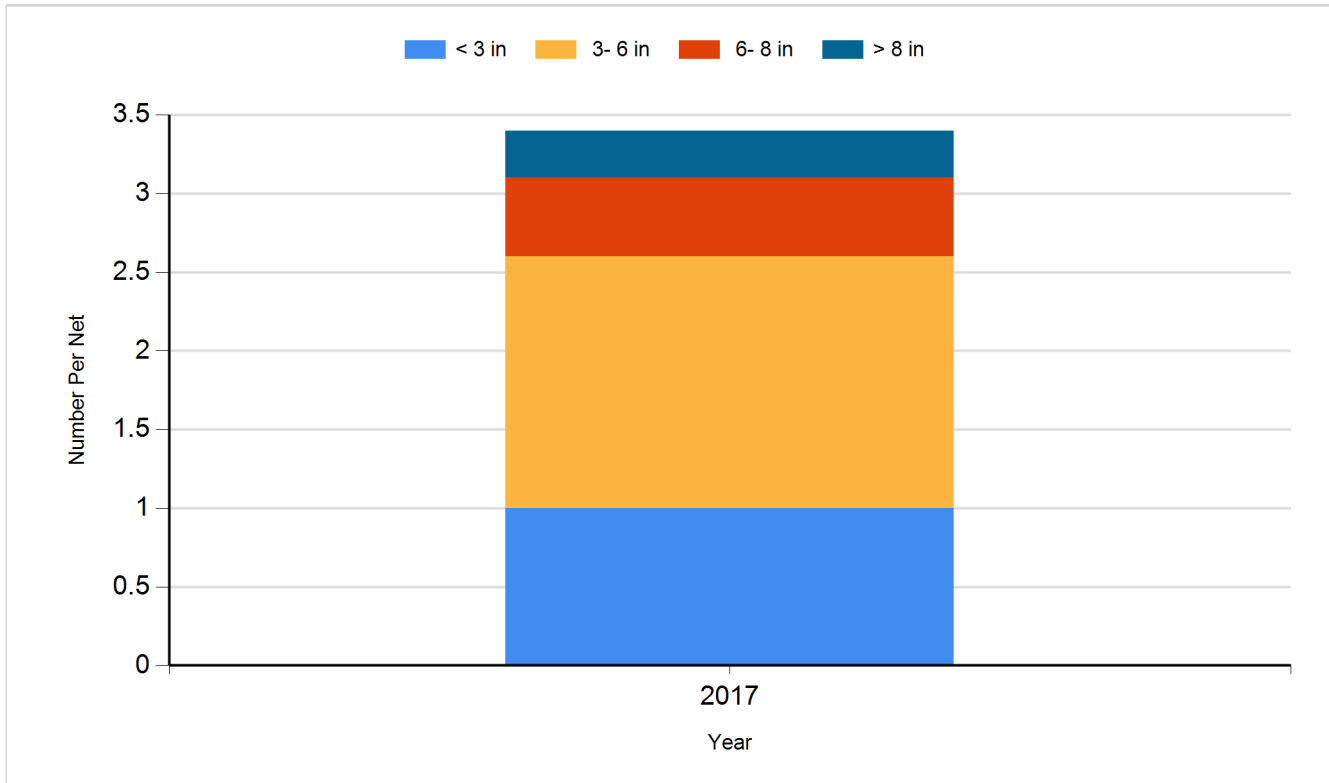


Historic Fish Sizes and Relative Abundance

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

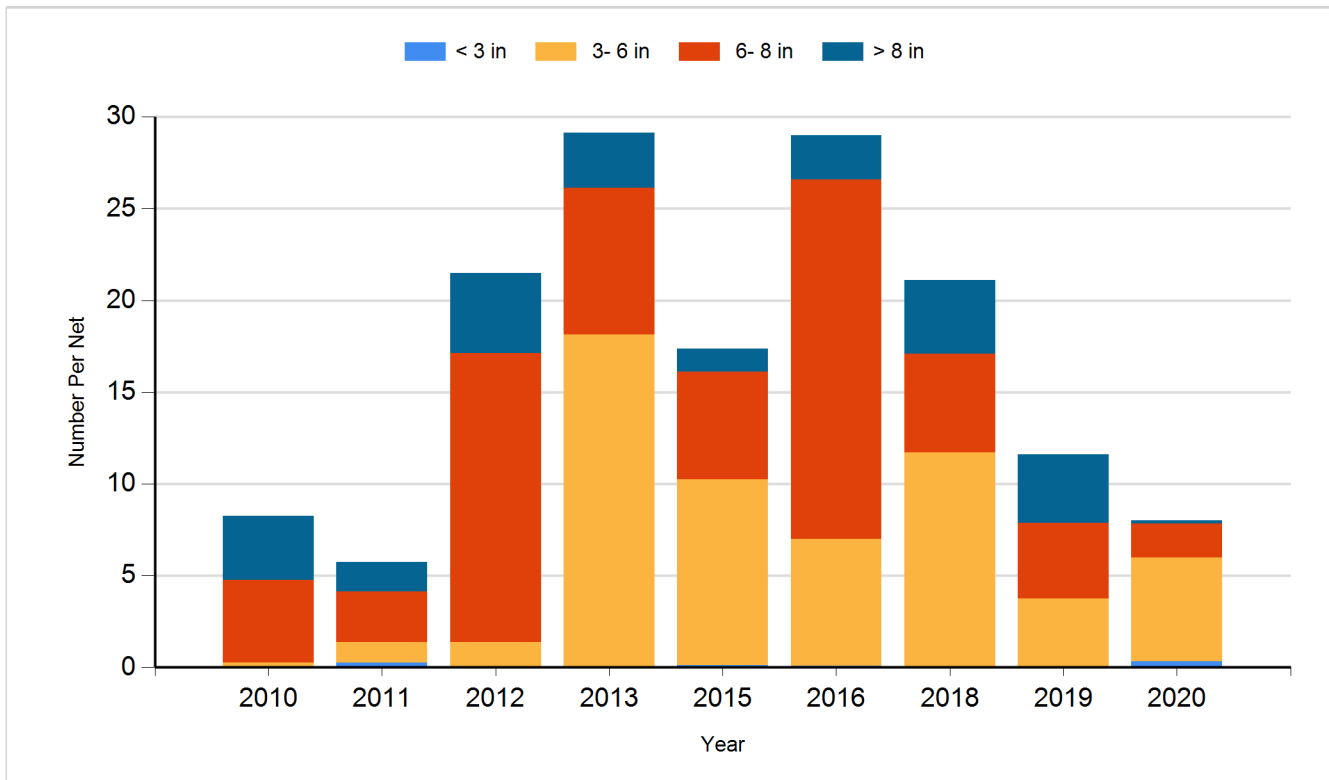
Species: Bluegill

Gear: AFS std frame net

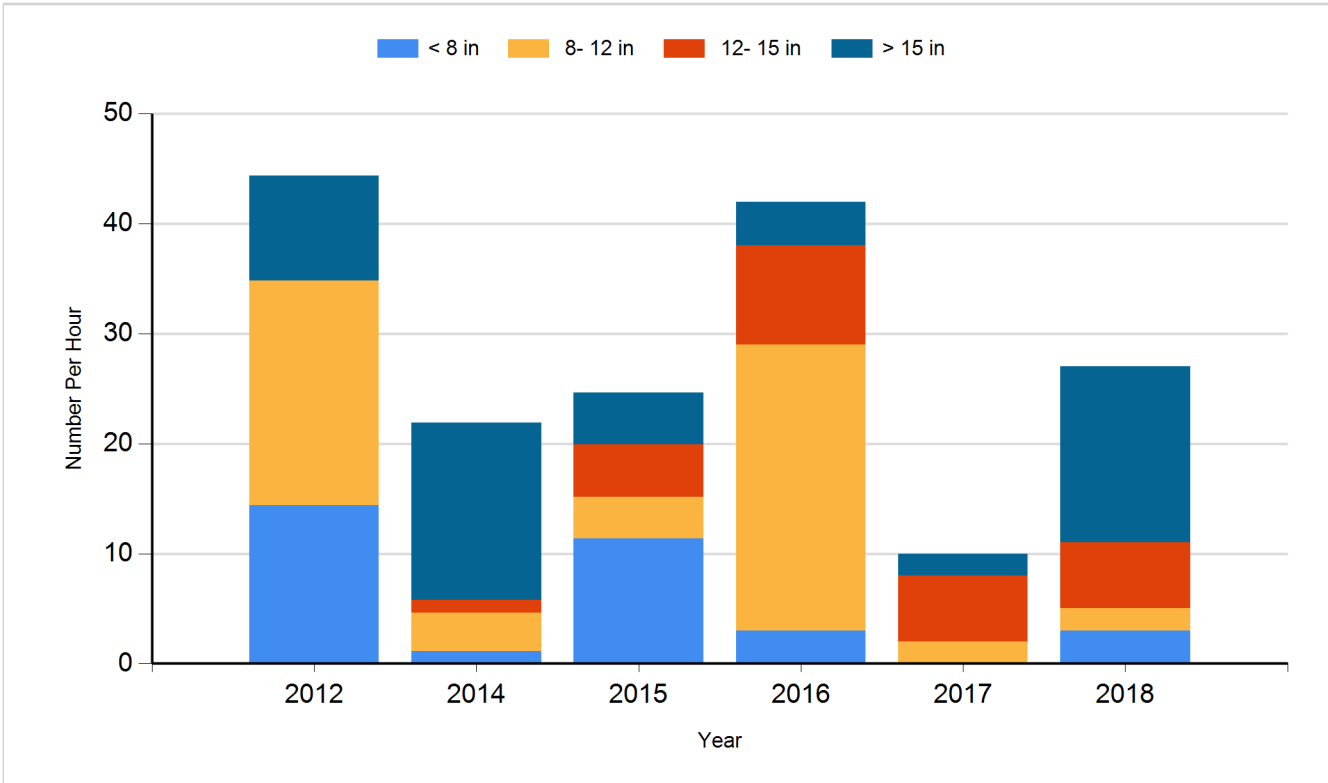


Species: Bluegill

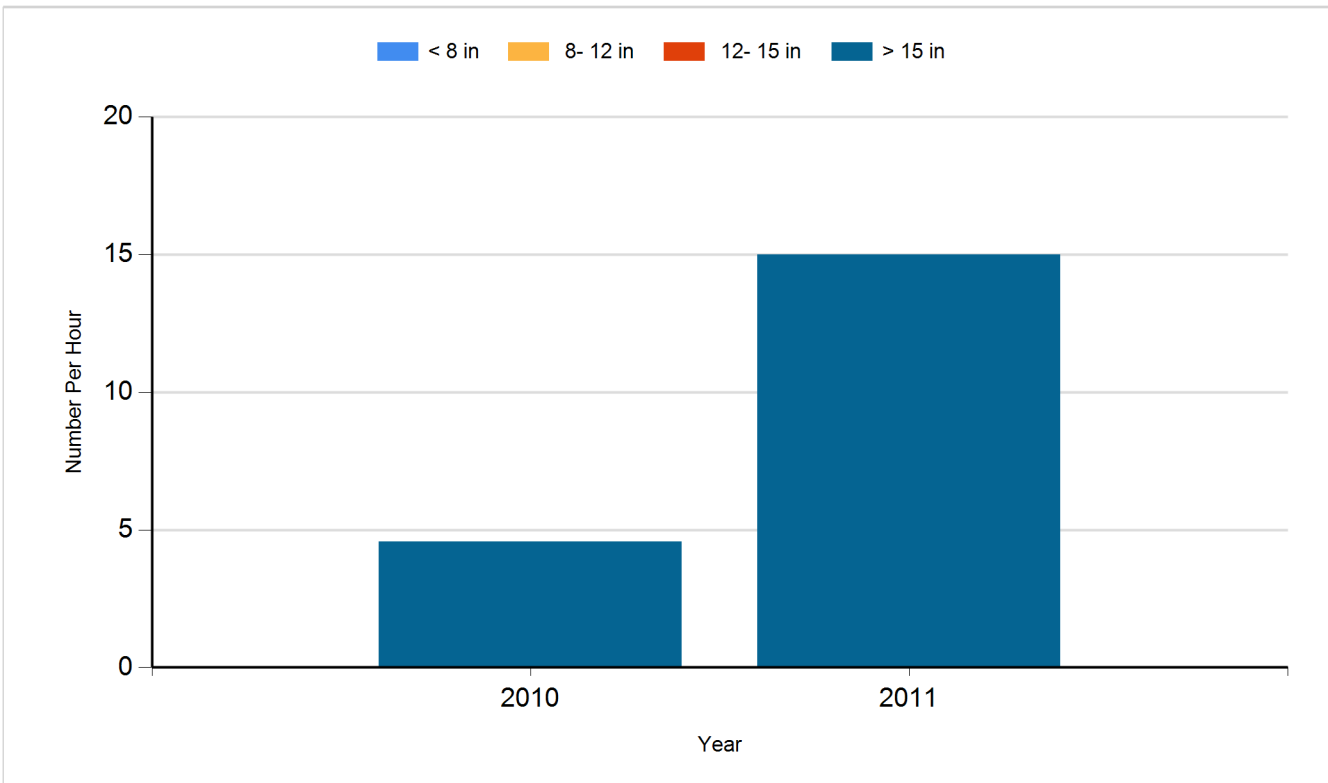
Gear: frame net (std 3/4 in)



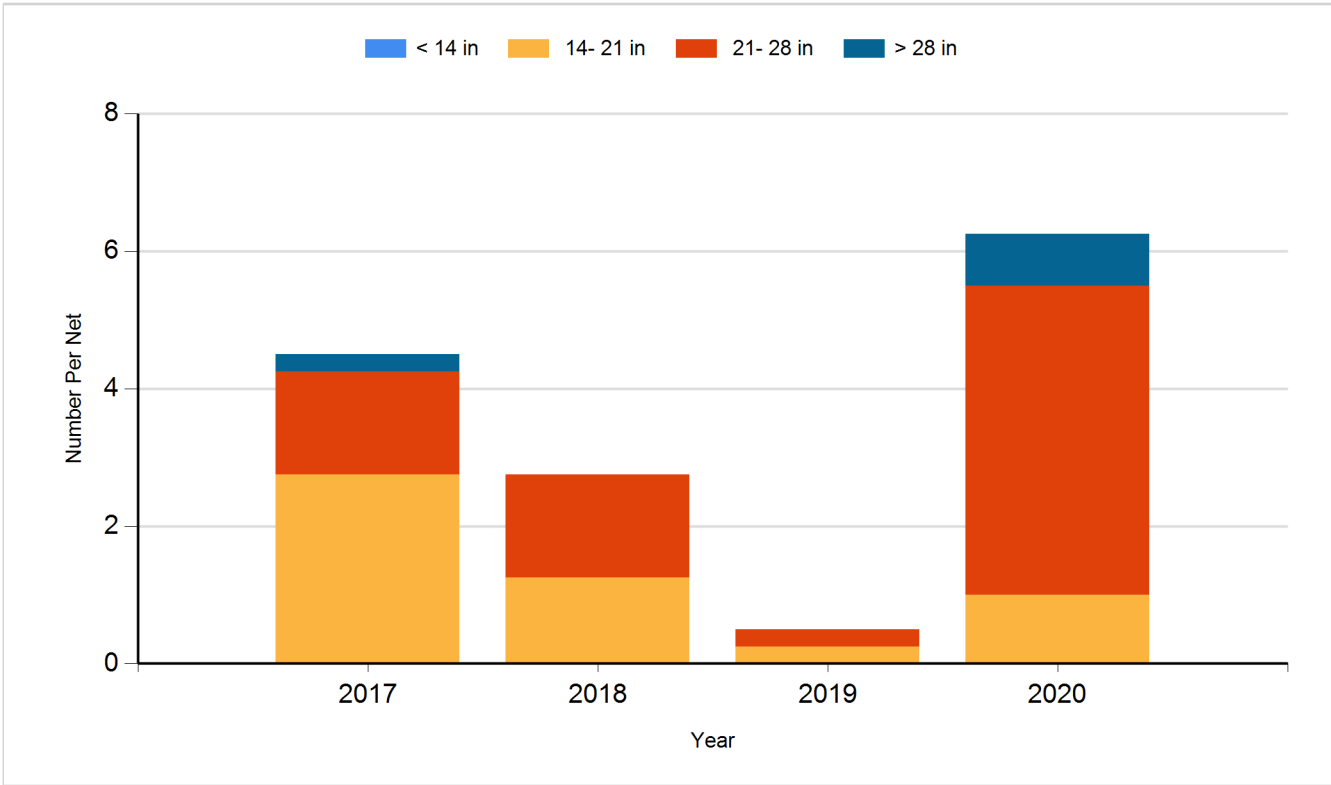
Species: Largemouth Bass
Gear: boat shocker (night)



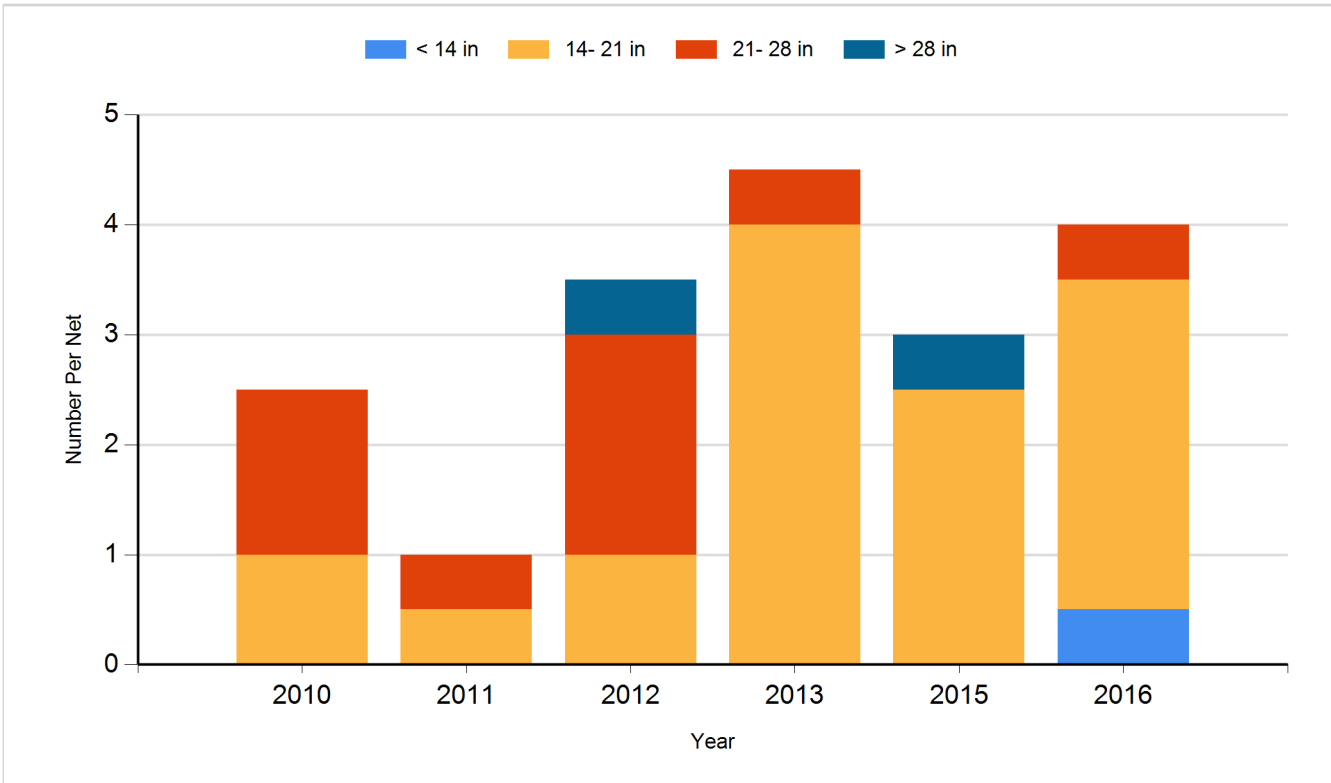
Species: Largemouth Bass
Gear: boat shocker (night, AC)



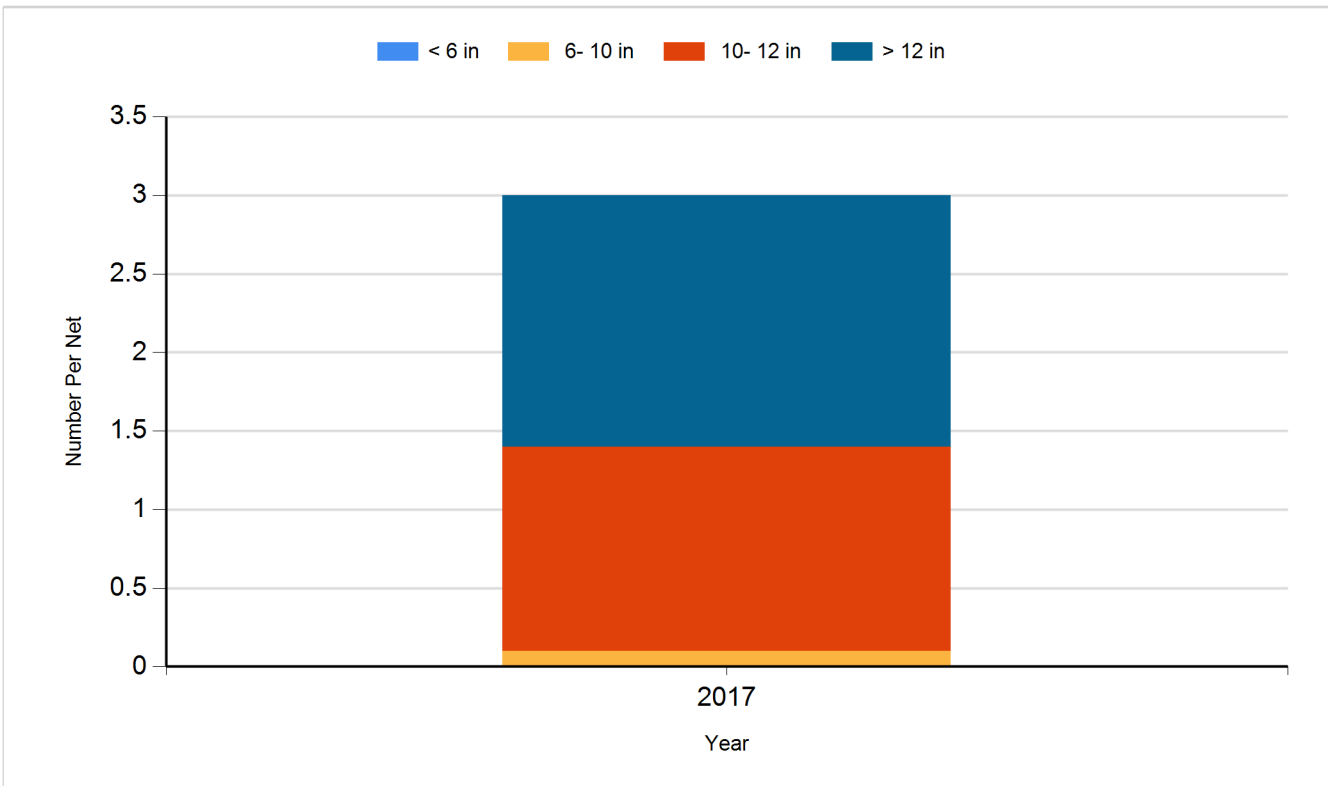
Species: Northern Pike
Gear: AFS std gill net



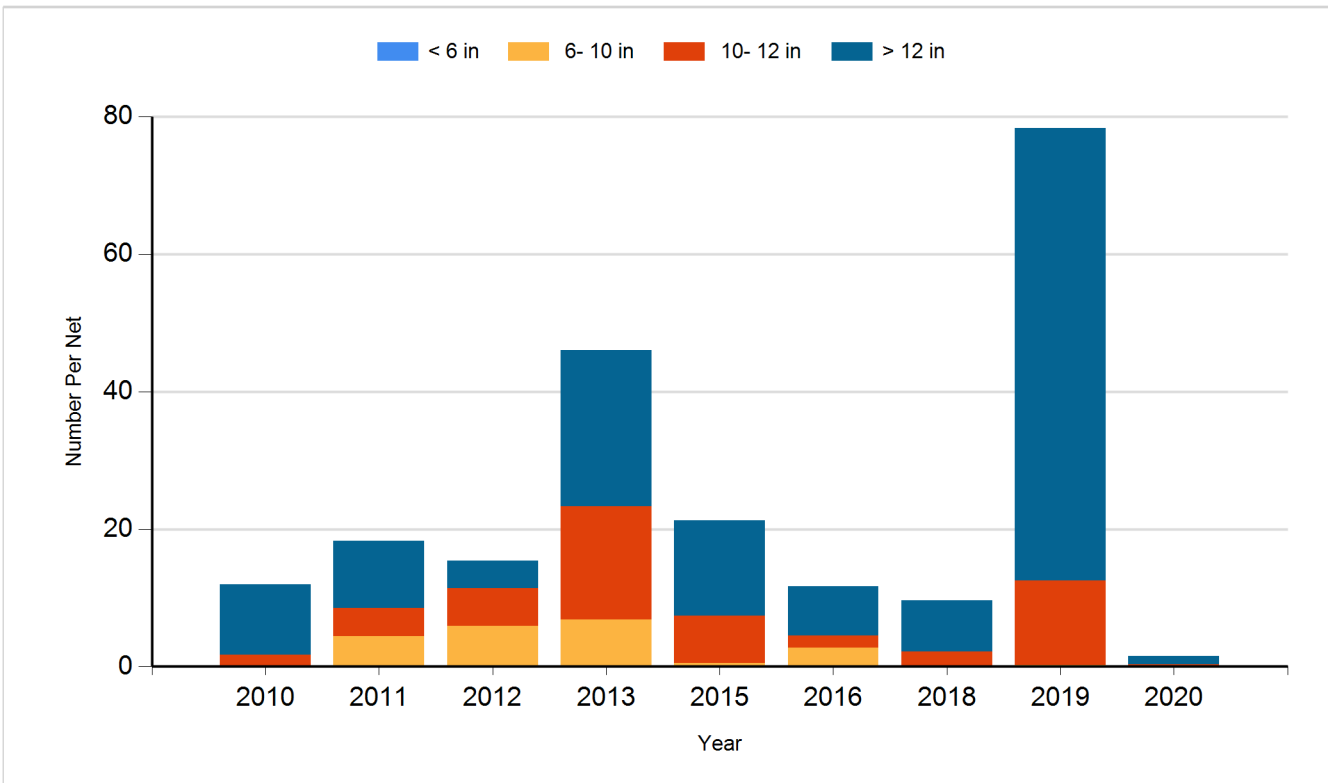
Species: Northern Pike
Gear: std exp gill net



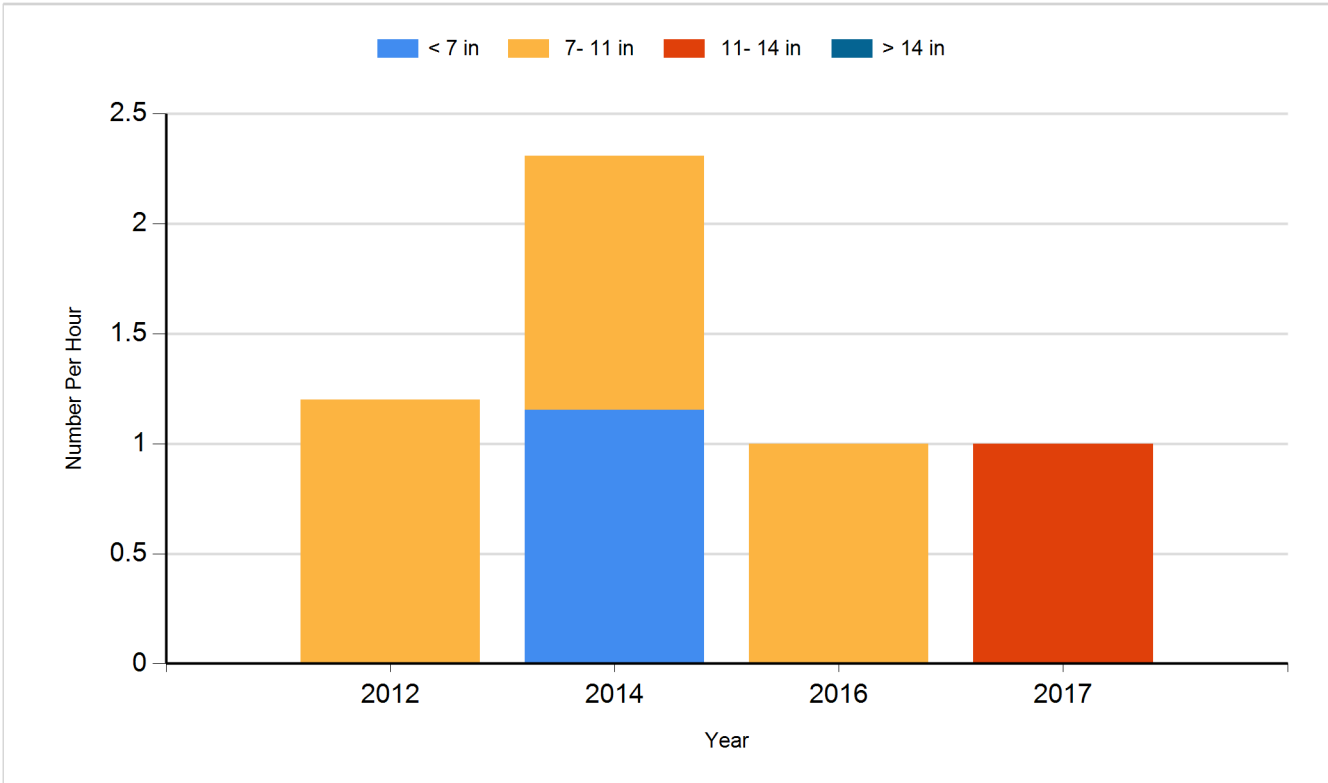
Species: Rudd
Gear: AFS std frame net



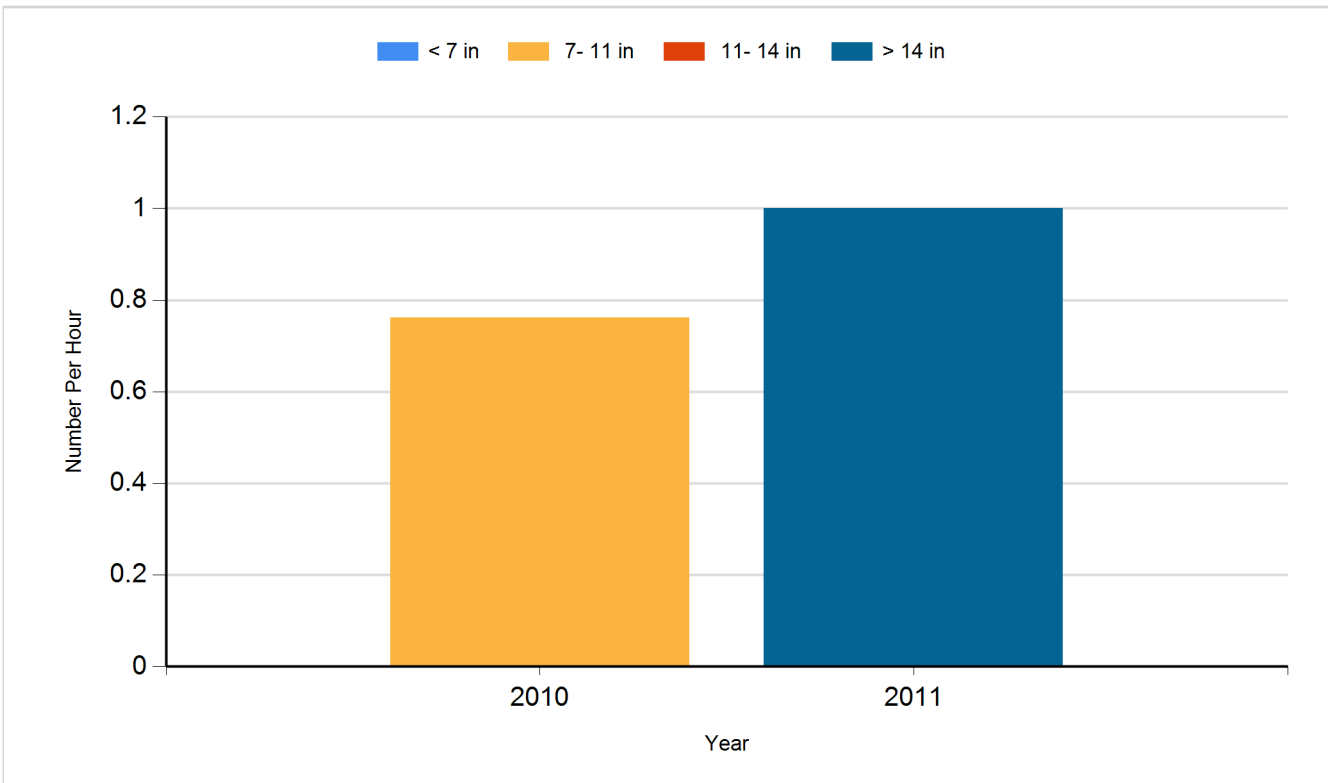
Species: Rudd
Gear: frame net (std 3/4 in)



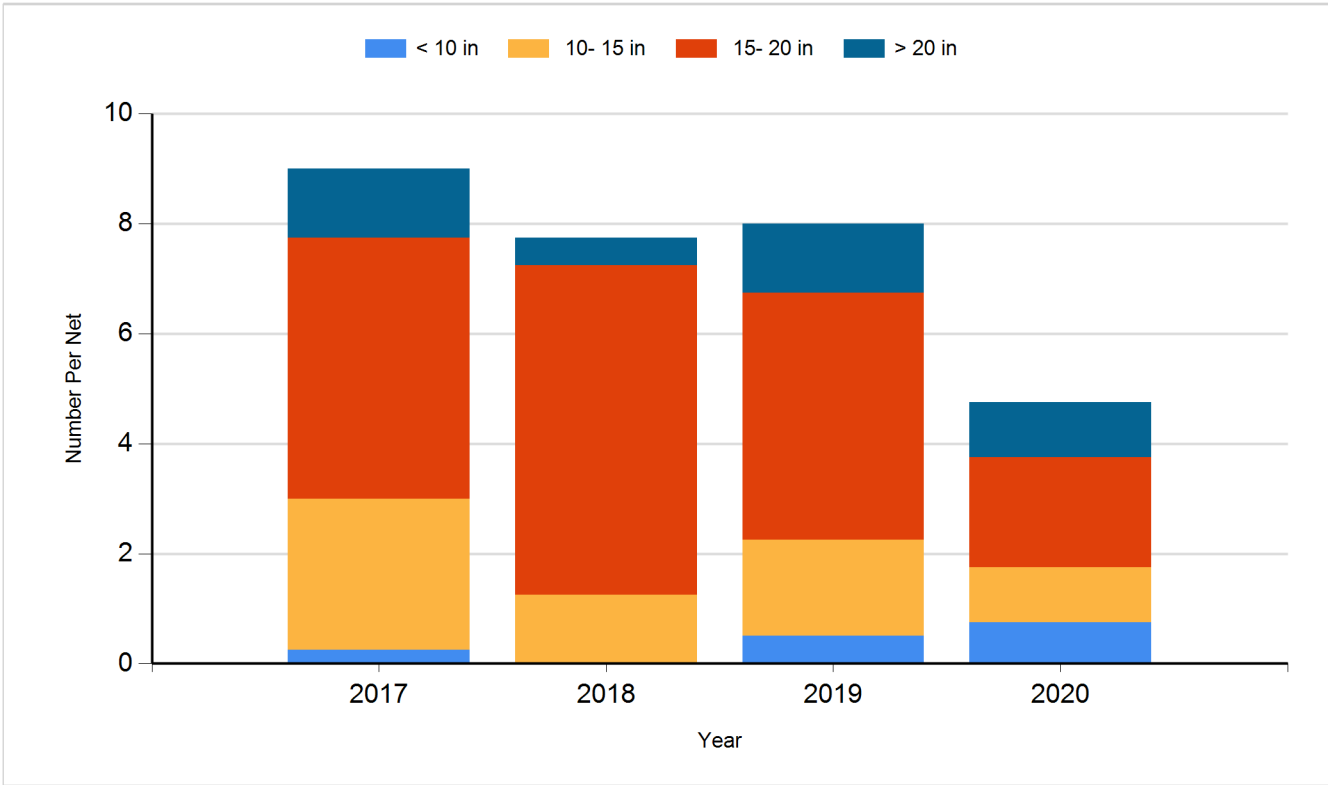
Species: Smallmouth Bass
Gear: boat shocker (night)



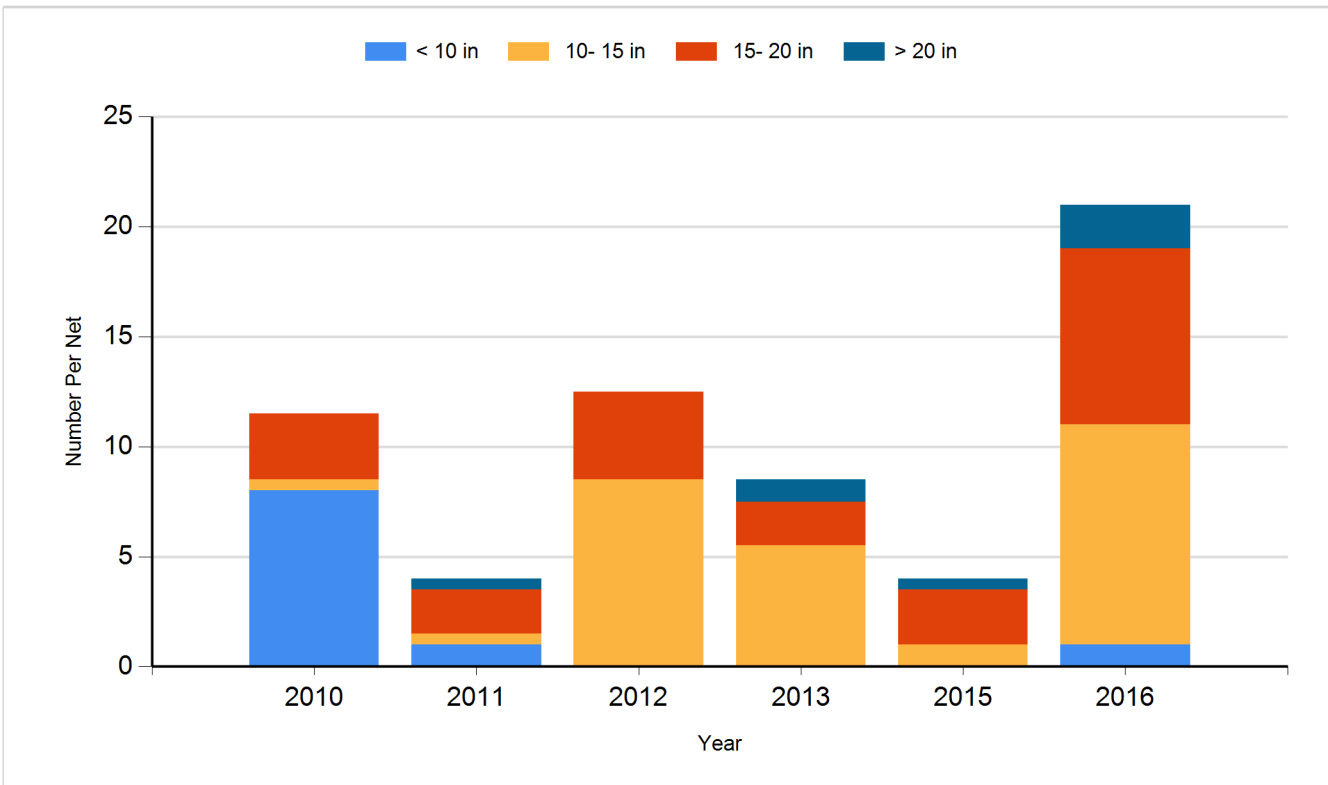
Species: Smallmouth Bass
Gear: boat shocker (night, AC)



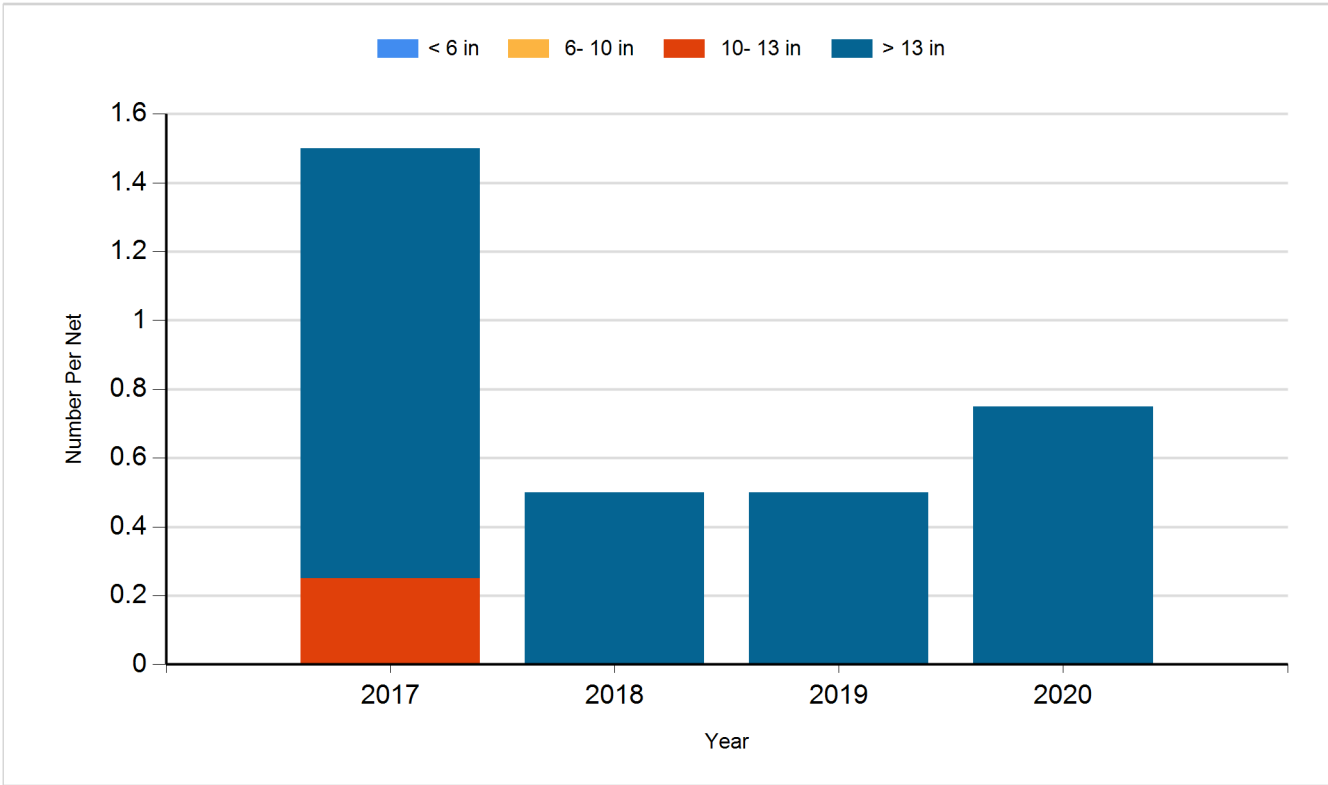
Species: Walleye
Gear: AFS std gill net



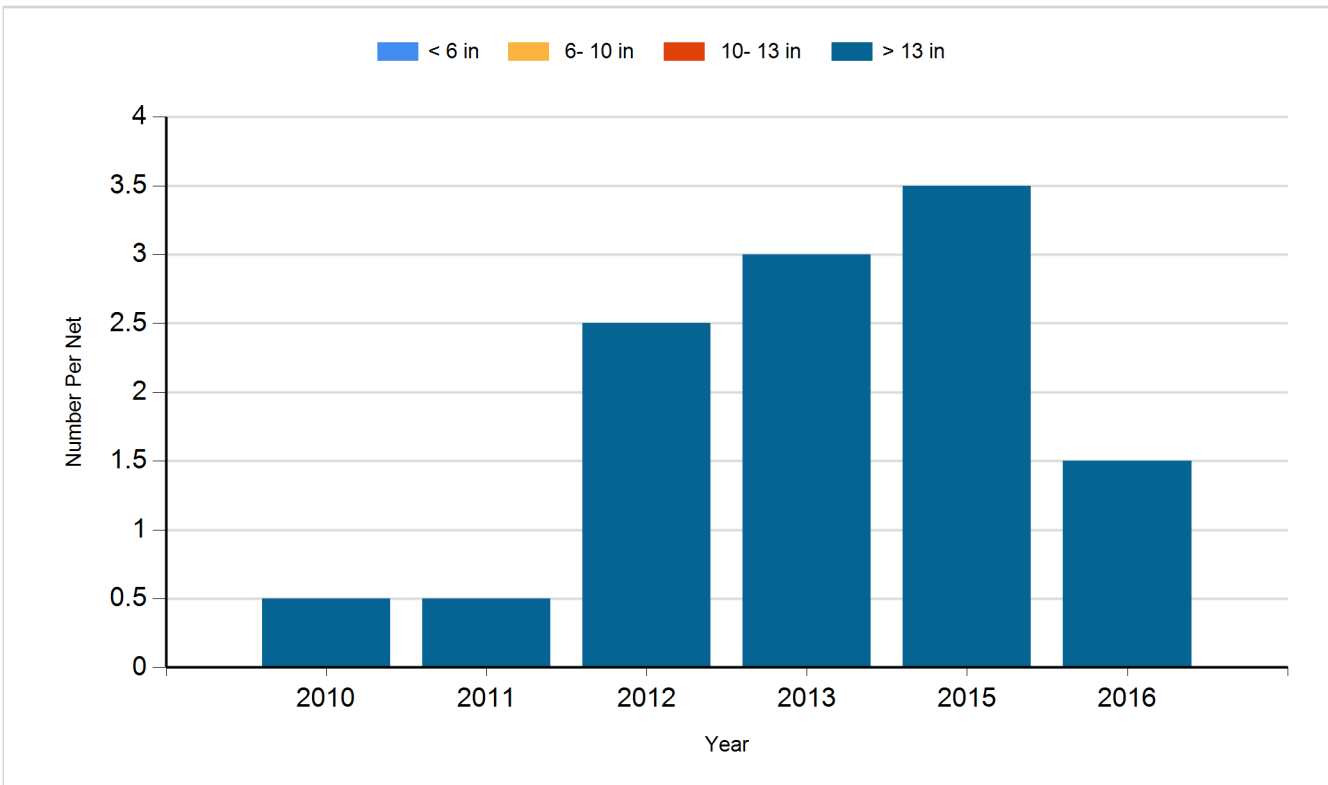
Species: Walleye
Gear: std exp gill net



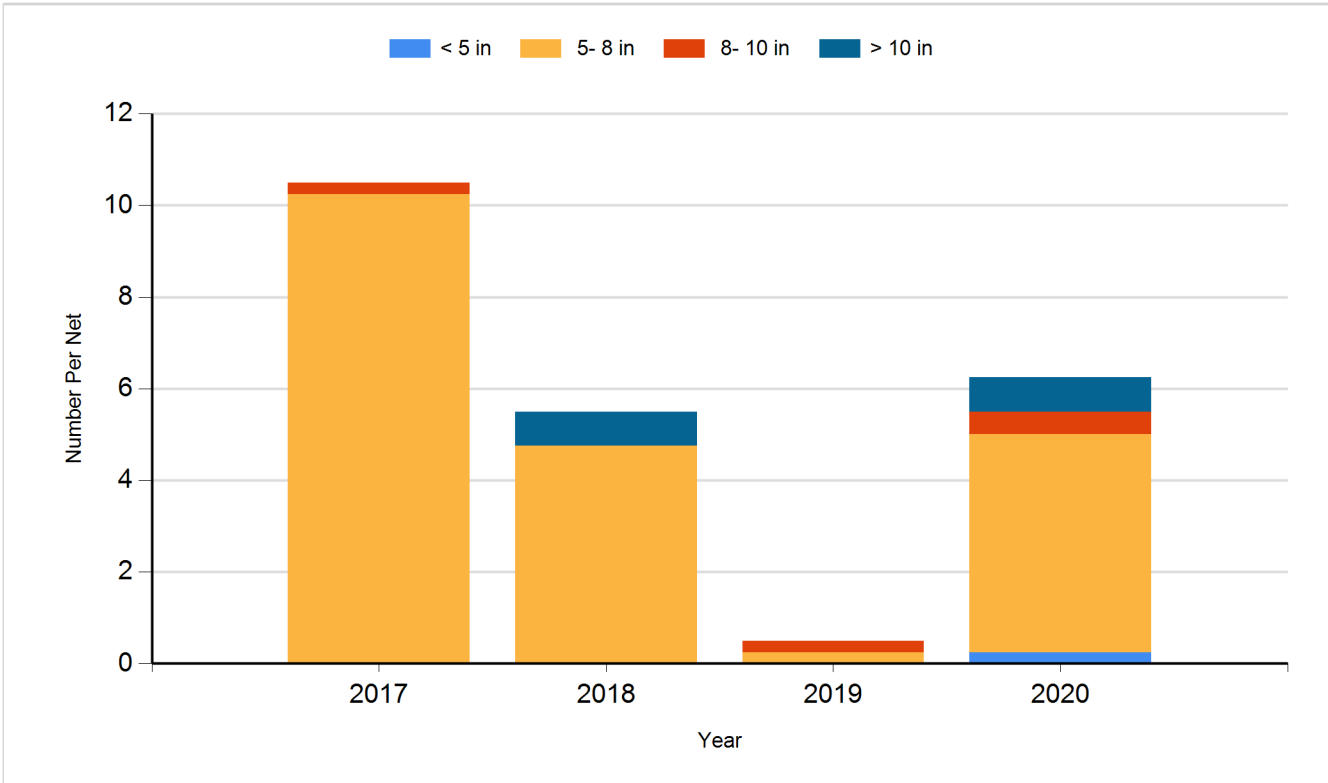
Species: White Sucker
Gear: AFS std gill net



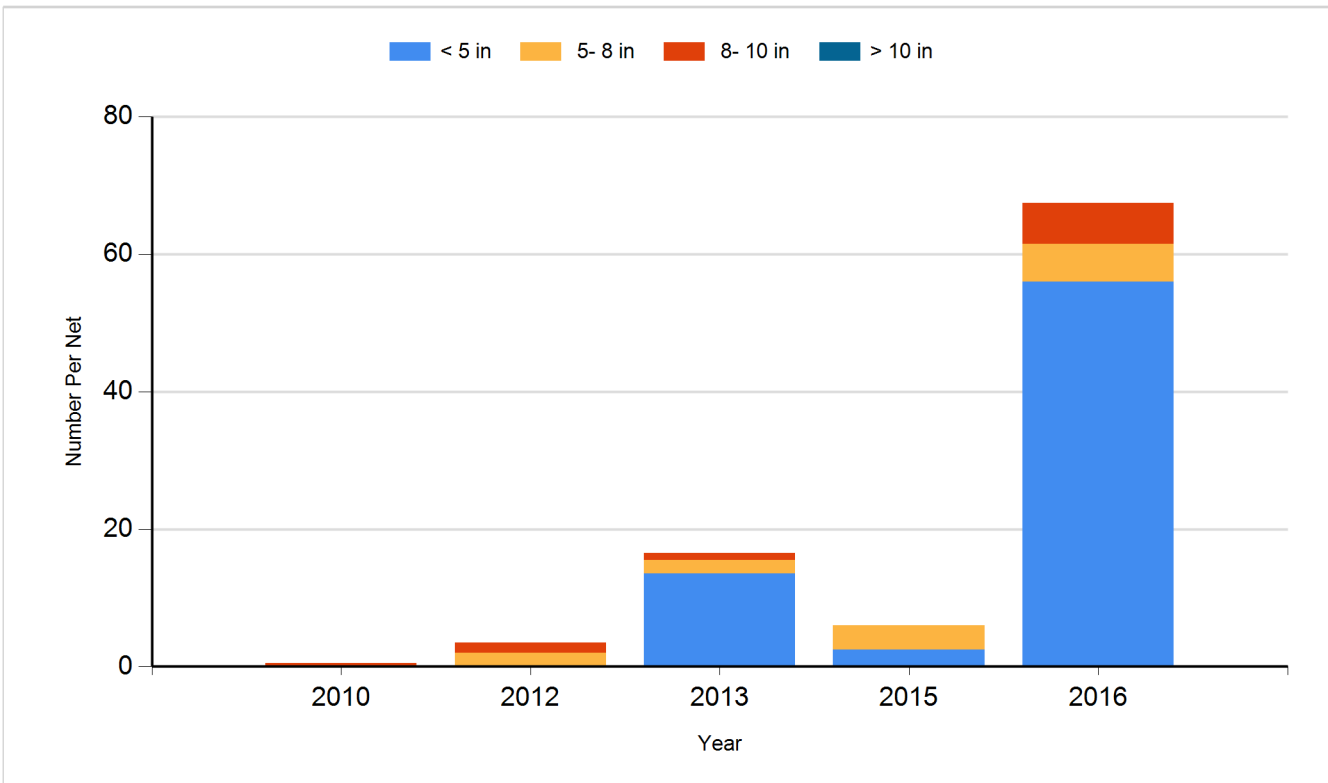
Species: White Sucker
Gear: std exp gill net



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
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
2019	Gizzard Shad	Adult	61