SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Little White River Project, Bennett County
LIW-Lake-8-000
2018

Lake Information

Name: Little White River Project

County: Bennett

Surface Area: 160 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 26, 2018	2 net-nights
AFS std gill net	Jun 27, 2018	2 net-nights
boat shocker (day)	Sep 13, 2018	3090 seconds
frame net (std 3/4 in)	Jun 26, 2018	4 net-nights
frame net (std 3/4 in)	Jun 27, 2018	4 net-nights

Common Fish Species Present

Northern Pike

Largemouth Bass

Channel Catfish

Black Crappie

Walleye

Black Bullhead

Shorthead Redhorse

Bluegill

Common Carp

Gizzard Shad

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.

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

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

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.

$$Wr = \left(\frac{W}{Ws}\right) \text{x } 100$$

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).

	Stock		Quality		Preferred		Memorable		Trophy	
Species Name	(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**

			Abundance		Stock Density Indices				Condition	
Gear	Species	Sample Size (n)	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Black Bullhead	5	1.3	1.6	20		0		86	1
	Black Crappie	4	1.0	0.7	75		0		90	4
	Channel Catfish	11	2.3	1.8	78		33		93	3
	Common Carp	8	2.0	0.7	63		13		84	3
	Gizzard Shad	3	0.8	0.4	67				100	
	Northern Pike	1	0.3	0.4	100		0		92	
	Shorthead Redhorse	1	0.3	0.4	100		100			
	Walleye	8	2.0	1.2	75		63		86	2
	Yellow Perch	2	0.5	0.8	100		0		90	2
boat shocker (day)	Largemouth Bass	41	43.9	16.9	74	11	23	10	113	2
	Walleye*	10	10.0	9.3	0		0		91	3
frame net (std 3/4 in)	Black Bullhead	46	5.8	2.3	48	11	0		97	2
	Black Crappie	851	103.8	18.5	31	2	10	1	98	1
	Bluegill	17	2.1	0.9	29		0		106	4
	Channel Catfish	23	1.4	1.0	27		9		85	5
	Common Carp	4	0.5	0.5	50		0		80	
	Golden Shiner	1	0.0	0.0						
	Green Sunfish	1	0.1	0.2	0		0		133	
	Largemouth Bass	1	0.1	0.2	100		100		103	
	Northern Pike	7	0.9	0.5	86		14		81	2
	Shorthead Redhorse	29	3.6	2.3	100		93		79	1
	Walleye	5	0.6	0.5	100		100		87	5
	White Sucker	1	0.1	0.2	100		100		90	

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.

		CPUE										
Gear	Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Avg
AFS std frame net	Black Bullhead									2.6		2.6
	Black Crappie									32.7		32.7
	Bluegill									1.0		1.0
	Channel Catfish									0.0		0.0
	Common Carp									0.7		0.7
	Gizzard Shad									1.0		1.0
	Golden Shiner									0.0		0.0
	Green Sunfish									0.3		0.3
	Largemouth Bass									0.1		0.1
	Northern Pike									1.4		1.4
	Shorthead Redhorse									3.7		3.7
	Tadpole Madtom									0.0		0.0
	Walleye									1.1		1.1
	Yellow Perch									0.4		0.4
AFS std gill net	Black Bullhead									5.5	1.3	3.4
	Black Crappie									1.8	1.0	1.4
	Channel Catfish									3.5	2.3	2.9
	Common Carp									2.3	2.0	2.2
	Gizzard Shad									3.3	0.8	2.1
	Northern Pike										0.3	0.3
	Shorthead Redhorse									0.5	0.3	0.4
	Walleye									2.3	2.0	2.2
	Yellow Perch									0.8	0.5	0.7
boat shocker (day)	Largemouth Bass							18.0	35.0	39.0	43.9	34.0
	Walleye						39.6		1.0	6.0	10.0	14.2
frame net (std 3/4 in)	Black Bullhead	11.8		23.3		9.1	16.8	6.9	10.7		5.8	12.1
	Black Crappie	2.3		9.8		14.9	11.0	24.0	29.0		103.8	27.8
	Bluegill							0.4	0.1		2.1	0.9
	Bullhead Catfish Family	0.0										0.0
	Channel Catfish	4.5		7.3		0.1	0.1	0.2	2.9		1.4	2.4
	Common Carp	2.3		1.2		0.1	0.4	0.2	0.9		0.5	0.8
	Gizzard Shad					0.1		0.3	0.1			0.2
	Golden Shiner					0.0		0.0	0.0		0.0	0.0
	Green Sunfish			0.5			0.4		0.3		0.1	0.3

		CPUE										
Gear	Species	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	Avg
frame net (std 3/4 in)	Largemouth Bass						0.3	0.2	0.4		0.1	0.3
	Northern Pike	5.3		1.3		2.9	1.3	1.3	1.9		0.9	2.1
	Shorthead Redhorse	0.5		0.2		0.1	0.9	1.3	3.6		3.6	1.5
	Walleye			0.3		0.1	0.3	0.2	0.7		0.6	0.4
	White Sucker										0.1	0.1
	Yellow Perch			0.2		0.3	0.1	0.1	0.1			0.2
std exp gill net	Black Bullhead	2.0		1.0		13.0	11.5	111.5	11.5			25.1
	Black Crappie			1.0		1.0	2.5	4.0	1.5			2.0
	Channel Catfish	5.0		3.5		2.0	1.5	7.5	2.5			3.7
	Common Carp	5.0		1.0		1.0	2.5	4.5	2.0			2.7
	Gizzard Shad							2.0	1.0			1.5
	Golden Shiner	0.0						0.0				0.0
	Northern Pike	4.5		2.5		0.5	1.5	0.5				1.9
	Shorthead Redhorse			0.5		0.5	2.5		0.5			1.0
	Walleye	3.0		3.0		2.0	5.0	6.0	3.5			3.8
	Yellow Perch	0.5				1.5	0.5	1.5	3.5			1.5

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.

			Year									
Gear	Species	Index	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AFS std frame net	Black Bullhead	PSD									44	
		PSD-P									0	
		Wr									93	
	Black Crappie	PSD									33	
		PSD-P									10	
		Wr									98	
	Bluegill	PSD									0	
		PSD-P									0	
		Wr									105	
	Channel Catfish	PSD									0	
		PSD-P									0	
	Common Carp	PSD									20	
		PSD-P									20	
		Wr									88	
	Gizzard Shad	PSD									0	
	Largemouth Bass	PSD									100	
		PSD-P									0	
		Wr									102	
	Northern Pike	PSD									80	
		PSD-P									10	
		Wr									93	
	Shorthead Redhorse	PSD									100	
		PSD-P									62	
		Wr									95	
	Walleye	PSD									100	
		PSD-P									50	
		Wr									90	
AFS std gill net	Black Bullhead	PSD									68	20
		PSD-P									0	0
		Wr									83	86
	Black Crappie	PSD									57	75
		PSD-P									0	0
		Wr									94	90

			Year									
Gear	Species	Index	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AFS std gill net	Channel Catfish	PSD									79	78
		PSD-P									29	33
		Wr									97	93
	Common Carp	PSD									67	63
		PSD-P									0	13
		Wr									85	84
	Gizzard Shad	PSD									46	67
		Wr									89	100
	Northern Pike	PSD										100
		PSD-P										0
		Wr										92
	Shorthead Redhorse	PSD									100	100
		PSD-P									50	100
		Wr									101	
	Walleye	PSD									100	75
		PSD-P									44	63
		Wr									92	86
boat shocker (day)	Largemouth Bass	PSD							72	60	44	74
		PSD-P							22	34	26	23
		Wr							110	113		113
	Walleye	PSD						70		0	0	0
		PSD-P						30		0	0	0
		Wr						87				91
frame net (std 3/4 in)	Black Bullhead	PSD	0		2		2	3	10	39		48
		PSD-P	0		1		0	0	0	0		0
		Wr			82		84	82	88	93		97
	Black Crappie	PSD	33		7		53	59	66	38		31
		PSD-P	33		0		4	20	43	19		10
		Wr			111		104	93	96	110		98
	Bluegill	PSD							67	100		29
		PSD-P							0	0		0
		Wr							123	93		106
	Channel Catfish	PSD	61		45		100	100	100	40		27
		PSD-P	0		2		0	0	100	10		9
		Wr			94		92	102	123	118		85
	Common Carp	PSD	44		86		0	100	100	100		50

			Year									
Gear	Species	Index	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
frame net (std 3/4 in)	Common Carp	PSD-P	11		0		0	100	0	17		0
		Wr			91		87	84	83	89		80
	Gizzard Shad	PSD					0		0	0		
		Wr					114		99			
	Largemouth Bass	PSD						50	50	0		100
		PSD-P						0	0	0		100
		Wr						96	117	117		103
	Northern Pike	PSD	48		63		85	80	67	69		86
		PSD-P	0		50		50	30	11	0		14
		Wr			79		91	89	90	94		81
	Shorthead Redhorse	PSD	100		0		100	86	92	96		100
		PSD-P	50		0		100	43	33	24		93
		Wr			92			89	90	87		79
	Walleye	PSD			100		100	100	100	80		100
		PSD-P			0		0	100	100	60		100
		Wr			85		89	92	96	91		87
std exp gill net	Black Bullhead	PSD	0		0		4	0	20	30		
		PSD-P	0		0		0	0	0	0		
		Wr			79		90	84	91	88		
	Black Crappie	PSD			0		50	60	75	100		
		PSD-P			0		0	0	50	33		
		Wr			119		112	95	103	104		
	Channel Catfish	PSD	60		86		100	67	40	60		
		PSD-P	10		14		0	0	20	20		
		Wr			109		103	95	100	89		
	Common Carp	PSD	20		50		100	40	33	25		
		PSD-P	0		0		0	0	0	0		
		Wr			90		87	89	86	90		
	Gizzard Shad	PSD							50	0		
		Wr							105			
	Northern Pike	PSD	44		100		0	67	100			
		PSD-P	0		40		0	33	100			
		Wr			85		88	88	91			
	Shorthead Redhorse	PSD			100		100	80		100		
		PSD-P			100		100	0		100		
		Wr			87		89	86		91		
	Walleye	PSD	0		100		75	60	17	71		

			Year									
Gear	Species	Index	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
std exp gill net	Walleye	PSD-P	0		0		25	10	8	14		
		Wr			84		91	86	95	95		

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+
2015	782	115 (472)	173 (110)	221 (8)	242 (87)	276 (12)	278 (95)				
2014	254	115 (94)	141 (2)	196 (79)	214 (22)	251 (52)	313 (6)				

Species: Largemouth Bass

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	41	197 (19)	288 (8)	345 (5)	398 (5)	401 (5)					
2015	44	201 (16)	312 (12)	370 (10)	416 (6)						

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	8		357 (3)		553 (1)	564 (2)	560 (2)				
2016	14		376 (8)	483 (4)	547 (2)						
2015	24		364 (20)	486 (2)				530 (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).

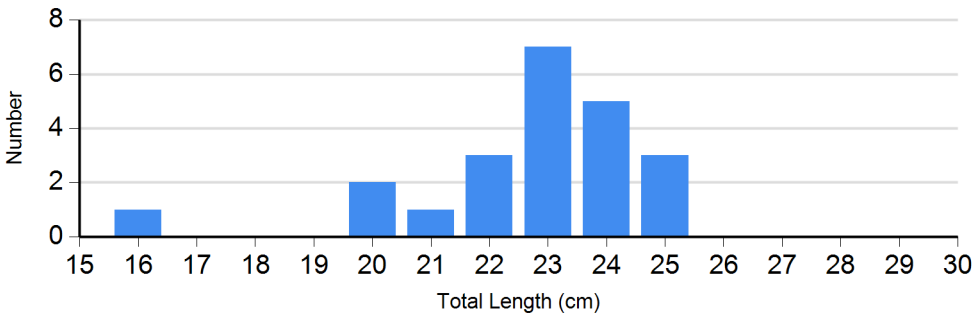
		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2014	46	84 (1.3)	0		0		0	
	2015	358	90 (0.5)	88	95 (1.6)	0		0	
	2016	32	88 (1.6)	14	86 (1.5)	0		0	
	2017	7	86 (2.9)	15	82 (2.2)	0		0	
	2018	4	85 (0.3)	1	87	0		0	
Black Crappie Frame Net	2014	72	101 (0.7)	68	88 (0.5)	26	85 (0.5)	10	88 (0.4)
	2015	120	105 (0.7)	80	96 (0.7)	138	93 (0.4)	10	94 (0.6)
	2016	252	122 (0.6)	78	102 (0.7)	60	97 (0.7)	16	103 (1.8)
	2017	154	103 (1.1)	51	93 (0.6)	12	97 (1.2)	12	98 (2.1)
	2018	570	106 (0.8)	178	88 (0.7)	58	87 (0.5)	24	85 (0.7)
Bluegill Frame Net	2015	2	122 (0.0)	4	124 (1.0)	0		0	
	2016	0		2	93 (0.0)	0		0	
	2017	7	105 (4.9)	0		0		0	
	2018	12	107 (4.3)	5	103 (4.7)	0		0	
Channel Catfish Gill Net	2014	2	96 (0.0)	4	95 (5.5)	0		0	
	2015	18	97 (1.5)	6	98 (2.2)	4	105 (0.1)	2	122 (0.0)
	2016	4	81 (1.5)	4	94 (3.4)	2	97 (0.0)	0	
	2017	3	93 (1.9)	7	94 (1.6)	3	108 (2.1)	1	89
	2018	2	86 (6.0)	4	96 (3.4)	3	93 (5.4)	0	
Common Carp Gill Net	2014	6	90 (2.5)	4	88 (1.3)	0		0	
	2015	12	86 (1.0)	6	87 (4.1)	0		0	
	2016	6	91 (1.0)	2	84 (0.0)	0		0	

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Common Carp Gill Net	2017	3	87 (0.9)	6	84 (1.6)	0		0	
	2018	3	86 (5.3)	4	85 (2.7)	1	74	0	
Largemouth Bass Electro Fishing	2015	10	110 (1.5)	18	111 (1.5)	8	110 (0.9)	0	
	2016	14	111 (2.5)	9	116 (2.4)	12	112 (1.4)	0	
	2018	10	110 (1.6)	20	114 (1.8)	9	116 (2.4)	0	
Northern Pike Gill Net	2014	2	83 (0.0)	2	80 (0.0)	2	100 (0.0)	0	
	2015	0		0		0		2	91 (0.0)
	2018	0		1	92	0		0	
Walleye Gill Net	2014	8	88 (2.9)	10	85 (1.3)	2	84 (0.0)	0	
	2015	20	95 (1.2)	2	102 (0.0)	2	92 (0.0)	0	
	2016	4	92 (0.3)	8	98 (2.6)	2	91 (0.0)	0	
	2017	0		5	91 (1.0)	4	94 (2.6)	0	
	2018	2	91 (4.2)	1	88	5	84 (1.2)	0	

Length Frequency Distribution

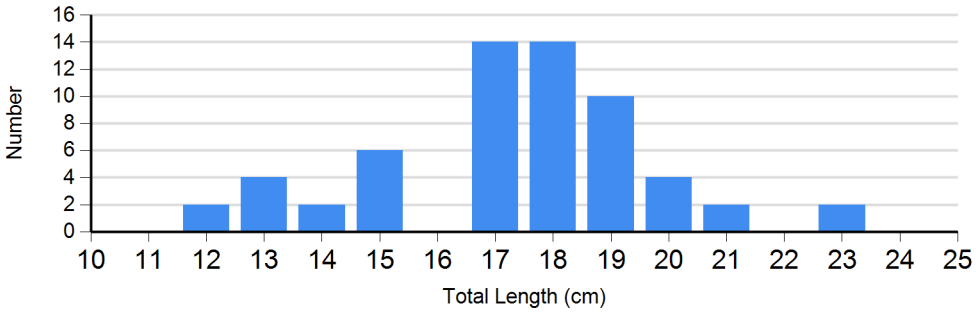
Length frequency histogram of species sampled by year.

Species: Black Bullhead
Gear: AFS std gill net

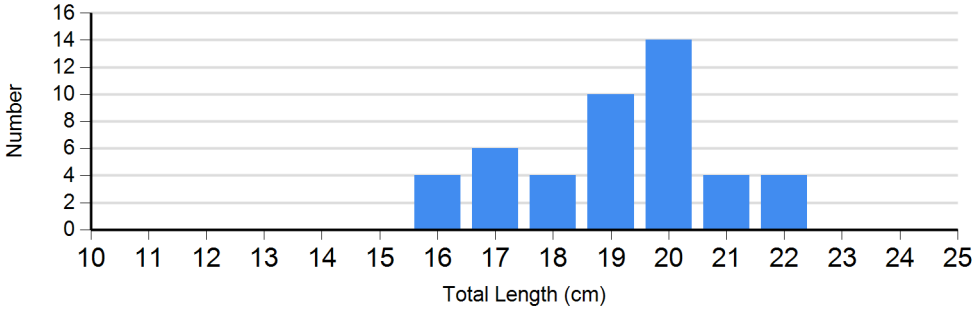


2017

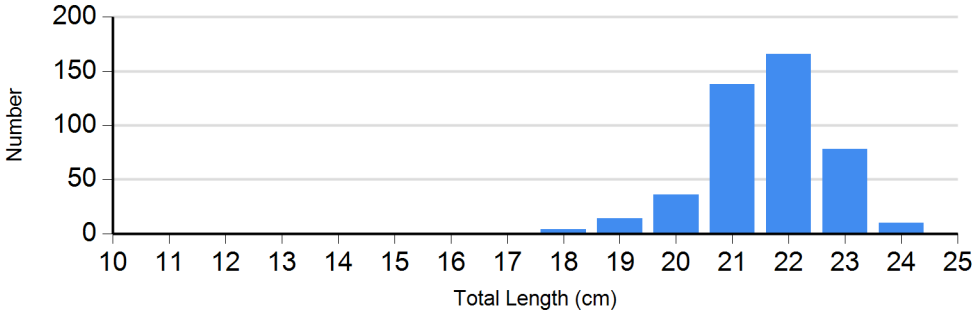
Species: Black Bullhead
Gear: std exp gill net



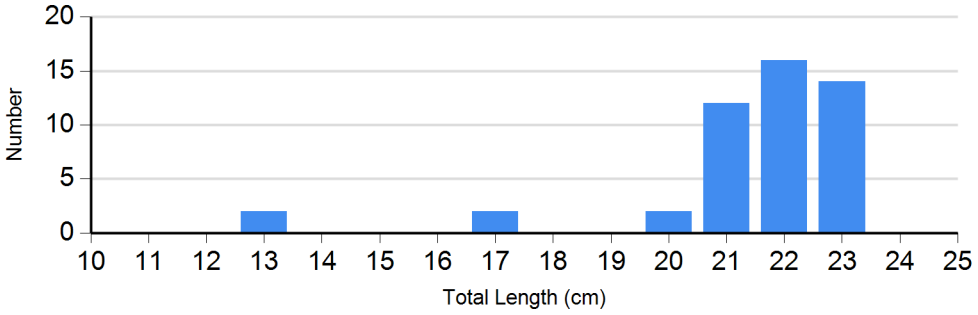
2013



2014

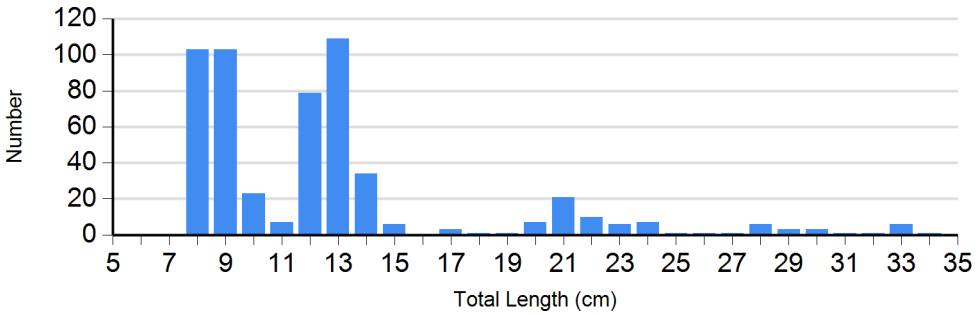


2015



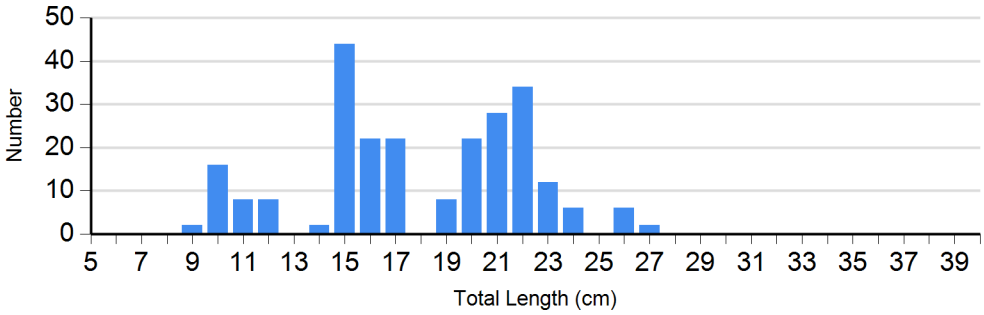
2016

Species: Black Crappie
Gear: AFS std frame net

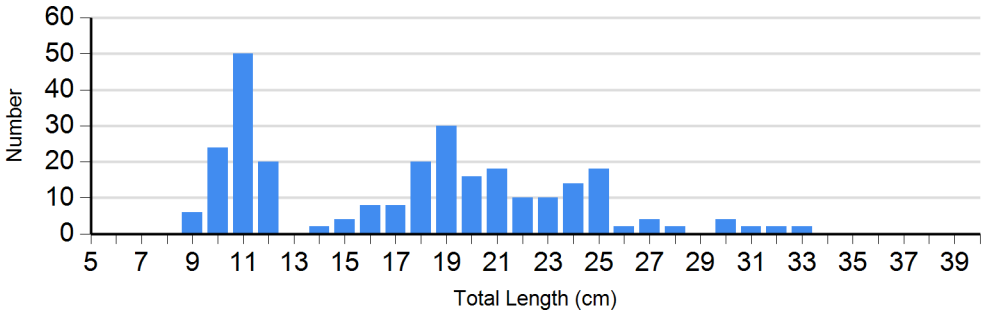


2017

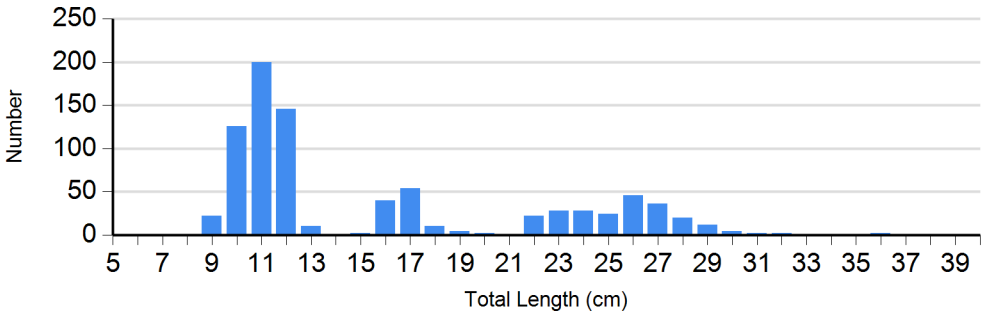
Species: Black Crappie
Gear: frame net (std 3/4 in)



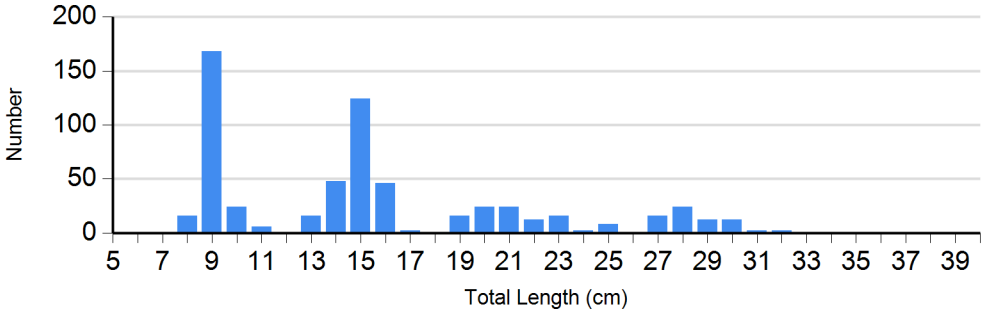
2013



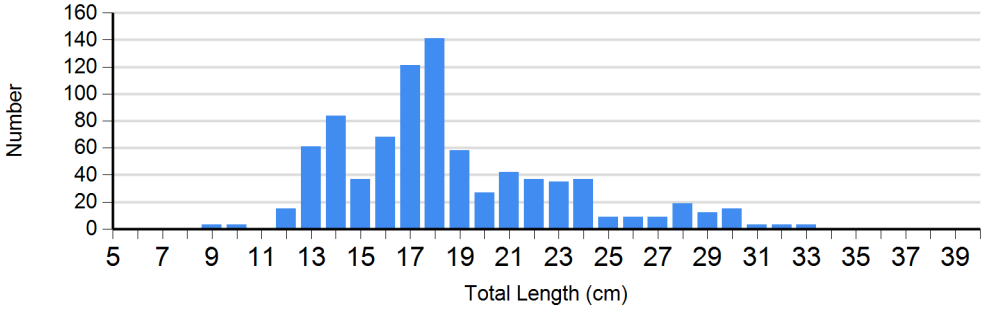
2014



2015

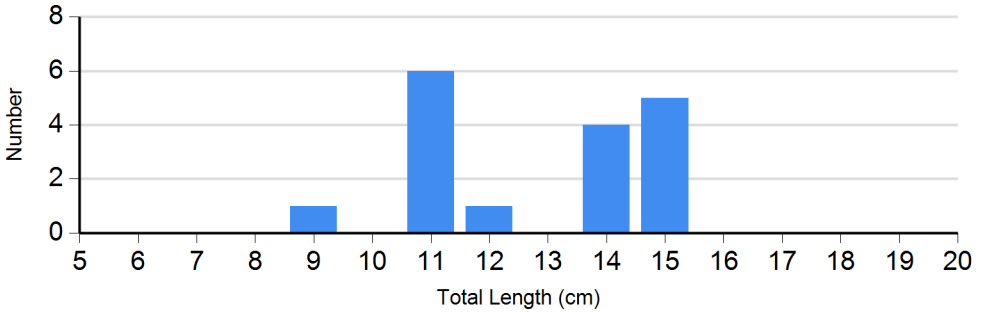


2016



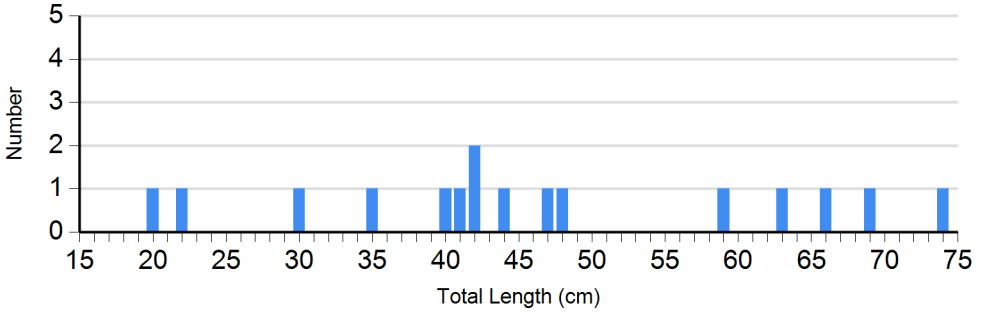
2018

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

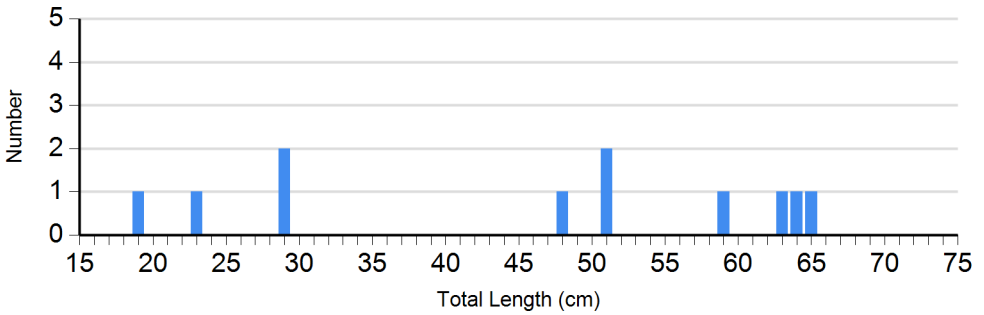


2018

Species: Channel Catfish
Gear: AFS std gill net

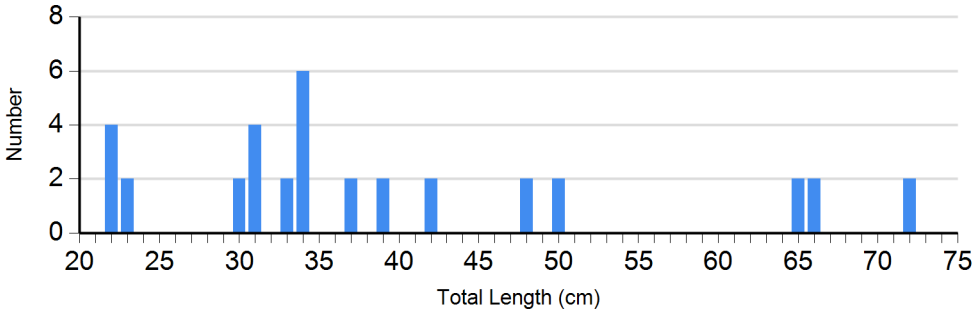


2017

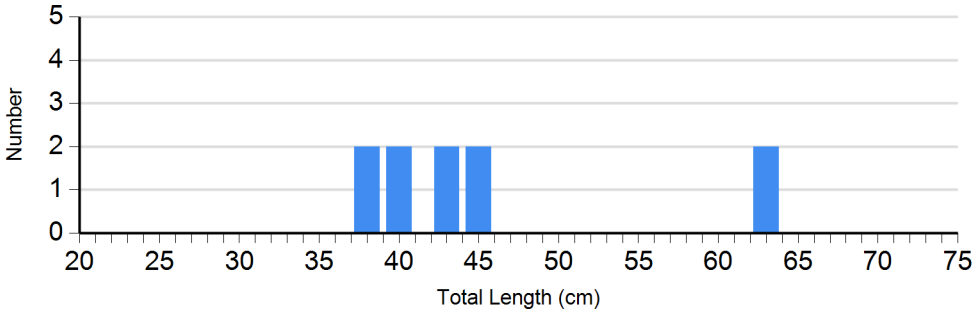


2018

Species: Channel Catfish
Gear: std exp gill net

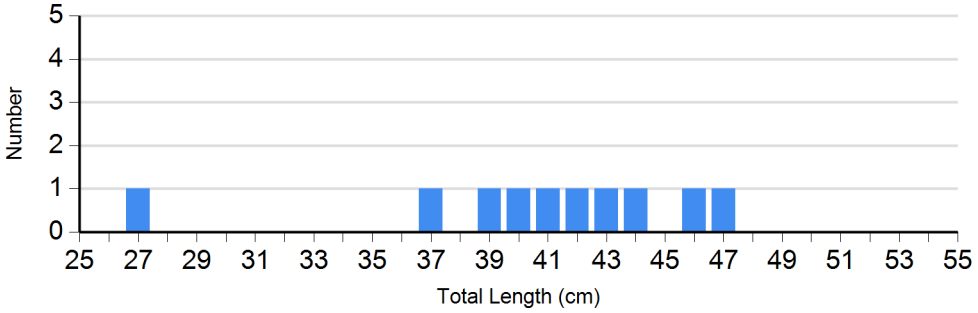


2015



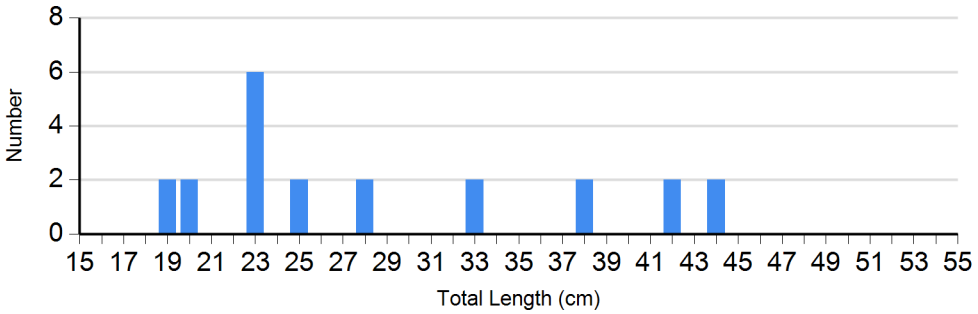
2016

Species: Common Carp
Gear: AFS std gill net

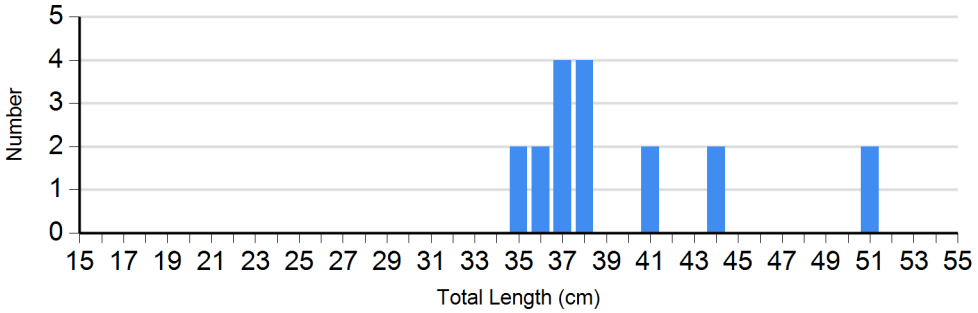


2017

Species: Common Carp
Gear: std exp gill net

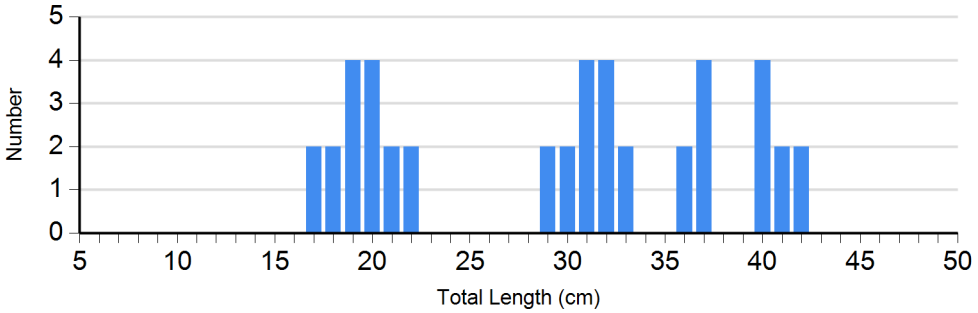


2014

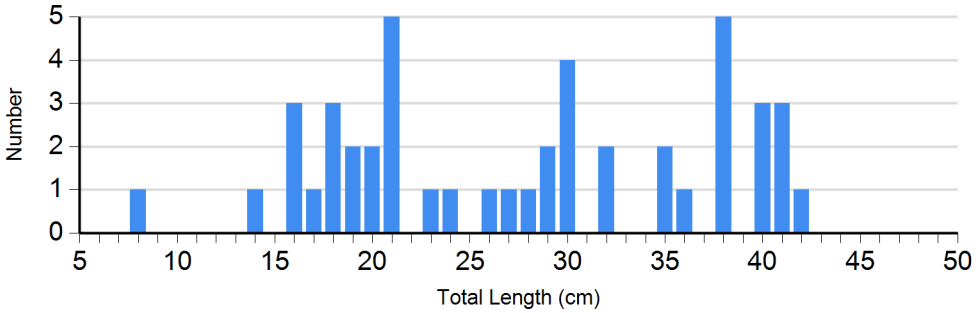


2015

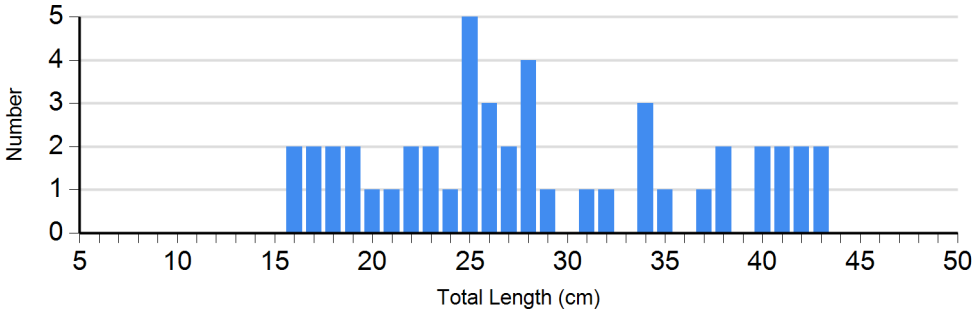
Species: Largemouth Bass
Gear: boat shocker (day)



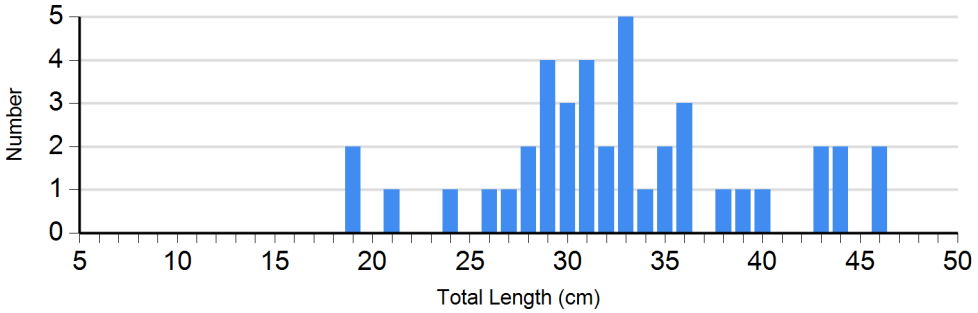
2015



2016

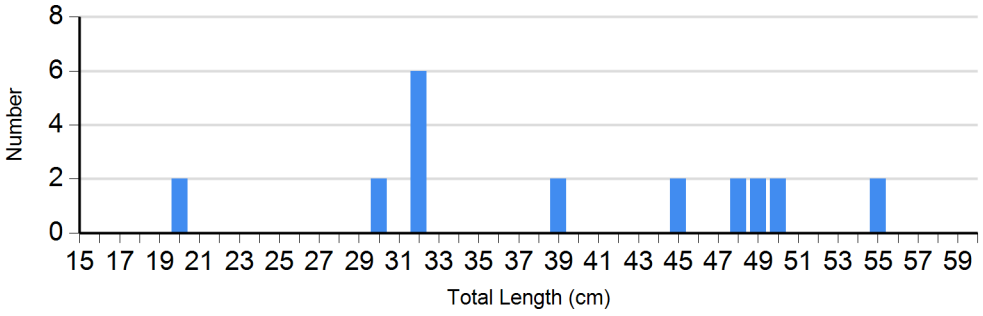


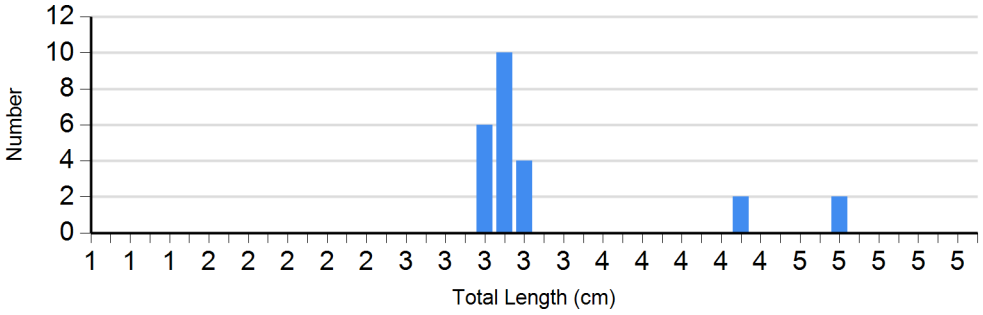
2017

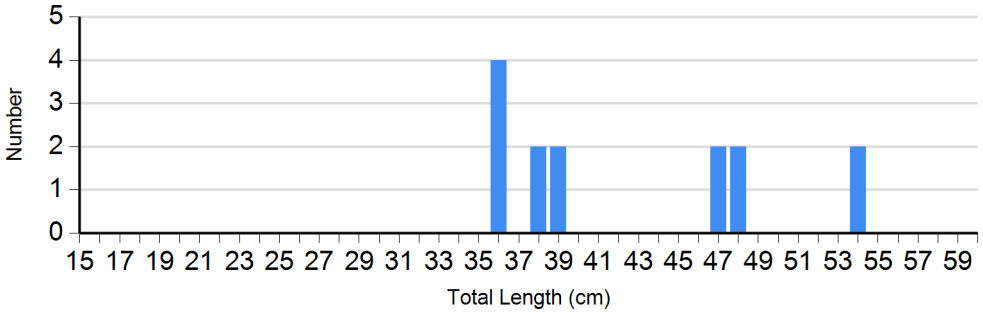


2018

Species: Walleye
Gear: std exp gill net



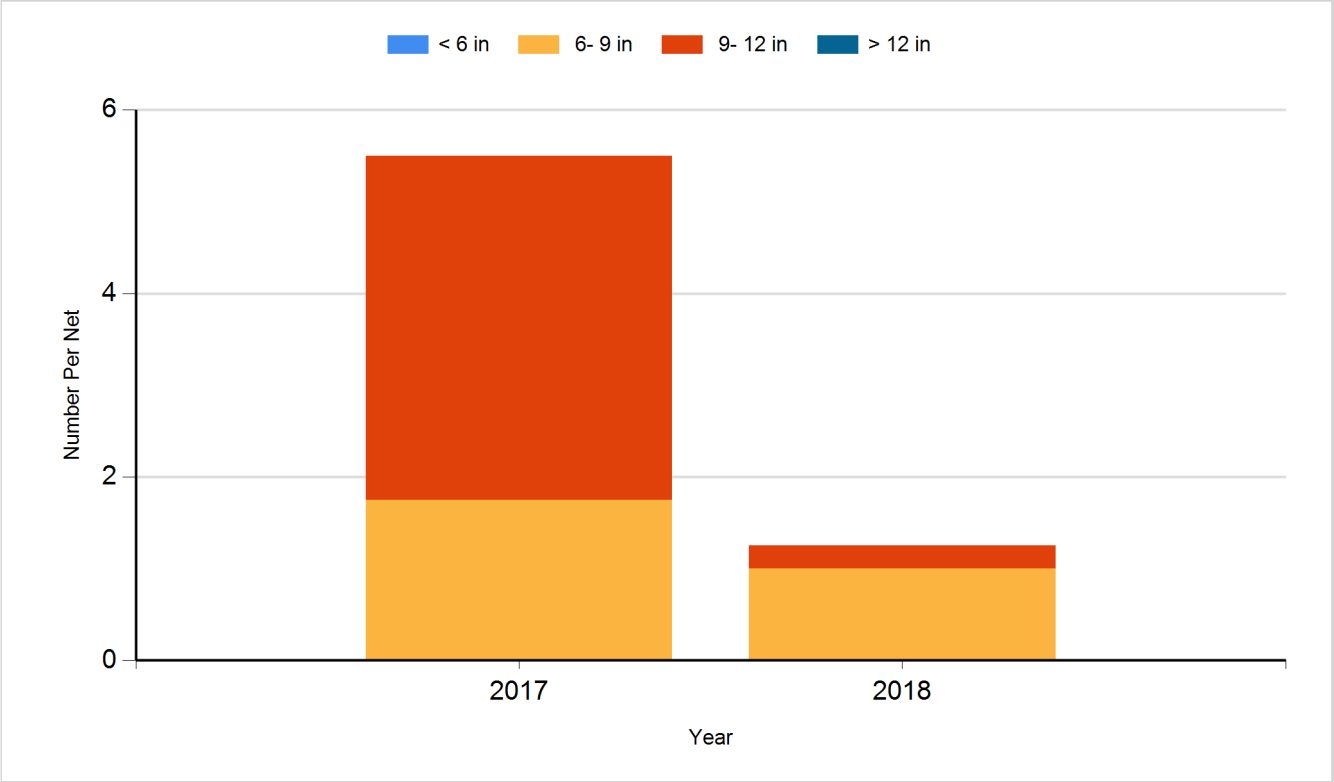




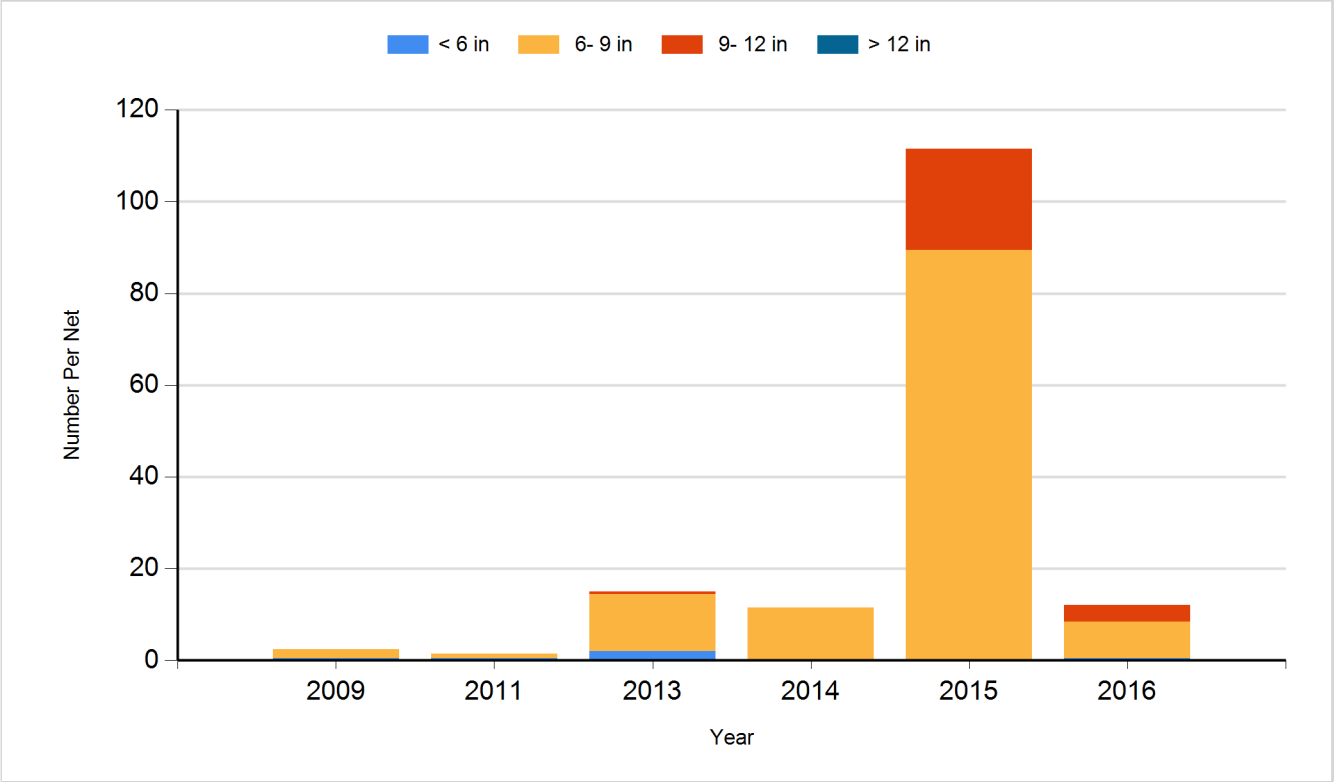
Historic Fish Sizes and Relative Abundance

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

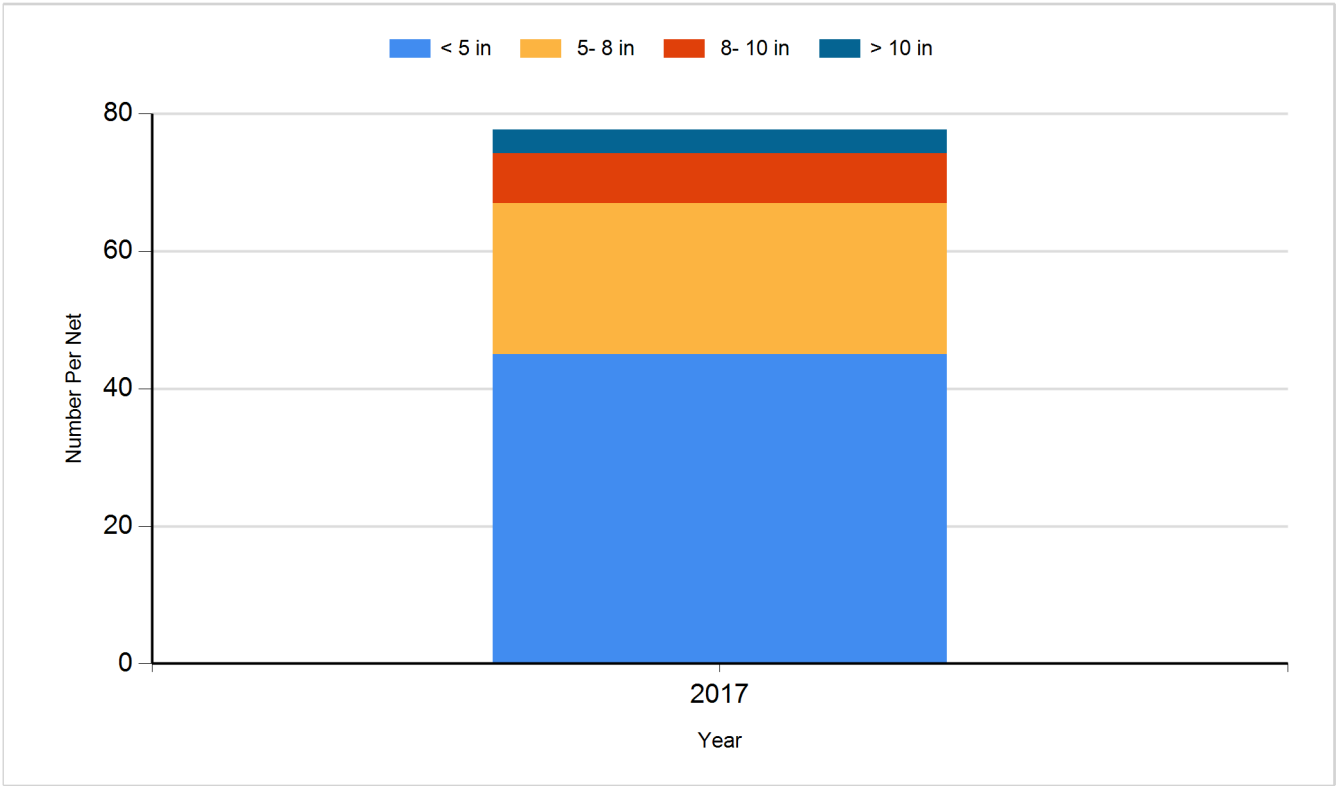
Species: Black Bullhead
Gear: AFS std gill net



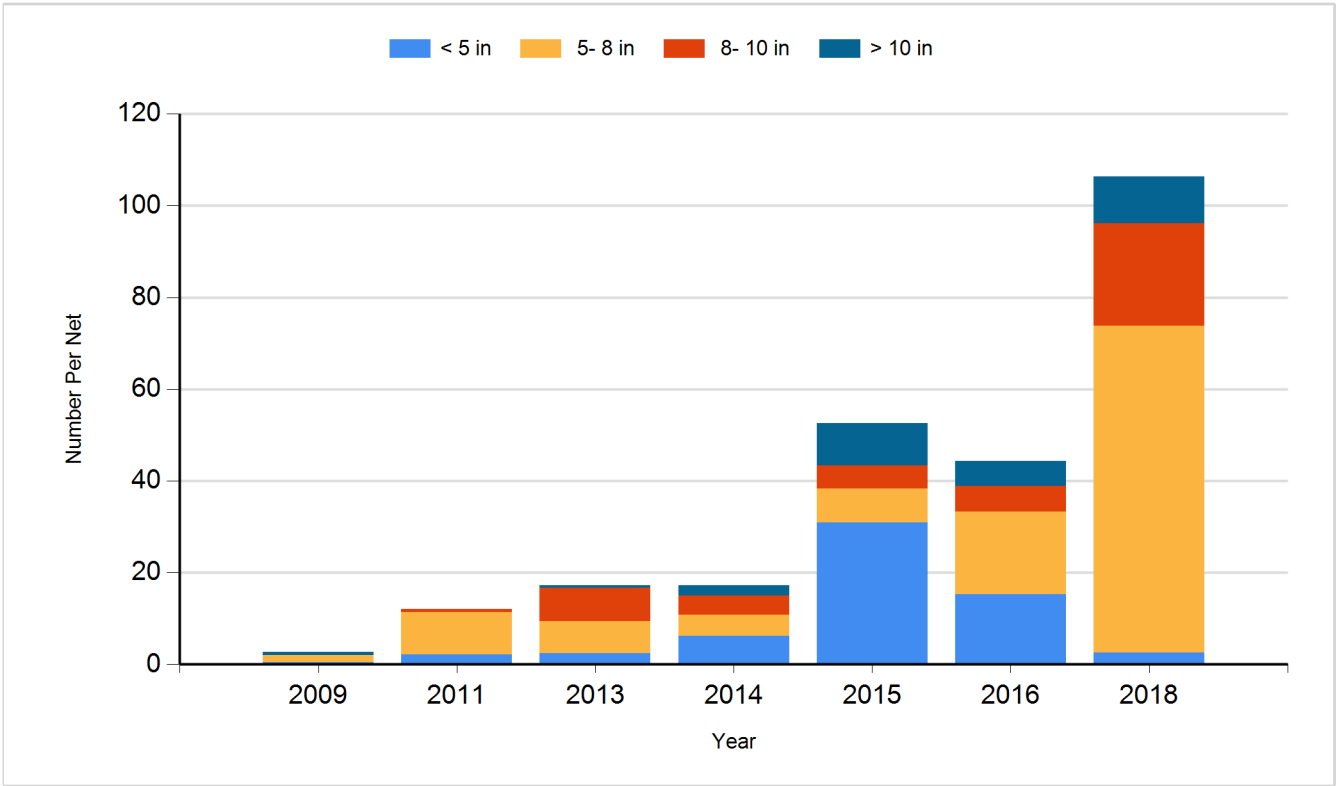
Species: Black Bullhead
Gear: std exp gill net



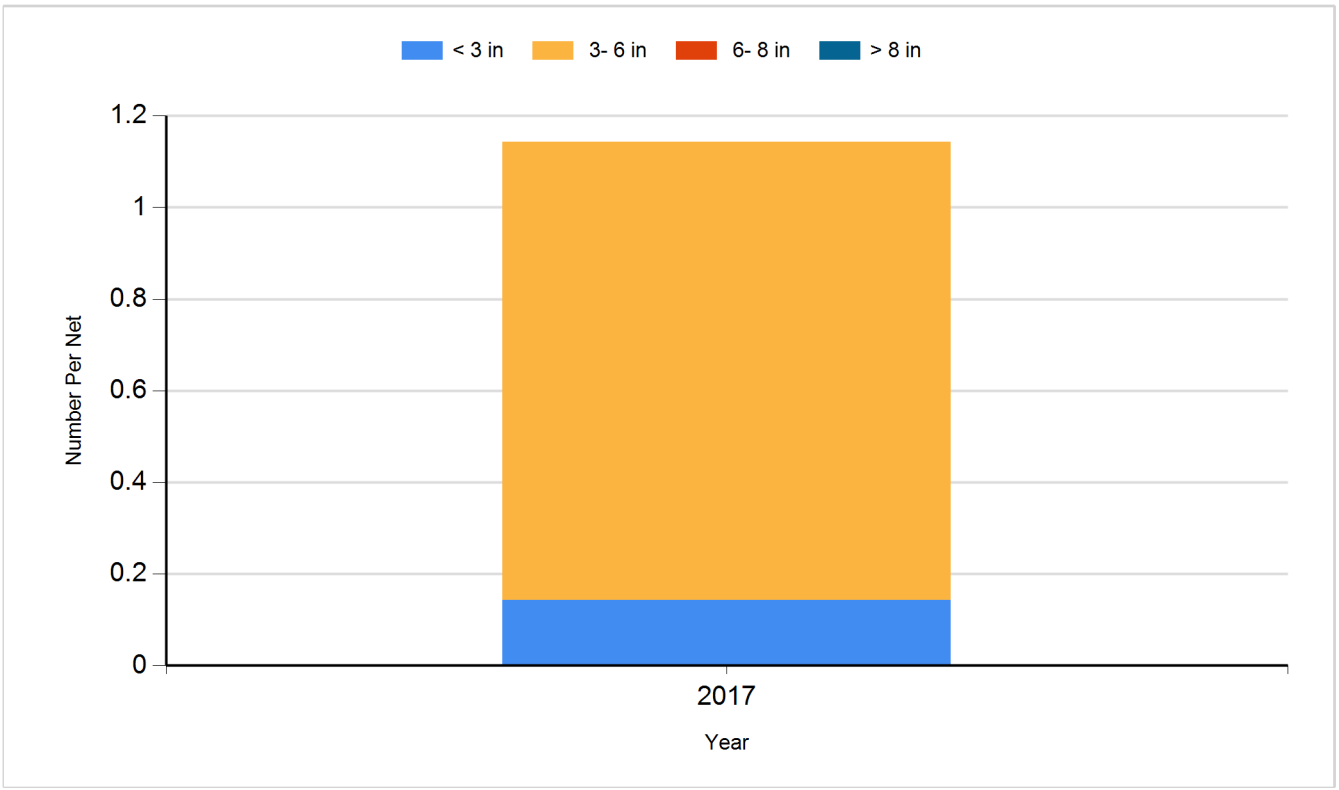
Species: Black Crappie
Gear: AFS std frame net



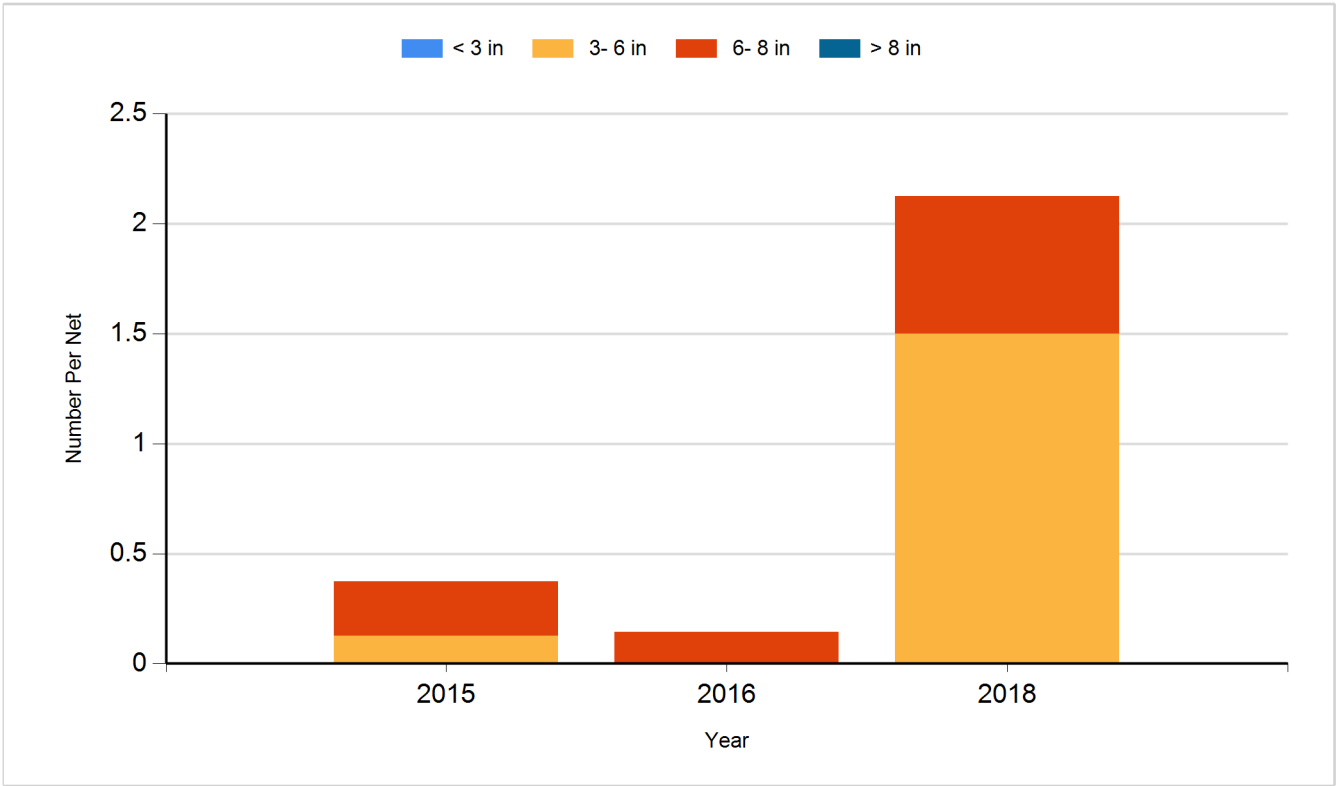
Species: Black Crappie
Gear: frame net (std 3/4 in)



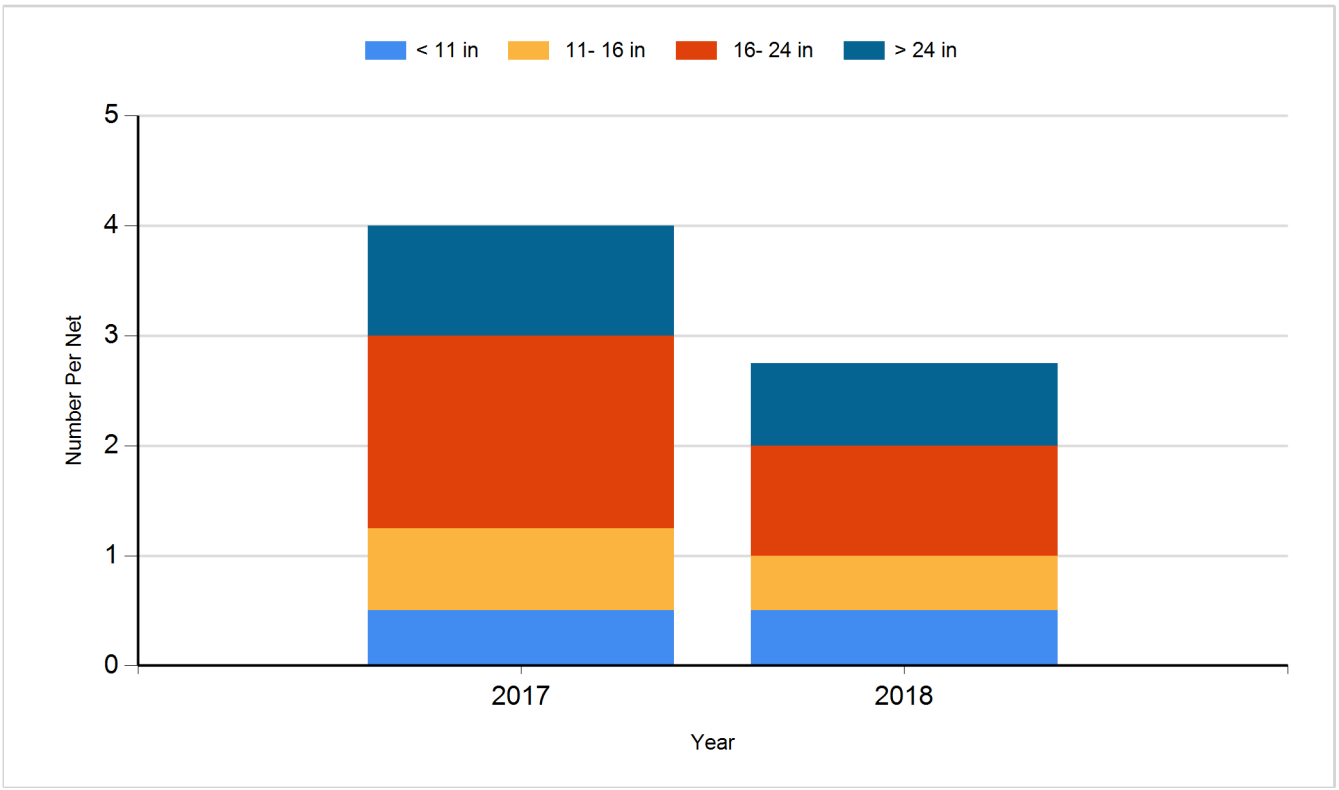
Species: Bluegill
Gear: AFS std frame net



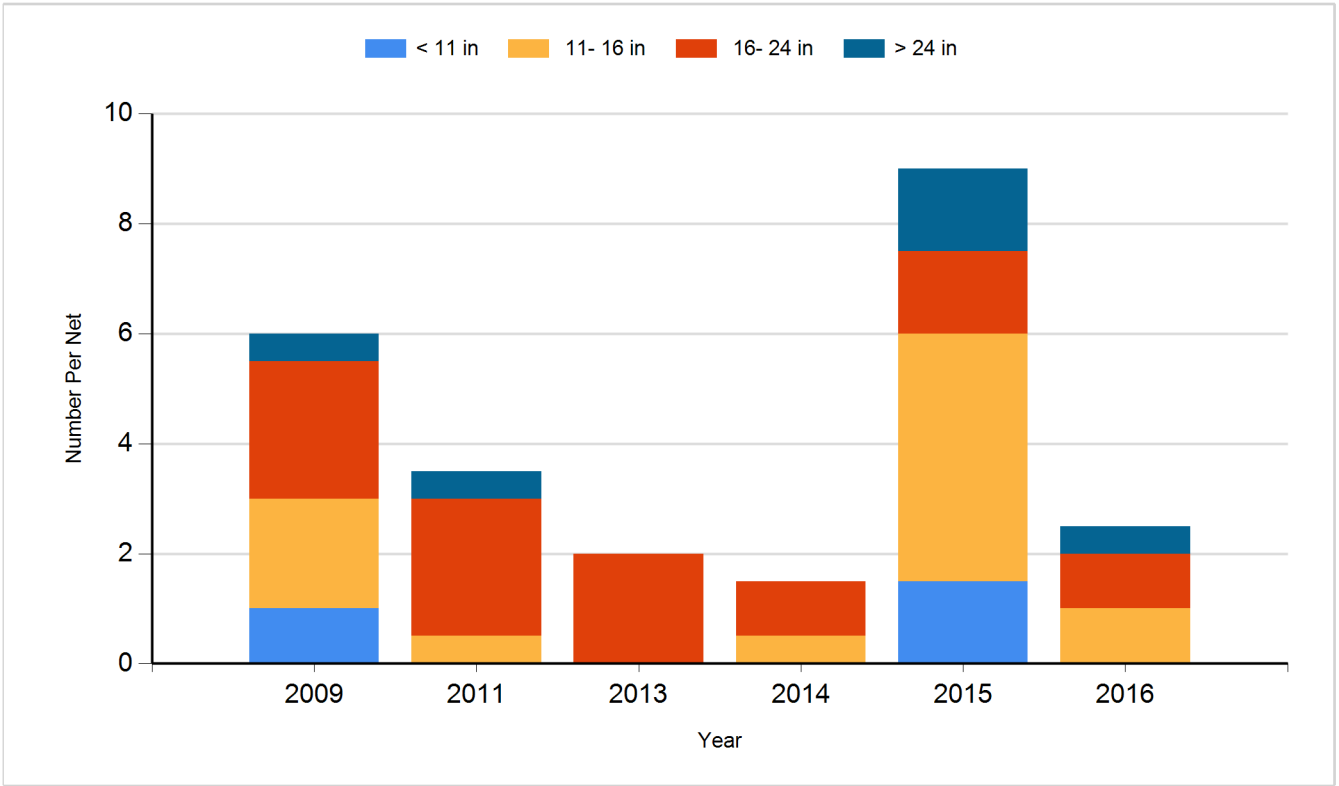
Species: Bluegill
Gear: frame net (std 3/4 in)



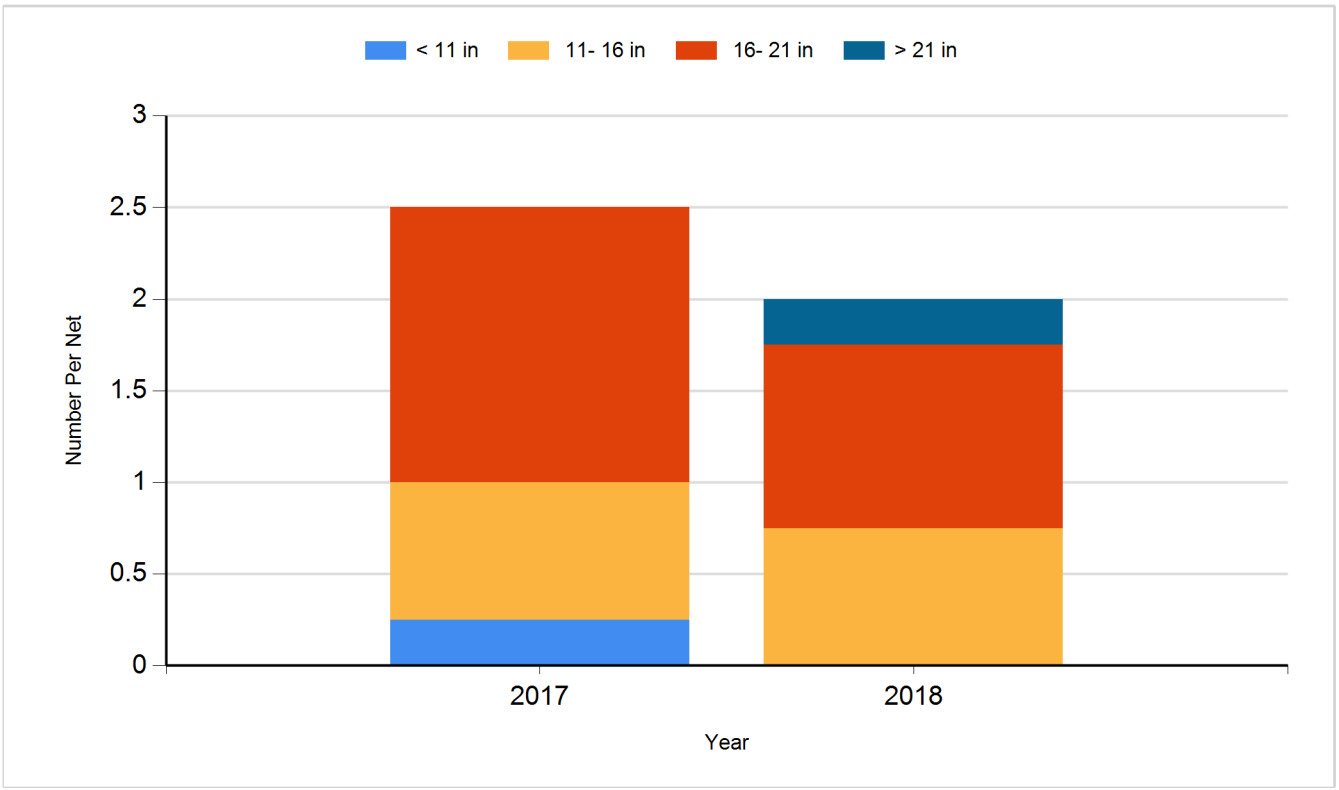
Species: Channel Catfish
Gear: AFS std gill net



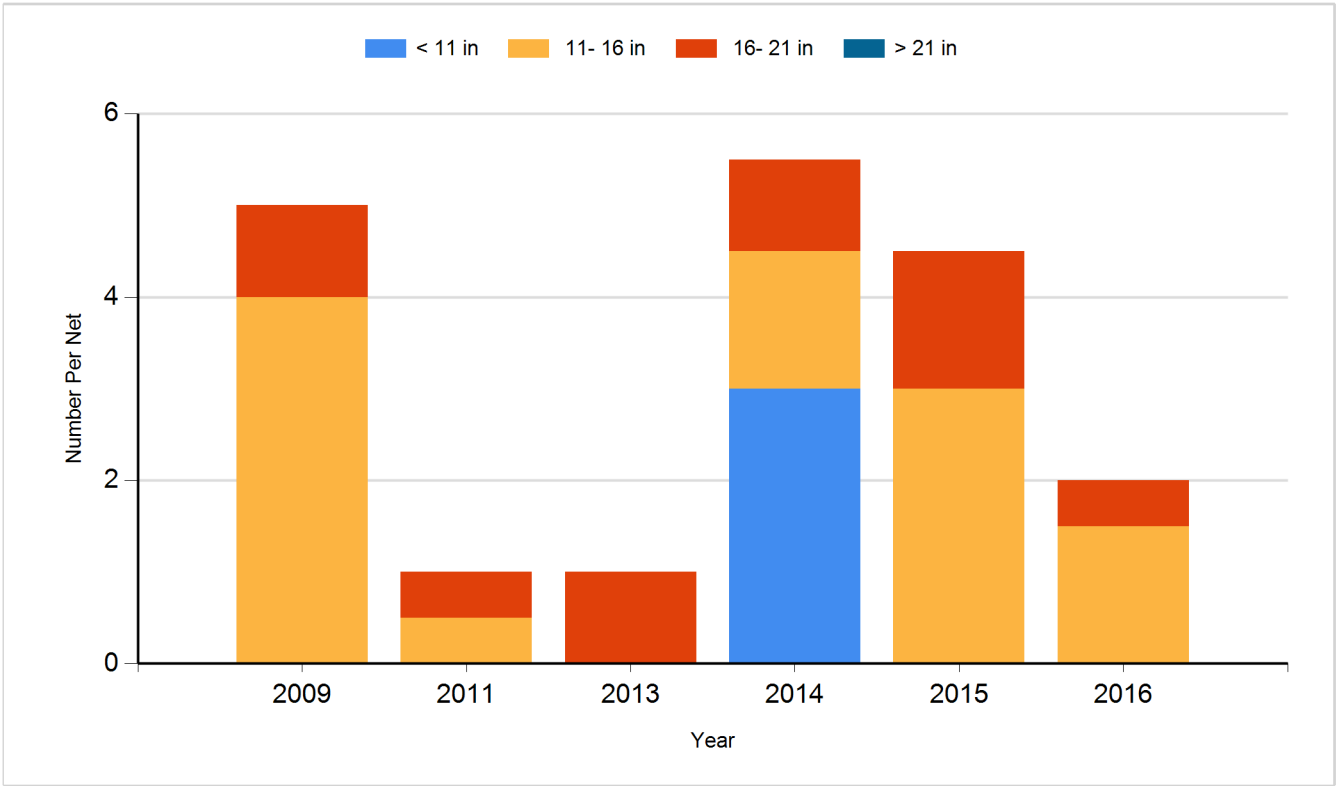
Species: Channel Catfish
Gear: std exp gill net



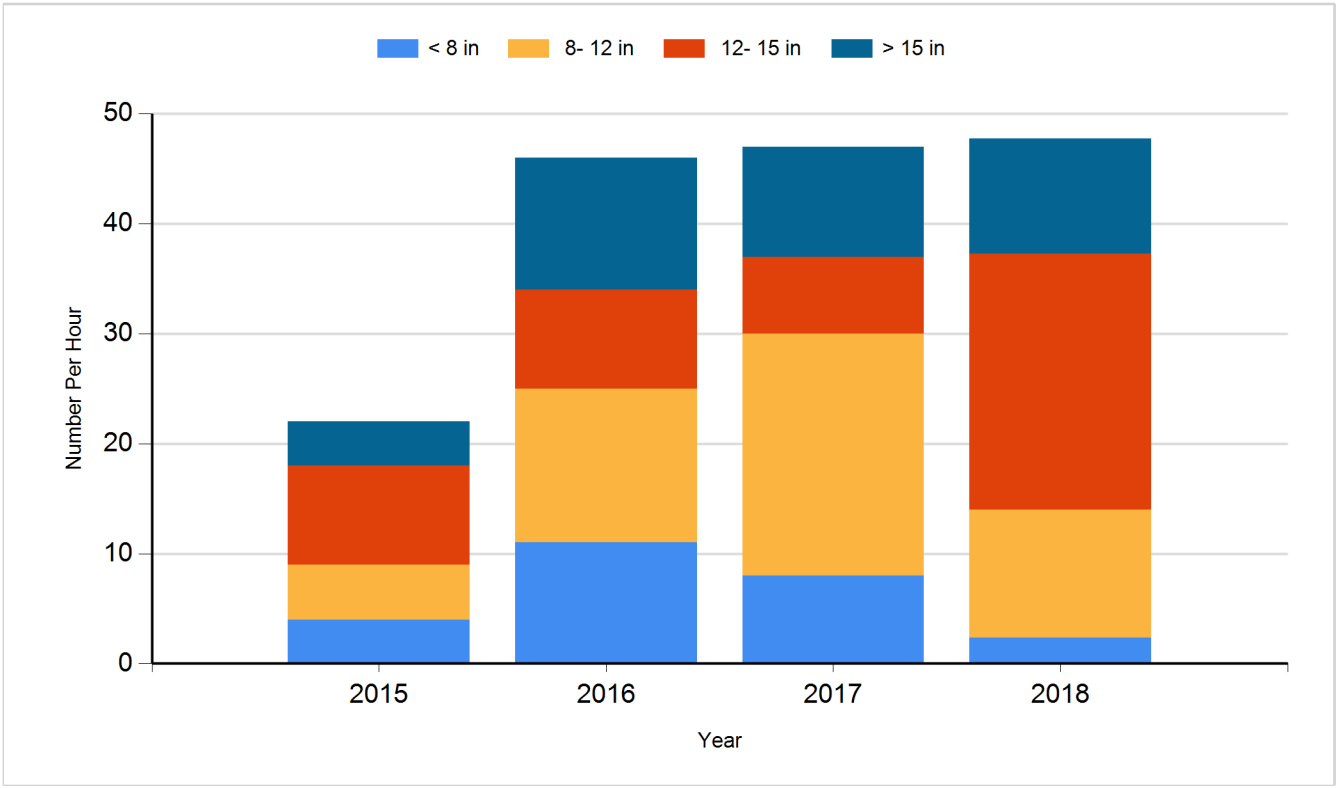
Species: Common Carp
Gear: AFS std gill net



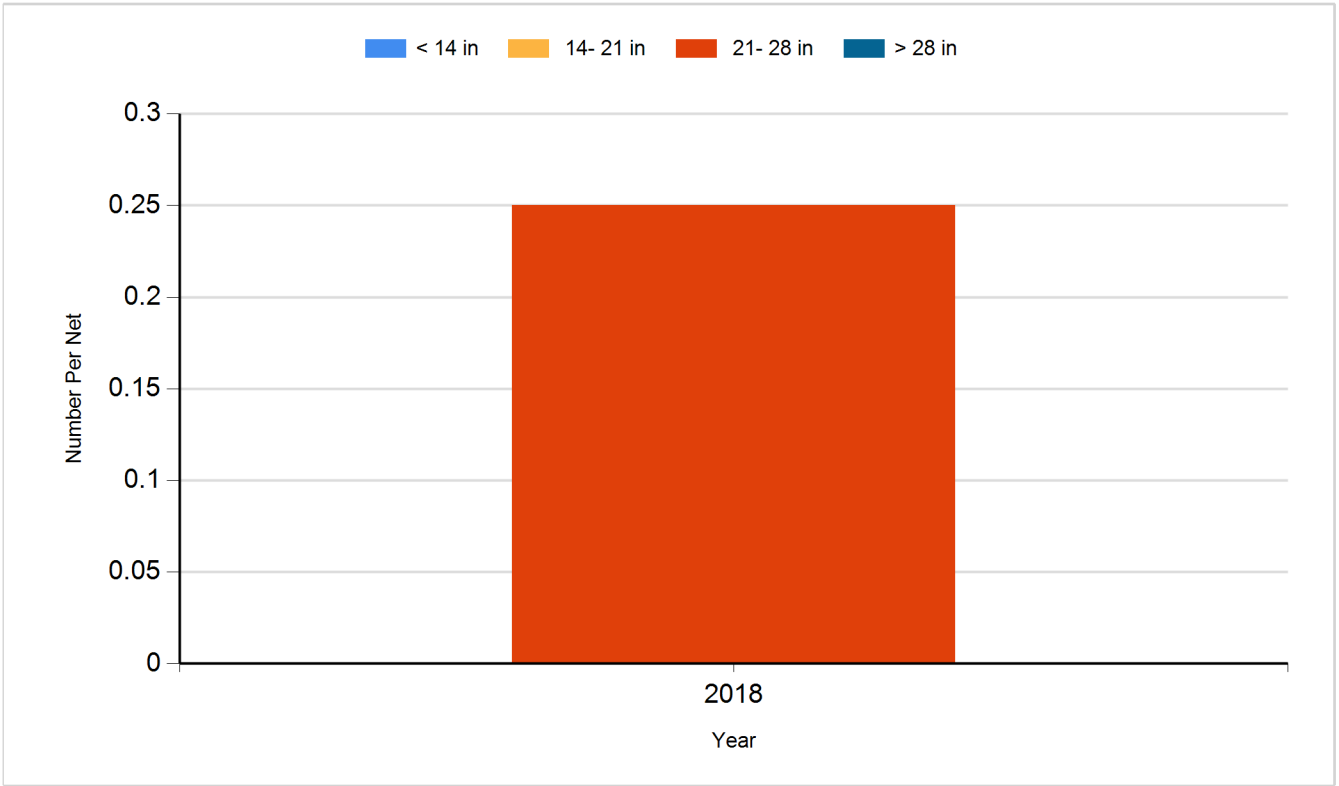
Species: Common Carp
Gear: std exp gill net



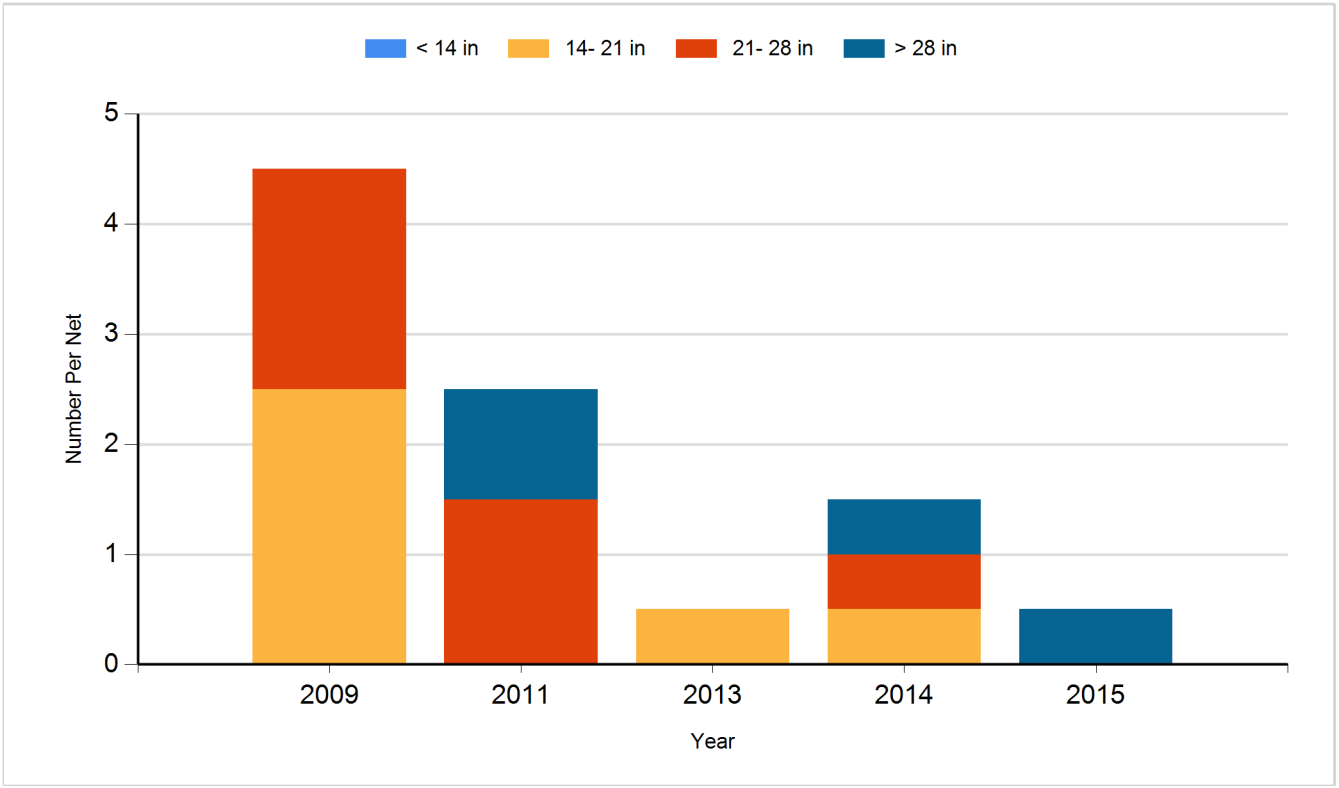
Species: Largemouth Bass
Gear: boat shocker (day)



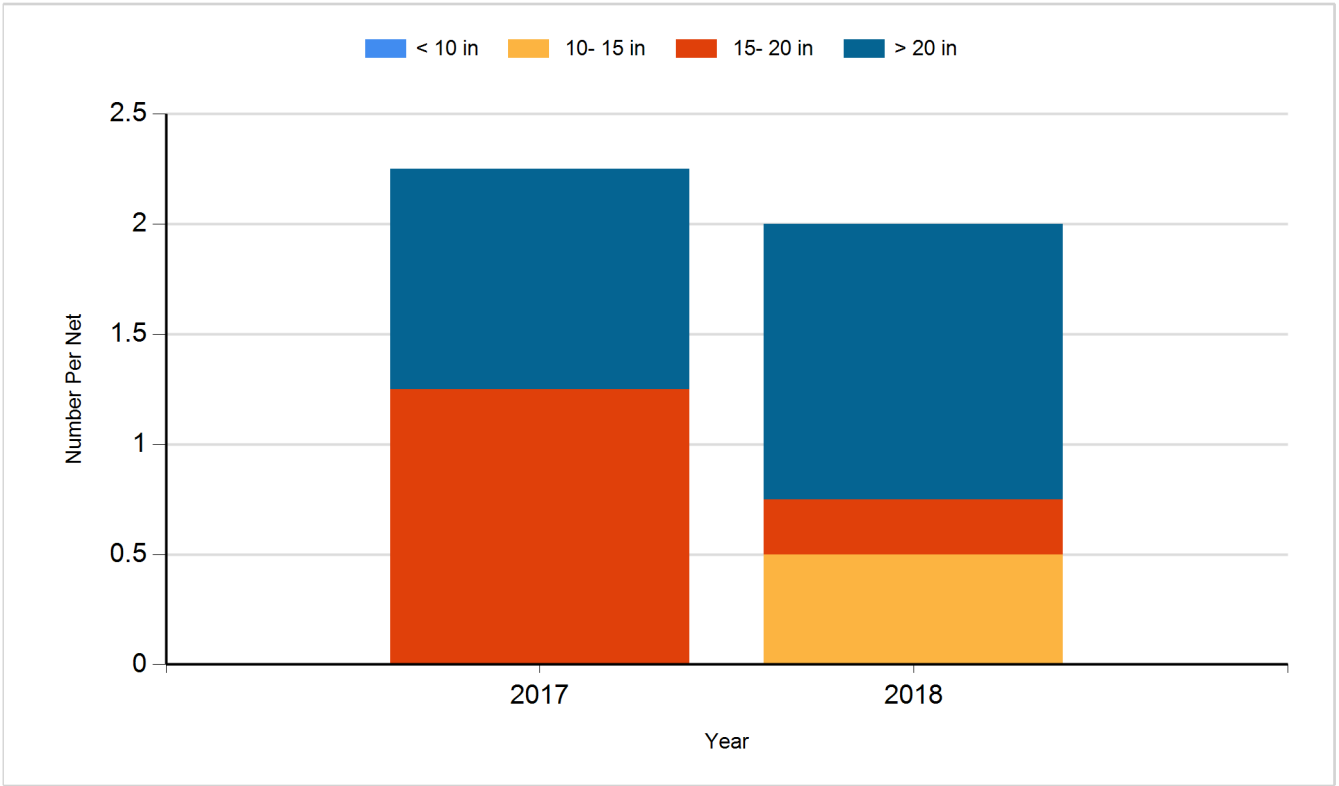
Species: Northern Pike
Gear: AFS std gill net



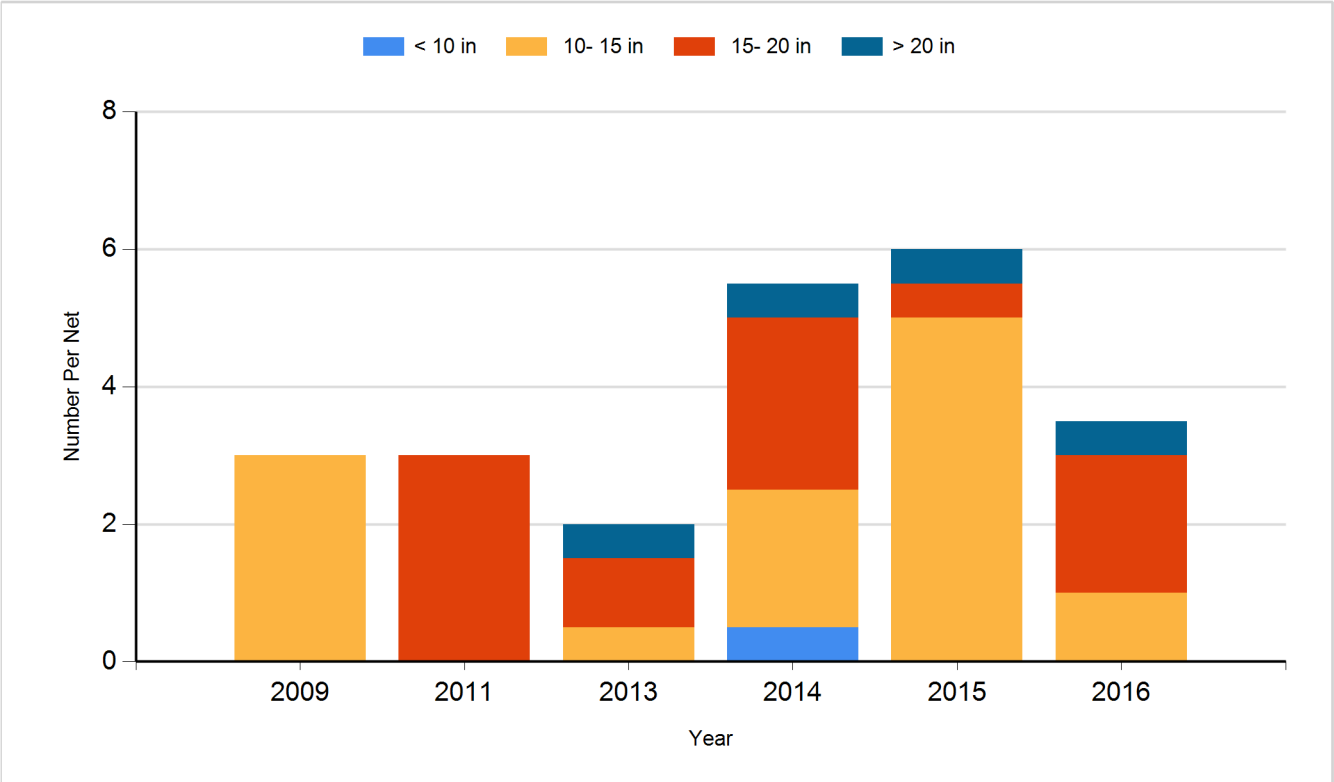
Species: Northern Pike
Gear: std exp gill net



Species: Walleye
Gear: AFS std gill net



Species: Walleye
Gear: std exp gill net



Fish Stocking

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2008	Black Crappie	Adult	385
2008	Channel Catfish	Adult	800
2008	Largemouth Bass	Fingerling	3,000
2008	Northern Pike	Fry	420,000
2008	Walleye	Fingerling	20,800
2008	Yellow Perch	Adult	1,710
2009	Largemouth Bass	Fingerling	20,000
2012	Gizzard Shad	Adult	25
2012	Largemouth Bass	Fingerling	4,500
2012	Walleye	Fingerling	20,304
2013	Gizzard Shad	Adult	32
2013	Walleye	Fingerling	22,626
2014	Gizzard Shad	Adult	30
2014	Walleye	Fingerling	20,000
2016	Walleye	Fingerling	25,500
2018	Walleye	Small Fingerling	40,000