

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Little White River Project, Bennett County
LIW-Lake-8-000
2017

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
boat shocker (day)	October 03, 2017	3600 seconds
std exp gill net	June 27, 2017	4 net-nights
std frame net (3/8 inch)	June 27, 2017	7 net-nights

Common Fish Species Present

Northern Pike

Largemouth Bass

Channel Catfish

Black Crappie

Walleye

Black Bullhead

Shorthead Redhorse

Gizzard Shad

Common Carp

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).

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

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)
Bigmouth Buffalo	11	28	18	46	24	61	30	76	37	94
Black Bullhead	6	15	9	23	12	30	15	38	18	46
Black Crappie	5	13	8	20	10	25	12	30	15	38

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)
Blue Catfish	12	30	20	51	30	76	35	89	45	114
Bluegill	3	8	6	15	8	20	10	25	12	30
Bluegill X Gr. Sunfish Hybrid	3	8	6	15	8	20	10	25	12	30
Brown Bullhead	5	13	8	20	11	28	14	36	17	43
Burbot	8	20	15	38	21	53	26	67	32	82
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Common Carp	11	28	16	41	21	53	26	66	33	84
Flathead Catfish	14	35	20	51	28	71	34	86	40	102
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Gizzard Shad	7	18	11	28						
Green Sunfish	3	8	6	15	8	20	10	25	12	30
Lake Herring	5	13	8	20	11	28	14	35	17	43
Largemouth Bass	8	20	12	30	15	38	20	51	25	63
Longnose Gar	16	41	27	69	36	91	45	114	55	140
Muskellunge	20	51	30	76	38	97	42	107	50	127
Northern Pike	14	35	21	53	28	71	34	86	44	112
Paddlefish	16	41	26	66	33	84	41	104	51	130
Pumpkinseed	3	8	6	15	8	20	10	25	12	30
Redear Sunfish	4	10	7	18	9	23	11	28	13	33
River Carpsucker	7	18	11	28	14	36	18	46	22	56
Rock Bass	4	10	7	18	9	23	11	28	13	33
Rudd	6	15	10	25	12	30	15	38	19	48
Sauger	8	20	12	30	15	38	20	51	25	63
Saugeye	9	23	14	35	18	46	22	56	27	69
Shorthead Redhorse	6	15	10	25	13	33	16	41	20	51
Smallmouth Bass	7	18	11	28	14	35	17	43	20	51
Smallmouth Buffalo	11	28	18	46	24	61	30	76	37	94
Spotted Bass	7	18	11	28	14	35	17	43	20	51
Striped Bass	12	30	20	51	30	76	35	89	45	114
Striped Bass Hybrid (wiper)	8	20	12	30	15	38	20	51	25	63
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
White Perch	5	13	8	20	10	25	12	30	15	38
White Sucker	6	15	10	25	13	33	16	41	20	51
Yellow Bass	4	10	7	18	9	23	11	28	13	33
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).

Gear	Species	Abundance		Stock Density Indices			Condition		
		CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
boat shocker (day)	Largemouth Bass	39.0	16.6	44	12	26	11		
	Walleye	6.0	4.6	0		0			
std exp gill net	Black Bullhead	5.5	2.7	68	16	0		83	2
	Black Crappie	1.8	0.4	57		0		94	2
	Channel Catfish	3.5	1.6	79		29		97	3
	Common Carp	2.3	2.2	67		0		85	2
	Gizzard Shad	3.3	3.3	46	23			89	1
	Shorthead Redhorse	0.5	0.5	100		50		101	6
	Walleye	2.3	1.2	100		44		92	2
	Yellow Perch	0.8	0.8	67		0		90	5
	std frame net (3/8 inch)	Black Bullhead	2.6	1.5	44	19	0		93
Black Crappie		32.7	6.7	33	4	10	3	98	1
Bluegill		1.0	0.6	0		0		105	6
Channel Catfish		0.0	0.0	0		0			
Common Carp		0.7	0.4	20		20		88	5
Gizzard Shad		1.0	1.0	0					
Golden Shiner		0.0	0.0						
Green Sunfish		0.3	0.4	50		0		91	4
Largemouth Bass		0.1	0.2	100		0		102	
Northern Pike		1.4	0.5	80		10		93	3
Shorthead Redhorse		3.7	1.7	100		62	15	95	3
Tadpole Madtom		0.0	0.0						
Walleye		1.1	0.8	100		50		90	1
Yellow Perch		0.4	0.3	67		33		80	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
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
boat shocker (day)	Largemouth Bass								18.0	35.0	39.0	30.7
	Walleye							39.6		1.0	6.0	15.5
boat shocker (night)	Largemouth Bass									35.0		35.0
	Walleye									1.0		1.0
frame net (std 3/4 in)	Black Bullhead	11.8		23.3		9.1	16.8	6.9	10.7			13.1
	Black Crappie	2.3		9.8		14.9	11.0	24.0	29.0			15.2
	Bluegill								0.4	0.1		0.3
	Bullhead Catfish Family	0.0										0.0
	Channel Catfish	4.5		7.3		0.1	0.1	0.2	2.9			2.5
	Common Carp	2.3		1.2		0.1	0.4	0.2	0.9			0.9
	Gizzard Shad						0.1		0.3	0.1		0.2
	Golden Shiner						0.0		0.0	0.0		0.0
	Green Sunfish			0.5				0.4		0.3		0.4
	Largemouth Bass							0.3	0.2	0.4		0.3
	Northern Pike	5.3		1.3		2.9	1.3	1.3	1.9			2.3
	Shorthead Redhorse	0.5		0.2		0.1	0.9	1.3	3.6			1.1
	Walleye			0.3		0.1	0.3	0.2	0.7			0.3
	Yellow Perch			0.2		0.3	0.1	0.1	0.1			0.2
	std exp gill net	Black Bullhead					13.0				11.5	5.5
Black Crappie						1.0				1.5	1.8	1.4
Channel Catfish						2.0				2.5	3.5	2.7
Common Carp						1.0				2.0	2.3	1.8
Gizzard Shad										1.0	3.3	2.2
Northern Pike							0.5					0.5
Shorthead Redhorse							0.5			0.5	0.5	0.5
Walleye							2.0			3.5	2.3	2.6
Yellow Perch						1.5			3.5	0.8	1.9	
std exp gill net (150 ft)	Black Bullhead	2.0		1.0			11.5	111.5				31.5
	Black Crappie			1.0			2.5	4.0				2.5
	Channel Catfish	5.0		3.5			1.5	7.5				4.4
	Common Carp	5.0		1.0			2.5	4.5				3.3
	Gizzard Shad								2.0			2.0
	Golden Shiner	0.0							0.0			0.0

		CPUE										
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
std exp gill net (150 ft)	Northern Pike		4.5		2.5			1.5	0.5			2.3
	Shorthead Redhorse				0.5			2.5				1.5
	Walleye		3.0		3.0			5.0	6.0			4.3
	Yellow Perch		0.5					0.5	1.5			0.8
std frame net (3/8 inch)	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	

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										
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
boat shocker (day)	Walleye	PSD							70		0	0	
		PSD-P							30		0	0	
		Wr							87				
boat shocker (night)	Walleye	PSD										0	
		PSD-P										0	
frame net (std 3/4 in)	Black Crappie	PSD		33		7		53	59	66	38		
		PSD-P		33		0		4	20	43	19		
		Wr				111		104	93	96	110		
	Northern Pike	PSD		48		63		85	80	67	69		
		PSD-P		0		50		50	30	11	0		
		Wr				79		91	89	90	94		
	Walleye	PSD				100		100	100	100	80		
		PSD-P				0		0	100	100	60		
		Wr				85		89	92	96	91		
	Yellow Perch	PSD				100		100	100	0	100		
		PSD-P				0		0	0	0	0		
		Wr				92		92	92	92	72		
	std exp gill net	Black Crappie	PSD						50			100	57
			PSD-P						0			33	0
			Wr						112			104	94
Northern Pike		PSD						0					
		PSD-P						0					
		Wr						88					
Walleye		PSD							75			71	100
		PSD-P							25			14	44
		Wr							91			95	92
Yellow Perch		PSD							33			57	67
		PSD-P							0			0	0
		Wr							101			90	90
std exp gill net (150 ft)		Black Crappie	PSD				0			60	75		

Gear	Species	Index	Year										
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
std exp gill net (150 ft)	Black Crappie	PSD-P				0			0	50			
		Wr				119			95	103			
	Northern Pike	PSD		44		100			67	100			
		PSD-P		0		40			33	100			
	Walleye	Wr				85			88	91			
		PSD		0		100			60	17			
	Yellow Perch	PSD-P		0		0			10	8			
		Wr				84			86	95			
	std frame net (3/8 inch)	Black Crappie	PSD										33
			PSD-P										10
			Wr										98
		Northern Pike	PSD										
PSD-P													10
Wr													93
Walleye		PSD											100
		PSD-P											50
		Wr											90
Yellow Perch		PSD											67
		PSD-P											33
		Wr											80

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: Walleye

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

Fish Condition

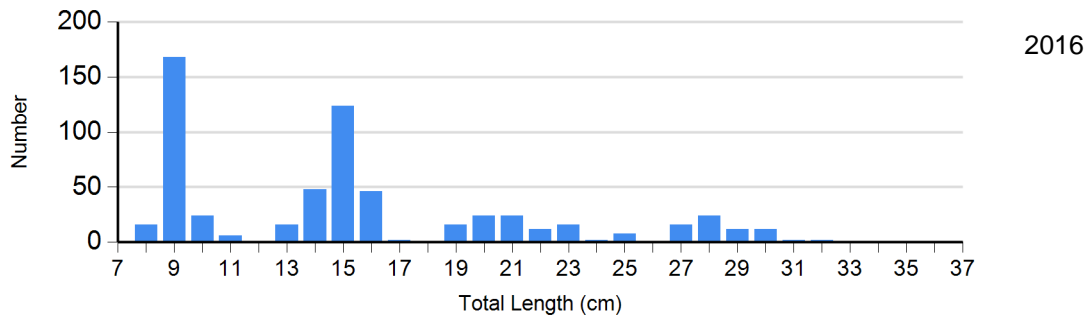
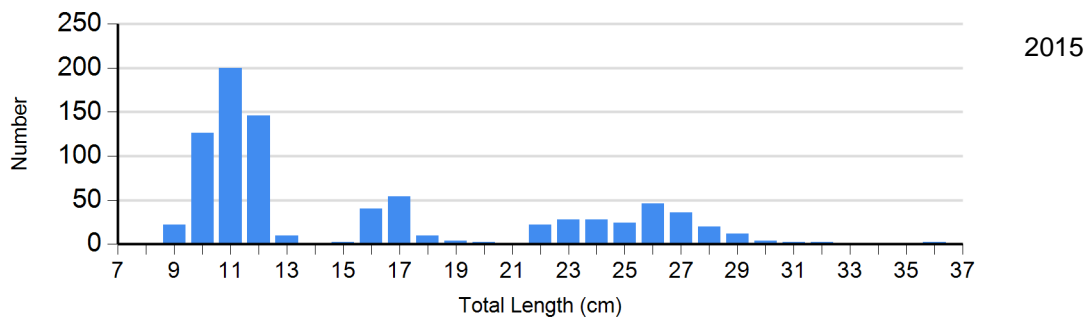
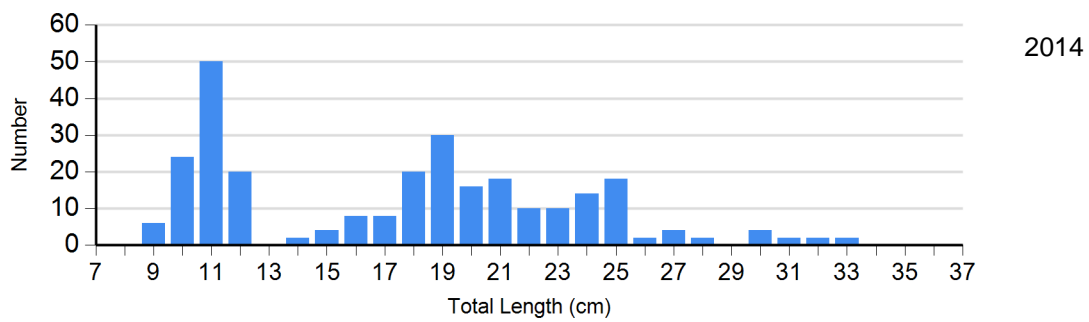
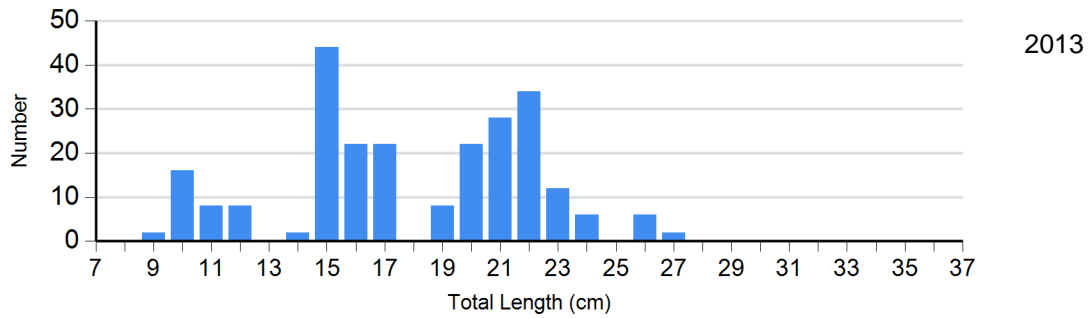
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2013	98	114 (0.9)	102	96 (0.6)	8	97 (1.9)	0	
	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)
Northern Pike Gill Net	2013	2	88 (0.0)	0		0		0	
	2014	2	83 (0.0)	2	80 (0.0)	2	100 (0.0)	0	
	2015	0		0		0		2	91 (0.0)
Walleye Gill Net	2013	2	79 (0.0)	4	96 (6.2)	2	94 (0.0)	0	
	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	
Yellow Perch Gill Net	2013	4	110 (8.1)	2	84 (0.0)	0		0	
	2014	2	92 (0.0)	0		0		0	
	2015	2	99 (0.0)	4	91 (1.4)	0		0	
	2016	6	95 (0.6)	8	86 (1.5)	0		0	
	2017	1	92	2	89 (6.9)	0		0	

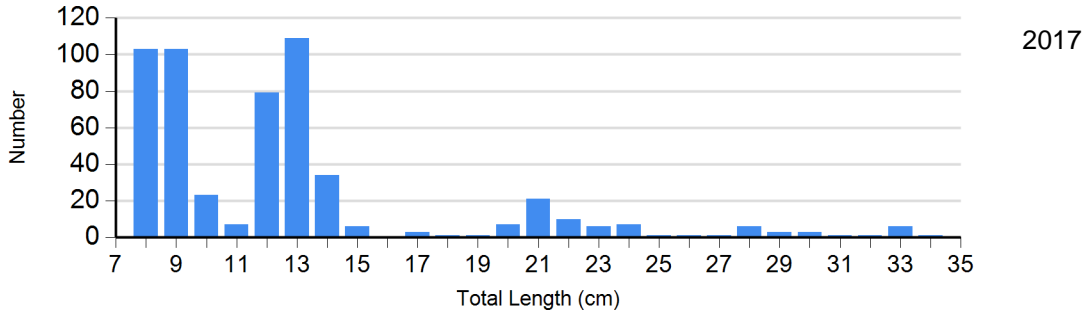
Length Frequency Distribution

Length frequency histogram of species sampled by year.

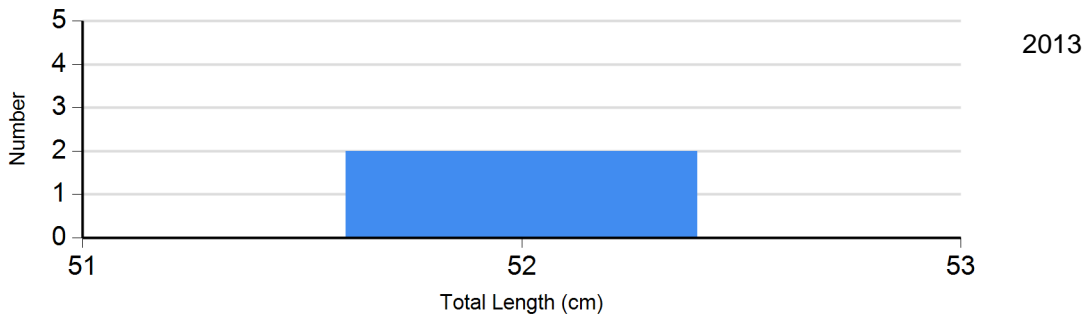
Species: Black Crappie
Gear: frame net (std 3/4 in)



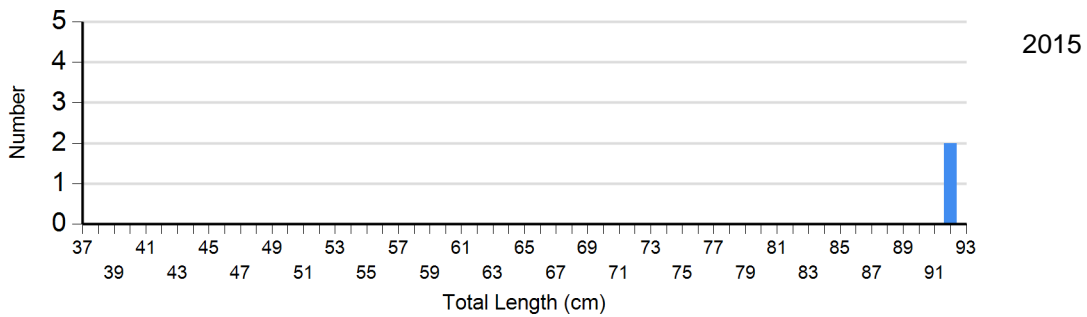
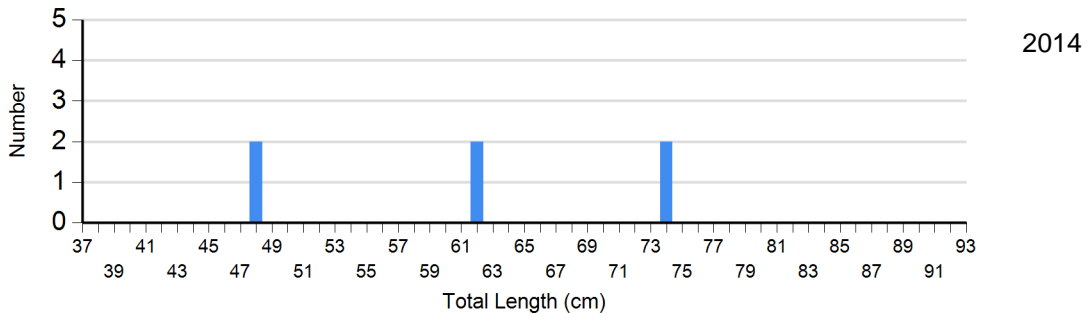
Species: Black Crappie
 Gear: std frame net (3/8 inch)



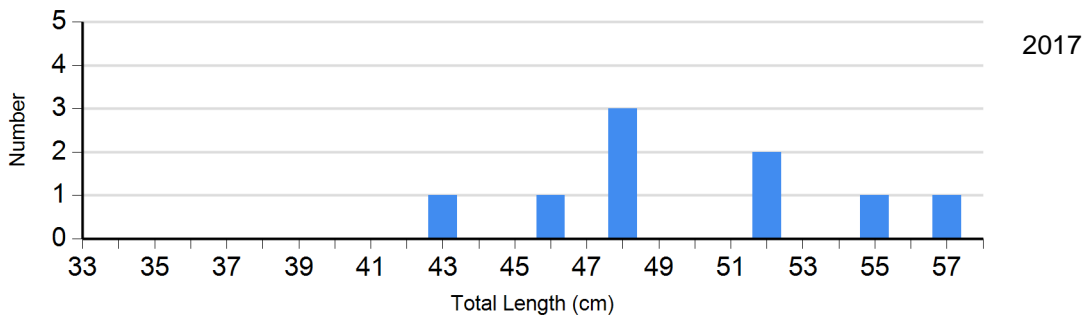
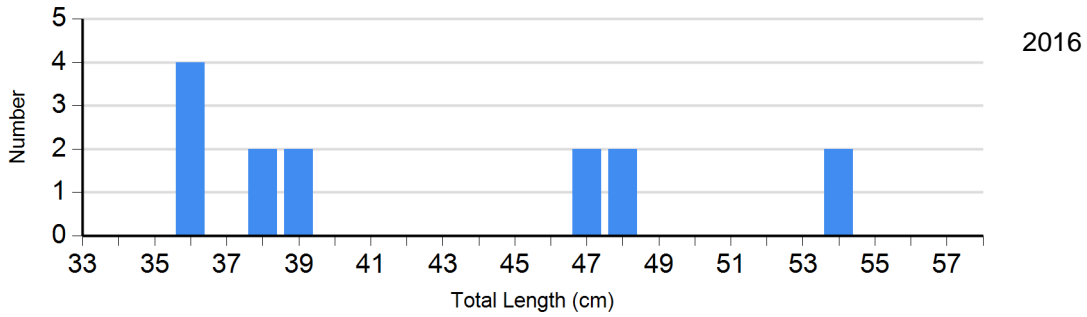
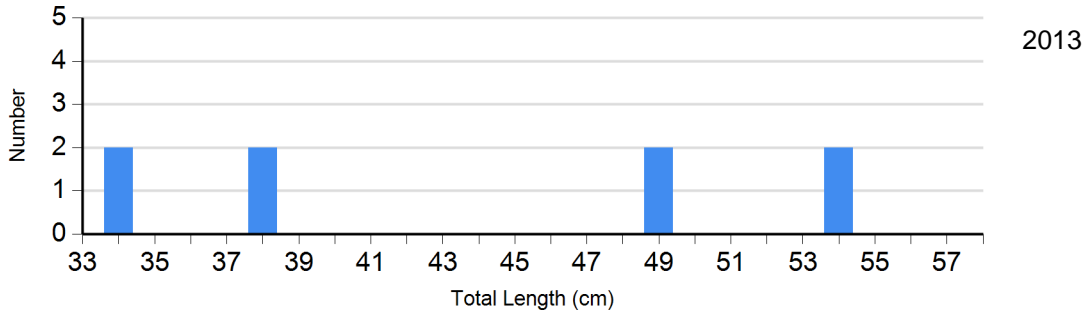
Species: Northern Pike
 Gear: std exp gill net



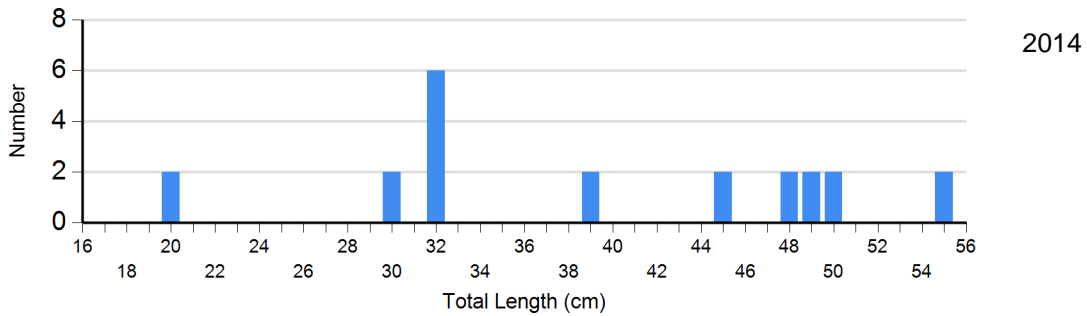
Species: Northern Pike
 Gear: std exp gill net (150 ft)

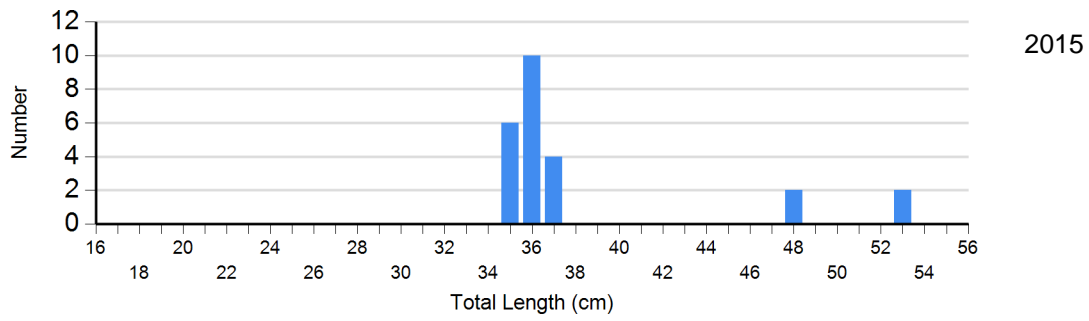


Species: Walleye
Gear: std exp gill net

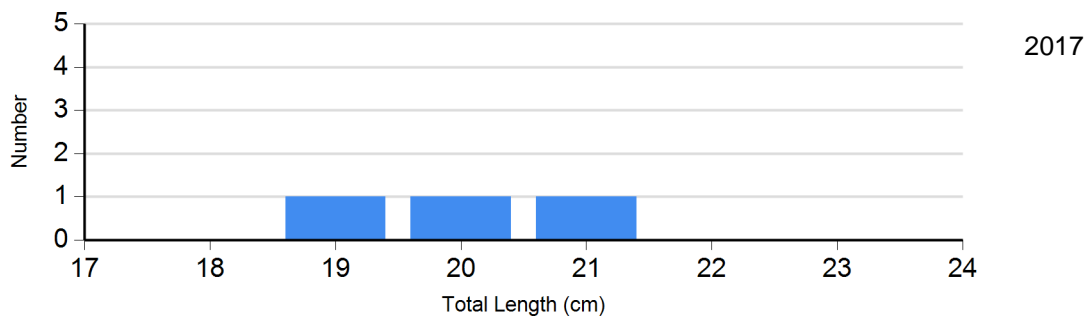
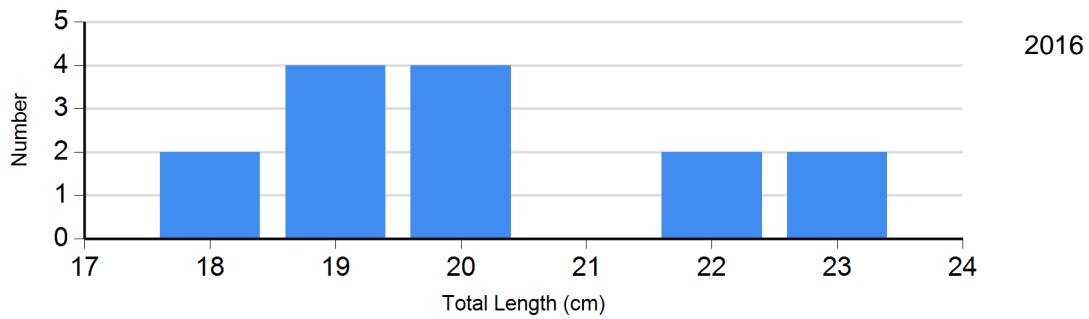
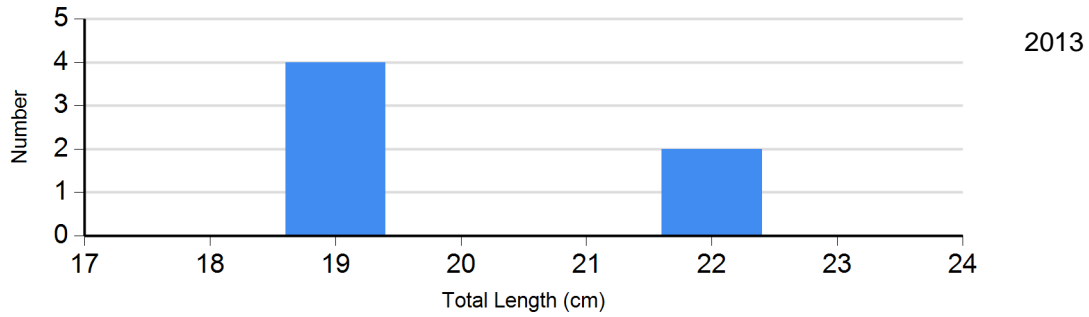


Species: Walleye
Gear: std exp gill net (150 ft)

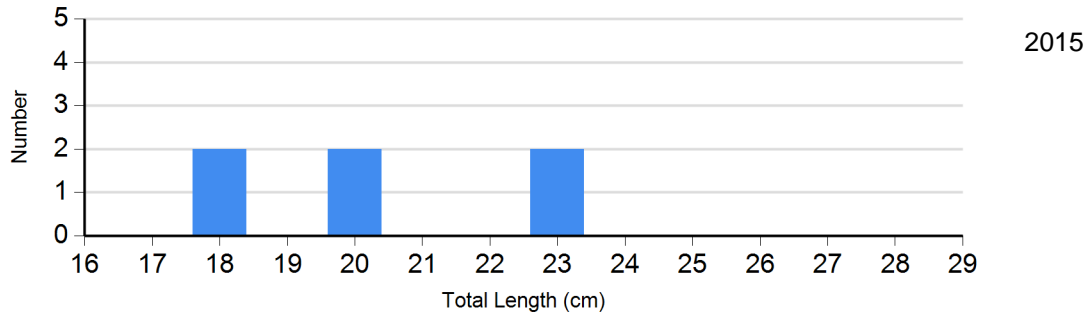
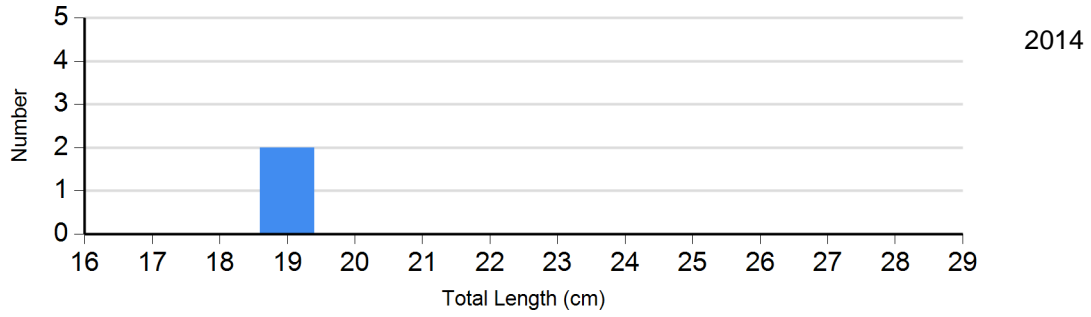




Species: Yellow Perch
 Gear: std exp gill net



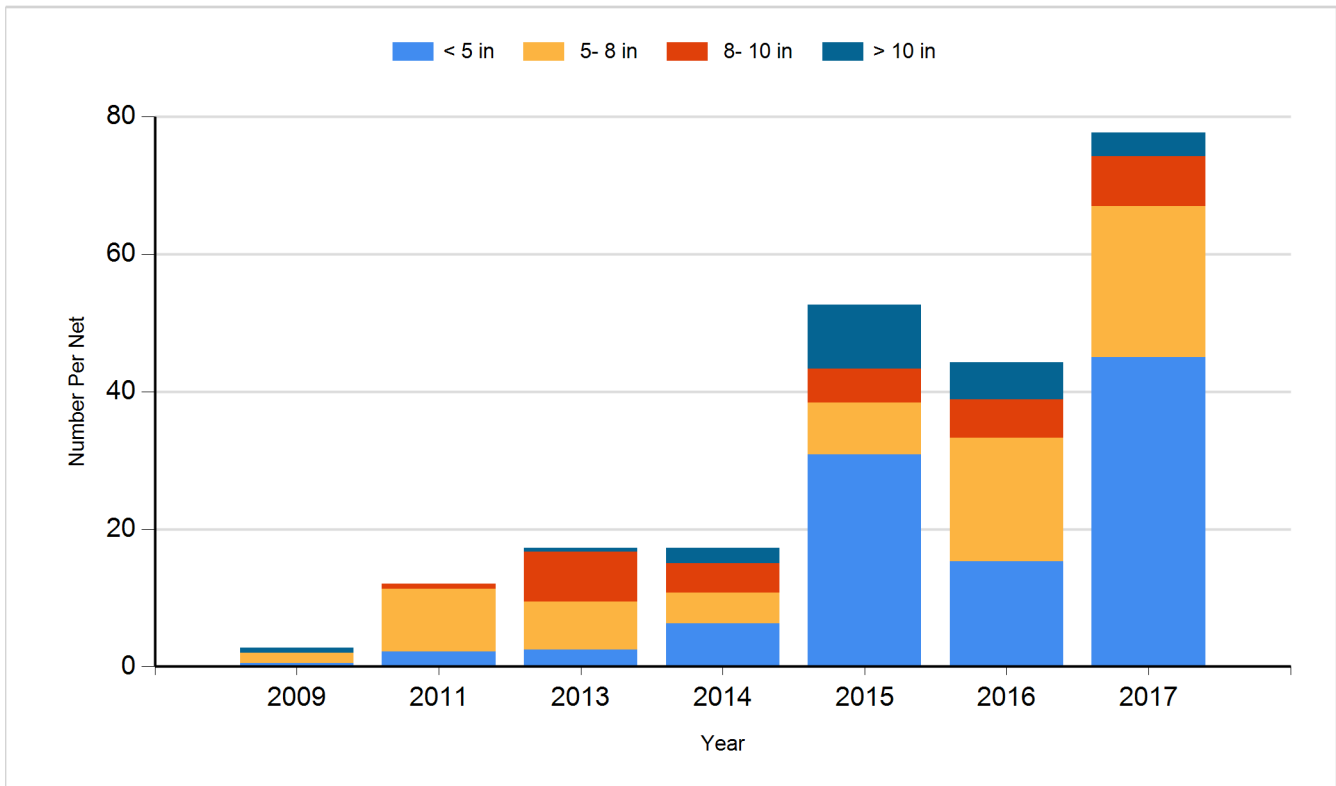
Species: Yellow Perch
Gear: std exp gill net (150 ft)



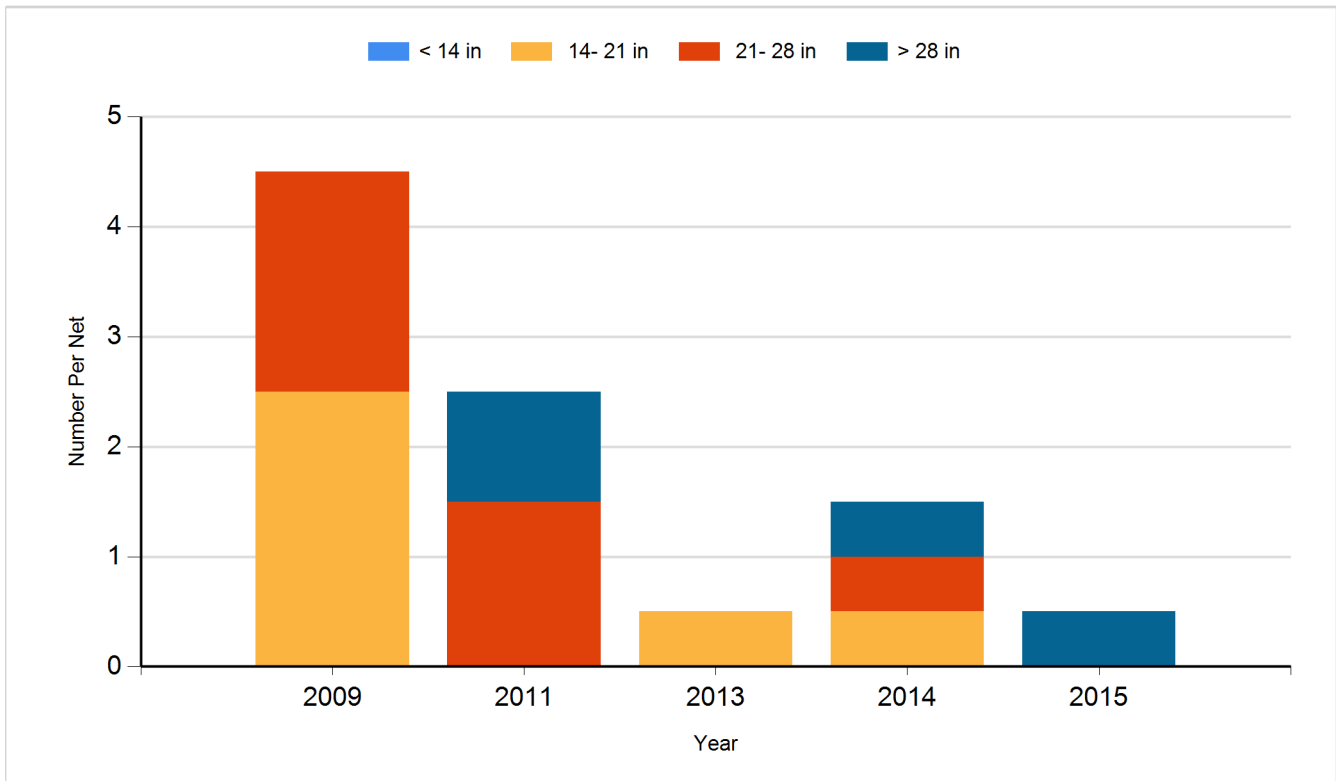
Historic Fish Sizes and Relative Abundance

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

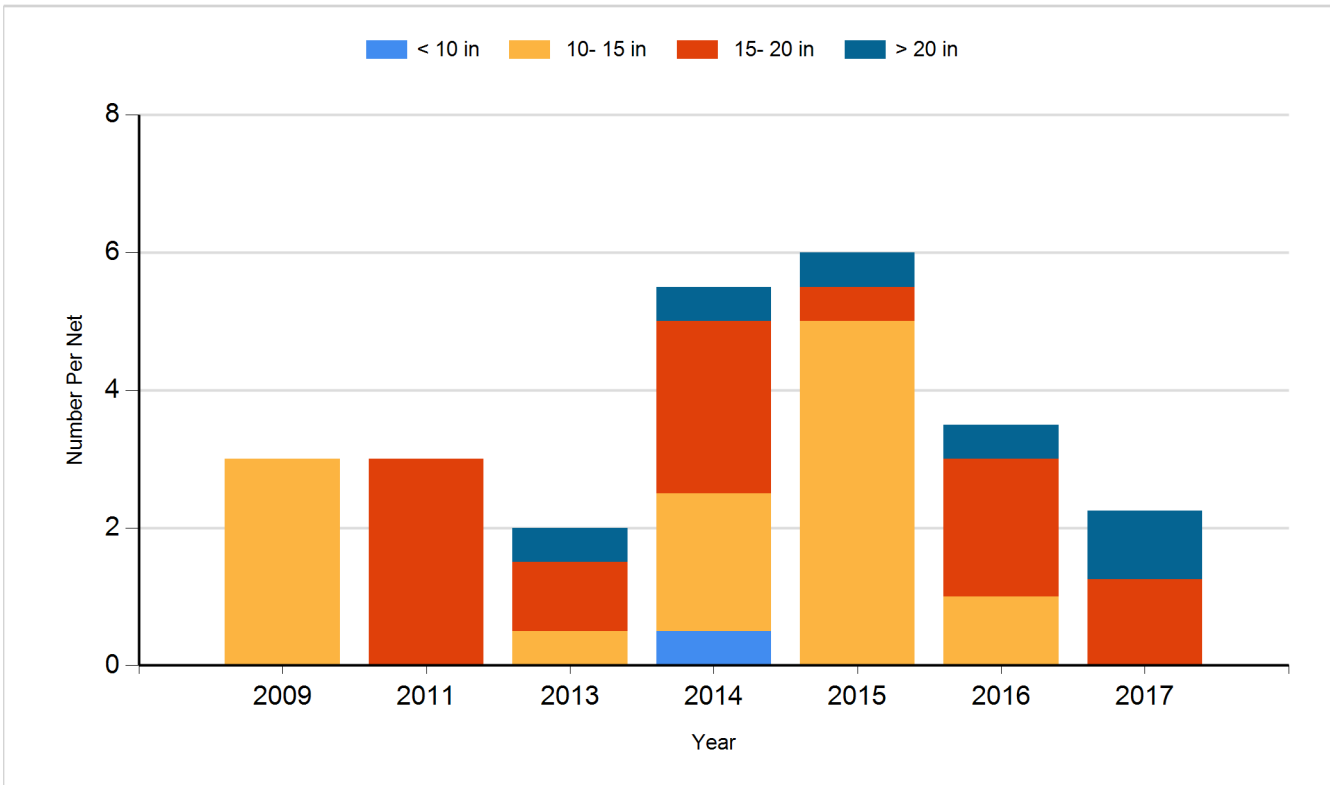
Species: Black Crappie
Gear: Frame Net



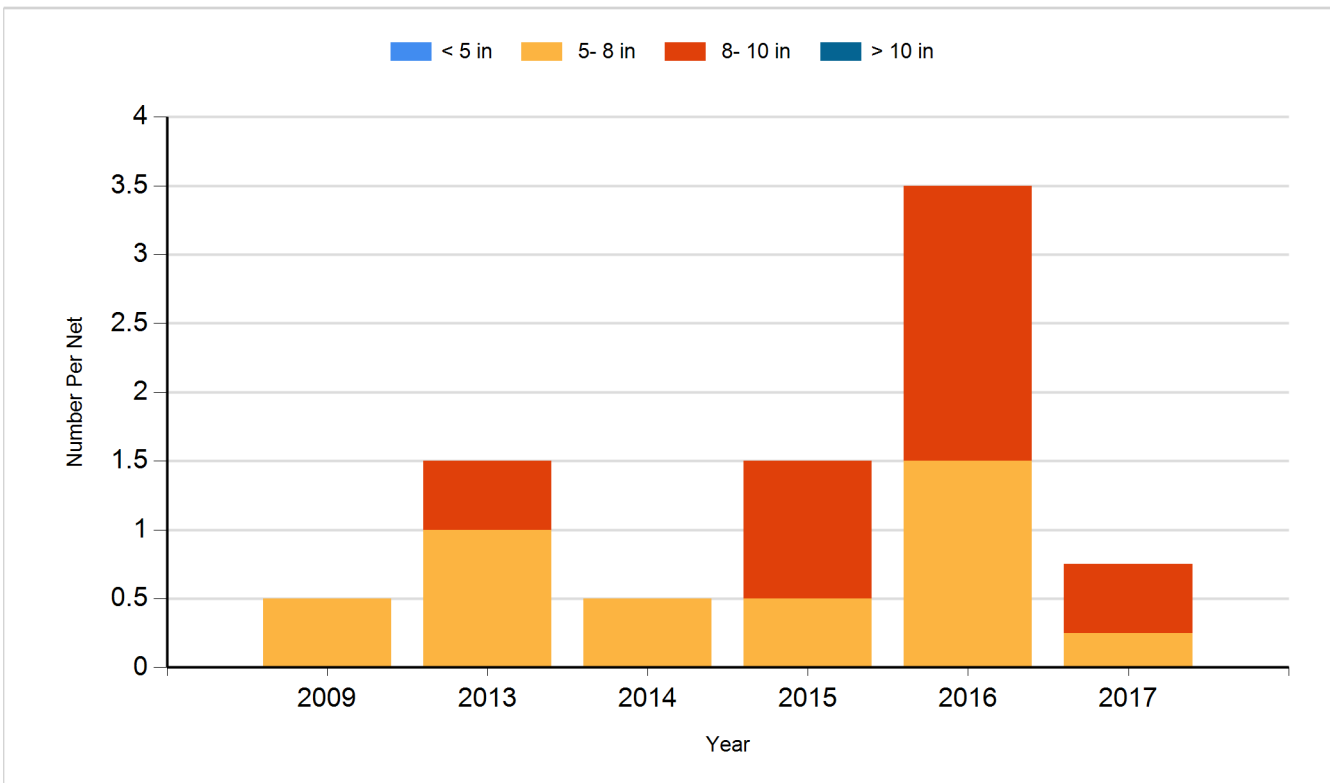
Species: Northern Pike
Gear: Gill Net



Species: Walleye
Gear: Gill Net



Species: Yellow Perch
Gear: 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