

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Curlew, Meade County
MCE-Lake-6-000
2016

Lake Information

Name: Curlew
County: Meade
Surface Area: 123 Acres

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	September 28, 2016	7200 seconds
frame net (std 3/4 in)	May 19, 2016	20 net-nights
std exp gill net	August 12, 2016	4 net-nights

Common Fish Species Present

Walleye

Largemouth Bass

Gizzard Shad

Black Crappie

Black Bullhead

Channel Catfish

Bluegill

Smallmouth Bass

Yellow Perch

Northern Pike

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 (night)	Largemouth Bass	85.0	6.3	11	3	5	3	101	1
	Smallmouth Bass	5.0	4.6	0		0		96	4
	Walleye	105.0	32.6	74	5	22	5	90	1
frame net (std 3/4 in)	Black Bullhead	31.2	5.0	18	2	0		78	1
	Black Crappie	48.9	9.7	91	1	25	2	97	1
	Bluegill	5.0	1.2	36	7	0		99	2
	Channel Catfish	0.6	0.2	33		0		105	4
	Common Carp	0.1	0.1	0		0		81	0
	Gizzard Shad	2.3	2.0	0					
	Golden Shiner	0.0	0.0						
	Walleye	0.3	0.2	100		33		94	8
	Yellow Perch	2.0	0.9	5		0		69	7
	std exp gill net	Black Bullhead	13.5	1.4	0		0		81
Black Crappie		5.0	1.9	60	18	20		96	3
Channel Catfish		6.5	0.5	62	15	8		85	2
Gizzard Shad		25.5	24.1	8	4				
Largemouth Bass		1.5	0.5	0		0		97	2
Northern Pike		0.5	0.5	100		0		98	0
Walleye		11.5	2.4	87	8	43	11	90	1

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	
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016		
boat shocker (day)	Largemouth Bass					15.5							15.5
boat shocker (night)	Largemouth Bass		3.0				40.6		16.9	40.8	85.0		37.3
	Smallmouth Bass								1.2	9.6	5.0		5.3
	Walleye		23.3				67.2		158.6	32.4	105.0		77.3
frame net (1/2 inch)	Black Bullhead				37.2								37.2
	Black Crappie				19.7								19.7
	Channel Catfish				0.2								0.2
	Common Carp				2.5								2.5
	Golden Shiner				0.0								0.0
	Green Sunfish				0.2								0.2
	Largemouth Bass				0.2								0.2
	Northern Pike				0.5								0.5
	Walleye				0.0								0.0
	White Sucker				0.3								0.3
	Yellow Perch				0.3								0.3
	frame net (std 3/4 in)	Black Bullhead	0.1	2.9			185.5	59.8	65.9	56.5	82.9	31.2	
Black Crappie		216.4	48.9			57.5	61.0	87.5	39.3	48.0	48.9		75.9
Bluegill		1.4	1.6				0.9	0.5	2.0	2.6	5.0		2.0
Channel Catfish			1.0			1.6			0.0	0.4	0.6		0.7
Common Carp			0.3			3.1	0.1	0.1	0.0	1.0	0.1		0.7
Gizzard Shad										0.0	2.3		1.2
Golden Shiner		0.0						0.0		0.0	0.0		0.0
Largemouth Bass						0.4							0.4
Northern Pike			0.1			0.3	0.5			0.1			0.3
Walleye		0.8	0.5			0.1	0.5	0.0	0.8	0.3	0.3		0.4
White Sucker		0.1				0.1			0.1	0.4			0.2
Yellow Perch		4.5	0.4			0.6	0.8	3.0	0.3	0.5	2.0		1.5
std exp gill net	Black Bullhead		0.5		0.5			3.1			13.5		4.4
	Black Crappie			0.0				2.9			5.0		2.6
	Channel Catfish							0.4			6.5		3.5
	Common Carp			0.0				0.1					0.1
	Gizzard Shad							0.0			25.5		12.8
	Golden Shiner							0.0					0.0

		CPUE										
Gear	Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
std exp gill net	Largemouth Bass						0.0				1.5	0.8
	Northern Pike						0.9				0.5	0.7
	Walleye		0.5	0.0	0.0		6.9				11.5	3.8
	Yellow Perch		0.0	0.5	0.5		1.1					0.5
std exp gill net (150 ft)	Black Bullhead						3.0		0.5	23.0		8.8
	Black Crappie						2.0		17.0	3.5		7.5
	Channel Catfish						2.5		1.5	0.5		1.5
	Common Carp						4.5		0.5	0.5		1.8
	Gizzard Shad								1.5	32.0		16.8
	Largemouth Bass									1.0		1.0
	Northern Pike						3.5		0.5	2.5		2.2
	Smallmouth Bass									0.5		0.5
	Walleye						4.5		17.0	7.5		9.7
	White Sucker						0.5					0.5
	Yellow Perch								4.5	3.0		3.8
std frame net (3/8 inch)	Black Bullhead			13.5								13.5
	Black Crappie			16.3								16.3
	Common Carp			0.3								0.3
	Northern Pike			0.3								0.3
	White Sucker			0.3								0.3
	Yellow Perch			0.5								0.5

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.

Gear	Species	Index	Year										
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
boat shocker (night)	Walleye	PSD		100					7	32	100	74	
		PSD-P		100				0	3	26	22		
		Wr		89				86	100	98	90		
frame net (1/2 inch)	Black Crappie	PSD				34							
		PSD-P				2							
		Wr				94							
	Northern Pike	PSD				100							
		PSD-P				33							
		Wr				84							
	Walleye	PSD				0							
		PSD-P				0							
	Yellow Perch	PSD				50							
		PSD-P				0							
		Wr				78							
	frame net (std 3/4 in)	Black Crappie	PSD	17	9			31	42	59	52	80	91
PSD-P			0	2			2	0	8	35	8	25	
Wr			102	109			102	103	103	90	91	97	
Northern Pike		PSD		100			50	75			0		
		PSD-P		100			0	25			0		
		Wr		89			93	85			91		
Walleye		PSD	100	100			100	0	0	100	50	100	
		PSD-P	67	100			100	0	0	17	50	33	
		Wr	87	85				82		85	107	94	
Yellow Perch		PSD	0	0			20	100	67	50	0	5	
		PSD-P	0	0			0	0	0	50	0	0	
		Wr	88	104			88	81	80	74	79	69	
std exp gill net		Black Crappie	PSD			0				0			60
			PSD-P			0				0			20
			Wr							100			96
	Northern Pike	PSD							100			100	
		PSD-P							14			0	

Gear	Species	Index	Year									
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
std exp gill net	Northern Pike	Wr								101		98
		PSD		100	0	0			69		87	
		PSD-P		100	0	0			0		43	
	Walleye	Wr								94		90
		PSD		0	0	0			11			
		PSD-P		0	0	0			0			
		Wr			90	79			84			
		PSD								75	3	86
		PSD-P								0	3	29
std exp gill net (150 ft)	Black Crappie	Wr							100	92	92	
		PSD						43	100	80		
		PSD-P						0	0	0		
	Northern Pike	Wr							82	90	99	
		PSD							22	59	87	
		PSD-P							11	0	20	
	Walleye	Wr							81	84	89	
		PSD								11	0	
		PSD-P								0	0	
	Yellow Perch	Wr								77	77	
		PSD										
		PSD-P										
	std frame net (3/8 inch)	Black Crappie	PSD			38						
			PSD-P			2						
			Wr			101						
Northern Pike		PSD			100							
		PSD-P			50							
		Wr			92							
Yellow Perch		PSD			33							
		PSD-P			0							
		Wr			81							

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	784		131 (26)	212 (171)	216 (527)	252 (55)	252 (5)				
2014	544			180 (358)	255 (23)	261 (117)	274 (46)				
2013	1400		150 (572)	222 (331)	238 (332)	249 (165)					
2012	1638	123 (862)	180 (209)	196 (272)	212 (260)	213 (35)					
2011	916		145 (28)	186 (664)	209 (128)	223 (79)	247 (19)				
2010	238	106 (2)	165 (130)	197 (27)	208 (74)	234 (2)	261 (4)				
2007	5650		131 (5014)	180 (44)	212 (135)	230 (288)	236 (169)				

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	42		342 (6)	500 (25)	511 (5)	565 (4)			596 (2)		
2015	30	276 (2)	409 (18)		535 (2)		496 (2)	531 (6)			
2014	80	217 (12)	324 (4)	379 (38)	414 (2)		439 (24)				
2013	144		299 (24)	348 (7)	375 (8)	411 (105)					
2012	18				326 (16)			690 (2)			

Fish Condition

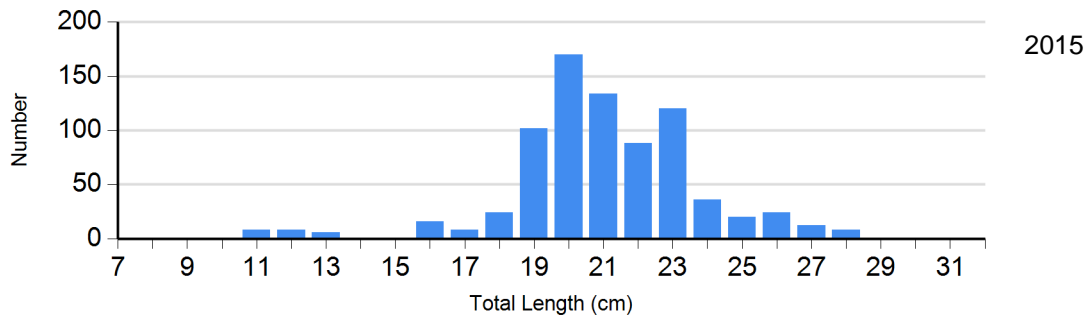
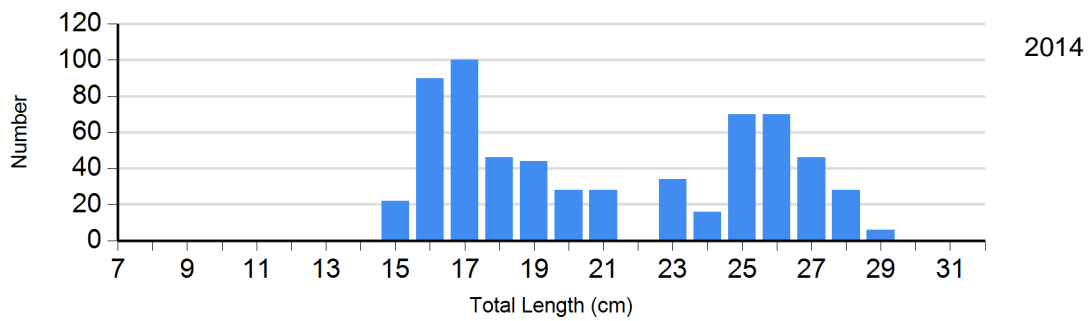
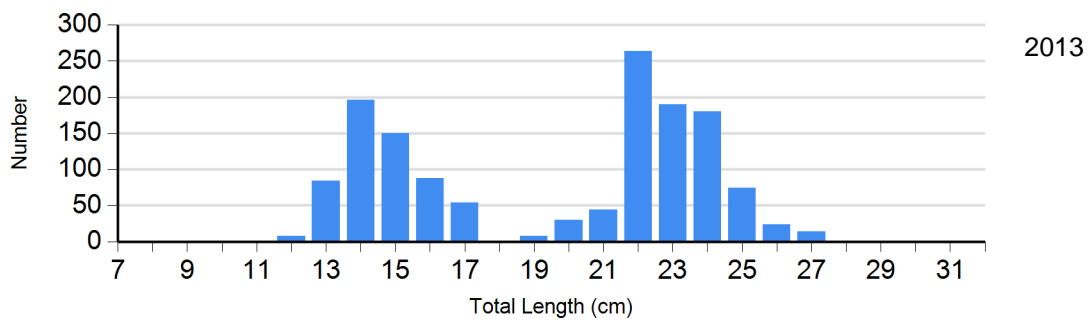
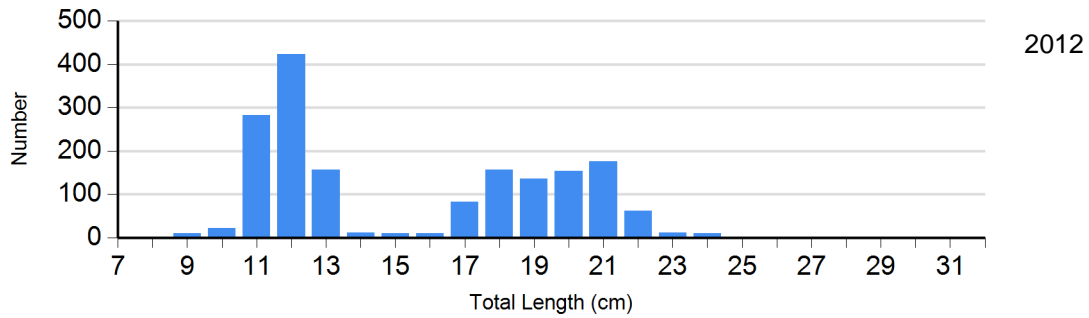
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

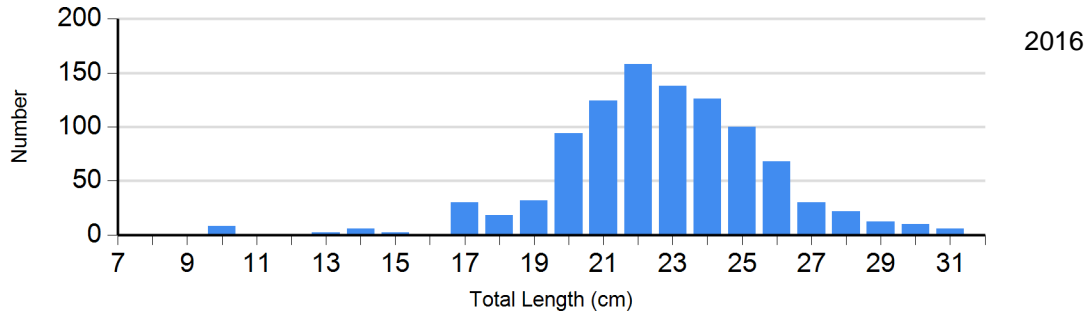
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2012	562	106 (0.6)	414	99 (0.4)	0		0	
	2013	580	102 (0.6)	708	103 (0.4)	112	106 (0.8)	0	
	2014	302	92 (0.5)	106	85 (0.6)	220	87 (0.4)	0	
	2015	156	85 (0.7)	548	89 (0.6)	64	107 (1.0)	0	
	2016	90	87 (1.0)	640	97 (0.6)	232	103 (0.5)	16	105 (1.3)
Northern Pike Gill Net	2012	8	78 (1.5)	6	87 (3.0)	0		0	
	2013	0		12	101 (0.6)	2	101 (0.0)	0	
	2014	0		2	90 (0.0)	0		0	
	2015	2	102 (0.0)	8	99 (1.1)	0		0	
	2016	0		2	98 (0.0)	0		0	
Walleye Gill Net	2012	14	80 (1.8)	2	79 (0.0)	0		2	87 (0.0)
	2013	50	92 (1.1)	110	95 (0.7)	0		0	
	2014	28	84 (1.2)	40	85 (1.0)	0		0	
	2015	4	87 (1.0)	20	89 (1.5)	6	91 (5.0)	0	
	2016	6	84 (2.0)	20	92 (1.4)	20	89 (1.3)	0	
Yellow Perch Gill Net	2013	16	85 (1.0)	2	76 (0.0)	0		0	
	2014	16	79 (1.9)	2	67 (0.0)	0		0	
	2015	12	77 (1.9)	0		0		0	

Length Frequency Distribution

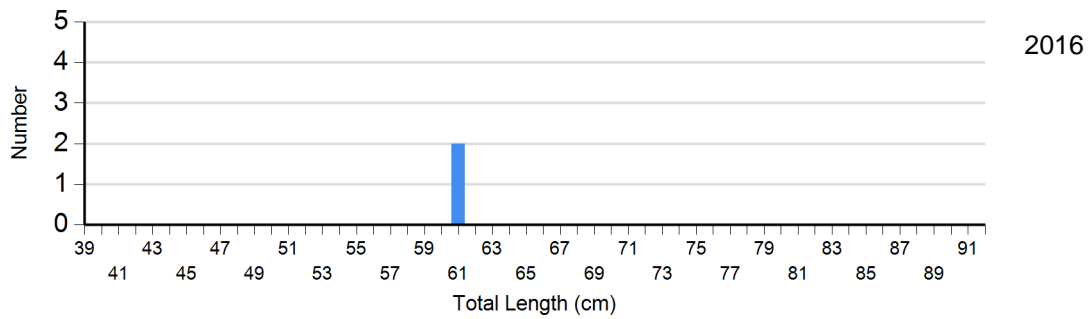
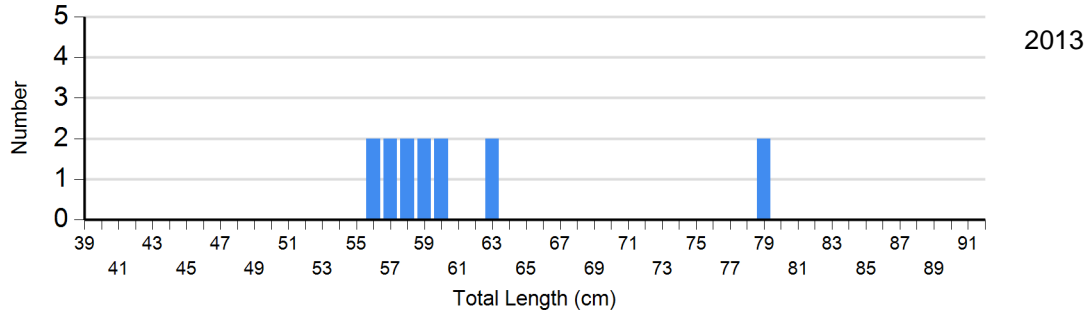
Length frequency histogram of species sampled by year.

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

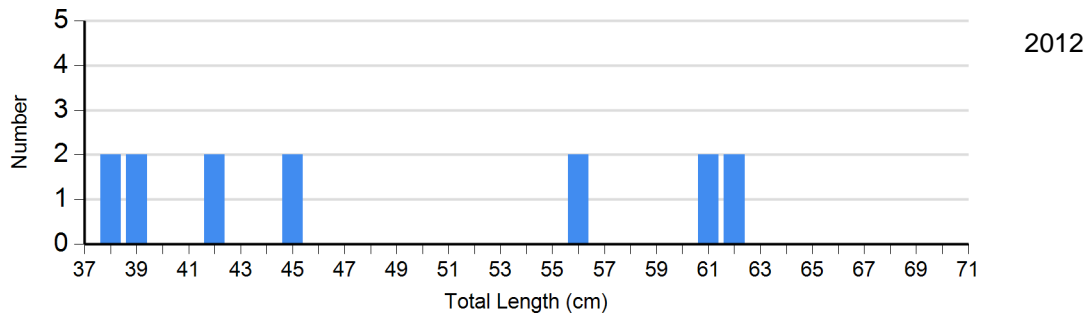


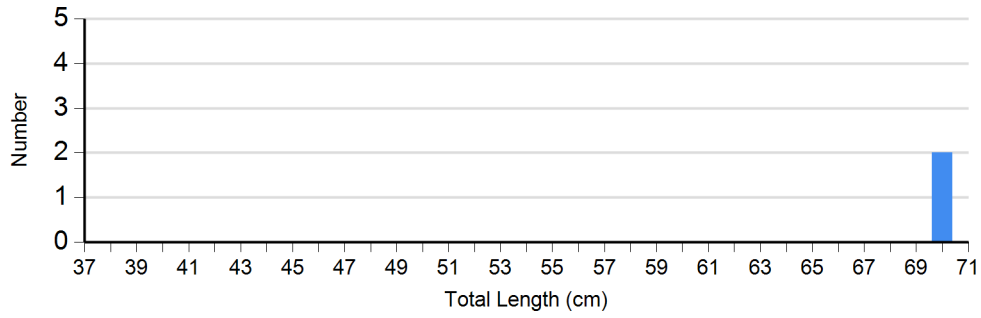


Species: Northern Pike
 Gear: std exp gill net

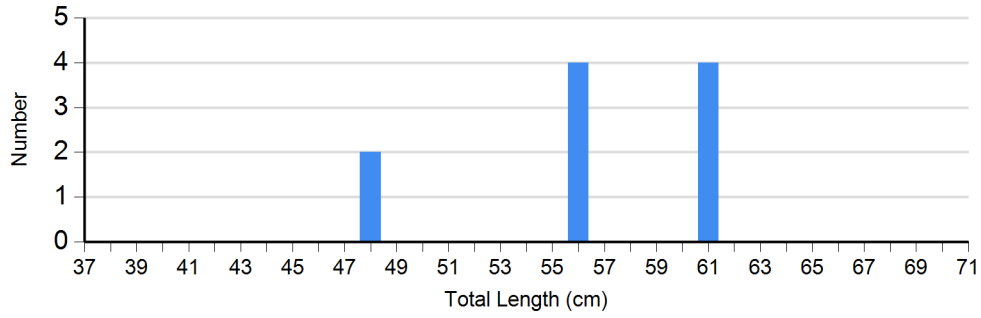


Species: Northern Pike
 Gear: std exp gill net (150 ft)



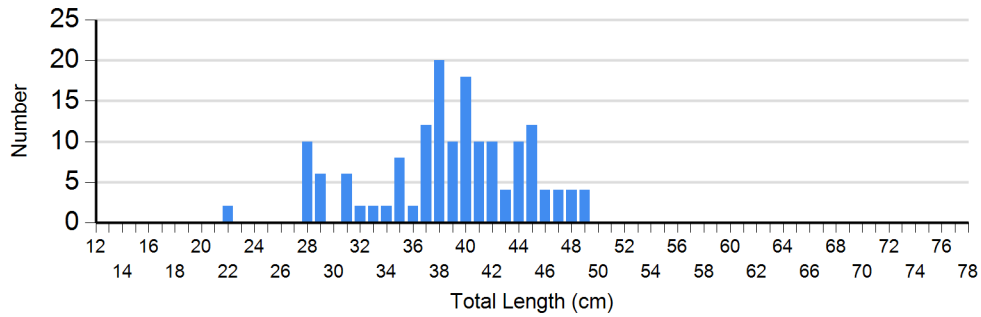


2014

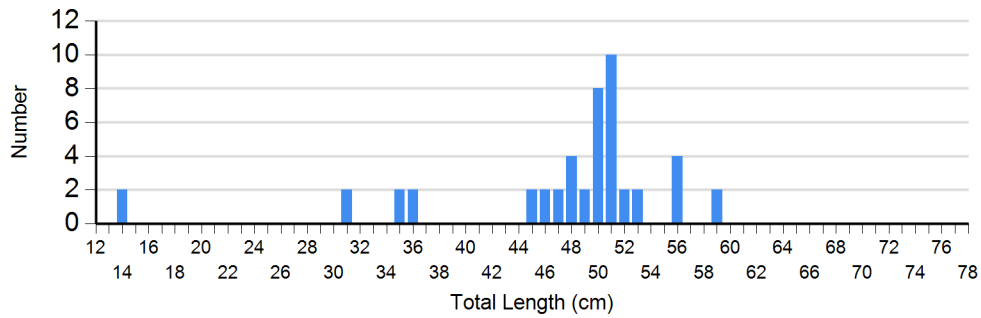


2015

Species: Walleye
Gear: std exp gill net

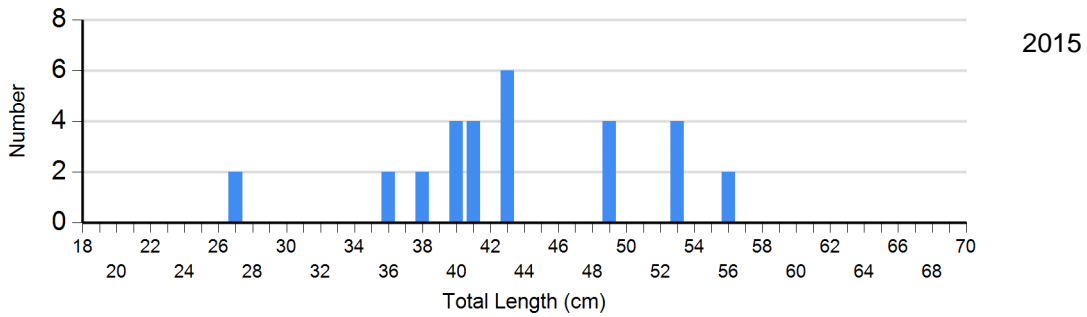
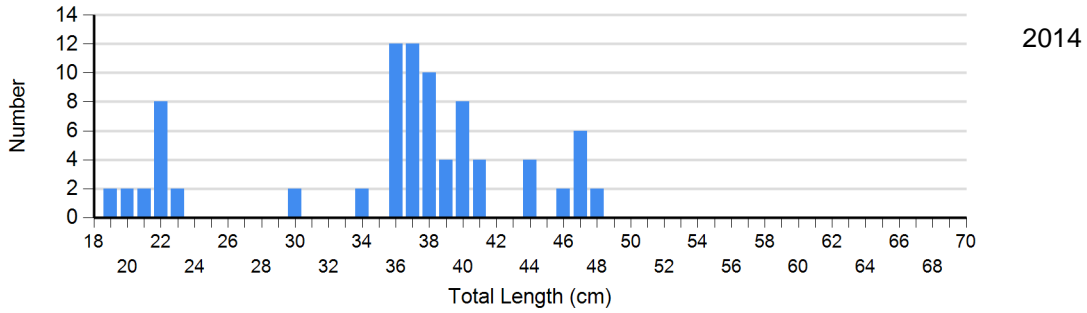
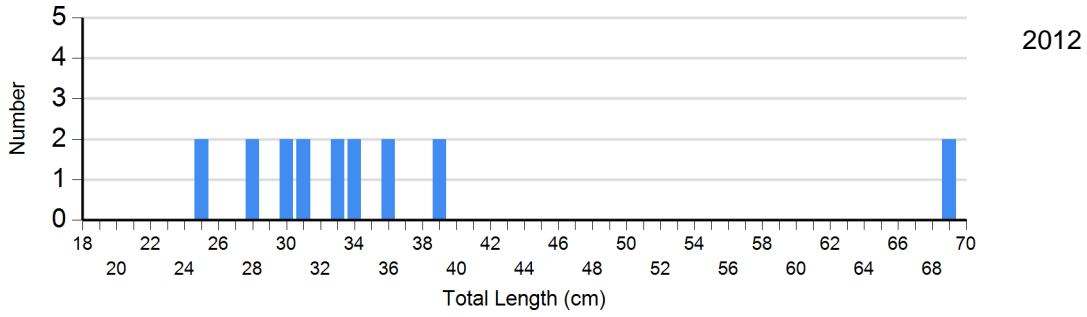


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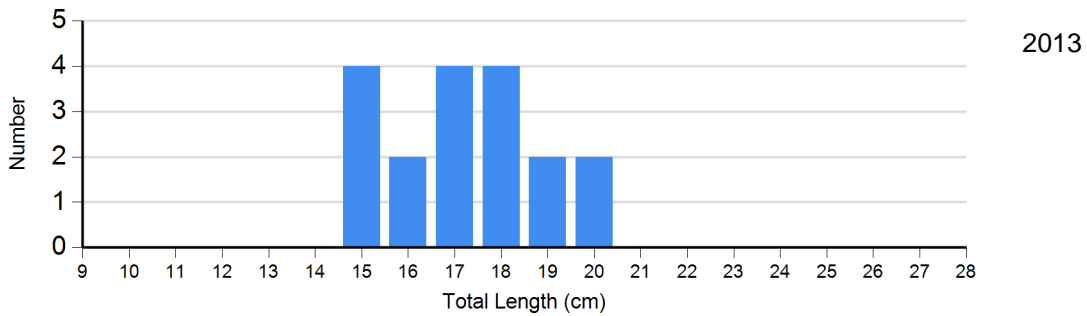


2016

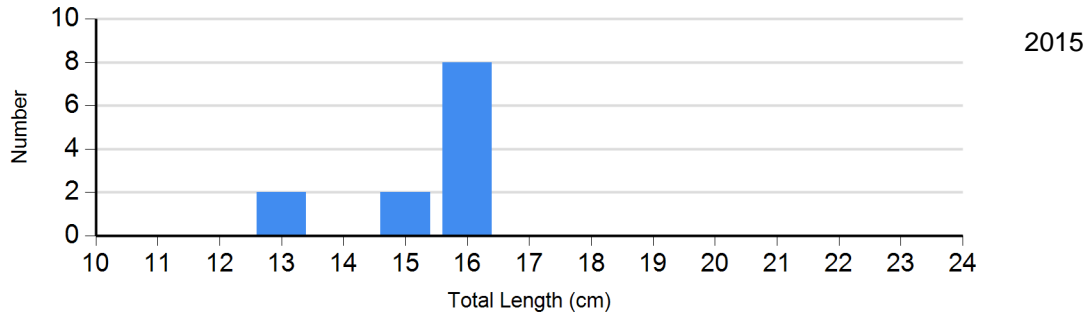
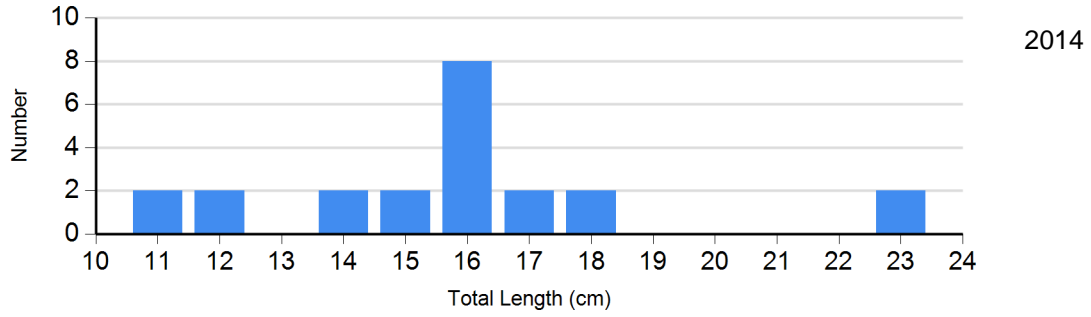
Species: Walleye
 Gear: std exp gill net (150 ft)



Species: Yellow Perch
 Gear: std exp gill net



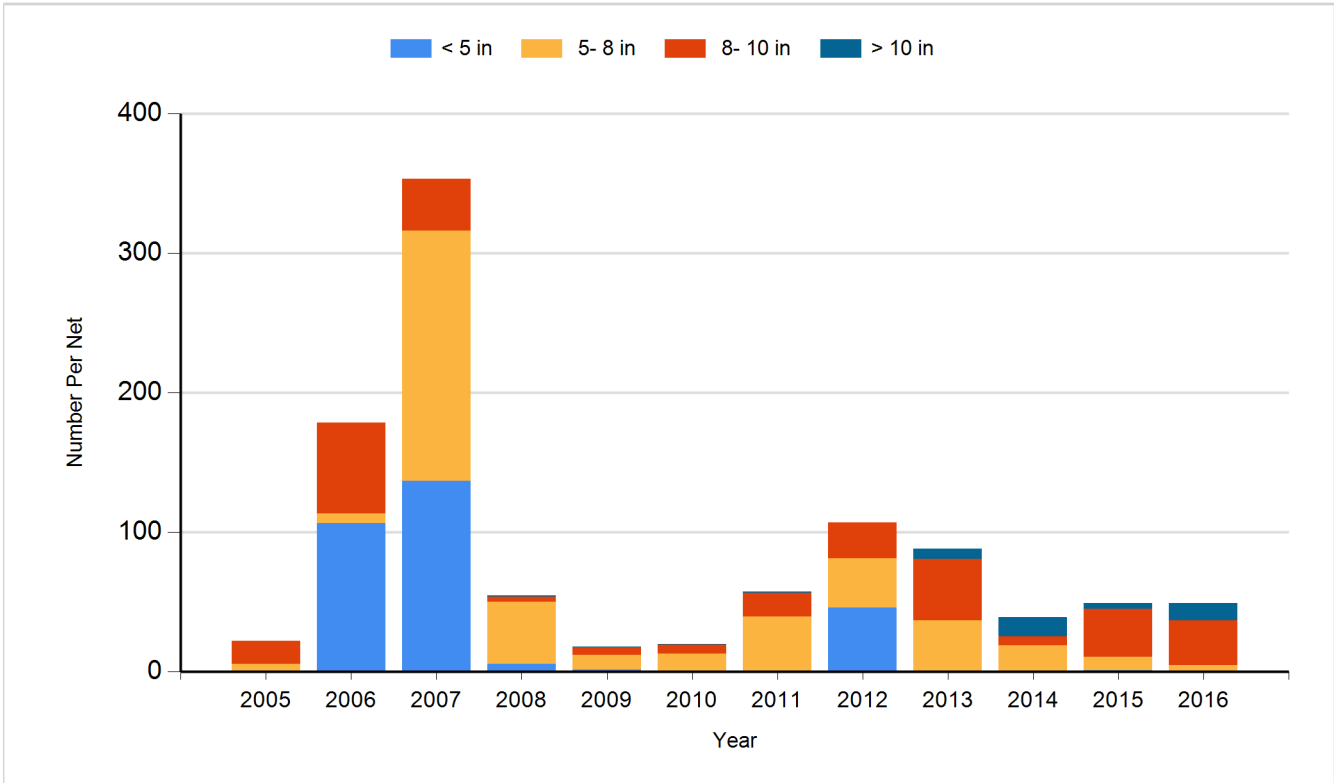
Species: Yellow Perch
Gear: std exp gill net (150 ft)



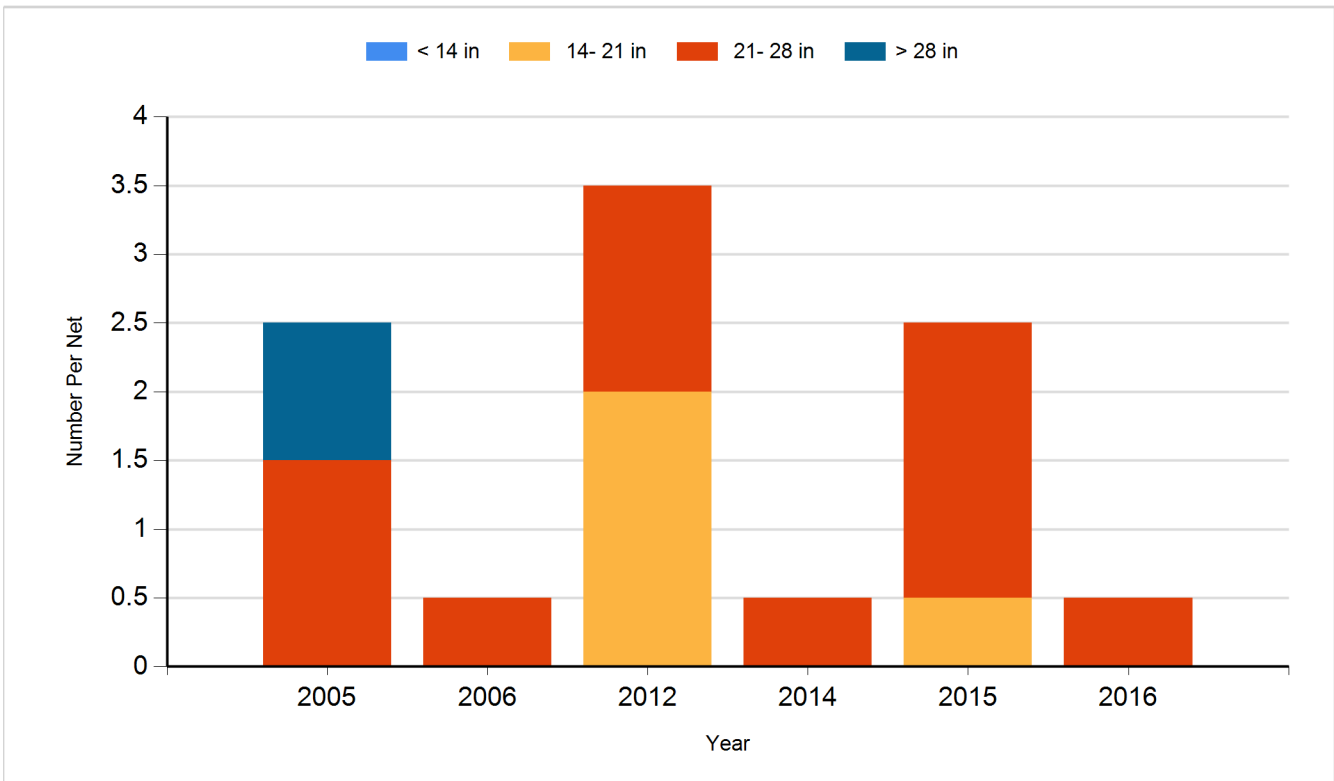
Historic Fish Sizes and Relative Abundance

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

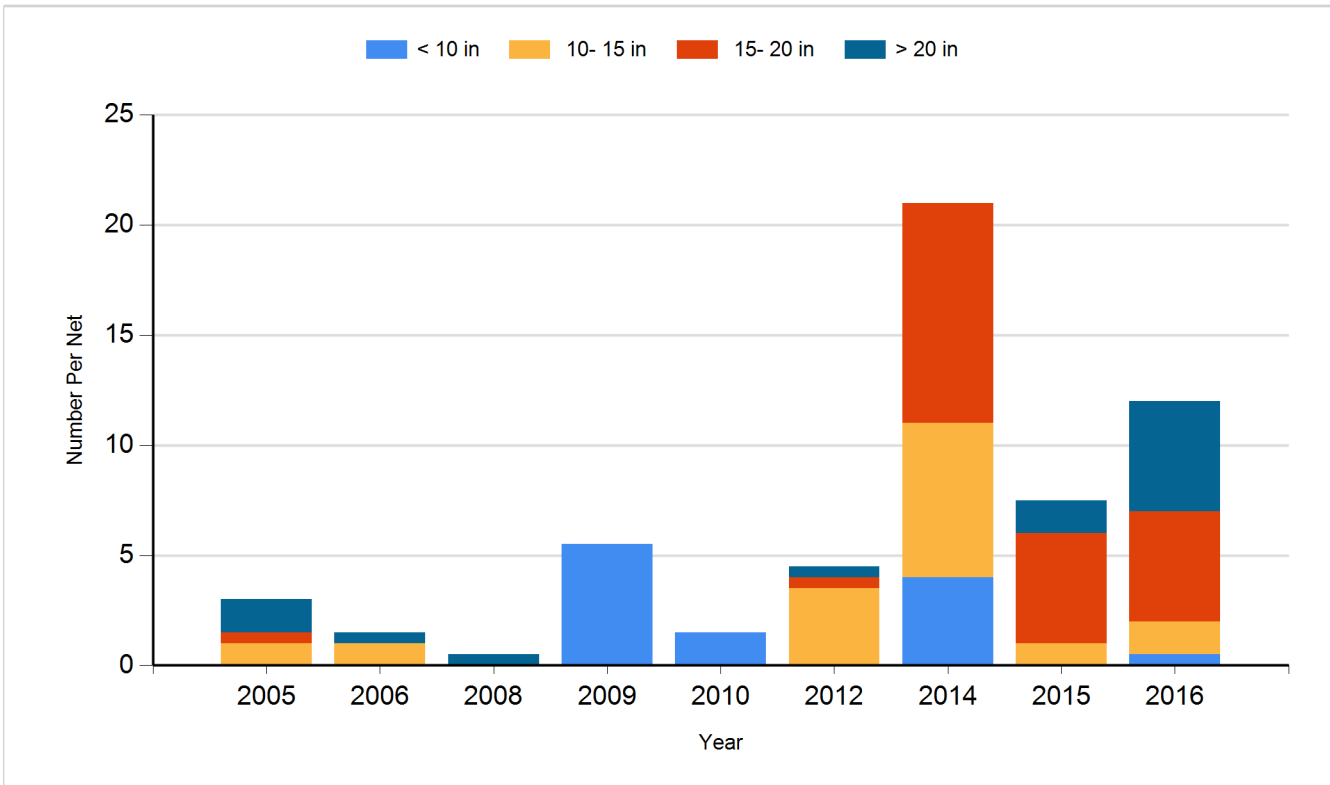
Species: Black Crappie
Gear: Frame Net



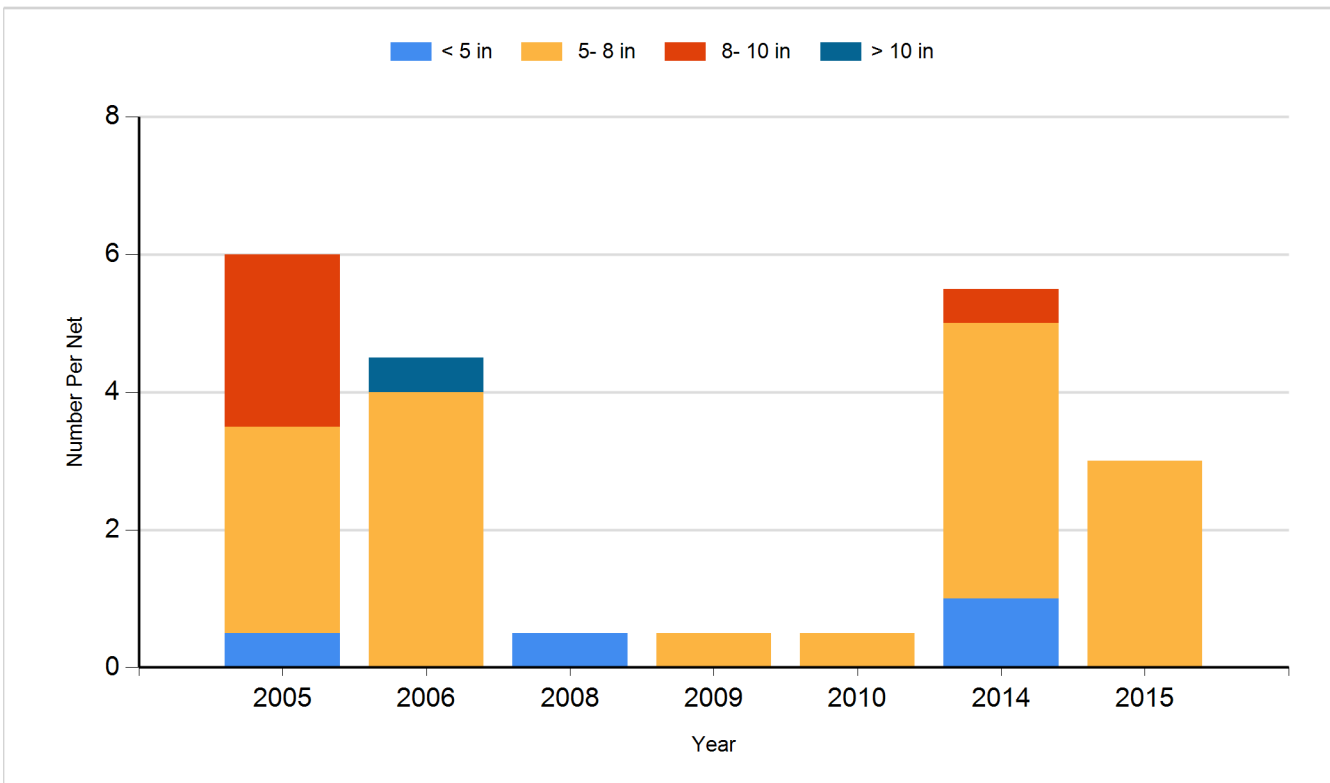
Species: Northern Pike
Gear: Gill Net



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	Largemouth Bass	Fingerling	13,000
2008	Walleye	Small Fingerling	46,990
2009	Channel Catfish	Adult	70
2009	Largemouth Bass	Adult	150
2009	Largemouth Bass	Fingerling	23,960
2009	Walleye	Fingerling	46,260
2009	Yellow Perch	Adult	400
2010	Golden Shiner	Adult	250
2010	Largemouth Bass	Fingerling	8,420
2010	Walleye	Small Fingerling	14,000
2011	Channel Catfish	Adult	200
2011	Yellow Perch	Adult	1,398
2012	Gizzard Shad	Adult	54
2012	Largemouth Bass	Fingerling	13,320
2013	Gizzard Shad	Adult	35
2013	Walleye	Large Fingerling	4,000
2014	Channel Catfish	Adult	200
2014	Gizzard Shad	Adult	50
2014	Largemouth Bass	Juvenile	400
2014	Yellow Perch	Adult	650
2015	Gizzard Shad	Adult	13
2015	Smallmouth Bass	Adult	380
2015	Walleye	Fingerling	900
2016	Walleye	Fingerling	25,500