

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Waubay, Day County
UBS-Lake-411-000
2016

Lake Information

Name:	Waubay	Maximum Depth:	31 Feet
County:	Day	Mean Depth:	13 Feet
		OHWM Elevation:	1,787
Surface Area:	16,943 Acres		

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	August 16, 2016	4 net-nights
AFS std gill net	August 17, 2016	4 net-nights
AFS std gill net	August 18, 2016	4 net-nights
AFS std gill net	August 19, 2016	4 net-nights
boat shocker (night)	September 08, 2016	2400 seconds

Common Fish Species Present

Northern Pike

Walleye

Smallmouth Bass

Yellow Perch

White Bass

Black Bullhead

Rock Bass

Lake Herring

Common Carp

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
AFS std gill net	Black Bullhead	0.4	0.3	100		100		94	6
	Common Carp	0.1	0.1	100		100		103	
	Lake Herring	0.3	0.2	100		100		121	4
	Northern Pike	0.1	0.1	100		100		91	10
	Rock Bass	0.4	0.2	100		0		109	3
	Smallmouth Bass	1.3	0.7	50	18	20		100	2
	Walleye	6.3	1.4	28	6	5	3	86	1
	White Bass	13.2	2.5	100		100		98	1
	Yellow Perch	5.4	1.1	71	7	38	7	109	1
boat shocker (night)	Walleye	1.5	2.5	0		0		93	

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		
AFS std gill net	Black Bullhead										0.4	0.4	
	Common Carp										0.1	0.1	
	Lake Herring										0.3	0.3	
	Northern Pike										0.1	0.1	
	Rock Bass										0.4	0.4	
	Smallmouth Bass										1.3	1.3	
	Walleye										6.3	6.3	
	White Bass										13.2	13.2	
	Yellow Perch									5.4	5.4		
boat shocker (night)	Smallmouth Bass	14.7	4.0	21.8				41.8		5.6		17.6	
	Walleye	0.8	6.0	41.5		6.0	5.0	0.3	15.0	0.4	1.5	8.5	
frame net (std 3/4 in)	Black Bullhead	1.7	0.8	0.9	0.8	0.4	1.5	3.5	2.0			1.5	
	Black Crappie	0.2	0.3	0.1	0.2	0.3	1.3	1.5	2.6			0.8	
	Bluegill	0.2	0.1	0.1	0.6	0.7	0.9	0.4	0.3			0.4	
	Common Carp	1.1	0.4	0.3	0.5	0.5	0.5	0.3	0.2			0.5	
	Northern Pike	0.4	0.8	0.7	0.4	0.1	0.2	0.3	0.6			0.4	
	Rock Bass	0.0	0.3	0.7	0.9	0.6	0.9	2.6	1.2			0.9	
	Smallmouth Bass	6.3	1.9	3.4	6.3	6.1	5.1	6.2	3.5			4.9	
	Walleye	8.3	6.1	5.4	5.5	3.1	2.9	2.5	2.8			4.6	
	Western Painted Turtle	0.0										0.0	
	White Bass	6.6	3.2	7.1	3.1	6.5	5.1	3.8	2.5			4.7	
	White Sucker	0.4	0.1	0.2	0.1	0.1	0.1	0.1	0.0			0.1	
Yellow Perch	0.0	0.0	0.3	0.2	0.0	0.1	0.0				0.1		
std exp gill net	Black Bullhead	0.6		0.0		0.2	4.3	4.1	1.4	0.1		1.5	
	Bluegill						0.3					0.3	
	Common Carp	1.5	0.6		0.3	0.0	0.5		0.5	0.1		0.5	
	Lake Herring	1.9	0.6	0.5	1.4	0.3	0.1	0.4	0.3	0.3		0.6	
	Northern Pike			0.0	0.0		0.1	0.5	1.0	0.4		0.3	
	Rock Bass				0.1	0.2	1.4	1.3	2.0	0.4		0.9	
	Smallmouth Bass	0.4	0.9	0.0	0.0	0.0		0.3	0.3			0.3	
	Spottail Shiner				0.0								0.0
	Walleye	34.3	28.8	4.1	5.3	5.3	11.1	11.8	19.3	14.1			14.9
	White Bass	2.0	4.6	0.1	0.3	1.0	1.5	17.6	8.1	23.9			6.6

		CPUE										
Gear	Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
std exp gill net	White Sucker	0.3	0.1		0.1			0.3	0.1			0.2
	Yellow Perch	42.8	32.4	4.6	6.6	9.2	28.1	21.9	18.5	19.5		20.4

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										
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	
AFS std gill net	Northern Pike	PSD											100
		PSD-P											100
		Wr											91
	Walleye	PSD											28
		PSD-P											5
		Wr											86
	Yellow Perch	PSD											71
		PSD-P											38
		Wr											109
boat shocker (night)	Walleye	PSD	0	0	0		0	0	0	0	0	0	
		PSD-P	0	0	0		0	0	0	0	0	0	
		Wr	82	69	93		97	86		96	83	93	
frame net (std 3/4 in)	Black Crappie	PSD	83	63	50	80	22	90	100	99			
		PSD-P	67	50	0	20	11	8	44	92			
		Wr	99	108	114	110	108	109	105	105			
	Northern Pike	PSD	86	64	48	91	100	83	70	89			
		PSD-P	57	48	10	18	50	50	30	50			
		Wr	82	82	84	89	83	87	77	80			
	Walleye	PSD	24	15	41	68	51	80	48	11			
		PSD-P	3	1	2	2	9	7	9	1			
		Wr	81	80	85	87	81	79	78	80			
	Yellow Perch	PSD	100	0	90	0	100	67	100				
		PSD-P	0	0	30	0	0	67	0				
		Wr	116	104	114	104	112	93	127				
	std exp gill net	Northern Pike	PSD			100	100		0	100	100	100	
			PSD-P			100	0		0	25	63	100	
			Wr			88	94		75	79	86	77	
Walleye		PSD	7	12	16	25	42	48	28	17	8		
		PSD-P	0	1	3	0	0	7	2	1	0		
		Wr	88	86	90	88	83	83	82	84	85		
Yellow Perch		PSD	79	61	75	59	72	85	79	87	83		

Gear	Species	Index	Year									
			2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
std exp gill net	Yellow Perch	PSD-P	32	33	20	22	22	32	36	41	38	
		Wr	121	115	117	115	114	117	115	115	117	

Length at Capture

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

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	100		320 (6)	396 (1)	396 (1)	365 (83)	334 (1)	485 (4)			691 (3)
2015	117	215 (4)	280 (1)		332 (104)		387 (4)				417 (4)
2014	157	228 (3)		304 (120)		386 (21)	399 (3)			435 (9)	
2013	113	235 (4)	259 (61)	350 (2)	374 (28)	427 (2)		374 (3)	447 (11)	416 (1)	724 (1)
2012	217	213 (131)	326 (14)	367 (30)	402 (7)	489 (1)	365 (2)	447 (30)			502 (1)
2011	129	248 (5)	322 (50)	368 (17)			407 (54)	391 (3)	454 (1)		
2010	129	270 (47)	347 (24)			380 (55)	395 (3)				
2009	104	239 (6)	317 (6)		349 (77)	378 (6)		364 (2)	491 (2)		527 (5)
2008	232	214 (2)	267 (1)	314 (188)	377 (10)	383 (13)		408 (5)	407 (3)	424 (11)	
2007	277	249 (5)	279 (190)	331 (26)	353 (34)			435 (1)	412 (20)	657 (1)	

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	87	153 (22)	205 (7)	238 (18)	258 (16)	267 (21)	242 (4)				
2015	159	136 (17)	190 (14)	237 (38)	248 (56)	261 (14)	267 (19)	312 (1)			
2014	152	138 (9)	186 (12)	233 (62)	261 (33)	251 (31)	299 (3)	343 (1)	303 (1)		
2013	175	150 (5)	198 (51)	237 (39)	250 (62)	244 (4)	280 (10)		323 (1)	269 (4)	
2012	228	144 (26)	217 (63)	244 (111)	264 (13)	261 (7)			305 (1)	335 (1)	270 (7)
2011	221	153 (23)	206 (131)	242 (26)	270 (32)	280 (9)					
2010	159	151 (60)	217 (31)	245 (61)	250 (7)		278 (3)				
2009	110	147 (2)	204 (75)	250 (14)	259 (2)	268 (5)	256 (1)		290 (4)	265 (2)	289 (5)

Fish Condition

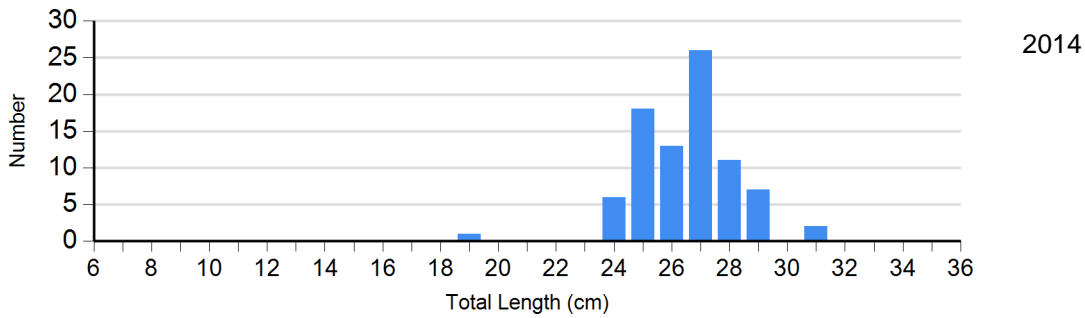
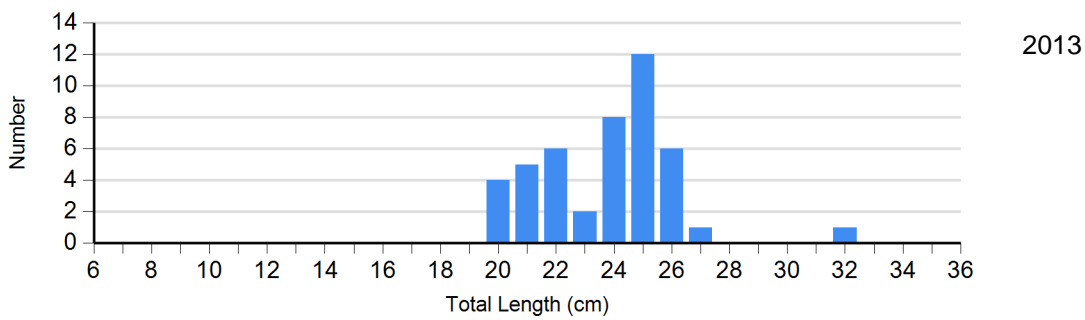
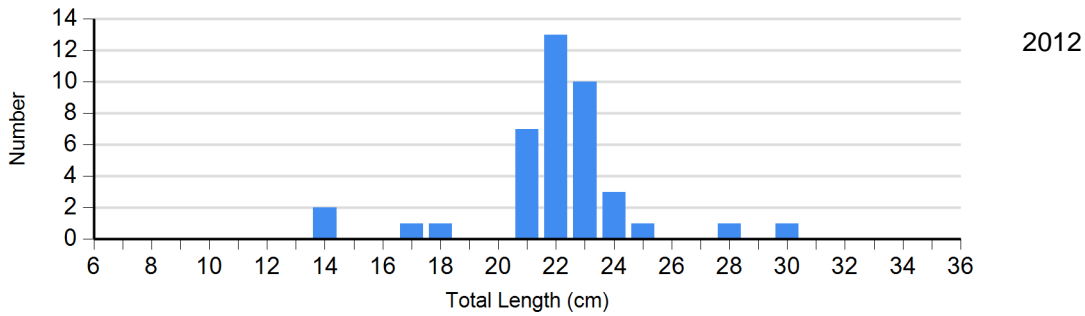
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	4	117 (3.8)	33	109 (0.9)	2	96 (0.9)	1	94
	2013	0		25	105 (1.5)	19	104 (1.5)	1	90
	2014	1	108	6	107 (2.3)	75	105 (1.0)	2	100 (2.4)
Northern Pike Gill Net	2012	1	75	0		0		0	
	2013	0		3	81 (5.6)	1	71	0	
	2014	0		3	81 (4.5)	4	85 (5.3)	1	106
	2015	0		0		2	78 (0.7)	1	75
	2016	0		0		1	83	1	98
Walleye Gill Net	2012	46	84 (0.7)	37	81 (0.7)	6	85 (1.6)	0	
	2013	68	83 (0.5)	24	78 (0.9)	1	79	1	91
	2014	128	85 (0.4)	25	80 (1.0)	1	76	0	
	2015	104	86 (0.4)	9	81 (1.1)	0		0	
	2016	72	87 (0.5)	23	86 (0.9)	2	80 (2.5)	3	83 (2.5)
Yellow Perch Gill Net	2012	33	111 (2.1)	121	120 (1.1)	66	116 (1.2)	5	106 (3.9)
	2013	37	116 (1.7)	75	116 (1.2)	59	114 (1.0)	4	102 (3.7)
	2014	19	110 (2.0)	68	119 (1.2)	58	112 (1.3)	3	94 (5.4)
	2015	26	114 (2.0)	71	120 (1.1)	57	116 (1.4)	2	112 (2.6)
	2016	25	107 (1.7)	29	111 (1.7)	33	109 (1.9)	0	

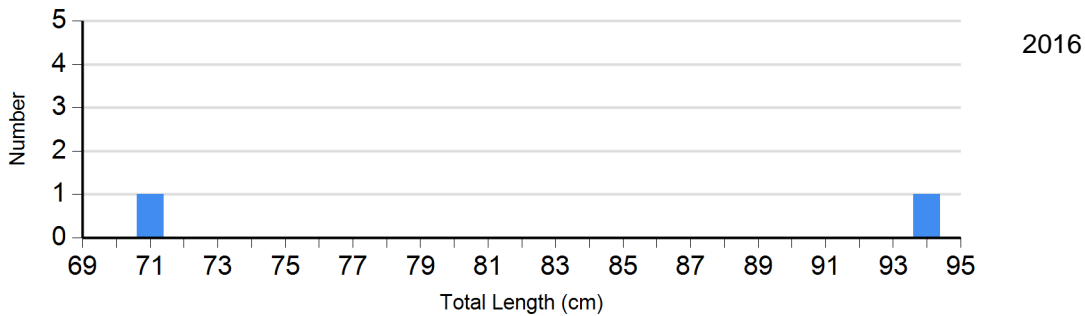
Length Frequency Distribution

Length frequency histogram of species sampled by year.

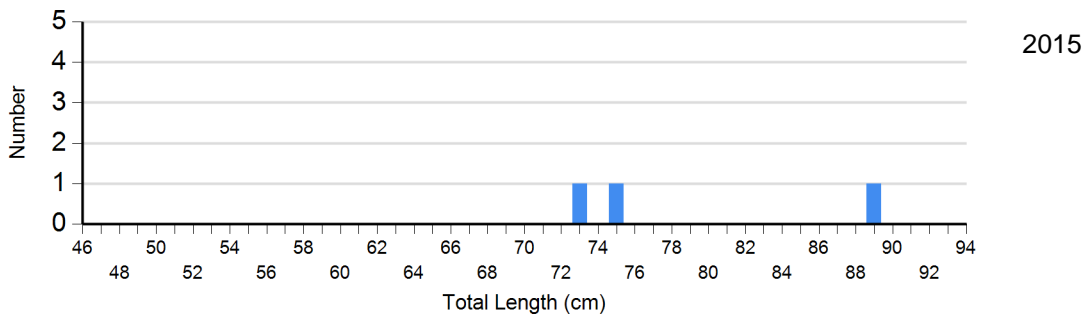
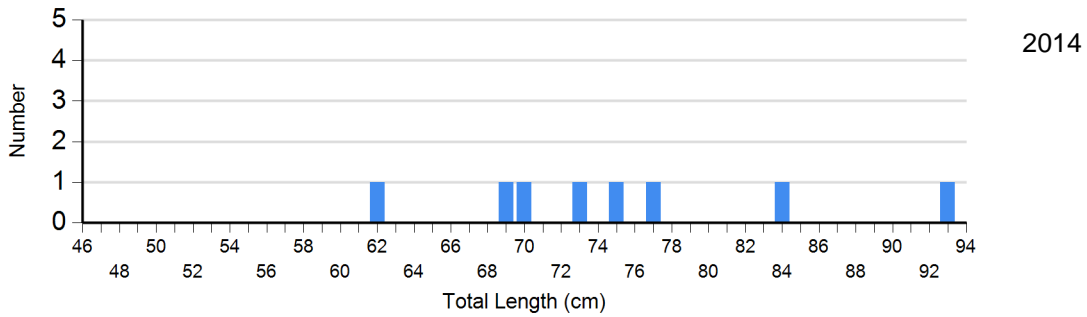
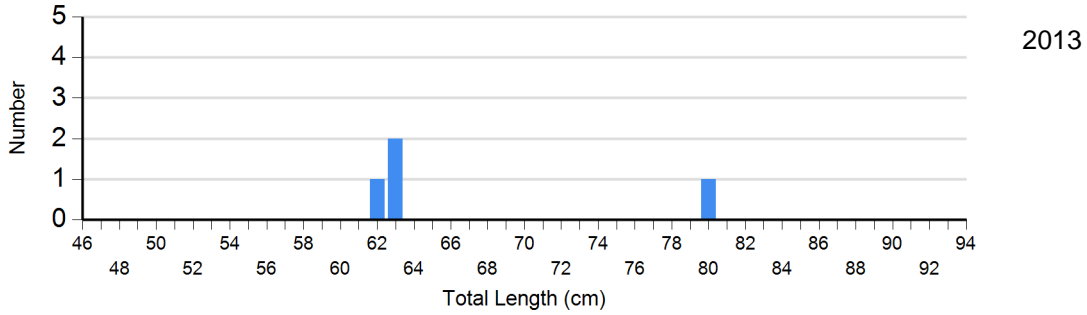
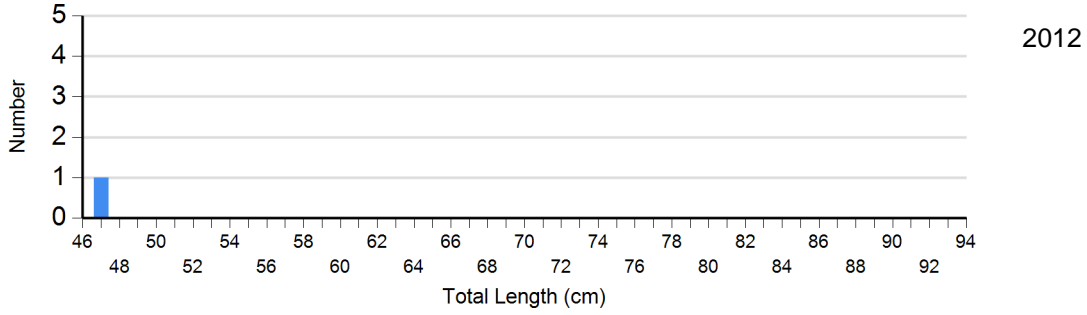
Species: Black Crappie
Gear: frame net (std 3/4 in)



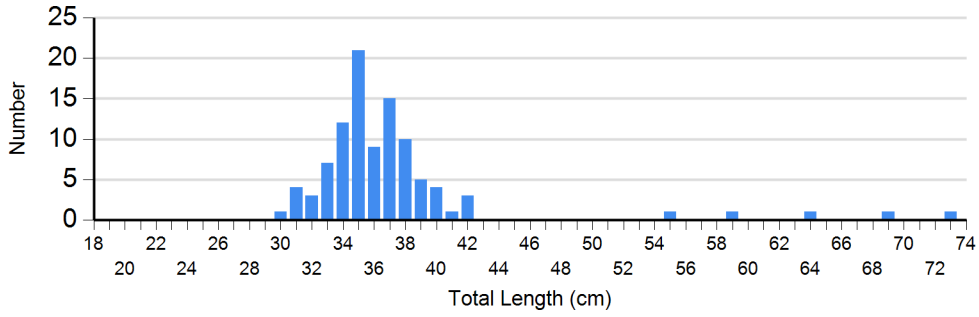
Species: Northern Pike
Gear: AFS std gill net



Species: Northern Pike
Gear: std exp gill net

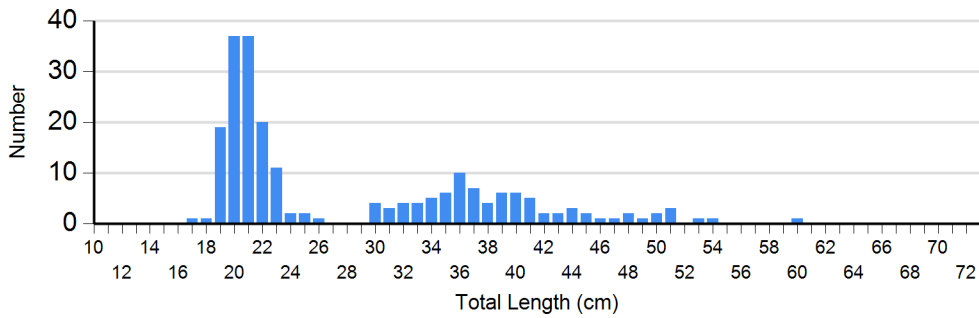


Species: Walleye
Gear: AFS std gill net

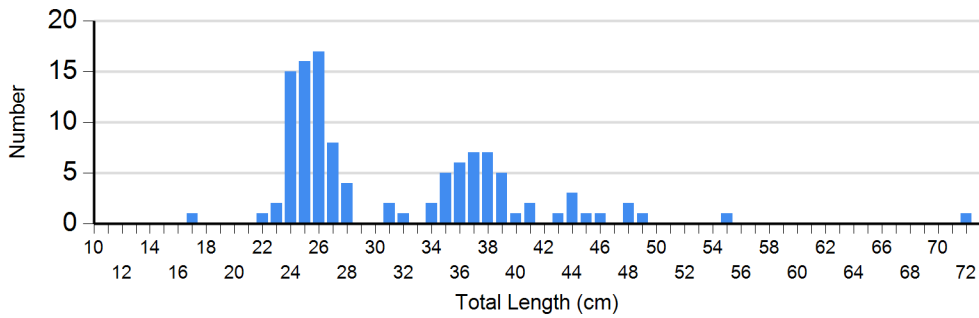


2016

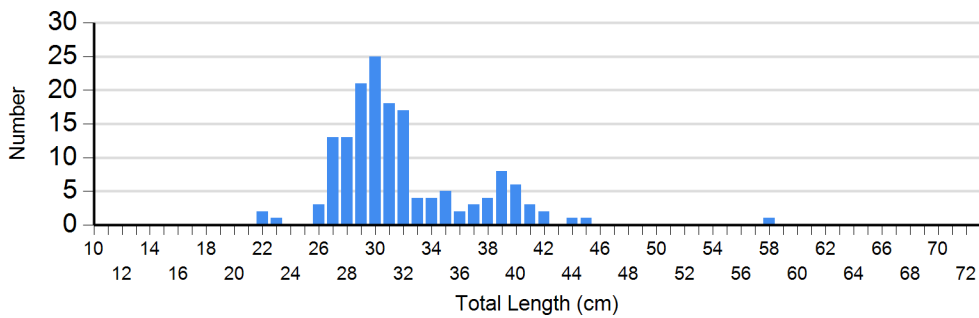
Species: Walleye
Gear: std exp gill net



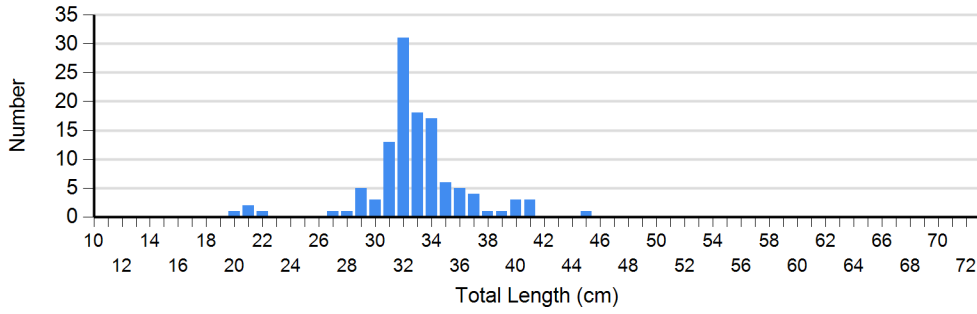
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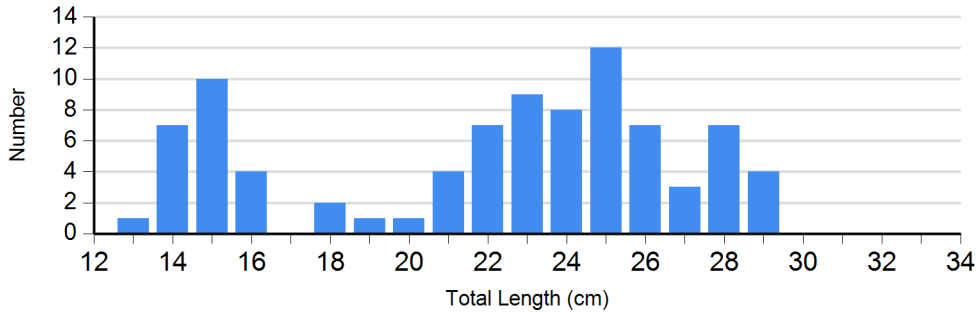
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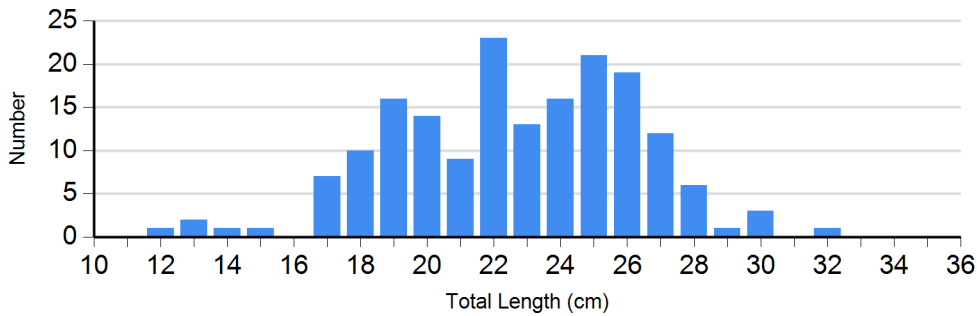
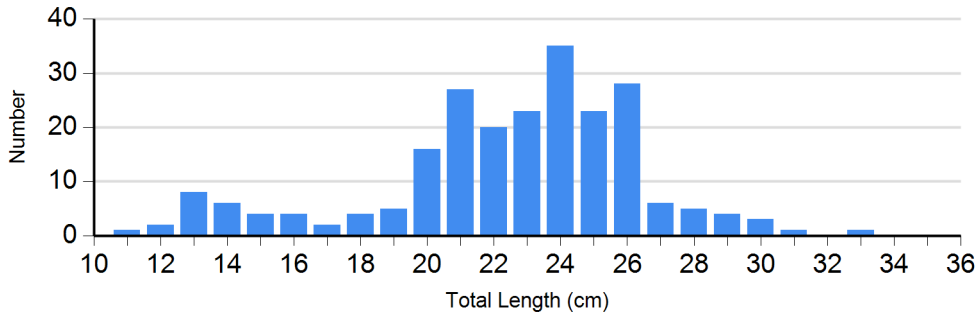
2014

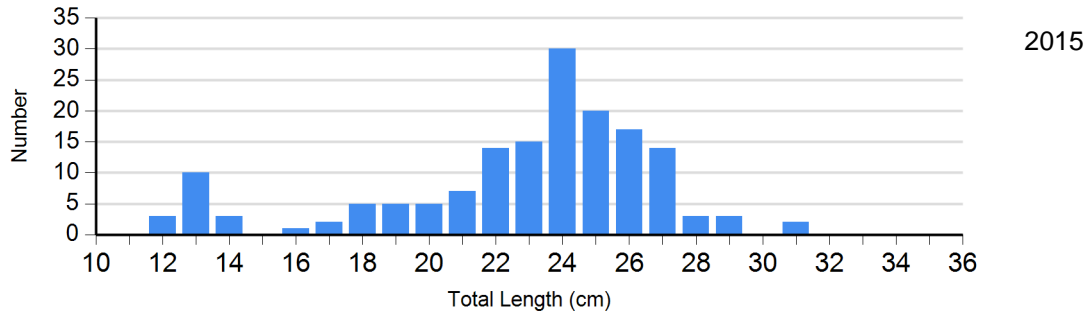
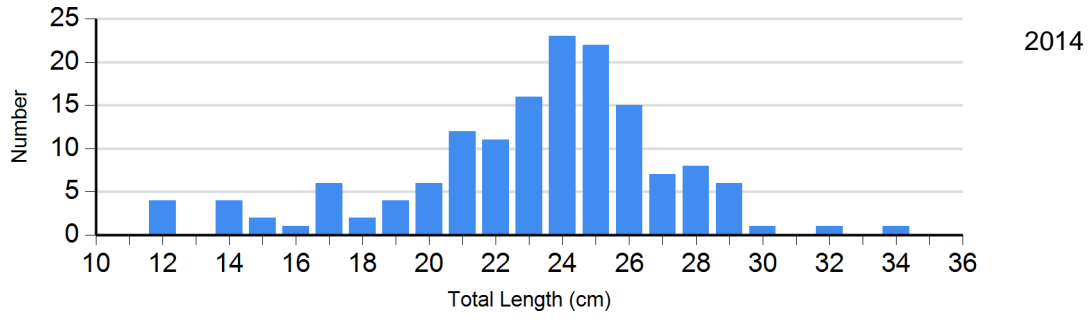


Species: Yellow Perch
Gear: AFS std gill net



Species: Yellow Perch
Gear: std exp gill net

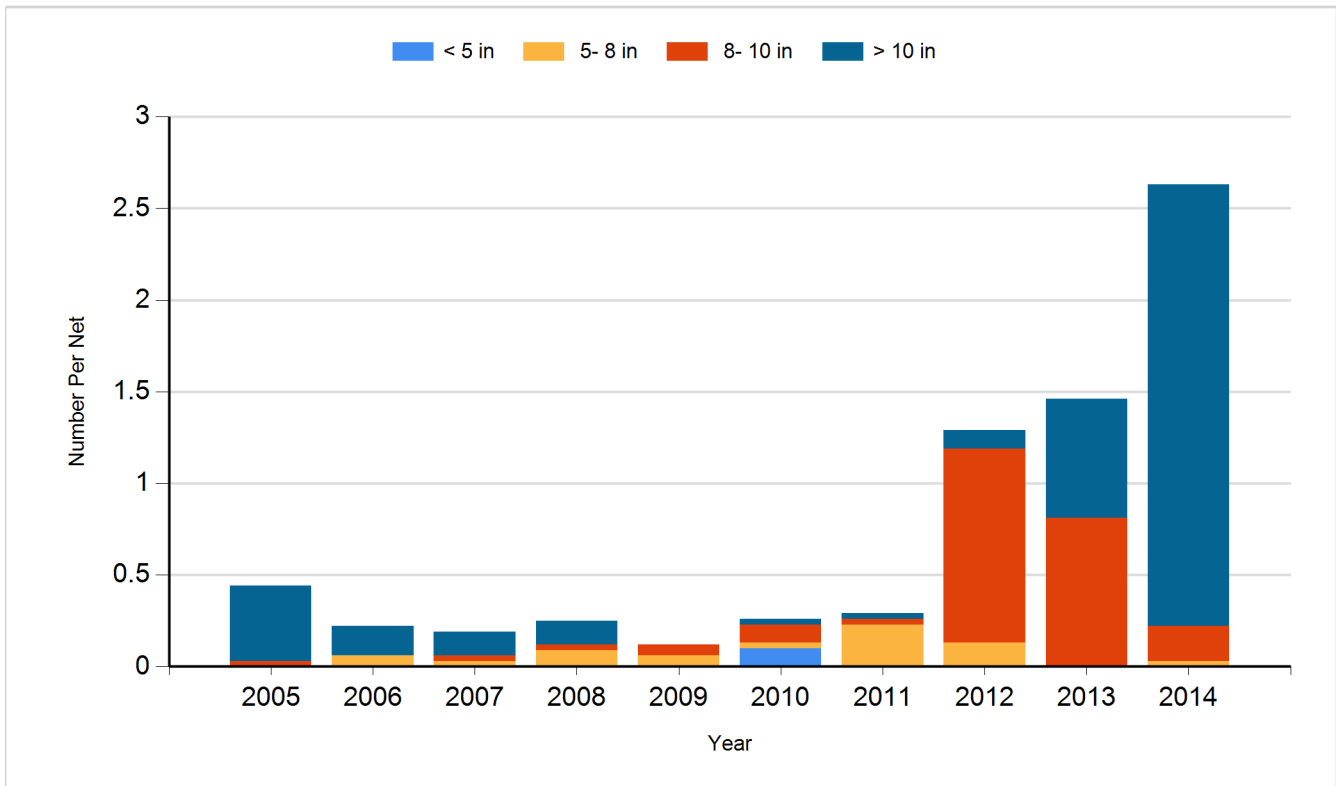




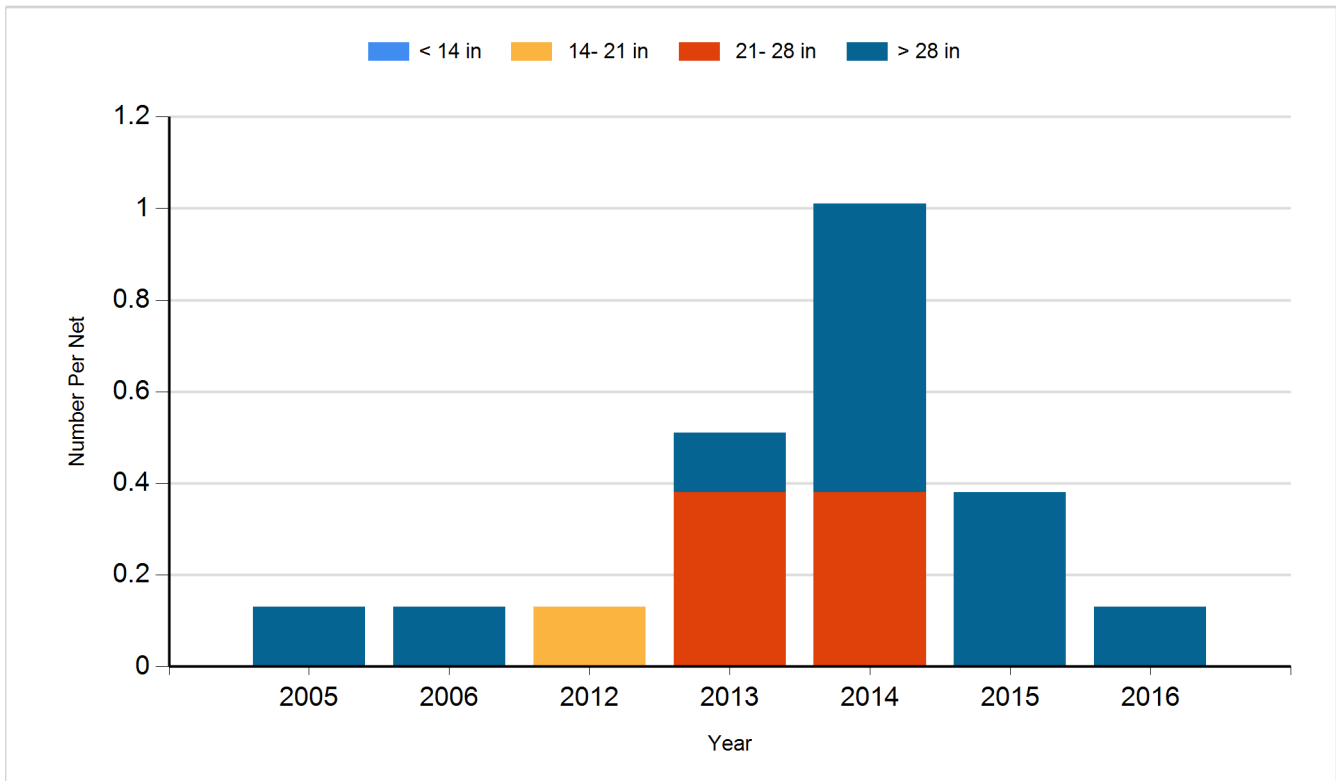
Historic Fish Sizes and Relative Abundance

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

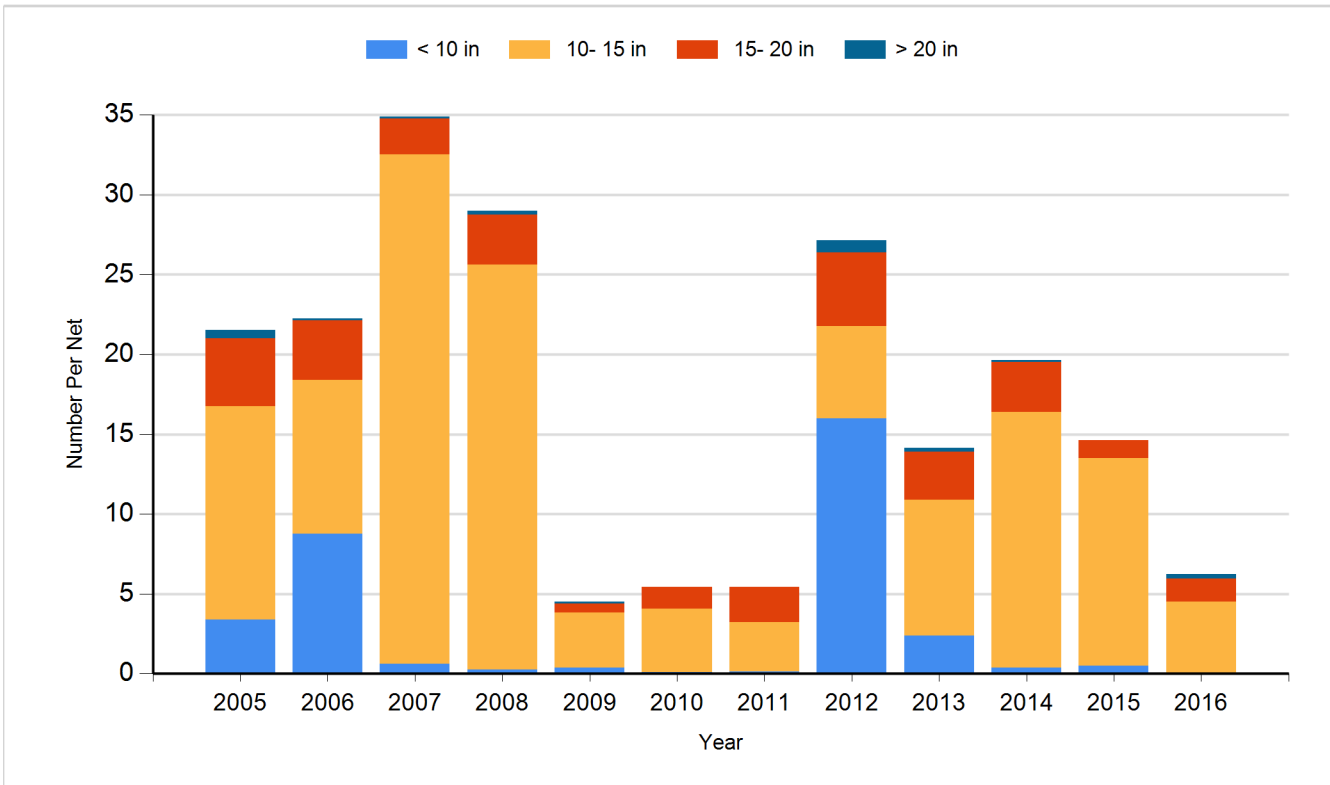
Species: Black Crappie
Gear: Frame Net



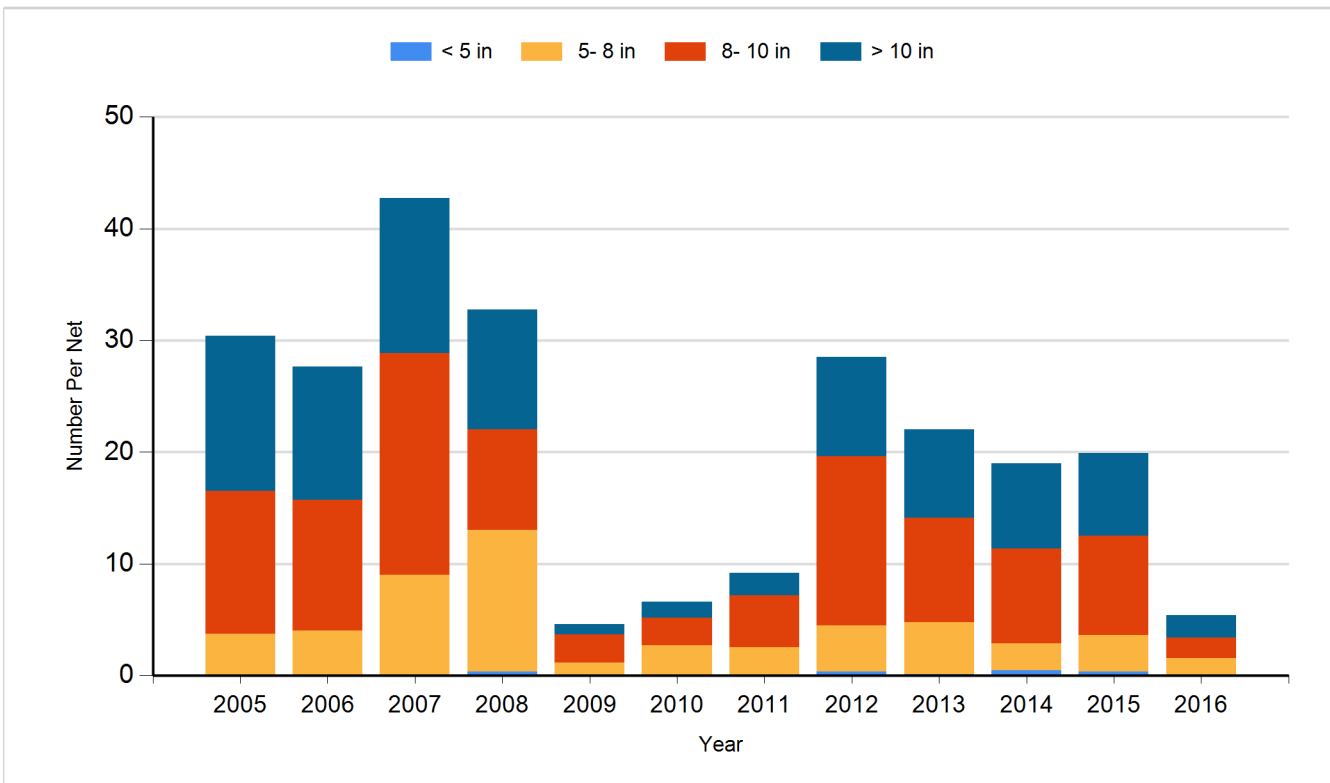
Species: Northern Pike
Gear: Gill Net



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
2005	Walleye	Fry	6,000,000
2009	Walleye	Fry	4,000,000
2011	Walleye	Fry	8,000,000
2012	Walleye	Fry	8,000,000
2014	Walleye	Fry	8,500,000
2016	Walleye	Fry	8,500,000