SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Clear, Marshall County
UJA-Lake-917-001
2016

Lake Information

Name:	Clear	**Maximum Depth:**	20 Feet
County:	Marshall	**Mean Depth:**	12 Feet
		OHWM Elevation:	1,824
Surface Area:	1,217 Acres	**Outlet Elevation:**	1,823

Surveys and Investigations

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

Gear	Date	Effort
AFS std frame net	July 12, 2016	6 net-nights
AFS std frame net	July 13, 2016	4 net-nights
AFS std frame net	July 14, 2016	7 net-nights
AFS std gill net	July 12, 2016	4 net-nights
AFS std gill net	July 13, 2016	4 net-nights
AFS std gill net	July 14, 2016	4 net-nights
boat shocker (night)	September 19, 2016	2400 seconds

Common Fish Species Present

Walleye

Smallmouth Bass

Northern Pike

Largemouth Bass

Yellow Perch

Bluegill

Black Crappie

Black Bullhead

White Sucker

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).

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

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)
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

	Stock		Quality		Preferred		Memorable		Trophy	
Species Name	(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).

		Abundance		Stock Density Indices				Condition	
Gear	Species	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std frame net	Black Bullhead	7.8	3.2	96	3	84	5	102	2
	Black Crappie	1.9	1.0	82	11	73	12	95	2
	Bluegill	15.2	5.2	25	4	3	2	108	1
	Common Carp	0.6	0.6	100		90		114	
	Largemouth Bass	0.0	0.0	0		0			
	Northern Pike	0.8	0.4	85		15		81	3
	Smallmouth Bass	0.1	0.1	100		100		70	
	Yellow Perch	9.9	4.6	7	3	0		85	2
AFS std gill net	Black Bullhead	15.0	3.9	97	2	78	4	102	1
	Black Crappie	1.3	0.6	67		67		100	5
	Bluegill	2.0	0.6	42	16	13		111	2
	Common Carp	0.1	0.1	100		0		112	
	Largemouth Bass	0.1	0.1	100		0		115	
	Northern Pike	2.2	0.6	69	14	0		90	1
	Smallmouth Bass	1.5	0.5	89		61	19	104	3
	Walleye	5.1	2.0	70	9	11	6	93	1
	White Sucker	0.8	0.4	100		100		106	5
	Yellow Perch	7.5	2.0	9	5	2		94	1
boat shocker (night)	Walleye	1.5	2.5	0		0		80	

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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
AFS std frame net	Black Bullhead										7.8	7.8
	Black Crappie										1.9	1.9
	Bluegill										15.2	15.2
	Common Carp										0.6	0.6
	Largemouth Bass										0.0	0.0
	Northern Pike										0.8	0.8
	Smallmouth Bass										0.1	0.1
	Yellow Perch										9.9	9.9
AFS std gill net	Black Bullhead										15.0	15.0
	Black Crappie										1.3	1.3
	Bluegill										2.0	2.0
	Common Carp										0.1	0.1
	Largemouth Bass										0.1	0.1
	Northern Pike										2.2	2.2
	Smallmouth Bass										1.5	1.5
	Walleye										5.1	5.1
	White Sucker										0.8	0.8
	Yellow Perch										7.5	7.5
boat shocker (night)	Largemouth Bass	22.0										22.0
	Smallmouth Bass	163.0	74.4	44.8		41.5		20.7		18.7		60.5
	Walleye	109.6	1.7	180.9	21.0	170.4	13.5	17.0	3.0	5.7	1.5	52.4
boat shocker (night, AC	Largemouth Bass		37.6	58.5		54.0		92.0				60.5
frame net (std 3/4 in)	Black Bullhead	7.4	5.2	0.6	0.6		7.2	29.7	26.4			11.0
	Black Crappie	3.4	0.8	0.0	0.3		5.2	10.7	2.4			3.3
	Bluegill	36.6	35.6	4.8	13.1		18.6	39.0	22.9			24.4
	Common Carp	0.1					0.1					0.1
	Green Sunfish		0.1									0.1
	Largemouth Bass	0.0			0.0		0.0	0.1	0.0			0.0
	Northern Pike	0.7	0.7	0.4	0.2		1.8	0.6	1.1			0.8
	Smallmouth Bass	1.4	2.0	0.8	5.1		3.4	2.4	1.1			2.3
	Walleye	0.3	0.5	0.2	0.2		0.2	0.4	0.5			0.3
	Western Painted Turtle	0.0										0.0
	White Sucker	0.1	0.1	0.5	0.2		0.1	0.1				0.2

		CPUE										
Gear	Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
frame net (std	Yellow Perch	17.7	1.4	2.5	16.5		10.4	3.9	1.8			7.7
std exp gill net	Bigmouth Buffalo								0.2			0.2
	Black Bullhead	6.5	4.8	0.1		0.1	7.5	20.3	21.7	10.3		8.9
	Black Crappie	0.0				0.3	14.0	6.2	11.7	1.5		5.6
	Bluegill	0.8	1.3		0.2		1.0	0.3	2.5	1.5		1.1
	Common Carp	2.0	0.3	0.1		0.1						0.6
	Northern Pike	5.3	2.2	0.2	0.4	0.9	3.3	3.8	6.0	5.5		3.1
	Smallmouth Bass	1.2	2.0	1.3	2.6	0.8	2.0	4.3	3.3	3.0		2.3
	Walleye	6.8	6.2	2.0	1.6	2.3	4.2	10.7	9.2	10.8		6.0
	White Sucker	1.2	1.0	0.6	1.1	1.1	5.2	1.3	2.2	1.3		1.7
	Yellow Perch	117.2	20.8	5.0	27.6	40.8	84.8	40.5	25.5	7.0		41.0

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	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AFS std frame net	Black Crappie	PSD										82
		PSD-P										73
		Wr										95
	Northern Pike	PSD										85
		PSD-P										15
		Wr										81
	Yellow Perch	PSD										7
		PSD-P										0
		Wr										85
AFS std gill net	Black Crappie	PSD										67
		PSD-P										67
		Wr										100
	Northern Pike	PSD										69
		PSD-P										0
		Wr										90
	Walleye	PSD										70
		PSD-P										11
		Wr										93
	Yellow Perch	PSD										9
		PSD-P										2
		Wr										94
boat shocker (night)	Walleye	PSD	0	0	0	0	0	0	0	0	0	0
		PSD-P	0	0	0	0	0	0	0	0	0	0
		Wr	95	93	88	83	94		97	94	92	80
frame net (std 3/4 in)	Black Crappie	PSD	11	57	0	0		80	99	100		
		PSD-P	0	43	0	0		0	58	100		
		Wr	113	108		116		110	102	100		
	Northern Pike	PSD	69	62	100	67		56	64	50		
		PSD-P	15	23	0	33		25	36	0		
		Wr	88	83	85	87		87	86	87		
	Walleye	PSD	40	33	75	100		75	75	22		

			Year									
Gear	Species	Index	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
frame net (std 3/4 in)	Walleye	PSD-P	20	11	50	25		0	25	0		
		Wr	87	89	87	92		81	84	91		
	Yellow Perch	PSD	20	16	0	1		21	32	41		
		PSD-P	3	4	0	0		0	0	0		
		Wr	89	90	93	94		91	85	91		
std exp gill net	Black Crappie	PSD	0				0	64	100	97	100	
		PSD-P	0				0	0	76	96	100	
		Wr					185	116	106	101	100	
	Northern Pike	PSD	91	85	75	63	69	35	52	50	55	
		PSD-P	16	15	50	13	13	10	9	8	3	
		Wr	86	85	90	96	89	88	87	87	84	
	Walleye	PSD	41	24	53	72	32	32	22	15	37	
		PSD-P	15	8	11	14	10	16	3	2	5	
		Wr	91	89	94	91	88	90	89	86	88	
	Yellow Perch	PSD	15	10	0	0	0	14	32	36	24	
		PSD-P	1	1	0	0	0	0	0	2	0	
		Wr	101	100	101	105	99	99	95	92	93	

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	61		277 (2)	339 (16)	384 (4)	456 (36)	505 (1)			639 (1)	693 (1)
2015	70	149 (1)	241 (5)	324 (7)	373 (52)	420 (1)	481 (3)	575 (1)			
2014	60	187 (5)		345 (51)	394 (1)	461 (2)				589 (1)	
2013	67		279 (42)	359 (5)	394 (17)		481 (1)				652 (2)
2012	29	194 (4)	313 (3)	348 (15)		472 (1)		561 (3)	483 (1)		573 (2)
2011	45	190 (1)	272 (31)	429 (2)	461 (4)		514 (6)	481 (1)			
2010	38	195 (11)	306 (2)	383 (11)		470 (9)			500 (1)	615 (1)	577 (3)
2009	37		289 (16)		409 (15)	459 (2)			555 (1)		623 (3)
2008	38	168 (1)		317 (28)	444 (2)	480 (2)		488 (2)			577 (3)
2007	49		257 (29)	378 (7)	438 (4)		470 (2)			590 (3)	608 (4)

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	90		134 (2)	153 (69)	178 (11)	215 (1)	235 (6)	235 (1)			
2015	114	93 (3)	115 (72)	151 (27)		210 (11)	237 (1)				
2014	233	98 (13)	125 (101)	159 (14)	192 (53)	208 (28)	230 (18)	221 (7)			
2013	345	99 (81)	123 (34)	166 (93)	188 (59)	216 (77)					
2012	576	102 (67)	148 (243)	178 (110)	193 (158)						
2011	1176	98 (419)	142 (342)	164 (415)							
2010	747	100 (161)	139 (563)	164 (24)							
2009	932	97 (842)	138 (90)								

Fish Condition

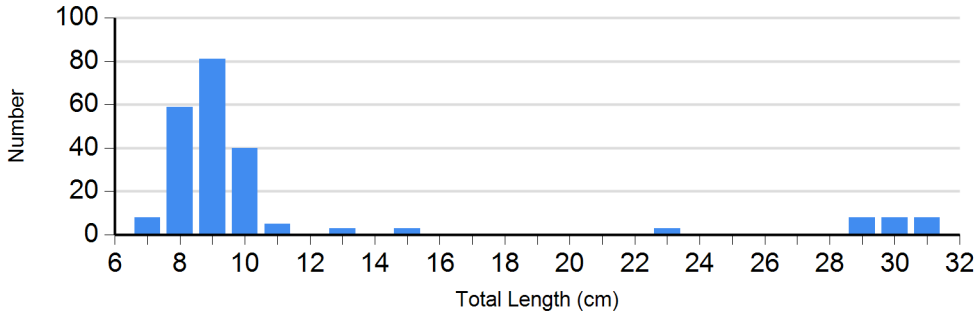
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2012	19	112 (2.0)	75	109 (1.0)	0		0	
	2013	1	105	79	104 (0.9)	112	100 (0.6)	0	
	2014	0		0		43	100 (0.9)	0	
	2016	6	104 (2.5)	3	102	8	89 (1.1)	16	93 (2.0)
Northern Pike Gill Net	2012	13	87 (1.4)	5	92 (2.6)	2	87 (2.9)	0	
	2013	11	90 (1.2)	10	84 (1.0)	1	83	1	86
	2014	18	89 (1.1)	15	85 (0.8)	3	80 (4.1)	0	
	2015	15	86 (1.3)	17	82 (1.2)	1	82	0	
	2016	8	93 (1.2)	18	89 (1.3)	0		0	
Walleye Gill Net	2012	17	89 (1.1)	4	94 (3.5)	4	90 (0.7)	0	
	2013	50	89 (0.7)	12	85 (1.1)	1	101	1	81
	2014	47	86 (1.8)	7	84 (2.3)	1	103	0	
	2015	41	87 (0.6)	21	89 (0.9)	3	96 (8.7)	0	
	2016	18	91 (1.1)	36	94 (0.9)	5	91 (2.5)	2	89 (3.0)
Yellow Perch Gill Net	2012	438	100 (0.3)	71	94 (0.7)	0		0	
	2013	165	96 (0.5)	78	92 (0.7)	0		0	
	2014	98	94 (0.8)	52	90 (0.8)	3	85 (2.1)	0	
	2015	32	94 (1.4)	10	89 (1.7)	0		0	
	2016	82	95 (0.9)	6	91 (3.8)	2	89 (1.0)	0	

Length Frequency Distribution

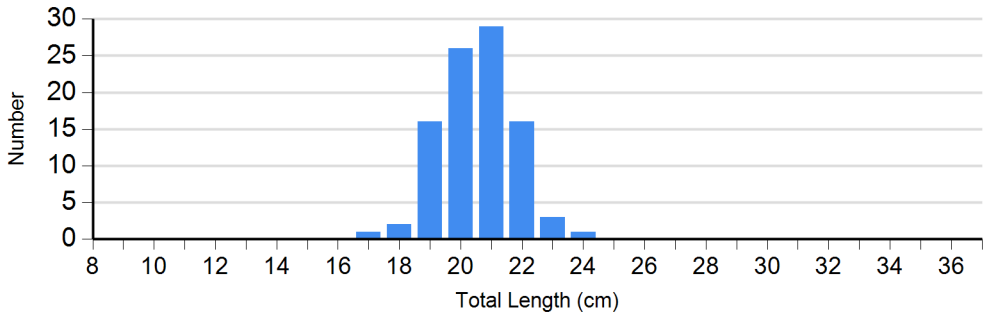
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net



2016

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



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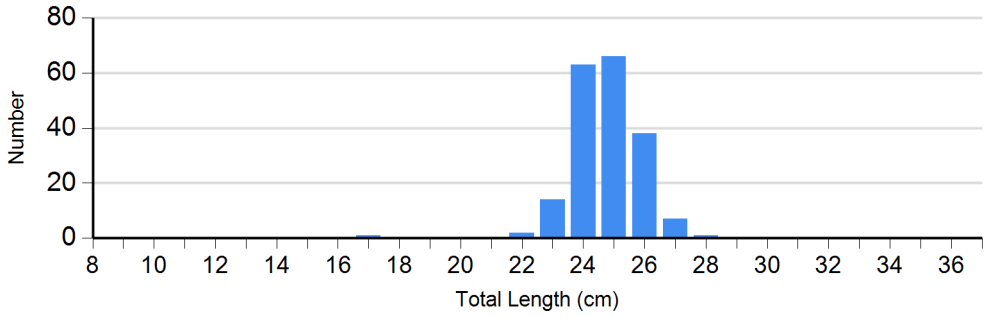

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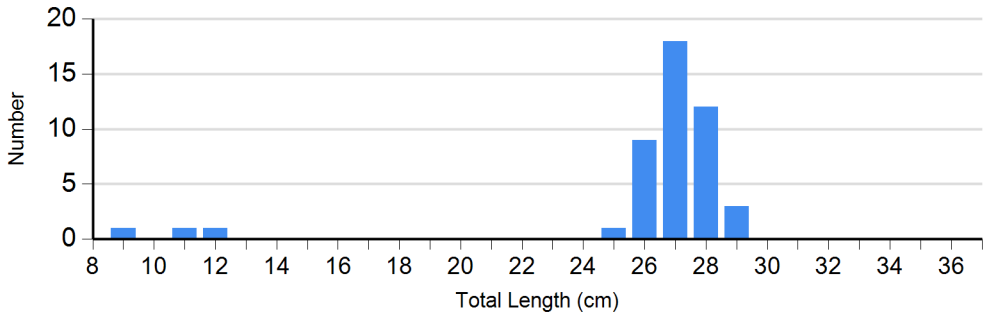
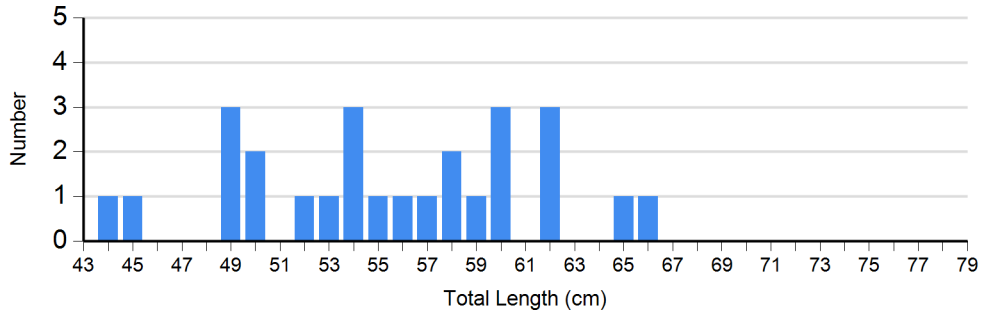


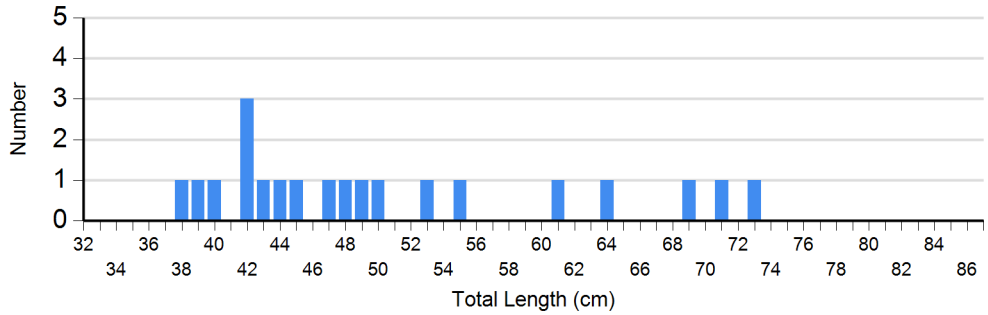
2014

Species: Northern Pike
Gear: AFS std gill net



2016

Species: Northern Pike
Gear: std exp gill net



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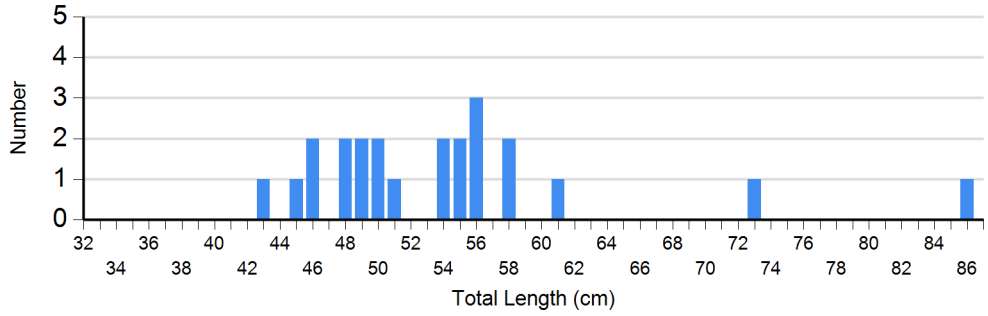

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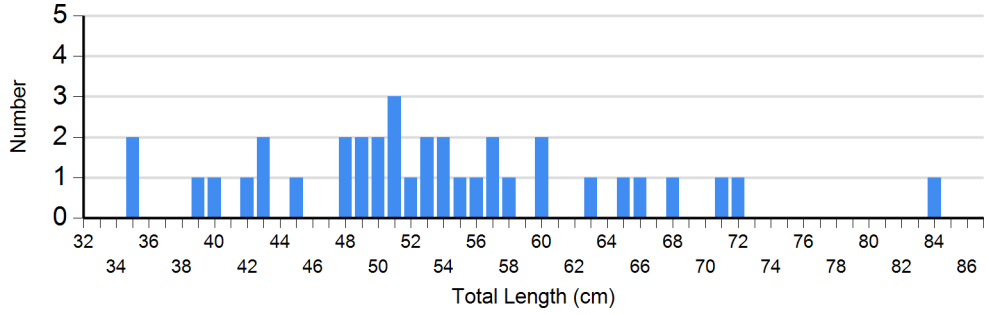

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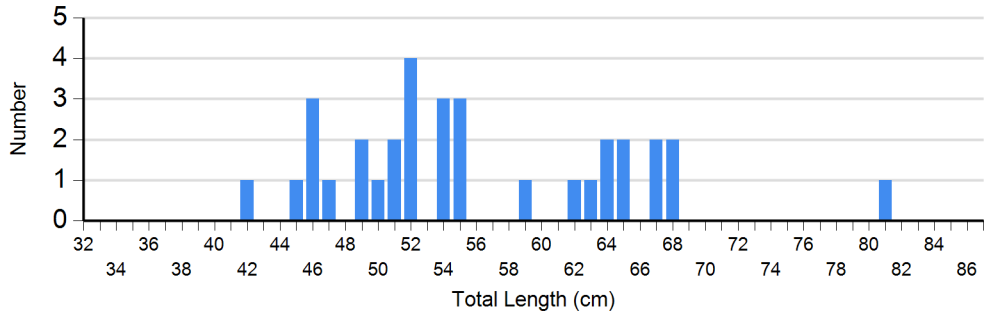
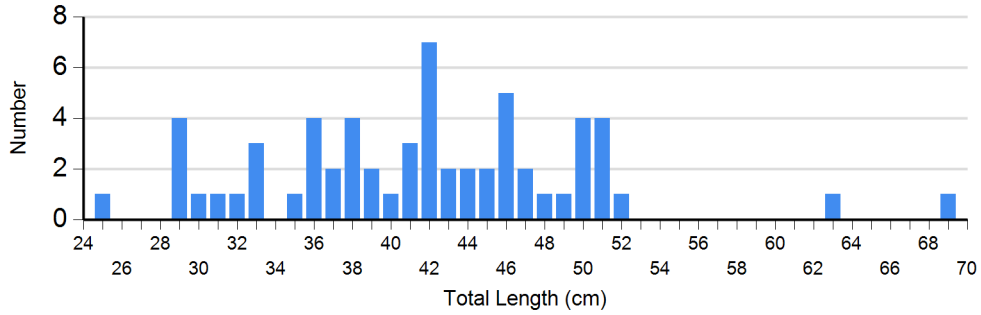


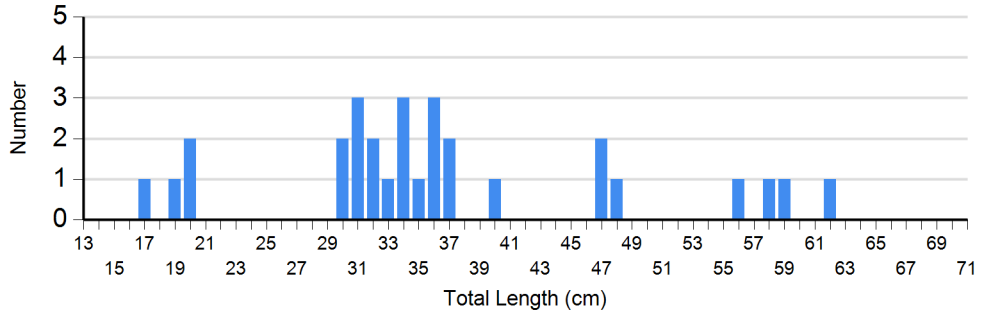
2015

Species: Walleye
Gear: AFS std gill net

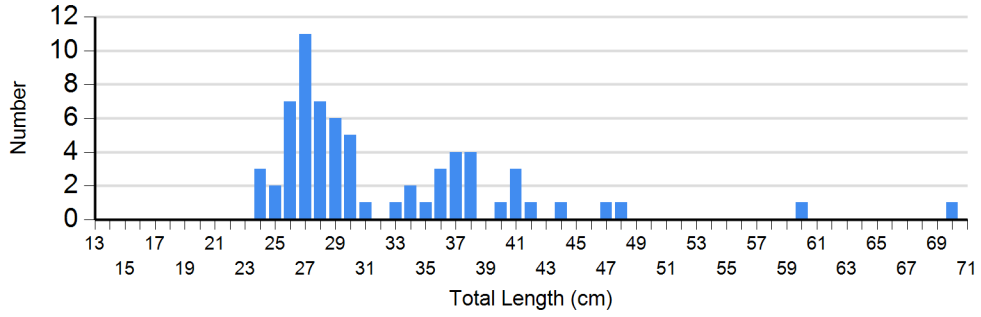


2016

Species: Walleye
Gear: std exp gill net



2012



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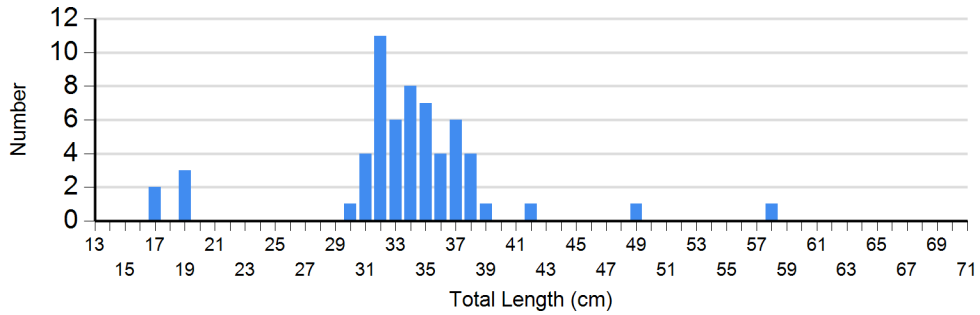

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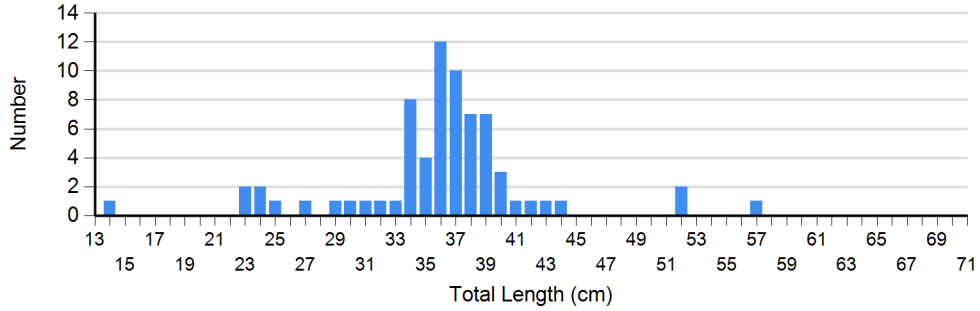
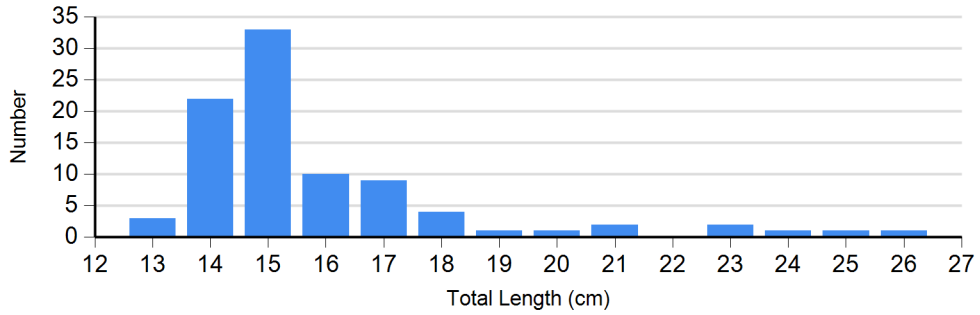


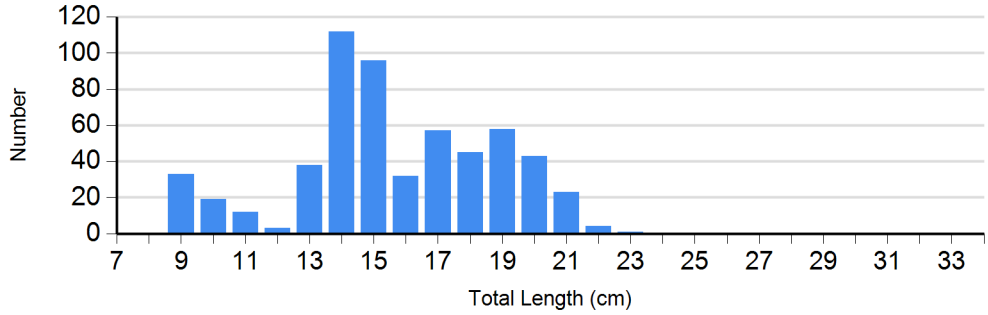
2015

Species: Yellow Perch
Gear: AFS std gill net



2016

Species: Yellow Perch
Gear: std exp gill net



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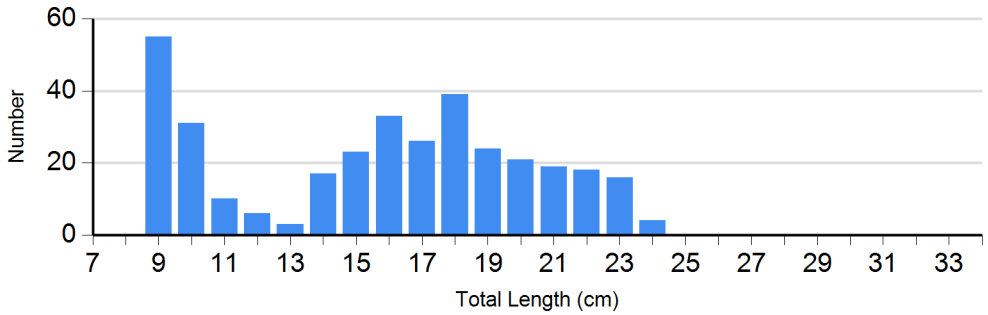

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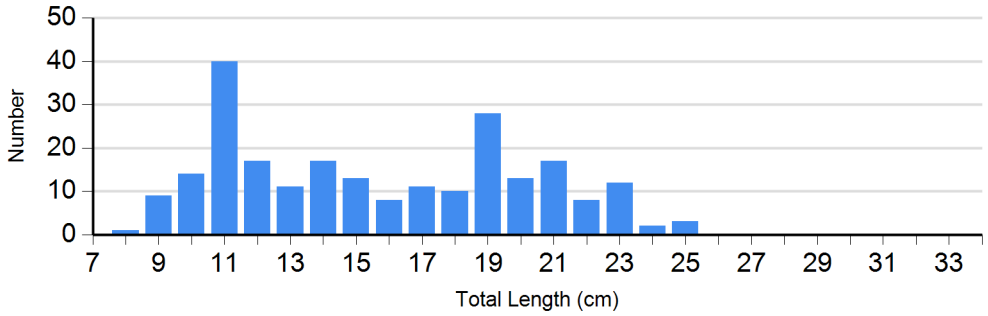
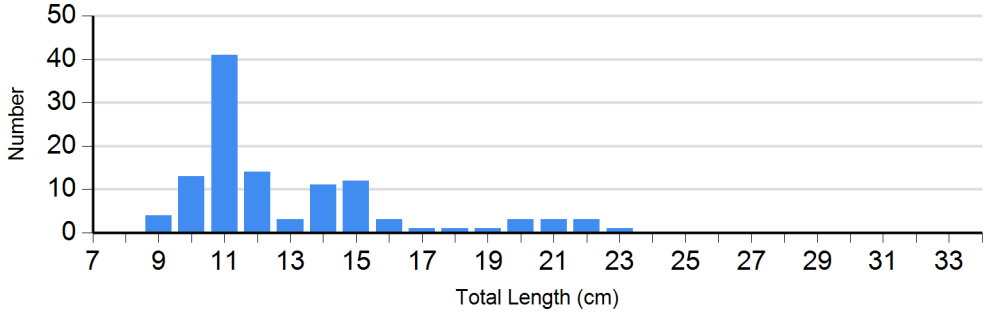


2014

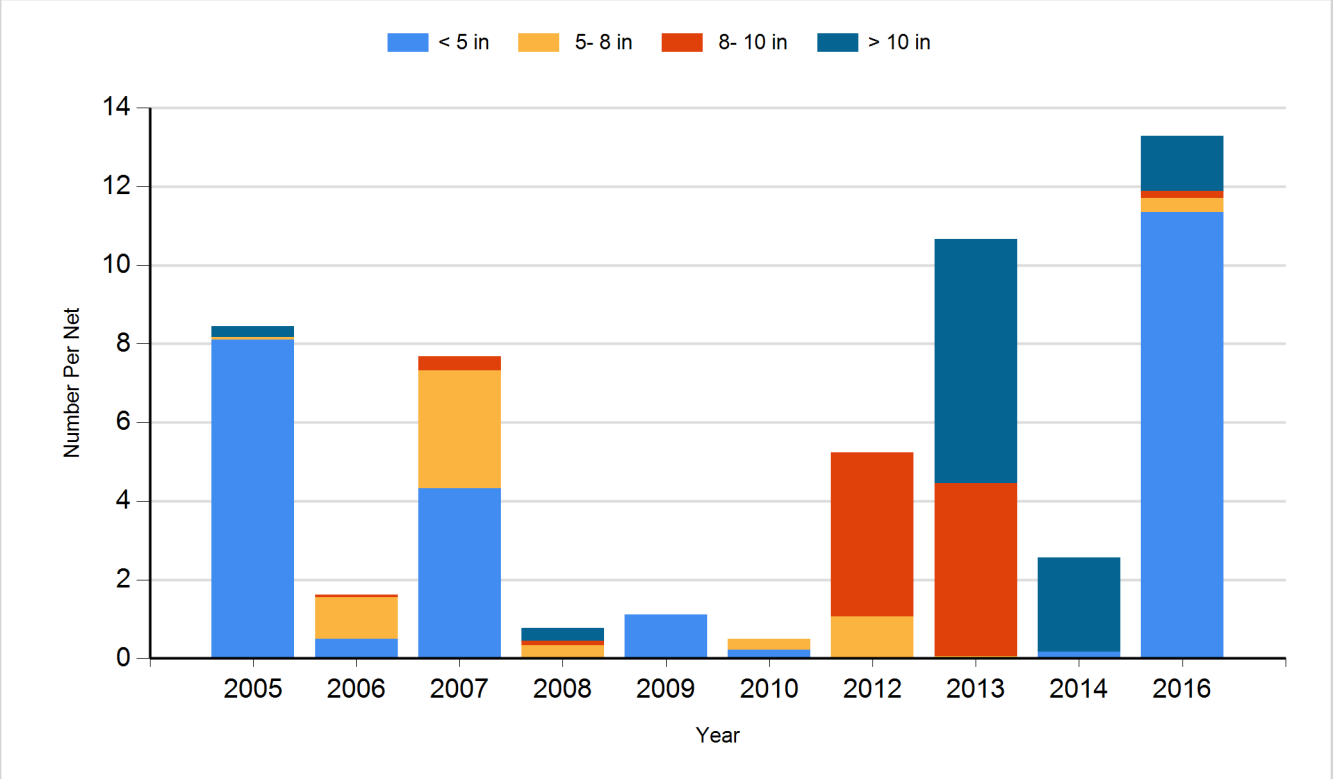


2015

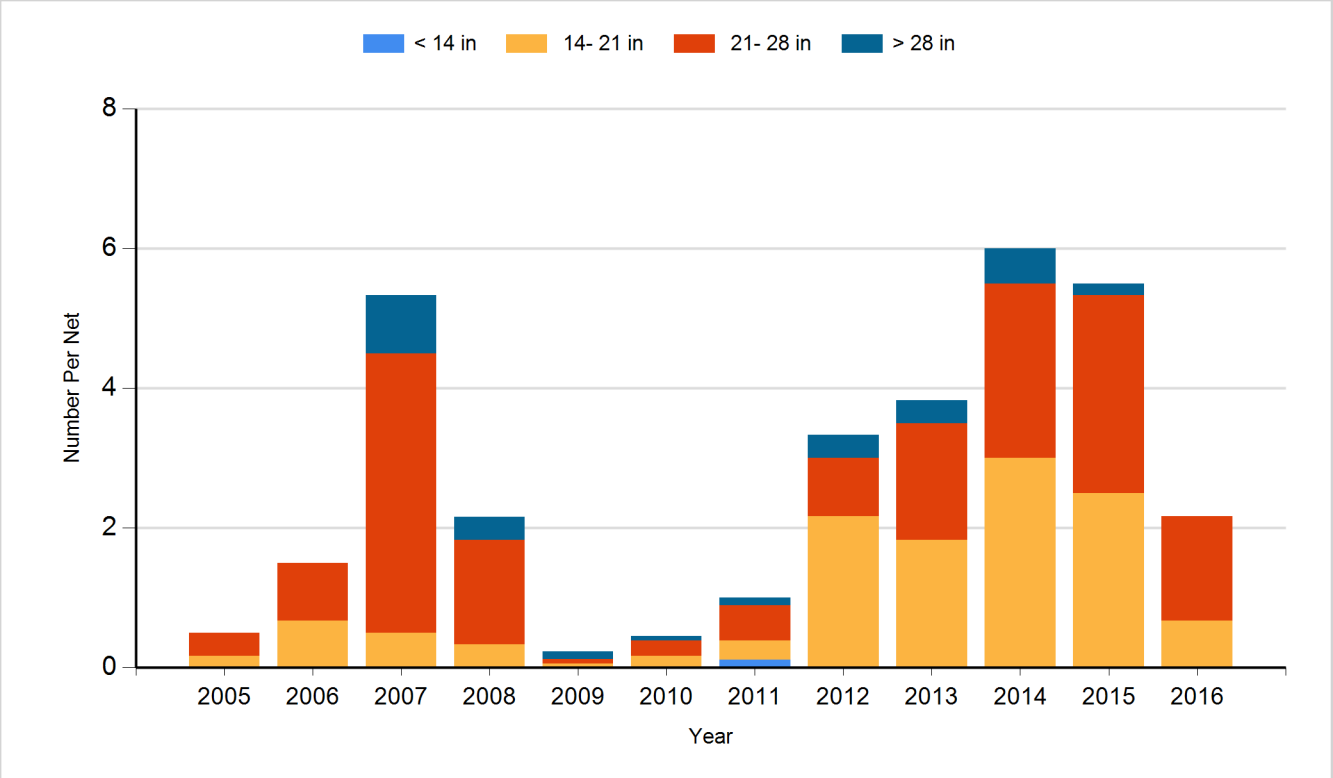
Historic Fish Sizes and Relative Abundance

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

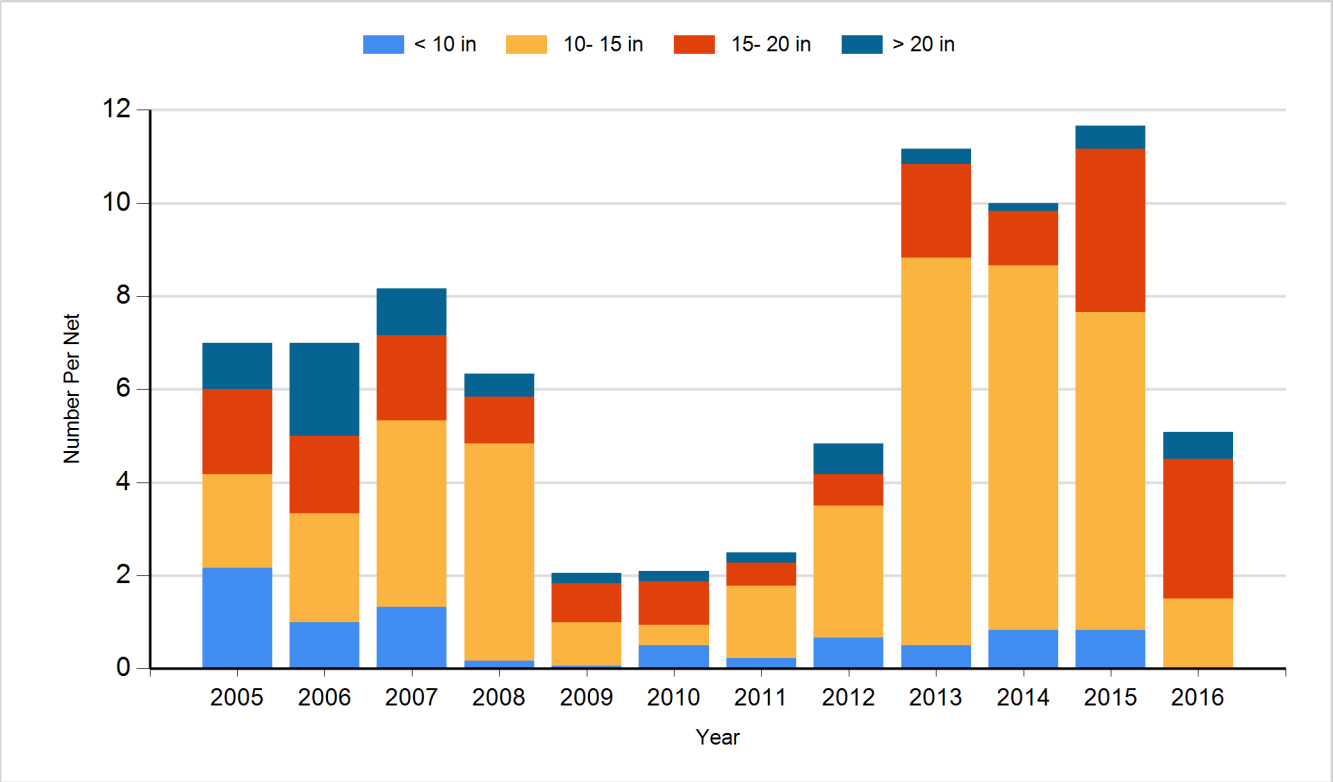
Species: Black Crappie
Gear: Frame Net



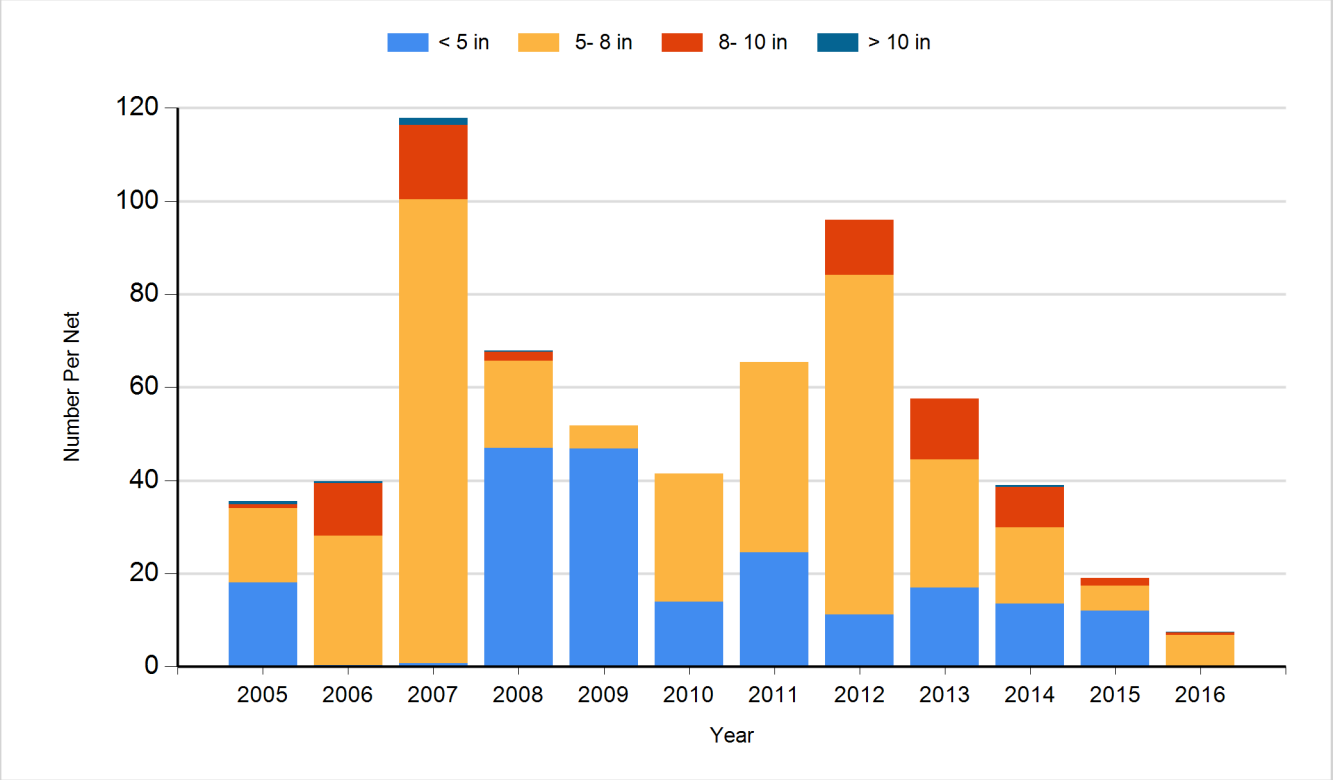
Species: Northern Pike
Gear: Gill Net



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	600,000
2009	Walleye	Fry	600,000
2011	Walleye	Fry	600,000
2012	Walleye	Fry	600,000
2013	Walleye	Fry	600,000
2014	Walleye	Fry	542,000
2014	Walleye	Large Fingerling	24,879
2015	Walleye	Fry	550,000
2016	Walleye	Fry	550,000