SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Sinai, Brookings County
MBS-Lake-232-000
2015

Lake Information

Name:	Sinai	**Maximum Depth:**	33 Feet
County:	Brookings	**Mean Depth:**	17 Feet
Legal Description:	T109N- R52W-Sec 3-4, 8-10		
Surface Area:	1,778 Acres		

Surveys and Investigations

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

Gear	Date	Effort
fall night EF-WAE	September 24, 2015	7200 seconds
std exp gill net	June 30, 2015	3 net-nights
std frame net (3/8 inch)	June 30, 2015	10 net-nights

Common Fish Species Present

Walleye

Muskellunge

Black Bullhead

Yellow Perch

Black Crappie

Smallmouth Bass

Bluegill

Yellow Bullhead

Northern Pike

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
fall night EF-WAE	Walleye	79.0	42.5					84	1
std exp gill net	Black Bullhead	40.0	13.9	8	4	0			
	Black Crappie	2.0	1.1	17		0		113	3
	Northern Pike	1.0	1.1	100		33		85	5
	Smallmouth Bass	1.7	2.3	40		40		90	4
	Walleye	18.0	8.9	83	8	13	7	85	2
	Yellow Perch	24.3	18.6	11	6	0		99	2
std frame net (3/8 inch)	Black Bullhead	44.4	16.4	13	2	6	2		
	Black Crappie	11.5	3.7	20	5	14	5	104	1
	Bluegill	2.6	1.7	12		8		118	6
	Common Carp	0.2	0.2	100		50			
	Northern Pike	0.3	0.2	100		67		83	5
	Smallmouth Bass	2.7	1.2	15		11		94	2
	Sunfish Hybrid	0.0	0.0						
	Walleye	1.6	1.1	100		31		84	2
	Yellow Bullhead	1.1	0.5	100		18			
	Yellow Perch	1.8	1.7	39	19	0		92	3

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	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Avg
fall night EF-WAE	Walleye	291.0	113.0	31.2	28.5	210.5	262.0	16.0	55.5	94.5	79.0	118.1
large frame net	Black Bullhead	2.5	1.7	0.3	0.6			0.4	2.5			1.3
	Black Crappie	0.9	0.2		0.4	0.4	0.0	11.1	2.5			2.2
	Bluegill	0.7	1.4	0.4		0.4	1.3	4.9	1.0			1.4
	Channel Catfish							0.1				0.1
	Common Carp	0.1	1.0	0.3	0.3	1.6	0.1	1.7	1.4			0.8
	Green Sunfish		0.3	0.2	0.1	0.1		0.1	0.1			0.2
	Northern Pike		0.3		0.1			0.6	0.2			0.3
	Smallmouth Bass	1.9	1.7	1.2	0.9	2.9	2.0	16.8	2.9			3.8
	Sunfish Hybrid		0.0			0.0						0.0
	Walleye	1.8	1.2	1.6	0.8	1.9	0.6	4.9	1.3			1.8
	Yellow Perch	1.8	1.5	1.7	2.2	1.0	1.5	2.7				1.8
std exp gill net	Black Bullhead	0.2	0.3					0.3	0.3	1.5	40.0	7.1
	Black Crappie	0.0						0.3		0.0	2.0	0.6
	Bluegill									0.3		0.3
	Common Carp	1.2		0.2	0.8		0.4	0.8		0.8		0.7
	Green Sunfish							0.3				0.3
	Northern Pike	0.8		0.2		0.2		0.5	0.8		1.0	0.6
	Smallmouth Bass	0.2	0.5	0.8	1.0	0.4	0.8	2.5	0.3	1.3	1.7	1.0
	Walleye	6.2	3.3	8.4	10.6	15.0	4.4	36.8	23.0	18.3	18.0	14.4
	White Sucker				0.4				0.3			0.4
	Yellow Perch	27.8	11.0	10.4	41.8	23.4	45.0	33.8	4.5	2.5	24.3	22.5
std frame net (3/8 inch)	Black Bullhead									10.0	44.4	27.2
	Black Crappie									4.5	11.5	8.0
	Bluegill									0.3	2.6	1.5
	Common Carp										0.2	0.2
	Northern Pike										0.3	0.3
	Smallmouth Bass									0.9	2.7	1.8
	Sunfish Hybrid										0.0	0.0
	Walleye									2.8	1.6	2.2
	Yellow Bullhead									0.2	1.1	0.7
	Yellow Perch									0.3	1.8	1.1

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	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
fall night EF-WAE	Walleye	Wr	91	92	96	100	80	92	93	88	89	84
large frame net	Black Crappie	PSD	0	100		50	25	0	98	92		
		PSD-P	0	50		0	0	0	5	84		
		Wr	111	102		102	115		103	102		
	Northern Pike	PSD		100		0			0	50		
		PSD-P		33		0			0	0		
		Wr		87		88			75	78		
	Walleye	PSD	33	50	25	29	32	100	14	54		
		PSD-P	11	25	6	14	5	17	8	46		
		Wr	79	85	83	83	88	82	78	91		
	Yellow Perch	PSD	50	40	24	90	70	60	100			
		PSD-P	11	0	0	0	10	7	33			
		Wr	95	103	106	101	100	100	99			
std exp gill net	Black Crappie	PSD	0						100		0	17
		PSD-P	0						0		0	0
		Wr							99			113
	Northern Pike	PSD	100		100		100		50	33		100
		PSD-P	40		100		100		0	0		33
		Wr	89		62		76		84	76		85
	Walleye	PSD	46	46	12	2	28	59	7	5	92	83
		PSD-P	14	15	7	0	4	0	1	0	1	13
		Wr	87	87	82	85	84	83	77	87	91	85
	Yellow Perch	PSD	76	73	52	76	81	56	99	94	40	11
		PSD-P	23	2	19	6	26	9	39	72	20	0
		Wr	99	107	103	110	102	103	96	110	106	99
std frame net (3/8 inch)	Black Crappie	PSD									91	20
		PSD-P									84	14
		Wr									99	104
	Northern Pike	PSD										100
		PSD-P										67

			Year									
Gear	Species	Index	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
std frame net (3/8 inch)	Northern Pike	Wr										83
	Walleye	PSD									61	100
		PSD-P									11	31
		Wr									89	84
	Yellow Perch	PSD									67	39
		PSD-P									33	0
		Wr									91	92

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+
2015	55	209 (1)	340 (10)		469 (10)	470 (29)			541 (4)		593 (1)
2014	73	260 (5)		408 (22)	429 (43)			471 (2)	547 (1)		
2013	92		294 (14)	343 (75)	455 (1)	416 (1)		424 (1)			
2012	150	195 (4)	307 (133)	419 (5)	404 (3)	450 (5)					602 (2)
2011	64	208 (45)	352 (5)	376 (1)	429 (12)	426 (1)					
2010	75	280 (1)	329 (10)	365 (45)	383 (15)		507 (2)			530 (1)	645 (1)
2009	51		283 (36)	339 (14)	365 (1)						
2008	57	208 (14)	299 (36)		404 (4)			573 (2)			655 (1)
2007	22	221 (10)		345 (5)		468 (6)		564 (1)			
2006	37		284 (20)	395 (4)	422 (5)	490 (2)	553 (2)	583 (1)	655 (3)		

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2015	75	103 (2)	179 (73)								
2014	29	119 (25)		248 (3)	265 (1)						
2013	18		231 (5)	260 (4)	274 (8)		322 (1)				
2012	135		221 (37)	247 (88)	278 (11)						
2011	227	134 (9)	199 (186)	248 (23)	268 (9)						
2010	159	107 (42)	206 (76)	259 (41)							
2009	209		208 (188)	252 (18)	273 (4)						
2008	67	132 (40)	221 (13)	254 (14)							
2007	44	146 (12)	220 (29)	246 (3)							
2006	168	143 (24)	211 (83)	222 (20)	265 (5)	268 (35)	293 (2)				

Fish Condition

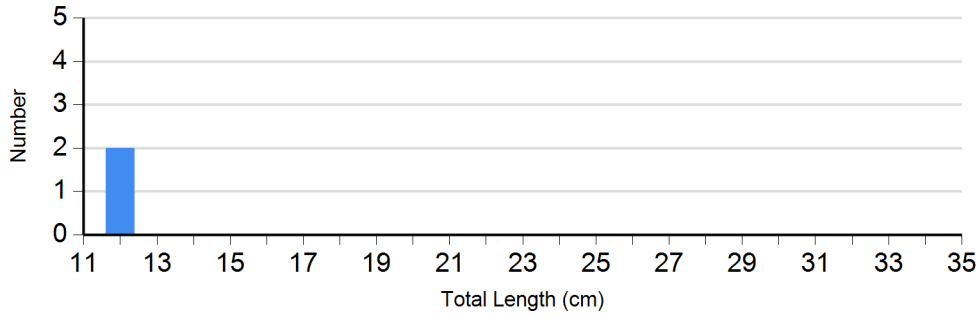
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2011	0		0		0		0	
	2012	2	96 (0.0)	104	104 (1.0)	2		3	91
	2013	2	112 (2.0)	2	98 (1.4)	21	102 (2.2)	0	
	2014	4	137 (5.8)	3	111 (0.4)	12	95 (1.5)	26	93 (1.1)
	2015	92	108 (0.9)	7	108 (0.8)	5	97	11	89 (1.4)
Northern Pike Gill Net	2012	1	86	1	83	0		0	
	2013	2	73 (3.8)	1	81	0		0	
	2015	0		2	82 (3.3)	1	91	0	
Walleye Gill Net	2011	9	85 (1.1)	13	82 (1.4)	0		0	
	2012	136	78 (0.7)	9	75 (1.5)	1	72	1	81
	2013	87	88 (0.8)	5	81 (3.1)	0		0	
	2014	6	89 (3.6)	66	91 (0.7)	1	97	0	
	2015	9	84 (1.8)	38	85 (1.6)	6	85 (3.1)	1	82
Yellow Perch Gill Net	2011	98	106 (1.2)	106	103 (1.3)	21	97 (3.6)	0	
	2012	1	111	81	96 (0.8)	51	97 (0.9)	2	85 (4.1)
	2013	1	116	4	110 (4.0)	12	110 (2.1)	1	106
	2014	6	108 (6.8)	2	99 (0.3)	2	107 (1.1)	0	
	2015	65	99 (1.0)	8	99 (6.4)	0		0	

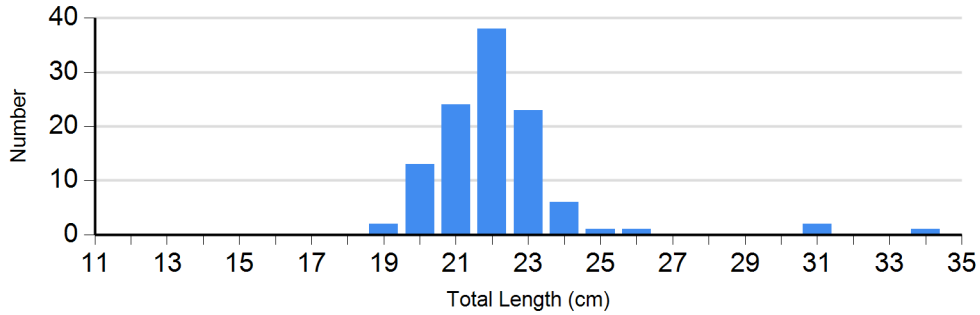
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: large frame net



2011



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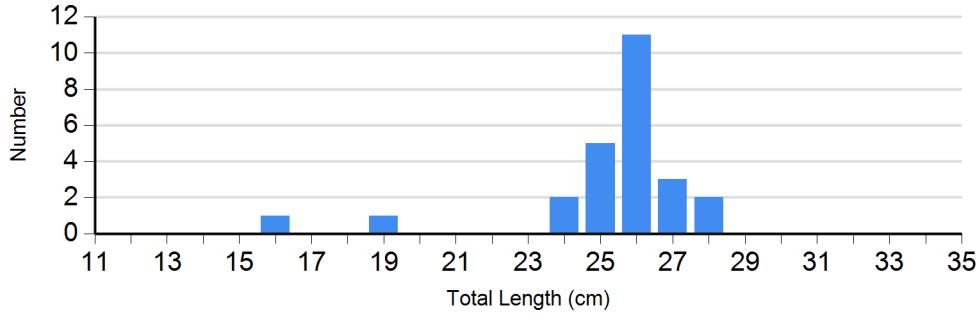
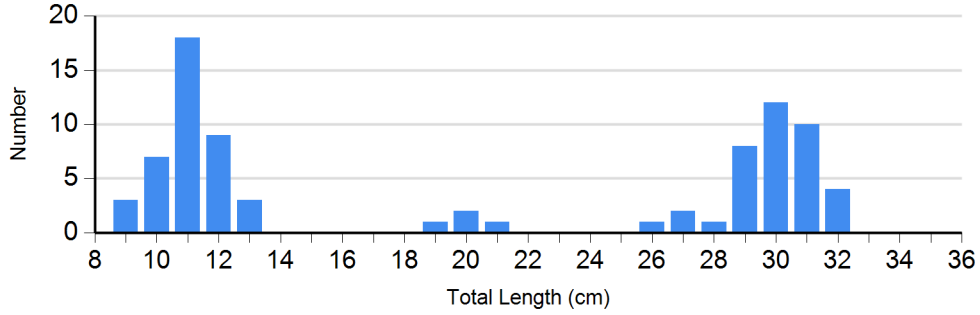


2013

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



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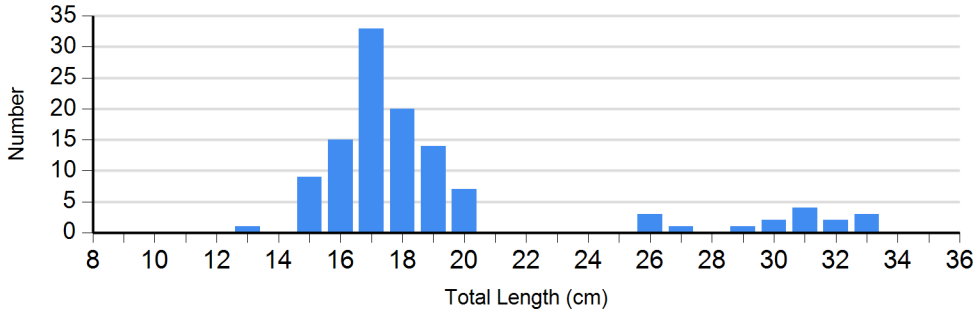

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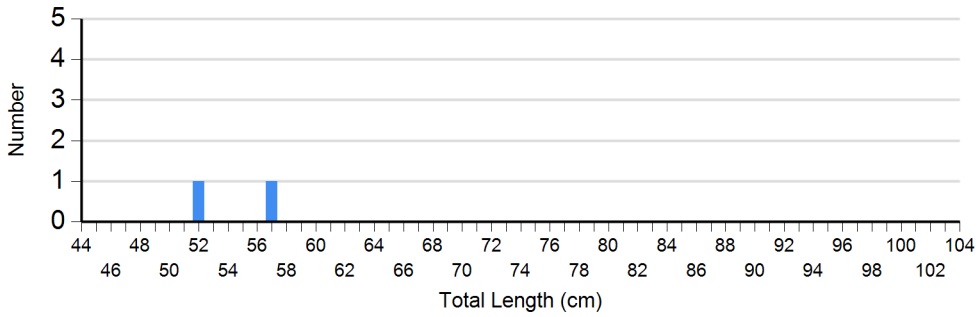
Species: Northern Pike
Gear: std exp gill net



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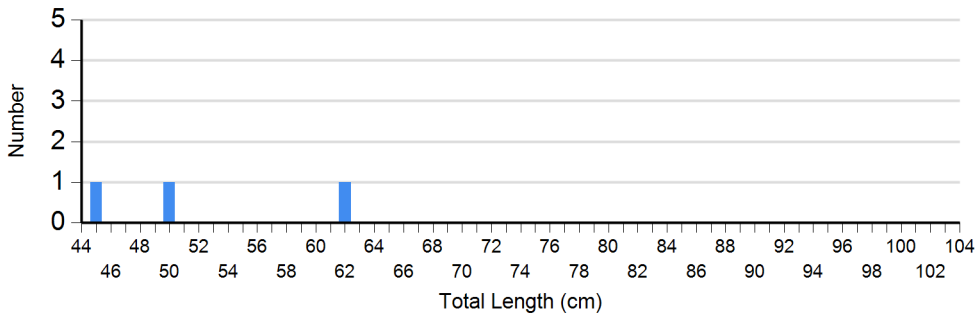

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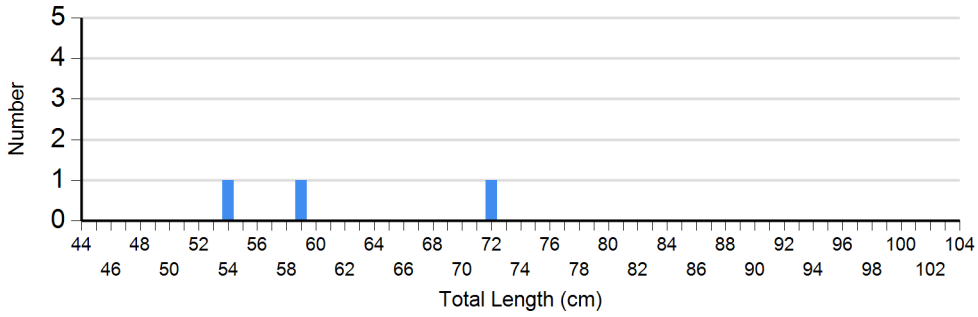
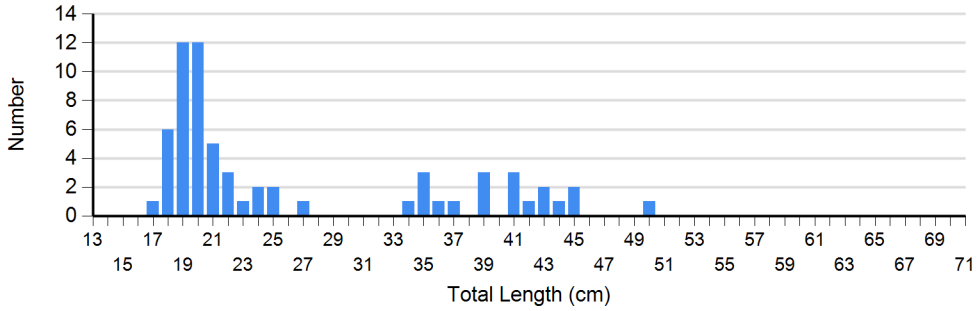


2015

Species: Walleye
Gear: std exp gill net



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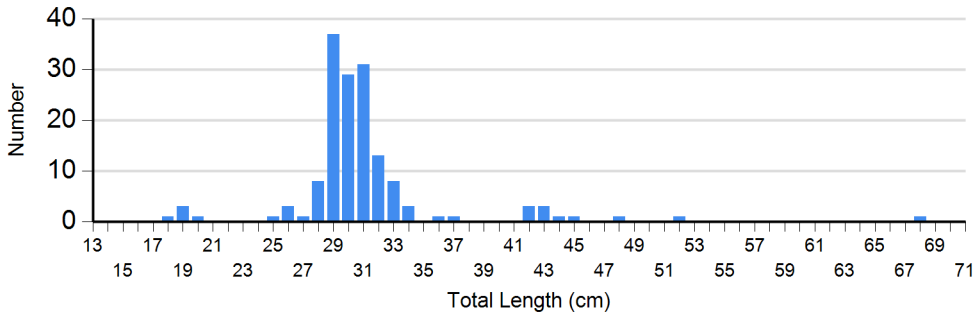

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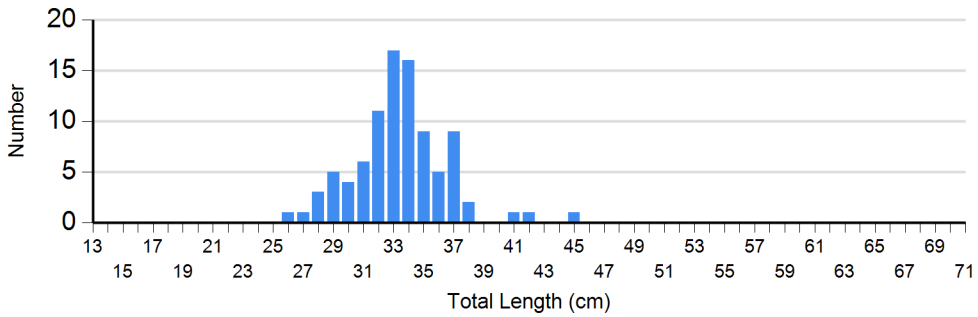

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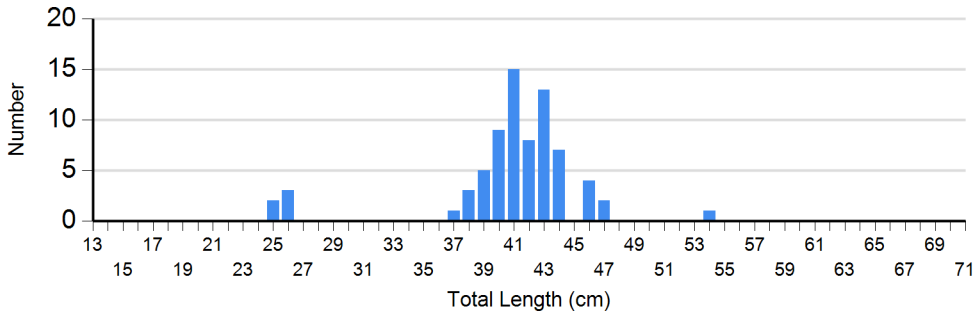
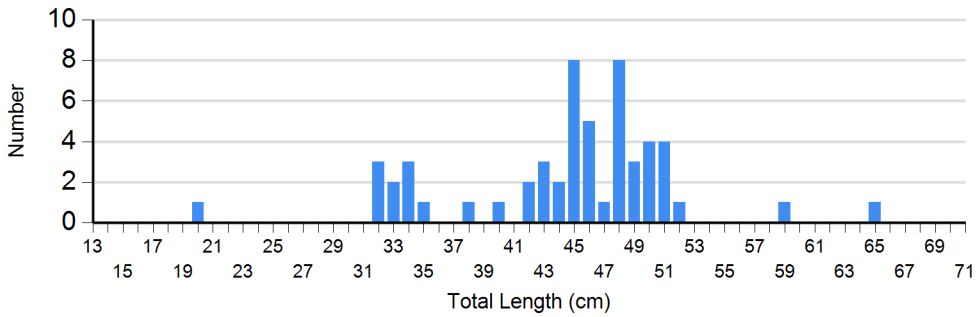


2014



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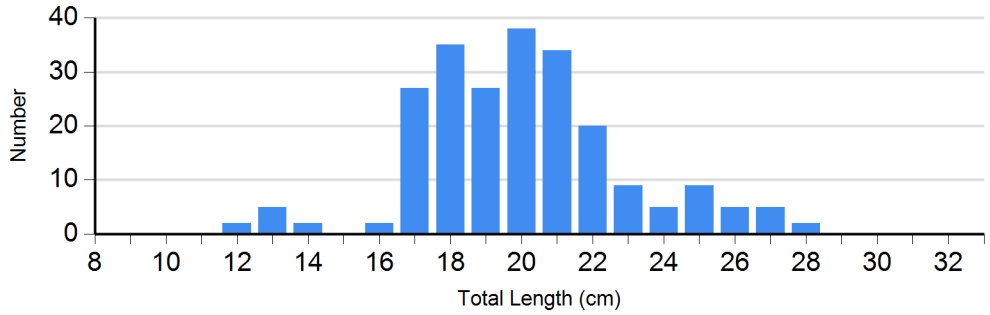
Species: Yellow Perch
Gear: std exp gill net



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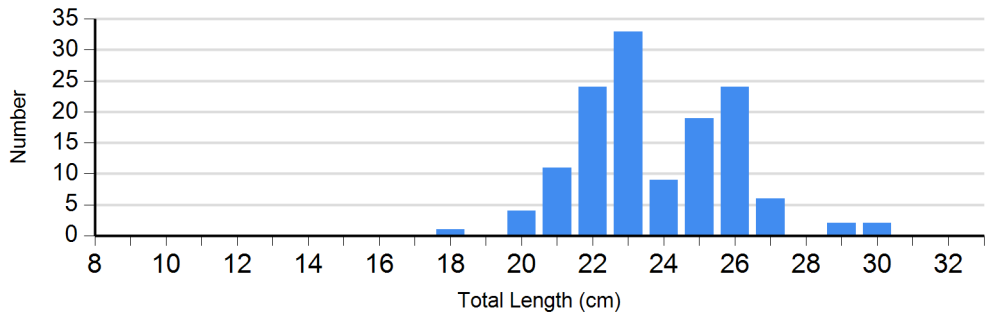

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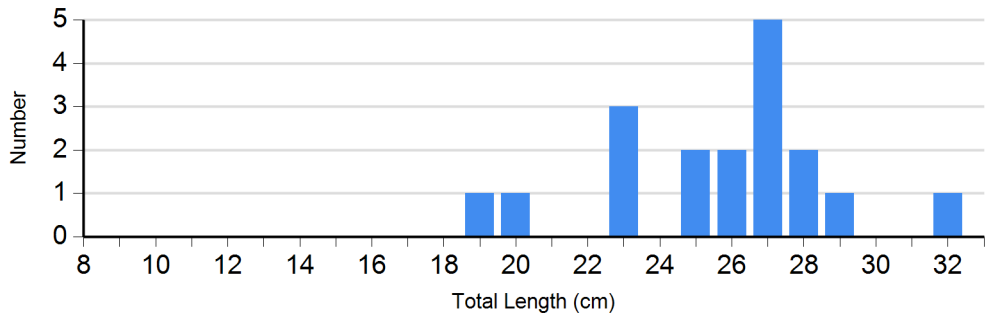

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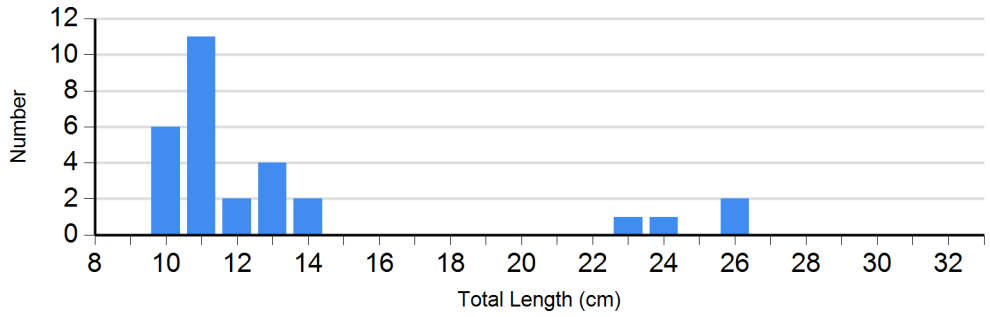
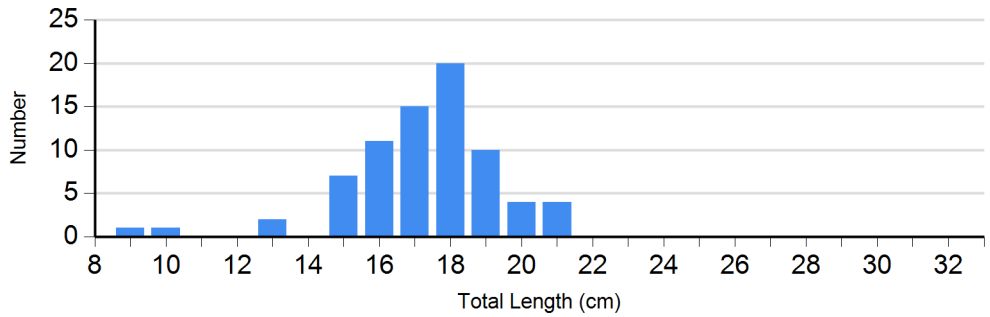


2014

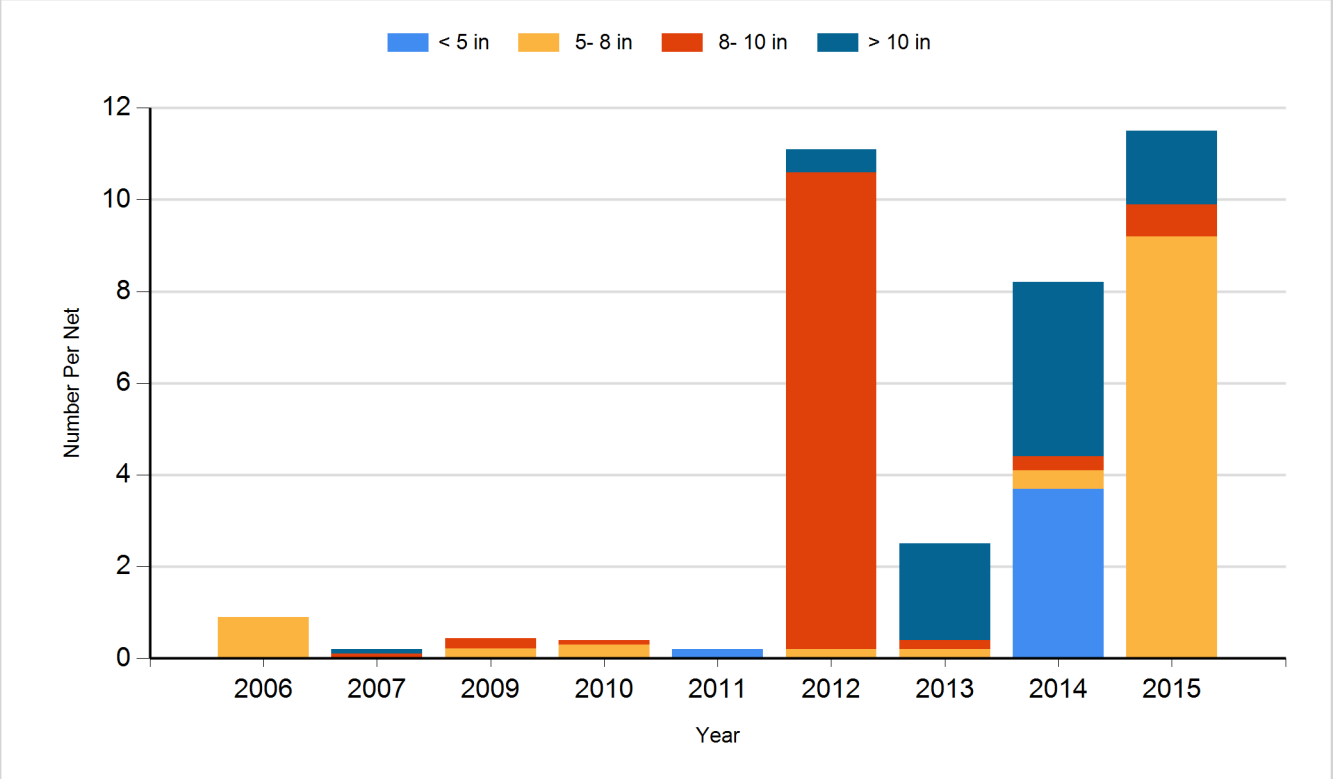


2015

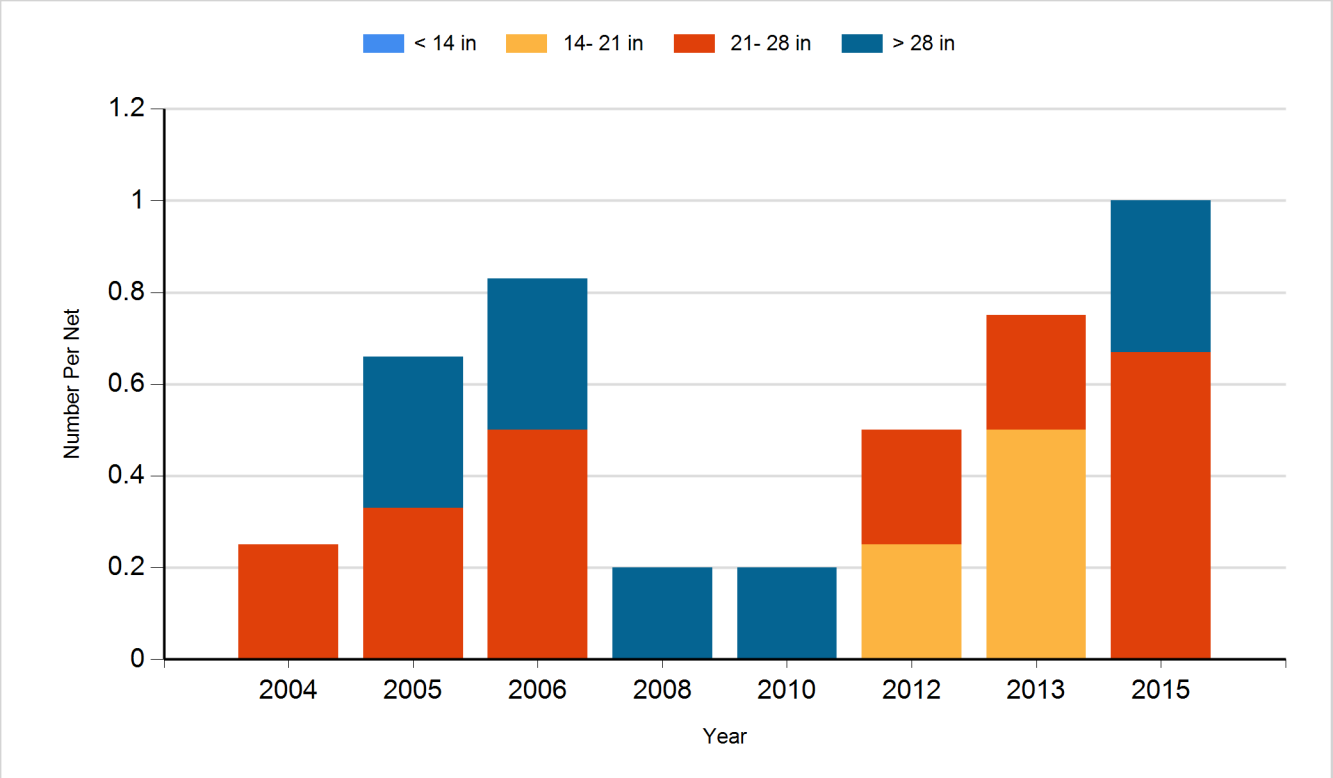
Historic Fish Sizes and Relative Abundance

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

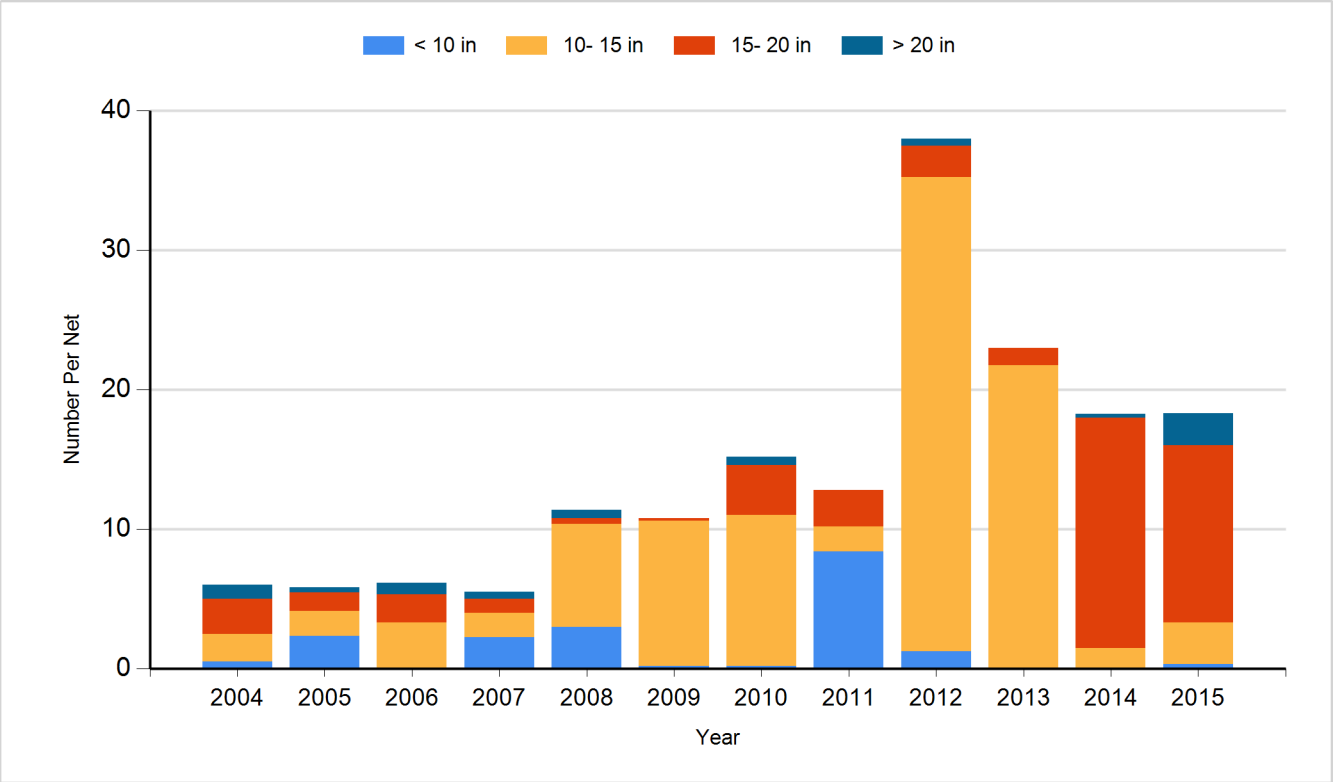
Species: Black Crappie
Gear: Frame Net



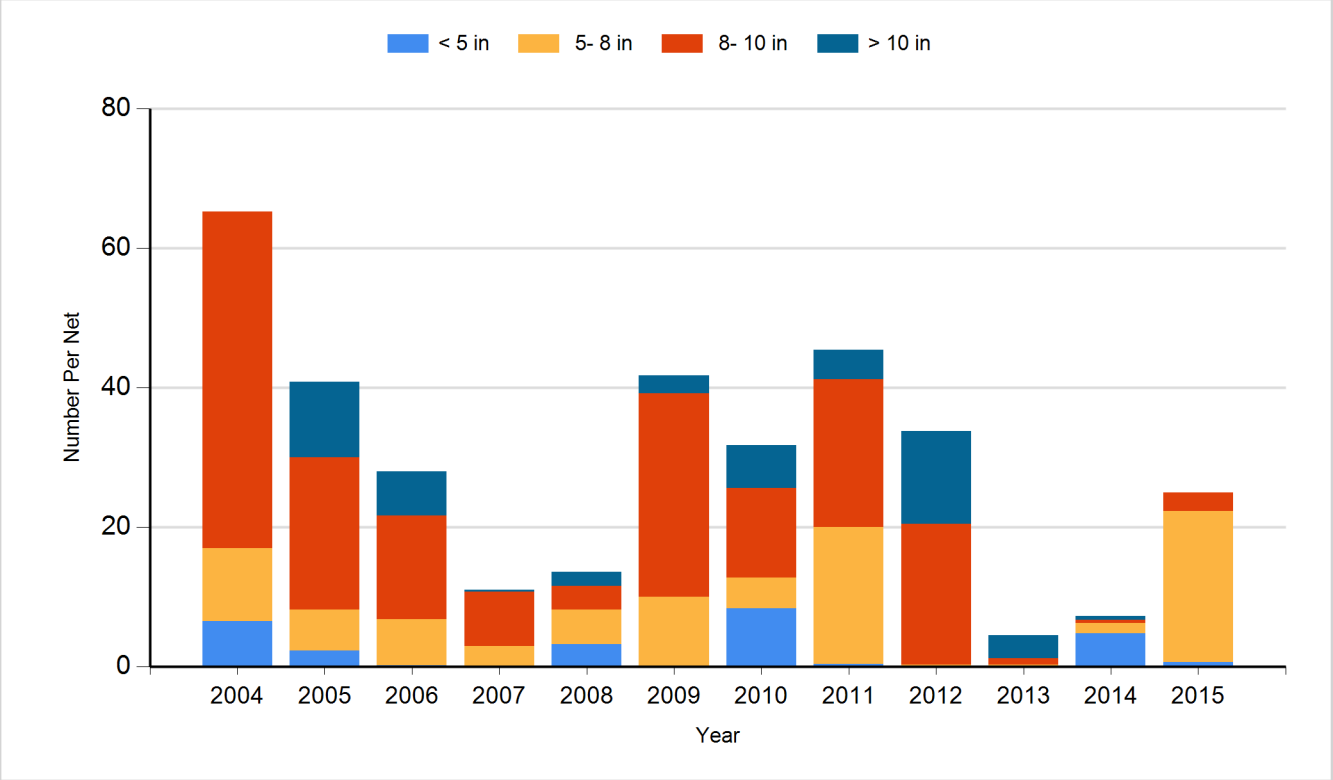
Species: Northern Pike
Gear: Gill Net



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
2004	Smallmouth Bass	Fingerling	13,440
2004	Walleye	Fingerling	170,200
2005	Smallmouth Bass	Fingerling	58,290
2006	Fathead Minnow	Adult	76,806
2006	Walleye	Small Fingerling	173,060
2010	Walleye	Small Fingerling	172,480
2011	Muskellunge	Large Fingerling	1,223
2012	Muskellunge	Adult	2
2013	Muskellunge	Fingerling	780
2014	Muskellunge	Large Fingerling	1,719
2015	Muskellunge	Large Fingerling	1,720
2015	Walleye	Small Fingerling	118,400