SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Waubay, Day County
UBS-Lake-411-000
2017

Lake Information

Name: Waubay

County: Day

Surface Area: 16,943 Acres

Maximum Depth: 31 Feet

Mean Depth: 13 Feet

OHWM Elevation: 1,787

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	August 15, 2017	4 net-nights
AFS std gill net	August 16, 2017	4 net-nights
AFS std gill net	August 17, 2017	4 net-nights
AFS std gill net	August 18, 2017	4 net-nights
boat shocker (night)	September 07, 2017	3600 seconds

Common Fish Species Present

Yellow Perch

Northern Pike

Walleye

Smallmouth Bass

White Bass

Rock Bass

Common Carp

Black Bullhead

White Sucker

Lake Herring

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 gill net	Black Bullhead	0.3	0.2	100		100		90	12
	Bluegill	0.1	0.1	100		50		132	7
	Common Carp	0.5	0.2	63		63		100	5
	Lake Herring	0.1	0.2	100		100		134	2
	Northern Pike	0.1	0.1	100		0		83	
	Rock Bass	0.8	0.6	100		31		109	2
	Smallmouth Bass	1.3	0.6	86		48	17	91	2
	Walleye	4.6	1.0	81	7	3		88	1
	White Bass	12.9	2.9	99		99		92	0
	White Sucker	0.1	0.2	100		100		97	1
	Yellow Perch	8.3	3.0	62	6	37	6	109	1
boat shocker (night)	Walleye	7.0	4.2	0		0		96	2

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	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
AFS std gill net	Black Bullhead									0.4	0.3	0.4
	Bluegill										0.1	0.1
	Common Carp									0.1	0.5	0.3
	Lake Herring									0.3	0.1	0.2
	Northern Pike									0.1	0.1	0.1
	Rock Bass									0.4	0.8	0.6
	Smallmouth Bass									1.3	1.3	1.3
	Walleye									6.3	4.6	5.5
	White Bass									13.2	12.9	13.1
	White Sucker										0.1	0.1
	Yellow Perch									5.4	8.3	6.9
boat shocker (night)	Smallmouth Bass	4.0	21.8				41.8		5.6			18.3
	Walleye	6.0	41.5		6.0	5.0	0.3	15.0	0.4	1.5	7.0	9.2
frame net (std 3/4 in)	Black Bullhead	0.8	0.9	0.8	0.4	1.5	3.5	2.0				1.4
	Black Crappie	0.3	0.1	0.2	0.3	1.3	1.5	2.6				0.9
	Bluegill	0.1	0.1	0.6	0.7	0.9	0.4	0.3				0.4
	Common Carp	0.4	0.3	0.5	0.5	0.5	0.3	0.2				0.4
	Northern Pike	0.8	0.7	0.4	0.1	0.2	0.3	0.6				0.4
	Rock Bass	0.3	0.7	0.9	0.6	0.9	2.6	1.2				1.0
	Smallmouth Bass	1.9	3.4	6.3	6.1	5.1	6.2	3.5				4.6
	Walleye	6.1	5.4	5.5	3.1	2.9	2.5	2.8				4.0
	White Bass	3.2	7.1	3.1	6.5	5.1	3.8	2.5				4.5
	White Sucker	0.1	0.2	0.1	0.1	0.1	0.1	0.0				0.1
	Yellow Perch	0.0	0.3	0.2	0.0	0.1	0.0					0.1
std exp gill net	Black Bullhead		0.0		0.2	4.3	4.1	1.4	0.1			1.7
	Bluegill					0.3						0.3
	Common Carp	0.6		0.3	0.0	0.5		0.5	0.1			0.3
	Lake Herring	0.6	0.5	1.4	0.3	0.1	0.4	0.3	0.3			0.5
	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	0.9	0.0	0.0	0.0		0.3	0.3				0.3
	Spottail Shiner			0.0								0.0
	Walleye	28.8	4.1	5.3	5.3	11.1	11.8	19.3	14.1			12.5

		CPUE										
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
std exp gill net	White Bass	4.6	0.1	0.3	1.0	1.5	17.6	8.1	23.9			7.1
	White Sucker	0.1		0.1			0.3	0.1				0.2
	Yellow Perch	32.4	4.6	6.6	9.2	28.1	21.9	18.5	19.5			17.6

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	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AFS std gill net	Northern Pike	PSD									100	100
		PSD-P									100	0
		Wr									91	83
	Walleye	PSD									28	81
		PSD-P									5	3
		Wr									86	88
	Yellow Perch	PSD									71	62
		PSD-P									38	37
		Wr									109	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	69	93		97	86		96	83	93	96
frame net (std 3/4 in)	Black Crappie	PSD	63	50	80	22	90	100	99			
		PSD-P	50	0	20	11	8	44	92			
		Wr	108	114	110	108	109	105	105			
	Northern Pike	PSD	64	48	91	100	83	70	89			
		PSD-P	48	10	18	50	50	30	50			
		Wr	82	84	89	83	87	77	80			
	Walleye	PSD	15	41	68	51	80	48	11			
		PSD-P	1	2	2	9	7	9	1			
		Wr	80	85	87	81	79	78	80			
	Yellow Perch	PSD	0	90	0	100	67	100				
		PSD-P	0	30	0	0	67	0				
		Wr	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	12	16	25	42	48	28	17	8		
		PSD-P	1	3	0	0	7	2	1	0		
		Wr	86	90	88	83	83	82	84	85		
	Yellow Perch	PSD	61	75	59	72	85	79	87	83		

			Year									
Gear	Species	Index	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
std exp gill net	Yellow Perch	PSD-P	33	20	22	22	32	36	41	38		
		Wr	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+
2017	92	223 (21)	354 (1)	394 (4)	479 (2)		410 (58)		410 (2)	445 (1)	668 (2)
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)	

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2017	133	152 (39)	207 (31)	247 (21)	269 (7)	273 (4)	279 (18)	300 (4)	286 (7)		
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

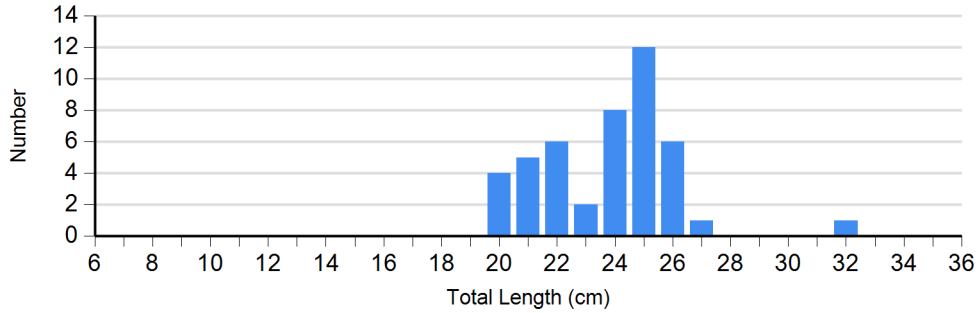
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	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	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
	2017	0		1	83	0		0	
Walleye Gill Net	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)
	2017	14	88 (1.5)	57	88 (0.7)	0		2	89 (3.6)
Yellow Perch Gill Net	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	
	2017	51	109 (1.4)	33	113 (1.6)	39	111 (1.3)	10	96 (3.0)

Length Frequency Distribution

Length frequency histogram of species sampled by year.

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



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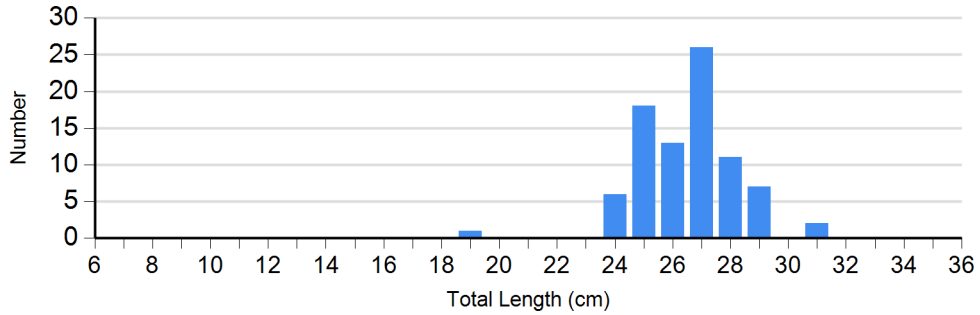
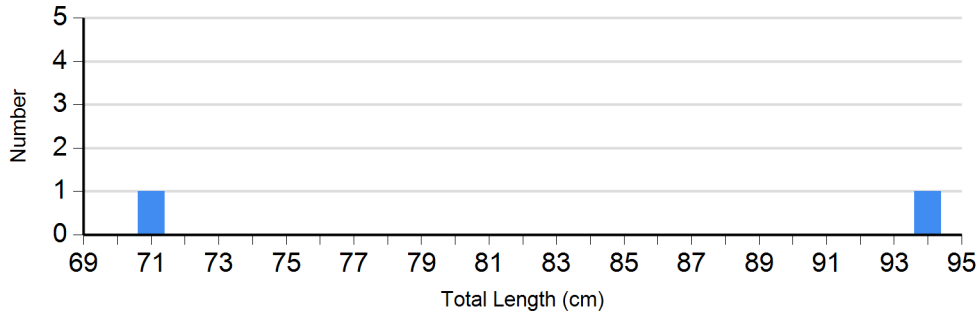
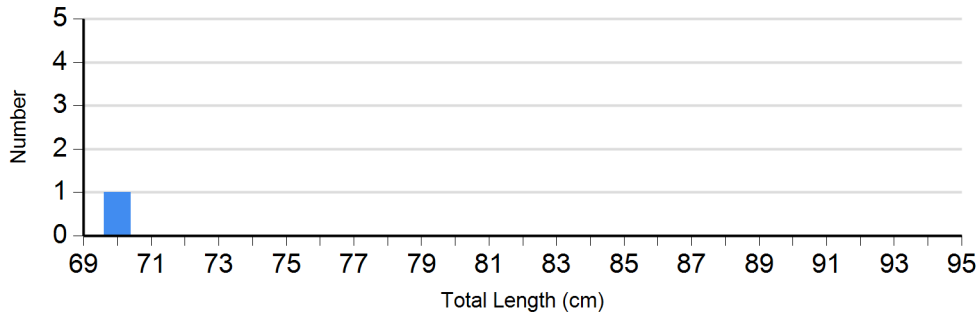


2014

Species: Northern Pike
Gear: AFS std gill net

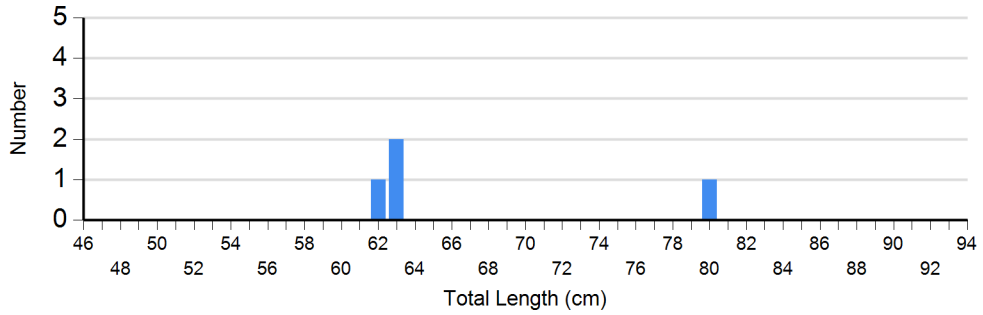


2016



2017

Species: Northern Pike
Gear: std exp gill net



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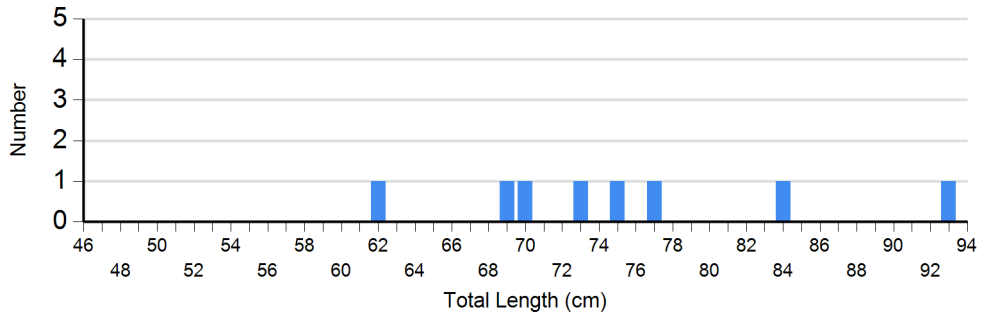

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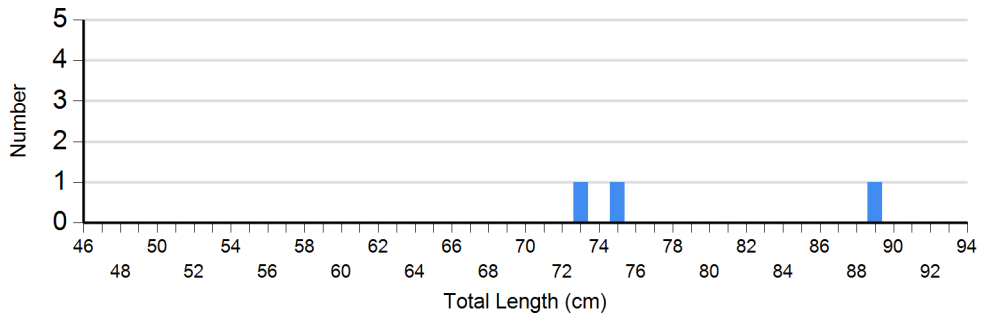
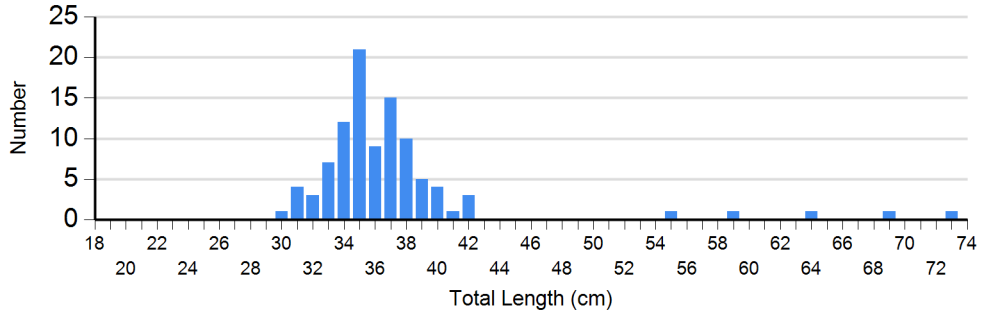


2015

Species: Walleye
Gear: AFS std gill net



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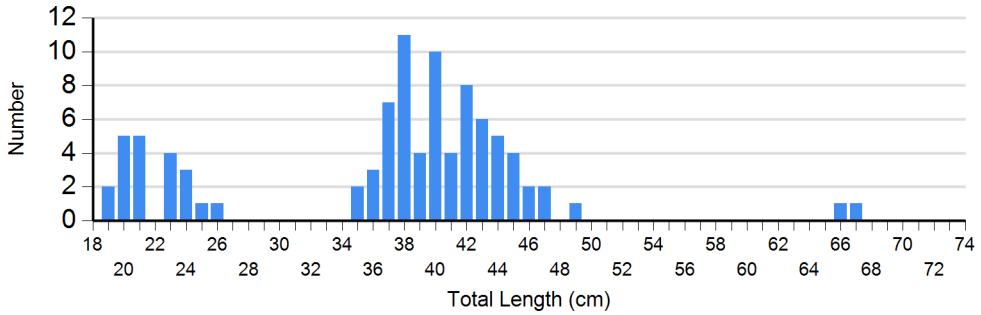

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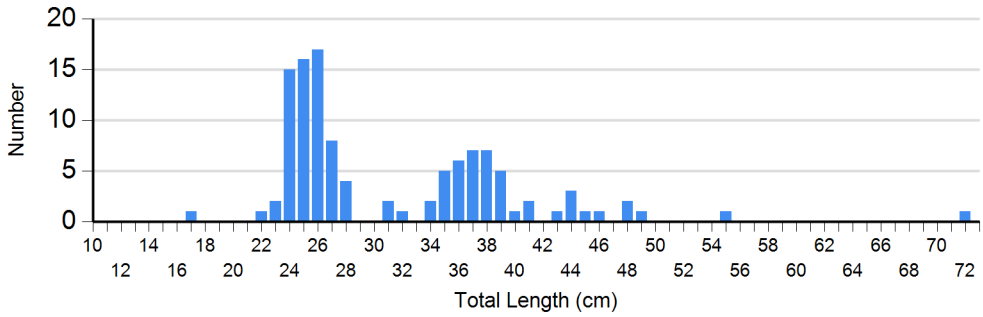
Species: Walleye
Gear: std exp gill net



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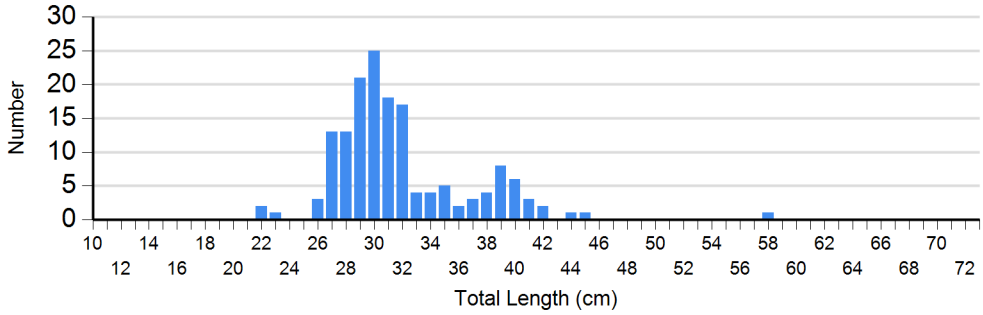
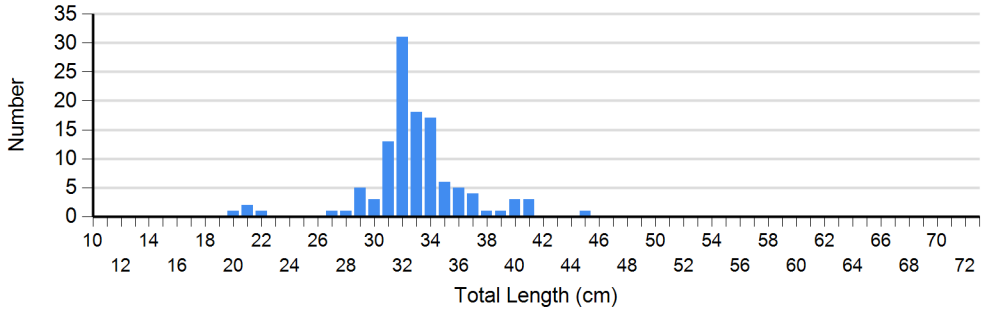
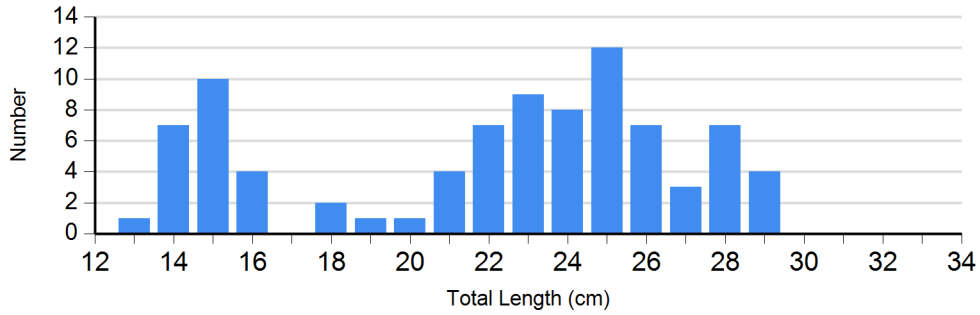


2014

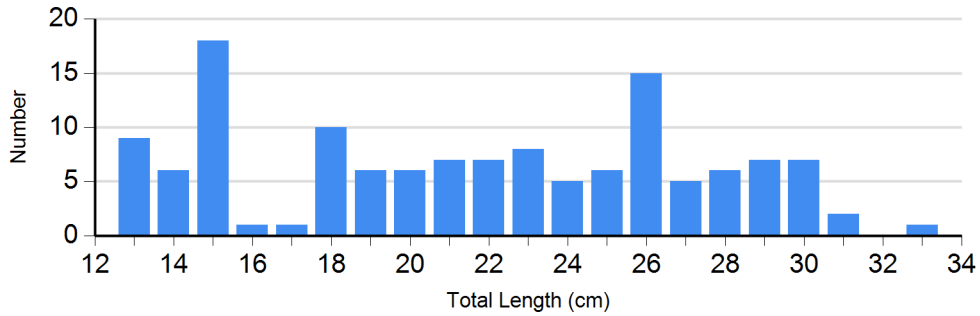


2015

Species: Yellow Perch
Gear: AFS std gill net

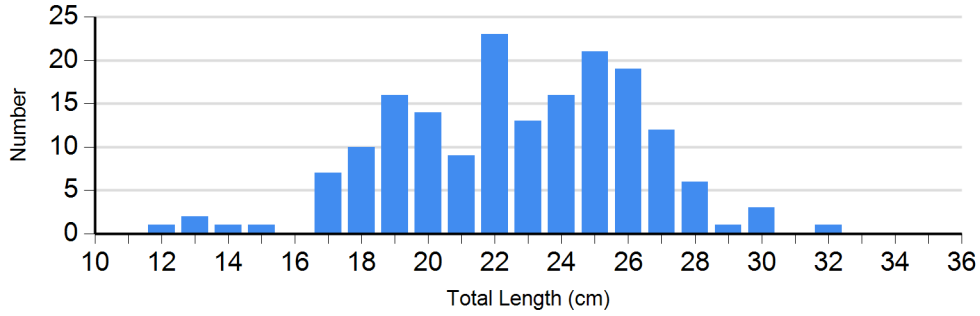


2016

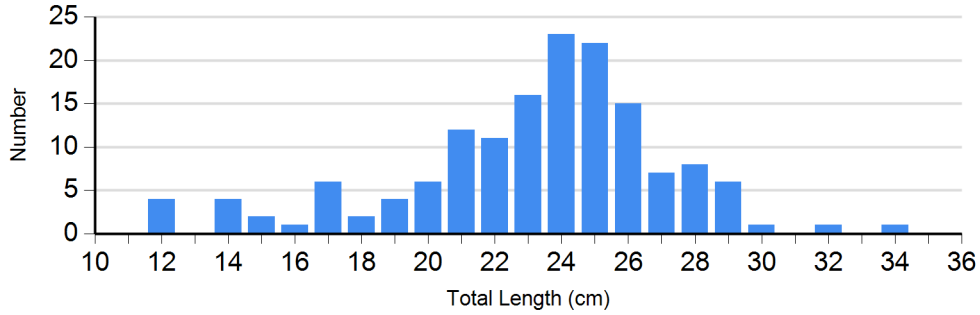


2017

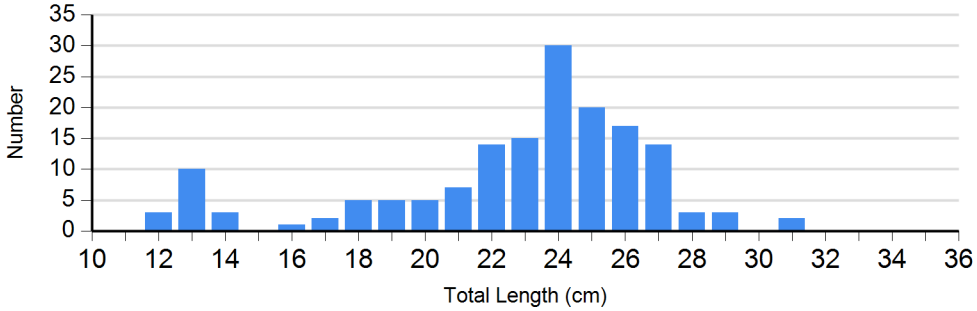
Species: Yellow Perch
Gear: std exp gill net



2013



2014

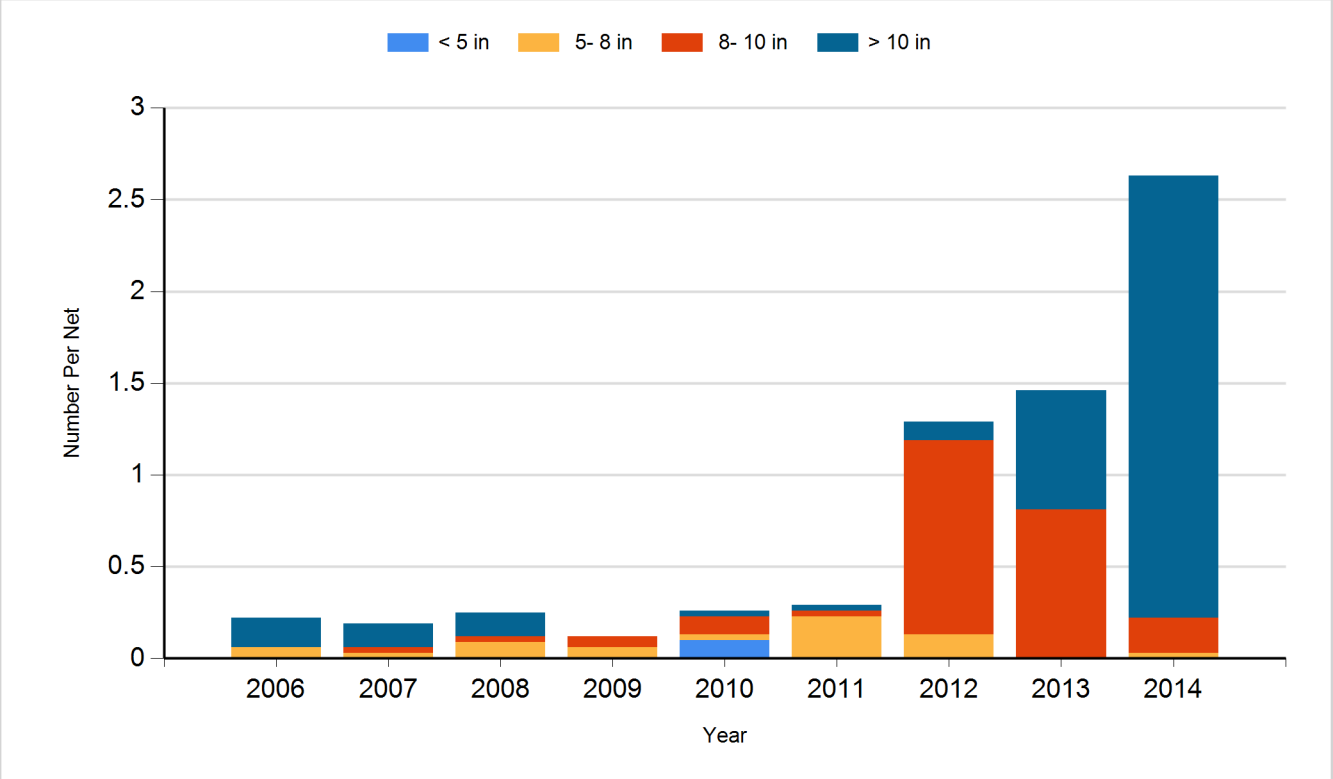

Number
35
30
25
20
15
10
5
0
10
12
14
16
18
20
22
24
26
28
30
32
34
36
Total Length (cm)

2015

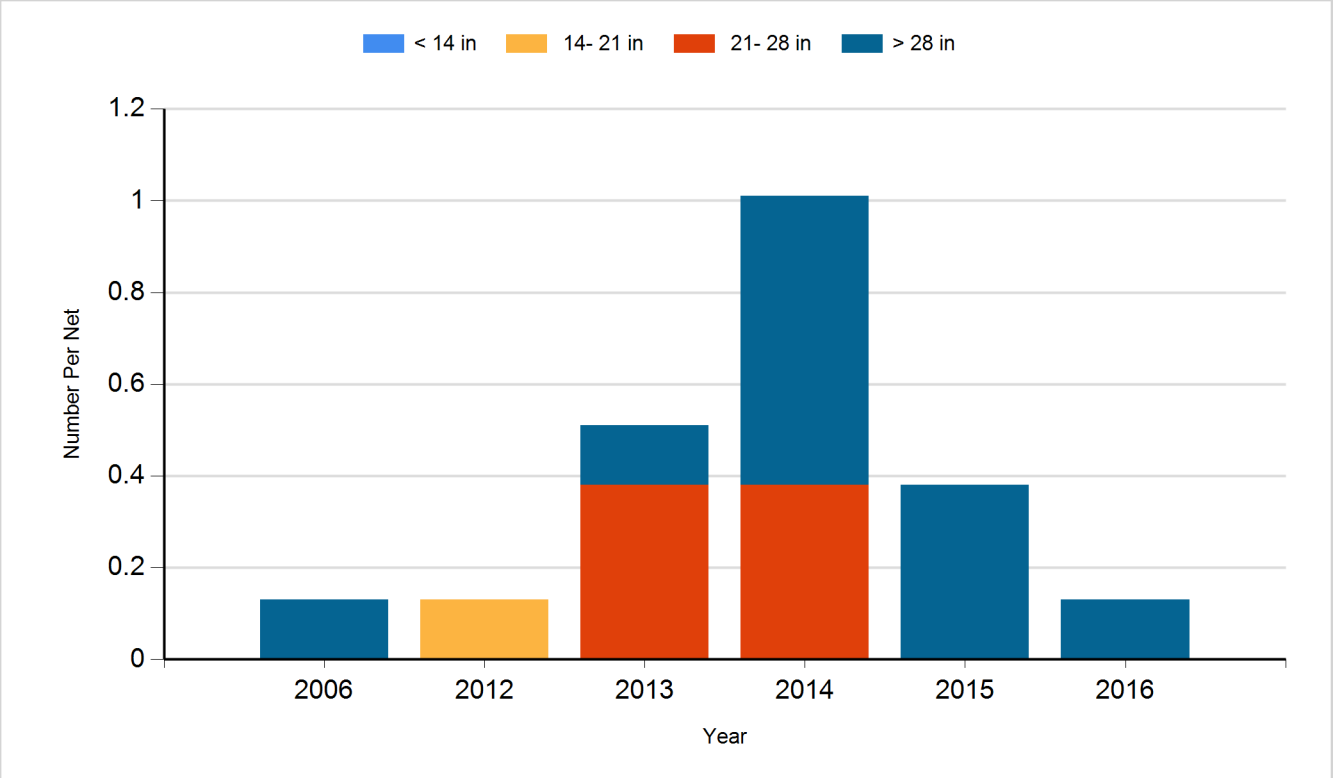
Historic Fish Sizes and Relative Abundance

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

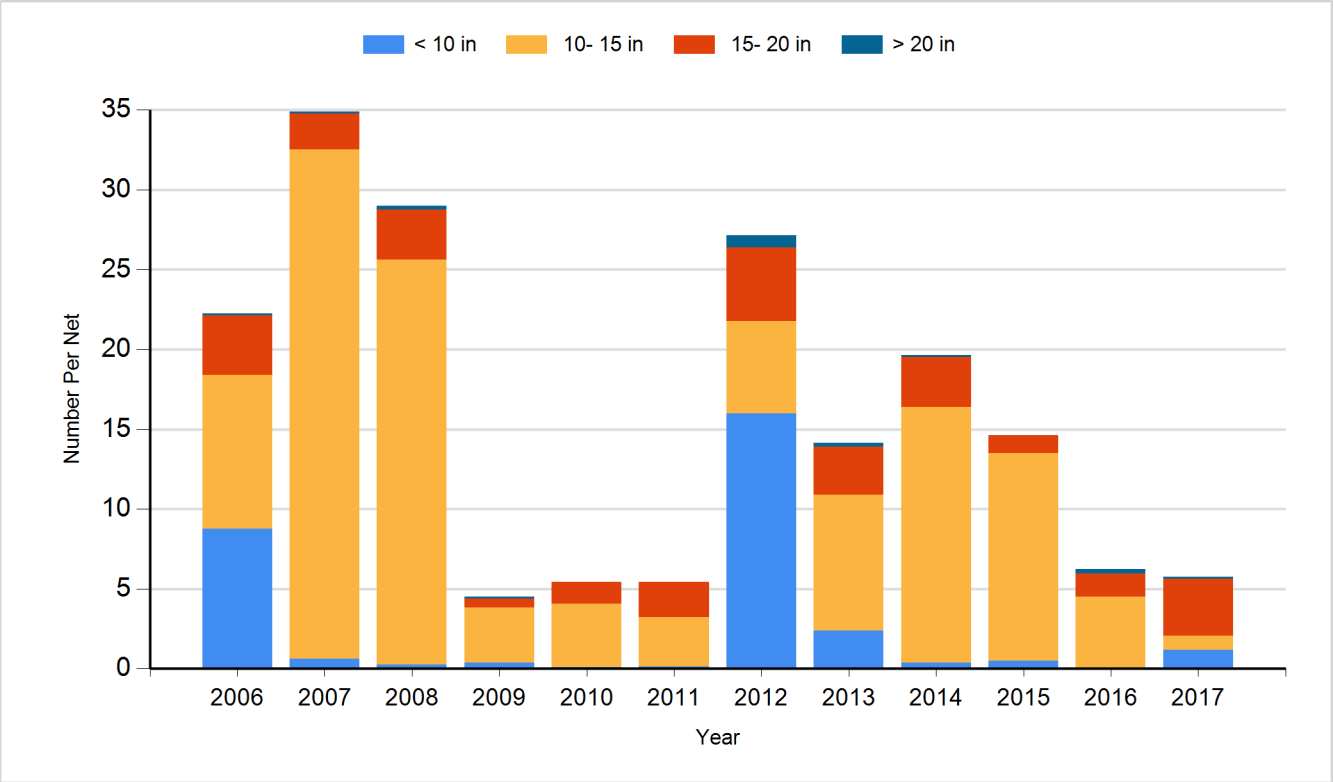
Species: Black Crappie
Gear: Frame Net



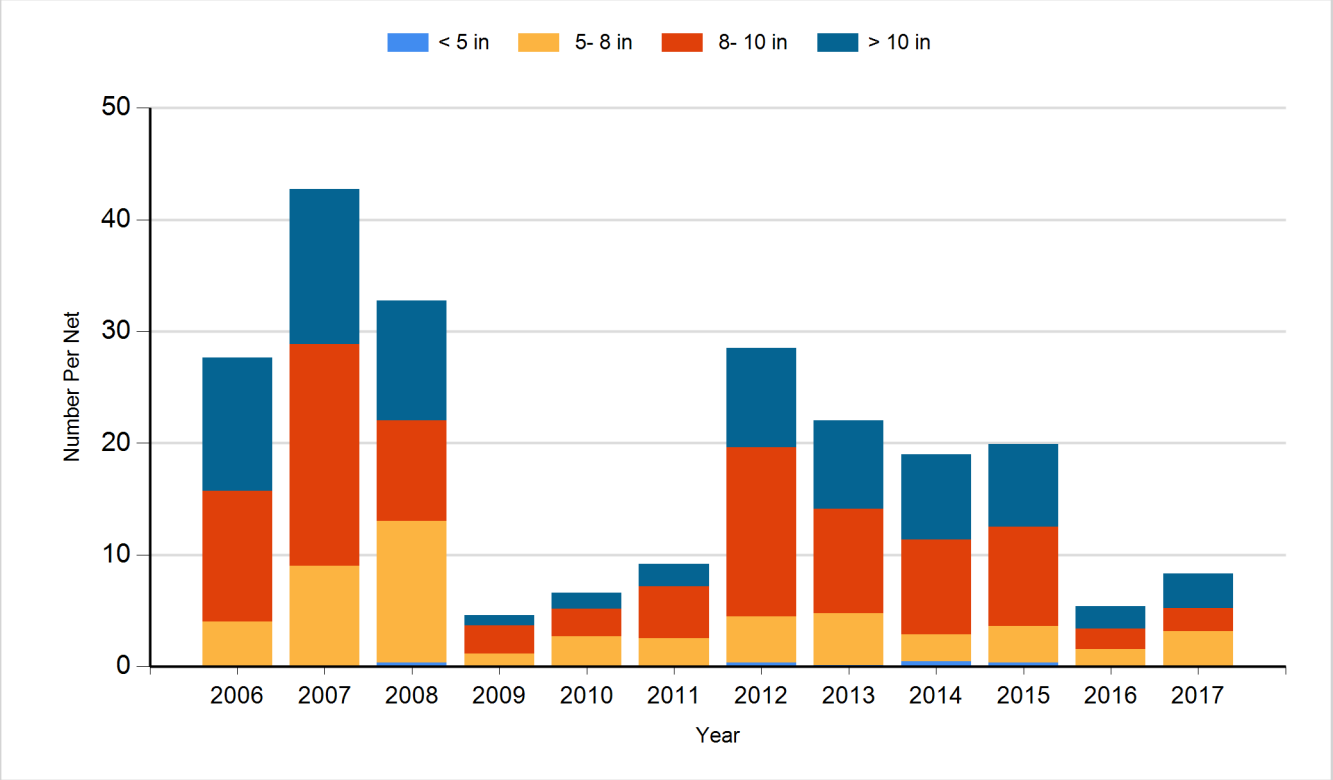
Species: Northern Pike
Gear: Gill Net



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
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
2017	Walleye	Fry	8,000,000