

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Oahe Upper, Campbell County
ULO-Lake-933-000
2015

Lake Information

Name: Oahe Upper
County: Campbell
Surface Area: 96,152 Acres

Surveys and Investigations

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

Gear	Date	Effort
std exp gill net	August 10, 2015	6 net-nights
std exp gill net	August 11, 2015	6 net-nights
std exp gill net	August 12, 2015	6 net-nights

Common Fish Species Present

Channel Catfish

Walleye

Yellow Perch

Common Carp

Freshwater Drum

White Bass

Shorthead Redhorse

Smallmouth Bass

River Carpsucker

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
std exp gill net	Channel Catfish	13.5	1.5	60	4	10	3	83	1
	Common Carp	0.9	0.3	100		75		87	2
	Freshwater Drum	0.8	0.3	100		40	21	96	3
	Goldeye	0.0	0.0						
	Northern Pike	0.5	0.2	11		0		80	3
	River Carpsucker	0.6	0.2	90		90		98	5
	Sauger	0.1	0.1	100		100		67	
	Shorthead Redhorse	0.7	0.4	92		83		94	3
	Shortnose Gar	0.0	0.0						
	Smallmouth Bass	0.6	0.3	30		30		100	3
	Smallmouth Buffalo	0.2	0.1	100		67		86	6
	Walleye	9.3	2.1	24	5	0		83	1
	White Bass	0.8	0.4	100		100		98	4
	White Crappie	0.1	0.1	50		50		97	15
	White Sucker	0.1	0.1	100		100		99	
Yellow Perch	2.9	0.8	29	9	2		93	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.

Gear	Species	CPUE										Avg
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
std exp gill net	Bigmouth Buffalo	0.2	0.9	0.4	0.1	0.6	0.1		0.1	0.2		0.3
	Black Bullhead						0.1					0.1
	Black Crappie					1.1	0.1	0.3	0.1	0.1		0.3
	Brown Bullhead					0.1						0.1
	Channel Catfish	10.1	14.6	15.7	14.7	10.9	11.7	22.0	15.1	12.7	13.5	14.1
	Chinook Salmon						0.0					0.0
	Common Carp	4.2	1.8	1.8	2.6	2.0	1.1	1.3	1.2	1.3	0.9	1.8
	Freshwater Drum	1.4	3.6	3.2	1.0	3.0	0.6	0.9	1.2	1.3	0.8	1.7
	Gizzard Shad	0.2	1.3	0.1	0.0							0.4
	Goldeye	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Lake Herring		0.1									0.1
	Northern Pike			0.1	0.1	0.5	2.6	1.6	1.1	0.3	0.5	0.9
	Paddlefish		0.1	0.1								0.1
	Rainbow Smelt					0.0						0.0
	River Carpsucker	0.7	1.6	0.7	1.7	1.6	0.6	1.0	0.2	0.4	0.6	0.9
	Sauger	3.8	3.2	1.9	1.5	1.6	0.7	0.5	0.2	0.6	0.1	1.4
	Shorthead Redhorse	0.3	0.2	0.1	0.2	0.6	0.2	1.6	1.4	2.2	0.7	0.8
	Shortnose Gar			0.0	0.0		0.0	0.0		0.0	0.0	0.0
	Smallmouth Bass			0.1	0.6	1.9	0.6	0.6	0.4	0.3	0.6	0.6
	Smallmouth Buffalo				0.3		0.1	0.7		0.1	0.2	0.3
	Spottail Shiner				0.0							0.0
	Walleye	13.8	15.1	6.7	2.9	8.4	16.5	19.0	13.7	13.6	9.3	11.9
	White Bass	0.4	0.4	0.6	0.1	0.3	0.5	0.9	1.1	0.3	0.8	0.5
	White Crappie	0.1	0.0	0.1	2.9	2.1	1.2	0.6	0.9	0.4	0.1	0.8
White Sucker				0.1	0.2	0.1			0.1	0.1	0.1	
Yellow Perch	0.4	0.4	1.4	21.4	22.5	11.3	2.7	1.0	2.9	2.9	6.7	

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									
			2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
std exp gill net	Black Crappie	PSD						13	50	100	100	100
		PSD-P					0	0	67	100	50	
		Wr					114	109	102	102	109	
	Northern Pike	PSD			100	100	60	68	89	90	80	11
		PSD-P			0	50	10	15	25	60	60	0
		Wr			84	97	89	83	71	77	86	80
	Walleye	PSD	62	70	58	72	40	19	8	5	28	24
		PSD-P	6	5	13	9	8	5	3	2	2	0
		Wr	85	87	87	93	85	85	82	83	85	83
Yellow Perch	PSD	13	13	72	2	19	44	75	72	37	29	
	PSD-P	0	0	8	0	0	1	2	22	8	2	
	Wr	85	90	89	112	99	90	86	84	99	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+
2015	271	214 (112)	322 (47)	362 (62)	385 (20)	392 (7)	398 (24)				
2014	290	237 (56)	313 (50)	350 (35)	370 (21)	376 (125)	395 (1)	562 (3)	553 (1)		
2013	269	207 (19)	259 (16)	294 (18)	329 (205)	407 (9)	580 (1)				662 (1)
2012	377	210 (32)	272 (43)	315 (285)	383 (8)	551 (1)	523 (4)	504 (2)	551 (1)		643 (2)
2011	466	199 (32)	270 (363)	379 (47)	449 (8)	519 (6)	521 (4)			534 (1)	630 (5)
2010	374	211 (234)	323 (80)	434 (28)	479 (17)	468 (11)	459 (2)			528 (1)	642 (1)
2009	62	241 (14)	378 (18)	441 (14)	491 (11)	482 (1)		509 (2)	545 (2)		
2008	128	262 (20)	358 (46)	429 (35)	483 (4)	503 (7)	435 (1)	521 (11)	534 (2)	502 (1)	571 (1)
2007	274	266 (20)	373 (86)	413 (27)	448 (44)	451 (15)	466 (55)	475 (8)	447 (5)	454 (2)	515 (12)
2006	262	271 (71)	357 (37)	415 (46)	436 (16)	455 (66)	449 (11)	504 (6)	494 (1)		515 (7)

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2012	48	136 (1)	183 (2)	208 (23)	222 (22)	233 (1)					
2011	203		172 (67)	203 (127)	233 (8)						

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).

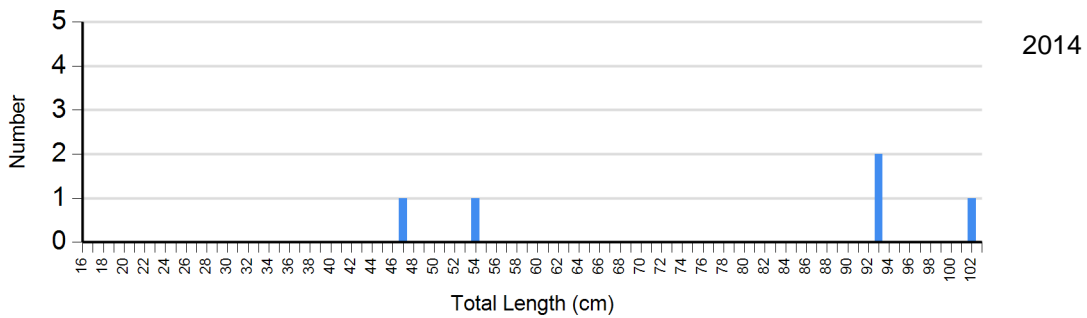
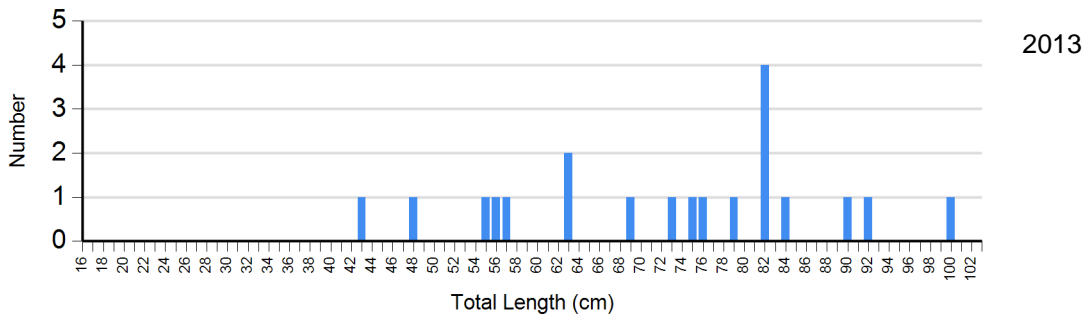
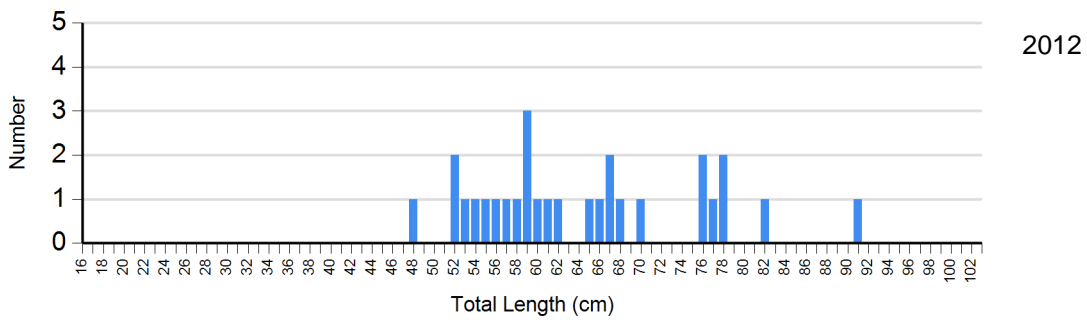
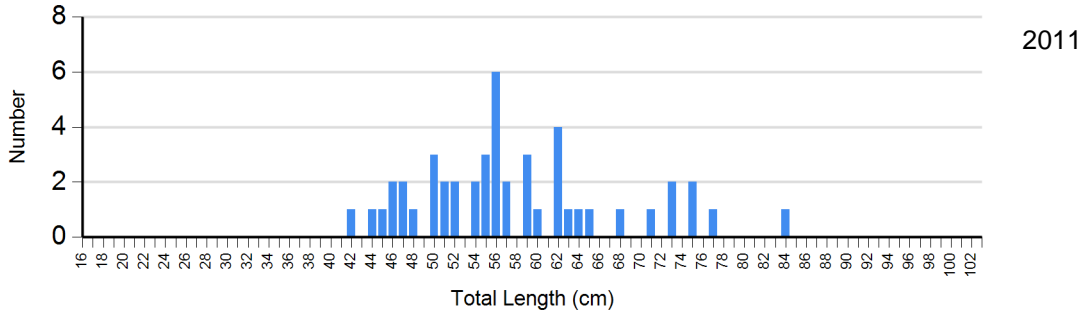
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2011	15	78 (1.7)	25	83 (2.0)	7	92 (3.0)	0	
	2012	3	59 (6.9)	18	70 (2.0)	6	77 (2.3)	1	84
	2013	2	76 (6.8)	6	63 (2.6)	9	81 (1.2)	3	92 (3.6)
	2014	1	56	1	81	0		3	97 (1.7)
	2015	8	81 (1.7)	1	70	0		0	
Walleye Gill Net	2011	240	84 (0.4)	42	89 (0.8)	12	82 (0.9)	3	86 (3.6)
	2012	315	83 (0.6)	18	76 (3.0)	8	75 (2.6)	1	49
	2013	234	83 (0.5)	8	81 (2.4)	3	79 (1.6)	1	61
	2014	175	85 (0.5)	65	84 (0.9)	4	81 (4.3)	0	
	2015	127	84 (0.5)	41	82 (0.6)	0		0	
Yellow Perch Gill Net	2011	113	92 (0.8)	88	88 (0.7)	2	89 (3.1)	0	
	2012	12	89 (2.7)	35	86 (0.9)	1	59	0	
	2013	5	83 (5.0)	9	85 (2.7)	4	82 (1.9)	0	
	2014	33	101 (1.9)	15	96 (2.0)	4	93 (3.4)	0	
	2015	37	93 (1.3)	14	92 (2.5)	1	84	0	

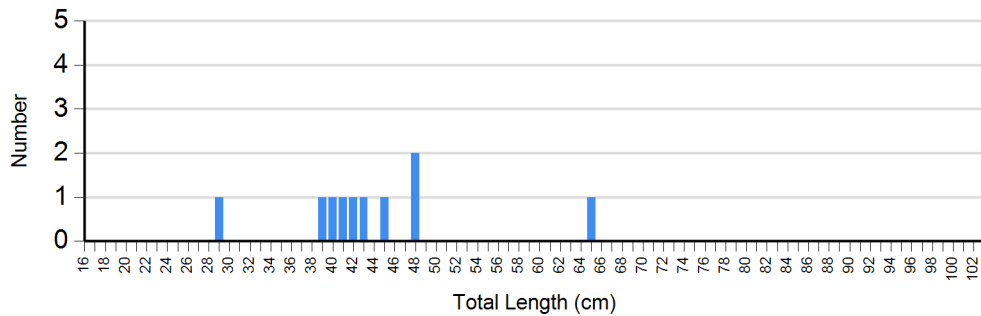
Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Northern Pike

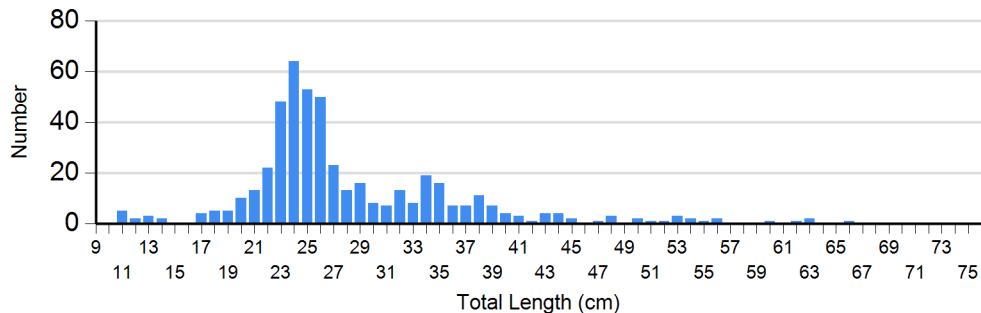
Gear: std exp gill net



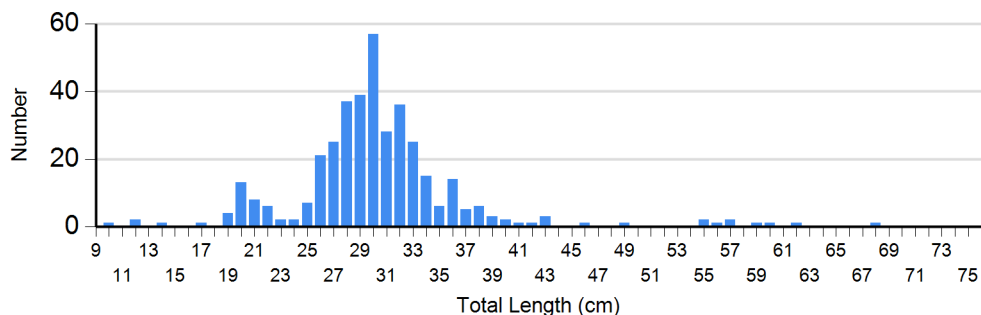


2015

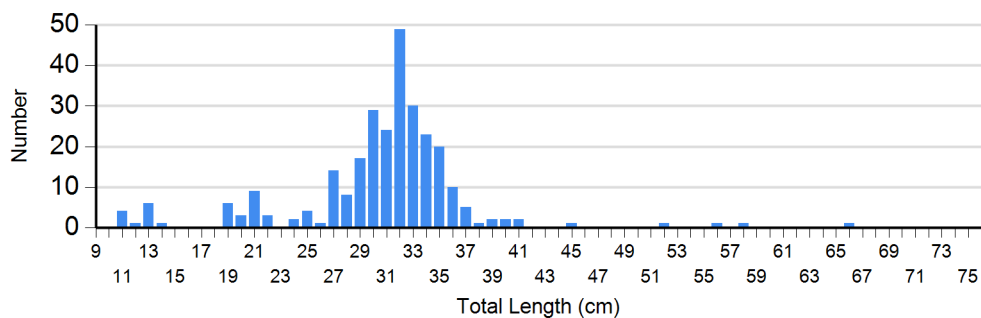
Species: Walleye
Gear: std exp gill net



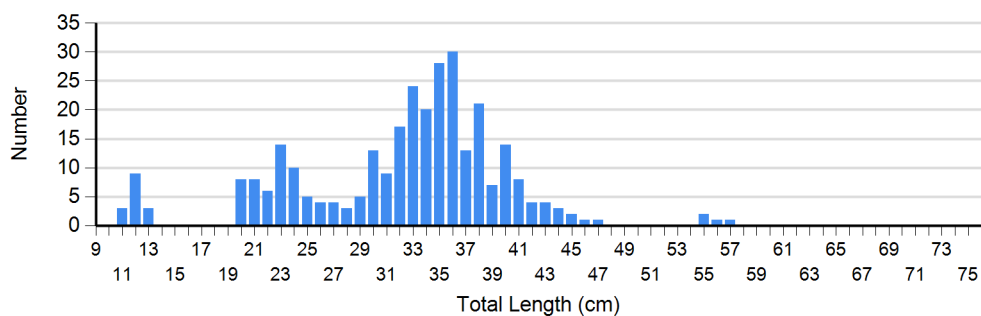
2011



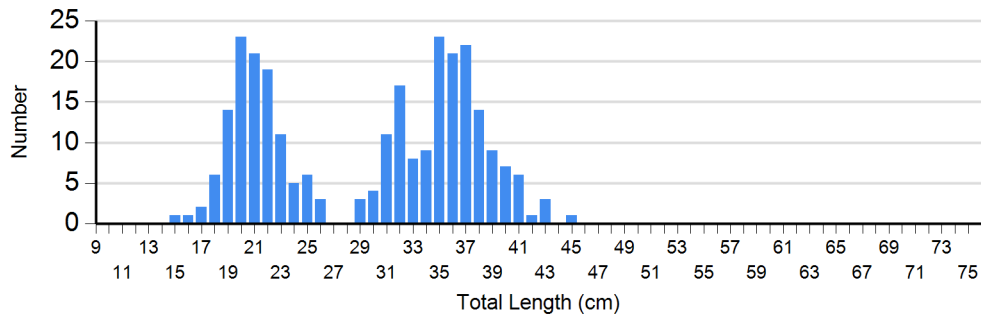
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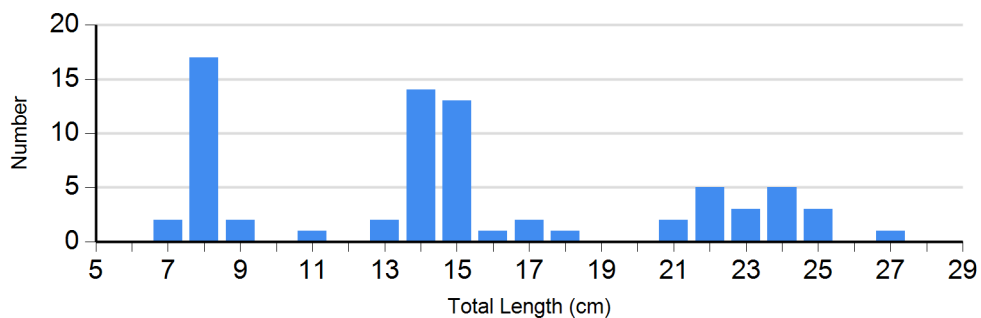
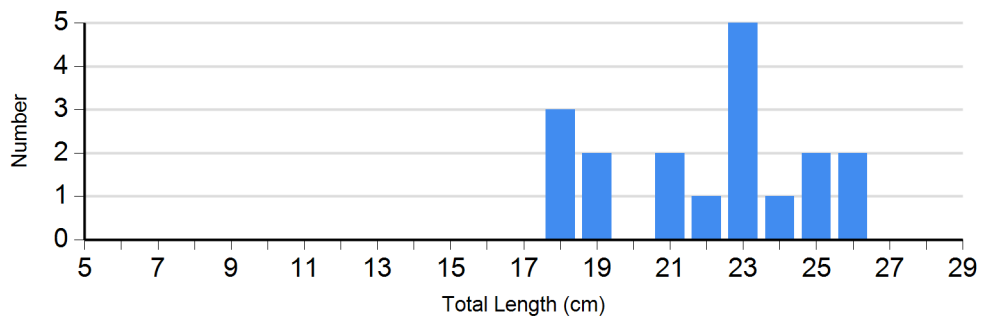
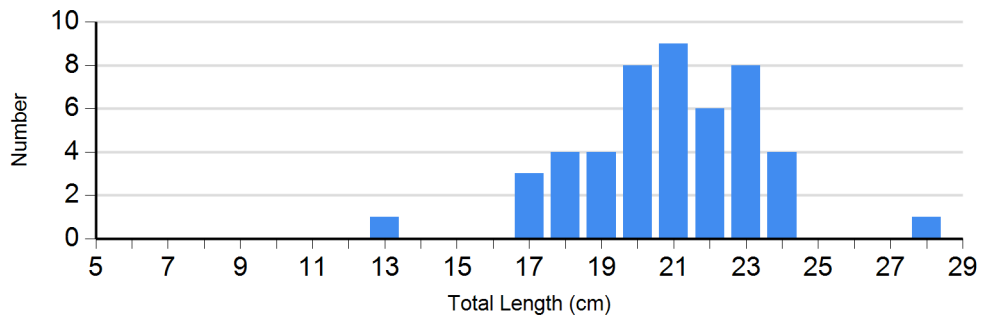
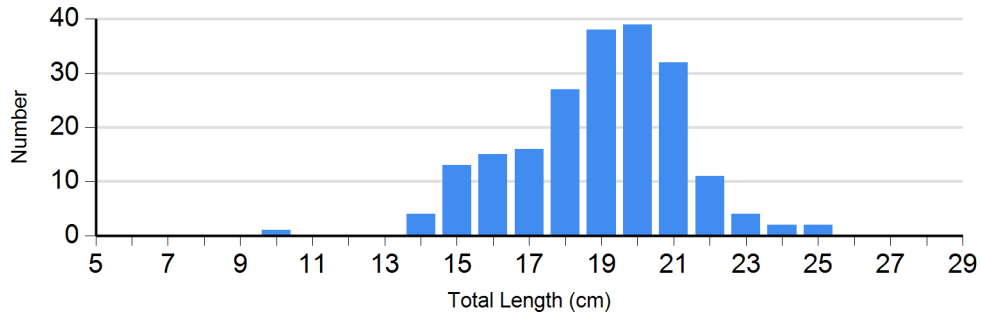
2013

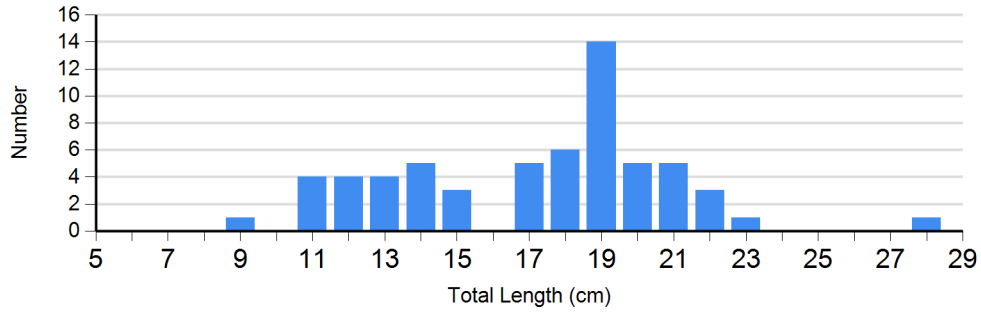


2014



Species: Yellow Perch
Gear: std exp gill net



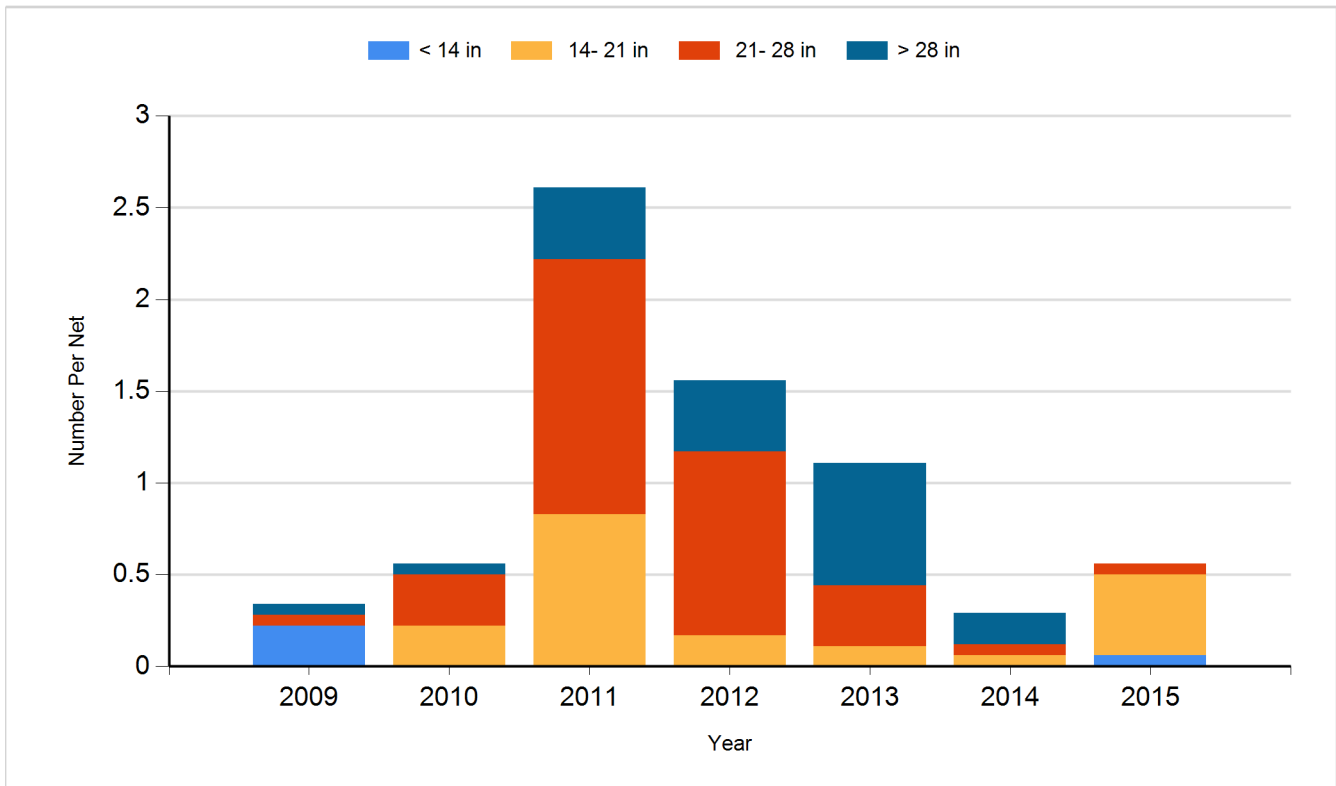


2015

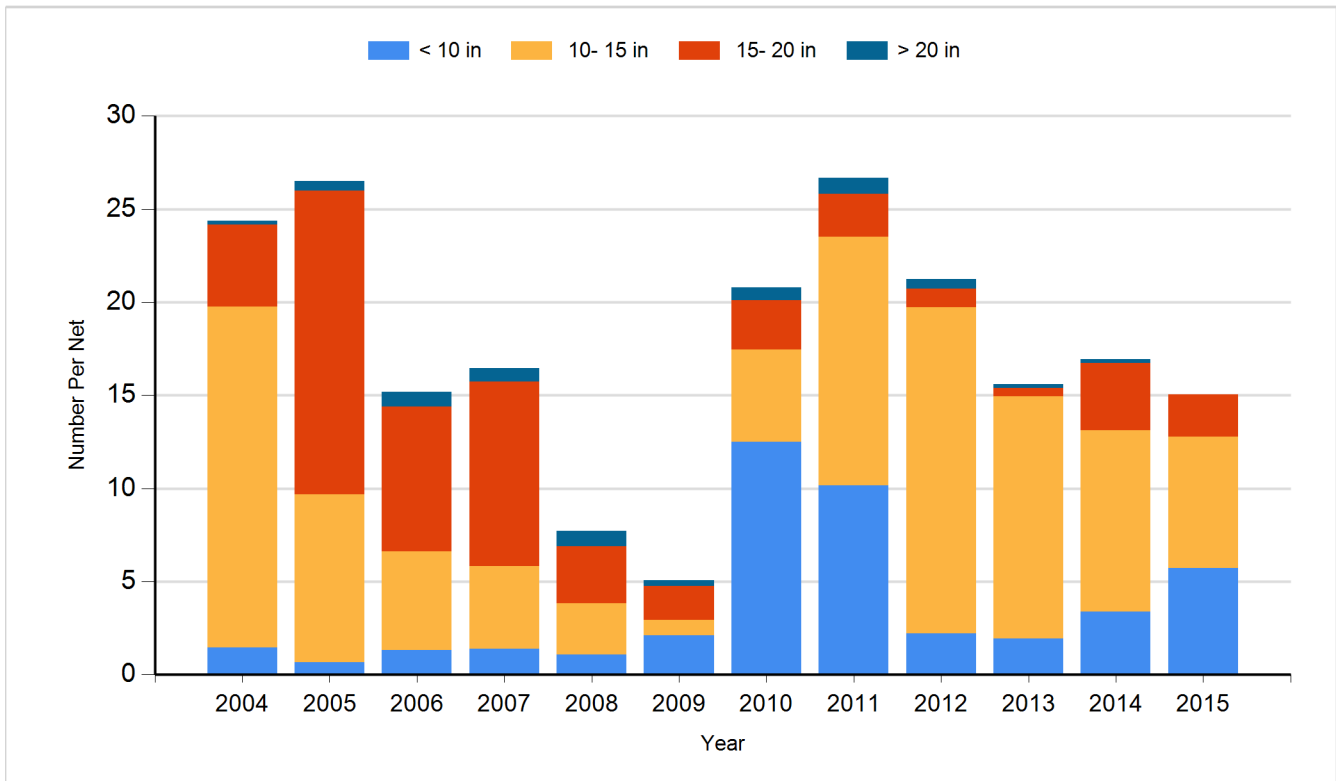
Historic Fish Sizes and Relative Abundance

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

Species: Northern Pike
Gear: Gill Net



Species: Walleye
Gear: Gill Net



Species: Yellow Perch
Gear: Gill Net

