

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Byron, Beadle County
MJA-Lake-531-800
2017

Lake Information

Name:	Byron	Maximum Depth:	10 Feet
County:	Beadle	Mean Depth:	7 Feet
Legal Description:	T113N- R61W- Sec. 22-23, 25-26, 28, 34-35	OHWM Elevation:	1,250
Surface Area:	1,858 Acres	Outlet Elevation:	1,248

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	August 23, 2017	6 net-nights

Common Fish Species Present

Walleye

Bigmouth Buffalo

Black Bullhead

Yellow Perch

Freshwater Drum

Northern Pike

Black Crappie

Common Carp

Channel Catfish

White Sucker

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	Bigmouth Buffalo	12.8	0.5	87	6	1			
	Black Bullhead	4.5	2.5	100		56	15		
	Black Crappie	0.3	0.5	100		50		102	4
	Channel Catfish	0.2	0.2	100		100		100	
	Common Carp	0.2	0.2	100		100			
	Common Shiner	0.0	0.0						
	Freshwater Drum	0.7	0.5	75		25			
	Northern Pike	0.3	0.3	100		100		82	6
	Shortnose Gar	0.0	0.0						
	Walleye	1.7	1.4	50	28	30		84	4
	White Sucker	0.2	0.2	100		100			
Yellow Perch	1.0	0.8	83		50		94	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.

Gear	Species	CPUE										Avg
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AFS std gill net	Bigmouth Buffalo										12.8	12.8
	Black Bullhead										4.5	4.5
	Black Crappie										0.3	0.3
	Channel Catfish										0.2	0.2
	Common Carp										0.2	0.2
	Common Shiner										0.0	0.0
	Freshwater Drum										0.7	0.7
	Northern Pike										0.3	0.3
	Shortnose Gar										0.0	0.0
	Walleye										1.7	1.7
	White Sucker										0.2	0.2
Yellow Perch										1.0	1.0	
large frame net	Bigmouth Buffalo		5.3		4.0		0.2					3.2
	Black Bullhead		5.8		65.6		1,085.8					385.7
	Black Crappie		21.6		11.9		0.8					11.4
	Bluegill		0.1		1.1							0.6
	Channel Catfish		0.5		3.0		0.6					1.4
	Common Carp		8.2		3.6		2.0					4.6
	Freshwater Drum		0.4		1.1		0.8					0.8
	Gizzard Shad		0.0									0.0
	Green Sunfish				0.4							0.4
	Northern Pike		1.5		0.8		0.6					1.0
	Orangespotted Sunfish		0.0									0.0
	River Carpsucker		0.2		0.1							0.2
	Shorthead Redhorse				0.3		0.2					0.3
	Shortnose Gar		0.0		0.0		0.0					0.0
	Walleye		0.7		0.3		0.6					0.5
	White Sucker		4.5		2.3		2.8					3.2
	Yellow Bullhead		0.3		0.5							0.4
Yellow Perch		0.5		0.1							0.3	
std exp gill net	Bigmouth Buffalo		2.3		4.3		4.0	0.3	5.0	16.7		5.4
	Black Bullhead		4.3		20.7		94.0	26.7	18.3	19.7		30.6
	Black Crappie		1.7		1.7			0.3	1.3			1.3

Gear	Species	CPUE										
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
std exp gill net	Channel Catfish		0.3		0.3				1.0			0.5
	Common Carp		1.0		0.3		1.0	0.3	0.7	0.7		0.7
	Freshwater Drum		0.3		0.7		0.5		1.7	2.0		1.0
	Gizzard Shad		0.0		0.0							0.0
	Northern Pike				0.7		2.0	1.0		1.0		1.2
	River Carpsucker		0.3					0.3		1.3		0.6
	Shorthead Redhorse						0.5		0.3			0.4
	Shortnose Gar		0.0				0.0			0.0		0.0
	Walleye		9.3		10.3		3.0	6.3	2.7	1.0		5.4
	White Sucker		1.7		2.7		4.5	1.7	3.7	1.7		2.7
	Yellow Perch		2.7		12.0		7.0	0.3	0.7			4.5

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											
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
AFS std gill net	Black Crappie	PSD											100	
		PSD-P											50	
		Wr											102	
	Northern Pike	PSD												100
		PSD-P												100
		Wr												82
	Walleye	PSD												50
		PSD-P												30
		Wr												84
Yellow Perch	PSD												83	
	PSD-P												50	
	Wr												94	
large frame net	Black Crappie	PSD		47		64		75						
		PSD-P		3		13		25						
		Wr		122		116		129						
	Northern Pike	PSD		93		100		100						
		PSD-P		27		0		100						
		Wr		88		86		93						
	Walleye	PSD		14		50		100						
		PSD-P		14		50		0						
		Wr		103		88		98						
Yellow Perch	PSD		20		0									
	PSD-P		20		0									
	Wr		107		93									
std exp gill net	Black Crappie	PSD		100		60				0	0			
		PSD-P		20		20				0	0			
		Wr		126		121				122	119			
	Northern Pike	PSD				100		100		67			100	
		PSD-P				50		0		33			33	
		Wr				79		94		88			89	
	Walleye	PSD		43		61		50		42	63		67	

Gear	Species	Index	Year									
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
std exp gill net	Walleye	PSD-P		14		0		0	11	0	0	
		Wr		91		97		102	97	93	91	
	Yellow Perch	PSD		25		56		71	100	100		
		PSD-P		0		0		21	0	100		
		Wr		106		105		112	93	92		

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).

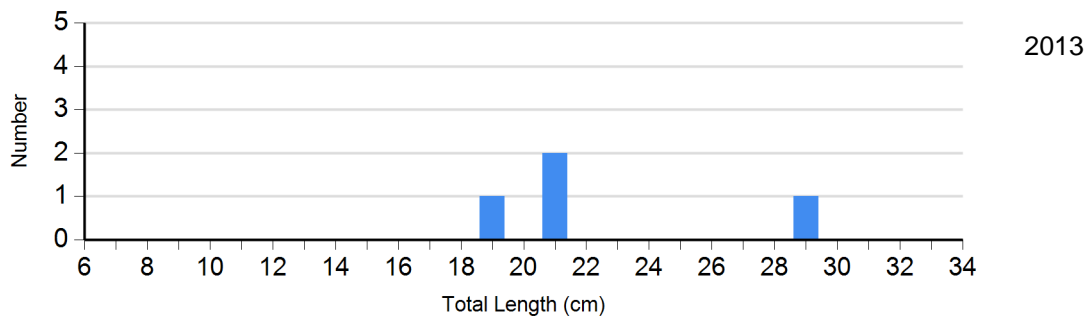
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2013	1	133	2	131 (8.1)	1	120	0	
Northern Pike Gill Net	2013	0		4	94 (2.6)	0		0	
	2014	1	98	1	106	1	62	0	
	2016	0		2	92 (11.8)	1	84	0	
	2017	0		0		2	82 (5.0)	0	
	2017	5	80 (3.1)	2	94 (14.0)	3	83 (4.7)	0	
Walleye Gill Net	2013	3	105 (2.1)	3	100 (4.1)	0		0	
	2014	11	91 (2.7)	6	103 (2.0)	2	109 (12.0)	0	
	2015	3	94 (0.9)	5	92 (1.8)	0		0	
	2016	1	95	2	90 (1.9)	0		0	
	2017	5	80 (3.1)	2	94 (14.0)	3	83 (4.7)	0	
Yellow Perch Gill Net	2013	4	119 (3.1)	7	109 (2.7)	3	107 (2.8)	0	
	2014	0		1	93	0		0	
	2015	0		0		0		2	92 (5.4)
	2017	1	95	2	96 (7.0)	3	92 (3.4)	0	

Length Frequency Distribution

Length frequency histogram of species sampled by year.

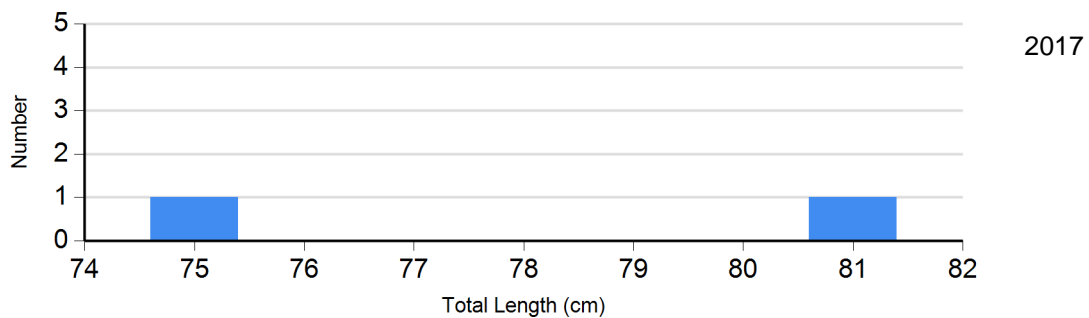
Species: Black Crappie

Gear: large frame net



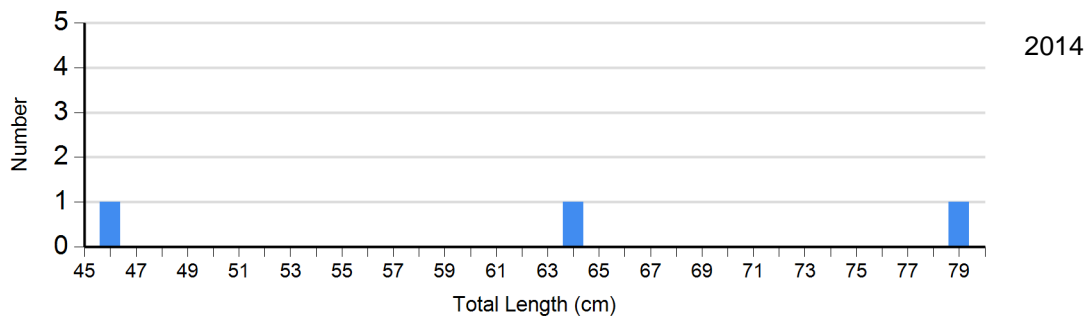
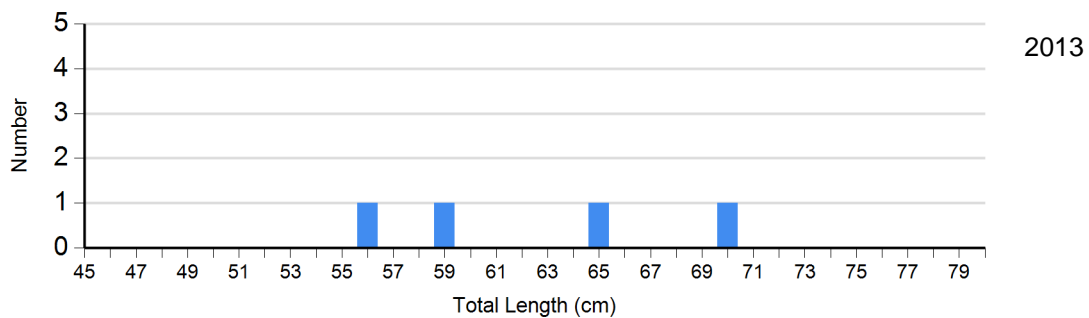
Species: Northern Pike

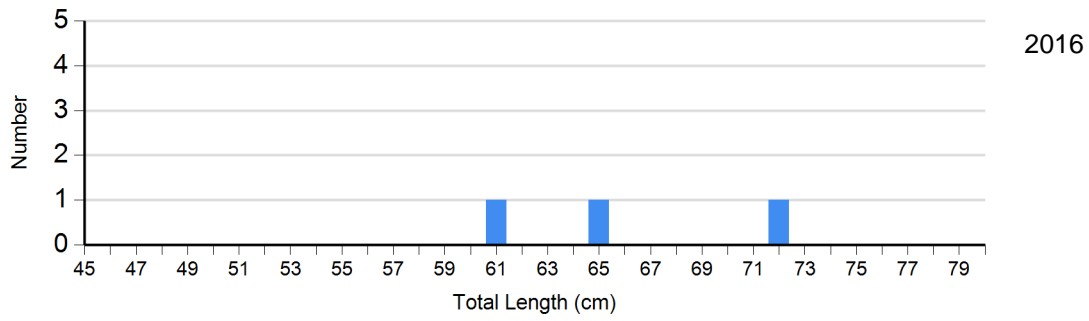
Gear: AFS std gill net



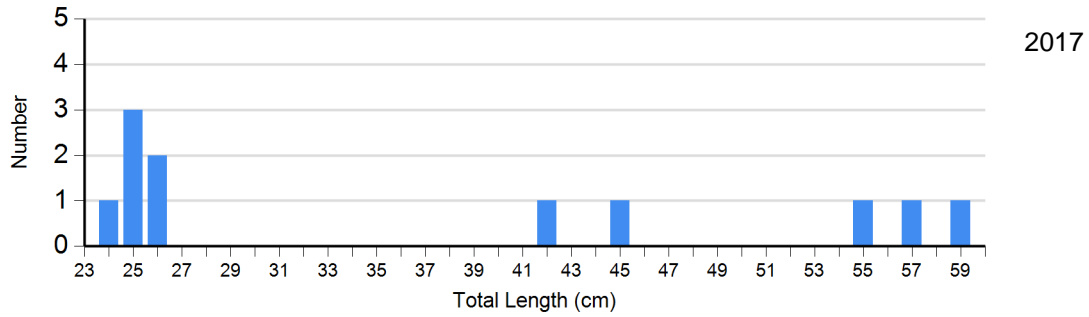
Species: Northern Pike

Gear: std exp gill net

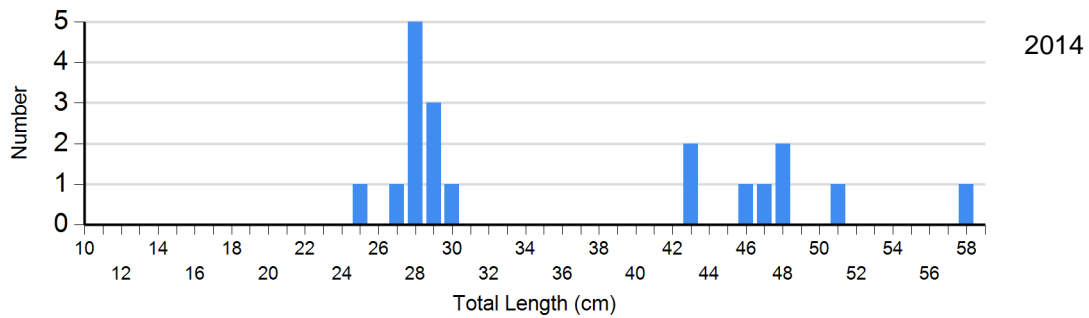
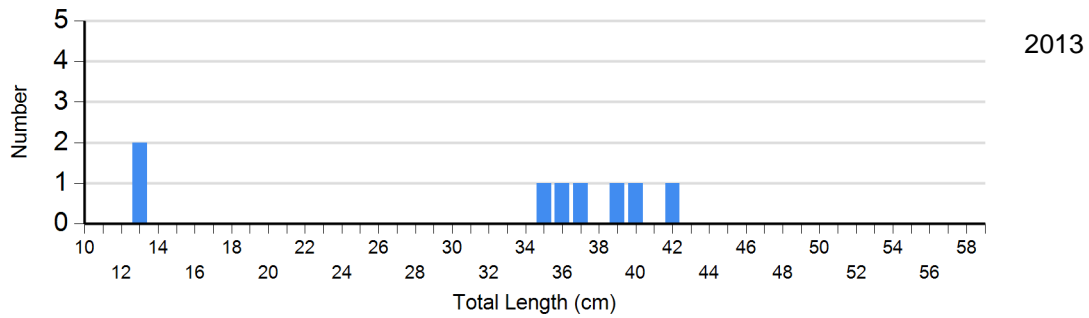


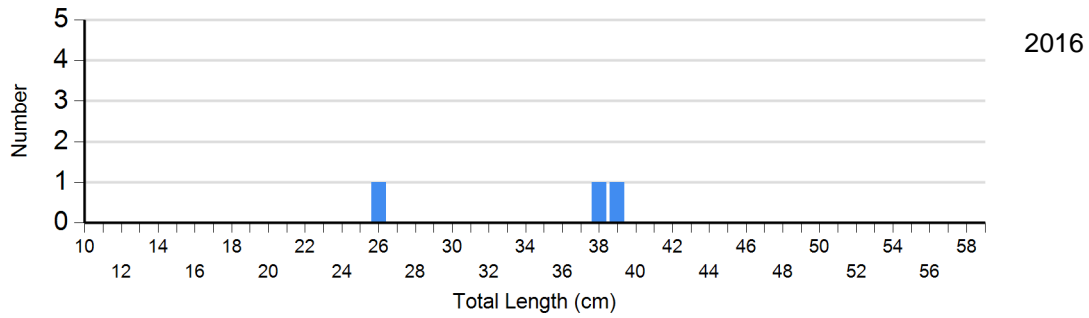
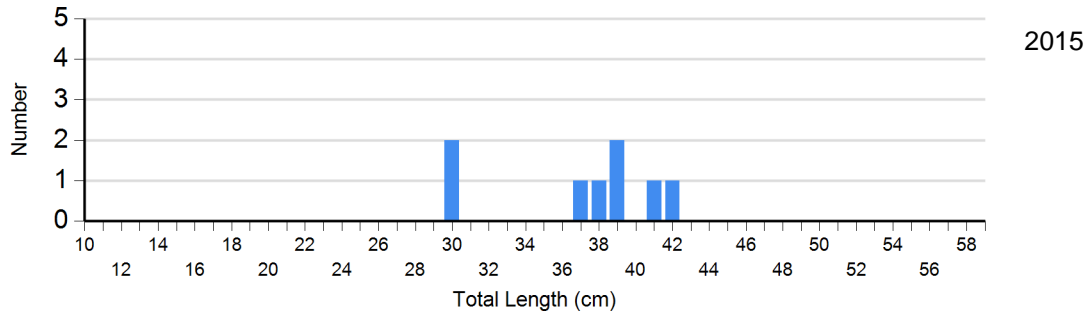


Species: Walleye
Gear: AFS std gill net

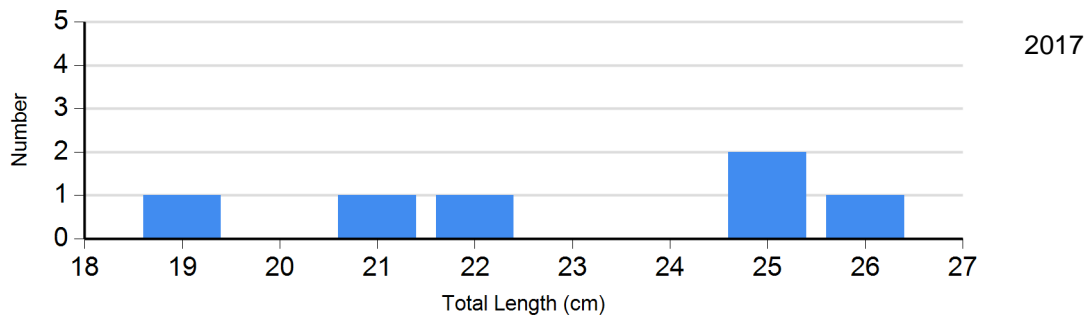


Species: Walleye
Gear: std exp gill net

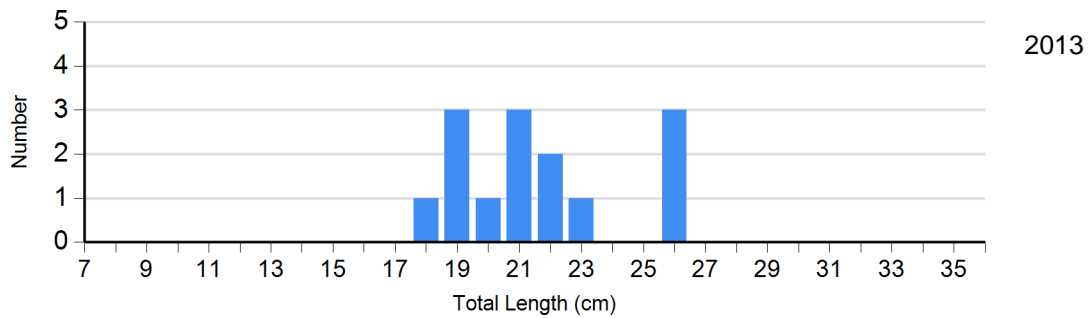


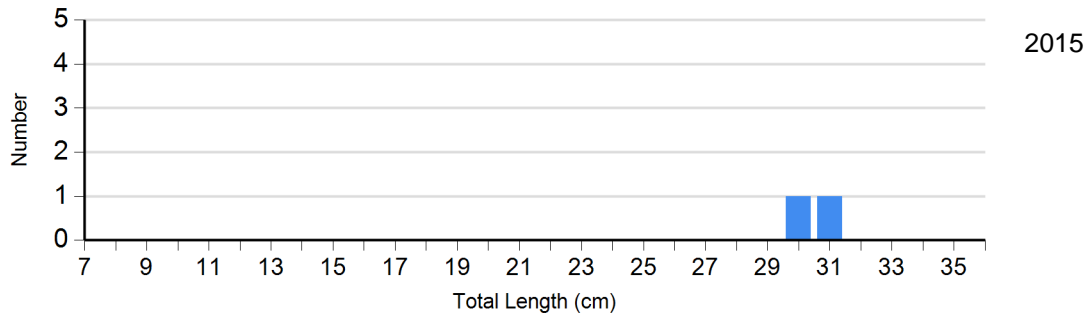
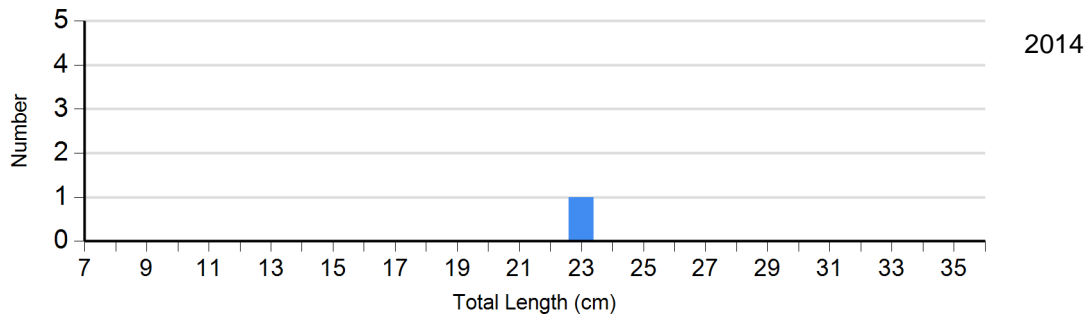


Species: Yellow Perch
Gear: AFS std gill net



Species: Yellow Perch
Gear: std exp gill net

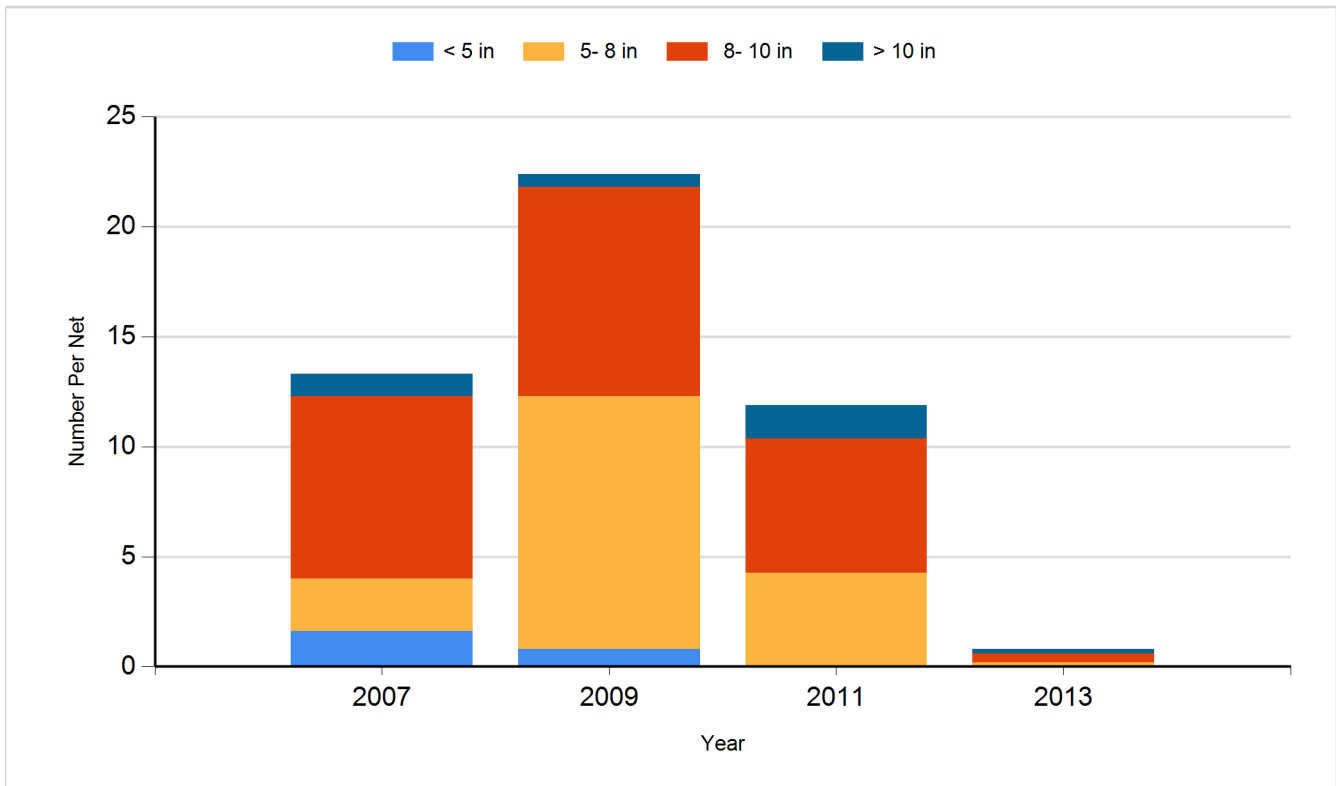




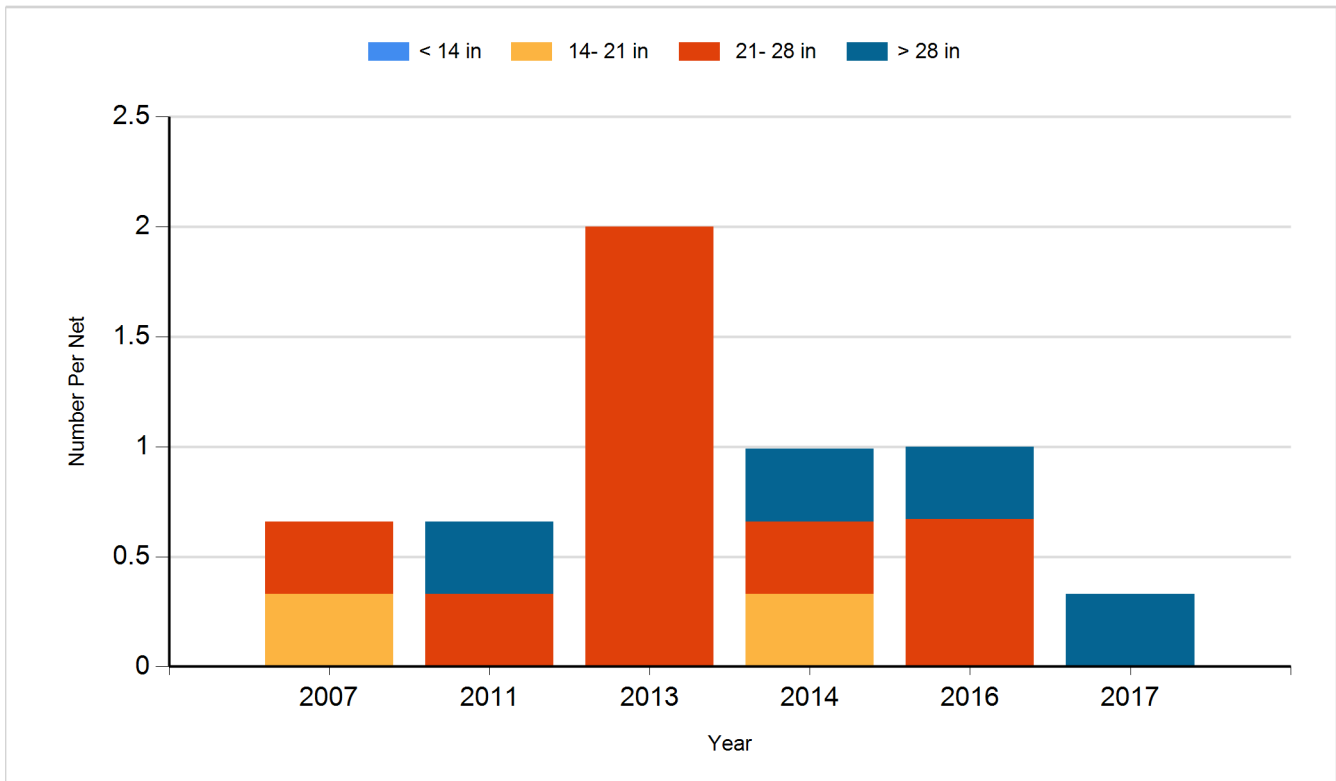
Historic Fish Sizes and Relative Abundance

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

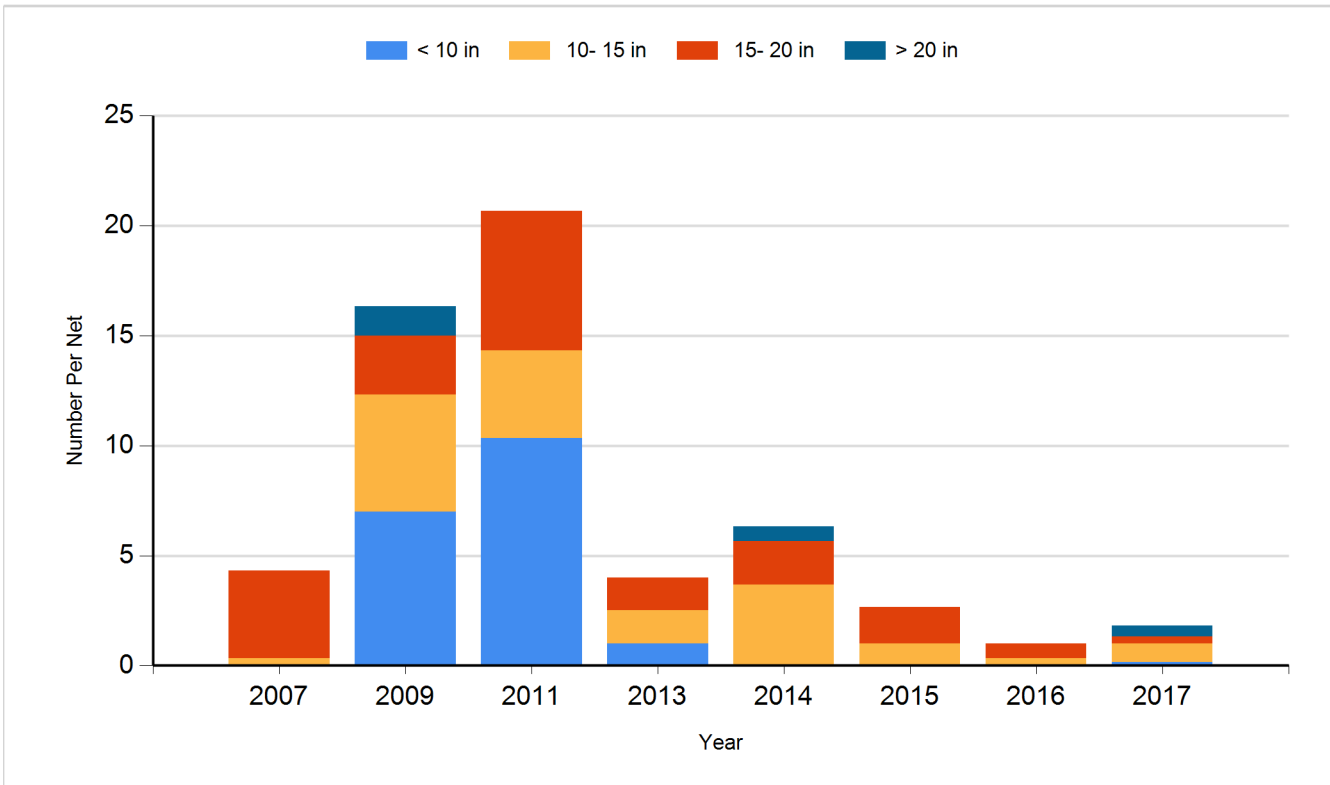
Species: Black Crappie
Gear: Frame Net



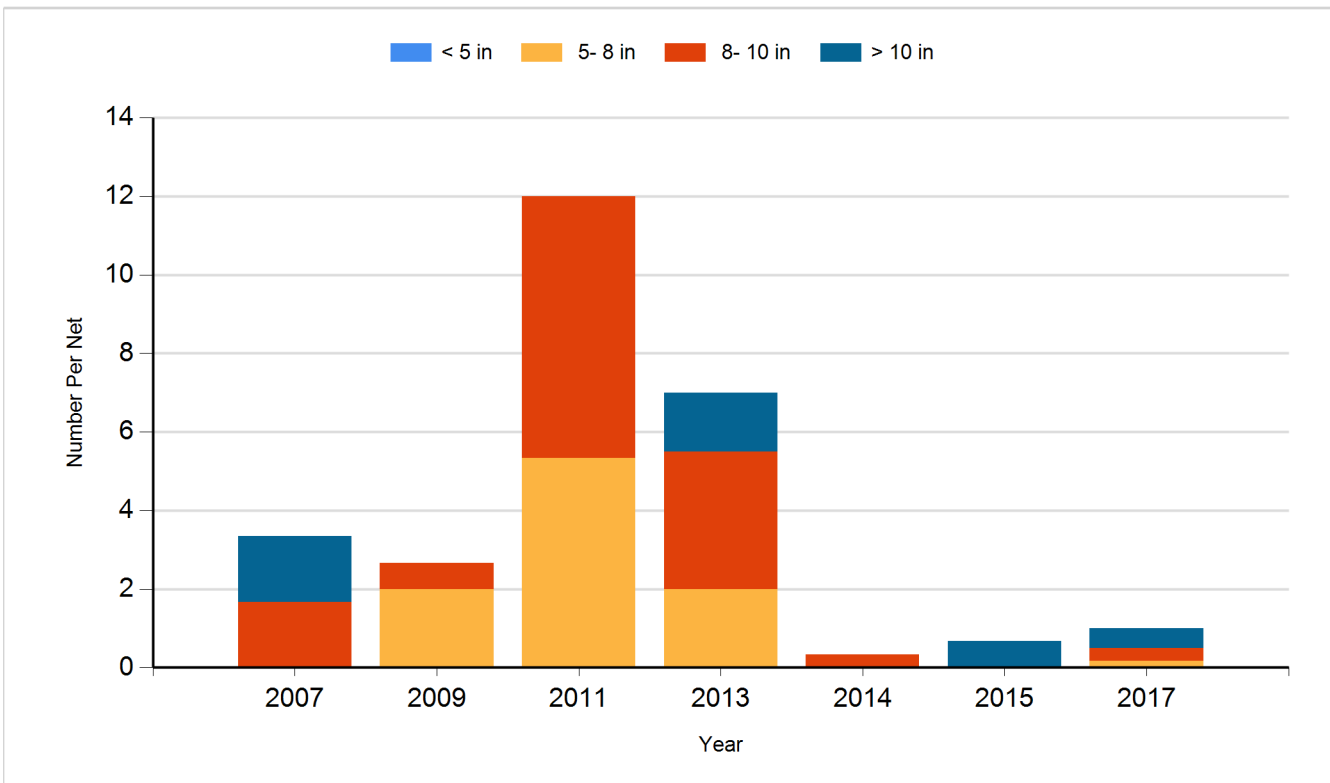
Species: Northern Pike
Gear: Gill Net



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
2008	Walleye	Fry	2,000,000
2010	Walleye	Fry	2,000,000
2012	Walleye	Fry	1,003,118
2013	Walleye	Fry	950,000
2014	Walleye	Fry	950,000
2015	Walleye	Fry	891,071
2016	Walleye	Fry	900,000
2017	Walleye	Fry	1,600,000