

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Beaver, Minnehaha County
LBS-Lake-70-000
2017

Lake Information

Name:	Beaver	Maximum Depth:	11 Feet
County:	Minnehaha	Mean Depth:	9 Feet
Legal Description:	T102N-R52W-Sec. 14,15	OHWM Elevation:	1,652
Surface Area:	372 Acres	Outlet Elevation:	1,652

Surveys and Investigations

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

Gear	Date	Effort
AFS std frame net	June 15, 2017	4 net-nights
AFS std gill net	June 15, 2017	4 net-nights

Common Fish Species Present

Yellow Perch

Walleye

Black Crappie

Black Bullhead

Common Carp

Northern Pike

Green Sunfish

Orangespotted Sunfish

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 frame net	Black Bullhead	24.3	17.9	19	6	13	5		
	Black Crappie	25.0	15.9	29	6	11	5	112	2
	Common Carp	0.0	0.0	0		0			
	Green Sunfish	0.3	0.4	100		0			
	Northern Pike	0.3	0.4	0		0		90	
	Orangespotted Sunfish	0.0	0.0						
	Walleye	1.0	0.7	100		0		88	2
	Yellow Perch	0.8	0.8	67		0		83	8
AFS std gill net	Black Bullhead	4.8	1.9	63	18	32	17		
	Black Crappie	0.0	0.0	0		0			
	Common Carp	7.5	2.5	63	14	10			
	Northern Pike	3.3	1.0	38		15		96	3
	Walleye	9.3	2.2	68	12	8		96	1
	Yellow Perch	3.8	2.9	100		13		86	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
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AFS std frame net	Black Bullhead										24.3	24.3
	Black Crappie										25.0	25.0
	Common Carp										0.0	0.0
	Green Sunfish										0.3	0.3
	Northern Pike										0.3	0.3
	Orangespotted Sunfish										0.0	0.0
	Walleye										1.0	1.0
	Yellow Perch										0.8	0.8
AFS std gill net	Black Bullhead										4.8	4.8
	Black Crappie										0.0	0.0
	Common Carp										7.5	7.5
	Northern Pike										3.3	3.3
	Walleye										9.3	9.3
	Yellow Perch										3.8	3.8
large frame net	Black Bullhead	35.2					689.3					362.3
	Black Crappie	7.4					0.3					3.9
	Bluegill	0.1										0.1
	Green Sunfish	0.2										0.2
	Northern Pike	1.9					0.3					1.1
	Walleye	0.4					0.3					0.4
	Yellow Perch	0.1										0.1
std exp gill net	Black Bullhead	1.0					129.7	74.0	19.0	7.7		46.3
	Black Crappie	0.3										0.3
	Common Carp								4.0	14.7		9.4
	Northern Pike	11.0					2.0	1.0	0.3	0.7		3.0
	Orangespotted Sunfish								0.0			0.0
	Walleye	6.3					2.0	6.3	1.7	13.7		6.0
	Yellow Perch	3.3					0.3	7.7	14.3	24.0		9.9
std frame net (3/8 inch)	Black Bullhead							740.0	72.0	6.2		272.7
	Black Crappie								0.0	0.2		0.1
	Common Carp							0.2	1.0	10.2		3.8
	Northern Pike							1.0		0.4		0.7
	Walleye							1.0	0.0	1.2		0.7

		CPUE										
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
std frame net (20' x 1')	Yellow Perch								0.2	0.6		0.4

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 frame net	Black Crappie	PSD											29	
		PSD-P											11	
		Wr											112	
	Northern Pike	PSD												0
		PSD-P												0
		Wr												90
	Walleye	PSD												100
		PSD-P												0
		Wr												88
Yellow Perch	PSD												67	
	PSD-P												0	
	Wr												83	
AFS std gill net	Black Crappie	PSD											0	
		PSD-P											0	
		Wr											96	
	Northern Pike	PSD												38
		PSD-P												15
		Wr												96
	Walleye	PSD												68
		PSD-P												8
		Wr												96
Yellow Perch	PSD												100	
	PSD-P												13	
	Wr												86	
large frame net	Black Crappie	PSD		95					100					
		PSD-P		53					67					
		Wr		106					105					
	Northern Pike	PSD		74					100					
		PSD-P		0					33					
		Wr		97					77					
	Walleye	PSD		25					100					
		PSD-P		0					0					

Gear	Species	Index	Year										
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
large frame net	Walleye	Wr		97					97				
	Yellow Perch	PSD		100									
		PSD-P		0									
		Wr		110									
std exp gill net	Black Crappie	PSD		100									
		PSD-P		100									
		Wr		104									
	Northern Pike	PSD		58					83	100	100	50	
		PSD-P		0					50	67	0	50	
		Wr		102					84	90	85	117	
	Walleye	PSD		5					33	79	100	2	
		PSD-P		0					33	11	40	2	
		Wr		99					89	97	93	91	
	Yellow Perch	PSD		70					100	0	93	6	
		PSD-P		0					0	0	2	6	
		Wr		108					115	99	111	124	
	std frame net (3/8 inch)	Black Crappie	PSD									0	0
			PSD-P									0	0
			Wr										115
Northern Pike		PSD								100		100	
		PSD-P								80		100	
		Wr								81		131	
Walleye		PSD								100	0	33	
		PSD-P								0	0	17	
		Wr								92		89	
Yellow Perch		PSD									100	33	
		PSD-P									0	33	
		Wr									110	114	

Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2014	29	135 (29)									

Fish Condition

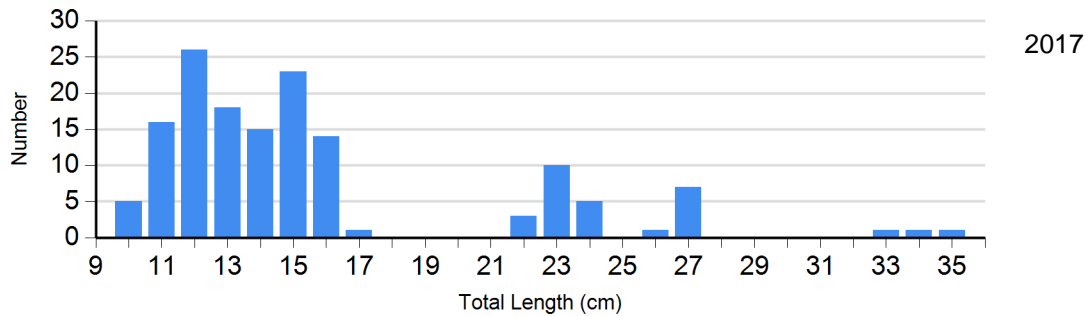
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	0		1	106	2	105 (1.2)	0	
	2015	0		0		0		0	
	2016	1	115	0		0		0	
	2017	71	109 (2.5)	18	122 (2.9)	8	112 (3.1)	3	97 (3.8)
Northern Pike Gill Net	2013	1	76	2	83 (3.5)	3	87 (3.5)	0	
	2014	0		1	94	2	88 (1.1)	0	
	2015	0		1	85	0		0	
	2016	1	109	0		1	124	0	
	2017	8	95 (2.2)	3	104 (2.1)	1	88	1	83
Walleye Gill Net	2013	4	86 (0.7)	0		2	95 (0.5)	0	
	2014	4	99 (4.1)	13	97 (1.4)	2	95 (1.4)	0	
	2015	0		3	92 (2.9)	2	95 (3.4)	0	
	2016	40	91 (1.5)	0		0		1	98
	2017	12	99 (1.9)	22	94 (1.1)	3	96 (7.2)	0	
Yellow Perch Gill Net	2013	0		1	115	0		0	
	2014	23	99 (2.1)	0		0		0	
	2015	3	117 (7.3)	39	110 (1.5)	1	110	0	
	2016	68	126 (2.9)	0		4	104 (2.7)	0	
	2017	0		13	86 (1.5)	1	86	1	92

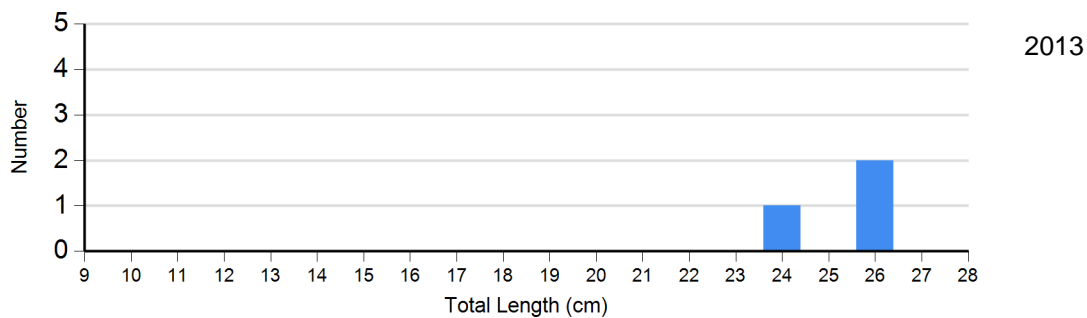
Length Frequency Distribution

Length frequency histogram of species sampled by year.

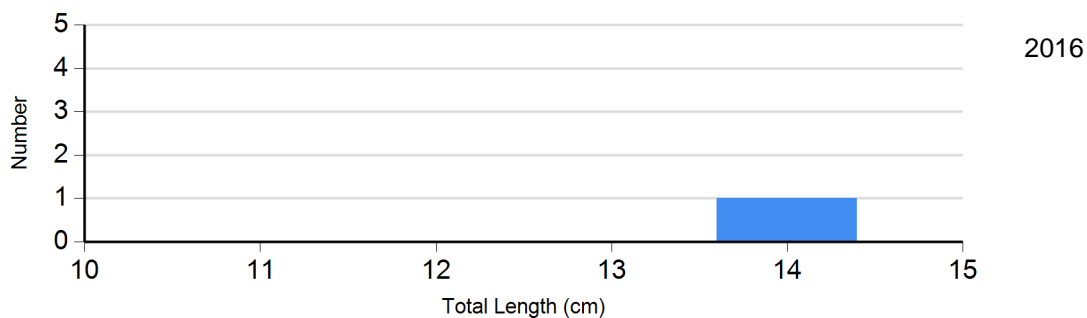
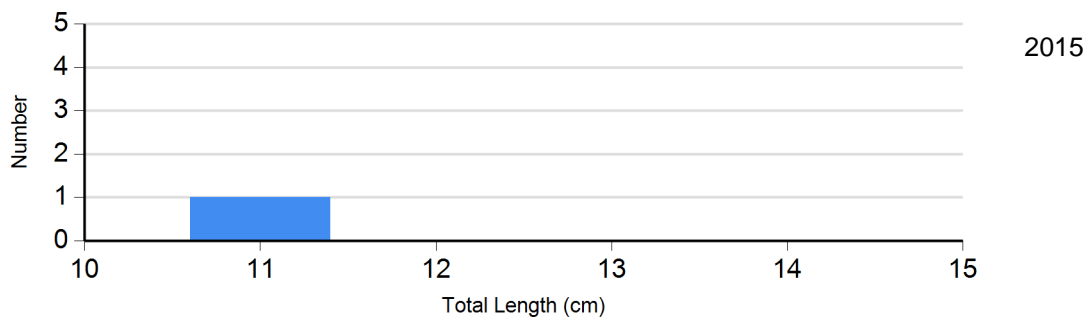
Species: Black Crappie
Gear: AFS std frame net



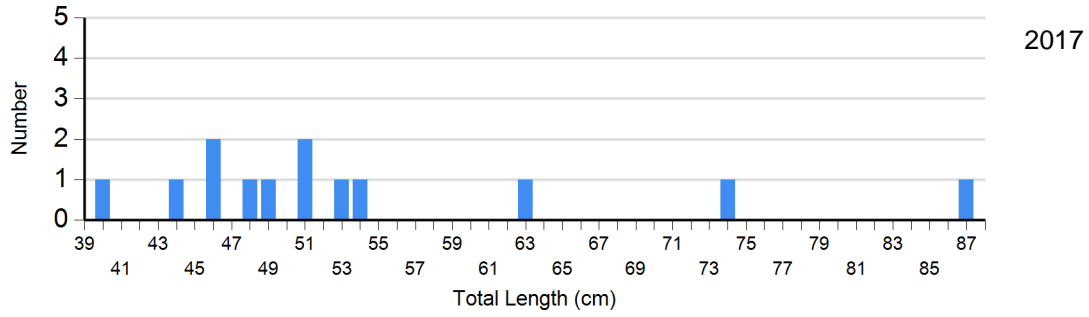
Species: Black Crappie
Gear: large frame net



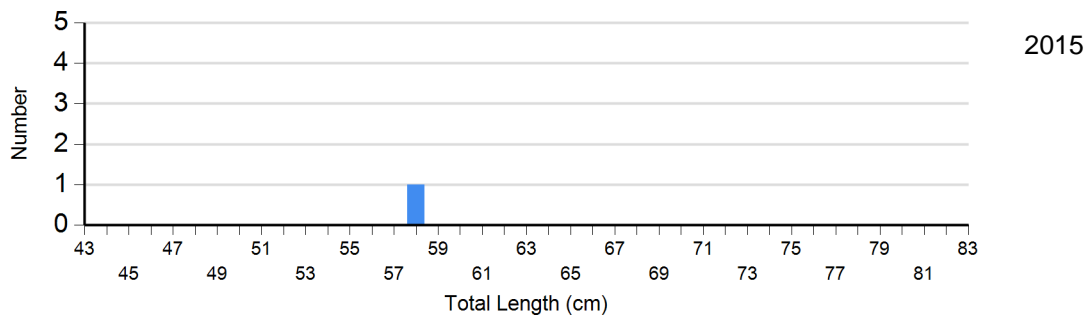
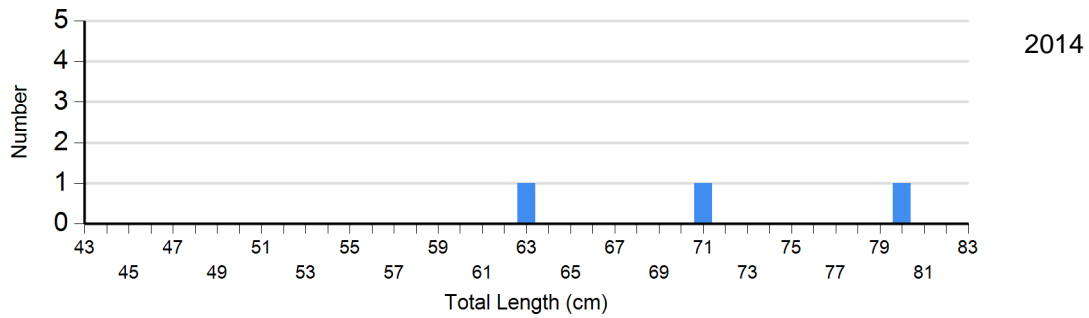
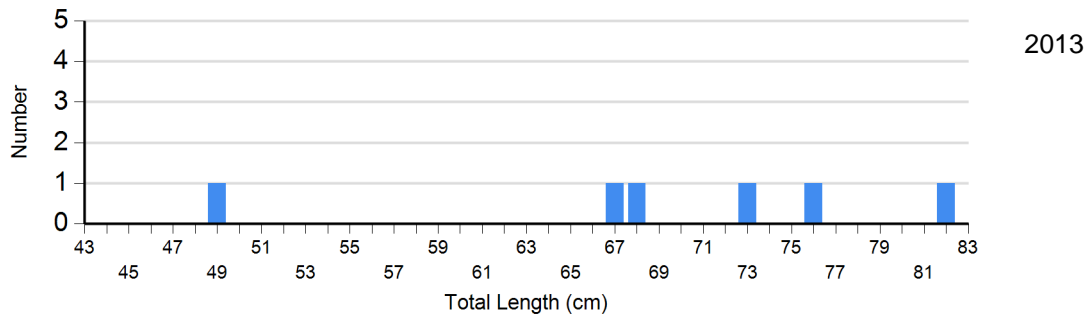
Species: Black Crappie
Gear: std frame net (3/8 inch)

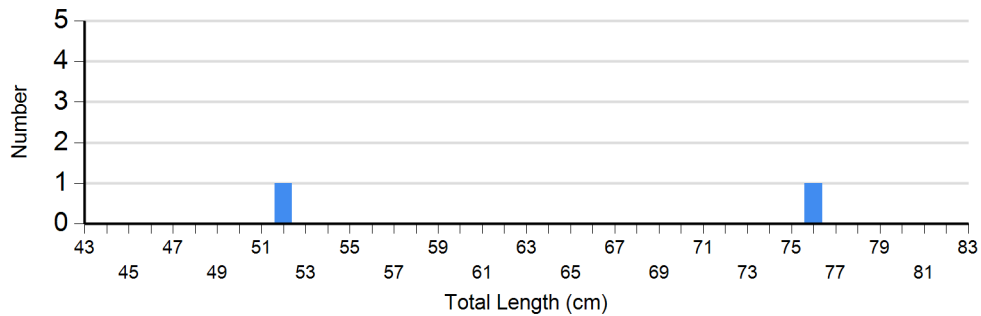


Species: Northern Pike
Gear: AFS std gill net



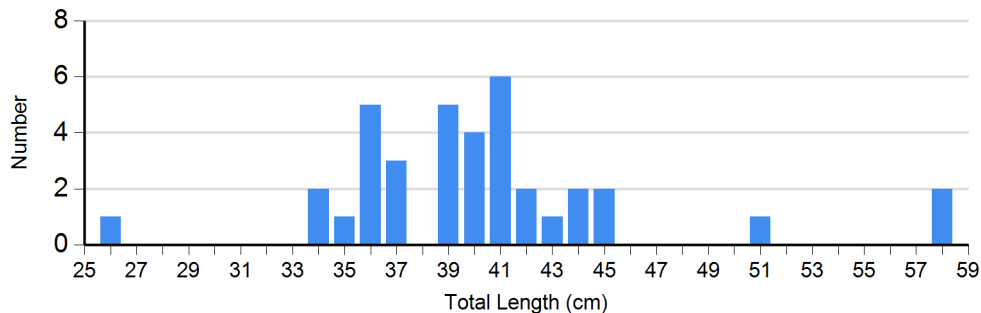
Species: Northern Pike
Gear: std exp gill net





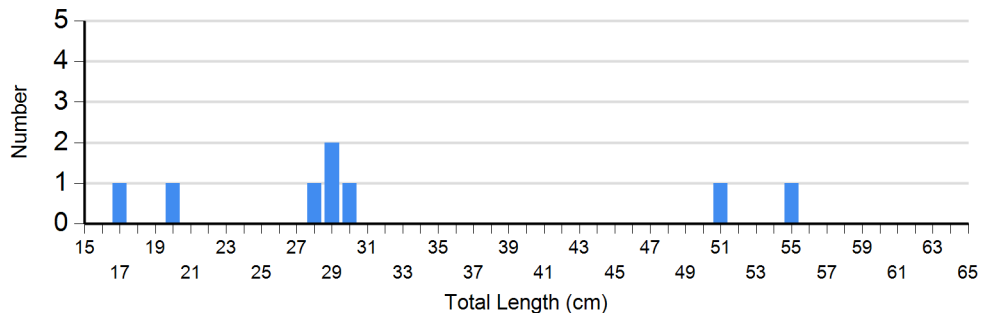
2016

Species: Walleye
Gear: AFS std gill net

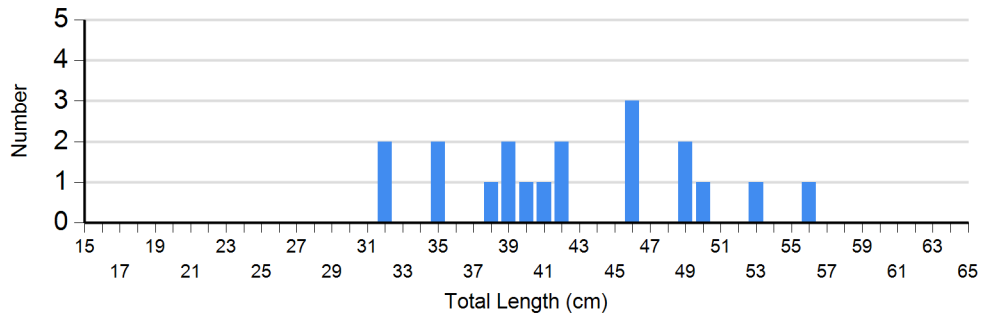


2017

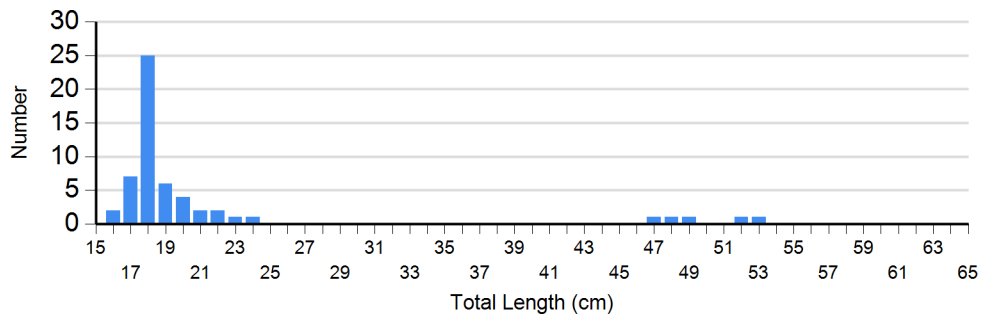
Species: Walleye
Gear: std exp gill net



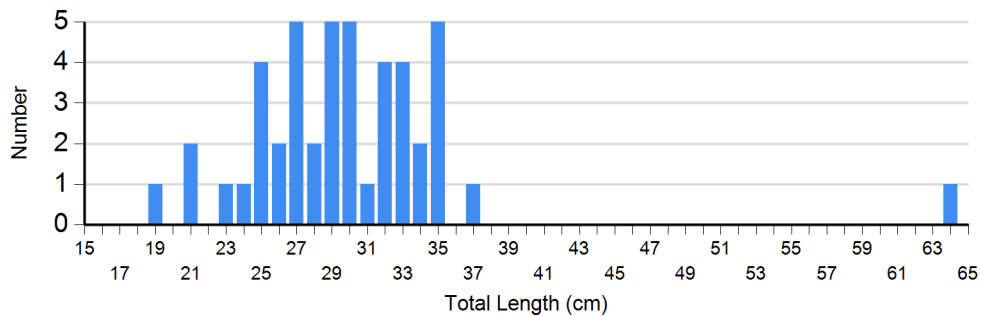
2013



2014

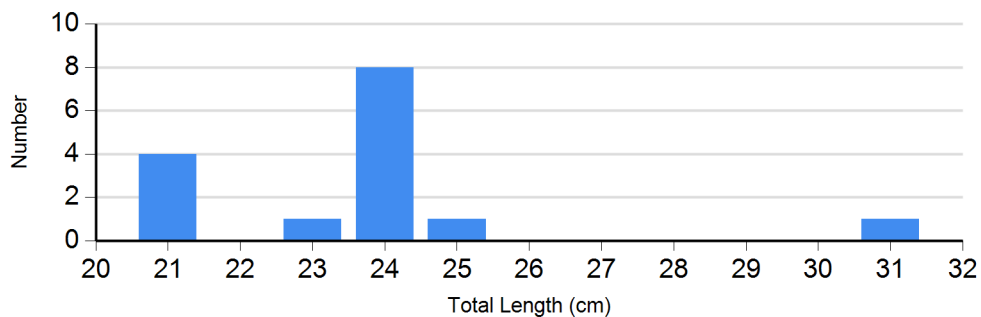


2015



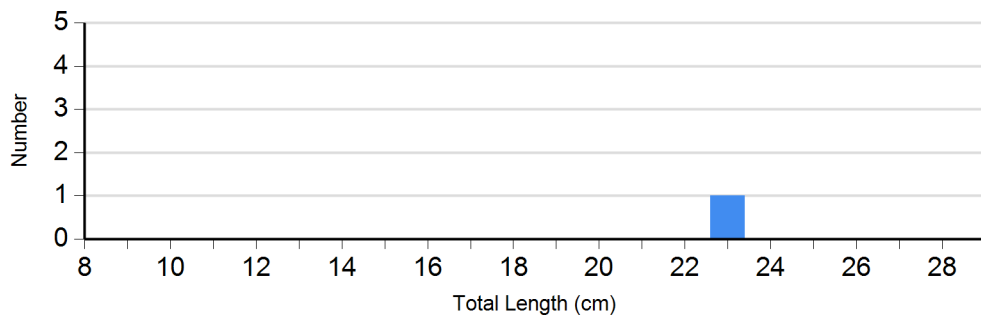
2016

Species: Yellow Perch
Gear: AFS std gill net

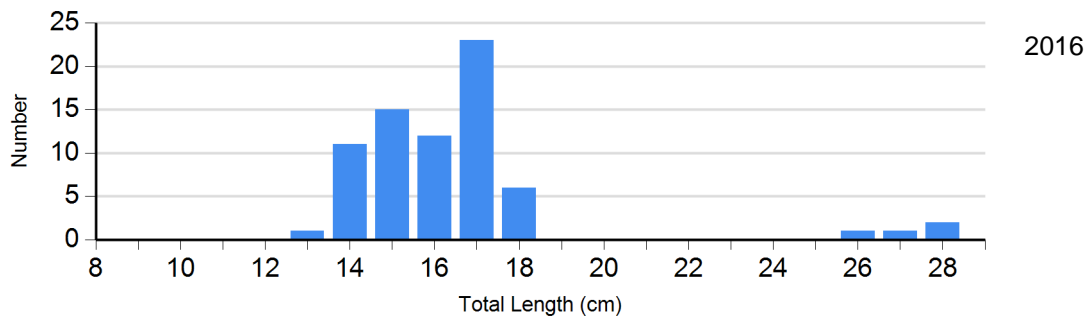
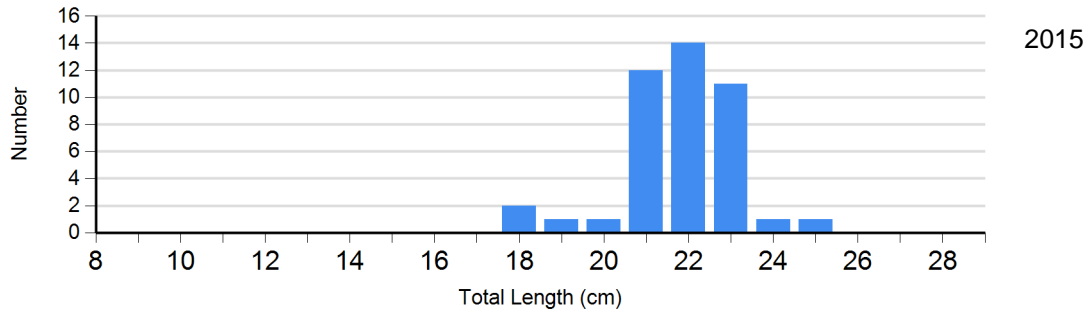
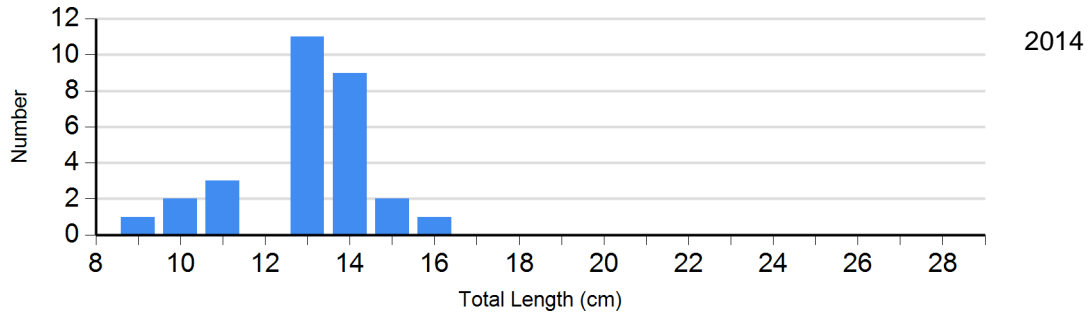


2017

Species: Yellow Perch
Gear: std exp gill net



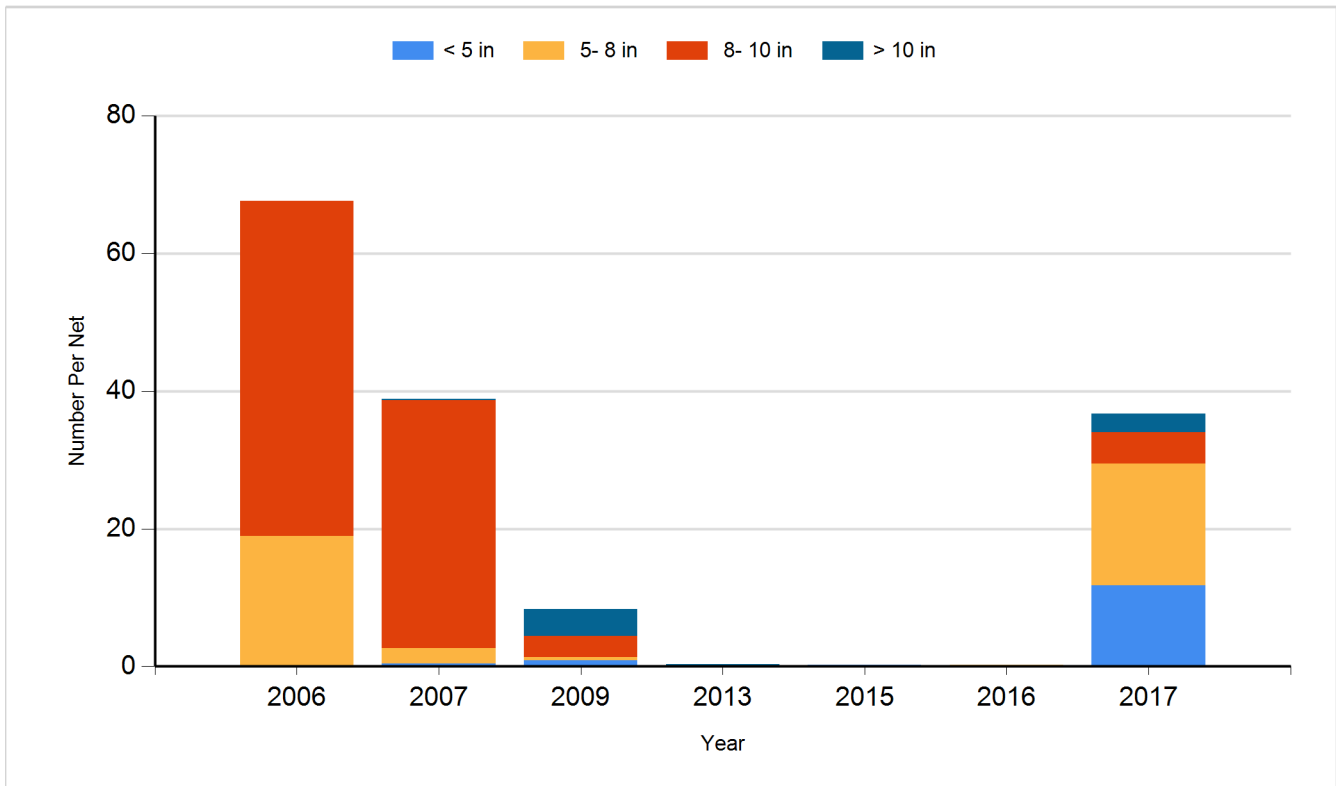
2013



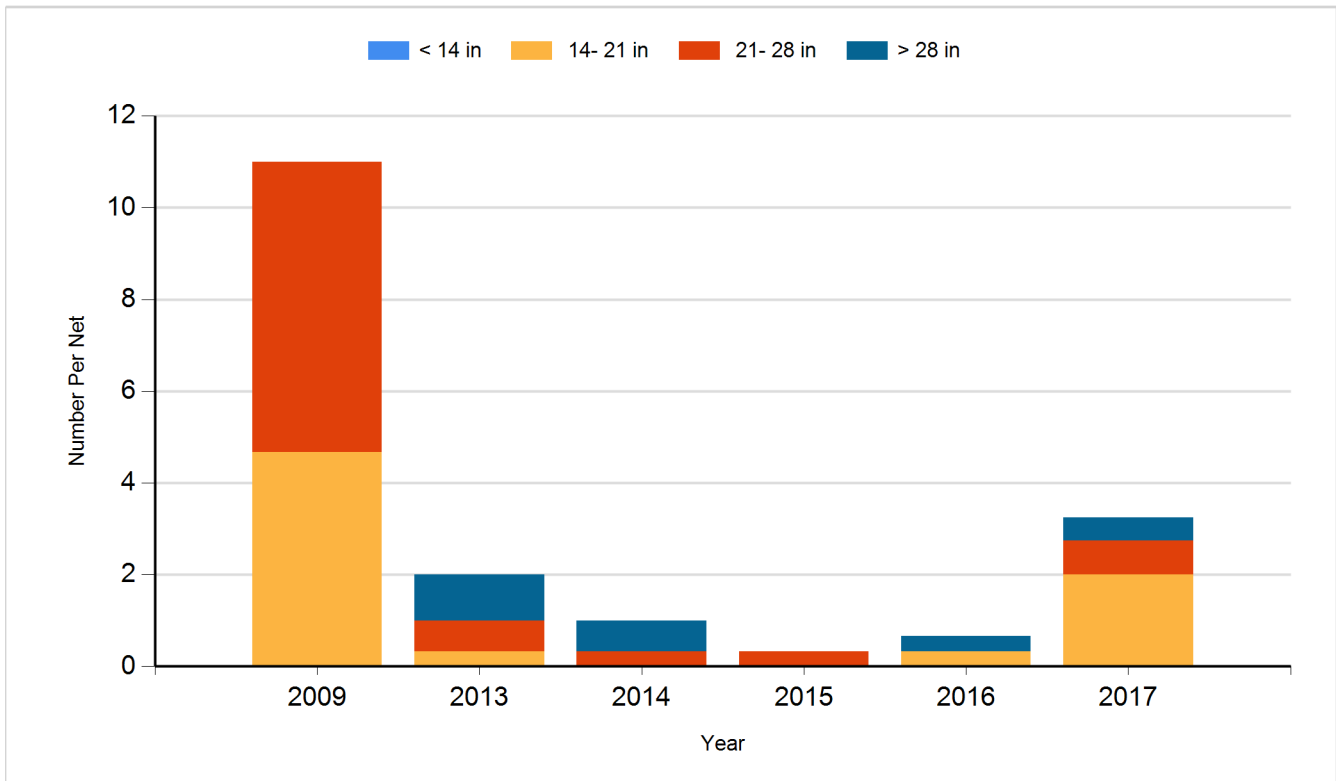
Historic Fish Sizes and Relative Abundance

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

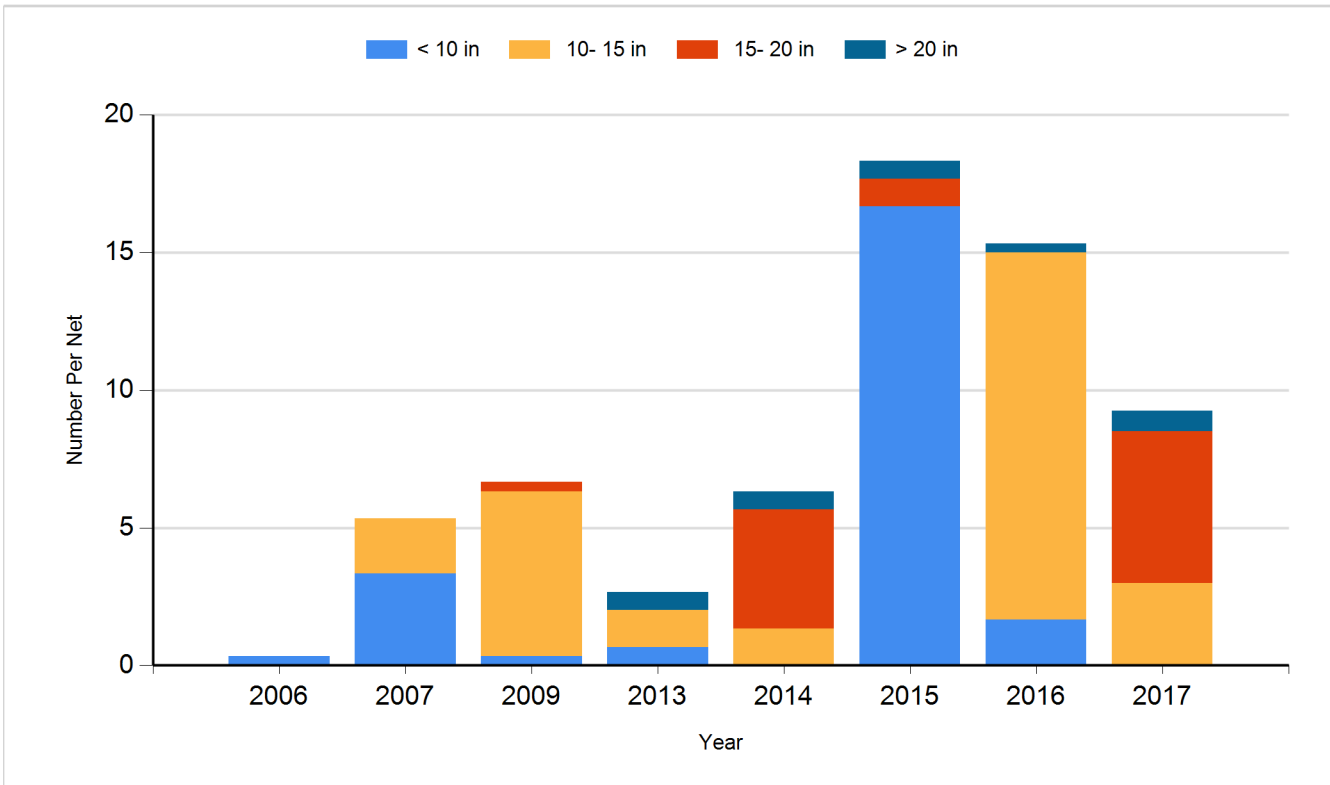
Species: Black Crappie
Gear: Frame Net



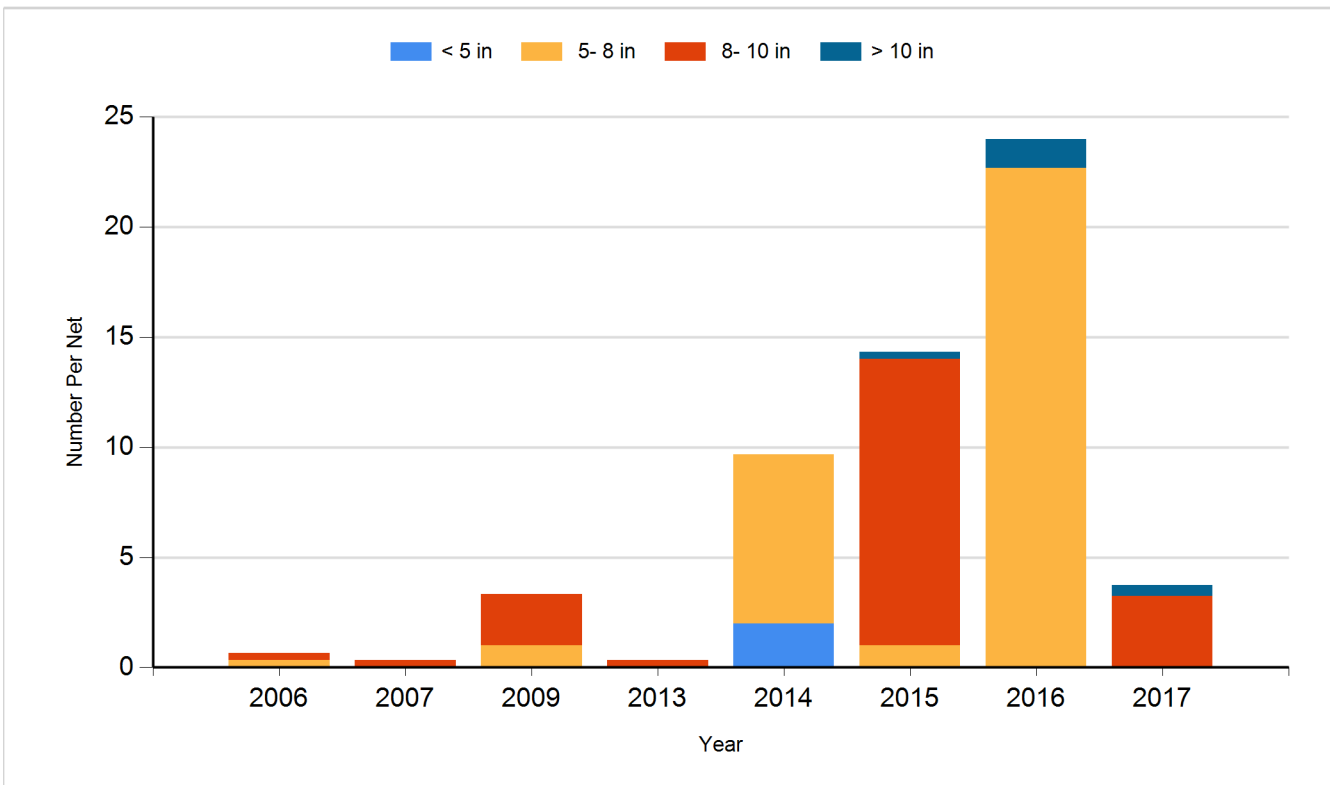
Species: Northern Pike
Gear: Gill Net



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
2006	Fathead Minnow	Adult	54,700
2006	Walleye	Fingerling	6,666
2006	Walleye	Juvenile	310
2006	Walleye	Small Fingerling	30,250
2007	Walleye	Large Fingerling	825
2008	Black Crappie	Adult	3,283
2008	Northern Pike	Juvenile	820
2008	Walleye	Fry	300,000
2008	Walleye	Small Fingerling	30,340
2008	Yellow Perch	Fingerling	37,185
2010	Walleye	Juvenile	500
2010	Walleye	Small Fingerling	27,000
2011	Walleye	Small Fingerling	29,900
2012	Walleye	Small Fingerling	60,500
2012	Yellow Perch	Fingerling	54,670
2013	Yellow Perch	Small Fingerling	161,182
2014	Walleye	Fry	300,000
2015	Walleye	Small Fingerling	21,054
2017	Walleye	Fingerling	21,600