SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Mitchell, Davison County
LJA-Lake-623-000
2017

Lake Information

Name:	Mitchell	**Maximum Depth:**	29 Feet
County:	Davison	**Mean Depth:**	12 Feet
Legal Description:	T103W- R60N-Sec 4-6, 9; T104N-R60W-Sec 31-32		
Surface Area:	690 Acres	**Watershed Area:**	19,821.31 Sq Miles

Surveys and Investigations

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

Gear	Date	Effort
AFS std frame net	June 06, 2017	12 net-nights
AFS std gill net	June 06, 2017	8 net-nights
hoop net	June 07, 2017	6 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

White Crappie

Channel Catfish

Freshwater Drum

Common Carp

Northern Pike

Walleye

Green 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).

$$CPUE = \frac{number\ of\ fish}{effort}$$

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 frame net	Black Crappie	20.3	11.1	100		0		95	2
	Bluegill	4.6	3.8	85	7	4		114	2
	Channel Catfish	2.3	1.9	79	12	4		95	3
	Common Carp	1.3	0.6	100		40	21		
	Freshwater Drum	0.1	0.1	0		0			
	Green Sunfish	0.1	0.1	0		0		98	
	Northern Pike	0.1	0.1	100		100		79	
	Orangespotted Sunfish	0.0	0.0						
	Shorthead Redhorse	0.1	0.1	100		100			
	Sunfish Hybrid	0.0	0.0						
	White Crappie	16.9	12.7	99		0		100	2
AFS std gill net	Bigmouth Buffalo	0.1	0.2	100		100			
	Black Crappie	7.4	2.8	100		2		102	2
	Bluegill	0.1	0.2	100		0		100	
	Channel Catfish	13.4	4.0	85	5	2		86	1
	Flathead Catfish	0.1	0.2	100		0		102	
	Freshwater Drum	2.6	1.4	67	17	0			
	Northern Pike	0.3	0.2	100		100		83	9
	Quillback	0.0	0.0						
	Walleye	0.3	0.2	100		100		87	6
	White Crappie	3.0	1.1	96		0		105	4
hoop net	Channel Catfish	2.3	3.1	64	22	0		93	4

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 frame net	Black Crappie										20.3	20.3
	Bluegill										4.6	4.6
	Channel Catfish										2.3	2.3
	Common Carp										1.3	1.3
	Freshwater Drum										0.1	0.1
	Green Sunfish										0.1	0.1
	Northern Pike										0.1	0.1
	Orangespotted Sunfish										0.0	0.0
	Shorthead Redhorse										0.1	0.1
	Sunfish Hybrid										0.0	0.0
	White Crappie										16.9	16.9
AFS std gill net	Bigmouth Buffalo										0.1	0.1
	Black Crappie										7.4	7.4
	Bluegill										0.1	0.1
	Channel Catfish										13.4	13.4
	Flathead Catfish										0.1	0.1
	Freshwater Drum										2.6	2.6
	Northern Pike										0.3	0.3
	Quillback										0.0	0.0
	Walleye										0.3	0.3
	White Crappie										3.0	3.0
boat shocker (night)	Largemouth Bass									3.5		3.5
	Smallmouth Bass									20.0		20.0
fall night EF-WAE	Flathead Catfish							156.9	13.6			85.3
	Largemouth Bass		18.0		12.3	4.3						11.5
	Smallmouth Bass		1.8									1.8
	Walleye	7.5	18.5	49.5	12.3	0.5	119.5	12.4	0.2			27.6
hoop net	Black Crappie									7.0		7.0
	Bluegill									1.3		1.3
	Channel Catfish									0.7	2.3	1.5
	Smallmouth Bass									0.7		0.7
	White Crappie									2.3		2.3
large frame net	Bigmouth Buffalo			0.1			0.1					0.1

		CPUE										
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
large frame net	Black Bullhead		0.1	0.2		0.7						0.3
	Black Crappie	1.6	1.2	10.4	8.6	3.8	1.4					4.5
	Blue Catfish		0.1									0.1
	Bluegill	17.1	4.3	24.3	7.6	18.5	2.3					12.4
	Channel Catfish	23.9	5.9	1.7	3.1	1.8	2.6					6.5
	Common Carp	2.4	6.3	2.6	2.7	3.6	2.3					3.3
	Flathead Catfish	0.1	0.1	0.0	0.3		0.3					0.2
	Freshwater Drum	0.7	0.1	0.2	0.1	1.6	0.5					0.5
	Green Sunfish	0.1			0.2							0.2
	Northern Pike	0.2	0.3	0.3	0.1	0.1	0.3					0.2
	Shorthead Redhorse	1.7	1.1	2.4	2.1	1.0	0.4					1.5
	Smallmouth Bass	0.5	0.4	0.8	1.1	0.4	0.4					0.6
	Sunfish Hybrid	0.0		0.0	0.0							0.0
	Walleye	0.6	0.3	0.1			0.1					0.3
	White Crappie			0.2	0.1							0.2
	White Sucker	0.1	0.3	0.9	0.9	0.3	0.3					0.5
std exp gill net	Bigmouth Buffalo		0.2				1.0			1.0		0.7
	Black Bullhead	1.5	0.2	4.2	2.6	2.8						2.3
	Black Crappie	0.3	0.5	0.2		2.7	0.6	0.3	14.0	5.8		3.1
	Bluegill		0.2	0.2	0.2	0.2	0.6			0.2		0.3
	Channel Catfish	2.5	4.2	5.3	1.2	16.7	9.8	16.5	18.4	22.0		10.7
	Common Carp	0.5	0.7	0.5	0.6	1.0	1.0	2.5	0.4	0.8		0.9
	Flathead Catfish			0.2								0.2
	Freshwater Drum	3.5	2.2	3.5	4.8	11.3	1.4	2.0	3.8	5.0		4.2
	Largemouth Bass						0.2	0.0				0.1
	Northern Pike	1.2	1.8	0.5	3.0	0.7	0.8	0.3				1.2
	Shorthead Redhorse	0.2	0.8	0.3	1.4	1.8	0.6	0.5				0.8
	Smallmouth Bass				0.8	0.0	0.2	0.8	0.2			0.4
	Smallmouth Buffalo	0.0										0.0
	Walleye	2.0	2.0	1.8	8.0	3.3	2.4	2.8	0.8	0.8		2.7
	White Crappie							0.8		5.0		2.9
	White Sucker	0.5	0.8	2.5	6.8	0.2	0.4					1.9
std frame net (3/8 inch)	Bigmouth Buffalo								0.5			0.5
	Black Bullhead								0.0	0.1		0.1
	Black Crappie							1.0	7.3	43.9		17.4
	Bluegill							2.3	4.0	2.3		2.9

		CPUE										
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
std frame net (3/8 inch)	Channel Catfish							4.6	18.7	6.4		9.9
	Common Carp								1.4	1.3		1.4
	Flathead Catfish							0.1	0.3			0.2
	Freshwater Drum							0.9		0.1		0.5
	Green Sunfish									0.4		0.4
	Largemouth Bass							0.0		0.1		0.1
	Northern Pike							0.1	0.1	0.3		0.2
	Shorthead Redhorse									0.1		0.1
	Smallmouth Bass							0.0		0.2		0.1
	Walleye							0.5				0.5
	White Crappie							0.4	0.7	15.3		5.5

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.

			Year									
Gear	Species	Index	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AFS std frame net	Black Crappie	PSD										100
		PSD-P										0
		Wr										95
	Northern Pike	PSD										100
		PSD-P										100
		Wr										79
AFS std gill net	Black Crappie	PSD										100
		PSD-P										2
		Wr										102
	Northern Pike	PSD										100
		PSD-P										100
		Wr										83
	Walleye	PSD										100
		PSD-P										100
		Wr										87
fall night EF-WAE	Walleye	Wr	95	89	83	94	93	85	79	90		
hoop net	Black Crappie	PSD									71	
		PSD-P									0	
		Wr									104	
large frame net	Black Crappie	PSD	59	86	75	87	63	65				
		PSD-P	3	7	23	15	50	41				
		Wr	105	111	100	103	105	107				
	Northern Pike	PSD	25	75	100	100	0	67				
		PSD-P	0	25	50	100	0	0				
		Wr	79	79	86	85	66	80				
	Walleye	PSD	20	67	100			0				
		PSD-P	10	33	0			0				
		Wr	87	82	78			85				
std exp gill net	Black Crappie	PSD	0	33	0		69	100	100	3	62	
		PSD-P	0	0	0		56	100	100	0	0	

			Year									
Gear	Species	Index	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
std exp gill net	Black Crappie	Wr	138	127	106		105	79	104	113	109	
	Northern Pike	PSD	0	64	67	33	75	100	100			
		PSD-P	0	0	0	7	0	0	0			
		Wr	75	80	85	78	77	74	93			
	Walleye	PSD	33	58	55	5	30	42	82	75	0	
		PSD-P	0	8	0	0	0	8	9	0	0	
		Wr	84	86	83	82	86	87	91	76	93	
std frame net (3/8 inch)	Black Crappie	PSD							88	0	49	
		PSD-P							25	0	2	
		Wr							101	108	103	
	Northern Pike	PSD							100	100	100	
		PSD-P							100	0	67	
		Wr							104	86	85	
	Walleye	PSD							100			
		PSD-P							25			
		Wr							90			

Length at Capture

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

Species: Black Crappie

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2015	87		180 (87)								
2014	216	107 (208)	199 (1)	244 (5)	302 (2)						
2013	17	140 (5)	194 (3)	259 (4)	271 (3)	264 (2)					
2012	38	163 (14)	253 (6)	255 (11)	266 (6)	273 (1)					
2011	103	151 (3)	209 (62)	232 (30)	270 (8)						
2010	127	140 (26)	204 (19)	245 (75)	257 (6)	278 (1)					
2009	27	111 (15)	212 (9)		244 (3)						

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2017	2										568 (2)
2016	4		281 (2)	290 (2)							
2015	4		262 (1)	387 (1)	438 (2)						
2014	11	259 (2)		418 (4)	468 (2)	486 (2)		475 (1)			
2013	12		391 (12)								
2012	20	266 (1)	327 (7)	375 (10)	505 (1)	467 (1)					
2011	46	229 (7)	298 (36)	383 (2)		452 (1)					
2009	12		333 (4)	403 (6)					575 (2)		
2008	14	251 (3)	337 (7)			494 (1)		470 (2)	487 (1)		

Fish Condition

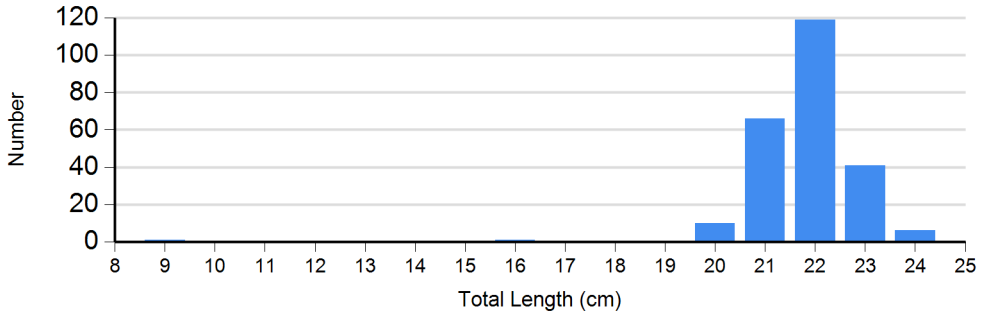
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	6	121 (3.3)	4	108 (4.1)	7	94 (1.9)	0	
	2014	1	98	5	106 (0.2)	1	97	1	99
	2015	87	108 (0.8)	0		0		0	
	2016	270	105 (0.8)	247	101 (0.7)	10	87	0	
	2017	1	162	242	94 (0.9)	0		0	
Northern Pike Gill Net	2013	0		4	74 (3.5)	0		0	
	2014	0		1	93	0		0	
	2017	0		0		2	83 (7.1)	0	
Walleye Gill Net	2013	7	87 (3.3)	4	88 (3.1)	1	78	0	
	2014	2	80 (2.1)	8	93 (2.4)	1	92	0	
	2015	1	77	3	75 (1.7)	0		0	
	2016	4	93 (3.7)	0		0		0	
	2017	0		0		2	87 (4.7)	0	

Length Frequency Distribution

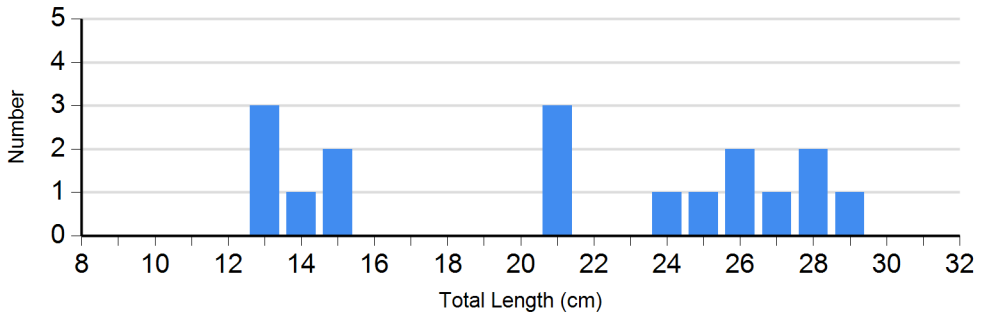
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net



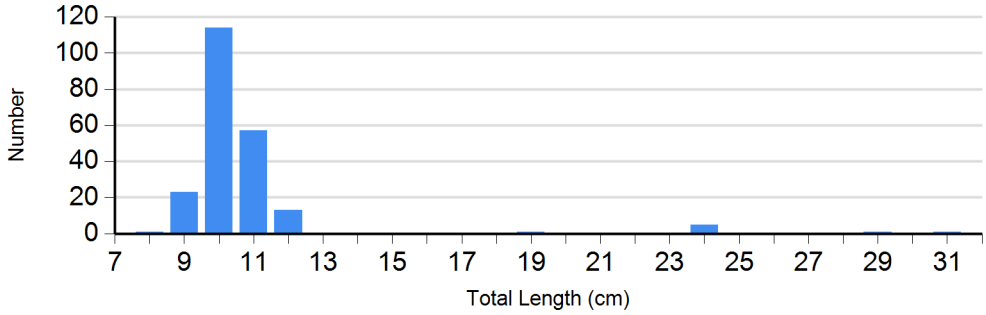
2017

Species: Black Crappie
Gear: large frame net



2013

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



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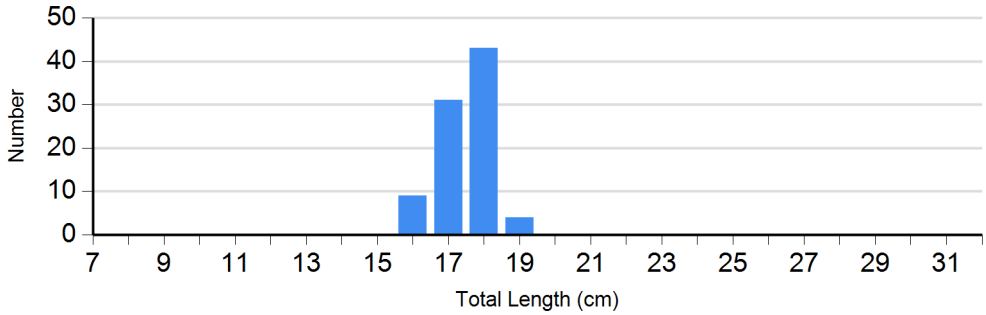
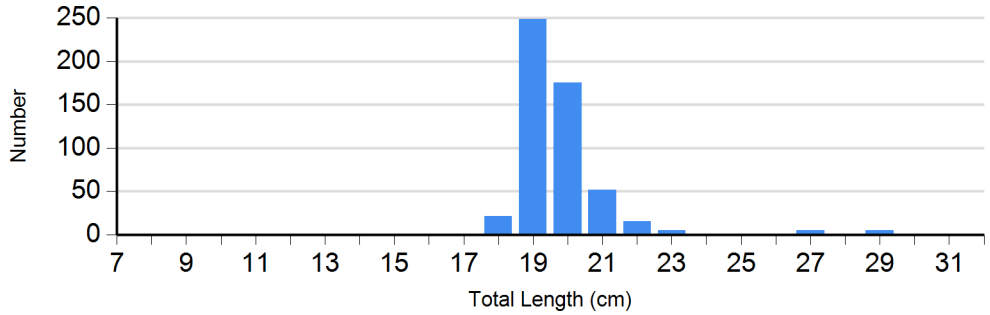
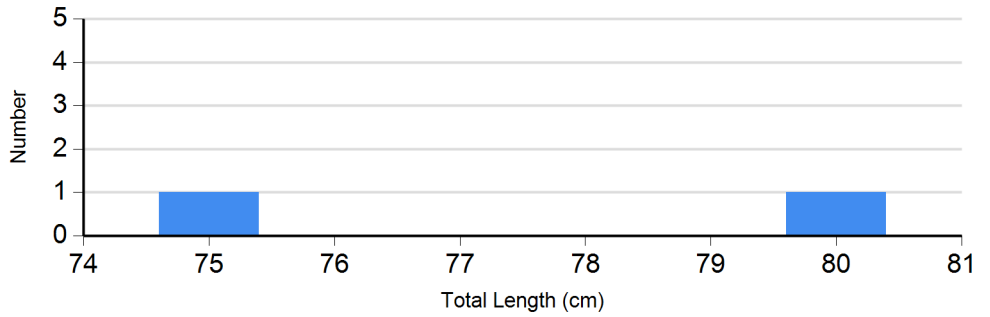


2015



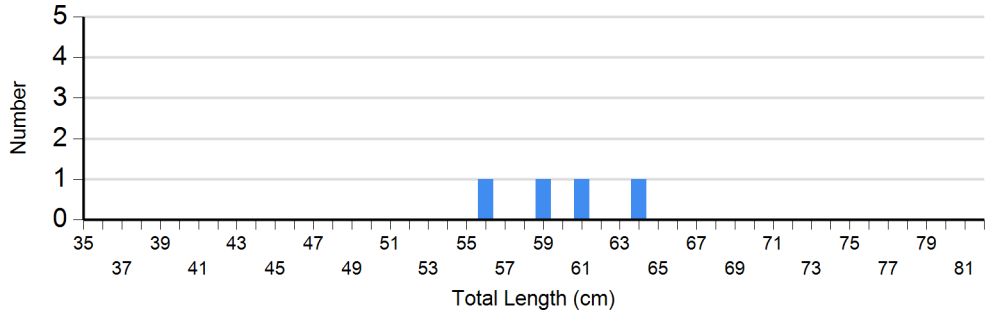
2016

Species: Northern Pike
Gear: AFS std gill net

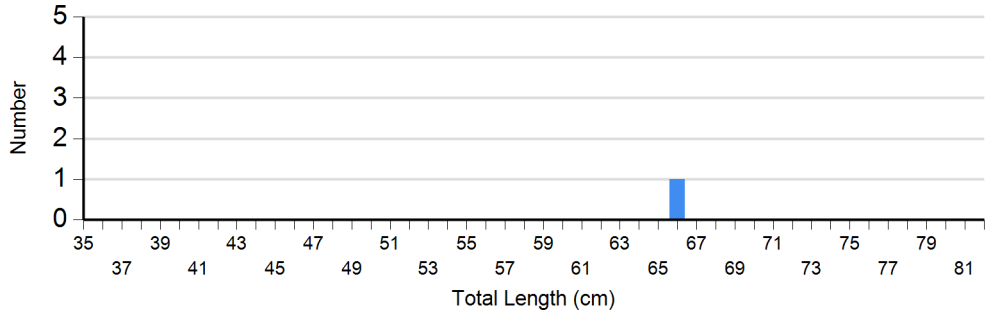


2017

Species: Northern Pike
Gear: std exp gill net

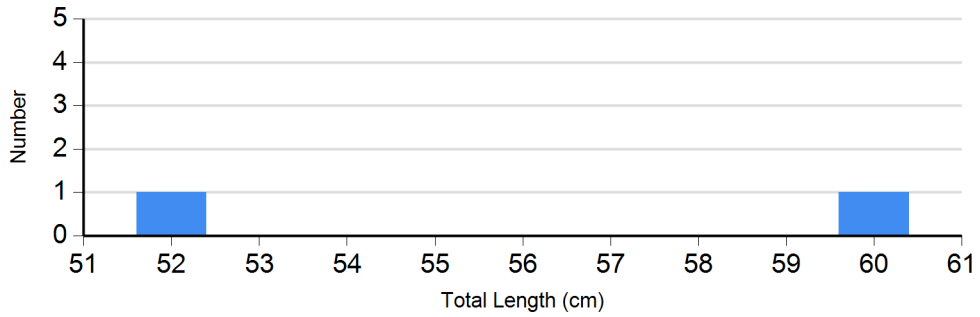


2013



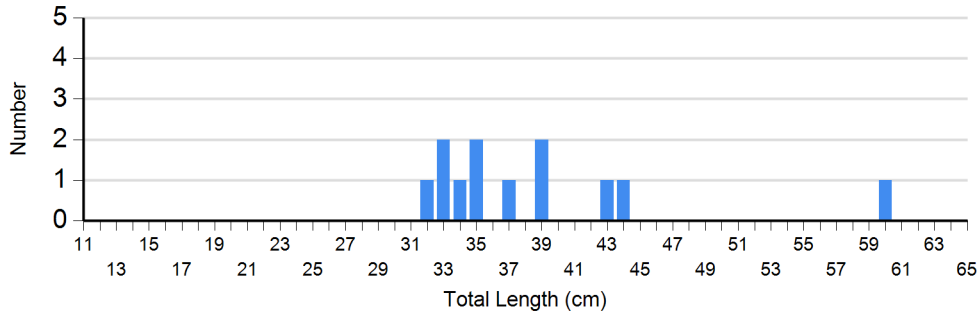
2014

Species: Walleye
Gear: AFS std gill net

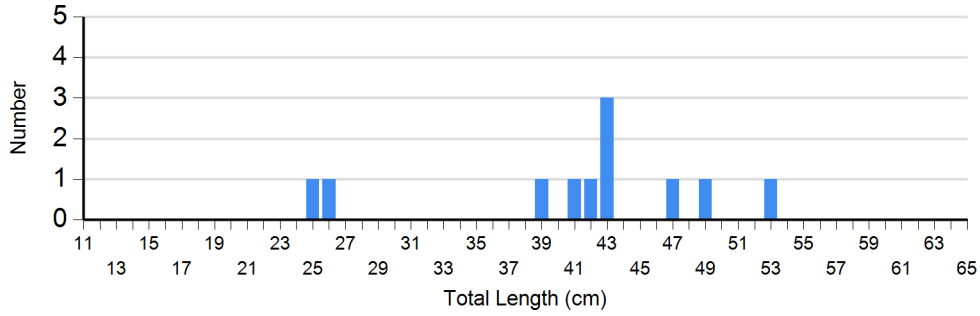


2017

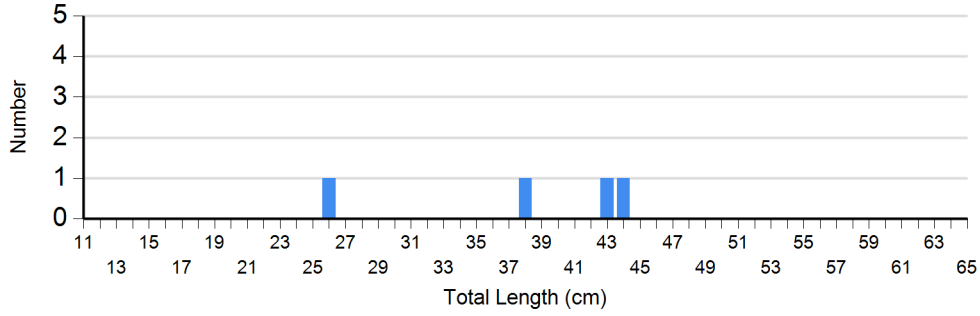
Species: Walleye
Gear: std exp gill net



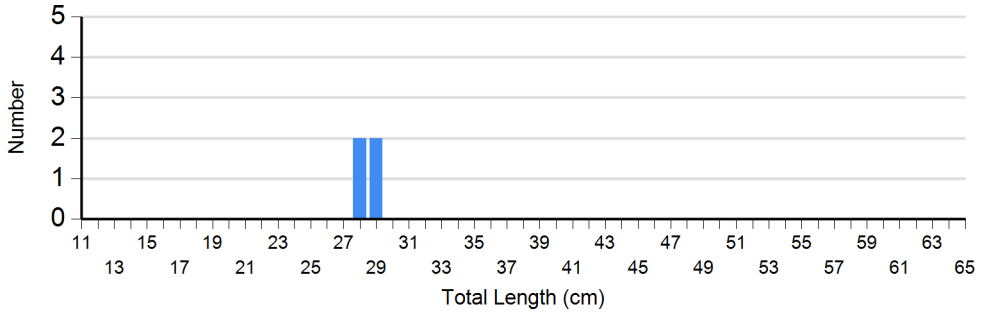
2013



2014



2015

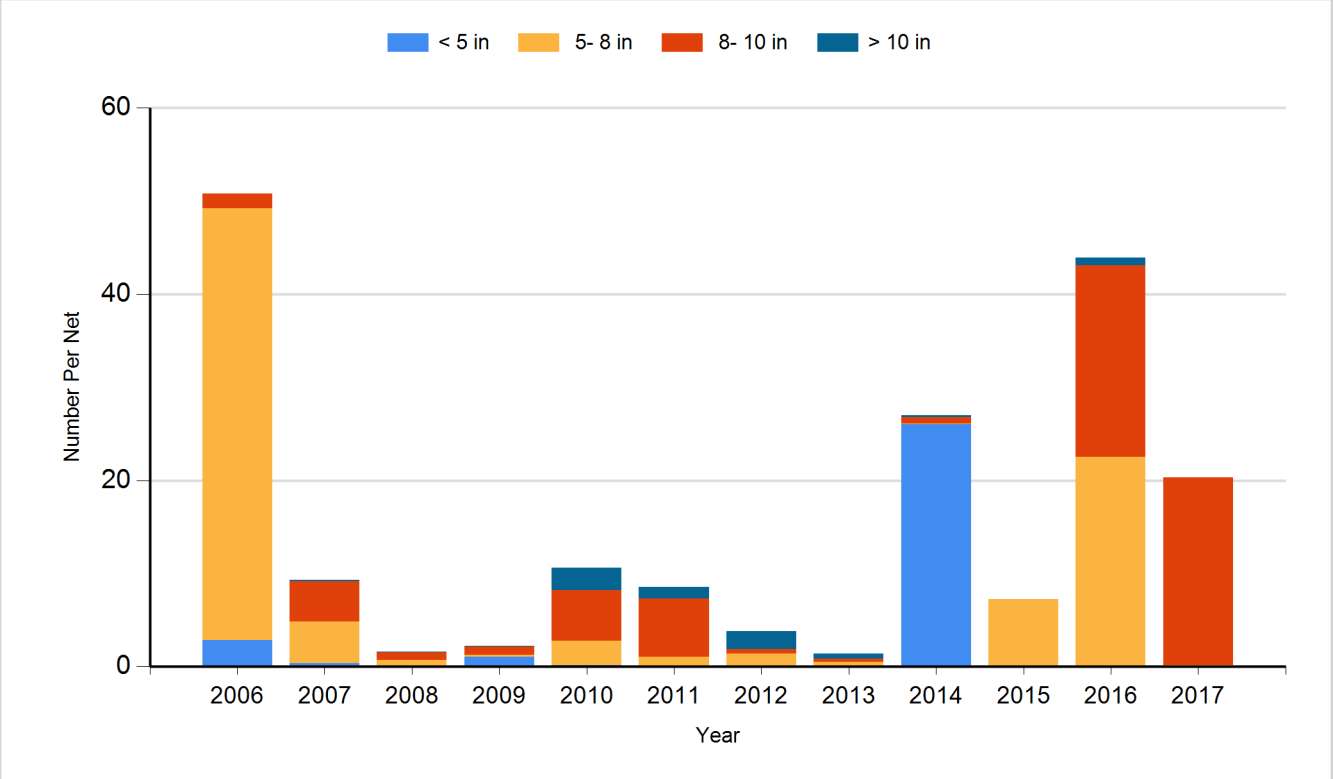

Number
5
4
3
2
1
0
11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65
Total Length (cm)

2016

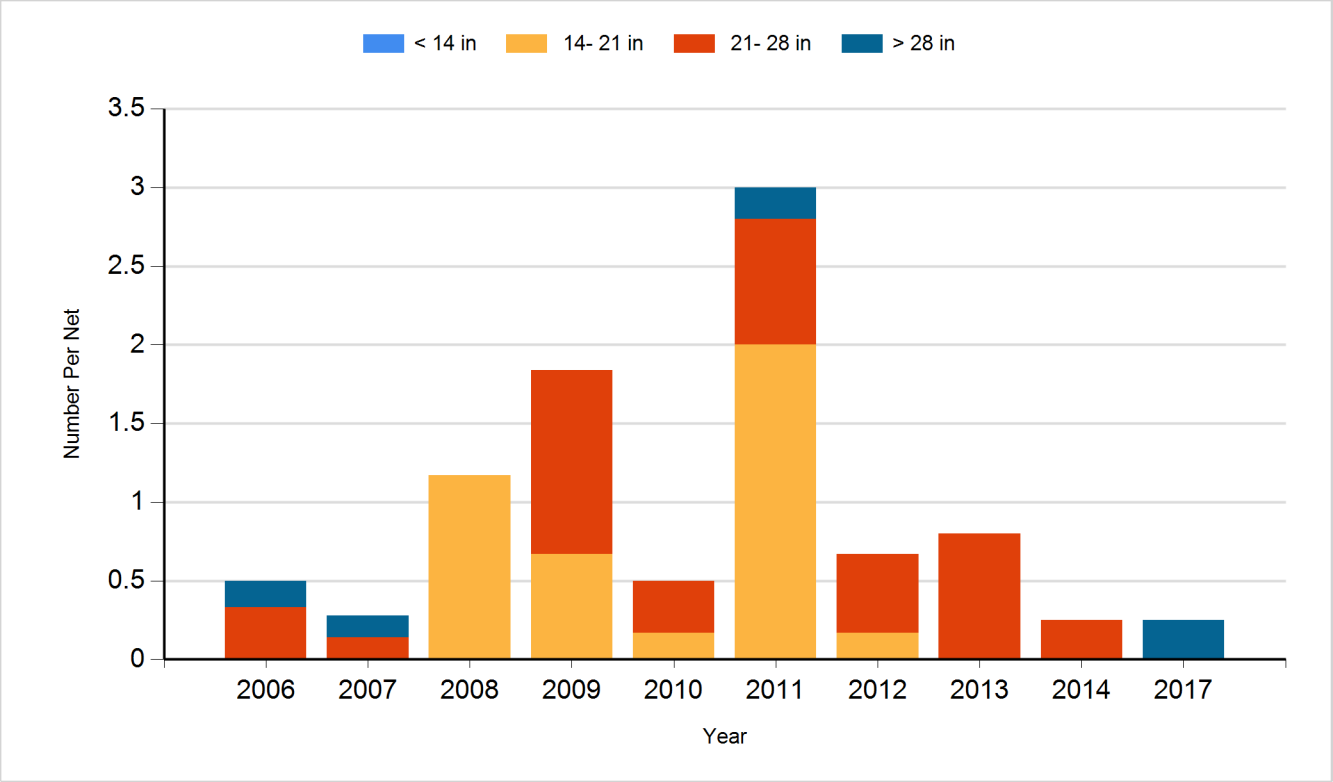
Historic Fish Sizes and Relative Abundance

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

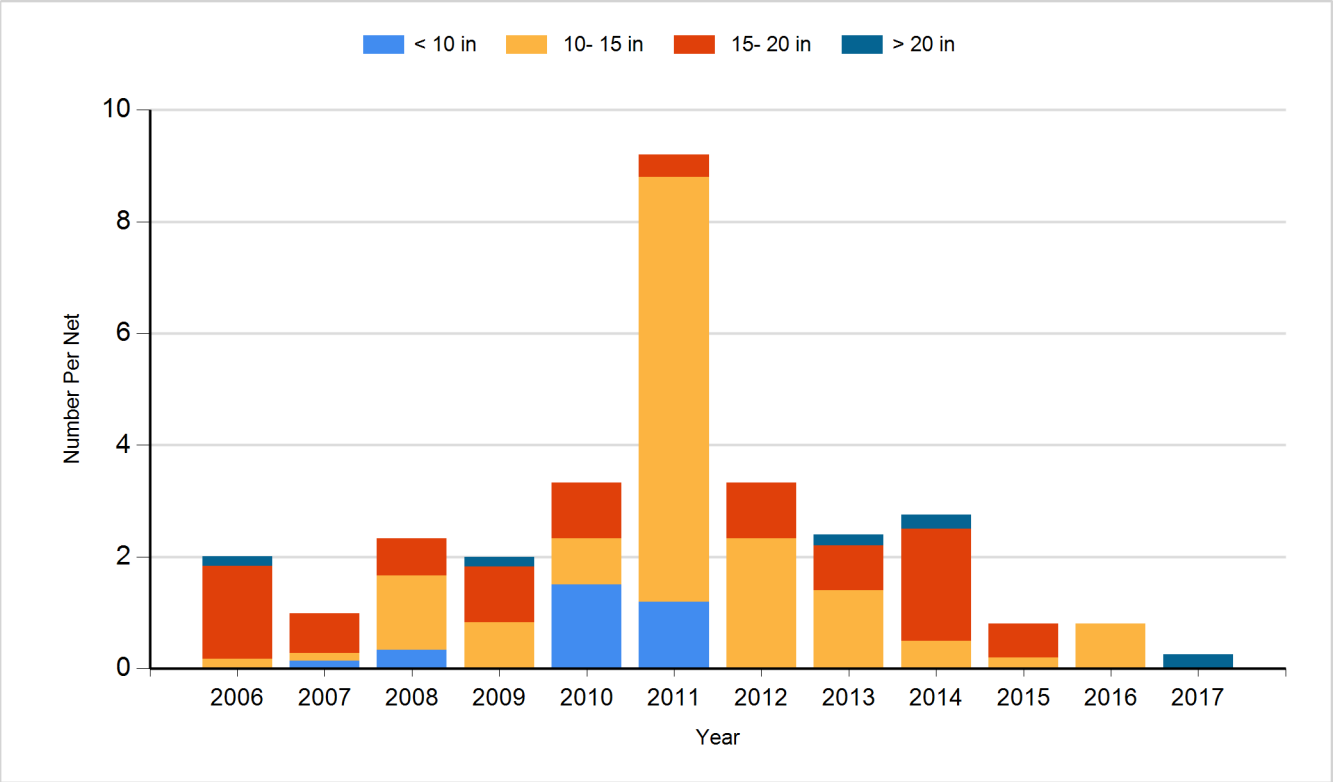
Species: Black Crappie
Gear: Frame Net



Species: Northern Pike
Gear: Gill Net



Species: Walleye
Gear: Gill Net



Fish Stocking

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2006	Walleye	Small Fingerling	67,760
2007	Walleye	Large Fingerling	5,192
2009	Walleye	Small Fingerling	67,500
2012	Walleye	Small Fingerling	67,340
2013	Walleye	Small Fingerling	32,080
2015	Walleye	Small Fingerling	52,698
2016	Walleye	Small Fingerling	48,020
2017	Walleye	Fingerling	59,000