

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Brant, Lake County

LBS-Lake-135-001

2017

Lake Information

Name:	Brant	Maximum Depth:	14 Feet
County:	Lake	Mean Depth:	10 Feet
Legal Description:	T105N-R51W-Sec. 3, 4, 9, 10	OHWM Elevation:	1,598
Surface Area:	1,046 Acres	Outlet Elevation:	1,597

Surveys and Investigations

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

Gear	Date	Effort
AFS std frame net	July 11, 2017	10 net-nights
AFS std gill net	July 11, 2017	10 net-nights

Common Fish Species Present

Walleye

Yellow Perch

Black Bullhead

Black Crappie

White Sucker

White Bass

Smallmouth Bass

Bigmouth Buffalo

Common Carp

Bluegill

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	Bigmouth Buffalo	0.1	0.1	0		0			
	Black Bullhead	16.5	6.8	66	5	42	5		
	Black Crappie	9.5	3.8	57	7	14	5	101	2
	Bluegill	0.5	0.3	40		0		109	11
	Common Carp	0.1	0.1	100		0			
	Smallmouth Bass	2.7	0.8	19	12	4		89	2
	Walleye	1.6	0.9	6		0		78	1
	White Bass	3.3	1.2	97		82	11	86	2
	White Sucker	2.2	1.4	100		95			
	Yellow Perch	0.2	0.2	100		100		84	3
AFS std gill net	Bigmouth Buffalo	1.6	1.1	25		19			
	Black Bullhead	21.0	7.5	75	4	22	4		
	Black Crappie	2.0	1.2	5		0		121	3
	Bluegill	0.2	0.2	50		0		92	23
	Common Carp	1.2	0.7	100		17			
	Northern Pike	0.2	0.3	100		100		109	5
	Shorthead Redhorse	0.1	0.1	100		100			
	Smallmouth Bass	0.7	0.7	57		43		92	5
	Walleye	2.7	1.0	59	15	11		83	2
	White Bass	4.7	1.5	79	9	43	11	97	4
White Sucker	7.3	1.1	100		97				
Yellow Perch	6.7	1.2	60	9	45	9	99	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	Bigmouth Buffalo										0.1	0.1	
	Black Bullhead										16.5	16.5	
	Black Crappie										9.5	9.5	
	Bluegill										0.5	0.5	
	Common Carp										0.1	0.1	
	Smallmouth Bass										2.7	2.7	
	Walleye										1.6	1.6	
	White Bass										3.3	3.3	
	White Sucker										2.2	2.2	
Yellow Perch										0.2	0.2		
AFS std gill net	Bigmouth Buffalo										1.6	1.6	
	Black Bullhead										21.0	21.0	
	Black Crappie										2.0	2.0	
	Bluegill										0.2	0.2	
	Common Carp										1.2	1.2	
	Northern Pike										0.2	0.2	
	Shorthead Redhorse										0.1	0.1	
	Smallmouth Bass										0.7	0.7	
	Walleye										2.7	2.7	
	White Bass										4.7	4.7	
	White Sucker										7.3	7.3	
Yellow Perch										6.7	6.7		
fall night EF-WAE	Walleye	2.5	111.0	136.5	7.0	3.0	27.0	85.5	30.5			50.4	
large frame net	Bigmouth Buffalo	7.8	6.5	4.4	4.5	1.9	0.7					4.3	
	Black Bullhead	11.4	10.4	4.7	15.4	330.3	41.1					68.9	
	Black Crappie	7.5	5.8	5.2	4.8	5.9	2.4					5.3	
	Bluegill	9.4	1.9	3.2	2.7	1.3	0.7					3.2	
	Channel Catfish	0.3		0.2		1.5	0.2					0.6	
	Common Carp	3.4	2.6	3.5	1.2	7.1	0.3					3.0	
	Northern Pike	1.7	0.4	4.8	2.8	5.9	1.8					2.9	
	Smallmouth Bass	3.8	1.9	1.6	3.8	3.0	1.2					2.6	
	Sunfish Hybrid	0.0											0.0
	Walleye	0.8	0.5	2.2	0.6	1.2	0.1						0.9

Gear	Species	CPUE										Avg	
		2008	2009	2010	2011	2012	2013	2014	2015	2016	2017		
large frame net	White Bass	1.6	0.3	0.9	0.2	3.8	3.0						1.6
	White Sucker	0.2	1.5	3.9	0.6	1.5	0.9						1.4
	Yellow Bullhead					0.1	0.2						0.2
	Yellow Perch	0.3	0.5	5.0	8.5	2.2							3.3
std exp gill net	Bigmouth Buffalo	1.0	4.0	4.4		0.5	0.3	1.0		0.2			1.6
	Black Bullhead	4.5	4.8	4.4	9.7	23.8	24.3	27.6	21.2	34.2			17.2
	Black Crappie	1.8	1.0	0.4		2.5				1.4			1.4
	Bluegill	1.3	0.2	0.2		0.3		0.2	0.2	0.4			0.4
	Channel Catfish	0.2	0.2			0.3	1.3			1.6			0.7
	Common Carp	1.0	0.0	1.2		0.5	0.7	0.4	0.6	2.2			0.8
	Green Sunfish		0.2										0.2
	Northern Pike	1.0	0.2	1.4	12.7	1.8	1.7	1.8	0.4	0.2			2.4
	Orangespotted Sunfish			0.0									0.0
	Smallmouth Bass	1.8	0.2	3.2	3.0	4.3	2.3	1.2	1.6	2.8			2.3
	Spottail Shiner	0.0	0.0	0.0				0.0					0.0
	Walleye	7.5	6.2	8.0	23.7	11.3	1.3	4.0	3.0	3.8			7.6
	White Bass	10.5	7.4	0.8	2.7	4.3	1.0	1.0	1.2	3.4			3.6
	White Sucker	4.2	3.4	7.2	6.0	6.0	2.7	6.8	5.2	2.6			4.9
	Yellow Perch	14.8	12.4	35.4	16.3	32.8		8.4	4.6	18.8			17.9
	std frame net (3/8 inch)	Bigmouth Buffalo							0.3		2.6		
Black Bullhead								48.6	41.7	306.8			132.4
Black Crappie								1.5	1.3	4.7			2.5
Bluegill								0.2	0.3	1.6			0.7
Channel Catfish								0.1	0.1				0.1
Common Carp								0.7	0.2	1.3			0.7
Green Sunfish									0.1				0.1
Northern Pike								1.9	1.4	1.6			1.6
Smallmouth Bass								1.4	1.1	17.0			6.5
Sunfish Hybrid								0.0		0.0			0.0
Walleye								0.2	0.0	1.4			0.5
White Bass								1.8	1.3	3.9			2.3
White Sucker								2.3	4.3	1.6			2.7
Yellow Bullhead									0.1				0.1
Yellow Perch								0.1	0.3	1.4			0.6

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.

Gear	Species	Index	Year										
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AFS std frame net	Black Crappie	PSD											57
		PSD-P											14
		Wr											101
	Walleye	PSD											6
		PSD-P											0
		Wr											78
	Yellow Perch	PSD											100
		PSD-P											100
		Wr											84
AFS std gill net	Black Crappie	PSD											5
		PSD-P											0
		Wr											121
	Northern Pike	PSD											100
		PSD-P											100
		Wr											109
	Walleye	PSD											59
		PSD-P											11
		Wr											83
	Yellow Perch	PSD											60
		PSD-P											45
		Wr											99
	fall night EF-WAE	Walleye	Wr	89	94	94	89	83	88	84	89		
	large frame net	Black Crappie	PSD	89	93	100	60	99	100				
			PSD-P	40	22	100	40	6	59				
Wr			103	105	101	107	108	102					
Northern Pike		PSD	40	40	36	15	66	71					
		PSD-P	15	20	3	9	14	24					
		Wr	83	66	84	81	80	84					
Walleye		PSD	22	67	15	29	14	100					
		PSD-P	11	67	4	0	7	0					
		Wr	85	78	90	84	91	75					

Gear	Species	Index	Year										
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
large frame net	Yellow Perch	PSD	0	100	83	73	100						
		PSD-P	0	17	77	23	8						
		Wr	104	106	103	103	99						
std exp gill net	Black Crappie	PSD	73	80	100		100					0	
		PSD-P	18	40	100		0					0	
		Wr	110	109	94		109					125	
	Northern Pike	PSD	67	100	14	8	71	100	89	100	100		
		PSD-P	33	0	0	0	14	20	56	100	0		
		Wr	91	71	89	81	78	93	93	79	129		
	Walleye	PSD	16	13	15	37	11	75	35	67	0		
		PSD-P	7	6	3	1	4	25	10	40	0		
		Wr	83	81	88	85	90	88	89	85	85		
	Yellow Perch	PSD	47	87	68	82	96		19	26	73		
		PSD-P	34	11	53	35	21		5	4	24		
		Wr	105	103	96	102	96		108	101	105		
	std frame net (3/8 inch)	Black Crappie	PSD							100	94	55	
			PSD-P							100	69	28	
			Wr							102	97	110	
Northern Pike		PSD							91	100	100		
		PSD-P							13	18	31		
		Wr							90	76	82		
Walleye		PSD							100	0	43		
		PSD-P							50	0	29		
		Wr							93		82		
Yellow Perch		PSD							0	33	79		
		PSD-P							0	33	43		
		Wr							127	94	100		

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+
2013	29		212 (1)	250 (25)	245 (2)		322 (2)				
2012	71	163 (1)	225 (60)		245 (8)	311 (2)					
2011	58	151 (23)	225 (12)	277 (2)	291 (13)	306 (7)	336 (1)				
2010	62			263 (54)	277 (7)	305 (1)					
2009	68		208 (41)	248 (19)	276 (6)		320 (1)	335 (1)			

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2017	30	247 (11)	384 (4)	437 (10)	482 (3)			551 (2)			
2016	30	255 (15)	297 (15)								
2015	32	203 (17)	351 (6)			469 (1)	540 (5)	588 (2)	471 (1)		
2014	20	266 (12)	293 (1)	398 (1)	465 (5)	578 (1)					
2013	4			396 (3)	541 (1)						
2012	50	236 (6)	314 (39)	419 (1)	474 (2)	539 (1)					718 (1)
2011	105	245 (54)	359 (32)	425 (8)	468 (11)						
2010	53	249 (25)	334 (12)	372 (15)					586 (1)		
2009	37	220 (6)	302 (25)	389 (4)			572 (1)				727 (1)
2008	55	242 (18)	333 (30)	419 (3)				535 (1)		644 (2)	485 (1)

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	67	165 (27)	248 (16)	272 (23)				335 (1)			
2016	94	179 (28)	243 (64)	293 (2)							
2015	23	165 (17)	236 (5)	296 (1)							

Mean Length (expanded sample number) at capture by age

Year	N	1	2	3	4	5	6	7	8	9	10+
2014	42	165 (34)	236 (5)	260 (2)	313 (1)						
2012	131	174 (3)	227 (107)	270 (22)							
2011	49	155 (9)	240 (32)	261 (5)	308 (2)	318 (1)					
2010	177	158 (56)	231 (21)	265 (94)	311 (2)	307 (4)					
2009	61	161 (2)	220 (53)	270 (3)	303 (3)						
2008	90	150 (45)	228 (16)	276 (27)	240 (2)						

Fish Condition

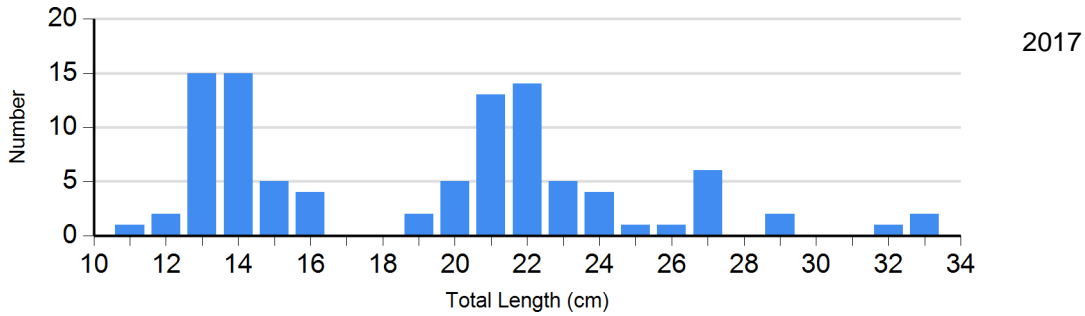
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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		12	104 (1.4)	15	103 (1.3)	2	84 (2.7)
	2014	0		0		16	103 (1.7)	2	91 (8.5)
	2015	1	104	4	105 (1.3)	2	96 (1.7)	9	94 (1.6)
	2016	21	121 (3.0)	13	108 (2.4)	5	98 (13.7)	8	93 (2.2)
	2017	41	108 (1.4)	41	96 (1.9)	10	96 (1.1)	3	83
Northern Pike Gill Net	2013	0		4	88 (3.9)	0		1	114
	2014	1	86	3	85 (8.4)	5	99 (6.3)	0	
	2015	0		0		2	79 (18.7)	0	
	2016	0		1	129	0		0	
	2017	0		0		1	105	1	113
Walleye Gill Net	2013	1	88	2	85 (4.2)	1	94	0	
	2014	13	86 (3.7)	5	93 (5.7)	2	99 (1.2)	0	
	2015	5	78 (1.7)	4	89 (1.8)	6	88 (2.3)	0	
	2016	19	85 (1.2)	0		0		0	
	2017	11	79 (1.2)	13	83 (1.5)	3	94 (3.9)	0	
Yellow Perch Gill Net	2014	34	108 (1.9)	6	111 (12.8)	1	101	1	91
	2015	17	101 (2.2)	5	103 (2.9)	1	90	0	
	2016	25	104 (1.5)	46	106 (1.2)	23	104 (1.3)	0	
	2017	27	101 (2.1)	10	98 (1.6)	29	99 (1.5)	1	80

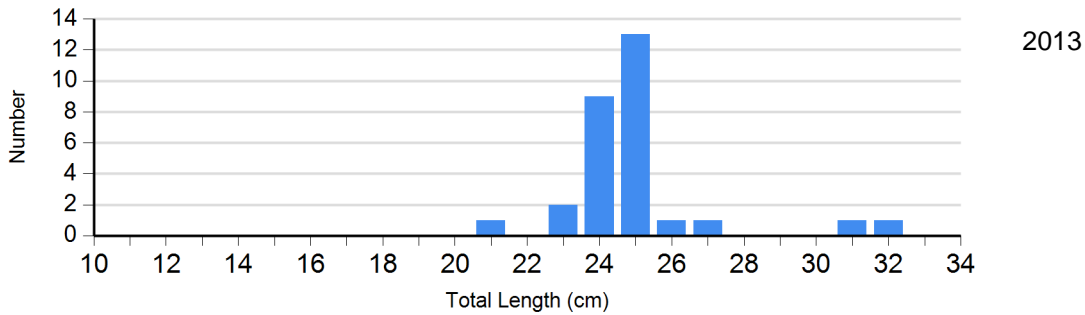
Length Frequency Distribution

Length frequency histogram of species sampled by year.

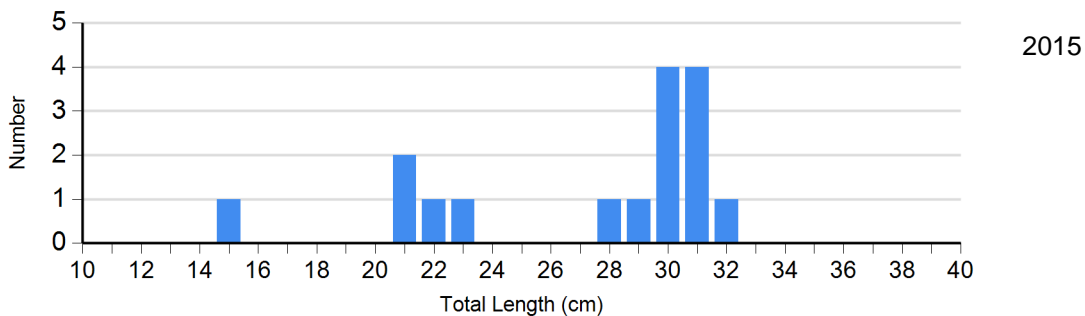
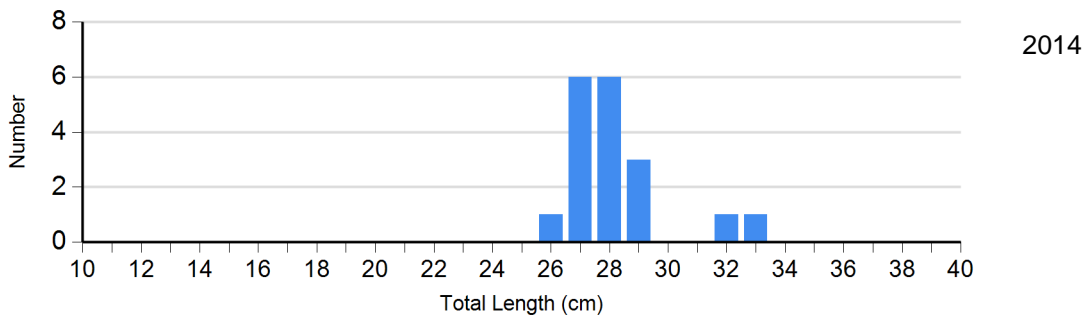
Species: Black Crappie
Gear: AFS std frame net

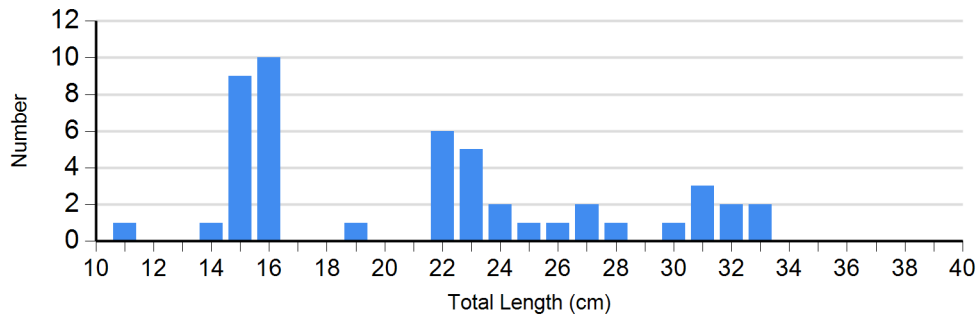


Species: Black Crappie
Gear: large frame net



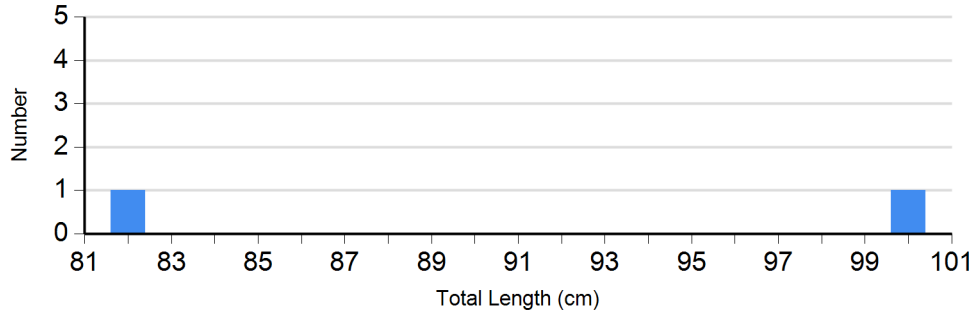
Species: Black Crappie
Gear: std frame net (3/8 inch)





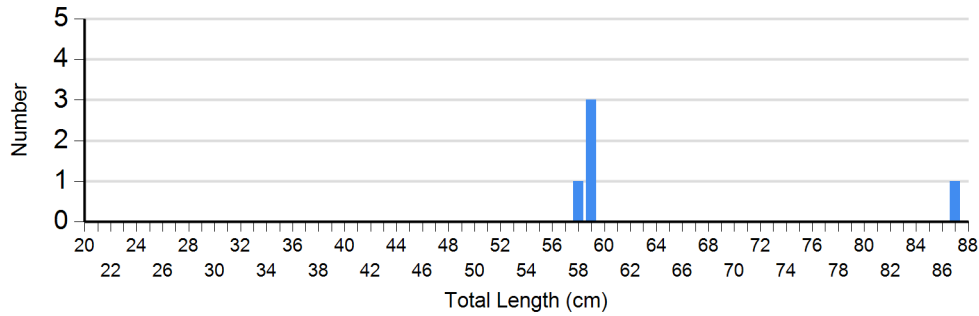
2016

Species: Northern Pike
Gear: AFS std gill net

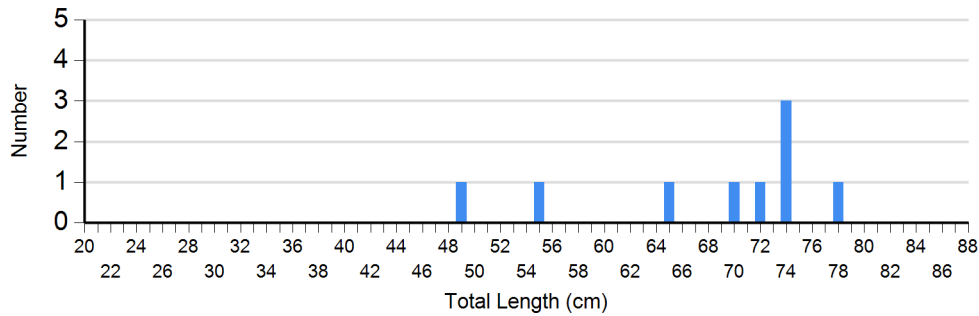


2017

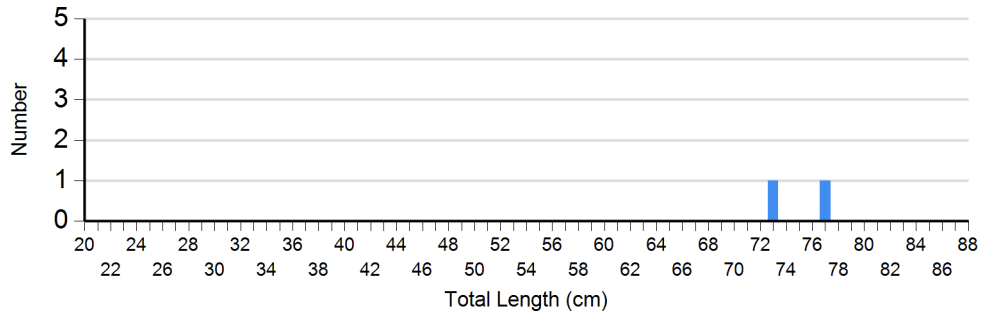
Species: Northern Pike
Gear: std exp gill net



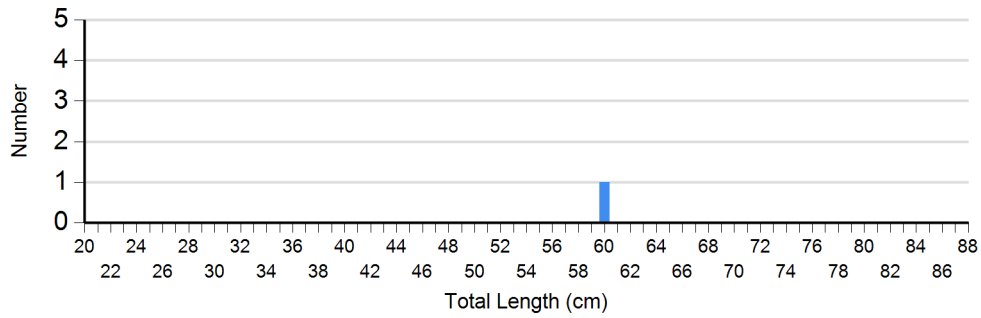
2013



2014

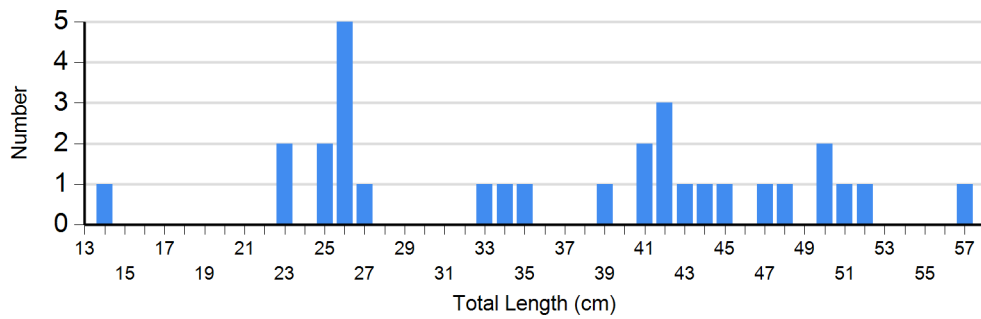


2015



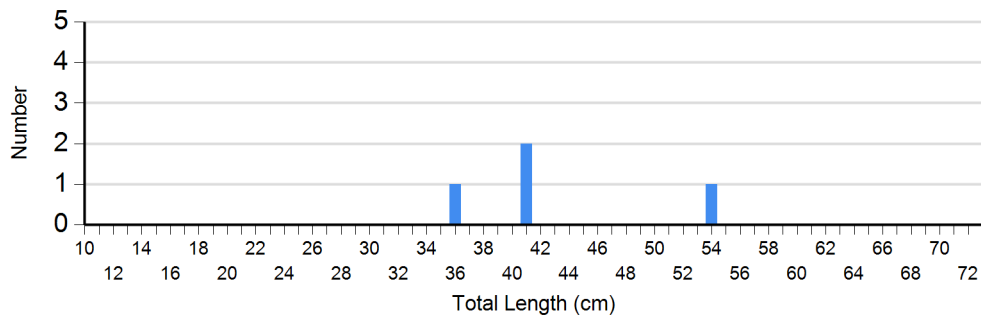
2016

Species: Walleye
Gear: AFS std gill net

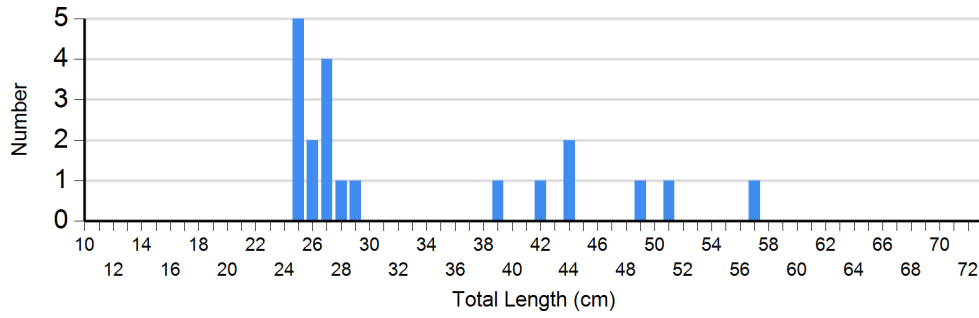


2017

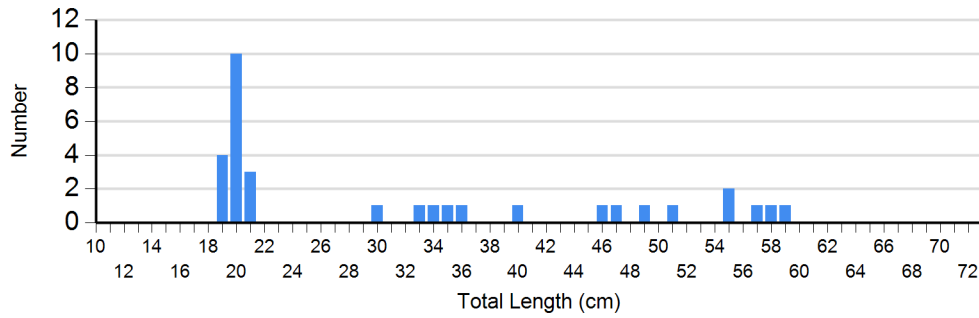
Species: Walleye
Gear: std exp gill net



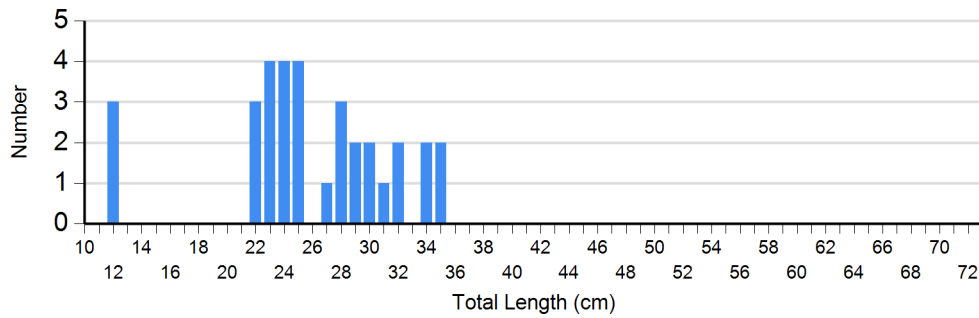
2013



2014

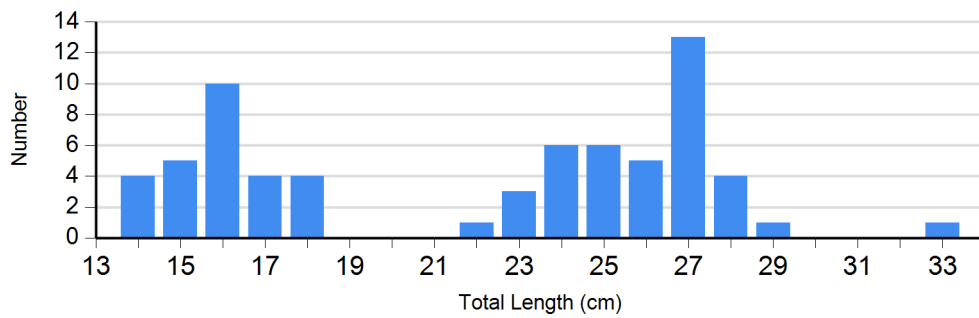


2015



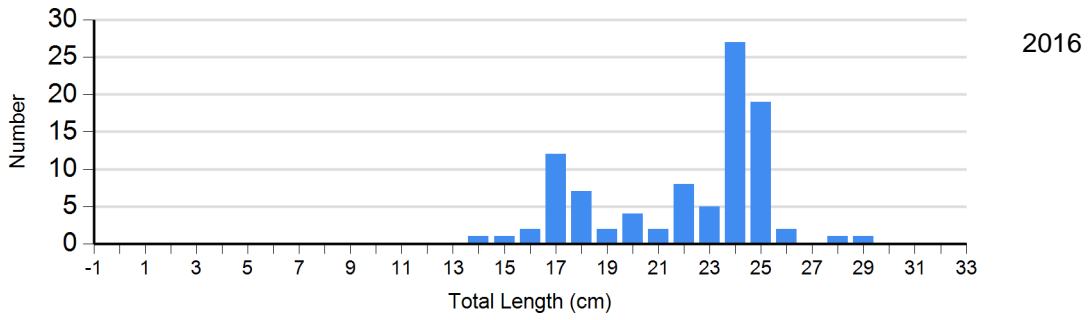
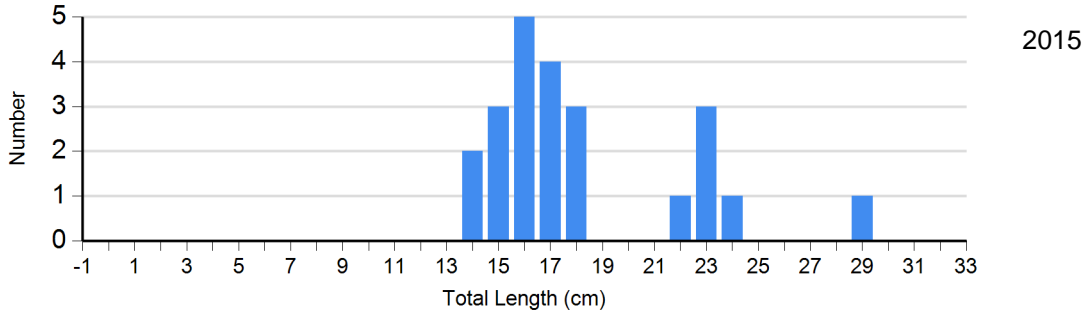
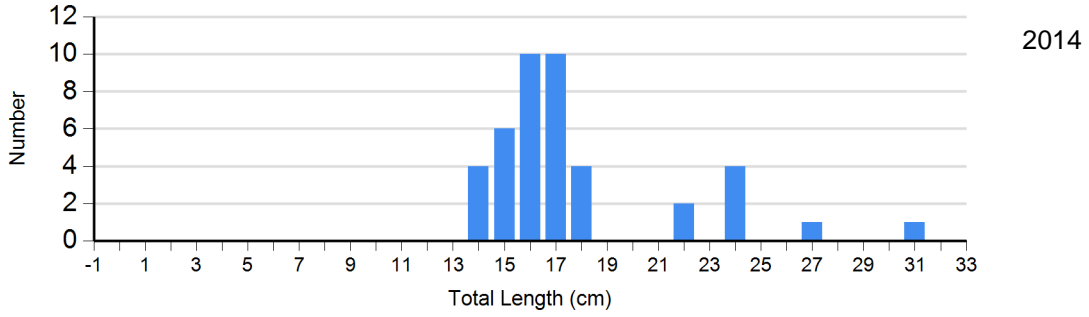
2016

Species: Yellow Perch
Gear: AFS std gill net



2017

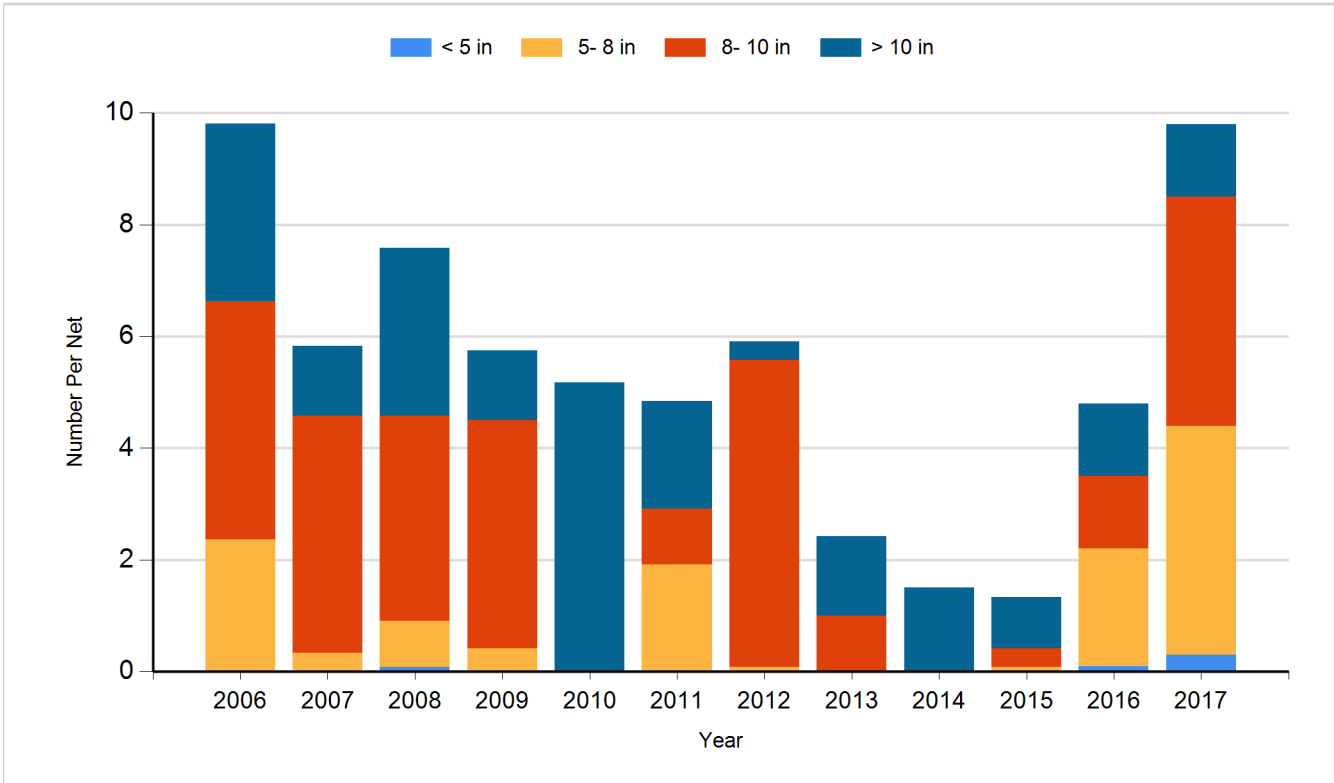
Species: Yellow Perch
Gear: std exp gill net



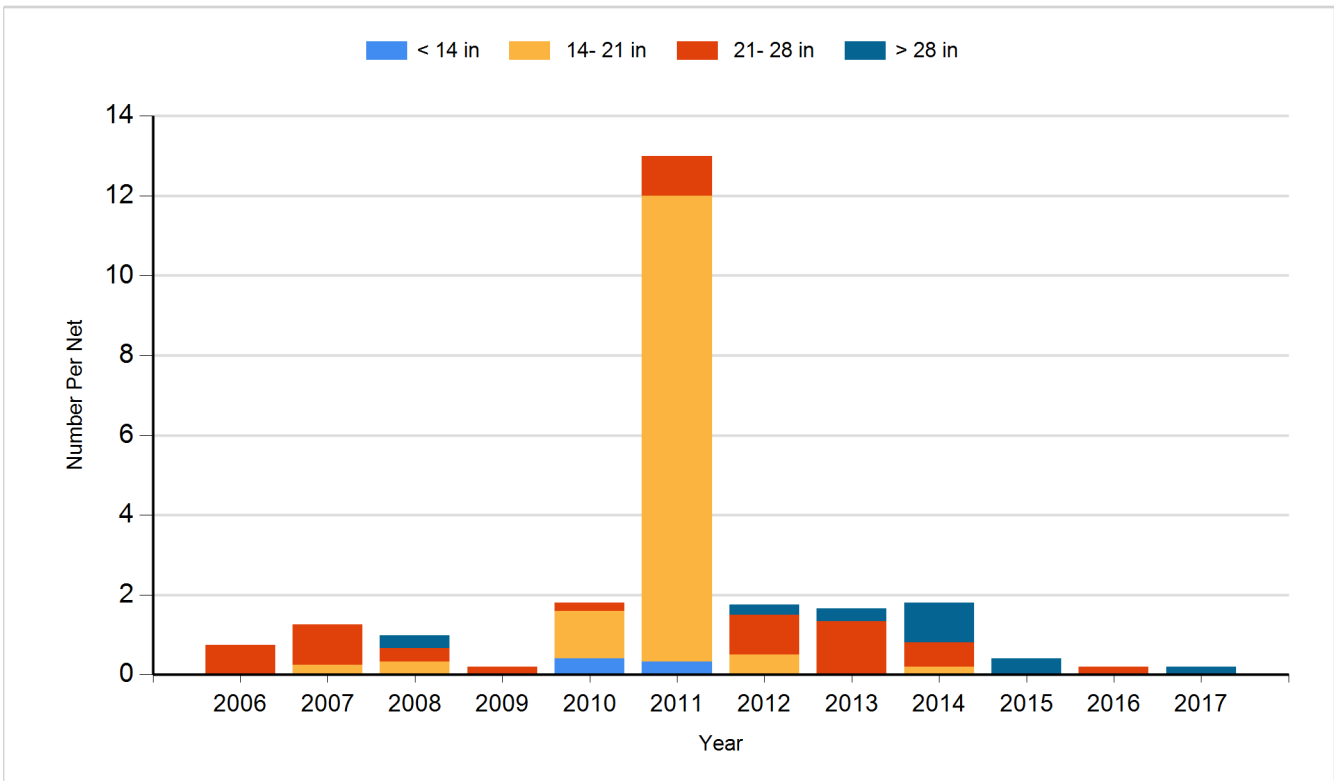
Historic Fish Sizes and Relative Abundance

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

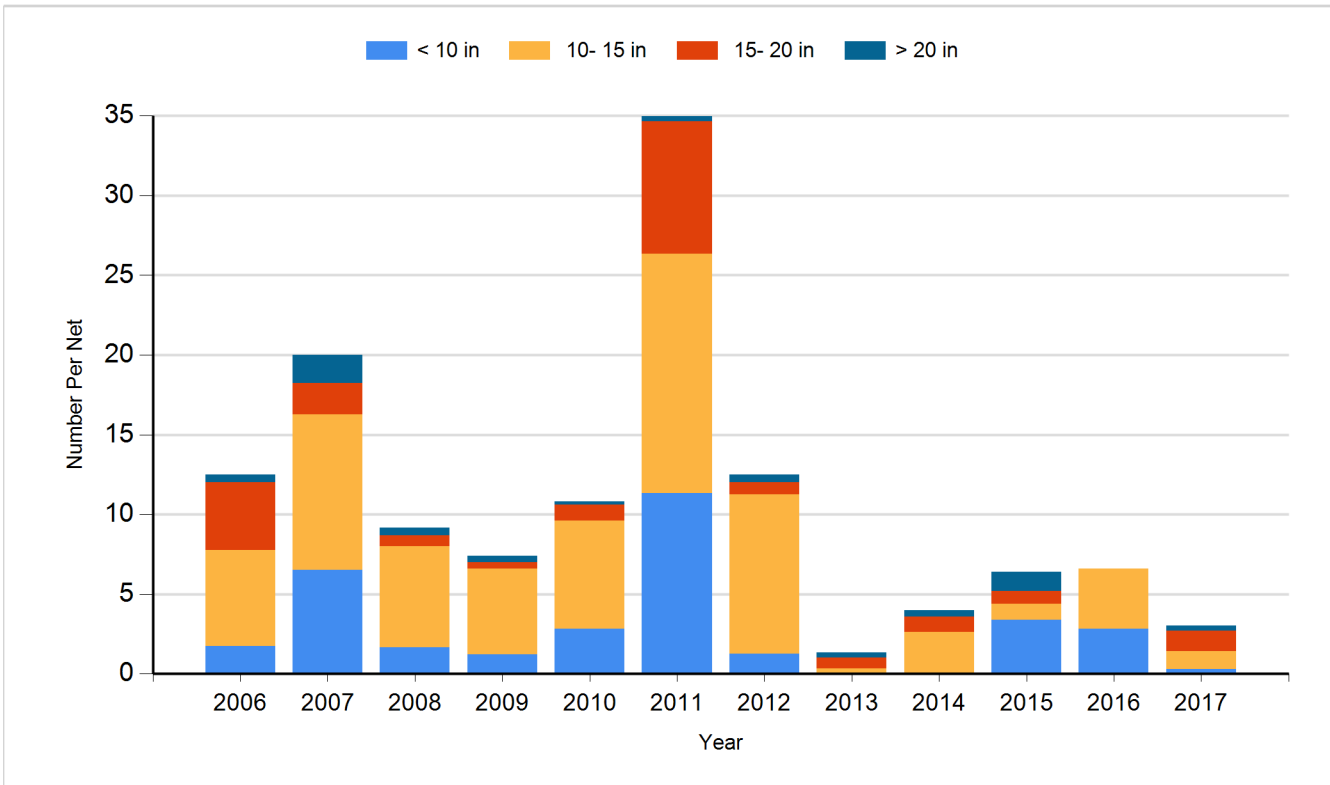
Species: Black Crappie
Gear: Frame Net



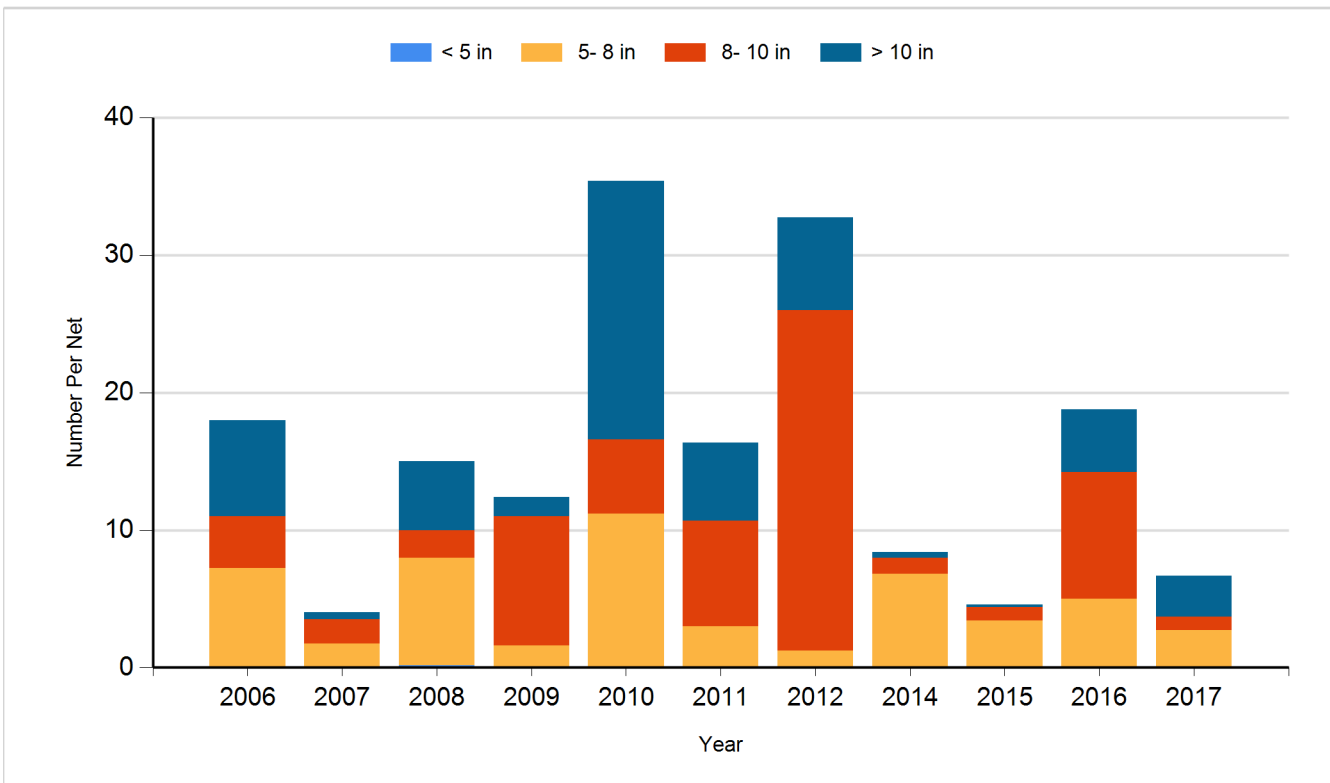
Species: Northern Pike
Gear: Gill Net



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	Walleye	Small Fingerling	104,910
2006	Yellow Perch	Fingerling	3,582
2007	Fathead Minnow	Adult	4,000
2007	Yellow Perch	Fingerling	40,205
2008	Yellow Perch	Small Fingerling	103,540
2009	Walleye	Small Fingerling	103,900
2009	Yellow Perch	Fry	5,245,000
2013	Walleye	Small Fingerling	102,660
2014	Walleye	Small Fingerling	103,600
2014	Yellow Perch	Small Fingerling	499,000
2015	Walleye	Small Fingerling	68,320
2017	Walleye	Small Fingerling	70,490