

# SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Brant, Lake County

LBS-Lake-135-001

2015

## Lake Information

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

## Surveys and Investigations

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

Gear	Date	Effort
fall night EF-WAE	September 08, 2015	7200 seconds
std exp gill net	July 21, 2015	5 net-nights
std frame net (3/8 inch)	July 21, 2015	12 net-nights

## **Common Fish Species Present**

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Walleye

Yellow Perch

Black Bullhead

White Sucker

Smallmouth Bass

Northern Pike

White Bass

Black Crappie

Common Carp

Bluegill

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## 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
fall night EF-WAE	Walleye	30.5	17.7					89	1
std exp gill net	Black Bullhead	21.2	9.4	100		16	5		
	Bluegill	0.2	0.3	100		0		107	
	Common Carp	0.6	0.6	100		100			
	Northern Pike	0.4	0.4	100		100		79	24
	Smallmouth Bass	1.6	1.2	50		38		100	2
	Walleye	3.0	1.4	67		40	21	85	2
	White Bass	1.2	0.6	100		100		84	2
	White Sucker	5.2	1.3	100		88			
	Yellow Perch	4.6	3.3	26	15	4		101	2
	std frame net (3/8 inch)	Black Bullhead	41.7	10.4	98	1	42	3	
Black Crappie		1.3	0.7	94		69		97	2
Bluegill		0.3	0.2	50		25		110	13
Channel Catfish		0.1	0.1	100		0		96	
Common Carp		0.2	0.2	100		100			
Green Sunfish		0.1	0.1	0		0		115	
Northern Pike		1.4	0.5	100		18		76	3
Smallmouth Bass		1.1	0.6	31		8		98	6
Walleye		0.0	0.0	0		0			
White Bass		1.3	0.5	100		100		85	3
White Sucker		4.3	1.4	100		98			
Yellow Bullhead		0.1	0.1	100		100			
Yellow Perch		0.3	0.2	33		33		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
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
fall night EF-WAE	Walleye	124.0	39.5	2.5	111.0	136.5	7.0	3.0	27.0	85.5	30.5	56.7
large frame net	Bigmouth Buffalo	16.1	3.0	7.8	6.5	4.4	4.5	1.9	0.7			5.6
	Black Bullhead	27.0	4.7	11.4	10.4	4.7	15.4	330.3	41.1			55.6
	Black Crappie	9.8	5.8	7.5	5.8	5.2	4.8	5.9	2.4			5.9
	Bluegill	6.7	4.6	9.4	1.9	3.2	2.7	1.3	0.7			3.8
	Channel Catfish	0.5	0.5	0.3		0.2		1.5	0.2			0.5
	Common Carp	3.4	6.2	3.4	2.6	3.5	1.2	7.1	0.3			3.5
	Green Sunfish	0.1										0.1
	Northern Pike	0.7	0.9	1.7	0.4	4.8	2.8	5.9	1.8			2.4
	Smallmouth Bass	33.4	13.3	3.8	1.9	1.6	3.8	3.0	1.2			7.8
	Sunfish Hybrid			0.0								0.0
	Walleye	0.9	0.3	0.8	0.5	2.2	0.6	1.2	0.1			0.8
	White Bass			1.6	0.3	0.9	0.2	3.8	3.0			1.6
	White Sucker	7.1	0.8	0.2	1.5	3.9	0.6	1.5	0.9			2.1
	Yellow Bullhead							0.1	0.2			0.2
	Yellow Perch	0.7	0.2	0.3	0.5	5.0	8.5	2.2				2.5
std exp gill net	Bigmouth Buffalo	12.8	3.5	1.0	4.0	4.4		0.5	0.3	1.0		3.4
	Black Bullhead	12.0	2.0	4.5	4.8	4.4	9.7	23.8	24.3	27.6	21.2	13.4
	Black Crappie	2.0	0.5	1.8	1.0	0.4		2.5				1.4
	Bluegill	1.3	0.8	1.3	0.2	0.2		0.3		0.2	0.2	0.6
	Channel Catfish			0.2	0.2			0.3	1.3			0.5
	Common Carp	0.3	2.5	1.0	0.0	1.2		0.5	0.7	0.4	0.6	0.8
	Green Sunfish				0.2							0.2
	Northern Pike	0.8	1.3	1.0	0.2	1.4	12.7	1.8	1.7	1.8	0.4	2.3
	Orangespotted Sunfish					0.0						0.0
	Smallmouth Bass	6.5	8.3	1.8	0.2	3.2	3.0	4.3	2.3	1.2	1.6	3.2
	Spottail Shiner	0.0		0.0	0.0	0.0				0.0		0.0
	Walleye	10.8	13.5	7.5	6.2	8.0	23.7	11.3	1.3	4.0	3.0	8.9
	White Bass		0.3	10.5	7.4	0.8	2.7	4.3	1.0	1.0	1.2	3.2
	White Sucker	8.8	5.5	4.2	3.4	7.2	6.0	6.0	2.7	6.8	5.2	5.6
	Yellow Perch	18.0	4.0	14.8	12.4	35.4	16.3	32.8		8.4	4.6	16.3
std frame net (3/8 inch)	Bigmouth Buffalo								0.3			0.3
	Black Bullhead								48.6	41.7		45.2

Gear	Species	CPUE										Avg
		2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
std frame net (3/8 inch)	Black Crappie									1.5	1.3	1.4
	Bluegill									0.2	0.3	0.3
	Channel Catfish									0.1	0.1	0.1
	Common Carp									0.7	0.2	0.5
	Green Sunfish										0.1	0.1
	Northern Pike									1.9	1.4	1.7
	Smallmouth Bass									1.4	1.1	1.3
	Sunfish Hybrid									0.0		0.0
	Walleye									0.2	0.0	0.1
	White Bass									1.8	1.3	1.6
	White Sucker									2.3	4.3	3.3
	Yellow Bullhead										0.1	0.1
	Yellow Perch									0.1	0.3	0.2

## 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
fall night EF-WAE	Walleye	Wr	95	92	89	94	94	89	83	88	84	89
large frame net	Black Crappie	PSD	76	94	89	93	100	60	99	100		
		PSD-P	32	21	40	22	100	40	6	59		
		Wr	111	109	103	105	101	107	108	102		
	Northern Pike	PSD	75	64	40	40	36	15	66	71		
		PSD-P	50	9	15	20	3	9	14	24		
		Wr	87	84	83	66	84	81	80	84		
	Walleye	PSD	40	67	22	67	15	29	14	100		
		PSD-P	0	67	11	67	4	0	7	0		
		Wr	82	85	85	78	90	84	91	75		
	Yellow Perch	PSD	75	100	0	100	83	73	100			
		PSD-P	13	50	0	17	77	23	8			
		Wr	106	93	104	106	103	103	99			
std exp gill net	Black Crappie	PSD	25	100	73	80	100		100			
		PSD-P	0	0	18	40	100		0			
		Wr	120	108	110	109	94		109			
	Northern Pike	PSD	100	80	67	100	14	8	71	100	89	100
		PSD-P	0	0	33	0	0	0	14	20	56	100
		Wr	77	86	91	71	89	81	78	93	93	79
	Walleye	PSD	44	28	16	13	15	37	11	75	35	67
		PSD-P	5	13	7	6	3	1	4	25	10	40
		Wr	84	85	83	81	88	85	90	88	89	85
	Yellow Perch	PSD	60	56	47	87	68	82	96		19	26
		PSD-P	39	13	34	11	53	35	21		5	4
		Wr	103	104	105	103	96	102	96		108	101
std frame net (3/8 inch)	Black Crappie	PSD									100	94
		PSD-P									100	69
		Wr									102	97
	Northern Pike	PSD									91	100
		PSD-P									13	18



Gear	Species	Index	Year												
			2006	2007	2008	2009	2010	2011	2012	2013	2014	2015			
std frame net (3/8 inch)	Northern Pike	Wr										90	76		
		PSD										100	0		
		PSD-P										50	0		
	Yellow Perch	Wr											93		
		PSD											0	33	
		PSD-P											0	33	
		Wr											127	94	

## 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)			
2006	108	159 (23)	211 (22)	248 (51)	263 (8)	306 (3)	286 (1)				

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
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)
2007	80	241 (40)	343 (25)	380 (3)	453 (3)	478 (3)	545 (1)	611 (3)	686 (2)		
2006	50	258 (26)	256 (2)	394 (6)	416 (7)	442 (6)	479 (1)	500 (1)		692 (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+
2015	23	165 (17)	236 (5)	296 (1)							
2014	42	165 (34)	236 (5)	260 (2)	313 (1)						

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
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)						
2007	16	167 (4)	199 (6)	248 (6)							
2006	72	180 (32)	237 (10)	259 (7)	263 (1)	290 (18)	297 (4)				

## 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).

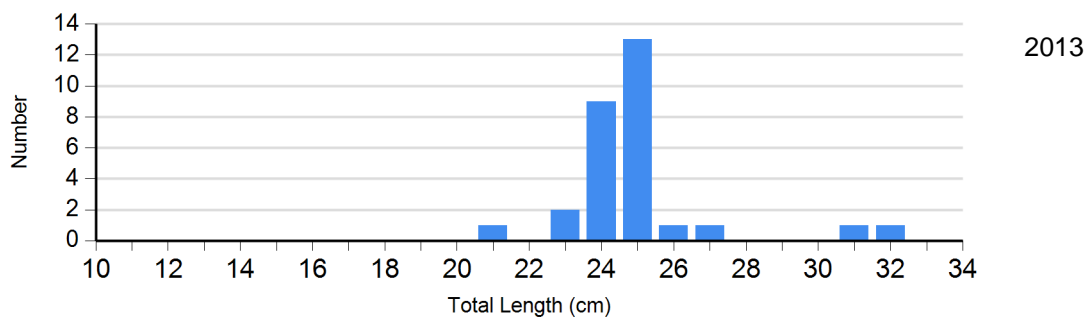
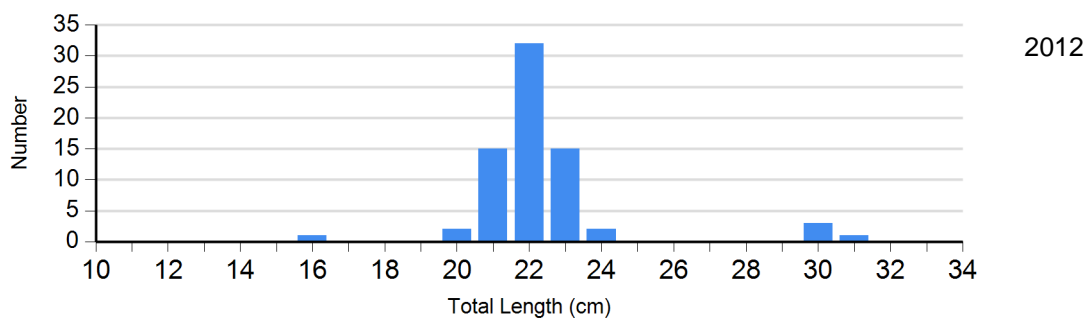
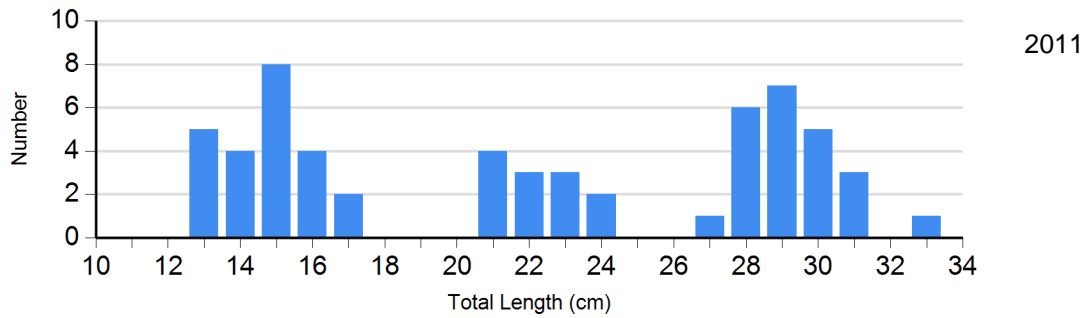
Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2011	23	117 (2.2)	12	106 (1.9)	14	98 (1.2)	9	97 (1.4)
	2012	1	130	66	108 (0.7)	0		4	96 (5.0)
	2013	0		12	104 (1.4)	15	103 (1.3)	2	84 (2.7)
	2014	0		0		16	103 (1.7)	2	91 (8.5)
	2015	1	104	4	105 (1.3)	2	96 (1.7)	9	94 (1.6)
Northern Pike Gill Net	2011	35	81 (1.2)	3	83 (3.4)	0		0	
	2012	2	78 (13.0)	4	79 (2.0)	1	72	0	
	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	
Walleye Gill Net	2011	45	86 (0.8)	25	85 (0.8)	1	90	0	
	2012	40	91 (1.0)	3	85 (4.2)	1	82	1	79
	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	
Yellow Perch Gill Net	2011	9	99 (2.4)	23	104 (1.4)	15	103 (2.0)	2	87 (5.4)
	2012	5	99 (3.6)	99	96 (1.0)	27	96 (1.9)	0	
	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	

## Length Frequency Distribution

Length frequency histogram of species sampled by year.

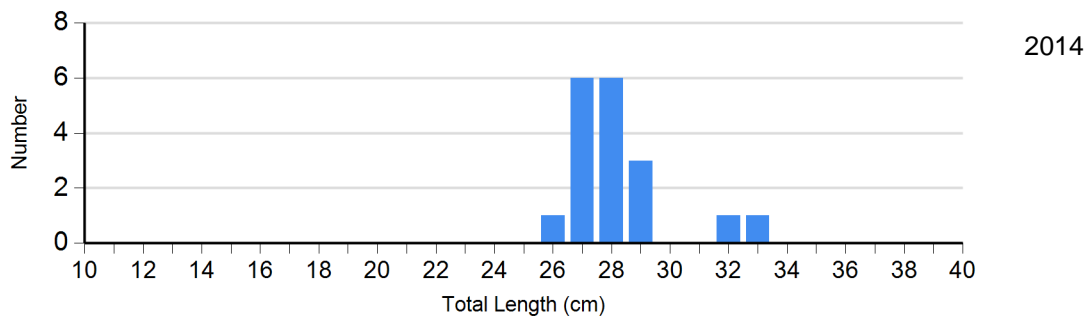
Species: Black Crappie

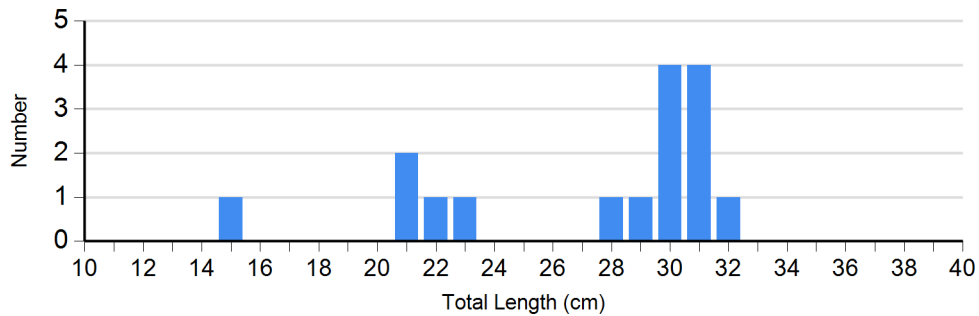
Gear: large frame net



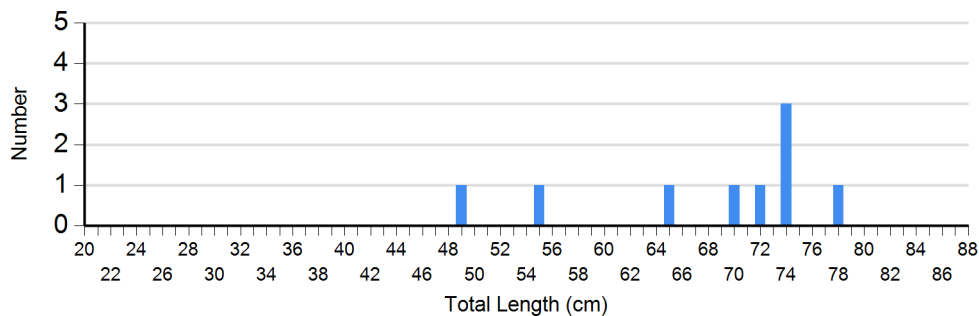
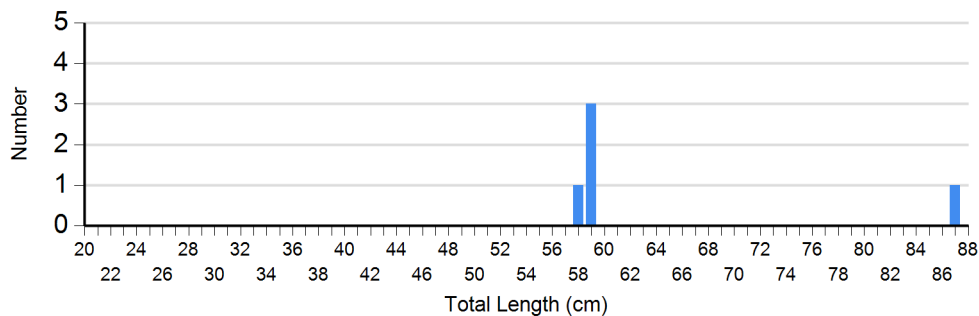
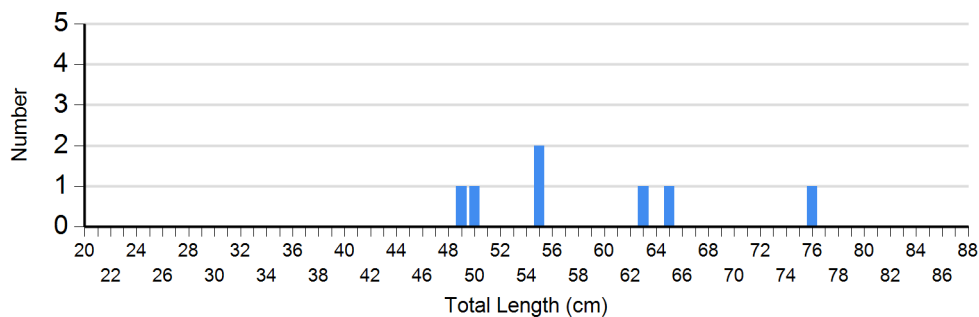
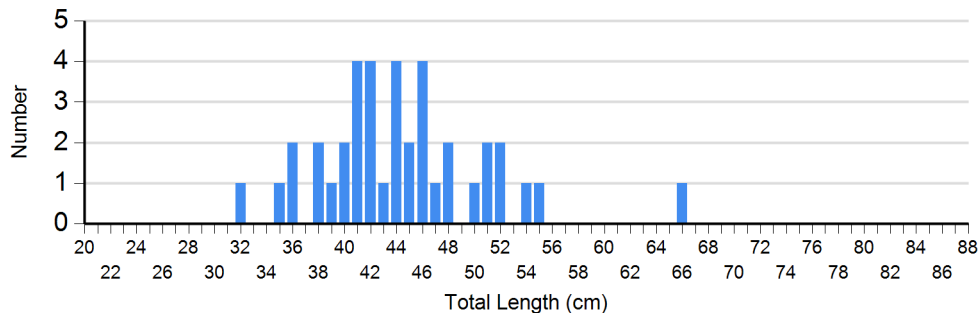
Species: Black Crappie

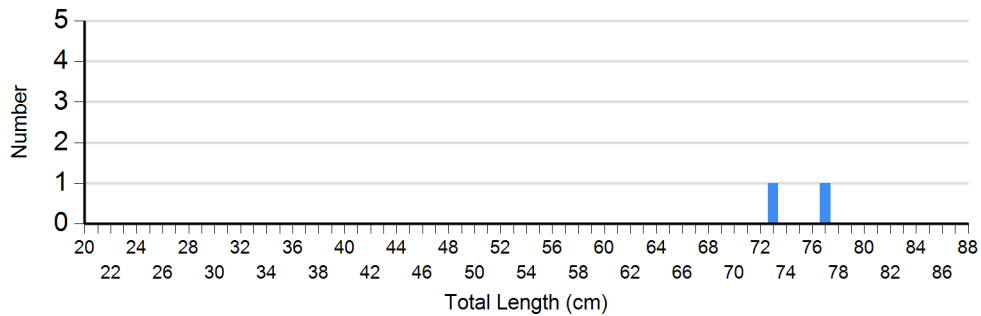
Gear: std frame net (3/8 inch)





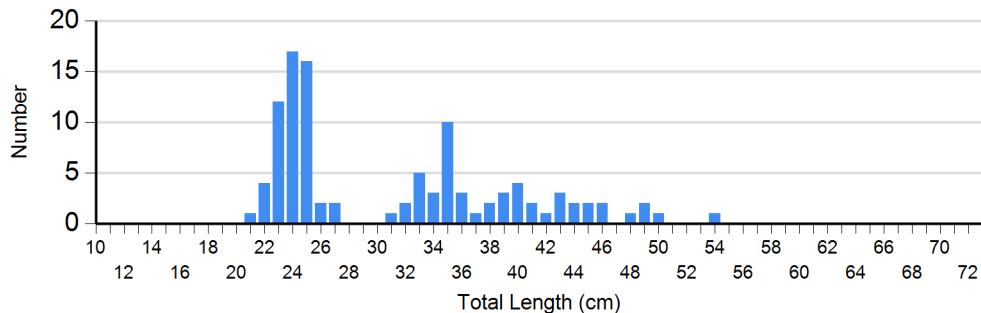
Species: Northern Pike  
Gear: std exp gill net



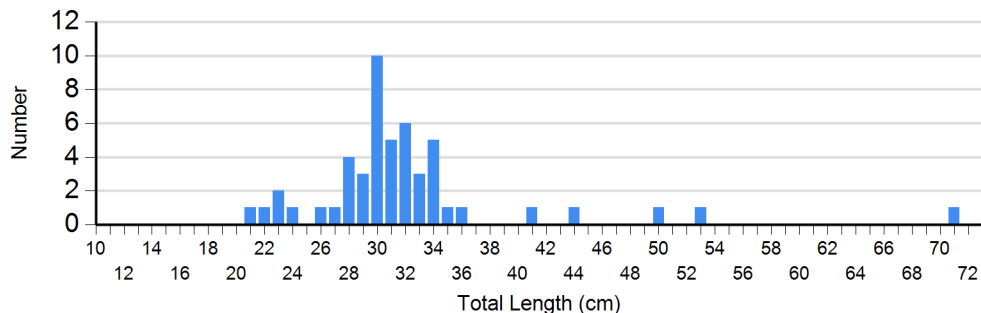


2015

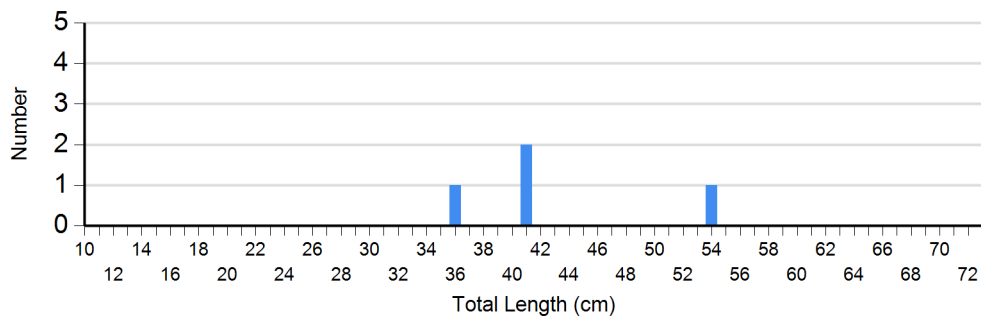
Species: Walleye  
Gear: std exp gill net



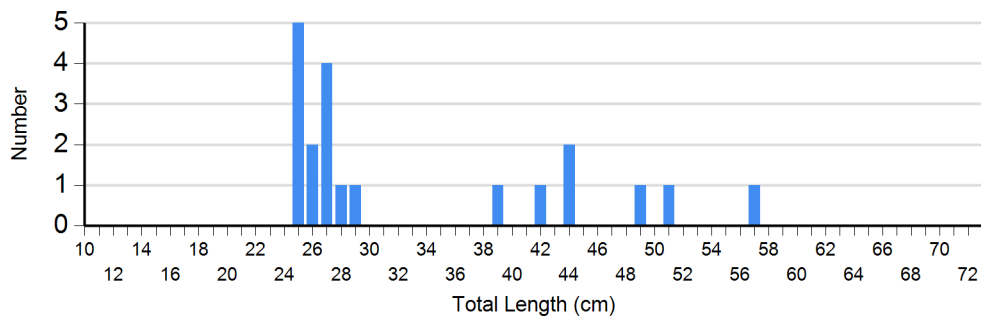
2011



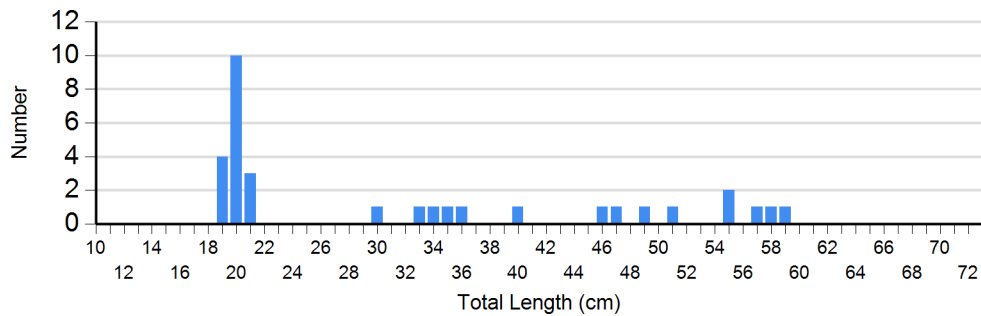
2012



2013

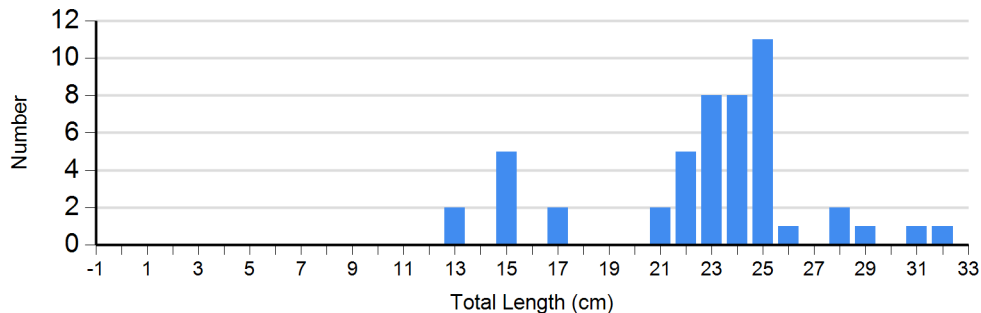


2014

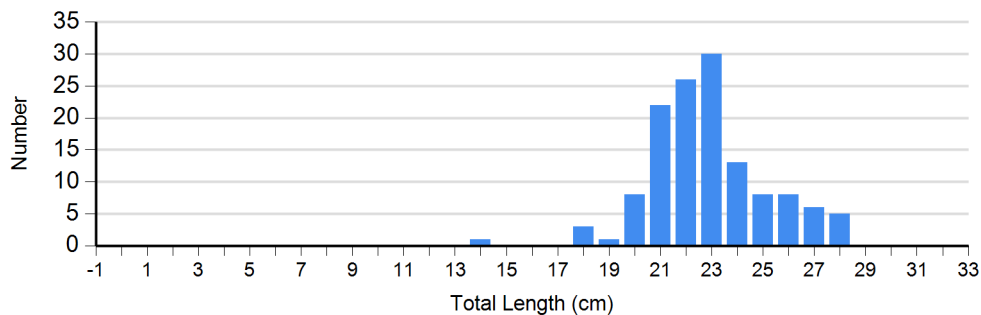


2015

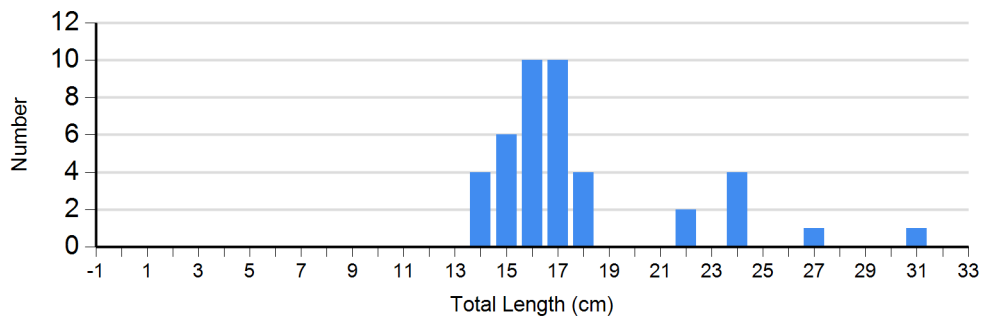
Species: Yellow Perch  
Gear: std exp gill net



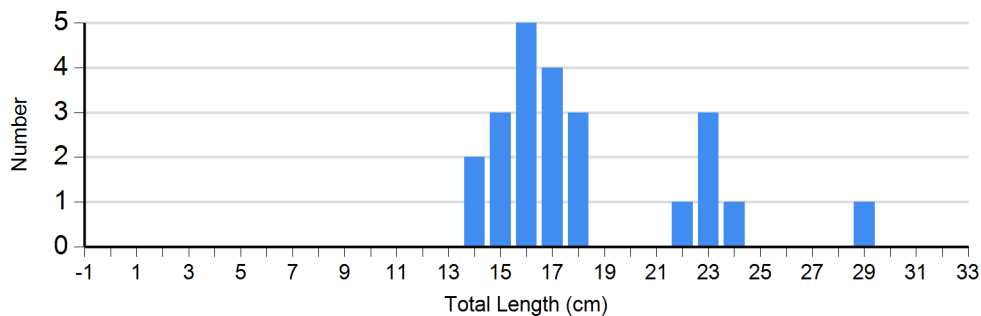
2011



2012



2014



2015

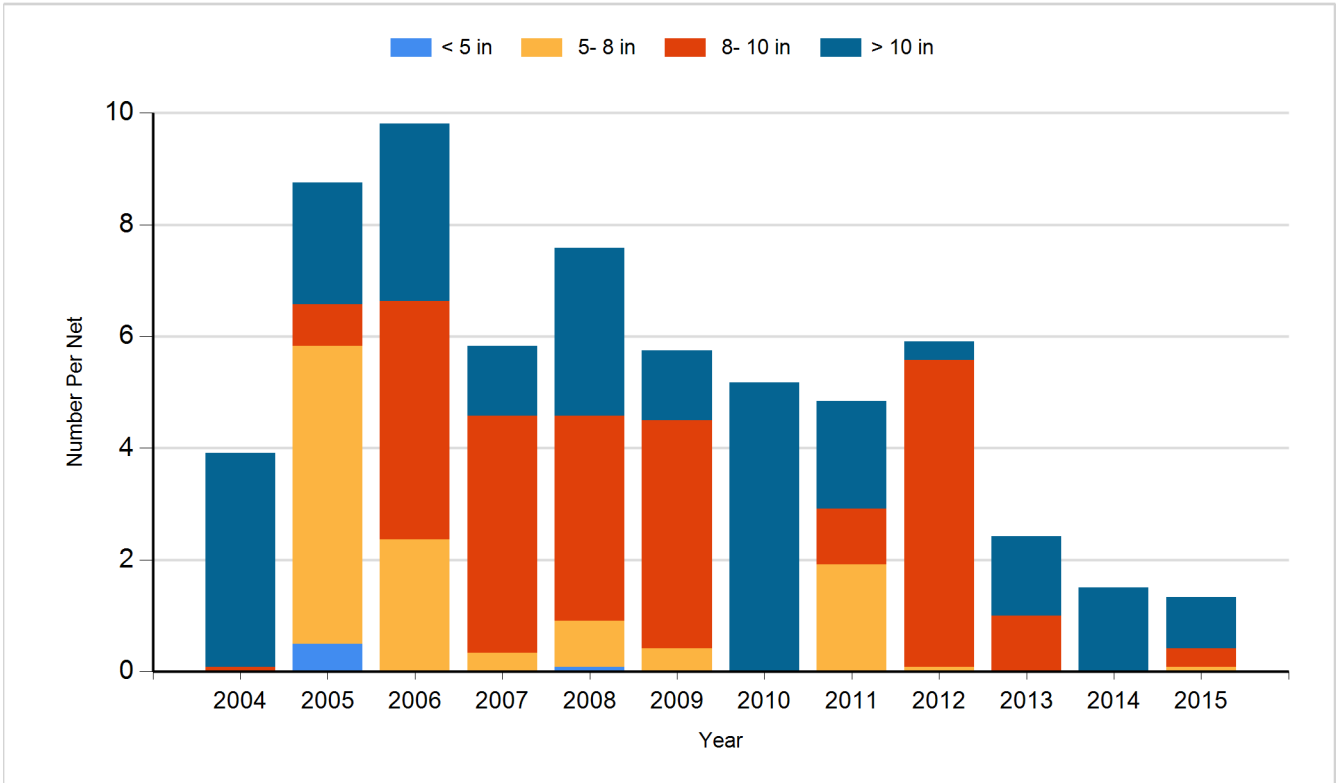




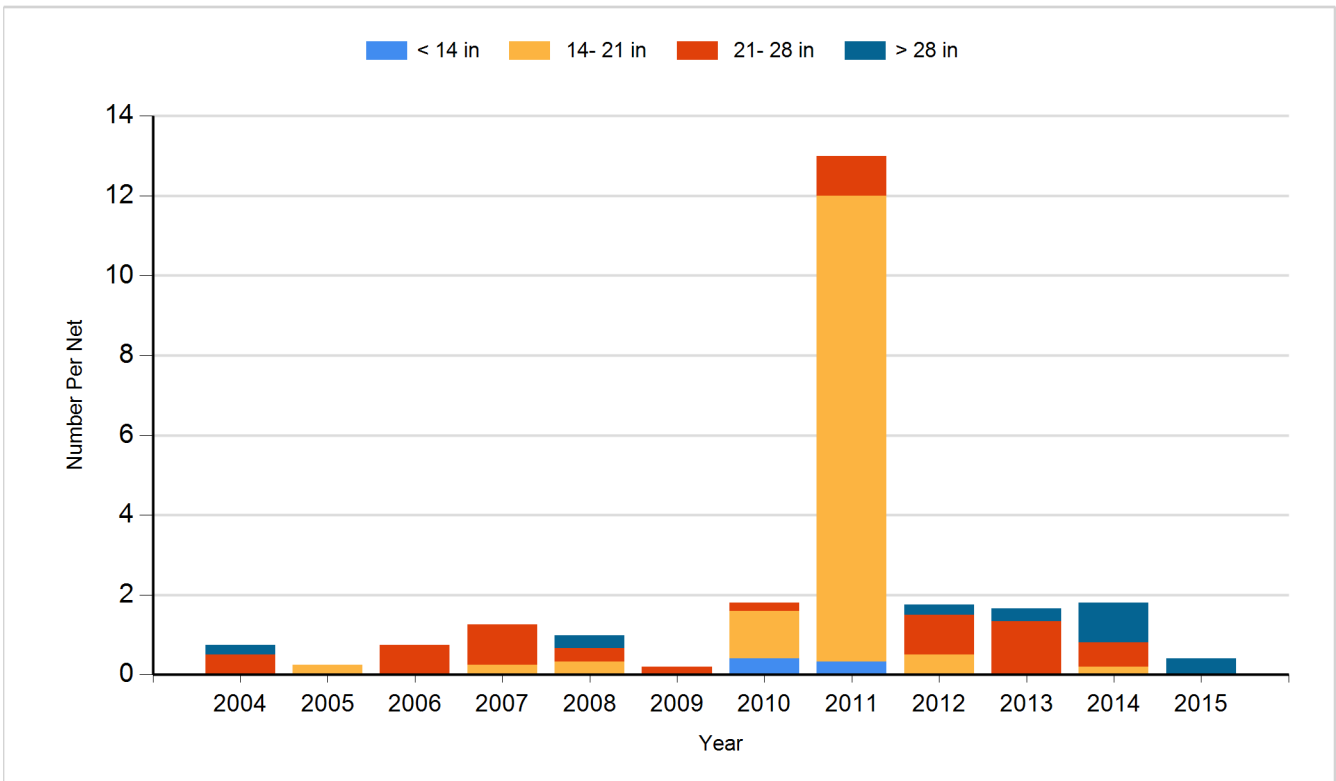
## Historic Fish Sizes and Relative Abundance

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

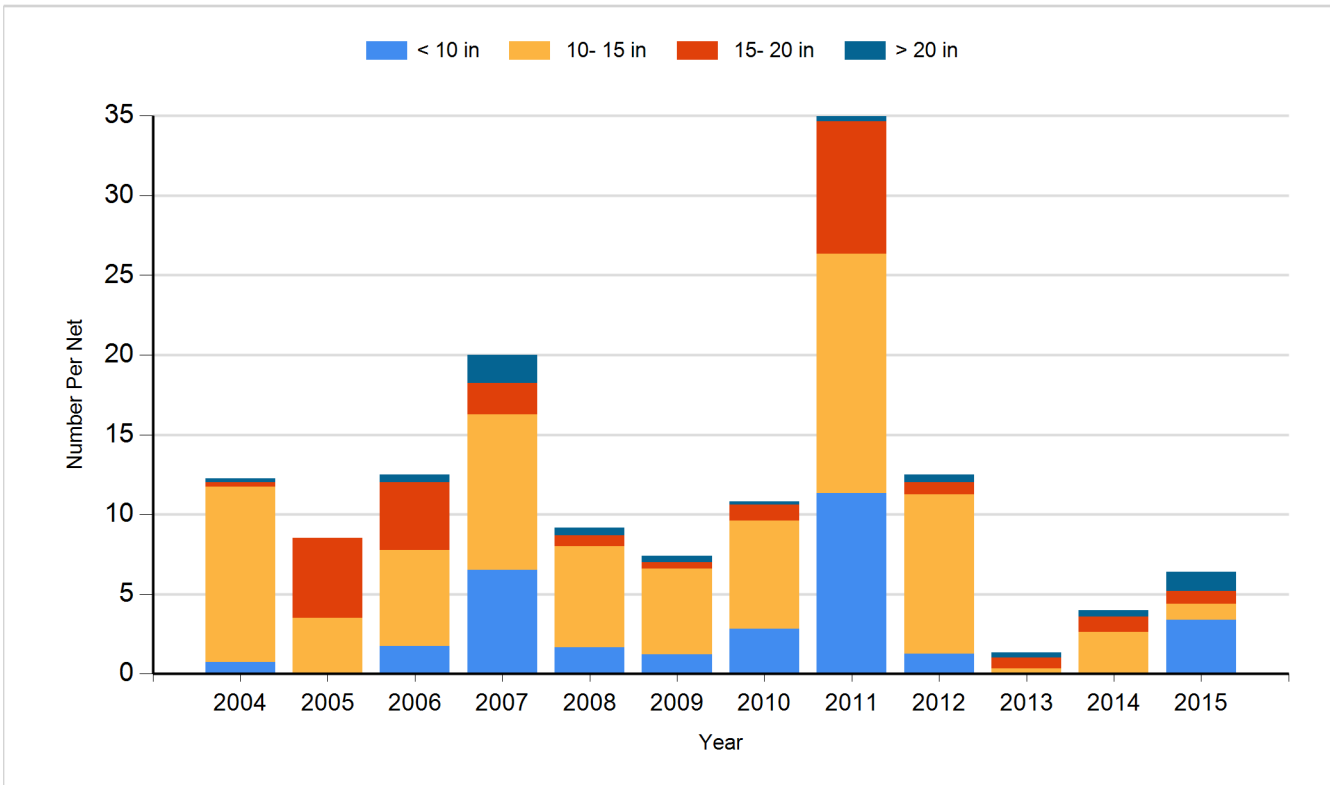
Species: Black Crappie  
Gear: Frame Net



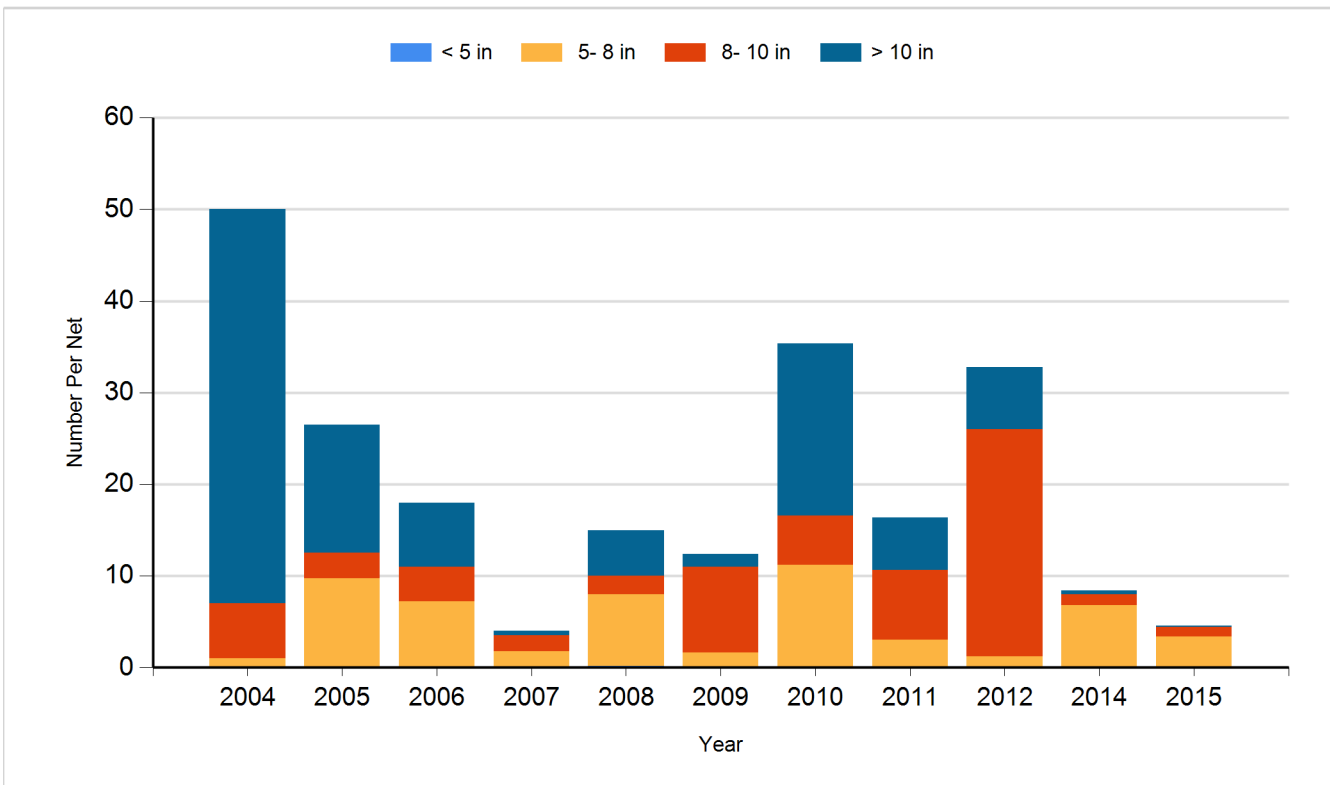
Species: Northern Pike  
Gear: Gill Net



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
2004	Yellow Perch	Fingerling	6,885
2005	Walleye	Fry	1,085,950
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