

**SOUTH DAKOTA STATEWIDE FISHERIES SURVEY**  
**Angostura Reservoir, Fall River County**  
**ANR-Lake-4-000**  
**2017**

**Lake Information**

**Name:** Angostura Reservoir  
**County:** Fall River  
**Surface Area:** 4,835 Acres

**Surveys and Investigations**

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

Gear	Date	Effort
std exp gill net	August 22, 2017	8 net-nights
std frame net (3/8 inch)	May 18, 2017	11 net-nights

## **Common Fish Species Present**

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Channel Catfish

Black Crappie

Largemouth Bass

Gizzard Shad

Walleye

Smallmouth Bass

River Carpsucker

Common Carp

Shorthead Redhorse

Freshwater Drum

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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
std exp gill net	Black Crappie	1.8	1.0	100		86		110	4
	Bluegill	0.1	0.2	100		100		79	
	Channel Catfish	4.6	1.8	27	11	0		88	2
	Common Carp	1.5	0.8	50	25	0		87	4
	Freshwater Drum	0.6	0.6	40		20		98	4
	Gizzard Shad	5.1	1.8	100				101	1
	Largemouth Bass	0.3	0.2	100		50		112	9
	Northern Pike	0.5	0.3	100		50		80	8
	River Carpsucker	3.0	1.7	100		100		100	2
	Shorthead Redhorse	1.1	0.7	100		78		92	2
	Smallmouth Bass	6.3	3.0	68	10	18	8	98	1
	Walleye	11.0	1.9	65	7	5		88	1
White Sucker	0.1	0.2	100		100		94		
std frame net (3/8 inch)	Black Crappie	8.7	2.8	100		63	7	101	1
	Bluegill	0.4	0.3	100		0		112	4
	Common Carp	0.4	0.3	50		25		83	3
	River Carpsucker	0.5	0.3	100		80		100	7
	Walleye	0.6	0.6	86		71		80	5

## 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		
boat shocker (night)	Walleye	60.0											60.0
frame net (1/2 inch)	Black Crappie	10.8	5.5	2.9									6.4
	Bluegill	19.0	16.3	5.9									13.7
	Channel Catfish	0.0	3.3	8.1									3.8
	Common Carp		0.3	1.1									0.7
	Freshwater Drum	0.1	0.1	0.9									0.4
	Gizzard Shad			0.0									0.0
	Green Sunfish	0.3											0.3
	River Carpsucker	3.1	0.6	0.8									1.5
	Rock Bass	0.1	0.1										0.1
	Shorthead Redhorse	0.6		0.5									0.6
	Smallmouth Bass	1.1	0.4	0.3									0.6
	Walleye	0.5	0.6	1.1									0.7
	White Sucker			0.1									0.1
	Yellow Perch	0.3	0.1										0.2
frame net (std 3/4 in)	Black Bullhead				0.3			1.1					0.7
	Black Crappie				26.4	3.9	11.3	7.0	5.9	8.3			10.5
	Bluegill				0.8	4.5	8.1	2.0	1.4	0.6			2.9
	Bluegill X Gr. Sunfish Hybrid						0.3						0.3
	Channel Catfish				3.4		0.1	1.3	0.3	6.3			2.3
	Common Carp				0.6		0.4	2.6	0.3	0.9			1.0
	Freshwater Drum						0.0						0.0
	Green Sunfish					0.1	0.9						0.5
	Largemouth Bass									0.6			0.6
	Northern Pike					0.1		0.1					0.1
	River Carpsucker				0.6	0.1	0.3	0.5		0.3			0.4
	Rock Bass						0.8	0.1	0.1				0.3
	Shorthead Redhorse					0.1		0.1	0.3				0.2
	Smallmouth Bass				0.3	0.5		1.4		0.4			0.7
	Walleye				0.9	0.8	0.8	1.3	1.3	1.9			1.2
	White Sucker							0.4	0.1				0.3
Yellow Perch				0.3				0.0				0.2	

		CPUE										
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
std exp gill net	Black Crappie	1.0	0.3	1.0			1.3			4.3	1.8	1.6
	Bluegill									0.3	0.1	0.2
	Channel Catfish	19.0	26.5	13.8			13.5			10.8	4.6	14.7
	Common Carp	2.3	3.5	10.0			6.0			4.5	1.5	4.6
	Freshwater Drum	10.0	4.0	1.3			2.3			5.0	0.6	3.9
	Gizzard Shad	0.0	0.5	0.0			2.8			2.8	5.1	1.9
	Largemouth Bass	0.0	0.3	1.5						0.3	0.3	0.5
	Northern Pike		0.8				0.3			1.0	0.5	0.7
	River Carpsucker	1.0	1.3	2.5			2.5			1.5	3.0	2.0
	Shorthead Redhorse	2.0	3.3	2.8			5.0			4.5	1.1	3.1
	Smallmouth Bass	0.7	4.3	6.8			5.3			5.0	6.3	4.7
	Spottail Shiner	0.0	0.0	0.0			0.0			0.0		0.0
	Walleye	39.0	21.8	21.5			25.3			25.8	11.0	24.1
	White Sucker		0.5							0.5	0.1	0.4
Yellow Perch	2.3	17.0	12.0			3.0			2.0		7.3	
std exp gill net (150 ft)	Black Crappie				2.5	0.8		3.3	2.3			2.2
	Bluegill					0.3						0.3
	Channel Catfish				24.0	9.8		16.8	8.8			14.9
	Common Carp				8.8	6.0		3.0	6.5			6.1
	Freshwater Drum				1.5	1.8		4.3	2.0			2.4
	Gizzard Shad				0.3	0.3		2.5	5.8			2.2
	Largemouth Bass				0.5			0.3				0.4
	Northern Pike				0.3	0.5			1.8			0.9
	River Carpsucker				1.0	3.5		2.0	2.0			2.1
	Shorthead Redhorse				0.3	1.5		8.5	4.8			3.8
	Smallmouth Bass				4.0	12.8		4.3	5.0			6.5
	Spottail Shiner				0.0	0.0			0.0			0.0
	Walleye				16.5	21.5		29.5	28.0			23.9
	White Sucker							0.3	0.8			0.6
Yellow Perch				9.0	2.8		3.8	3.0			4.7	
std frame net (3/8 inch)	Black Crappie										8.7	8.7
	Bluegill										0.4	0.4
	Common Carp										0.4	0.4
	River Carpsucker										0.5	0.5
	Walleye										0.6	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	
boat shocker (night)	Walleye	PSD	0										
		PSD-P	0										
frame net (1/2 inch)	Black Crappie	PSD	43	66	61								
		PSD-P	9	14	22								
		Wr	100	104	102								
	Walleye	PSD	75	60	89								
		PSD-P	0	40	44								
		Wr	82	82	75								
	Yellow Perch	PSD	50	0									
		PSD-P	0	0									
		Wr	81	93									
frame net (std 3/4 in)	Black Crappie	PSD				100	94	73	95	100	79		
		PSD-P				50	32	26	68	94	60		
		Wr				99	95	94	98	99	111		
	Northern Pike	PSD					100		100				
		PSD-P					100		0				
		Wr							83				
	Walleye	PSD				100	83	100	100	100	100	69	
		PSD-P				57	50	67	20	80	38		
		Wr				86	90	89	85	80	86		
	Yellow Perch	PSD				0					0		
		PSD-P				0					0		
		Wr				164							
	std exp gill net	Black Crappie	PSD	100	100	50			100			76	100
			PSD-P	33	100	0			60			18	86
			Wr	99	103	105			108			105	110
Northern Pike		PSD		100				100			75	100	
		PSD-P		0				100			0	50	
		Wr		94				91			85	80	
Walleye		PSD	65	53	53			55			36	65	
		PSD-P	2	8	6			9			5	5	

Gear	Species	Index	Year										
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
std exp gill net	Walleye	Wr	85	86	83			85			85	88	
	Yellow Perch	PSD	14	22	19			25			25		
		PSD-P	0	0	0			0			13		
		Wr	87	90	89			89			85		
std exp gill net (150 ft)	Black Crappie	PSD				60	33		54	56			
		PSD-P				10	33		54	56			
		Wr				116	82		108	118			
	Northern Pike	PSD				100	100				29		
		PSD-P				0	0				0		
		Wr				94	89				95		
	Walleye	PSD				70	48		59	58			
		PSD-P				9	6		6	14			
		Wr				85	88		85	92			
	Yellow Perch	PSD				22	18		60	8			
		PSD-P				3	9		13	0			
		Wr				89	92		92	95			
std frame net (3/8 inch)	Black Crappie	PSD										100	
		PSD-P										63	
		Wr										101	
	Walleye	PSD											86
		PSD-P											71
		Wr											80

## 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+
2016	116		189 (26)	251 (56)	264 (10)	298 (4)	308 (20)				
2014	108		207 (14)	241 (20)	264 (60)	309 (4)	269 (11)	320 (2)			
2012	58			236 (44)	279 (10)	304 (2)	316 (2)				
2011	412		145 (2)	242 (273)	285 (86)	299 (46)	334 (6)				
2009	112	127 (52)	221 (48)	272 (12)							

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2017	84	285 (18)	392 (54)	431 (9)					568 (3)		
2016	204	308 (126)	397 (62)		445 (8)	524 (6)			606 (2)		
2015	228	279 (92)	390 (21)	447 (25)	460 (46)	515 (16)	523 (10)	610 (6)	584 (4)	515 (6)	623 (2)
2014	236	290 (60)	381 (63)	426 (82)	464 (17)	525 (4)	599 (4)	617 (2)		576 (2)	485 (2)
2013	192	264 (2)	359 (110)	442 (53)	525 (2)	517 (23)					662 (2)
2012	182	276 (78)	384 (70)	471 (9)	497 (14)	525 (2)	514 (5)	519 (2)			723 (2)
2011	142	251 (22)	381 (54)	456 (29)	475 (15)	483 (5)	523 (15)		544 (2)		499 (2)
2010	170	267 (24)	379 (110)	445 (14)	496 (12)	502 (6)				519 (4)	
2009	156	291 (66)	401 (10)	435 (33)	452 (33)	435 (3)	555 (4)	525 (2)	514 (2)		584 (4)
2008	230	307 (54)	383 (76)	430 (93)	444 (5)	491 (2)					

## Fish Condition

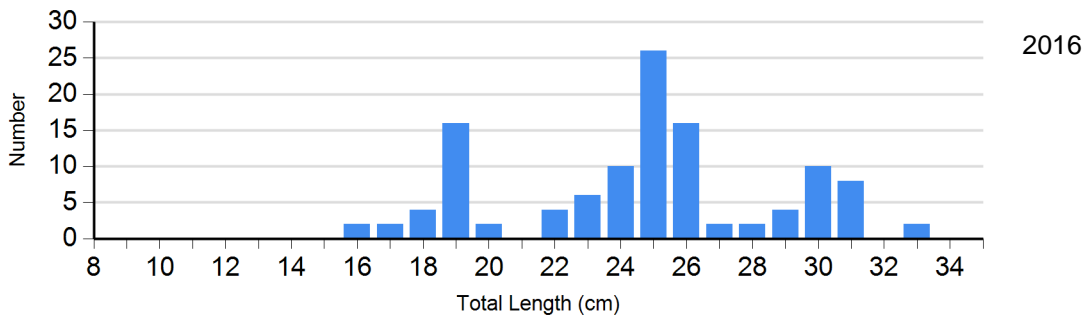
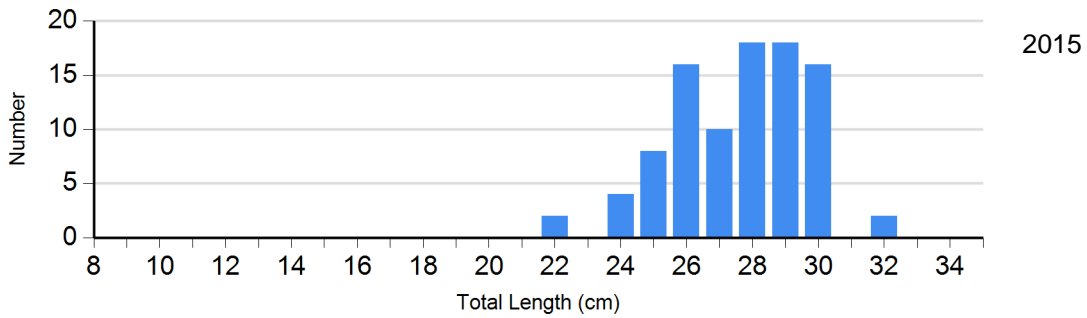
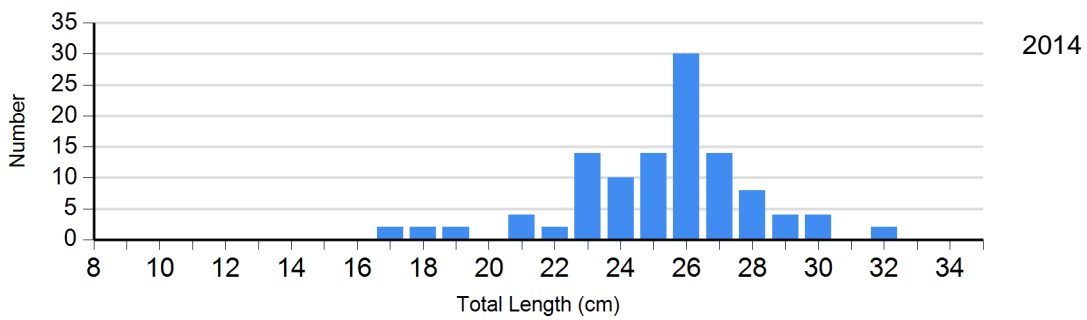
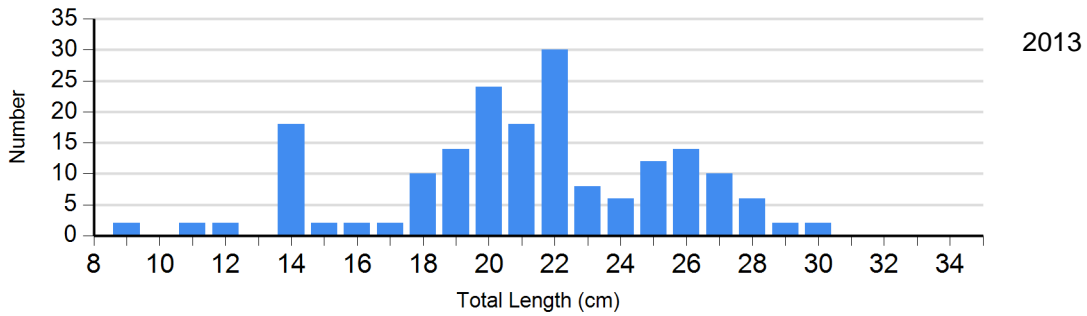
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	48	95 (1.3)	86	91 (0.7)	44	100 (0.8)	2	97 (0.0)
	2014	6	99 (0.3)	30	102 (1.1)	70	97 (0.7)	6	96 (1.1)
	2015	0		6	106 (1.6)	70	99 (0.6)	18	98 (1.2)
	2016	24	113 (2.9)	22	116 (1.2)	50	112 (1.1)	20	104 (1.1)
	2017	0		36	108 (1.1)	52	98 (1.0)	8	94 (3.0)
Northern Pike Gill Net	2013	0		0		0		2	91 (0.0)
	2015	10	97 (1.4)	4	93 (1.1)	0		0	
	2016	2	85 (0.0)	6	85 (4.0)	0		0	
	2017	0		2	72 (10.7)	2	87 (3.3)	0	
Walleye Gill Net	2013	90	84 (0.5)	94	85 (0.6)	16	81 (1.3)	2	85 (0.0)
	2014	96	88 (0.8)	126	83 (0.4)	12	77 (1.3)	2	79 (0.0)
	2015	94	95 (0.5)	98	91 (0.5)	30	87 (0.8)	2	81 (0.0)
	2016	132	85 (0.4)	64	86 (0.6)	8	76 (1.4)	2	65 (0.0)
	2017	31	88 (1.4)	53	89 (0.7)	2	78 (5.7)	2	83 (4.1)
Yellow Perch Gill Net	2013	18	89 (1.4)	6	89 (2.8)	0		0	
	2014	12	94 (2.2)	14	92 (1.9)	4	90 (3.4)	0	
	2015	22	95 (1.9)	2	93 (0.0)	0		0	
	2016	12	86 (1.3)	2	87 (0.0)	2	82 (0.0)	0	

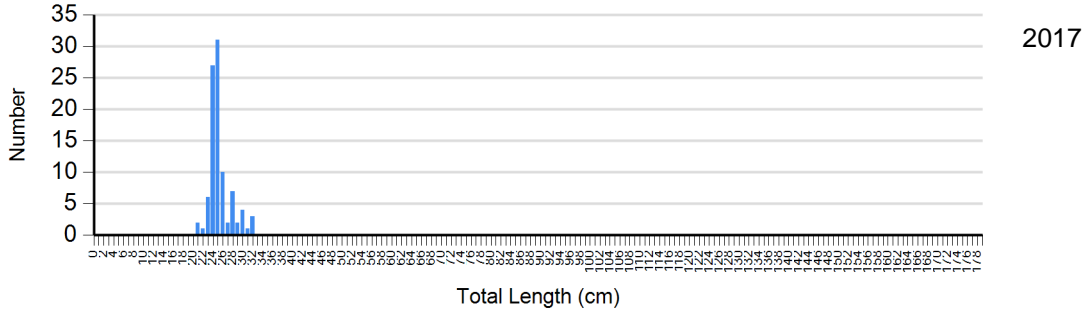
# Length Frequency Distribution

Length frequency histogram of species sampled by year.

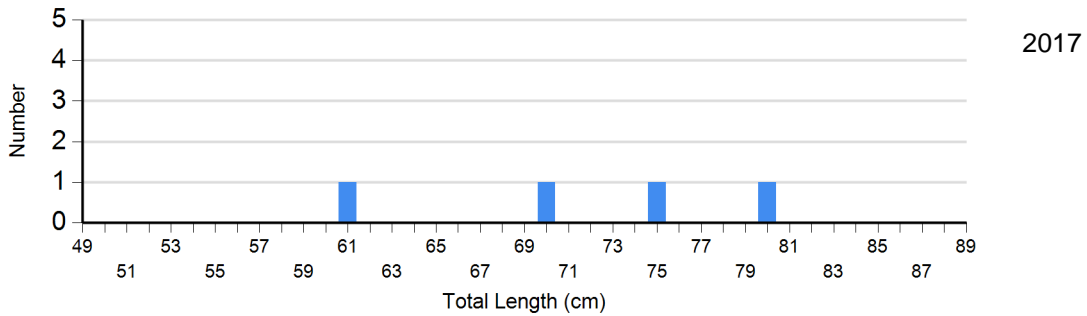
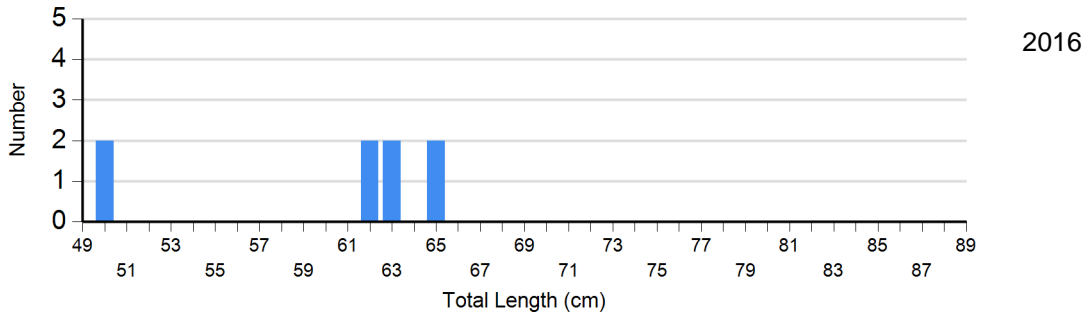
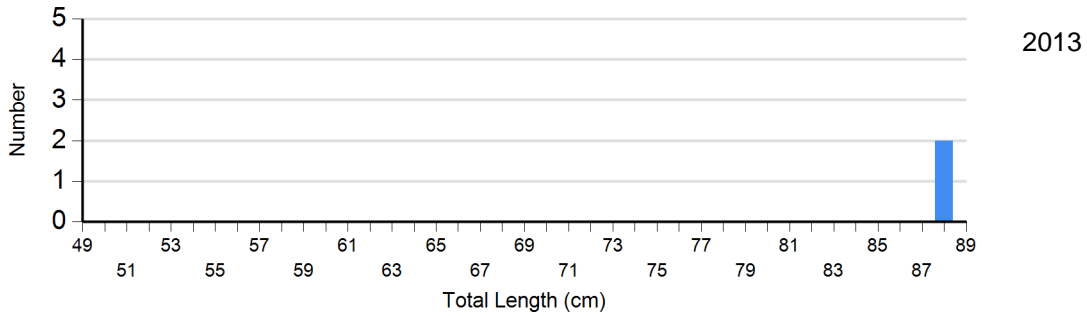
Species: Black Crappie  
Gear: frame net (std 3/4 in)



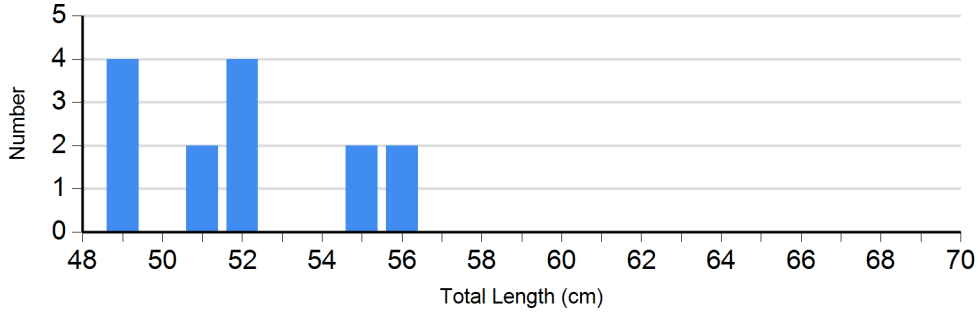
Species: Black Crappie  
 Gear: std frame net (3/8 inch)



Species: Northern Pike  
 Gear: std exp gill net

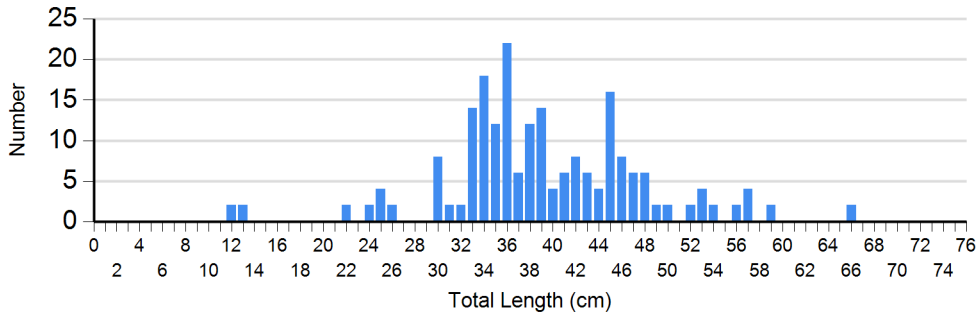


Species: Northern Pike  
 Gear: std exp gill net (150 ft)

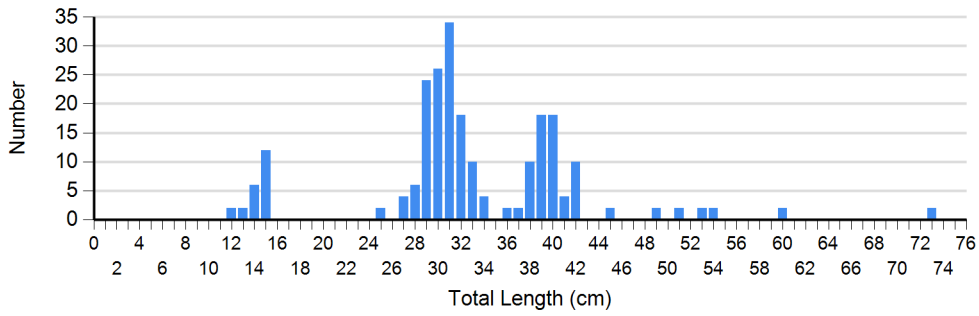


2015

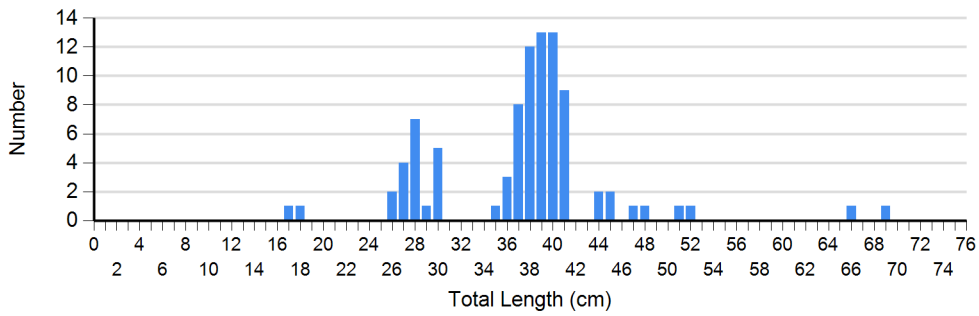
Species: Walleye  
 Gear: std exp gill net



2013

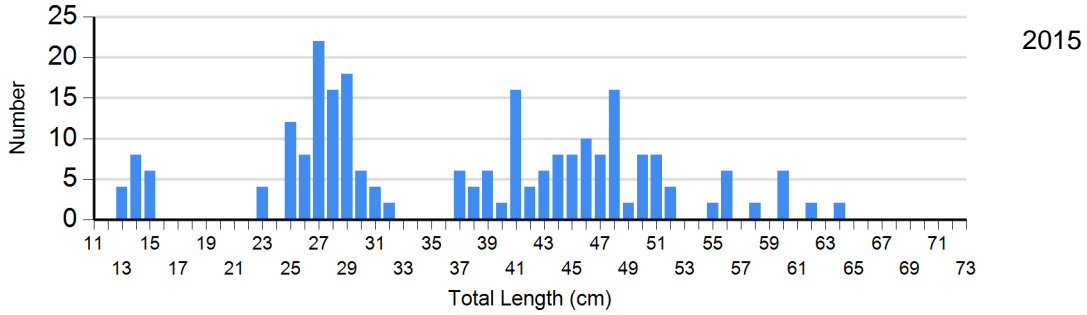
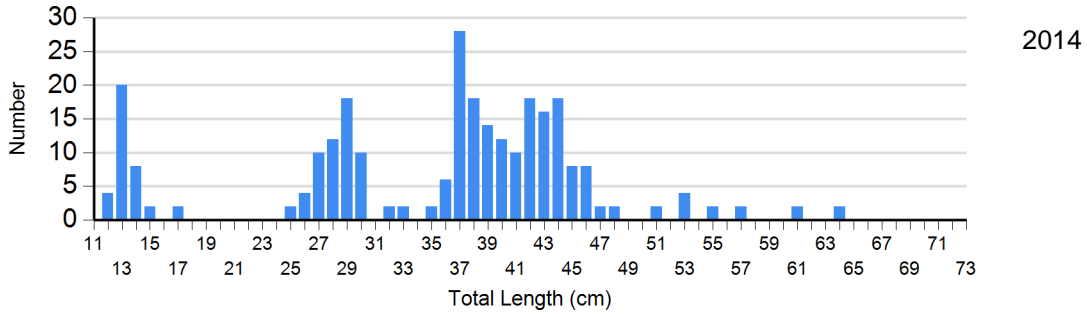


2016

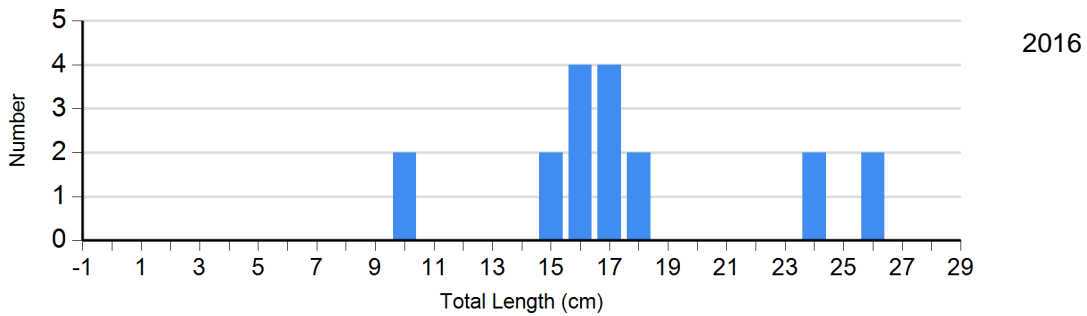
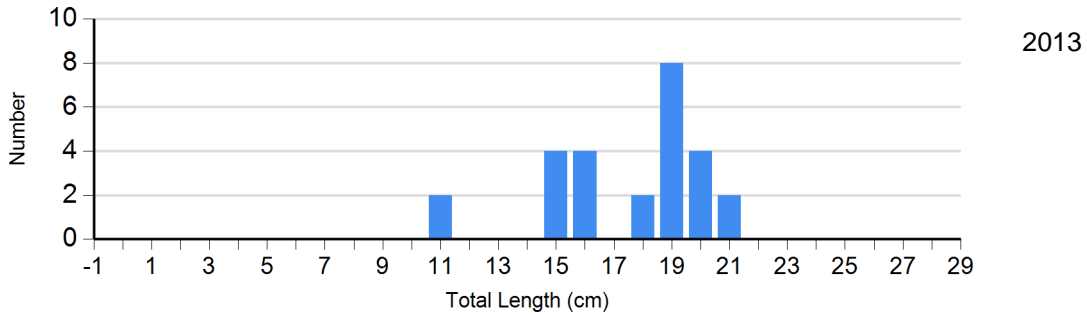


2017

Species: Walleye  
 Gear: std exp gill net (150 ft)

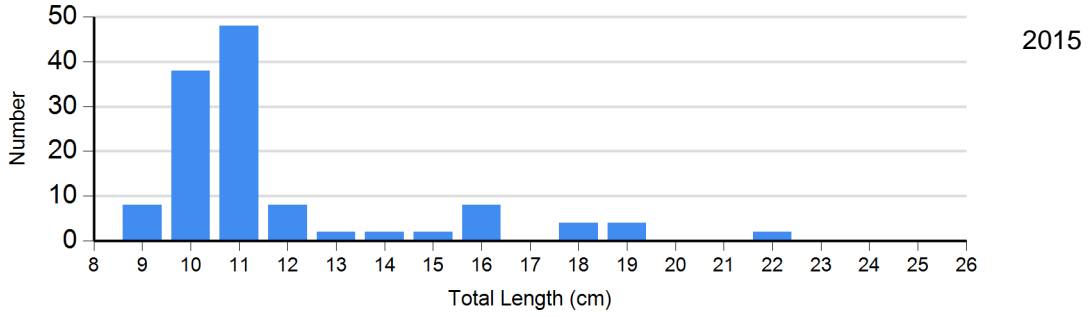
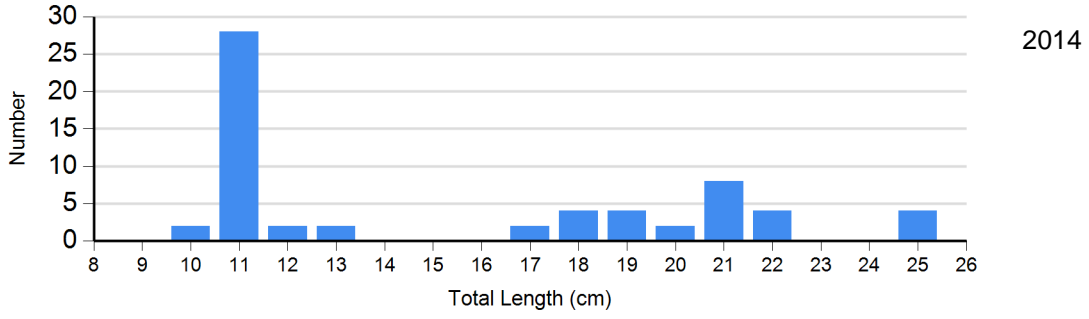


Species: Yellow Perch  
 Gear: std exp gill net





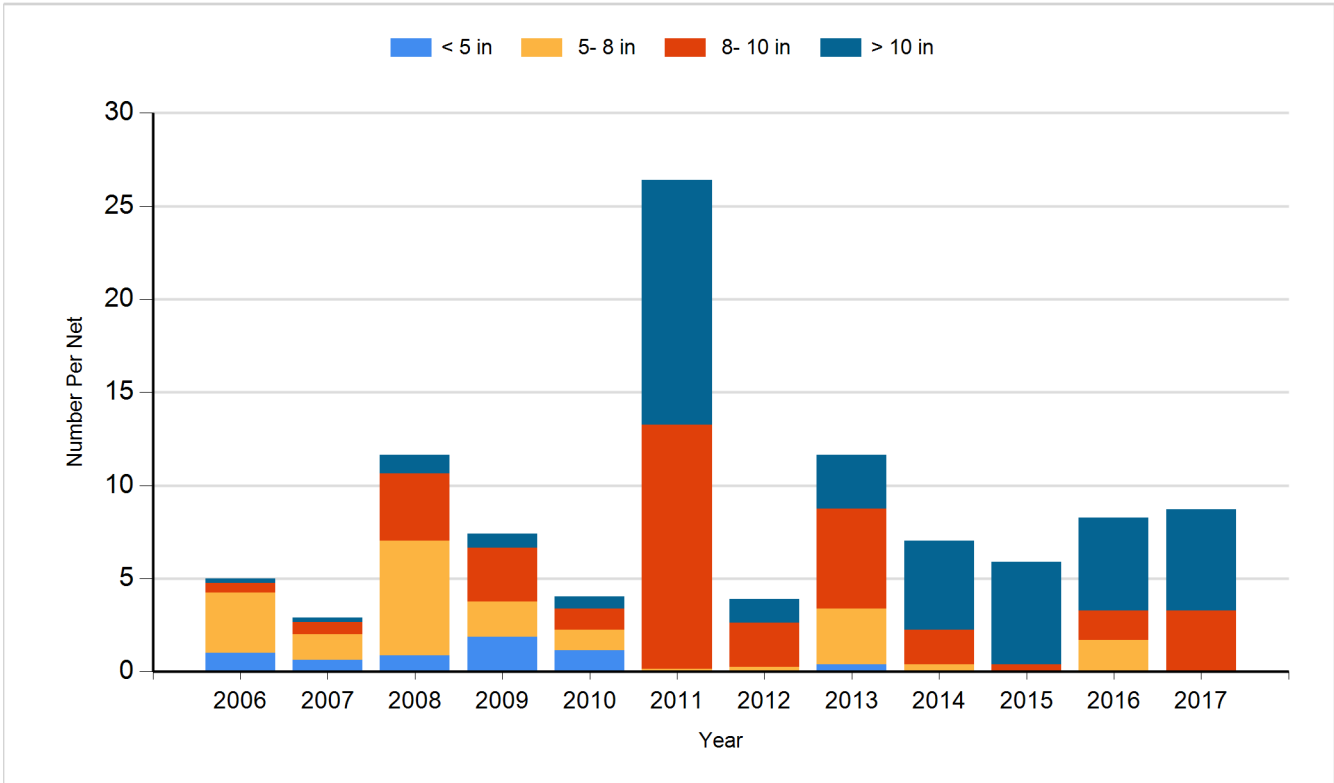
Species: Yellow Perch  
Gear: std exp gill net (150 ft)



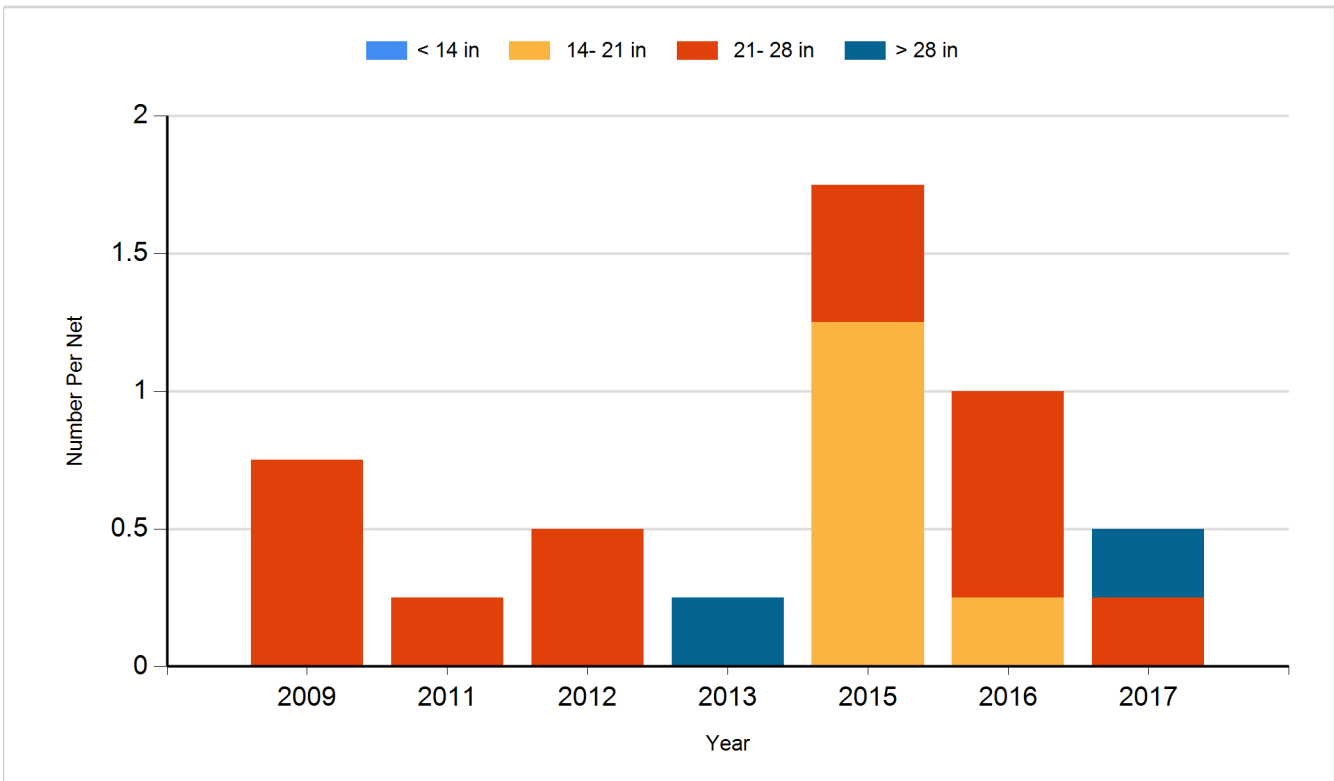
## Historic Fish Sizes and Relative Abundance

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

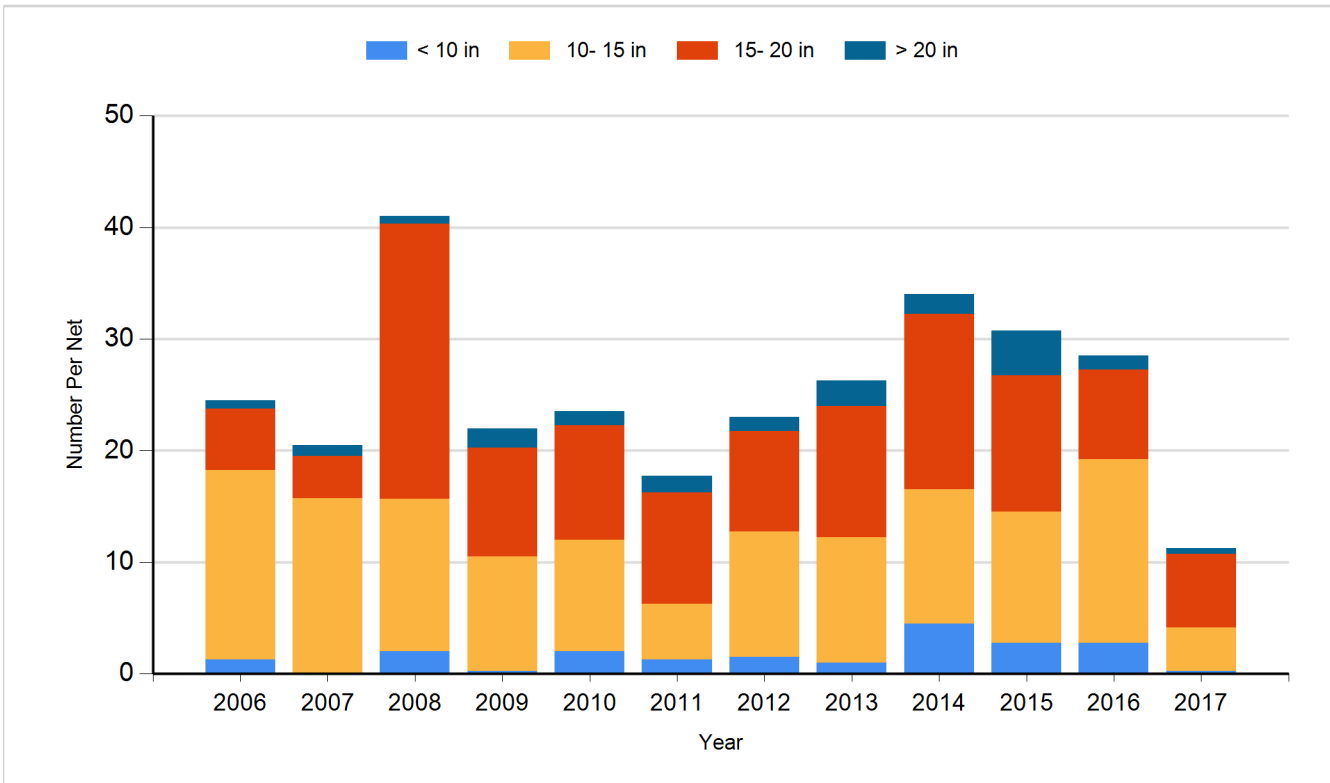
Species: Black Crappie  
Gear: Frame Net



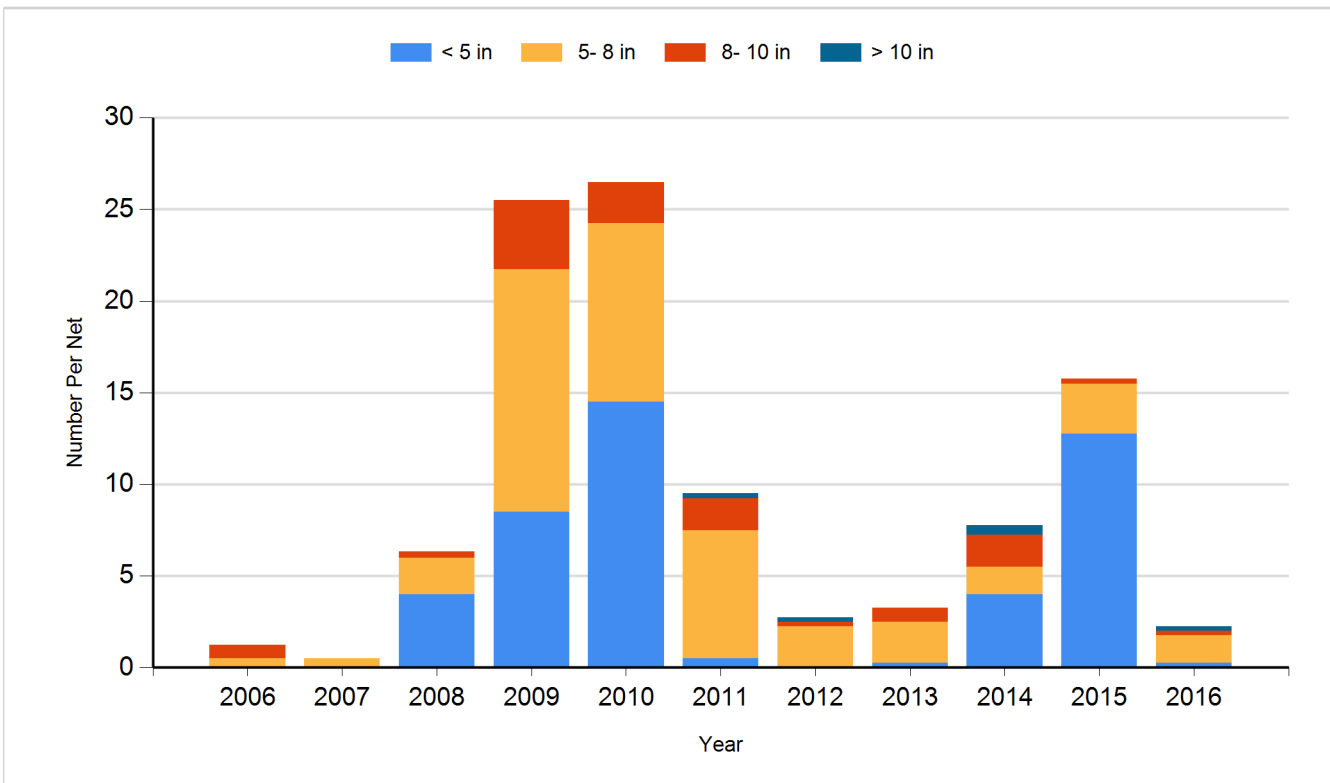
Species: Northern Pike  
Gear: Gill Net



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	Fingerling	479,900
2010	Walleye	Fingerling	289,340
2011	Walleye	Fingerling	310,199
2012	Walleye	Fingerling	476,423
2014	Walleye	Fingerling	549,725
2015	Walleye	Fry	4,702,776
2016	Walleye	Fry	4,809,475
2017	Walleye	Fry	4,609,032