

Common Fish Species Present

Northern Pike

Yellow Perch

Walleye

Rock Bass

Black Bullhead

Common Carp

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	1.1	0.6	100		94		95	5
	Common Carp	0.3	0.2	100		100		69	6
	Northern Pike	0.1	0.1	100		0		81	
	Orangespotted Sunfish	0.0	0.0						
	Rock Bass	0.9	0.3	27		0		109	4
	Walleye	1.5	0.7	85		8		69	3
AFS std gill net	Black Bullhead	0.4	0.2	100		100		107	4
	Common Carp	0.3	0.1	100		100		94	6
	Northern Pike	0.1	0.1	100		0		81	
	Rock Bass	2.8	0.5	91	5	6		107	2
	Walleye	3.3	0.8	55	8	0		80	1
	Yellow Perch	13.8	1.4	91	2	84	3	108	1

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										1.1	1.1
	Common Carp										0.3	0.3
	Northern Pike										0.1	0.1
	Orangespotted Sunfish										0.0	0.0
	Rock Bass										0.9	0.9
	Walleye										1.5	1.5
AFS std gill net	Black Bullhead									0.8	0.4	0.6
	Common Carp									0.1	0.3	0.2
	Northern Pike									0.4	0.1	0.3
	Rock Bass									1.8	2.8	2.3
	Smallmouth Bass									0.2		0.2
	Walleye									5.6	3.3	4.5
boat shocker (night) frame net (std 3/4 in)	Walleye				283.5	167.0	144.0	75.0			360.0	205.9
	Black Bullhead	0.6		0.1		0.2	4.9	7.0				2.6
	Black Crappie	0.6		0.6	0.2	0.1	0.9	0.3				0.5
	Common Carp	0.4		0.3		0.3	0.1	0.1				0.2
	Northern Pike	0.2		0.3	0.2	0.1	0.1	0.3				0.2
	Orangespotted Sunfish					0.0						0.0
	Rock Bass			0.6	1.4	2.2	6.9	2.6				2.7
	Walleye	6.8		2.9	3.9	4.0	6.0	5.9				4.9
	Western Painted Turtle	0.0										0.0
	White Sucker					0.1						0.1
Yellow Perch	0.4				0.7	0.1					0.4	
std exp gill net	Black Bullhead	0.3					0.5	0.3	0.7			0.5
	Common Carp								0.5			0.5
	Northern Pike	0.3				0.3	1.5	1.5	0.5			0.8
	Rock Bass				0.0	0.8	1.0	1.3	0.8			0.8
	Walleye	12.5		3.4	39.7	29.0	17.7	27.7	22.5			21.8
	Yellow Perch	4.2		0.2	11.7	6.0	18.2	34.2	33.8			15.5

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.

Gear	Species	Index	Year										
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
AFS std frame net	Northern Pike	PSD											100
		PSD-P											0
		Wr											81
	Walleye	PSD											85
		PSD-P											8
		Wr											69
AFS std gill net	Northern Pike	PSD										100	100
		PSD-P										80	0
		Wr										93	81
	Walleye	PSD										27	55
		PSD-P										1	0
		Wr										82	80
	Yellow Perch	PSD										100	91
		PSD-P										93	84
		Wr										103	108
boat shocker (night)	Walleye	PSD				0	0	0	0			0	
		PSD-P				0	0	0	0			0	
		Wr				101	89	93	92			90	
frame net (std 3/4 in)	Black Crappie	PSD	100		100	100	100	59	100				
		PSD-P	70		100	100	0	41	80				
		Wr	101		96	99	100	110	97				
	Northern Pike	PSD	75		67	50	100	50	100				
		PSD-P	25		0	25	0	0	0				
		Wr	77		91	87	83	82	76				
	Walleye	PSD	53		81	64	93	59	12				
		PSD-P	9		2	10	7	3	1				
		Wr	83		89	91	81	80	80				
	Yellow Perch	PSD	57				8	100					
		PSD-P	43				8	100					
		Wr	110				91	102					
std exp gill net	Northern Pike	PSD	100				100	89	100	100			

Gear	Species	Index	Year									
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
std exp gill net	Northern Pike	PSD-P	50					0	0	44	67	
		Wr	78				83	80	81	81		
	Walleye	PSD	16		52	14	68	28	6	5		
		PSD-P	0		0	0	0	0	0	0		
	Yellow Perch	Wr	87		90	95	84	83	82	80		
		PSD	100		100	77	97	87	99	96		
	Yellow Perch	PSD-P	64		100	16	56	19	62	74		
		Wr	120		121	116	119	113	108	108		

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+
2011	3						312 (1)	346 (1)	330 (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	66	205 (26)	317 (1)	355 (2)	385 (19)	384 (3)	386 (15)		405 (1)		
2016	67		320 (6)	349 (21)	374 (10)	380 (30)		520 (1)			
2015	143	201 (7)	276 (24)	324 (24)	356 (88)	395 (2)					
2014	185	212 (17)	288 (23)	339 (136)		420 (8)			425 (1)		
2013	112	185 (3)	283 (74)	356 (1)	396 (31)			453 (2)		485 (1)	
2012	309	201 (135)	320 (8)	386 (152)	404 (3)	465 (1)	436 (7)	465 (2)	457 (1)		
2011	239	225 (1)	330 (207)	414 (2)	402 (1)	441 (27)		435 (1)			
2010	147	203 (86)	328 (5)	376 (9)	387 (44)		406 (3)				
2008	77	202 (1)	276 (58)	356 (2)	389 (16)						

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	166	141 (15)	231 (10)		272 (38)	289 (11)	298 (90)		325 (2)		
2016	171			254 (37)	277 (23)	300 (90)	309 (10)	305 (11)			
2015	203		197 (14)	229 (28)	274 (149)	278 (11)	325 (1)				
2014	205		213 (16)	254 (148)		278 (41)					
2013	109		211 (82)	249 (4)	265 (22)	257 (1)					
2012	36	150 (1)	203 (1)	249 (32)	275 (1)	275 (1)					
2011	70		205 (51)	235 (11)	274 (5)		290 (2)				351 (1)
2010	4	92 (1)		263 (2)						300 (1)	

Fish Condition

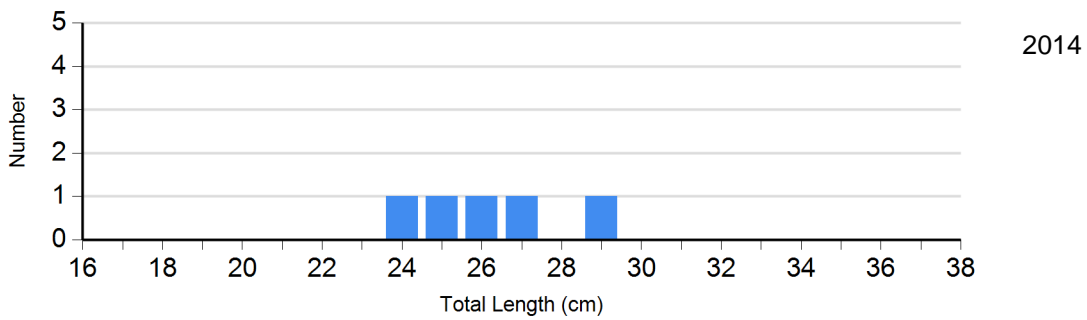
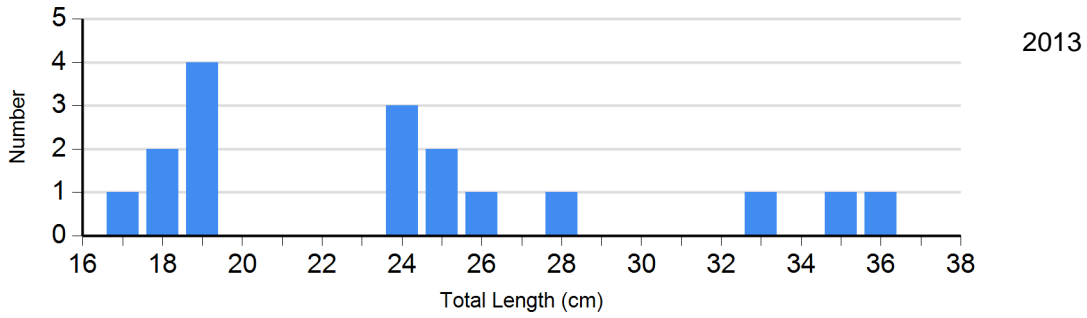
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	7	118 (1.5)	3	108 (1.0)	4	103 (1.5)	3	101 (3.8)
	2014	0		1	103	4	96 (1.6)	0	
Northern Pike Gill Net	2013	1	89	8	79 (2.5)	0		0	
	2014	0		5	79 (3.2)	3	82 (1.6)	1	86
	2015	0		1	92	2	75 (2.3)	0	
	2016	0		1	85	2	85 (10.2)	2	104 (3.5)
	2017	0		1	81	0		0	
Walleye Gill Net	2013	76	85 (0.5)	30	78 (0.8)	0		0	
	2014	156	82 (0.3)	10	83 (2.2)	0		0	
	2015	128	81 (0.5)	7	75 (1.8)	0		0	
	2016	49	83 (0.8)	17	80 (1.3)	1	72	0	
	2017	18	83 (1.2)	22	78 (0.9)	0		0	
Yellow Perch Gill Net	2013	14	111 (2.5)	74	111 (0.8)	21	119 (2.3)	0	
	2014	2	112 (13.8)	75	111 (0.8)	121	107 (0.7)	7	106 (2.5)
	2015	9	114 (2.6)	44	111 (1.3)	136	107 (0.7)	14	102 (1.2)
	2016	0		12	110 (3.3)	95	105 (0.9)	64	99 (0.8)
	2017	15	111 (1.4)	12	119 (2.1)	92	110 (0.8)	47	101 (1.1)

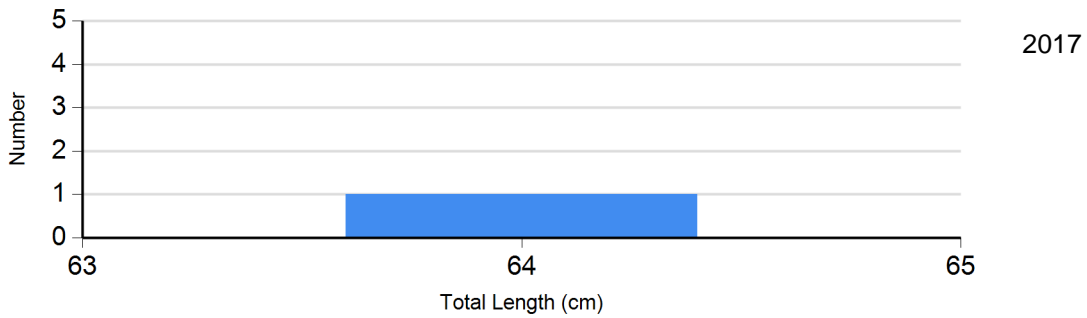
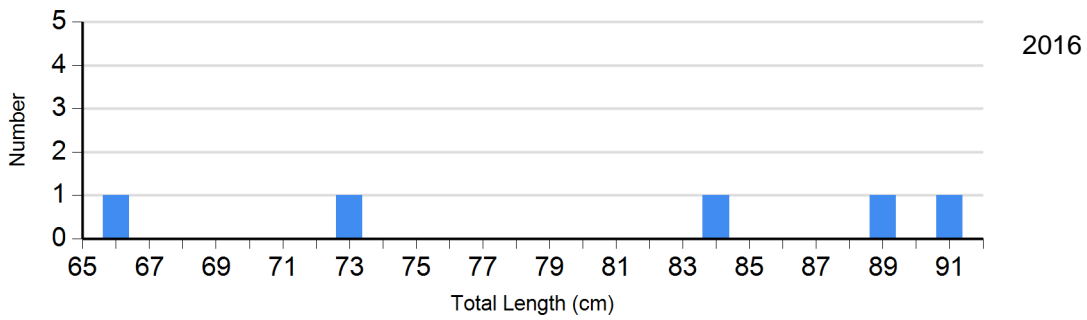
Length Frequency Distribution

Length frequency histogram of species sampled by year.

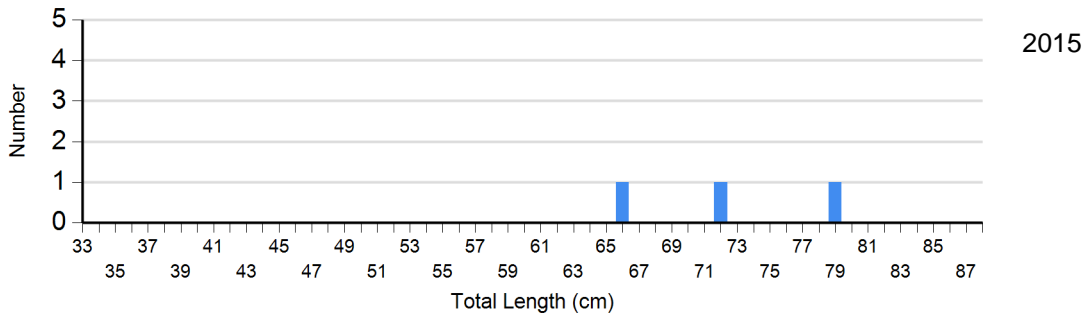
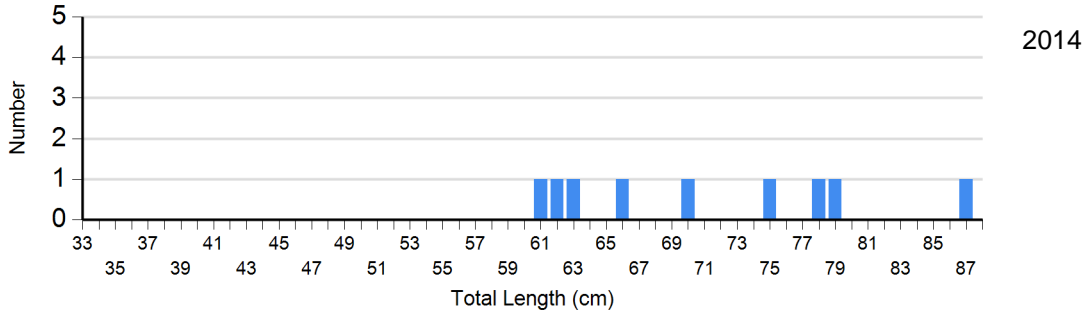
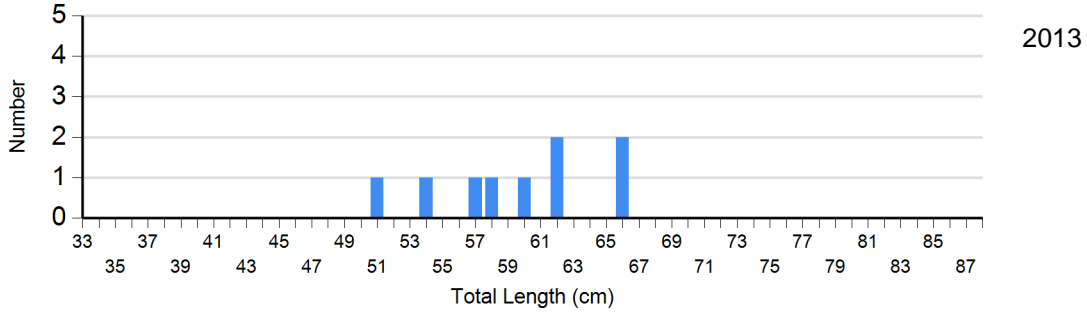
Species: Black Crappie
Gear: frame net (std 3/4 in)



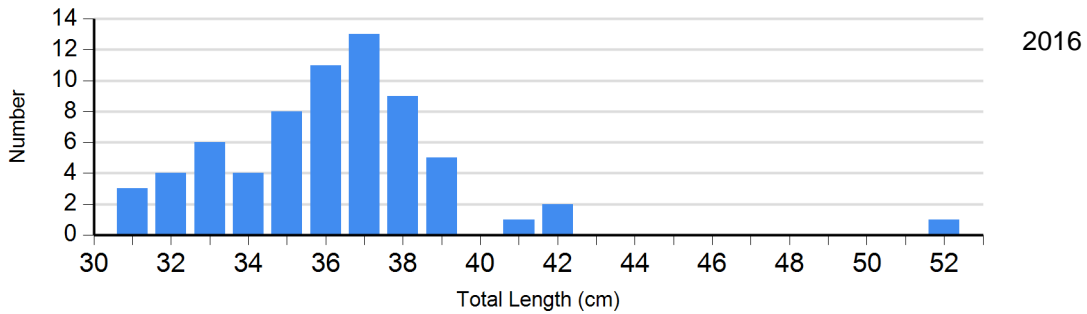
Species: Northern Pike
Gear: AFS std gill net

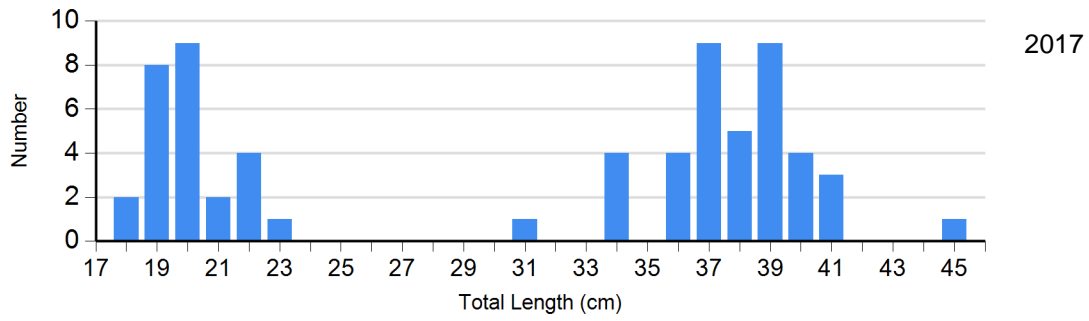


Species: Northern Pike
Gear: std exp gill net

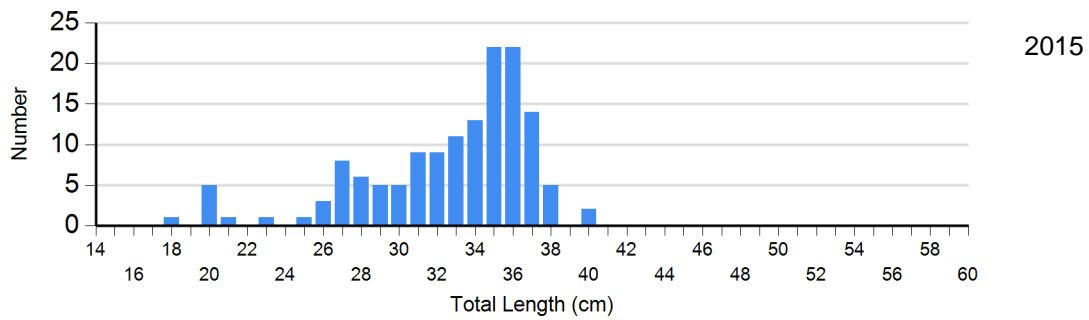
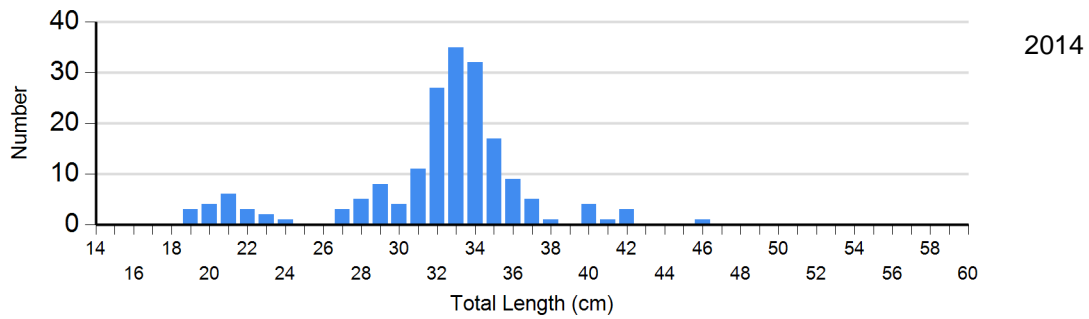
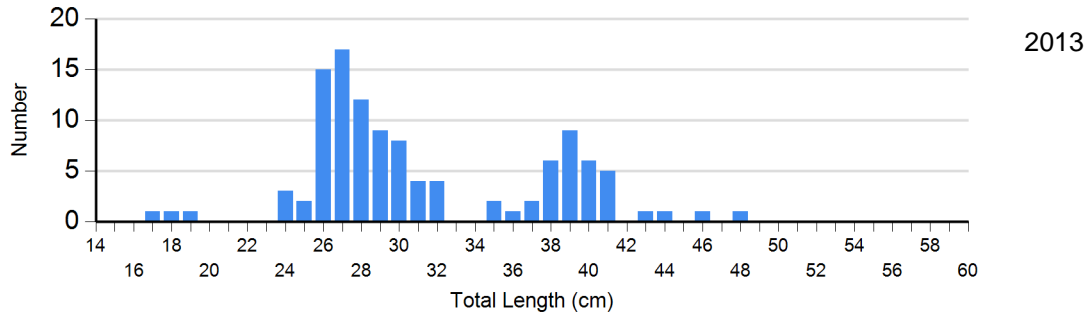


Species: Walleye
Gear: AFS std gill net

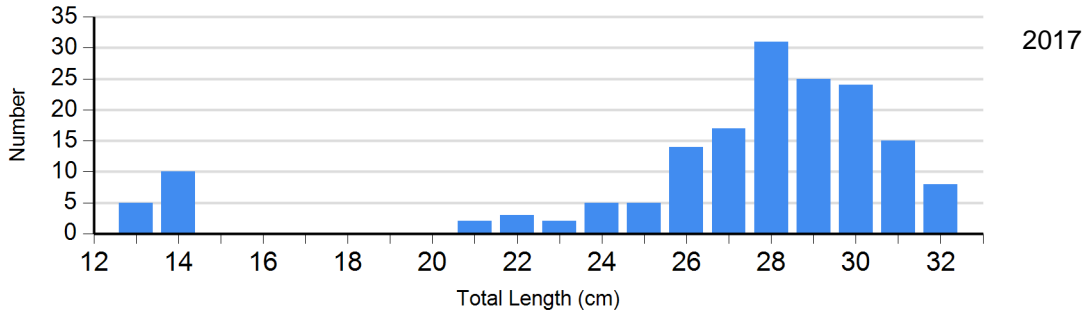
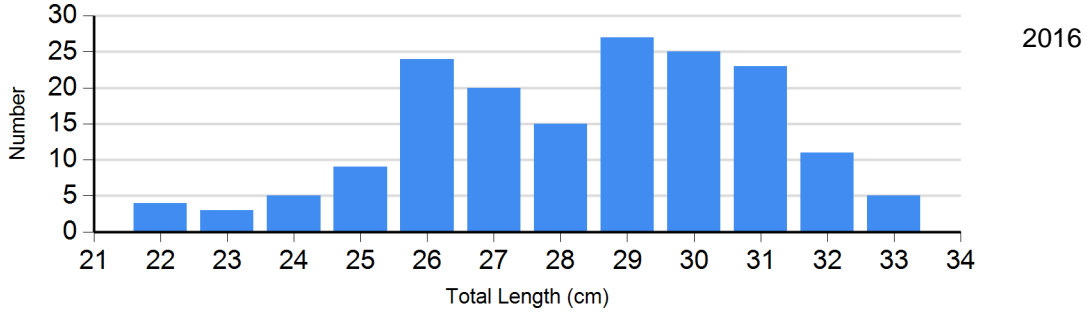




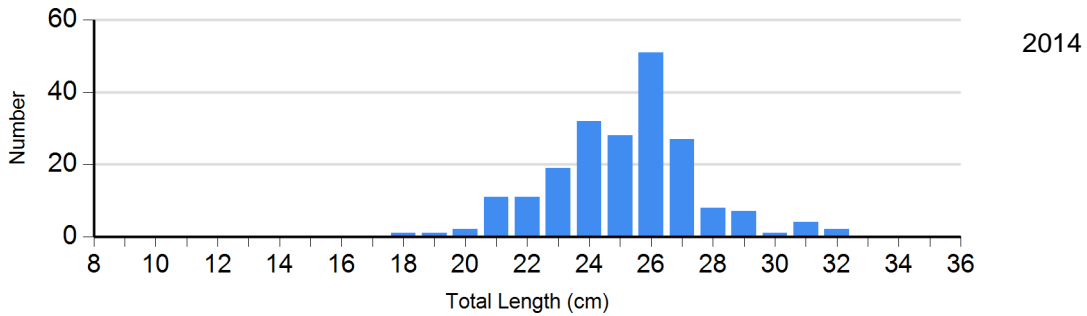
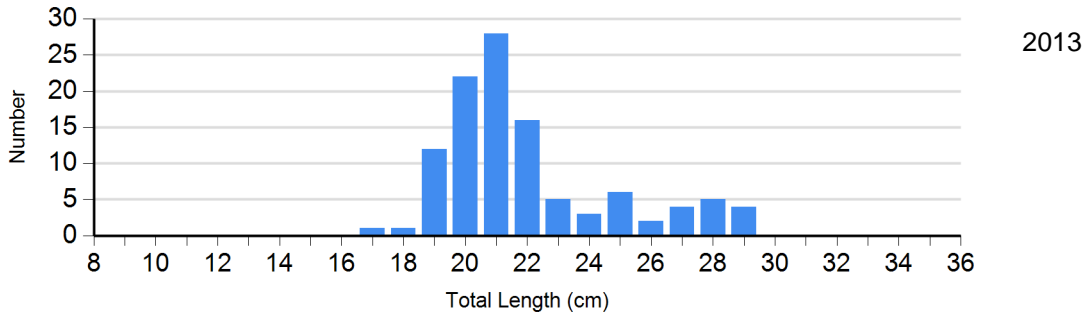
Species: Walleye
 Gear: std exp gill net

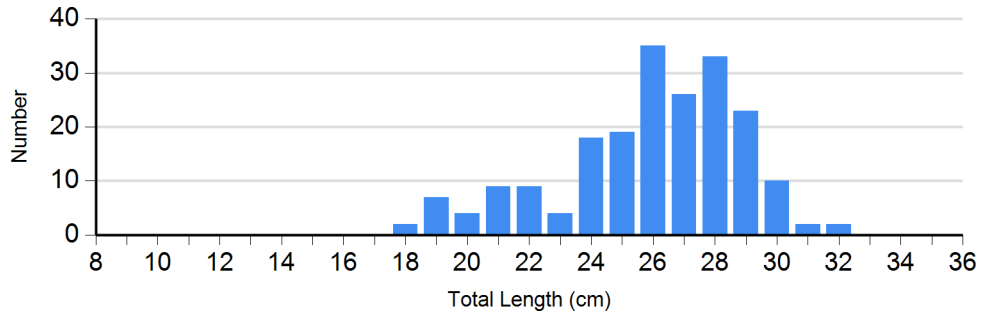


Species: Yellow Perch
Gear: AFS std gill net



Species: Yellow Perch
Gear: std exp gill net



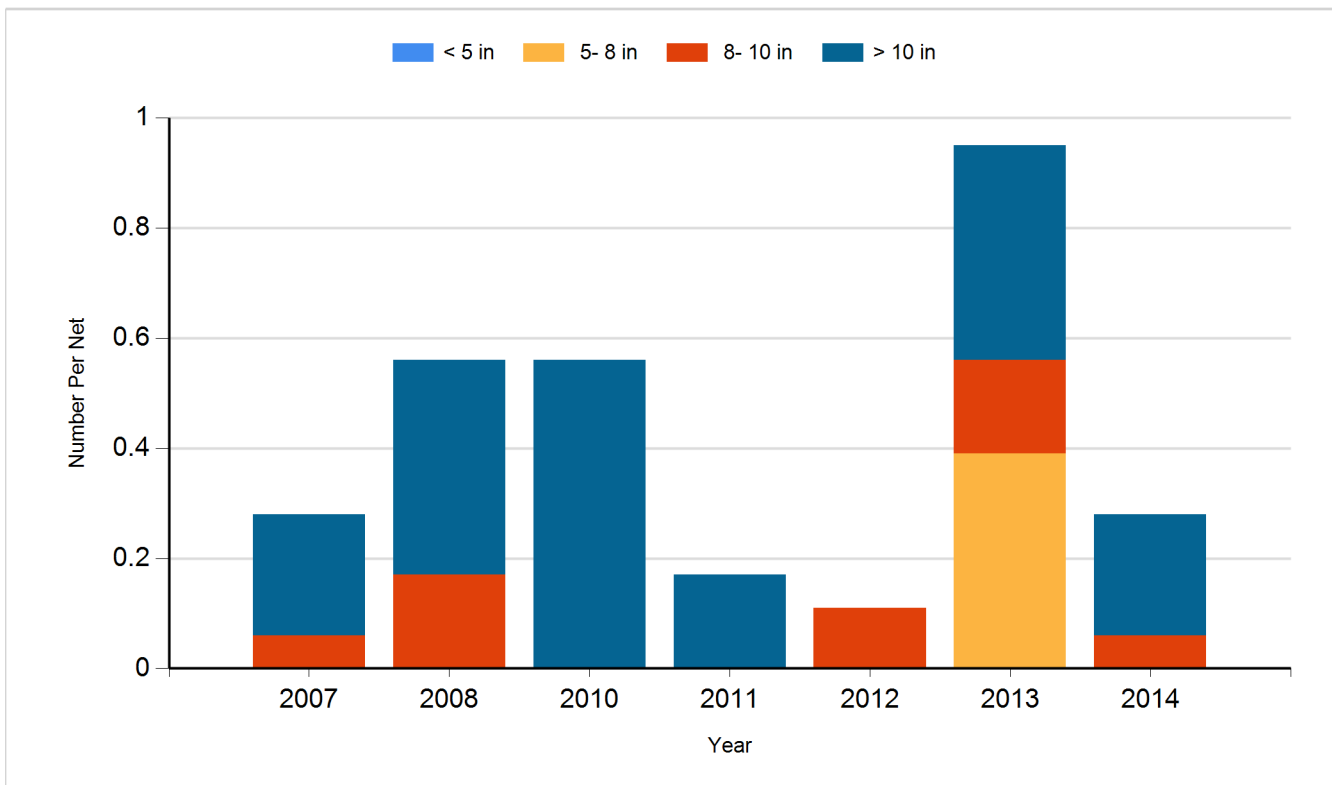


2015

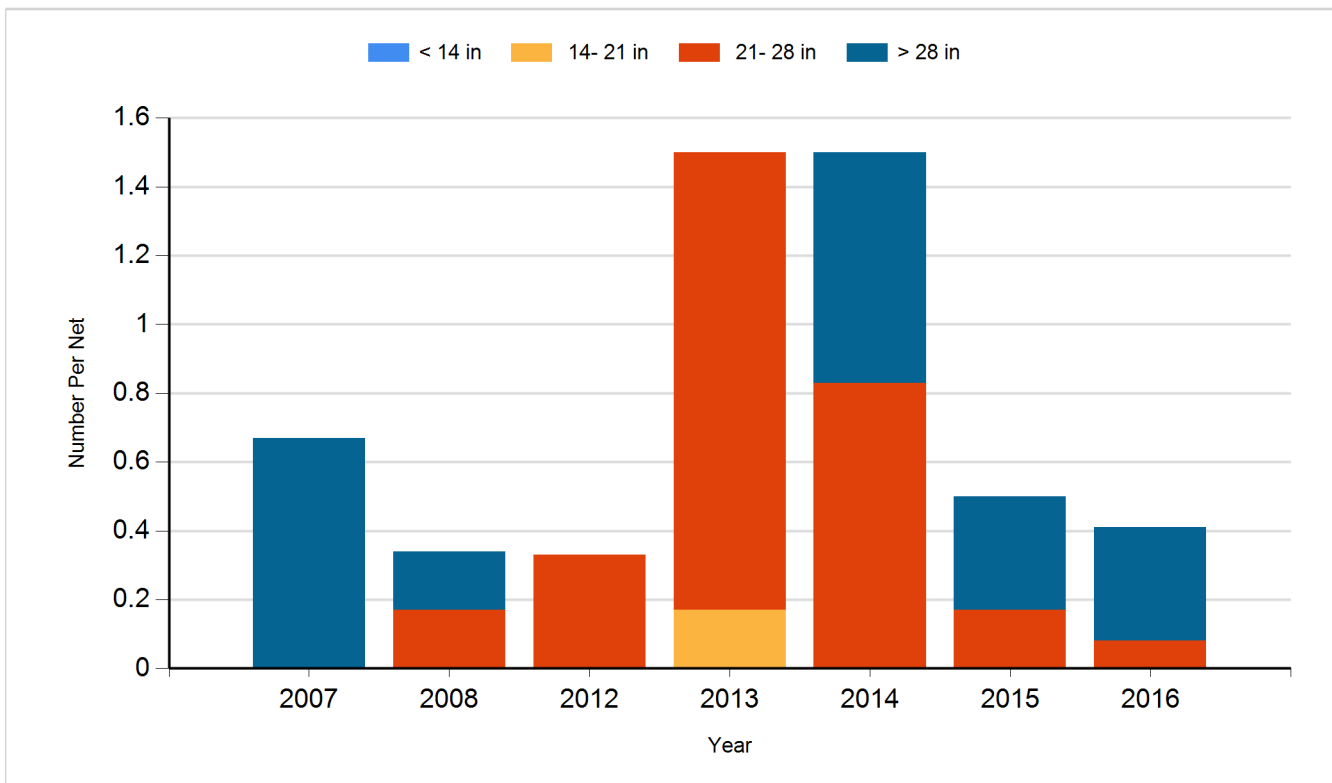
Historic Fish Sizes and Relative Abundance

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

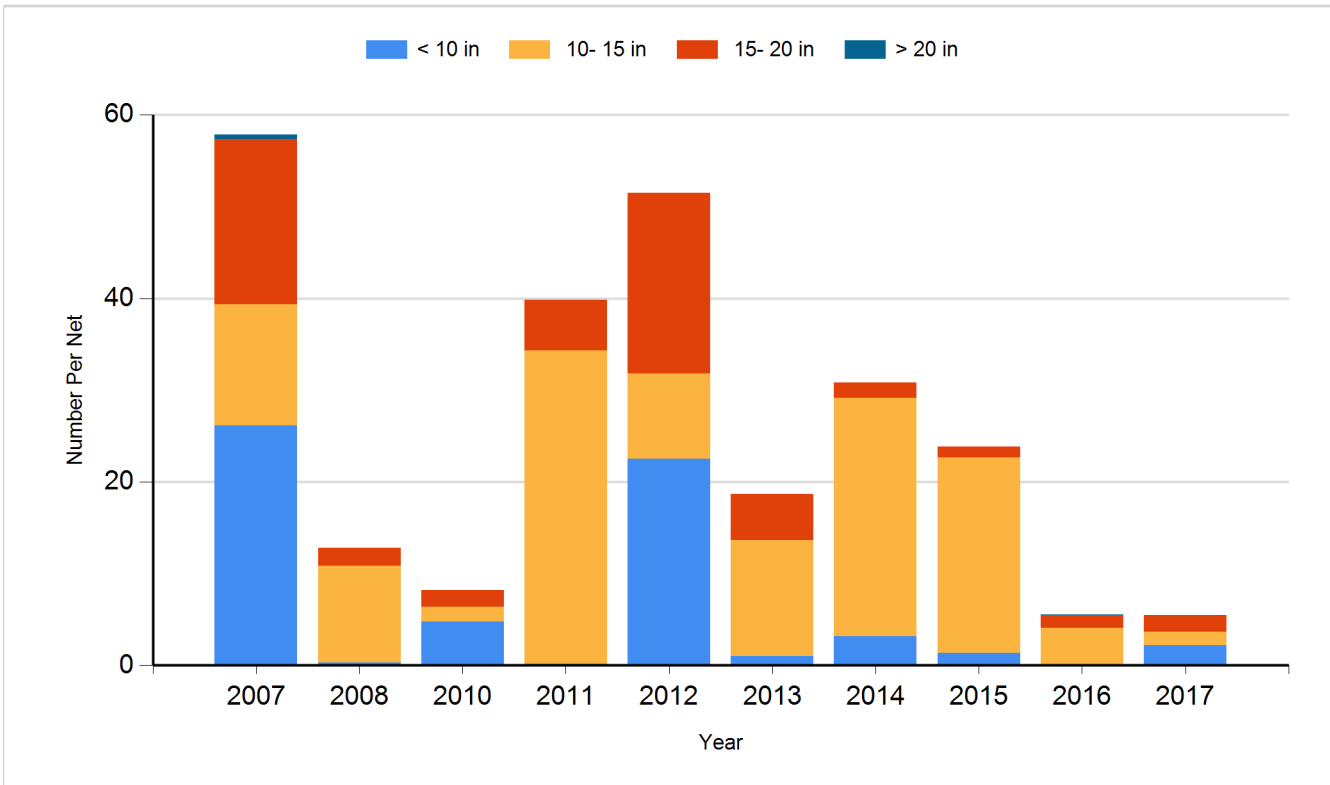
Species: Black Crappie
Gear: Frame Net



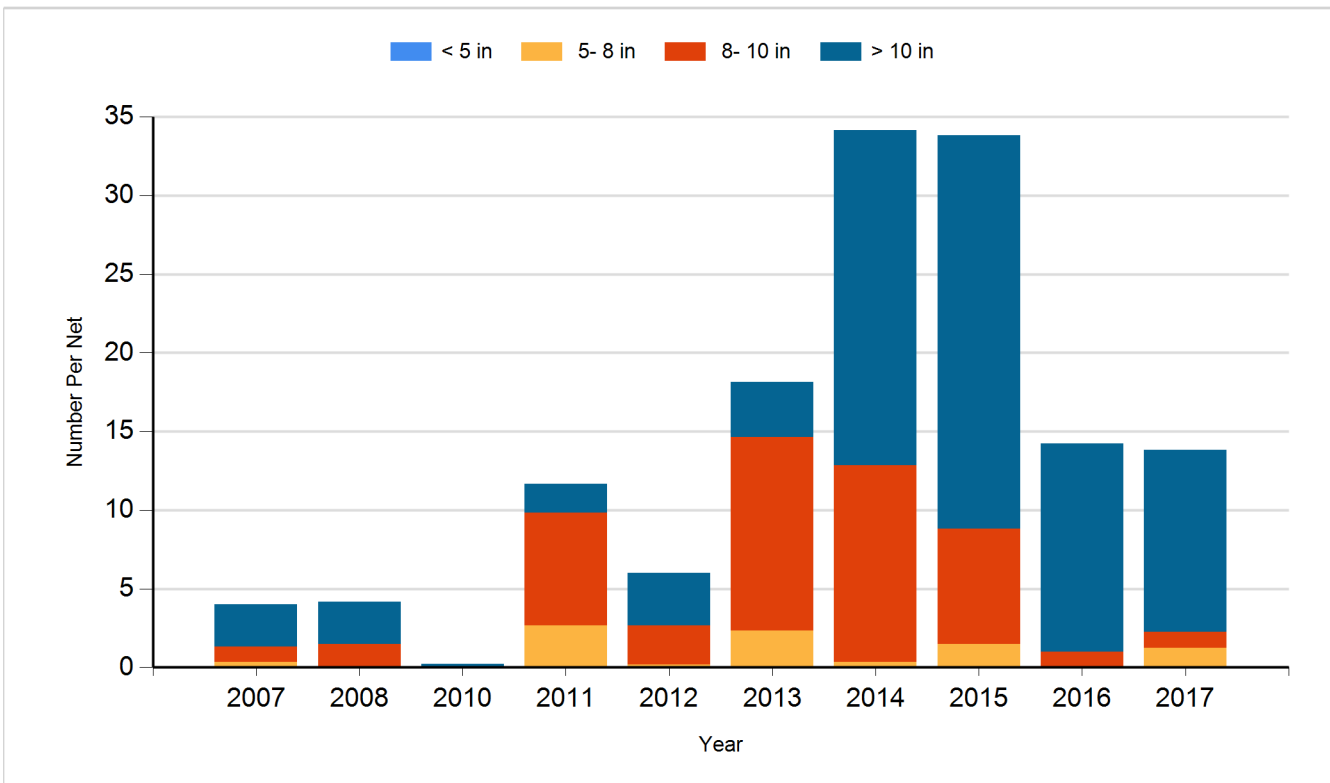
Species: Northern Pike
Gear: Gill Net



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
2006	Walleye	Fry	1,500,000
2009	Walleye	Fry	750,000
2011	Walleye	Fry	900,000
2016	Walleye	Fry	700,000