

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Roy, Marshall County
UJA-Lake-866-001
2017

Lake Information

Name:	Roy	Maximum Depth:	21 Feet
County:	Marshall	Mean Depth:	10 Feet
		OHWM Elevation:	1,796
Surface Area:	2,113 Acres	Outlet Elevation:	1,795

Surveys and Investigations

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

Gear	Date	Effort
AFS std frame net	July 11, 2017	8 net-nights
AFS std frame net	July 12, 2017	8 net-nights
AFS std frame net	July 13, 2017	7 net-nights
AFS std gill net	July 11, 2017	4 net-nights
AFS std gill net	July 12, 2017	4 net-nights
AFS std gill net	July 13, 2017	4 net-nights
boat shocker (night)	September 12, 2017	3477 seconds

Common Fish Species Present

Walleye

Smallmouth Bass

Bluegill

Black Crappie

Northern Pike

Largemouth Bass

Yellow Perch

White Sucker

Green Sunfish

Black Bullhead

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	1.4	0.6	91		73	12	96	3
	Black Crappie	0.2	0.1	0		0		113	4
	Bluegill	22.5	9.9	4	1	0		112	1
	Common Carp	0.2	0.2	100		100		88	3
	Green Sunfish	2.0	1.1	0		0		95	4
	Largemouth Bass	0.1	0.1	100		67		101	13
	Northern Pike	0.7	0.2	94		13		84	2
	Rock Bass	0.0	0.1	100		100		104	
	Smallmouth Bass	0.0	0.1	100		100		96	
	Walleye	0.1	0.1	100		50		82	5
	Yellow Perch	7.8	4.4	0		0		91	1
AFS std gill net	Black Bullhead	0.9	0.5	100		100		93	3
	Black Crappie	0.2	0.2	100		100		101	13
	Bluegill	0.3	0.3	25		0		126	8
	Northern Pike	2.3	0.7	82	12	4		89	2
	Smallmouth Bass	4.2	0.9	100		86	8	100	2
	Walleye	3.4	0.9	90		34	11	87	1
	White Sucker	2.8	0.9	100		100		105	3
	Yellow Perch	2.8	1.2	0		0		102	2
boat shocker (night)	Walleye	24.5	19.9	0		0		98	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	Black Bullhead										1.4	1.4
	Black Crappie										0.2	0.2
	Bluegill										22.5	22.5
	Common Carp										0.2	0.2
	Green Sunfish										2.0	2.0
	Largemouth Bass										0.1	0.1
	Northern Pike										0.7	0.7
	Rock Bass										0.0	0.0
	Smallmouth Bass										0.0	0.0
	Walleye										0.1	0.1
Yellow Perch										7.8	7.8	
AFS std gill net	Black Bullhead									1.3	0.9	1.1
	Black Crappie									0.3	0.2	0.3
	Bluegill									0.3	0.3	0.3
	Largemouth Bass									0.1		0.1
	Northern Pike									3.2	2.3	2.8
	Smallmouth Bass									2.6	4.2	3.4
	Walleye									2.4	3.4	2.9
	White Sucker									2.8	2.8	2.8
Yellow Perch									7.4	2.8	5.1	
boat shocker (night)	Smallmouth Bass		8.7	21.2				13.2		2.0		11.3
	Walleye	238.9	142.8	77.0	466.5		286.0	30.0	27.0	29.0	24.5	146.9
boat shocker (night, AC)	Largemouth Bass	22.5	18.7	26.3				58.8		44.0		34.1
frame net (std 3/4 in)	Black Bullhead	1.5	0.5	0.5	0.6		6.5	3.3	3.0			2.3
	Black Crappie	0.3	0.0	0.2	0.5		0.6	0.2	0.3			0.3
	Bluegill	32.4	16.8	8.2	7.2		8.0	8.0	56.6			19.6
	Bluegill X Gr. Sunfish Hybrid			0.0	0.5		0.1	0.2				0.2
	Channel Catfish				0.0							0.0
	Common Carp	0.3	0.0	0.1	0.0		0.1					0.1
	Green Sunfish	0.7	0.7	0.1			0.2		0.2			0.4
	Largemouth Bass				0.0					0.0		0.0
	Northern Pike	1.0	0.8	0.5	0.5		1.2	1.0	0.5			0.8

		CPUE										
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
frame net (std 3/4 in)	Smallmouth Bass	0.5	0.3	0.5	0.8		0.2	0.9	0.3			0.5
	Sunfish Hybrid		0.0		0.0				0.0			0.0
	Walleye	1.0	0.5	0.3	0.1		0.2	0.2	0.0			0.3
	Western Painted Turtle								0.0			0.0
	White Sucker	0.2	0.3	0.0	0.0		0.1	0.0	0.2			0.1
	Yellow Perch	5.5	6.8	20.9	19.6		9.8	4.1	2.0			
std exp gill net	Black Bullhead	0.2					1.2	1.5	0.3			0.8
	Black Crappie	0.0	0.1	0.1			0.0	0.3	0.2			0.1
	Bluegill						0.3	0.0	0.7			0.3
	Common Carp	0.3	0.1	0.2	0.1				0.2			0.2
	Northern Pike	3.7	0.5	0.9	2.6		7.5	6.3	6.0			3.9
	Smallmouth Bass	0.2	0.1	0.3	0.1		2.3	4.0	2.3			1.3
	Walleye	2.8	1.0	1.1	0.6		8.3	6.3	6.5			3.8
	White Sucker	2.2	2.1	1.6	2.4		4.7	8.5	5.0			3.8
	Yellow Perch	15.3	4.9	17.0	26.8		82.2	10.0	23.3			25.6

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											0	
		PSD-P											0	
		Wr											113	
	Northern Pike	PSD												94
		PSD-P												13
		Wr												84
	Walleye	PSD												100
		PSD-P												50
		Wr												82
Yellow Perch	PSD												0	
	PSD-P												0	
	Wr												91	
AFS std gill net	Black Crappie	PSD										0	100	
		PSD-P										0	100	
		Wr										117	101	
	Northern Pike	PSD										89	82	
		PSD-P										5	4	
		Wr										89	89	
	Walleye	PSD										76	90	
		PSD-P										34	34	
		Wr										91	87	
	Yellow Perch	PSD										2	0	
		PSD-P										1	0	
		Wr										97	102	
boat shocker (night)	Walleye	PSD	0	0	0	0		0	0	0	0	0		
		PSD-P	0	0	0	0		0	0	0	0	0		
		Wr	96	91	93	95		91	90	96	92	98		
frame net (std 3/4 in)	Black Crappie	PSD	100	0	20	27		50	100	33				
		PSD-P	86	0	20	18		14	100	33				
		Wr	100		103	108		105	101	103				
	Northern Pike	PSD	83	78	58	54		38	42	85				

Gear	Species	Index	Year										
			2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
frame net (std 3/4 in)	Northern Pike	PSD-P	33	11	0	8		0	0	0			
		Wr	84	84	93	93		89	85	97			
	Walleye	PSD	96	100	100	100		40	40	100			
		PSD-P	92	92	88	100		20	0	0			
		Wr	84	84	80	71		86	82	87			
		Yellow Perch	PSD	4	4	2	1		22	10	6		
	PSD-P		0	0	0	0		0	0	0			
	Wr		94	90	91	92		86	91	84			
	std exp gill net	Black Crappie	PSD	0	100	100			0	100	100		
			PSD-P	0	100	100			0	100	100		
			Wr		89	102				98	92		
		Northern Pike	PSD	68	100	81	66		51	61	81		
PSD-P			0	11	19	15		0	5	6			
Wr			93	87	93	90		88	85	88			
Walleye		PSD	65	83	45	64		36	68	77			
		PSD-P	35	39	10	27		14	18	8			
		Wr	91	87	87	94		91	88	90			
Yellow Perch		PSD	1	1	0	0		13	7	3			
		PSD-P	0	0	0	0		0	0	0			
		Wr	101	102	100	103		91	99	92			

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+
2010	13	102 (8)	169 (4)				328 (1)				
2009	25	105 (25)									
2008	8		117 (1)	245 (3)	266 (4)						

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2017	42	215 (1)		395 (13)	450 (1)		511 (16)	510 (4)	547 (4)		661 (3)
2016	30		285 (6)	371 (2)	455 (1)	476 (9)	486 (4)	597 (2)	626 (1)		637 (5)
2015	42	194 (3)	282 (2)	356 (7)	427 (23)	443 (4)	575 (1)				678 (2)
2014	40		232 (2)	377 (19)	408 (10)	482 (2)	592 (2)	476 (1)			652 (4)
2013	50		300 (21)	367 (15)	424 (6)	535 (3)					631 (5)
2011	16	183 (4)	276 (5)	398 (1)	485 (2)	464 (1)		513 (1)			661 (2)
2010	24	177 (3)	294 (12)	384 (1)	464 (2)	523 (3)	473 (2)			483 (1)	
2009	22	194 (4)	301 (2)	398 (5)	465 (2)	502 (2)	506 (1)	562 (1)	570 (3)		592 (2)
2008	17	262 (1)	324 (4)	438 (1)	408 (5)	557 (1)				626 (1)	595 (4)

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	34		138 (10)	157 (23)	186 (1)						
2016	89		140 (27)	153 (37)	165 (22)	195 (1)	249 (2)				
2015	728	99 (187)	112 (423)	153 (113)	194 (2)	219 (3)					
2014	275	97 (55)	116 (172)	129 (23)	182 (22)	214 (4)					
2013	1069	99 (563)	138 (44)	167 (258)	187 (165)	202 (33)	205 (9)				
2011	1506	99 (764)	128 (548)	156 (194)							

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2010	1178	97 (208)	121 (926)	158 (44)							
2009	506	94 (138)	116 (361)	176 (5)	194 (2)						

Fish Condition

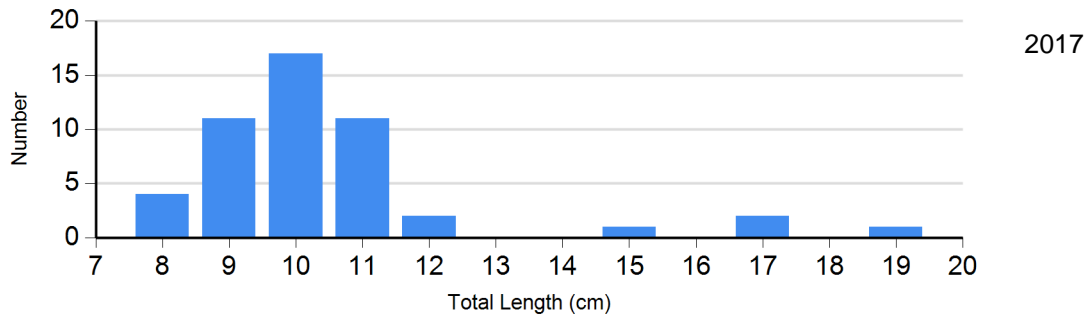
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	7	107 (4.4)	5	106 (1.8)	2	96 (3.2)	0	
	2014	0		0		1	107	4	99 (1.1)
	2015	4	107 (2.3)	0		0		2	96 (1.3)
	2017	4	113 (3.2)	0		0		0	
Northern Pike Gill Net	2013	22	89 (1.4)	23	87 (1.2)	0		0	
	2014	15	87 (1.6)	21	85 (1.2)	2	65 (19.2)	0	
	2015	7	93 (2.8)	27	87 (2.3)	2	82 (1.7)	0	
	2016	4	90 (2.4)	32	88 (1.2)	2	95 (4.1)	0	
	2017	5	98 (3.4)	22	87 (1.4)	1	83	0	
Walleye Gill Net	2013	32	92 (0.9)	11	90 (1.8)	4	88 (5.8)	3	89 (3.2)
	2014	12	88 (1.3)	19	89 (1.2)	5	82 (2.9)	2	92 (6.1)
	2015	9	90 (0.8)	27	90 (1.0)	1	89	2	79 (2.6)
	2016	7	92 (1.3)	12	94 (2.0)	7	90 (1.2)	3	81 (3.8)
	2017	4	84 (2.6)	23	89 (1.0)	12	86 (1.7)	2	77 (3.4)
Yellow Perch Gill Net	2013	429	93 (0.5)	64	86 (0.9)	0		0	
	2014	56	99 (0.9)	4	97 (4.5)	0		0	
	2015	136	93 (0.9)	4	87 (1.5)	0		0	
	2016	87	97 (0.8)	1	93	1	81	0	
	2017	33	102 (1.2)	0		0		0	

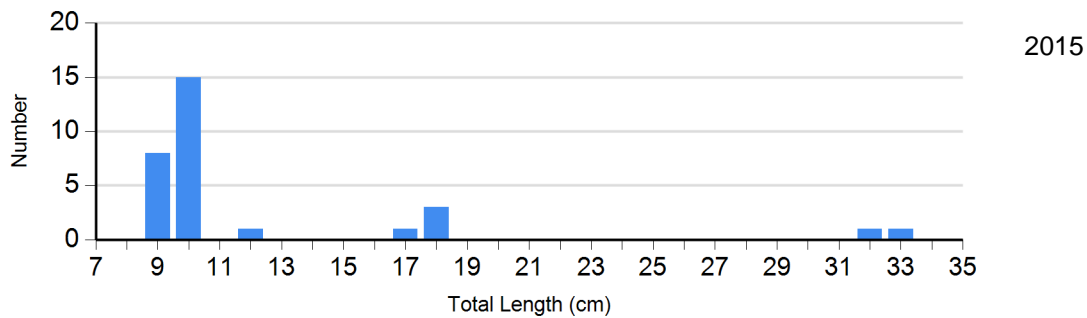
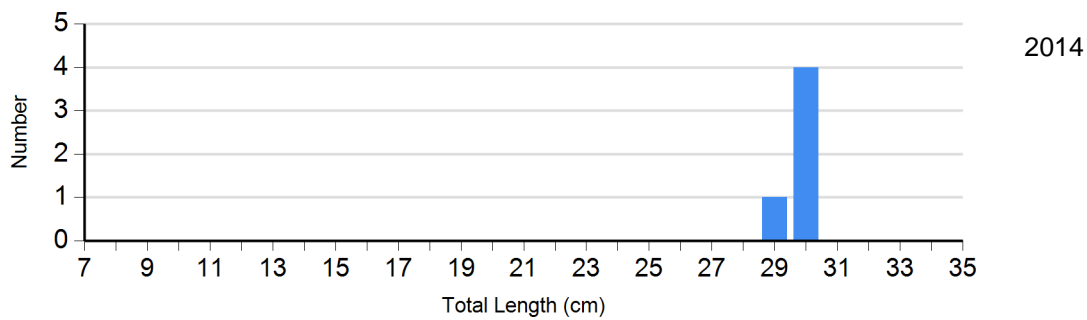
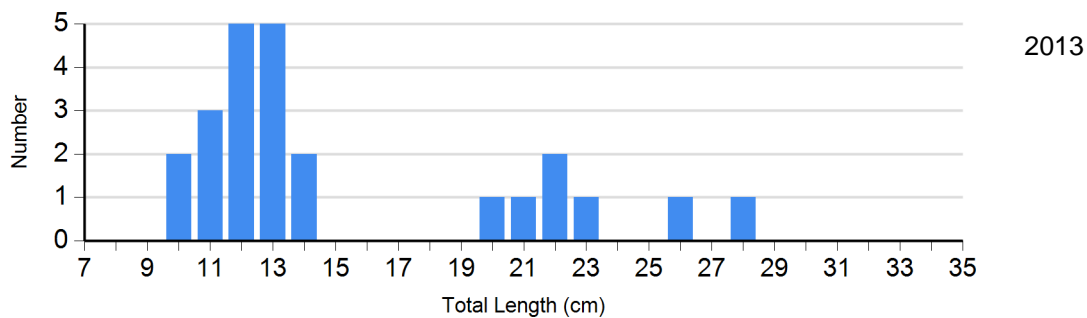
Length Frequency Distribution

Length frequency histogram of species sampled by year.

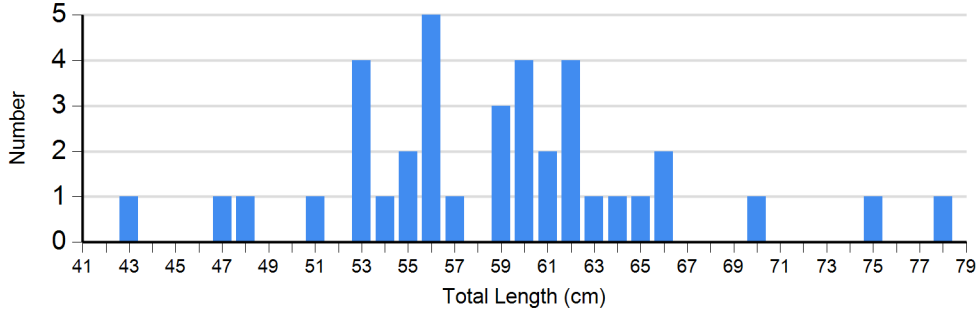
Species: Black Crappie
Gear: AFS std frame net



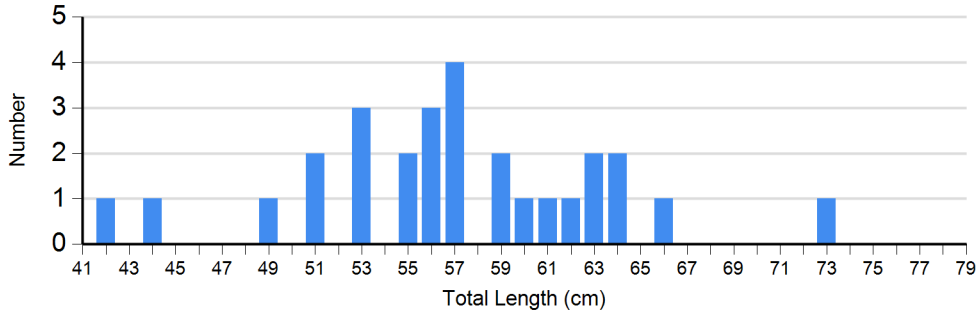
Species: Black Crappie
Gear: frame net (std 3/4 in)



Species: Northern Pike
 Gear: AFS std gill net

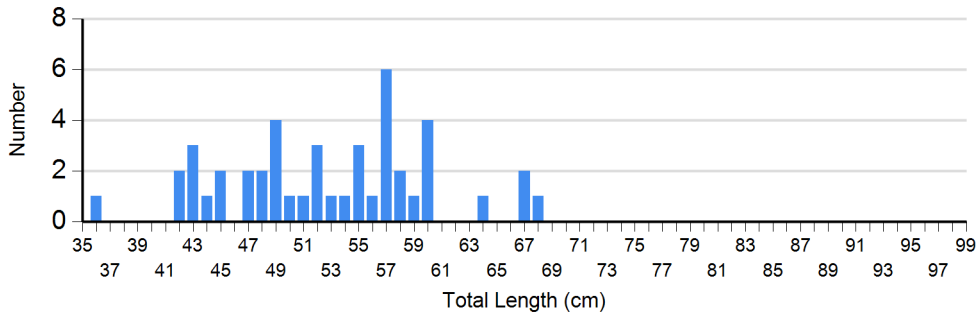


2016

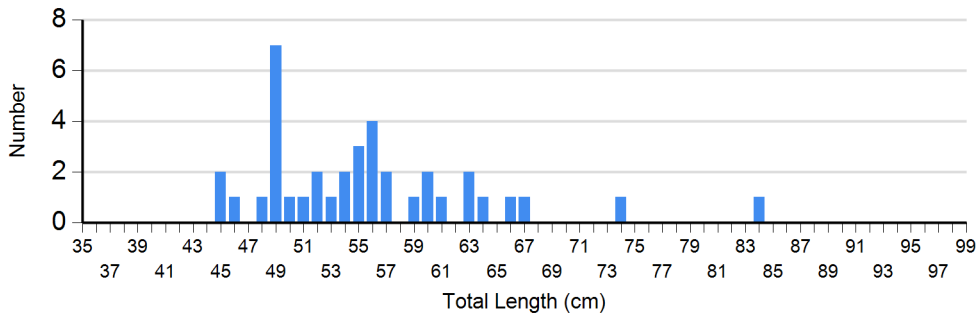


2017

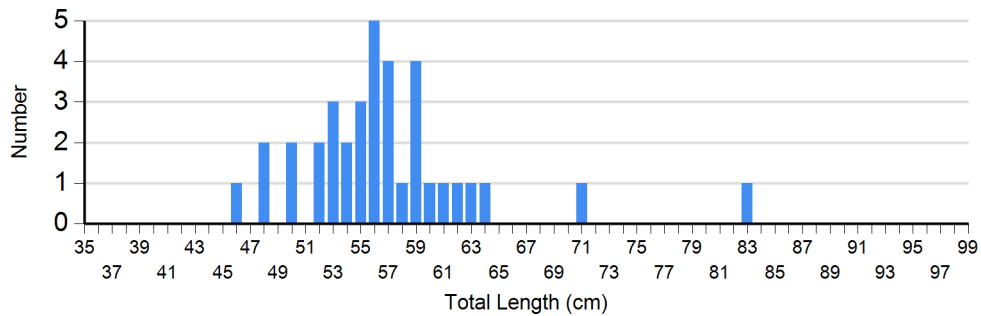
Species: Northern Pike
 Gear: std exp gill net



2013

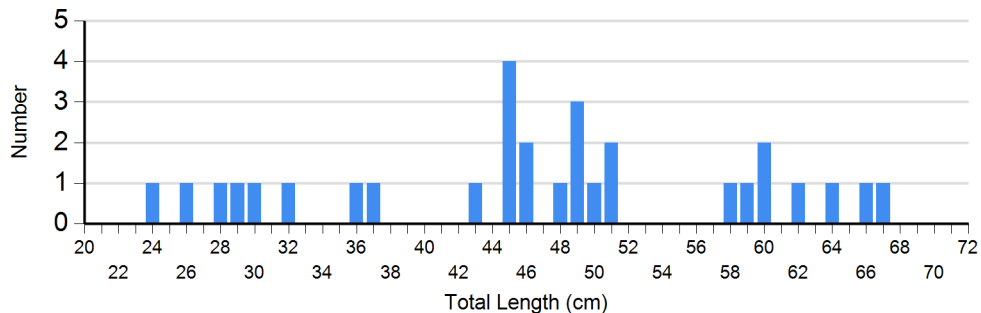


2014

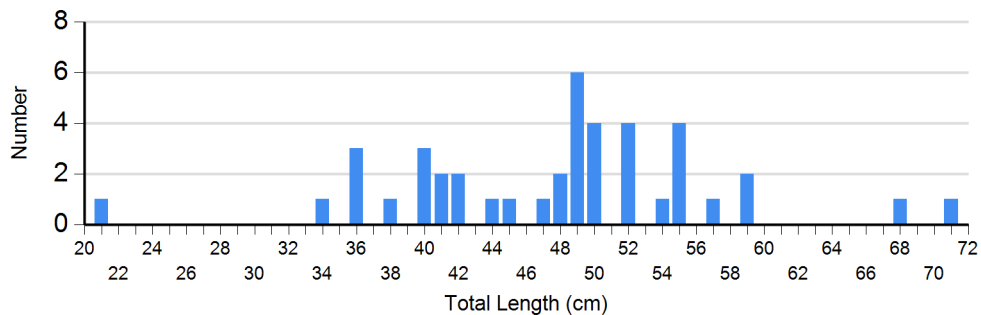


2015

Species: Walleye
Gear: AFS std gill net

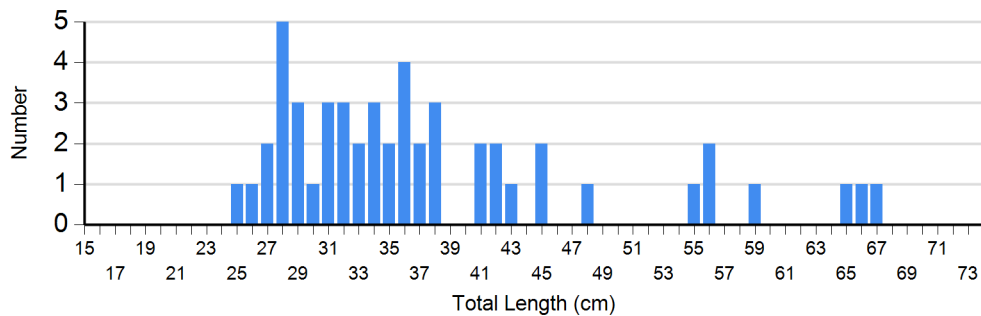


2016

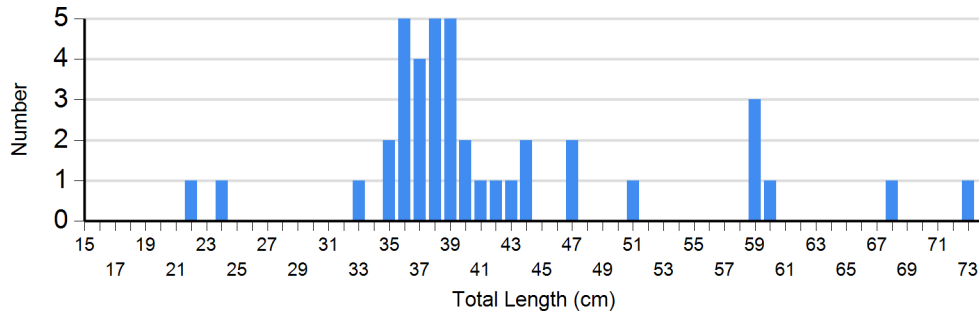


2017

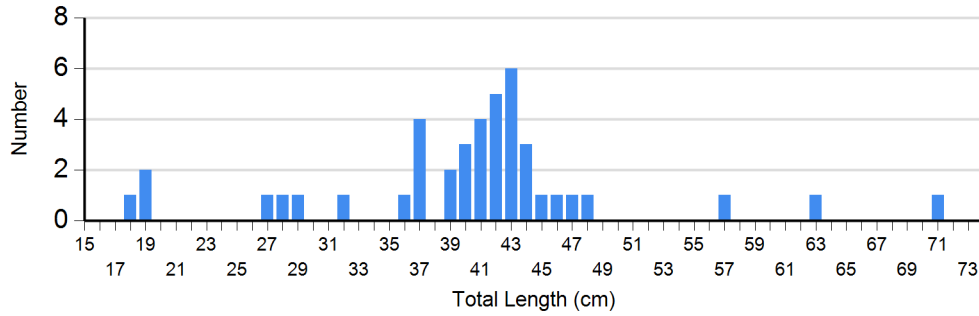
Species: Walleye
Gear: std exp gill net



2013

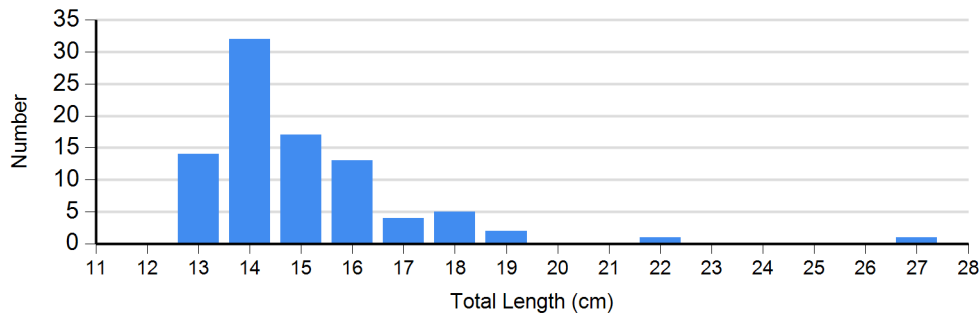


2014

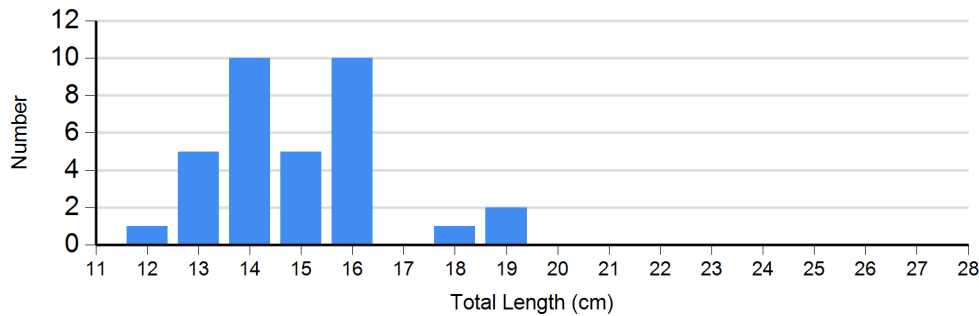


2015

Species: Yellow Perch
Gear: AFS std gill net

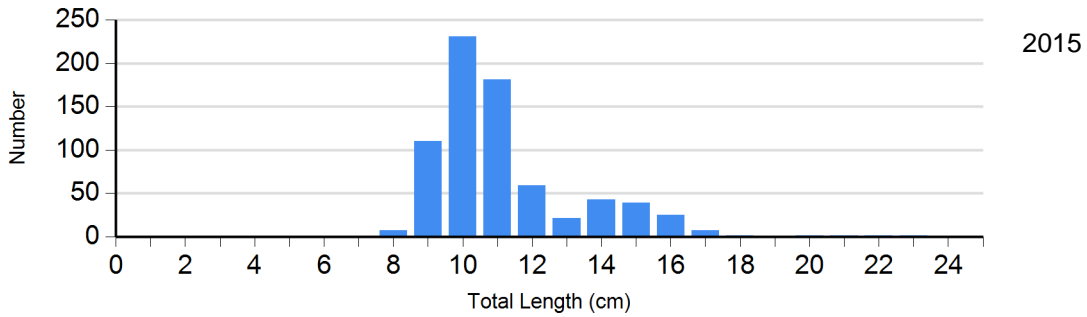
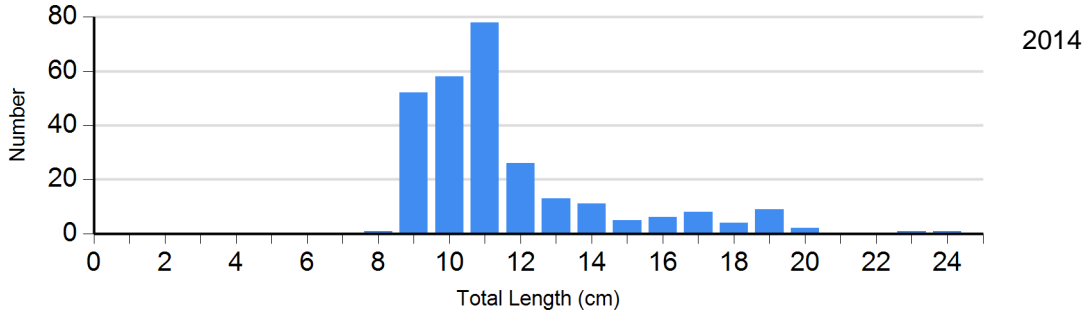
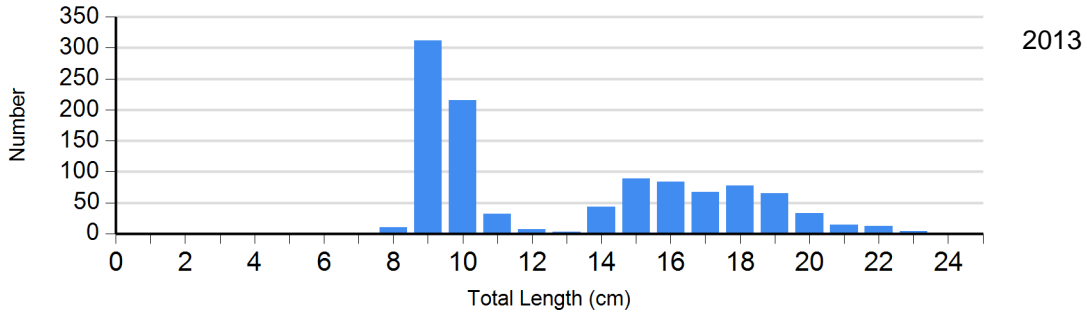


2016



2017

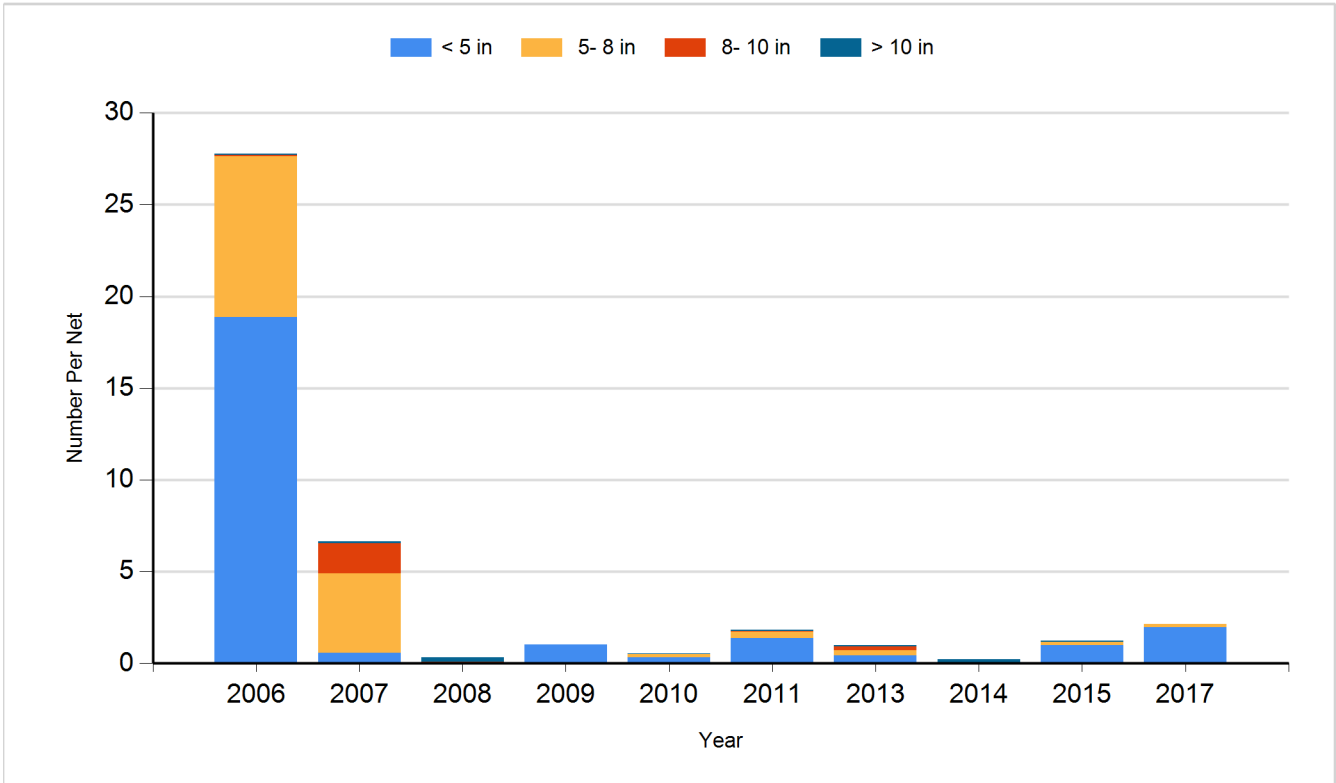
Species: Yellow Perch
Gear: std exp gill net



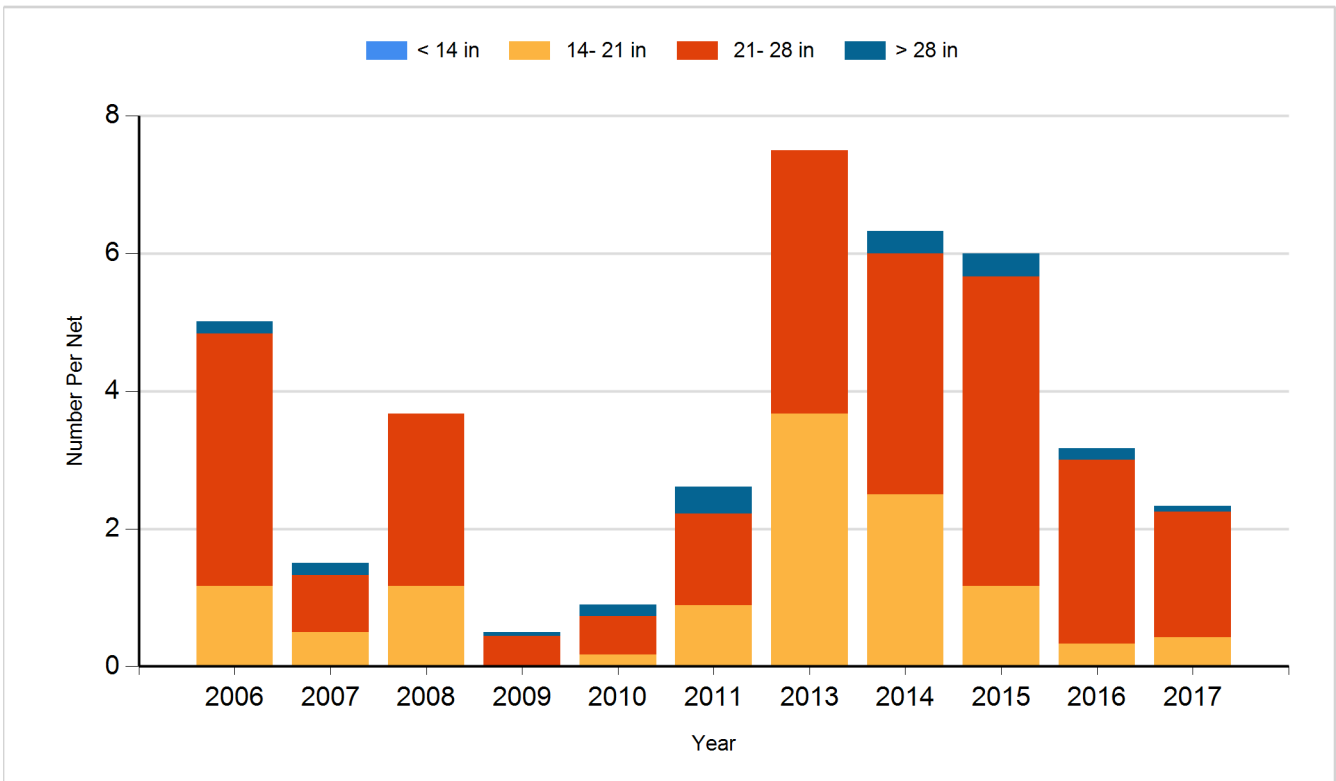
Historic Fish Sizes and Relative Abundance

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

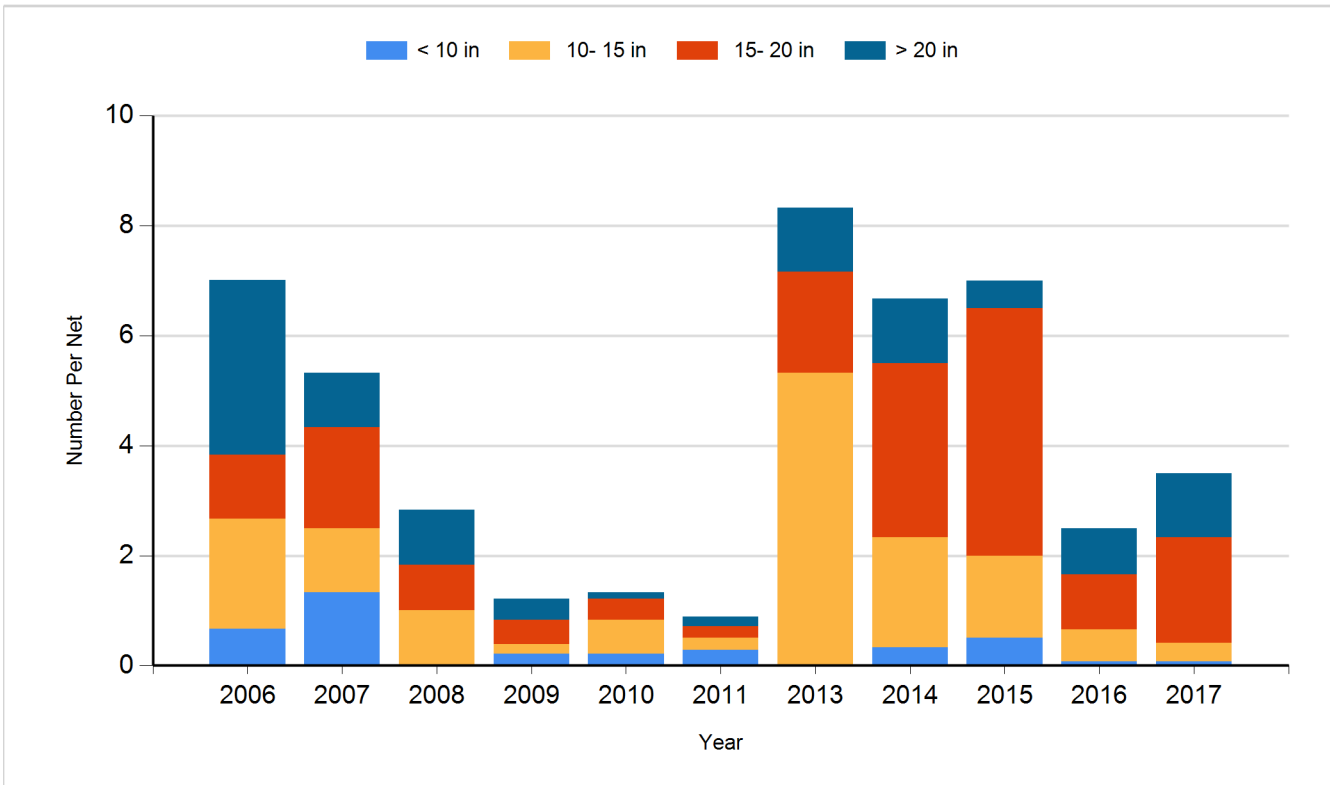
Species: Black Crappie
Gear: Frame Net



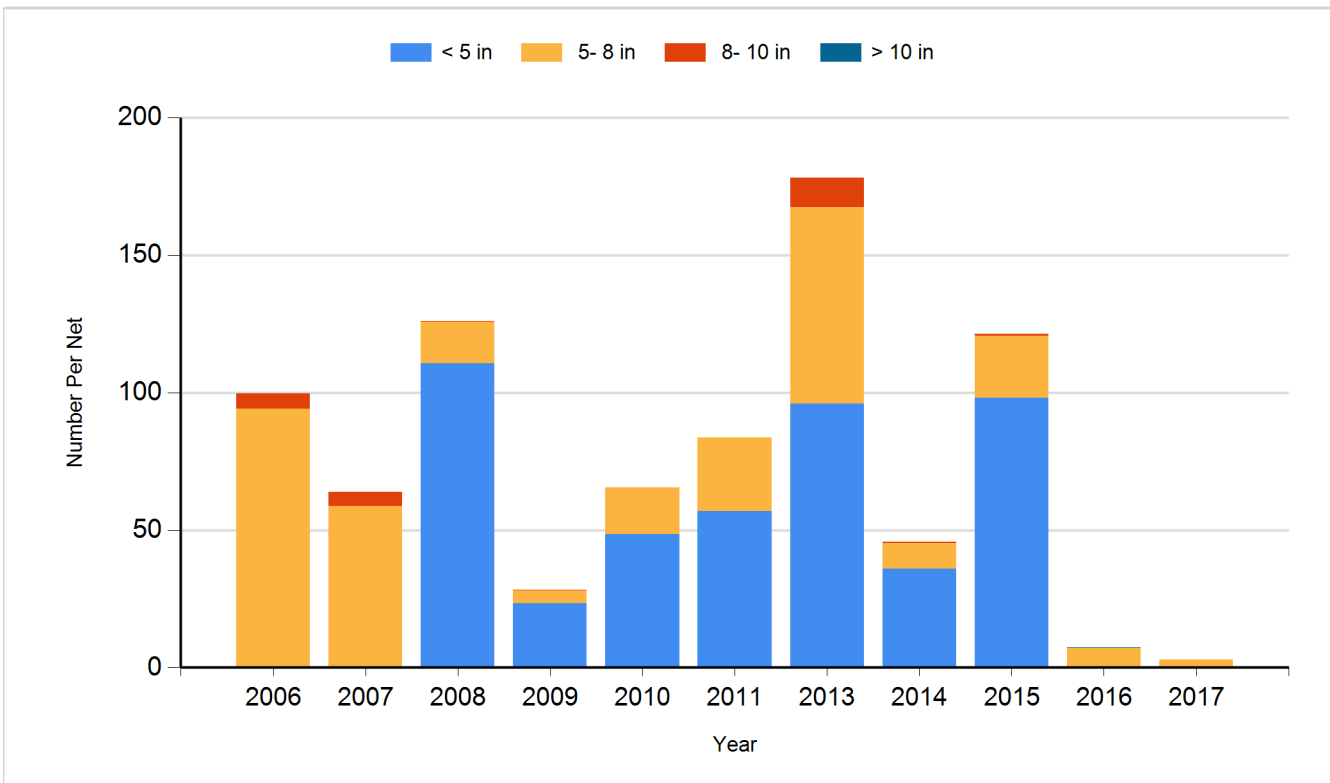
Species: Northern Pike
Gear: Gill Net



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
2013	Walleye	Fry	850,000
2016	Walleye	Fry	1,000,000