SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Roy, Marshall County
UJA-Lake-866-001
2016

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 gill net	July 06, 2016	4 net-nights
AFS std gill net	July 07, 2016	4 net-nights
AFS std gill net	July 08, 2016	4 net-nights
boat shocker (night)	May 18, 2016	3600 seconds
boat shocker (night)	September 19, 2016	3600 seconds
boat shocker (night, AC	June 08, 2016	3600 seconds

Common Fish Species Present

Walleye

Smallmouth Bass

Northern Pike

Largemouth Bass

Bluegill

Black Crappie

Yellow Perch

White Sucker

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).

$$CPUE = \frac{number\ of\ fish}{effort}$$

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.

$$PSD = \left(\frac{number\ of\ fish \geq quality\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

$$PSD - P = \left(\frac{number\ of\ fish\ \geq preferred\ length}{number\ of\ fish \geq stock\ length}\right) \text{x } 100$$

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.

$$Wr = \left(\frac{W}{Ws}\right) \text{x } 100$$

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).

	Stock		Quality		Preferred		Memorable		Trophy	
Species Name	(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

	Stock		Quality		Preferred		Memorable		Trophy	
Species Name	(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).

		Abundance		Stock Density Indices				Condition	
Gear	Species	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Black Bullhead	1.3	0.6	100		93		91	3
	Black Crappie	0.3	0.2	0		0		117	9
	Bluegill	0.3	0.3	25		25		108	12
	Largemouth Bass	0.1	0.1	100		0		121	
	Northern Pike	3.2	0.5	89		5		89	1
	Smallmouth Bass	2.6	1.2	100		97		100	2
	Walleye	2.4	0.8	76	13	34	14	91	2
	White Sucker	2.8	0.7	100		91		104	2
	Yellow Perch	7.4	2.5	2		1		97	1
boat shocker (night)	Smallmouth Bass	2.0	1.9	0		0		105	4
	Walleye	29.0	17.2	0		0		92	1
boat shocker (night, AC	Largemouth Bass	44.0	20.9	66	11	39	11	114	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.

		CPUE										
Gear	Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
AFS std gill net	Black Bullhead										1.3	1.3
	Black Crappie										0.3	0.3
	Bluegill										0.3	0.3
	Largemouth Bass										0.1	0.1
	Northern Pike										3.2	3.2
	Smallmouth Bass										2.6	2.6
	Walleye										2.4	2.4
	White Sucker										2.8	2.8
	Yellow Perch										7.4	7.4
boat shocker (night)	Largemouth Bass	6.0										6.0
	Smallmouth Bass	33.0		8.7	21.2				13.2		2.0	15.6
	Walleye	138.3	238.9	142.8	77.0	466.5		286.0	30.0	27.0	29.0	159.5
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	3.6	1.5	0.5	0.5	0.6		6.5	3.3	3.0		2.4
	Black Crappie	6.1	0.3	0.0	0.2	0.5		0.6	0.2	0.3		1.0
	Bluegill	46.7	32.4	16.8	8.2	7.2		8.0	8.0	56.6		23.0
	Bluegill X Gr. Sunfish Hybrid	0.4			0.0	0.5		0.1	0.2			0.2
	Channel Catfish					0.0						0.0
	Common Carp	0.3	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	0.6	1.0	0.8	0.5	0.5		1.2	1.0	0.5		0.8
	Smallmouth Bass	0.4	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	0.4	1.0	0.5	0.3	0.1		0.2	0.2	0.0		0.3
	Western Painted Turtle	0.0								0.0		0.0
	White Sucker	0.2	0.2	0.3	0.0	0.0		0.1	0.0	0.2		0.1
	Yellow Perch	24.9	5.5	6.8	20.9	19.6		9.8	4.1	2.0		11.7
std exp gill net	Black Bullhead	1.8	0.2					1.2	1.5	0.3		1.0
	Black Crappie	1.7	0.0	0.1	0.1			0.0	0.3	0.2		0.3
	Bluegill	0.5						0.3	0.0	0.7		0.4
	Common Carp	2.0	0.3	0.1	0.2	0.1				0.2		0.5

		CPUE										
Gear	Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
std exp gill net	Northern Pike	1.5	3.7	0.5	0.9	2.6		7.5	6.3	6.0		3.6
	Smallmouth Bass	2.5	0.2	0.1	0.3	0.1		2.3	4.0	2.3		1.5
	Walleye	4.0	2.8	1.0	1.1	0.6		8.3	6.3	6.5		3.8
	White Sucker	2.5	2.2	2.1	1.6	2.4		4.7	8.5	5.0		3.6
	Yellow Perch	63.7	15.3	4.9	17.0	26.8		82.2	10.0	23.3		30.4

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.

			Year									
Gear	Species	Index	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
AFS std gill net	Black Crappie	PSD										0
		PSD-P										0
		Wr										117
	Northern Pike	PSD										89
		PSD-P										5
		Wr										89
	Walleye	PSD										76
		PSD-P										34
		Wr										91
	Yellow Perch	PSD										2
		PSD-P										1
		Wr										97
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	96	91	93	95		91	90	96	92
frame net (std 3/4 in)	Black Crappie	PSD	28	100	0	20	27		50	100	33	
		PSD-P	1	86	0	20	18		14	100	33	
		Wr	117	100		103	108		105	101	103	
	Northern Pike	PSD	79	83	78	58	54		38	42	85	
		PSD-P	21	33	11	0	8		0	0	0	
		Wr	90	84	84	93	93		89	85	97	
	Walleye	PSD	91	96	100	100	100		40	40	100	
		PSD-P	64	92	92	88	100		20	0	0	
		Wr	89	84	84	80	71		86	82	87	
	Yellow Perch	PSD	1	4	4	2	1		22	10	6	
		PSD-P	0	0	0	0	0		0	0	0	
		Wr	87	94	90	91	92		86	91	84	
std exp gill net	Black Crappie	PSD	10	0	100	100			0	100	100	
		PSD-P	0	0	100	100			0	100	100	
		Wr	125		89	102				98	92	
	Northern Pike	PSD	67	68	100	81	66		51	61	81	

			Year									
Gear	Species	Index	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
std exp gill net	Northern Pike	PSD-P	11	0	11	19	15		0	5	6	
		Wr	91	93	87	93	90		88	85	88	
	Walleye	PSD	71	65	83	45	64		36	68	77	
		PSD-P	25	35	39	10	27		14	18	8	
		Wr	90	91	87	87	94		91	88	90	
	Yellow Perch	PSD	8	1	1	0	0		13	7	3	
		PSD-P	0	0	0	0	0		0	0	0	
		Wr	101	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)						
2007	164	126 (26)	185 (115)	236 (23)							

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
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)
2007	31	205 (9)	327 (6)	423 (7)	467 (3)	537 (1)	504 (1)		537 (1)	641 (1)	651 (2)

Species: Yellow Perch

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
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

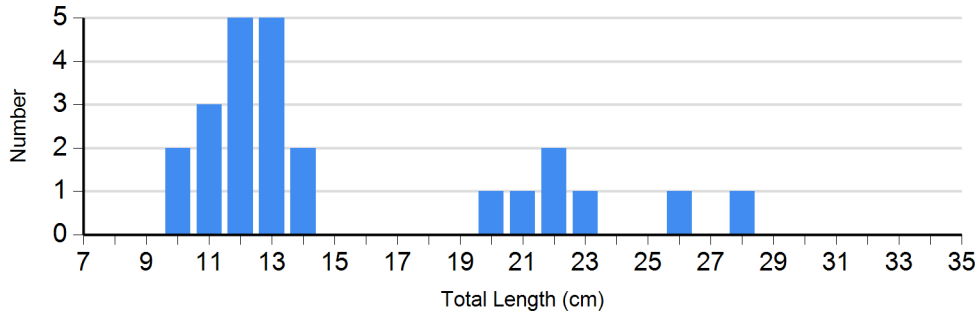
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	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)
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	
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)
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	

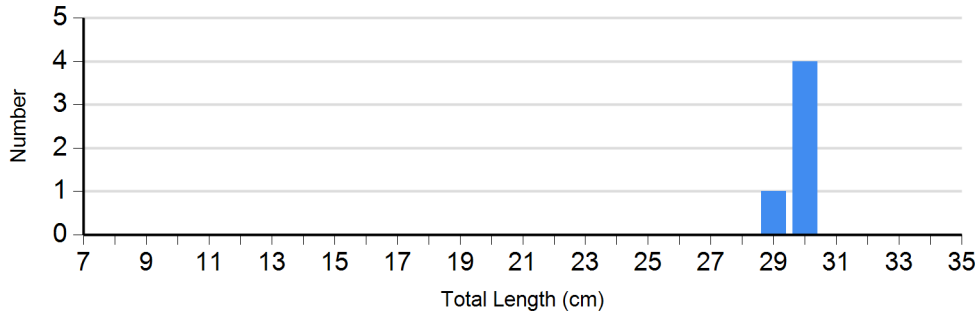
Length Frequency Distribution

Length frequency histogram of species sampled by year.

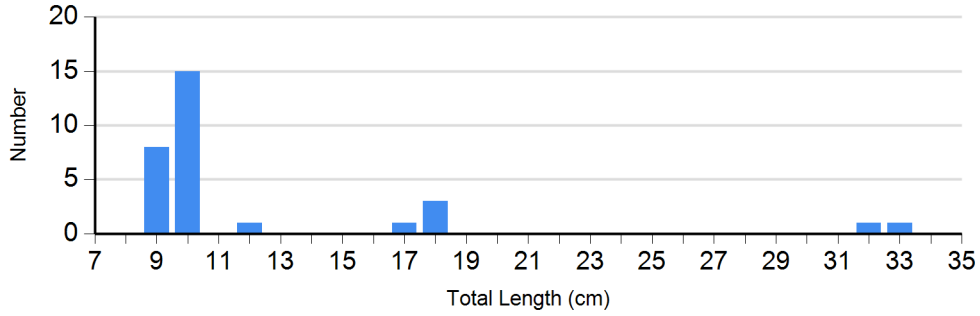
Species: Black Crappie
Gear: frame net (std 3/4 in)



2013

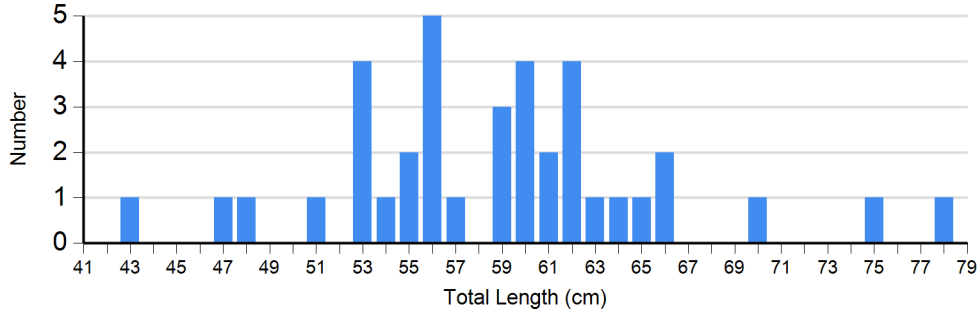


2014



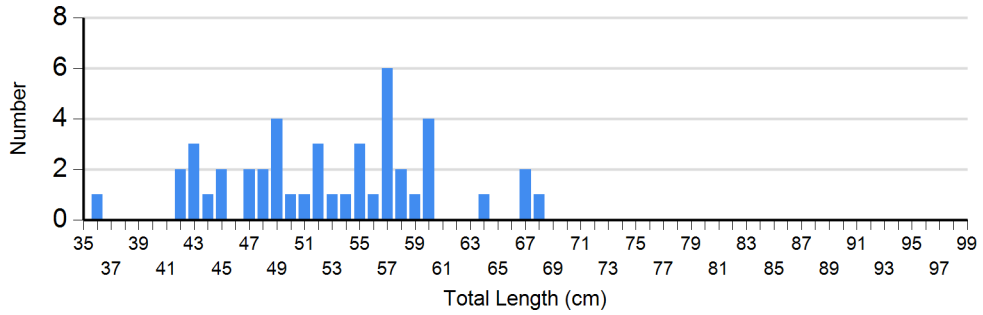
2015

Species: Northern Pike
Gear: AFS std gill net

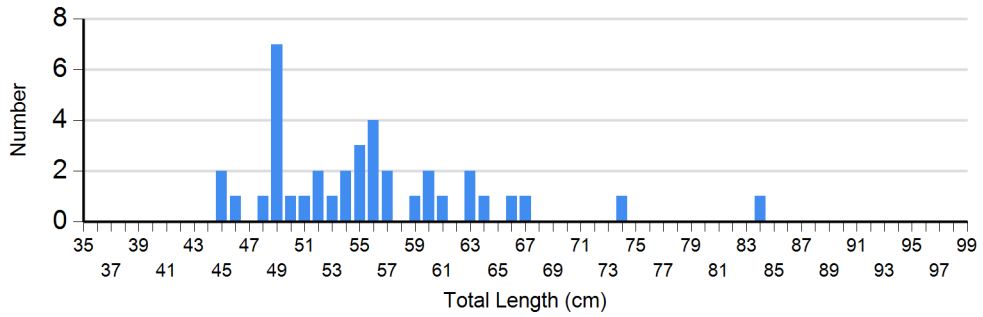


2016

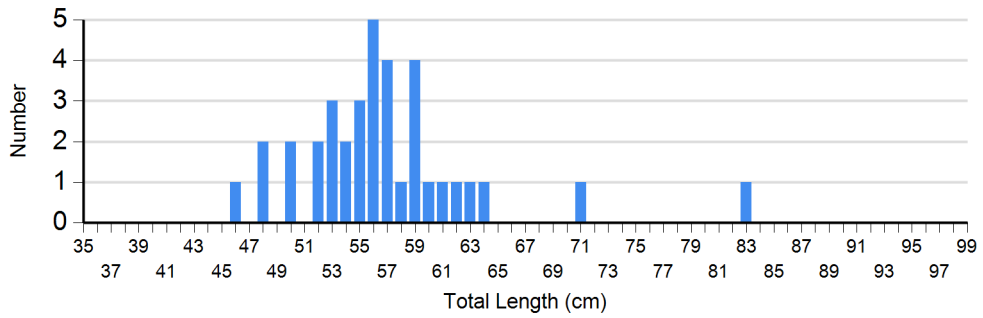
Species: Northern Pike
Gear: std exp gill net



2013

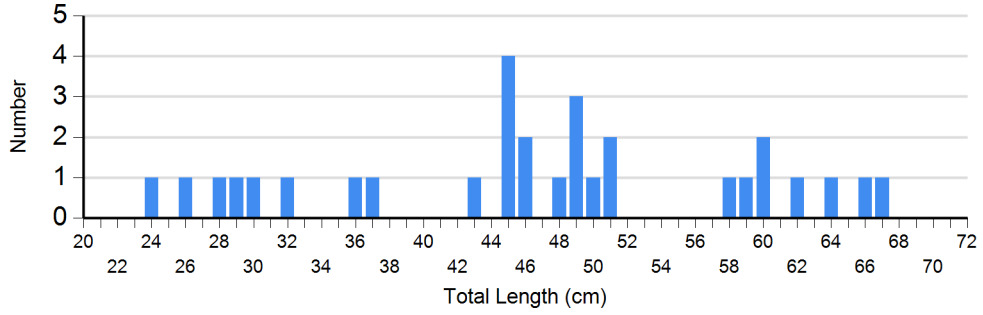


2014



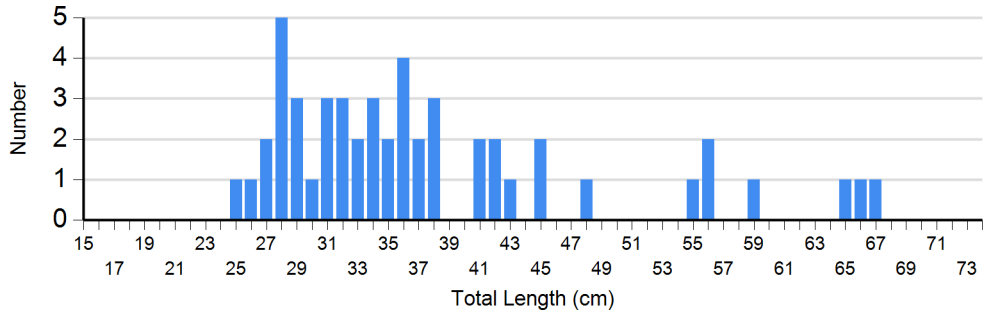
2015

Species: Walleye
Gear: AFS std gill net



2016

Species: Walleye
Gear: std exp gill net



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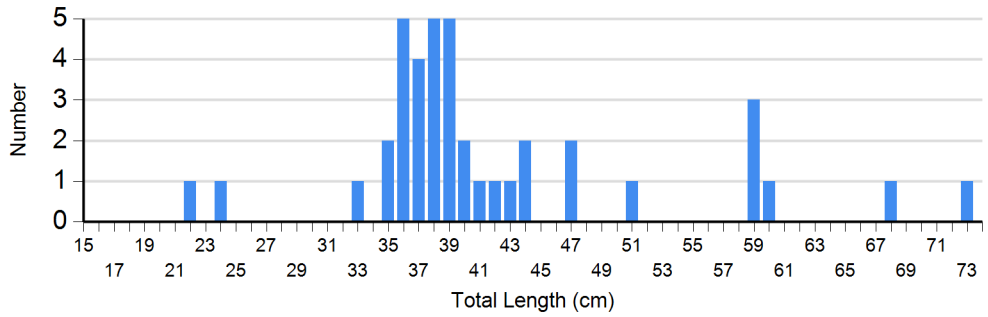
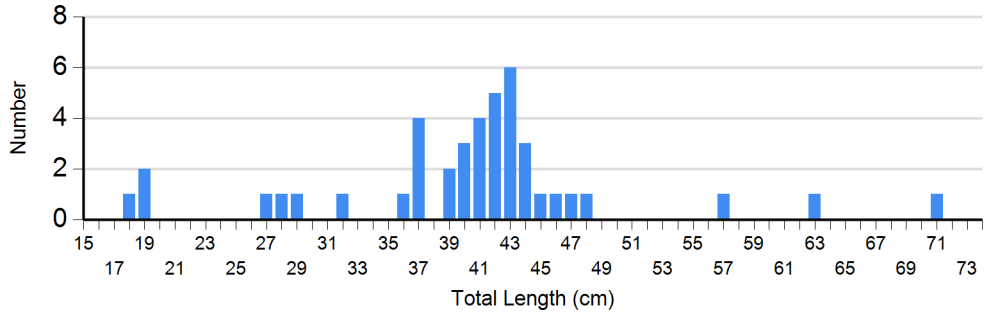
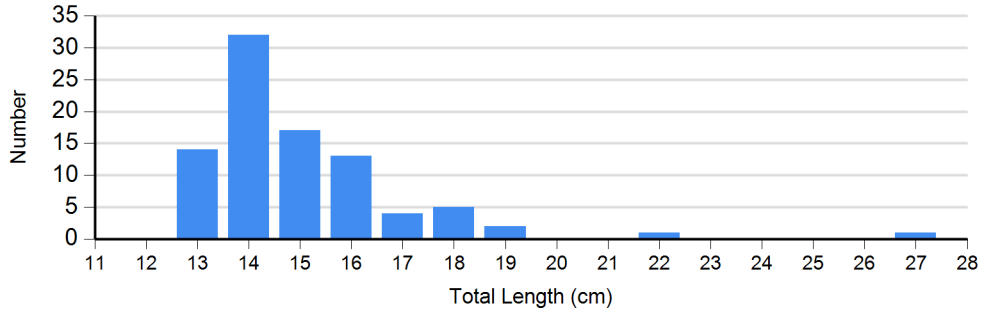


2014



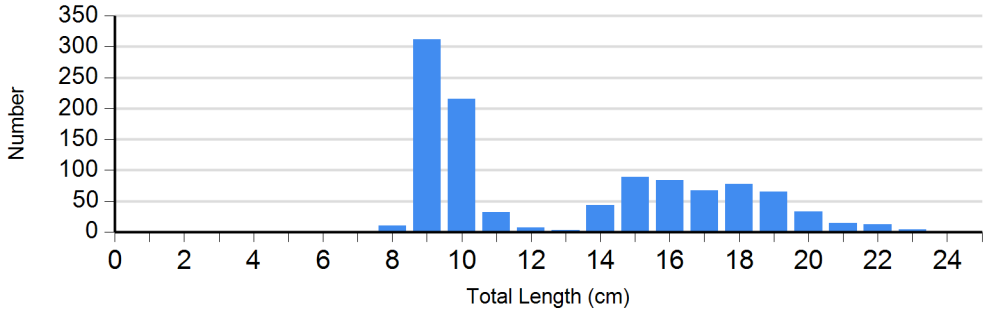
2015

Species: Yellow Perch
Gear: AFS std gill net

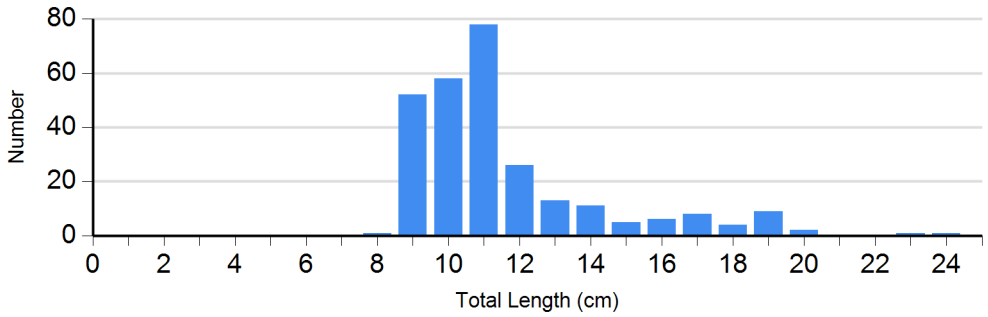


2016

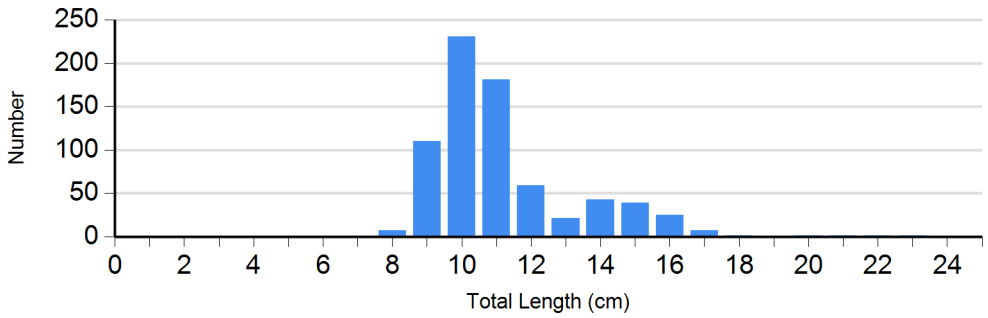
Species: Yellow Perch
Gear: std exp gill net



2013



2014

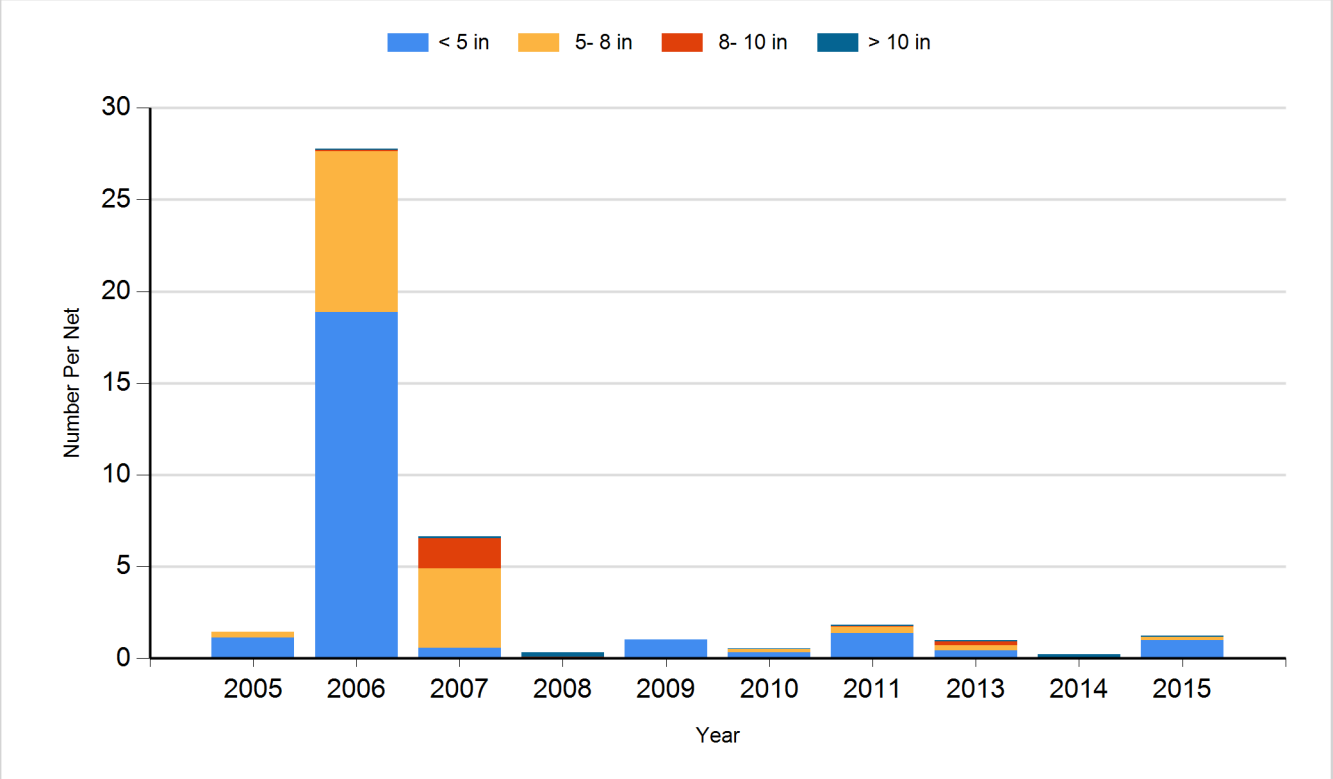


2015

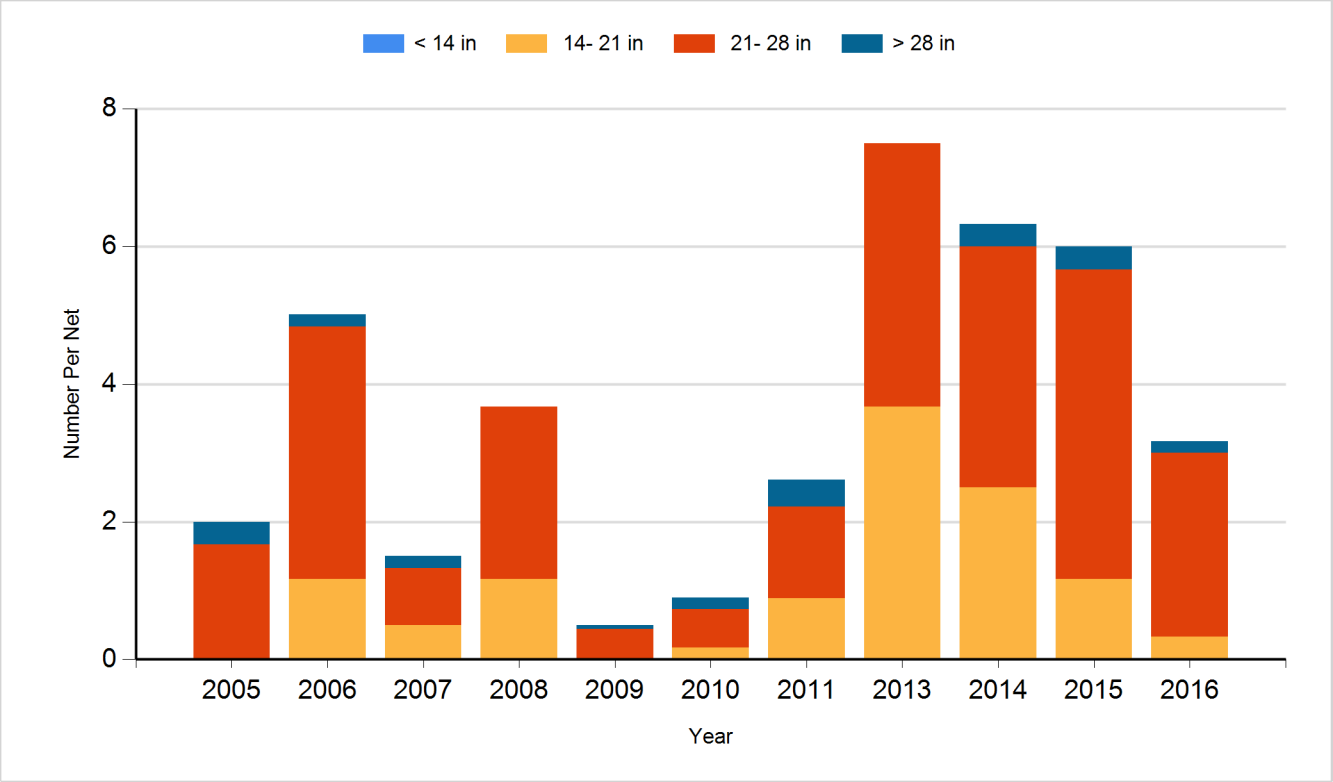
Historic Fish Sizes and Relative Abundance

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

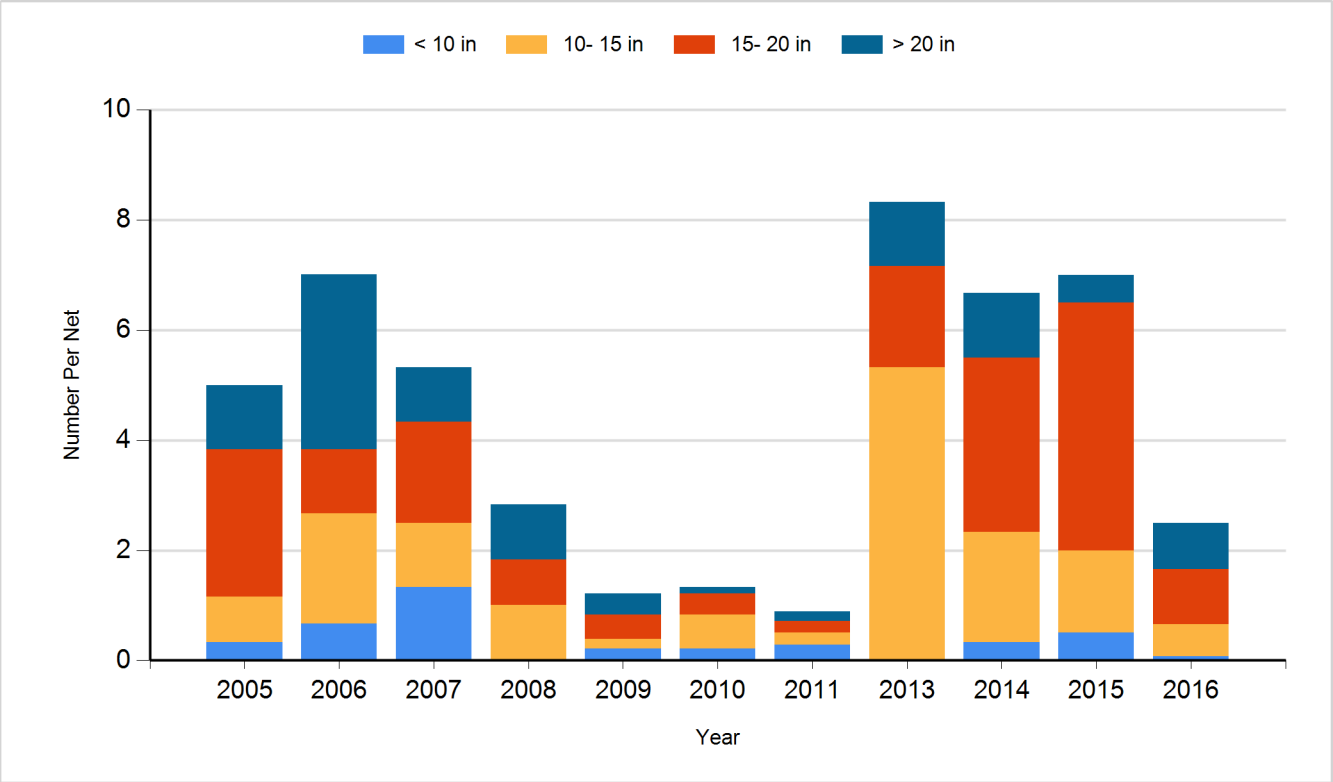
Species: Black Crappie
Gear: Frame Net



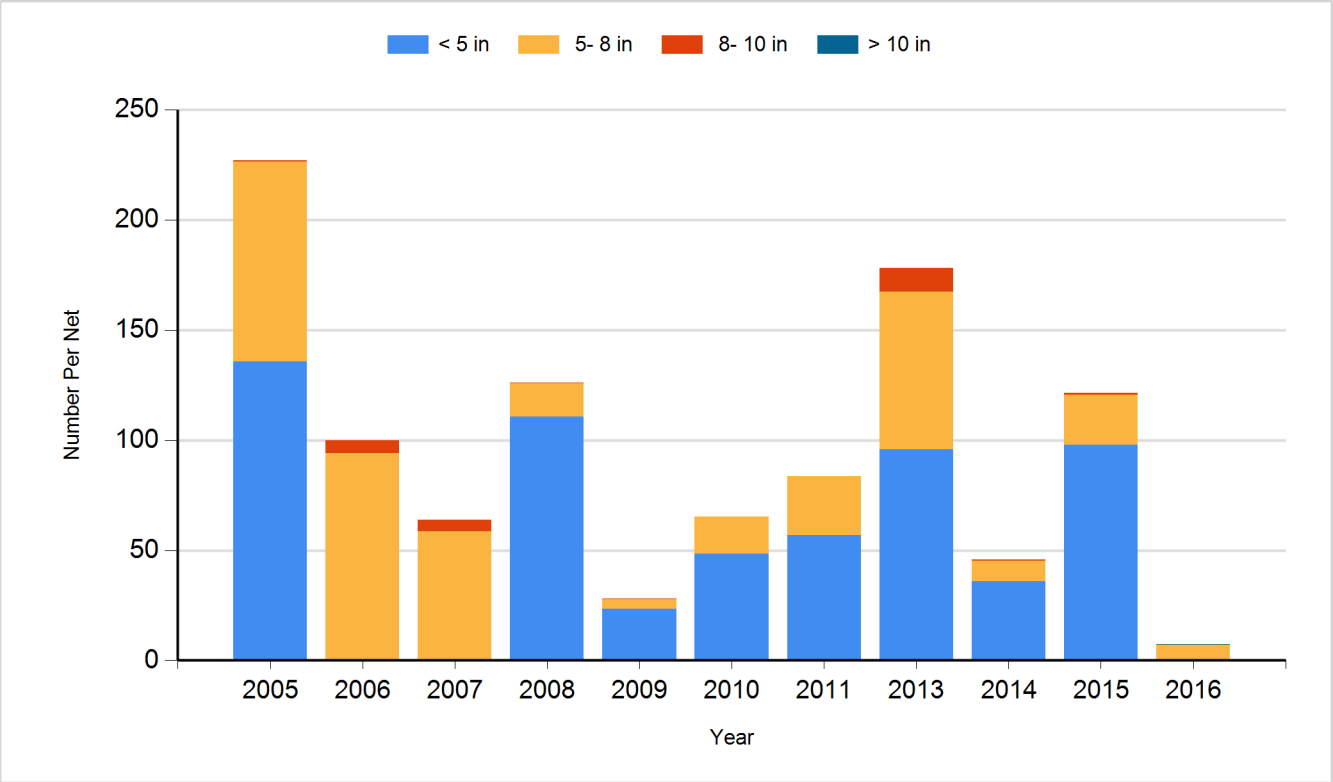
Species: Northern Pike
Gear: Gill Net



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