SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Pudwell, Corson County
GRA-Lake-511-000
2016

Lake Information

Name: Pudwell

County: Corson

Legal Description: T23-R23-S27

Surface Area: 70 Acres

Maximum Depth: 17 Feet

Mean Depth: 10 Feet

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	September 26, 2016	3600 seconds
frame net (std 3/4 in)	June 14, 2016	5 net-nights
frame net (std 3/4 in)	June 15, 2016	5 net-nights
std exp gill net	June 14, 2016	1 net-nights
std exp gill net	June 15, 2016	1 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Yellow Perch

Northern Pike

Walleye

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
boat shocker (night)	Largemouth Bass	41.0	36.0	71	11	44	12	120	2
frame net (std 3/4 in)	Black Bullhead	0.2	0.2	0		0		90	1
	Black Crappie	7.1	2.1	92	5	92	5	96	2
	Bluegill	8.8	3.6	100		75	7	127	1
	Northern Pike	2.1	0.6	67	17	5		79	3
	Walleye	1.1	0.4	100		73		80	3
	Yellow Perch	0.6	0.7	50		0		93	3
std exp gill net	Black Crappie	1.5	1.5	0		0		118	8
	Northern Pike	7.5	13.9	80		0		85	2
	Walleye	1.5	4.6	67		33		78	8
	Yellow Perch	17.5	16.9	6		0		105	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.

		CPUE										
Gear	Species	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	Avg
boat shocker (night)	Largemouth Bass	16.0			37.0				17.0		41.0	27.8
	Walleye	28.0			34.0				25.0			29.0
frame net (std 3/4 in)	Black Bullhead	0.6						0.2			0.2	0.3
	Black Crappie	3.7			10.2			3.4			7.1	6.1
	Bluegill	0.4			2.3			1.0			8.8	3.1
	Largemouth Bass	0.2						0.1				0.2
	Northern Pike	0.1			0.9			0.6			2.1	0.9
	Smallmouth Bass							0.1				0.1
	Walleye	2.6			1.5			0.3			1.1	1.4
	Yellow Perch	0.2			0.7						0.6	0.5
std exp gill net	Black Crappie				10.0						1.5	5.8
	Largemouth Bass				0.5							0.5
	Northern Pike				2.0			3.0			7.5	4.2
	Walleye	9.5			6.5			0.5			1.5	4.5
	Yellow Perch	1.0			0.5			0.5			17.5	4.9

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
boat shocker (night)	Walleye	PSD	71			71				60		
		PSD-P	43			38				24		
		Wr	97			97				89		
frame net (std 3/4 in)	Black Crappie	PSD	100			91			100			92
		PSD-P	100			21			100			92
		Wr	87			111			101			96
	Northern Pike	PSD	100			78			83			67
		PSD-P	0			0			33			5
		Wr	92			87			84			79
	Walleye	PSD	100			100			100			100
		PSD-P	46			87			100			73
		Wr	85			75			80			80
	Yellow Perch	PSD	0			100						50
		PSD-P	0			86						0
		Wr	99			95						93
std exp gill net	Black Crappie	PSD				0						0
		PSD-P				0						0
		Wr				122						118
	Northern Pike	PSD				0			100			80
		PSD-P				0			33			0
		Wr				91			83			85
	Walleye	PSD	95			15			0			67
		PSD-P	37			8			0			33
		Wr	85			93			99			78
	Yellow Perch	PSD	0			100			100			6
		PSD-P	0			100			0			0
		Wr	108			102			103			105

Back-Calculated Lengths

Mean species back-calculated total length (mm) at age, standard error (SE), and sample size (N).

Species: Black Crappie

Year Class	Age	N	Mean back-calculated length (SE) at age									
			1	2	3	4	5	6	7	8	9	10
2014	2	3	85 (4.6)	128 (5.1)								
2013	3	3	60 (3.5)	119 (4.5)	156 (5.4)							
2013	3	16	62 (.6)	117 (.1)	157 (2.1)							
2011	5	2	93 (6.5)	155 (9.3)	216 (1.1)	266 (2.2)	290 (3.1)					
2010	6	7	81 (2.5)	140 (5.2)	200 (4.7)	255 (5.6)	288 (4.6)	302 (4.8)				
2009	7	10	80 (4.5)	140 (6.7)	204 (8.1)	255 (5.3)	278 (5.6)	295 (4.8)	310 (4.1)			
2008	8	2	88 (5.7)	146 (13.6)	201 (30.1)	243 (37.1)	280 (21.4)	294 (18.4)	306 (16.9)	318 (12.5)		
2007	9	3	89 (4.8)	152 (11)	222 (11.6)	262 (7.1)	277 (9.2)	289 (8.6)	304 (4.6)	315 (5.8)	325 (4.5)	
2005	11	1	69	147	200	231	250	285	288	297	304	333
Weighted Mean		47	74	132	185	255	281	296	307	313	320	333

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2014	2	3										
2013	3	3										
2013	3	16										
2011	5	2										
2010	6	7										
2009	7	10										
2008	8	2										
2007	9	3										
2005	11	1	345									
Weighted Mean		47	345									

Species: Walleye

Year Class	Age	N	Mean back-calculated length (SE) at age									
			1	2	3	4	5	6	7	8	9	10
2013	3	16	234 (2.5)	331 (5)	386 (5.1)							
2012	4	1	220	333	437	475						
2011	5	3	175 (6)	310 (6.2)	429 (14)	491 (19.2)	523 (22.1)					
2011	5	8	196 (0)	411 (0)	451 (0)	499 (0)	532 (0)					
2010	6	1	173	326	409	452	483	500				
2009	7	5	186 (10.5)	316 (11.9)	420 (7.9)	483 (7.6)	531 (7.1)	570 (6.7)	605 (11.1)			
Weighted Mean		34	211	346	412	489	527	558	605			

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2013	3	16										
2012	4	1										
2011	5	3										
2011	5	8										
2010	6	1										
2009	7	5										
Weighted Mean		34										

Species: Yellow Perch

Year Class	Age	N	Mean back-calculated length (SE) at age									
			1	2	3	4	5	6	7	8	9	10
2015	1	56	73 (.8)									
2014	2	1	79	130								
2014	2	72	77 (.7)	122 (1)								
2013	3	3	79 (7.5)	139 (6.7)	180 (6.5)							
2013	3	112	74 (.6)	123 (.9)	160 (1.2)							
2012	4	2	68 (3.1)	145 (.2)	204 (8.6)	233 (2.2)						
2012	4	16	72 (.3)	144 (.1)	181 (.9)	212 (1)						
Weighted Mean		262	75	125	164	214						

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2015	1	56										
2014	2	1										
2014	2	72										
2013	3	3										
2013	3	112										
2012	4	2										
2012	4	16										
Weighted Mean		262										

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	71		138 (3)	165 (3)		296 (5)	308 (22)	313 (25)	315 (3)	318 (9)	347 (1)
2013	34					267 (8)	271 (14)	294 (2)	300 (3)	313 (5)	312 (2)
2010	102		155 (9)	234 (79)	256 (2)		335 (2)			335 (3)	339 (8)
2007	38	118 (1)				292 (4)	310 (12)	319 (13)	337 (7)	379 (2)	

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	3			392 (2)		543 (1)					
2013	1		297 (1)								
2007	19		358 (1)	417 (7)	462 (3)		511 (1)	503 (2)	605 (1)	592 (1)	595 (3)

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	48	93 (12)	140 (11)	174 (23)	220 (2)						
2010	76	102 (75)			276 (1)						

Fish Condition

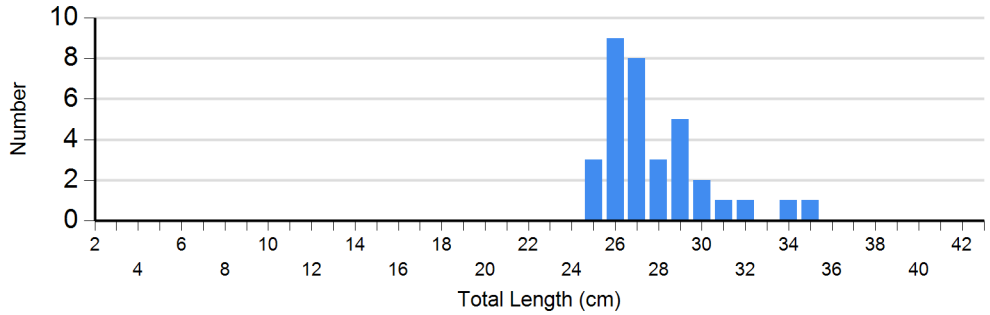
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	0		0		28	102 (0.8)	6	95 (8.4)
	2016	6	117 (5.2)	0		14	96 (2.2)	51	93 (1.0)
Northern Pike Gill Net	2013	0		4	85 (1.2)	2	79 (4.7)	0	
	2016	3	87 (2.6)	12	85 (2.2)	0		0	
Walleye Gill Net	2013	1	99	0		0		0	
	2016	1	85	1	84	1	66	0	
Yellow Perch Gill Net	2013	0		1	103	0		0	
	2016	33	106 (1.7)	2	89 (4.8)	0		0	

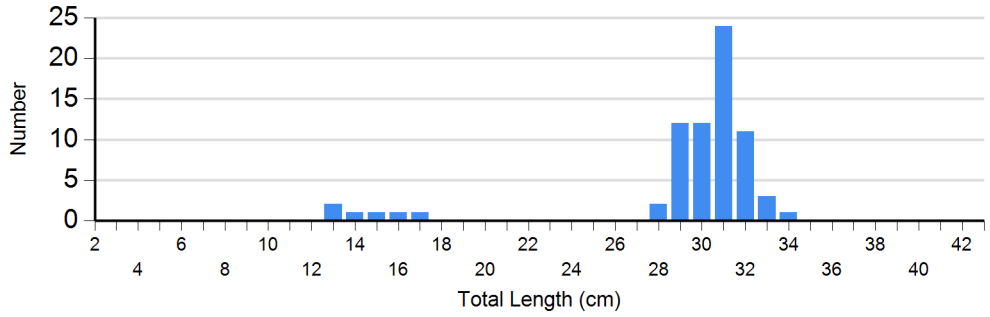
Length Frequency Distribution

Length frequency histogram of species sampled by year.

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

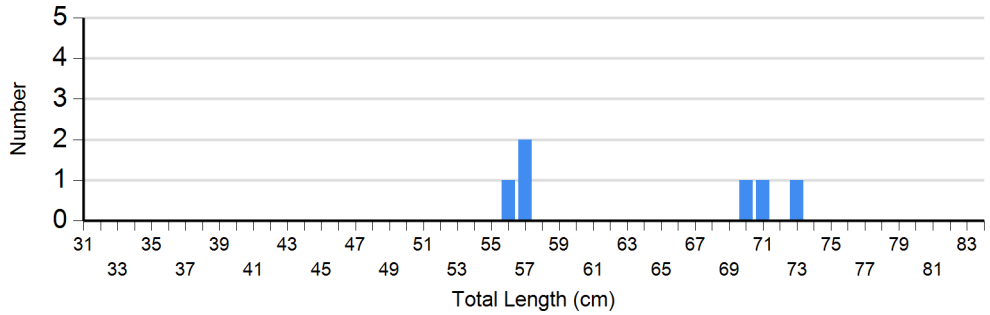


2013

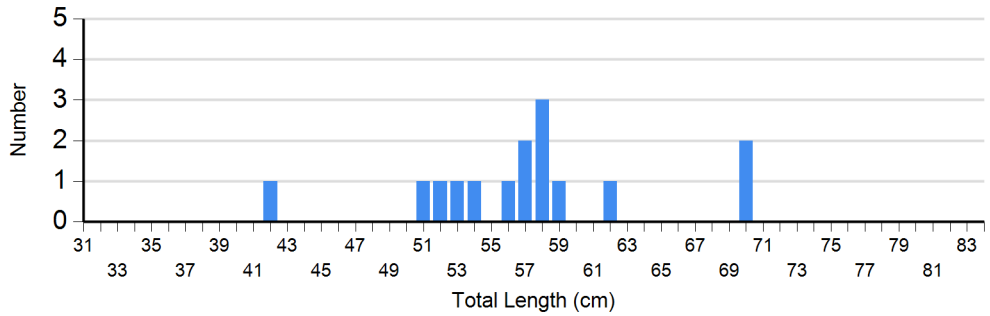


2016

Species: Northern Pike
Gear: std exp gill net

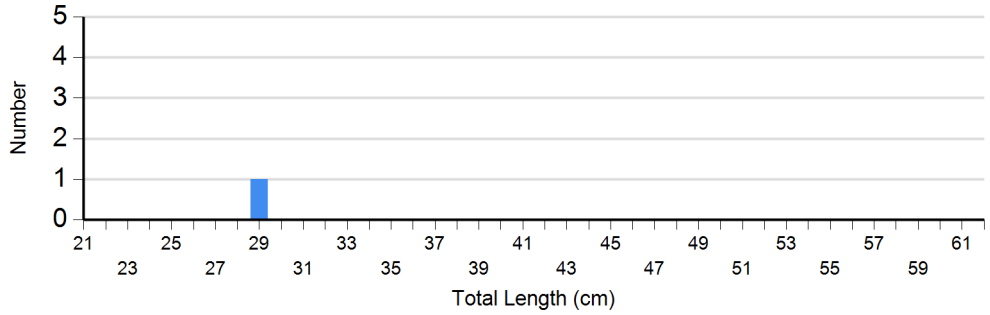


2013

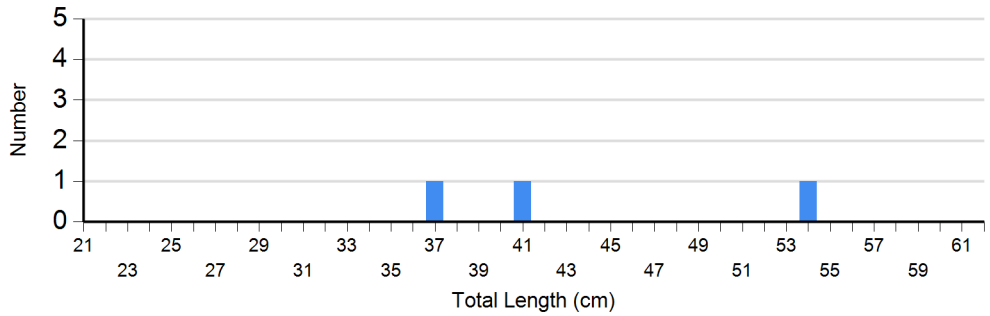


2016

Species: Walleye
Gear: std exp gill net



2013



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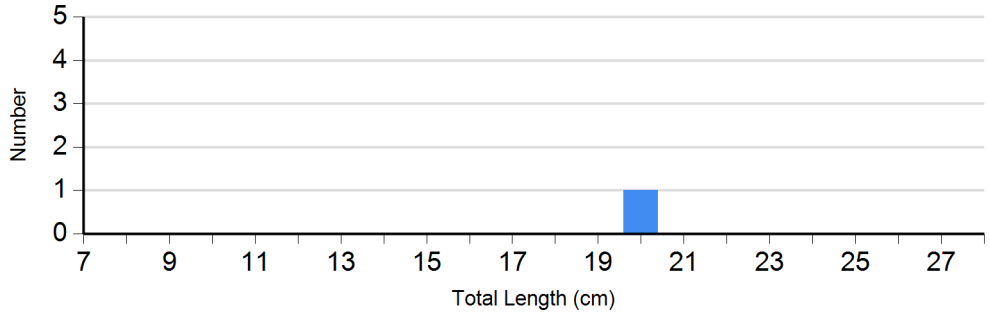
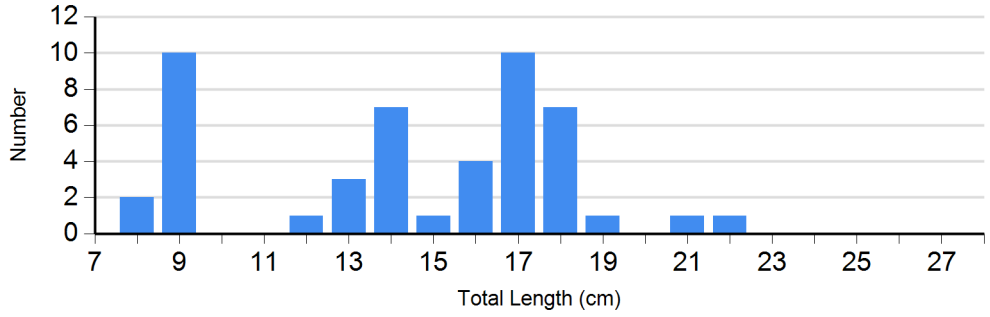
Species: Yellow Perch
Gear: std exp gill net



2013

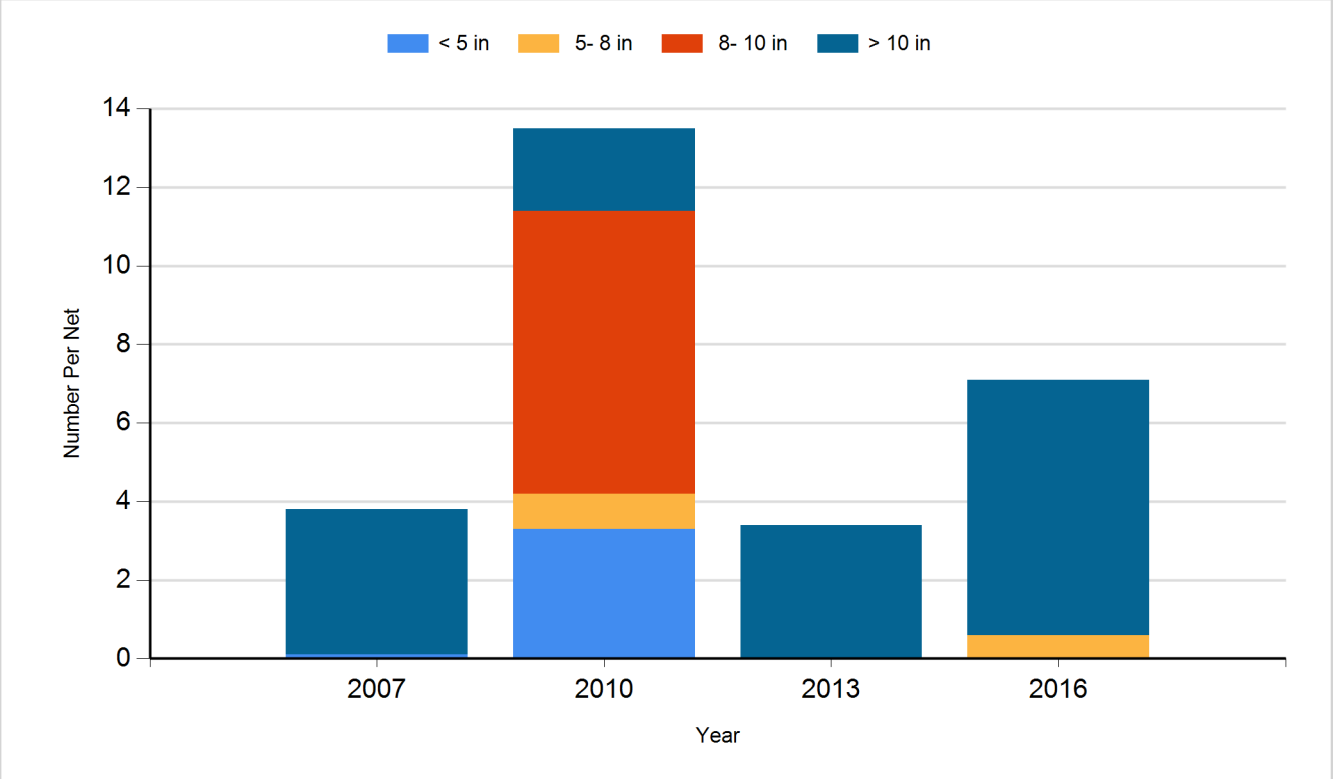


2016

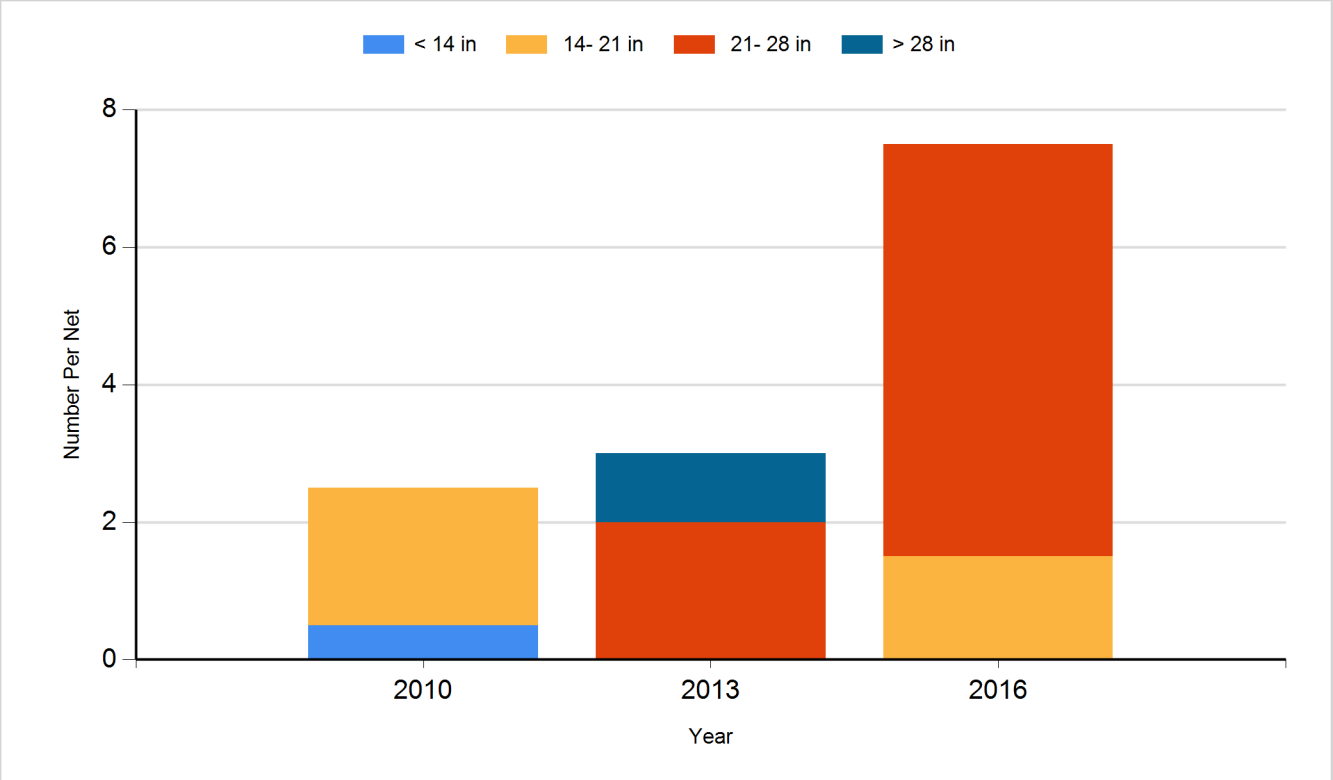
Historic Fish Sizes and Relative Abundance

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

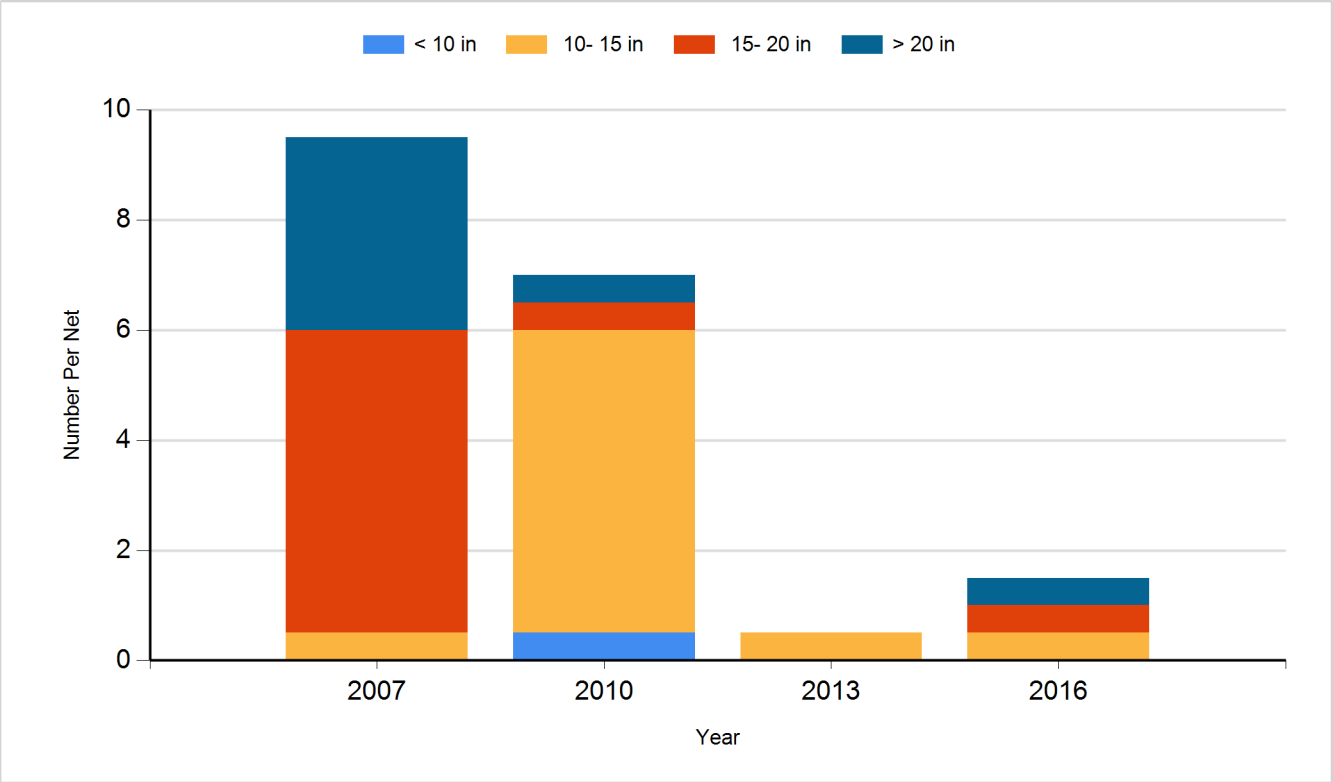
Species: Black Crappie
Gear: Frame Net



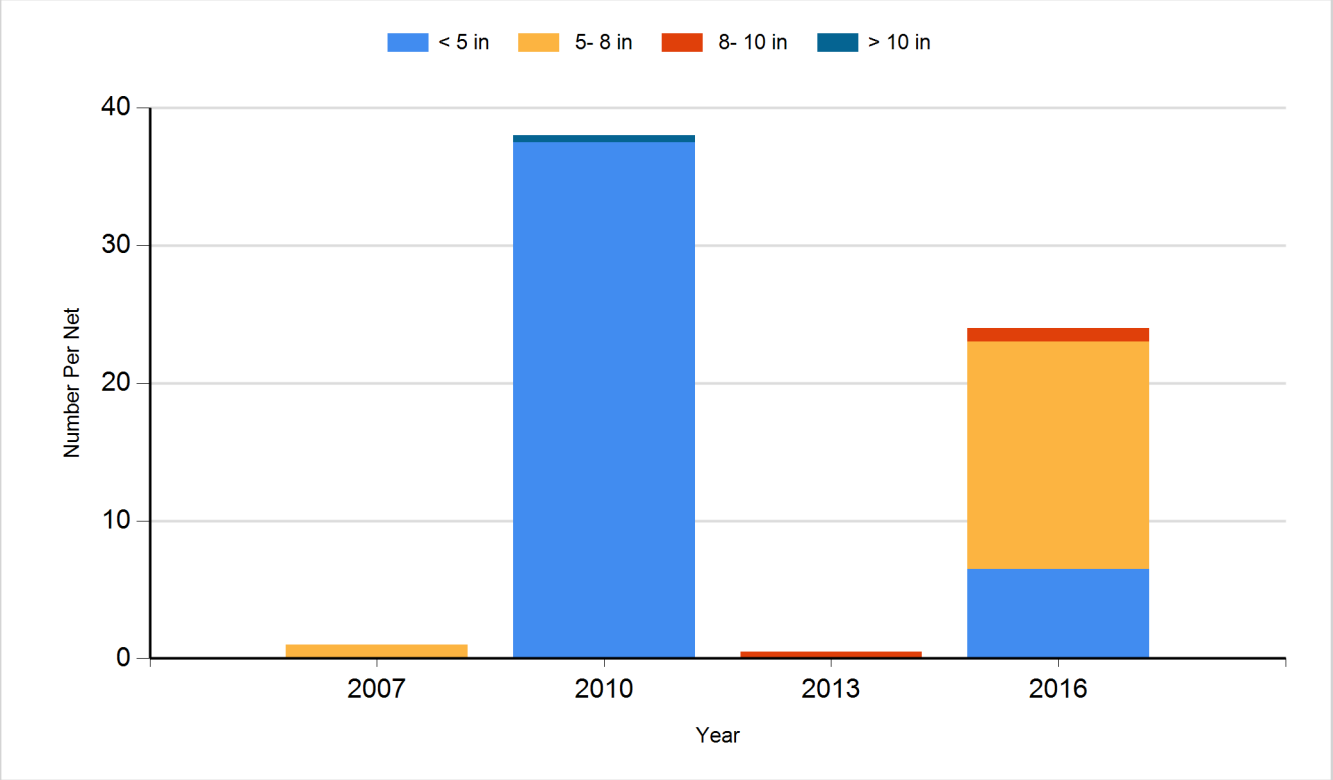
Species: Northern Pike
Gear: Gill Net



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	Large Fingerling	1,710
2008	Walleye	Large Fingerling	1,300
2013	Walleye	Large Fingerling	920
2015	Walleye	Large Fingerling	1,890