SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Amsden, Day County
MUD-Lake-22-000
2017

Lake Information

Name: Amsden

County: Day

Surface Area: 209 Acres

Maximum Depth: 27 Feet

Mean Depth: 9 Feet

Surveys and Investigations

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

Gear	Date	Effort
AFS std frame net	September 06, 2017	6 net-nights
AFS std frame net	September 07, 2017	5 net-nights
AFS std gill net	September 06, 2017	3 net-nights
AFS std gill net	September 07, 2017	3 net-nights

Common Fish Species Present

Walleye

Smallmouth Bass

Muskellunge

Black Crappie

Bluegill

Yellow Perch

Black Bullhead

Rock Bass

White Sucker

Northern Pike

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 frame net	Black Bullhead	1.3	0.8	79		71		92	3
	Black Crappie	23.2	17.2	62	4	25	4	111	1
	Bluegill	28.2	13.9	15	3	0		102	1
	Common Carp	0.0	0.0	0		0			
	Creek Chub	0.0	0.0						
	Northern Pike	0.0	0.0	0		0			
	Rock Bass	3.3	2.7	42	12	11		103	2
	Smallmouth Bass	0.4	0.3	0		0		107	3
	Walleye	0.1	0.1	100		100			
	White Sucker	0.2	0.2	100		100		91	4
	Yellow Perch	2.0	0.8	41	17	9		91	2
AFS std gill net	Black Bullhead	4.7	2.1	100		96		93	3
	Black Crappie	3.5	1.2	33	17	14		119	2
	Bluegill	0.7	0.7	25		0		112	4
	Muskellunge	0.2	0.2	100		0			
	Northern Pike	0.2	0.2	100		100		77	
	Rock Bass	0.5	0.7	33		0		104	7
	Smallmouth Bass	1.2	1.2	71		57		107	3
	Walleye	8.5	3.3	69	10	25	9	88	1
	White Sucker	2.8	1.0	100		100		102	2
	Yellow Perch	8.5	2.6	61	10	29	9	97	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	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
AFS std frame net	Black Bullhead										1.3	1.3
	Black Crappie										23.2	23.2
	Bluegill										28.2	28.2
	Common Carp										0.0	0.0
	Creek Chub										0.0	0.0
	Northern Pike										0.0	0.0
	Rock Bass										3.3	3.3
	Smallmouth Bass										0.4	0.4
	Walleye										0.1	0.1
	White Sucker										0.2	0.2
	Yellow Perch										2.0	2.0
AFS std gill net	Black Bullhead										4.7	4.7
	Black Crappie										3.5	3.5
	Bluegill										0.7	0.7
	Muskellunge										0.2	0.2
	Northern Pike										0.2	0.2
	Rock Bass										0.5	0.5
	Smallmouth Bass										1.2	1.2
	Walleye										8.5	8.5
	White Sucker										2.8	2.8
	Yellow Perch										8.5	8.5
boat shocker (night)	Muskellunge			0.0	1.0	0.0						0.3
	Smallmouth Bass	2.0	13.0		26.7							13.9
	Walleye	97.7	78.9	61.0		14.0						62.9
frame net (std 3/4 in)	Black Bullhead	15.6			117.8			42.8				58.7
	Black Crappie	5.0			13.3			3.1				7.1
	Bluegill	10.0			0.0			1.3				3.8
	Common Carp	0.1			0.6			0.1				0.3
	Northern Pike	0.5			0.9			0.6				0.7
	Rock Bass	7.7			29.7			5.3				14.2
	Smallmouth Bass	0.8			3.0			2.3				2.0
	Walleye	1.0			1.0			0.5				0.8
	White Sucker	0.4			0.5			0.8				0.6

		CPUE										
Gear	Species	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Avg
frame net (std	Yellow Perch	1.0			2.8			0.9				1.6
std exp gill net	Black Bullhead	44.0			120.0			28.7				64.2
	Black Crappie	1.0			1.3			14.7				5.7
	Bluegill	0.3			1.0			0.3				0.5
	Common Carp	0.0			0.3			0.3				0.2
	Muskellunge							0.3				0.3
	Northern Pike	0.3						1.3				0.8
	Rock Bass	3.7			7.3			3.0				4.7
	Smallmouth Bass	0.0			0.3			3.7				1.3
	Walleye	16.3			12.3			14.3				14.3
	White Sucker	3.0			11.3			9.0				7.8
	Yellow Perch	5.7			19.0			49.3				24.7

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	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
AFS std frame net	Black Crappie	PSD										62
		PSD-P										25
		Wr										111
	Northern Pike	PSD										0
		PSD-P										0
	Walleye	PSD										100
		PSD-P										100
	Yellow Perch	PSD										41
		PSD-P										9
		Wr										91
AFS std gill net	Black Crappie	PSD										33
		PSD-P										14
		Wr										119
	Northern Pike	PSD										100
		PSD-P										100
		Wr										77
	Walleye	PSD										69
		PSD-P										25
		Wr										88
	Yellow Perch	PSD										61
		PSD-P										29
		Wr										97
boat shocker (night)	Walleye	PSD	0	0	0		0					
		PSD-P	0	0	0		0					
		Wr	93	91	95		99					
frame net (std 3/4 in)	Black Crappie	PSD	100			36			89			
		PSD-P	34			30			86			
		Wr	119			115			109			
	Northern Pike	PSD	80			100			86			
		PSD-P	0			22			43			
		Wr	90			89			90			

			Year									
Gear	Species	Index	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
frame net (std 3/4 in)	Walleye	PSD	40			80			100			
		PSD-P	0			10			17			
		Wr	95			91			93			
	Yellow Perch	PSD	50			11			64			
		PSD-P	10			4			36			
		Wr	88			87			88			
std exp gill net	Black Crappie	PSD	100			0			52			
		PSD-P	33			0			52			
		Wr	124			118			117			
	Northern Pike	PSD	100						50			
		PSD-P	0						0			
		Wr	98						83			
	Walleye	PSD	59			59			72			
		PSD-P	2			8			12			
		Wr	93			91			91			
	Yellow Perch	PSD	18			4			11			
		PSD-P	12			2			4			
		Wr	99			98			99			

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+
2017	255	155 (68)	206 (123)		270 (64)						
2014	36	149 (4)		267 (3)	293 (27)	303 (1)			362 (1)		
2011	133	175 (85)	248 (17)	277 (26)		312 (4)	338 (1)				
2008	50		229 (31)	270 (16)	283 (2)						368 (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	50	286 (12)	357 (3)	389 (4)	432 (9)	440 (5)	497 (8)	557 (1)	608 (3)	613 (4)	612 (1)
2014	43	312 (4)	366 (12)	430 (16)	453 (5)	503 (3)	540 (2)				671 (1)
2011	37	295 (11)	381 (12)	433 (10)	532 (1)	517 (2)					573 (1)
2008	49	310 (3)	376 (30)	411 (3)	425 (11)	444 (2)		580 (1)			

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	51	188 (23)			251 (27)	243 (1)					
2014	153	152 (137)	220 (7)	243 (6)	274 (3)						
2011	57	180 (56)			321 (1)						

Fish Condition

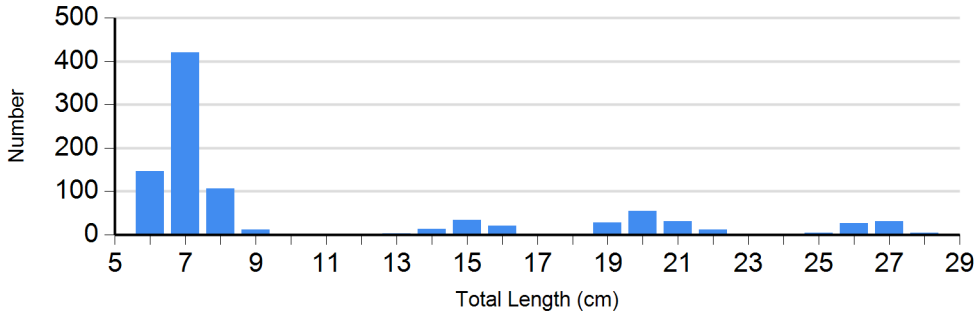
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2014	4	122 (3.1)	1	110	24	107 (0.9)	8	105 (3.0)
	2017	96	114 (0.9)	95	112 (0.8)	64	106 (0.9)	0	
Northern Pike Gill Net	2014	2	85 (0.3)	2	81 (1.9)	0		0	
	2017	0		0		1	77	0	
Walleye Gill Net	2014	12	91 (1.6)	26	90 (1.3)	4	95 (4.5)	1	93
	2017	16	87 (1.6)	22	90 (1.1)	11	87 (1.3)	2	84 (1.7)
Yellow Perch Gill Net	2014	132	100 (0.7)	10	95 (2.5)	6	87 (1.4)	0	
	2017	20	95 (0.9)	16	100 (1.4)	15	96 (1.7)	0	

Length Frequency Distribution

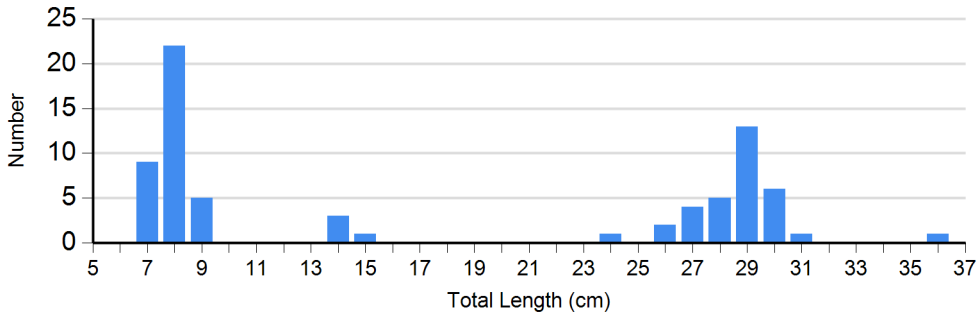
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net



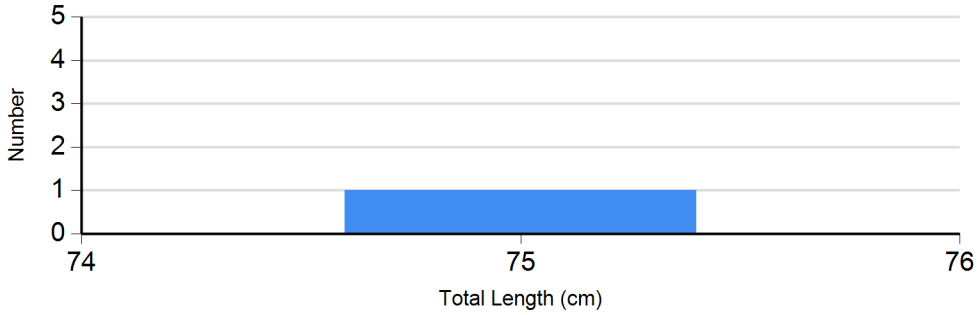
2017

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



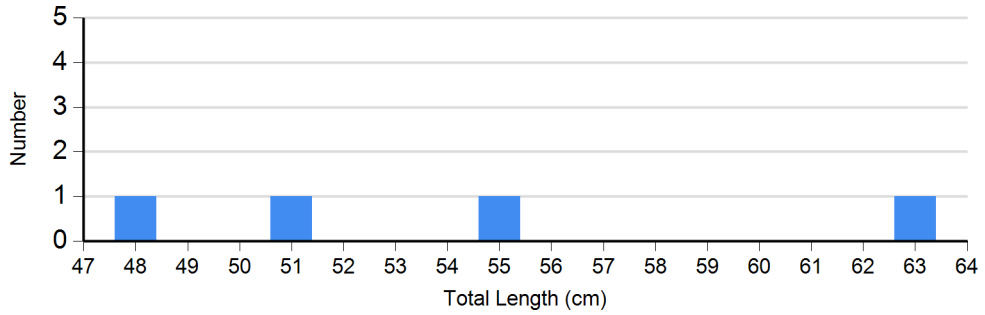
2014

Species: Northern Pike
Gear: AFS std gill net



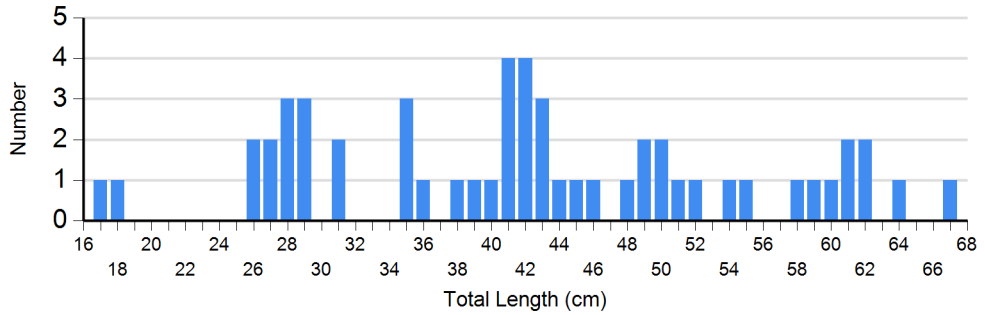
2017

Species: Northern Pike
Gear: std exp gill net



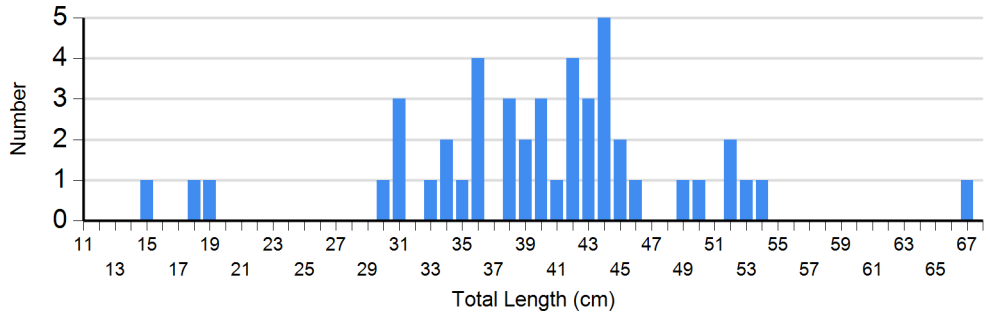
2014

Species: Walleye
Gear: AFS std gill net



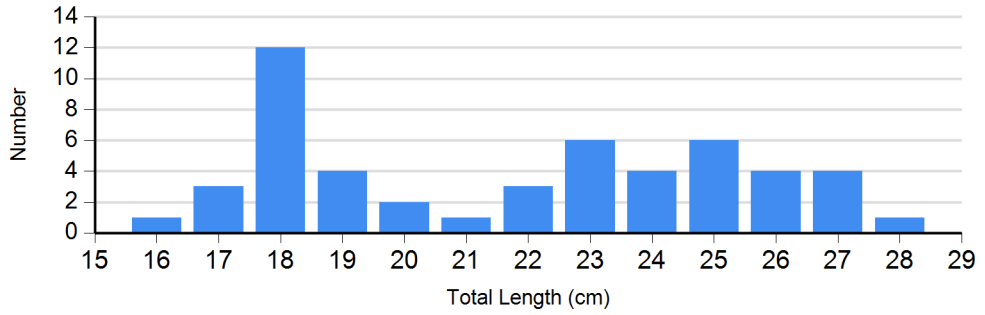
2017

Species: Walleye
Gear: std exp gill net



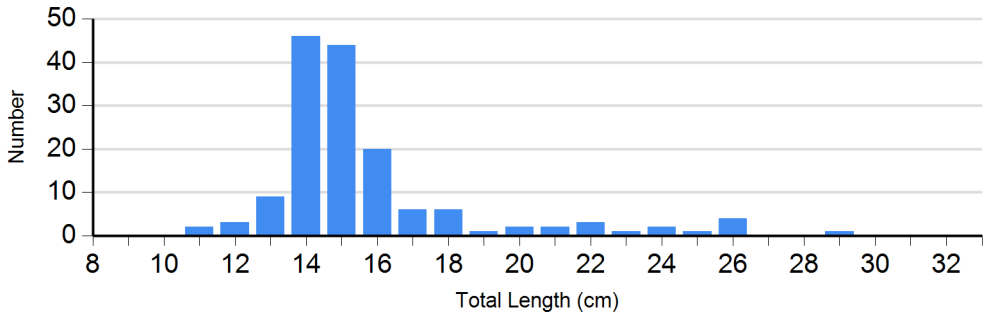
2014

Species: Yellow Perch
Gear: AFS std gill net



2017

Species: Yellow Perch
Gear: std exp gill net

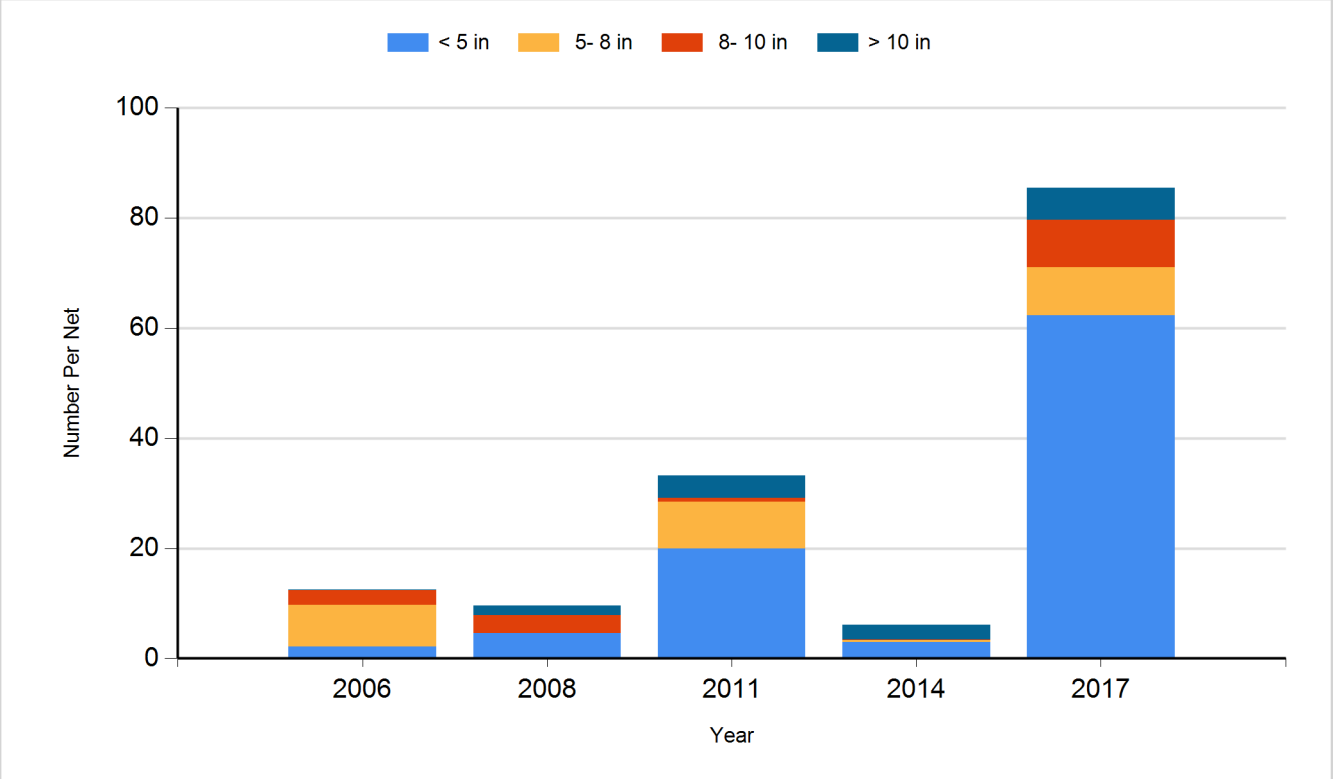


2014

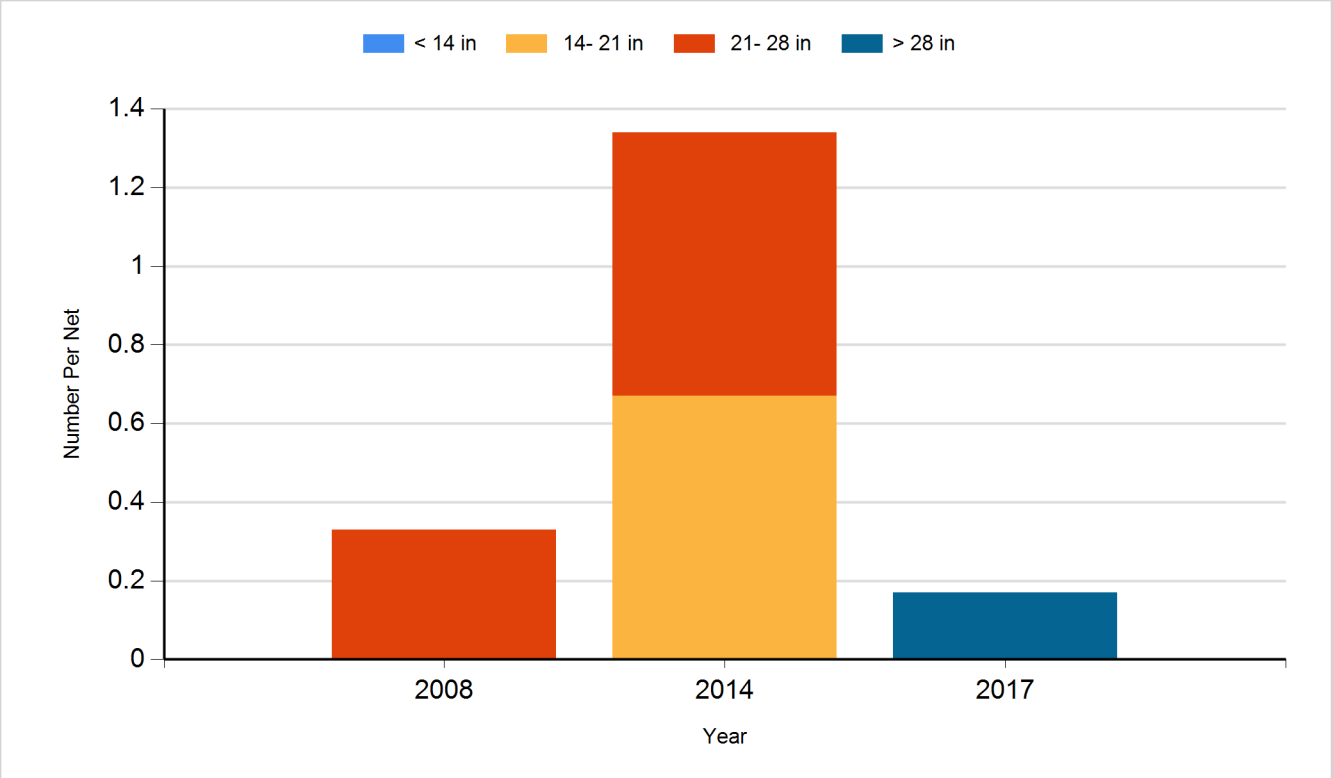
Historic Fish Sizes and Relative Abundance

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

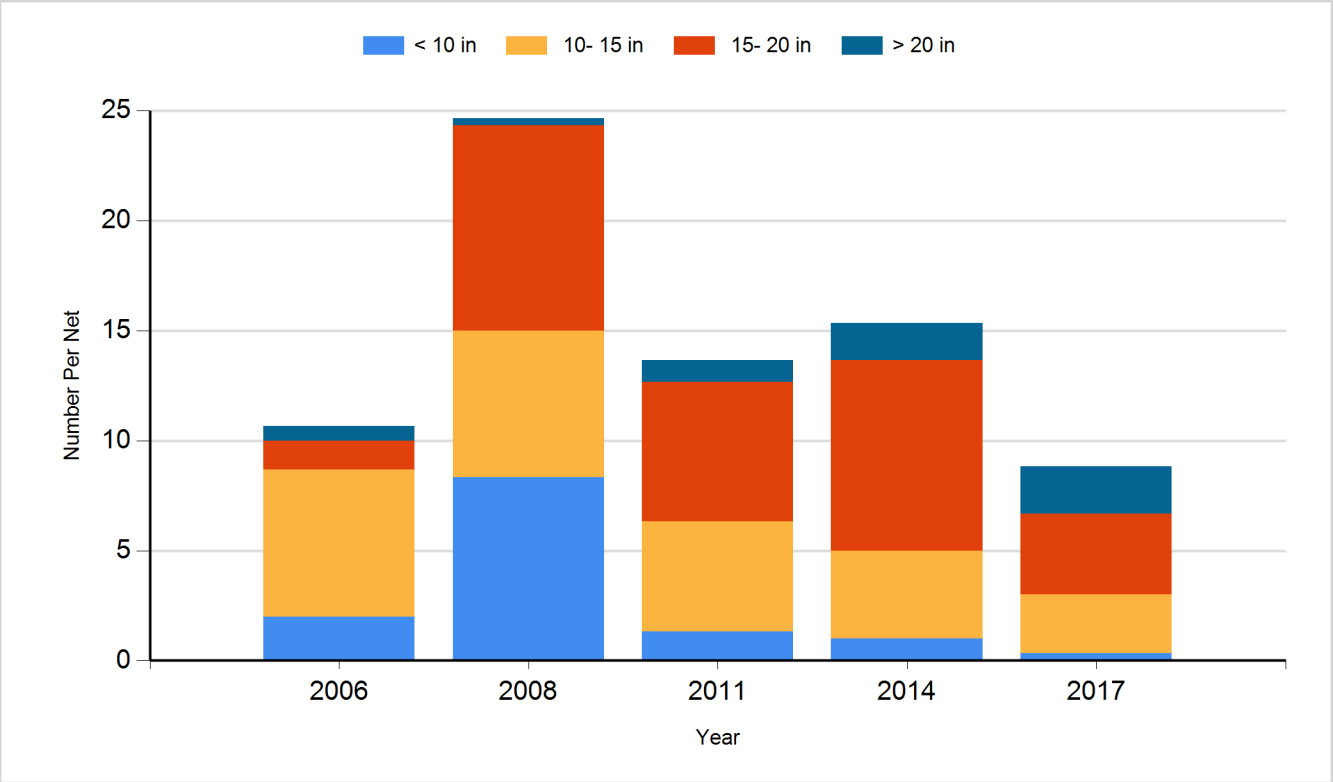
Species: Black Crappie
Gear: Frame Net



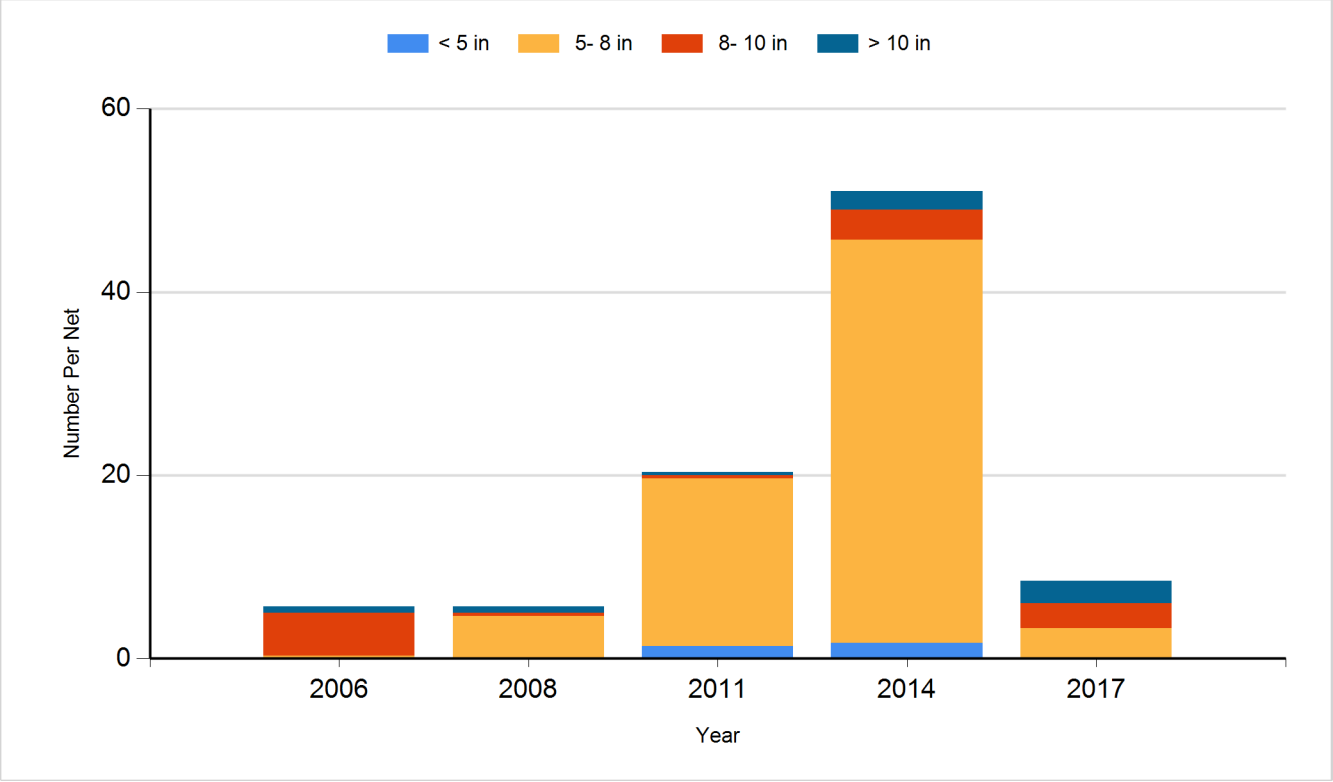
Species: Northern Pike
Gear: Gill Net



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	Muskellunge	Fingerling	250
2008	Walleye	Small Fingerling	24,840
2010	Muskellunge	Large Fingerling	500
2012	Muskellunge	Large Fingerling	509
2012	Walleye	Small Fingerling	23,370
2014	Muskellunge	Large Fingerling	505
2014	Walleye	Fry	120,000
2016	Walleye	Fry	120,000