SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Cochrane, Deuel County
LQP-Lake-56-000
2016

Lake Information

Name:	Cochrane	**Maximum Depth:**	24 Feet
County:	Deuel	**Mean Depth:**	13 Feet
		OHWM Elevation:	1,684
Surface Area:	366 Acres	**Outlet Elevation:**	1,683

Surveys and Investigations

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

Gear	Date	Effort
AFS std frame net	June 14, 2016	6 net-nights
AFS std frame net	June 15, 2016	6 net-nights
AFS std gill net	June 14, 2016	3 net-nights
AFS std gill net	June 15, 2016	3 net-nights
boat shocker (night, AC	June 09, 2016	3600 seconds

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Yellow Perch

Walleye

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 Crappie	17.6	5.5	11	3	5	2	94	1
	Bluegill	65.1	16.1	33	2	0		105	1
	Largemouth Bass	0.0	0.0	0		0			
	Northern Pike	0.2	0.2	100		100		85	2
	Walleye	0.1	0.1	0		0		72	
	Yellow Perch	3.9	1.6	23	9	0		86	1
AFS std gill net	Black Crappie	5.2	2.5	0		0		107	2
	Bluegill	0.2	0.2	100		0		82	
	Largemouth Bass	0.2	0.2	100		100		116	
	Northern Pike	2.0	1.0	100		75		93	5
	Walleye	10.0	4.9	80	8	10	6	95	1
	Yellow Perch	36.8	16.7	19	4	1		94	1
boat shocker (night, AC	Largemouth Bass	231.0	77.4	34	4	13	3	103	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 frame net	Black Crappie										17.6	17.6
	Bluegill										65.1	65.1
	Largemouth Bass										0.0	0.0
	Northern Pike										0.2	0.2
	Walleye										0.1	0.1
	Yellow Perch										3.9	3.9
AFS std gill net	Black Crappie										5.2	5.2
	Bluegill										0.2	0.2
	Largemouth Bass										0.2	0.2
	Northern Pike										2.0	2.0
	Walleye										10.0	10.0
	Yellow Perch										36.8	36.8
boat shocker (night, AC	Largemouth Bass		100.0		123.0		177.0		82.3		231.0	142.7
frame net (std 3/4 in)	Black Bullhead		6.4		3.5		0.2					3.4
	Black Crappie		1.3		0.1		1.3		1.1			1.0
	Bluegill		29.1		35.1				44.5			36.2
	Green Sunfish		1.4									1.4
	Largemouth Bass		0.1		0.1							0.1
	Northern Pike		0.1		0.1		0.1					0.1
	Sunfish Hybrid		0.0				0.0					0.0
	Walleye		0.2		0.2		0.3					0.2
	Yellow Perch		12.5		2.2		0.9		2.9			4.6
std exp gill net	Black Bullhead		0.8		0.3		0.3		0.3			0.4
	Black Crappie		0.3		0.3		19.0		0.3			5.0
	Bluegill		0.3		1.2				0.3			0.6
	Common Carp				0.1							0.1
	Largemouth Bass		0.8		0.3		0.8					0.6
	Northern Pike		0.8		0.3		2.5		3.0			1.7
	Sunfish Hybrid		0.0				0.0					0.0
	Walleye		4.3		2.4		1.8		3.0			2.9
	Yellow Perch		5.3		18.1		38.5		170.0			58.0

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 frame net	Black Crappie	PSD										11
		PSD-P										5
		Wr										94
	Northern Pike	PSD										100
		PSD-P										100
		Wr										85
	Walleye	PSD										0
		PSD-P										0
		Wr										72
	Yellow Perch	PSD										23
		PSD-P										0
		Wr										86
AFS std gill net	Black Crappie	PSD										0
		PSD-P										0
		Wr										107
	Northern Pike	PSD										100
		PSD-P										75
		Wr										93
	Walleye	PSD										80
		PSD-P										10
		Wr										95
	Yellow Perch	PSD										19
		PSD-P										1
		Wr										94
frame net (std 3/4 in)	Black Crappie	PSD		43		0		100		85		
		PSD-P		9		0		0		38		
		Wr		95		103		96		93		
	Northern Pike	PSD		100		100		0				
		PSD-P		0		0		0				
		Wr		76		87		83				
	Walleye	PSD		0		50		33				

			Year									
Gear	Species	Index	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
frame net (std 3/4 in)	Walleye	PSD-P		0		0		33				
		Wr		86		91		89				
	Yellow Perch	PSD		19		33		55		49		
		PSD-P		0		0		0		6		
		Wr		87		92		90		84		
std exp gill net	Black Crappie	PSD		0		25		64		100		
		PSD-P		0		0		3		100		
		Wr		105		109		108		99		
	Northern Pike	PSD		100		100		80		100		
		PSD-P		100		33		0		78		
		Wr		96		102		93		92		
	Walleye	PSD		18		45		43		56		
		PSD-P		6		3		0		0		
		Wr		87		90		90		90		
	Yellow Perch	PSD		29		38		26		34		
		PSD-P		0		0		0		5		
		Wr		90		93		102		97		

Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Walleye

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2016	64	216 (4)	314 (8)	423 (43)	505 (4)		518 (2)		588 (2)		670 (1)
2014	9		356 (3)		404 (4)	421 (1)	472 (1)				
2012	10		244 (1)		388 (4)						327 (5)
2010	29		274 (10)			405 (16)				526 (3)	
2008	19			284 (13)	304 (1)	256 (1)	443 (3)	400 (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+
2016	221			179 (197)	219 (17)	214 (1)	248 (5)	293 (1)			
2014	544	98 (26)	160 (298)	189 (32)	197 (40)	232 (85)	237 (48)	230 (12)	224 (2)		
2012	154			162 (45)	193 (64)	195 (23)	220 (3)	204 (4)			177 (16)
2010	244	98 (13)	149 (74)	173 (71)	197 (11)	220 (66)	232 (8)	244 (2)		225 (2)	

Fish Condition

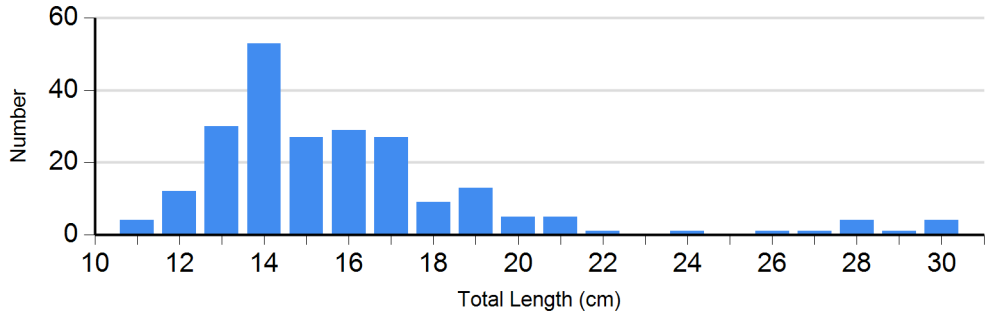
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		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	2012	0		15	96 (1.1)	0		0	
	2014	2	93 (2.7)	6	93 (3.2)	5	93 (2.3)	0	
	2016	188	96 (0.6)	12	84 (1.2)	7	75 (3.1)	4	80 (2.7)
Northern Pike Gill Net	2012	2	93 (0.5)	8	93 (0.9)	0		0	
	2014	0		2	87 (3.3)	7	93 (3.2)	0	
	2016	0		3	102 (4.8)	6	94 (5.8)	3	82 (3.2)
Walleye Gill Net	2012	4	90 (2.9)	3	90 (4.5)	0		0	
	2014	4	92 (2.4)	5	89 (3.1)	0		0	
	2016	12	90 (1.7)	42	98 (0.8)	5	89 (2.0)	1	93
Yellow Perch Gill Net	2012	114	104 (0.7)	40	97 (0.9)	0		0	
	2014	336	98 (0.4)	151	96 (0.5)	23	95 (1.3)	0	
	2016	179	96 (0.5)	39	87 (1.0)	3	75 (2.5)	0	

Length Frequency Distribution

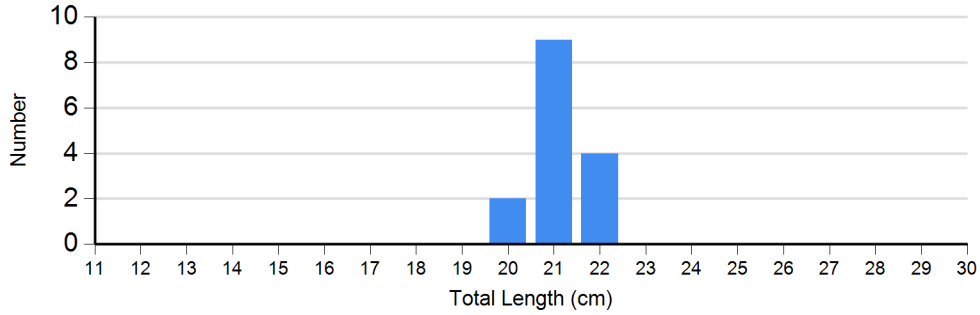
Length frequency histogram of species sampled by year.

Species: Black Crappie
Gear: AFS std frame net

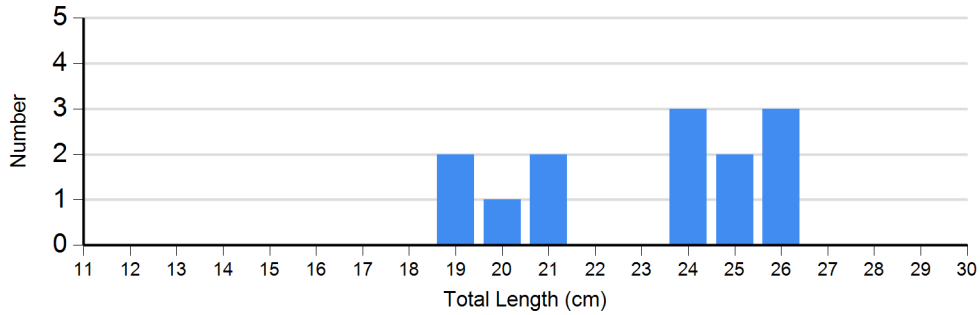


2016

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

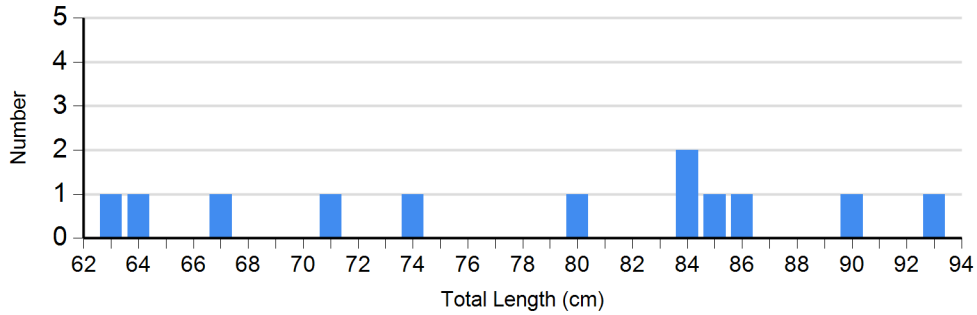


2012



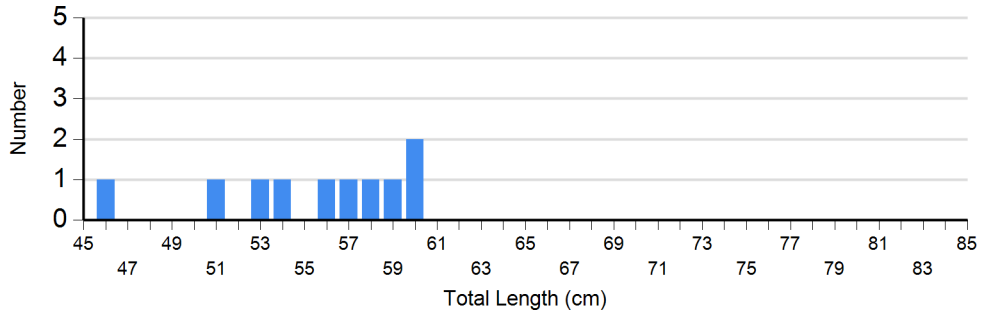
2014

Species: Northern Pike
Gear: AFS std gill net

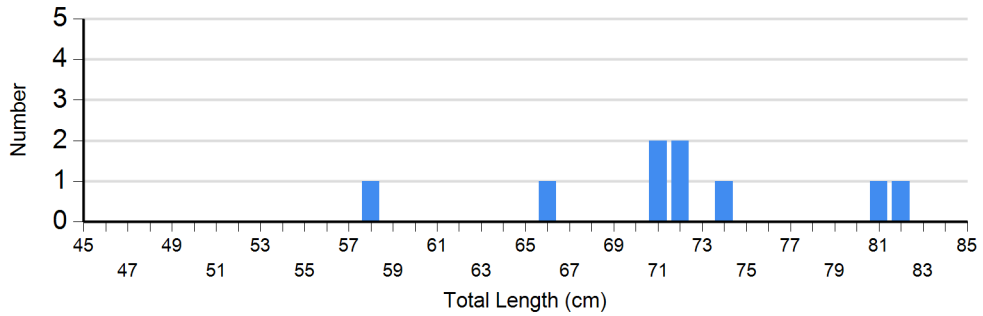


2016

Species: Northern Pike
Gear: std exp gill net

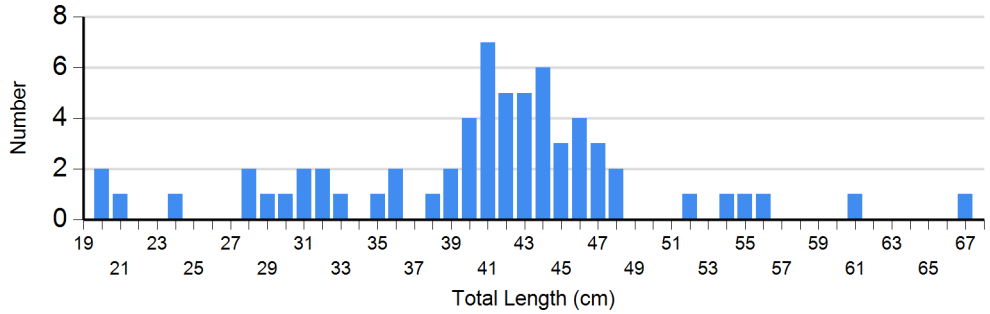


2012



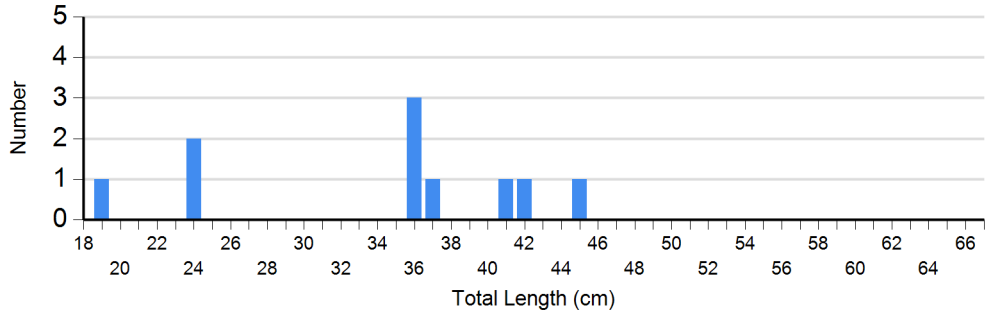
2014

Species: Walleye
Gear: AFS std gill net

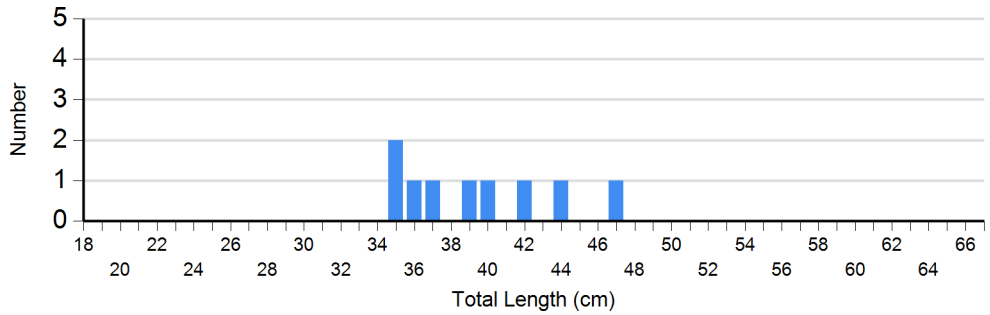


2016

Species: Walleye
Gear: std exp gill net

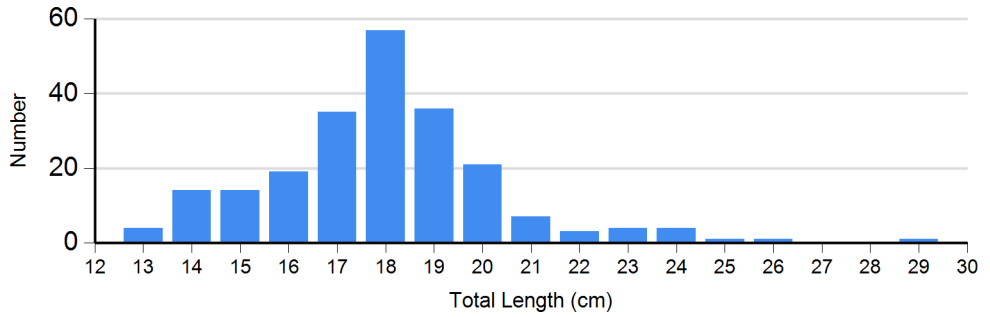


2012



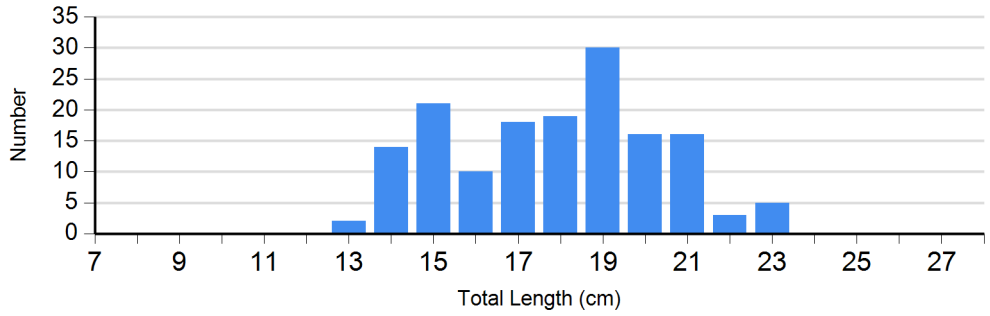
2014

Species: Yellow Perch
Gear: AFS std gill net

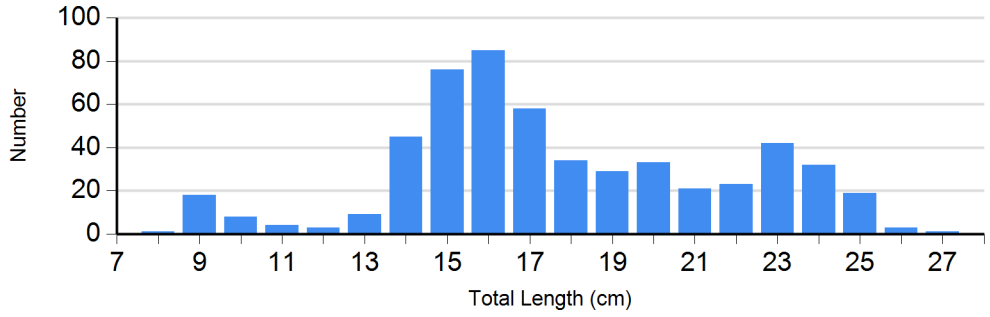


2016

Species: Yellow Perch
Gear: std exp gill net



2012

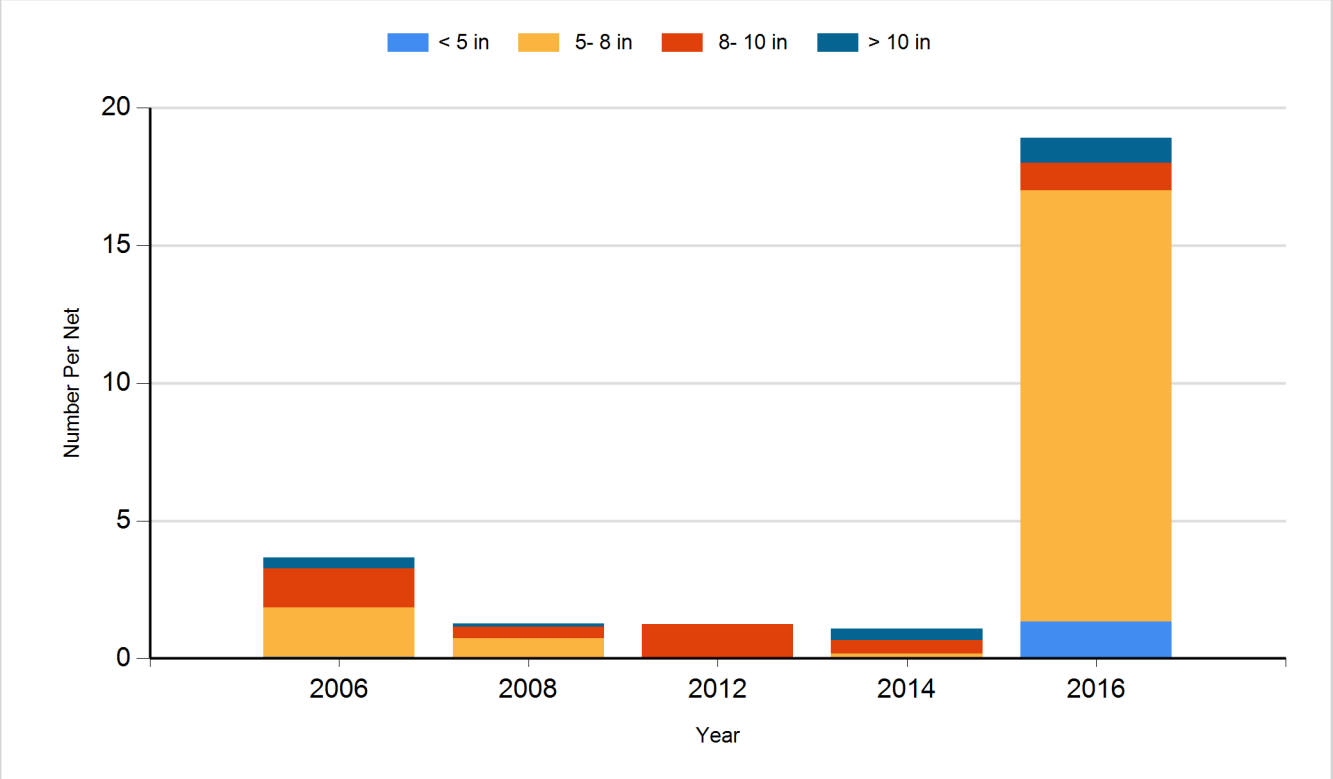


2014

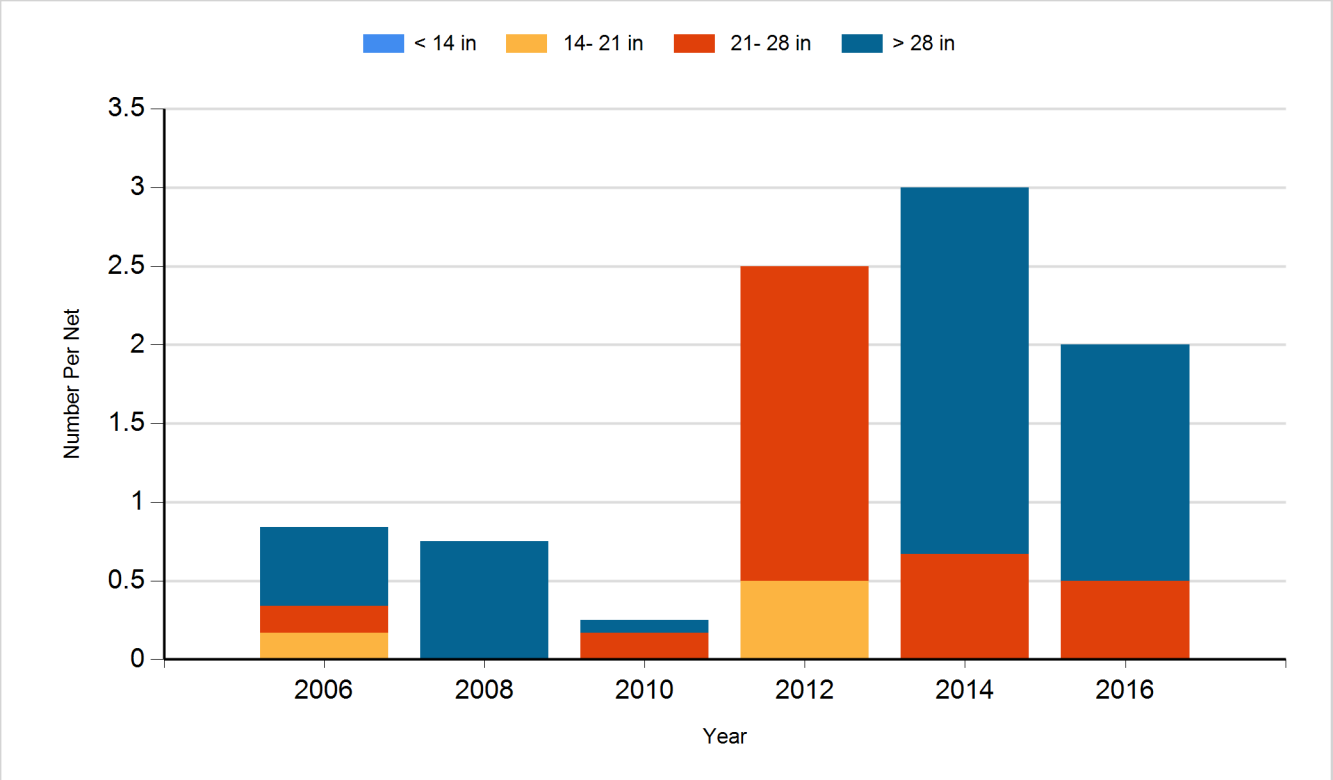
Historic Fish Sizes and Relative Abundance

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

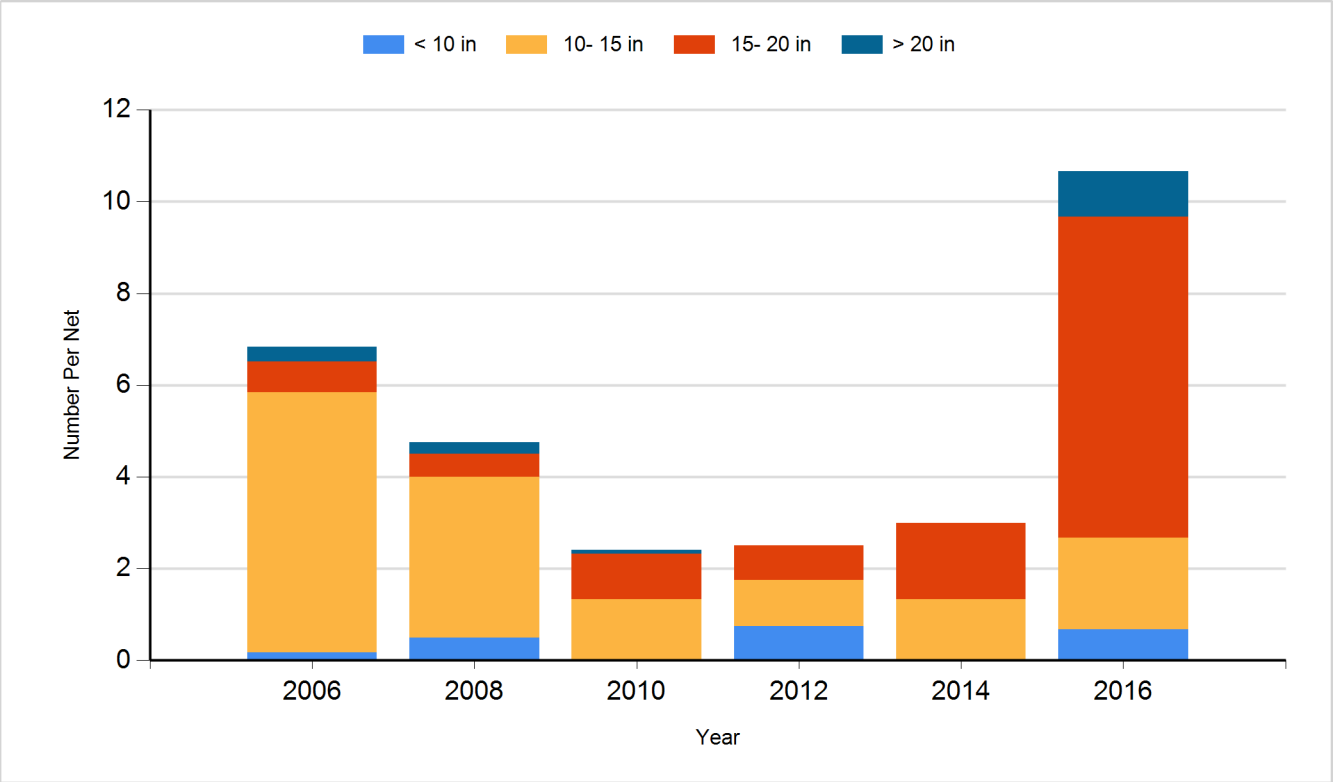
Species: Black Crappie
Gear: Frame Net



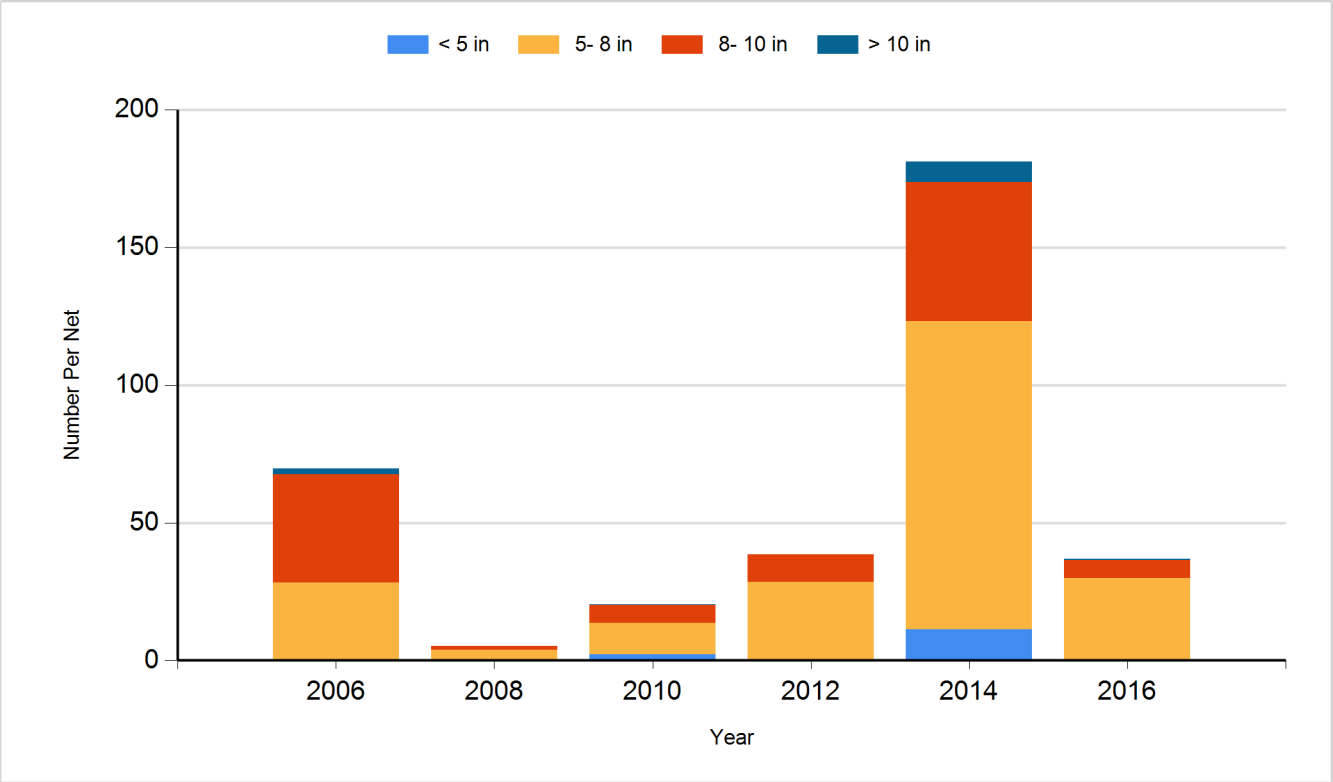
Species: Northern Pike
Gear: Gill Net



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
2005	Walleye	Fingerling	16,000
2008	Walleye	Large Fingerling	7,068
2010	Walleye	Large Fingerling	3,176
2012	Walleye	Large Fingerling	3,725
2013	Walleye	Large Fingerling	11,132
2015	Walleye	Large Fingerling	4,026