SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Francis Case, Charles Mix County
FTR-Lake-6327-000
2015

Lake Information

Name: Francis Case

County: Charles Mix

Surface Area: 88,007 Acres

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	June 01, 2015	2700 seconds
boat shocker (night)	June 03, 2015	2700 seconds
boat shocker (night)	June 04, 2015	2700 seconds
boat shocker (night)	June 08, 2015	2700 seconds
boat shocker (night)	June 09, 2015	2400 seconds
std exp gill net	September 09, 2015	9 net-nights
std exp gill net	September 11, 2015	6 net-nights
std exp gill net	September 15, 2015	12 net-nights

Common Fish Species Present

Smallmouth Bass

Channel Catfish

Walleye

Sauger

Common Carp

Yellow Perch

Shorthead Redhorse

Gizzard Shad

Freshwater Drum

White Bass

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)	Smallmouth Bass	68.9	13.7	37	3	12	2	92	1
std exp gill net	Black Crappie	0.0	0.0	0		0		83	
	Channel Catfish	4.7	0.9	46	6	2		79	1
	Common Carp	1.8	0.5	86	8	2		83	1
	Freshwater Drum	0.2	0.1	50		17		89	3
	Gizzard Shad	0.3	0.2	88				94	4
	Goldeye	0.0	0.0						
	Lake Herring	0.0	0.0	100		0		68	
	Northern Pike	0.1	0.1	100		0		89	3
	River Carpsucker	0.1	0.1	50		50		101	2
	Sauger	3.7	0.7	74	6	32	7	76	1
	Shorthead Redhorse	0.3	0.2	88		63		120	33
	Shortnose Gar	0.0	0.0						
	Smallmouth Bass	1.0	0.5	62	15	12		100	4
	Smallmouth Buffalo	0.1	0.1	100		100		76	2
	Spottail Shiner	0.0	0.0						
	Walleye	3.9	0.7	60	7	9	4	84	1
	White Bass	0.2	0.2	100		100		97	3
	White Crappie	0.0	0.0	0		0			
	Yellow Perch	0.9	0.3	8		0		79	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	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Avg
boat shocker (night)	Smallmouth Bass	166,320.0	139,500.0	132,480.0	183,600.0	181.6	73.6	80.7	66.7	86.0	68.9	62245.8
std exp gill net	Bigmouth Buffalo									0.1		0.1
	Black Bullhead					0.4	0.1					0.3
	Black Crappie			0.0			0.1	0.1	0.0	0.0	0.0	0.0
	Bluegill									0.0		0.0
	Brown Trout						0.0					0.0
	Channel Catfish	4.7	5.3	5.7	4.4	3.9	2.5	2.8	3.1	3.2	4.7	4.0
	Chinook Salmon						0.0					0.0
	Common Carp	1.7	1.7	1.4	1.0	0.7	1.0	1.8	1.3	1.0	1.8	1.3
	Emerald Shiner	0.0										0.0
	Flathead Catfish					0.1						0.1
	Freshwater Drum	0.5	0.5	0.3	0.3	0.2	0.2	0.5	0.7	0.4	0.2	0.4
	Gizzard Shad	0.1	0.2	0.0	0.1	0.2	0.4	0.1	0.6	0.0	0.3	0.2
	Goldeye	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Green Sunfish		0.0									0.0
	Lake Herring					0.0					0.0	0.0
	None						0.0					0.0
	Northern Pike		0.1		0.1	0.4	0.4	0.4	0.1		0.1	0.2
	Orangespotted Sunfish					0.0						0.0
	River Carpsucker	0.3	0.1	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.1	0.1
	Sauger	3.8	2.6	1.2	1.9	4.0	7.2	7.4	5.9	5.4	3.7	4.3
	Shorthead Redhorse	0.0	0.1	0.0	0.1	0.3	0.3	0.2	0.3	0.2	0.3	0.2
	Shortnose Gar	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Shovelnose Sturgeon								0.0			0.0
	Smallmouth Bass	0.7	0.3	0.3	0.6	0.6	0.8	0.6	0.2	0.2	1.0	0.5
	Smallmouth Buffalo	0.1	0.0	0.0	0.1	0.0		0.0	0.0	0.1	0.1	0.0
	Spottail Shiner	0.0		0.0		0.0	0.0				0.0	0.0
	Walleye	11.6	7.3	6.7	10.0	14.9	11.9	9.4	5.8	6.2	3.9	8.8
	Western Silvery Minnow								0.0			0.0
	White Bass	1.3	1.0	0.6	0.5	0.0	0.5	0.1	0.3	0.1	0.2	0.5
	White Crappie	0.1	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
	Yellow Perch	0.4	0.3	0.4	0.3	4.7	3.6	1.4	0.4	0.8	0.9	1.3

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	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
std exp gill net	Black Crappie	PSD			100			0	0	0	0	0
		PSD-P			0			0	0	0	0	0
		Wr			112			116	106			83
	Northern Pike	PSD		100		50	8	91	100	100		100
		PSD-P		0		0	8	9	27	0		0
		Wr		81		84	98	94	81	83		89
	Walleye	PSD	29	29	33	46	47	44	40	20	33	60
		PSD-P	1	2	1	1	1	2	9	4	2	9
		Wr	79	78	83	81	88	83	82	82	84	84
	Yellow Perch	PSD	33	25	27	33	26	22	28	8	22	8
		PSD-P	8	0	0	0	3	0	5	8	0	0
		Wr	82	77	86	81	83	85	84	82	84	79

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+
2015	135	237 (46)	334 (9)	394 (13)	398 (37)	466 (7)	474 (6)	484 (3)	496 (3)		509 (11)
2014	208	255 (11)	316 (36)	353 (89)	392 (27)	405 (31)	441 (3)	482 (1)	519 (2)	509 (5)	505 (3)
2013	175	232 (21)	312 (107)	376 (31)	430 (8)	469 (2)	533 (3)	526 (1)	526 (1)		504 (1)
2012	298	256 (114)	350 (76)	398 (48)	477 (10)	475 (5)	475 (7)	513 (26)	513 (8)	465 (1)	526 (3)
2011	345	269 (99)	369 (156)	417 (41)	446 (11)	456 (10)	462 (25)	446 (1)		483 (1)	615 (1)
2010	427	267 (178)	359 (77)	416 (35)	437 (68)	441 (58)	456 (6)	493 (2)		478 (2)	526 (1)
2009	296	240 (41)	318 (45)	368 (71)	392 (118)	415 (10)	425 (5)	562 (1)		454 (2)	576 (3)
2008	213	240 (25)	309 (44)	357 (100)	409 (19)	458 (10)	472 (6)	429 (2)	486 (5)	467 (3)	504 (1)
2006	433	252 (236)	350 (105)	395 (56)	438 (20)	436 (4)	456 (4)	484 (4)	463 (2)	528 (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+
2010	1				482 (1)						

Fish Condition

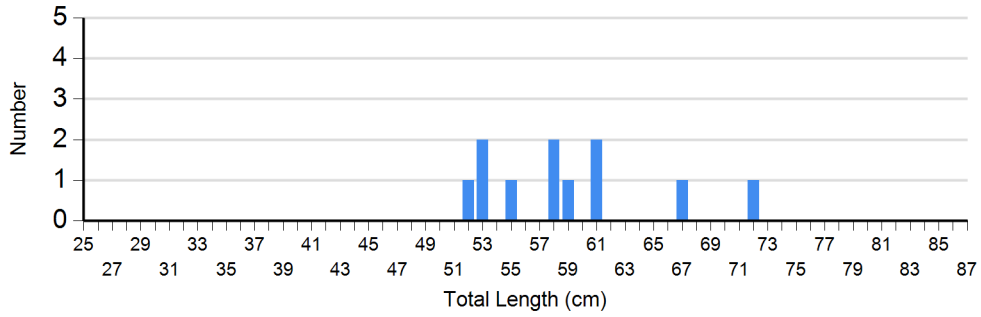
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Northern Pike Gill Net	2011	1	110	9	92 (2.7)	1	93	0	
	2012	0		8	83 (3.8)	3	75 (2.8)	0	
	2013	0		2	83 (9.3)	0		0	
	2015	0		2	89 (2.0)	0		0	
Walleye Gill Net	2011	180	83 (0.7)	135	83 (0.6)	5	83 (2.5)	0	
	2012	152	82 (1.1)	78	83 (1.1)	24	81 (1.1)	0	
	2013	125	82 (0.6)	26	80 (1.3)	6	74 (3.3)	0	
	2014	136	85 (0.5)	64	81 (0.6)	4	71 (2.7)	0	
	2015	42	84 (0.9)	54	84 (1.0)	9	80 (1.9)	0	
Yellow Perch Gill Net	2011	76	85 (1.3)	21	84 (1.3)	0		0	
	2012	28	89 (1.7)	9	83 (2.7)	2	24 (1.0)	0	
	2013	11	88 (4.0)	0		1	22	0	
	2014	21	85 (1.8)	6	81 (2.2)	0		0	
	2015	23	79 (1.2)	2	79 (7.3)	0		0	

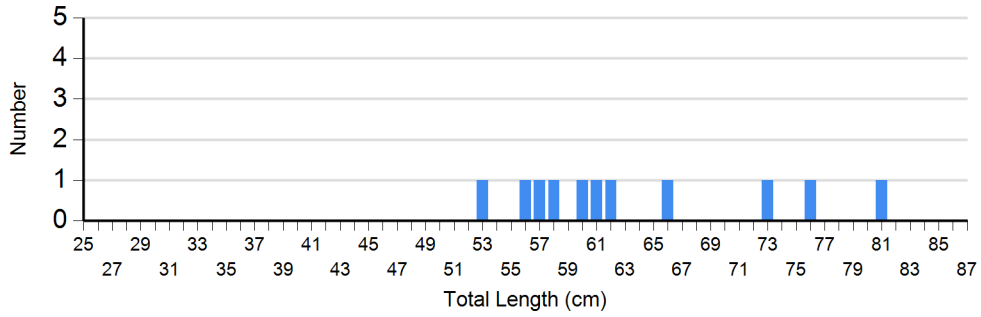
Length Frequency Distribution

Length frequency histogram of species sampled by year.

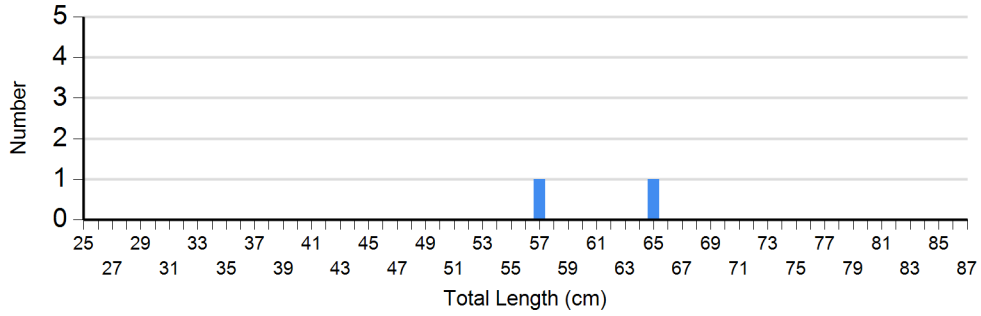
Species: Northern Pike
Gear: std exp gill net



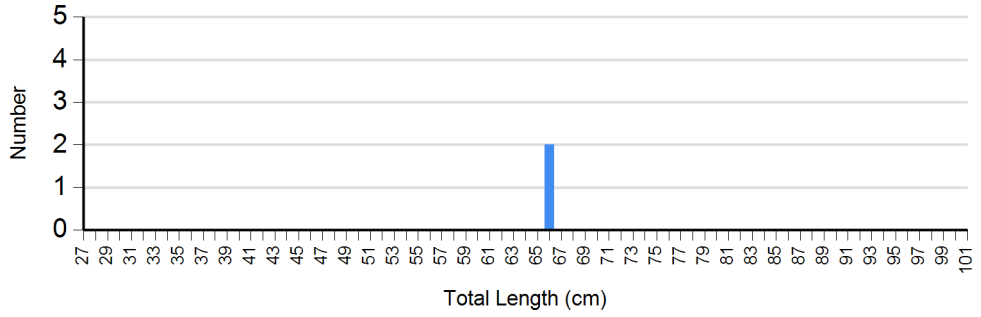
2011



2012

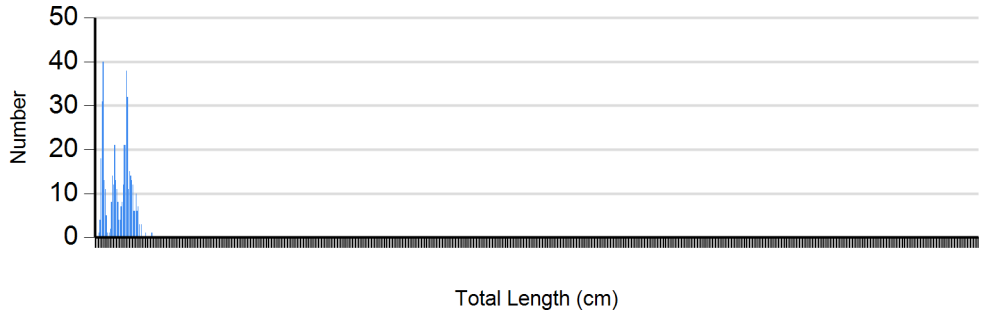


2013

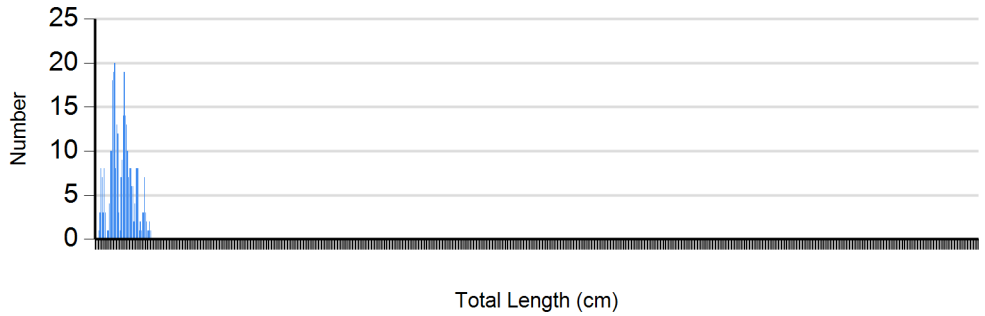


2015

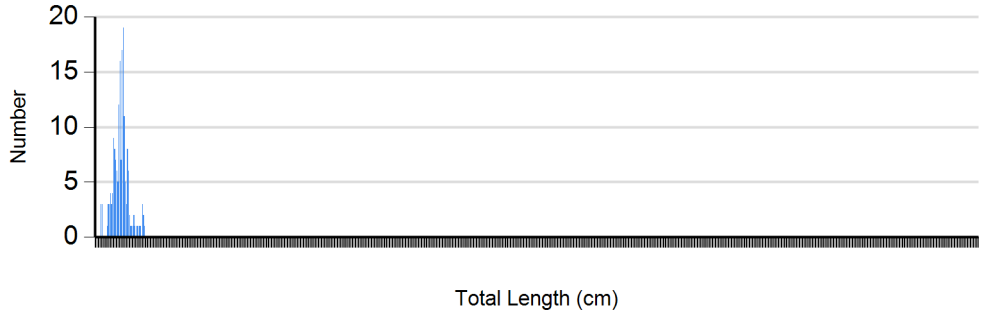
Species: Walleye
Gear: std exp gill net



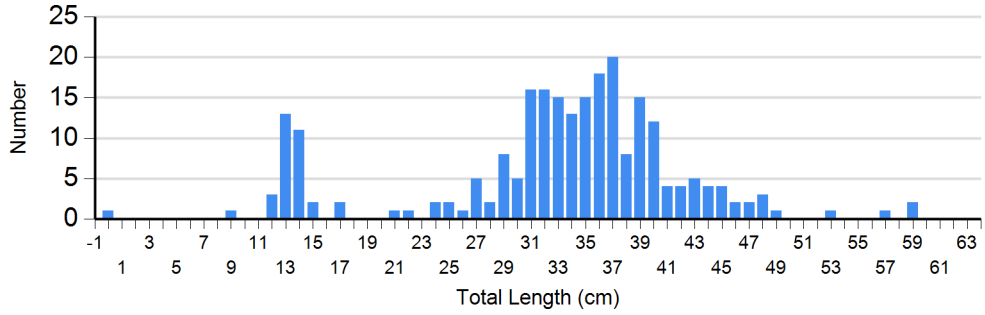
2011



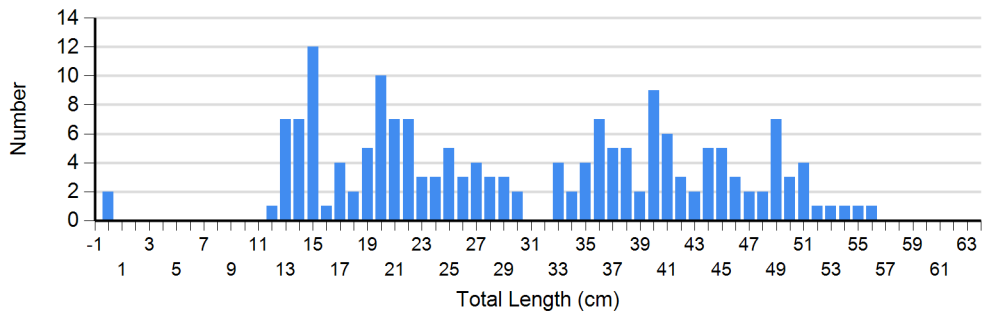
2012



2013

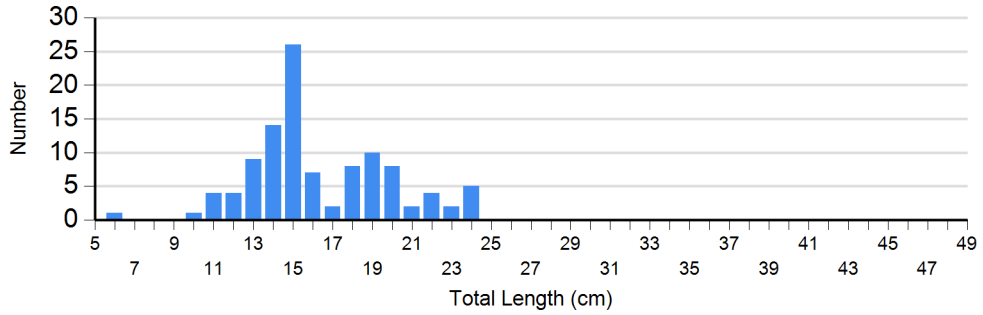


2014

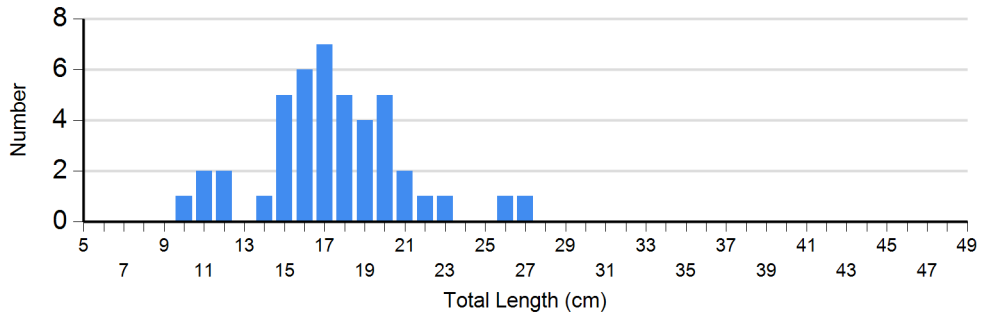


2015

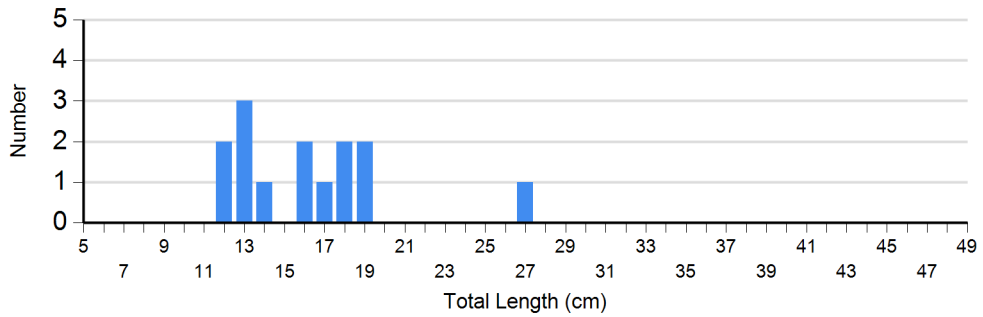
Species: Yellow Perch
Gear: std exp gill net



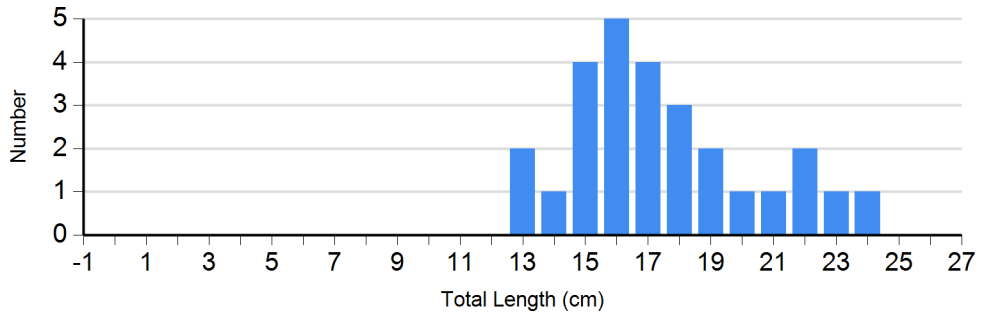
2011



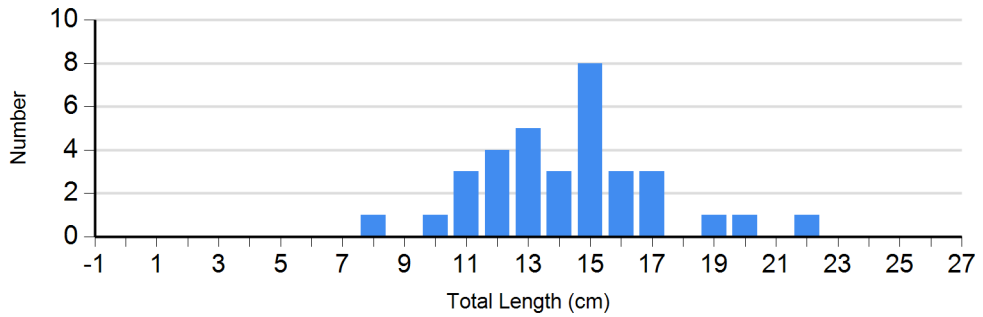
2012



2013



2014

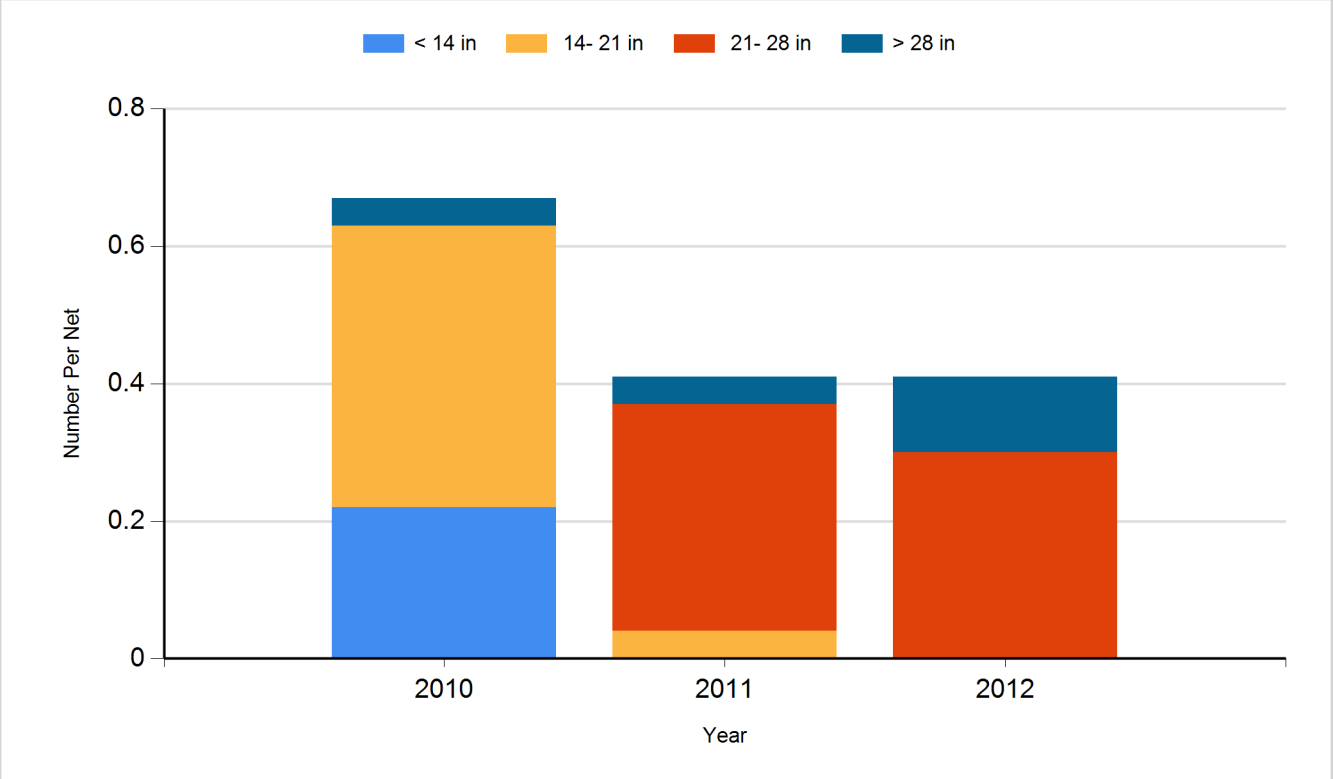


2015

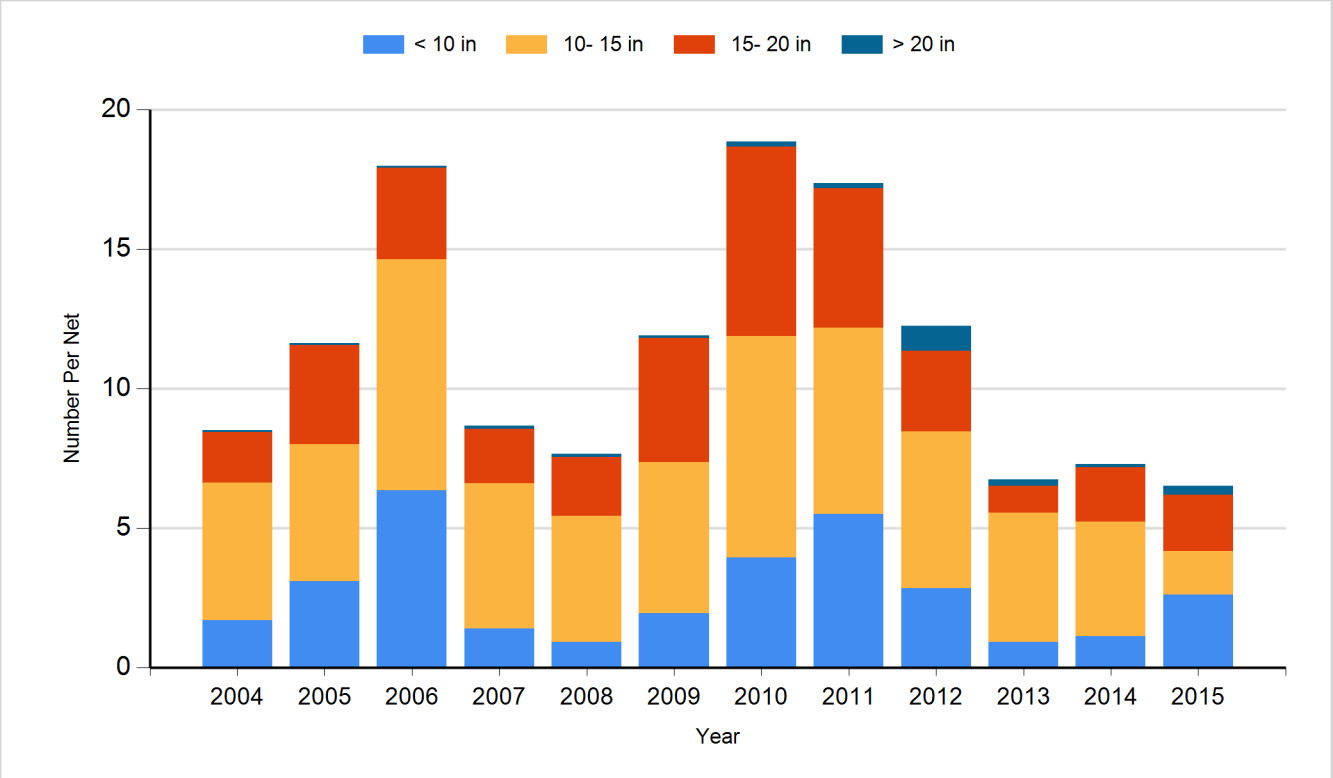
Historic Fish Sizes and Relative Abundance

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

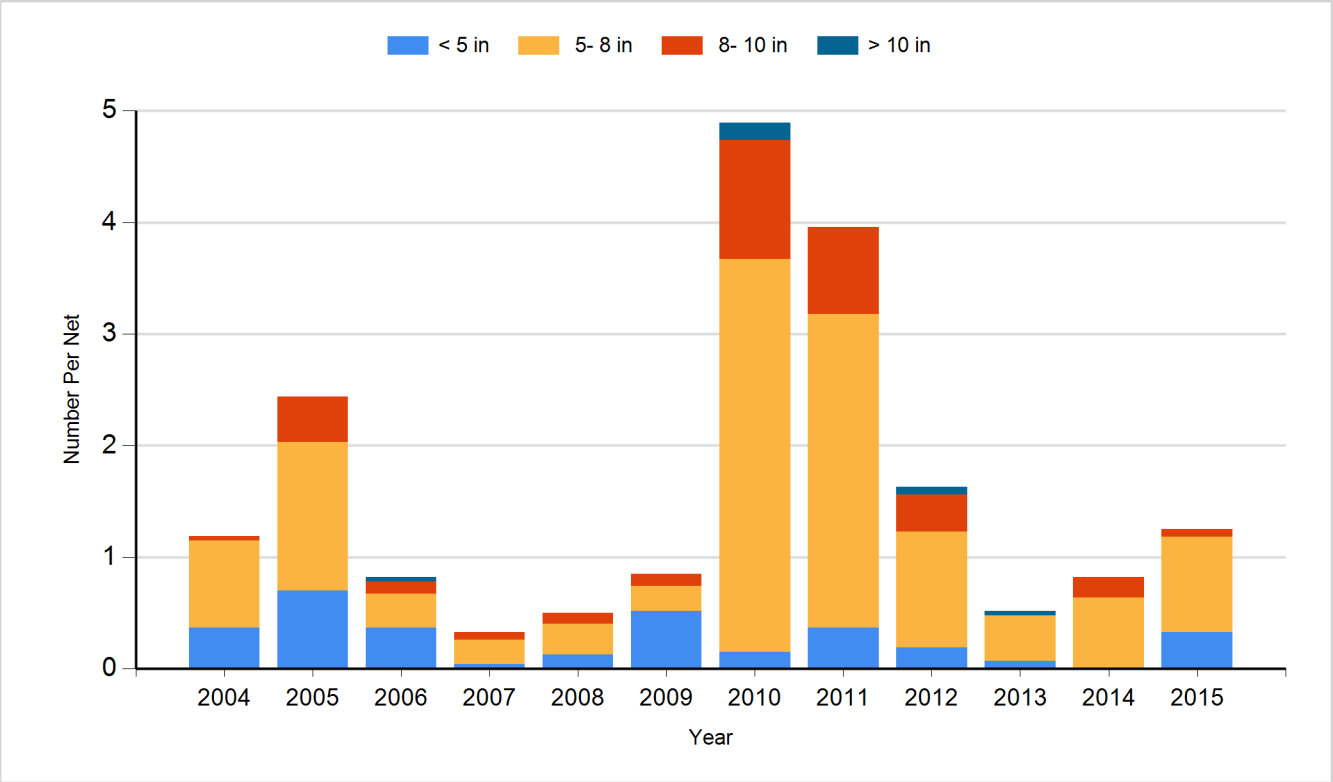
Species: Northern Pike
Gear: Gill Net



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
2014	Paddlefish	Juvenile	3,980