

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Isabel, Dewey County

GRA-Lake-613-000

2018

Lake Information

Name: Isabel **Maximum Depth:** 25 Feet
County: Dewey **Mean Depth:** 9 Feet
Legal Description: T17-R22-S16
Surface Area: 107 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 26, 2018	2 net-nights
AFS std gill net	Jun 27, 2018	2 net-nights
boat shocker (night)	Oct 01, 2018	3600 seconds
boat shocker (night)	Oct 22, 2018	3600 seconds
frame net (std 3/4 in)	Jun 26, 2018	5 net-nights
frame net (std 3/4 in)	Jun 27, 2018	5 net-nights

Common Fish Species Present

Largemouth Bass

Bluegill

Black Crappie

Walleye

Yellow Perch

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).

A statewide effort to help make netting efforts comparable to all waters sampled across the state, occurred in 2017, with a switch to American Fisheries Society gill nets. Past gill netting efforts were completed with different style/types of nets and are not comparable side by side.

- **AFS std gill net** – 80 ft experimental gill net containing eight panels (10 ft each) of varying monofilament meshes of 0.75, 1.00, 1.25, 1.50, 1.75, 2.00, 2.25 and 2.50 inches.
- **std experimental gill net for non-Missouri River waters** - 150 ft experimental gill net containing six panels (25 ft each) of varying monofilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.
- **std experimental gill net for Missouri River reservoirs** – 300 ft experimental gill net containing six panels (50 ft each) of varying multifilament meshes of 0.5, 0.75, 1.00, 1.25, 1.50 and 2.00 inches.

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

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.

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

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

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.

$$Wr = \left(\frac{W}{W_s} \right) \times 100$$

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).

Species Name	Stock		Quality		Preferred		Memorable		Trophy	
	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)	(in)	(cm)
Black Bullhead	6	15	9	23	12	30	15	38	18	46
Black Crappie	5	13	8	20	10	25	12	30	15	38
Bluegill	3	8	6	15	8	20	10	25	12	30
Brown Trout	8	20	12	30	16	40	20	50	18	46
Channel Catfish	11	28	16	41	24	61	28	71	36	91
Freshwater Drum	8	20	12	30	15	38	20	51	25	63
Lake Trout	12	30	20	50	26	65	31	80	39	100
Largemouth Bass	8	20	12	30	15	38	20	51	25	63
Muskellunge	20	51	30	76	38	97	42	107	50	127
Northern Pike	14	35	21	53	28	71	34	86	44	112
Pumpkinseed	3	8	6	15	8	20	10	25	12	30
Rainbow Trout	10	25	16	40	20	50	26	65	31	80
Rudd	6	15	10	25	12	30	15	38	19	48
Sauger	8	20	12	30	15	38	20	51	25	63
Smallmouth Bass	7	18	11	28	14	35	17	43	20	51
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
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).

* **Methods/Species that ignore stock length**

Gear	Species	Sample Size (n)	Abundance		Stock Density Indices			Condition		
			CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Black Crappie	7	1.3	0.8	80		0		98	5
	Bluegill	1	0.3	0.4	100		0		93	
	Northern Pike	8	2.0	1.2	100		88		91	3
	Walleye	3	0.8	0.8	100		67		89	5
	Yellow Perch	125	31.3	18.2	15	5	0		99	2
boat shocker (night)	Largemouth Bass	93	40.5	11.5	81	6	42	8	107	1
frame net (std 3/4 in)	Black Crappie	178	17.4	6.2	63	5	3	2	102	1
	Bluegill	92	9.2	5.4	48	7	0		101	1
	Northern Pike	8	0.8	0.4	100		50		95	1
	Walleye	1	0.0	0.0	0		0			
	Yellow Perch	98	9.8	4.9	12	5	8	4	91	3

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.

Gear	Species	CPUE										Avg
		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	
AFS std gill net	Black Crappie										1.3	1.3
	Bluegill										0.3	0.3
	Northern Pike										2.0	2.0
	Walleye										0.8	0.8
	Yellow Perch										31.3	31.3
boat shocker (night)	Largemouth Bass	39.0		27.0			13.0				40.5	29.9
	Smallmouth Bass						3.0					3.0
	Walleye			23.0			9.0					16.0
frame net (std 3/4 in)	Black Bullhead	9.9		3.8			4.8					6.2
	Black Crappie	4.3		9.3			8.0				17.4	9.8
	Bluegill	0.5		1.6			1.0				9.2	3.1
	Northern Pike	0.2		0.3			0.5				0.8	0.5
	Walleye						0.1				0.0	0.1
	Yellow Perch			0.3			0.7				9.8	3.6
std exp gill net	Black Bullhead	10.0		23.5			2.0					11.8
	Black Crappie	16.0					2.5					9.3
	Bluegill	0.5										0.5
	Northern Pike	4.5		0.5			3.0					2.7
	Walleye	0.0		0.5			5.0					1.8
	Yellow Perch	1.5		0.5			5.5					2.5

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.

Gear	Species	Index	Year											
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018		
AFS std gill net	Black Crappie	PSD												80
		PSD-P												0
		Wr												98
	Bluegill	PSD												100
		PSD-P												0
		Wr												93
	Northern Pike	PSD												100
		PSD-P												88
		Wr												91
	Walleye	PSD												100
		PSD-P												67
		Wr												89
	Yellow Perch	PSD												15
		PSD-P												0
		Wr												99
boat shocker (night)	Largemouth Bass	PSD	5		52				100				81	
		PSD-P	3		11				69				42	
		Wr	109		108				104				107	
	Walleye	PSD			64				56					
		PSD-P			0				11					
		Wr			90				85					
	frame net (std 3/4 in)	Black Crappie	PSD	9		70				85				63
			PSD-P	2		2				20				3
			Wr	114		99				97				102
Bluegill		PSD	40		31				80				48	
		PSD-P	0		0				40				0	
		Wr	119		120				107				101	
Northern Pike		PSD	100		100				100				100	
		PSD-P	100		67				40				50	
		Wr	99		93				88				95	
Walleye		PSD							100				0	
		PSD-P							100				0	

Gear	Species	Index	Year									
			2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
frame net (std 3/4 in)	Walleye	Wr							80			
	Yellow Perch	PSD			0				43			12
		PSD-P			0				29			8
		Wr			86				87			91
std exp gill net	Black Crappie	PSD	3						100			
		PSD-P	0						40			
		Wr	126						94			
	Bluegill	PSD	0									
		PSD-P	0									
		Wr	132									
	Northern Pike	PSD	100		100					100		
		PSD-P	33		0					83		
		Wr	97		93					84		
	Walleye	PSD	0		0					90		
		PSD-P	0		0					50		
		Wr								91		
	Yellow Perch	PSD	100		0					55		
		PSD-P	67		0					0		
		Wr	91							91		

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						
2017	1	1	104															
2017	1	4	100 (6.1)															
2016	2	1	100	100														
2016	2	13	102 (2.2)	128 (1.5)														
2015	3	5	108 (6.2)	145 (6.5)	168 (7.6)													
2014	4	1	123	164	182	193												
2014	4	3	104 (.8)	142 (2.3)	164 (1.1)	183 (1.1)												
2013	5	2	114 (7.1)	153 (15.2)	168 (15)	189 (8)	207 (4.8)											
2013	5	4	109 (5.4)	136 (8.5)	165 (9.6)	189 (8.1)	202 (7.7)											
2012	6	3	115 (7.8)	139 (2.7)	162 (3)	180 (2.2)	195 (2.7)	210 (2.3)										
2011	7	4	120 (5)	148 (10.3)	167 (13.5)	181 (15.7)	199 (14.2)	210 (14.1)	221 (13.9)									
2010	8	4	108 (7)	135 (10.7)	154 (12.7)	172 (11.7)	191 (9.9)	206 (9.5)	217 (9.9)	229 (11.8)								
2009	9	3	115 (2)	143 (4)	159 (5)	171 (6.4)	183 (4.5)	198 (3.5)	210 (3.2)	222 (.8)	235 (3.2)							
2008	10	1	102	115	135	155	170	181	190	202	211	227						
2008	10	1	112	143	155	168	186	197	208	218	226	235						
Weighted Mean		50	108	137	163	179	194	204	214	222	228	231						
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20						
2017	1	1																
2017	1	4																
2016	2	1																
2016	2	13																

2015	3	5
2014	4	1
2014	4	3
2013	5	2
2013	5	4
2012	6	3
2011	7	4
2010	8	4
2009	9	3
2008	10	1
2008	10	1
Weighted Mean		50

Species: Bluegill

Year Class	Age	N	Mean back-calculated length (SE) at age											
			1	2	3	4	5	6	7	8	9	10		
2016	2	12	59 (3.1)	91 (4.8)										
2015	3	4	68 (2.3)	104 (5.8)	124 (1.3)									
2014	4	1	68	95	118	139								
2014	4	10	69 (2.6)	95 (2.9)	118 (3)	139 (3.2)								
2013	5	2	69 (4.5)	103 (.9)	127 (1.3)	144 (3.6)	174 (1.8)							
2012	6	6	69 (2.3)	90 (4.2)	115 (4.1)	134 (4.5)	148 (4.2)	161 (3.4)						
2011	7	5	65 (2.8)	88 (4.1)	114 (4.8)	135 (4.9)	151 (6.1)	164 (5.1)	174 (4.4)					
Weighted Mean		40	65	93	118	137	153	162	174					

Year Class	Age	N	Mean back-calculated length (SE) at age											
			11	12	13	14	15	16	17	18	19	20		
2016	2	12												
2015	3	4												
2014	4	1												
2014	4	10												
2013	5	2												
2012	6	6												
2011	7	5												
Weighted Mean		40												

Species: Largemouth Bass

Year Class	Age	N	Mean back-calculated length (SE) at age											
			1	2	3	4	5	6	7	8	9	10		
2017	1	4	119 (6.8)											
2016	2	3	123 (15.3)	164 (9.7)										
2015	3	9	128 (3.4)	168 (4.7)	205 (3.3)									
2014	4	4	124 (4.5)	171 (1.3)	215 (8.2)	250 (9.2)								

2013	5	4	129 (4.7)	176 (7.4)	226 (7.7)	265 (8.2)	293 (10.2)						
2012	6	5	114 (6.1)	170 (4.6)	208 (8)	242 (11.1)	277 (10.1)	308 (7.1)					
2011	7	6	119 (4.2)	179 (6.1)	231 (6.1)	275 (5.5)	305 (5.4)	335 (3.8)	366 (5.8)				
2010	8	4	115 (10.4)	155 (13.2)	194 (16.8)	231 (21.4)	272 (20.7)	300 (26.8)	330 (27.9)	353 (26.8)			
2009	9	2	91 (4.9)	148 (5.4)	187 (13.9)	238 (17.5)	281 (5.5)	314 (4.4)	348 (6.3)	381 (10.6)	408 (9.9)		
2008	10	3	122 (2.5)	163 (12.6)	199 (13.5)	230 (12.5)	271 (11)	307 (3.9)	335 (4.8)	373 (10.2)	404 (7.9)	434 (5.8)	
2007	11	3	99 (5.6)	135 (6.1)	169 (6.5)	208 (6.7)	238 (4.3)	268 (4.8)	298 (5.1)	331 (8.3)	363 (1.6)	387 (.6)	
2005	13	1	87	138	183	208	250	282	304	333	367	400	
2000	18	1	128	128	167	167	190	190	212	212	244	244	
Weighted Mean		49	119	164	206	243	276	303	331	345	373	388	

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2017	1	4										
2016	2	3										
2015	3	9										
2014	4	4										
2013	5	4										
2012	6	5										
2011	7	6										
2010	8	4										
2009	9	2										
2008	10	3										
2007	11	3	414 (2.8)									
2005	13	1	414	433	447							
2000	18	1	268	268	297	297	318	318	340	340		
Weighted Mean		49	385	351	372	297	318	318	340	340		

Species: Yellow Perch

Year Class	Age	N	Mean back-calculated length (SE) at age											
			1	2	3	4	5	6	7	8	9	10		
2017	1	11	119 (1.4)											
2016	2	12	117 (2.2)	143 (3.9)										
2015	3	3	96 (.5)	134 (3.1)	161 (8.6)									
2014	4	16	106 (2.5)	141 (2.2)	165 (3)	184 (3.2)								
2013	5	7	116 (4.5)	149 (5.4)	173 (6.9)	191 (8.3)	206 (8.5)							
2012	6	1	111	146	165	196	219	239						
2012	6	3	125 (5.5)	155 (7.6)	177 (7.4)	199 (6.2)	215 (5.7)	227 (6.5)						
Weighted Mean		53	113	144	168	188	210	230						

Year Class	Age	N	11	12	13	14	15	16	17	18	19	20
2017	1	11										
2016	2	12										
2015	3	3										
2014	4	16										
2013	5	7										
2012	6	1										
2012	6	3										
Weighted Mean		53										

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+
2018	178	126 (6)	145 (51)	198 (18)	203 (23)	209 (29)	219 (15)	222 (16)	222 (15)	246 (6)	241 (2)
2014	81		137 (3)	193 (11)	217 (36)	244 (19)	252 (5)	262 (6)	262 (1)		
2011	94		150 (9)	194 (24)	227 (56)	264 (5)					
2009	40		178 (35)	173 (3)	248 (1)				352 (1)		

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	92		116 (22)	134 (14)	154 (27)	186 (6)	174 (14)	182 (11)			
2014	10			126 (1)	126 (1)	172 (1)	172 (1)	186 (2)	204 (2)	211 (2)	
2011	16		96 (11)		170 (4)	173 (1)					

Species: Largemouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	73	166 (5)	194 (3)	243 (10)	292 (5)	325 (10)	342 (15)	403 (8)	378 (6)	436 (3)	439 (10)
2014	14	133 (1)				376 (5)	387 (2)	403 (5)		533 (1)	
2011	31	193 (5)	241 (4)	215 (1)	312 (16)	314 (2)	400 (2)		448 (1)		
2009	55	175 (1)	210 (53)					405 (1)			

Species: Walleye

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2014	12	232 (3)			400 (4)		543 (5)				

Species: Yellow Perch

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2018	125	146 (56)	156 (29)	179 (7)	196 (22)	216 (8)	237 (3)				
2014	11			162 (4)		227 (6)	244 (1)				

Fish Condition

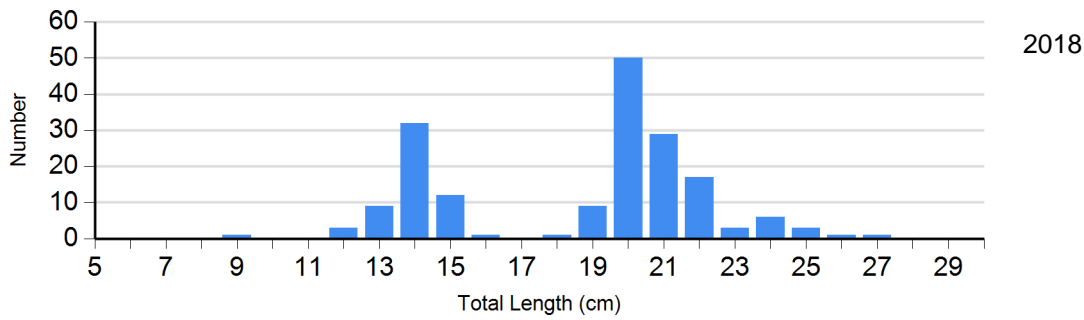
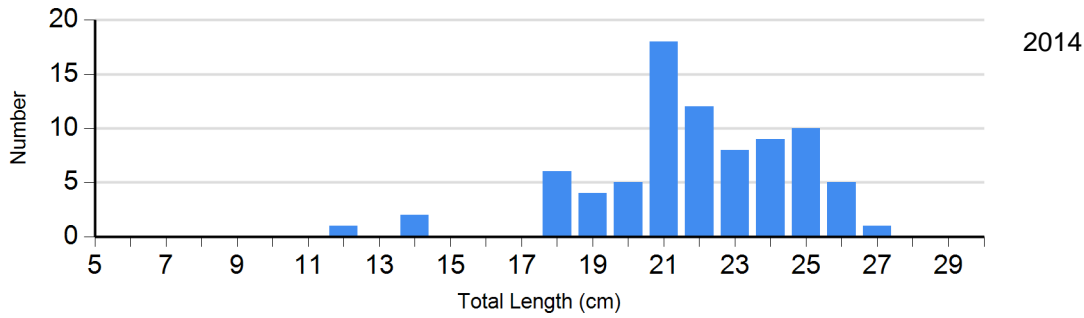
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2014	12	102 (1.6)	52	97 (1.0)	16	94 (1.8)	0	
	2018	64	110 (0.9)	105	99 (0.7)	5	86 (1.0)	0	
Bluegill Frame Net	2014	2	112 (4.2)	4	110 (3.6)	4	101 (5.6)	0	
	2018	48	104 (0.9)	44	99 (1.1)	0		0	
Largemouth Bass Electro Fishing	2014	0		4	107 (6.6)	8	103 (3.0)	1	107
	2018	15	105 (1.7)	32	105 (1.4)	34	109 (1.6)	0	
Northern Pike Gill Net	2014	0		1	81	5	85 (1.6)	0	
	2018	0		1	80	4	92 (3.4)	3	92 (3.1)
Walleye Gill Net	2014	1	101	4	92 (0.7)	5	88 (3.1)	0	
	2018	0		1	82	1	89	1	96
Yellow Perch Gill Net	2014	5	87 (5.4)	6	95 (2.5)	0		0	
	2018	106	100 (2.0)	19	92 (1.1)	0		0	

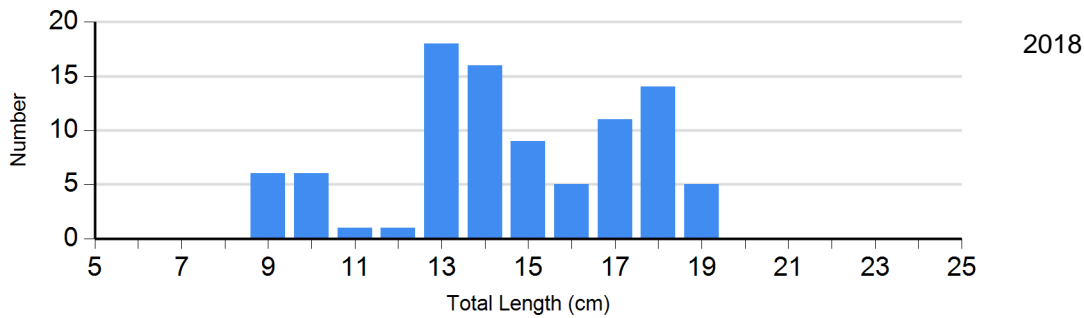
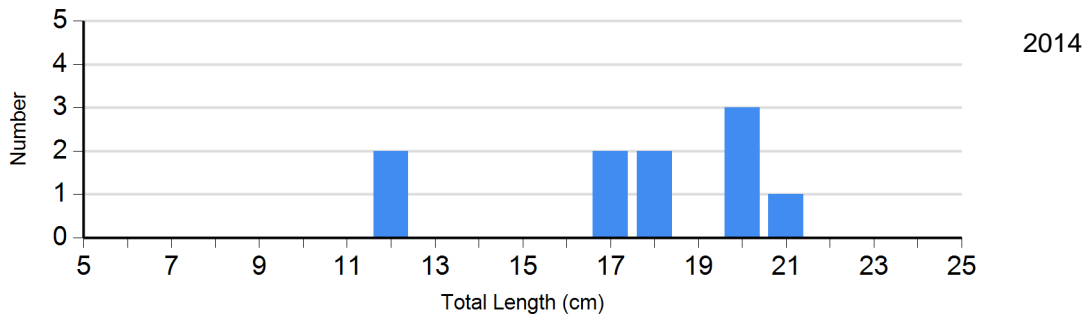
Length Frequency Distribution

Length frequency histogram of species sampled by year.

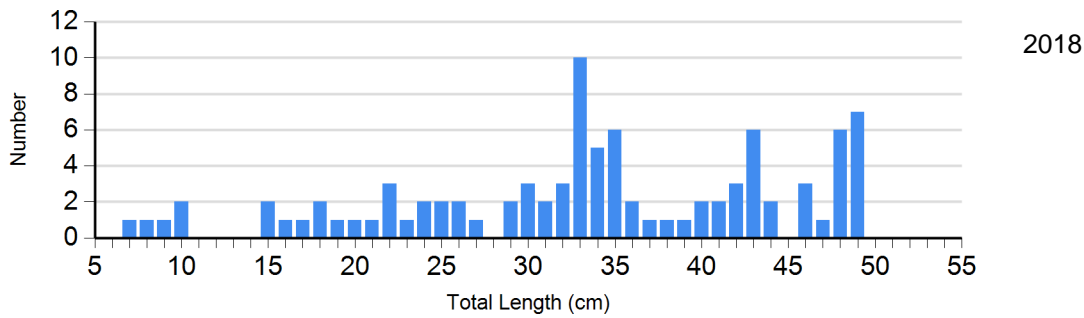
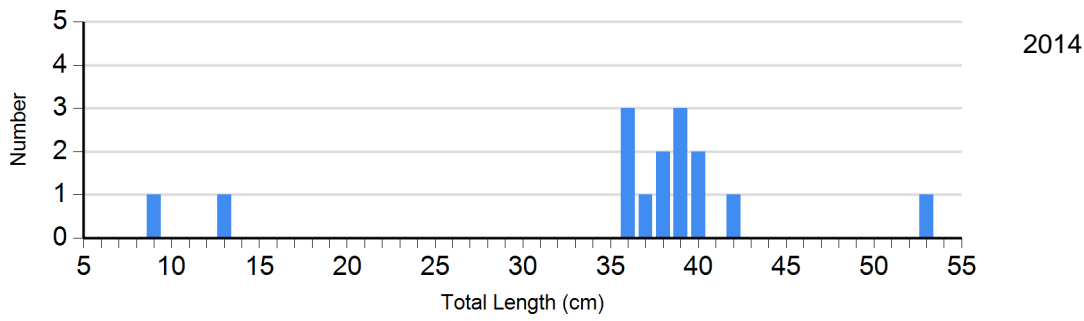
Species: Black Crappie
Gear: frame net (std 3/4 in)



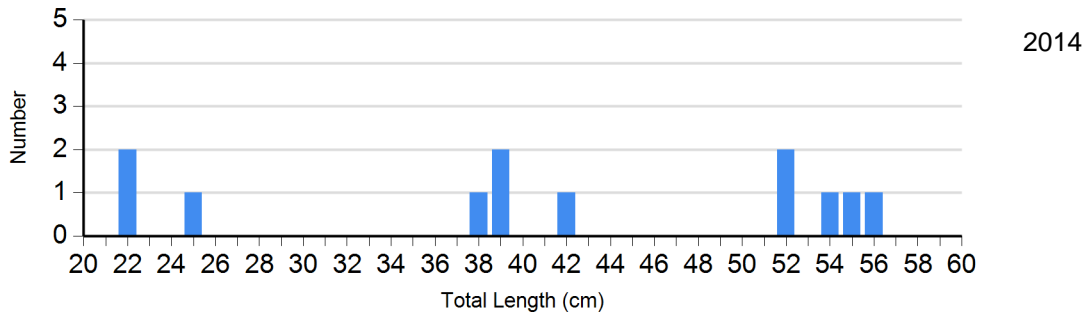
Species: Bluegill
Gear: frame net (std 3/4 in)



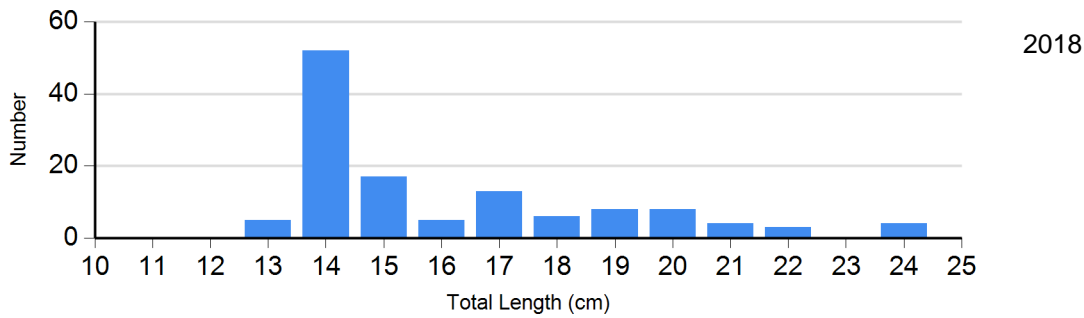
Species: Largemouth Bass
 Gear: boat shocker (night)



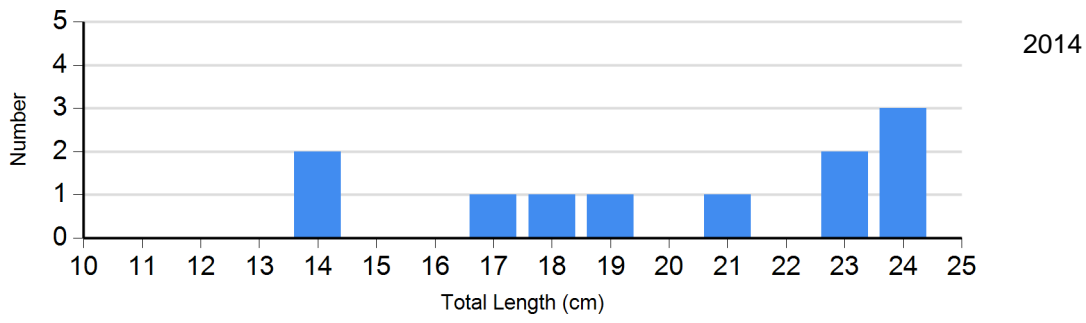
Species: Walleye
 Gear: std exp gill net



Species: Yellow Perch
 Gear: AFS std gill net



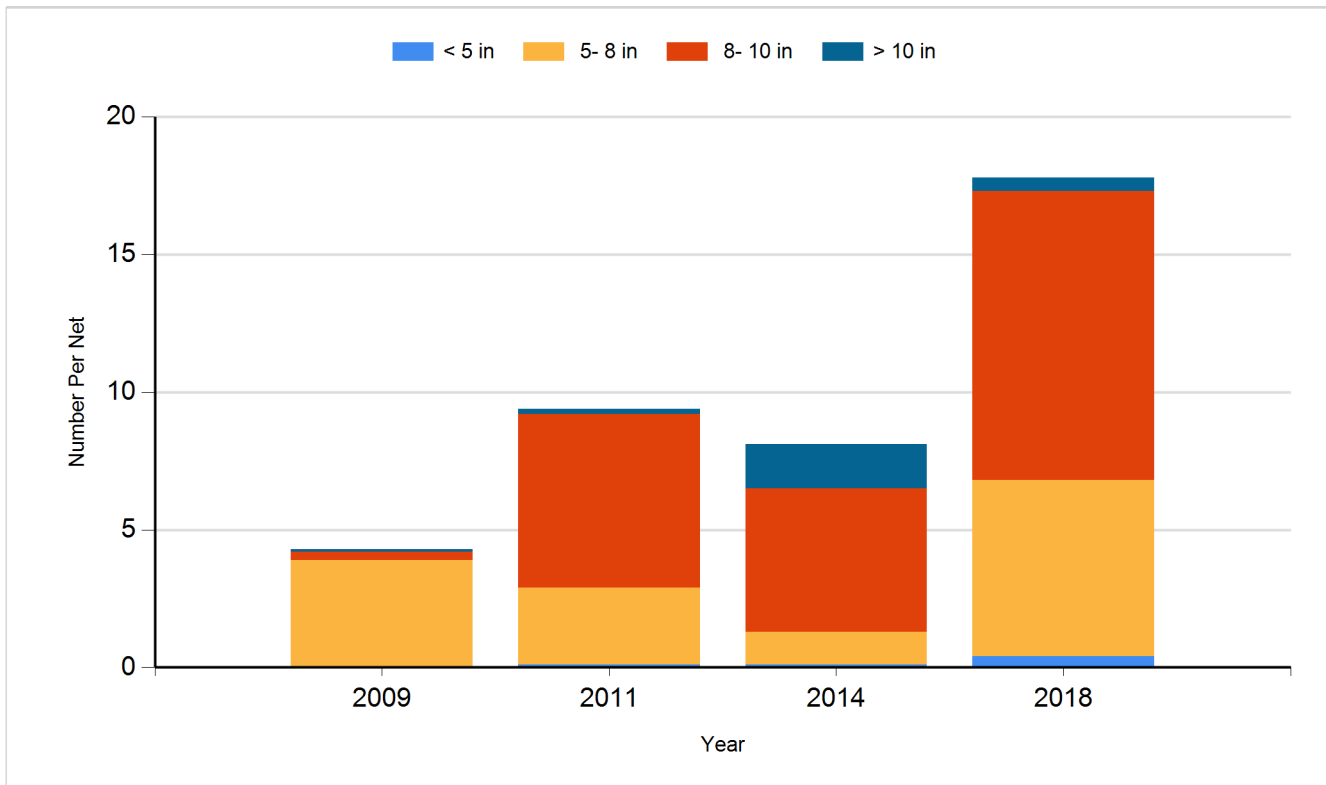
Species: Yellow Perch
Gear: std exp gill net



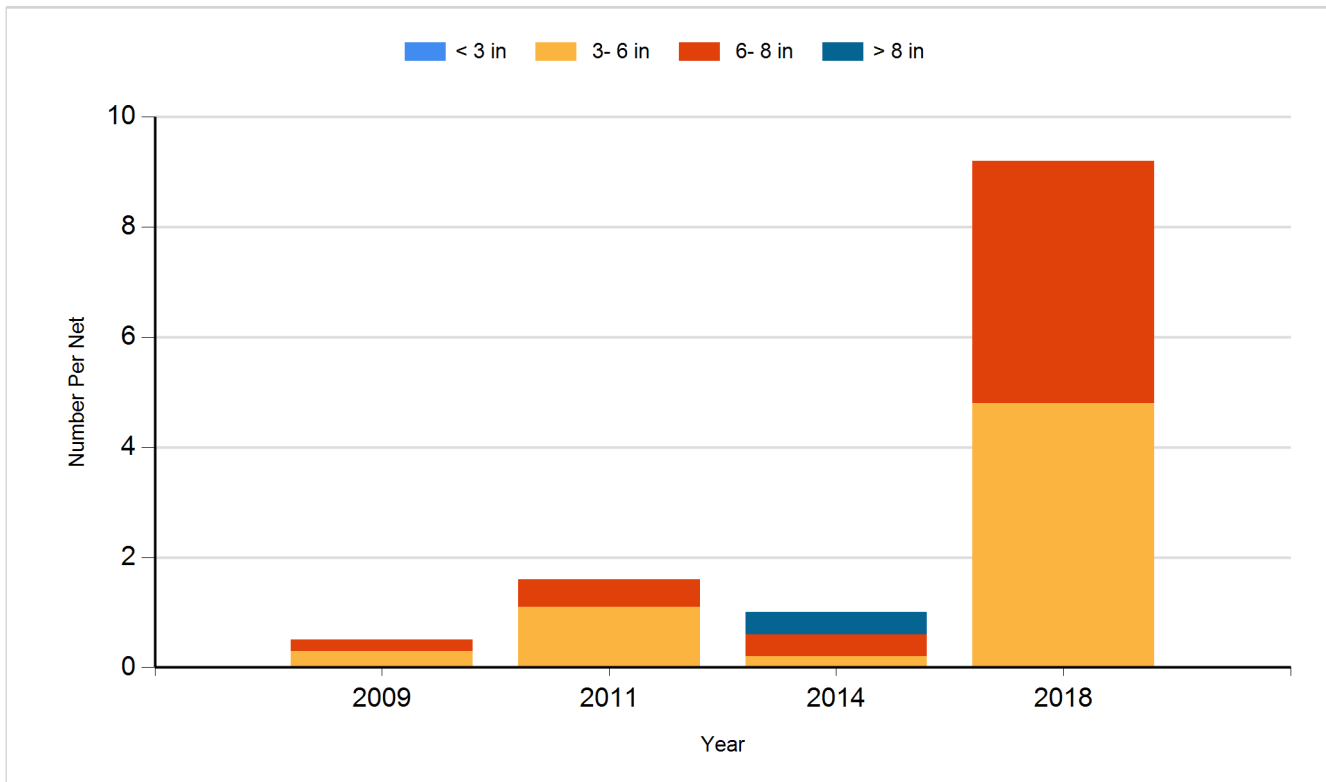
Historic Fish Sizes and Relative Abundance

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

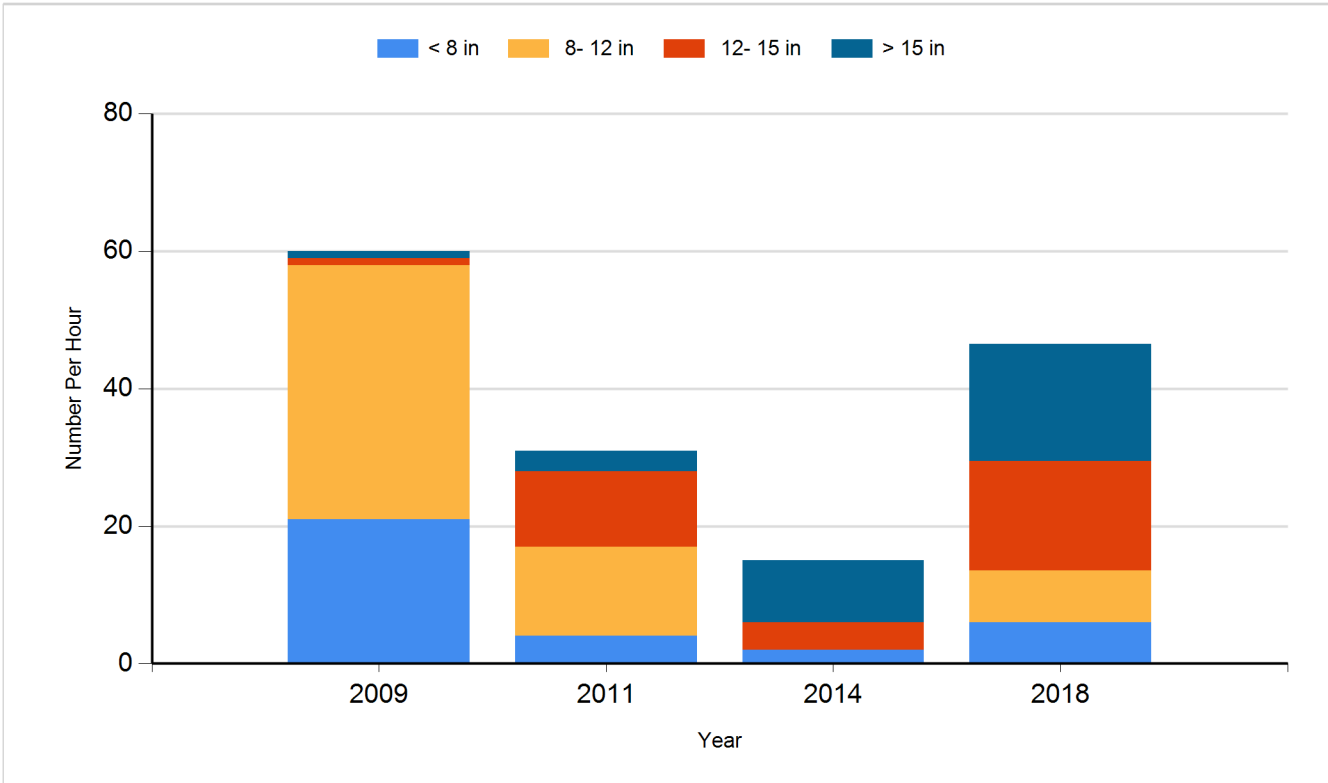
Species: Black Crappie
Gear: frame net (std 3/4 in)



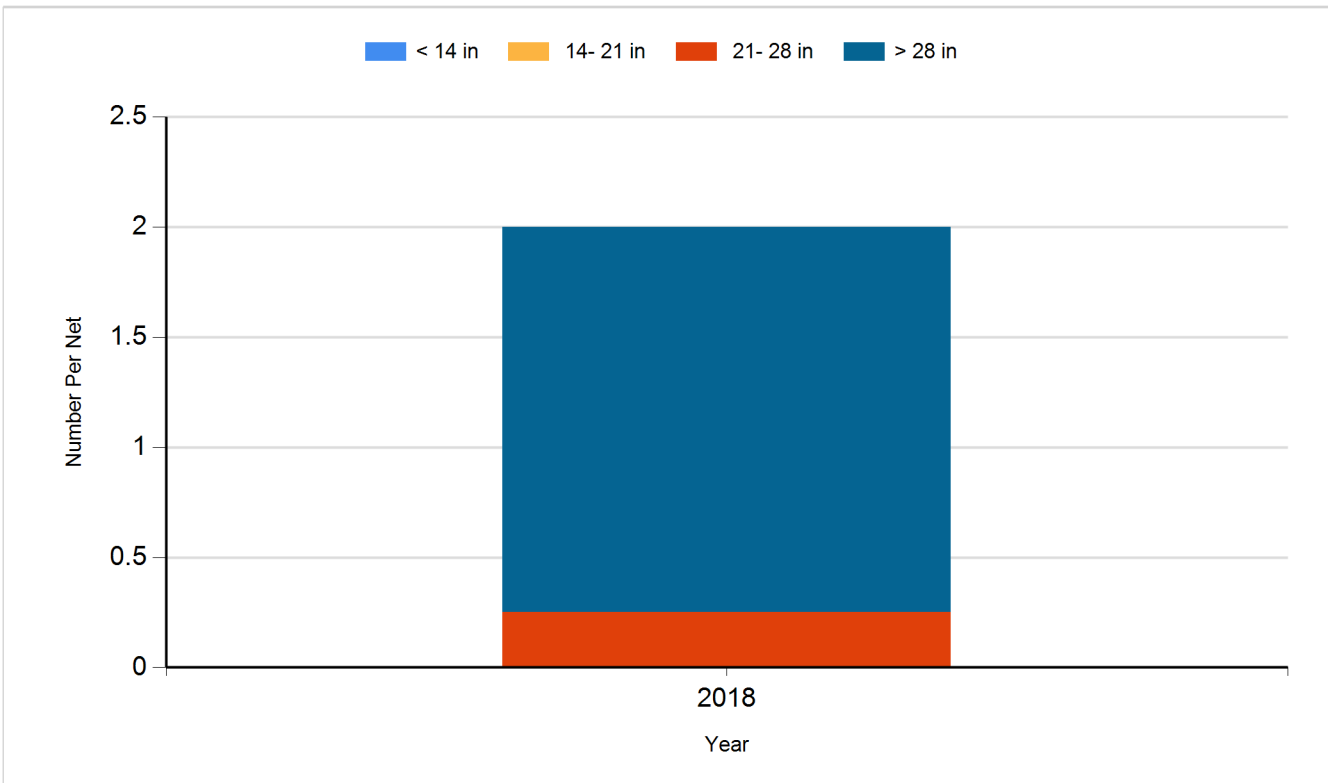
Species: Bluegill
Gear: frame net (std 3/4 in)



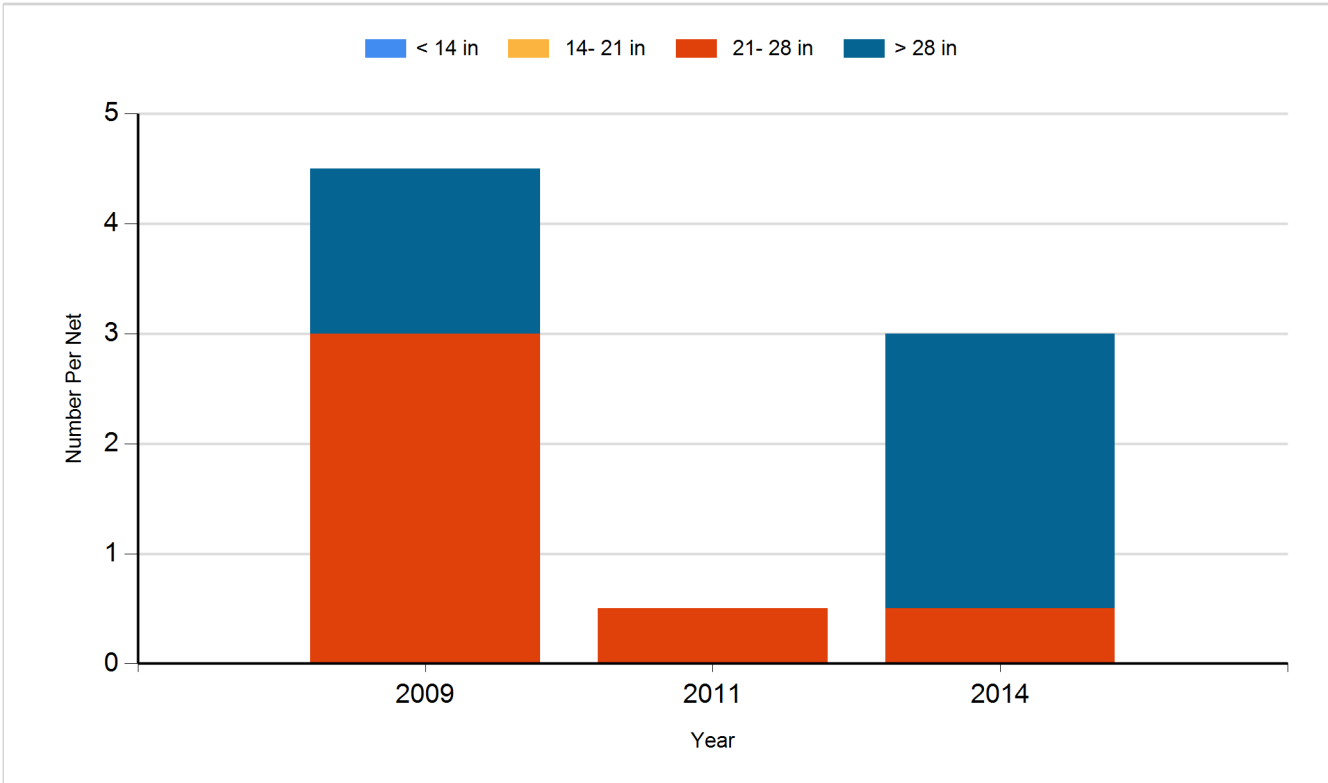
Species: Largemouth Bass
Gear: boat shocker (night)



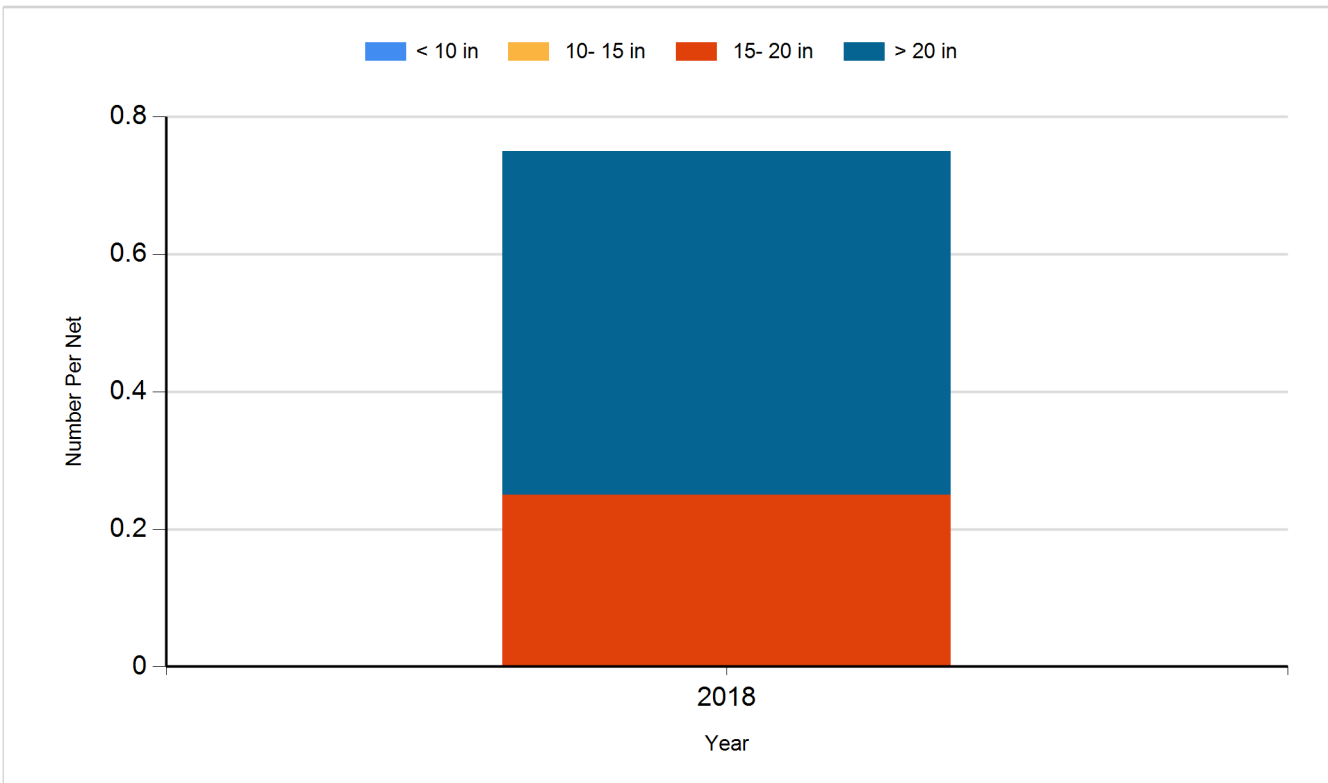
Species: Northern Pike
Gear: AFS std gill net



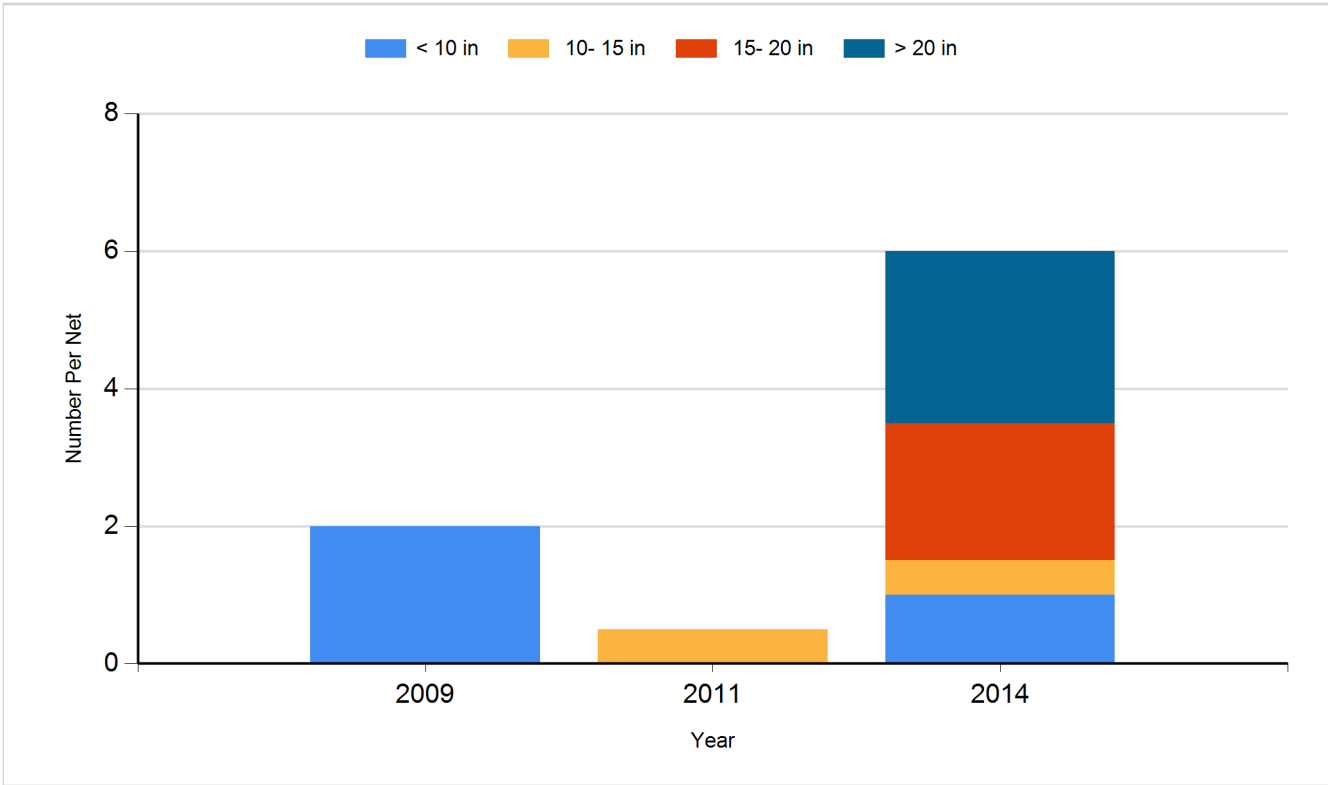
Species: Northern Pike
Gear: std exp gill net



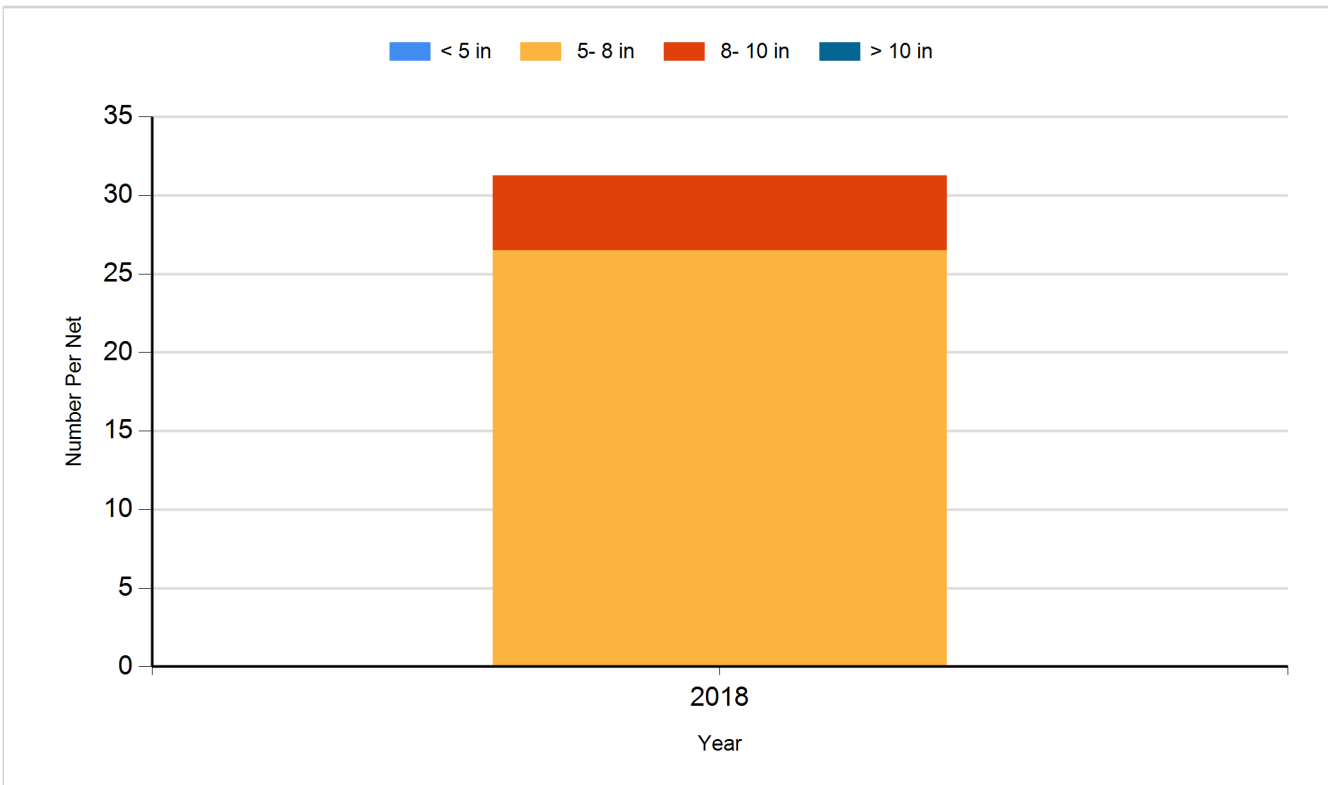
Species: Walleye
Gear: AFS std gill net



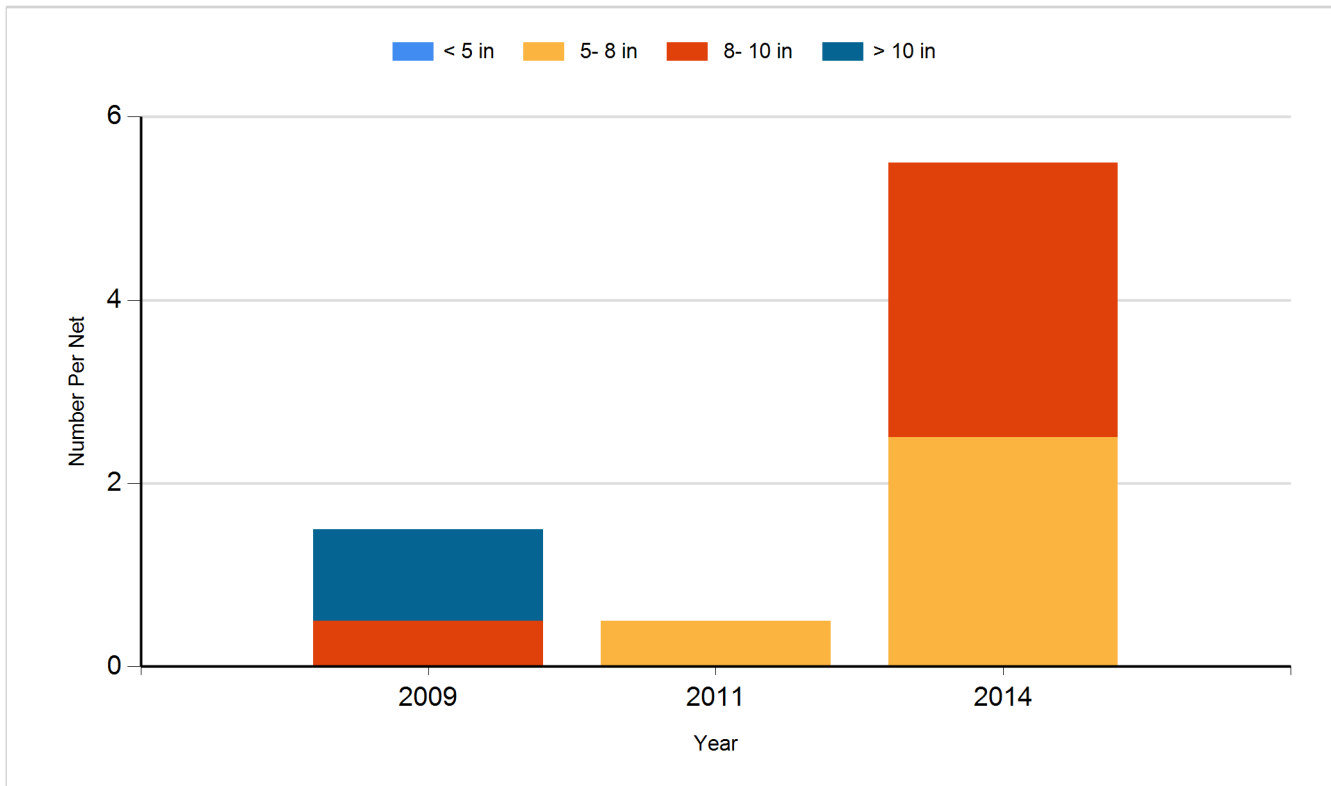
Species: Walleye
Gear: std exp gill net



Species: Yellow Perch
Gear: AFS std gill net



Species: Yellow Perch
Gear: std exp gill net



Fish Stocking

Number of fish stocked by year, species, and size.

Year	Species	Size	Number
2008	Walleye	Large Fingerling	910
2010	Walleye	Small Fingerling	8,100
2013	Walleye	Large Fingerling	688
2015	Walleye	Large Fingerling	540
2017	Walleye	Large Fingerling	2,800