

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Isabel, Dewey County

GRA-Lake-613-000

2020

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
boat shocker (night)	Sep 15, 2020	3600 seconds

Common Fish Species Present

Walleye

Largemouth Bass

Bluegill

Black Crappie

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
boat shocker (night)	Largemouth Bass	73	73.0	12.0	71	8	41	8	106	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.

* Methods/Species that ignore stock length

Gear	Species	CPUE										Avg
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
AFS std gill net	Black Crappie								1.3			1.30
	Bluegill								0.3			0.30
	Northern Pike								2.0			2.00
	Walleye								0.8			0.80
	Yellow Perch								31.3			31.30
boat shocker (night)	Largemouth Bass	27.0			13.0				39.5	35.5	73.0	37.60
	Smallmouth Bass	0.0			3.0				0.0	0.0	0.0	0.60
	Walleye*	23.0			9.0				0.0	0.0	0.0	6.40
frame net (std 3/4 in)	Black Bullhead	3.8			4.8				0.0			2.87
	Black Crappie	9.3			8.0				17.4			11.57
	Bluegill	1.6			1.0				9.2			3.93
	Northern Pike	0.3			0.5				0.8			0.53
	Walleye	0.0			0.1				0.0			0.03
	Yellow Perch	0.3			0.7				9.8			3.60
std exp gill net	Black Bullhead	23.5			2.0							12.75
	Black Crappie	0.0			2.5							1.25
	Bluegill	0.0			0.0							0.00
	Northern Pike	0.5			3.0							1.75
	Walleye	0.5			5.0							2.75
	Yellow Perch	0.5			5.5							3.00

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											
			2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
AFS std gill net	Black Crappie	PSD									80			
		PSD-P									0			
		Wr									98			
	Bluegill	PSD										100		
		PSD-P										0		
		Wr										93		
	Walleye	PSD										100		
		PSD-P										67		
		Wr										89		
boat shocker (night)	Largemouth Bass	PSD	52			100					81	75	71	
		PSD-P	11			69					43	46	41	
		Wr	108			104					107	105	106	
	Walleye	PSD	64			56								
		PSD-P	0			11								
		Wr	90			85								
	frame net (std 3/4 in)	Black Crappie	PSD	70			85					63		
			PSD-P	2			20					3		
			Wr	99			97					102		
Bluegill		PSD	31			80					48			
		PSD-P	0			40					0			
		Wr	120			107					101			
Walleye		PSD				100					0			
		PSD-P				100					0			
		Wr				80								
std exp gill net	Black Crappie	PSD				100								
		PSD-P				40								
		Wr				94								
	Walleye	PSD	0			90								
		PSD-P	0			50								
		Wr				91								

Back-Calculated Lengths

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

Species: Largemouth Bass

Year Class	Age	N	Mean back-calculated length (SE) at age											
			1	2	3	4	5	6	7	8	9	10		
2019	1	5	136 (3.4)											
2018	2	9	176 (6.7)	221 (5.5)										
2017	3	5	165 (4.5)	239 (8.5)	276 (8.9)									
2016	4	7	152 (7.9)	230 (6)	268 (8.5)	303 (6)								
2015	5	6	162 (4.2)	219 (9.2)	262 (3)	299 (3.9)	325 (3.5)							
2014	6	9	166 (6.8)	226 (7.2)	262 (7.1)	296 (5.3)	324 (5.2)	350 (5.6)						
2013	7	1	163	195	231	266	313	345	370					
2012	8	7	163 (5)	213 (11)	251 (8.1)	292 (5)	319 (5.7)	348 (7.4)	374 (7.9)	390 (6.6)				
2011	9	9	184 (6.1)	231 (6.9)	274 (9.1)	303 (6.5)	328 (6.3)	351 (7.6)	373 (7.9)	394 (7.5)	412 (7.6)			
2010	10	2	155 (5.9)	206 (13.4)	235 (11.9)	264 (13.3)	296 (25.2)	324 (27)	366 (5.5)	390 (3.3)	414 (1.3)	431 (2.4)		
2009	11	7	164 (10.2)	205 (12)	253 (10)	289 (10.1)	318 (10.9)	352 (8.8)	382 (7)	408 (6.1)	432 (5.7)	454 (4.8)		
2008	12	2	148 (3.4)	201 (1.2)	249 (19.6)	284 (4.6)	307 (8)	363 (15.4)	391 (14.4)	413 (11.4)	432 (13.8)	453 (16.9)		
Weighted Mean		69	164	221	261	295	321	349	376	398	421	450		
Year Class	Age	N	11	12	13	14	15	16	17	18	19	20		
2019	1	5												
2018	2	9												
2017	3	5												
2016	4	7												
2015	5	6												
2014	6	9												
2013	7	1												

2012	8	7		
2011	9	9		
2010	10	2		
2009	11	7	466 (3.3)	
2008	12	2	474 (13.4)	492 (13.3)
Weighted Mean		69	468	492

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)					

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+
2020	73	204 (8)	251 (10)	296 (5)	325 (7)	340 (6)	368 (9)	388 (1)	401 (7)	427 (9)	473 (11)
2018	71	166 (5)	194 (3)	243 (10)	292 (5)	325 (10)	342 (15)	403 (8)	385 (5)	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)		

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)				

Fish Condition

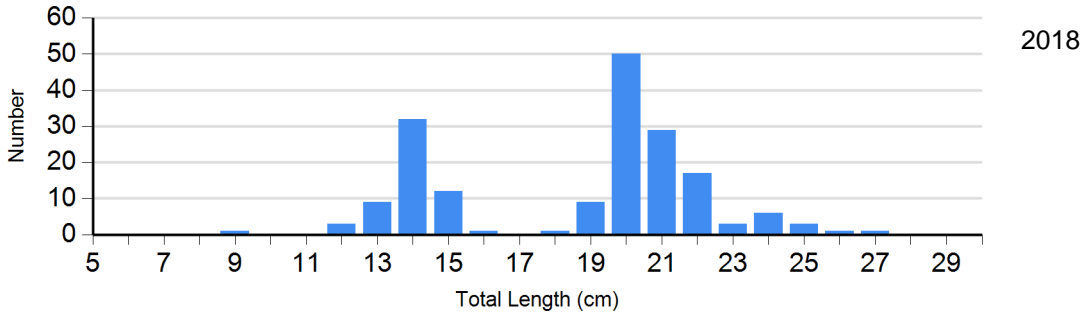
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

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	2018	64	110 (0.9)	105	99 (0.7)	5	86 (1.0)	0	
Bluegill Frame Net	2018	48	104 (0.9)	44	99 (1.1)	0		0	
Largemouth Bass Electro Fishing	2018	15	105 (1.7)	30	105 (1.4)	34	109 (1.6)	0	
	2019	18	103 (3.2)	20	107 (3.1)	30	105 (1.5)	3	108 (6.1)
	2020	21	106 (2.1)	22	104 (2.2)	29	107 (3.8)	1	114
Walleye Gill Net	2018	0		1	82	1	89	1	96

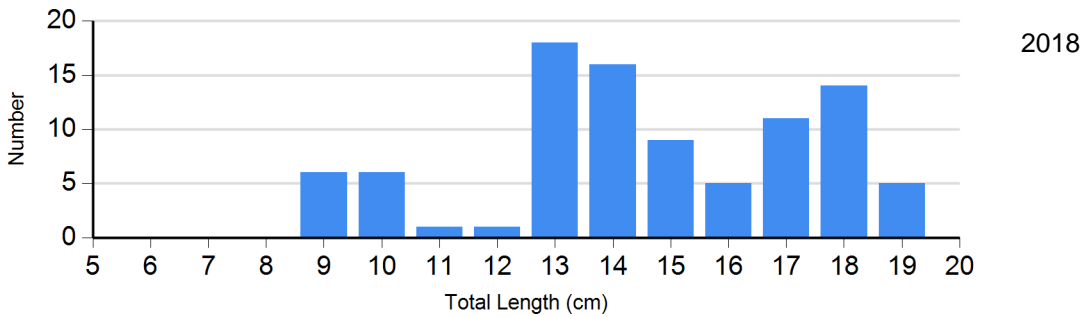
Length Frequency Distribution

Length frequency histogram of species sampled by year.

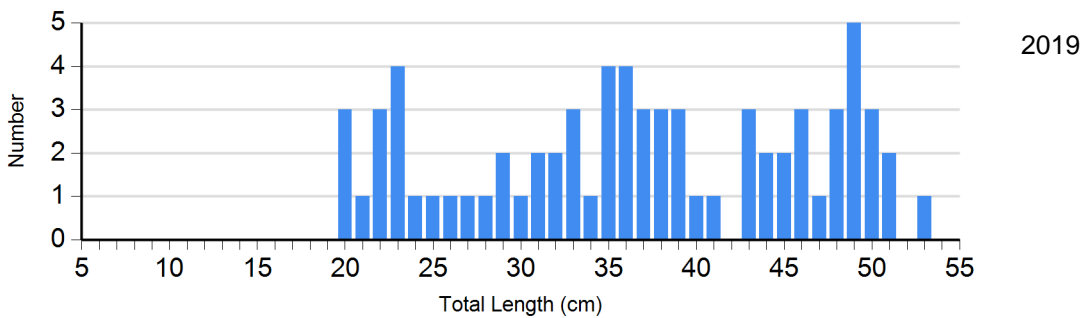
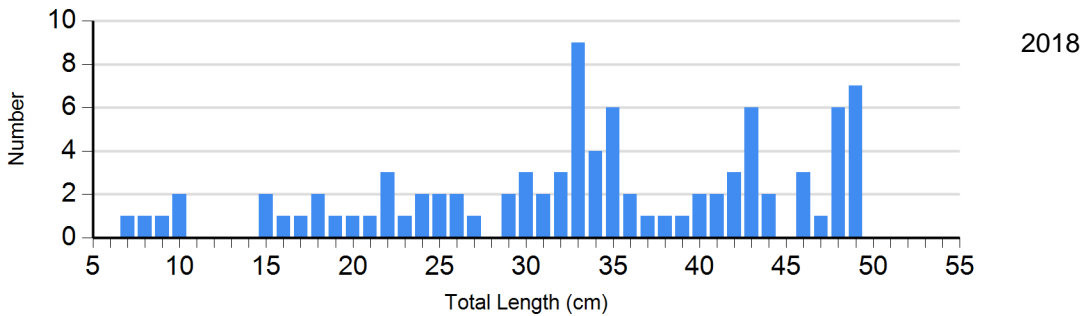
Species: Black Crappie
Gear: frame net (std 3/4 in)

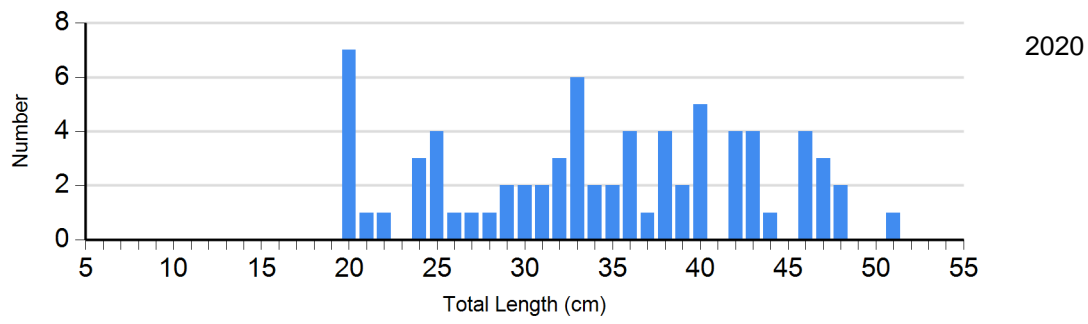


Species: Bluegill
Gear: frame net (std 3/4 in)



Species: Largemouth Bass
Gear: boat shocker (night)

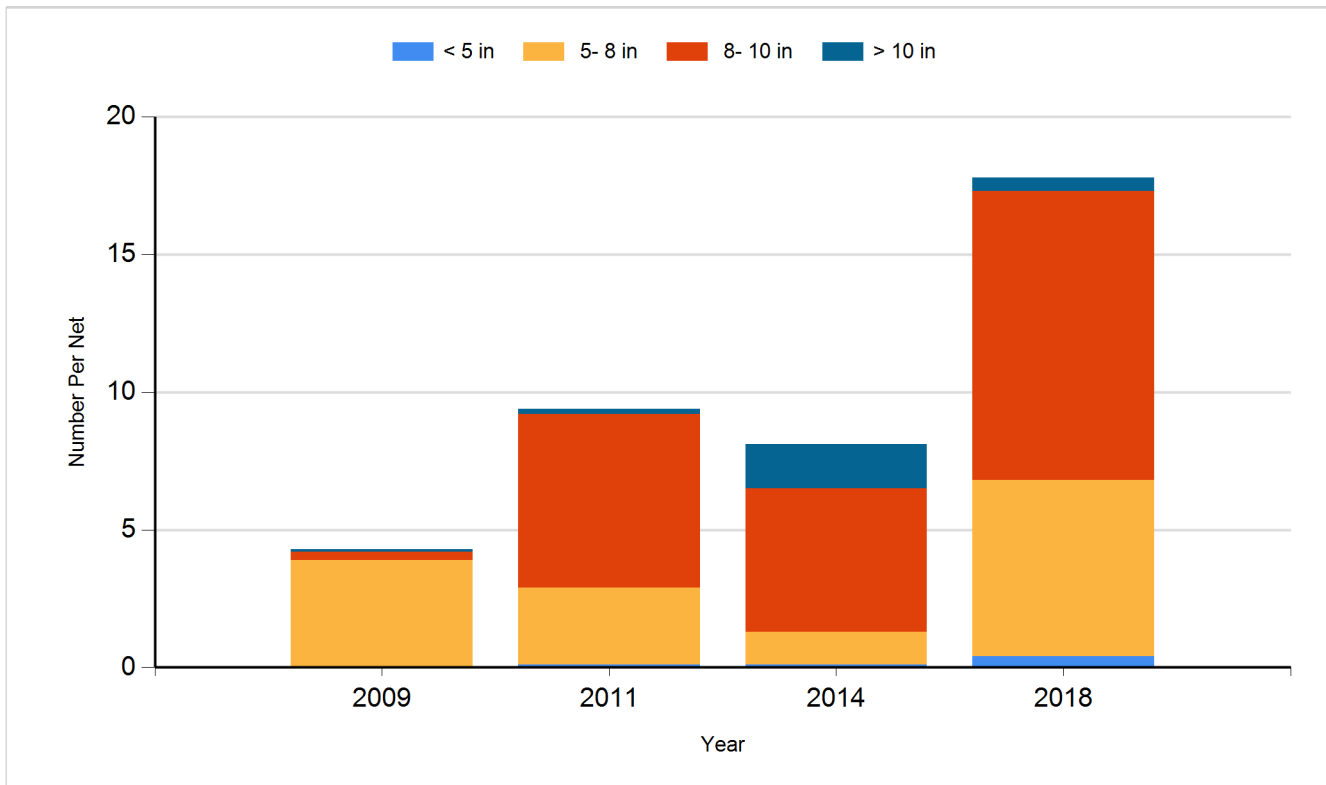




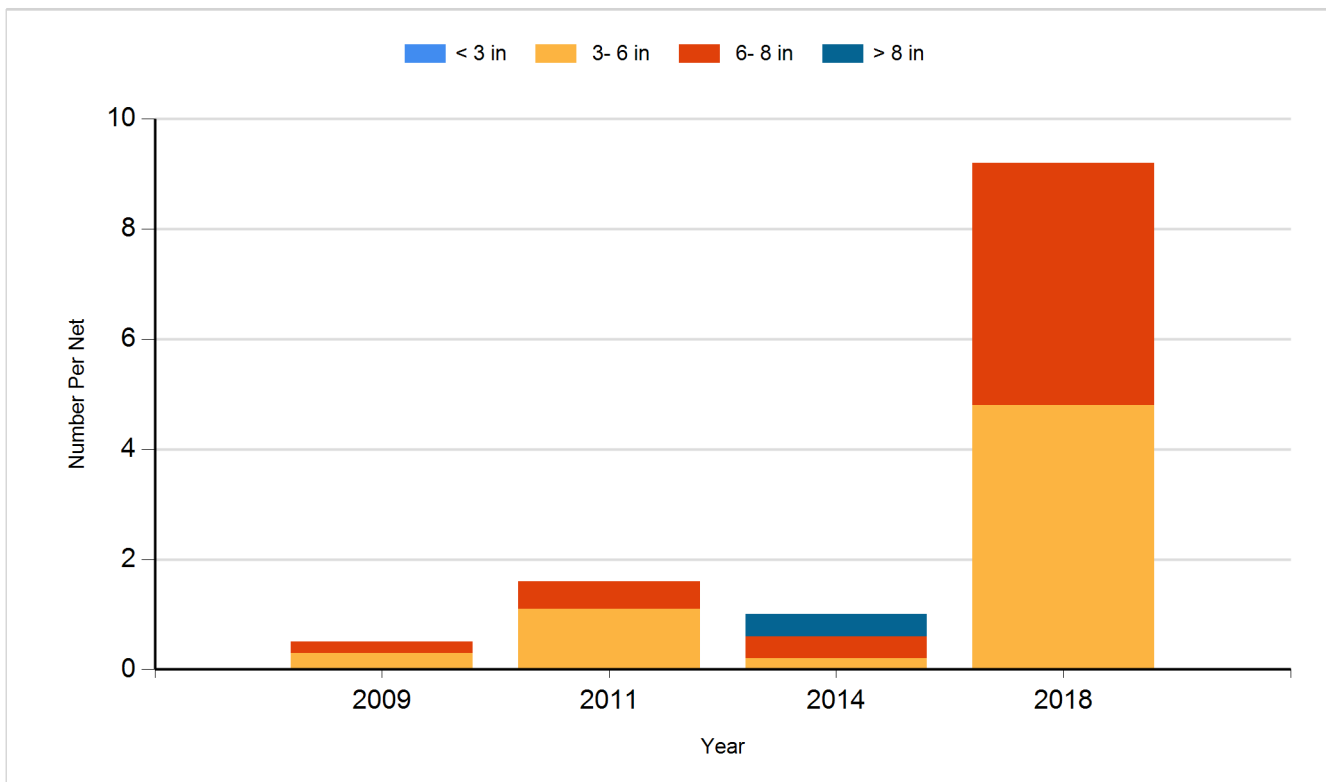
Historic Fish Sizes and Relative Abundance

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

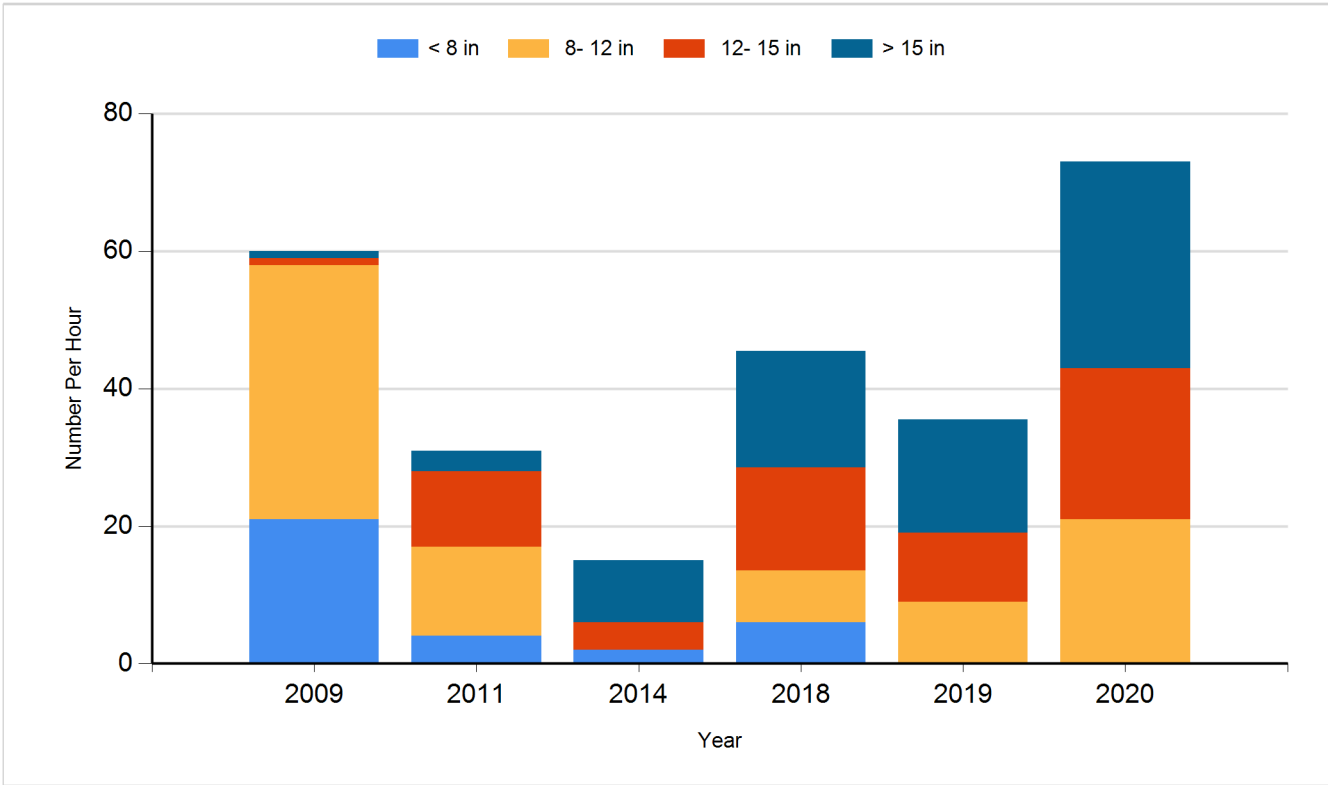
Species: Black Crappie
Gear: frame net (std 3/4 in)



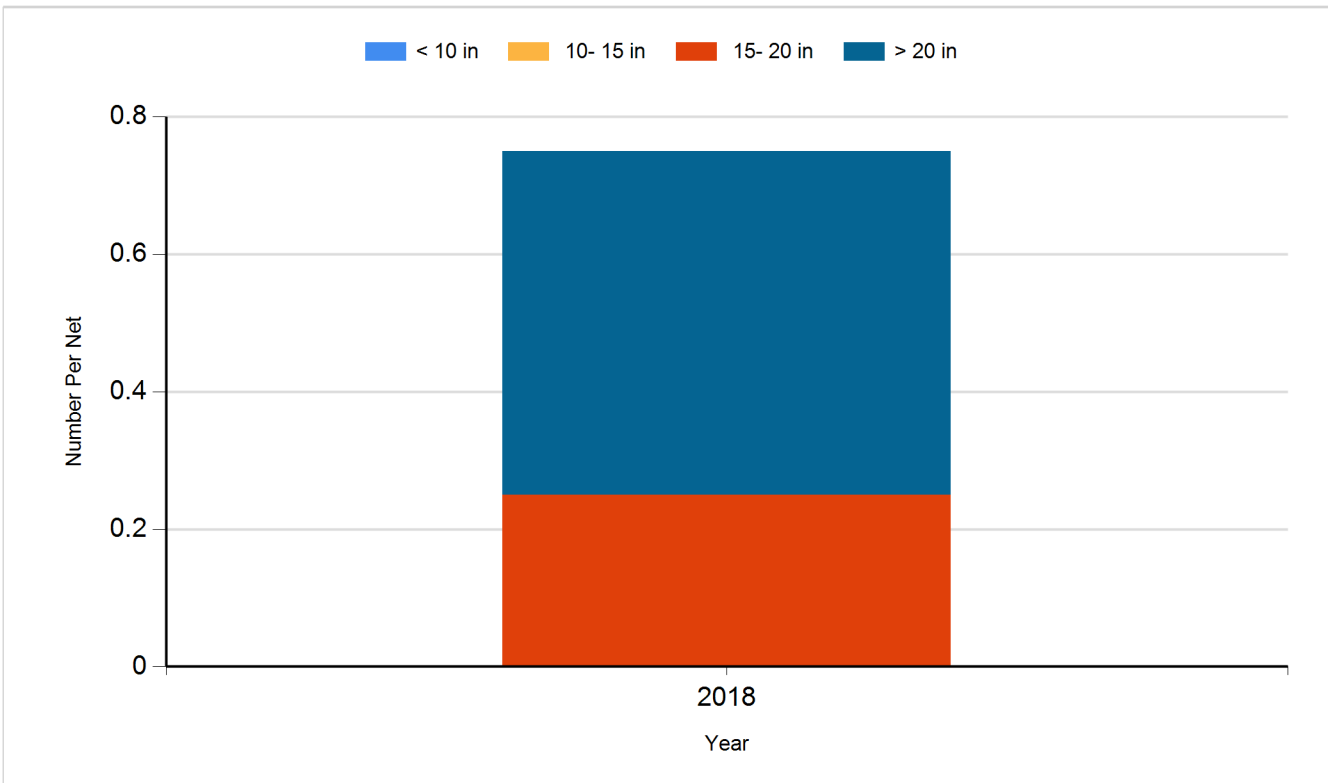
Species: Bluegill
Gear: frame net (std 3/4 in)



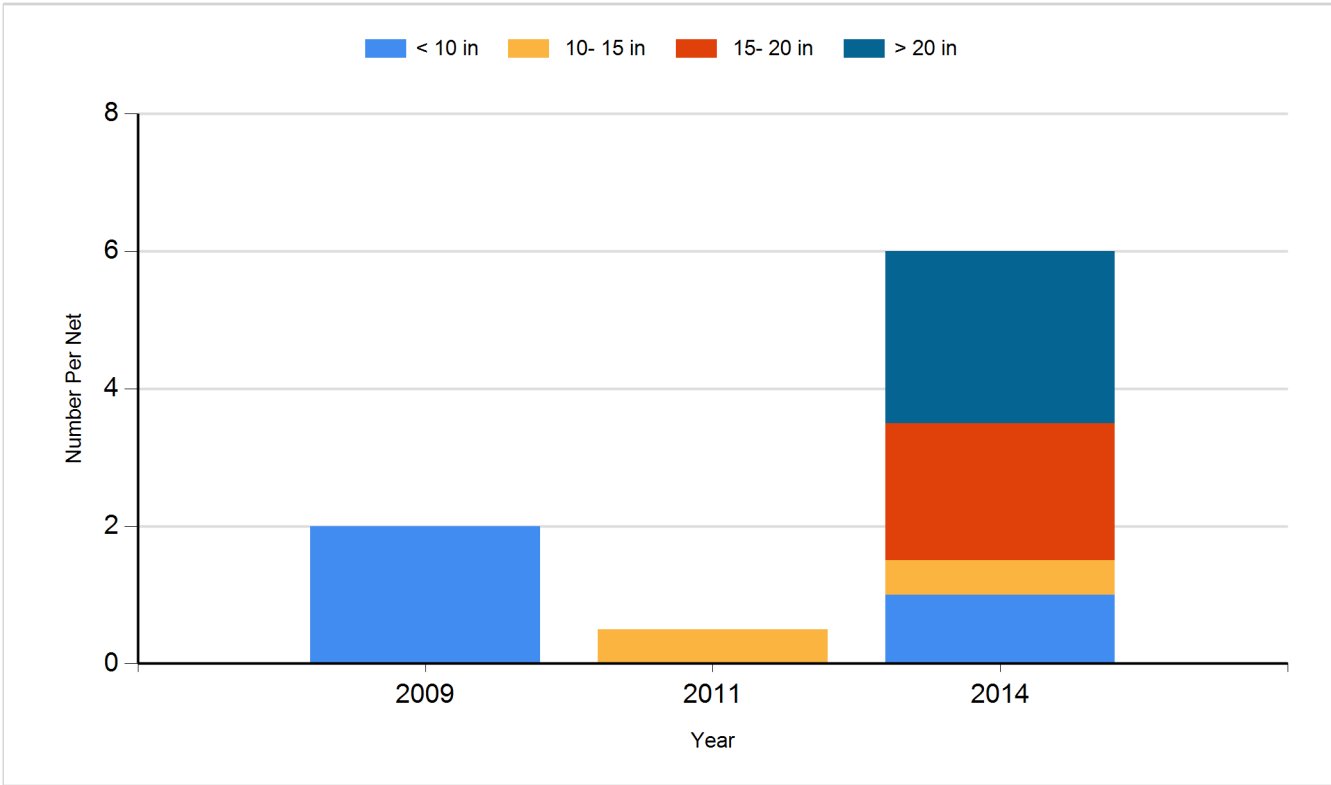
Species: Largemouth Bass
Gear: boat shocker (night)



Species: Walleye
Gear: AFS std gill net



Species: Walleye
Gear: std exp gill net



Fish Stocking

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

Year	Species	Size	Number
2010	Walleye	Small Fingerling	8,100
2013	Walleye	Large Fingerling	688
2015	Walleye	Large Fingerling	540
2017	Walleye	Large Fingerling	2,800
2019	Walleye	Large Fingerling	2,868