

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY

Murdo, Jones County

BAD-Lake-2898-000

2021

Lake Information

Name: Murdo **Maximum Depth:** 28 Feet
County: Jones **Mean Depth:** 9 Feet
Legal Description: T1-R28-S36
Surface Area: 87 Acres

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 02, 2021	1 net-nights
boat shocker (night)	Oct 04, 2021	3600 seconds
frame net (std 3/4 in)	Jun 02, 2021	6 net-nights
frame net (std 3/4 in)	Jun 03, 2021	5 net-nights

Common Fish Species Present

Largemouth Bass

Black Crappie

Yellow Perch

Bluegill

Black Bullhead

Golden Shiner

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	Yellow Perch	84	84.0		26	7	8	5	86	2
boat shocker (night)	Largemouth Bass	176	164.0	28.0	11	4	4	2	104	1
frame net (std 3/4 in)	Black Bullhead	44	4.0	1.4	93		75	10	121	10
	Black Crappie	102	9.2	3.1	68	7	22	6	105	4
	Bluegill	330	30.0	14.4	94	2	79	3	102	2
	Golden Shiner	3	0.0	0.0						
	Largemouth Bass	7	0.5	0.4	80		40		102	3
	Yellow Perch	75	6.8	4.7	29	8	8	5	82	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.

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

Gear	Species	CPUE										Avg
		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
AFS std gill net	Black Bullhead								0.8		0.0	0.40
	Black Crappie								0.2		0.0	0.10
	Bluegill								0.5		0.0	0.25
	Channel Catfish								0.2		0.0	0.10
	Walleye								0.2		0.0	0.10
	Yellow Perch								17.8		84.0	50.90
boat shocker (day)	Largemouth Bass								34.0			34.00
boat shocker (night)	Largemouth Bass	36.0			54.5			12.0			164.0	66.63
frame net (std 3/4 in)	Black Bullhead	5.1			10.0				4.9		4.0	6.00
	Black Crappie	2.8			10.9				3.3		9.2	6.55
	Bluegill	2.7			10.0				6.5		30.0	12.30
	Golden Shiner	0.0			0.0				0.0		0.0	0.00
	Largemouth Bass	0.1			0.1				0.0		0.5	0.18
	Smallmouth Bass	0.0			0.0				0.1		0.0	0.03
	Yellow Perch	0.4			5.9				42.8		6.8	13.98

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										
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
AFS std gill net	Black Bullhead	PSD									40		
		PSD-P									20		
		Wr									117		
	Black Crappie	PSD									100		
		PSD-P									0		
		Wr									98		
	Bluegill	PSD									100		
		PSD-P									100		
		Wr									105		
Yellow Perch	PSD									84		26	
	PSD-P									7		8	
	Wr									94		86	
boat shocker (day)	Largemouth Bass	PSD									47		
		PSD-P									9		
		Wr									113		
boat shocker (night)	Largemouth Bass	PSD	42			56				83			11
		PSD-P	22			39				8			4
		Wr	111			101				113			104
frame net (std 3/4 in)	Black Bullhead	PSD	94			97					96		93
		PSD-P	27			14					92		75
		Wr	108			89					103		121
	Black Crappie	PSD	82			4					97		68
		PSD-P	18			0					24		22
		Wr	96			103					91		105
	Bluegill	PSD	41			32					100		94
		PSD-P	15			5					28		79
		Wr	115			120					107		102
	Largemouth Bass	PSD	0			100							80
		PSD-P	0			0							40
		Wr	113			105							102
	Yellow Perch	PSD	100			59					84		29
		PSD-P	100			12					7		8

Gear	Species	Index	Year										
			2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	
frame net (std 3/4 in)	Yellow Perch	Wr	104				88				84		82

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+
2019	33			213 (3)	222 (13)	245 (14)	266 (1)	268 (2)			
2015	109		145 (12)	163 (26)	177 (65)	192 (6)	207 (1)				
2012	128	97 (100)	149 (1)	206 (21)	235 (1)		267 (1)	267 (1)	275 (3)		

Species: Bluegill

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	64				194 (8)	185 (3)	198 (39)	187 (14)		214 (1)	
2015	100		140 (59)	152 (29)	191 (9)	207 (2)	211 (1)				
2012	27	93 (16)	161 (1)	199 (4)	190 (4)		217 (2)				

Species: Largemouth Bass

Mean Length (expanded sample number) at capture by age											
Year	N	1	2	3	4	5	6	7	8	9	10+
2019	56	127 (19)	200 (10)	252 (13)	346 (6)	368 (7)	374 (1)	445 (1)			
2015	151	200 (87)	225 (3)	364 (1)	360 (15)	400 (21)	432 (19)	454 (5)	511 (1)	483 (1)	
2012	99	172 (85)		375 (12)	373 (1)	430 (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+
2019	107		172 (10)	221 (12)	222 (78)	240 (7)					

Fish Condition

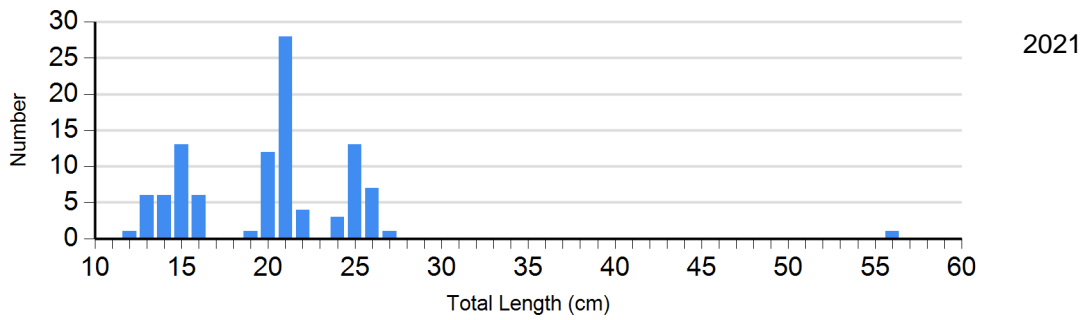
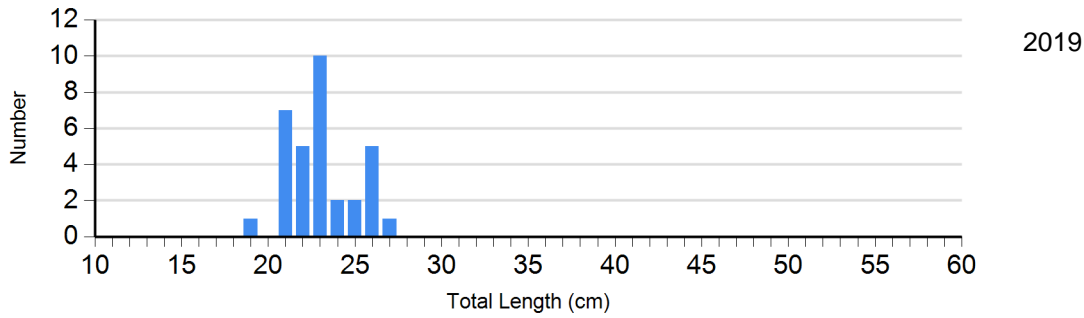
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

Species	Year	Length Groups							
		S-Q		Q-P		P-M		M	
		N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Bullhead Gill Net	2019	3	111 (2.9)	1	119	1	134	0	
Black Crappie Frame Net	2019	1	108	24	91 (1.0)	8	88 (1.6)	0	
	2021	32	125 (6.7)	47	101 (0.9)	21	93 (2.0)	1	7
Bluegill Frame Net	2019	0		47	108 (1.0)	18	104 (2.6)	0	
	2021	20	97 (1.4)	48	107 (2.8)	262	101 (1.4)	0	
Largemouth Bass Electro Fishing	2018	2	114 (2.4)	9	114 (1.0)	1	101	0	
	2019	18	112 (1.9)	13	114 (2.0)	3	113 (1.3)	0	
	2021	146	105 (0.6)	11	95 (1.4)	6	101 (4.9)	1	122
Yellow Perch Gill Net	2019	17	100 (1.7)	83	93 (0.9)	7	91 (3.4)	0	
	2021	62	90 (1.7)	15	80 (1.5)	7	68 (2.4)	0	

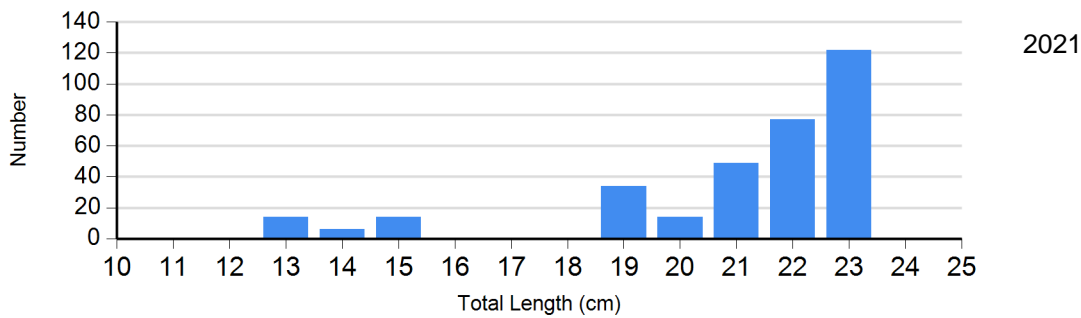
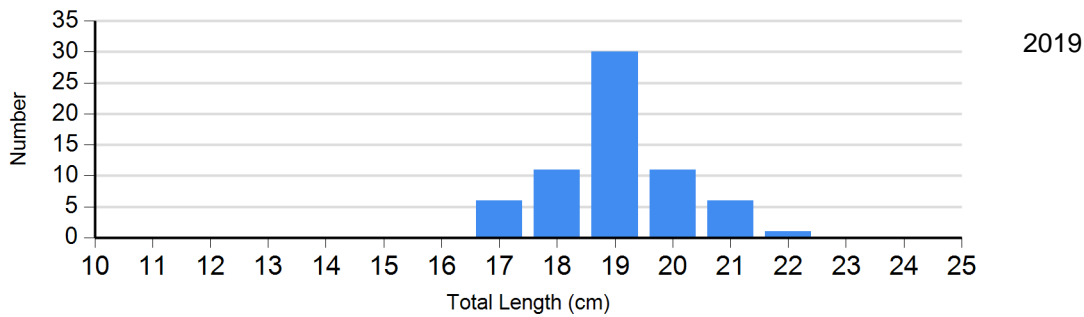
Length Frequency Distribution

Length frequency histogram of species sampled by year.

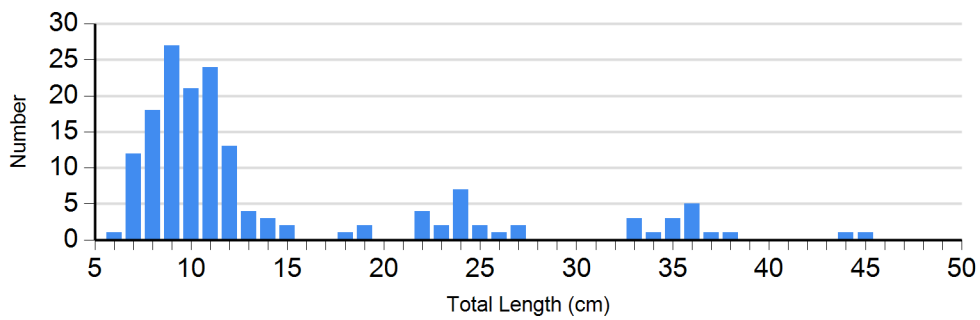
Species: Black Crappie
Gear: frame net (std 3/4 in)



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

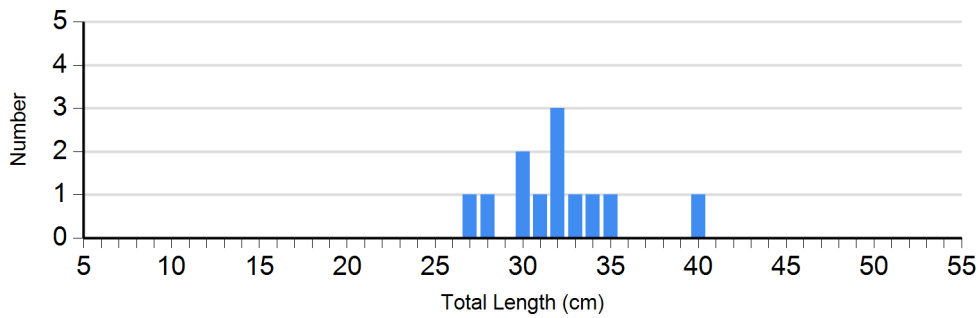


Species: Largemouth Bass
Gear: boat shocker (day)

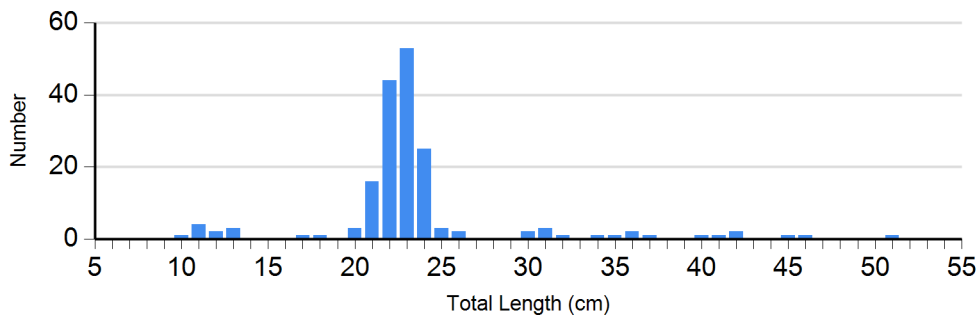


2019

Species: Largemouth Bass
Gear: boat shocker (night)

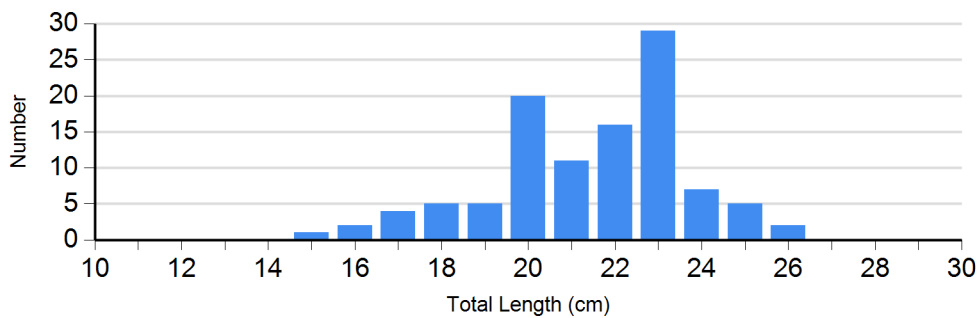


2018

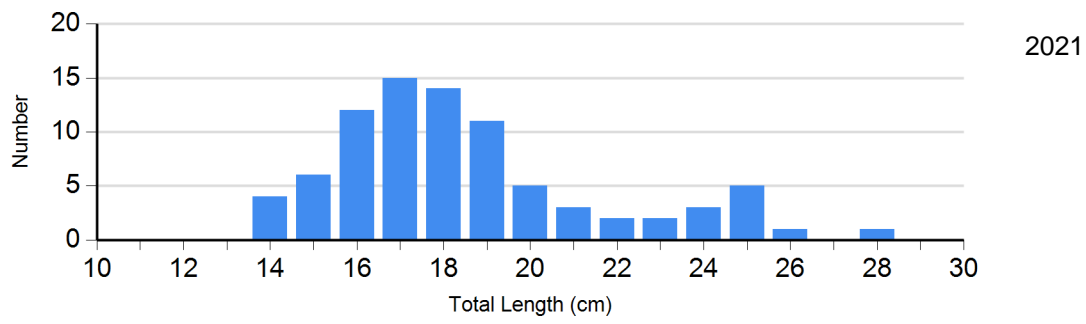


2021

Species: Yellow Perch
Gear: AFS std gill net



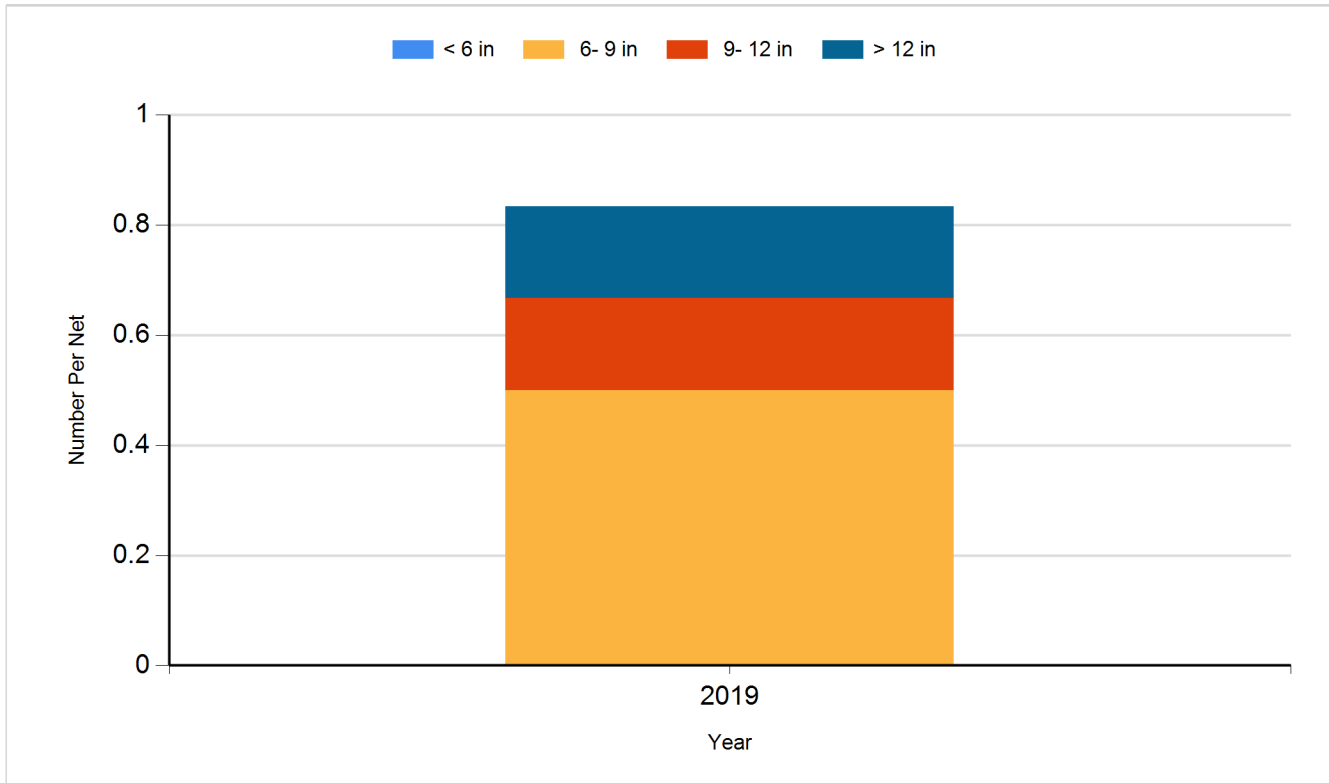
2019



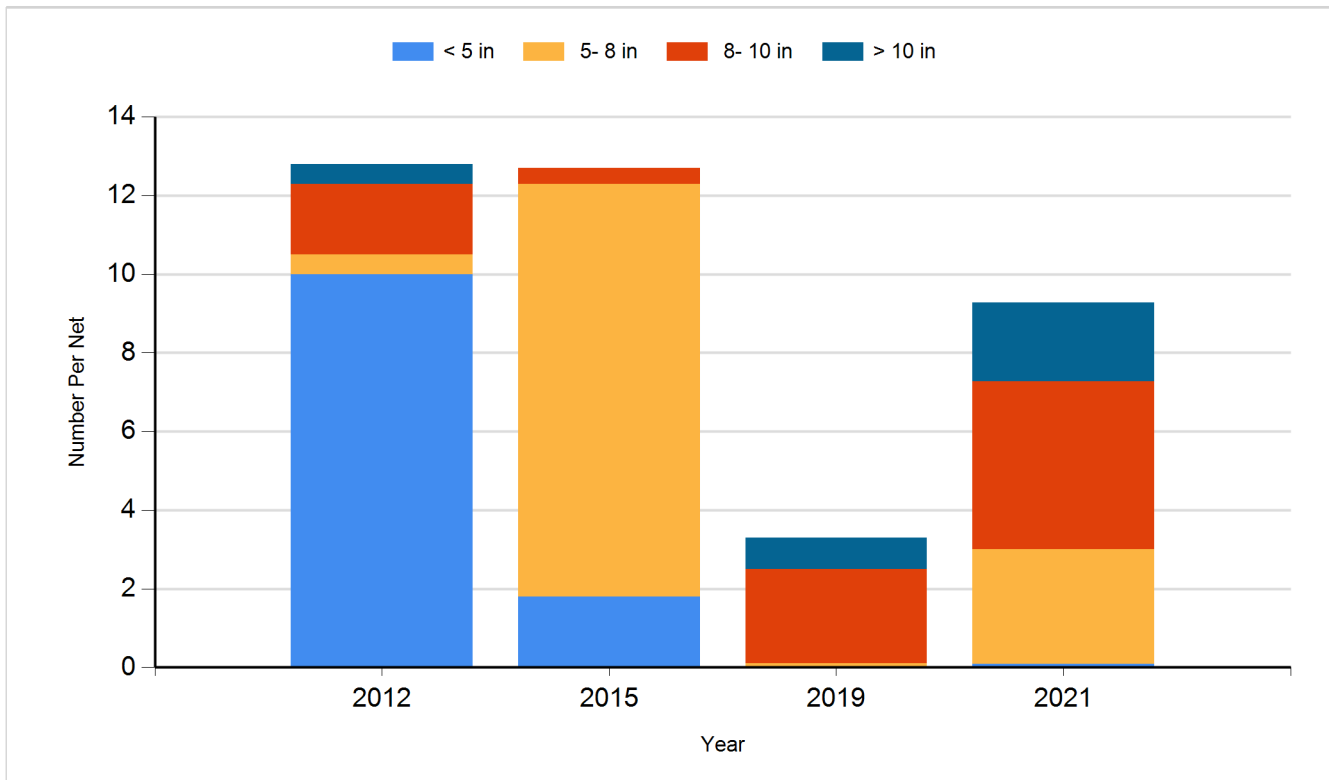
Historic Fish Sizes and Relative Abundance

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

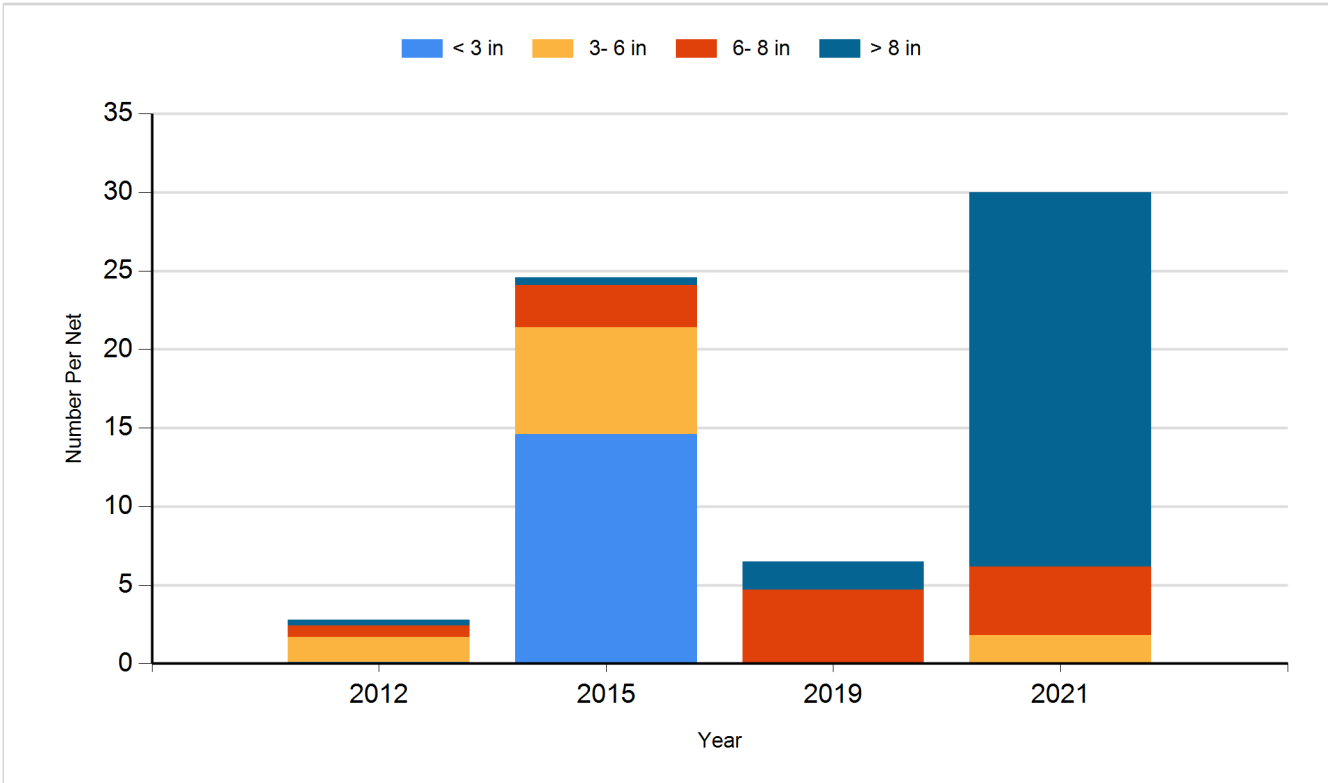
Species: Black Bullhead
Gear: AFS std gill net



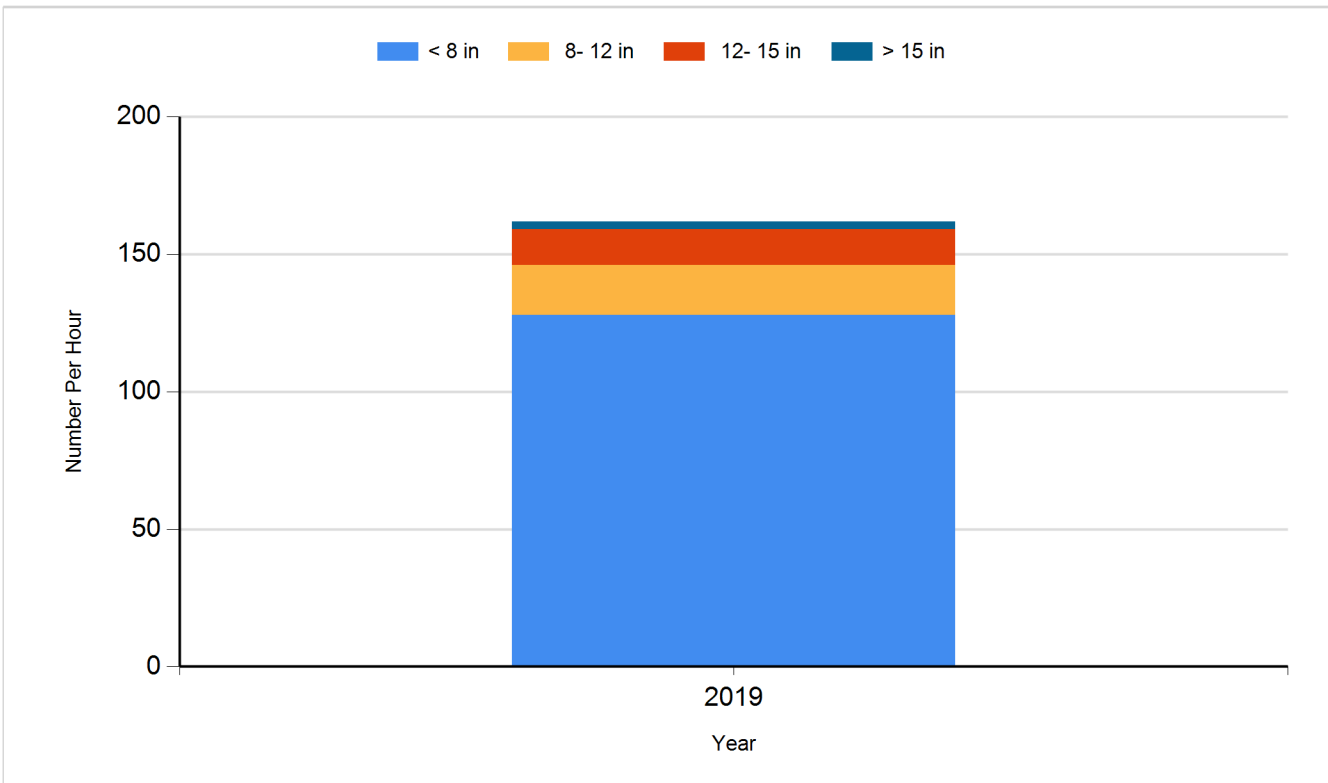
Species: Black Crappie
Gear: frame net (std 3/4 in)



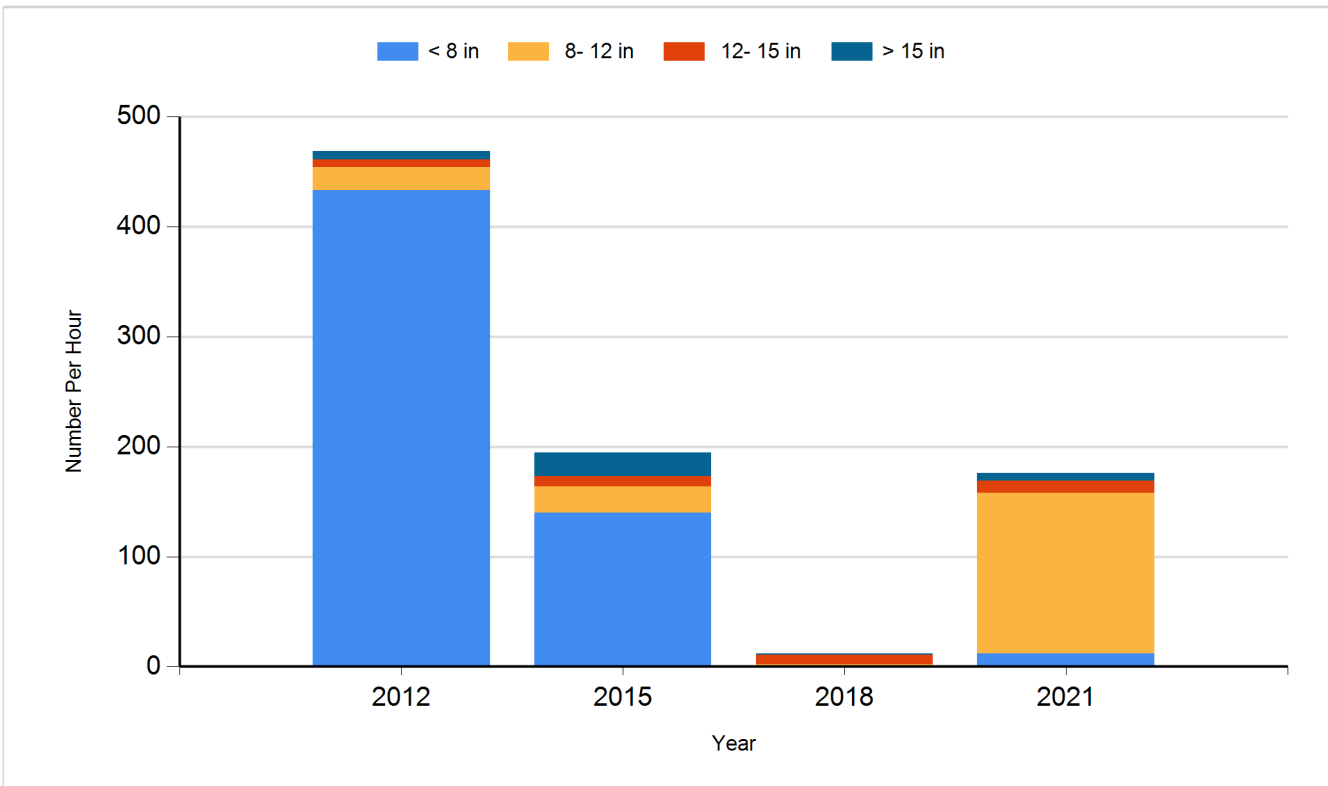
Species: Bluegill
Gear: frame net (std 3/4 in)



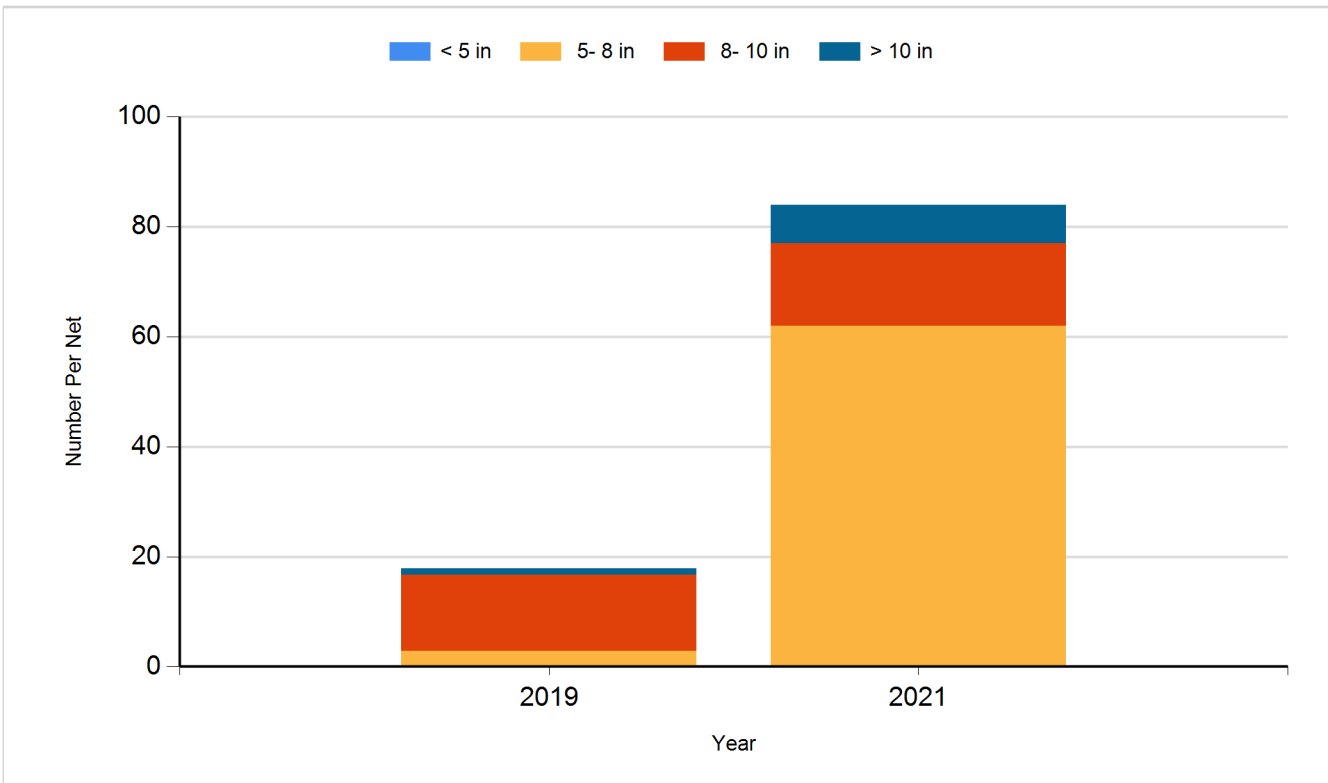
Species: Largemouth Bass
Gear: boat shocker (day)



Species: Largemouth Bass
Gear: boat shocker (night)



Species: Yellow Perch
Gear: AFS std gill net



Fish Stocking

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

Year	Species	Size	Number
2012	Smallmouth Bass	Juvenile	100
2021	Walleye		100,000