Murdo Lake Survey Summary

Murdo Lake is an 87-acre impoundment also locally known as Murdo Dam or Murdo North Dam. It is located approximately two miles north of the City of Murdo, Jones County, South Dakota. The lake was created in 1938 when the Works Project Administration (WPA) constructed an earthen dam on a tributary to the upper portion of White Clay Creek. The lake was constructed to provide a primary water source for the city. The City of Murdo owns 640 acres of land containing the dam grade and the entire lake. South Dakota Department of Game, Fish and Parks completes fisheries management activities at Murdo Lake.

Fishing access for Murdo Lake include the entire shoreline for shore fishing but dense cattails may impair a large portion of the shoreline. Access also includes a concrete boat ramp and parking lot, a floating fishing pier adjacent to ramp, and 2 developed picnic shelters. The City maintains all structures surrounding the lake. Ice fishing opportunities exist, and many anglers take advantage of the lake's amenities.

Murdo Lake's fishery was sampled using frame and gill nets and boat electrofishing during 2019. Many fish species were sampled survey the survey including Black Bullhead, Black Crappie, Bluegill, Channel Catfish, Largemouth Bass, Walleye, Yellow Perch, Smallmouth Bass, and Golden Shiner. Reports of a minor summer kill were documented during the recent summers of 2017 and 2018.

- **Black Bullhead:** Black Bullhead abundance has remained stable. In 2019, catch rates were 4.9 fish/net with an average size of 12 inches.
- **Black Crappie:** Abundance of Black Crappie has decreased to 3.3 fish/net but the average size in 2019 increased to 9.5 inches. Approximately 24% of the population also exceeded 10 inches. Growth is slightly slower than statewide average but there are several year-classes of fish within the population.
- **Bluegill:** Bluegill abundance remains stable but low with a catch rate of 6.5 fish/net which is lower than 10 fish/net in the 2015 survey. Several age-classes of fish were collected. The average size of Bluegill was 8 inches and ranged from 6 to 9 inches.
- **Largemouth Bass:** During the fall of 2019, boat electrofishing was conducted to sample the Largemouth Bass population within Murdo Lake. A catch rate of 34 fish/hour indicates a good population of Largemouth Bass. The population remains stable over the past several surveys completed. Sizes ranged from 2.5 inches (young of the year) to 18 inches. Growth of Largemouth Bass is at or slightly above the statewide average with fish growing past 12 inches at the age of 5.
- **Yellow Perch:** Abundance of Yellow Perch is very good for Murdo Lake at 17.8 fish/gill net. The 2019 abundance is the highest seen for Murdo Lake. The average size was 8.5 inches and ranged from 6 to 10.5 inches. Several year-classes were collected with the age-4 (2015) year-class providing the largest abundance (75%) of the population. Growth of Yellow Perch is slower than the statewide average with age-4 year-class average 8.5 inches.
- **Other Species:** A few other species have been found to exist in Murdo Lake. Golden Shiner are a great forage fish for Largemouth Bass and exist in Murdo Lake. Smallmouth Bass, Walleye and Channel Catfish were sampled in 2019 and are in very low abundance.

For more detailed results see the computer-generated South Dakota Statewide Fisheries Survey for Murdo Lake below. Please contact South Dakota Game, Fish and Parks Ft. Pierre office – (605) 223-7700 for additional information.

Prepared 02-19-2020 by KDP

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Murdo, Jones County
BAD-Lake-2898-000
2019

Lake Information

Name: Murdo

County: Jones

Legal Description: T1-R28-S36

Surface Area: 87 Acres

Maximum Depth: 28 Feet

Mean Depth: 9 Feet

Surveys and Investigations

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

Gear	Date	Effort
AFS std gill net	Jun 11, 2019	3 net-nights
AFS std gill net	Jun 12, 2019	3 net-nights
boat shocker (day)	Sep 23, 2019	3600 seconds
frame net (std 3/4 in)	Jun 11, 2019	5 net-nights
frame net (std 3/4 in)	Jun 12, 2019	5 net-nights

Common Fish Species Present

Black Crappie

Largemouth Bass

Yellow Perch

Bluegill

Black Bullhead

Channel Catfish

Walleye

Smallmouth Bass

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.
- s**td 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.

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

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)
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**

			Abundance		Stock Density Indices				Condition	
Gear	Species	Sample Size (n)	CPUE	CI-80	PSD	CI-80	PSD-P	CI-80	Wr	CI-80
AFS std gill net	Black Bullhead	5	0.8	0.8	40		20		117	6
	Black Crappie	1	0.2	0.2	100		0		98	
	Bluegill	3	0.5	0.7	100		100		105	2
	Channel Catfish	1	0.2	0.2	100		0		105	
	Walleye	1	0.2	0.2	100		100		95	
	Yellow Perch	107	17.8	6.4	84	5	7	4	94	1
boat shocker (day)	Largemouth Bass	162	34.0	13.1	47	13	9		113	2
frame net (std 3/4 in)	Black Bullhead	49	4.9	1.1	96		92		103	5
	Black Crappie	33	3.3	1.8	97		24	12	91	1
	Bluegill	65	6.5	2.9	100		28	8	107	1
	Golden Shiner	8	0.0	0.0						
	Smallmouth Bass	1	0.1	0.1	100		0		92	
	Yellow Perch	428	42.8	19.9	84	2	7	2	84	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	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
AFS std gill net	Black Bullhead										0.8	0.80
	Black Crappie										0.2	0.20
	Bluegill										0.5	0.50
	Channel Catfish										0.2	0.20
	Walleye										0.2	0.20
	Yellow Perch										17.8	17.80
boat shocker (day)	Largemouth Bass										34.0	34.00
boat shocker (night)	Largemouth Bass			36.0			54.5			12.0		34.17
frame net (std 3/4 in)	Black Bullhead			5.1			10.0				4.9	6.67
	Black Crappie			2.8			10.9				3.3	5.67
	Bluegill			2.7			10.0				6.5	6.40
	Golden Shiner			0.0			0.0				0.0	0.00
	Largemouth Bass			0.1			0.1				0.0	0.07
	Smallmouth Bass			0.0			0.0				0.1	0.03
	Yellow Perch			0.4			5.9				42.8	16.37

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	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
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
	Channel Catfish	PSD										100
		PSD-P										0
		Wr										105
	Walleye	PSD										100
		PSD-P										100
		Wr										95
	Yellow Perch	PSD										84
		PSD-P										7
		Wr										94
boat shocker (day)	Largemouth Bass	PSD										47
		PSD-P										9
		Wr										113
boat shocker (night)	Largemouth Bass	PSD			42			56			83	
		PSD-P			22			39			8	
		Wr			111			101			113	
frame net (std 3/4 in)	Black Bullhead	PSD			94			97				96
		PSD-P			27			14				92
		Wr			108			89				103
	Black Crappie	PSD			82			4				97
		PSD-P			18			0				24
		Wr			96			103				91
	Bluegill	PSD			41			32				100
		PSD-P			15			5				28

	Wr	115	120	107
Largemouth Bass	PSD	0	100	
	PSD-P	0	0	
	Wr	113	105	
Smallmouth Bass	PSD			100
	PSD-P			0
	Wr			92
Yellow Perch	PSD	100	59	84
	PSD-P	100	12	7
	Wr	104	88	84

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
2016	3	2	78 (5)	155 (3.3)	213 (1.1)							
2015	4	9	82 (3.6)	152 (3.7)	193 (2.6)	219 (4.4)						
2014	5	9	79 (3.5)	157 (4.8)	207 (3.7)	230 (4.4)	245 (4.7)					
2013	6	1	78	131	166	218	246	264				
2012	7	2	74 (7.3)	121 (4.9)	171 (.3)	228 (1)	247 (2.3)	260 (2.9)	270 (.6)			
Weighted Mean		23	80	151	197	225	245	261	270			

Species: Bluegill

Year Class	Age	N	Mean back-calculated length (SE) at age									
			1	2	3	4	5	6	7	8	9	10
2019	0	1										
2015	4	1	64	132	176	195						
2014	5	3	48 (1)	106 (2.4)	154 (11.6)	169 (12.1)	183 (9.5)					
2013	6	15	53 (1.7)	113 (4.5)	155 (4)	178 (3)	194 (2.9)	200 (2.9)				
2012	7	9	51 (2.2)	118 (3.3)	144 (3.5)	162 (3.5)	172 (3.7)	183 (3.5)	186 (3.6)			
2010	9	1	42	98	142	167	176	189	198	208	216	
Weighted Mean		30	52	114	152	172	185	193	187	208	216	

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	0	1										
2018	1	4	86 (5.4)									
2017	2	8	77 (7.2)	134 (6.3)								
2016	3	11	67 (4.5)	124 (6.1)	197 (5.9)							
2015	4	6	72 (3.2)	127 (10.6)	203 (6.7)	298 (4.4)						
2014	5	6	69 (6.3)	123 (20.3)	216 (10.7)	256 (5.9)	322 (4.1)					
2013	6	1	60	87	173	250	287	336				
2012	7	1	87	151	252	327	361	409	434			
Weighted Mean		38	73	126	204	279	323	373	434			

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

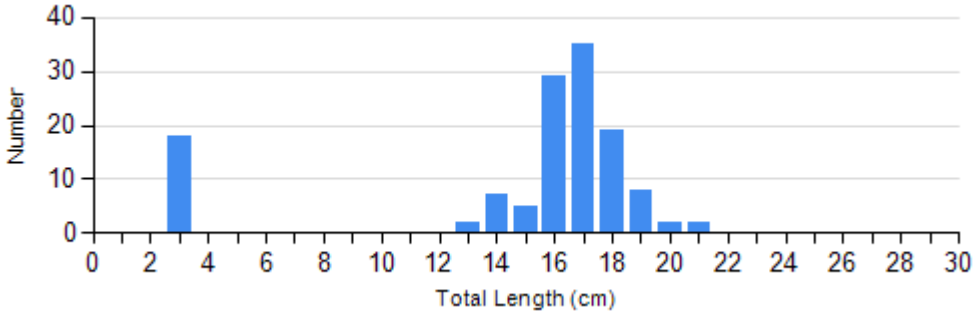
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	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	2015	105	103 (0.9)	4	101 (2.8)	0		0	
	2019	1	108	24	91 (1.0)	8	88 (1.6)	0	
Bluegill Frame Net	2015	68	127 (15.5)	27	105 (1.6)	5	94 (2.8)	0	
	2019	0		47	108 (1.0)	18	104 (2.6)	0	
Channel Catfish Gill Net	2019	0		1	105	0		0	
Largemouth Bass Electro Fishing	2015	48	103 (1.1)	18	99 (1.6)	42	99 (1.4)	1	103
	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	
Walleye Gill Net	2019	0		0		1	95	0	
Yellow Perch Gill Net	2019	17	100 (1.7)	83	93 (0.9)	7	91 (3.4)	0	

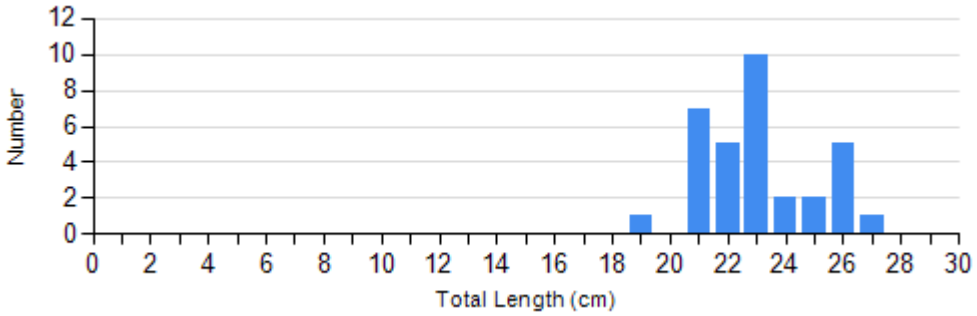
Length Frequency Distribution

Length frequency histogram of species sampled by year.

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

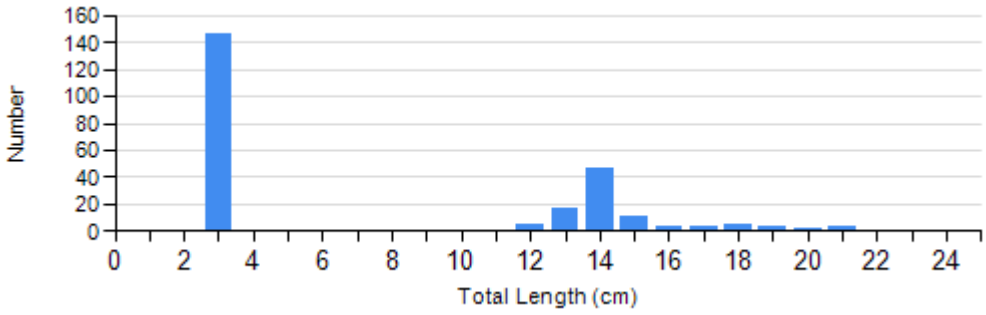


2015

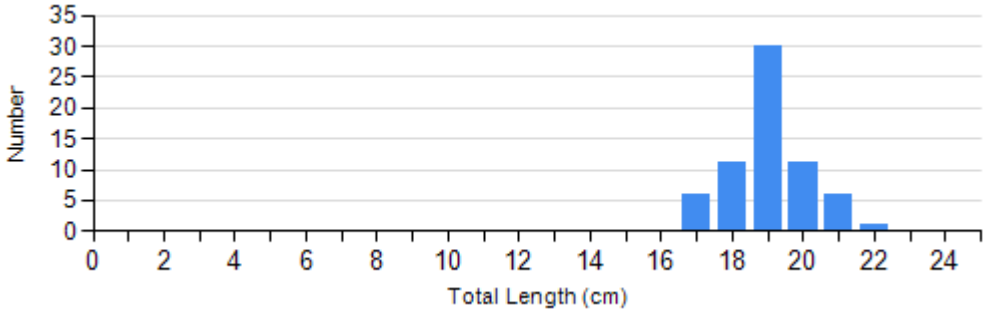


2019

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

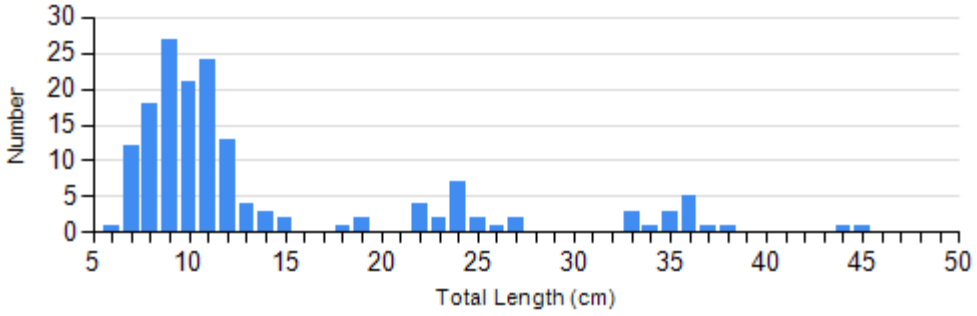


2015



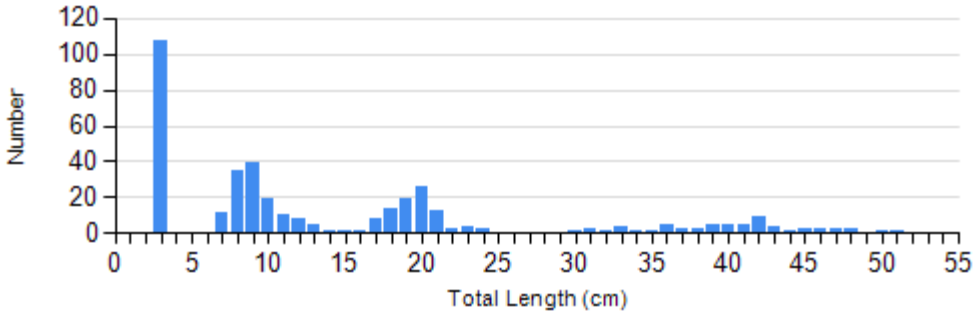
2019

Species: Largemouth Bass
Gear: boat shocker (day)

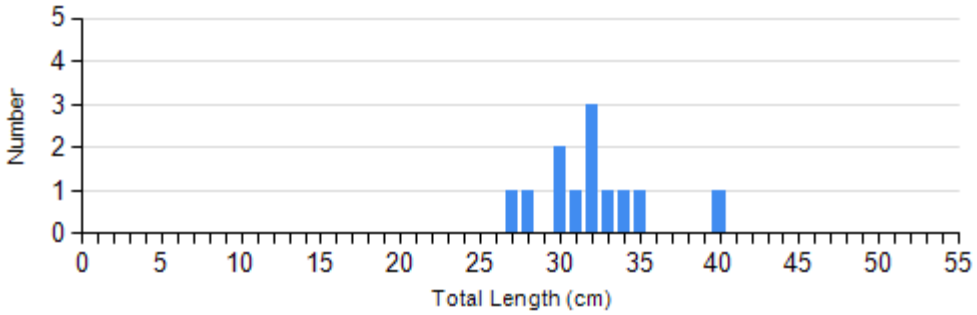


2019

Species: Largemouth Bass
Gear: boat shocker (night)

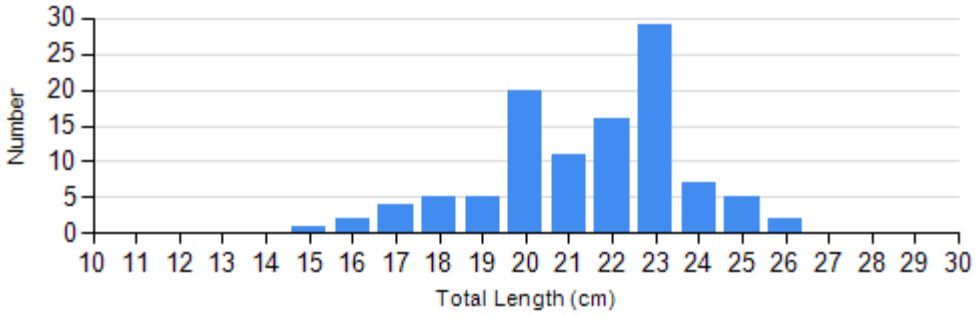


2015



2018

Species: Yellow Perch
Gear: AFS std gill net

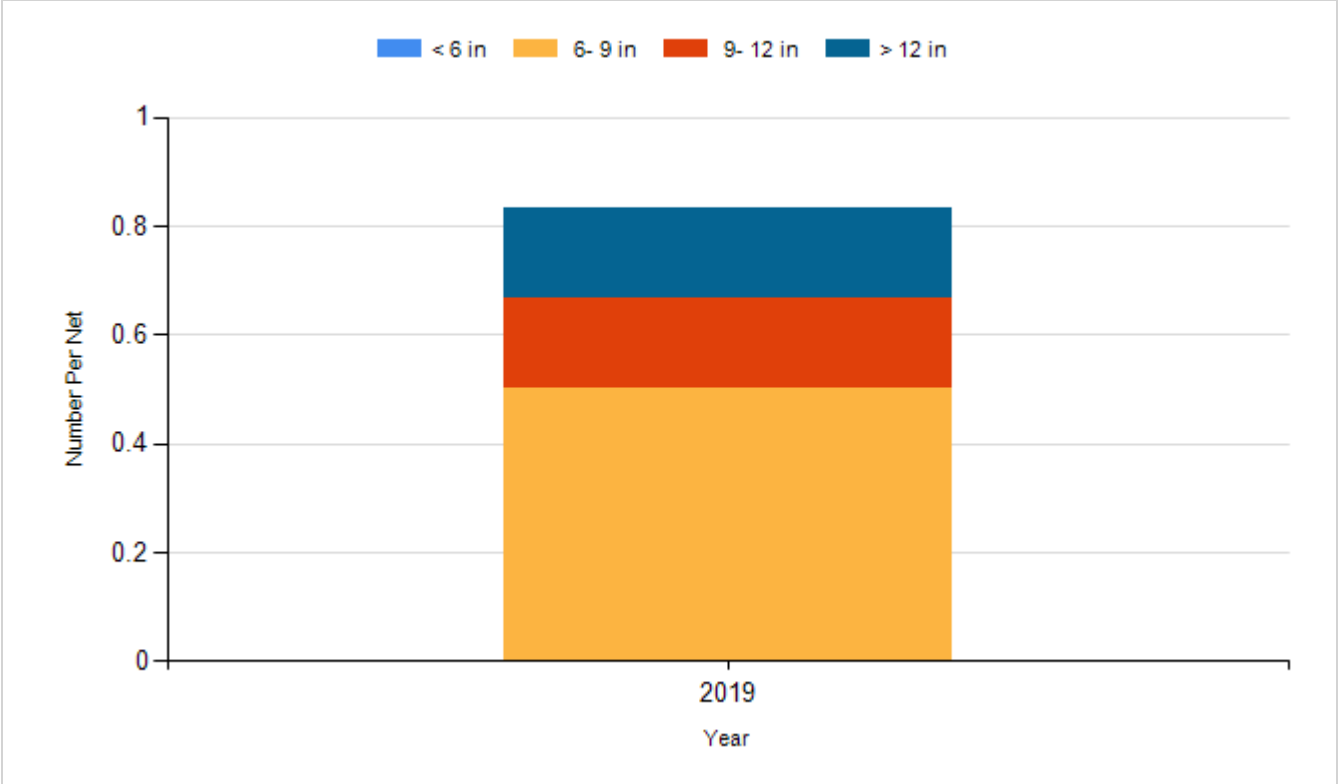


2019

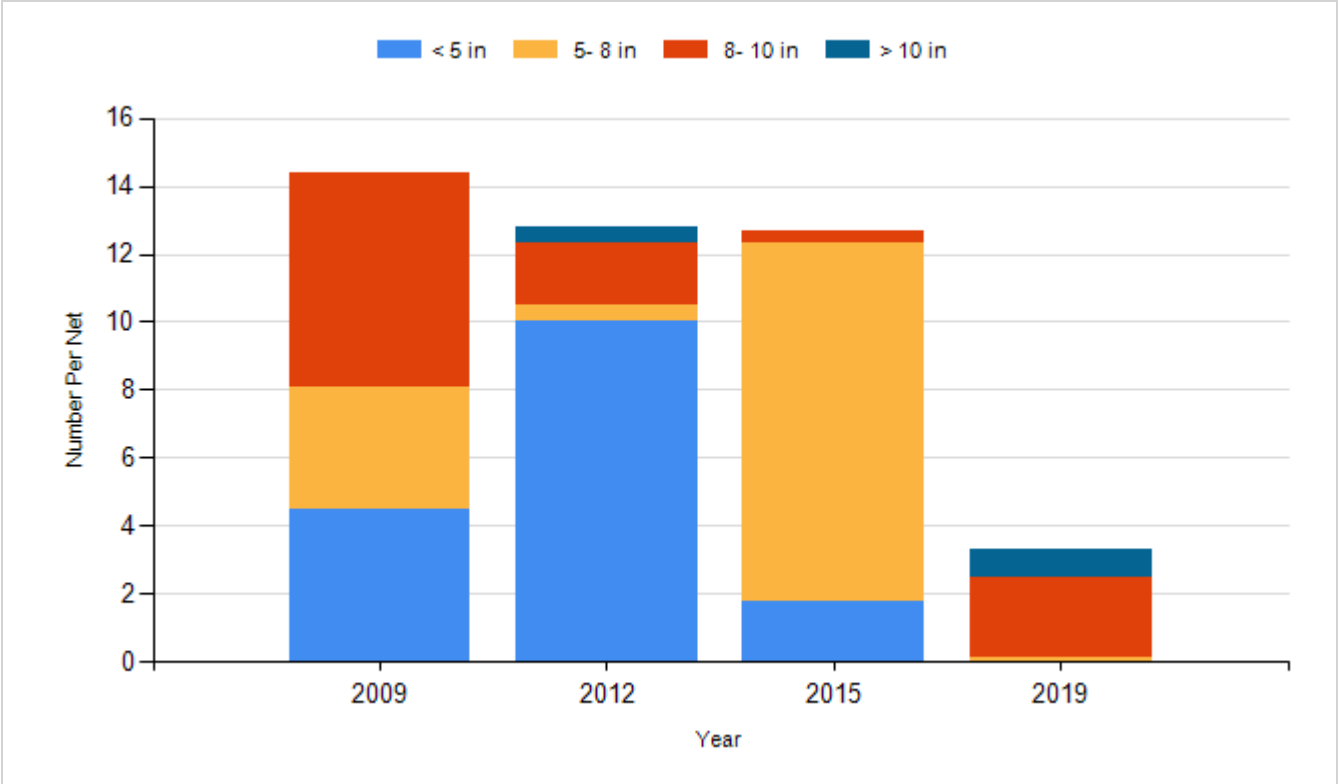
Historic Fish Sizes and Relative Abundance

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

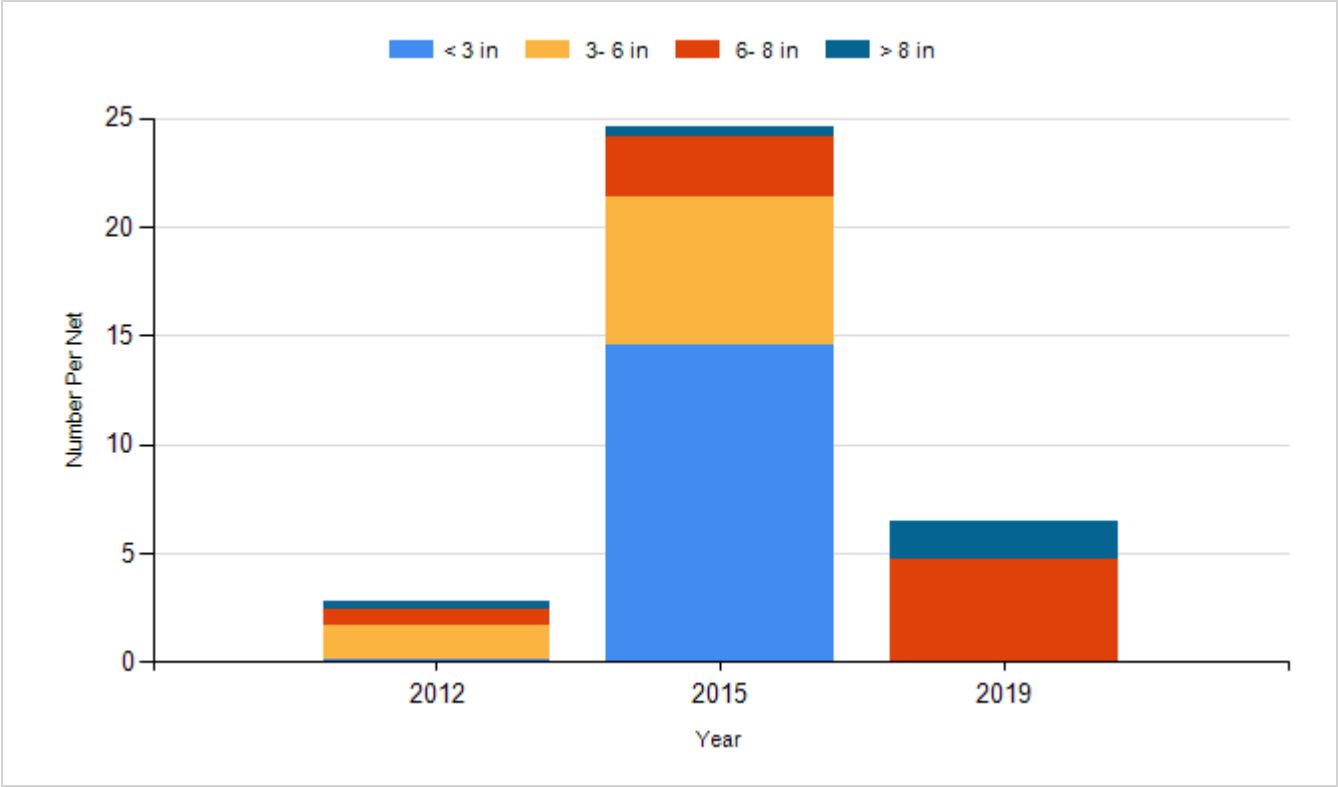
Species: Black Bullhead
Gear: AFS std gill net



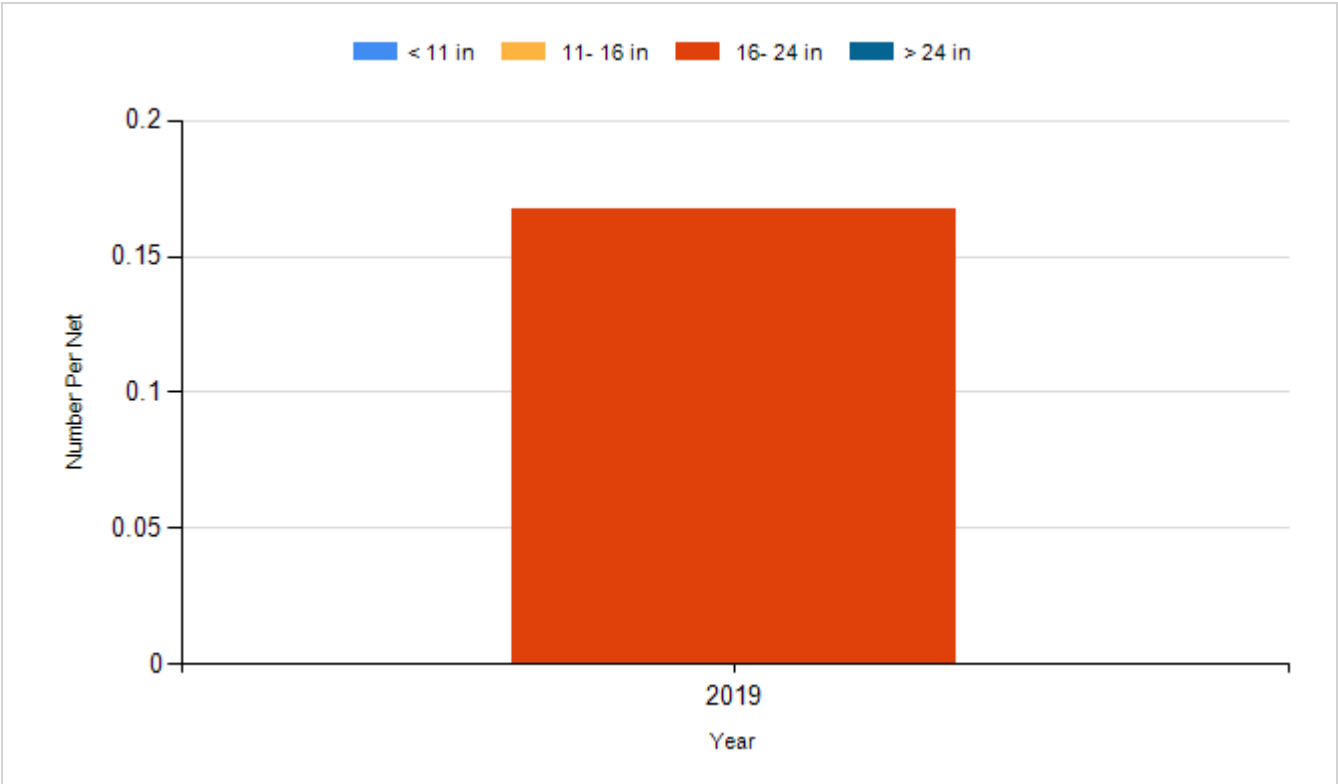
Species: Black Crappie
Gear: frame net (std 3/4 in)



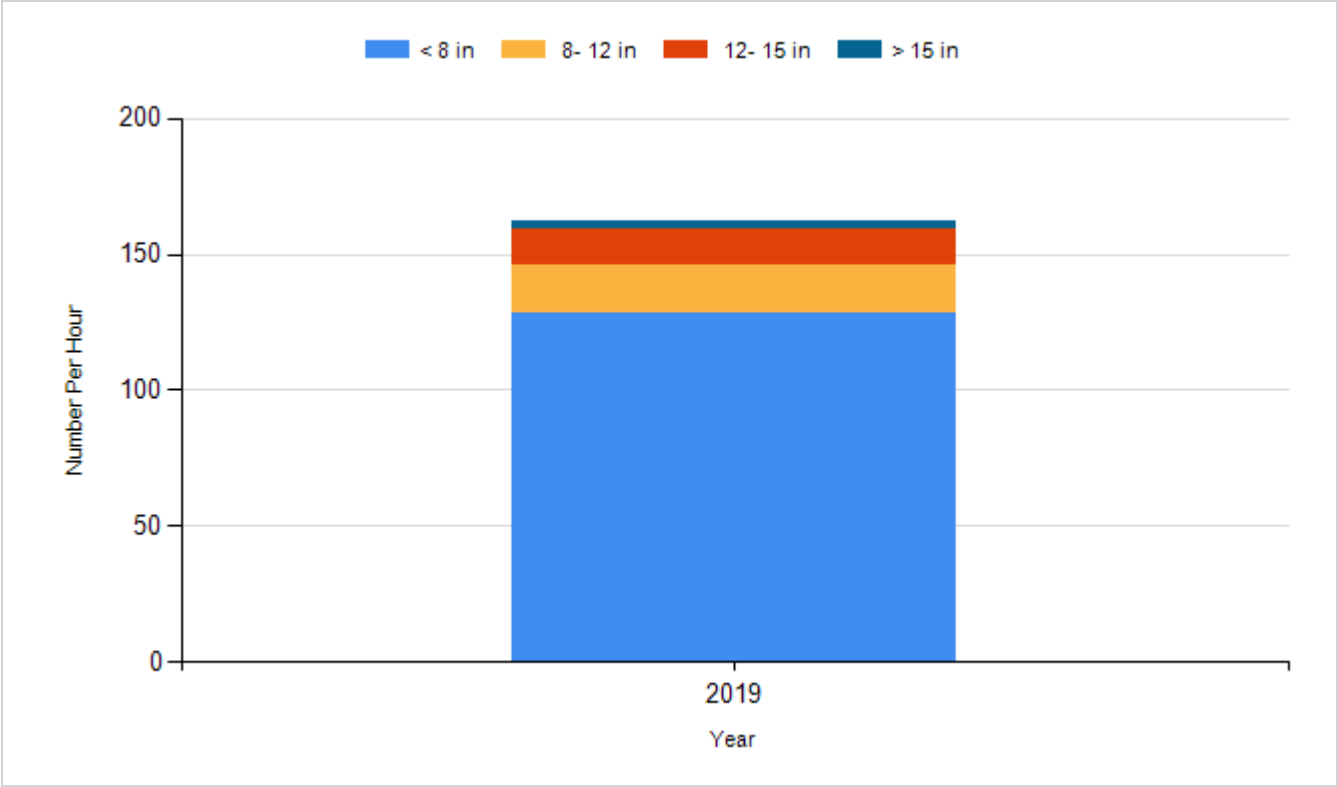
Species: Bluegill
Gear: frame net (std 3/4 in)



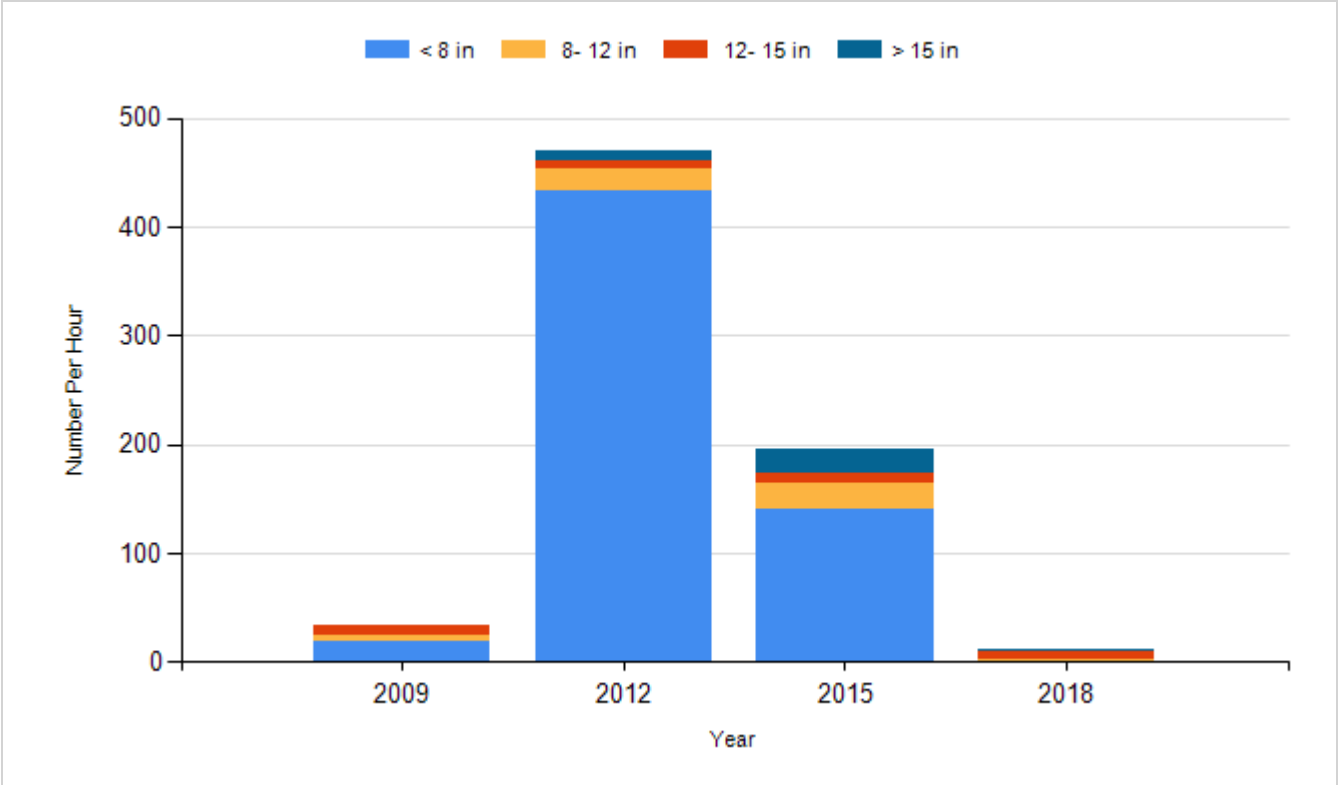
Species: Channel Catfish
Gear: AFS std gill net



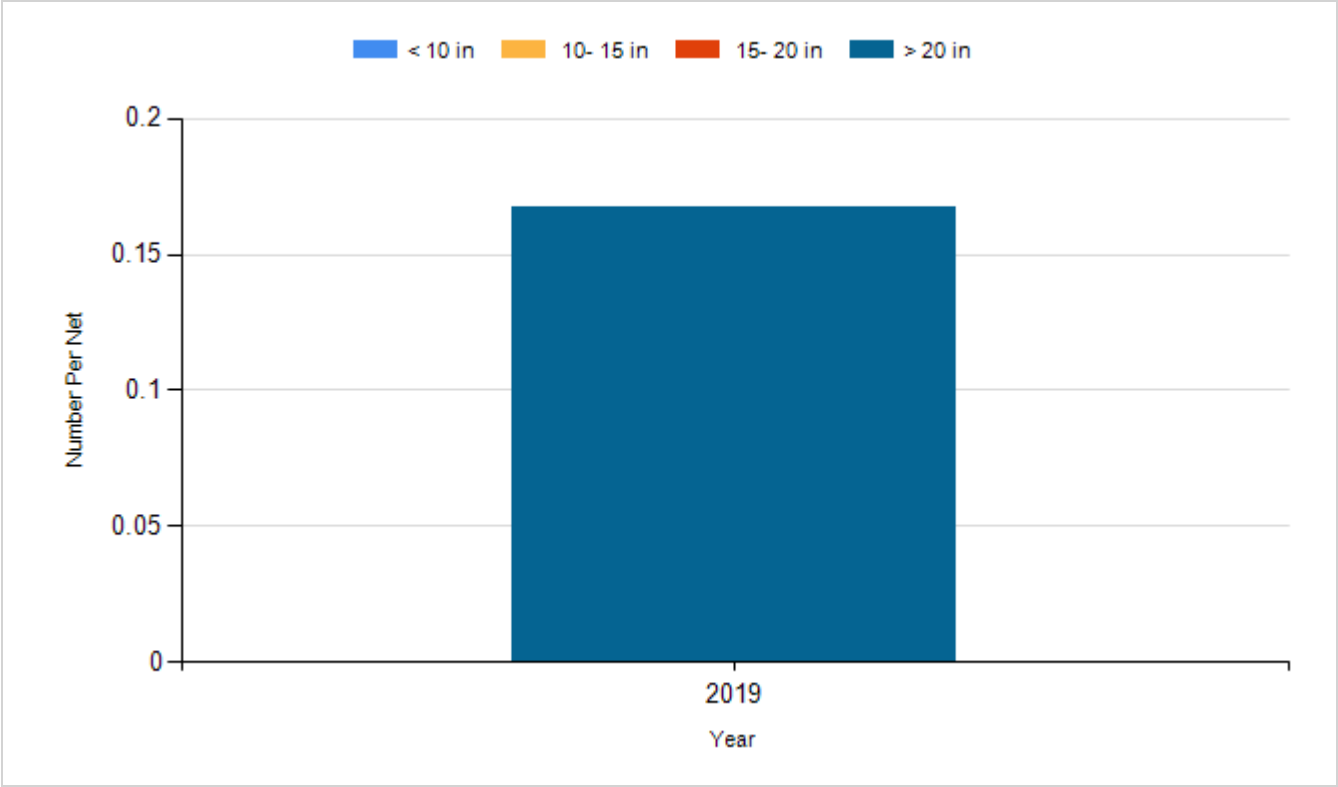
Species: Largemouth Bass
Gear: boat shocker (day)



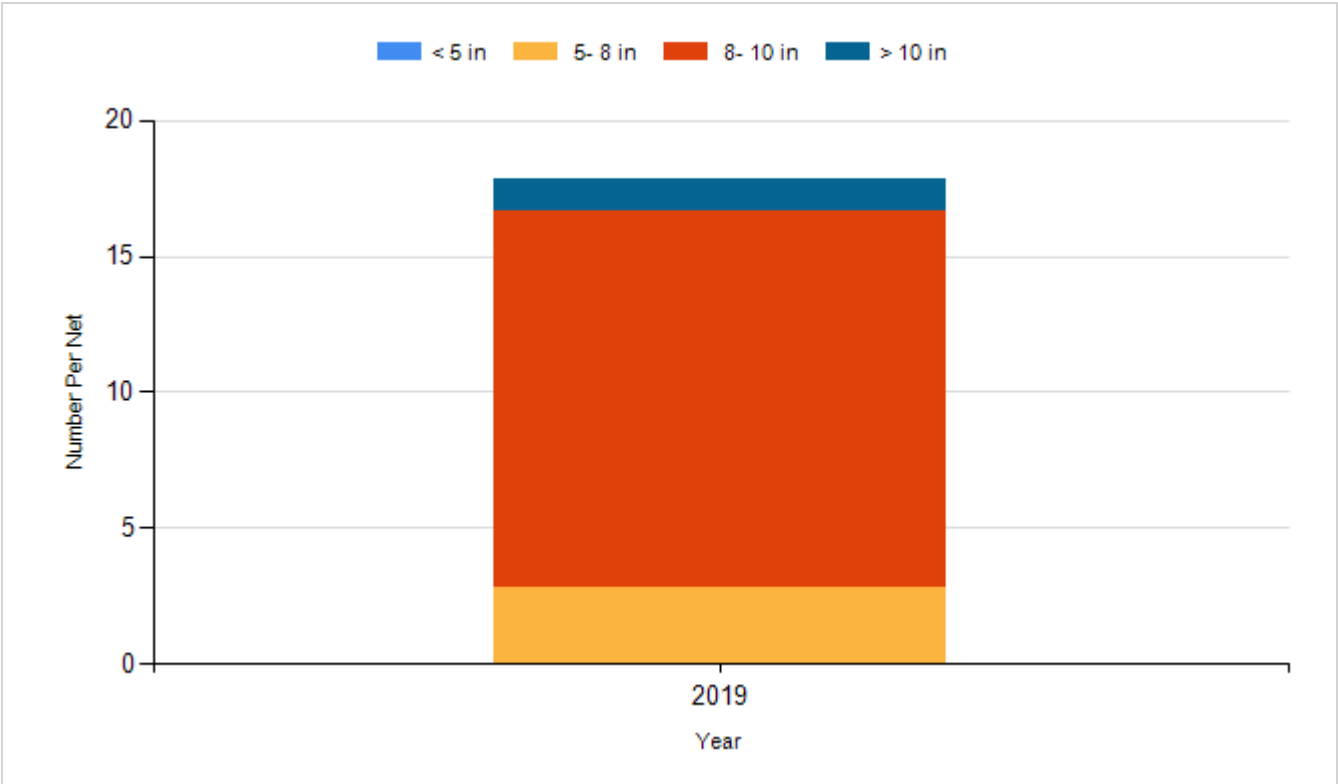
Species: Largemouth Bass
Gear: boat shocker (night)



Species: Walleye
Gear: AFS std gill net



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