SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Bismark, Custer County
MCS-Lake-7-000
2021

Lake Information

Name: Bismark

County: Custer

Surface Area: 24 Acres

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (night)	Jun 16, 2021	3000 seconds
frame net (std 3/4 in)	Sep 08, 2021	4 net-nights

Common Fish Species Present

Yellow Perch

Rainbow Trout

Largemouth Bass

Black Crappie

Black Bullhead

Smallmouth Bass

Bluegill

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.

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

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

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.

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

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 (in)	Stock (cm)	Quality (in)	Quality (cm)	Preferred (in)	Preferred (cm)	Memorable (in)	Memorable (cm)	Trophy (in)	Trophy (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)	Rainbow Trout	8	8.4	4.7	0		0		76	6
	Smallmouth Bass	33	38.4	17.1	53	13	44	13	91	2
frame net (std 3/4 in)	Black Bullhead	366	70.8	70.0	0		0		74	1
	Black Crappie	58	14.5	7.0	0		0		96	2
	Bluegill	1	0.3	0.4	100		100		119	
	Rainbow Trout	24	4.3	1.7	0		0		71	2
	Smallmouth Bass	8	1.8	1.2	57		29		93	3
	Yellow Perch	10	2.5	1.4	40		0		88	4

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

		CPUE										
Gear	Species	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Avg
boat shocker (night)	Rainbow Trout										8.4	8.40
	Smallmouth Bass										38.4	38.40
frame net (std 3/4 in)	Black Bullhead					14.8					70.8	42.80
	Black Crappie					0.3					14.5	7.40
	Bluegill					0.0					0.3	0.15
	Brown Trout					0.5					0.0	0.25
	Rainbow Trout					9.0					4.3	6.65
	Smallmouth Bass					4.5					1.8	3.15
	Yellow Perch					3.0					2.5	2.75

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
boat shocker (night)	Rainbow Trout	PSD										0
		PSD-P										0
		Wr										76
	Smallmouth Bass	PSD										53
		PSD-P										44
		Wr										91
frame net (std 3/4 in)	Black Bullhead	PSD					12					0
		PSD-P					3					0
		Wr					96					74
	Black Crappie	PSD					100					0
		PSD-P					100					0
		Wr										96
	Bluegill	PSD										100
		PSD-P										100
		Wr										119
	Rainbow Trout	PSD					0					0
		PSD-P					0					0
		Wr					72					71
	Smallmouth Bass	PSD					44					57
		PSD-P					0					29
		Wr					118					93
	Yellow Perch	PSD					75					40
		PSD-P					67					0
		Wr					92					88

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).

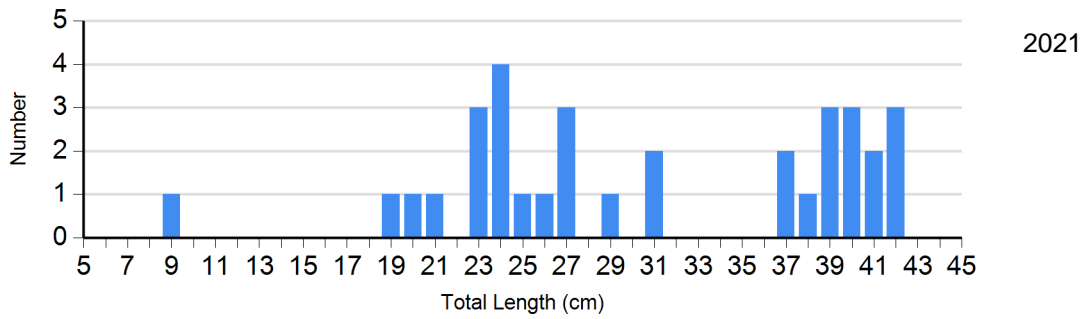| | | Length Groups | | | | | | | |
| | | S-Q | | Q-P | | P-M | | M | |
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Black Crappie Frame Net	2021	58	96 (1.6)	0		0		0	
Bluegill Frame Net	2021	0		0		1	119	0	
Smallmouth Bass Electro Fishing	2021	15	89 (1.8)	3	94 (3.4)	14	92 (2.1)	0	

Length Frequency Distribution

Length frequency histogram of species sampled by year.
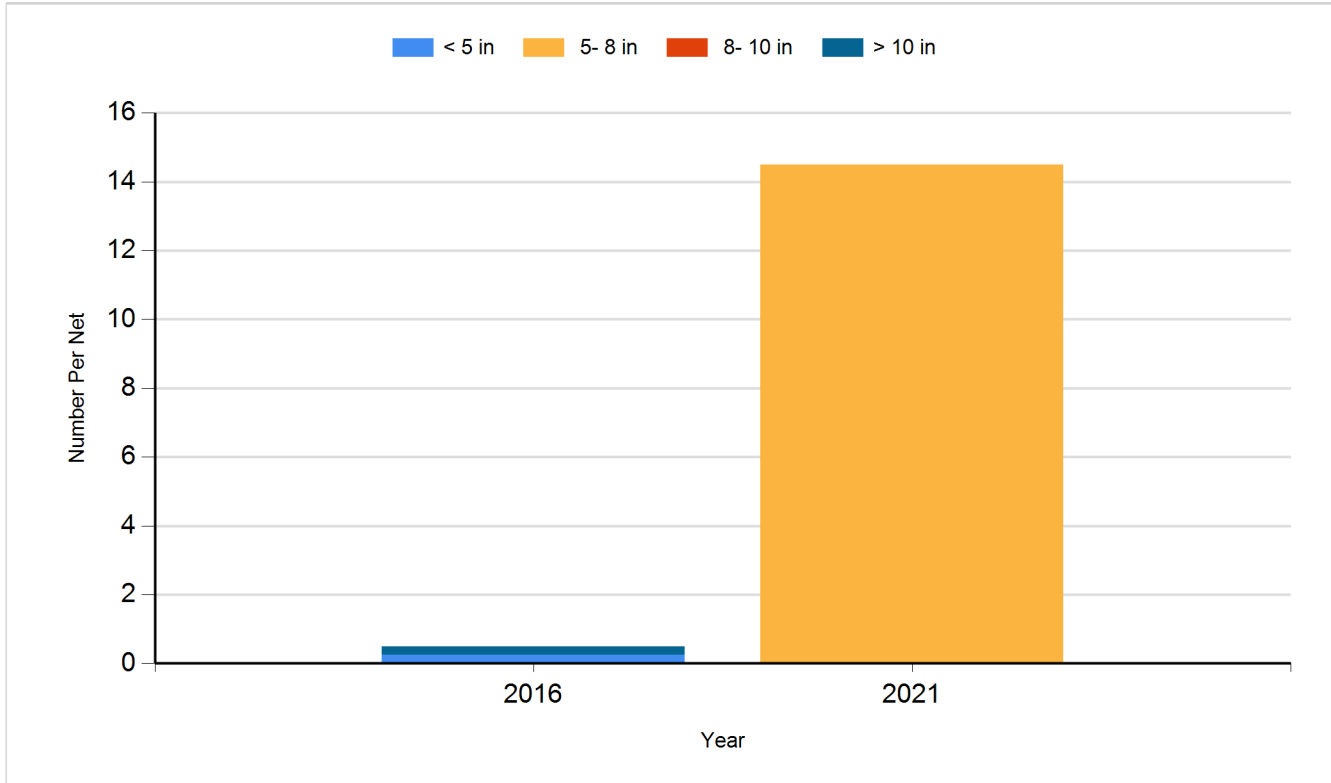
Species: Black Crappie
Gear: frame net (std 3/4 in)

2021

Species: Smallmouth Bass
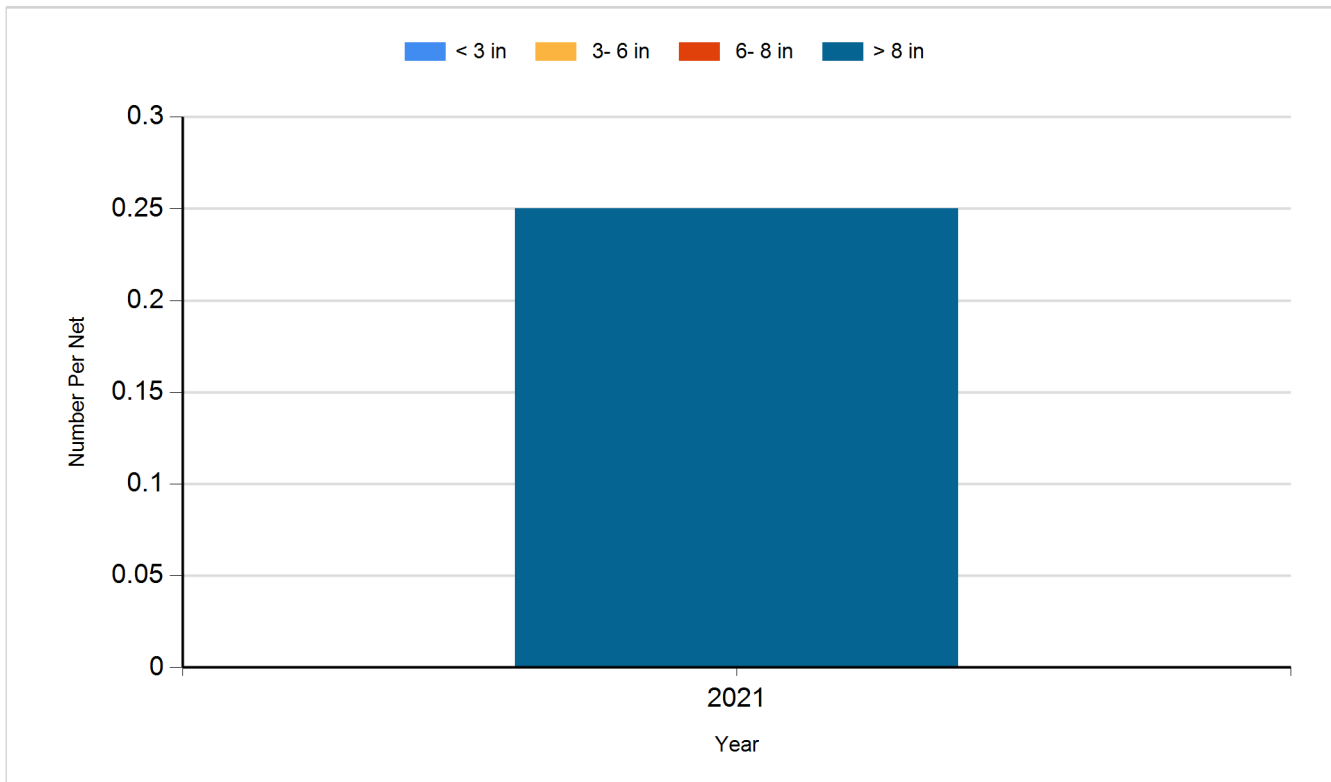Gear: boat shocker (night)

2021
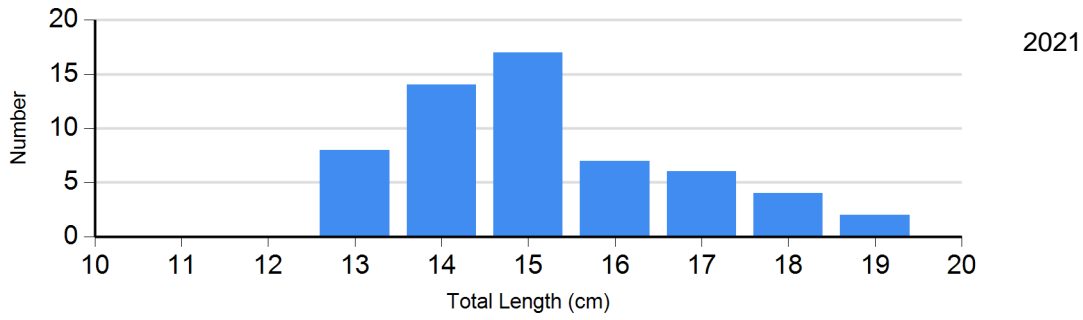
Historic Fish Sizes and Relative Abundance

Size distribution per net by color for species sampled by year.
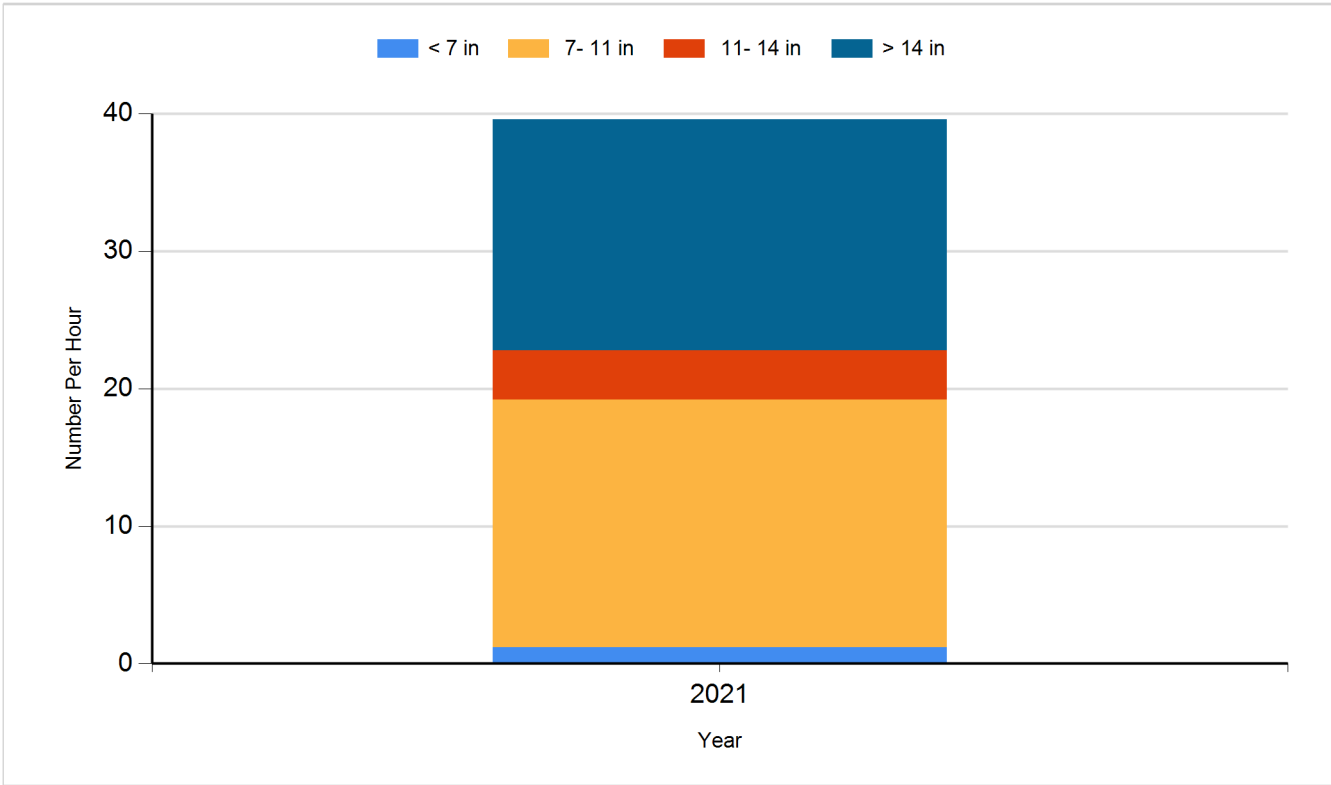
Species: Black Crappie
Gear: frame net (std 3/4 in)

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

Species: Smallmouth Bass
Gear: boat shocker (night)

Fish Stocking

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

Year	Species	Size	Number
2010	Rainbow Trout (Erwin x Arlee)	Catchable	1,400
2010	Rainbow Trout (Erwin)	Catchable 15"	70
2010	Rainbow Trout (Shasta)	Catchable	3,500
2010	Rainbow Trout (Shasta)	Catchable 15"	35
2011	Rainbow Trout (Erwin x Arlee)	Catchable	1,316
2011	Rainbow Trout (Erwin x Arlee)	Catchable 15"	105
2011	Rainbow Trout (Shasta)	Catchable	3,500
2012	Rainbow Trout (Erwin x Arlee)	Catchable	1,400
2012	Rainbow Trout (Erwin x Arlee)	Catchable 15"	70
2012	Rainbow Trout (Shasta)	Catchable	3,500
2013	Rainbow Trout (Erwin x Arlee)	Catchable	1,400
2013	Rainbow Trout (Erwin x Arlee)	Catchable 15"	115
2013	Rainbow Trout (Shasta)	Catchable	4,350
2014	Rainbow Trout (Erwin x Arlee)	Catchable 15"	70
2014	Rainbow Trout (Shasta)	Catchable	4,200
2015	Black Crappie	Adult	60
2015	Brown Trout	Fingerling	1,500
2015	Rainbow Trout (Erwin x Arlee)	Catchable	700
2015	Rainbow Trout (Erwin x Arlee)	Catchable 15"	70
2015	Rainbow Trout (Shasta)	Catchable	3,500
2015	Smallmouth Bass	Adult	380
2016	Brown Trout (Plymouth Rock)	Catchable 11"	700
2016	Rainbow Trout (Erwin x Arlee)	Catchable	1,400
2016	Rainbow Trout (Erwin x Arlee)	Catchable 15"	105
2016	Rainbow Trout (Shasta)	Catchable	3,500
2016	Redear Sunfish	Small Fingerling	6,450
2016	Smallmouth Bass	Adult	300
2016	Smallmouth Bass	Juvenile	300
2017	Brown Trout (Plymouth Rock)	Catchable	1,173
2017	Rainbow Trout (Eagle Lake)	Catchable	700
2017	Rainbow Trout (Erwin x Arlee)	Catchable	2,100
2017	Rainbow Trout (Shasta)	Catchable	2,100
2017	Redear Sunfish	Fingerling	4,100
2017	Smallmouth Bass	Adult	275
2018	Brown Trout (Plymouth Rock)	Catchable	500
2018	Rainbow Trout (Erwin x Arlee)	Catchable 11"	1,985

2018	Rainbow Trout (Shasta)	Catchable	700
2018	Rainbow Trout (Shasta)	Catchable 11"	2,800
2018	Redear Sunfish	Fingerling	9,795
2018	Smallmouth Bass	Juvenile	250
2019	Brown Trout (Plymouth Rock)	Catchable	386
2019	Rainbow Trout (Shasta)	Catchable 11"	5,553
2020	Rainbow Trout (Arlee)	Catchable 11"	4,900
2020	Rainbow Trout (Shasta)	Catchable 11"	3,200
2021	Rainbow Trout (Arlee)	Adult	1,293
2021	Rainbow Trout (Arlee)	Catchable 11"	590
2021	Rainbow Trout (Shasta)	Adult	2,827