2023 Dante Lake (Charles Mix County)

Dante Lake is located 5 miles east and 1 mile south of Wagner, SD. It is a 16-acre impoundment with a mean depth of 11 feet and max depth of 23 feet. Access locations at Dante Lake consist of a concrete boat ramp, a fishing pier on the west side and several maintained shore fishing locations. It is managed as a multi-species fishery consisting of Bluegill, Channel Catfish and Largemouth Bass. Sampling occurs every three years, consisting of frame nets targeting all species and fall electrofishing targeting Largemouth Bass.

- **No fish were sampled in 2023.**

On March 29th, 2023, four solar powered aeration units were installed at Dante Lake. This equipment was purchased with Habitat Stamp funds. Each aeration unit is equipped with four air diffusers. These diffusers are spread throughout the entire lake. The purpose of this project is to improve water quality and ultimately make it more habitable for fish in the hot summer months. High nutrient loads in this lake have caused poor water quality which has subsequently decreased fish survival. Noticeable changes realized thus far from this project have been an increase in dissolved oxygen throughout and a decrease of reactive phosphorus in the deepest sampling site on the lake. Since the installation of the aeration systems dissolved oxygen levels have increased during months when fish survival has been low. The deepest parts of the lake in the summer of 2022 before the aeration units were installed had high reactive phosphorus (~24 – 33.3 mg/L PO_4^{3-}) and total phosphorus (~1.2 -2.2 mg/L PO_4^{3-}) levels and have significantly decreased to an average of 2.9 mg/L PO_4^{3-} with a maximum of 12.2 mg/L PO_4^{3-} and 0.47 mg/L PO_4^{3-} with a maximum of 0.75 mg/L PO_4^{3-} respectively while the aeration units were operating during this summer. Aeration units will be turned off during the ice-covered months and turned on again in the spring.

* 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.

Created 1/29/2024 AG

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Dante, Charles Mix County
LCL-Lake-33-000
2023

Lake Information

Name: Dante

County: Charles Mix

Legal Description: T95-R62-S4

Surface Area: 16 Acres

Maximum Depth: 23 Feet

Mean Depth: 11 Feet

Surveys and Investigations

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

Gear	Date	Effort
frame net (std 3/4 in)	Jun 21, 2023	4 net-nights

Common Fish Species Present

Largemouth 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.

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

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

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

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	Avg
AFS std frame net	Black Bullhead				0.5							0.50
	Bluegill				14.2							14.20
	Fathead Minnow				0.0							0.00
	Yellow Perch				0.1							0.10
boat shocker (night)	Bluegill	0.0				431.9						215.95
	Fathead Minnow	0.0				0.0						0.00
	Largemouth Bass	2.0				0.0						1.00
frame net (std 3/4 in)	Black Bullhead		1.3									1.30
	Bluegill		10.1									10.10
	Fathead Minnow		0.0									0.00
	Yellow Perch		6.1									6.10

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	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AFS std frame net	Bluegill	PSD				6						
		PSD-P				0						
		Wr				93						
boat shocker (night)	Bluegill	PSD					13					
		PSD-P					0					
		Wr					106					
	Largemouth Bass	PSD	100									
		PSD-P	100									
		Wr	126									
frame net (std 3/4 in)	Bluegill	PSD		15								
		PSD-P		0								
		Wr		109								

Length at Capture

Mean length at capture by age across years sampled, sample size (N).

Species: Bluegill

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2017	167		86 (132)	128 (35)							
2015	101	103 (85)	163 (7)	163 (8)	155 (1)						

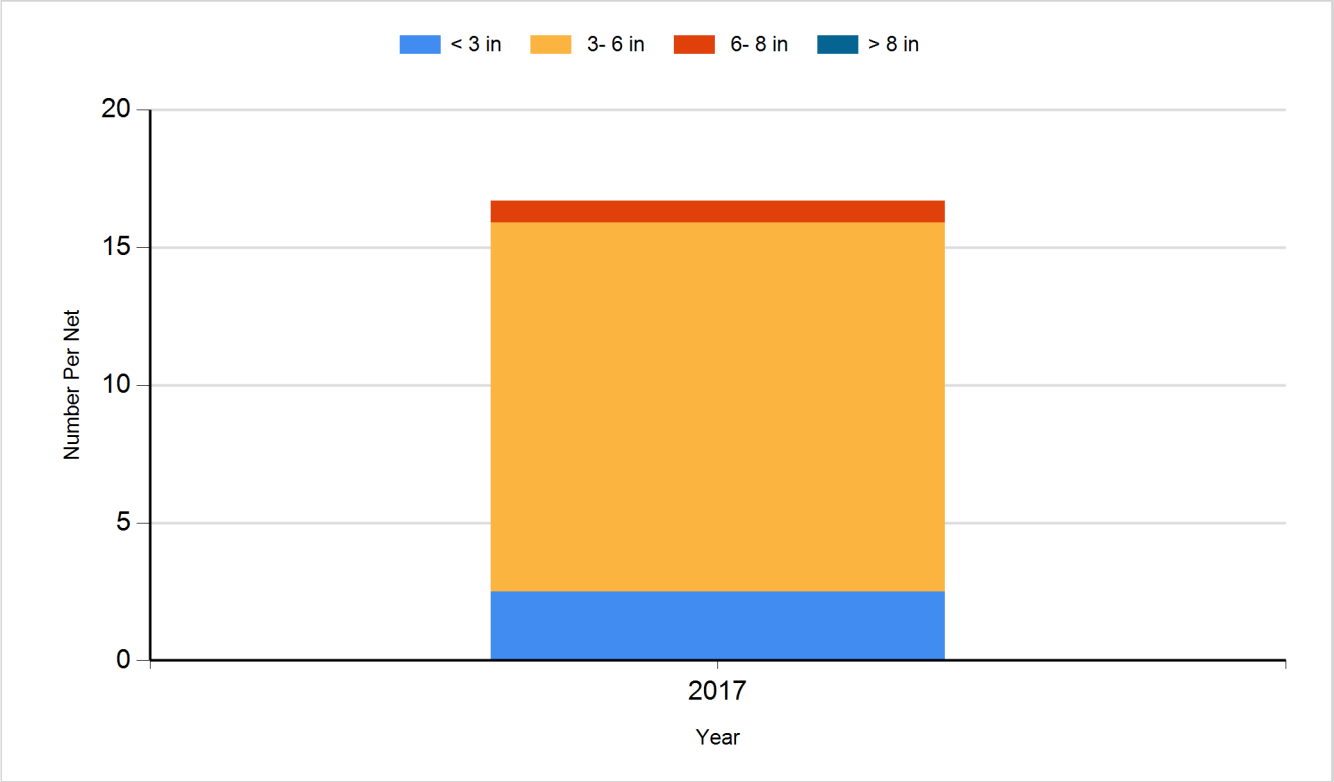
Species: Largemouth Bass

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2014	1		392 (1)								

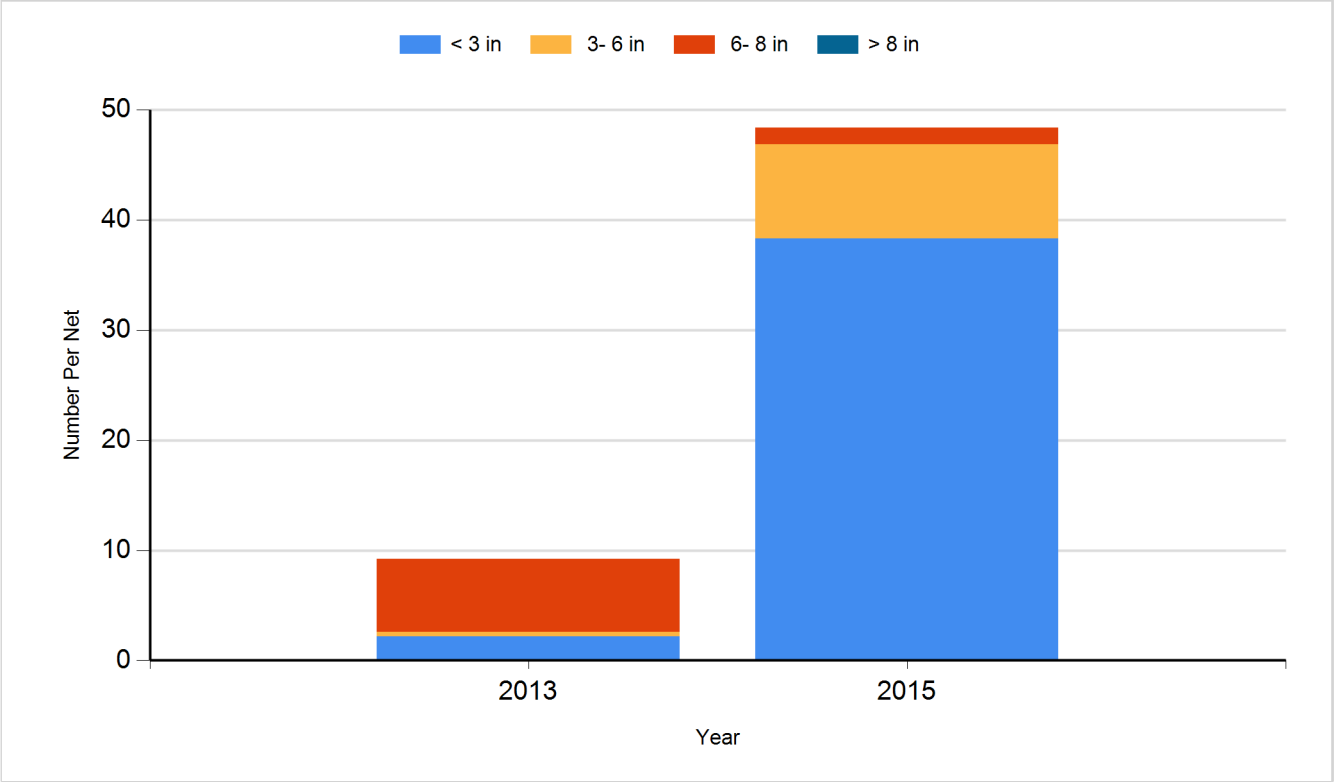
Historic Fish Sizes and Relative Abundance

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

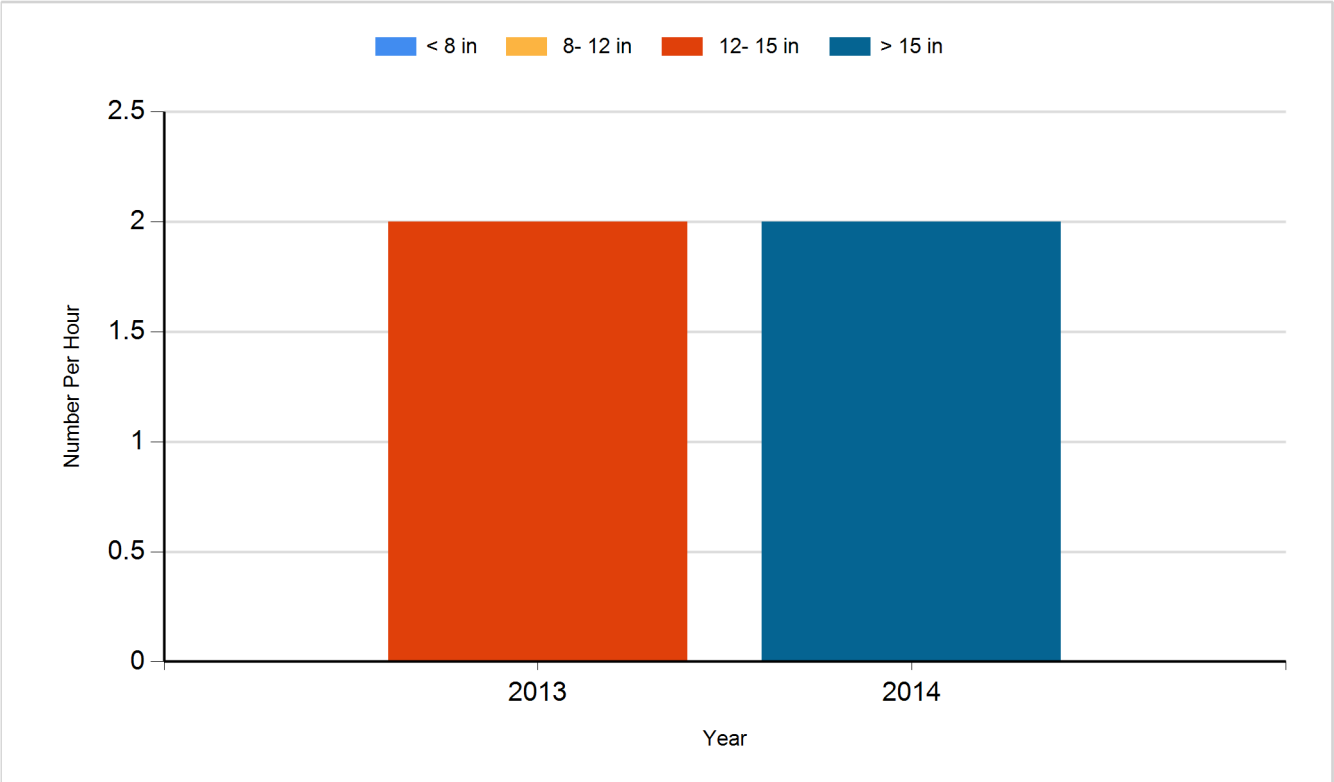
Species: Bluegill
Gear: AFS std frame net



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



Species: Largemouth Bass
Gear: boat shocker (night)



Fish Stocking

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

Year	Species	Size	Number
2012	Largemouth Bass	Juvenile	102
2013	Largemouth Bass	Large Fingerling	624
2014	Largemouth Bass	Fingerling	650
2014	Largemouth Bass	Juvenile	600
2015	Largemouth Bass	Juvenile	630
2016	Largemouth Bass	Juvenile	244
2017	Largemouth Bass	Adult	68
2017	Largemouth Bass	Fingerling	990
2018	Largemouth Bass	Adult	95
2018	Smallmouth Bass	Adult	45
2021	Channel Catfish		400
2022	Channel Catfish	Juvenile	125