SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Wilmarth, Aurora County
LJA-Lake-233-000
2021

Lake Information

Name: Wilmarth

County: Aurora

Legal Description: T105N-R65W-Sec 35, 36

Surface Area: 116 Acres

Maximum Depth: 26 Feet

Mean Depth: 11 Feet

Surveys and Investigations

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

Gear	Date	Effort
boat shocker (day)	Jun 07, 2021	3600 seconds

Common Fish Species Present

Largemouth Bass

Black Bullhead

Bluegill

Green Sunfish

Black Crappie

Yellow Perch

Northern Pike

Sunfish Hybrid

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
boat shocker (day)	Black Bullhead	1313	1,289.0		39	2	0			
	Black Crappie	7	2.0		50		50		98	
	Bluegill	66	65.0		62	9	18	7	122	2
	Green Sunfish	2	2.0		50		0			
	Largemouth Bass	9	9.0		100		44		103	3
	Northern Pike	1	1.0		100		100			
	Sunfish Hybrid	5	0.0							
	Yellow Perch	2	2.0		100		0		100	7

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 (day)	Black Bullhead								14.4		1,289.0	651.70
	Black Crappie								0.0		2.0	1.00
	Bluegill								2.4		65.0	33.70
	Green Sunfish								0.0		2.0	1.00
	Largemouth Bass								0.0		9.0	4.50
	Northern Pike								0.0		1.0	0.50
	Sunfish Hybrid								0.0		0.0	0.00
	Yellow Perch								0.0		2.0	1.00
boat shocker (night)	Black Bullhead		144.5	551.5	129.5	0.0						206.38
	Black Crappie		4.0	3.0	2.0	0.0						2.25
	Bluegill		61.5	28.5	22.5	0.0						28.13
	Largemouth Bass		2.5	7.0	5.0	17.0						7.88
	Northern Pike		0.5	5.0	4.0	0.0						2.38
	Yellow Perch		3.5	2.5	3.0	0.0						2.25
frame net (std 3/4 in)	Black Bullhead					232.0						232.00
	Bluegill					0.2						0.20
	Northern Pike					0.6						0.60
	Yellow Perch					0.2						0.20

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	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
boat shocker (day)	Black Bullhead	PSD								0		39
		PSD-P								0		0
	Black Crappie	PSD										50
		PSD-P										50
		Wr										98
	Bluegill	PSD								50		62
		PSD-P								0		18
		Wr								113		122
	Green Sunfish	PSD										50
		PSD-P										0
	Largemouth Bass	PSD								0		100
		PSD-P								0		44
		Wr										103
	Northern Pike	PSD										100
		PSD-P										100
	Yellow Perch	PSD										100
		PSD-P										0
		Wr										100
boat shocker (night)	Black Bullhead	PSD		84	69	92						
		PSD-P		3	4	7						
		Wr		93								
	Black Crappie	PSD		50	0	0						
		PSD-P		0	0	0						
		Wr		100	115	108						
	Bluegill	PSD		71	74	31						
		PSD-P		0	4	9						
		Wr		107	121	117						
	Largemouth Bass	PSD		80	93	100	32					
		PSD-P		60	71	100	29					
		Wr		117	119	120	115					
	Northern Pike	PSD		0	20	88						
		PSD-P		0	0	13						
		Wr		108	86	74						

			Year									
Gear	Species	Index	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
boat shocker (night)	Yellow Perch	PSD		14	60	0						
		PSD-P		14	0	0						
		Wr		104	96	93						
frame net (std 3/4 in)	Black Bullhead	PSD					32					
		PSD-P					0					
	Bluegill	PSD					100					
		PSD-P					100					
		Wr					118					
	Northern Pike	PSD					67					
		PSD-P					0					
		Wr					80					
	Yellow Perch	PSD					0					
		PSD-P					0					

Length at Capture

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

Species: Largemouth Bass

		Mean Length (expanded sample number) at capture by age									
Year	N	1	2	3	4	5	6	7	8	9	10+
2013	4			309 (2)	442 (1)						518 (1)

Fish Condition

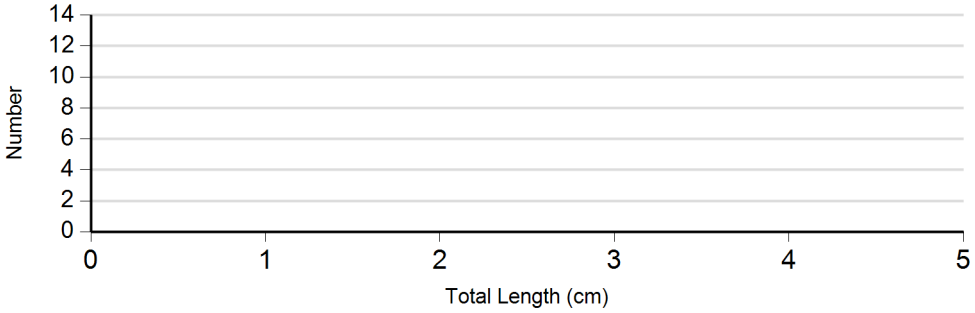
Mean relative weight (Wr) by sample size (N), length category stock to quality (S-Q), quality to preferred (Q-P), preferred to memorable (P-M), and memorable (M) for species collected across survey years with standard error (SE).

		Length Groups							
		S-Q		Q-P		P-M		M	
Species	Year	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)	N	Wr (SE)
Largemouth Bass Electro Fishing	2019	0		0		0		0	
	2021	0		5	104 (3.9)	4	102 (2.2)	0	

Length Frequency Distribution

Length frequency histogram of species sampled by year.

Species: Largemouth Bass
Gear: boat shocker (night)

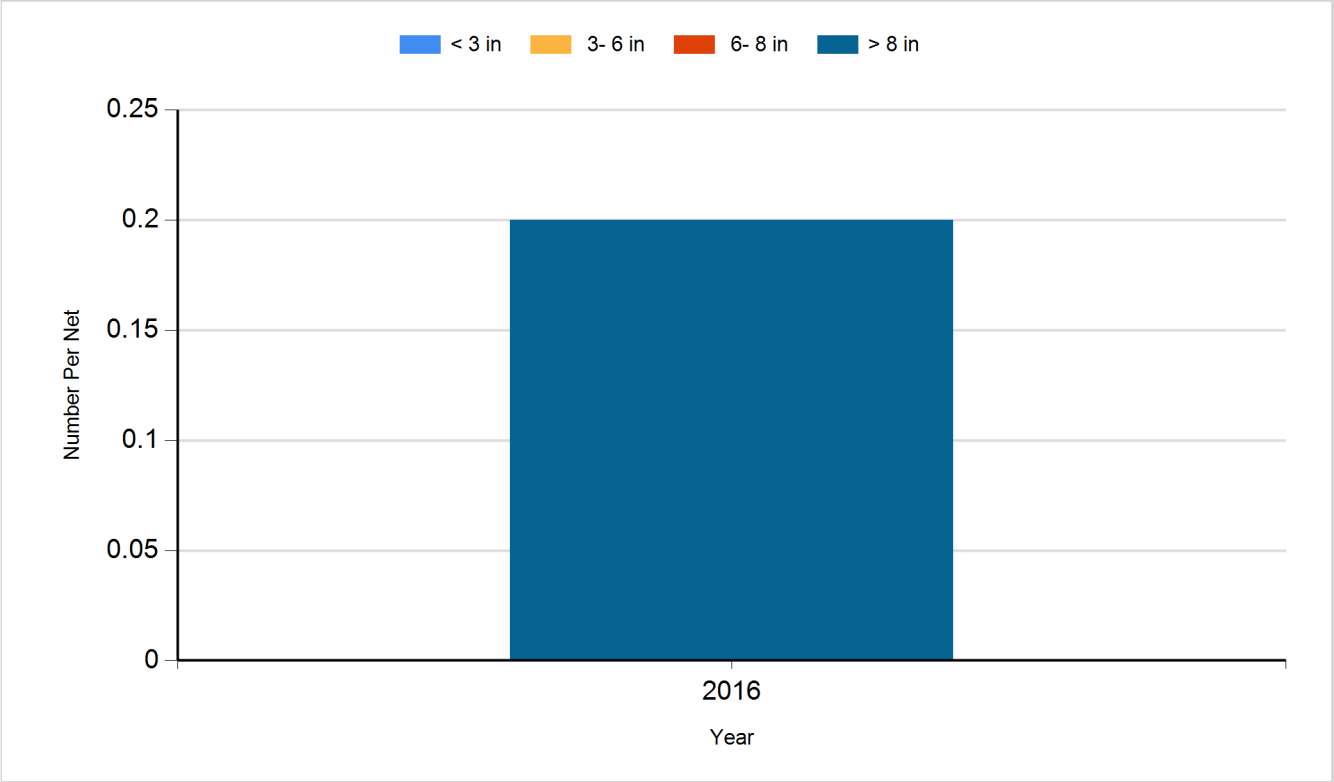


2016

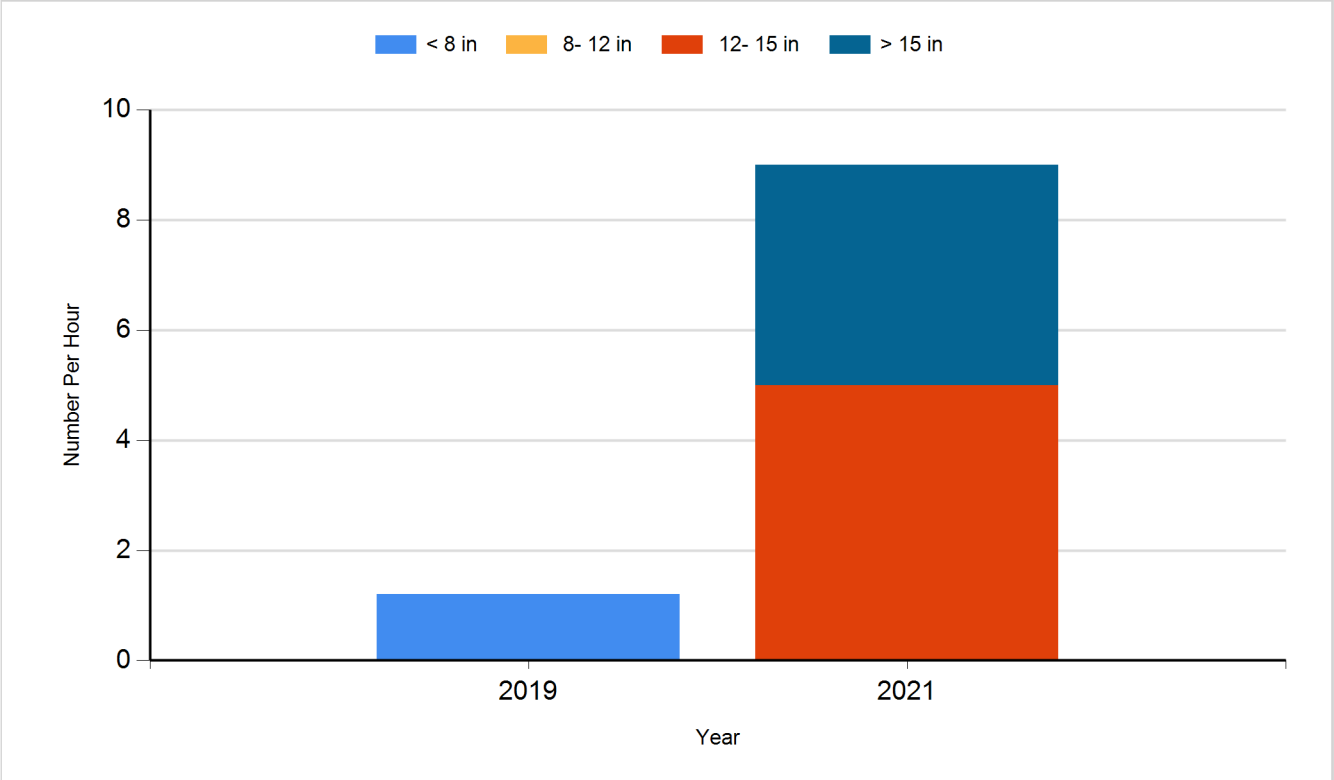
Historic Fish Sizes and Relative Abundance

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

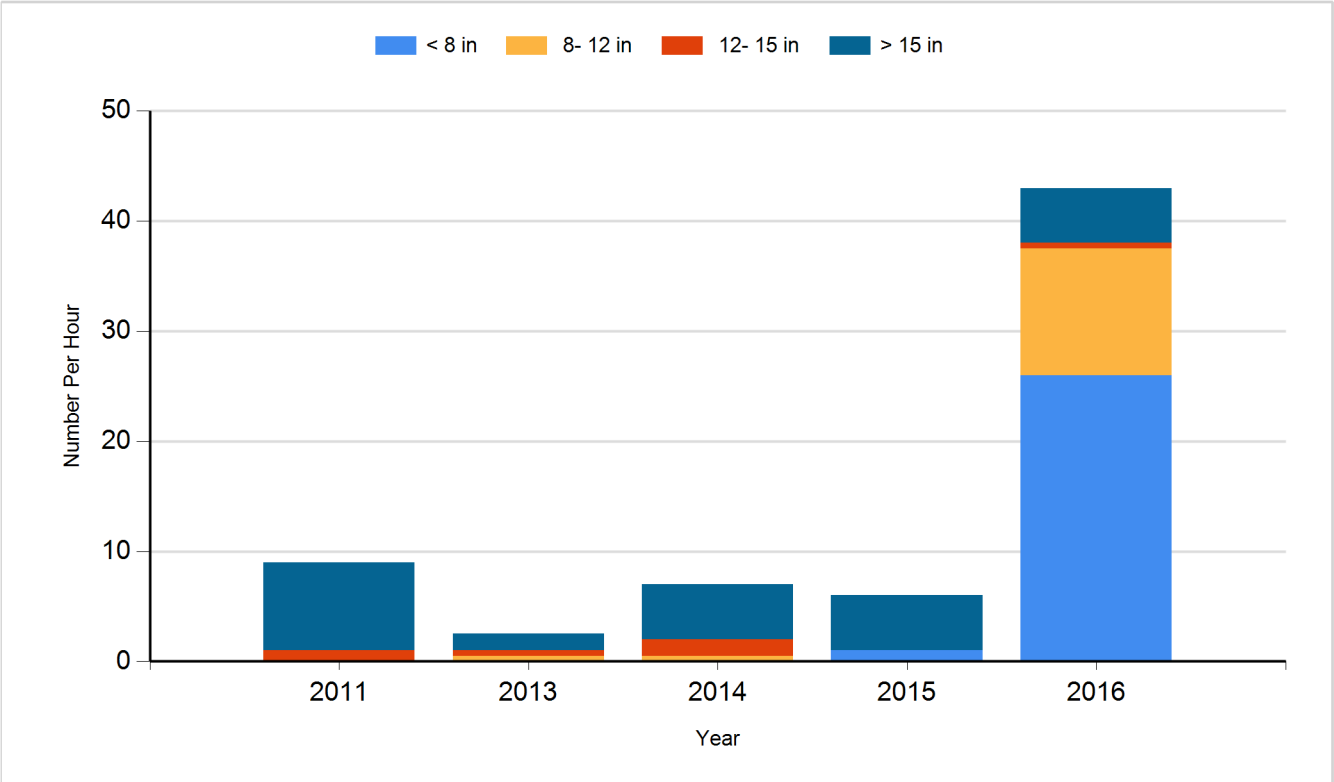
Species: Bluegill
Gear: frame net (std 3/4 in)



Species: Largemouth Bass
Gear: boat shocker (day)



Species: Largemouth Bass
Gear: boat shocker (night)



Fish Stocking

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

Year	Species	Size	Number
2012	Channel Catfish	Fingerling	10,000
2012	Largemouth Bass	Fingerling	1,030
2015	Largemouth Bass	Juvenile	1,035
2019	Largemouth Bass	Adult	637
2019	Largemouth Bass	Catchable	306
2019	Walleye	Small Fingerling	7,840
2019	Yellow Perch	Fry	40,000