

SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Long Lake, Lake County
2102-F-21-R-47
2014



Figure 1. Long Lake, Lake County

Legal Description: T105-106N-R51-52W-Sec 1, 6, 31, 36

Location from nearest town: 3 miles west, 3 north and 1½ west of Chester, SD

Surface Area: 480 acres

Meandered (Y/N): yes

OHWM elevation: no data

Outlet elevation: no data

Max. depth at outlet elevation: 6 feet

Observed water level: 1 foot low

Contour map available (Y/N): yes

Watershed area: no data

Shoreline length: 11.5 miles

Date set: NA

Date set: NA

Mean depth at outlet elevation: 1.7 feet

Lake volume: 830 acre-feet

Date mapped: 1992

DENR beneficial use classifications: (6) warmwater marginal fish propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation, recreation and stock watering

Introduction

General

Long Lake is a natural lake named for its long, narrow shape. The lake gets most of its water from Buffalo Creek, which enters on the west end. The natural outlet is on the east end and eventually empties into Skunk Creek. The lake reached its highest recorded depth in 1986 at 9 feet, but when it was mapped in 1992, the maximum depth was only 6 feet.

Ownership of Lake and Adjacent Lakeshore Properties

Long Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. The United States Fish and Wildlife Service (USFWS) owns about 350 acres of land adjacent to the lake with the remainder of the shoreline in private ownership.

Fishing Access

There are no boat ramps on Long Lake. However, small boats can be launched off shorelines on the north and south sides of the lake. The entire lake has been designated as a no-wake zone except during the months of July and August. There are many shore fishing locations available on the public lands.

Water Quality and Aquatic Vegetation

Water temperature was 22 °C (72°F) at the time of survey. The Secchi depth measurement was only 28 cm (11 in) and no aquatic vegetation was observed (Table 1).

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Long Lake, Lake County, 2005-2014.

Year	Water Temp °C (°F)	Secchi Depth cm (in)	Observations/Comments (algae, aquatic vegetation, water quality, etc.)
2014	22 (72)	28 (11)	No aquatic vegetation observed
2012	26 (78)	48 (19)	No aquatic vegetation observed
2005	23 (74)	30 (12)	Sago pondweed, cattail, bulrushes, and flooded terrestrial

Fish Community

Long Lake has a simple fish community comprised of four species (Table 2). A few black crappie, green sunfish, northern pike, walleye, and white sucker have been sampled in the past (Table 7).

Table 2. Fish species commonly found in Long Lake, Lake County.

<i>Game Species</i>	<i>Other Species</i>
Yellow Perch Black Bullhead Orange-spotted Sunfish	Common Carp

Fish Management

The primary fish management objective for Long Lake is to provide a source of yellow perch for stocking into other waters. Providing a yellow perch fishing opportunity is the secondary objective. Stocking is occasionally used in attempts to achieve these objectives (Table 4). However, frequent fish kills often thwart these efforts (Table 3).

Table 3. Fish kill history for Long Lake, Lake County.

<i>Year</i>	<i>Severity</i>	<i>Comments</i>
2011	Light	Minor winterkill of carp and a few perch
2010	Severe	Winterkill, no YEP found alive, some BLB and COC survived
2001	Severe	Winterkill, only 12 bullheads caught in test nets
1997	Severe	Winterkill – some small perch, bullheads and pike survived

Table 4. Stocking history for Long Lake, Lake County, 2005-2014.

<i>Year</i>	<i>Number</i>	<i>Species</i>	<i>Size</i>
2005	83,955	Yellow Perch	Fingerling
2010	17,350	Yellow Perch	Juvenile
	50,810	Yellow Perch	Large Fingerling
2011	128,000	Yellow Perch	Small Fingerling

Methods

Long Lake was sampled on June 16-17, 2014 with three overnight gill nets. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh ($\frac{1}{2}$, $\frac{3}{4}$, 1, $1\frac{1}{4}$, $1\frac{1}{2}$, and 2 in) monofilament netting.

Results and Discussion

Net Catch Results

Black bullhead and common carp comprised the majority the gill-net catch (Table 5). Yellow perch, orange-spotted sunfish, and one walleye were also sampled. Since walleye have not been stocked, it is assumed this fish was illegally stocked. Nearly all fish sampled were stock length and longer (Table 6).

Table 5. Total catch from three overnight gill nets set in Long Lake, Lake County, June 16-17, 2014.

<i>Species</i>	<i>#</i>	<i>%</i>	<i>CPUE</i> ¹	<i>80% C.I.</i>	<i>Mean CPUE*</i>	<i>PSD</i>	<i>RSD-P</i>	<i>Mean Wr</i>
Black Bullhead	293	72.2	97.7	+22.9	80.0	29	0	--
Common Carp	80	19.7	26.7	+4.3	26.8	94	0	--
Yellow Perch	23	5.7	7.7	+6.0	5.7	22	9	102
O. S. Sunfish	9	2.2	3.0	+2.0	1.1	--	--	--
Walleye	1	0.2	0.3	+0.4	0.2	--	--	--

*10 years (2005-2014)

Table 6. CPUE by length category for selected species sampled with gill nets in Long Lake, Lake County, June 16-17, 2014.

<i>Species</i>	<i>Substock</i>	<i>Stock</i>	<i>S-Q</i>	<i>Q-P</i>	<i>P+</i>	<i>All sizes</i>	<i>80% C.I.</i>
Black Bullhead	0.3	97.3	86.3	11.0	--	97.7	+22.9
Common Carp	6.0	20.7	1.3	19.3	--	26.7	+4.3
Yellow Perch	--	7.7	6.0	1.0	0.7	7.7	+6.0
O. S. Sunfish*	--	--	--	--	--	3.0	+2.0
Walleye	--	0.3	--	0.3	--	0.3	+0.4

*No length categories established. Length categories can be found in Appendix A.

Table 7. Gill-net (GN), and trap-net (TN) CPUE for selected fish species sampled in Long Lake, Lake County, 2005-2014.

<i>Species</i>	<i>Gear</i>	<i>2005</i>	<i>2006</i>	<i>2007</i>	<i>2008</i>	<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>	<i>2013</i>	<i>2014</i>
Black Bullhead	GN	12.0							130.3		97.7
	TN	64.1							642.5		
Black Crappie	GN	--							0.3		--
	TN	0.1							--		
Common Carp	GN	22.5							31.3		26.7
	TN	3.9							13.5		
Green Sunfish	GN	--							0.7		--
	TN	0.1							2.3		
Northern Pike	GN	2.0							--		--
	TN	1.3							0.3		
O. S. Sunfish	GN	--							0.3		3.0
	TN	7.6							0.3		
Walleye	GN	--							0.3		0.3
	TN										
White Sucker	GN	--							--		--
	TN	0.3							--		
Yellow Perch	GN	46.5							50.7		7.7
	TN	19.4							7.5		

¹ See Appendix A for definitions of CPUE, PSD, RSD, RSD-P and mean Wr.

Yellow Perch

Management Objectives

- raise yellow perch for stocking other South Dakota waters
- provide occasional yellow perch fishing opportunity

Management Strategies

- stock yellow perch eggs, fry, small fingerlings or adults as needed to achieve the management objectives
- conduct annual fish population surveys and report the results to inform anglers of potential fishing opportunity

Yellow perch abundance has declined substantially since 2012 (Table 8). High abundance in 2012 may be a result of stocking efforts the previous two years (Table 9). Although Long Lake was not surveyed in 2013, it may have experienced the same sharp decline in yellow perch abundance seen in many southeastern South Dakota lakes that year. Most of the yellow perch sampled were between stock and quality size (Figure 2).

Table 8. CPUE, PSD, RSD-P, and mean Wr for all yellow perch sampled with gill nets in Long Lake, Lake County, 2005-2014. Stocked years are shaded.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CPUE	46.5							50.7		7.7
PSD	46							10		22
RSD-P	34							1		9
Mean Wr	100							96		102

Table 9. Yellow perch stocked into Long Lake, Lake County, 2005-2014.

Year	Number	Size
2005	83,955	Fingerling
2010	17,350	Juvenile
	50,810	Large Fingerling
2011	128,000	Small Fingerling

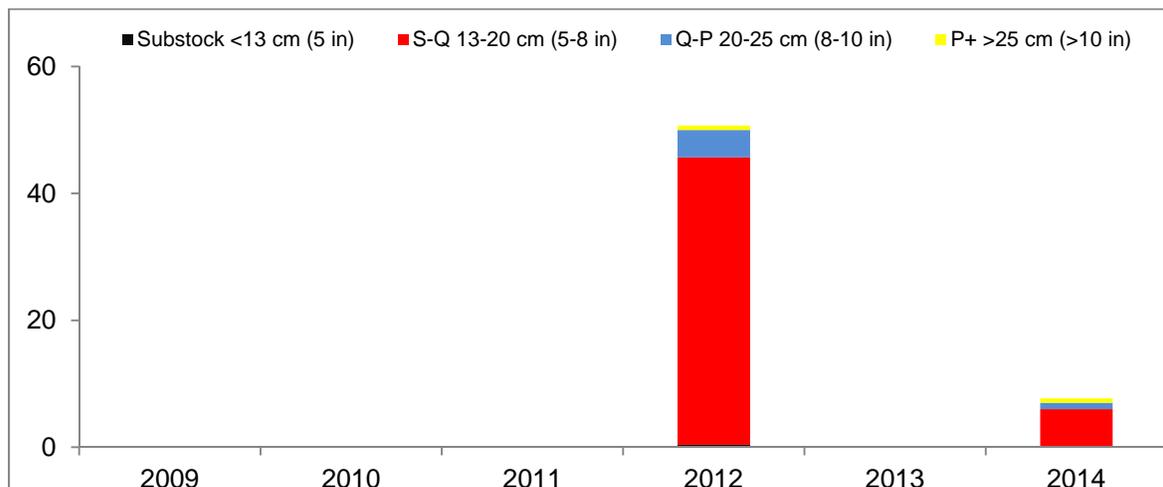


Figure 2. CPUE by length category for yellow perch sampled with gill nets in Long Lake, Lake County, 2009-2014.

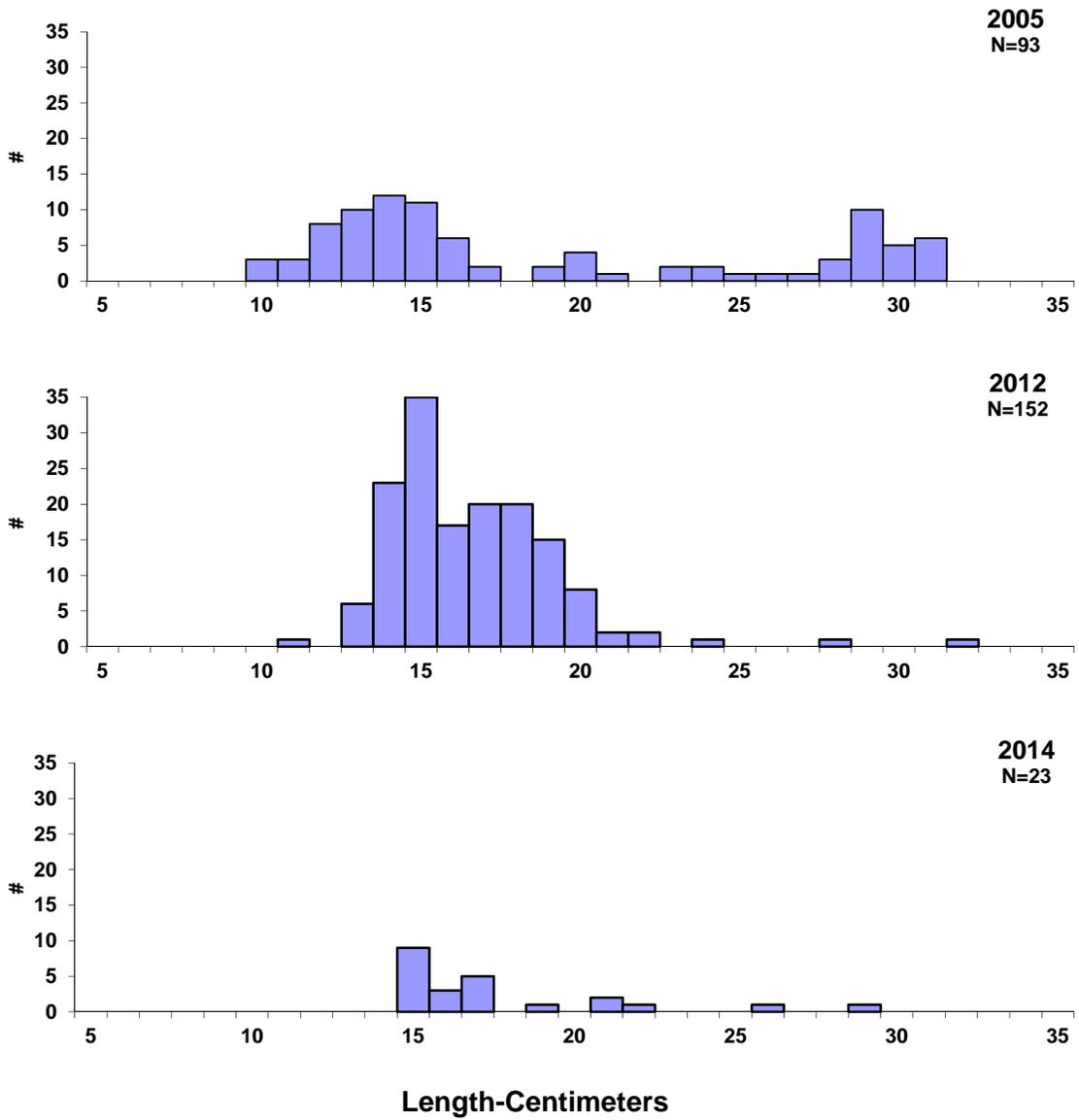


Figure 3. Length frequency histograms for yellow perch sampled with gill nets in Long Lake, Lake County, 2005, 2012, 2014.

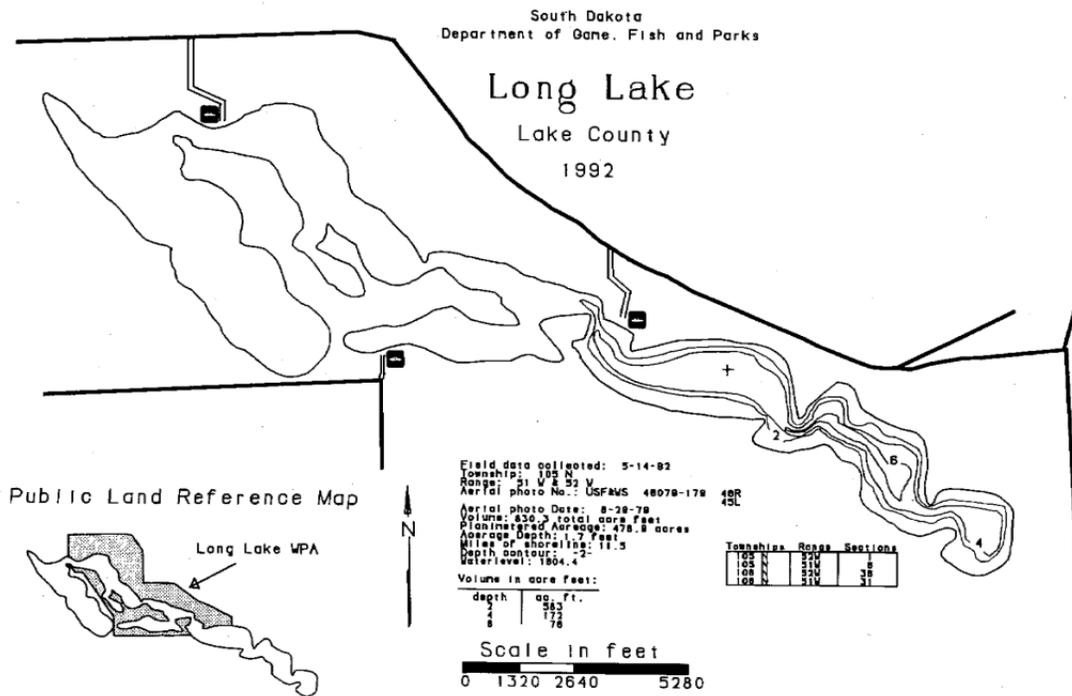


Figure 4. Contour map of Long Lake, Lake County.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$\text{PSD} = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$\text{RSD-P} = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.