

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



Figure 1. Lake Henry, Lake County

Legal Description: T105-R54 - Sec. 4, 9

Location from nearest town: 5 miles south, 2 miles east of Winfred, SD

Surface Area: 428 acres

Meandered (Y/N): yes

OHWM elevation: no data

Outlet elevation: no data

Max. depth at outlet elevation: 13 feet

Observed water level: Full

Contour map available (Y/N): no

Watershed area: no data

Shoreline length: no data

Date set: NA

Date set: NA

Mean depth at outlet elevation: 9 feet

Volume at outlet elevation: 14,440 acre feet

Date mapped: NA

DENR beneficial use classifications: (5) warmwater semipermanent fish life propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation, recreation, and stock watering

Introduction

General

No general information at this time.

Ownership of Lake and Adjacent Lakeshore Properties

Lake Henry is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes and the South Dakota Department of Game, Fish and Parks (GFP) manages the fishery. Most of the lake lies within a Waterfowl Production Area (WPA) owned by the United States Fish and Wildlife Service (USFWS). The remainder of the shoreline is privately owned.

Fishing Access

Lake Henry has a gravel trail on the west shore of the lake to the water's edge. Small boats can be launched off a primitive rock ramp. Shore fishing is available within the public land described above.

Water Quality and Aquatic Vegetation

The water in Lake Henry was clear during the survey. The Secchi depth measurement was 1.17 m (46 in) (Table 1). Clasp ing leaf pondweed (*Potamogeton richardsonii*) and sago pondweed (*Potamogeton pectinatus*) were present.

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

Year	Water Temp °C (°F)	Secchi Depth cm (in)	Observations/Comments (algae, aquatic vegetation, water quality, etc.)
2012	26 (75)	244 (96)	small beds of sago and clasp ing leaf
2014	21 (70)	117 (46)	small beds of sago and clasp ing leaf

Fish Community

Lake Henry's fish community is fairly simple with only five species sampled (black crappies were stocked after the survey, Table 2).

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

Game Species	Other Species
Walleye	Orange-spotted Sunfish
Yellow Perch	Fathead Minnow
Black Bullhead	
Black Crappie	

Fish Management

Lake Henry is managed primarily for walleye and yellow perch and stocking is used to maintain their populations (Table 3). Black crappies were introduced in 2014 in an attempt to create additional fishing opportunities.

Table 3. Stocking history for Lake Henry, Lake County, 2005-2014.

Year	Number	Species	Size
2006	120,000	Walleye	Small Fingerling
2007	43,920	Walleye	Small Fingerling
2010	400,000	Walleye	Fry
2011	40,160	Walleye	Small Fingerling
	201,450	Yellow Perch	Small Fingerling
2012	1,056	Yellow Perch	Adult
	4,725	Yellow Perch	Juvenile
2014	400,000	Walleye	Fry
	98	Black Crappie	Adult

Methods

Lake Henry was sampled on June 16- 17, 2014 with three overnight gill-net sets. The gill nets were 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

Although black bullheads comprised the majority of the fish sampled in the gill nets, a good number of walleyes were also caught (Table 4).

Table 4. Total catch from three overnight gill nets set in Lake Henry, Lake County, June 30-July 1, 2014.

Species	#	%	CPUE¹	80% C.I.	Mean CPUE*	PSD	RSD-P	Mean Wr
Black Bullhead	227	75.7	75.7	+32.4	63.2	59	6	--
Walleye	67	22.3	22.3	+4.5	51.1	74	3	92
Yellow Perch	5	1.7	1.7	+0.9	14.7	--	--	--
O. S. Sunfish	1	0.3	0.3	+0.4	0.1	--	--	--

*3 years (2011, 2012, 2014)

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

Table 5. CPUE by length category for selected species sampled with gill nets in Lake Henry, Lake County, June 30-July 1, 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	17.3	58.3	23.7	31.3	3.3	75.7	<u>±32.4</u>
Walleye	0.3	22.0	5.7	15.7	0.7	22.3	<u>±4.5</u>
Yellow Perch	--	1.7	1.7	--	--	1.7	<u>±0.9</u>
O. S. Sunfish*	--	--	--	--	--	0.3	<u>±0.4</u>

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

Table 6. Gill-net CPUE for selected fish species sampled in Lake Henry, Lake County, 2005-2014.

<i>Species</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							65.7	48.3		75.7
O. S. Sunfish							--	--		0.3
Walleye							74.3	56.7		22.3
Yellow Perch							3.7	38.7		1.7

Walleye

Management Objective

- maintain a walleye population with a total gill-net CPUE of at least 15

Management Strategy

- stock small walleye fingerlings at the rate of 70/acre (29,960) as needed to achieve the management objective

Walleye abundance is above the management objective (Table 7), and the majority of the fish sampled were 38-51 cm (15-20 in) long (Figures 2 and 3). A few substock-length fish were sampled indicating some natural reproduction or survival of stocked walleyes (Table 8, Figure 2).

Table 7. CPUE, PSD, RSD-P, and mean Wr for all walleye sampled with gill nets in Lake Henry, Lake County, 2005-2014. Columns for stocked years are shaded.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CPUE							74.3	56.7		22.3
PSD							2	2		74
RSD-P							1	0		3
Mean Wr							--	86		92

Table 8. Walleye stocked into Lake Henry, Lake County, 2005-2014.

Year	Number	Size
2006	120,000	Fingerling
2007	43,920	Fingerling
2010	400,000	Fry
2011	40,160	Fingerling
2014	400,000	Fry

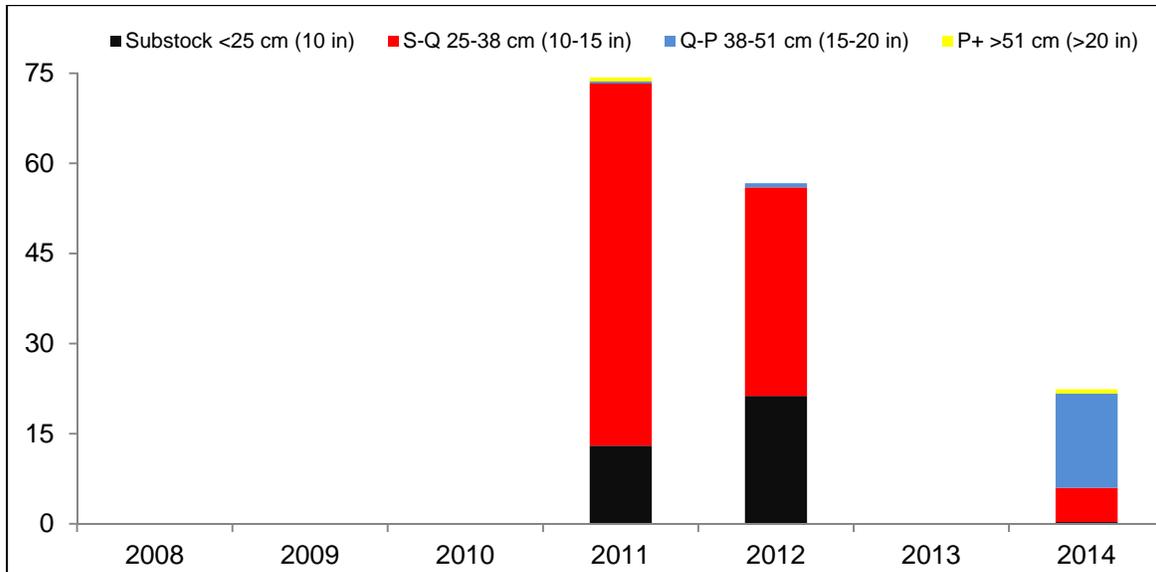


Figure 2. CPUE by length category for walleye sampled with gill nets in Lake Henry, Lake County, 2011, 2012, 2014.

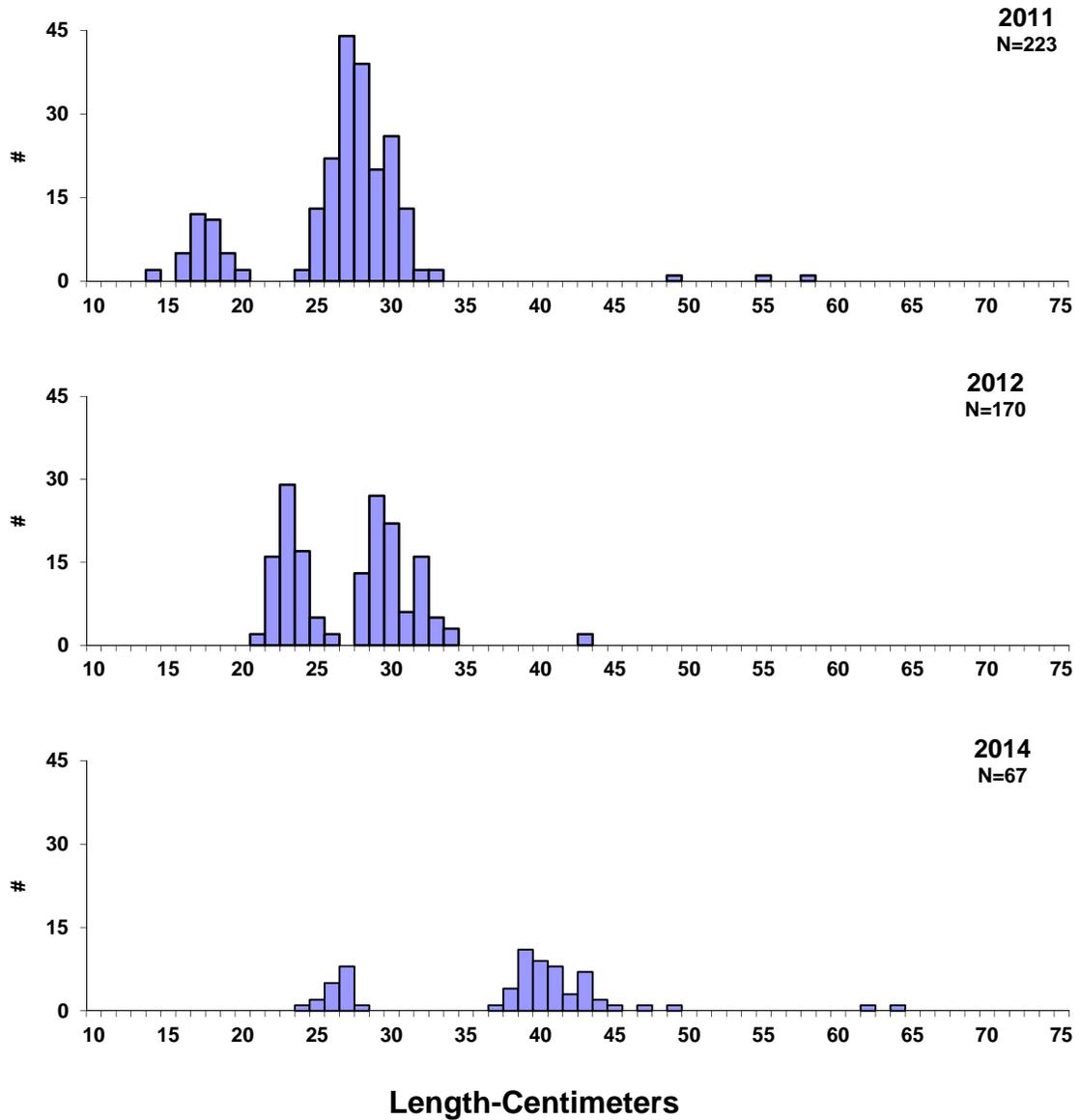


Figure 3. Length frequency histograms for walleyes sampled with gill nets in Lake Henry, Lake County, 2011, 2012, 2014.

Yellow Perch

Management Objective

- maintain a yellow perch population with a total gill-net CPUE of at least 25

Management Strategies

- stock small fingerling yellow perch at the rate of 500/acre (214,00) as needed to achieve the management objective
- mark stocked yellow perch fingerlings with oxytetracycline to enable evaluation

Yellow perch abundance has declined significantly since 2012 (Table 9). However, this may be a sampling anomaly because large numbers of small yellow perch were caught in trap nets during an early spring effort to spawn walleyes.

Table 9. CPUE, PSD, RSD-P, and mean Wr for all yellow perch sampled with gill nets in Lake Henry, Lake County, 2005-2014. Columns for stocked years are shaded.

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
CPUE							3.7	38.7		1.7
PSD							--	79		--
RSD-P							--	0		--
Mean Wr							--	106		--

Table 11. Yellow perch stocked into Lake Henry, Lake County, 2005-2014.

Year	Number	Size
2011	201,450	Fingerling
2012	1,056	Adult
	4,725	Juvenile

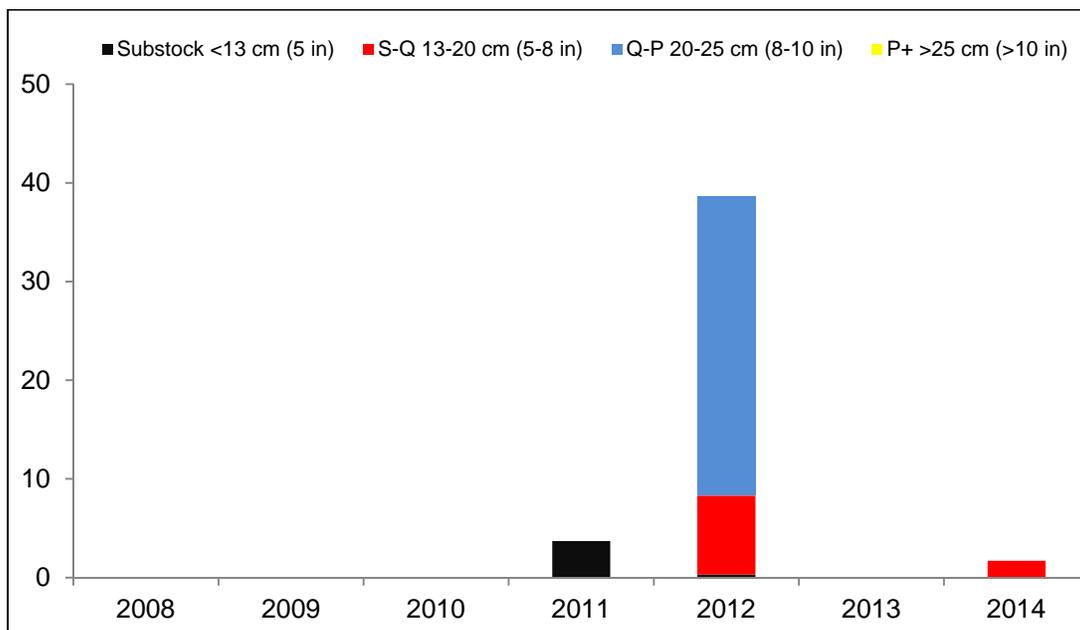


Figure 4. CPUE by length category for yellow perch sampled with gill nets in Lake Henry, Lake County, 2011, 2012, 2014.

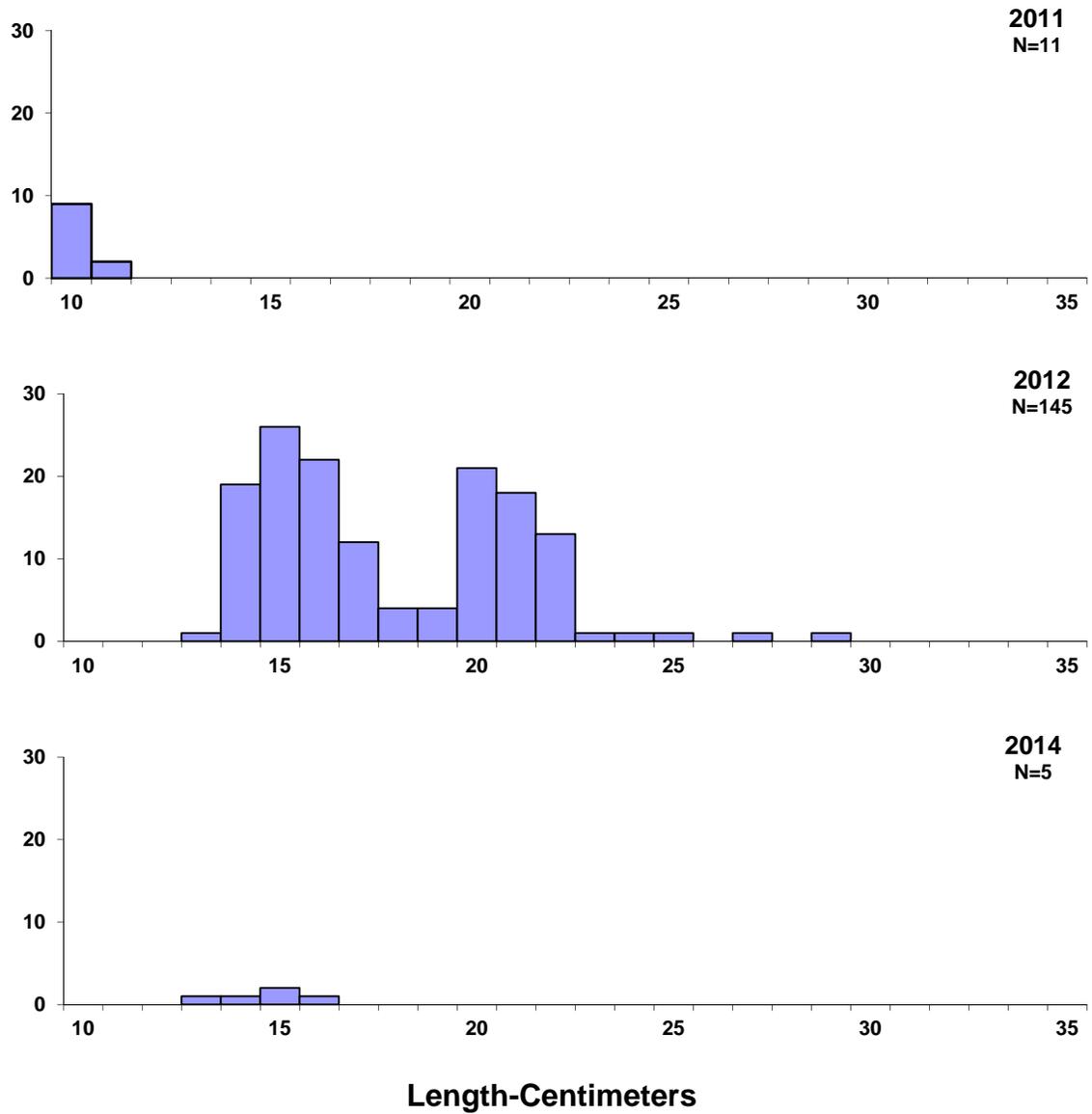


Figure 5. Length frequency histograms for yellow perch sampled with gill nets in Lake Henry, Lake County, 2011, 2012, 2014.

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.