

**SOUTH DAKOTA STATEWIDE FISHERIES SURVEY**  
**Lake Campbell, Brookings County**  
**2102-F-21-R-47**  
**2014**



**Figure 1.** Lake Campbell, Brookings County

**Legal Description:** T109N-R50W-Sec.28, 29, 32, 33; T108N-R50W-Sec. 5  
**Location from nearest town:** 6 miles south and 2 miles west of Brookings, SD

**Surface Area:** 910 acres  
**Meandered (Y/N):** Yes  
**OHWM elevation:** 1575.7  
**Outlet elevation:** 1575.2  
**Max. depth at outlet elevation:** 8 feet  
**Observed water level:** Full  
**Contour map available:** Yes

**Watershed area:** 103,762 acres  
**Shoreline length:** 9.8 miles  
**Date set:** April, 1983  
**Date set:** April, 1983  
**Mean depth at outlet elevation:** 3.1 feet  
**Lake volume:** 2,842 acre-feet  
**Date mapped:** 1996

**DENR beneficial use classifications:** (6) warm water marginal fish propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation

## Introduction

### General

It is understood that Lake Campbell was named after Albert H. Campbell of the Pacific Wagon Railroad.

### Ownership of Lake and Adjacent Lakeshore Properties

Lake Campbell is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes and the fishery is managed by the South Dakota Department of Game, Fish and Parks (GFP). GFP also owns and manages an access area on the north end of the lake. There is a road right-of-way on the south end of the lake owned by Moody County and open for public access. The remainder of the shoreline is privately owned.

### Fishing Access

The North Shore Access Area contains a concrete plank boat ramp, boat dock, vault toilet, and handicapped-accessible fishing pier. There are several areas suitable for shore fishing on this area as well. Shore fishing also occurs off the bridge and shoreline on the south end of the lake.

### Water Quality and Aquatic Vegetation

Lake Campbell lies on the downstream end of the Badus-Battle Creek drainage which flows into the Big Sioux River. The watershed is mostly cropland which contributes a heavy silt load to the lake whenever runoff occurs. As a result, Lake Campbell is very shallow, water quality is poor, and fish kills are frequent.

The water temperature during this year's lake survey was 22°C (71°F) and the water clarity was only 20 cm (8 in). A significant algae bloom combined with high turbidity was responsible for the poor water clarity. On the rare occasions when water clarity is good, significantly more submerged aquatic vegetation grows in the lake.

**Table 1.** Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Lake Campbell, Brookings County, 2006-2014.

<b>Year</b>	<b>Water Temp °C (°F)</b>	<b>Secchi Depth cm (in)</b>	<b>Observations/Comments (algae, aquatic vegetation, water quality, etc.)</b>
2014	22 (71)	20 (8)	Little sago
2013	27 (80)	173 (68)	Sago pondweed
2011	22 (71)	30 (12)	Sago and cattail
2010	--	35 (14)	Sago pondweed
2008	25 (77)	25 (10)	Few spots of sago
2006	29 (85)	30 (12)	Blue green algae bloom

**Fish Community**

Lake Campbell contains a very diverse fish community (Table 2). Several of these species are riverine in nature and it is assumed they enter the lake from the Big Sioux River during flood events.

**Table 2.** Fish species commonly found in Lake Campbell, Brookings County.

<b>Game Species</b>	<b>Other Species</b>
Walleye	Common Carp
Yellow Perch	White Sucker
Black Crappie	Shorthead Redhorse
Northern Pike	Bigmouth Buffalo
Black Bullhead	
Yellow Bullhead	
Channel Catfish	

**Fish Management**

Maintaining fishing opportunity in Lake Campbell is a challenge due to frequent fish kills (Table 3) and periodic stocking is needed to maintain walleye and perch populations (Table 4). However, northern pike and channel catfish abundance is likely sustained by immigration from the Big Sioux River.

**Table 3.** Fish kill history for Lake Campbell, Brookings County.

<b>Year</b>	<b>Severity</b>	<b>Comments</b>
2014	Light	Late winter or early spring kill of catfish and bullheads.
2009	Light	Light winterkill. All species present in test nets
2008	Light	Winterkill
2007	Light	South end. About 30/100'
2006	Light	7/5/06 - below the lake spillway
2004	Moderate	Winterkill – no WAE in test nets
2001	Moderate	Winterkill – test nets had all species

**Table 4.** Stocking history for Lake Campbell, Brookings County, 2004-2013.

<b>Year</b>	<b>Number</b>	<b>Species</b>	<b>Size</b>
2004	102,100	Walleye	Fingerling
	21,060	Yellow Perch	Fingerling
2006	926,316	Walleye	Fry
2009	4,584,000	Yellow Perch	Fry
2010	91,320	Walleye	Fingerling
2014	553,320	Walleye	Fry

## Methods

Lake Campbell was sampled on July 2-3, 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 abundance remained relatively low, catfish abundance declined, and northern pike abundance increased since 2013 (Table 7). Only a handful of walleye and yellow perch were sampled in 2014 (Table 5).

**Table 5.** Total catch from three overnight gill nets set in Lake Campbell, Brookings County, July 2-3, 2014.

<i>Species</i>	<i>#</i>	<i>%</i>	<i>CPUE<sup>1</sup></i>	<i>80% C.I.</i>	<i>Mean CPUE*</i>	<i>PSD</i>	<i>RSD-P</i>	<i>Mean Wr</i>
Black Bullhead	84	53.8	28.0	<u>+3.8</u>	20.1	45	0	--
Northern Pike	26	16.7	8.7	<u>+1.7</u>	4.0	35	8	97
Channel Catfish	11	7.1	3.7	<u>+1.5</u>	3.6	100	27	107
White Sucker	10	6.4	3.3	<u>+0.4</u>	13.3	70	70	--
Walleye	9	5.8	3.0	<u>+1.3</u>	7.1	--	--	--
Yellow Perch	7	4.5	2.3	<u>+0.4</u>	32.9	--	--	--
Common Carp	5	3.2	1.7	<u>+1.5</u>	4.9	--	--	--
Bigmouth Buffalo	4	2.6	1.3	<u>+0.4</u>	0.3	--	--	--

\* = 6 years (2006-2014)

**Table 6.** CPUE by length category for selected species sampled with gill nets in Lake Campbell, Brookings County, July 2-3, 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	27.7	15.3	12.3	--	28.0	<u>+3.8</u>
Northern Pike	--	8.7	5.7	2.3	0.7	8.7	<u>+1.7</u>
Channel Catfish	--	3.7	--	2.7	1.0	3.7	<u>+1.5</u>
White Sucker	--	3.3	0.7	--	2.7	3.3	<u>+0.4</u>
Walleye	--	3.0	--	2.7	0.3	3.0	<u>+1.3</u>
Yellow Perch	--	2.3	2.3	--	--	2.3	<u>+0.4</u>
Common Carp	1.7	--	--	--	--	1.7	<u>+1.5</u>
Bigmouth Buffalo	0.6	0.7	0.7	--	--	1.3	<u>+0.4</u>

Length categories can be found in Appendix A.

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

**Table 7.** Gill-net CPUE for selected fish species sampled in Lake Campbell, Brookings County, 2005-2014.

<b>Species</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>
Black Bullhead		11.0		36.3		41.7	44.7		21.3	24.7
Channel Catfish		--		--		5.7	4.3		7.7	3.7
Common Carp		6.5		16.3		--	0.7		1.3	1.7
Northern Pike		0.5		2.0		3.3	8.3		1.0	8.7
Walleye		20.0		15.0		1.3	2.7		0.3	3.0
White Sucker		20.0		15.0		1.3	2.7		0.3	3.3
Yellow Perch		0.5		5.3		183.7	5.7		--	2.3

# Walleye

## Management Objective

- maintain a walleye population with a total gill-net CPUE of at least 10

## Management Strategy

- stock small walleye fingerlings at the rate of 100/acre (91,000) as needed to achieve the management objective

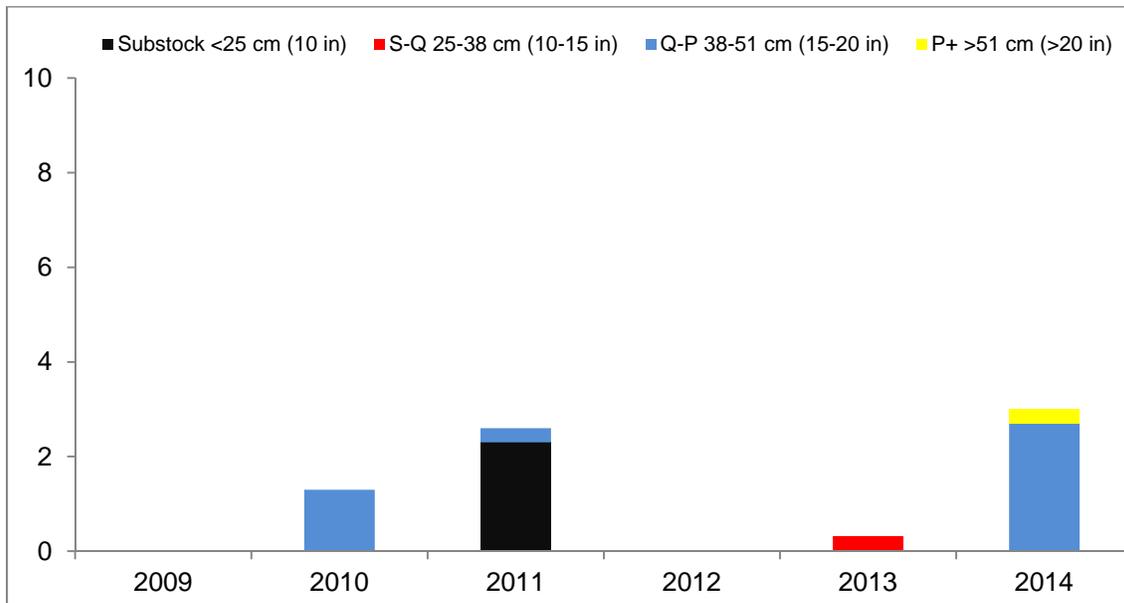
It is unclear whether fry or small fingerling stocking is more effective at increasing gill-net CPUE in Lake Campbell. The higher CPUE's seen in 2006 and 2008 were likely created by fry stocking in 2004 (2013 report) and small fingerling stocking in 2006 (Table 9). Since small fingerlings are easier to supply by Blue Dog State Fish Hatchery, they will be used for the next several years to evaluate their effectiveness.

**Table 8.** CPUE, PSD, RSD-P and mean Wr for all walleye sampled with gill nets in Lake Campbell, Brookings County, 2005-2014. Stocked years are shaded.

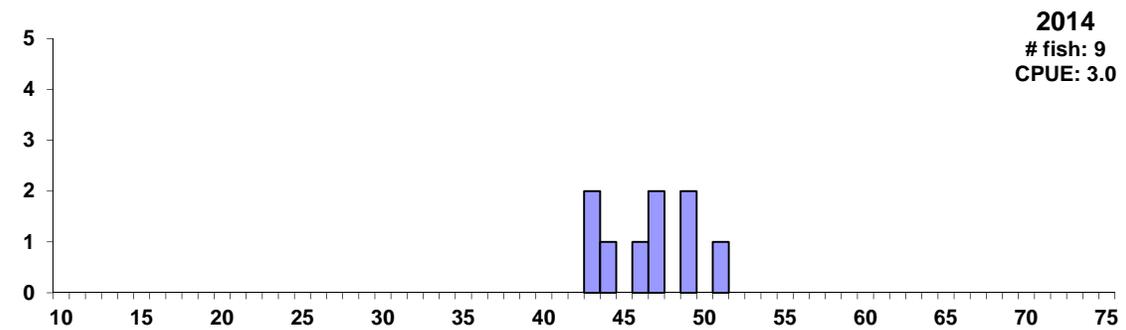
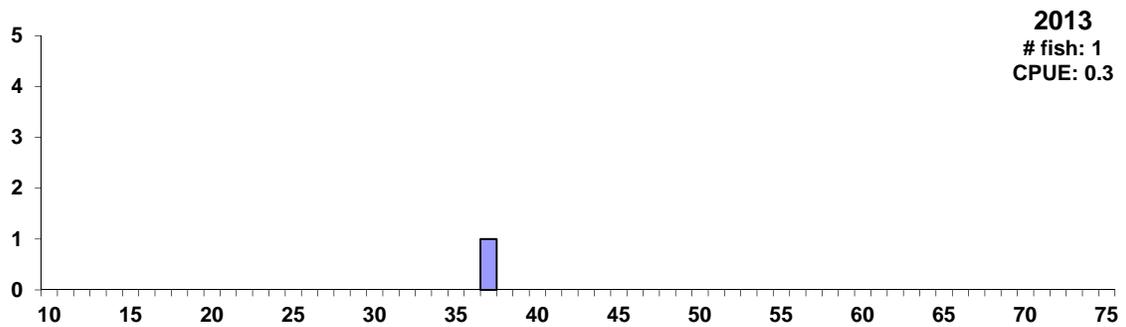
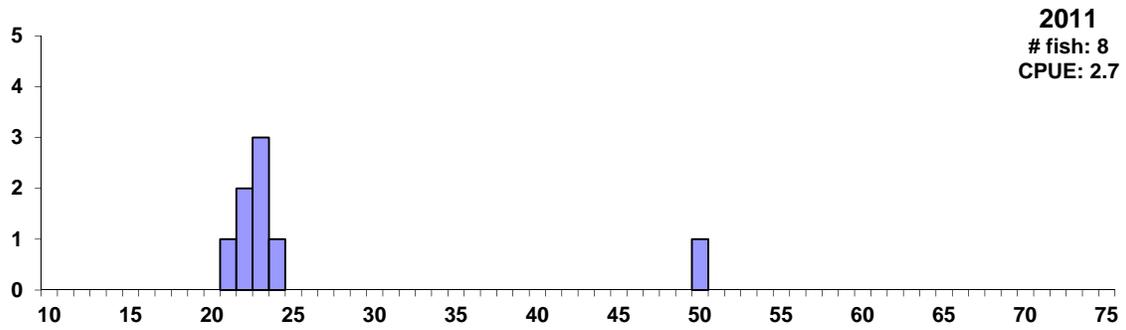
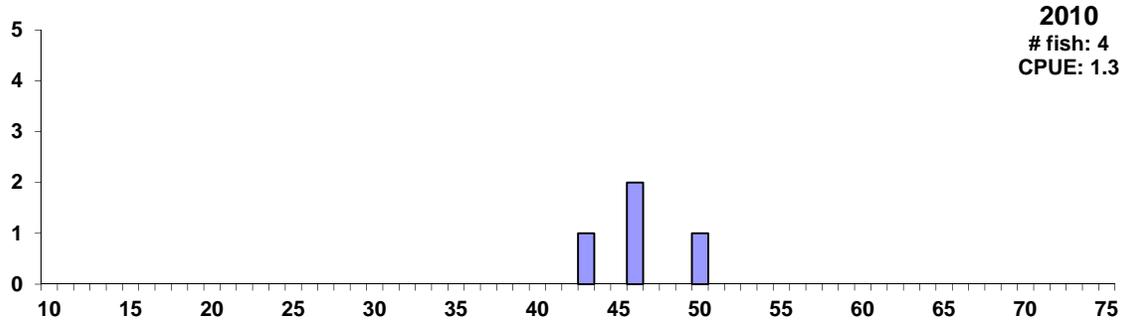
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>		20.0		15.0		1.3	2.7		0.3	3.0
<b>PSD</b>		93		47		--	--		--	--
<b>RSD-P</b>		0		7		--	--		--	--
<b>Mean Wr</b>		102		99		--	--		--	--

**Table 9.** Walleyes stocked into Lake Campbell, Brookings County, 2005-2014.

Year	Number	Size
2006	926,316	Fry
2010	91,320	Small Fingerling
2014	553,320	Fry



**Figure 2.** CPUE by length category for walleye sampled with gill nets in Lake Campbell, Brookings County, 2009-2014.



**Length-Centimeters**

**Figure 3.** Length-frequency histograms for walleye sampled with gill nets in Lake Campbell, Brookings County, 2010, 2011, 2013, 2014.

## Yellow Perch

### Management Objective

- maintain a yellow perch population with a total gill net CPUE of at least 20

### Management Strategy

- stock yellow perch eggs, fry or small fingerlings and evaluate their effectiveness at achieving the management objective

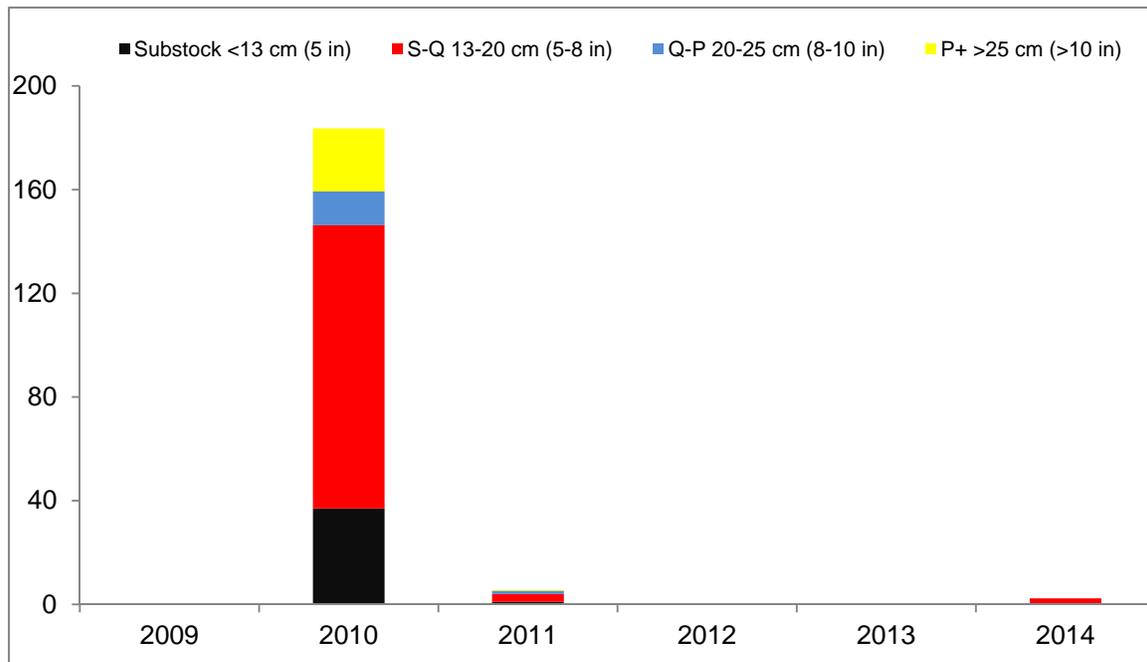
Yellow perch gill-net CPUE increased slightly in 2014 (Table 10), but it remains far below the management objective, and too low to produce any reasonable fishing opportunity. Stocking will be needed to increase yellow perch abundance in Lake Campbell. However, considerable evaluation will be needed to determine whether eggs, fry or small fingerlings are most effective.

**Table 10.** CPUE, PSD, RSD-P, and mean *Wr* for all yellow perch sampled with gill nets in Lake Campbell, Brookings County, 2005-2014. Stocked years are shaded.

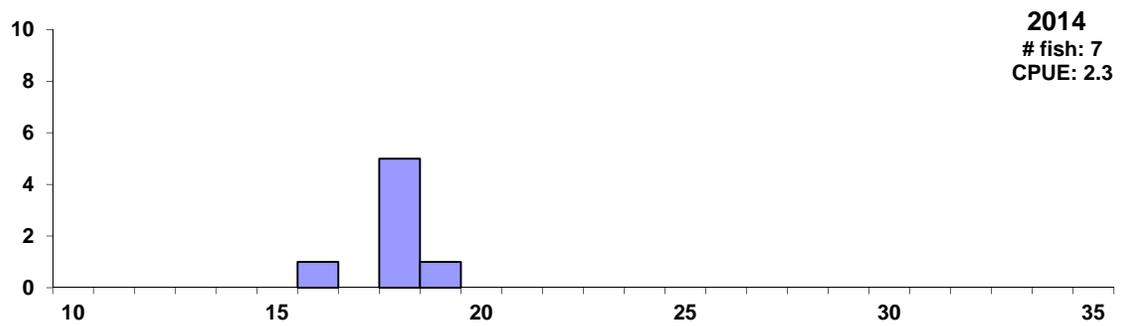
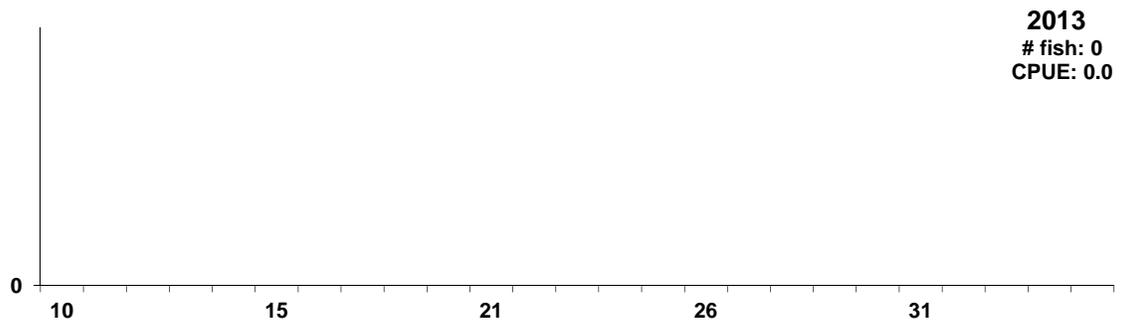
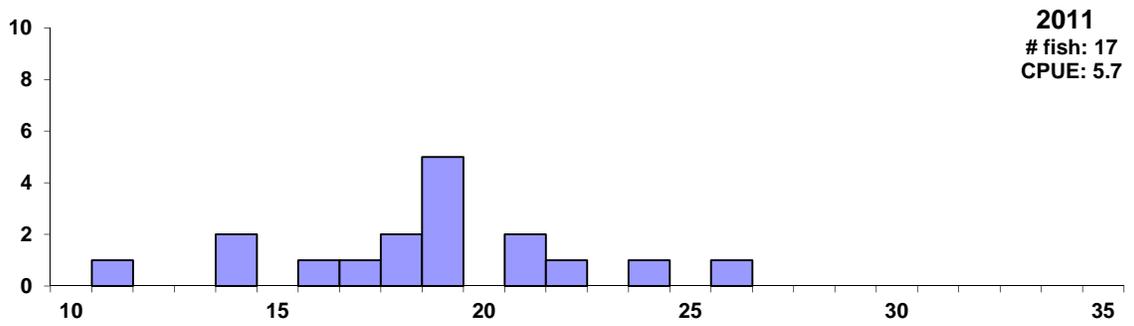
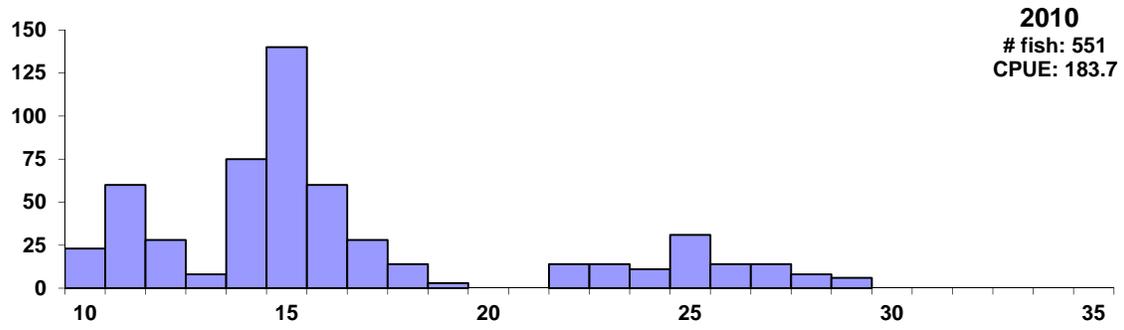
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>		0.5		5.3		183.7	5.7		0.0	2.3
<b>PSD</b>		--		56		25	31		--	--
<b>RSD-P</b>		--		44		17	6		--	--
<b>Mean <i>Wr</i></b>		--		106		96	97		--	--

**Table 11.** Yellow perch stocked into Lake Campbell, Brookings County, 2005-2014.

Year	Number	Size
2009	4,584,000	Fry

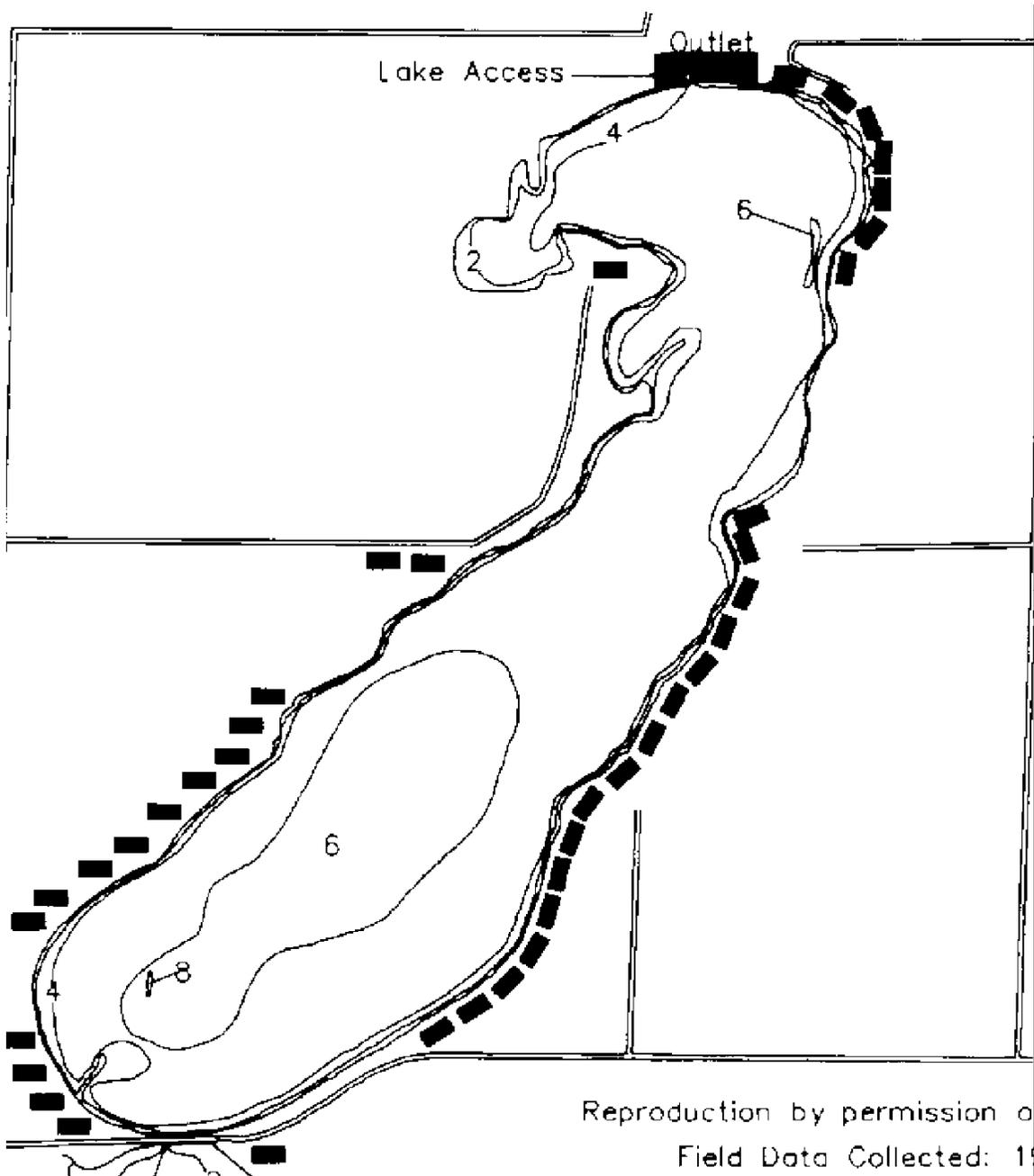


**Figure 4.** CPUE by length category for yellow perch sampled with gill nets in Lake Campbell, Brookings Name County, 2009-2014.



**Length-Centimeters**

**Figure 5.** Length-frequency histograms for yellow perch sampled with gill nets in Lake Campbell, Brookings County, 2010, 2011, 2013, 2014.



**Figure 6.** Contour map of Lake Campbell, Brookings 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.

Species	Stock	Quality	Preferred	Memorable	Trophy
Common carp	28	41	53	66	84
White Sucker	15	25	33	41	51
Bigmouth buffalo	28	41	53	66	84
Black bullhead	15	23	30	38	46
Channel catfish	28	41	61	71	91
Northern pike	35	53	71	86	112
White Bass	15	23	30	38	46
Green Sunfish	8	15	20	25	30
Bluegill	8	15	20	25	30
Smallmouth bass	18	28	35	43	51
Largemouth bass	20	30	38	51	63
White crappie	13	20	25	30	38
Black crappie	13	20	25	30	38
Yellow perch	13	20	25	30	38
Walleye	25	38	51	63	76
Freshwater Drum	20	30	38	51	63

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.