

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



**Figure 1.** East Oakwood Lake, Brookings County

**Legal Description:** T111N- R51W-Sec. 4-5, 8-9, 16-17

**Location from nearest town:** 3 miles west of Bruce, SD

**Surface Area:** 933 acres

**Meandered (Y/N):** yes

**OHWM elevation:** 1626.9

**Outlet elevation:** 1626.4

**Max. depth at outlet elevation:** 8.6 feet

**Observed water level:** 1 ft low

**Contour map available (Y/N):** yes

**Watershed area:** 50,999 acres

**Shoreline length:** 10.7 miles

**Date set:** October, 1981

**Date set:** October, 1981

**Mean depth at outlet elevation:** 5.8 feet

**Lake volume:** 5,000 acre feet

**Date mapped:** 2011

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

## Introduction

### General

The Oakwood Lakes complex derived its name from the numerous oak trees found in the area. East Oakwood Lake was originally named Oakwood Lake while West Oakwood was originally known as Lake Tetonkaha. East Oakwood is a natural glacial lake with an outlet that flows into the Big Sioux River.

### Ownership of Lake and Adjacent Lakeshore Properties

East Oakwood Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. Game, Fish, and Parks (GFP) owns the majority of the lake basin as a Game Production Area and manages the fishery. The remainder of the shoreline is privately owned.

### Fishing Access

The East Oakwood Lake Access Area, located on the northwest side of the lake, contains a concrete plank boat ramp, boat dock, gravel parking area, and concrete vault toilet (Figure 1). The North Access area has an old, narrow-plank concrete boat ramp and limited, primitive parking. Shore fishing access is available on the public land adjacent to the lake and along the county road grade on the south end.

### Water Quality and Aquatic Vegetation

As a shallow, natural lake, water clarity can vary considerably from year to year (Table 1). Generally, the abundance of submerged aquatic vegetation is highest in years when water clarity is also highest. Sago pondweed is predominant species present.

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

<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	26 (78)	79 (31)	Sago pondweed
2012	-- (--)	23 (9)	No observations were recorded
2010	26 (79)	100 (39)	Sago pondweed
2008	-- (--)	-- (--)	No aquatic vegetation
2006	26 (79)	18 (7)	No aquatic vegetation

### Fish Community

East Oakwood contains the typical species found in many shallow eastern South Dakota Lakes, but it also has the only population of tadpole madtoms found in the region (Table 2).

**Table 2.** Fish species commonly found East Oakwood Lake, Brookings County.

<b>Game Species</b>	<b>Other Species</b>
Walleye	Common Carp
Yellow Perch	White Sucker
Black Bullhead	Bigmouth Buffalo
Green Sunfish	Tadpole Madtom
Northern Pike	Orange-spotted Sunfish

**Fish Management**

Shallow water, high turbidity, excessive rough fish populations and frequent fish kills (Table 3) make it difficult to maintain consistent fishing opportunity in East Oakwood. The lake is currently managed for the primary purpose of rearing walleyes and yellow perch for restocking in other waters and the secondary purpose of providing fishing opportunity.

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

<b>Year</b>	<b>Severity</b>	<b>Comments</b>
2010	Light	winterkill
2008	Light	winterkill – most species sampled alive
2001	Severe	winterkill – 1000's dead fish – a few live fish sampled
1997	Severe	winterkill – mostly carp – some of all species sampled alive
1993	Severe	winterkill – live specimens of all species sampled

**Table 4.** Stocking history for East Oakwood Lake, Brookings County, 2005-2014.

<b>Year</b>	<b>Number</b>	<b>Species</b>	<b>Size</b>
2006	1,001,580	Walleye	Fry
2008	1,000,000	Walleye	Fry
2010	1,000,000	Walleye	Fry
2012	500,000	Walleye	Fry
2013	650,000	Walleye	Fry
2014	453,750	Walleye	Fry

## Methods

East Oakwood Lake was sampled on July 15-16, 2014 with 3 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

Yellow perch and walleye were the most abundant species sampled by the gill nets this year (Table 5) and only a few fish of each species were smaller than stock length (Table 6).

**Table 5.** Total catch from three overnight gill nets set in East Oakwood Lake, Brookings County, July 15-16, 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>
Yellow perch	99	46.3	33.0	<u>+3.7</u>	89.6	0	0	107
Walleye	79	36.9	26.3	<u>+3.0</u>	64.4	25	1	93
White Sucker	23	10.7	7.7	<u>+3.1</u>	7.1	70	26	--
Common carp	4	1.9	1.3	<u>+0.4</u>	3.5	--	--	--
Northern Pike	4	1.9	1.3	<u>+0.4</u>	2.7	--	--	--
Bigmouth Buffalo	3	1.4	1.0	<u>+1.3</u>	1.5	--	--	--
Black bullhead	1	0.5	0.3	<u>+0.4</u>	10.8	--	--	--
Orange-spotted Sunfish	1	0.5	0.3	<u>+0.4</u>	1.9	--	--	--

\*10 years (2005-2014)

**Table 6.** CPUE by length category for selected species sampled with gill nets in East Oakwood Lake, Brookings County, July 15-16, 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>
Yellow perch	0.3	32.7	32.7	--	--	33.0	<u>+3.7</u>
Walleye	0.7	25.7	19.3	6.0	0.3	26.3	<u>+3.0</u>
White Sucker	--	7.7	2.3	3.3	2.0	7.7	<u>+3.1</u>
Common carp	--	1.3	--	--	1.3	1.3	<u>+0.4</u>
Northern Pike	--	1.3	--	0.3	1.0	1.3	<u>+0.4</u>
Bigmouth Buffalo	0.3	0.7	--	0.3	0.3	1.0	<u>+1.3</u>
Black bullhead	--	0.3	0.3	--	--	0.3	<u>+0.4</u>
O. S. Sunfish*	--	--	--	--	--	0.3	<u>+0.4</u>

\*No length categories established. 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 (GN) and trap-net (TN) CPUE for selected fish species sampled in East Oakwood Lake, Brookings 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>
Bigmouth	GN	--			2.0		0.3		4.3		1.0
Buffalo	TN		0.5		1.0		0.5		2.4		
Black	GN		18.0		--		0.2		35.7		0.3
Bullhead	TN		67.2		289.5		3.8		55.7		
Common	GN		6.0		1.3		5.7		3.3		1.3
Carp	TN		2.4		5.5		138.9		5.7		
Green	GN		--		--		--		0.7		--
Sunfish	TN		0.1		--		--		7.2		
Northern	GN		0.5		8.0		1.0		2.7		1.3
Pike	TN		1.0		1.2		1.2		3.0		
O. S.	GN		8.5		--		--		0.7		0.3
Sunfish	TN		4.9		--		--		5.0		
Tadpole	GN		--		--		--		--		--
Madtom	TN		2.5		--		--		0.1		
	GN		139.0		30.3		93.7		32.7		26.3
Walleye	TN		46.7		--		0.9		2.2		
White	GN		1.5		9.3		4.3		12.7		7.7
Sucker	TN		20.9		9.6		0.9		7.4		
Yellow	GN		--		--		--		1.7		--
Bullhead	TN		0.1		0.3		--		6.2		
Yellow	GN		87.5		55.0		201.7		71.0		33.0
Perch	TN		14.7		5.1		5.2		7.6		

# Walleye

## Management Objectives

- raise walleyes for stocking other South Dakota waters
- provide occasional walleye fishing opportunity

## Management Strategies

- stock walleye fry at the rate of 1,000/acre (933,000) as needed to achieve the management objective
- conduct annual fish population surveys and report the results to inform anglers of potential fishing opportunity

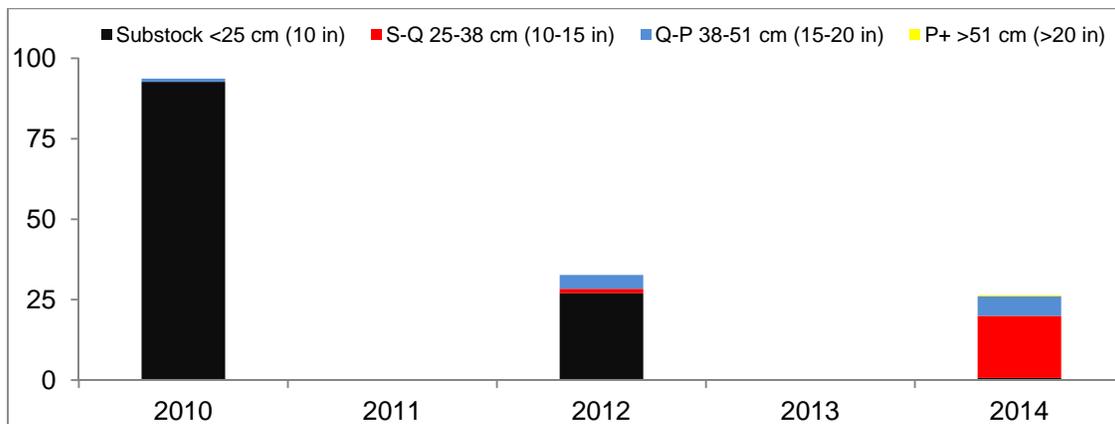
Walleye gill-net CPUE has been declining since 2010 (Table 8) even though fry have been stocked in four of the last five years (Table 9). However, gill-net CPUE is still higher than many other lakes in the region and Figures 2 and 3 indicate that the population contains larger fish that should provide some angling opportunity.

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

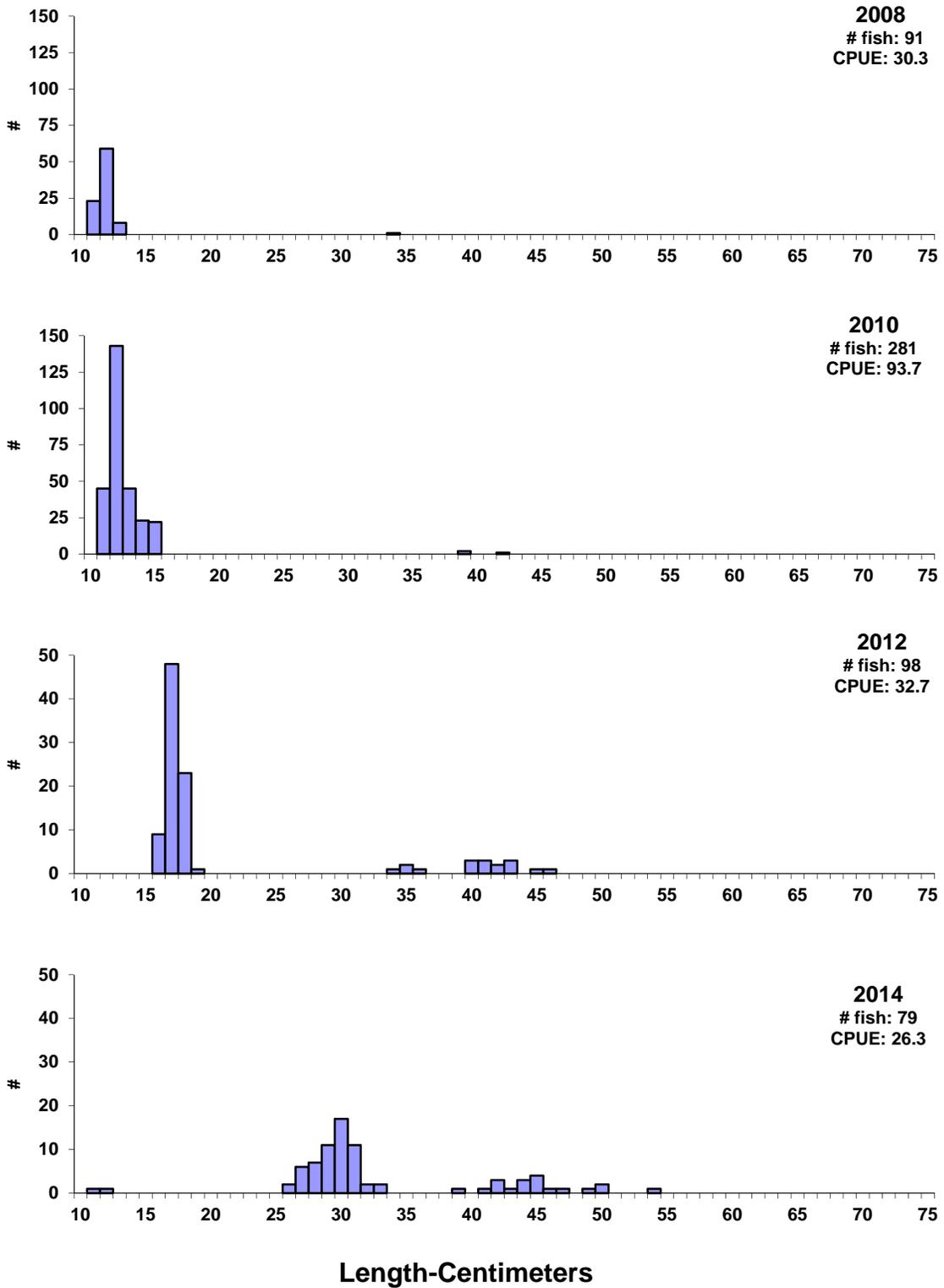
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>		139.0		30.3		93.7		32.7		26.3
<b>PSD</b>		100		0		--		76		25
<b>RSD-P</b>		12		0		--		0		1
<b>Mean Wr</b>		91		--		--		95		93

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

Year	Number	Size
2006	1,001,580	Fry
2008	1,000,000	Fry
2010	1,000,000	Fry
2012	500,000	Fry
2013	650,000	Fry
2014	453,750	Fry



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



**Figure 3.** Length frequency histograms for walleye sampled with gill nets in East Oakwood, Brookings County, 2008, 2010, 2012, and 2014.

## Yellow Perch

### Management Objectives

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

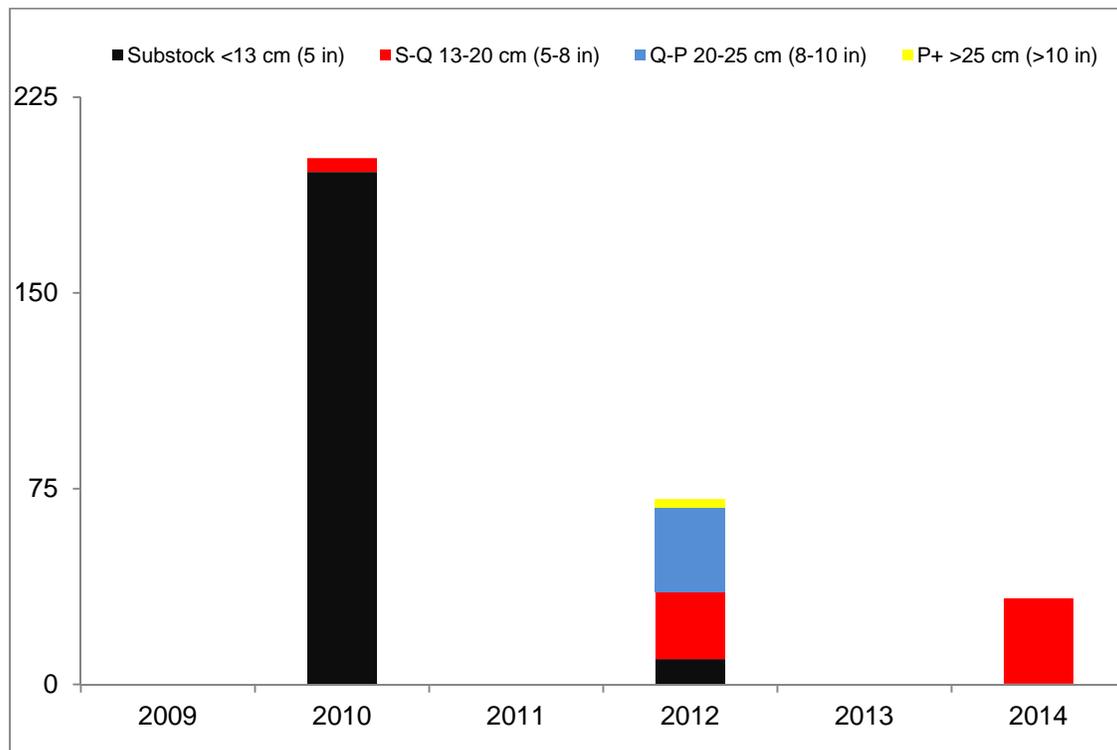
### Management Strategies

- conduct annual fish population surveys and report the results to inform anglers of potential fishing opportunity

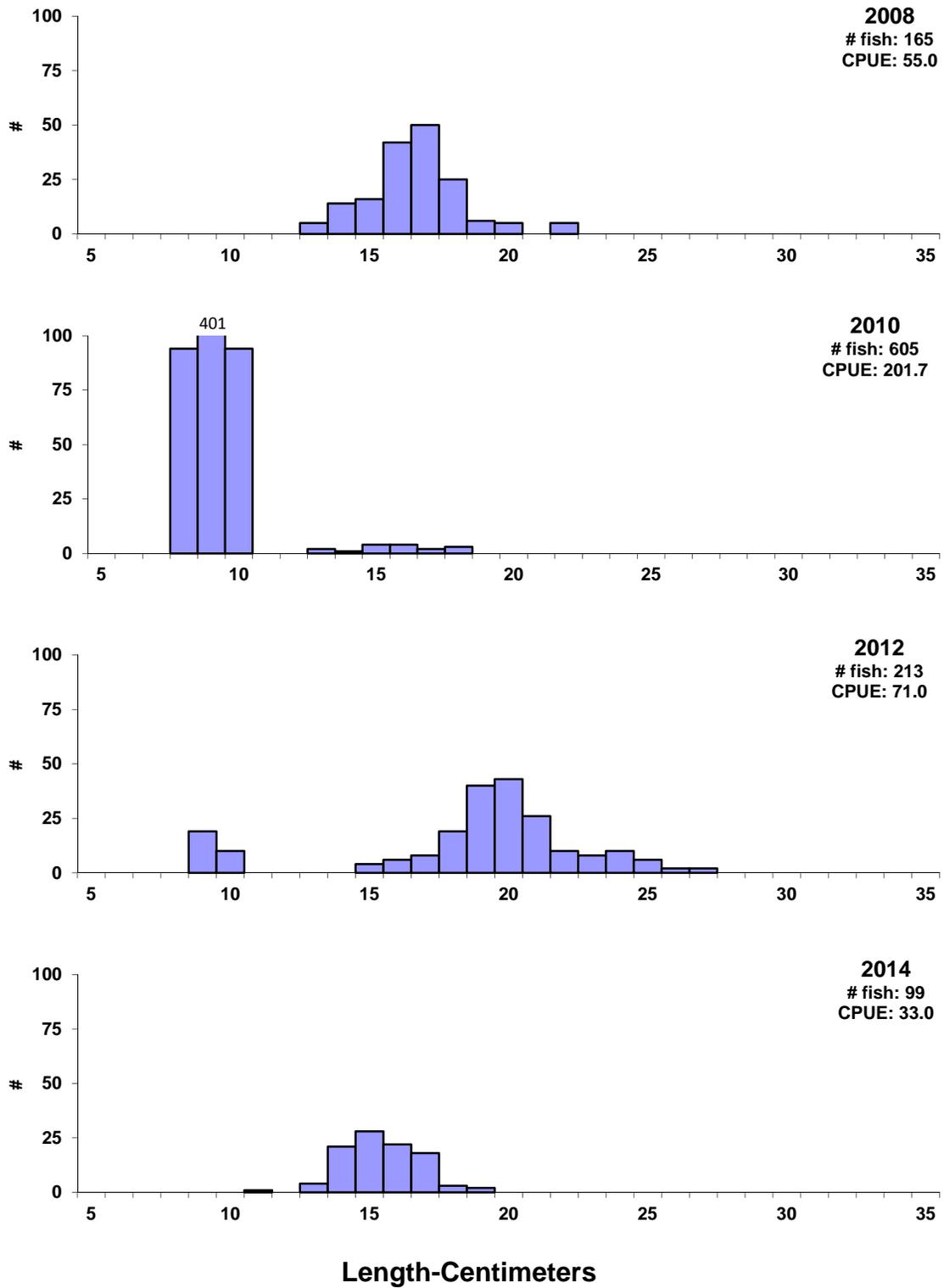
Similar to walleye, yellow perch abundance has been declining since 2010 (Table 10).

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

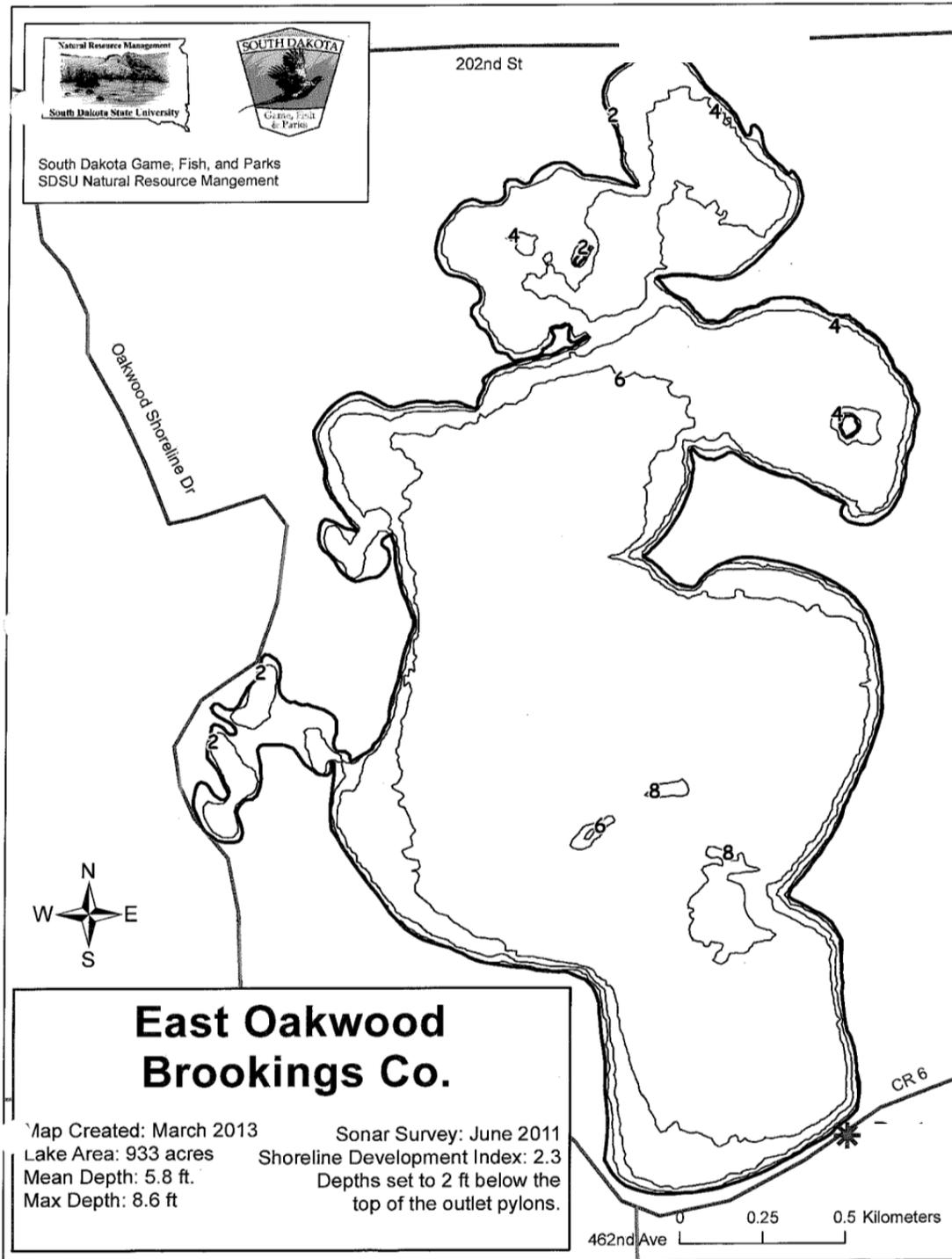
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>		87.5		55.0		201.7		71.0		33.0
<b>PSD</b>		3		4		0		58		0
<b>RSD-P</b>		0		0		0		5		0
<b>Mean Wr</b>		94		111		108		101		107



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



**Figure 5.** Length frequency histograms for yellow perch sampled with gill nets in East Oakwood, Brookings County, 2008, 2010, 2012, and 2014.



**Figure 6.** Contour map of East Oakwood Lake, 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 (Inches in parenthesis).

<b>Species</b>	<b>Stock</b>	<b>Quality</b>	<b>Preferred</b>	<b>Memorable</b>	<b>Trophy</b>
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.