

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



**Figure 1.** Whitewood Lake, Kingsbury County

**Legal Description:** T110N- R54W-Sec. 2, 3, 9-21; T110N- R53W-Sec.18-19  
**Location from nearest town:** 3-1/2 miles south, 1/2 east of Lake Preston, SD

<b>Surface Area:</b> 4,677 acres	<b>Watershed area:</b> 106,134 acres
<b>Meandered (Y/N):</b> Yes	<b>Shoreline length:</b> 20.4 miles
<b>OHWM elevation:</b> None set	<b>Date set:</b> NA
<b>Outlet elevation:</b> None set	<b>Date set:</b> NA
<b>Max. depth at outlet elevation:</b> 7 feet	<b>Mean depth at outlet elevation:</b> 3.8 feet
<b>Observed water level:</b> 1 feet low	<b>Volume at outlet elevation:</b> No data
<b>Contour map available (Y/N):</b> Yes	<b>Date mapped:</b> 1990

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

# Introduction

## Ownership of Lake and Adjacent Lakeshore Properties

Whitewood Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. It was named for the white-barked trees that grew around its shores. The entire shoreline is privately owned except for a lake access area owned by the South Dakota Department of Game, Fish, and Parks (GFP) on the southwest corner of the lake and some Kingsbury County road right-of-way along the south end.

## Fishing Access

The Whitewood Lake Access Area contains a single lane boat ramp, boat dock, parking lot, and concrete vault toilet. Shore fishing is available in the access area and along the county road right-of-way. Shallow water depths and abundant submerged vegetation restricts boat and shore fishing during the summer. However, winter ice fishing is very popular when game fish populations are abundant.

## Water Quality and Aquatic Vegetation

Water temperature during the survey was 22°C (71°F) and water clarity was only 35 cm (14 in) (Table 1). A considerable amount of algae accumulated on the nets and small beds of sago pondweed were observed.

**Table 1.** Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Whitewood Lake, Kingsbury 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	22 (71)	35 (14)	No observations were recorded
2012	24 (75)	18 (7)	No vegetation
2010	26 (78)	61 (24)	Sago Pondweed
2008	26 (79)	28 (11)	No vegetation

## Fish Community

The fish community in Whitewood Lake is fairly diverse and comprised of species commonly found in shallow natural lakes (Table 3).

**Table 2.** Fish species commonly found in Whitewood Lake, Kingsbury County.

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

## **Fish Management**

Whitewood Lake is shallow and prone to severe water level fluctuations that limit fisheries management and recreational boating opportunities, sometimes for several consecutive years. The lake also experiences frequent fish kills due to its shallow depth (Table 3).

Whitewood is managed primarily for walleye and yellow perch and it usually produces a good, naturally-produced northern pike fishery due to frequent flooding of terrestrial vegetation. Walleye abundance is maintained by fry stockings (Table 3).

**Table 3.** Fish kill history for Whitewood Lake, Kingsbury County.

<b>Year</b>	<b>Severity</b>	<b>Comments</b>
1997	Severe	Winterkill – multiple species, only black bullheads in test nets
1999	Moderate	Summer kill – multiple species
2001	Moderate	Winterkill – some live game fish caught in test nets
2004	Light	Winterkill – only common carp, <4 feet of water remained
2008	Light	Winterkill – multiple live species sampled
2011	Light	Winterkill – mainly common carp
2012	Moderate	Summer kill – hundreds of 12" walleye on NE shore

**Table 4.** Stocking history for Whitewood Lake, Kingsbury County, 2005-2014.

<b>Year</b>	<b>Number</b>	<b>Species</b>	<b>Size</b>
2007	5,000,000	Walleye	Fry
2009	5,000,000	Walleye	Fry
2010	2,500,000	Walleye	Fry
2011	499,380	Walleye	Fingerling
2012	2,500,000	Walleye	Fry

## **Methods**

Whitewood Lake was sampled on July 23-July 24, 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

Yellow perch and walleye comprised a substantial portion (56.1%) of the gill net sample in 2014 (Table 5) and were in excellent condition.

**Table 5.** Total catch from three overnight gill nets set in Whitewood Lake, Kingsbury County, June 30-July 1, 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	114	30.6	38.0	+17.8	21.1	20	0	--
Yellow perch	108	29.0	36.0	+8.7	50.4	80	74	104
Walleye	101	27.1	33.7	+6.7	15.7	97	1	104
White sucker	24	6.4	8.0	+3.4	6.5	88	88	--
Northern pike	19	5.1	6.3	+1.9	3.8	11	0	90
Common carp	7	1.9	2.3	+1.5	24.5	--	--	--

\*10 years (2005-2014)

**Table 6.** CPUE by length category for selected species sampled with gill nets in Whitewood Lake, Kingsbury 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	3.7	34.3	27.3	7.0	--	38.0	+17.8
Yellow perch	2.3	33.7	6.7	2.0	25.0	36.0	+8.7
Walleye	--	33.7	1.0	32.3	0.3	33.7	+6.7
White sucker	--	8.0	1.0	--	7.0	8.0	+3.4
Northern pike	--	6.3	5.7	0.7	--	6.3	+1.9
Common carp	0.3	2.0	--	1.7	0.3	2.3	+1.5

Length categories can be found in Appendix A.

**Table 7.** Gill-net CPUE for selected fish species sampled in Whitewood Lake, Kingsbury 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>
BM Buffalo	--	--	--	--	--	--	--	0.8	--	--
Black Bullhead	30.5	14.3	14.3	14.3	14.3	0.3	0.3	22.3	22.3	38.0
Common Carp	62.5	62.5	62.5	20.0	20.0	16.3	16.3	21.3	21.3	2.3
Northern Pike	3.5	3.5	3.5	7.3	7.3	1.7	1.7	0.3	0.3	6.3
Walleye	--	--	--	1.7	1.7	--	--	43.0	43.0	33.7
White Sucker	0.5	0.5	0.5	2.0	2.0	--	--	22.0	22.0	8.0
Yellow Perch	62.0	62.0	62.0	29.7	29.7	4.3	4.3	120.0	120.0	36.0

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

# Walleye

## Management Objective

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

## Management Strategy

- Stock walleye fry at the rate of 500/acre (1,849,500) as needed to achieve the management objective.

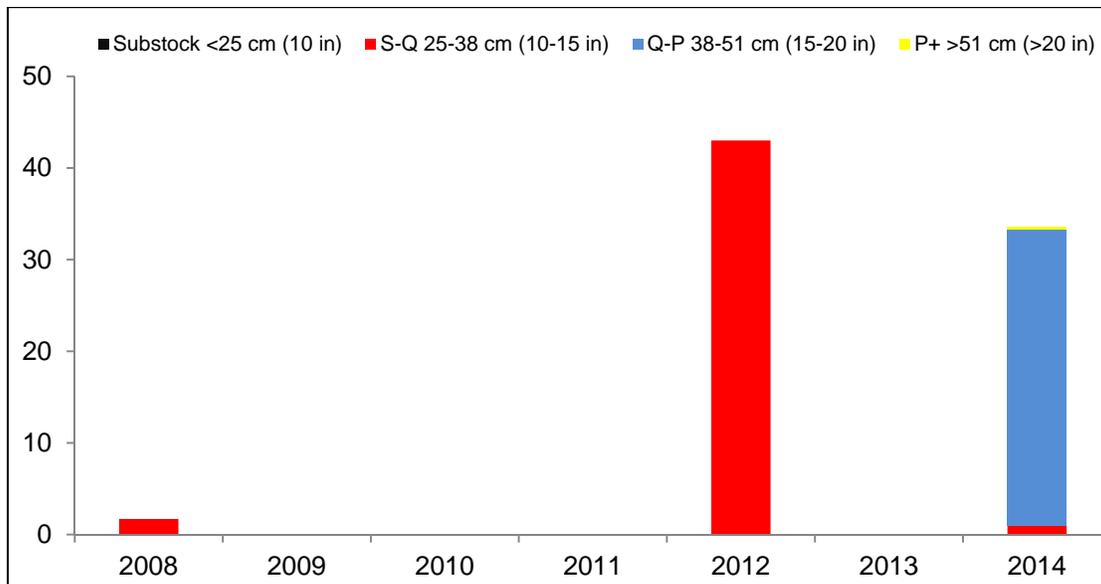
Although walleye abundance decreased since 2012, gill net CPUE remained well above the management objective (Table 8) in 2014. The majority of the fish sampled were 38-51 cm (15-20 in) long (Table 9, Figure 2). A few substock-length fish were sampled indicating some natural reproduction or stocking survival (Table 9).

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

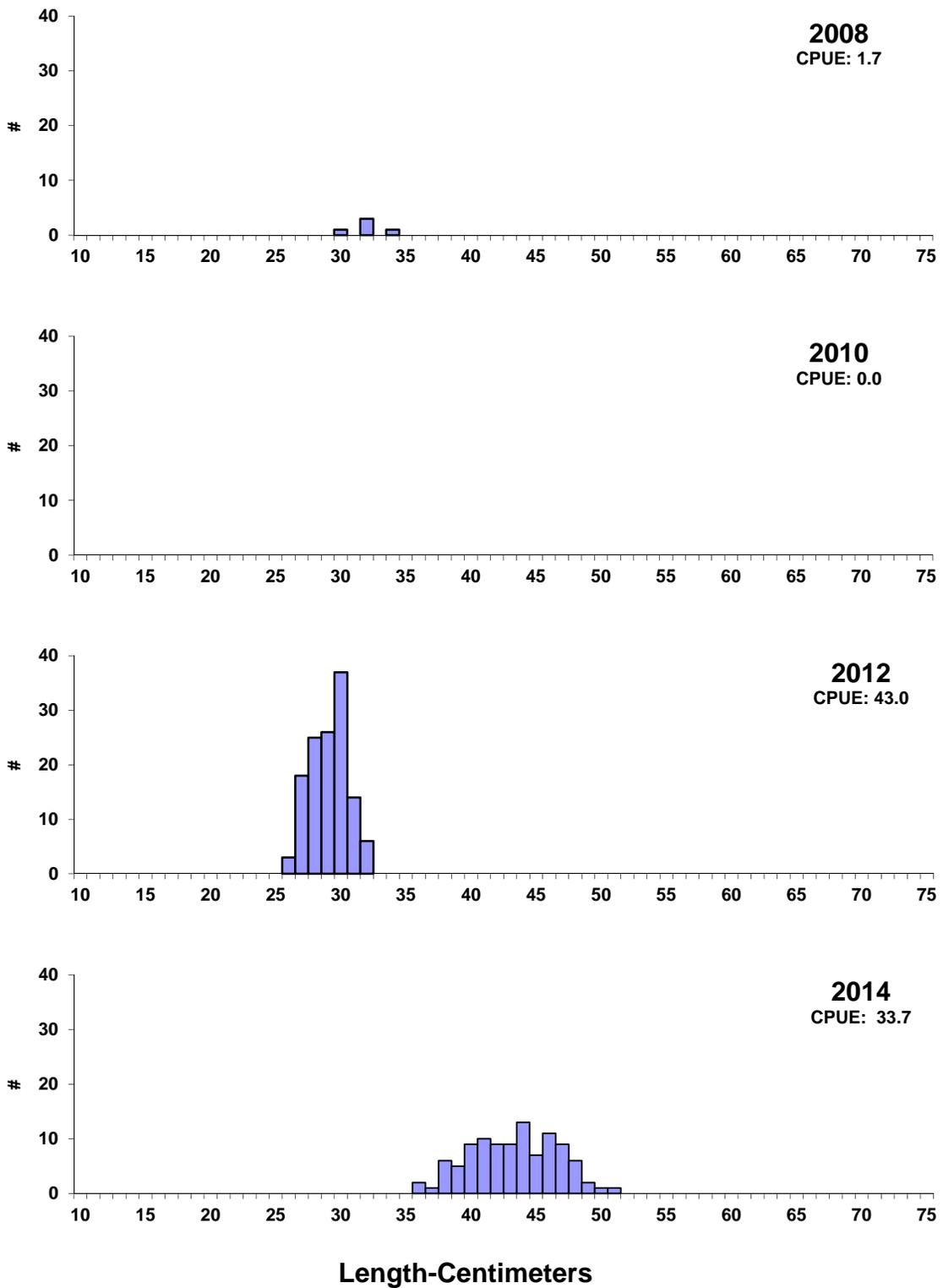
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>		0.0		1.7		0.0		43.0		33.7
<b>PSD</b>		--		--		--		0		97
<b>RSD-P</b>		--		--		--		0		1
<b>Mean Wr</b>		--		--		--		88		104

**Table 9.** Walleye stocked into Whitewood Lake, Kingsbury County, 2005-2014.

Year	Number	Size
2007	5,000,000	Fry
2009	5,000,000	Fry
2010	2,500,000	Fry
2011	499,380	Fingerling
2012	2,500,000	Fry



**Figure 2.** CPUE by length category for walleye sampled with gill nets in Whitewood Lake, Kingsbury County, 2008, 2010, 2012, 2014.



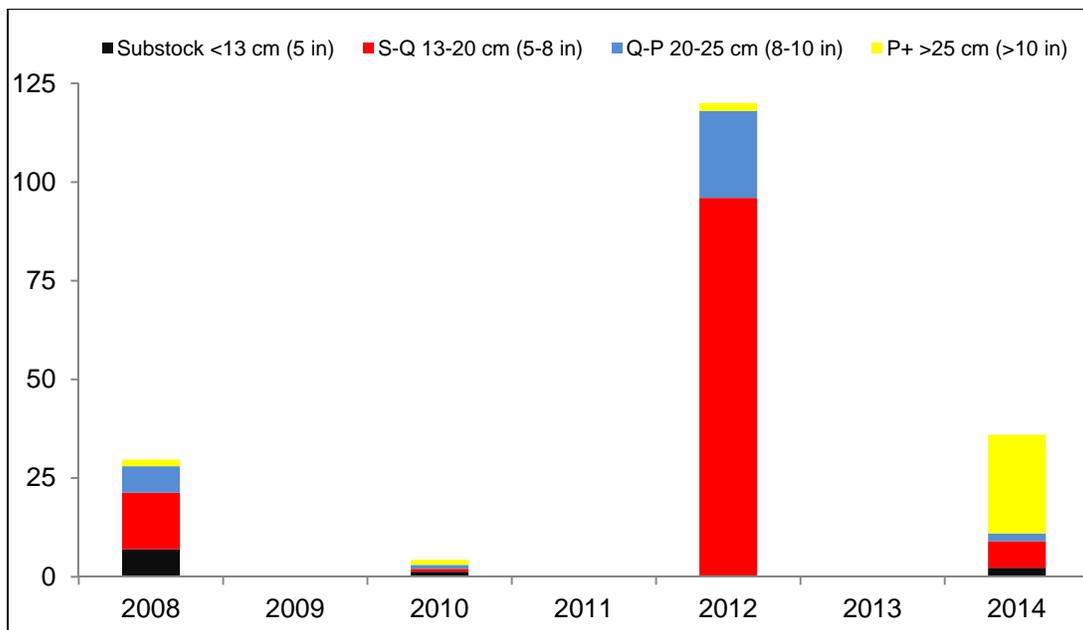
**Figure 3.** Length frequency histograms for walleyes sampled with gill nets in Whitewood Lake, Kingsbury County, 2008, 2010, 2012, 2014.

## Yellow Perch

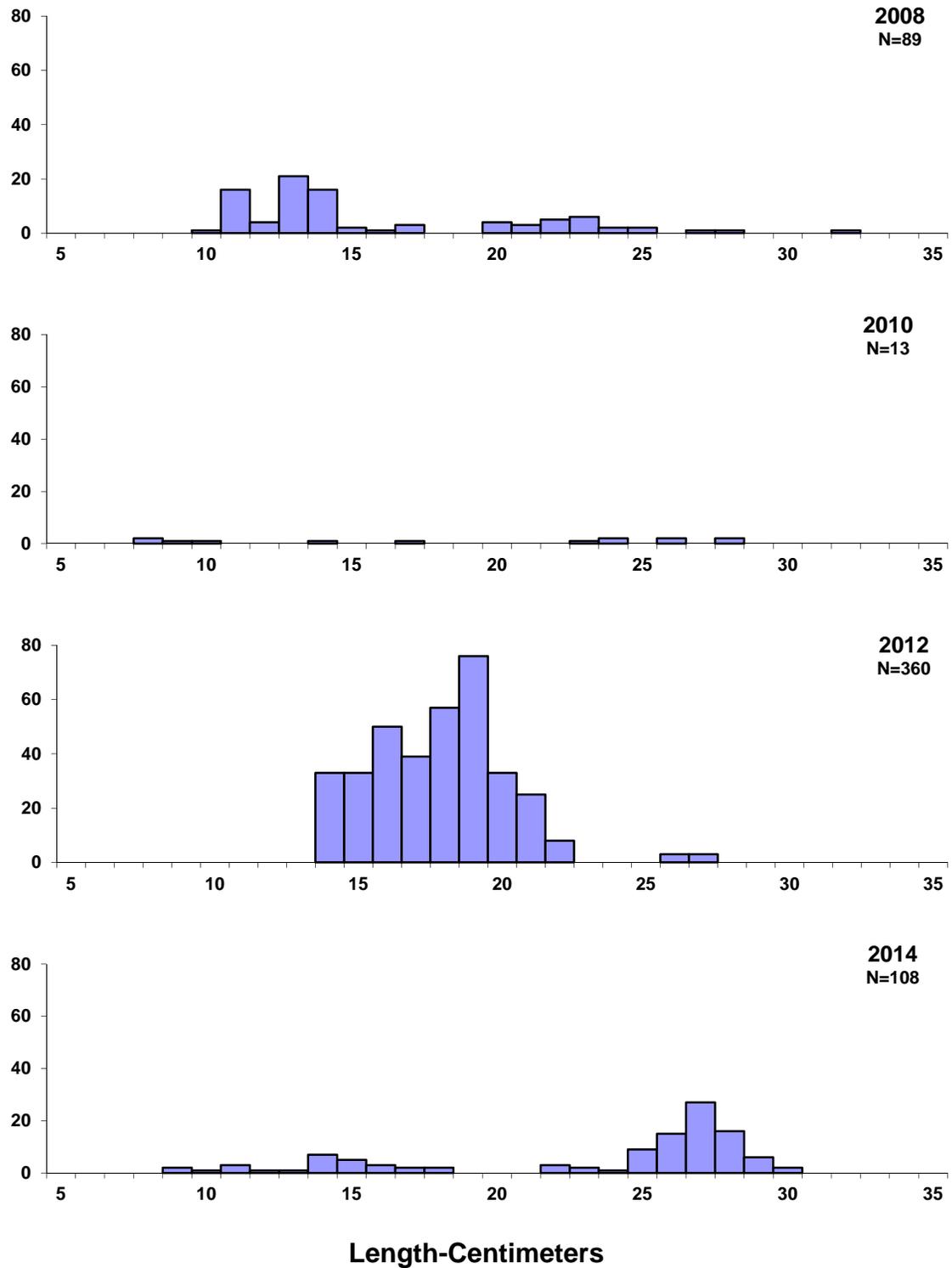
Yellow perch abundance has decreased since 2012 (Table 10) and the majority of the fish sampled were 25-30 cm (10-12 in) long (Figure 4). The lengths of fish in this large year class suggest they were produced in 2011 (Figure 5). There has been no stocking in Whitewood (Table 3) so these fish were naturally produced.

**Table 10.** CPUE, PSD, RSD-P, and mean  $W_r$  for all yellow perch sampled with gill nets in Whitewood Lake, Kingsbury County, 2005-2014. Columns for stocked years are shaded.

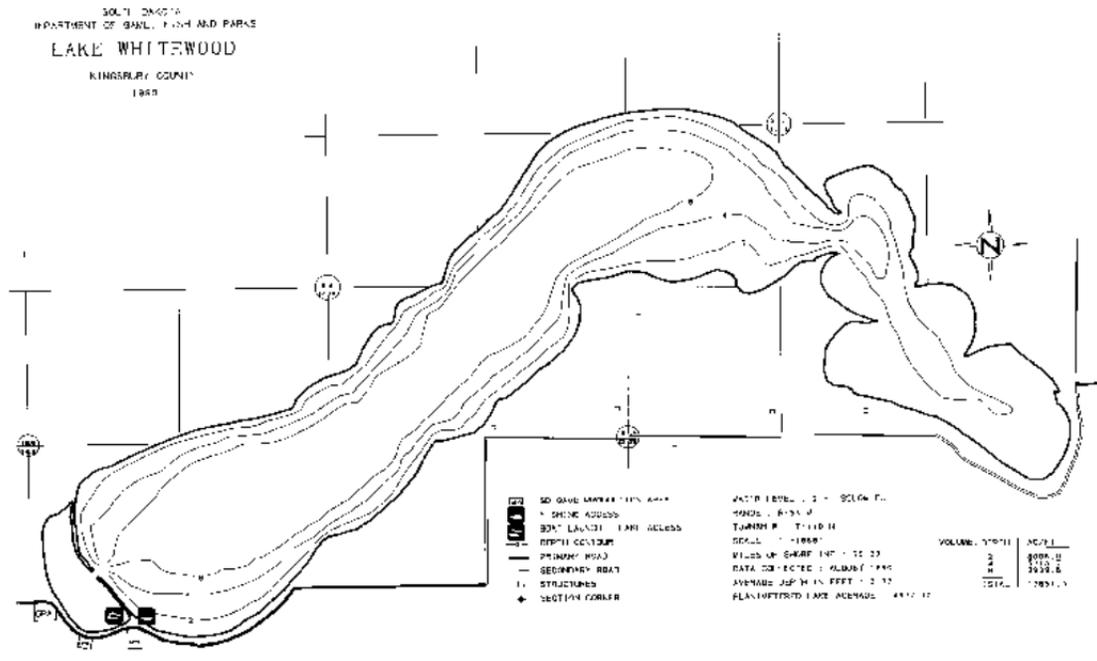
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>		62.0		29.7		4.3		120.0		36.0
<b>PSD</b>		92		37		78		20		80
<b>RSD-P</b>		50		7		44		2		74
<b>Mean <math>W_r</math></b>		106		107		105		97		104



**Figure 4.** CPUE by length category for yellow perch sampled with gill nets in Whitewood Lake, Kingsbury County, 2008, 2010, 2012, 2014.



**Figure 5.** Length frequency histograms for yellow perch sampled with gill nets in Whitewood Lake, Kingsbury County, 2008, 2010, 2012, 2014.



**Figure 6.** Contour map of Whitewood Lake, Kingsbury 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.