

**SOUTH DAKOTA STATEWIDE FISHERIES SURVEY**  
**North Island Lake, Minnehaha County**  
**2102-F-21-R-47**  
**2014**



**Figure 1.** North Island Lake, Minnehaha County

**Legal Description:** T104N-R 52W-Sec. 19, T104-R 53-Sec 24-25

**Location from nearest town:** 10 miles west of Colton, SD

**Surface Area:** 375 acres

**Meandered (Y/N):** No

**Max. depth at outlet elevation:** 17 feet

**Observed water level:** Full

**Contour map available:** Yes

**Watershed area:** Unknown acres

**Shoreline length:** 4.4 miles

**Mean depth at outlet elevation:** 13 feet

**Lake volume:** 4,922 acre feet

**Date mapped:** 1997

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

## Introduction

### General

Island Lake is a natural lake that lies on the McCook/Minnehaha County line. It was named for the numerous islands present during lower water years. County Highway 110 divides the lake into two sections that are managed separately and named North and South Island lakes. Culverts underneath the road used to allow fish passage between the lakes, but we believe they were covered by rock when the road was raised in the mid-1990's. Island Lake has a small, local watershed with no inlet or outlet streams.

### Ownership of Lake and Adjacent Lakeshore Properties

North Island Lake is not a meandered public water. The South Dakota Department of Game, Fish and Parks (GFP) and the United States Fish and Wildlife Service (USFWS) share ownership of most of the lake basin and surrounding shoreline. The extreme northeast, southwest and northwest portions of the lake are privately owned.

### Fishing Access

The North Island Lake Access Area is currently in poor condition. High water levels have eroded much of the shoreline and the boat ramp is entirely under water. Small boats can still be launched, but parking is limited. Shore fishermen frequently park along the county road to fish. Some shore fishing is available on the USFWS land on the north end of the lake. Plans are currently being drafted to make fishing access improvements within the next two years.

### Water Quality and Aquatic Habitat

The water in North Island Lake was clear during the survey with a Secchi depth measurement of 1.7 meters (67 in, Table 1). There were large beds of sago pondweed (*Potamogeton pectinatus*) and clasping leaf pondweed (*Potamogeton richardsonii*) around the entire lake. There are some cattails (*Typha spp.*) and bulrush (*Scirpus spp.*) in the bays at the north end of the lake.

**Table 1.** Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in North Island Lake, Minnehaha 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	25 (77)	170 (67)	Sago and clasping leaf pondweed, cattails, bulrushes
2013	26 (79)	79 (31)	Sago and clasping leaf pondweed, cattails, bulrushes
2011	24 (75)	218 (86)	Sago, bulrushes, cattails
2009	23 (74)	183 (72)	Lots of sago and clasping leaf pondweed
2007	24 (76)	152 (60)	Lots of sago and clasping leaf pondweed
2005	24 (76)	91 (36)	Lots of sago, clasping leaf pondweed, and coontail

**Fish Community**

North Island Lake supports a diverse fish community comprised of many different species (Table 2). Walleye, yellow perch, black crappie and bluegill are most popular with anglers fishing the lake but smallmouth bass, northern pike, and muskellunge are also available.

**Table 2.** Fish species commonly found in North Island Lake, Minnehaha County.

<b><i>Game Species</i></b>	<b><i>Other Species</i></b>
Walleye Yellow Perch Northern Pike Black Crappie Muskellunge Bluegill Smallmouth Bass Black Bullhead Green Sunfish Largemouth Bass	Common Carp

**Fish Management**

North Island Lake has never winterkilled since being managed as a fishery (Table 3). Occasional stockings of yellow perch, muskellunge and walleye are made to maintain population abundance and fishing opportunity when natural reproduction is lacking (Table 4).

**Table 3.** Fish kill history for North Island Lake, Minnehaha County. (List by most recent to less recent)

<b><i>Year</i></b>	<b><i>Severity</i></b>	<b><i>Comments</i></b>

**Table 4.** Stocking history for North Island Lake, Minnehaha County, 2005-2014.

<b>Year</b>	<b>Number</b>	<b>Species</b>	<b>Size</b>
2005	45,100	Walleye	Fingerling
	25,317	Yellow Perch	Fingerling
	77	Yellow Perch	Adult
2007	164	Smallmouth Bass	Adult
	3,224	Walleye	Large Fingerling
	3,420	Yellow Perch	Juvenile
2008	185	Smallmouth Bass	Adult
	28	Smallmouth Bass	Juvenile
2009	8,748	Walleye	Large Fingerling
	620	Yellow Perch	Fingerling
	310	Yellow Perch	Adult
	145	Muskellunge	Juvenile
2011	272	Muskellunge	Large Fingerling
	10,058	Yellow Perch	Large Fingerling
2012	4	Muskellunge	Adult
	43,860	Walleye	Fingerling
	2,746	Yellow Perch	Adult
	34,020,000	Yellow Perch	Eggs
	7,350	Yellow Perch	Juvenile
2014	441	Muskellunge	Large Fingerling
	30,800	Walleye	Fingerling

## Methods

North Island Lake was sampled on June 23-24, 2014 with three overnight gill-net sets and five overnight trap-net sets. 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. The trap nets are constructed with 19-mm-bar-mesh ( $\frac{3}{4}$  in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads.

## Results and Discussion

### Net Catch Results

Black bullheads made up almost 98% of both the gill-net and trap-net catch in 2014 (Tables 5 and 7). Most bullheads were quality-length (23 cm or 9 in) or longer (Tables 6 and 8).

**Table 5.** Total catch from three overnight gill nets set in North Island Lake, Minnehaha County, June 23-24, 2014.

<b>Species</b>	<b>#</b>	<b>%</b>	<b>CPUE<sup>1</sup></b>	<b>80% C.I.</b>	<b>Mean CPUE*</b>	<b>PSD</b>	<b>RSD-P</b>	<b>Mean Wr</b>
Black Bullhead	336	97.7	112.0	$\pm 10.9$	80.9	90	0	--
Walleye	5	1.5	1.7	$\pm 0.9$	3.8	--	--	--
Common Carp	3	0.9	1.0	$\pm 0.7$	0.8	--	--	--

\*10 years (2005-2014)

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

**Table 6.** CPUE by length category for selected species sampled with gill nets in North Island Lake, Minnehaha County, June 23-24, 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	--	112.0	2.8	109.2	--	112.0	$\pm 10.9$
Walleye	--	1.7	--	0.3	1.3	1.7	$\pm 0.9$
Common Carp	--	1.0	--	0.7	0.3	1.0	$\pm 0.7$

Length categories can be found in Appendix A.

**Table 7.** Total catch from five overnight trap nets set in North Island Lake, Minnehaha County, June 23-24, 2014.

<i>Species</i>	<i>#</i>	<i>%</i>	<i>CPUE</i>	<i>80% C.I.</i>	<i>Mean CPUE*</i>	<i>PSD</i>	<i>RSD-P</i>	<i>Mean Wr</i>
Black Bullhead	817	97.8	163.4	$\pm 103.7$	197.0	94	0	--
Yellow Perch	6	0.7	1.2	$\pm 1.2$	0.3	--	--	--
Smallmouth Bass	4	0.5	0.8	$\pm 0.5$	1.0	--	--	--
Common Carp	4	0.5	0.8	$\pm 0.7$	2.5	--	--	--
Bluegill	3	0.4	0.6	$\pm 0.8$	2.7	--	--	--
Northern Pike	1	0.1	0.2	$\pm 0.3$	0.6	--	--	--

\*10 years (2005-2014)

**Table 8.** CPUE by length category for selected species sampled with trap nets in North Island Lake, Minnehaha County, June 23-24, 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	--	163.4	10.0	153.4	--	163.4	$\pm 103.7$
Yellow Perch	--	1.2	--	1.2	--	1.2	$\pm 1.2$
Smallmouth Bass	--	0.8	0.4	0.2	0.2	0.8	$\pm 0.5$
Common Carp	--	0.8	--	0.2	0.6	0.8	$\pm 0.7$
Bluegill	--	0.6	--	0.6	--	0.6	$\pm 0.7$
Northern Pike	--	0.2	--	0.2	--	0.2	$\pm 0.3$

Length categories can be found in Appendix A.

**Table 9.** Gill-net (GN) and trap-net (TN) CPUE for selected fish species sampled in North Island Lake, Minnehaha 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	GN	83.0		35.8		4.8		137.8		111.7	112.0
Bullhead	TN	256.0		388.5		139.0		84.4		150.9	163.4
Black	GN	--		--		--		--		--	--
Crappie	TN	--		--		0.1		--		--	--
	GN	0.3		--		--		--		--	--
Bluegill	TN	2.9		0.4		9.5		1.8		0.9	0.6
Common	GN	--		--		--		--		4.0	1.0
Carp	TN	--		0.1		1.0		0.2		13.1	0.8
Green	GN	0.3		0.8		--		--		--	--
Sunfish	TN	--		3.8		0.5		0.5		0.2	--
	GN	--		--		--		--		0.3	--
Muskellunge	TN	--		--		--		--		0.1	--
Northern	GN	--		--		--		--		0.3	--
Pike	TN	1.9		0.3		0.2		--		1.0	0.2
Smallmouth	GN	--		1.5		1.5		4.3		0.3	--
Bass	TN	--		0.8		--		1.0		3.1	0.8
	GN	3.8		5.8		6.3		4.3		0.7	1.7
Walleye	TN	2.3		0.8		1.0		0.5		0.1	--
White	GN	--		--		--		--		--	--
Sucker	TN	0.4		0.1		0.1		--		--	--
Yellow	GN	9.3		3.5		--		--		1.7	--
Perch	TN	0.2		0.4		--		0.2		--	1.2

## 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 (26,250) as needed to achieve the management objective.

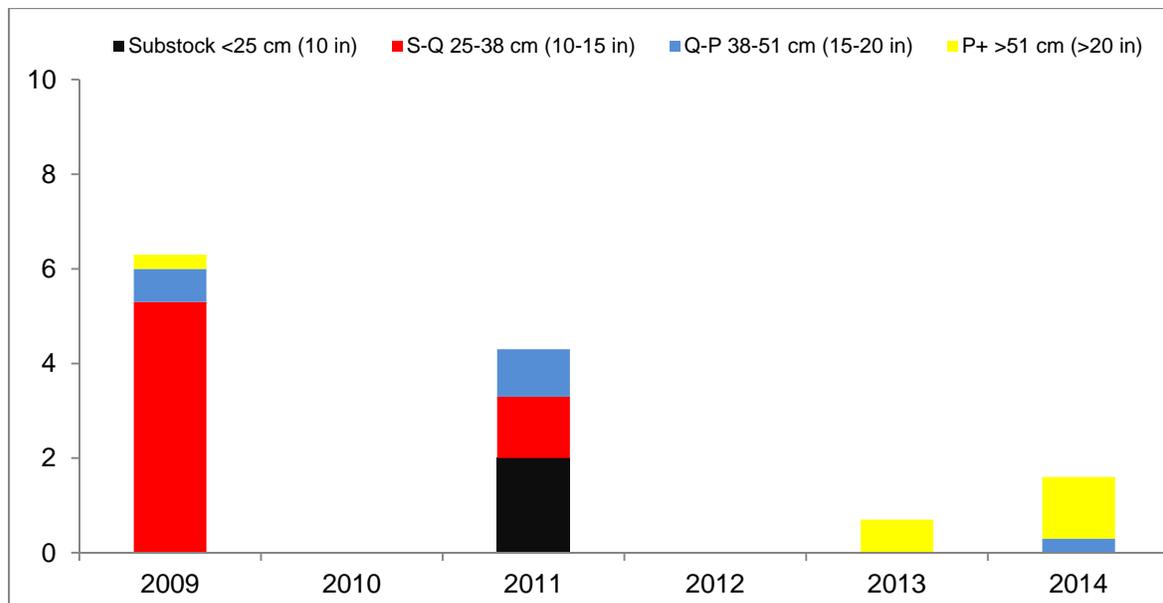
Walleye CPUE increased slightly in 2014 (Table 10), but still remains well below the management objective. The catch was entirely comprised of a few large fish (Figures 2 and 3). Fingerling stocking in 2012 and 2014 was unsuccessful at creating a year class (Table 11 and Figure 3).

**Table 10.** CPUE, PSD, RSD-P, and mean Wr for all walleyes sampled with gill nets in North Island Lake, Minnehaha County, 2005-2014. Stocked years are shaded.

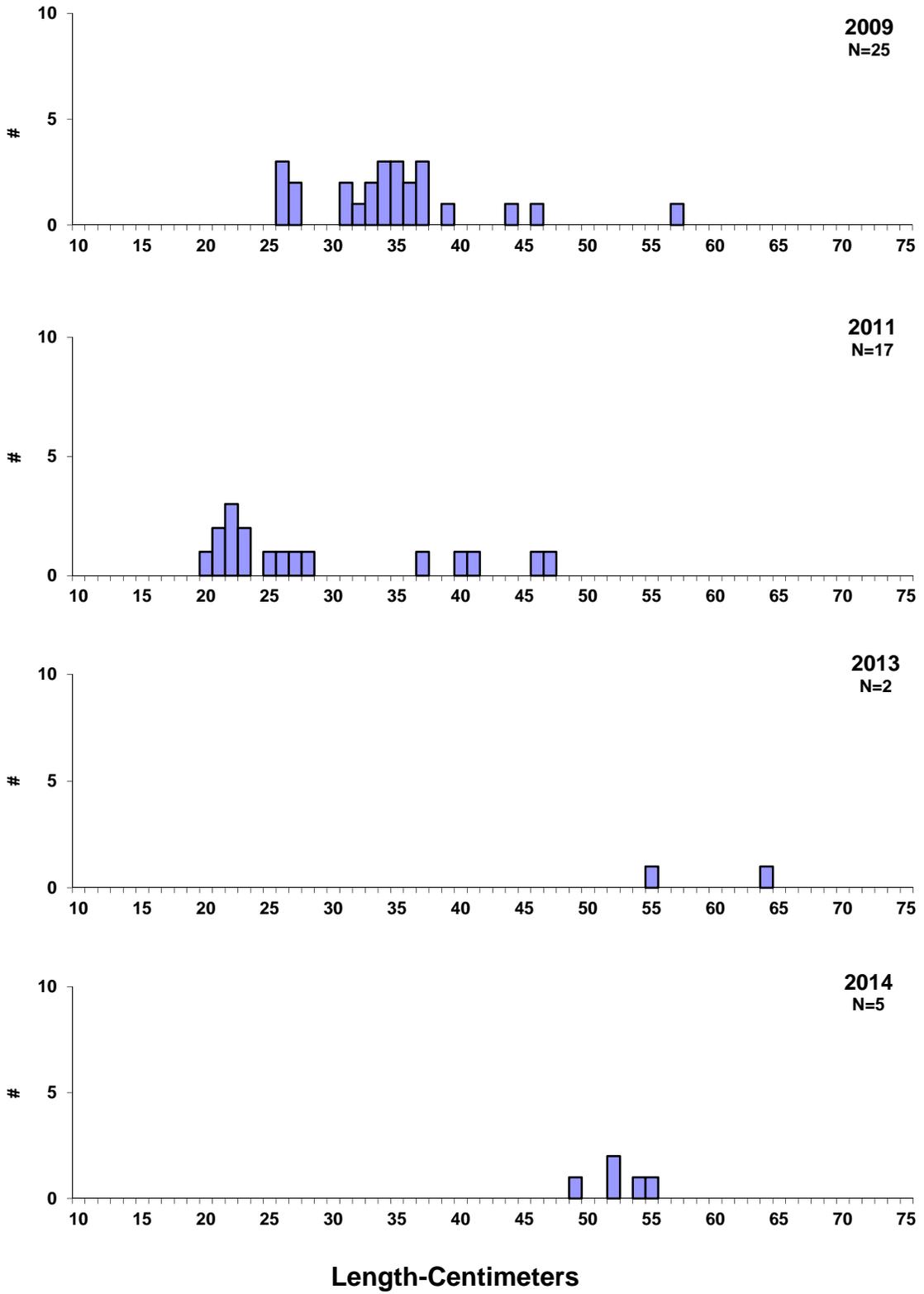
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>	3.8		5.8		6.3		4.3		0.7	1.7
<b>PSD</b>	53		0		16		44		--	--
<b>RSD-P</b>	40		0		4		0		--	--
<b>Mean Wr</b>	81		89		94		89		--	--

**Table 11.** Walleyes stocked into North Island Lake, Minnehaha County, 2005-2014.

Year	Number	Size
2005	45,100	Fingerling
2007	3,224	Large Fingerling
2009	8,748	Large Fingerling
2012	43,860	Fingerling
2014	30,800	Fingerling



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



**Figure 3.** Length frequency histograms for walleye sampled with gill nets in North Island Lake, Minnehaha County, 2009, 2011, 2013, 2014.

## Yellow Perch

### Management Objective

- None. Yellow perch will no longer be actively managed in North Island Lake.

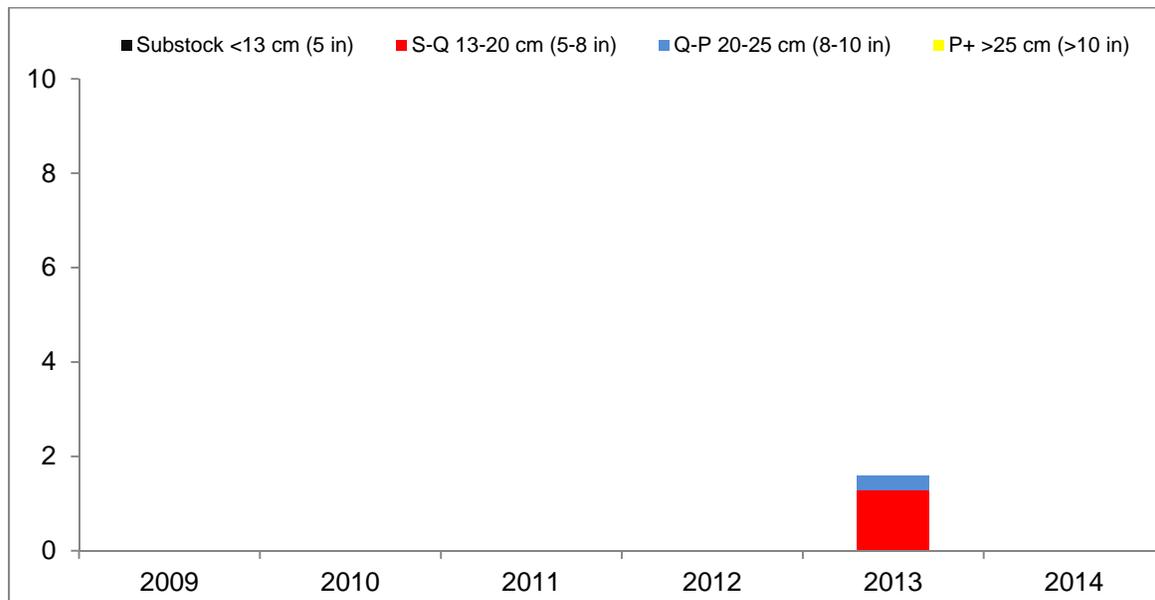
No yellow perch were sampled in the 2014 gill nets (Table 14). Frequent stockings (Table 15) have failed to improve the population (Table 14) so yellow perch will no longer be actively managed by stocking.

**Table 14.** CPUE, PSD, RSD-P, and mean Wr for all yellow perch sampled with gill nets in North Island Lake, Minnehaha County, 2005-2014. Stocked years are shaded.

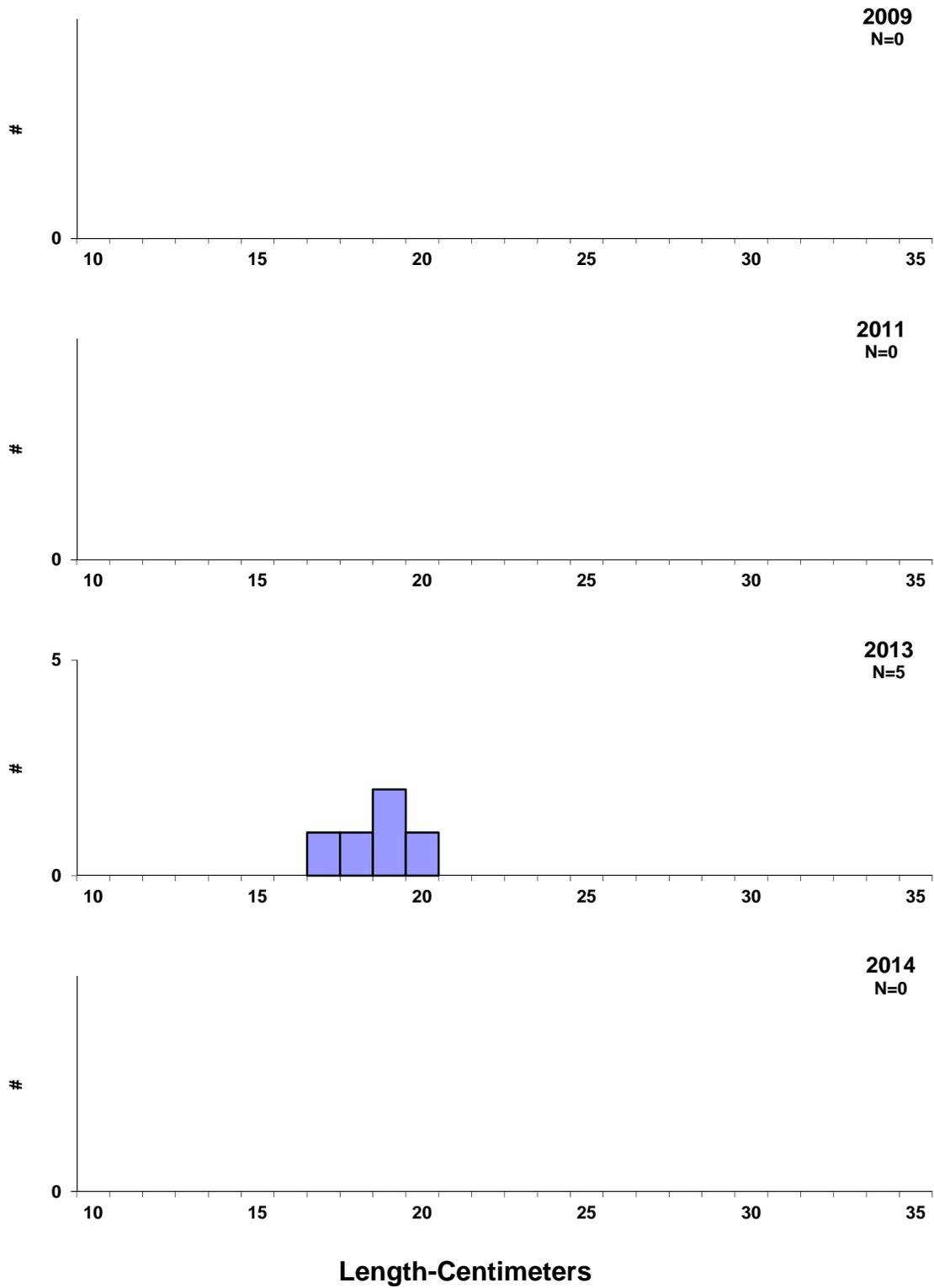
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>	9.3		3.5		--		--		1.7	--
<b>PSD</b>	63		56		--		--		--	--
<b>RSD-P</b>	53		13		--		--		--	--
<b>Mean Wr</b>	102		104		--		--		--	--

**Table 15.** Yellow perch stocked into North Island Lake, Minnehaha County, 2005-2014.

Year	Number	Size
2005	25,317	Fingerling
	77	Adult
2007	3,420	Juvenile
2009	620	Fingerling
	310	Adult
2011	10,058	Large Fingerling
2012	2,746	Adult
	34,020,000	Eggs
	7,350	Juvenile



**Figure 4.** CPUE by length category for yellow perch sampled with gill nets in North Island Lake, Minnehaha County, 2009-2014.



**Figure 5.** Length frequency histograms for yellow perch sampled in gill nets in North Island Lake, Minnehaha County, 2009, 2011, 2013, 2014.

South Dakota Department of Game, Fish and Parks

Island Lake  
Minnehaha / McCook Co.  
1997

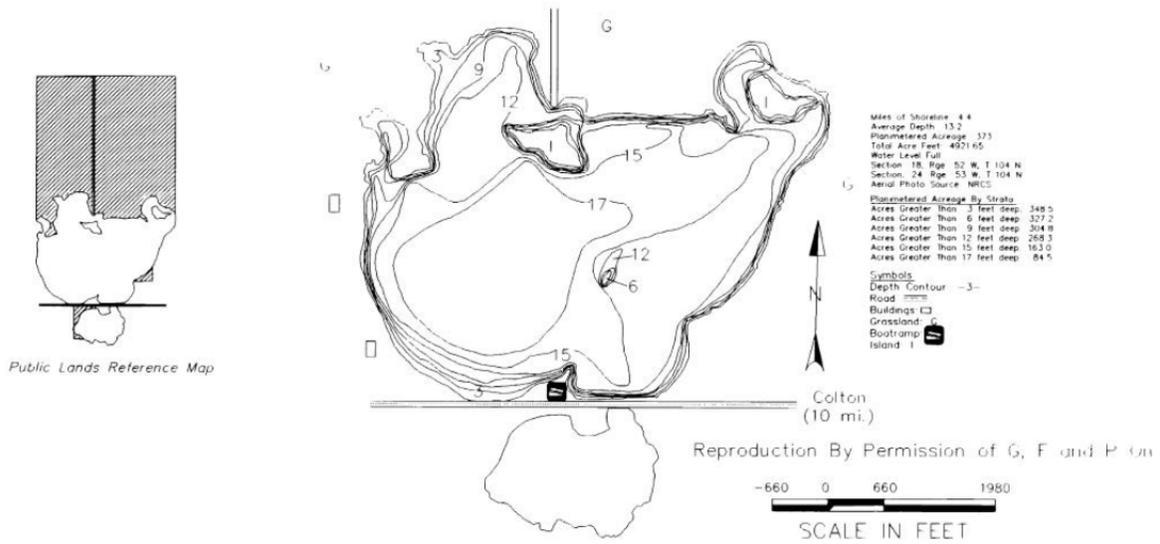


Figure 6. Contour map of North Island Lake, Minnehaha County.

**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.