

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



**Figure 1.** Wall Lake, Minnehaha County

**Legal Description:** T101N-R51W-Sec. 21 & 28

**Location from nearest town:** 6 miles south and 1/2 mile west of Hartford, SD

**Surface Area:** 228 acres

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

**OHWM elevation:** 1559.5

**Outlet elevation:** 1559.0

**Max. depth at outlet elevation:** 22.8 feet

**Observed water level:** Full

**Contour map available:** Yes

**Watershed area:** 1,118 acres

**Shoreline length:** 2.5 miles

**Date set:** April, 1983

**Date set:** April, 1983

**Mean depth at outlet elevation:** 10.9 feet

**Lake volume:** 2,501 acre-feet

**Date mapped:** 2010

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

## Introduction

### General

The proximity of Wall Lake to Sioux Falls makes it an important source of water-based recreation for the area.

### Ownership of Lake and Adjacent Lakeshore Properties

Wall Lake 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. The entire shoreline is privately owned with the exception of the Wall Lake Access Area on the southwest corner of the lake and a public swimming beach managed by Minnehaha County on the south shore.

### Fishing Access

The Wall Lake Access Area has a double lane boat ramp, boat dock, public toilet, handicapped-accessible fishing pier and excellent shore fishing access.

### Water Quality and Aquatic Vegetation

The Secchi depth measurement was 76 cm (30 in) during the survey which was similar to previous surveys (Table 1). Cattails were the only aquatic vegetation observed.

**Table 1.** Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Wall 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	22 (71)	76 (30)	Some cattail was observed
2012	26 (78)	82 (32)	No aquatic vegetation observations were recorded
2010	-- (--)	58 (23)	Turbid water and no aquatic vegetation observed
2008	-- (--)	-- (--)	Sago pondweed
2006	22 (71)	117 (46)	A few cattails

**Fish Community**

Wall Lake contains many species (Table 2) and black bullheads are usually the most abundant.

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

<b><i>Game Species</i></b>	<b><i>Other Species</i></b>
Walleye	White Sucker
Black Crappie	Common Carp
Yellow Perch	Bigmouth Buffalo
Channel Catfish	
Black Bullhead	
Northern Pike	
Pumpkinseed Sunfish	
Bluegill	
Sunfish Hybrids	

**Fish Management**

Although Wall Lake has experienced two fish kills in recent history (Table 3), both were caused by extraordinary environmental conditions. Walleyes are the only species currently managed by regular stocking (Table 4).

**Table 3.** Fish kill history for Wall Lake, Minnehaha County.

<b><i>Year</i></b>	<b><i>Severity</i></b>	<b><i>Comments</i></b>
2010	Severe	July runoff caused DO crash
2008	Light	Stress related Aeromonas die off of common carp

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

<b><i>Year</i></b>	<b><i>Number</i></b>	<b><i>Species</i></b>	<b><i>Size</i></b>
2005	359	Channel Catfish	Adult
	1,034	Yellow Perch	Adult
	7,680	Walleye	Fingerling
2006	3,568	Black Crappie	Adult
	400	Channel Catfish	Adult
	26	Bluegill	Adult
2008	2,472	Walleye	Fingerling
2010	20,340	Walleye	Small Fingerling
	3,445	Walleye	Large Fingerling
2011	20,800	Walleye	Small Fingerling
	2,124	Yellow Perch	Adult
2013	14,850	Walleye	Small Fingerling
2014	20,900	Walleye	Small Fingerling

## Methods

Wall Lake was sampled June 17-18, 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 (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting. The trap nets are constructed with 19-mm-bar-mesh (¾ 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

As usual, black bullheads comprised the majority of the gill net and trap net samples in 2014 (Tables 5, 6). However, significant numbers of channel catfish and walleyes were sampled in the gill nets indicating these populations are starting to recover while bluegills and black crappies continue to decline (Table 9).

**Table 5.** Total catch from three overnight gill nets set in Wall Lake, Minnehaha County, June 17-18, 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	107	56.0	35.7	<u>+8.7</u>	25.7	97	2	93
Channel Catfish	45	23.6	15.0	<u>+1.5</u>	22.1	87	2	101
Walleye	22	11.5	7.3	<u>+4.3</u>	12.7	0	0	86
Common Carp	8	4.2	2.7	<u>+1.5</u>	4.3	--	--	--
Yellow Perch	5	2.6	1.7	<u>+1.1</u>	9.0	--	--	--
White Sucker	2	1.0	0.7	<u>+0.4</u>	1.2	--	--	--
Bigmouth Buffalo	2	1.0	0.7	<u>+0.9</u>	0.4	--	--	--

\*10 years (2005-2014)

**Table 6.** CPUE by length category for selected species sampled with gill nets in Wall Lake, Minnehaha County, June 17-18, 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	--	35.7	1.0	34.0	0.7	35.7	<u>+8.7</u>
Channel Catfish	--	15.0	2.0	12.7	0.3	15.0	<u>+1.5</u>
Walleye	6.3	1.0	1.0	--	--	7.3	<u>+4.3</u>
Common Carp	1.7	1.0	--	0.7	0.3	2.7	<u>+1.5</u>
Yellow Perch	--	1.7	0.3	1.3	--	1.7	<u>+1.1</u>
White Sucker	--	0.7	--	--	0.7	0.7	<u>+0.4</u>
Bigmouth Buffalo	--	0.7	--	--	0.7	0.7	<u>+0.9</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.** Total catch from five overnight trap nets set in Wall Lake, Minnehaha County, June 17-18, 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	1,075	93.4	215.0	<u>+176.8</u>	84.0	84	0	101
Channel Catfish	34	3.0	6.8	<u>+8.4</u>	2.6	97	0	101
Black Crappie	23	2.0	4.6	<u>+3.8</u>	42.9	87	70	94
Pumpkinseed	7	0.6	1.4	<u>+1.1</u>	13.0	--	--	--
Walleye	3	0.3	0.6	<u>+0.5</u>	0.5	--	--	--
Common Carp	3	0.3	0.6	<u>+0.5</u>	8.7	--	--	--
Bluegill	2	0.2	0.4	<u>+0.3</u>	55.0	--	--	--
Hybrid Sunfish	2	0.2	0.4	<u>+0.5</u>	2.5	--	--	--
White Sucker	1	0.1	0.2	<u>+0.3</u>	0.2	--	--	--
Bigmouth Buffalo	1	0.1	0.2	<u>+0.3</u>	1.9	--	--	--

\*10 years (2005-2014)

**Table 8.** CPUE by length category for selected species sampled with trap nets in Wall Lake, Minnehaha County, June 17-18, 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	4.2	210.8	34.2	176.6	--	215.0	<u>+176.8</u>
Channel Catfish	--	6.8	0.2	6.6	--	6.8	<u>+8.4</u>
Black Crappie	--	4.6	0.6	0.8	3.2	4.6	<u>+3.8</u>
Pumpkinseed	--	1.4	--	1.4	--	1.4	<u>+1.1</u>
Walleye	--	0.6	0.4	0.2	--	0.6	<u>+0.5</u>
Common Carp	--	0.6	0.4	--	0.2	0.6	<u>+0.5</u>
Bluegill	--	0.4	--	0.2	0.2	0.4	<u>+0.3</u>
Hybrid Sunfish*	--	--	--	--	--	0.4	<u>+0.5</u>
White Sucker	--	0.2	--	--	0.2	0.2	<u>+0.3</u>
Bigmouth Buffalo	--	0.2	--	--	0.2	0.2	<u>+0.3</u>

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

**Table 9.** Gill-net (GN) and trap-net (TN) CPUE for selected fish species sampled in Wall 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>
Bigmouth	GN		2.0		--		--		--		--
Buffalo	TN		3.6		0.8		4.1		0.7		0.2
Black	GN		15.0		13.7		8.0		56.0		35.7
Bullhead	TN		45.4		49.7		20.4		89.5		215.0
Black	GN		68.0		7.7		20.0		0.3		--
Crappie	TN		133.7		14.7		47.2		14.2		4.6
	GN		6.0		1.0		2.3		0.7		--
Bluegill	TN		52.1		13.3		93.4		115.9		0.4
Channel	GN		12.0		7.0		39.0		37.3		15.0
Catfish	TN		1.6		0.2		2.8		1.6		6.8
Common	GN		2.5		1.3		5.3		9.7		2.7
Carp	TN		34.1		0.5		0.3		8.1		0.6
Green	GN		--		--		--		--		--
Sunfish	TN		0.6		--		0.2		1.2		--
Hybrid	GN		--		--		--		--		--
Sunfish	TN		--		1.6		0.9		9.5		0.4
Northern	GN		--		0.7		4.0		1.3		--
Pike	TN		--		--		0.1		0.5		--
O. Spotted	GN		6.0		0.7		--		--		--
Sunfish	TN		0.1		0.2		--		0.9		--
Pumpkinseed	GN		8.0		4.0		1.7		0.3		--
Sunfish	TN		36.6		17.7		5.0		4.1		1.4
	GN		33.5		10.3		9.3		3.3		7.3
Walleye	TN		0.3		--		0.6		1.2		0.6
White	GN		0.5		2.7		1.0		1.3		0.7
Sucker	TN		0.3		0.4		0.2		--		0.2
Yellow	GN		--		--		--		--		--
Bullhead	TN		0.1		2.3		0.1		1.3		--
Yellow	GN		23.5		4.3		12.3		3.3		1.7
Perch	TN		5.9		1.1		1.3		--		--

## Walleye

### Management Objective

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

### Management Strategy

- Stock walleye fingerlings at the rate of 70/acre (14,490) as needed to achieve management objective.

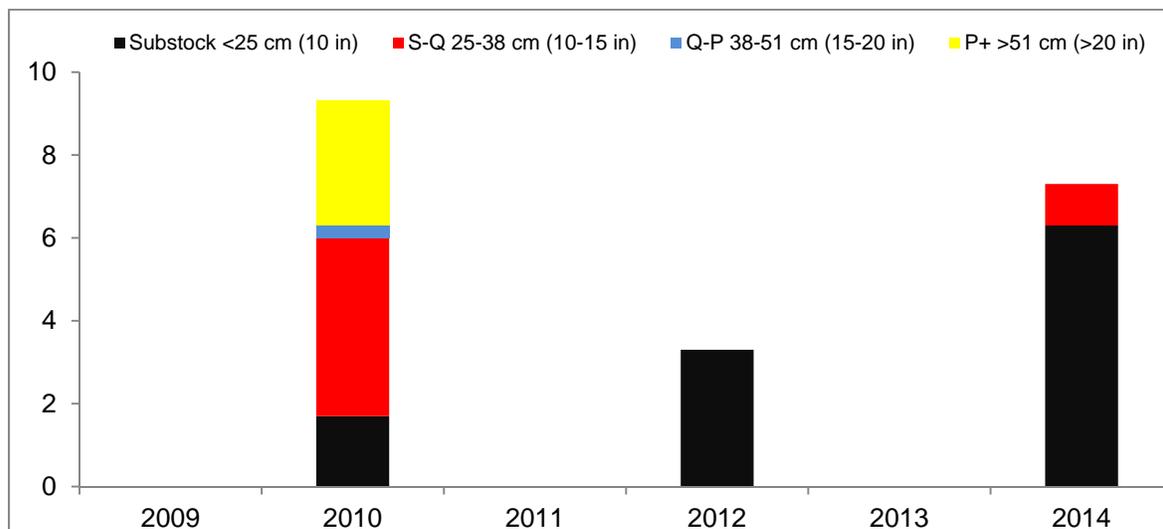
Walleye abundance increased in 2014, but remains below management objective (Table 10). Most of the walleyes sampled were likely age-1 and originated from the 2013 fingerling stocking (Table 11).

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

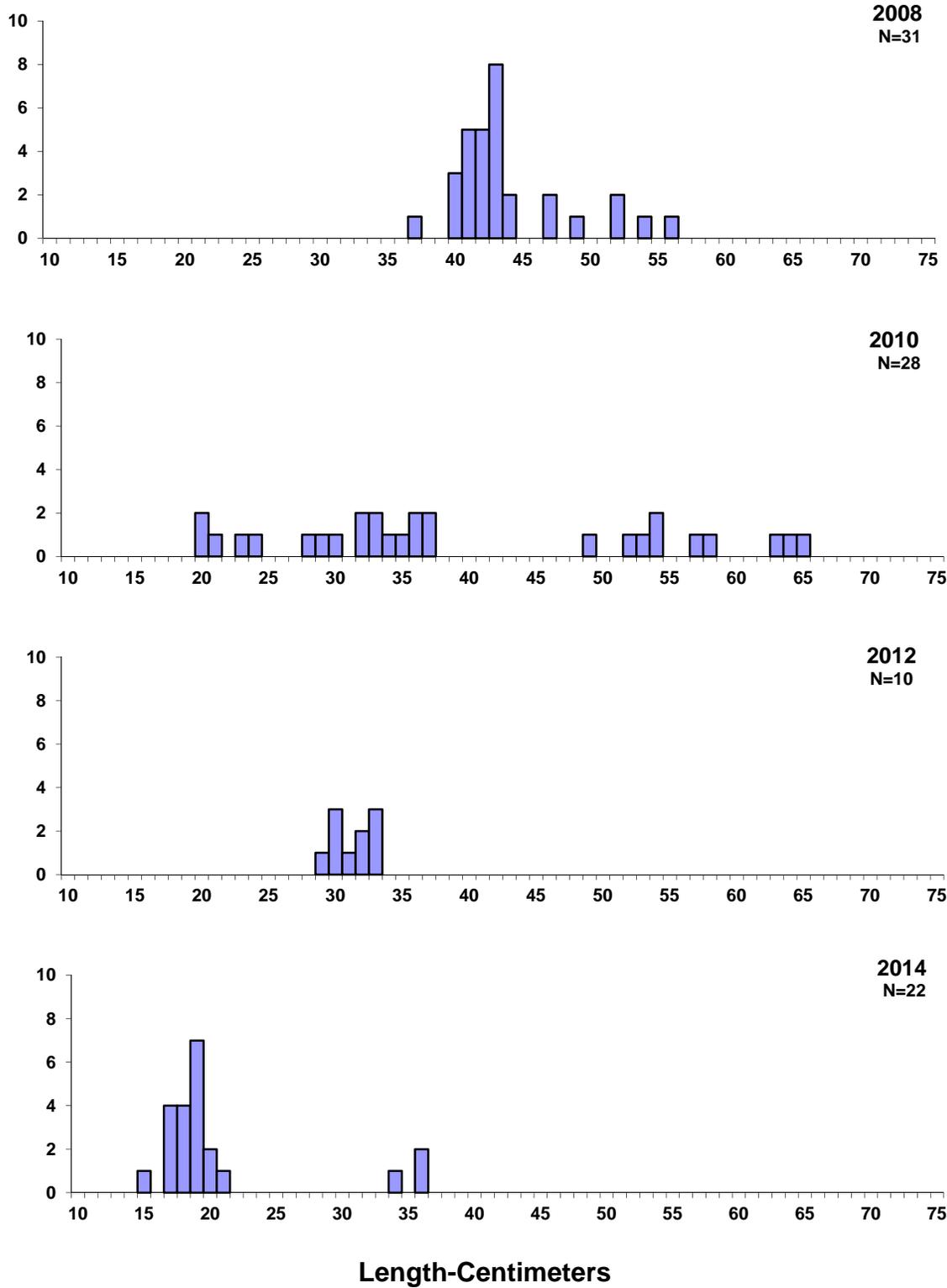
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>		33.5		10.3		9.3		3.3		7.3
<b>PSD</b>		61		97		43		0		0
<b>RSD-P</b>		2		13		39		0		0
<b>Mean Wr</b>		93		99		82		73		86

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

Year	Number	Size
2005	7,680	Large Fingerling
2008	2,472	Large Fingerling
2010	20,340	Small Fingerling
	3,445	Large Fingerling
2011	20,800	Small Fingerling
2013	14,850	Small Fingerling
2014	20,900	Small Fingerling



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



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

## Yellow Perch

### Management Objective

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

### Management Strategy

- Stock small yellow perch fingerlings at the rate of 500/acre (160,000) as needed to achieve the management objective.

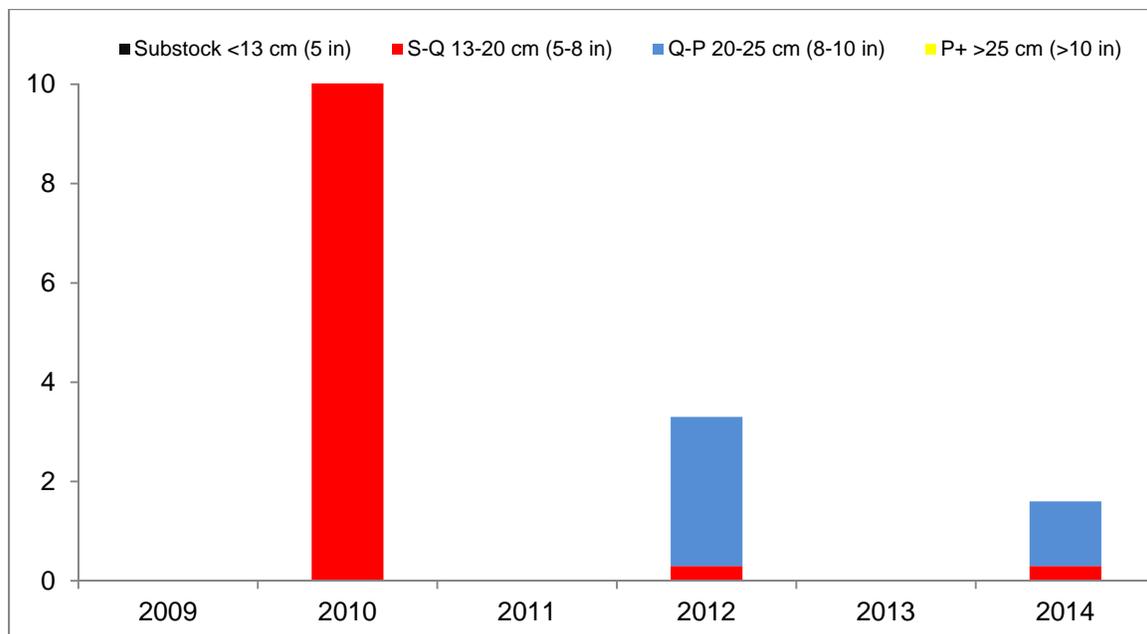
Yellow perch CPUE fell to a 10-year low in 2014 (Table 12). Only 5 yellow perch were sampled and they ranged in length from 13-22 cm (5.1-8.7 in) (Figure 5).

**Table 12.** CPUE, PSD, RSD-P, and mean Wr for all yellow perch sampled with gill nets in Wall Lake, Minnehaha County, 2005-2014. Stocked years are shaded.

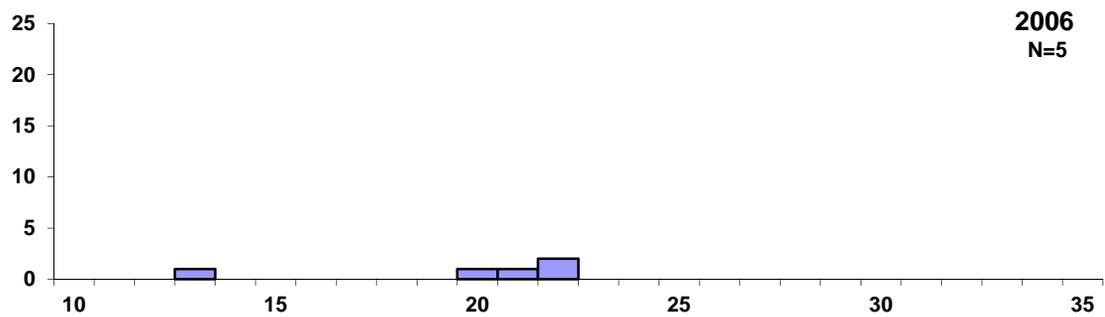
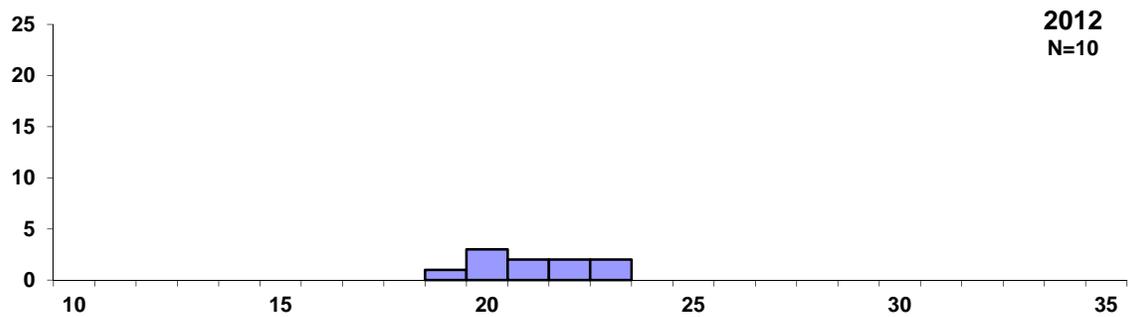
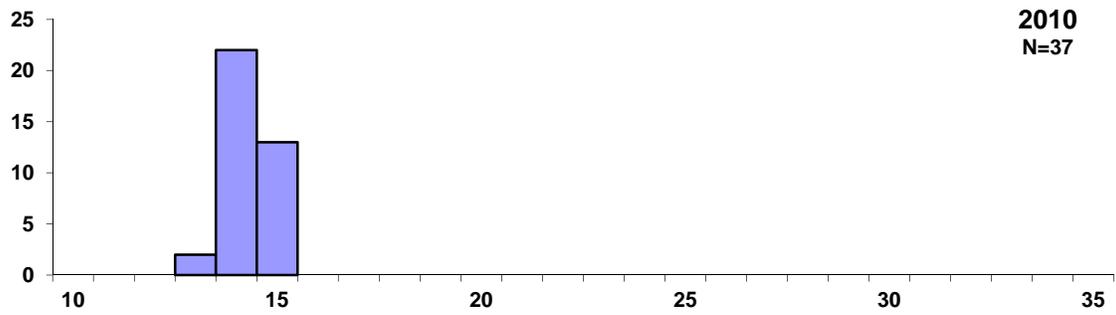
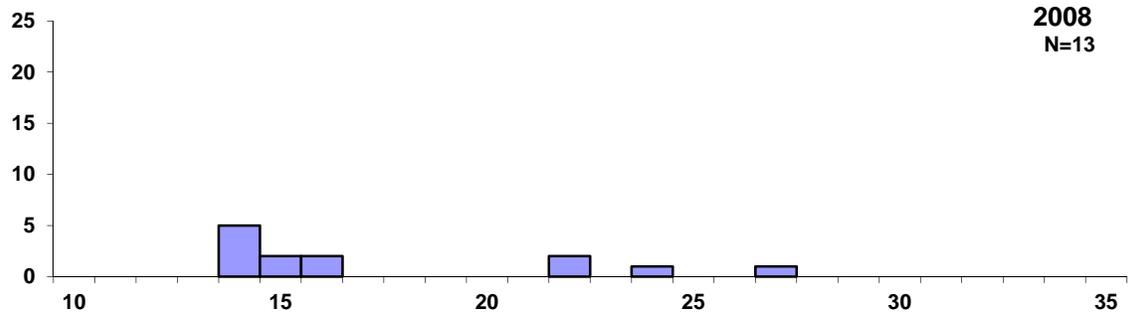
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>		23.5		4.3		12.3		3.3		1.7
<b>PSD</b>		79		31		0		90		--
<b>RSD-P</b>		49		8		0		0		--
<b>Mean Wr</b>		89		91		91		95		--

**Table 13.** Yellow perch stocked into Wall Lake, Minnehaha County, 2005-2014.

Year	Number	Size
2005	1,034	Adult
2011	2,124	Adult



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



**Length-Centimeters**

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

## **Black Crappie**

### **Management Objective**

- Maintain a black crappie population with a trap net CPUE of at least 20.

### **Management Strategy**

- Stock adult black crappies when trap-net CPUE is below the management objective and fish are readily available.

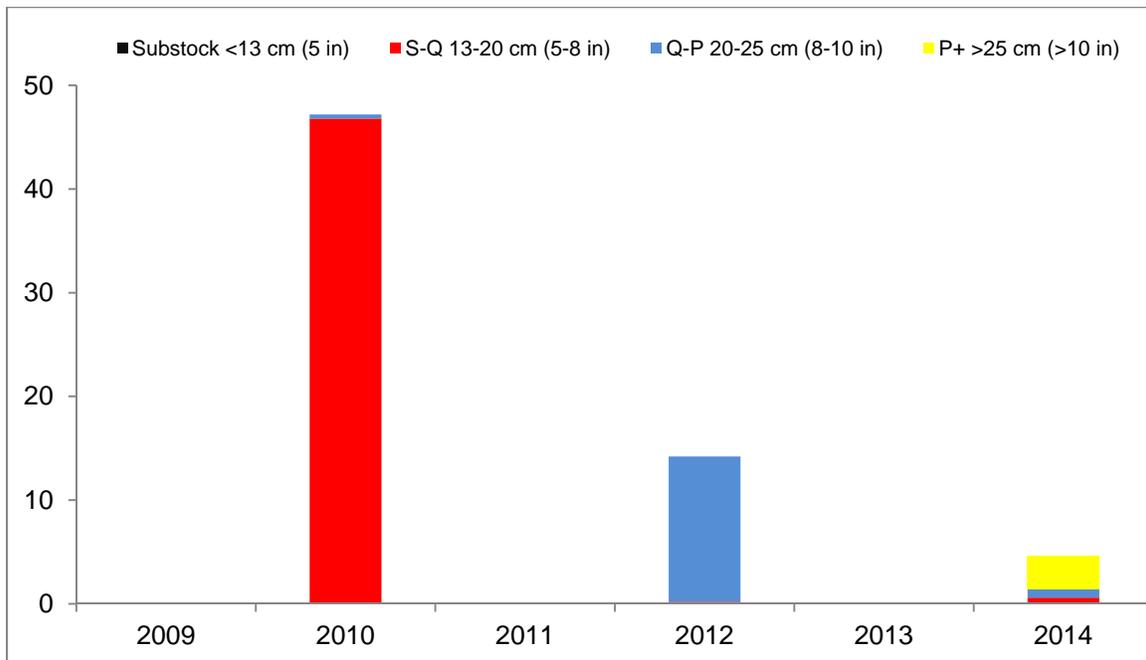
Black crappie CPUE continued to decline in 2014 (Table 14) and has yet to rebound from the summer kill in 2010. The size structure of the population is good with 70% of the fish exceeding 25 cm (10 in) (Figures 6 and 7).

**Table 14.** CPUE, PSD, RSD-P, and mean Wr for all black crappies sampled with trap nets in Wall Lake, Minnehaha County, 2005-2014. Stocked years are shaded.

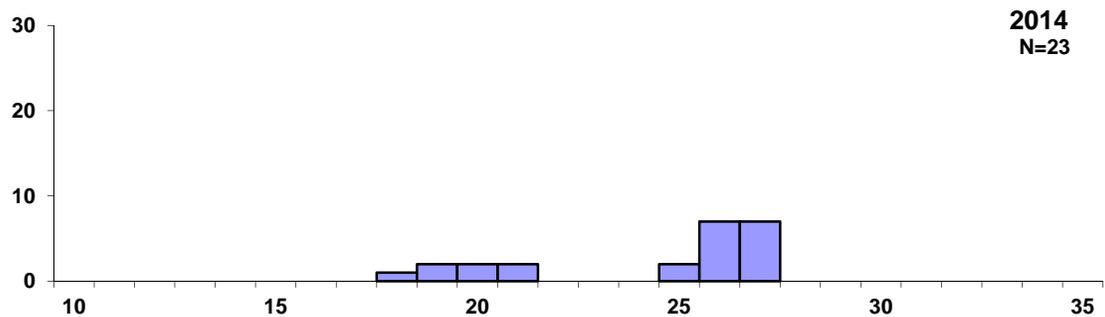
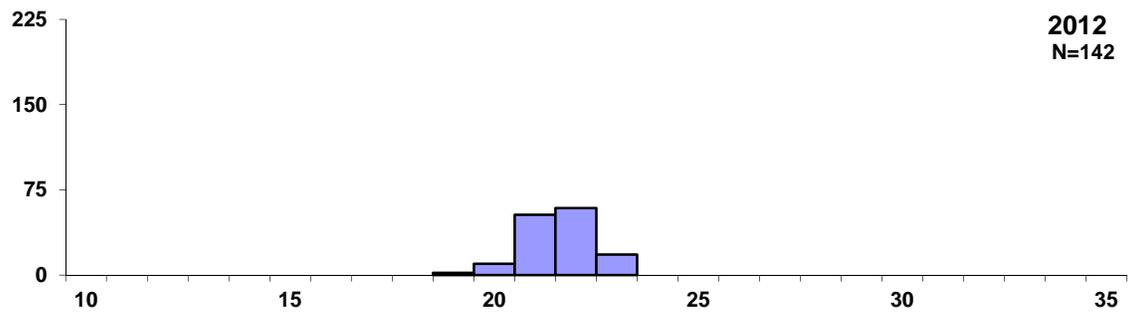
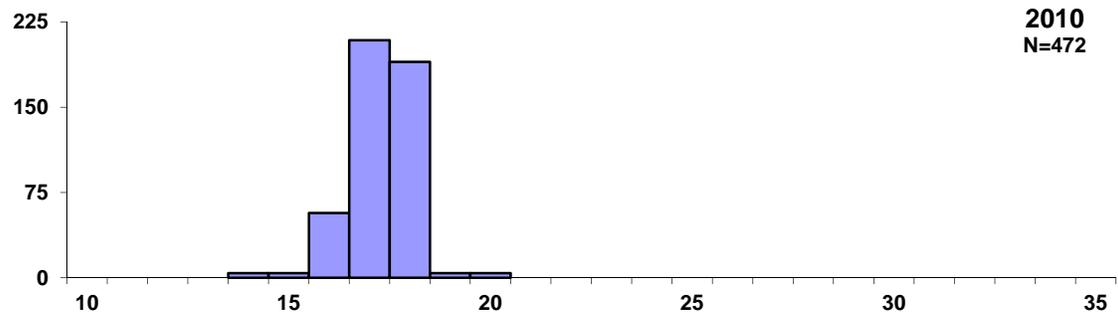
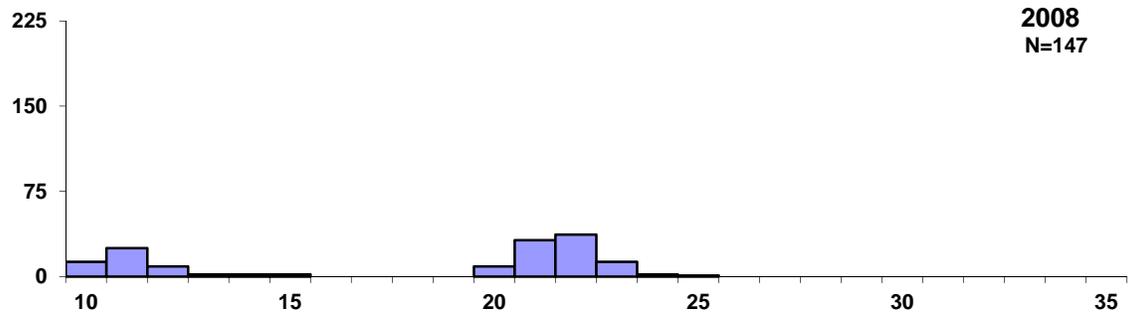
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
<b>CPUE</b>		133.7		14.7		47.2		14.2		4.6
<b>PSD</b>		13		94		1		99		87
<b>RSD-P</b>		0		1		0		0		70
<b>Mean Wr</b>		125		108		91		96		94

**Table 15.** Black crappies stocked into Wall Lake, Minnehaha County, 2005-2014.

<b>Year</b>	<b>Number</b>	<b>Size</b>
2008	3,283	Adult

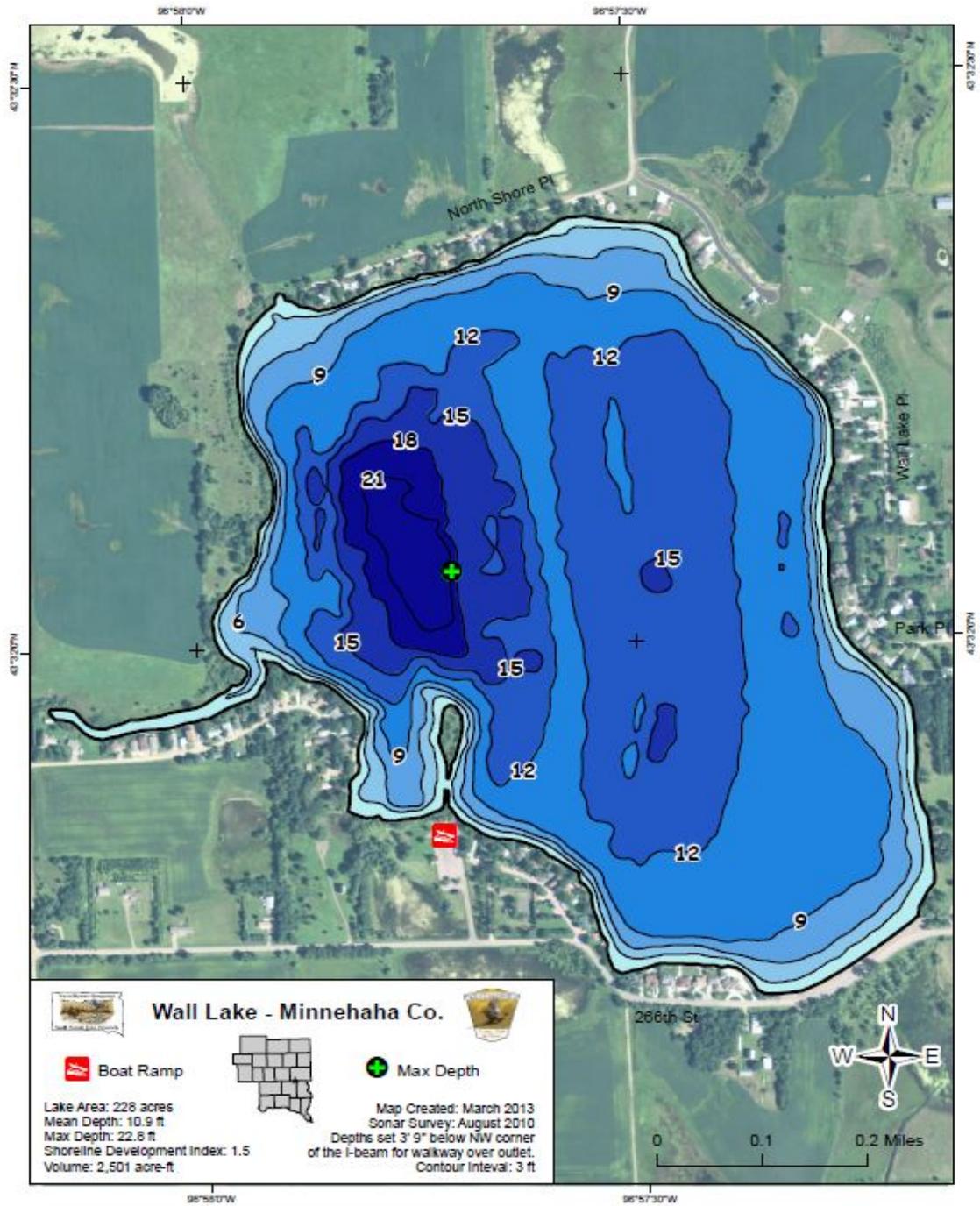


**Figure 6.** CPUE by length category for black crappies sampled with trap nets in Wall Lake, Minnehaha County, 2009-2014.



**Length-Centimeters**

**Figure 7.** Length frequency histograms for black crappies sampled with trap nets in Wall Lake, Minnehaha County, 2006, 2007, 2009, 2013.



**Figure 8.** Contour map of Wall 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.

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.