

**SOUTH DAKOTA STATEWIDE FISHERIES SURVEY**  
**Marindahl Lake, Yankton County**  
**2102-F-21-R-46**  
**2014**



**Figure 1.** Marindahl Lake, Yankton County

**Legal Description:** T95N-R54W-Sec. 7, 17, 18, 20

**Location from nearest town:** 4 miles west and 3 miles south of Irene, SD

**Surface Area:** 139 acres

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

**OHWM elevation:** 1598.3

**Outlet elevation:** 1597.3

**Max. depth at outlet elevation:** 30 feet

**Observed water level:** Low

**Contour map available:** Yes

**Watershed area:** 7,658 acres

**Shoreline length:** 16.2 miles

**Date set:** December, 1981

**Date set:** February, 1987

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

**Lake volume:** 11,000 acre feet

**Date mapped:** November, 2002

**DENR beneficial use classifications:** (4) warm water permanent fish life propagation, (7) immersion recreation, (8) limited-contact recreation, (9) fish and wildlife propagation and stock watering

## Introduction

### General

Marindahl Lake is an artificial impoundment created when the South Dakota Department of Game, Fish and Parks (GFP) constructed an earthen dam across Clay Creek in 1952.

### Ownership of Lake and Adjacent Lakeshore Properties

Marindahl Lake and the surrounding shoreline are owned and managed by the South Dakota Department of Game, Fish and Parks (GFP).

### Fishing Access

The Marindahl Lake Access Area is located on the southwest corner of the lake near the dam and contains a single lane boat ramp, boat dock, public toilet and many shore fishing areas. Many other shore fishing areas are located around the lake. Several improvements to the fishing access roads were completed in 2009.

### Water Quality and Aquatic Habitat

The water in Marindahl during the survey was very clear with a Secchi depth measurement of 1 m (39 in., Table 1). Sparse stands of sago pondweed (*Potamogeton pectinatus*) were observed. Cattail (*Typha spp.*) and smartweed were common in the shallow areas of the lake.

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

| <b>Year</b> | <b>Water Temp<br/>°C (°F)</b> | <b>Secchi Depth<br/>cm (in)</b> | <b>Observations/Comments<br/>(algae, aquatic vegetation, water quality, etc.)</b> |
|-------------|-------------------------------|---------------------------------|---|
| 2014        | 26 (78)                       | 100 (39)                        | No aquatic vegetation was observed  |
| 2013        | -- (--)                       | 185 (73)                        | No observations were recorded   |
| 2011        | 28 (83)                       | 41 (16)                         | Sago pondweed   |
| 2009        | 20 (68)                       | 66 (26)                         | Stained coffee colored  |
| 2007        | 27 (80)                       | -- (--)                         | Cattails and sago pondweed, brown water   |
| 2005        | 24 (76)                       | 66 (26)                         | Sparse sago pondweed  |

### **Fish Community**

Marindahl Lake supports a fish community typical of southeastern South Dakota impoundments (Table 2). The lake contains a variety of panfish including largemouth bass, bluegill, black crappie and green sunfish. Panfish abundance is highly variable and bluegill and bass reproduction and recruitment is limited due to a lack of aquatic vegetation. The lake also has abundant channel catfish, some black bullheads, white sucker and common carp. No fish kills have been documented at Marindahl Lake (Table 3).

**Table 2.** Fish species commonly found in Marindahl Lake, Yankton County.

| <b><i>Game Species</i></b> | <b><i>Other Species</i></b> |
|----------------------------|-----------------------------|
| Largemouth Bass            | Common Carp                 |
| Bluegill                   | White Sucker                |
| Black Crappie              |                             |
| Channel Catfish            |                             |
| Black Bullhead             |                             |
| Green Sunfish              |                             |

### **Fish Management**

Marindahl Lake is managed for largemouth bass, black crappie, bluegill and channel catfish. Challenges include sporadic recruitment of panfish and panfish that do not attain a size acceptable to anglers due to slow growth and high mortality as adults. Removals of bluegill and black crappie, done to reduce competition for food and improve growth, have had some success. Adult and spring-stocked, large-fingerling largemouth bass were stocked (Table 4) to provide a better fishery and to reduce panfish abundance through predation, but that has been relatively unsuccessful.

**Table 3.** Fish kill history for Marindahl Lake, Yankton County.

| <b><i>Year</i></b> | <b><i>Severity</i></b> | <b><i>Comments</i></b>                                |
|--------------------|------------------------|---|
|                    |                        | No fish kills have been documented for Marindahl Lake |

**Table 4.** Stocking history for Marindahl Lake, Yankton County, 2005-2014.

| <b><i>Year</i></b> | <b><i>Number</i></b> | <b><i>Species</i></b> | <b><i>Size</i></b> |
|--------------------|----------------------|-----------------------|--------------------|
| 2006               | 320                  | Largemouth Bass       | Adult              |
| 2009               | 2,025                | Largemouth Bass       | Juvenile           |
| 2011               | 2,880                | Largemouth Bass       | Large Fingerling   |
| 2013               | 3,104                | Largemouth Bass       | Large Fingerling   |
|                    | 3,424                | Rainbow Trout         | Fingerling         |

## Methods

Marindahl Lake was sampled on August 18-19, 2014 with 10 overnight trap net sets. The trap nets are constructed with 19-mm-bar-mesh (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. Two hours of electrofishing was done on June 10, 2014 to sample the largemouth bass population.

## Results and Discussion

### Net Catch Results

Small black bullheads were most abundant in the trap nets followed by black crappies and white sucker (Tables 5 and 6). Low numbers of bluegills and channel catfish were also sampled. Panfish catch was far below average (Table 7).

**Table 5.** Total catch from 10 overnight trap nets set in Marindahl Lake, Yankton County, August 18-19, 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  | 525      | 73.2     | 52.5        | <u>+27.6</u>    | 11.4              | 2          | 1            | --             |
| Black Crappie   | 56       | 7.8      | 5.6         | <u>+2.9</u>     | 37.1              | 98         | 0            | 104            |
| White Sucker    | 55       | 7.7      | 5.5         | <u>+1.3</u>     | 21.3              | 100        | 98           | --             |
| Bluegill        | 47       | 6.6      | 4.7         | <u>+1.6</u>     | 32.0              | 32         | 2            | 108            |
| Common Carp     | 26       | 3.6      | 2.6         | <u>+2.1</u>     | 1.4               | 0          | 0            | --             |
| Channel Catfish | 5        | 0.7      | 0.5         | <u>+0.4</u>     | 3.859             | --         | --           | --             |
| Green Sunfish   | 3        | 0.4      | 0.3         | <u>+0.2</u>     | 0.9               | --         | --           | --             |

\*10 years (2005-2014)

**Table 6.** CPUE by length category for selected species sampled with trap nets in Marindahl Lake, Yankton County, August 18-19, 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  | 0.4             | 52.1         | 51.3       | 0.4        | 0.4       | 52.5             | <u>+27.6</u>    |
| Black Crappie   | --              | 5.6          | 0.1        | 5.5        | --        | 5.6              | <u>+2.9</u>     |
| White Sucker    | --              | 5.5          | --         | 0.1        | 5.4       | 5.5              | <u>+1.3</u>     |
| Bluegill        | --              | 4.7          | 3.2        | 1.4        | 0.1       | 4.7              | <u>+1.6</u>     |
| Common Carp     | 1.2             | 1.4          | 1.4        | --         | --        | 2.6              | <u>+2.1</u>     |
| Channel Catfish | --              | 0.5          | 0.4        | 0.1        | --        | 0.5              | <u>+0.4</u>     |
| Green Sunfish   | --              | 0.3          | 0.1        | 0.2        | --        | 0.3              | <u>+0.2</u>     |

Length categories can be found in Appendix A.

**Table 7.** Trap-net CPUE for all fish species sampled in Marindahl Lake, Yankton 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  | 0.5         |             | 0.1         |             | 0.3         |             | 4.0         |             | 11.0        | 52.5        |
| Black Crappie   | 62.3        |             | 35.2        |             | 69.9        |             | 46.1        |             | 3.6         | 5.6         |
| Bluegill        | 45.0        |             | 26.3        |             | 28.0        |             | 81.9        |             | 6.3         | 4.7         |
| Channel Catfish | 12.1        |             | 3.9         |             | 0.5         |             | 4.3         |             | 1.8         | 0.5         |
| Common Carp     | 0.5         |             | 1.3         |             | 0.1         |             | 1.1         |             | 2.8         | 2.6         |
| Green Sunfish   | 0.1         |             | 0.4         |             | 0.3         |             | 3.5         |             | 0.5         | 0.3         |
| Hybrid Sunfish  | 0.2         |             | --          |             | --          |             | --          |             | 0.3         | --          |
| Largemouth Bass | 0.1         |             | --          |             | --          |             | 0.3         |             | --          | --          |
| White Sucker    | 22.7        |             | 25.4        |             | 25.4        |             | 43.7        |             | 4.8         | 5.5         |
| Yellow Perch    | 0.3         |             | --          |             | 0.1         |             | 0.3         |             | --          | --          |

## Largemouth Bass

### Management Objective

- Maintain a largemouth bass population with a total electrofishing CPUE of at least 20.

### Management Strategies

- Stock hatchery-reared, large fingerling largemouth bass in the spring as needed.
- Introduce gizzard shad as a potential source of forage and evaluate.

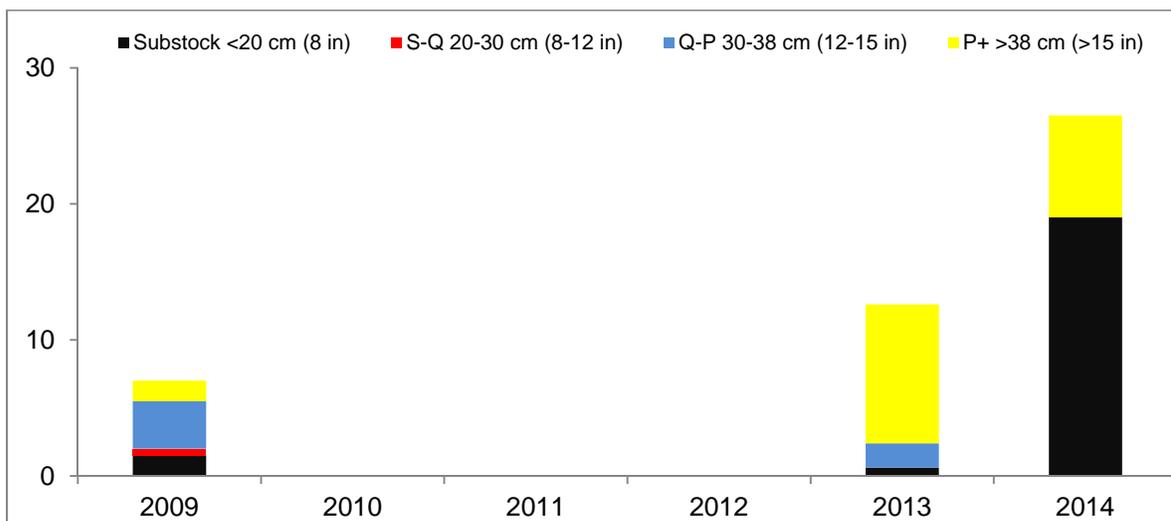
Two hours of nighttime electrofishing was conducted on June 10, 2014 to assess the contribution of hatchery-reared, large-fingerling largemouth bass stocked in 2011 (Table 11). Fifty-three largemouth bass ranging from 96 to 530 mm (3.8-20.9 in) were sampled. The majority of fish were most likely age-1+ and the product of natural reproduction (Figures 1 and 2). Contribution from the 2011 and 2013 spring-stocked large fingerlings (Table 9) was low.

**Table 8.** Largemouth bass electrofishing CPH, PSD, RSD-P, and mean Wr for Marindahl Lake, Yankton County, 2005-2014. Columns for stocked years are shaded.

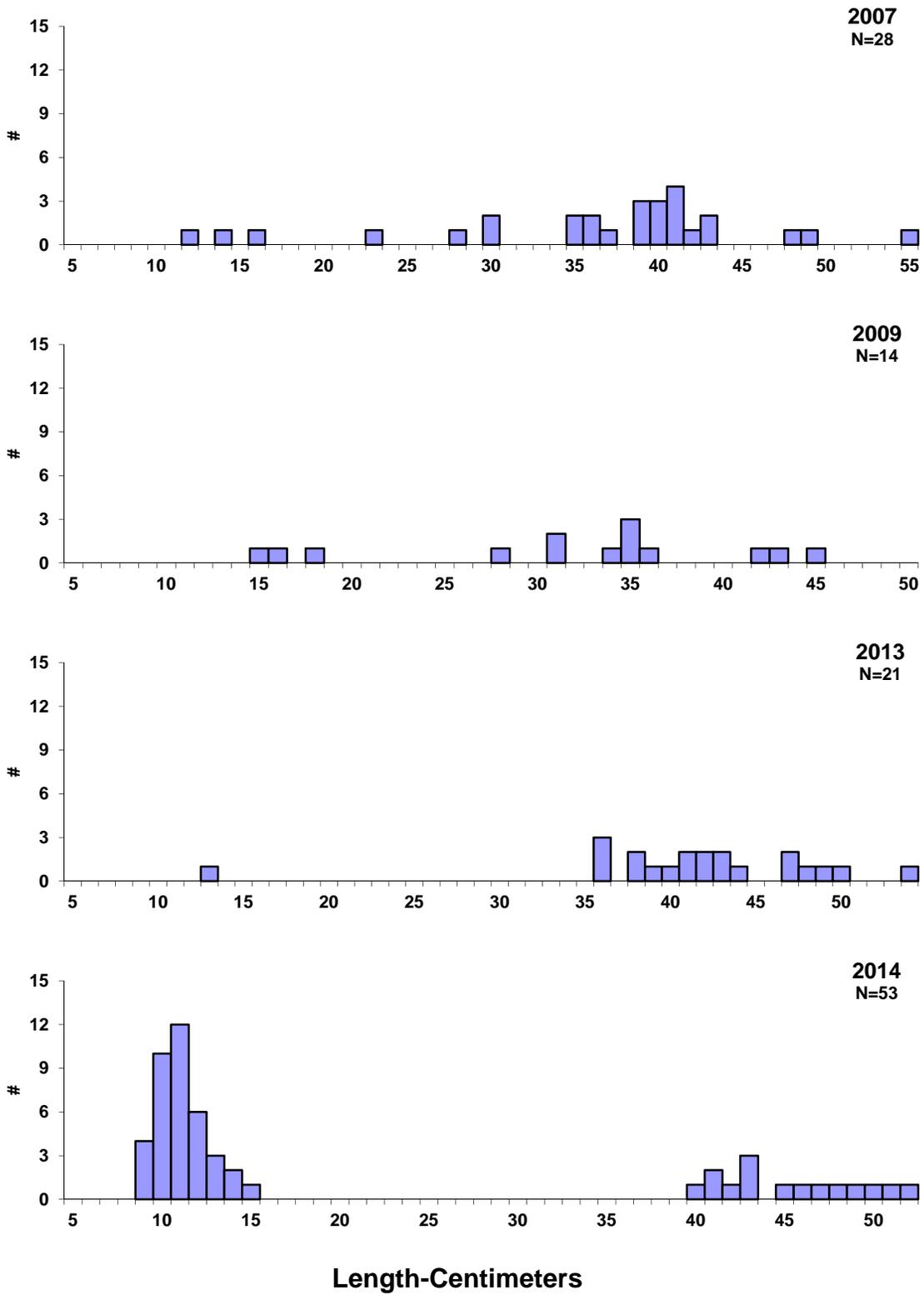
|                | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|----------------|------|------|------|------|------|------|------|------|------|------|
| <b>CPUE</b>    | 19.0 |      | 14.0 |      | 7.0  |      |      |      | 12.6 | 26.5 |
| <b>PSD</b>     | 65   |      | 92   |      | 91   |      |      |      | 100  | 100  |
| <b>RSD-P</b>   | 22   |      | 64   |      | 27   |      |      |      | 85   | 100  |
| <b>Mean Wr</b> | 101  |      | 99   |      | 109  |      |      |      | 97   | 107  |

**Table 9.** Largemouth bass stocked into Marindahl Lake, Yankton County, 2005-2014.

| Year | Number | Size             |
|------|--------|------------------|
| 2006 | 320    | Adult            |
| 2009 | 2,025  | Juvenile         |
| 2011 | 2,880  | Large Fingerling |
| 2013 | 3,104  | Large Fingerling |



**Figure 2.** CPUE by length category for largemouth bass sampled by electrofishing in Marindahl Lake, Yankton County, 2009-2014.



**Figure 3.** Length frequency histograms for largemouth bass sampled by electrofishing in Marindahl Lake, Yankton County, 2007, 2009, 2013, 2014.

## Bluegill

**Management objective:** Maintain a bluegill fishery with a trap net CPUE of at 25-50 and RSD-18 of at least 20.

### **Management Strategy**

- Reduce bluegill abundance, when high, through removal (trap and transfer to other waters) in order to improve growth rates and size structure

Trap-net CPUE of bluegills declined and remains well below the management objective again in 2014 (Table 10). Population size structure also was below the objective (Table 10, Figures 4 and 5), however, growth was better than normal for Marindahl Lake and similar to the Region III mean (Table 11). Improved growth is likely due to the current low abundance of bluegills and crappies. However, several complaints from anglers about poor fishing opportunity were received this past year.

**Table 10.** Bluegill trap-net CPUE, PSD, RSD-18, RSD-P, and mean Wr for Marindahl Lake, Yankton County, 2005-2014.

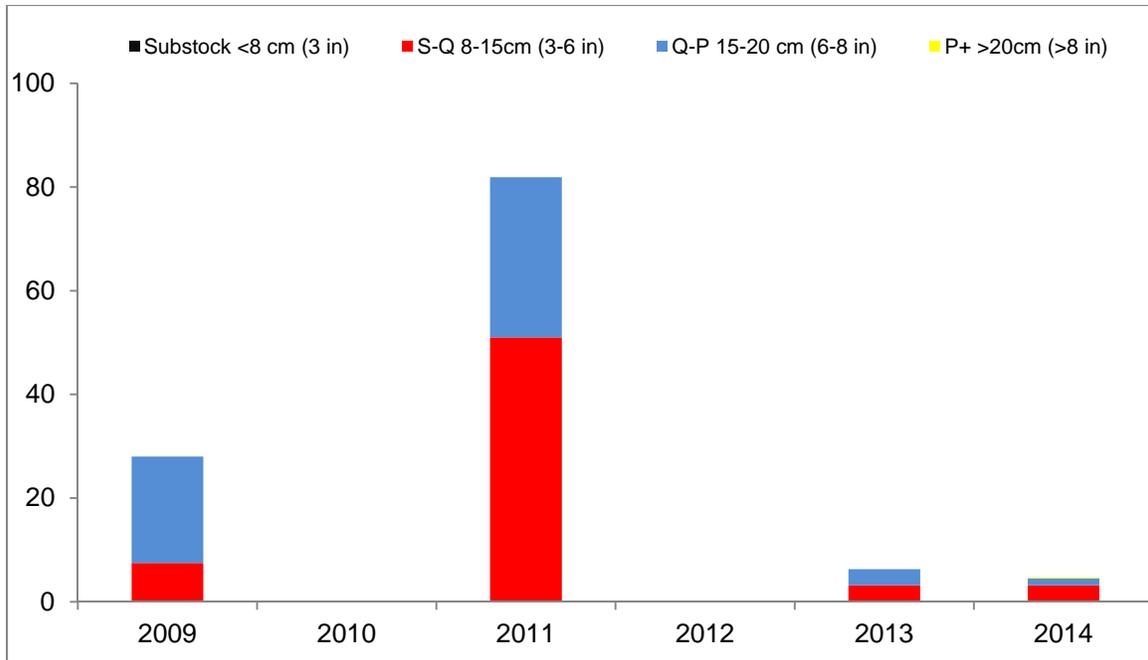
|                | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|----------------|------|------|------|------|------|------|------|------|------|------|
| <b>CPUE</b>    | 45.0 |      | 26.3 |      | 28.0 |      | 81.9 |      | 6.3  | 4.7  |
| <b>PSD</b>     | 57   |      | 74   |      | 73   |      | 38   |      | 49   | 32   |
| <b>RSD-18</b>  | 0    |      | 4    |      | 6    |      | 13   |      | 2    | 9    |
| <b>RSD-P</b>   | 0    |      | 0    |      | 0    |      | 0    |      | 0    | 2    |
| <b>Mean Wr</b> | 89   |      | 94   |      | 92   |      | 94   |      | 104  | 108  |

\*5 years (2003, 2005, 2007, 2009, 2011)

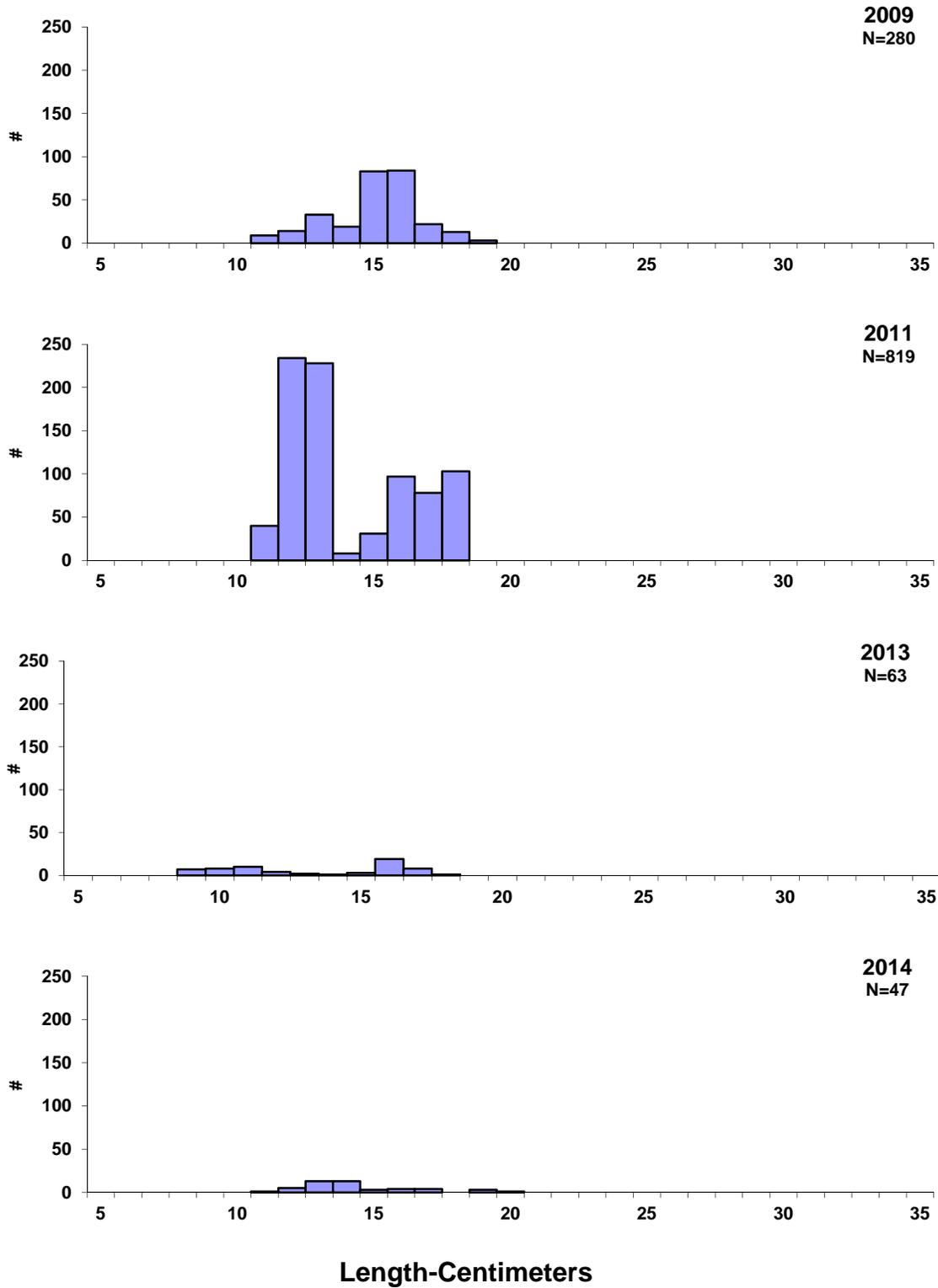
**Table 11.** Average back-calculated lengths (mm) for each age class of bluegill in Marindahl Lake, Yankton County, 2014.

| Year Class         | Age | N         | <b>Back-calculation Age</b> |            |            |            |            |   |   |   |  |
|--------------------|-----|-----------|-----------------------------|------------|------------|------------|------------|---|---|---|--|
|                    |     |           | 1                           | 2          | 3          | 4          | 5          | 6 | 7 | 8 |  |
| 2013               | 1   | 29        | 60                          |            |            |            |            |   |   |   |  |
| 2012               | 2   | 5         | 57                          | 103        |            |            |            |   |   |   |  |
| 2011               | 3   | 8         | 44                          | 125        | 156        |            |            |   |   |   |  |
| 2010               | 4   | 3         | 73                          | 131        | 162        | 180        |            |   |   |   |  |
| 2009               | 5   | 2         | 66                          | 126        | 160        | 170        | 191        |   |   |   |  |
| <b>All Classes</b> |     | <b>47</b> | <b>60</b>                   | <b>121</b> | <b>159</b> | <b>175</b> | <b>191</b> |   |   |   |  |
| Statewide Mean     |     |           | 55                          | 103        | 141        | 166        |            |   |   |   |  |
| Region III Mean    |     |           | 60                          | 116        | 157        | 180        |            |   |   |   |  |
| SLI* Mean          |     |           | 53                          | 101        | 138        | 163        |            |   |   |   |  |

\* Small Lakes and Impoundments



**Figure 4.** CPUE by length category for bluegill sampled with trap nets in Marindahl Lake, Yankton County, 2009-2014.



**Figure 5.** Length frequency histograms for bluegill sampled with trap nets in Marindahl Lake, Yankton County, 2007, 2009, 2011, and 2013.

## **Black Crappie**

### **Management Objective**

- Maintain a black crappie population with a trap net CPUE of at least 20 and PSD of at least 40.

### **Management Strategies**

- Reduce crappie abundance, when high, through removal (trap and transfer to other waters) in order to improve growth rates and size structure
- Introduce gizzard shad as a potential source of forage.

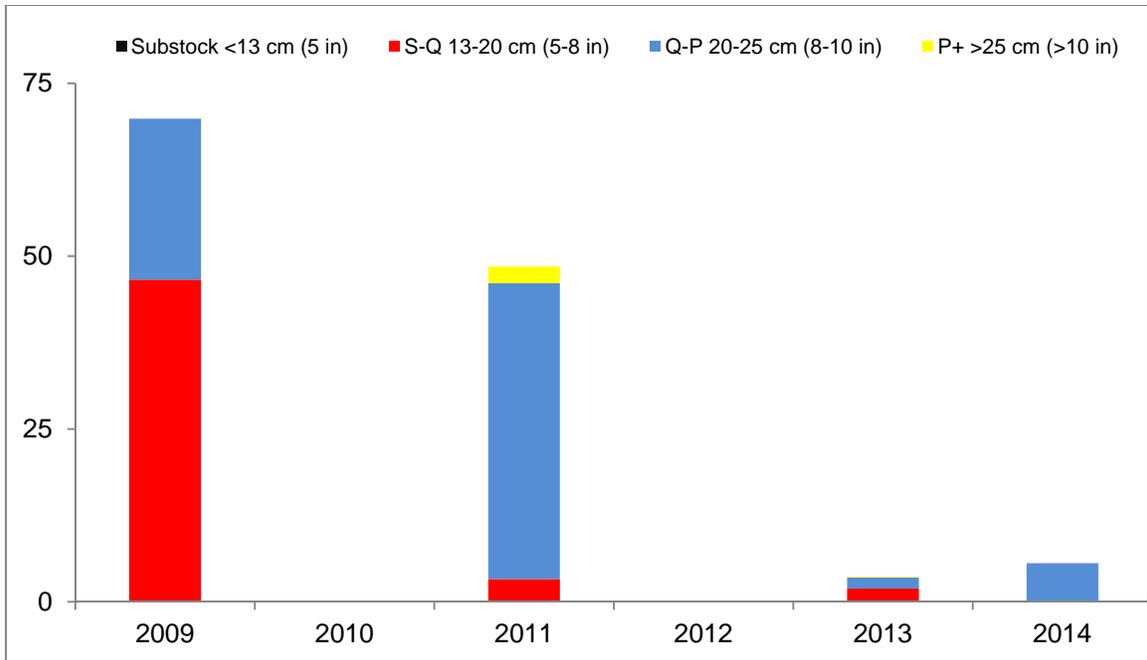
Trap-net CPUE for black crappie was low again in 2014 (Table 12) and has not rebounded since the low water conditions of 2012. Most of the crappies sampled were from the 2011 year class (Table 13). Growth of 2011 fish is fast with crappies averaging 213 mm at age-3 (Table 13 and Figures 6 and 7). Similar to bluegills, crappie growth is benefitting from low panfish abundance.

**Table 12.** CPUE, PSD, RSD-P, and mean Wr for all black crappie sampled with trap nets in Marindahl Lake, Yankton County, 2005-2014.

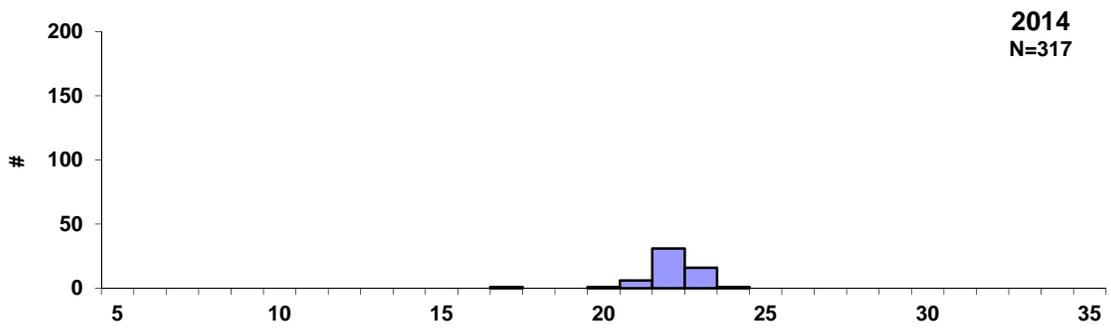
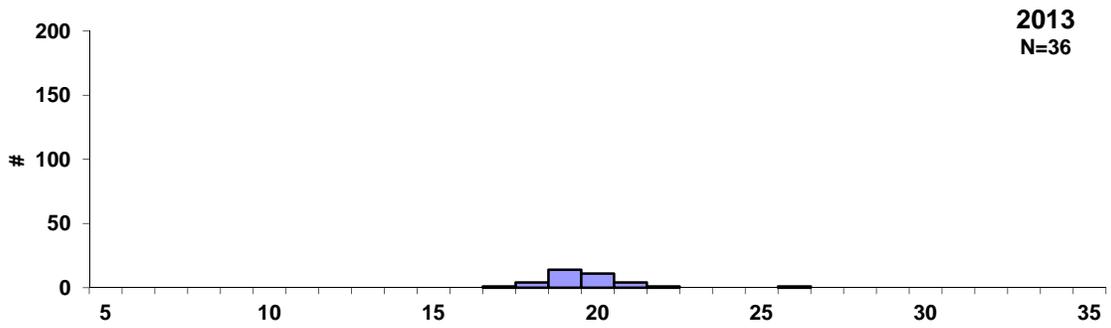
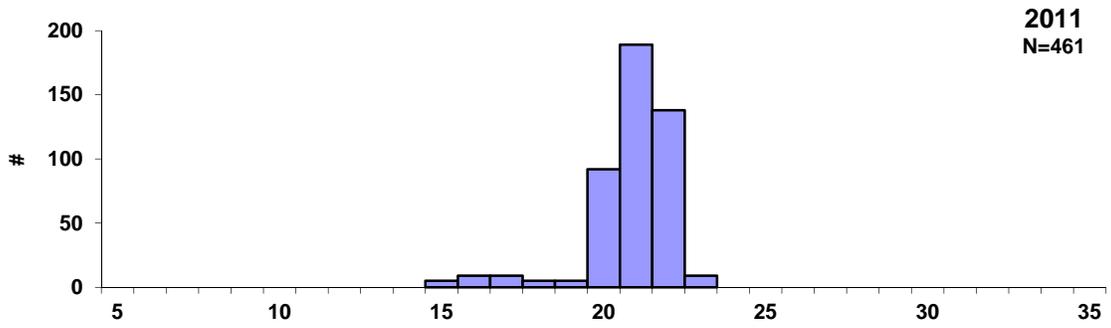
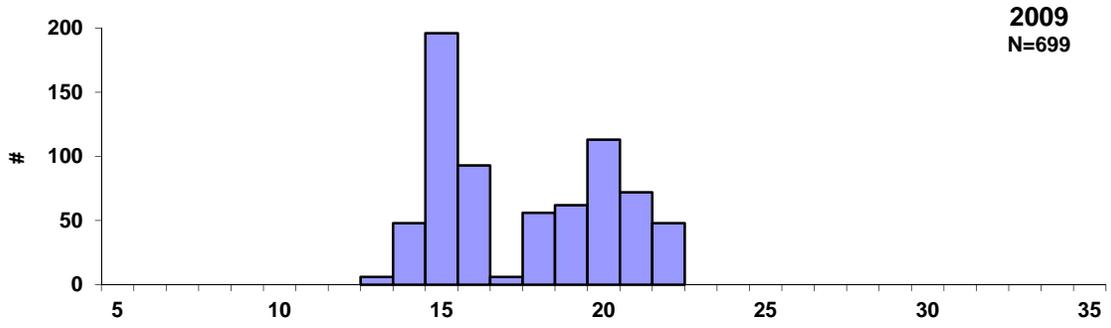
|                | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|----------------|------|------|------|------|------|------|------|------|------|------|
| <b>CPUE</b>    | 62.3 |      | 35.2 |      | 69.9 |      | 46.1 |      | 3.6  | 5.6  |
| <b>PSD</b>     | 10   |      | 11   |      | 33   |      | 93   |      | 47   | 98   |
| <b>RSD-P</b>   | 1    |      | 0    |      | 0    |      | 0    |      | 3    | 0    |
| <b>Mean Wr</b> | 97   |      | 101  |      | 95   |      | 97   |      | 105  | 104  |

**Table 13.** Average back-calculated lengths (mm) for each age class of black crappie in Marindahl Lake, Yankton County, 2014.

| Year Class         | Age | N         | <b>Back-calculation Age</b> |            |            |            |     |   |   |   |
|--------------------|-----|-----------|-----------------------------|------------|------------|------------|-----|---|---|---|
|                    |     |           | 1                           | 2          | 3          | 4          | 5   | 6 | 7 | 8 |
| 2012               | 2   | 1         | 99                          | 154        |            |            |     |   |   |   |
| 2011               | 3   | 54        | 80                          | 156        | 213        |            |     |   |   |   |
| 2010               | 4   | 1         | 85                          | 143        | 170        | 207        |     |   |   |   |
| <b>All Classes</b> |     | <b>56</b> | <b>88</b>                   | <b>151</b> | <b>192</b> | <b>207</b> |     |   |   |   |
| Statewide Mean     |     |           | 83                          | 147        | 195        | 229        | 249 |   |   |   |
| Region III Mean    |     |           | 95                          | 167        | 219        | 253        | 274 |   |   |   |
| SLI* Mean          |     |           | 78                          | 134        | 180        | 209        | 226 |   |   |   |



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



**Length-Centimeters**

**Figure 7.** Length frequency histograms for black crappie sampled with trap nets in Marindahl Lake, Yankton County, 2007, 2009, 2011, and 2013.

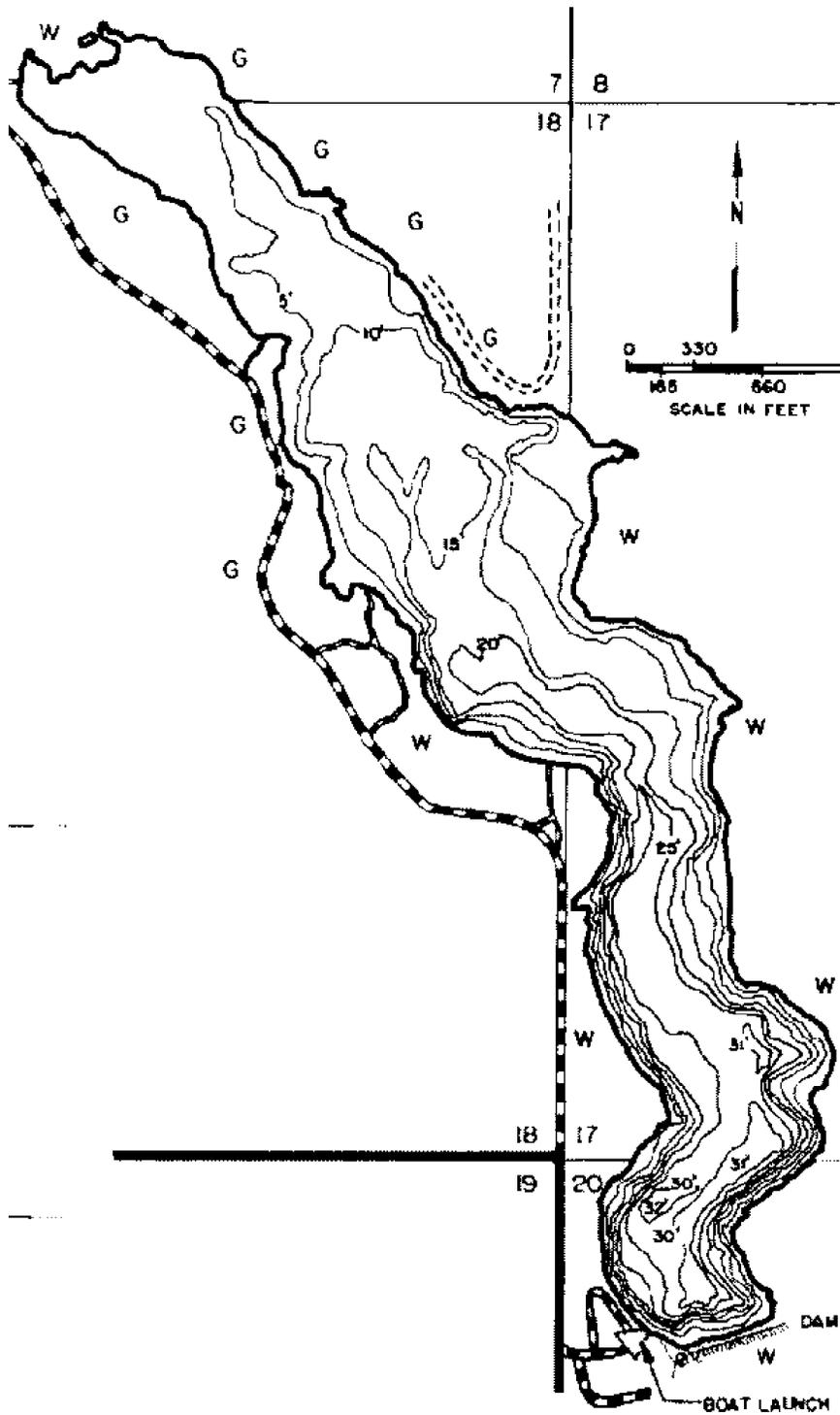


Figure 8. Contour map of Marindahl Lake, Yankton County.

**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.