



putting the pieces together

An aerial photograph of a large, multi-lobed lake with numerous islands and peninsulas. The water is a deep blue-green color. The surrounding land is a patchwork of green fields, forests, and some small buildings. The sky is filled with soft, white clouds. The text is overlaid on the center of the image.

Lake Partnerships

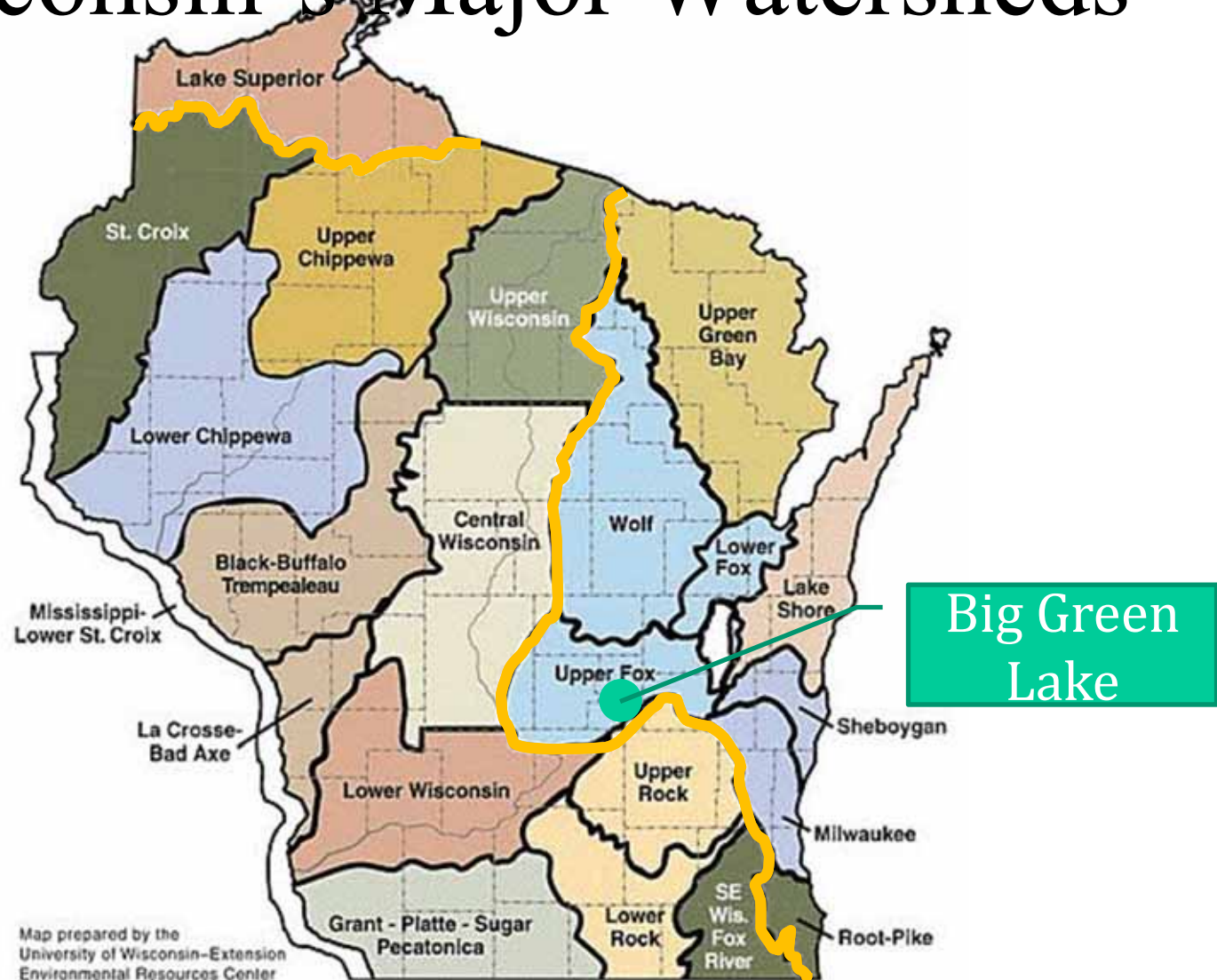
Assembly Required



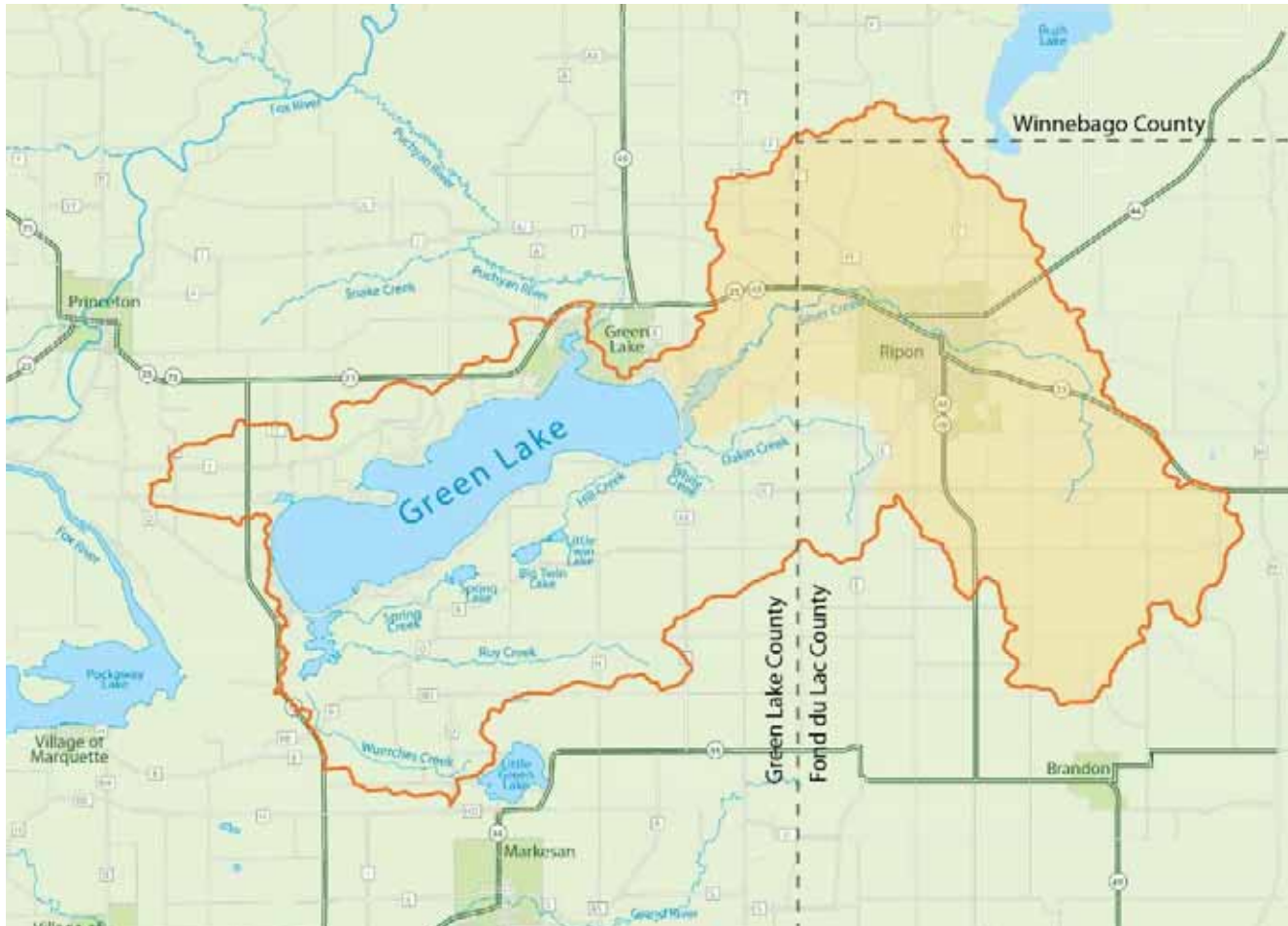
WATERSHED INTRODUCTION

Charlie Marks, *Green Lake Sanitary District*

Wisconsin's Major Watersheds



Green Lake Watershed



Watershed Area
107 square miles

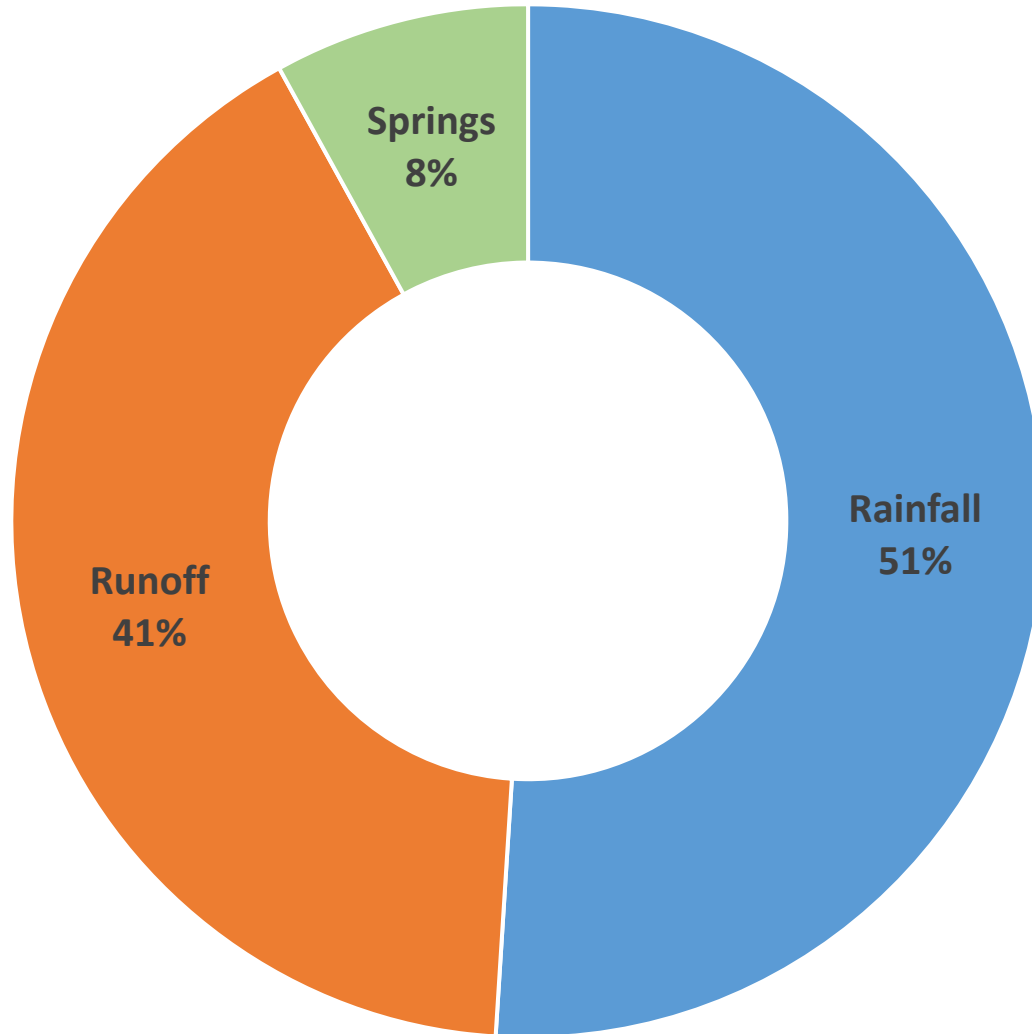
County Breakdown

Green Lake = 58%
Fond du Lac = 41%
Winnebago = 1%

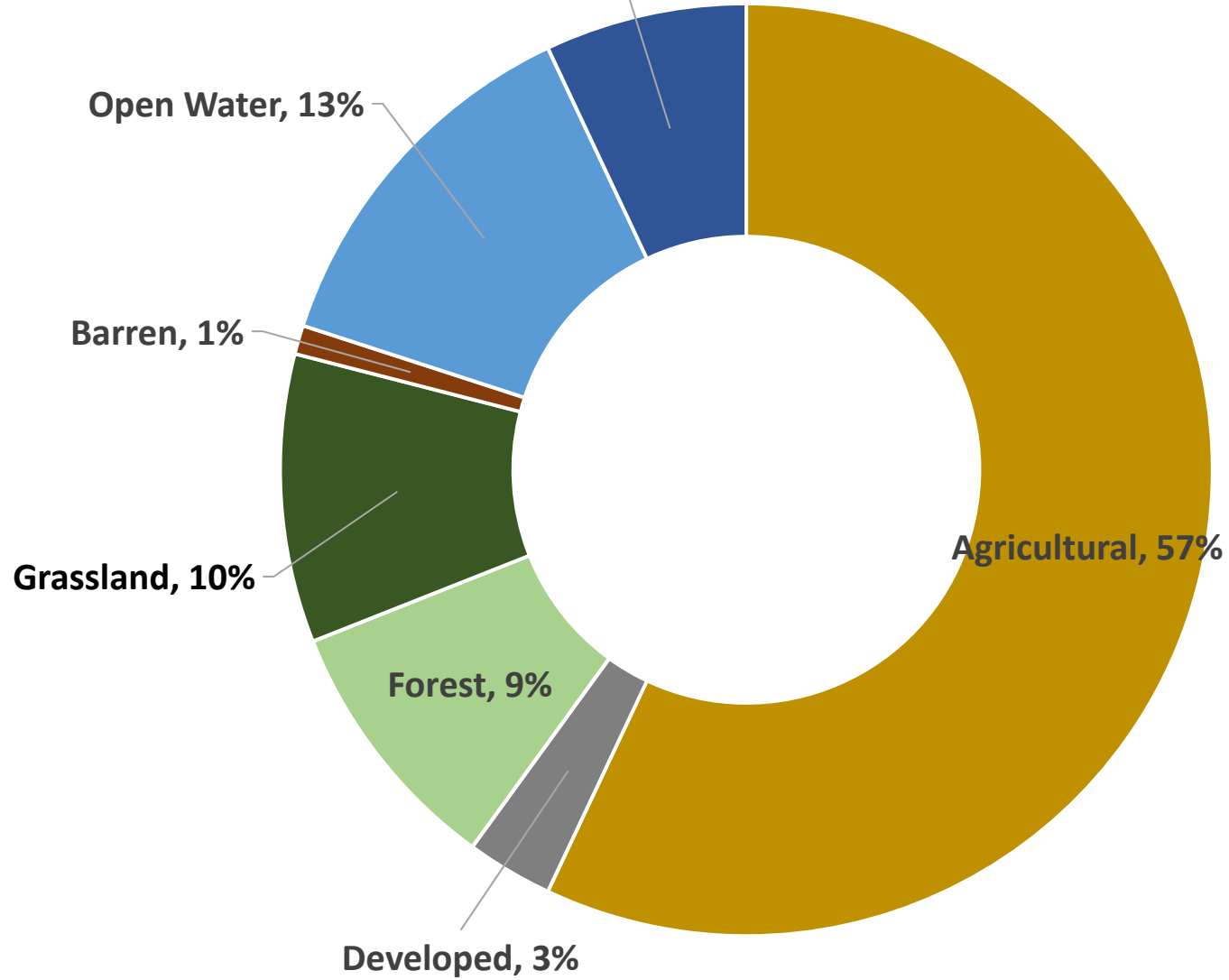
Primary Tributary

Silver Creek
44% watershed area

Green Lake Water Source



Green Lake Landuse



Green Lake Formation



Formation

Glacial lake
Formed 10,000 years ago
during last Ice Age

Size and Depth

11.5 square miles
7 miles x 2 miles
25 miles of shoreline

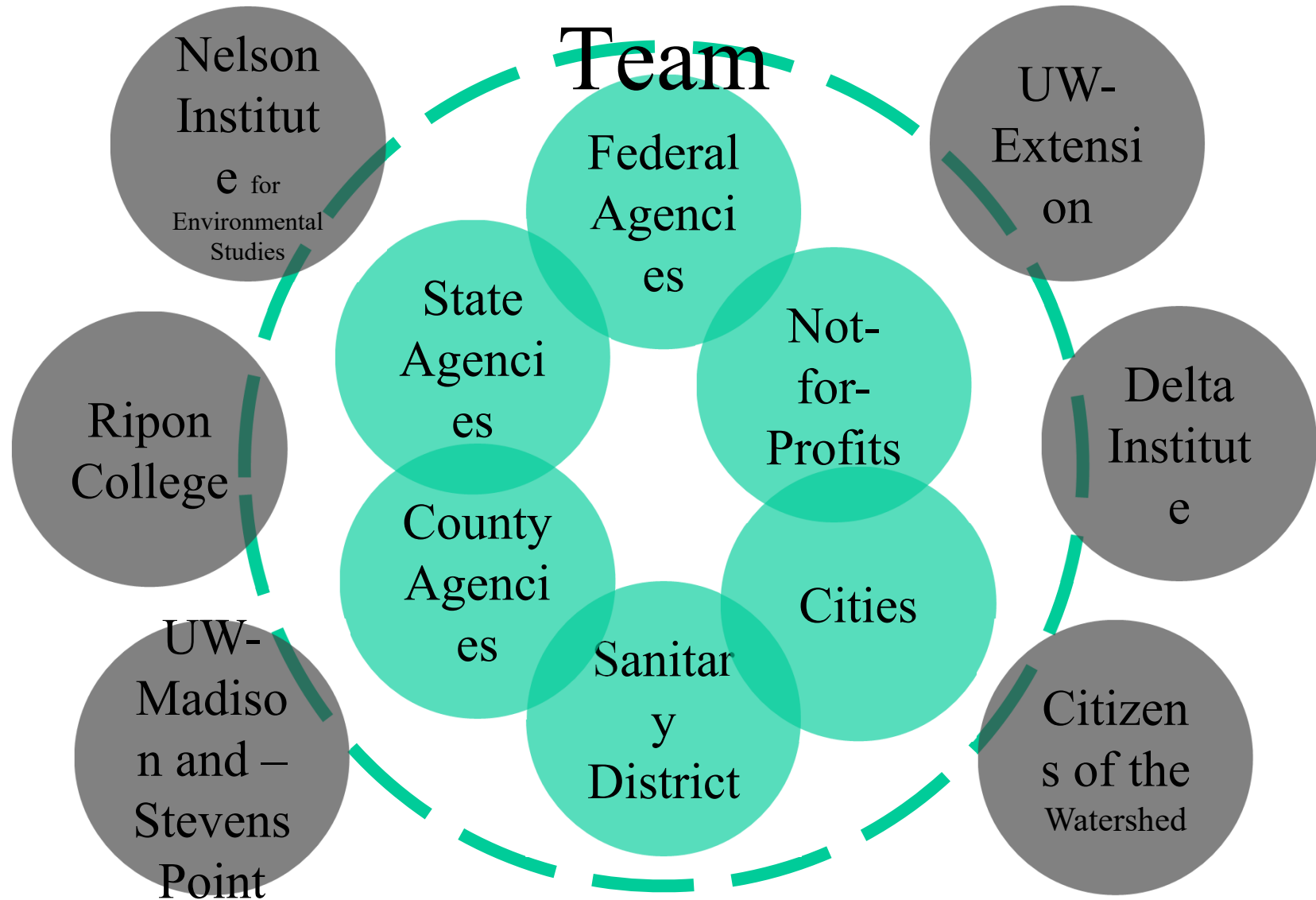
Retention Time

21 years

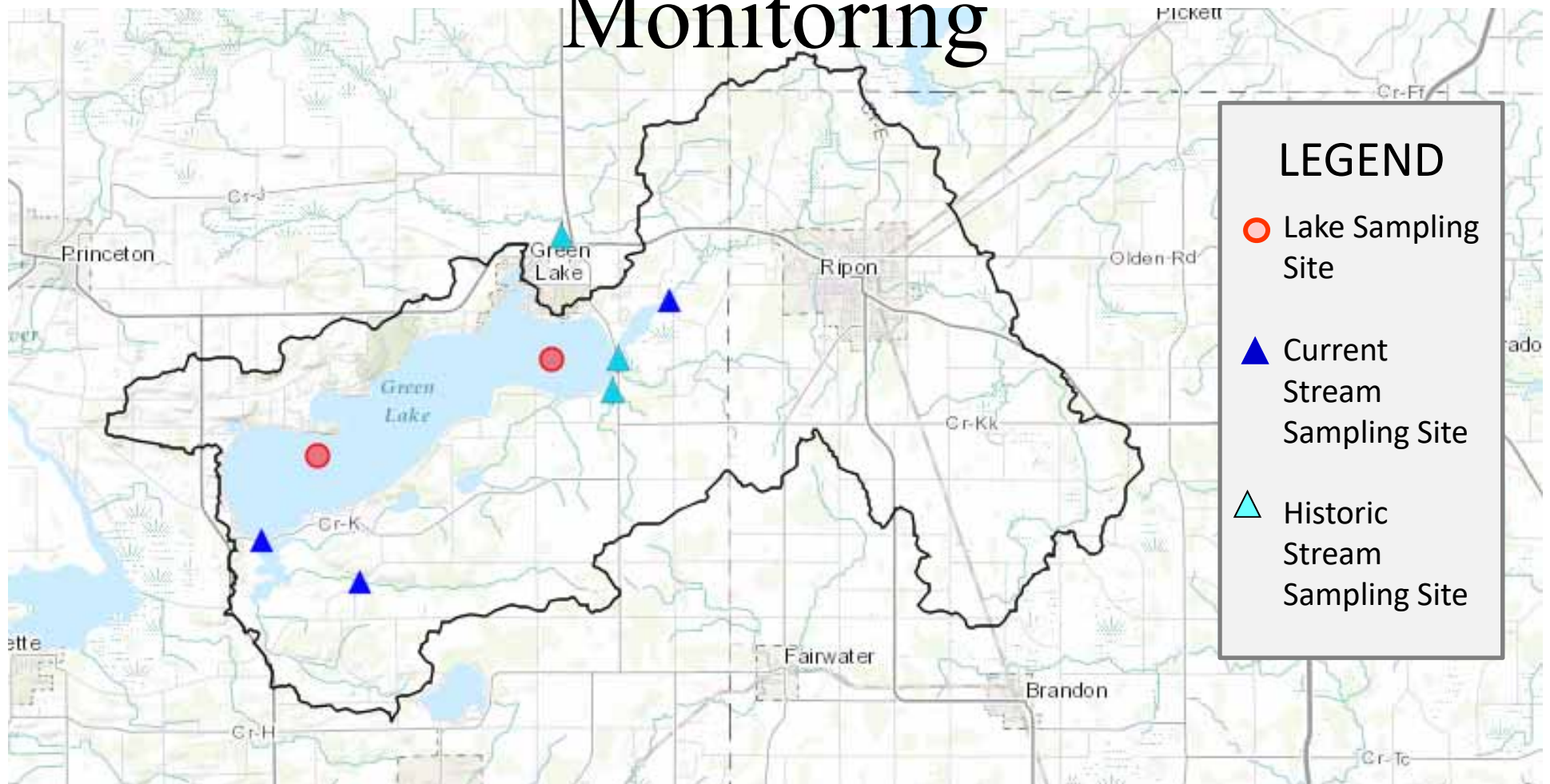
**Deepest natural inland
lake in Wisconsin (236 ft)**

**First lake in state with
priority watershed status**

Lake Management Planning

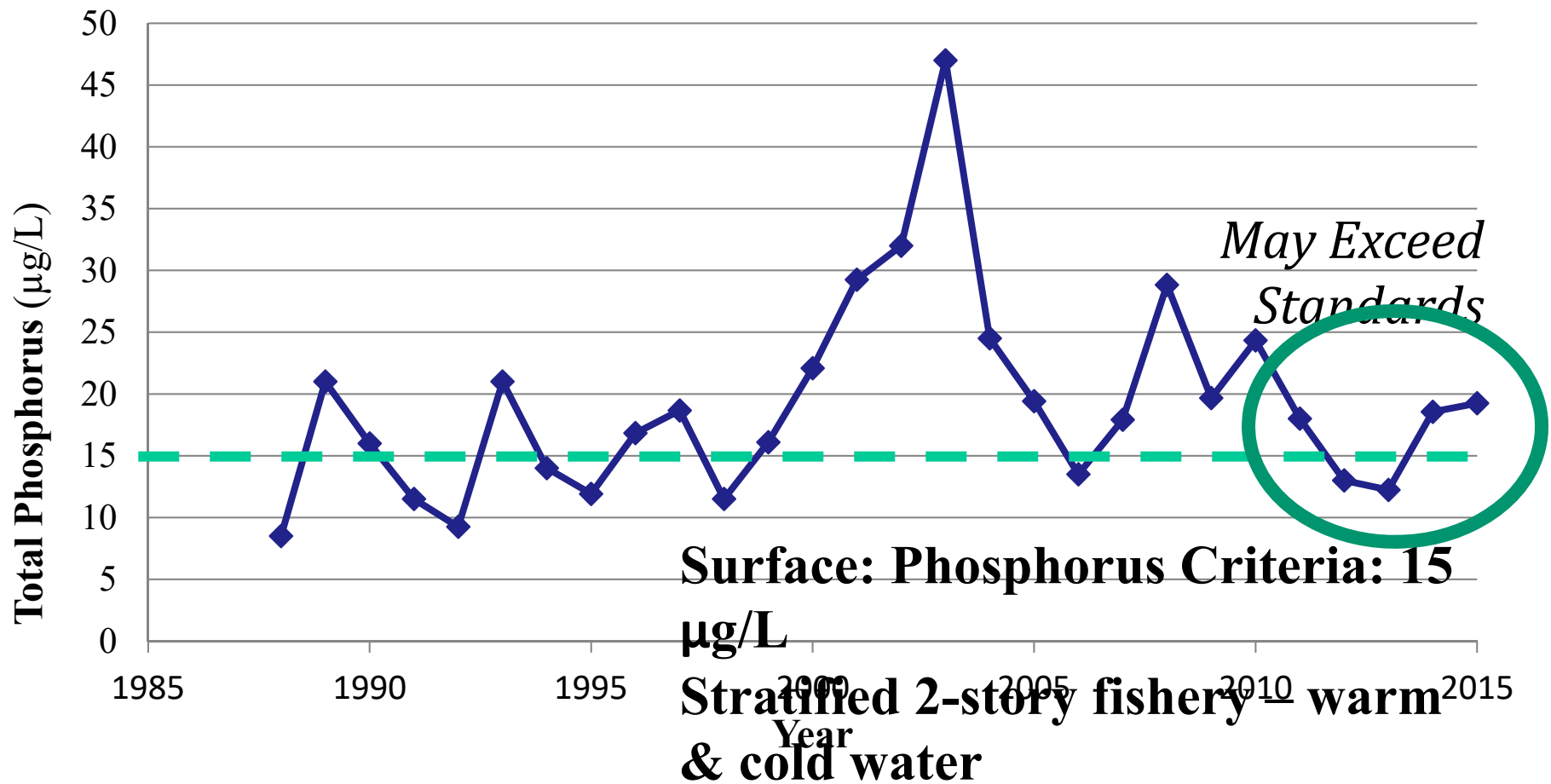


USGS Lake and Stream Monitoring



Currently monitoring **70%** of watershed area → **90%** coverage in
2018

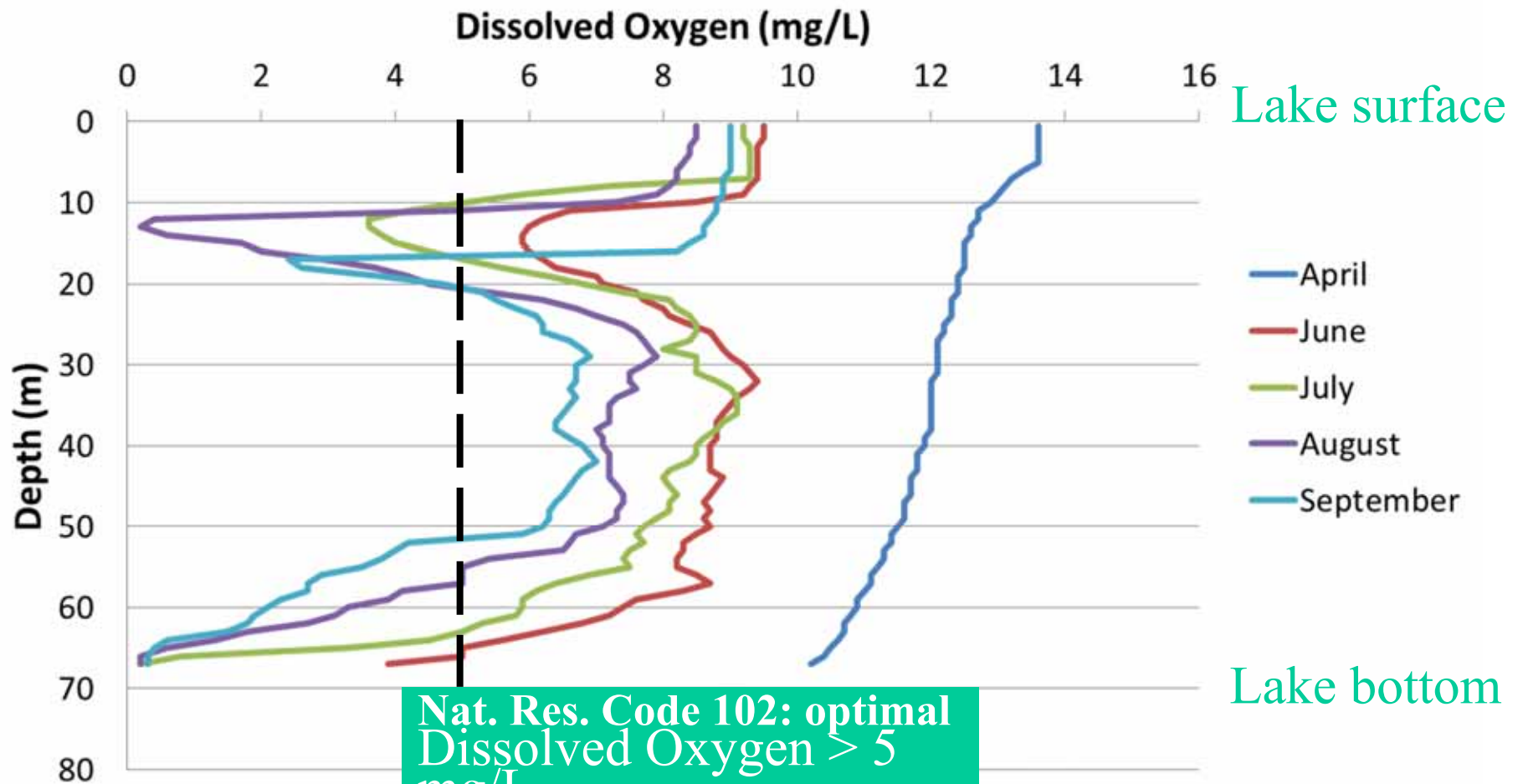
Water Quality Trends: Total Phosphorus



Water quality data collected by USGS, DNR and citizen monitors. Data compiled by USGS.

Dissolved Oxygen Hypoxia

West End, 2012 (but similar in other years)



Data collected and compiled by USGS.

Green Lake's Impairment

2014


DNR classifies Green Lake as
an impaired waterway

Impairment Classification

Impairment
Low Dissolved Oxygen

Pollutant
Phosphorus



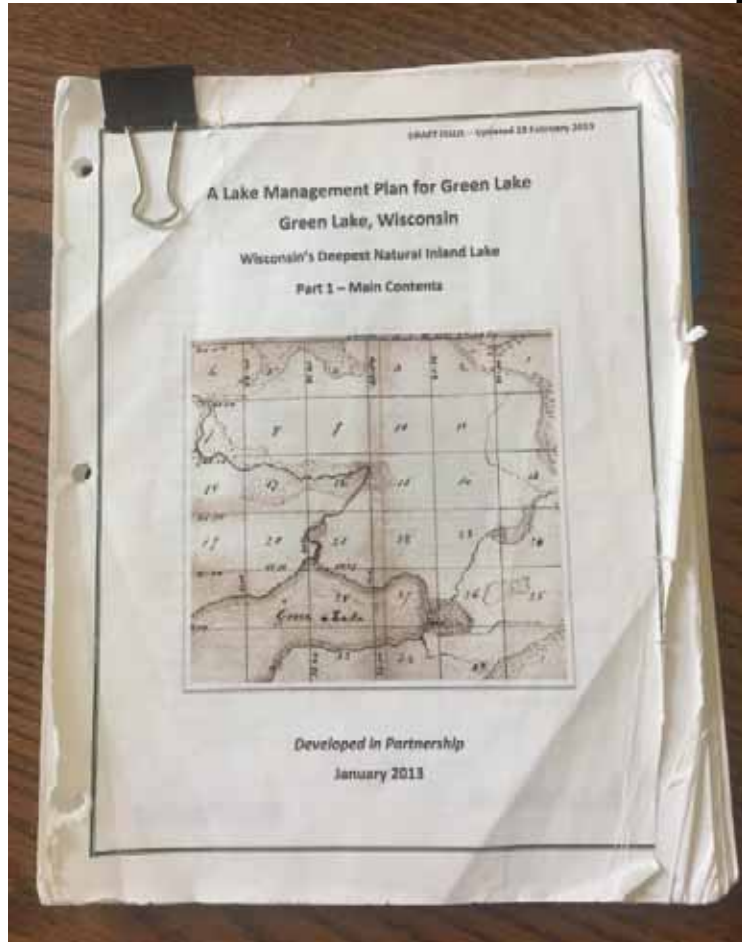


GREEN LAKE WATERSHED:
16,650 LBS. OF PHOSPHORUS

GREEN LAKE:
8.3 MILLION LBS. OF ALGAE

Phosphorus loading estimate by Paul Baumgart (UW-GB) and Dale Robertson (USGS)

Lake Management Plan for Green Lake



- Approved by the DNR in 2013
- Meeting Schedule
 - Monthly during planning
 - Quarterly after approval
- Nine Key Elements
 - Current updating the plan to meet the EPA's more stringent "Nine Key Elements"

1 Conducting a three-year **LAKE STUDY** focusing on solutions to Green Lake's water quality challenges.



*Green Lake
Association*

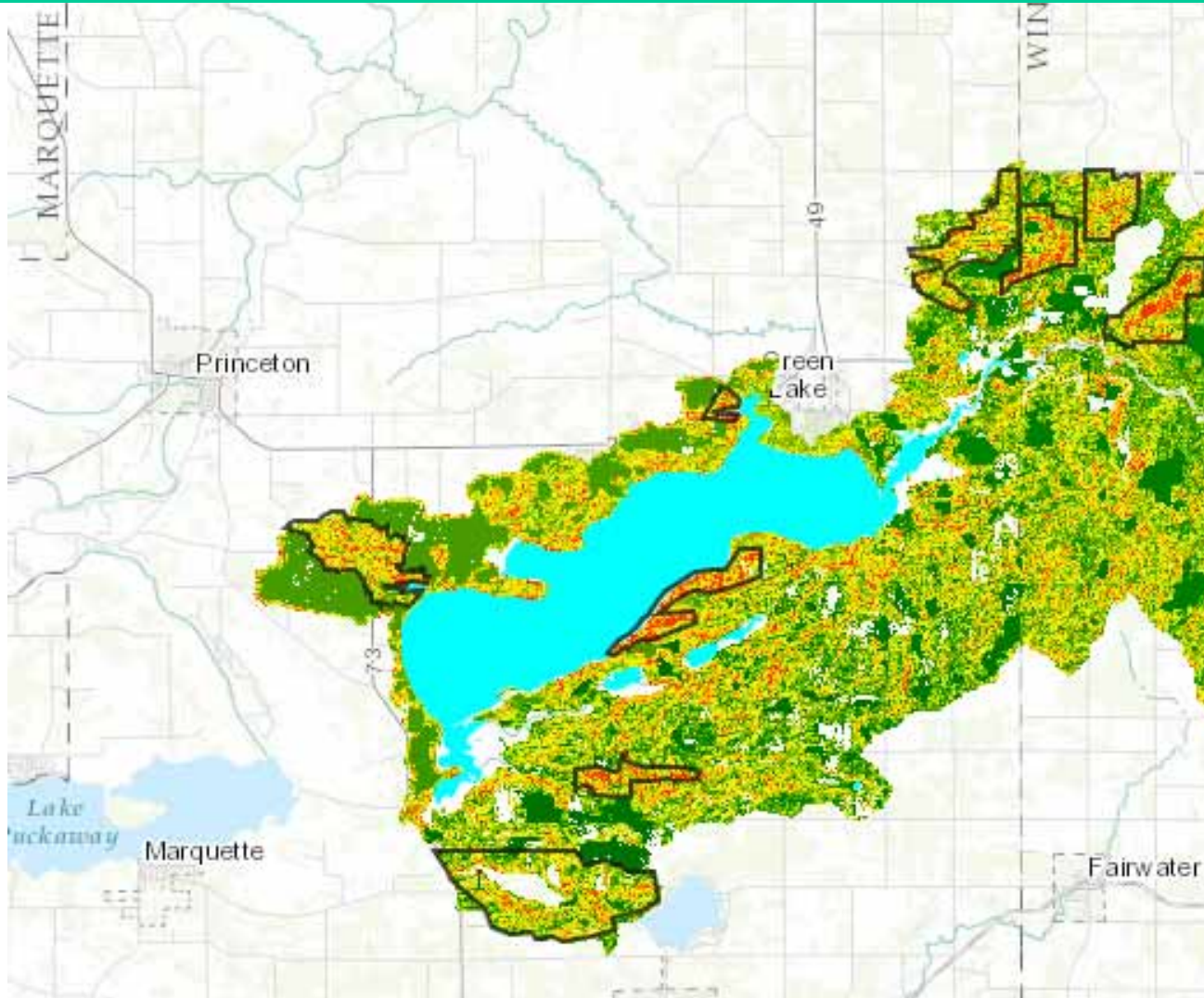
*Green Lake Sanitary
District*

*Superior
Hydroscience*

U.S. Geological

Survey

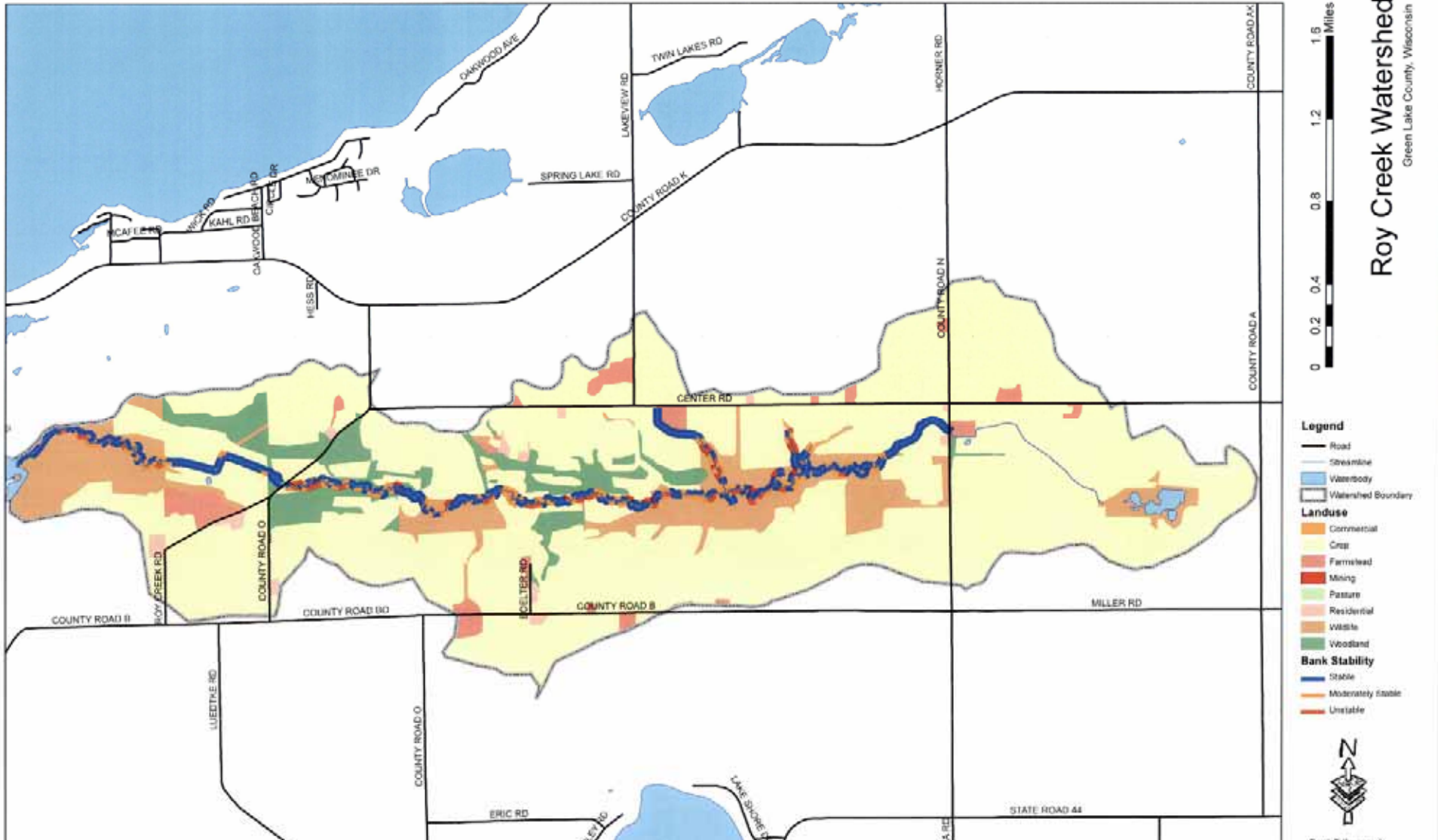
2 Targeting NUTRIENT LOADING PRIORITY AREAS in the watershed.



*Delta Institute
Green Lake and Fond
du Lac County Land
Conservation
Departments
Green Lake
Association*

Green Lake Sanitary

3 Identified **RIPARIAN PRIORITY AREAS** in the watershed to prioritize stream and shoreline restorations.



4

Recently completed a **SOCIAL SCIENCE SURVEY** to ensure we have the most effective agricultural conservation programs.



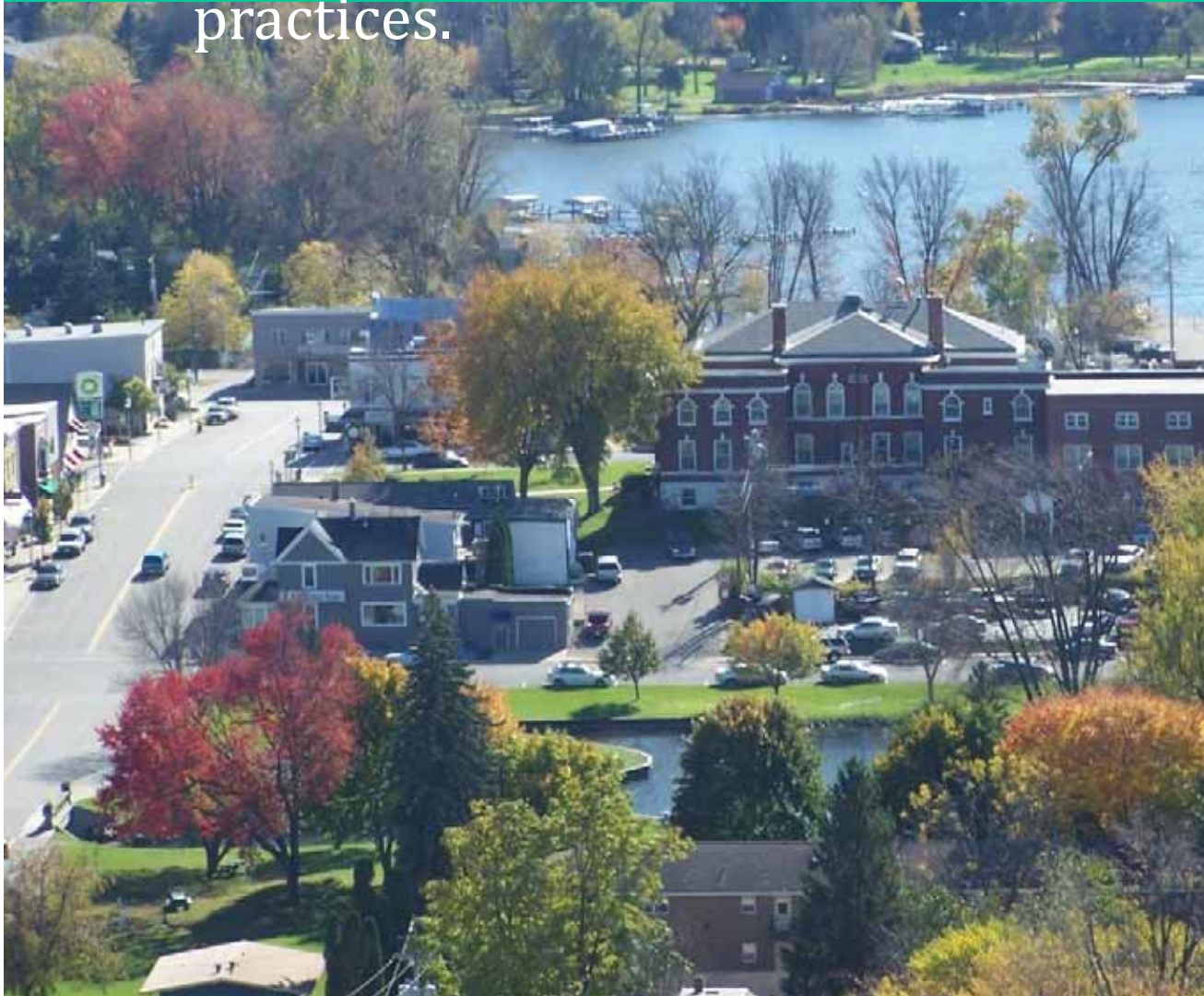
*Green Lake
Association*

*Green Lake and Fond
du Lac Land
Conservation Depts.*

*Green Lake Sanitary
District*

*Natural Resources
Conservation*

5 Conducting a City of Green Lake STORMWATER MANAGEMENT PLAN to increase the adoption of urban conservation practices.



City of Green Lake

*Green Lake
Association*

*Green Lake Sanitary
District*



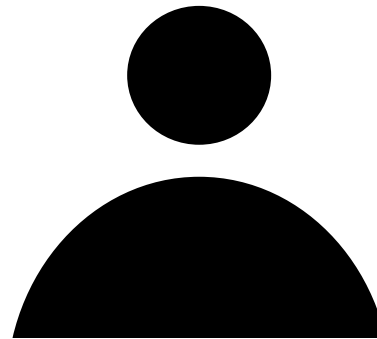
IMPLEMENTATION

Caleb Zahn, Natural Resources Conservation Service

The Standard Ag BMP Model



+



*~70%
via EQIP*

*~30%
landowner*

$\$50,000 = \$35,000 + \underline{\$15,000}$

*Practices required to be installed
for a ~10-20 year lifespan (for structural practices)*

The Green Lake BMP Model

Grant Funding



USDA NWQI

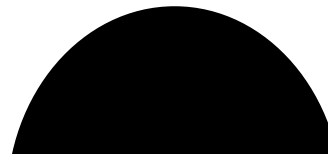


DNR Lake
Protection Grants

Cash Contributions



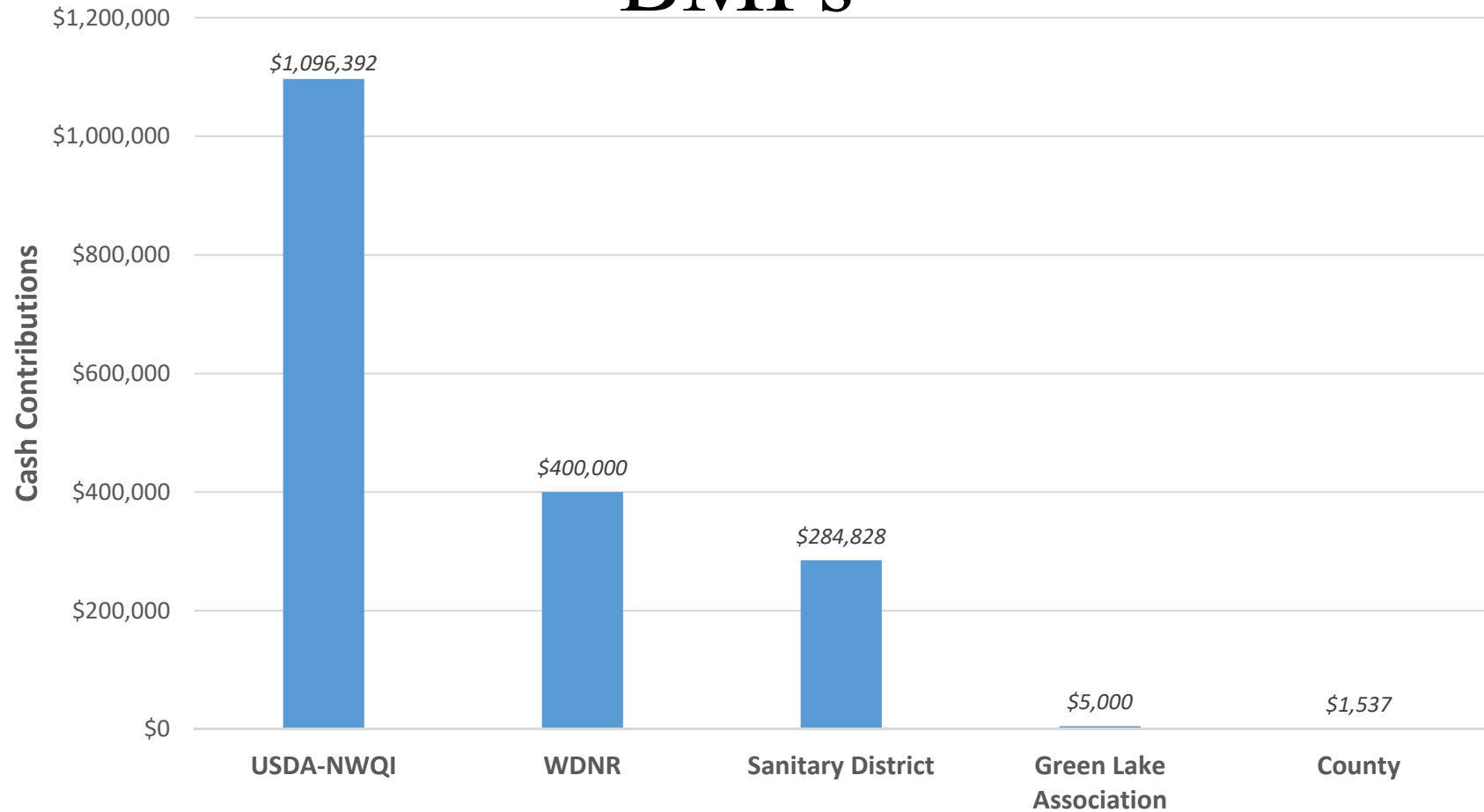
Technical Support



0%
Landowner

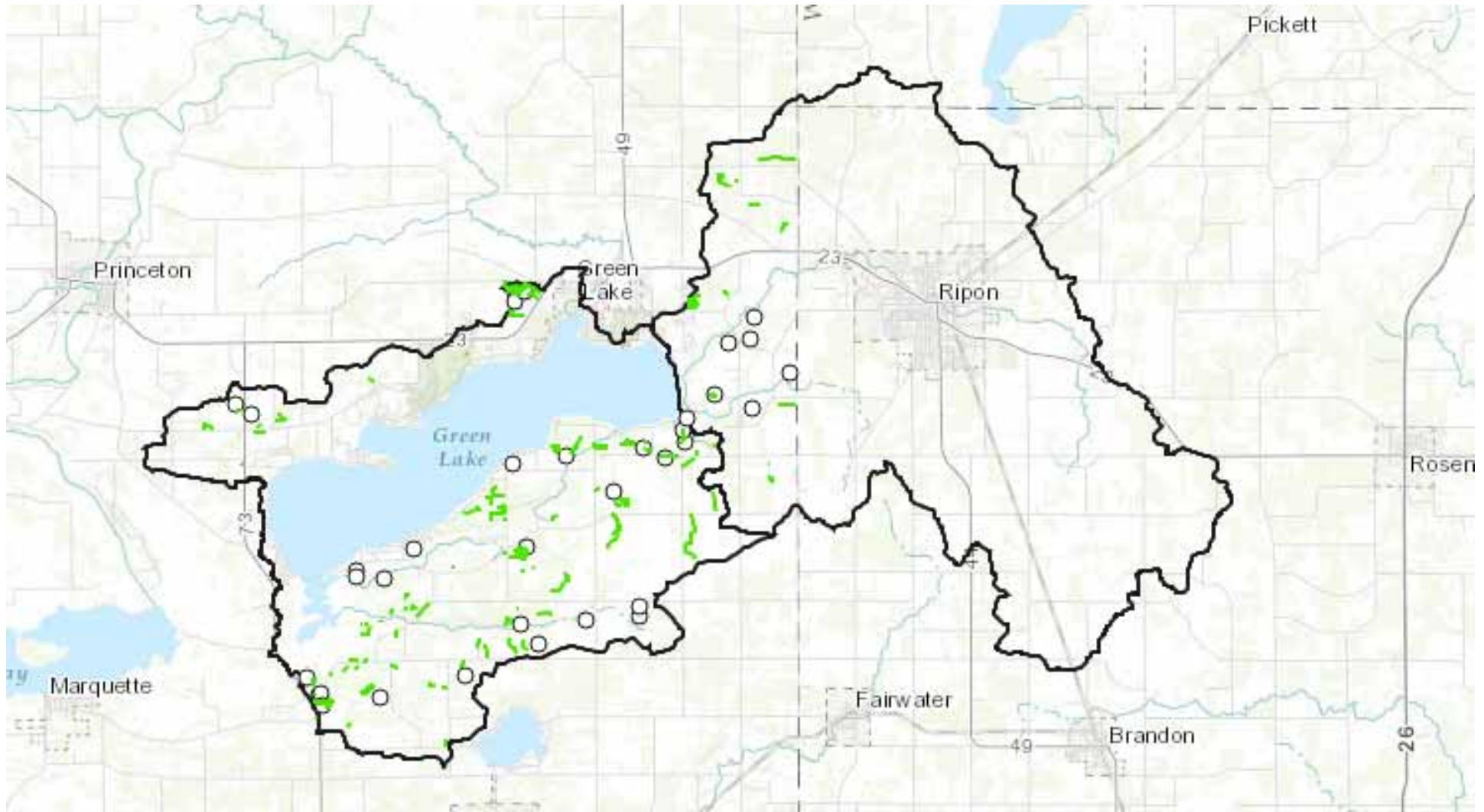
- *In exchange, best practices are installed in perpetuity (75.4% of projects)*
- *Recorded in property deed*
- *Practices maintained by the GLSD*

Funding Sources of Big Green BMPs



Total funding = \$1.8

Installed BMPs in the Green Lake Watershed (2012-2017)



THE GREEN LAKE WATERSHED STRATEGY (2012-2017)

\$1.8MM

Total dollars for ag BMPs
in the Green Lake
watershed (2012-2017)

131

Hard and soft BMPs installed or
planned in the Green Lake watershed

For entire Big Green Lake watershed

THE GREEN LAKE WATERSHED STRATEGY (2012-2017)

56

Landowners willing to
install BMPs

6,260

Estimated pounds of phosphorus
diverted from Big Green Lake

3.1 MM

Estimated pounds of algae
prevented from growing
in Big Green Lake

For entire Big Green Lake watershed

THE GREEN LAKE WATERSHED STRATEGY (2012-2017)

Practice	Treatment Area*
Cover Crops	200 ac
Grade stabilization structure	2,750 ac
Grassed/lined waterways	4.1 mi
No-till	170 ac
Streambank and shoreline protection	2.7 mi
Terrace	235 ac
Waste storage / leachate	758 ac

**For NWQI area only (not entire Green Lake watershed)*

Grade Stabilization Structure + Waterway

31 Grade
stabilization
structures

3,080 Pounds of
phosphorus
savings

4.4 Miles of
waterways

820 Pounds of
phosphorus
savings

Retention Pond and Chute



5 years later (2015)



Stream Restoration



Green Lake County Land Conservation Department

Stream Restoration



3.4 Miles of restored streams

645 Pounds of phosphorus savings

AFTER

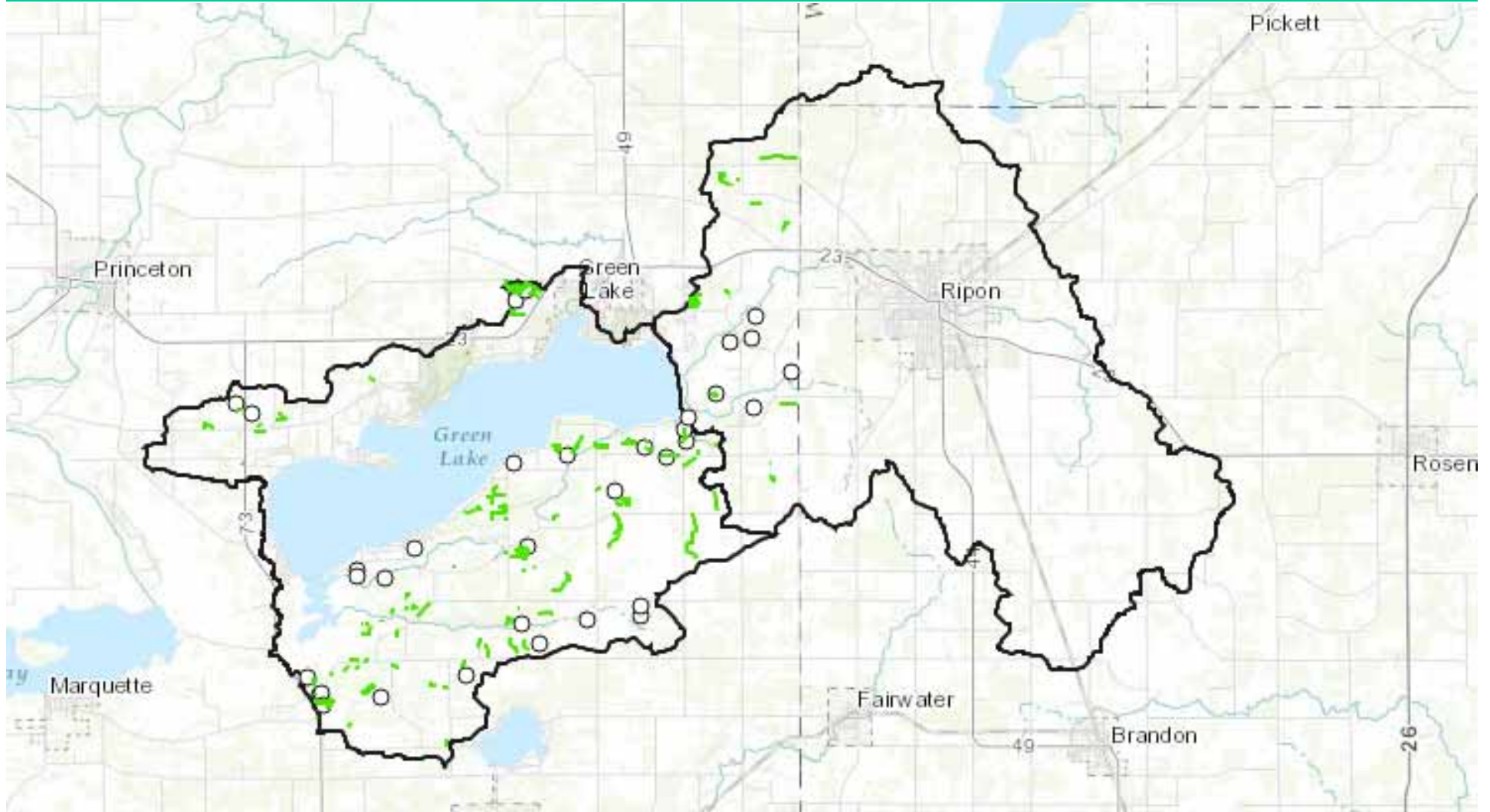


NEXT STEPS

Caleb Zahn, Natural Resources Conservation Service

NEXT STEPS

BMP installation focus within the Silver Creek HUC.



Why Has it Worked?

- Strong partnerships
- Good relationships with landowners
- History of conservation within watershed
- History of water quality monitoring
- Diverse funding sources – flexibility and mobility
- Treasured natural resource
- A community that cares
- Plans for the future

A wide-angle landscape photograph capturing a dramatic sunset or sunrise. The sky is filled with heavy, dark clouds, through which a bright, glowing light source (the sun) is visible, casting a strong, warm glow across the scene. The light creates a gradient of colors, from deep purple and blue in the upper parts of the sky to a bright, almost white glow near the horizon. The foreground and middle ground consist of a large body of water, possibly a bay or a wide river, with several smaller, winding channels or inlets. The water's surface is dark, reflecting the colors of the sky. In the distance, low, dark hills or mountains are visible against the horizon. The overall mood is serene yet powerful, with a sense of vastness and natural beauty.

Questions?