

## Technical Memorandum

**To:** Barb Peichel, MPCA  
**From:** Jen Koehler and Scott Sobiech, Barr Engineering  
**Subject:** Red Rock Lake – Request for Removal from the MPCA 303(d) Impaired Waters List  
**Date:** 12/31/2013  
**Project:** 23/27-0053  
**c:** Claire Bleser, RPBCWD

This memorandum related to the removal of Red Rock Lake from the MPCA 303(d) Impaired Waters List was prepared on behalf of the Riley-Purgatory-Bluff Creek Watershed District (RPBCWD).

Red Rock Lake is a shallow lake located in the RPBCWD (specifically, the Purgatory Creek watershed) in the City of Eden Prairie. The watershed is about 1,262 acres and is primarily low density residential land use. There is public access to Red Rock Lake through Red Rock Lake Park, including a public boat access although there are no swimming beaches or fishing piers on the lake. An Eden Prairie city ordinance restricts the size of motors in use on the lake to 10 horsepower.

Table 1 summarizes the physical parameters and the water quality impairment information of Red Rock Lake, including the reasons for the request for removal from the MPCA 303(d) impaired waters list. Additionally, Figure 1 summarizes the historic water quality data for Red Rock Lake from 2003-2013. This summary includes the data available from the MPCA EDA website, data collected by the City of Eden Prairie, and more recent data collected by RPBCWD. The water quality parameters summarized in Figure 1 include the surface (0-2 m) concentrations of total phosphorus and chlorophyll-*a* (corrected for pheophytin) and Secchi disc transparency. Also shown on Figure 1 are the applicable MPCA water quality standards and the number of samples that were used in estimating the growing season average.

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**Table 1: Summary of Red Rock Lake Physical Parameters and Water Quality Impairment**

<b>Red Rock Lake Physical Parameters</b>	
Surface Area (ac)	72
Maximum Depth (ft)	16
Average Depth (ft)	5.2
Littoral Area (ac)	66
Drainage Area (ac)	1,262
<b>Red Rock Lake Impairment Summary</b>	
Water Body Name	Red Rock Lake
MDNR ID	27-0076
Major Watershed	Lower Minnesota River
Use Classification	2B, 3C
Ecoregion	North Central Hardwood Forest
MPCA Lake Classification	Shallow
Impairment	Aquatic Recreation Nutrient/Eutrophication Biological Indicators
Year Listed	2002
Reason for Removal	More recent years of water quality data have shown an improving trend and have been consistently meeting the MPCA shallow lake criteria
Staff Contact	Barb Peichel, MPCA
Brief Summary of Reasons for Requesting a Listing Change Review	<ul style="list-style-type: none"> <li>- Last assessed by the MPCA in 2007 (per EDA website)</li> <li>- Additional water quality data collected by City of Eden Prairie in 2004 (Secchi Depth only), 2008, 2009, 2010) and RPBCWD in 2011, 2012, &amp; 2013</li> <li>- The RPBCWD completed the Red Rock Lake UAA (RPBCWD, 2006).</li> <li>- The City of Eden Prairie implemented a water quality improvement project on the west side of Red Rock Lake including dredging and reshaping to improve water quality.</li> <li>- Water quality improvement projects were implemented in the watershed as part of the construction of Highway 212.</li> <li>- Recent management of aquatic plants including Curlyleaf pondweed in areas of Red Rock Lake</li> </ul>

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Below is a more detailed summary of the work completed for Red Rock Lake by the City of Eden Prairie and the Riley-Purgatory-Bluff Creek Watershed District:

### **Past Studies & Monitoring**

- 1988 – City of Eden Prairie completed the Chain of Lakes projects
- 2004, 2012 – City of Eden Prairie hired Blue Water Science to monitor aquatic plants in Red Rock Lake
- 2005 – The City of Eden Prairie conducted a soils analysis of 2 bays on west side of Red Rock Lake for sediment accumulation
- 2006 – The Riley-Purgatory-Bluff Creek Watershed District completed their Use Attainability Analysis for the lake (a lake-specific best management plan to maintain or attain the best use of the lake). Recommended actions included managing Curlyleaf leaf pondweed (herbicide treatment) and use of alum to improve water quality (both to be done over a period of 4 years). The study also identified potential improvement/maintenance activities for several ponds in the Red Rock Lake watershed.
- 2008, 2009, 2010 - City of Eden Prairie conducted water quality monitoring in Red Rock Lake
- 2011, 2012, 2013 – RPBCWD conducted water quality monitoring in Red Rock Lake
- 2012 – The City of Eden Prairie completed the Red Rock Lake watershed stormwater inventory and assessment.
- 2013 – RPBCWD hired Blue Water Science to monitor aquatic plants in Red Rock Lake
- 2012, 2013 – City of Eden Prairie hired Blue Water Science to complete an Aquatic Invasive Species (AIS) Suitability Analysis for the City of Eden Prairie (including Red Rock Lake)

### **Watershed Activities**

- Late 1990's - Early 2000's - Mn/DOT incorporated several water quality treatment ponds within the Red Rock Lake watershed as part of the Highway 212 construction that also provided treatment of runoff from areas outside of the Highway 212 project area.

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- Much of the development within the Red Rock Lake watershed happened from the 1980's through the mid-1990's (based in review of the Hennepin County parcel and tax information). Since then, most changes within the watershed are small, parcel-scale development projects (with the exception of the construction of Highway 212). Because there have been very little recent development/redevelopment in the Red Rock Lake watershed, the watershed is fairly stable, with limited disturbance due to construction activities, helping protect the water quality in the lake.
- 2013, 2014 – The RPBCWD is in the process of revising its rules including the stormwater management rule (policies and standards) that applies to new development, redevelopment, and linear projects. The revised (draft) stormwater management rule aligns with the criteria outlined in the MPCA Minimal Impact Design Standards (MIDS), including abstraction of 1.1 inches of runoff from impervious surfaces. Additionally, the rules require providing for at least 75% annual total phosphorus and 90% annual total suspended solids removal. The implementation of these rules will protect and improve the water quality in Red Rock Lake as changes are made in the watershed.

### **In-Lake Management Activities**

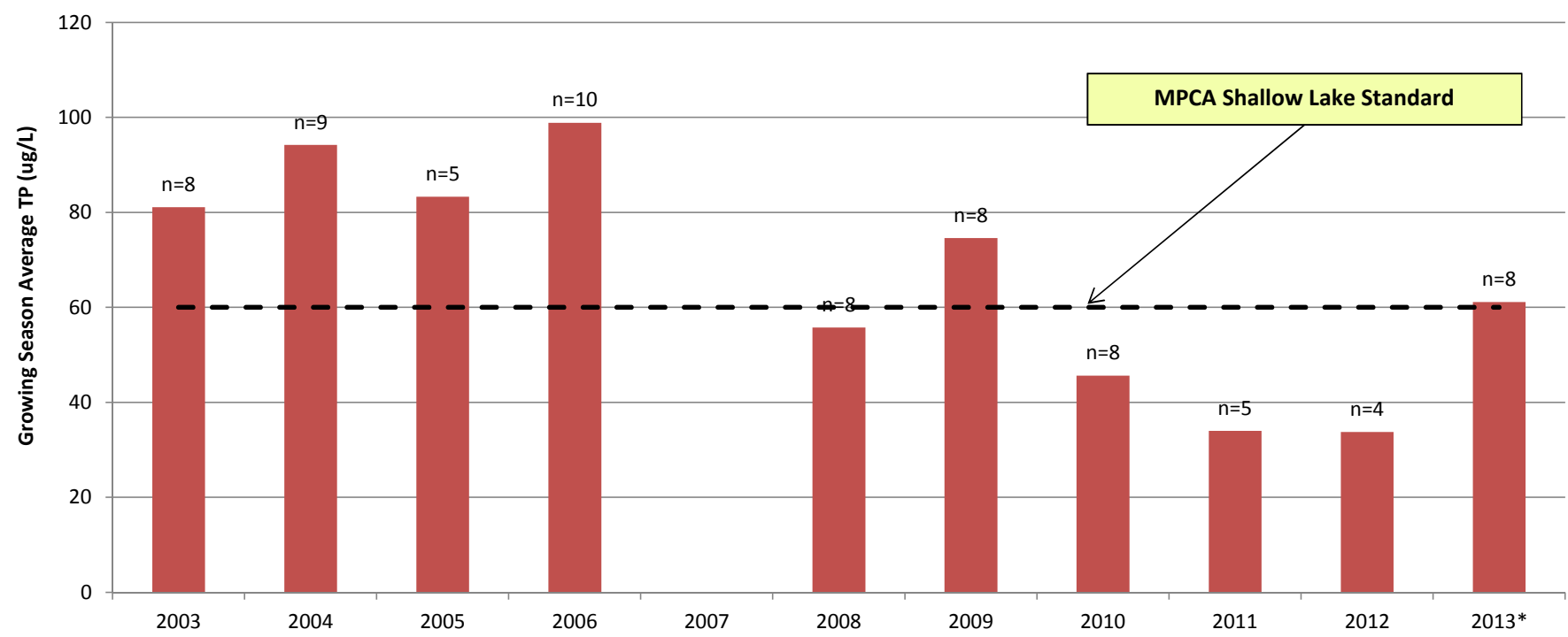
- 2006 – The City of Eden Prairie dredged and reshaped the smaller bay on the west side of Red Rock Lake, removing accumulated sediment from the storm sewer outfalls in the lake.
- 2011 – RPBCWD contracted with Midwest Weed Harvesting to remove some floating cattail bogs from Red Rock Lake
- 2012 – RPBCWD hired the University of Minnesota to evaluate the fishery in Red Rock Lake, primarily focusing on the presence of carp and the potential impact on water quality. The survey completed by the University of Minnesota did not find any carp and determined that carp are not a significant concern in Red Rock Lake.
- 2012 – RPBCWD partnered with the City of Eden Prairie and contracted with Midwest Weed Harvesting to harvest Curlyleaf pondweed from portions of Red Rock Lake
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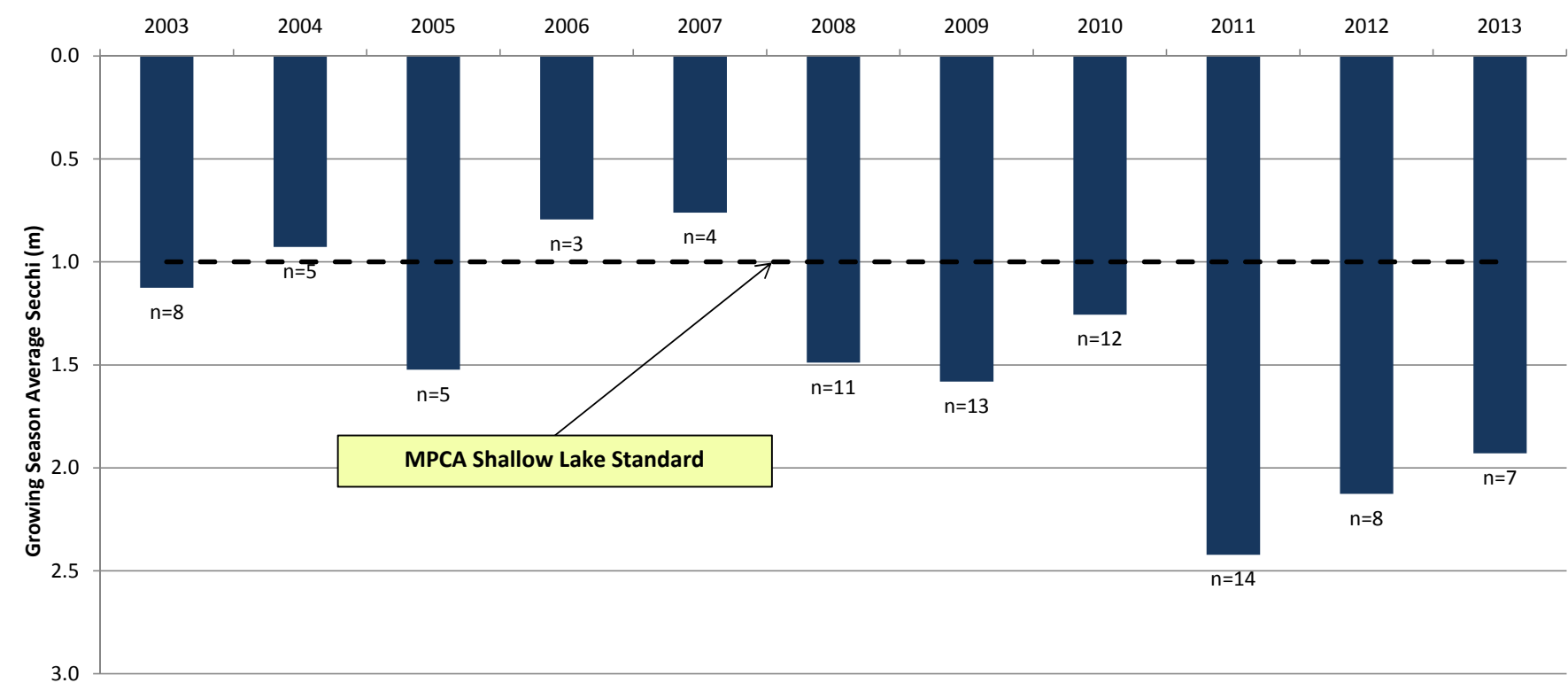
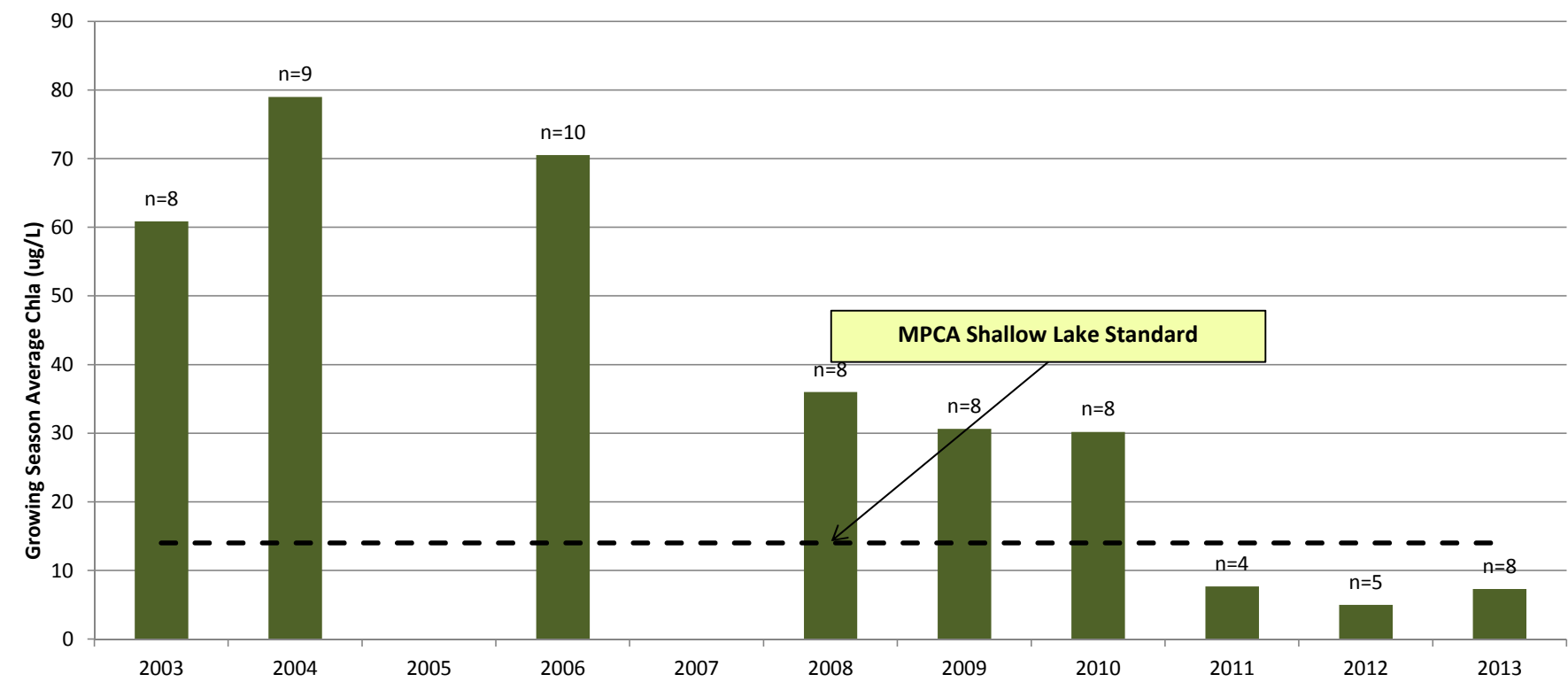
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### **Potential Future Management Activities**

- Potential water quality improvement projects within the Red Rock Lake watershed were identified and included in the 2013-2023 City of Eden Prairie Draft Budget:
  - 2014-2015 (\$300,000 for maintenance of 2 stormwater ponds in Miller Park and potential dredging of a portion of the bay)
  - 2018 (\$125,000 for maintenance of 2 stormwater ponds)



\*2013 Growing Season Average TP concentration includes 9/5/2013 outlier data point (sample more than 2 standard deviations from the growing season mean). Without the 9/5/2013 outlier, the growing season average TP concentration would be 51 ug/L.



**Figure 1**  
**Historic Growing Season**  
**(June - September)**  
**Water Quality Summary for**  
**Red Rock Lake**