



Memorandum

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co.
Subject: Item 5B – Consider Approval of Scope of Work and Budget for Medicine Lake TMDL Progress Assessment
BCWMC December 21, 2023 Meeting Agenda
Date: December 14, 2023

5B. Consider Approval of Scope and Budget for Medicine Lake TMDL Status Assessment

Recommendations:

- a) Consider approving the scope of work and \$85,400 budget presented in this memorandum and direct the Engineer to complete the Medicine Lake TMDL status assessment.

Background

Medicine Lake is on the Minnesota Pollution Control Agency's (MPCA) impaired waters list for mercury and excess nutrients and is included on the draft 2024 impaired waters list for fish bioassessments. In 2010, a total maximum daily load (TMDL) study was prepared for Medicine Lake to address the nutrient impairment. A TMDL study determines the maximum amount of a pollutant a body of water can receive without violating water quality standards and allocates that amount among the pollutant's sources. Cities and other stormwater discharge permit holders are assigned a wasteload allocation (WLA) if they are considered a source of the pollution. The BCWMC is the "convener" of a categorical WLA, or allowable point source loading, shared by the member cities. As the convener, the BCWMC cooperates with the member cities to identify and implement water quality improvements to achieve the desired reduction in pollutant loading.

The [Medicine Lake Excess Nutrients TMDL](#) study calls for a 28% reduction in total phosphorus load to the lake and estimates that point source discharges will need to be reduced by 1,287 pounds per year to comply with the TMDL. Since the WLA was developed for the 2006 water year, which was a year that MPCA assessed that internal sources did not contribute to excess phosphorus loading, the TMDL was based entirely on a 1,287 pounds per year (or 28%) total phosphorus load reduction assigned to WLA sources (such as impervious surface and lawn runoff). While a strict interpretation of the TMDL implies that the internal load reduction percentage is limited or minimal, it is clear that internal sources such as phosphorus release from sediments and curly-leaf pondweed die-off (combined with wind mixing), do contribute to excess phosphorus loading during all the other years that were discussed in the TMDL report. As a result, the TMDL implementation plan included other controls to help reduce internal phosphorus load.

Many projects have been implemented in the Medicine Lake watershed and in the lake, but the lake is still considered impaired, as it fails to meet State water quality standards.

As part of the Commission's 2025 watershed management plan update process, the Commission assigned a high priority to the goal of improving the water quality in Medicine Lake such that it meets water quality standards and is removed from the impaired waters list. At the October Commission meeting, and based on the Plan Steering Committee's recommendation, the Commission directed the Commission Engineer to develop a scope and budget for an assessment of the status of the Medicine Lake nutrient TMDL study. The assessment would result in a list of projects, programs, or practices that could be included in the 2025 Watershed Plan to help reach the goal of delisting the lake.

Content and Scope of Study

This study will assess the progress of the Medicine Lake TMDL—the water quality improvement projects implemented to date, load reductions achieved, the current lake water quality, and additional load reductions and projects needed to achieve the lake's water quality goals.

Below is a summary of the work scope components for this study:

1) Kickoff meeting

- a) Hold in person kickoff meeting with stakeholders, including staff from affected cities (MS4s), including Plymouth, Minnetonka, Golden Valley, New Hope, Medicine Lake, Hennepin County and MnDOT, BCWMC, and Three Rivers Park District (TRPD). The Commission Engineer will prepare the materials for this meeting and the administrator will make the meeting arrangements.
- b) The Commission Engineer will prepare meeting notes and the administrator will distribute the notes.

2) Review lake and watershed water quality monitoring data

- a) Compile and review background lake and watershed water quality monitoring and modeling data. Data will be obtained from BCWMC, City of Plymouth, TRPD, MPCA and the other MS4s, as well as the two permitted wastewater dischargers identified in the TMDL study.
- b) Compare the lake water quality data to State lake eutrophication criteria, review trends in the water quality data, the seasonality of the data and the relationship of the data to climate conditions.
- c) Prepare graphs showing trends and comparing lake water quality monitoring data to lake eutrophication criteria (total phosphorus, chlorophyll-a, and Secchi disc transparency) and a summary table for direct comparison with MPCA's delisting requirements.

3) Compile list of completed projects/practices and total phosphorus load reductions

- a) Identify completed projects/practices and the associated expected TP load reductions for each project/practice, including BCWMC CIP projects, city projects, known large developments, etc.

- b) Update the BCWMC's current watershed-wide P8 modeling for the Medicine Lake watershed to estimate annual total phosphorus load reductions for new projects implemented in the watershed since 2006. Update the P8 modeling performed for the TMDL to include current climate conditions, assuming this model is available from the MPCA.
- c) Hold one meeting with all of the stakeholders to get consensus on the list of completed projects and expected total phosphorus load reductions.
- d) Prepare final list of completed projects/practices and expected TP load reductions.

4) Identify gaps between expected and required load reductions

- a) Review the overall expected external and internal TP load reductions from planned watershed projects or planned in-lake projects that have not yet been implemented. Compare with projects that were identified in the TMDL implementation plan that may not have been completed to-date.
- b) Review TP load hotspot mapping, if relevant.
- c) Identify gaps between the TP load reductions and the published TMDL wasteload allocations (WLAs).
- d) Prepare a table that summarizes/compares the TP load reductions to the reduction(s) called for in the TMDL wasteload allocations.

5) Estimate expected lake water quality benefits from completed projects and identify additional needed BMPs

- a) Estimate the expected lake water quality benefits from implementation of recent project/practices (completed since 2006) within MPCA's modeling framework (both P8 watershed and BATHTUB in-lake water quality modeling) to explain the trends/seasonality (noted in task 2b) and/or relationship with climate and to evaluate if the lake would likely meet State water quality standards on a long-term basis.
- b) If the modeling shows the lake will not meet State standards, identify the additional future (not yet planned) BMPs that are needed for the lake to meet State standards; this includes modeling the benefits of the additional BMPs.
- c) Review sediment study conducted by TRPD in 2018 and use available information to provide a more detailed estimate of internal loading.
- d) If the water quality modeling shows the lake will not meet State standards without addressing internal phosphorus load, the lake water quality monitoring data and TRPD sediment study will be used to complete a detailed assessment of sediment phosphorus release, phosphorus release from curly-leaf pondweed die-off (senescence), and the potential impact of zebra mussels (to the degree that the data supports it). Where possible, the TRPD sediment study will also be used to develop a recommended alum dosage for each zone of the lake, estimate the alum treatment costs and recommend phasing for alum treatment.

Through the review and assessment of all the data and information, we may find that additional sediment testing is needed to better estimate the internal phosphorus loading and develop an alum dosage. Sediment testing is not part of this scope and would only be completed after Commission approval of an amendment to the scope and budget.

6) Report results of progress assessment

- a) Prepare draft report on the results of the TMDL progress assessment and provide to stakeholders for review.
- b) Hold in person meeting with stakeholders to address questions/comments/suggestions; the meeting will include MPCA staff to discuss compliance with the assigned WLAs.
- c) Revise the TMDL progress assessment report, based on stakeholder review. An important part of the report will be the recommendations for future implementation projects, which would be incorporated into the BCWMC's 2025 watershed plan. The recommendations could also be formatted for standalone use in a future BWSR Clean Water Fund grant application.
- d) Present revised report at a Commission meeting.
- e) Prepare final report, based on comments/direction from the Commission.

Cost Estimate

The table below summarizes our cost estimate for the scope of work outlined above.

Tasks	Estimated Total
1) Kickoff meeting	\$3,100
2) Review lake and watershed water quality monitoring data	\$6,600
3) Compile list of completed projects/practices and total phosphorus load reductions	\$12,200
4) Identify gaps between expected and required load reductions	\$7,000
5) Estimate expected lake water quality benefits from completed projects and identify additional needed BMPs	\$37,800
6) Report results of progress assessment	\$18,700
Total	\$85,400

Schedule

We will complete the tasks and milestones outlined in the scope of work on the following schedule.

Tasks and milestones	Estimated Schedule
Kick-off meeting with BCWMC, city staff, and TRPD staff	January 2024
Review lake and watershed water quality monitoring data	January/February 2024
Compile list of completed projects/practices and total phosphorus load reductions	February/March 2024
Identify gaps between expected and required load reductions	April 2024

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co.
Subject: Item 5B – Consider Approval of Scope of Work and Budget for Medicine Lake TMDL Progress Assessment
BCWMC December 21, 2023 Meeting Agenda
Date: December 14, 2023
Page: 5

Estimate expected lake water quality benefits from completed projects and identify additional needed BMPs	May-July 2024
Report results of progress assessment: Submit draft report for stakeholder review Meeting with stakeholders regarding draft report Present revised draft report at Commission meeting Complete final report	August 2024 September 2024 October 2024 November 2024