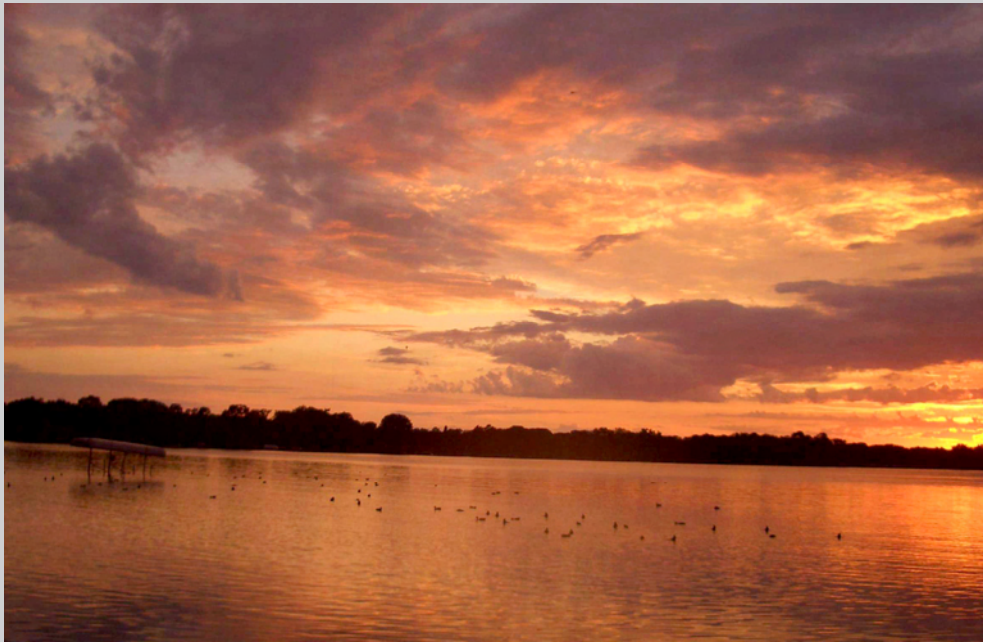


Medicine Lake Excess Nutrients Total Maximum Daily Load Implementation Plan



DRAFT

Prepared for:

**Minnesota Pollution Control Agency
and the
Bassett Creek Watershed Management
Commission**

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5. ADAPTIVE MANAGEMENT PROCESS

Management measures to meet the Medicine Lake TMDL are focused on reducing stormwater runoff and increasing the removal of phosphorus from stormwater runoff. Implementation of these types of controls will likely include numerous projects of varying size and will be distributed throughout the watershed. Predictions of load reductions from individual projects are limited in terms of their accuracy and precision. The attainment of water quality goals in Medicine Lake under reduced loading conditions is also subject to uncertainty. Therefore, monitoring, as discussed in Section 6, will be required to assess progress towards meeting the necessary load reductions and water quality goals. Also, an adaptive management decision-making process will provide a means of continually tracking progress and informing subsequent implementation projects.

It is important that all activities or projects in the watershed that reduce phosphorus loads to Medicine Lake be documented and tracked.

Annual monitoring of in-lake water quality and intensive monitoring of watershed loads every 5 years, as described in Section 6, will also be used to track progress. Annual variability in climatic conditions and potential lag time for BMPs to achieve full load reduction potential will need to be considered in assessing the data and developing conclusions.

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6. MONITORING

To ensure effectiveness and efficiency of TMDL implementation, ongoing monitoring will be conducted. The following monitoring plan is a very comprehensive plan to aid the communities in assessing whether progress toward the TMDL is being made. While this level of monitoring will provide valuable information to utilize in watershed and lake management efforts it is not required to determine if the allocations are being met. Monitoring will assess BMP implementation, in-lake condition, watershed loading and aquatic plant community composition.

BMP implementation tracking will be coordinated by the Bassett Creek Watershed Commission, as lead entity in the categorical TMDL. Each year, member communities will submit a summary of BMP projects and the anticipated phosphorus reductions to the Bassett Creek Commission in conjunction with Stormwater Pollution Prevention Plan (SWPPP) reporting. BMPs will be cataloged to track progress toward the individual wasteload reduction goals. Mn/DOT and Hennepin County should also track BMP implementation and document it in their MS4 annual reports.

In-lake monitoring will be conducted annually following completion of the TMDL (TRPD currently conducts this monitoring and will continue doing so). Samples will be collected biweekly (April thru October) following previously described protocols for eutrophic lake assessment (Heiskary 1994 and Heiskary 2007). Based on this sampling frequency, there is a 75% probability that a 30% change in lake condition will be detected after 3 years of monitoring (90% after 6 yrs; (MPCA 2007). Monitoring will be continued at this frequency for a ten year period and/or until implementation efforts have been completed.

A detailed watershed load monitoring study should be conducted to quantify the relative load reduction associated with various BMPs. Modeling using FLUX and P8 should be conducted concurrently to assess annual loading rates. Watershed monitoring will be conducted at the current TMDL monitoring sites following protocols described by Walker (1996). The scheduling of an initial monitoring effort should consider the timing of implementation activities and occur approximately five years after approval of the TMDL. Follow-up monitoring should be conducted for a one to two year period (depending on precipitation patterns), every five years until wasteload reduction goals have been achieved. Watershed load monitoring efforts should also include upstream-downstream assessments of individual BMPs to validate the predicted phosphorus removal and facilitate an adaptive approach to the design/implementation of future BMPs.

Sediment phosphorus levels should be assessed to better evaluate the applicability and potential cost-effectiveness of additional in-lake BMPs. Sediment phosphorus monitoring will be conducted following the protocol outlined by Pettersson et al. (1988).

Aquatic macrophyte monitoring will be conducted annually to assess: 1) the natural variability of the aquatic plant community; and 2) the efficacy of any future aquatic plant management programs (TRPD currently performs this sampling and plans to continue with this effort). Monitoring will be conducted at ~200 points throughout the littoral zone using a point intercept survey (e.g., Madsen 1999). Annual monitoring will be conducted until in-lake plant management activities have been completed.

7. REFERENCES

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