



BALMM

Basin Alliance for the Lower
Mississippi in Minnesota

*Providing Local Leadership for
Water Quality Protection & Improvement in the
Lower Mississippi River Basin*

To Resource Managers in SE MN:

The Basin Alliance for the Lower Mississippi in Minnesota (BALMM) has been for more than two decades coordinating efforts in southeastern Minnesota to protect and improve water quality in the basin. There has been significant progress made through many cooperative projects, especially regarding pathogen reduction via locally led programs and projects to reduce pollution from feedlots and failing septic systems. In 2007 BALMM recognized the need to focus on nitrate-nitrogen pollution reduction by petitioning Commissioner Brad Moore of the Minnesota Pollution Control Agency (MPCA) to assess trout streams against the drinking water standard of 10 mg/L nitrate-nitrogen. Nitrate pollution concerns are many-faceted and they include local impacts to drinking water and toxicity to fish and aquatic invertebrates in the region's streams and rivers. A downstream concern is nitrogen loading to the Gulf of Mexico where a nutrient-enriched hypoxic zone impacts fisheries. The letter submitted on behalf of the local governments that constitute BALMM noted that "If nitrate contamination is to be addressed effectively through the TMDL process, it is necessary to have this methodology established." The letter ultimately resulted in the MPCA assessing trout streams against the drinking water standard (Water Quality Forum Briefing Paper, September 18, 2008) and accordingly adding twelve coldwater stream reaches in southeast Minnesota to the 2010 impaired waters list. Every impaired waters list since that time has included trout streams that regularly exceed 10 mg/l nitrate-nitrogen. Leading up to the first nitrate listings in 2010, a de facto Nitrogen Workgroup met in December 2009 to discuss information needs pertaining to nitrate pollution reduction efforts. At the steering of this group, the MPCA used Clean Water Funds to (1) contract with the Minnesota Geological Survey (MGS) to complete a study of [Geologic controls on groundwater and surface water flow in southeastern Minnesota and its impact on nitrate concentrations in streams](#), and (2) work with Winona State University, Fillmore County Soil and Water Conservation District and the Minnesota Department of Agriculture to build a soilwater monitoring network in the region, to document nitrate concentrations leaching away from the root zones of various land uses and row crop management systems. Both of these efforts provided invaluable information regarding nitrate transport in our region and how land use and management practices affect nitrate leaching loss.

The prompt from MPCA Commissioner John Linc-Stine in December 2018 to consider a Generic Environmental Impact Statement (GEIS) for nitrate impacts in southeast Minnesota has refocused the BALMM constituency on an assessment of available nitrogen-related data, tools, and understanding. BALMM greatly appreciates the leadership of the state agencies in building Minnesota's Nutrient Reduction Strategy and Nitrogen Fertilizer Management Plan. These high level documents comport very well with our BALMM Scoping Document (2001) regarding both the sources of nitrate pollution in our region (approximately 90% of the load has its "geographical source" in the region's cropland acres) and the best strategies for reducing nitrate pollution (source control and vegetative scouring). In recent years BALMM partners have successfully secured grant dollars (both Clean Water Fund and EPA Section 319) to apply these strategies in the watersheds of southeast Minnesota.

While BALMM partners progress efforts to reduce nitrate pollution, there remain some regional needs regarding data, tools and understanding that are not focused on source assessment or the general nitrate reduction strategies, but rather on (1) more "specialized" data that will further our understanding of nitrate leaching loss and transport in the karst system, and (2) outreach, information and tools to support local government efforts to implement nitrate reduction work. The Nitrate Workgroup met most recently in June, 2019 and provided the following summary of these needs:

- **Continue to study "lag time" between nitrate moving from the land surface to groundwater.** Given the region's karst setting, there is significant variability in water's travel time from the land surface to groundwater and on (in some cases) to wells or the baseflow of trout streams. Furthering this understanding helps answer questions like "is the nitrate problem getting better or worse?"
- **Study potential impacts of increased tiling in karsted landscapes.** Changing climate and wet years may lead to tiling of cultivated lands in karsted areas. There is a need to understand the "range of possible impacts" to local water cycles and nitrate transport (e.g. impacts to trout stream baseflow) that may come of various tiling scenarios.

- Maintain and grow monitoring networks focused on nitrate.**
 Assess the adequacy of the [current regional monitoring network of spring](#) and trout stream locations. Consider growing it to include sites at more stratigraphic locations (e.g. founding a “sentinel springs” network). Long-term records of baseflow and spring nitrate concentrations are critical for trend analysis.
 Supplement spring monitoring locations with springshed delineations, land use study and age dating of springwater. Grow the network of nitrate sensors (that record time series nitrate data) to include varying geologic/stratigraphic settings. Time series data allow for study of timing and transport dynamics that is not afforded by grab sample records.
 Maintain the monitoring effort at the [Root River Field to Stream Partnership](#) sites. This project provides unprecedented and invaluable coincidence of nitrate monitoring, full understanding of management practices and established landowner relationships.
 Maintain the [Southeast Volunteer Nitrate Monitoring Network](#) of private wells.. Nitrate testing results from this network of nearly 600 private wells is used to track trends of nitrate levels in SE regional drinking water over time (2008 – present).
- Maintain and grow monitoring networks focused on nitrate leaching loss from agronomic systems.** While it is well understood that the dominant geographic source of nitrate pollution in southeast Minnesota is cultivated acres, there are many variables that determine the magnitude of the leaching loss from those settings. Monitoring sites at tile outfalls and under fields (via suction cup lysimeters) paired with understanding of nitrogen management in the upstream drainages provides important information regarding the effectiveness of management practices. These efforts should encompass various management systems, especially those with pointed information gaps (e.g. fields that receive regular manure applications).
- Organize, summarize and make available nitrate related datasets.**
 Ensure that well monitoring network data at both county and state levels are accessible via geodatabases.
 Summarize and make accessible lysimeter and tilewater nitrate data.
 Serve the karst features database (KFD) via an interactive tool similar to that designed for the Minnesota Spring Inventory.
- Continue to develop visualization and outreach tools.**
 Use video and animation (e.g. three dimensional cross sections) to describe how water and nitrate move in southeast Minnesota.
 Use video, animation and interviews (e.g. with producers) to share and promote nitrate reduction strategies.
 Ensure that education curricula are kept up to date regarding karst and nitrate pollution.
 Develop “nitrogen talking points” for shared use in southeast Minnesota to promote consistent messaging for outreach, interviews, news stories, etc.
 Provide estimates of “costs” of nitrate pollution. Discussing costs to society and costs to producers is an important component of outreach.

Minnesota is fortunate to have funding (Clean Water Fund, EPA 319, Conservation Reserve Enhancement Program and numerous NRCS/SWCD programs) and programmatic support (Total Maximum Daily Loads (TMDLs), Watershed Restoration and Protection Strategies (WRAPS), One Water One Plan (1W1P)) that are critical to implementing nitrogen reduction work. On behalf of the BALMM partners, this memo is forwarded as a guide to steer funding and work related to data and information needs in support of nitrate reduction efforts in southeast Minnesota.

Signed,



Caitlin Brady
 BALMM Chair