



Minnesota River Basin Interagency Study

Agencies collaborate for basin water quality and ecosystem restoration in Minnesota, Iowa, North Dakota, and South Dakota

A multi-state effort is underway to reduce excess nutrients, pollutants and flooding from stormwater runoff to streams, rivers, and lakes, while sustaining productive land use in the nation's heartland.

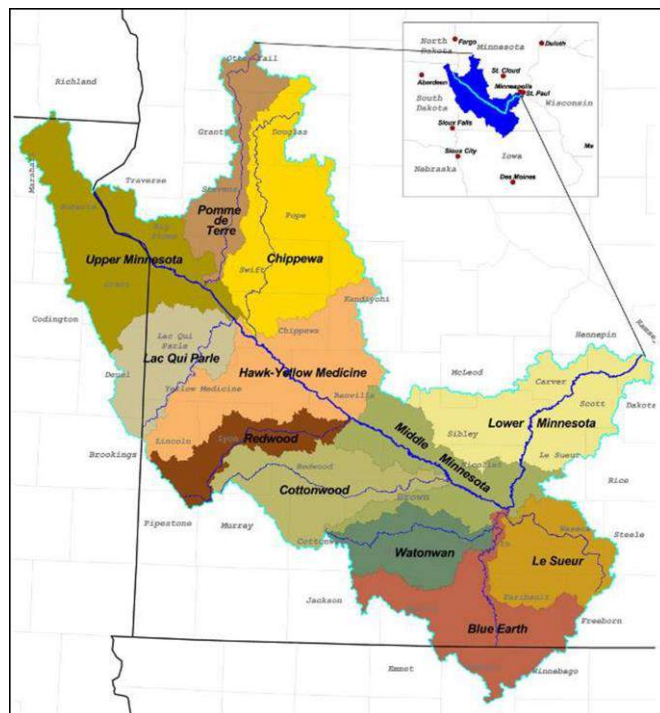
In the Minnesota River basin, local, state, and federal agencies are collaborating to integrate watershed assessment and management tools for conservation organizations and land owners. They include the latest computer models of the landscape and water that will support more efficient and effective decision-making about water quality improvement projects.

The Issue: The Minnesota River Basin has been identified as a major source of excess amounts of pollution runoff, sediment and algae-fueling nutrients to the Mississippi River, and ultimately to the Gulf of Mexico. The basin is seeing increased erosion; sedimentation, habitat degradation, flooding and impaired water quality. We need to manage land use for cleaner water and healthier habitats, to improve recreational areas, and to support sustainable industry and agriculture now and for the future.

Purpose of the study: The study is contributing to improving the health of environmental, social and economic systems in the Minnesota River basin. The study is also helping to improve and coordinate watershed management by identifying the best ways to address land use, habitat, water quality and other water resource issues at various watershed sizes.

How:

- Collaboration: Tool-sharing, quarterly meetings, product-driven working groups and public engagement activities.
- Create and validate more detailed hydrologic information using state-of-the-art models.
- Start with sub-watersheds about 10,000 to 40,000 acres in size. Test the study approach in the Seven Mile Creek and Shakopee Creek watersheds.
- Use detailed information about water flow to identify what will work in specific watersheds.
- Learn how the information in small watersheds translates to effects seen in large watersheds.
- Combine existing tools and data into an efficient "tool kit."



Minnesota River basin sub watersheds

Minnesota River interagency study team

The interagency study team represents more than 18 partners from federal and state agencies, tribes, and other organizations. The team is working on studies and tools to support information sharing, planning and management within the Minnesota River Basin.

The U.S. Army Corps of Engineers-St. Paul District and the Minnesota Environmental Quality Board (EQB) are co-sponsors of the study. The EQB includes the Departments of Agriculture, Administration, Employment and Economic Development, Health, Natural Resources, Commerce, Transportation, Pollution Control Agency and Board of Water and Soil Resources.

The integrated study approach provides collaboration opportunities for initiatives such as: Watershed Health Assessment Framework of the Department of Natural Resources, the One Watershed-One Plan approach of the Board of Water and Soil Resources, and the Watershed Restoration and Protection Strategy of the Pollution Control Agency.

Interagency team activities:

The team meets yearly to quarterly to share progress reports, learn about state-of-the-art tools for watershed assessment and management, develop goals, and provide input on questions from partners and the study work plans.

Developing the tools involves working with local partners interested in the river, collecting information throughout the basin, completing detailed modeling efforts and developing plans based on the needs of the people living and working in the Minnesota River basin.

Working groups

Work is done with team members from many organizations in specific working groups organized in response to study needs:

- Communications and public engagement
- Technical modeling
- Environmental
- Economics
- Decision Support System (tool kit)

These groups support the study by producing or integrating existing tools that will inform a decision support system to aid water and land managers in the Minnesota River basin.

These tools will enable:

- Examination of existing conditions.
- Forecasting of future conditions.
- Simulating watershed management alternatives exploring ecological, economic and socially desirable actions.



2015 activities summary:

- ✚ Seven Mile Creek and Shakopee Creek watersheds were modeled using GSSHA and working meetings were held with IST partner agency HSPF and SWAT modelers to coordinate model comparisons and tool development.
- ✚ Alternative Scenarios for testing the sensitivity of the management practice impacts were developed in collaboration with state and federal IST partners.
- ✚ Public engagement forums such as Farm Fest and Shakopee Creek & Seven Mile Creek Field Days share information between the study team and members of the public in order to inform the modeling effort.
- ✚ Water quality, environmental, geomorphology, and socio-economic impacts in these watersheds have been determined and will be used to inform future work.

Local government:

Soil and Water Conservation Districts, Watershed Districts, watershed projects and county water planners, local landowners and others help define the local resource needs and tools to be developed by the study.



Future work:

The study team will apply lessons learned in Seven Mile Creek and Shakopee Creek to other sub-watersheds. This will depend on funding and authorization from the federal and state co-sponsors to continue the study. Products from the study will be available to local watershed planning groups.

Planned project investment (2010-2017)

Estimated Federal cost	\$4,205,000
Estimated non-Federal cost	<u>\$4,205,000</u>

Contacts

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Decision Support System Work Group Fact Sheet

Minnesota River Basin Integrated Watershed, Water Quality and Ecosystem Restoration Study: Minnesota, South Dakota, North Dakota and Iowa

Decision Support System Study Goal

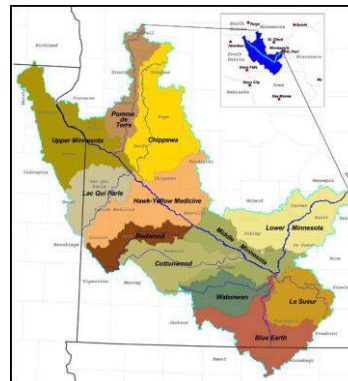
The Decision Support System (DSS) Work Group goal is to develop a framework of data and modeling tools for the entire Minnesota River Basin to explore economic, environmental and social trade-offs using a scenario-based approach in order to improve water quality and watershed health. The framework combine natural and social science products to assist decision makers and the public achieve the following goals:

- Identify effective management and restoration actions.
- Identify cost and benefits of incremental investments.
- Identify short- and long-term goals to effectively manage the watershed and its health.

DSS Work Group Proposal

- The DSS is based on hydrologic and hydraulic assessments of land use and climate changes.
- Water quality and sediment processes are coupled with those assessments.
- Ecosystem attributes, such as traditional habitat and wildlife quantification and ecosystem based economics, will build upon the hydrologic and hydraulic, water quality and sediment processes.
- The DSS accounts for economic viability and resilience of agriculture, energy production and other industries important to economic health of the river basin.
- The DSS incorporates social based economic priorities such as recreation, aesthetics and other quality of life aspects.

The DSS uses information across a range of geographic scales from the small catchment (sub Hydrologic Unit Code-12), to the major watershed, to the main stem of the river. To the extent practical, the DSS will incorporate small scale results into large scale evaluations (develop scaling relationships).



Minnesota River basin sub watersheds

DSS Work Group 2016 Activities for Seven Mile Creek and Shakopee Creek Pilot Sub Watersheds

- Listen to local watershed planners, managers and the public for input on needs for watershed management data and tools.
- Finalize database framework, begin populating database with model and evaluation outputs generated from running 6 landuse scenarios across MN River basin.
- Begin developing the graphical user interface that will allow for the data and information in the database to be displayed on a webpage.

Opportunities

Those interested in providing input to the DSS work group are encouraged to contact a co-chairperson listed below.

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Technical Modeling Work Group Fact Sheet

Minnesota River Basin Integrated Watershed, Water Quality and Ecosystem Restoration Study: Minnesota, South Dakota, North Dakota and Iowa

Technical Modeling Work Group Study Goals:

- ✚ Work with partner agencies to provide guidance on modeling to address planning questions in the watershed.
- ✚ Coordinate development and linking of detailed physically based models within different regions across the watershed.
- ✚ Advise scaling rule development and implementation. Scaling rules will use detailed sub watershed information to help inform whole basin models and increase confidence in management options applied within watersheds.
- ✚ Update the main stem model that receives water from the sub watersheds with sediment movement simulations and channel widening. This will improve our understanding of hydraulic conditions along the Minnesota River.
- ✚ Simulate alternate land use scenarios with input from the local land managers and provide the model output for use in the Decision Support System (DSS) tool kit.

Technical Modeling Working Group 2016 Activities:

For Seven Mile Creek and Shakopee Creek:

- Provide, validate and compare detailed hydrologic information using state-of-the-art models such as:
 - Gridded Surface Subsurface Hydrologic Assessment Model;
 - Soil and Water Assessment Tool; and
 - Hydrologic Simulation Program FORTRAN.
- Advise the land management scenario simulations within the hydrologic models.
- Work closely with modelers in the development of scaling rules based on model comparisons described above.
- Collect field data on ravine and near channel sediment sources and processes including vegetation and soil erosivity characteristics through a cooperative ecosystem studies unit with the University of Minnesota.

For Main Stem or Watershed Wide Coordination:

- Add sediment transport to the calibrated 1-dimensional flow routing model on the main stem Minnesota River from the mouth to approximately Mankato.
- Coordinate with the DSS Work Group to integrate output from hydrology and river hydraulic models with other discipline models such as biology, ecology and economics.



Future Activities:

- ✚ Add a channel widening feature to the river's main stem flow model.
- ✚ Integrate models into the DSS tool kit to:
 - Examine existing conditions;
 - Simulate best management practices and alternative land use scenarios;
 - Find sinks and sources of sediment; and
 - Formulate alternatives to identify ecologically sustaining and economically and socially desirable management actions.

Current Technical Modeling Work Group Participating Agencies

Participating agencies include the National Center for Earth Surface Dynamics; the National Weather Service; the Natural Resources Conservation Service; the U.S. Fish and Wildlife Service; the U.S. Army Corps of Engineers; the Minnesota Departments of Agriculture and Natural Resources; the Minnesota Pollution Control; the Metropolitan Council; the St. Croix Research Station; the University of Minnesota

Contacts

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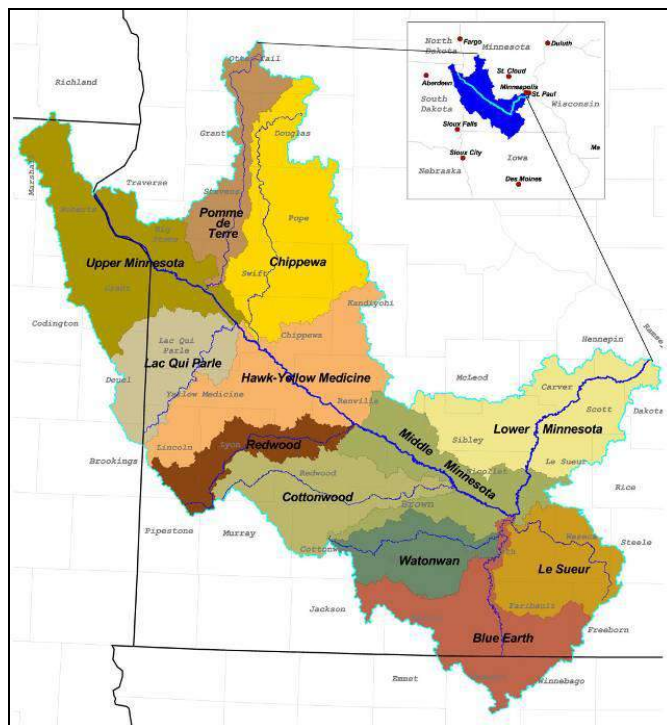


Draft Communications & Public Engagement (CPE) Work Group Fact Sheet

Minnesota River Integrated Watershed, Water Quality, and Ecosystem Restoration Study: in Minnesota, South Dakota, North Dakota and Iowa

Minnesota River Basin Integrated Study

Communication and public engagement is essential to the Minnesota River Basin integrated watershed study. The study incorporates the efforts of local, state, tribal nation, and federal agencies, as well as active non-governmental organizations, to aid water and land managers in the Basin. The study will contribute to management planning through a decision support system designed to address watershed, water quality, and ecosystem restoration needs at varying watershed scales. Five working groups including, Communications & Public Engagement, Technical Modeling, Environmental, Socio-economics, and Decision Support System, support the study through their work group efforts and through collaboration at the quarterly Interagency Study Team meetings. The Communications & Public Engagement work group is focused on ensuring that components of the study reflect the diverse perspectives of interested stakeholders across the Basin.



Minnesota River basin sub-watersheds

Communications & Public Engagement Work Group (CPE)

A subset of the interagency study team, the Communications and Public Engagement (CPE) work group, engages with Minnesota River Basin partners to seek local input for modeling scenarios that will contribute to a basin-specific toolkit for land and water resource management. A toolkit based on the needs of the people living and working in the Basin. Current CPE work group participating agencies include: Environmental Quality Board, Minnesota Pollution Control Agency, Dept. of Natural Resources, U.S. Army Corps of Engineers, Upper Sioux Community, and Lake Pepin Legacy Alliance.

Status Update

The CPE work group was established in 2013 and submitted a proposed strategic communications plan to the Interagency Study Team at the 2014 Winter Quarter meeting.

CPE work group 2015-16 activities

- **CPE Strategic Plan** working draft finalized.
- **Participation in MN River Congress meetings** helping to develop structure and missions for the group.
- **Collaboration with Humphreys Institute** reps on Local Bio-economy Project: 7 Mile Creek.
- **Collaboration with DNR, Gustavus Adolphus, 7 Mile Creek Watershed Coordinator, MPCA, U of MN CESU researchers, & MNDOT:** focused on longer term coordination & monitoring in 7 Mile Creek related to \$1.6 M grant for implementing BMP's to reduce sediment and improve water quality.
- **August Farm Fest Display:** With district PAO support in Redwood Falls, MN. 2015 & 2016
- **Public Outreach Seven Mile Creek** in conjunction with Field Day Friday Sept 11th. A Seven Mile Creek specific poster was produced showing the linkages of the different studies.
- **CSSR Meeting:** Jan 12 2016 Mankato for incorporating sediment load prediction and management option costs into IST Decision support toolkit.

Future Work

The group will continue to implement the strategic plan for communications and public involvement incorporating manager, stakeholder, and public input in the scenarios modeled by the IST and providing science based decision tools for local watershed management.

CPE products directly support the development of a decision support toolkit to aid water and land resource managers in the Minnesota River Basin. The tools will address watershed, water quality, and ecosystem restoration needs at different scales.

Basin wide application of the tools through additional sub-watershed work will be based on funding and authorization.

Contact(s)

New State Rep TBD, WG Co-chair
EQB Website Here

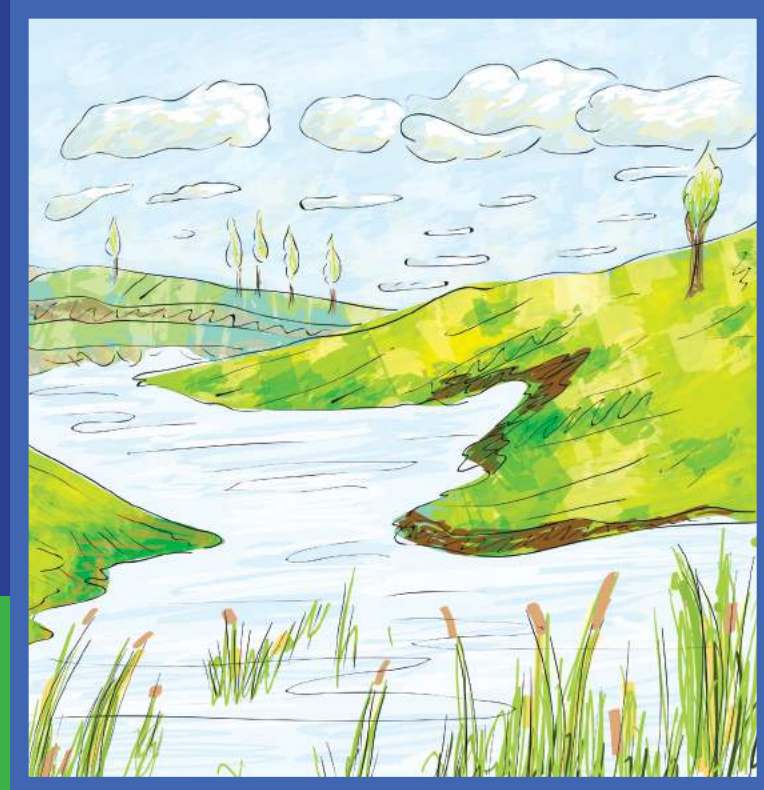
Rebecca Seal-Soileau (USACE), WG Co-Chair
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Opportunities

Those interested in providing input to the Communications and Public Involvement Work Group are encouraged to contact the WG Co-chairs. Upcoming meetings with local watershed districts and public meetings will be posted on the EQB website listed below.





Minnesota River Basin Integrated Watershed, Water Quality and Ecosystem Restoration Study

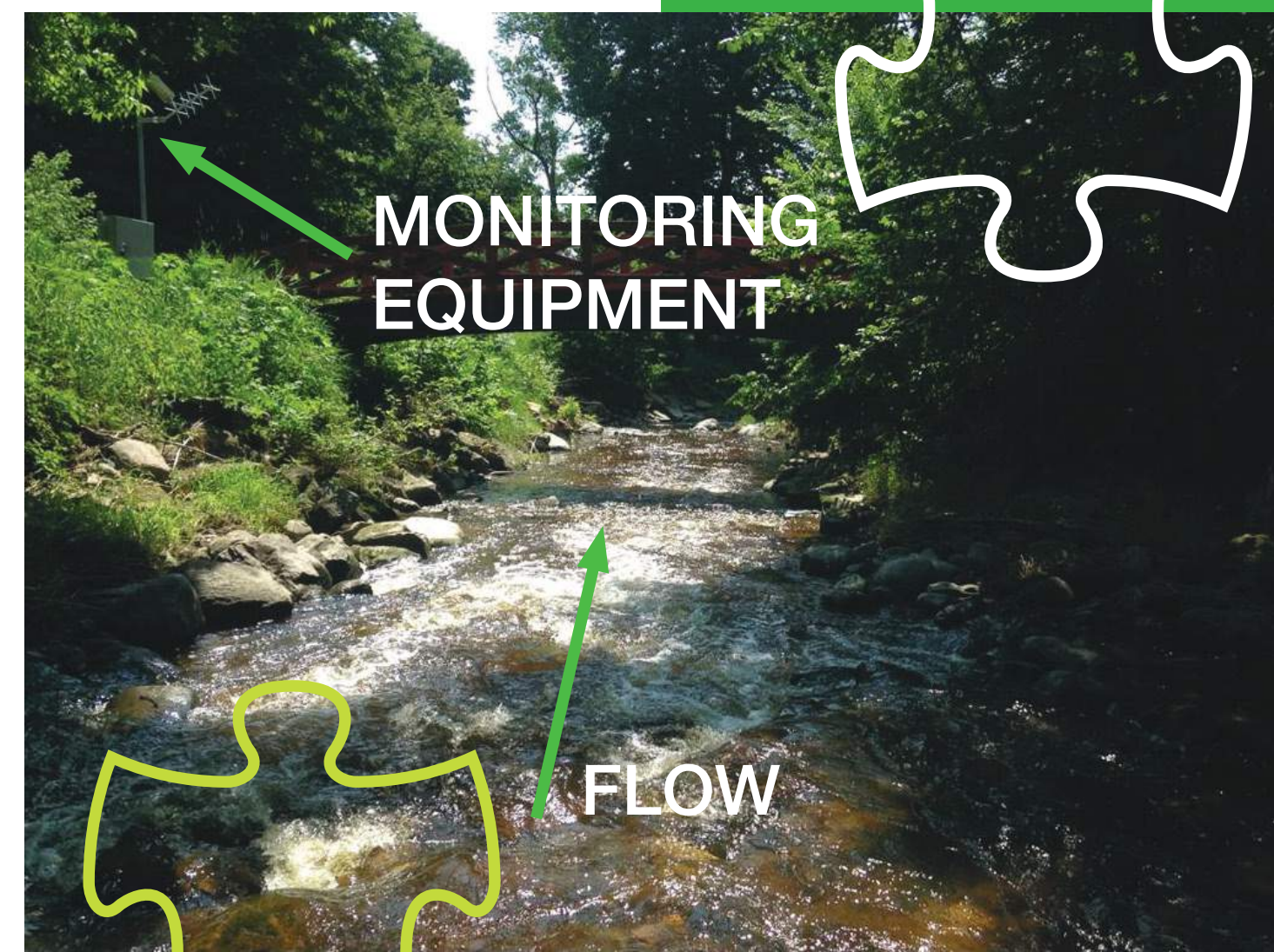
Connecting management partners and practices to improve soil health and water quality!



Seven Mile Creek Watershed

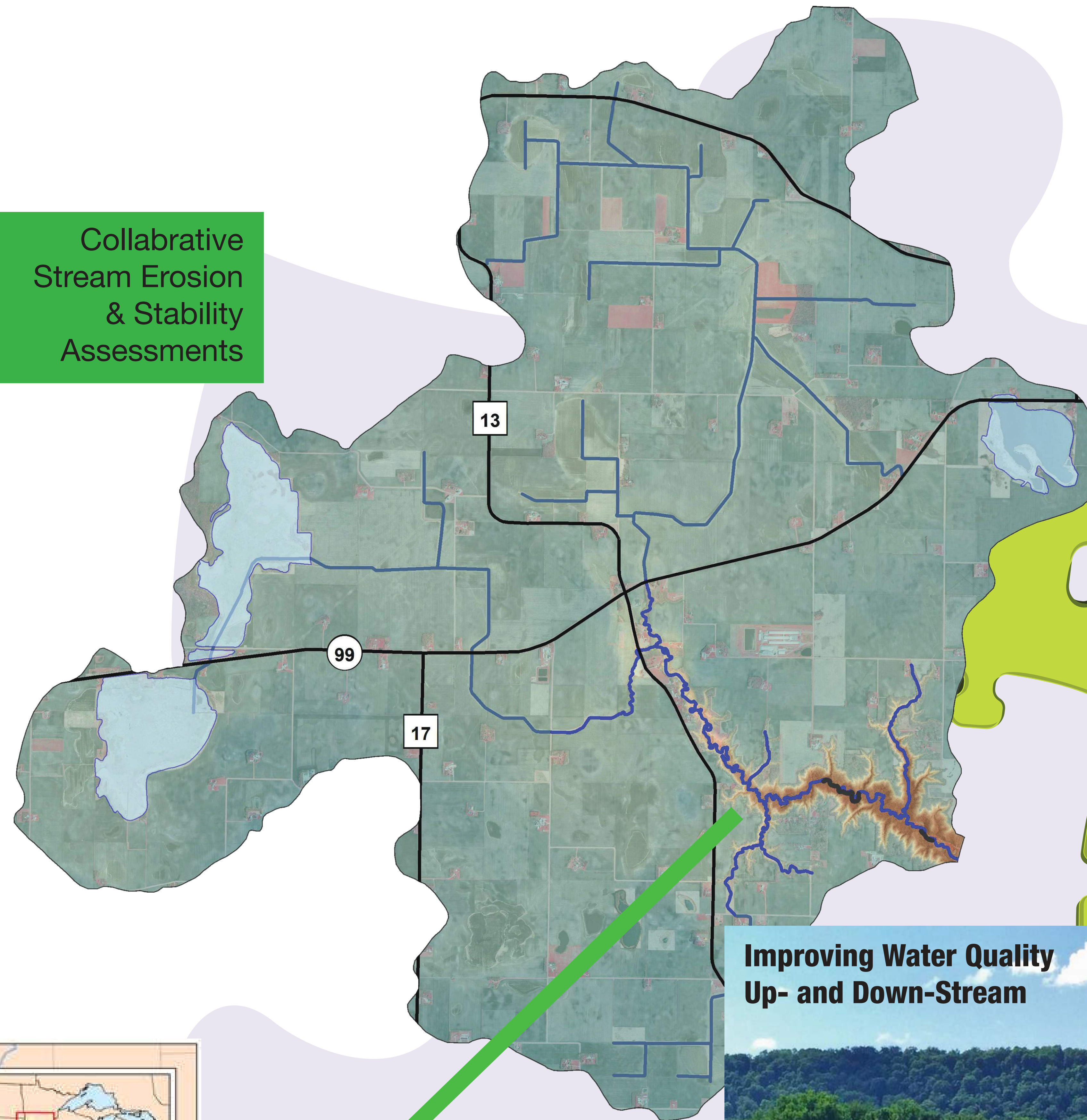


Collabrative Stream Erosion & Stability Assessments



MONITORING EQUIPMENT

FLOW



Watershed Modeling Helps Tell the Story



Surface Water/Groundwater Interaction



Newly planted soybeans in corn residue. Photo courtesy USDA NRCS

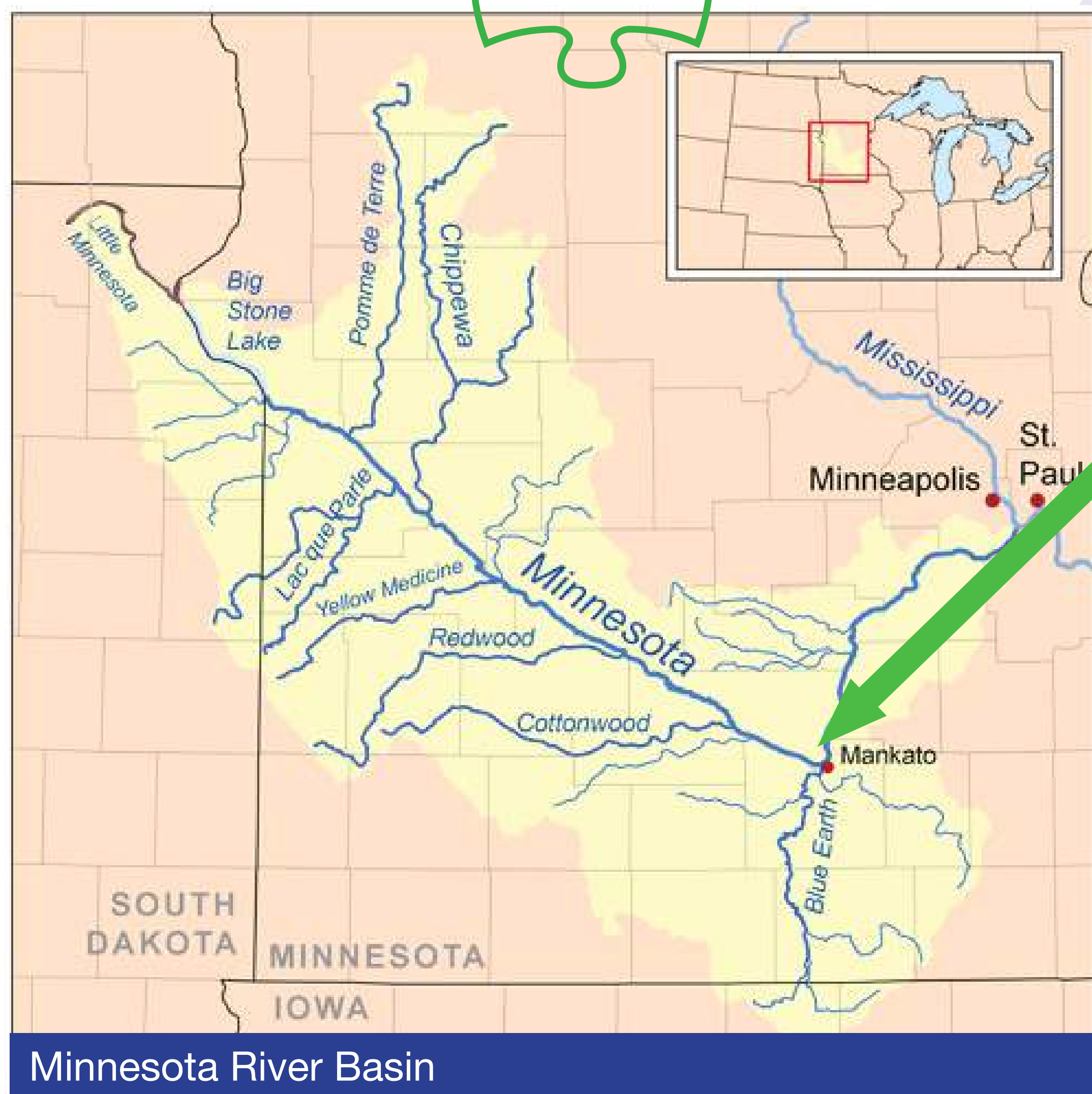
Improving Soil Health



Improving Water Quality Up- and Down-Stream



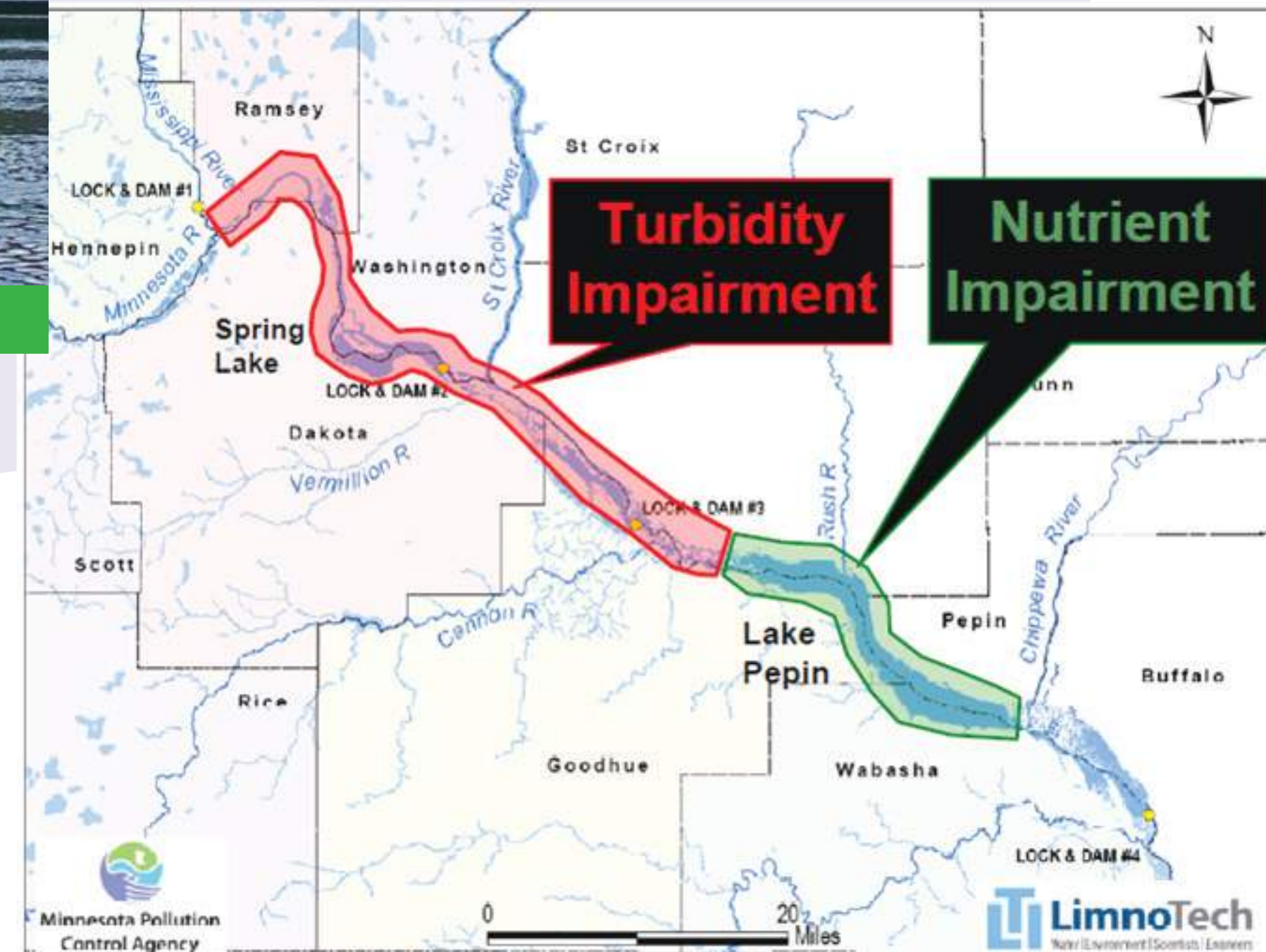
Lake Pepin Backwater



Minnesota River Basin



A directory of businesses, organizations, individuals, and government interested in water resources, recreation and economic opportunities in the watershed is available online and at the MPCA Mankato office. www.pca.state.mn.us/hqzqdc



Excess Sediments Settle in Lake Pepin & Nutrients Flow to the Gulf

Clean Water Is Everyone's Responsibility!

