



BWSR-Assisted Research

Toward Improving Conservation Outcomes

The Minnesota Board of Water and Soil Resources (BWSR) collaborates with research institutions that are seeking to improve the environmental outcomes of conservation practices, especially those that protect and improve water quality. While BWSR does not conduct this research, BWSR employees often serve as advisors on research projects that require professional expertise on many subjects, including:

- Soil Science
- Hydrology
- Geology
- Engineering
- Landscape Ecology
- Wildlife Biology
- Natural Resource Management

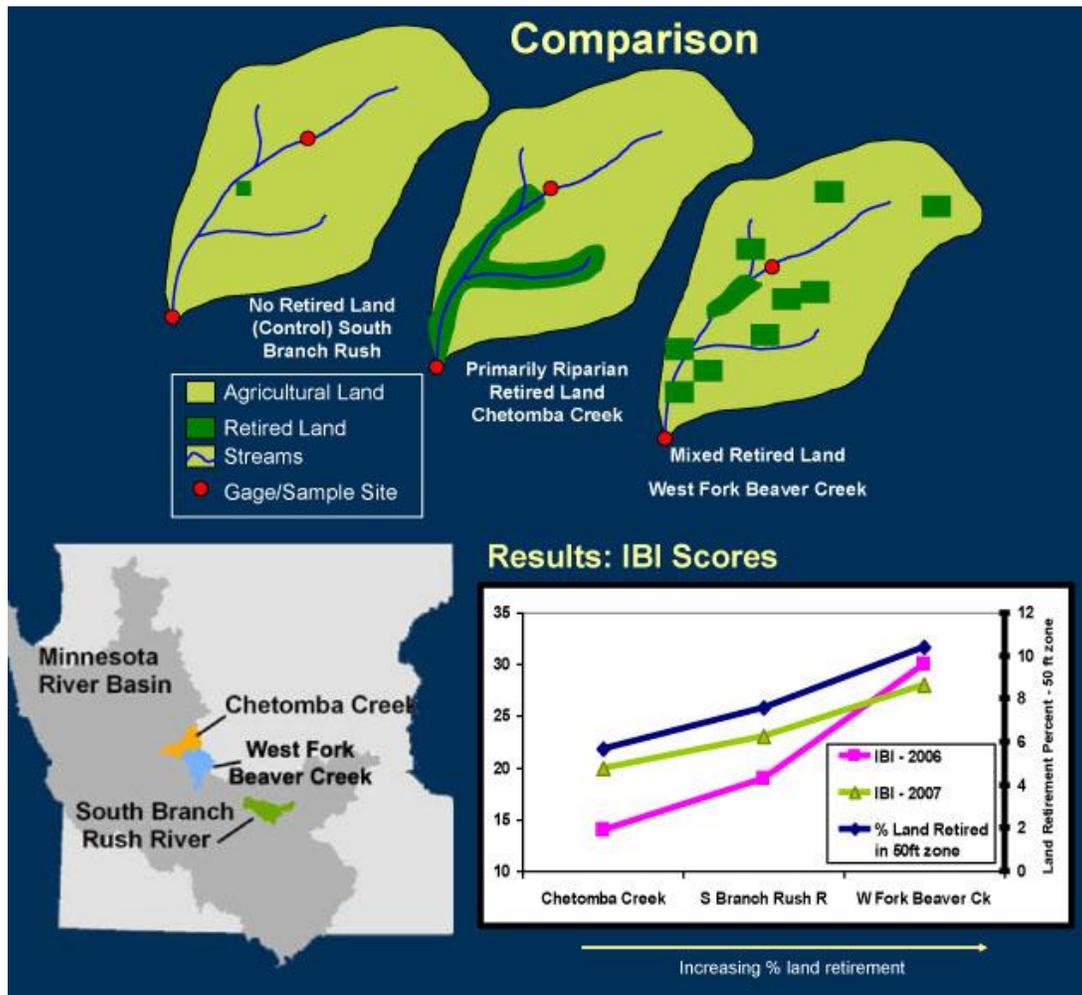
By participating in these research efforts and transferring that information to local government units and other conservation partners, BWSR is ensuring that conservation implementation is based on the best available science and applied research.



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Effects of Agricultural Land Retirement of the Minnesota River Basin



Purpose:

Water quality improvement is one of the primary goals of land retirement programs such as Reinvest In Minnesota (RIM), Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), and the like, as well as large-scale best management practices (BMPs) such as buffer strips and filter strips. To date there has been little evaluation of watershed-scale improvements to water quality and aquatic biology resulting from land retirement.

The overall objective of the effort was to compare water quality and biological conditions in small watersheds as similar as possible except for the amount and location of agricultural set-aside land. The Chetomba Creek, West Fork Beaver Creek, and South Branch Rush River sub-basins were selected after considering many parameters.

BWSR participated in this research, which was completed in two projects that received funding through the Legislative-Citizen Commission on Minnesota Resources (LCCMR): Effects of Land Retirement on the Minnesota River (2005-2008), and Land Retirement Effects on Minnesota River Basin Streams (2007-2009)

The project included:

1. Establishing fully-instrumented sampling sites with automated samplers, stream flow gages, and water-quality monitors
2. Collection of water-quality and biological data
3. Continuous collection of data with in-stream monitors and the collection of multiple sediment samples during storm events
4. Analysis of data including Index of Biotic Integrity (IBI) scoring

The project provided the infrastructure for future evaluations of agricultural-land retirement and other agricultural management practices in the basins.

Lead Agency:

United States Geological Survey (USGS)

Main Partners:

BWSR, United States Geological Survey (USGS), LCCMR, Hawk Creek Watershed Project, Department of Natural Resources (DNR)

Completion Date:

2009

Project Costs and Funding Source:

Environment and Natural Resources Trust Fund (LCMR): (ML 2005, First Special Session, [Chap.1], Art. 2, Sec.[10], Subd. 7c)	\$300,000
Federal (USGS) Match:	\$300,000
Environment and Natural Resources Trust Fund (LCCMR): (ML 2007, [Chap. HF 293], Sec.[2], Subd. 5c)	\$275,000
Federal (USGS) Match:	\$275,000

Results Published / Available:

Water Quality and Biological Characteristics and Responses to Agricultural Land Retirement in Three Streams of the Minnesota River Basin, Water Years 2006-08, USGS Scientific Investigations Report 2009-5215, by Christensen, V.G., Lee, K.E., Sanocki, C.A., Mohring, E.H., and Kiesling, R.L. url:

<http://pubs.usgs.gov/sir/2009/5215/>

Summary prepared for BWSR, August 2008

Effects Of Agricultural Land Retirement In The Minnesota River Basin, Victoria G. Christensen and Kathy E. Lee, American Water Resources Assoc. Specialty Conference, 2008.

BWSR Contact:

Eric Mohring, (651) 297-7360

Wetlands: Role of Buffers in Upland Infiltration, Nutrient Absorption, and Wildlife Habitat

Purpose:

This project investigates the role of buffers on maintaining water quality and wildlife habitat in wetlands. Existing wetlands in the Twin Cities Metro Area are being studied to determine the role of their buffers in providing ecosystem functions. Along with literature reviews, information obtained from the existing wetlands will be used to provide guidelines for the establishment and protection of wetland buffers.

Lead Agency:

Funded by Minnesota Department of Transportation (Mn/DOT), research conducted by the University of Minnesota

Main Partners:

Mn/DOT, BWSR, Ramsey-Washington Metro Conservation District, Met Council, Minnesota Pollution Control Agency (MPCA) (TAP members)

Completion Date:

Fall 2009

Project Costs and Funding Source:

Mn/DOT funded

BWSR Contact:

Dan Shaw, (651) 296-0644

Wetland Mitigation in Abandoned Gravel Pits

Purpose:

This study investigates methods to establish mitigation wetlands in gravel pits through the use of donor soils/sphagnum from nearby impacted wetlands. Different methods of applying donor materials and the use of state of Minnesota seed mixes are being investigated. The site is being closely monitored to determine how sites established with donor soils differ from other restored wetlands. The results will be used to guide other wetland restoration efforts in the state.



Lead Agency:

Mn/DOT, research conducted by the University of Minnesota Duluth Natural Resource Research Institute

Main Partners:

Mn/DOT, BWSR, University of Minnesota

Completion Date:

Fall 2009

Project Costs and Funding Source:

Mn/DOT with matching funding from BWSR

Results Published / Available:

Data not currently available

BWSR Contact:

Dan Shaw, (651) 296-0644

Wetland Controlled Grazing Study

Purpose:

The effects of grazing in wetlands is being studied as a management strategy for controlling non-native cool season grasses. Non-native grasses including reed canary grass, Kentucky bluegrass and smooth brome grass are common invaders of restored wetlands and upland buffers. Controlled grazing can be used to set back these grasses if focused during times of the year when they are active.



Despite its potential for management, controlled grazing in wetlands is not often recommended in wetlands due to a lack of information about its effectiveness and potential negative influences. Results of the study will be used to guide wetland management recommendations in Minnesota.

Lead Agency:

BWSR

Main Partners:

BWSR, Clay SWCD, Landowner

Completion Date:

Research is starting in 2010 and results are anticipated in 2011 or 2012

Project Costs and Funding Source:

Local Government Road Wetland Replacement Program

Results Published / Available:

Data available in 2011 or 2012

BWSR Contact:

Steve Hofstad, (218) 736-5445

Side Inlet Controls to Improve Water Quality

Purpose:

Side inlets serve as surface runoff outlets from agricultural land into drainage ditches and are very common wherever surface drainage ditches are present. These side inlets contribute sediment and concomitant nutrients and pesticides to MN's waters. Side inlet controls such as culverts and drop pipes can prevent gully erosion, control the rate of flow to ditches, and create sedimentation areas to improve water quality. Side inlet controls were identified as a key BMP in the LCMR-funded MN River Assessment Project (LMCR, 1994) and are eligible for federal and state cost share (mechanism for widespread implementation). Current design practice does not consider water quality impacts, which this project would address. Research and demonstration are needed to quantify the benefits of this BMP on sediment, nutrient, and pesticide loading to receiving waters and to develop design guidance and outreach so that side inlet controls can be implemented on a widespread basis. Development of design guidance could then be used in TMDL implementation plans to address sediment and nutrient impairments.



Lead Agency:

BWSR

Main Partners:

University of Minnesota, Hawk Creek Watershed Project, Brown Nicollet, Cottonwood WQB, Sand Hill River WD, Mower SWCD, MDA

Completion Date: July, 2013

Project Costs and Funding Source:

\$621,100, EPA 319 DER Funds: \$341,605

Results Published / Available:

Insufficient progress

BWSR Contact: Joel Peterson (651) 215-9008

Historic Soil Carbon

Purpose:

The purpose of this study is to determine how soil organic carbon levels in Minnesota soils have changed over time. This project will compare the soil organic carbon contents from 20 to 30 year old soil samples to contemporary soil samples. Using a record of land use history inferences are made regarding land use activities and carbon storage in soil.

Lead Agency:

University of Minnesota

Main Partners:

University of Minnesota

Completion Date:

June 2010

Project Costs and Funding Source:

LCCMR (ML 2008, [Chap.367], Sec.[20], Subd. 5b) \$150,000

Results Published / Available:

Data not currently available

BWSR Contact:

Megan Lennon (651) 296-1285

Rye Cover Crop Research

Purpose:

Massive removal of stover from corn production systems for energy production is likely to cause significant environmental harm, including increased erosion, higher sediment and phosphorus loading of surface waters, loss of soil organic carbon, and increased nitrogen losses to ground and surface waters. It is critically important that new management systems be developed that will prevent these adverse impacts.

A promising strategy involves the use of winter cover crops such as rye. A winter rye cover crop can provide surface protection against erosive losses, immobilize excess nitrogen, and provide an additional input of carbon to help maintain soil organic carbon. This project involves a two year on farm study to address the feasibility and agronomic issues and document the environmental benefits of winter cover crops.



Lead Agency:

University of Minnesota

Main Partners:

University of Minnesota

Completion Date:

Summer 2011

Project Costs and Funding Source:

Clean Energy appropriations provided by the 2007 Legislature

Results Published / Available:

Data not currently available

BWSR Contact:

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