

# From Shore to Shore

A publication of the University of Minnesota  
Shoreland Education Team

November - December 2010

Issue # 100

[www.shorelandmanagement.org](http://www.shorelandmanagement.org)

## Clean Water and Climate Adaptation Summit

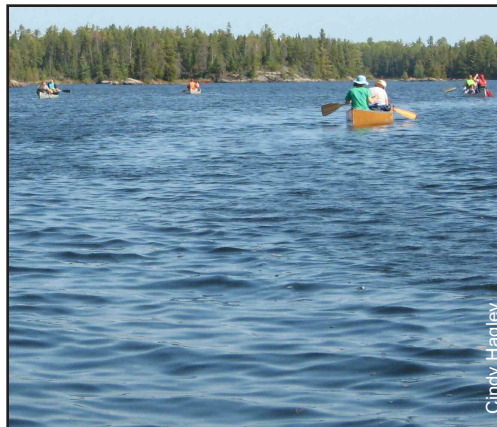
Barbara Liukkonen, Water Resources Center, [liukk001@umn.edu](mailto:liukk001@umn.edu)

On September 17-18, 2010, nearly 300 participants gathered at the University of Minnesota Landscape Arboretum for an outstanding conference on Green Infrastructure and Climate Adaptation. The conference goal was to bring together local government officials and staff, industry leaders, natural resource professionals, researchers, and citizens to learn how climate trends might affect Minnesota and the region, to discuss how green infrastructure is becoming an important water-management strategy, and to review strategies for making decisions that enhance the economic viability of their communities.

Nationally renowned speakers presented keynotes, followed by breakout sessions on a variety of subjects. You can see the agenda, and view the PowerPoint presentations at: [www.arboretum.umn.edu/cleanwaterclimatechangeconferencereport.aspx](http://www.arboretum.umn.edu/cleanwaterclimatechangeconferencereport.aspx).

The first day focused on design, policies, and techniques for urban development and redevelopment to protect clean water, with speakers addressing stormwater, low impact development, water-centric design, and other facets of green infrastructure.

To kick off the second day, Ben Santer of Lawrence Livermore Laboratory spoke about climate change models, highlighting strengths and weaknesses, and giving listeners guidance on how to assess how well certain models work. Eileen Shea, from the National Oceanic and Atmospheric Administration (NOAA), described the challenges and opportunities for providing climate information that meets the needs of society and decision-makers. Peter Mulvaney, assistant commissioner of the Department of Water Management for the City of Chicago, inspired participants by showing how



Chicago is planning for and implementing adaptation strategies to deal with climate change. University of Minnesota Extension climatologist and meteorologist Mark Seeley served as emcee and provided perspectives on current trends in Minnesota's climate.

Climate breakout sessions included: public engagement, downscaling models, agricultural adaptation, preparing for extreme events, climate change in forests and lakes, and implications for human health. In each breakout session participants discussed needs, opportunities, and next steps for climate adaptation strategies in Minnesota.

The Climate Change Adaptation Working Group (CCAWG) will compile those responses into a report and direction for future collaborative work. If you would like to join our Climate Adaptation networking site, visit: [www.mnclimateadaptation.ning.com](http://www.mnclimateadaptation.ning.com).

The conference was co-sponsored by the Landscape Arboretum, CCAWG, Minnehaha Creek Watershed District, University of Minnesota Extension, and the Pulte Group. ■



For the most current listing of Shoreland Education workshops, visit [www.extension.umn.edu/shoreland](http://www.extension.umn.edu/shoreland).

### Four Part AIS Speaker Series

**Date:** November 17, December 15

**Location:** Hartley Nature Center, Duluth, MN

**Contact:** Marte Thabes Kitson, [mkitson@d.umn.edu](mailto:mkitson@d.umn.edu) or visit: [www.seagrant.umn.edu/news/2010/09/15](http://www.seagrant.umn.edu/news/2010/09/15)

Sponsored by Hartley Nature Center, Minnesota Sea Grant and National Park Service

### Minnesota-Wisconsin Invasive Species Conference 2010

**Date:** November 8-10

**Location:** Crown Plaza River Front, St. Paul, MN

**Contact:** For information and registration, call (414) 967-5678 or visit [www.minnesotaswcs.org/2010\\_mn\\_wi\\_invasive\\_species\\_conference.htm](http://www.minnesotaswcs.org/2010_mn_wi_invasive_species_conference.htm)

Hosting organizations include the Minnesota Invasive Species Advisory Council, the Invasive Plants Association of Wisconsin, the Midwest Invasive Plant Network, and the Soil and water Conservation Society - Minnesota Chapter

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# What is Conservation Drainage?

Ann Lewandowski, Water Resources Center, 612-624-6765, alewand@umn.edu

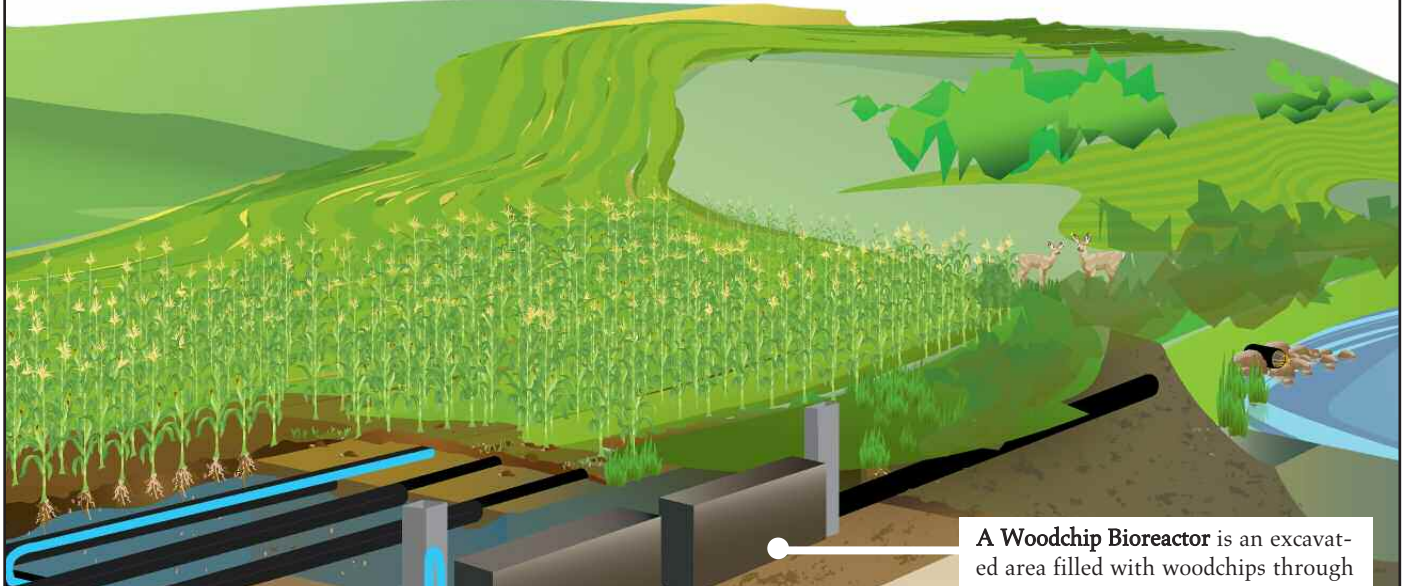
One hundred years ago Minnesotans were industriously digging ditches and installing sub-surface clay tiles to establish major artificial drainage systems. Their motivation was to improve public health as well as to create more farmable land. They were very successful, creating a massive, largely invisible infrastructure across much of our state. Artificial drainage is essential to the state's agricultural economy, so not surprisingly, new drainage activities are still common, sometimes to the detriment of the surrounding environment. Ann Lewandowski, research fellow with the Water Resources Center, and Mark Dittrich, senior planner with the Minnesota Department of Agriculture, hope to educate stakeholder groups about new drainage

technology research called conservation drainage, which minimizes environmental impact.

Conservation drainage is a suite of designs, structures, and practices that provide the benefits of artificial drainage while minimizing negative environmental impacts. It includes field-scale practices such as controlled drainage (also called drainage water management) to reduce total and peak flow and woodchip bioreactors to reduce nitrogen losses; storage practices such as impoundments, which slow down the release of water after a heavy rainfall; and alternative system designs such as culvert sizing and two-stage ditches.

Dittrich and Lewandowski conducted a total of nine focus groups across the state, three with each of three stakeholder groups: engineers and agencies, farmers and contractors, and drainage regulation authorities. Meetings were held in the northwest, west central, and southern regions of Minnesota. Participants were asked about the feasibility of various drainage approaches and what they understood about the impacts of drainage.

"We realized we needed to listen first to the people who are actually making the decisions about how drainage gets done," says Lewandowski. "We wanted to know what alternatives they thought would work and that they could implement."



**Shallow Drainage** is the installation of drainage pipe at a depth of 2½ to 3 feet as compared to the more conventional 4-foot depth. Shallow drainage has been shown to reduce flows and nitrate in drainage water by about 7%-18% (for a 3-foot depth). Shallow drainage may also make more water available to crops. This is a passive system and no management is required.

**Managed Drainage** uses simple water control structures in the drainage system to manage the water table during the growing season to increase available water for crops, while providing full drainage during spring tillage and fall harvest. Managed drainage has been shown to reduce flow volume and nitrates by 26-38%. These systems work best on fields with a 1% slope or less.

The opportunity to retrofit with water control structures at a later date is possible when new systems are properly designed. Installing a water control structure on an existing drainage system may require replacing old tile lines with a new layout.

**A Woodchip Bioreactor** is an excavated area filled with woodchips through which drainage water flows, removing between 45% and 80% of nutrients and bacteria. The excavated area is filled nearly full with woodchips and then covered with topsoil. Drainage water is directed from the field to the bottom of the bioreactor with a drainage pipe. Water leaves the downstream end of the bioreactor through another section of drainage pipe, then to a drainage main or ditch. Land requirements for bioreactors are very small, and they can be retrofitted to almost any drainage system.

Minnesota Department of Agriculture



## What is Conservation Drainage? (cont. from page 2)

Each focus group also heard a presentation from a speaker chosen specifically to address the concerns of that particular group. For example, Gary Sands, associate professor and extension engineer in the University of Minnesota's Bioproducts and Biosystems Engineering Department, spoke to engineers and agency members about innovative, low- impact drainage plans.

One of the messages heard repeatedly from focus group participants was the importance of personal relationships – among the landowners within a community, and between landowners and the various technical assistance providers and government staff. The quality of these relationships facilitates meeting multiple goals. Another common message was the importance of site-specific approaches: none of the proposed practices and designs is appropriate for every situation, and any of them can fail or be harmful if poorly implemented or

badly maintained. Good relationships between landowners and technical assistance providers facilitate effective site-specific approaches.

Some of the proposed practices – such as buffers and side inlets – are fairly well understood and participants had observed their benefits. However, Lewandowski noted, "For some of the other practices, we need to have a lot more discussion and research before they are ready for prime time." These other practices include two-stage ditches and culvert sizing for short-term water storage. "We'll need to address concerns about different options for each region and for each stakeholder group," Lewandowski added.

This article was originally published in the June 2010 issue of the University of Minnesota Water Resources Center "Minnegram" (<http://wrc.umn.edu/pubs/>).

The picture and description of practices is available in a pamphlet from the Minnesota Department of Agriculture.

### Resources

Full report of the focus group project:

<http://wrc.umn.edu/randpe/agandwq/consdrainage>, or contact AnnLewandowski, [alewand@umn.edu](mailto:alewand@umn.edu), 612-624-6765.

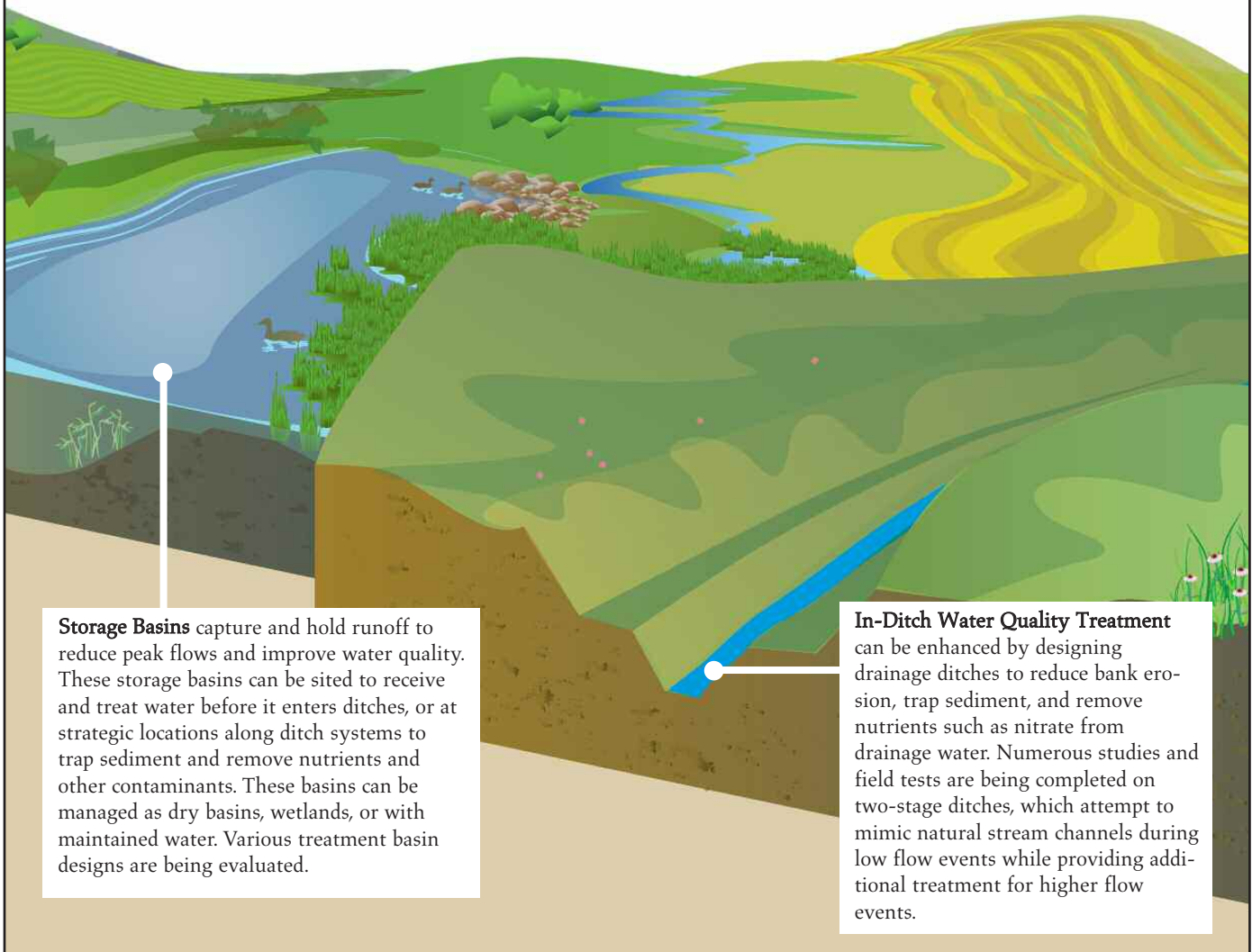
Conservation drainage information:

[www.mda.state.mn.us/protecting/conservation/practices/consdrainage.aspx](http://www.mda.state.mn.us/protecting/conservation/practices/consdrainage.aspx)

[www.mda.state.mn.us/protecting/conservation/drainage.aspx](http://www.mda.state.mn.us/protecting/conservation/drainage.aspx)

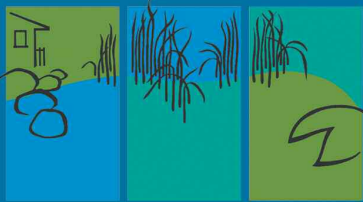
Drainage information:

[www.extension.umn.edu/DrainageOutlet](http://www.extension.umn.edu/DrainageOutlet) ■



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*A publication of the Shoreland Education Team, dedicated to educating Minnesota citizens about shoreland management to improve water quality, habitat, and aesthetics of our lakes and rivers.*

*From Shore to Shore* is available in hard copy and electronic formats. Archived issues are available online at [www.shorelandmanagement.org](http://www.shorelandmanagement.org)

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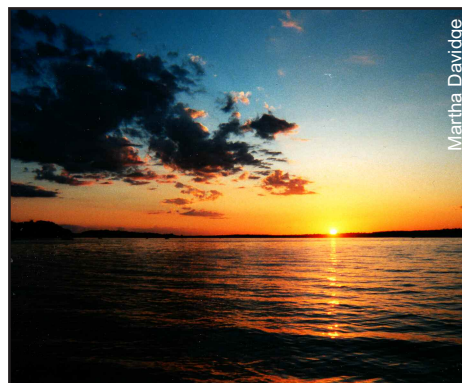
## Clean Water Partnership Grant Focuses Upstream

Contributed by Muffie Davidge, Whitefish Area Property Owners Association

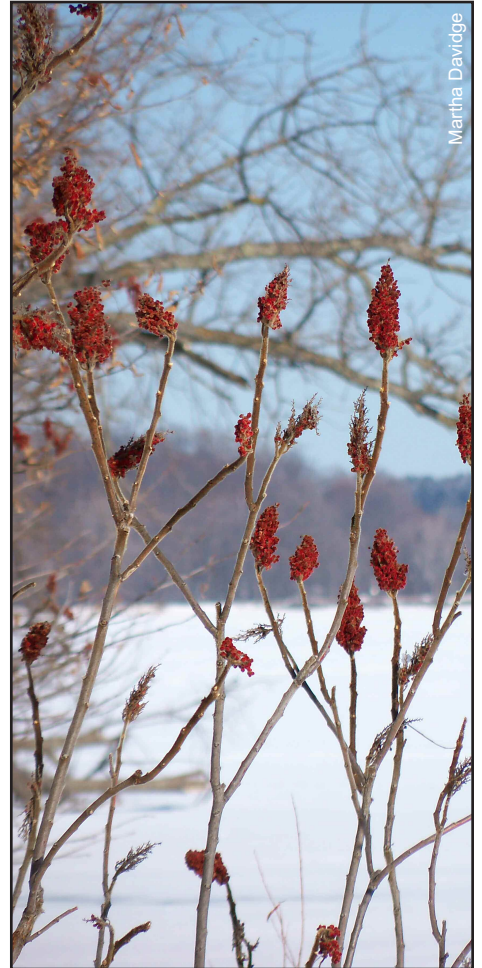
The MPCA (Minnesota Pollution Control Agency) recently announced that it has awarded a \$105,000 Clean Water Partnership grant to the Pine River Watershed Alliance. Members of WAPOA (Whitefish Property Owners Association) will provide volunteer hours as an in-kind labor contribution to facilitate the project in the amount of over \$107,000. This grant will enable the two groups to significantly build on previous efforts to improve water quality. The funds are to be used over a two-year period beginning in 2010.

In the past, efforts to improve the water quality of individual lakes have involved improving the septic systems of lakeshore property owners, promoting buffer strips of unmowed vegetation at the lake's edge, urging lakeshore owners to use non-phosphorus fertilizer for lawns (if used at all), and preventing runoff carrying chemicals and sediment from directly flowing into the lake.

Previous water sampling has established baseline conditions for water quality in many of the lakes in the Pine River Watershed. WAPOA volunteers have been very active in this sampling. This new grant will be used for testing waters of streams that feed the Pine River and thus the Whitefish Chain. The six lakes that these streams directly influence are Lower and Upper Whitefish, Rush, Little Pine, Daggett, and Cross. The streams to be studied are of particular importance because they are thought to provide at least 50% of the nutrients imported to the chain.



The Pine River gets its water from 500,000 acres of surrounding land. If streams from this land dump phosphorus into a lake, excessive algae growth can result. The lake water turns green, loses clarity, and desirability. The new grant will provide baseline



data that is needed as a foundation for any remedial efforts.

The project will be a two-year program of weekly chemical and physical sampling during the ice-free season, characterizing four stream locations on the Pine River; one on Spring Brook and Daggett Brook, along with the six Whitefish Chain lakes that are influenced by these streams. It will involve several cooperating organizations, both public and private, many volunteers making many measurements, professionals analyzing complicated water flows, funds to pay for laboratory tests, and an overall plan to bring this all together.

In addition, WAPOA volunteers will continue water quality measurements on the remaining seven lakes on the Whitefish Chain and are also testing waters of nearby lakes that are not on the chain itself. ■