

From Shore to Shore

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Maintenance of Stormwater Practices is Essential for Cleaner Water

By Shane Missaghi, University of Minnesota Extension, miss0035@umn.edu, 952-221-1333

Stormwater runoff is generated by rain and snow melt. Changes to our landscape can alter the natural hydrologic cycle by concentrating much of the stormwater into surface water as excessive runoff rather than water that is infiltrated into the ground, picked up by plants, or evaporated back into the atmosphere. Stormwater best management practices (BMPs), such as rain gardens or water quality ponds, are tools that minimize the impacts of excessive runoff and are designed and built to last a generation. Today, a typical Minnesota community may have tens to as many as hundreds of BMPs constructed. It has been fun and exciting to design, develop, and construct these BMPs to protect our clean waters, but their maintenance is not always a priority.

BMP maintenance, defined as a restoration of the original designed functions, includes inventory, assessment, and the actual work of BMP maintenance and repairs. The first step of inventory is to find the BMPs and ask, "Where were they constructed?" Finding these BMPs has proven a challenge for most communities where detailed records are lacking. After BMPs are located, field verified, and inventoried, then their conditions are assessed using established metrics, such as the health or density of plants in a rain garden. The University of

Minnesota has been a national leader in developing assessment manuals that evaluate the health, condition, and maintenance extent of BMPs. Once the BMPs are inventoried and assessed, then a "work order" can be issued as to initiate the needed maintenance.

What has been missing from this process is a clear set of guidance on how to conduct the actual work of maintenance and repair of the BMPs. Extension, in collaboration with a team of Stormwater experts, is leading the development of a series education programs on Stormwater Practices Maintenance. Participants in these series will learn the physical, chemical, and biological stormwater treatment process, BMP assessment (inspection), and the necessary maintenance techniques to restore the BMPs original designed functions. We intend to develop a clear set of research based guidelines for conducting BMP maintenance that Minnesota communities can readily use. The program will also offer certifications so the stormwater professional may promote their newly gained skills and ultimately move us closer to cleaner waters. Visit us at www.extension.umn.edu/Stormwater/ for more information on these upcoming programs. ■



Calendar of Events

For the most current calendar items and more details, visit www.extension.umn.edu/environment/water/calendar/.

The State of Water: Minnesotans Protecting Our Lakes and Rivers

Date: May 1-2

Location: Brainerd, MN

Website: www.conservationsminnesota.org/state-of-water-conference/

Linking Land Use to Clean Water: Making the Connection for Community Leaders

Date: May 8: Edina; May 14: Excelsior

Contact: John Bilotta, jbilotta@umn.edu, 612-624-7708, or register at <http://z.umn.edu/NEMO101>

Keeping our Lakes and Rivers Clean and Shoreland Buffers and Rain Gardens

Specifically for realtors

Date: May 15

Location: St. Cloud, MN

Contact: Kelly Travis, St. Cloud Area

Association of Realtors, kelly@stcloudrealtors.com, 320-253-7149

NEMO Watershed Game at the Minnesota Master Naturalist Annual Conference

Date: May 17

Location: Annandale, MN

Contact: John Bilotta, jbilotta@umn.edu, 651-480-7708

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Clean Streets Can Mean Clean(er) Water

By John Bilotta, University of Minnesota Extension, jbilotta@umn.edu; 612-624-7708

Shortly, city public work crews, county and state highway departments, and caregivers for private commercial properties will begin a seasonal ritual of street sweeping. Perhaps a more accurate title to this task is street cleaning. As the ice and snow thaws off our roads and we welcome spring, a good question is: Why do we spend time, money, and resources to clean our streets?

Street cleaning helps protect and improve our community's lakes, rivers, and streams and is also motivated by other benefits including aesthetics, safety, flood prevention, and preventative maintenance. After a long winter, a variety of pollutants have accumulated on our roadways including sand and soil, trash, leaves from the fall, materials from cars and trucks, and nutrients like phosphorus and heavy metals such as mercury that have bound themselves to soil particles. Our roads, parking lots, and curb lines make up miles of impervious surface that provide express routes for these pollutants to enter our lakes, rivers, and streams through storm sewers and overland flow. Snow melt and spring storms wash the pollutants off of these hard surfaces and deposit them in the nearest water body, often having negative impacts on water quality, aesthetics, fish habitat, and recreational opportunities.



Street sweeping or street cleaning is a stormwater best management practice designed to remove as many pollutants as possible. For spring street cleaning to be most effective, it needs to happen immediately after snow melt and before spring rains occur. Late spring and early summer operations target flower and seed materials from trees that can be a source of excessive nutrients. Developers use and are often required to clean streets to remove soil tracked onto roads during construction. In the fall, street cleaning activities are timed as closely as possible with leaf

drop to capture as much phosphorus and nitrogen as possible that is present in these materials and prevent blockage of storm sewers that can lead to localized flooding.

Cleaner streets can mean cleaner water in our lakes, rivers, and streams.

Did you know? Road salt and deicers:

The salt and chemical deicers we use to clear snow and ice from our roads and sidewalks are harmful to lakes, rivers, and streams – street cleaning can't remove the salts because they dissolve and move away with melting snow and rainfall.

What can you do?

Only apply salt after shoveling and only in areas where it is needed. Apply less than four pounds of salt per 1,000 square feet. One pound of salt is about a heaping coffee mug full. If there is salt left on the pavement after the snow has melted, you have over applied. Sweep up the extra and reuse it or throw it in the trash. Remember, most salts don't work below 15° F (pavement temperature), so should not be applied. Instead, use a small amount of sand for traction. ■



Zebra Mussels in Our Lakes – Have They Found “The Silver Bullet” Yet?

Gary Montz, Research Scientist, MNDNR - Division of Ecological and Water Resources, gary.montz@state.mn.us, 651-259-5121

By now likely everyone in Minnesota is familiar with zebra mussels. These small striped mussels are found in a small number of lakes across the state, from Lake Zumbro in the southeast, Lake Minnetonka in the metropolitan area, Lake Mille Lacs in the central part of the state and to Lake Le Homme Dieu in the Alexandria area.

Zebra mussels are small, generally less than 1½ inches long. The adults attach themselves to solid objects in water including rocks, wood, aquatic vegetation, boats, docks or any other hard surface. In the spring when water temperatures begin to consistently reach over 55 degrees eggs are released into the lake. They are fertilized in the water and develop into the larval stage, called a veliger. These veligers float in the water for up to three weeks until they grow large enough to settle to the bottom and attach themselves with structures called byssal threads.

Large numbers of this invasive can cause problems in our lakes. People have been cut or scraped from the sharp ridge on the shells. Boat motors can be fouled, and personal water pumps can be clogged by settling mussels. Zebra mussels filter algae for food, which may possibly interfere with the ecological food chain in lakes.

Much research has been done searching for a way to control zebra mussels in natural waters. While industry uses a variety of chemicals, most of these are not registered for use in natural waters, due to their toxicity to other aquatic animals. A few attempts by resource agencies (including the MN DNR) have used copper products to attempt limited control. However, copper products can cause fish kills, so this chemical is not viable for larger areas of lakes. Potassium chloride was used under a special permit in one small quarry in the state of Virginia, but this product is not permitted for general use in lakes or rivers. Recent attention has been focused on a bacterial control product. Scientists discovered a strain of common soil bacteria (*Pseudomonas fluorescens*) that kills zebra



Several zebra mussels have attached to a native mussel, which can lead to its demise.

mussels if they eat enough of it. Further investigation found that the bacteria could be killed and still be effective, and this material is now being investigated for zebra mussel control under the trade name Zequanox®.

Zequanox® has been shown to be extremely safe for a variety of other aquatic animals, including fish, other small invertebrates, and native mussels. It does not persist in the water, but is eaten by other microorganisms. However, it is not currently registered for use in natural waters. While industry has used it in pipes, fairly high doses over longer periods of time have been needed to kill most of the mussels.

Federal researchers are currently working in a few Minnesota lakes to look at Zequanox® and zebra mussel control in partnership with a number of groups, including the MN DNR. One study is examining the possible use to kill zebra mussels that are infesting native mussels. If these attempts work well, it could give resource managers a tool to help protect endangered and rare species in our lakes and rivers. Another project is using small enclosures in Lake Minnetonka to see if this material can control zebra mussels in a natural lake.

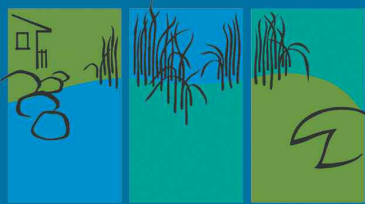
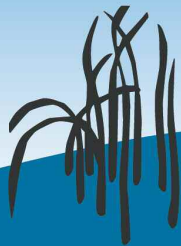
While there are some intriguing aspects of Zequanox®, there are also significant questions that remain. The high dosages and long exposure times used by industry create major difficulties for possible open water use. Zebra mussels need to eat Zequanox® for it to be effective, and keeping this material in the water long enough for it to be toxic presents a major hurdle. Finally, even in industrial settings, complete kill of zebra mussels is not often achieved. Studies may provide answers to some of these questions, but it also may be that this control might only be useful over small areas of water. Right now there is no effective, environmentally safe control material for lake-wide use. The best alternative for control remains prevention of spread. Draining water from boats, cleaning off boats and other gear and making sure that any docks, lifts or other equipment purchased second hand are completely and thoroughly cleaned can prevent mussels from hitching a ride to our lakes. ■



Hundreds of zebra mussels have attached to this boat lift before it was removed from the lake.

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www.shorelandmanagement.org

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To subscribe or unsubscribe, please contact Heidi Olson-Manska at olsonh@umn.edu or 320-589-1711.

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SNAPSHOTS: Water Resources Team Programming and Research – Recent Past and Upcoming Opportunities

Past Events

Water Resources Educator Karen Terry recently demonstrated stream processes and functions using a stream model at the annual River Watch Forum at the University of Minnesota Crookston. River Watch is a program that engages teams of high school students in monitoring stream parameters such as pH, turbidity, dissolved oxygen, temperature, and total suspended solids. At the Forum, teams present their findings and have the opportunity to participate in learning sessions like the stream model demonstration.

Upcoming Events

September 11, 2014 Clean Water Summit – the Multiple Benefits of Green Infrastructure, Chaska, MN. John Bilotta and Leslie Yetka (Minnehaha Creek Watershed District) are the co-chairs leading a planning team to develop the Summit. Mark your calendars and watch for details soon.

October 14-15, 2014 Minnesota Water Resources Conference in St. Paul – Planning is underway for the conference, including a new day-long session on stormwater and Low Impact Development. John Bilotta, Shane Missaghi, and Faye Sleeper are contributing to planning. Watch for more details soon.

NEMO Workshops on-the-water programs for local elected and appointed leaders: John Bilotta is currently framing two July on-the-water workshops on the St. Croix River and on Lake Minnetonka.

Extension Water Resource Educators will be presenting multiple programs at the 2014 Conference of the Association of Natural Resource Extension Professionals in Sacramento, CA. Multiple Extension Educators were selected to share our Minnesota water programming efforts with our national colleagues. Those presenting at the May 18-21 conference include John Bilotta, Shane Missaghi, Eleanor Burkett, Karen Terry, and Doug Malchow.

Partnerships

Thanks to a grant by the McKnight Foundation, Water Resources Educator Karen Terry will collaborate with Water Resources Center staff and others to create a Rural Stream Handbook to assist local conservation staff in working with landowners. The Handbook will show stream response

to changes in flows and land management practices that can reduce flow-related near-channel erosion. Illustrations and descriptions will be provided by team members who conduct field research on stream response to changing flows, and who work with landowners and conservation staff to install related practices. Practices include perennial plant buffers and cover crops to increase spring transpiration and soil water holding capacity, controlled drainage, constructed and restored wetlands, two-stage ditches, downsized culverts, and ponds/impoundments. The Handbook is anticipated to be completed in Fall 2015.

Also of Interest: Septic System Care

Start your septic system out on the right foot for spring: Seasonal cabin owners are always anxious to open the cabin in the spring. This fact sheet provides tips to get your septic system off to a good start for upcoming summer and fall use. <http://septic.umn.edu/factsheets/septicsspring/index.htm>

Septic systems - After the flood: Given the cold weather, deep frost, and the high amount of snow much of Minnesota has experienced this winter, flooding is a possibility throughout much of the state. This fact sheet describes steps you can take to minimize flood damage to your septic system as well as protect human health and the environment. <http://septic.umn.edu/factsheets/flooddamageprotection/index.htm>

Understanding your septic system: Your septic system is a machine. Like any machine, it needs periodic maintenance and care to work at peak efficiency and to protect the longevity of the system. This fact sheet describes the components of a system, how the system operates, and ways to protect your investment. <http://septic.umn.edu/factsheets/understandyoursystem/index.htm>

Freezing Problems and Septic Systems: It is not too early to start thinking of steps you can take during our warm season to minimize septic system freeze-up next winter. This fact sheet provides information about why systems freeze and the steps to avoid the freezing problem. <http://septic.umn.edu/factsheets/freezingproblems/index.htm>

For more fact sheets as well as videos dealing with septic systems basics, care, product use, and other issues, please visit the Onsite Sewage Treatment Program website at <http://septic.umn.edu/owners/index.htm>. ■