

From Shore to Shore

A publication of the University of Minnesota Extension
Water Resources Team

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Minimal Impact Design Standards (MIDS) and Low Impact Development (LID)

By Anne Gelbmann, Minnesota Pollution Control Stormwater Program, anne.gelbmann@state.mn.us

What is MIDS and how does it relate to LID?

Minimal Impact Design Standards (MIDS) represent the next generation of stormwater management in Minnesota. The standards offer guidelines, recommendations and tools to implement low impact development (LID) more uniformly across Minnesota's landscape. When used, MIDS tools will minimize the pollution reaching our lakes, rivers and streams and will help to recharge groundwater resources. The Minnesota Pollution Control Agency (MPCA) developed MIDS, along with a group of diverse stakeholders.

MIDS's four main components:

- Stormwater performance goals for new development, redevelopment and linear construction projects that will provide enhanced protection for Minnesota's water resources.
- A design sequence flow chart that considers restrictions on a site.
- The new Minnesota MIDS Calculator and credit calculations that will standardize the use of a range of innovative structural stormwater control techniques.
- A Community Assistance Package that contains ordinance guidance to help developers and communities implement MIDS.

The Minnesota MIDS Calculator:

The new MIDS Calculator quantifies volume and pollutant reductions for best management practices such as permeable pavement, bioretention basins, infiltration basins, tree trenches, green roofs and other practices. The reductions given in the calculator are based on the assumption that the best management practice is properly designed, constructed and maintained. The new Minnesota Stormwater Manual contains guidance and recommendations for design, construction and maintenance: http://stormwater.pca.state.mn.us/index.php/Main_Page.

To access the MIDS Calculator, go to: http://stormwater.pca.state.mn.us/index.php/MIDS_calculator.

For additional information on the MIDS project, go to the MIDS webpage: www.pca.state.mn.us/veiza8e or contact Anne Gelbmann, MPCA Stormwater Program: anne.gelbmann@state.mn.us. ■

Calendar of Events

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

NEMO St. Croix Workshop-on-the-Water Program

Date: July 29
Location: Hudson, WI
Contact: John Bilotta, 651-480-7708, jbilotta@umn.edu

Stormwater U: Stormwater Practices Maintenance and Certification

Date: July 30-31
Location: Blaine, MN
Contact: Shane Missaghi, 651-480-7759, miss0035@umn.edu

2014 Clean Water Summit - Green Infrastructure for Clean Water: Costs & Benefits to Our Communities

Date: September 11
Location: Chaska, MN

NEMO West Metro - Lessons Across the Landscape Workshop

Date: September 25
Location: TBD
Contact: John Bilotta, 651-480-7708, jbilotta@umn.edu

Water Resources Conference

Date: October 14-15
Location: St. Paul, MN
Contact: U of MN Water Resources Center, 612-624-9282, umwrc@umn.edu

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Why Does a Lake Become Green and Stinky?

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Pungent green lakes are usually blooming with algae. Algae are simple, small aquatic plants. An algal bloom is a dense concentration of these plants. Like grass and trees, algae use sunlight, carbon dioxide, and nutrients to generate energy and produce more algae. In most lakes, algal growth is limited by the availability of the nutrients, nitrogen (N) and phosphorus (P).

Eutrophication is the term used to describe the process of nutrient enrichment leading to excessive plant growth and the subsequent sedimentation of dead and rotting vegetation to the lake bottom. This natural process is often accelerated by human activities in the watershed, which introduce unnaturally high quantities of nutrients into lakes. Two common bloom-forming algae are diatoms and blue-green algae. Diatom blooms usually occur in the late spring or early summer, turning the water a bright green or brown but not causing surface scums or odors. Blue-green algal blooms create greater problems for lake users. The most obnoxious forms are buoyant during the day and can form thick surface scums, especially on a calm sunny afternoon. This scum may be blown into shallow water making the shoreline appear as though it has been slicked with blue-green paint.

When algae die the bacteria that break them down use up oxygen in the water. If enough algae die at one time, decomposition may use up the oxygen faster than wind mixing or photosynthesis can replenish it. This can lead to anoxic (no oxygen) conditions and the build-up of hydrogen sulfide gas (rotten egg smell) or ammonia in deep water. Certain species of algae can also be toxic to domestic animals.

What causes surface scum on a lake?

There are various causes of surface scums on a lake or pond. Look more closely to determine what is on the



Photo Credit: Vadnais Lake Area Watershed Management Organization

water's surface. An oily film or yellow-green dust on the surface of a lake make it look contaminated but, in most cases, nothing is wrong. In fact, something natural is probably occurring. An oily film in mid-summer may be caused by organic compounds from nearby wetlands, rotting vegetation, or insect cases that were concentrated along the shore by wind after a hatch. Insects can hatch at any time from ice-out in the spring until mid-September. As the insect cases decompose, they sometimes produce an oily film. Yellow-green dust floating on the surface in late spring and early summer is probably pollen from nearby trees. In contrast, a scum from an algal bloom is green to blue-green, might have an oily sheen that resembles a motor oil slick, and can form a thick, soupy mass on the surface of the water.

Why does the water quality of our lake seem to get worse throughout the summer?

Lakes change a great deal over the course of a year. Changes are caused by seasonal weather patterns, watershed influences, and the life cycles of the lake's biota. During the winter, ice and snow severely limit the amount of light available for photosynthesis under the ice, so there is not much algal growth. In the spring, snowmelt washes nutrients into

the lake. Many of the nutrients are used by rapidly growing aquatic plants (macrophytes) near the shoreline, resulting in a "clear water" phase.

As macrophyte growth slows in mid- to late-summer, incoming nutrients and nutrients from decomposing aquatic plants become available for algae. Available nutrients, combined with warm water and plentiful sunlight, can result in a period of heavy algal growth, potentially making the lake green and scummy. Mid-summer water quality problems may be particularly acute if you live on a shallow lake where high winds can mix warm surface water all the way down to the lake's bottom waters. When this happens, nutrients are released from the mud and sediments up into the surface water where light is plentiful and algae can flourish. In autumn, the combination of decreased daylight, cooler temperatures, and more zooplankton grazing on algae, reduces algal growth and yields clearer water once again.

What can I do to help improve the water quality of my favorite lake?

You can improve your favorite lake's water quality by becoming educated and involved. You and your neighbors can monitor the lake to learn why and how the water quality has changed and identify ways to minimize impacts. For instance, if erosion and excess nutrients are degrading water quality, follow the proven techniques for stabilizing shores suggested in *Protecting Our Waters: Shoreland Best Management Practices* (<http://shorelandmanagement.org/dept h/>). *Protecting Our Waters* explains how to minimize nutrient inputs, reduce human impacts, restore shorelines, and monitor lakes.

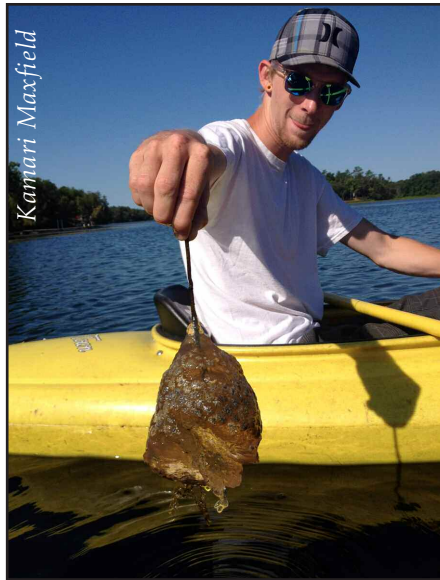
For more information on this and other topics, visit www.shorelandmanagement.org.

What's It? Slimy Blob!

Eleanor Burkett, Water Resources Educator, University of Minnesota Extension, burke044@umn.edu, 218-828-2326

Later this summer when you are on your favorite lake or stream, you may be surprised to find what looks like a blob of jelly. Is it a plant or animal? Does it belong here or is it some alien species that has found its way here? If it looks something like the photo on this page, it is probably bryozoan or sometimes called "moss animal." Of the genus *Ectoprocta*, they possess a specialized feeding structure called a lophophore which puts them into a classification with Phoronids, worm-like animals and Brachiopods, bivalve-like animals that are sometime referred to as lampshells, all of which are aquatic invertebrates.

The lophophore extends from the body wall to the mouth which is surrounded by jelly-like tentacles that contain cilia (hairs) which capture and filter food. The tentacles direct the captured food to the mouth. They feed on plankton and detritus or organic matter from dead plants and animals. Bryozoan live in colonies for mutual benefits, ranging from a few individuals to millions in a single colony. They join together by the tentacles. Individuals are called



polypides or zooids. The colonies grow in many forms: they can be free forming, erect, branching or tree-like, or flat and encrusting. Some produce a calcite substance which makes them appear almost coral like, but they are not related to coral. Individuals are microscopic in size, and colonies can be less than a quarter of an inch to massive blobs of jelly one foot in diameter.

Bryozoan may live in salt water, some in brackish water and some — like the ones we find in Minnesota — are adapted to fresh water. There are 5,000 known species of bryozoan. Only 50 species are known to inhabit freshwater. There are 15,000 different species found in fossils dating back as far as 500 million years, making them some of the oldest known creatures on the planet. All freshwater bryozoan are hermaphroditic (possessing both male and female characteristics). Late in the summer they produce and release eggs which develop into zooids and form a statoblast or protective layer which can withstand both drying out and freezing to survive over winter. In spring, the statoblast is shed and the zooid begins to create a new colony by copying itself.

Bryozoans are common in Minnesota and are found in small bodies of water, lakes, streams and large rivers that are slow moving and not too turbid. During the summer months they attach to rocks, docks and other solid submersed surfaces. They spend the summer capturing food, growing their colony size and may become food for fish and raccoons. For most of the summer they go unnoticed by humans. In the species of bryozoan pictured here, as they die off in the last days of summer they often release a gas which may make them float; this is when they are often spotted and are referred to as "slimy balls of yuck."

In the Extension office we get calls every year asking "what is it?" People wonder if it will hurt them, their pets or affect the water quality. While there may be a "yuck" factor, bryozoan are not known to be harmful to humans or animals or hurt our water quality. Occasionally they can be a nuisance by clogging underwater screens and pipes, but they also may be a beneficial because as filter feeders they help to clean the water.

References:

Smithsonian Marine State at Fort Pierce: www.sms.si.edu/irlspec/IntroBryozoa.htm

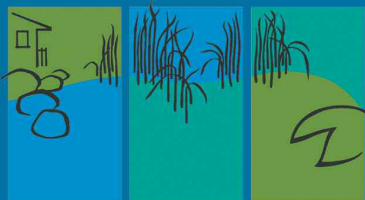
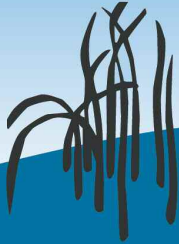
Minnesota Department of Natural Resources: www.dnr.state.mn.us/areas/fisheries/baudette/bryozoans.html

New Hampshire Department of Environmental Services Fact Sheet BB-59: <http://des.nh.gov/organization/commissioner/pip/factsheets/bb/documents/bb-59.pdf> ■



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From Shore to Shore

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

Team member Karen Terry taught two shoreland landscaping workshops in Fairmont in late June. Sponsored by the Martin Soil and Water Conservation District, the workshops included “the basics” Thursday and an all-day “details and ‘how-to’ instructions” Friday.

Team members John Bilotta and Shane Missaghi are working on a special all-day stormwater/LID session for the 2014 Minnesota Water Resources Conference, October 14-15. The Conference will include a keynote presentation from Tom Schueler from the Chesapeake Stormwater Network.

Doug Malchow and Karen Terry will be offering several water-related classes in the Windom/Des Moines River Watershed in the coming 12 months, thanks to a Toro grant received by the Windom Education and Collaborative Center. Some of the workshops will be for citizens and property owners and others will be directed at local elected and appointed officials who make decisions that affect water in the area.

The first biennial State of Water Conference was held in Brainerd May 1-2 and was attended by over 330 people. The conference was designed to bring together citizens and local leaders to learn about and discuss the issues facing Minnesota’s waters. Water Resources team members Karen Terry and Eleanor Burkett were on the planning committee and delivered presentations, and all other team members (Shane Missaghi, Mary Blickenderfer, John Bilotta, and Doug Malchow) delivered the following presentations:

- *Watersheds: How You Fit In*
- *Lake Management Practices with a New and Closer Physical, Chemical and Biological Look at Our Lakes*
- *Itasca County Natural Shoreline Buffer Incentive Research*



U of M Extension educators at the ANREP Conference in Sacramento, CA. Back row: Karen Terry, Diomy Zamora, Angie Gupta, Barb Radke. Front row: Gary Wyatt, John Bilotta, Andrea Lorek Strauss, Eli Sagor, Eleanor Burkett, Shane Missaghi.

- *What the Heck IS a Watershed and Why Does It Matter to Me?*
- *From Rain to Lake: What's In Your Runoff?*

Two sessions of The Watershed Game were also led by team members. Most of the 60+ presentations delivered during the conference are available as PDF files on our website at www.extension.umn.edu/water/. The next State of Water Conference will be held in 2016.

Team members traveled to Sacramento, California, in May to attend and present at the Association of Natural Resource Extension Professionals’ Conference. This conference is an opportunity for Extension educators nationwide to come together to learn about the work being done in other areas, build collaborations, and share successes and challenges. John Bilotta, Karen Terry, Eleanor Burkett, and Shane Missaghi were all able to participate in this biennial conference, along with six other Minnesota Extension educators. ■