

# From Shore to Shore

A publication of the University of Minnesota  
Shoreland Education Team

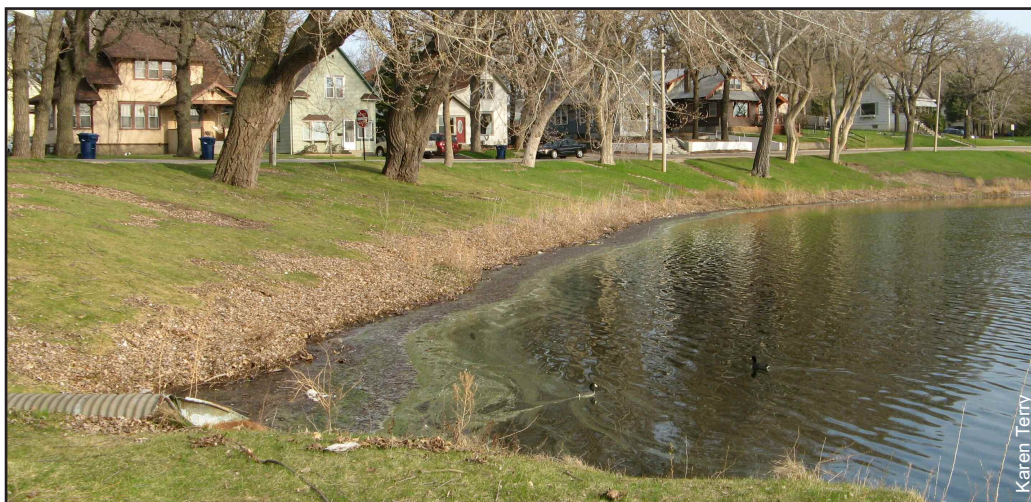
March - April 2010

Issue # 96

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

## The Relationship Between Storm Water Runoff and Fisheries

By Tim Brastrup, MN DNR, 218-828-2552, [tim.brastrup@state.mn.us](mailto:tim.brastrup@state.mn.us)



As untreated storm water enters lakes and streams, it is the latent effects and impacts we must consider. Storm water runoff from impervious surfaces may carry phosphorus-laden dust and dirt to surface waters. This can encourage algae blooms; turbidity; and sediment buildup on fish spawning substrates, gill filaments of aquatic gill-breathing fish and invertebrates, and eggs and various larval stages of aquatic organisms. During sudden storm events, the runoff may flush accumulations of heavy metals in relatively high concentrations. This may cause toxicity in organisms and introduce loading—which can become cycled internally for many years.

The effects of toxic substances, heavy metals, sediment, and phosphorus entering freshwater ecosystems (when little or none would be loading in the absence of lakeshore development) is a stepped up rate of loading which accelerates the eutrophication or nutrient enrichment process. This can lead to increased algal bloom intensity and frequency,

increased aquatic plant growth, higher concentrations of toxic metals, sedimentation of spawning habitat and invertebrate production surfaces, and the general lowering of water quality.

The distance from a structure (such as a house, garage, or other impervious surfaces) to the shore is important, as is the presence and depth of an upland buffer strip. The shorter the distance from impervious surfaces to the shore, the greater the potential for negative impacts on the resource because sediment and suspensions are not filtered out as well.

Subsequent impacts can be—but are not limited to—reduced water clarity, reduced fish and invertebrate production, reduced fishing quality, reduced recreation quality, and ultimately, lower property values. Therefore, zoning setbacks are crucial for successful preservation of fish, fish habitat, water quality, and good ecosystem health. ■



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

### Shoreland Gardens Workshop

**Date:** April 23-24

**Location:** Fairmont, MN

**Contact:** Cathy Thiesse,  
Martin SWCD, 507-235-6680,  
[cathy.thiesse@mn.nacdn.net](mailto:cathy.thiesse@mn.nacdn.net)

### Inside...

- ② The Relationship between Storm Water Runoff and Fisheries
- ③ Overview of Current Permeable Materials
- ④ Ice Out Dates

# Stearns County Soil and Water Conservation District Protects Shoreline Areas Long-Term

By Greg Berg, Stearns County SWCD, 320-251-7800 extension 143, greg.berg@mn.nacdn.net

In 2000, the Stearns County Soil and Water Conservation District (SWCD) hired a full time Shoreland Specialist to focus on shoreland restoration projects. The Shoreland Specialist began working with lake associations and other groups to complete shoreland re-vegetation projects, otherwise known as lakescaping or creating shoreland buffers. Shoreland buffers protect aquatic ecosystems and enhance fish and wildlife habitat. They make use of deeply rooted plants to keep soil in place, filter nutrients and pollutants from stormwater runoff, and reduce flooding. Shoreland buffers also discourage nuisance geese, provide privacy, and require low maintenance, while adding beauty and diversity to the landscape.

As the Stearns County SWCD shoreland restoration program evolved, it became apparent that many waterfront owners were finding the value in planting or protecting native vegetation along shorelines. Landowners could request cost-share monies for shoreline re-vegetation projects, and as the number of projects grew, and cost-share monies increased, the Stearns County SWCD Board wanted assurance that the projects would remain in place for the long-term, as intended, even if the properties changed ownership.

To protect shoreline areas long-term, a process was initiated in 2006 with input from staff from the Stearns County SWCD, Environmental Services, Auditors/Surveyor's Office, Recorder's Office and Attorney's Office advising the SWCD Board regarding the logistics of protecting shorelines in perpetuity.

In April 2007, the Stearns County SWCD Board adopted a policy requiring a permanent deed restriction to be signed for most shoreline projects with the SWCD (along lakes, rivers, and streams in Stearns County). As a result, project documentation must include a cost-share agreement, an as-



built drawing of the area of the project, vegetation plan details, operation and maintenance requirements, and a recorded deed restriction through the County Recorder's office. Once the project is complete and the landowner(s) has signed all the required paperwork, the document is recorded. After the recording is complete, the SWCD pays the cost share to the landowner.

From 2007 to 2009, the Stearns County SWCD recorded Shoreland Deed Restrictions on 13 separate properties. Many more landowners have initiated projects that will result in additional deed restrictions in 2010 and beyond.

In 2009, the Stearns County SWCD took the process a step further developing a Shoreland Deed Restriction for prior projects, subdivisions, and landowners who simply want to protect their shoreline properties. Since the

process has been developed, two additional landowners have requested deed restrictions be placed on their shoreline properties.

As a part of the Stearns County SWCD Shoreland Deed Restriction process, locations of the restricted properties are scanned and linked to a GIS-based map of the County where the restricted properties are located. In addition, the Stearns County Environmental Services Department has created a database that flags these properties as "restricted," so that no work permits are issued that would violate the deed restriction.

If you have interest in learning more about the Stearns County SWCD Shoreland Deed Restriction process, you can contact Greg Berg, Shoreland Specialist with the Stearns County SWCD at 320-251-7800 extension 143, or greg.berg@mn.nacdn.net. ■

# Overview of Current Permeable Materials

By Jackie Froemming, University of Minnesota Extension, 218-824-1068, froem022@umn.edu

Traditionally, development meant laying out impervious surfaces—surfaces that didn't allow rainwater or snowmelt to infiltrate. As a response to the increasing problems with stormwater runoff, pervious materials have been developed.

It's safe to say that there are a few more choices of permeable materials available today than there were a few years ago. The reason is clear: the demand for materials that promote runoff infiltration is increasing.

Permeable materials commonly available today are compared below. This information can help you decide which materials are better for your site. Be sure to consult your county Planning and Zoning Department or Environmental Services Department before making a final decision.

*Note: Suppliers listed are provided only as examples and are not being specifically endorsed by the University of Minnesota Extension or From Shore to Shore.*

## Pervious Concrete

### Recommended Uses:

- Same as for traditional concrete as long as proper sub-base material is used and materials are properly installed by experienced professionals

### Benefits:

- Provides a highly permeable surface depending on sub-base material used

### Disadvantages:

- Winter sanding should be kept at a minimum to avoid clogging
- Should be installed at least 75 feet from drinking water wells
- Should not be used in sites with a slope greater than 15%

### Suppliers:

- K. Johnson Construction, Inc. (Sauk Rapids) [www.kjohnsonconst.com](http://www.kjohnsonconst.com)

## Pervious Asphalt

### Recommended Uses:

- Same as for traditional asphalt as long as proper sub-base material is used and materials are properly installed by experienced professionals

### Benefits:

- Provides a highly permeable surface depending on sub-base material used

### Disadvantages:

- Winter sanding should be kept at a minimum to avoid clogging
- Should be installed at least 75 feet from drinking water wells
- Should not be used in sites with a slope greater than 15%

### Suppliers:

- Anderson Brothers (Brainerd/Walker) [www.andersonbrothers.com](http://www.andersonbrothers.com)

## Permeable Pavers

### Recommended Uses:

- Streets, driveways, parking areas, sidewalks, patios

### Benefits:

- Add from 20%-50% of open surface
- Could add aesthetic value to you project depending on style chosen

### Disadvantages:

- Provision should be made to prevent grass growth between pavers
- Winter sanding should be kept at a minimum to avoid clogging
- Should be installed at least 75 feet from drinking water wells
- Should not be used in sites with a slope greater than 15%

### Suppliers:

- Anderson Brothers (Brainerd/Walker) [www.andersonbrothers.com](http://www.andersonbrothers.com)

- Uni Eco-Stone (Palm Beach Gardens, FL) [www.uni-groupusa.org](http://www.uni-groupusa.org)
- Borgert Products (St. Joseph) [www.borgertproducts.com](http://www.borgertproducts.com)
  - Aqua-Bric, Uni-Eco-Stone
- Brock White (Bismarck, Brainerd, Duluth, Eagan, Elk River, Fargo, Green Bay, Rochester, Sioux Falls, St. Cloud and St. Paul) [www.brockwhite.com](http://www.brockwhite.com)
  - Colonial Eco-Square, Turfstone, Vast

## Permeable Plastic Grids

### Recommended Uses:

- driveways, parking areas

### Benefits:

- Made mostly of recycled plastic materials
- Provides a highly permeable surface depending on sub-base material used
- Grids are flexible so they may be used on uneven sites
- Do not require edging material

### Disadvantages:

- Winter plowing needs to be done with care to reduce damage
- Winter sanding should be kept at a minimum to avoid clogging
- Should be installed at least 75 feet from drinking water wells

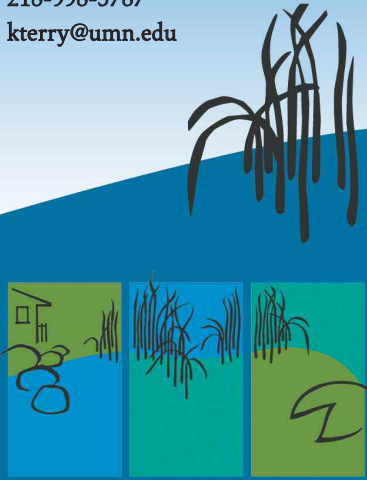
### Suppliers:

- Brock White [www.brockwhite.com](http://www.brockwhite.com)
  - Grasspave and Gravelpave systems ■



## Contact

Karen Terry  
University of Minnesota Extension  
From Shore to Shore Editor  
218-998-5787  
kterry@umn.edu



## From Shore to Shore

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

*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)

To subscribe or unsubscribe, please contact Barb Anderson at [bja@umn.edu](mailto:bja@umn.edu) or 218-998-5787.

The University of Minnesota is an equal opportunity employer and educator.



UNIVERSITY OF MINNESOTA  
EXTENSION

## Ice Out Dates

By Cindy Hagley, Minnesota Sea Grant, 218-726-8713, [chagley@umn.edu](mailto:chagley@umn.edu)

### A Shorter Ice-Fishing Season? If That Isn't Just the Icing on the Cake..... I Mean Lake

If you are one of the hundreds of people living along one of Minnesota's lakes—who keep track of when ice forms each fall and when it breaks up each spring—you may have noticed a trend. On average, ice is forming later in the fall and leaving lakes earlier in the spring. That may seem like a good thing or a bad thing, depending on what you like to do with your free time (ice-fisherman's fright is canoeist's delight?), but to scientists who study lakes (limnologists) and to those who study climate, it raises some questions and concerns. Read on.

How significant is this trend? Using diverse sources such as newspaper archives, transportation ledgers, and religious observances, researchers have gathered 150 years of lake and river ice records across not just Minnesota, but the whole northern hemisphere. All show a steady trend of fewer days of ice cover in the 150 years from 1846 to 1995. According to John Magnuson from the University of Wisconsin-Madison (Magnuson et al. 2000), lakes and rivers in the northern hemisphere now freeze nearly six days later and break up more than six days earlier than they did in 1846. These findings translate to increasing air temperatures of about 1.2 degrees Celsius each century. Minnesota's long-term data suggest ice out has occurred three days earlier on average over the past 20 years, according to Heinz Stefan at the University of Minnesota (Fang et al. 2003).

What does this trend mean for our lakes? Lake ice duration influences numerous biogeochemical processes, including the duration, degree, and stability of thermal stratification; oxygen exchange with the atmosphere; fish habitat availability (through changes in temperature and dissolved oxygen); and availability of fish prey species. Shorter ice-cover periods could prove positive for fish in shallow, productive lakes. Less ice cover could reduce or eliminate winter-kill by shortening the time that the water is sealed off from the atmosphere and the sunlight that fuels oxygen-producing photosynthesis by algae and plants. On the other hand, ecological modeling conducted by Stefan and others tells us that longer and warmer ice-free periods could have more complex impacts on cool and cold water fish habitat throughout the state.

## Learn More...

To learn more about how **climate warming and reduced ice cover** could impact Minnesota fish, go to: [www.dnr.state.mn.us/volunteer/mayjun08/warmer\\_waters.html](http://www.dnr.state.mn.us/volunteer/mayjun08/warmer_waters.html).

For a look at **ice-out dates** for lakes throughout Minnesota, check out the Minnesota Climatology Working Group's records at [http://climate.umn.edu/doc/ice\\_out/ice\\_out\\_historical.htm](http://climate.umn.edu/doc/ice_out/ice_out_historical.htm).

Learn more at **Winter Ice on Lakes, Rivers, Ponds: A Thing of the Past?** [www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=110967&org=ERE](http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=110967&org=ERE).

No matter what the summer impacts are, those of us who enjoy winter sports on our lakes and rivers will have to pack our fun into shorter seasons and keep an ever more vigilant eye on ice safety. And anyone who enjoys tracking the timing of natural events such as ice cover may be interested to know that much of the data used by researchers to identify these trends came from interested nature-observers, not trained scientists. So keep those notebooks and calendars going. Your observations could prove to be valuable for understanding changes caused by climate warming.

## References:

- Fang, X., H.G. Stefan, J.G. Eaton, J.H. McCormick, and S.R. Alam. 2003. Simulation of thermal/dissolved oxygen habitat for fishes in lakes under different climate scenarios: Part 1. Cool-water fish in the contiguous US. *Ecological Modeling*: 172(1):13-37.
- Magnuson J.J., D.M. Robertson, B.J. Benson, R.H. Wynne, D.M. Livingstone, T. Arai, R.A. Assel, R.G. Barry, V. Card, E. Kuusisto, N.G. Granin, T.D. Prowse, K.M. Stewart, and V.S. Vuglinski. 2000. Historical trends in lake and river ice cover in the northern hemisphere. *Science* 289(5485):1743-1746.
- Dybas, C. 2008. Winter Ice on Lakes, Rivers, Ponds: A Thing of the Past? [http://www.nsf.gov/discoveries/disc\\_summ.jsp?cntn\\_id=110967&org=ERE](http://www.nsf.gov/discoveries/disc_summ.jsp?cntn_id=110967&org=ERE). ■