

# Healthy Lake Huron

Clean Water, Clean Beaches

Newsletter  
Summer 2014



## This Issue:

- Highlights for all five priority watersheds
- Bayfield beach files Blue Flag
- Huron Clean Water Project update
- Watershed best practices
- Improving soil health
- MOE scientists go high tech
- Update from Bruce Biosphere
- What's happening with the water beneath your beach?
- Lake Huron water levels — constant change

## Healthy Lake Huron participants and supporters

Federal Government – Environment Canada, Parks Canada, Fisheries and Oceans Canada

Ontario Provincial Government – Ministry of the Environment, Ministry of Natural Resources, Ministry of Agriculture and Food, Ministry of Rural Affairs, Ministry of Municipal Affairs and Housing

Municipal/County Councils – Bruce County, Huron County, Lambton County

Public Health – Grey Bruce Health Unit, Huron County Health Unit, Lambton Public Health

Conservation Authorities – St. Clair Region, Ausable Bayfield, Maitland Valley, Saugeen Valley, Grey Sauble

Other Organizations – Bruce Peninsula Biosphere Association, Environmental Defence, Lake Huron Centre for Coastal Conservation, Pine River Watershed Initiative Network, Western University

International Stakeholders – Lake Huron Binational Partnership

## Rural Stormwater project moving forward, videos released

Healthy Lake Huron's Rural Stormwater Management Model (RSWMM) project is moving closer to completion of new computer modelling software to better understand how water runs off land during a storm event in rural areas and how to reduce the impacts of that stormwater runoff on water quality.

Earlier this year, the project team released three new online videos that highlight landowner efforts to keep soil on the land and out of Lake Huron.

The main video, *Working Together for Clean Water, Clean Beaches*, features landowners and conservation staff describing projects underway to preserve topsoil and keep bacteria, chemicals, and sediment out of watercourses.

The video covers Healthy Lake Huron's five priority watersheds: Lambton Shores, Main Bayfield, Bayfield North (Gullies), Garvey Creek-Glenn Drain (North Shore), and Pine River.

A second three-minute video shot at Bannockburn



Photo courtesy ruralstormwater.com

This 10-minute video focuses on Healthy Lake Huron projects designed to keep bacteria, chemicals, and sediment out of watercourses.

Conservation Area focuses on work residents around the Bayfield River are leading to share their Main Bayfield Watershed Plan and translate it into local action.

The third two-and-a-half minute video features students from Lucknow Central Public School planting dune grasses along the shore, a project led by the Lake Huron Centre for Coastal Conservation.

See Rural Stormwater on Page 5

## Cottages, invasive species, landscape fuel Lake Huron algae

By Erica Zazo Great Lakes Echo

Lined along Lake Huron's coast stand beach cottages and homes filled with residents and vacationers who enjoy the scenic views, splashing in the water and relaxing on the beach.

But also occupying the beach are unpleasant, green globs of algae – something that's caused problems on this shoreline for over the past decade.

"This was, and still is, a really curious situation," said David Barton, a retired University of Waterloo biology professor and head researcher studying the increase of algae in this area since 2007. "Locals were complaining that there was rotting, smelly stuff on the beach." he said. "The questions were, what is it and where is it coming from, because this is usually something associated with other lakes in the region, not Lake Huron."

Barton's research was conducted along Lake Huron's southeastern shoreline, from Sarnia northeast to Sauble Beach in Ontario.

Alongside Barton, Todd Howell, a Great Lakes ecologist from the Ontario Ministry of



Photo credit: Todd Howell

Cladophora algae washing up onto the Lake Huron shorelines has been a nuisance to beach-goers for more than a decade.

the Environment, and Cherie-Lee Fietsch, an environmental scientist at Bruce Power, studied the beach fouling – discovering multiple coinciding factors related to its increase.

According to their findings published in the December 2013 issue of the *Journal of Great Lakes Research*, the situation may be connected to the amount of phosphorus and nutrients deposited at the lake's edge from sources such as the lakeshore cottages' septic tanks and animal waste from local agricultural runoff.

See Lake Huron Algae on page 6

## Main Bayfield Watershed Plan

People living around the Bayfield River have been working for two years on a watershed plan to protect and improve forest conditions, wetlands, and water quality.

The plan focuses on the four principles of the Lake Huron-Georgian Bay Framework for Community Action: Building Awareness, Supporting Community Involvement, Taking Action, and Measuring Success. The community launched the plan in the autumn of 2013 and is now working to implement it on the ground.

Recommendations in the plan include establishing buffers and rain gardens, creating wetlands or berms, maintaining crop residue, following nutrient management plans, and planting windbreaks and trees on marginal land. Individual landowners have completed 22 projects and started another 30 projects which are to be completed in 2014.

A community advisory committee is raising

awareness about the plan through local events that include a rain-barrel sale, rain garden workshop, and a watershed walk to gather more information about how water flows over the landscape.

The Fred A. and Barbara M. Erb Family Foundation, a U.S. foundation dedicated to nurturing environmentally healthy and culturally vibrant communities in metropolitan Detroit and supporting initiatives to restore the Great Lakes Basin, provided Ausable Bayfield Conservation with \$100,000 for the work that was done with landowners to help restore wetlands and prepare the local watershed plan. The Ontario Ministry of the Environment, and Environment Canada also contributed.

More information about the plan is available on the Ausable Bayfield Conservation website at the following link:

<http://www.abca.on.ca/page.php?page=bayfield-main>

## Bayfield Beach flies Blue Flag once again

June 2013 marked the fourth consecutive year that Bayfield has raised the internationally-recognized Blue Flag at Bayfield Main Beach.

Blue Flag certification is awarded to beaches and marinas that meet strict criteria for water quality, environmental education, environmental management, safety, and services.

The award helps drive the tourist economy in both Bayfield and Huron County. Effective land-management practices upstream can play an important role in protecting and improving water quality in the lake.

Landowners and community groups can use the Main Bayfield Watershed Plan to take actions that will improve water quality and help maintain the Blue Flag designation.

## Watershed best practices evaluated

The Huron County Federation of Agriculture, Ausable Bayfield Conservation and the University of Guelph's Watersheds Evaluation Group recently completed a two-year Crops and Creeks Huron partnership project to evaluate watershed-based best management practices (BMPs).

More than 30 landowners who have implemented BMPs in three watersheds participated. The work was made possible through funding from Ontario's ministries of Agriculture and Food (OMAF), and Rural Affairs (OMRA), and the Canada-Ontario Agreement Respecting the Great Lakes Ecosystem.

Project partners utilized a Soil and Water Assessment Tool to determine the cumulative effectiveness of the four types of BMPs (conservation tillage, cover crops, nutrient management, and berms).

The project found that structural BMPs (such as berms or grassed filter strips) have environmental benefits realized downstream in the watershed and agronomic/management BMPs (such as using conservation tillage or cover crops on a regular basis) tend to have more immediate benefit at the field scale, but also cumulative benefits at the watershed scale.

Monitoring efforts in Bayfield North watersheds have been generating local, provincial, and international interest, with Ausable Bayfield Conservation hosting several tours of sites in the area. Tour groups have included Healthy Lake Huron stakeholders, a group of Huron County councillors, and the Agricultural Branch of the Ontario Ministry of Agriculture and Food and the Ontario Ministry of Rural Affairs. U.S. researchers toured several BMP monitoring stations in 2013.

Crops and Creeks Huron built on past actions the Bayfield North, Zurich Drain, and Ridgeway Drain watershed communities have taken. Several other projects are continuing these efforts to identify and implement BMPs to protect and improve water quality. Monitoring the effectiveness of BMPs is also continuing in Bayfield North watersheds.

Monitoring at the watershed scale continues at two sites, made possible by the Rural Stormwater Management Model project. Monitoring at several BMP sites is also continuing through OMAF's New Directions program.

Monitoring programs such as these provide valuable information to landowners on the effectiveness of implementing best management practices on agricultural properties.



Koos and Nathalie Vermue are one of more than 30 farm families in the Bayfield North area that participated in the Crops and Creeks Huron BMP evaluation project.

## Students clean up beaches

Keeping our beaches beautiful is not easy.

With endless kilometres of sandy shore and hundreds of thousands of visitors annually, some litter is inevitable.

Students in Bruce County are doing their part to protect the environment and maintain the beauty of the shoreline.

The Planetears environmental group from Saugeen District Secondary School in Port Elgin and students at Peninsula Shores District School in Wiarton undertake beach clean-ups and work to educate elected officials and the media about the importance of smoke-free beaches.

Cigarettes on our beaches are a hazard.

Completed by the students, the Coast Watchers Beach Litter Report Card identifies the kinds of products collected during clean-ups on Port Elgin and Sauble beaches in the summer of 2013. From 11 garbage bags, students recorded 1,236 items of cigarette butts and packaging; 216 food wrappers; and 57 items of various plastics.

"I have seen a definite improvement from when I was younger," says William Boulter, a Grade 10 student at Peninsula Shores District School.

The Planetears point out that beyond being a piece of litter that will take years to decompose, a cigarette butt thrown carelessly onto the sand immediately becomes a hazard to children, animals (particularly birds) and our Lake Huron water source. Students from both schools have spoken to their local municipal councils urging them to ban smoking on local beaches.

To date, no final decisions have been made to enact smoke-free bylaws or policies.

## Garvey-Glenn efforts pay off

Farmers and cottagers are working with Maitland Valley Conservation Authority (MVCA) on continuing efforts to improve soil and water quality within the Garvey-Glenn, a 1,600+ hectare area north of Goderich that's also a Healthy Lake Huron priority watershed.

The impacts of climate change and changing land-use patterns have caused significant erosion problems in the watershed, especially at the swiftly eroding gully where it enters Lake Huron. Work is underway throughout the watershed to remedy this.

In the headwaters, the goal is to slow down surface water runoff after a rainfall to reduce erosion and retain topsoil.

Five erosion control berms, along with French drains to help filter sediment, have been constructed in farmers' fields and two more will be added in 2014.

In the mid-section of the watershed, efforts are focused on buffering streams and constructing grassed waterways to allow for drainage, and minimize soil and nutrient loss.

Just over a hectare of land in this section was retired from active farming in 2013 and planted with trees, with another hectare of tree planting planned for spring 2014.

Information signs for two projects will also be installed in spring.

But the most cost-effective solution may be improved soil management. A recent Soil Health Project sponsored by the Ontario Ministry of Agriculture and Food has already had substantial farmer interest.

In addition to soil sampling, some farmers are trying no-till and strip-till farming techniques – combined with planting cover crops – to improve soil health on their farms.

In support of these efforts, MVCA has hired a consultant and added a new staff person to

work specifically on this project. Funding from the Ontario Ministry of the Environment in 2014 also allowed for three more watershed sub-basins to be surveyed and designed with landowner input.

To improve communications and maintain momentum for the project, MVCA staff members are also producing quarterly newsletters and ensuring one-on-one ongoing contact with both farmers and funders.

More information on the Garvey-Glenn project is available on Facebook ([/ggsweep](#)) or on Twitter ([@ggsweep](#)).



The Garvey-Glenn watershed, looking westward towards Lake Huron. MVCA is focusing on the headwaters first and working down towards the gully where it enters Lake Huron.

## Lambton farmers make a difference

Some Lambton Shores farmers are leading the way in water and soil conservation practices.

April 2012 brought heavy rains, meaning lots of muddy water moving across the fields. On Doug Rogers' property, however, that wasn't the case.

"With a fall of 14-18 feet (4.3-5 metres) from front to the back of our property, the water was definitely moving, but the water running off the grassed waterways was clear," explained Rogers. "The grassed waterways were doing their job."

For the last 19 years, Rogers has used grassed waterways and grass buffer strips. The grassed waterways are grassland strips in cultivated fields that slow down and filter rain runoff. Once established, maintenance involves mowing once or twice a year. Rogers also sells the hay he mows.

The five to 10-metre-wide grassed buffers reduce erosion, keep topsoil on the field and provide room for wagons during harvest. Planting cover crops also helps keep soil where it's supposed to be.

After hearing about cover crops at the Southwest Agricultural Conference at Ridgetown, Rogers took advantage of a Healthy Lake Huron grant and planted

oilseed radish and oats after wheat harvest and winter rye into soybean stubble. "The radish and oats will die off over winter, but the winter rye survives and needs to be killed off in the spring," Rogers said.

"These cover crops keep soil in place, instead of running off into the ditch, plus cover crops increase soil structure and organic matter."

Fraser Hodgson, cattle/sheep farmer and former president of the Lambton Soil and Crop Improvement Association, also used a Healthy Lake Huron grant to install eaves-troughs on his barns, diverting roof runoff from mixing with manure in the exercise yard.

Conservation practices like these and soil testing help to reduce the amount of phosphorus entering Lake Huron.

"Research shows that high levels of dissolved phosphorus correlate with toxic blue-green algae blooms, which can be hazardous to both humans and wildlife," said Jessica Van Zwol, Healthy Watershed Specialist with the St. Clair Region Conservation Authority.

"By soil testing and understanding the analysis, farmers can determine the right amount of fertilizer to use: enough phosphorus for a good yield, but avoiding excess that will end up in the lake."



Grassed waterways slow down storm runoff and retain valuable topsoil.

## Saugeen Conservation Update

Sampling in the first full year of the Rural Stormwater Management Model project has yielded some excellent base information to better understand how water flows in the Pine River.

Staff from the Saugeen Valley Conservation Authority collected surface water samples to monitor water quality and collected flow information from both the Ripley Gauge and a temporary site on the south Pine River.

A total of 32 bridges and 53 culverts in the Pine River watershed were also photographed and measured.

This information helps to accurately determine the flow of water, whether culvert sizes are adequate and if bridges act as possible restrictions to river flow patterns.

In 2013 SVCA staff also sampled six different storm runoff events and sent 83 surface water samples for analysis, with funding assistance from Bruce County's Clean Water Fund.

Monitoring and flow measurement of the Pine River will continue so resource managers can gain a deeper understanding of the watershed, measure the effectiveness of implementing best management practices and determine how we can succeed in improving the well-being of the Pine River.

## Watershed Contacts

Watershed	Contact Person
Pine River	Adrienne Mason, <a href="mailto:pineriverwin@yahoo.ca">pineriverwin@yahoo.ca</a> , 519-395-5538 Pine River Watershed Initiative Network, <a href="http://www.pineriverwatershed.ca">www.pineriverwatershed.ca</a>
	Jo-Anne Harbinson, <a href="mailto:j.harbinson@svca.on.ca">j.harbinson@svca.on.ca</a> , 519-367-3040 ext. 235 Saugeen Valley Conservation Authority, <a href="http://www.svca.on.ca">www.svca.on.ca</a>
Garvey/Glenn	Geoff King, <a href="mailto:gking@mvca.on.ca">gking@mvca.on.ca</a> , 519-335-3557 Maitland Valley Conservation Authority, <a href="http://www.mvca.on.ca">www.mvca.on.ca</a>
Bayfield North Main Bayfield	Mari Veliz, <a href="mailto:mveliz@abca.on.ca">mveliz@abca.on.ca</a> , 519-235-2610 or 1-888-286-2610 Ausable Bayfield Conservation Authority, <a href="http://www.abca.on.ca">www.abca.on.ca</a>
Lambton Shores	Muriel Andreae, <a href="mailto:mandreae@scrca.on.ca">mandreae@scrca.on.ca</a> , 519-245-3710 St. Clair Region Conservation Authority, <a href="http://www.scrca.on.ca">www.scrca.on.ca</a>

## Berms reduce erosion into Pine River

One of the innovative projects of the Pine River Watershed Initiative Network (PRWIN) in 2013 was the Water and Sediment Control Berm Project on the Eadie farm.

The Eadie farm is located in the upper reaches of the South Pine River sub-watershed in Huron-Kinloss Township. The project fulfills one of the recommendations outlined in the Pine River Watershed Integrated Watershed Management Plan (2012) – to help improve water quality.

Three berms were constructed on the Eadie Farm in 2013 and a fourth is planned for spring 2014.

Each berm was placed in a specific section of a swale or gully where erosion due to the surface runoff was a significant problem.

The berms hold back surface water flowing from approximately 35.6 hectares of sloping land.

The four berms are designed to store 4,347 cubic meters of water and sediment in shallow pools for up to 24 hours following a storm event, keeping topsoil on the farm fields where it belongs.

The berms also act to slow down water as it flows off farm fields into nearby ditches and creeks, and eventually into the South Pine River.

Before these berms were built, an estimated 71 tonnes of topsoil were lost each year from this section the Eadie farm.

That's the equivalent of six school buses worth of topsoil flowing towards Lake Huron from just one farm, every year.

Scientists believe at least half of the lost soil from a rural watershed, such as the Pine River, is caused by high flows and stream bank erosion.

An Ontario Ministry of Agriculture and Food publication, *Controlling Soil Erosion on the Farm*, points out that just under 2 kg of available nitrogen and .3 kg of phosphorus (which both contribute to nearshore algal blooms) can be contained in one tonne of topsoil.

The construction of these berms will help minimize nutrient loading to local watercourses and reduce nuisance algae that is fouling Lake Huron beaches.

PRWIN's work, with the cooperation and participation of local residents, is made possible by financial support from Environment Canada, Ontario Ministry of the Environment, Bruce County and many other partners.

For more information on PRWIN, visit <http://www.pineriverwatershed.ca/>.



Berm construction underway at the Eadie farm. Berms slow down stormwater drainage, reduce erosion and retain farm topsoil.

## Help protect Lake Huron health



The Lake Huron coast is a special place where people enjoy a unique ecosystem created over thousands of years through the action of wind and waves.

These coastal dunes, wetlands and bluffs are important, yet vulnerable, features forming the character of our shores.

While it's important that people have the opportunity to experience and enjoy the coastal environment, it is equally important that the quality of our coastal ecosystems is not compromised because of overuse, or due to a lack of proper stewardship. Stewardship of our shores is most effectively done at the local, grassroots level.

Individuals, communities and local businesses play a critical role as partners, guardians, and watchdogs. They are the most effective champions

to achieve environmental sustainability in their own backyards. Moving communities from the role of the observer to active participant will initiate and sustain a shoreline stewardship ethic.

The Lake Huron Centre for Coastal Conservation offers community programs and resources that help local communities, individuals, and businesses become actively engaged in shoreline stewardship for Lake Huron.

Are you doing everything you can to be a good steward of your shoreline property?

The Centre has resources to help you to make it happen. Interested volunteers and supporters should contact the Coastal Centre (226-421-3029) or visit the Community Programs section of our website at [www.lakehuron.on.ca](http://www.lakehuron.on.ca).

# Improve Soil Health to Build Resilient Soils

Managing rural stormwater helps reduce soil and nutrient runoff from agricultural fields.

In recent years, the intensity and frequency of weather events has increased (see Figure 1), and patterns are leading to more intense storms that present additional challenges for managing stormwater.

Excess rain falling on bare soil often results in soil erosion, so it is important to build resilience into our agricultural soils. Soil management can be a 'first line of defence' for your farm for these storm events.

Improving soil health is a key practice in adapting to heavy rainfall. There are several ways to build healthier soils:

## Use crop covers or manage crop residues

Maintain a minimum of 30 per cent cover over soil using cover crops or crop residue.

Cover crops and crop residue protect the soil from water and wind erosion, build organic matter and provide other economic and environmental benefits.

## Reduce compaction and modify tillage practices.

These practices improve soil structure. Soils with better structure can absorb rainfall much better than compacted soil, reducing the risk of water runoff.

Think of soil as being either like a brick or like a sponge. Try mopping up spilled water with a brick. Compacted soil is like a brick – hard and non-porous and therefore can't absorb water. On the other hand, healthy, aerated soils, like a sponge, can absorb water. They hold water needed for crop

growth during dry periods and promote biological activity.

In 2013, Healthy Lake Huron watershed partners collected soil samples in the priority watersheds and developed a database of the soil test results.

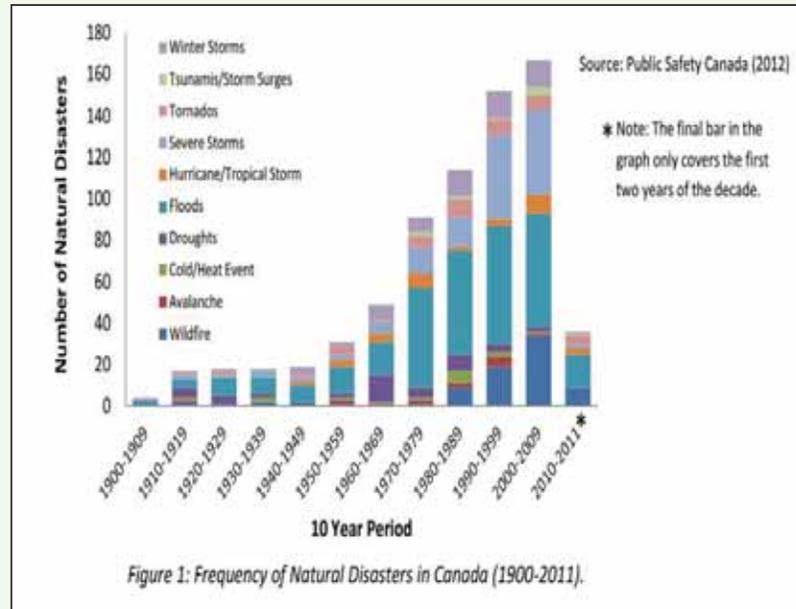
These test results can be used as soil health indicators to report on watershed soil health.

Landowners are encouraged to contact their local conservation authorities about workshops.

The Midwest Cover Crop Council provides an online tool for selecting cover crops to meet your needs. [www.mccc.msu.edu/selectorINTRO.html](http://www.mccc.msu.edu/selectorINTRO.html)

software tools and soil demonstration sites to learn more about the benefits of building and maintaining good soil health.

The Ontario Ministry of Agriculture and Food and the Ministry of Rural Affairs fund and support the Healthy Lake Huron project.



# Rural Stormwater

Continued from page 1

"It's very powerful to hear local people share their personal stories and we hope their work and their vision will give other residents ideas of some things they can do to protect and improve water quality in their local creek or river and Lake Huron," said Tim Cumming, Communications Specialist with Ausable Bayfield Conservation and the Rural Stormwater Project.

Ausable Bayfield Conservation is leading the project on behalf of the Healthy Lake Huron partnership, which includes federal and provincial ministries, local governments, conservation and public health agencies, academic institutions, and local environmental and community groups.

The installation of new or upgraded monitoring stations in each of the five priority watersheds has improved long-term monitoring of water quality, quantity, and weather.

The improved data will assist project partners as they continue to develop the technical and on-ground elements of the RSWMM. This tool will give municipalities and conservation field staff the best information possible to support project design and

landowner best management practices and projects. The computer model will show what projects should work best to manage stormwater runoff to protect water quality, the ideal scale for projects, and the best locations to place them for the best results. When complete, the model will help landowners and funders to decide where they can invest limited stewardship dollars for the most benefit to Lake Huron water quality and the people who rely on the lake.

Urban areas already use computer models to manage stormwater runoff, and some current models have rural features. But no single model currently exists with all the features needed to properly understand and manage stormwater runoff effectively in rural areas, like Lake Huron's southeastern shoreline.

The new model will combine urban modeling features with rural features such as agricultural best management practices; understanding changes from season to season or even within a season (such as changes in crop cover); modeling of roads, ditches, and culverts; slope and terrain types; dynamic travel of water running over land; tracking of key pollutants (sediment, phosphorus and nitrogen); and other features.

"The model will be a new tool to give people more detailed information about how their projects can reduce the impact of runoff during storm events," said Alec Scott, manager of the RSWMM project. "When people can see the benefits created by a wetland, or berm, or natural barrier, or a planting project, or a change in cropping practices, they may be more likely to consider doing that project, or adopting that practice, on their property."

Two firms are working under contract to create the model: Computational Hydraulics International (CHI) and Emmons & Olivier Resources, Inc. (EOR).

The model will build upon PCSWMM software which uses the US Environmental Protection Agency's Stormwater Management Model (SWMM) as its base.

The Rural Stormwater Management Model Project is funded by a three-year, \$700,000 grant from the Ontario Ministry of the Environment's Showcasing Water Innovation Program, with \$200,000 in further support and participation from Healthy Lake Huron partners.

For more information or to view the videos visit [www.ruralstormwater.com](http://www.ruralstormwater.com) and [www.healthylakehuron.ca](http://www.healthylakehuron.ca).

# Huron Clean Water Project supports individual action

Joanne Scott is one of many landowners who are preserving topsoil, limiting wind and soil erosion, and keeping creeks, rivers, and Lake Huron healthy with help from the Huron County Clean Water Project.

Scott has completed five tree-planting projects since buying her farm east of Kippen in 1990. She says trees give added life to the landscape and the Huron Clean Water Project makes it possible for her to do more planting. "It's an excellent program," she says.

She also likes the variety of birds that sit on the branches of her trees and the fact that trees keep her property cool in summer.

"Trees reduce erosion and stop nutrients from leaching into my creek," she says. "Tree planting also conserves topsoil and you can't easily replace the topsoil if you lose it."

Scott has planted many trees herself and paid for most of her planting projects. She has also received grants through the Huron County Clean Water Project and other programs.

And she is not alone in her commitment to protecting precious water resources and the local environment. Since 2004, Scott and other landowners have completed 1,636 projects under the initiative, including:

- Completing 440 tree planting projects
- Decommissioning 389 wells
- Upgrading 310 private wells
- Decommissioning 69 liquid manure storages
- Fencing cattle from more than 40 km of streams
- Planting more than 150 hectares of trees
- Establishing more than 90 km of windbreaks.

And more than \$1.7 million in funding has resulted in projects valued at more than \$7.2 million. The county is continuing that support with \$400,000 in new funding for 2014. A new category of eligible projects was added last year. Huron County landowners can apply for 50 per cent funding, up to \$1,000 maximum, for Forest Management Plans and Woodlot Enhancement.



Joanne Scott says planting trees attracts birds, reduces erosion, and keeps her farm cool in the summer.

These will help landowners optimize forest health, create long-term, sustainable returns from woodlands, and enhance forests to prevent soil erosion and benefit ground and surface-water quality.

The Huron County Clean Water Project is funded by the County of Huron and is delivered by the Maitland Valley and Ausable Bayfield conservation authorities.

## Lake Huron Algae

Continued from page 1.

"When the water hits the lake and mixes along the shoreline, you can see effects on water quality," said Howell. He has been researching water quality in Lake Huron related to algae growth since 2003.

The researchers also found invasive species that feed on algae-eating benthic invertebrates – organisms living near the lakebed – contribute to the problem. Because of the decrease in algae-feeding invertebrates that are preyed upon, more algae grows and eventually washes onto beaches.

Invasive species like the zebra mussels have caused other problems. According to their research, zebra mussels filter the water of organic matter and also redirect nutrients to the lake bottom where algae blooms flourish.

These two factors result in both the ability of light to more easily reach the algae on the lakebed and a surplus of nutrients to reach the plants and increase their growth rates.

Barton says there have been cottages around the southeastern coast of Lake Huron since the 1900s. However, they were much simpler when first built and used much less water than updated cottages today.

"If they had water at all, it would be a kitchen sink and an outhouse," said Barton.

Over the decades, many new owners purchased the original properties – demolishing and building new homes, or renovating them into year-round houses. "Most of them now are on septic tanks," said

Barton, "and septic tanks are not designed to retain nutrients."

Few septic tanks in this region are connected to municipal wastewater treatment systems, according to the researchers whose article is titled "Ecosystem Changes and Nuisance Benthic Algae on the Southeast Shores of Lake Huron."

The researchers say they believe that increased water use by the cottages may have boosted amounts of phosphorus left in shallow groundwater. During runoff events, the phosphorus is carried to the lake by tributary streams, and to larger rivers leading to Lake Huron.

However, the nutrients impacting the water and algae seem to affect mostly the immediate shoreline. That is true along this section of shoreline more than any other part of the lake, said the researchers.

Howell said one striking observation was that the portion of the lake seemingly affected directly from interaction with the shoreline doesn't extend more than two to three metres into the lake.

"It's a narrow band. The vast majority of the 'near shore' water past three metres deep has extremely low nutrient levels – levels almost indistinguishable from the open lake," he said. The bigger question, according to Howell, is nutrient distribution in the water and how that may affect algal growth.

Howell says these "diametrically opposed questions" of difference in nutrient distribution are challenging to understand and he continues to study the situation.

Many townships along the lake have been dealing

with residents' complaints about the rapid increase in shoreline algae since 2003. Huron-Kinloss Township, which includes 25 kilometres of shoreline, has been dealing with such complaints first-hand.

"It's the nuisance, it's the smell, and sometimes it's even difficult getting into the lake," said Mike Fair, the township's director of facilities and recreation.

Fair estimates Huron-Kinloss spends around \$40,000 a year on algae cleanup after hiring a private contractor. The township has an extensive water testing plan to track what is in the water.

Aside from the local municipality involvement, Fair emphasized the importance of local environmental groups helping with problems affecting algal growth along the shoreline.

One organization, the Pine River Watershed Initiative based in Huron-Kinloss, protects the watershed of the Pine River – monitoring points where rivers and tributaries enter Lake Huron. The organization started as an arm of Huron-Kinloss Township, but is now an independent effort to improve the lakeshore.

The group is building berms equipped with control outflow valves into agricultural fields to collect water during floods that may otherwise release nutrients into the watershed, Fair said. "We like to support these groups anyway we can," he said.

Article republished courtesy: Great Lakes Echo, Michigan State University Knight Center for Environmental Journalism. Website: <http://greatlakesecho.org> For complete study results go to <http://www.sciencedirect.com/science/article/pii/S0380133013001354>

# Bruce Peninsula Biosphere Association Update

The Bruce Peninsula Biosphere Association is moving ahead on various projects designed to achieve its mandate of promoting a balance between local sustainable development and conservation.

To identify environmental priorities and provide focus, the association developed a watershed strategic plan that includes innovative projects.

A Conservation and Stewardship Plan launched recently unites community and partner organizations in a common vision for the peninsula.

The plan is funded by the Friends of the Greenbelt Foundation, and guided by a steering committee. An environmental network will oversee implementing the plan.

The association's Six Streams Initiative is also well underway, with aims to:

- improve water quality
- increase awareness of, and active participation in, local environmental concerns
- develop sustainable economic capacity, and
- create new environmental partnerships with local landowners, agricultural and environmental groups, and other stakeholders.

The initiative uses education, knowledge and understanding of existing farming practices, livestock numbers, land uses, water quality and drainage patterns to inform conservation strategies.

The association is also leading another innovative project – installing solar-powered water supply systems to provide alternative livestock watering and reduce the number of livestock accessing surface water. Wildlife surveillance cameras were used in remote areas of the field to ensure the systems worked.

Future projects will focus on restoration of degraded stream banks.

A septic system awareness program carried out by the association educates residents on:

- the environmental benefits of properly functioning septic systems
- system operating and maintenance requirements, and
- how to recognize and solve issues with septic systems.

Working with a local landowner, the association also built an experimental agricultural drainage control structure that manages in-field water, holding water and nutrients for crop roots to use during dry periods.

Information gathered at the site will be used to evaluate the potential benefits for water quality and quantity using in-field drainage structures.

The Bruce Peninsula Biosphere Association consists of a diverse range of Northern Bruce Peninsula

Through community outreach and workshops, almost 1,000 people provided input into the Conservation and Stewardship Plan.

community members collaborating to create a healthy, vibrant and sustainable community.

The association supports research, education and information sharing to build community capacity.

For more information about these and other projects, visit [www.bpba.ca](http://www.bpba.ca).



A solar-powered water system keeps livestock out of streams.

## MOE scientists go high tech to measure algae

Who are those guys in waders down on our beach and why are they dipping strange flashlights into the water?

Simple. They're government scientists and they're studying the growth and volume of nuisance algae.

To better understand the increase of algae along the shoreline, Ontario Ministry of the Environment staff have started measuring algae both upstream and downstream from five key rivers and streams entering Lake Huron.

The work is being carried out by Dr. Ronald Griffiths, Ecologist, and Ryan Smith, a Surface Water Specialist with the ministry.

Streams transport various salts, nutrients and suspended solids that originate primarily on farm fields to the shoreline waters of the lake. This may contribute to growth of *Cladophora*, a green filamentous alga, and other algae that attach to rocks and solid objects in shallow waters.



A Benthos-Torch, new technology to measure algae, cyanobacteria and diatoms.

Storms along the lake help scour algae from these surfaces and on-shore currents carry them to the shoreline. In some places this action results in unsightly, green "yuck" floating in the water or matted on the shore.

A Benthos-Torch, new technology from Germany, was used to measure the abundance of algae on the nearshore sediments of Lake Huron.

The torch is a waterproof spectrophotometer device that:

- shines coloured lights onto the sediments
- measures the reflected light, and
- estimates the amount of green algae, cyanobacteria, and diatoms present.

In calf-deep water, the torch is placed on the bottom sediment at 10 random sites along a straight line and after a 30-second period, the torch provides information on the mass of greens, cyanobacteria and diatoms present.

Water samples are collected both upstream and downstream to measure the concentration of salts, nutrients and suspended solids.

Data gathered in the fall of 2011 confirmed that a greater concentration of algae occurred down-current of watershed tributaries as they entered the lake, compared to up-current.



Ontario Ministry of the Environment surface water specialist Ryan Smith measures algae with a Benthos-Torch.

Those results correlated with higher concentrations of phosphorus also found in down-current waters.

As best management practices are implemented within the area, gathering similar data will allow researchers to measure if and how much the ecosystem is benefitting cumulatively from the many individual projects being implemented to reduce the loss of soil and nutrients from agricultural lands.

# What's happening in the water beneath your beach?

When we think about beach water quality, we think about whether it is safe to swim at a beach.

The water quality at a beach can become degraded due to high levels of pollutants, including nutrients such as phosphorus and nitrogen, that stimulate excessive algae growth, fecal bacteria and pathogens.

To better understand and manage beach water quality, researchers at Western University, University of Waterloo and Environment Canada are asking questions instead about the quality of water beneath your beach – the levels of bacteria and nutrients in beach groundwater and in the beach sand itself.

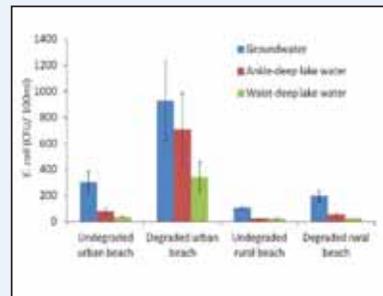
Why? If we want to be able to understand the nutrient and bacteria levels in the lake water, we need to understand the sources of the pollutants, and groundwater and beach sand may be an important pollutant source.

Research conducted at four beaches (urban and rural) on Lake Huron and Lake Ontario from May-September 2013 showed that concentrations of fecal indicator bacteria (*E. coli*) were significantly higher in groundwater close to the shoreline than in ankle- and waist-deep lake water (see graph).

Levels of *E. coli* were also found to be highest in the sand close to the shoreline rather than in offshore sediment or in the upshore sand.

Nutrient concentrations, particularly nitrate, were also elevated in the groundwater at some of the beaches, suggesting that groundwater may act as a source of nutrients to the lake.

Field research will continue in 2014 with plans to get a clearer picture of the linkages between the groundwater quality and quality of the lake water so



E. coli measurements in water samples from four Lake Huron beaches

CFU/100 ml = E. coli Colony Forming Units

we can generate the science needed to help improve the water quality at our beaches.

## Lake Huron water levels — constant change

The Lake Huron Coastal Centre keeps close track of water levels on Lake Huron because lake levels drive many of the coastal processes along our shores.

It relies on gauges operated by Environment Canada and the US National Ocean and Atmospheric Administration (NOAA). Looking back over the last century, lake levels have fluctuated as a result of short- and long-term variations in precipitation, evaporation and runoff.

Lake Huron water levels were very high in 1973-75, 1985-86 (highest on record), and 1997 and very low in 1934-35 and 1964-65 (lowest on record).

Water levels dropped again from highs in 1997, in part because 1998 was the hottest year (+2.3 Celsius degrees (°C) and fifth driest year (-8.9%) in the Great

Lakes region for the 51-year period of record at that time.

The drought that began in 1998 and lasted until 2002 (excluding 2000) affected the water balance of the Great Lakes significantly; summer temperatures ranged from 0.9 to 1.3°C above average while exceedingly below normal summer precipitation occurred in 2001 (-26.8%) and 2002 (-15.4%), and ranged from -1.0 to -4.3% in the other years.

Lake Michigan-Huron (which functions as one lake hydrologically) water levels were affected the most.

The start of 2013 had levels on Lake Huron dipping to a record low, reflecting a hot dry summer and fall in 2012.

It was a short-lived low as levels rebounded slightly

in February and March, and significantly in April.

The April rebound saw levels rise 24 centimetres in that month alone, the second highest increase for a single month on record. Much of 2013 had above average precipitation.

Is this the beginning of a full recovery of Lake Huron to long-term average levels?

While it's too early to say, it should be noted that after the 1964-65 lows, it took a few years for levels to rebound.

Monthly updates on lake levels are available through Environment Canada's Level News at <http://www.cc.gc.ca/eau-water>

Or contact the Coastal Centre at (226) 421-3029.

## Weather and water info for Lake Huron Beaches

Grey Bruce County:

- Online: [www.publichealthgreybruce.on.ca](http://www.publichealthgreybruce.on.ca)
- By phone: 519-376-9420 ext. 2501 or Toll free: 1-800-263-3456

Huron County:

- Online: [www.huronhealthunit.com](http://www.huronhealthunit.com)
- On Twitter: [www.twitter.com/huronbeachinfo](http://www.twitter.com/huronbeachinfo)
- By phone: 519-482-5119 ext. 2501 or Toll free: 1-877-837-6143

Lambton County:

- Online: [www.lambtonhealth.on.ca](http://www.lambtonhealth.on.ca)
- By phone: 519-383-8331 or Toll free: 1-800-667-1839

## Have a question?

Visit us on the web at <http://www.healthylakehuron.ca> and send us an email.

## Want to get involved?

We'll answer your questions or connect you with one of our partners so you can help keep Lake Huron's waters clean and healthy.

HealthyLakeHuron.ca