Greater Sudbury Lake Improvement Advisory Panel (GSLIAP) & Lake Water Quality Program

NEWSLETTER Summer 2004

New Greater Sudbury Lake Improvement Advisory Panel Appointed

The 2004 - 2006 Greater Sudbury Lake Improvement Advisory Panel (GSLIAP) was recently appointed in March by City Council. The membership includes 6 community volunteers, 6 water quality experts and 2 city councillors. GSLIAP is a panel of City Council whose role is to provide advice to the municipality on matters relating to lake water quality and stewardship. Their Mission is to serve as a watchdog on behalf of all citizens in the community and actively promote and protect the ecological health of the lakes. Since their appointment, the GSLIAP has had 3 full meetings. They have discussed their role, provided input into the waterfront background studies for the Official Plan and have met with Lake Nepahwin residents. GSLIAP will be meeting later in the summer to update their 5-year strategic plan.

Invading Species Watch 2004

The Ontario Federation of Anglers and Hunters (O.F.A.H.) and the City of Greater Sudbury's Lake Water Quality Program are searching for volunteers from lake associations to help track and monitor the spread of spiny water flea in Greater Sudbury lakes. The spiny water flea (*Bythotrephes cederstroemi*), introduced to the Great Lakes from Europe, is a member of the crustacean group of organisms the same as shrimp, crayfish and lobster. The spiny water flea is unwelcomed in Ontario lakes because it threatens aquatic ecosystems by competing with native zooplankton and fish for food. Zooplankton (small animal life) are important to the health of lakes because they eat algae. If the population of zooplankton decreases, algae will increase causing lakes to become less clear. The only way to prevent the spiny water flea is to restrict their migration between lakes. Once established it is impossible to eradicate them. To help find and track the spiny water flea in Greater Sudbury lakes, 6 lake stewardship groups are currently participating in the O.F.A.H. Invasive Species Watch. To volunteer or for more information about the spiny water flea and other invasive species in Ontario, contact the Invading Species Hotline at 1-800-563-7711, or visit www.invadingspecies.com, or call the City of Greater Sudbury's Lake Water Quality Program at (705) 671-2489, ext. 4604.

The spiny water flea is about 1 to 1.5 cm long, has a long tail spine with bark-like projections and a red stripe running half the length of its tail.

City of Lakes Ville de lacs

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Spring Phosphorus

Thanks to a partnership with the Ministry of the Environment's Lake Partner Program, the Lake Water Quality Program completed its annual spring phosphorus sampling of 31 lakes. The results will be available later in this summer on the Lake Water Quality web site and published in the annual report . This information will allow us to detect changes in the nutrient status of lakes due to the impacts of shoreline development, climate change and other stresses. Sources of phosphorus include runoff from fertilized lawns, urban and paved areas, areas of soil erosion, agriculture operations, septic tanks, and sewage treatment plants. To minimize the impact of phosphorus on the lakes, use phosphate-free cleaning products and detergents, avoid using pesticides and fertilizers, infiltrate or divert run-off from driveways and rooftops away from the lake, maintain and inspect your septic systems regularly, avoid washing in the lake, start a buffer strip of natural vegetation along the shoreline, and plant trees on your property to filter nutrients and stabilize the shoreline.

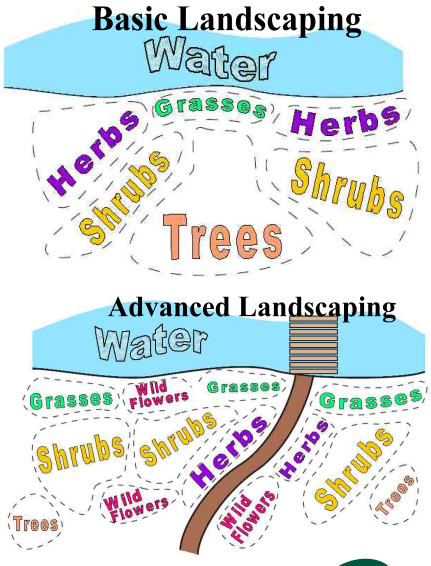
Community Monitoring - Lake Partner Program

In May, 22 lakes in Greater Sudbury volunteered for the Ontario Ministry of the Environment's (MOE) Lake Partner Program. The Lake Partner Program has been creating a valuable long-term database to track the nutrient enrichment of Ontario lakes. Volunteers collected water samples and measured the clarity of the water using Secchi disks and bottles provided by the MOE. Water clarity is an indirect measure of the amount of algae in a lake. Water clarity is affected by phosphorus, the principal nutrient that contributes to excessive algal and weed growth. By recording both phosphorus and water clarity readings, you can track two trends that go hand in hand. The provincial results for the Lake Partner Program, including lakes in Greater Sudbury are posted on the Ministry of the Environment Web site at http://www.ene.gov.on.ca/envision/water/lake_partner/index.htm. You can also contact the program at 1-800-470-8322.

Protecting Your Lakes with Native Shoreline Planting

By keeping a natural vegetation buffer near the waters edge, you can protect the quality of the lake water in turn ensuring the survival of wildlife and fish.

Shrubs for Shores
Sweet Gale (*Myrica gale*)
Leather-leaf (*Chamaedaphne calyculata*)
Sheep-laurel (*Kalmia angustifolia)*
Red-osier Dogwood (*Comus*)
Broad-Leaf Herbs
Joe-Pye Weed (*Eupatorium maculatum*)
Touch-me-not (*Impatiens capensis*)
Wild Vervain (*Verbana hastate*)
Trees for Wet Sites
Black Ash (*Traxinus nigra*)
Silver Maple (*Acer saccharinum*)
Willow (*Salix* spp.)
Tamarack (*Larix laricina*)
Grasses for Shores
Blue-joint (*Calamagrostis Canadensis*)
Manna Grasses (*Glyceria* spp.)
Wild Rice (*Zizania aquatica*)



Greater Grand Sudbury

NEWSLETTER Summer 2004

Celebrating 20 years of the Canadian Lakes Loon Survey

The Canadian Lakes Loon Survey (CLLS) is a long-term, volunteer-based project that has been monitoring the breeding success of loons on lakes across Canada for 20 years. It has been using loons to indicate the health of lakes, to address conservation issues along shorelines and to monitor the improvements in the water quality of lakes from acid rain. In 2003, loon chicks were observed on Daisy Lake in Greater Sudbury for the first time in 20 years. Daisy lake has been acidified for years but is recovering naturally from the effects of industrial pollution due to the regreening of its watershed and sulphuric emission controls. The survival of loon chicks is a good indicator of the impact of lake acidification and the conditions of fish stocks and other aquatic life. Loons are also directly affected by increased human activity on lakes. Shoreline development often displaces nesting sites, forage areas and protective cover for loons. With development comes more watercraft which can disturb and flood nesting sites, causing the adults to abandon the chicks. However, there are simple steps you can take to make your lake a loon-friendly lake: maintain a well-vegetated and natural shoreline; be a responsible boater; manage angling gear; discourage nest predators such as raccoons and skunks.

Volunteers needed to track loon populations

In 2003, 13 lakes (Bennett, Broder23 (Wolf), Daisy, Fairbank, Laurentian, Little Panache, Little Raft, Lohi, McFarlane, Raft, Ramsey, Richard, Robinson) in Greater Sudbury were surveyed by volunteers to track the loon population. To become a volunteer is simple - all you need to do is record 3 important facts: 1) when the loon pairs return to the lake in June, 2) how many newly hatched loon chicks there are in July and, 3)how many young loons survive to fledge in August. This information is then submitted to Marlies and Dieter Schoenefeld at (705) 522-3085 or at frogpond@cyberbeach.net who relay it to Bird Studies Canada to be used in their national database of loon population.

Loon Facts

from Canadian Lakes Loon Survey

- loons have existed for 10 million years.
- loons are able to dive up to 60 metres due to the fact that their bones are solid.
- loons can live up to 30 years due to their place at the top of the food chain.
- loons only lay 2-3 eggs a year.
- loons are fish eaters so they suffer when fish populations drop.
- loons are very clumsy on land because their feet are placed too far back on their body for balanced walking.
- loons build their nest on the water's edge for easy access.
- five species of loons exist in the world - Common loon, Yellow-billed loon, Red-throated loon, Arctic loon, and Pacific loon.
- 80% of the world's Common loons are found in Ontario lakes.
- loons are migratory and spend the winter months along the coast of Maine, through to the Gulf of Mexico, and from the Gulf of Alaska to Baja California.

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IN THE NEWS

Living with Lakes Centre

The Co-operative Freshwater Ecology Unit is in the process of designing and building a new home for itself on the shore of Ramsey Lake, the drinking water reservoir and recreational resource in the center of the City of Greater Sudbury. For the past 15 years they have occupied the staff residences of a former float plane base, built by the Ontario Ministry of Natural Resources (then Ontario Dept. of Lands and Forests) in 1924. The *Living with Lakes Centre* will be an internationally recognized centre of excellence for studying the impact of human activities on the lakes, streams and wetlands in Northern environments. The new Centre will provide the critical mass of scientists and infrastructure needed to attract highly qualified personnel (HQP) to Sudbury. Work at the Centre will result in recommendations and information for use by policy makers and the public in protecting water quality and resources in Sudbury and in other communities on the Canadian Shield. Designed to be one of the most high performance energy-efficient buildings in Canada, the new Centre will not only continue to deliver world-class science the Co-op Unit is known for, but will also demonstrate the use of state-of-the-art energy and water conservation, architectural design, technology and every day practices that Sudbury, and Ontario, will need if they are to be environmentally sustainable.

(*Excerpt reprinted with permission from the Co-operative Freshwater Ecology Unit)*

Adopt-a-Lake Certificate Program

The Co-operative Freshwater Ecology Unit has also launched an "Adopt-a-Lake Fund". This campaign was established to help support the science communication and public outreach work. By adopting one of the million lakes of the Boreal Shield ecozone, individuals or groups can make sure that important environmental information gets widespread attention. For more information about the Living with Lakes Centre and to make a donation to the Adopt-a- Lake Fund, please visit the Co-operative Freshwater Ecology Unit web site at www.coopunit.laurentian.ca, or phone (705) 675-1151, ext. 4831.

Adopt-a-Lake / *Adoptez un lac*

In recognition of/*En reconnaissance de l'appui de:*

Thank you for contributing to Laurentian University's Cooperative Freshwater Ecology Unit by adopting one of the million lakes of the Boreal Shield. The Adopt-a-Lake Fund was established to help support the extensive science communication and public outreach work of the Co-op Unit.

Merci de votre contribution à l'Unité conjointe d'écologie d'eau douce de l'Université Laurentienne en adoptant un lac parmi le million que l'on trouve dans le Bouclier boréal. Ce fonds a été constitué pour financer les activités considérables de l'Unité conjointe en ce qui concerne la communication scientifique et les relations externes avec le public.

Your adopted lake is/*Vous avez adopté le lac:*

Located at °N °W/*situé à ° de latitude Nord et à ° de longitude Ouest*

For details about this lake or the work of the Cooperative Freshwater Ecology Unit, visit/
Pour obtenir de plus amples renseignements sur ce lac ou les travaux de l'Unité conjointe d'écologie d'eau douce, consultez:
www.coopunit.laurentian.ca

Dr. Judith Woodsworth, President/*rectrice de l'Université Laurentienne*

IN THE NEWS

Watershed-Based Source Protection Planning Seeks Public Input

On February 12, 2004, the Ministry of the Environment released the White Paper on watershed-based source protection planning. The MOE is currently seeking public comment on the draft legislation regarding the development and approval of watershed-based source protection plans. The draft source protection legislation can be found on the Environmental Bill of Rights Registry http://www.ene.gov.on.ca/envision/env_reg/ebr/english/index.htm. Written comments will be accepted until August 23, 2004.

Great Canadian Shoreline Clean Up

The Great Canadian Shoreline Cleanup is an annual national event where thousands of volunteers from around the country join forces to clean up garbage and debris from the shores of lakes, rivers, wetlands and oceans. This is an environmental program that everyone can get involved with. Not only do you collect trash from a local shoreline, you also collect important data. With every cleanup, volunteers fill out a tally sheet with every piece of garbage that is collected and the results are tabulated. As an example, in 2003, over 150,000 cigarette butts were picked and recorded across Canada. This year the cleanup will take place from September 11 -19. To register your organization or for more information visit www.vanaqua.org/cleanup/home.php or phone at 1-877-427-2422.

Official Plan Waterfront and Rural Background Study - Update

The City of Greater Sudbury's 330 lakes are highly valued as a recreational resource for visitors and residents, so our lakes require effective community stewardship to ensure they are protected as a superior natural asset. Earlier this year, 1,500 questionnaires were sent out to all 31 lakes stewardship groups seeking their input with respect to waterfront development issues. There were 7 common main themes from the public response to the surveys: water quality of lakes is perceived to be threatened, inspection of septic systems is desired, more control over recreational uses (summer and winter) of lakes is desired, the amount of development allowed on the lake, the protection of the natural environment, the pollution from point and non-point sources, the conversion from seasonal to permanent, and the impact of mining activities on lakes are all major concerns. The Rural & Waterfront Study will assess the extent and potential impacts of un-serviced development in rural and waterfront areas in order to provide policy options and recommendations for the new Official Plan.

Lake Stewardship Resources

The Lake Water Quality Program has free brochures on healthy waterfront living tips.

Waterfront Living - Simple Tips, Lasting Benefits - Living By Water Project - *Poster showing the benefits of a natural shoreline and an altered shoreline.*

The Shore Primer & The Dock Primer - Cottage Life in association with Fisheries Canada - *Booklets describing waterfront friendly docks and healthy waterfront ideas for cottagers.*

Working Around Water - Ontario Ministry of Natural Resources and Fisheries and Oceans - *Fact Sheets describing what you should know when working near or around lakes, rivers, wetlands, and any required work permits.*

A Guide to Operating & Maintaining Your Septic System - Ministry of Municipal Affairs and Housing - *Booklet with tips on how to maintain and inspect septic systems with a troubleshooting section.*

Care and Feeding of Your Septic System - Ontario Ministry of Environment and Energy's Environmental Education and Awareness Program - *Booklet with tips on how to maintain and inspect septic systems with a troubleshooting section.*

Celebrating 20 Years of the Canadian Lakes Loon Survey - Birds Studies Canada in partnership with Bird Life International - *Report on the success and achievements of the Canadian Lakes Loon Survey over the past 20 years.*

Loon Friendly Lake - Canadian Lakes Loon Survey and Birds Studies Canada - *Pamphlet with tips to protect loons and loon chicks on lakes.*

Naturalizing your shoreline - Lake Water Quality Program City of Greater Sudbury - *Pamphlet with list of native vegetation in Greater Sudbury and shoreline planting ideas.*

Nature Clean - by Frank T Ross and Sons Ltd. - *Pamphlet of information on natural cleaning, laundry and personal care products that are non-toxic, hypo-allergenic, septic safe and fully biodegradable.*

Invasive Species Awareness Program - Ontario Federation of Anglers and Hunters - *ID cards and pamphlets with a list of invasive plants and animals in Ontario waters and tips on how to prevent and stop their spread.*

STOP THE INVASION - Ontario Federation of Anglers and Hunters - *Metal signs for posting at marinas and boat launches with tips on how to properly clean your boat.*

I Want To Protect My Shoreline Property & I Want Clean Water - Living by Water Project - *Checklist with health lakefront living tips.*

CONTACT US
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Science Corner

Probing the Ramsey Lake Watershed

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2. Department of Chemistry, Macquarie University NSW 2109, Australia

The Ramsey Lake watershed, a "living laboratory" that has survived a century of extreme industrial acid and metal-laden emission insult, is at the centre of ongoing regional development, being a source for potable water, recreation and relaxation. With water sources being from groundwater, streams from conservation lands, and runoff from urban infrastructure, Ramsey Lake provides a unique challenge, responsibility and opportunity for environmental monitoring research to utilize both long-term and the real-time data from chemical and physical measurements of both inputs to, and exports from, the watershed.

Data is obtained from both towed sensors measuring bottom water physical and chemical parameters, and from continuous monitoring equipment designed to allow development of dynamic predictive models crucial for planning and effective resource management. Instrumented buoys, profiling units and inflow samplers provide sub-daily limnological measurements that can be accessed remotely, in real-time, a feature particularly important for the detection of episodic events that may play a critical role in determining lake characteristics throughout the season. Analytical units providing data for wind speed, radiation, temperature, humidity and trace gas concentrations parallel the water quality monitoring initiatives. Innovative communication methods to water managers for this plethora of data will include website feeds displaying data as daily updated, finite, cumulative graphs (figure 1) and triggered alarm systems that use control charts to identify when water quality parameters exceed defined limits and respond by informing the appropriate authorities via email. With the increasing realization that potable water will be the most valued resource of the twenty-first century and the real threat of terrorism in this post 9/11 era, advanced environmental monitoring sensors are being developed and some will be integrated with these innovative monitoring tools to test performance and obtain maximum effectiveness in harsh environments.

The towed sensor array has proven to be an excellent tool for identifying areas of upwelling groundwater, point sources of urban runoff, and in-lake mixing patterns. Typical "finger prints" for upwelling groundwater in surface water are evident near the sediment-water interface and identified by elevated chloride, conductivity, turbidity and reduced temperature, dissolved oxygen, and oxidation/reduction potential (figure 2). Common urban runoff contaminant sources are indicated by near shore zones that exude higher chloride, nitrate, and/or conductivity. In-lake mixing patterns can be eluded from detailed gradient monitoring of plumes. The progressive monitoring techniques applied to this research show that there can be a vast diversity of chemical environments vertically and laterally in a water body, therefore a project design that incorporates high sampling and monitoring resolution provides greater insight to the systems health and sustainability.

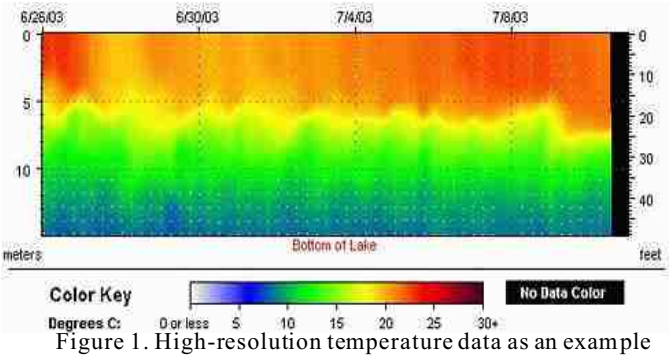

Figure 1. High-resolution temperature data as an example of the type of baseline data used for an early warning system. Each light coloured dot represents a spatio-temperal data point. This data would be fed into a control chart that would trigger an alarm system if threshold values were exceeded.

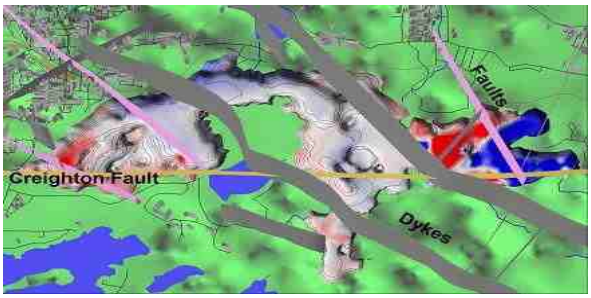

Figure 2. Upwelling water as indicated by low redox potential (red is low and blue is high) and the associated bedrock fractures in the Ramsey Lake area suggesting groundwater inflow is dominantly controlled by local hard rock geology.