Chapter 2

Public Outreach and Education

Public education is provided for visitors to Pukaskwa National Park as they enjoy the scenery of Lake Superior.
Photo Credit: John Marsden, Environment Canada.

Lake Superior Lakewide Management Plan
2006

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Chapter 2
Public Outreach and Education

EXECUTIVE SUMMARY

The Lake Superior Binational Program has a long history of public involvement in the development of the Lake Superior Lakewide Management Plan (LaMP). In particular, the Lake Superior Binational Forum, the primary public group associated with the agencies responsible for carrying out the zero discharge demonstration project, has been key to establishing an effective multi-sector stakeholder process. The Forum has held many workshops over the years for the purpose of acquiring necessary background information to help develop recommendations and proposals for reducing the Lake Superior nine critical pollutants. The Forum has also published many documents on key issues relating to the LaMP.

In addition, a separate Communications/Public Involvement Committee, comprised of staff from government agencies and their partners, was formed to help expand the network of stakeholders and outreach activities. This Committee has produced documents for the purpose of informing the public about all aspects of the LaMP and the Binational Program.

2.0 ABOUT THIS CHAPTER

All the partners involved in the Lake Superior LaMP (i.e., state, provincial, and federal agencies, the Tribes/First Nations, industry, the public and others) have long been committed to an open, fair and significant public involvement process. One of the main goals of the Lake Superior Binational Program is, in fact, to promote meaningful public participation and education so as to ensure that the needs and concerns of the diverse population in the Lake Superior Basin are met. This section of the LaMP will briefly describe the efforts that have been made to date on public outreach and involvement.

2.1 PUBLIC INVOLVEMENT

A major tenet of ecosystem management is the necessity of continuous involvement of the public that is inclusive and respectful of all viewpoints and stakeholders. Public input and support help ensure that the actions recommended in the LaMP are carried out, leading the way to restoring and protecting the Lake ecosystem. The key to public support and the program's success is effective communication between the government agencies and the diverse population of the Lake Superior basin.

LaMP 2006 is presented as a working document, based on existing information. It was the goal of the Binational Executive Committee to provide a *current* foundation for discussion of Lake Superior efforts, not necessarily a *complete historical one.* The LaMP will be modified based on new findings and public input. To that end, public input received on previous documents has

been addressed in LaMP 2006. This is a necessary step if we are to institute adaptive management on an ecosystem scale.

A significant project related to public outreach is the Community Awareness Review and Development (CARD) project carried out in 2004-2005. Thirteen communities and some First Nations were surveyed to determine community priorities and awareness of environmental issues. The results of this project will be used to focus future community outreach efforts and engage communities in implementing projects to achieve LaMP goals. See Section 7.1.1 for more information.

2.2 PUBLIC OUTREACH/EDUCATION EFFORTS TO DATE

When the Lake Superior Binational Program first began, public involvement activities were carried out primarily by the Binational Forum (see section 2.2.1 below). As the Program matured, it became apparent that the government agencies and their partners needed their own separate public outreach mechanism. Therefore a separate group was formed entitled the Communications/Public Involvement Committee. Over the years, the two groups have worked together, complementing each other's efforts to involve the Lake Superior population.

2.2.1 Lake Superior Binational Forum

Since 1991, the Lake Superior Binational Forum has served as the principal public body providing input to the governments responsible for carrying out the Binational Program. In 1990, the IJC recommended that Lake Superior be a demonstration area where no point source discharge of any persistent toxic substance would be permitted. The purpose of the Forum is to promote consultation and participation among government, industry, and environmental stakeholders on the restoration and protection of Lake Superior. The Forum is composed of Canadian and American stakeholders representing environmental, Tribal/First Nation, industrial, business, health, and academic interests.

Since 1991, the Forum has held various technical workshops for the purpose of acquiring necessary background information to help develop proposals for phase-out schedules and reduction recommendations. These recommendations on the nine critical pollutants, for example, may be found in the Stage 2 Lakewide Management Plan. The Forum has held workshops on mercury, sustainability indicators, PCBs and pesticides, to name a few. A more complete list and description of recent Forum activities may be found in Addendum 2-A.

In addition to sponsoring workshops, the Lake Superior Forum has published a number of reports and documents, ranging from assessing public attitudes toward pollution prevention, to providing feedback and comment on Lake Superior ecosystem objectives and principles.

The Forum has focused on a series of projects that are conducted jointly with the Superior Workgroup. These have included a newspaper insert, the CARD project, stewardship and awards programs, workshops on mercury and household garbage burning, Lake Superior Day,

public input sessions, mercury reduction mentoring, and updates to the monitoring meta-database. Forum activities are reviewed annually during the preparation of the yearly workplan.

2.2.2 Activities of the Communications/Public Involvement Committee

The Communications/Public Involvement Committee of the Work Group is led by staff from Environment Canada and US EPA. The committee implements provisions of a strategy reflecting the Lake Superior Binational Program's long-term commitment to communications, public involvement, outreach, and education.

The Binational Program has produced various documents and brochures for the purpose of informing and educating the public. These documents include a general informational brochure on the Binational Program, as well as a brief introduction of each committee on the Lake Superior Workgroup.

Since the LaMP 2004 Report was finalized, the Communications Committee has produced two highlights brochures. The first, "Lake Superior Lakewide Management Program (LaMP) Highlights 2004", was based on the LaMP 2004 Report and was mailed to Lake Superior stakeholders and distributed at various meetings around the basin. The most recent outreach project that the Communications Committee completed was a "Lake Superior Binational Program Highlights 2005". This colorful brochure highlights the accomplishments of the Lake Superior Binational Program in 2005 by ecosystem theme. It can be found in Addendum 2-B and on the Lake Superior website. It will be distributed to a wide range of Lake Superior stakeholders.

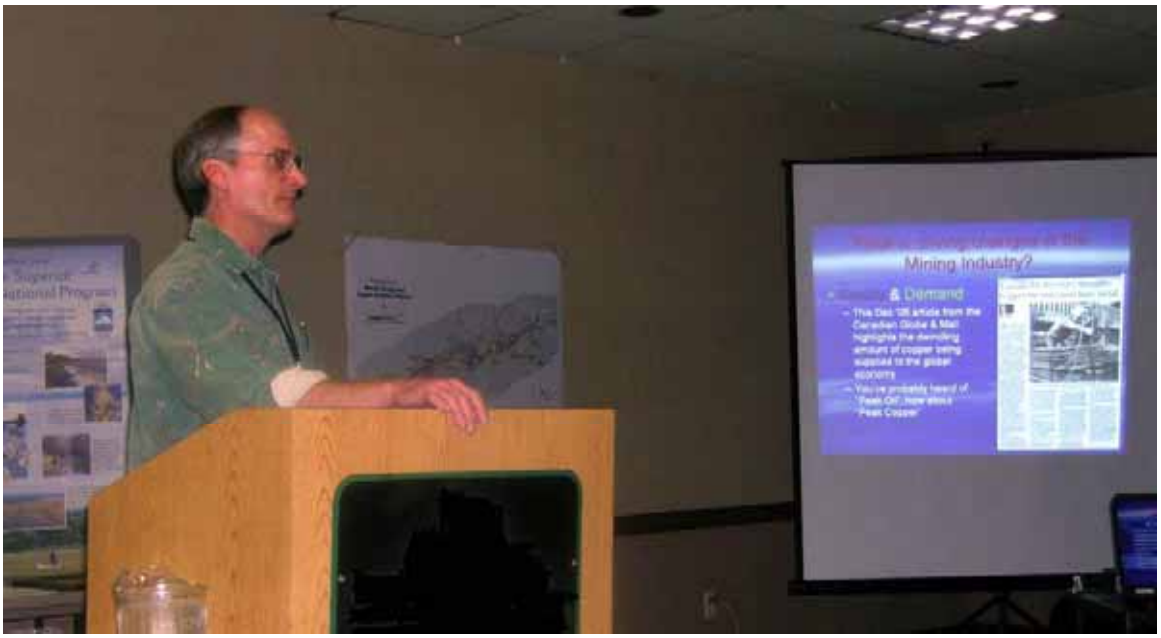


Figure 1. The Lake Superior Binational Forum holds a public input session at each of its quarterly meetings around the basin. At a recent session in Hibbing, MN, guest speaker Mark Severson of the University of Minnesota-Duluth geology department explained the trends in mining around the Lake Superior Basin. Photo Credit: Michelle Lee, Thunder Bay.

In addition, the Communications Committee has coordinated more closely with the US EPA – GLNPO Communications Team so that many Lake Superior highlights are reflected in a quarterly activities report that reaches the highest level of EPA management.

The Binational Program has developed a traveling display as a tool for outreach and education to the general public. This display has been, and will continue to be, used as a means to publicize Lake Superior and the Binational Program at public meetings, seminars and conferences. The display includes a large photograph of the lake, with space for fact sheets, brochures, and other documents. The display booth is staffed by members of the Binational Program. In addition, a table-top display developed by University of Wisconsin - Extension is in use around the basin.

The Committee has been revising the main Lake Superior Binational Program web sites (www.epa.gov/glnpo/lakesuperior/ and www.on.ec.gc.ca/water/greatlakes/lakes/superior/intro-e.html), which consist of a home page and supporting pages. This complements the Forum web site, which can be found at www.superiorforum.info/sitemap.html. In the future, it is anticipated that the main program web site will be moved to a joint Canada-U.S. site (www.binational.net), which is a site devoted to binational programs jointly lead by Environment Canada and US EPA.

The Communications/ Public Involvement Committee is also participating in joint outreach and education projects with the Forum such as a Lake Superior Awards program (see Addendum 2-A) and Lake Superior Day.

A mailing list has been compiled to keep the public informed of new developments in the Lake Superior basin and to provide them with the opportunity to comment. The mailing list includes both U.S. and Canadian government agencies; tribal organizations and First Nations; environmental groups and other public groups.

Assembling material to inform the public on progress toward restoring and protecting Lake Superior is another role the committee fulfills. In that function, the committee is working on success stories for distribution in various newsletters. The Binational Program works in partnership with other organizations toward a common goal of a healthy and safe Lake Superior.

As this Lakewide Management Plan Report 2006 is not intended to be extensively circulated to the public (as are all biennial reports), the agencies produced a separate document (a LaMP Highlights brochure) to inform the public on Binational Program activities.

2.2.3 Lake Superior Pathfinders Program

The Lake Superior Pathfinders program is empowering environmental leadership for its third year!

Pathfinders began in 2002 when educators at the University of Wisconsin-Extension received a grant from the Wisconsin Coastal Management Program (WCMP) to create environmental leadership programs for high school youth and adult audiences. A study group of approximately 12 partner organizations, including Lake Superior Binational Program experts, met for a year to assist with the development of the programs and then conducted pilot versions for both audiences. The youth program was piloted with 38 students in August of 2004, and the adult

program was piloted over weekends in September 2004 to 12 participants, of 59 nominated by UW-Extension educators and partners. In 2005 WCMP continued funding for the development of a statewide model for the youth program, drawing 85 participants (59 from Wisconsin) to attend three different week-long sessions. Northland College's Sigurd Olson Environmental Institute also became a partner and supplied funds, educators, and in-kind contributions. During the summer 2006 program, 120 students are expected to attend, including 30 Navigators, or returning Pathfinders who focus mostly on service learning. The adult program is still being pursued, but funding has not become available.

Figure 2. Pathfinders participants paddle past seacaves in kayaks. Photo Credit: Lake Superior Pathfinders Environmental Leadership Program.

The goals of Pathfinders include assisting participants in learning more about their own leadership styles through such tools as low and high ropes challenge courses, climbing walls, and on-the-water experiences kayaks. Educator's help participants learn how to utilize their skills better in their communities and take action concerning critical lake issues. After attending the program, participants understand critical Lake Superior issues, as identified by the Binational Program. They more effectively gather, analyze, and evaluate related information, and have the confidence, knowledge, and desire to take action to respond to these issues in terms of their sustainability. They recognize their own personal leadership skills and develop a personal "action" plan to complete in their community. When addressing an issue, they understand the Lake Superior Basin community and respect different perspectives in seeking a resolution, while networking and forming relationships and partnerships. Participants also gain a sense of place for Lake Superior, as well as insight into the lake's cultural significance and the Anishinabe or Chippewa Tribe's reliance on it as they interact with Tribal elders and educators.

Figure 3. Pathfinders group on the beach. Photo Credit: Lake Superior Pathfinders Environmental Leadership Program.

The Pathfinders program is currently working on a model that can be implemented in Michigan, Minnesota, and Ontario in an effort to expand lakewide, creating leaders in critical environmental issues all around Lake Superior.

For more information on this program, please visit www.northland.edu/pathfinders, or call Elizabeth Post, Lake Superior Pathfinders Program Director, at (715)682-1482. Addendum 2-C presents testimonials from Pathfinders participants and their parents.

2.3 CONCLUSION

The partners involved in the Lake Superior Binational Program have many ongoing outreach, education, and communication activities. The partners believe that these will meet the objectives of informing and educating the public about the program, involving the public in the decision making process and educating and motivating stakeholders into action. These agencies are mindful that involvement by people representing a wide range of interests is essential to the success of the Lake Superior Binational Program. Public input and support will help ensure that actions recommended in the program are carried out, leading the way to restoring and protecting Lake Superior.

ADDENDUM 2-A
LAKE SUPERIOR BINATIONAL FORUM ACCOMPLISHMENTS: 2004-2005

The Lake Superior Binational Forum is a citizen stakeholder group of 24 American and Canadian volunteers working together to provide input and analysis to governments about critical issues. The members also develop strategies to educate the public about how to protect and restore the lake's natural environment.

In 2004-2005 the Forum accomplished the following milestones:

1. Environmental Stewardship Awards Program

In collaboration with the Superior Work Group (SWG), the Forum initiated in 2004 an annual Environmental Stewardship Awards Program to recognize outstanding contributions that help restore or protect the basin's natural environment. Recipients in both the U.S. and Canada were selected from five categories for their innovative or ongoing activities. The first winners of this annual awards program included, in the U.S.:

- Roy Johnson, Cloverland, WI (Individual category)
- Minnesota Power, Duluth, MN (Industry)
- Pinehurst Inn at Pikes Creek, Bayfield, WI (Business)
- City of Superior, WI (Community)

In Canada:

- Josephine Mandamin, Thunder Bay, ON (Individual)
- Canadian Pacific Railway, Thunder Bay, ON (Industry)
- EcoSuperior, Thunder Bay, ON (Organization)

In July 2005, Ben Grumbles, the assistant administrator for the US EPA's Office of Water in Washington DC, presented awards to seven U.S. recipients during a special ceremony in Duluth, Minnesota. A separate ceremony for the Canadian recipient was held during the school year. The winners for 2005 included, in the U.S.:

U.S. award recipients from left to right:
Lynelle Hanson, Executive Director, St. Louis River Citizen Action Committee; Bill Bussey, Safety Director, Lake Country Power; John Twiest, Lineman, Grand Marais Public Utilities; Ben Grumbles, US EPA; Bill Bennett, CEO, LHB Inc; Sarah Cron, Operations Manager, Cooperative Light and Power; Joe Stepun, Duluth, MN. (Not pictured: Western UP Center for Science, Mathematics, and Environmental Education, Houghton, MI). Photo Credit: Michelle Lee, Thunder Bay.

- Western UP Center for Science, Math, and Environmental Education, Houghton, MI (Youth category)
- Joe Stepun, Duluth, MN (Individual)
- A cooperative action with three northeastern Minnesota power utilities: Lake Country Power, Cooperative Light and Power; and Grand Marais Power Utilities (Industry)
- LHB Inc, Duluth, MN (Business)
- St. Louis River Citizen Action Committee, Duluth, MN (Organization)

In Canada:

- Sir Winston Churchill Secondary School: Centre of Excellence for Environmental Studies Program (Youth)

For more information about each of these winners, visit the Forum's web site at www.superiorforum.info.

2. Educational Newspaper Supplement

The Forum also worked with the Superior Work Group to publish and distribute an educational four-page, color newspaper supplement that highlighted 'good news' stories around the basin. The publication, which was inserted in three newspapers in Ontario and Minnesota in the spring of 2005 (circulation 155,000), included stories about the achievements in chemical reduction targets in the Zero Discharge Demonstration Program; wetland restorations at Whittlesley Creek in Ashland, Wisconsin; safe alternatives to open garbage burning; how to reduce the spread of aquatic invasive species while boating or fishing on the lake; how to save energy and reduce mercury emissions at power plants; and other articles. A copy of this insert is presented in Addendum 2-D and is available on the US EPA web site at: http://www.epa.gov/glnpo/lakesuperior/forum_insert.pdf.

3. Lake Superior Day

The Forum wanted to elevate the visibility of Lake Superior by developing and promoting a celebration of the lake's importance, uniqueness, and beauty. Lake Superior Day is now held annually throughout the basin on the third Sunday in July.

The purpose of Lake Superior Day is to educate residents about their role as trustees of the lake by making thoughtful behavior choices that eliminate pollution and foster sustainable lifestyles. Lake

Volunteers from the Ashland, WI, area picked up trash along the Lake Superior shore on Lake Superior Day 2005 (held annually on the third Sunday in July) as part of a multi-city community project to celebrate the lake. Photo Credit: Michelle Lee, Thunder Bay.

Superior Day encourages people to pledge to care for the basin's natural resources and awaken an appreciation for the lake's unique ecosystems.

The main messages were to educate the public about the LaMP and successful implementation of LaMP goals, and to promote activities that reduce impacts on the lake. Target audiences for the first year included local elected officials, libraries, environmental groups, anglers, and churches.

The Forum developed a web site that describes activities and events that target audiences can organize in their communities. The day was promoted through special buttons, post cards, flyers, newspaper ads, and press releases, and was announced at meetings.

Moms and their kids participated in a multi-community beach clean-up event in Ashland, WI, held on Lake Superior Day (July 17, 2005). Almost 50 volunteers from 12 communities picked up trash along the shore on Lake Superior Day. Photo Credit: Michelle Lee, Thunder Bay.

Almost 20 groups organized events for the first basin-wide celebration. For example, several churches in the Chequamegon Bay, WI, area offered 'blessing of the water' services, beach clean ups, sermons, and potluck meals. A publisher in Bayfield, WI, launched a new magazine about Lake Superior called Gumee. The Town of Bell, WI, partnered with Wisconsin Indianhead Technical College to sponsor a day-long series of activities including a beach hike, an educational slideshow, displays, and a free community picnic.

For a list of events held in 2005 as well as activity ideas, visit the Forum's web site at www.superiorforum.info.

4. Public Input Sessions

One of the Forum's main functions is to serve as a link between the general public and the government agencies that are managing the lake. By holding open meetings and soliciting comments about issues, the Forum can learn what the public wants and needs. The Forum shares this feedback with members of the Lake Superior Binational Program, which considers the feedback to help shape policy regarding lake management strategies.

To enhance this role, in 2004 the Forum initiated a public input session to be held at each of its quarterly meetings. These sessions allow open exchanges between specialists and the public. Time is spent at each session to collect comments from citizens about concerns regarding environmental issues in the Lake Superior Basin. Since public input sessions were initiated in 2004, the following sessions have been held around the lake:

- Successful restoration and protection programs in the U.S. (Duluth, MN)
- The environmental and social impacts of a proposed synfuel facility (Thunder Bay, ON)

- Impacts of aquatic invasive species on the lake and how to reduce their spread (Thunder Bay, ON)
- Stream restoration in the Upper Peninsula (Marquette, MI)
- Impacts of the shipping industry on the lake (Sault Ste. Marie, ON)
- Native American/First Nations protection and restoration programs (Grand Portage, MN)
- Citizen Science: Volunteer water quality monitoring opportunities (Thunder Bay, ON)

5. The Forum continues to provide input and analysis to governments about LaMP implementation.

In addition to holding workshops and public input sessions, the Forum has also written numerous letters to various government representatives about different environmental issues having the potential to negatively impact the Lake Superior ecosystem.

Future Programs

The Forum is currently working on two other joint projects with the SWG: a mercury reduction mentoring program and a monitoring database development project.

1. Mercury Reduction Mentoring Program

The purpose of the mentoring project is to work with the shipping industry, municipal governments, and other target sectors to identify mercury sources and replace mercury-containing devices with non-mercury alternatives.

The Forum plays an important role in this joint project with the SWG. The SWG has begun to identify companies in the basin's shipping sector. The Forum will contact representatives in the shipping and municipal government sectors to invite them to learn how to identify mercury-containing equipment and devices in their facilities, how to dispose of them safely, and how to purchase mercury-free devices. The Forum will serve as the mentor and motivator to new participants and sectors that have not yet conducted this kind of inventory and replacement process.

Using a brochure of information recently published by the SWG, the Forum will motivate new sectors to work with a Canadian contractor to help conduct inventories and replacements. The brochure includes case studies of successful pollution prevention methods already used in basin industries; these case studies serve as models for what other industries can do. The Forum will also work with the participants and sectors that have already completed their replacements to spread the news about their successes in the media. The brochure is presented in Appendix D of the LaMP 2006 report.

2. Monitoring Database Development

To participate jointly in the SWG's focus on monitoring in 2006, the Forum will conduct a search of Michigan, Minnesota, and Wisconsin to find all private, corporate, municipal, tribal, and nonprofit organizations' natural resource monitoring programs at the local, regional, and

state levels. The Forum will develop an inventory of who is monitoring which indicators in what region, and produce a map of these programs.

Based on this list and map, the Forum will conduct a gap analysis of what indicators are missing and where monitoring is needed. The Binational Executive Committee (BEC) is currently developing a database of state, federal, and provincial monitoring programs. However, the Forum's focus will be on non-governmental efforts; this joint investigation of who is monitoring what elements in an ecosystem will produce a comprehensive overview of Lake Superior monitoring efforts.

3. Involving Youth in Leadership Activities

The Forum's Outreach Committee is seeking greater youth involvement in Forum activities by organizing a model monitoring assessment program to involve college and university students from basin institutions of higher education, together with their faculty mentors in exploring, evaluating, and expanding the citizen science movement around the basin. Northern Michigan University (NMU) in Marquette has expressed support for this program, and forum members are working with the NMU interdisciplinary Environmental Science Program to develop details and funding sources.

ADDENDUM 2-B
LAKE SUPERIOR BINATIONAL PROGRAM HIGHLIGHTS 2005

HIGHLIGHTS 2005

LAKE SUPERIOR BINATIONAL PROGRAM

INTRODUCTION

Several binational and national initiatives have been developed to protect, restore, and maintain the Great Lakes ecosystem. Foremost among them is the Great Lakes Water Quality Agreement (GLWQA), which has been hailed as an important example of international environmental cooperation. The 1978 GLWQA between the United States and Canada commits the governments to "restore and maintain the chemical, physical and biological integrity of the waters of the Great Lakes Basin Ecosystem."

To achieve that goal in Lake Superior, the Canadian and U.S. federal governments, the Province of Ontario, and the States of Michigan, Minnesota, and Wisconsin, in 1991, announced a "Binational Program to Restore and Protect Lake Superior." The Binational Program, through which the Lake Superior Lakewide Management Plan (LaMP) is implemented, identified two major areas of activity: A Zero Discharge Demonstration Program dedicated to the goal of achieving zero discharge or emission of nine persistent bioaccumulative toxic substances (mercury, PCBs, Dioxin, HCB, and five pesticides); and a "Broader Program" focusing on the protection and restoration of the broader Lake Superior basin ecosystem.

The framework through which participating jurisdictions act to fulfill commitments identified in the 1991 agreement is known as the Lake Superior Binational Program (LSBP). In addition to restoring degraded areas and reporting on progress, the LSBP is conducting ongoing research and monitoring to improve our understanding of the Lake Superior ecosystem and the changes that are occurring as a consequence of human activities in the basin. The ultimate purpose of this work is to secure a healthy ecosystem, which will provide sustained availability of natural resources and associated social, cultural, economic, and health benefits related to wholesome food, clean water, recreation, cultural heritage, and employment. The following sections highlight the progress made in 2005.

AQUATIC COMMUNITIES

An accurate picture of the aquatic food web and estimates of fish food stocks is needed to help agencies manage self-sustaining predator populations such as lake trout. It is necessary to find the relationship between habitat (quantity and quality) and fish production, as fisheries managers seek to put realistic expectations on Lake Superior fish production. Recent activities in the Aquatic Communities area include:

Lower trophic level organism (Mysis)

Acoustic Surveys

Hydroacoustics is the use of sound waves to measure or monitor underwater processes. Sound waves travel great distances underwater without losing strength, making this an effective tool for studying the open waters of Lake Superior. In 2005, the University of Minnesota-Duluth and U.S. Geological Survey (USGS) continued a hydroacoustic assessment that ranked as the highest priority Aquatic Communities project. The objective is to determine the abundance of prey fish important to lake trout. Sound waves sent from the ship toward the lake bottom bounce off objects (fish, in this case) and return to the ship, where biologists interpret the signals. Mid-water trawls are used to catch fish and verify hydroacoustic data. This year, Michigan waters from Whitefish Bay to the tip of the Keweenaw Peninsula were surveyed. Including work in Ontario and Minnesota waters in prior years, over 2,000 km of transects have now been sampled.

Display of nearshore habitat mapping results

Lower Trophic Level Monitoring

Understanding lower trophic levels, the base of the aquatic food pyramid upon which prey and predator fish depend, is important for managing Lake Superior's aquatic ecosystem. A binational sampling effort to assess lower trophic levels in Lake Superior began in summer 2005. Benthos (bottom organisms), zooplankton, and Mysis (tiny, swimming crustaceans eaten by fish – see image above) samples were collected in spring, summer, and fall by USGS, Environment Canada, the Ontario Ministry of Natural Resources (OMNR), the U.S. Environmental Protection Agency-Mid-Continent Ecology Division (EPA-MED), and the Wisconsin Department of Natural Resources (DNR). Over 1,500 samples have been collected for processing.

Habitat Mapping

Using hydroacoustic technology as described above, agencies have been mapping areas of the lake bottom that are important habitat for key fish species, including lake trout, walleye, coaster brook trout, and lake sturgeon. In 2005, substrate mapping was conducted in Nipigon Bay, Ontario, to describe coaster brook trout habitat and at Buffalo Reef, Michigan, to determine the impact of mining waste on a lake trout spawning reef. This work will help agency managers estimate the number of fish that can be produced by the habitat available in Lake Superior.

LAKE SUPERIOR BINATIONAL PROGRAM HIGHLIGHTS 2005

CHEMICAL CONTAMINANTS

The Lake Superior Binational Program's Zero Discharge Demonstration Program (ZDDP) seeks to end the use of nine critical pollutants in industrial processes or products and to prevent their release in the Lake Superior Basin. The LaMP Chemical Committee has been involved in a variety of projects to reduce the nine toxic chemicals targeted in the Lake Superior ZDDP. Recent reduction activities include the following:

PCB transformer phase-out (Grand Marais, MN)

Collections

Ontario completed its first ever hazardous waste collection in portions of the Lake Superior basin last year. The Upper Peninsula of Michigan also conducted a hazardous waste collection, sponsored by a faith-based coalition known as Earth Keepers, on Earth Day 2005. Programs in Minnesota and Wisconsin received funding to continue collecting hazardous waste.

Phase-outs, Exchanges and Equipment

The Ontario government and Ontario Dental Association recently agreed to regulations that require dentists' offices to install amalgam collection systems that trap mercury-bearing amalgam before it enters the sewer system. Some dentists on the U.S. side have agreed to use such systems voluntarily. In Minnesota, the Minnesota Dental Association encouraged dentists to install separators, and the Minnesota Pollution Control Agency offered free separators to dentists in the Lake Superior basin. Minnesota also completed a PCB transformer phase-out project and is in the process of analyzing the results. In addition, residents of Duluth and Two Harbors were offered the opportunity to exchange their burn barrels for a rain barrel and a pledge to stop burning trash.

EcoSuperior pesticide collection (Red Rock, ON)

Outreach

Lake Superior partners have produced and distributed materials on mercury and open burning. In addition, both the U.S. and Canadian jurisdictions have obtained funding for a basin-wide mercury reduction project that will focus on inventory and phase-out activities.

COOPERATIVE MONITORING

In 2001, U.S. and Canadian government agencies identified a need to improve coordination of Great Lakes monitoring activities. Great Lakes managers from Canada and the United States discussed the issue at a series of workshops and developed a set of recommendations for improvement. Based on these recommendations, a Great Lakes Cooperative Monitoring Program was established. U.S. and Canada Cooperative Monitoring is designed to improve monitoring coordination between the two countries, and address key information gaps identified through the LaMP in order to better manage the ecosystem.

The Cooperative Monitoring approach is above and beyond the routine monitoring programs that agencies normally conduct. It is a binational effort that focuses on one lake each year, with the goal of filling key information gaps as identified through the lakewide management programs. The approach complements and builds upon other monitoring and research projects being conducted on the lake in the same year. Recent developments in Cooperative Monitoring include the following:

Sampling Activities

In 2004, a rotational cycle for Cooperative Monitoring was endorsed, with Lake Superior being the focus for both 2005 and 2006. The Lake Superior LaMP Work Group identified the following key information gaps: atmospheric and open lake concentrations of LaMP pollutants; screening of tributaries to identify sources of LaMP pollutants; status of the lower food web; a better understanding of the comparability of fish tissue contaminant data among agencies; herptile distribution and abundance in the basin; and a method for measuring and reporting on land use changes. In response, during the spring, summer, and fall of 2005, numerous stations in the open lake and nearshore were sampled for LaMP pollutants and the lower food web; additional air and precipitation samplers were installed at Sibley and Eagle Harbor; and Canadian and U.S. tributaries were sampled for LaMP pollutants. The Cooperative Monitoring group is currently awaiting preliminary results from the 2005 sampling efforts. The information collected through the Cooperative Monitoring effort will be shared amongst the principal investigators in order to address LaMP priorities.

Future Plans

In 2006, additional nearshore sampling will continue; a multi-agency intercomparison study is being launched to assess differences in fish tissue contaminant results; and a pilot project to establish a herptile monitoring protocol will be launched. The projects conducted over these two years involve federal, state, and provincial agencies; First Nations/Tribes; and academia.

LAKE SUPERIOR BINATIONAL PROGRAM HIGHLIGHTS 2005

DEVELOPING SUSTAINABILITY

With a focus on local initiatives, sustainability involves increasing public awareness as to how to balance environmental, economic and social goals. The Developing Sustainability Committee (DSC) reported two major accomplishments in 2005:

▶ *Community Awareness Review and Development Survey*

The first phase of the LSBP's "Community Awareness Review and Development" project (CARD) was completed. The CARD was designed to increase knowledge and awareness of issues relevant to the LSBP and, especially, the Lake Superior LaMP. In order to obtain information that may be used to create educational campaigns targeted at local concerns, the DSC surveyed residents in nine basin communities on the U.S. side of Lake Superior, as well as four in Canada. Economic issues were the most pressing concerns, followed by social then environmental issues. Respondents were asked to rate both their level of knowledge and level of personal concern regarding issues in four general areas – water pollution, air pollution, land use, and health issues. In general, no more than one third reported that they knew a great deal about any given issue. When they did focus on environmental issues, the largest percentage of responses indicated that citizens in the basin were mostly concerned with watershed-related issues and, to a lesser extent, land use practices. Significant numbers of respondents reported little or no knowledge of key sustainability-oriented LaMP issues. The CARD survey also revealed that most respondents cited "inconvenience" and the feeling that one person would not make any difference when describing why people persist in conducting themselves in an environmentally-unsustainable manner. The next phase of the CARD will use the results of the survey to reach out to the targeted communities. At that time, outreach will focus on demonstrating how to be environmentally responsible and how to capitalize on economic opportunities. Given the preferences discovered in the initial survey, outreach activities will rely primarily upon electronic and newspaper venues for delivering information.

▶ *Lake Superior Basin Riparian Buffer Demonstration Project*

The Central Lake Superior Land Conservancy (CLSLC) based in Marquette, Michigan, completed a U.S. EPA-Great Lakes National Program Office (GLNPO)-funded project to restore riparian buffer areas and place conservation easements on five demonstration sites in the Lake Superior basin. At each site, a native plant buffer was installed in the spring and summer of 2005 to serve as demonstration and educational venues for the public. Each site has signage explaining what the project entailed, why native plants were used, and what conservation easements accomplish. The CLSLC conducted assessment and remediation efforts as recommended by the Lake Superior LaMP. The initiative included identifying and prioritizing potential demonstration sites for the remediation, contacting landowners to secure remediation/preservation agreements, determining the scope of interventions, obtaining needed native flora or construction materials, overseeing remediation, and facilitating publicity and outreach at the conclusion of the project. The CLSLC will provide ongoing monitoring of the remediation sites and their conservation easement agreements in the future.

HABITAT

Identification, restoration and protection of critical habitat and the ecological processes that sustain them are essential for a healthy ecosystem. Effective management requires both a recognition of the interconnections between habitat, fish and wildlife and the establishment of ecosystem indicators in order to assess ecosystem health. Trends and changes in aquatic invertebrate populations and community structure in tributaries, for example, can serve as indicators of stresses that may ultimately influence the aquatic community of Lake Superior.

The Habitat Committee is a historic and unique collaborative endeavor by Lake Superior resource managers to protect and restore habitat and the ecological processes that sustain habitat features. Recent habitat accomplishments include:

▶ *Identifying Groundwater Upwelling Areas*

Aerial thermography is being used to survey nearshore areas of Lake Superior, the Nipigon River, and the Lake Nipigon shoreline to locate groundwater upwelling areas, which provide critical habitat for coaster brook trout. Through funding from the Canada-Ontario Agreement (COA), an upwelling survey of the Nipigon River and portions of Lake Nipigon and Nipigon Bay was completed in 2004. A survey from the Pigeon River eastward to Black Bay Peninsula is planned. This information will be used to help protect these critical areas in the future.

Watercourse Stewardship sampling

Stonefly nymph (often found in unpolluted streams)

▶ *LaMP 2000 Chapter Integration*

The Habitat, Terrestrial Wildlife, and Aquatics Committees recently completed a consolidation of four chapters of the LaMP 2000 in order to acknowledge the integrated ecosystems of the region. This chapter describes these interconnected ecosystems in an integrated way and will contribute to sustainability throughout the region.

▶ *Watercourse Stewardship Project*

The goal of this joint project with the Binational Forum is to establish and promote the development of ecosystem indicators to assess the health of the Lake Superior ecosystem. COA funding has been used in part to produce Watercourse Stewardship Action Kits, and a number of workshops and presentations have been conducted to explain the program and to gain public support, interest, and participation.

LAKE SUPERIOR BINATIONAL PROGRAM HIGHLIGHTS 2005

TERRESTRIAL WILDLIFE COMMUNITIES

The ability to detect species declines or increases has a direct bearing on both aquatic and terrestrial habitat management for these species within the basin's forests, grasslands, wetlands, lakes and streams. Recent activities in the Terrestrial Wildlife Communities area include the following:

Gray Treefrog (photo by G.S. Casper)

▶ *Lake Superior Basin Herptile Monitoring Program*

Funding from U.S. EPA-GLNPO will establish and test an intensive monitoring program at several sites within the Lake Superior basin. A data repository will be established, and detection probability statistics will be developed that can be applied to existing programs to advance basin-wide analysis capabilities.

10-month-old lynx kitten in the snow

▶ *U.S. Forest Service Lynx Surveys*

The Superior National Forest is continuing the National Lynx Detection Surveys and initiating snow-track protocols within the Forest. Lynx DNA collection studies implemented in 2002 show that a minimum of 42 individual lynx genotypes exist within the state; this likely represents a small proportion of the actual numbers of lynx in the State of Minnesota. Lynx DNA collection efforts will continue.

The Natural Resources Research Institute at the University of Minnesota-Duluth, in conjunction with the Superior National Forest and the U.S. Fish and Wildlife Service, initiated a radio tracking project for lynx in Minnesota in 2003. Plans exist for the continuation and expansion of this program in the future.

Peregrine falcon (photo by Craig Koppie - USFWS)

▶ *2005 Peregrine Falcon Survey*

The Lake Superior basin is home to the majority of known peregrine falcon nest sites and territories in Ontario. The spring and summer of 2005 marked the survey window for the national peregrine falcon survey conducted every five years in Canada. As part of this effort, Ontario conducted intensive nest and territory searches within the province. The Lake Superior basin effort was coordinated by the Thunder Bay Field Naturalists, in conjunction with the OMNR and many volunteers. Survey results indicate a continued recovery of falcon numbers, with 43 active territories located in the basin (56.6% of the provincial total), up from 31 territories recorded during the 2000 Ontario survey. A minimum of 79 chicks were fledged in the basin during 2005, the highest number recorded to date. Of these, 47 chicks were banded, bringing the total number of chicks banded on the Ontario side of the basin during the past ten years to 319.

LSBP MEMBER AGENCIES:

1854 Authority
Agency for Toxic Substances and Disease Registry
Bad River Band of Lake Superior Chippewa
Chippewa-Ottawa Treaty Fishery Management Authority
Environment Canada
Fisheries and Oceans Canada
Fond du Lac Band of Lake Superior Chippewa
Grand Portage Band of Lake Superior Chippewa
Great Lakes Indian Fish and Wildlife Commission
Health Canada
Keweenaw Bay Indian Community
Michigan Department of Environmental Quality
Michigan Department of Natural Resources

FOR MORE INFORMATION:

Lake Superior Binational Program home page:
http://www.epa.gov/glnpo/lakesuperior/index.html

US Contact:
E. Marie Wines, US EPA,
Wines.E-Marie@epa.gov

Canadian Contact:
Marlene O'Brien, Environment Canada,
marlene.o'brien@ec.gc.ca

Minnesota Department of Natural Resources
Minnesota Department of Health
Minnesota Pollution Control Agency
Ontario Ministry of Natural Resources
Ontario Ministry of the Environment
Parks Canada
Red Cliff Band of Lake Superior Chippewa
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey - Biological Resources Division
U.S. National Park Service
Wisconsin Department of Natural Resources

ADDENDUM 2-C
PATHFINDERS 2005 TESTIMONIALS

"I realized who I am. I could be 100 percent me for the first time. It was amazing!"
- Participant 2005

"I've found accomplishing goals is not as tough as I thought. Also, that there are powerful people here that may just change the world one day." –Participant 2005

I feel more powerful as an individual. I feel more connected and inspired by/to the environment." – Participant 2005

"First of all, Brian was part of an exceptional group. Kids made everyone feel welcome and they developed a "team" spirit early on. This was fostered by a wonderful group of leaders. With that winning combination and a well planned program, he learned a tremendous amount and grew from the experience. It was the highlight of his summer, for sure." – Parent 2005

"I am more motivated to take a stand on environmental issues and go home and do something about them. I also have more confidence in myself as a leader." –Participant 2005

"I have already recommended this program for its great variety of activities teaching youth about leadership, the environment, and cultural values. The staff was clearly dedicated to its goal! An excellently planned program! Than you counselors and staff for your Exceptional Pathfinders program! You know it's a success when the youth already talk about returning next summer!" – Parent 2005

"I would definitely recommend this program to other parents. I like how you combined the environmental topic with the leadership training. Not only did you make them aware of critical environmental concerns, but you taught them how to take action." –Parent 2005

"The Pathfinders program seeks to empower youth to utilize their unique leadership abilities, and take action on environmental issues in their communities using new skills and strategies. We use Lake Superior and it's critical issues as our living classroom and experientially approach issues, balancing social, economic, and environmental concerns. This program challenges participants to apply critical thinking and engage in service learning, and most of all in helps them become a better world citizen."

ADDENDUM 2-D
SPRING 2005 LAKE SUPERIOR NEWSPAPER INSERT

Making a Great Lake Superior!

NEWS FROM THE LAKE SUPERIOR BINATIONAL PROGRAM

Spring 2005

Lake Superior

Terrestrial and aquatic habitat…deep, crystal-clear, frigid waters silently guarding the final resting place of more than 350 shipwrecked vessels…These are some of the images invoked by the "greatest" of the Great Lakes—Lake Superior, or as the Ojibwe people named it, *Gichigami*.

Lake Superior is the cleanest, clearest, and coldest of the Great Lakes. It contains low concentrations of nutrients, suspended sediments, and organic materials, which creates an underwater visibility of about 27 feet (eight metres). Acid precipitation in the form of rain and snow does fall on the lake, but the lake is so large that it hasn't noticeably affected overall quality.

Yet there is a less pleasing side to what appears to be a pristine Lake Superior basin. While toxic pollution is low compared to the other Great Lakes, pollutants such as mercury, dioxin, and PCBs still pose a threat because they do not break down. The lake has a long history of industrial pollution, which has created many contaminated areas near cities and towns. Other human activities that are changing the water quality and surrounding natural ecosystems include:

- Population growth expanding beyond urban areas
- Development of rural and waterfront vacation properties without proper planning and regulation
- Stormwater runoff
- Continuing deposition of pollutants from the air.

These activities can have long-term consequences because water that enters Lake Superior stays in the lake for an average of 173 years before it exits through the St. Marys River in Sault Ste. Marie, Ontario.

All of us have to be vigilant stewards as we try to preserve a lake that contains 10 percent of the world's available surface fresh water.

This special news supplement highlights the people, programs, and partnerships that have successfully restored or protected the lake and its basin. The articles highlight American and Canadian activities that are successfully improving the lake's ecosystem.

What Is the Lake Superior Binational Program?

"Water is life and the quality of water determines the quality of life."

-Lake Superior Binational Program vision statement

In the Great Lakes Water Quality Agreement, Canada and the United States agreed to develop and implement, in consultation with State and Provincial Governments, Lakewide Management Plans (LaMPs) for open lake waters and Remedial Action Plans (RAPs) for Areas of Concern (AOCs). The Lake Superior LaMP is being developed and implemented through a Binational Program.

The *Binational Program to Restore and Protect the Lake Superior Basin* began in 1991 through an agreement between the federal governments of Canada and the United States, tribal governments, the Province of Ontario and the States of Michigan, Minnesota and Wisconsin. The administrative framework through which these jurisdictions jointly act on the commitments identified in the agreement is known as the Lake Superior Binational Program (LSBP). The Program identifies two major areas of activity: A Zero Discharge Demonstration Project and The Broader Program.

Lake Superior's North Shore, Minnesota, Photo courtesy of Minn. Extension Service, Dave Hansen

The Zero Discharge Demonstration Program

Lake Superior is a unique, vast resource of fresh water that has not experienced the same levels of development, urbanization, and pollution as the other Great Lakes. Because of this uniqueness, the International Joint Commission recommended to the US, Canadian, and tribal governments that Lake Superior be designated as a demonstration area where no point source discharge (from a pipe) of any persistent toxic substance will be permitted.

The Zero Discharge Demonstration Program (ZDDP) established Lake Superior as the world's first model to eliminate toxic chemicals and reach zero discharge and emission of the following nine toxic, persistent, and bioaccumulative chemicals from a lake:

1. Mercury
2. Total polychlorinated biphenyls (PCBs)
3. Dieldrin/aldrin
4. Chlordane
5. DDT
6. Toxaphene
7. Hexachlorobenzene (HCB)
8. Octachlorostyrene (OCS)
9. 2,3,7,8-TCDD (Dioxin)

The goal is zero discharge by 2020 to be achieved in a step-wise manner. Voluntary pollution prevention is the preferred way to achieve zero discharge, but regulations might also be necessary.

The **Broader Program** is the other part of binational efforts to protect and restore the lake. Recognizing that the Zero Discharge Program alone will not be enough to restore, maintain, and protect Lake Superior, the *Broader Program* focuses on habitat and wildlife issues. The Broader Program coordinates the basin's many environmental agencies to address issues about forests, wetlands, wildlife, fish, and surface and groundwater. Government and tribal agencies and groups from Michigan, Minnesota, Wisconsin, and Ontario, along with both countries' federal governments, have taken steps that will restore degraded areas and protect this unique lake through wetlands and habitat restoration and rehabilitation projects, invasive-free demonstration zones, fish rehabilitation projects, and stream/inland lake restorations.

You can help!

Involvement of the public is needed to make the Lake Superior Binational Program successful. The citizens of the basin are also partners in the Binational Program. The Zero Discharge Program will succeed only if residents of the Lake Superior basin are aware and willing to make changes in how they use the lake and its resources. Getting to zero means changing from a consumer society to a conserver society. By working together, we can help make a Great Lake truly superior.

Isle Royale, Lake Superior Keweenaw County, Michigan Michigan Travel Bureau

Zero Discharge Demonstration Program Achievements

Achievements on 2000 targets:

- **Reduced mercury emissions from in-basin sources by 60 % from 1990 levels**
- **Achieved 24% destruction of PCBs in Canada**
- **Progress on Dioxin/HCB/OCS and pesticides targets.**

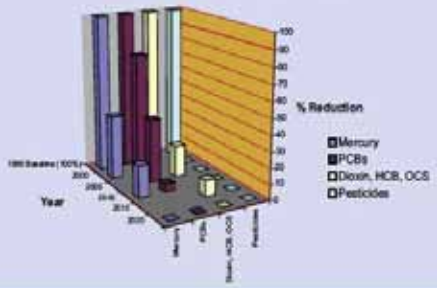
Achievements on 2005 targets will be assessed and reported in 2006.

Lake Superior Binational Program Goals and Activities

Supported by government and industry funding, the following are some examples of activities to reduce pollutants:

- Municipalities are upgrading their storm water and sewage treatment infrastructure
- Dentists are installing amalgam separators to recover mercury
- Programs are in place to recover mercury switches from automobiles, fluorescent lamps, thermostats, thermometers and button batteries
- Schools are learning that going mercury-free is safer for everyone
- Old appliances are being collected to recover mercury switches and PCB ballasts or capacitors
- Municipalities and industry are removing mercury and PCB containing equipment, changing industrial processes, destroying/recycling stockpiles, and researching new pollution control technologies
- Energy conservation and alternative energy sources are being promoted
- People are learning that it's safer to stop burning their garbage so that dioxins are not released (no more burn barrels!)
- Household hazardous waste collection programs are recovering old pesticides, mercury and pharmaceuticals
- Contaminated sediment is being assessed and cleaned up
- Outreach and education programs are being undertaken
- Monitoring of emissions, air, water, sediment and biota are ongoing

Lake Superior LaMP Zero Discharge Demonstration Critical Pollutant Load Reduction Goals



Lake Superior Binational Program Environmental Stewardship Awards Program

In 2004, the Binational Program restarted an annual awards program to honor outstanding environmental achievements of youth, adults, businesses or industry, and community groups or First Nations/Tribes that are protecting or restoring the natural environment of the Lake Superior basin.

The award paid tribute to seven individuals and organizations that have demonstrated a commitment to environmental stewardship through leadership in their respective categories. The Binational Program hopes to encourage all residents in the basin to start actions similar to those awarded wherever they live, work, or play.

Finalists from the US and Canada were selected based on several criteria: importance of the activity to the protection or restoration of the environment; positive impact on the water or land; and whether the activity could be reproduced in other areas.

2004 Award Recipients

Adult Individuals

Roy Johnson, Cloverland, Wisconsin, converted 160 acres of farmland to restored wetlands, including shallow ponds, deep marsh, sedge meadows, and mudflats. Once home to crops and cattle, the wetlands now host a number of sensitive wetland birds and plants.

Josephine Mandamin, Ontario, an Ojibwe woman living in Thunder Bay, organized a 1,300-mile/2,080 kilometre "Water Walk" around the entire coast of Lake Superior to honour Anishinabe womens' responsibility to protect water quality. Mandamin served as the lead Water Walk "grandmother" to help raise awareness about the importance of keeping water clean and free from privatization.

Industry and Business

A tie in the US: Minnesota Power and Pinehurst Inn at Pikes Creek.

Minnesota Power, Duluth, Minnesota, is working on the issue of mercury emissions from coal-fired power plants from both power production and consumption. The company carried out full-scale mercury emissions control technology testing at their Laskin Energy Center (which is within the Lake Superior watershed) as part of an Electrical Power Research Institute study. In an emissions study, Minnesota Power found carbon injection and chemical additives show some promise towards removing mercury from that facility's stack.

To reduce mercury emissions at a consumer level, the company constructed an energy-saving house called the *Millennium Star* in Duluth. The model house showed that building design, materials, and construction techniques can significantly reduce energy consumption and costs.

Pinehurst Inn at Pikes Creek, Bayfield, Wisconsin, is a bed and breakfast that consists of an historic inn and a modern Garden House. The Garden House was built using "green building" techniques, materials, and systems that complemented natural systems. These features minimize the inn's impact on Lake Superior and the surrounding environment by reducing its contribution to air and water pollution, minimizing solid wastes, and enhancing the inn's natural landscaping.

Canadian Pacific Railway, Thunder Bay, Ontario. The company reconstructed at their own expense several railroad water crossings on McKellar Creek (near Terrace Bay, Ontario) to enhance fish spawning opportunities on the creek. Fish surveys in fall 2003 showed that fish were migrating through the new structures, which indicated that the company had successfully restored important fish habitat.

Community/Organization Category

City of Superior, Wisconsin. Staff at the city's wastewater treatment facility has conducted extensive reduction and education programs that prevented mercury from entering the lake through wastewater discharges. By working with state agencies, tribes, schools, and private businesses, the city has kept 300 pounds/136 kilograms of bulk mercury, 400 lab thermometers, 4,000 fever thermometers, and 1,000 vehicle switches that contain mercury out of landfills and waterways.

City staff have incorporated mercury reduction curriculum and activities in public schools, and conducted campaigns for builders, dentists, and the public.

EcoSuperior, Thunder Bay, Ontario. EcoSuperior is a not-for-profit organization that provides Ontario residents with information and motivation for building healthy, sustainable communities. Staff delivers programming in a number of areas including water and energy conservation, waste reduction, green space naturalization, and pollution prevention. The group has delivered effective outreach programs that help change many wasteful or destructive behaviours, including composting Halloween pumpkins and Christmas trees, organizing hazardous waste material collections, and conducting a campaign about the dangers of open garbage burning.

The Binational Program will sponsor the awards program every year. The nomination period runs from February 15 through April 15. For more information, visit the Forum's web site at www.superiorforum.info

Kayak beached on rock, Lake Superior Pukaskwa National Park, Ontario, Robert F. Beltran

Lake Superior Binational Forum

Since 1991, the Lake Superior Binational Forum has served as a partnership of 24 citizen volunteers that provide input and analysis to American and Canadian governments about ways to protect and restore the Lake Superior basin. Through quarterly public input sessions, the Forum also gathers input from citizens and shares this input with binational governments to help shape public policy.

Recently Forum members began to look at how they could also help implement critical priority projects from the Lakewide Management Plan, and have been conducting outreach activities around the basin to raise awareness about:

- Harmful effects of mercury
- Effects of chemical pollutants on human health
- Invasive species
- Dangers of open garbage burning.

Current outreach projects include promoting a basin-wide Lake Superior Day celebration and an environmental stewardship awards program (see articles in this insert).

Forum members agree, as summarized in the group's vision statement, that "water is life and the quality of water determines the quality of life." The Forum recognizes that the Lake Superior region cannot have a sound economy without a healthy environment. This philosophy helps the group make decisions that protect and restore the lake's natural resources.

Who are the members?

Both Canada and the United States select 12 people from a diverse cross-section of community sectors in the Lake Superior basin including businesspeople, environmentalists, industrialists, First Nations/Tribes, municipal officials, and academics. Each member brings his or her own professional experience, sector perspectives, and skills to the Forum's decision-making processes. This diversity strengthens the group. The list of current members is on the Forum's website.

For more information:
In the US, call
(715) 682-1489
In Canada, call 807-343-8811
toll free at (888) 301-LAKE
Or visit the Forum's website at

www.superiorforum.info

Lake Superior Day July 17, 2005

What is Lake Superior Day and why is it being celebrated?

You've heard of *Earth Day*, which focuses on the importance of taking actions that protect the planet. *Lake Superior Day* is a day to celebrate our connection to the world's largest freshwater lake (by surface area) while finding ways to protect and restore basin communities.

Although Lake Superior is the cleanest of the five Great Lakes, it too is being threatened by pollution, contaminated fish, invasive species, loss of habitat, and overdevelopment. The purpose of a special day is to remind people how important the lake and its natural resources are to our health, food supply, recreation opportunities, weather, and lifestyles. Lake Superior Day highlights the many ways we use the lake every day and encourages citizens to take action to restore and protect it.

When is it celebrated?

Lake Superior Day is celebrated every year on the third Sunday in July all around the lake and wherever people around the world want to acknowledge their appreciation for this spectacular lake.

How do I celebrate this day?

People will celebrate this day in many ways—through contemplation, action, art, political means, or recreation. How you celebrate it is up to you.

Where can I get more information?

The Lake Superior Binational Forum will publish an events calendar, a list of celebration ideas, and articles about events on its website at www.superiorforum.info. Please visit the site to register your event or activity or submit media reports so the Forum can help promote your event and you can see what others are doing to celebrate.

A Burning Issue

The average resident of the Lake Superior watershed creates about seven pounds/3.2 kilograms of garbage each day, or 2,555 pounds/1,600 kilograms per year. What happens to all that material? Much of it goes into landfills or is recycled or composted. Some is illegally dumped in backyards, ditches, and the woods, or buried in backyards. The rest is burned.

Many an old-timer remembers that it was the children's job to burn the trash once or twice a week. Sometimes it was burned in a pit, a 55-gallon drum, a woodstove, or a household incinerator. In those days, people burned mostly paper, fabric, rubber, metal cans, and leather.

The old-timers' trash heap was very different from today's trash. Plastics and electronics have joined the heap, and some modern papers and fabrics now contain plastics. And, everyone is now throwing away more and more trash.

Even though the types and amount of trash have changed, people are still using an old-fashioned disposal method - burning trash. They do this for lots of reasons. They may not want to pay for trash service, or they're trying to cut down on how much trash they send to the landfill, or it's a "tradition" to burn garbage.

However, some traditions should be broken, because burning trash creates toxic chemicals. For example, pound for pound, a backyard burn barrel creates 20 times as much dioxin (which causes cancer) as a well-run municipal incinerator. The smoke also can sicken people, especially those who have respiratory illness. Dioxin in the smoke deposits on agricultural fields and can accumulate in the food we eat. In Wisconsin and Minnesota, about 40 percent of wildfires are caused by improper backyard burning. In fact, there are so many problems associated with burning trash that it is illegal in many places.

What can you do instead of burning garbage?

- Sign up for trash pickup service.
- Take your trash to landfills or transfer stations.
- Recycle as much as you can.
- Reuse as many materials as possible. For example, take usable items to a resale store, or repair broken items.
- Compost your organic materials such as food scraps or leaves and grass clippings.
- Try to minimize packaging that will become trash as soon as you get it home.

For more information, visit this binational web site about open burning:

Canadian Centre for Pollution Prevention
http://www.openburning.org
Or EcoSuperior, Thunder Bay
http://www.ecosuperior.com/openburning.html

Coastal Wetlands: Jewels Along the Shore

Many magical coastal wetlands exist along the shores of Lake Superior. Some are drowned river mouths, or secluded wetland refuges behind sand spits, protected from the vicious action of wave and ice. These are places where cold water meets warmer water, where wetland vegetation emerges from silty bottoms and provides underwater refuges for aquatic life, such as young fish and frogs. These places serve as the lake's dinner plate and home for many of its resident and migrating animals such as beaver, birds, and snails.

These wetlands help keep Lake Superior healthy. One very special creek and its wetland in northern Wisconsin was recently designated as a National Wildlife Refuge. The U.S. Fish and Wildlife Service is currently restoring **Whittlesley Creek** near Ashland as a home for fish and wildlife.

Historically, human impacts such as logging and farming changed the creek's natural flow. Floods were more intense because water flowed faster off the land after trees were removed. Farms, homes, and cropland along the floodplain near the creek mouth were often under water during these floods. Ultimately, the water won. Flooding, along with persistently high groundwater, proved too much to take, and most farms and homes near the creek mouth were abandoned.

The goal is to return the creek and its floodplain to its natural residents–sora rails, brook trout, swamp sparrows, yellow warblers, and frogs, to name a few.

The U.S. Fish and Wildlife Service will eventually purchase 540 acres from willing sellers. It's a small piece of land. But, because these coastal wetland areas are so critical to the lake, such action will have a big impact. The Service has already acquired 208 acres and has restored wetland habitats and planted about 10,000 trees on abandoned farmland.

The Service, along with the Wisconsin Department of Natural Resources, has also started to restore the coaster brook trout to Whittlesey Creek. Coasters spend part of their life in Lake Superior and spawn in its creeks or rocky shores. Once common in Lake Superior, populations are only found in a few locations now. Overfishing by early settlers, along with dramatic land use changes, nearly depleted their population.

The Service and its partners hopes to bring this fish back to the Wisconsin waters of Lake Superior. Experimental stocking efforts began in August 2003 when area residents and partners released 80 adult coaster brook trout into the creek. Future stocking will consist of placing various age groups, from eggs to adults, in Whittlesey Creek, through 2009. Results of this experiment will be monitored through 2030.

Though the refuge is still being developed, it is open to limited public use. For more information visit http:/ midwest.fws.gov/ashland/whitt-crk/whit_crk.html.

Stop The Invasion!

They may not be slipping in on flying saucers, but alien creatures *are* finding their way into the Lake Superior basin. These alien plant and animal species are causing serious problems in the Great Lakes basin.

What is an alien or non-native species?

Non-native species are those that do not naturally exist in an environment, but have been intentionally or unintentionally introduced by human activity or other means. They can be aquatic or land plants, fish, insects, invertebrates, mussels, or crustaceans.

You might also hear them called invasive, non-native, exotic, introduced, non-indigenous, or foreign species.

How did they get here?

Non-native species can sneak into the lake or land in a variety of ways:

- Intentional stockings
- Ballast water carried in international commercial vessels. *Ballast water* is fresh or salt water held in ships' cargo holds to make them heavier and less likely to roll. Upon entering a port, the water is discharged from the ship into the water.
- Building of canal systems
- Gardening and mowing lawns and roadside ditches
- Angling and recreational boating
- Release of unwanted live fish, either from aquariums or ponds, or live fish sold to be consumed
- Through natural methods such as the wind or animal droppings.

Why do they cause problems?

Invasive species negatively affect the *environment* and the *economy*. In the environment, non-natives prey upon native species and compete with them for food or habitat. For example, the ruffe, a small fish that is native to Eurasia, was first observed in Lake Superior in 1986. It was introduced through the ballast water of an ocean-going ship. It now competes with native fish for food and habitat, has no natural predators, and has a very successful reproductive rate, which affects how native fish survive.

Economic impacts have already been experienced in commercial fishing, agriculture, tourism, sport fishing, recreation, and utilities. For example, municipal water intake pipes can become clogged with zebra mussels that cling to hard surfaces.

Where are these species?

In 2000, Minnesota Sea Grant observed 28 non-native species in Lake Superior, including 17 fish, five aquatic invertebrates, and six aquatic plants.

Here are some examples of non-native species already living in the Lake Superior basin:

Fish

Some of the non-natives, such as sea lamprey, are found throughout the lake, while others, such as round nose goby, ruffe, and three-spine stickleback, are found in limited areas of the lake. Ship ballast water continues to be the main source of unintentionally introduced non-native fish species in Lake Superior.

Plants

Non-native aquatic plants of concern include purple loosestrife and Eurasian water milfoil. Both are growing in Lake Superior and are spread when boaters accidentally carry small plant parts in their trailers, live well water, or in personal watercraft treads.

Leafy spurge is a non-native land plant with roots that can extend 35 feet. It can grow through asphalt and flings its seed 15 feet. The deep root system enables it to survive disturbances and sprout even after the foliage is destroyed.

Non-native honeysuckles have been used as ornamentals in gardens for decades, and birds carry their seeds to natural habitats. Once established, honeysuckle can dominate the understory of woodlands.

Other non-native plants causing problems include exotic buckthorns, garlic mustard, and spotted knapweed.

What is being done to stop the spread of these species?

Binational activities are currently dealing with non-native species in Lake Superior and throughout the Great Lakes. For example, governmental agencies, Native American tribes, and nonprofit organizations from the United States and Canada continue fish surveys to document the range expansion of ruffe and detect other non-native species from Thunder Bay, Ontario, to Sault Ste. Marie, Michigan.

In 2003, round goby and white perch were discovered and confirmed in Thunder Bay harbour, Ontario. Fish surveys are continuing in the St. Louis River in Duluth, Minnesota, and four other south shore rivers to monitor ruffe and other non-native populations.

Rusty Crayfish, Lake Superior
Photo courtesy of Minnesota Sea Grant, Jeff Gunderson

Thousands of acres of land are being treated annually to control the spread of non-native plant species by governmental and non-governmental organizations. Educational materials such as pocket guides, signs at boat landings, brochures, and videos are available from Sea Grant, the Lake Superior Binational Program partners, and others. These materials are distributed throughout the Lake Superior basin to prevent the introduction and reduce the spread of non-native species.

What can you do to help stop the invasion?

A few simple actions will help prevent the spread of non-native species to your favorite place:

1. Always inspect your boat and trailer and remove any plants and animals before leaving the water. This is the best way to stop the spread of aquatic plants and fish species to other lakes! Drain water from the motor, live well, bilge, and transom before leaving the water.
2. Never release live baitfish in the water or live earthworms on the land or water.
3. When planting your landscape or garden, use only plants that are native to your region. Consult with professional garden centers and landscape planners on the best native plants for your area.
4. Learn what non-native species look like and additional prevention tips by contacting your local state, provincial, or federal natural resource management agency or university extension service.

For more information about non-native species, visit these web sites:

Environment Canada
http://www.on.ec.gc.ca/coa/2001/invaders-e.html

US Environmental Protection Agency
http://www.epa.gov/owow/invasive_species/

Conserving Energy Reduces Mercury Emissions

What Is Mercury?

There is more to mercury than just the silvery liquid in thermometers. Mercury is a naturally occurring element that is present throughout the environment. Scientists believe that more than half the mercury in the environment today is from human-made sources. Human activity, such as some forms of mining and burning fuel, releases mercury into the environment. These releases increase the amount of mercury cycling through the air, soils, plants, and surface and groundwater.

A North Shore stream flows into Lake Superior, Minnesota.
Photograph courtesy of Minnesota Extension Service

Living things easily absorb this mercury.

When atmospheric mercury falls to earth, bacteria or chemical interactions can change it into an organic form known as *methylmercury*. Methylmercury is much more toxic than the original form. It also has the ability to pass through cell walls and build up in living tissue. *Bioaccumulation* occurs when a substance absorbed from the air, water, or food builds up in the tissues of a living organism.

Mercury and the Food Chain

When methylmercury accumulates in natural ecosystems, it gets more and more concentrated in living creatures' bodies. For example, small fish may eat aquatic plants that contain mercury. Bigger fish then eat the smaller fish, and bald eagles eat the big fish. This is called *bioaccumulation*.

Mercury poses risks to wildlife that eat contaminated fish including behavioural problems, reduced reproductive success, impaired growth and development, and even death. Species that are at risk for mercury damage from eating fish include eagles, loons, osprey, mink, otter, and humans.

Mercury cannot be removed from fish before people eat them because methylmercury accumulates in the muscle, not the fat. This is why all US states and the province of Ontario in the Great Lakes region have fish advisories that suggest limits on fish consumption.

Mercury and Human Health

Mercury exposure in human beings can lead to damage of the brain, spinal cord, nervous system, kidneys, and liver. Exposure to mercury while in the womb is now linked to brain development problems in some unborn and growing children. A 2000 National Academy of Sciences report concluded that children of women who consume large amounts of fish are at the highest risk.

A recent public health study based on data from the US Center for Disease Control and Prevention concluded that between 300,000 and 600,000 children born each year in the U.S. have umbilical cord blood levels of mercury associated with loss of IQ. This is equivalent to between 8 and 16% of births in any given year. This startling calculation is a result of exposure to methylmercury while in the womb. It is thought that this loss of IQ is irreversible. The economic costs to the US would be over $8 billion annually.

Mercury and Coal Combustion

Mercury is naturally present in coal. When coal is burned in power plants, mercury is released into the air as a by-product. This means coal-fired power plants are a main source of mercury emissions. Taconite production, which also burns large amounts of coal, is another major source in the Lake Superior basin.

The good news is that we can reduce our energy use at home, work, and school. The more energy we save, the less coal would be burned and less mercury is released. This makes energy conservation an important part of mercury reduction activities.

Practical Steps For Energy Conservation

What's using energy in the average home?

Heating and cooling	38 %
Major Appliances	21 %
Hot Water	19 %
Other Appliances	15 %
Lighting	7 %

Here's how you can reduce energy use where you live:

- Set the furnace thermostat at 68 degrees F/20 degrees C or lower, and the air conditioner thermostat at 78 degrees F/25 degrees C or higher. This can decrease your energy usage by three to five percent per degree.
- In summer, open windows at night to bring in cool night air, and close windows and drapes during sunny days.
- Plant deciduous shade trees on the west and south sides of your house to block the summer sun.
- Close the fireplace damper, except when you're using the fireplace. This prevents warm air from escaping up the flue.
- Reduce heat to unused rooms in the house by closing doors and heat vents.
- Upgrade ceiling insulation to R-38. Higher R-values mean more effective insulation levels and thus more energy savings.
- Insulate exterior heated basement walls to at least R-11. Insulate floors over unheated areas to R-19.
- Install low-flow showerheads to reduce water-heating bills.
- Dry clothes outside on a line whenever possible.
- Run the dishwasher only when you have a full load of dishes.
- Buy energy-efficient room air conditioners and install them only where needed.
- Turn off electric lights when not in use. This is probably the simplest energy-saving thing you can do!
- Install compact fluorescent bulbs in the fixtures that you use most often.

Paper generously donated by
Bowater, Thunder Bay

Fun Facts About the Lake!

- The biggest, coldest, and cleanest of the Great Lakes, Lake Superior is the largest freshwater lake, by surface area, on Earth. By volume of water, it's the world's second largest lake. Only Lake Baikal in Siberia has more water.
- The lake's surface water is over 31,700 square miles/82,103 square kilometres.
- It's so big it could hold all the water from the other four Great Lakes, PLUS three more lakes the size of Lake Erie!
- The lake contains 10 percent of the world's fresh surface water, enough to submerge all of North and South America under one foot of water.
- If you could travel along the entire Lake Superior shoreline, you'd go 1,826 miles/2,922 km, or the distance from Duluth to Miami, or from Thunder Bay to Halifax.
- Lake Superior's deepest point is 1,332 feet/406 metres.
- French explorers referred to this tremendous body of water as le lac superieur, or "Upper Lake," or the lake above Lake Huron. The Chippewa Indian translation, Gichigami, signifies Great Water.

- Length: 350 miles / 563 km.
- Breadth: 160 miles / 257 km.
- Average Depth: 483 ft. / 147 m.
- Maximum Depth: 1,332 ft. / 406 m.
- Volume: 2,900 cubic miles / 12,100 cubic km.
- Drainage Basin Area: 49,300 sq. miles / 127,700 sq. km.
- Shoreline Length (including islands): 2,726 miles / 4,385 km.
- Average Temperature: 40 degrees F / 4 degrees C
- Elevation: 600 ft. / 183 m.
- Outlet: St. Marys River to Lake Huron
- Retention/Replacement Time: 173 years

Source: Great Lakes Information Network and the University of Wisconsin-Extension's website.