

## Appendix E

# Proceedings from Making a Great Lake Superior 2007: A Conference Linking Research, Education and Management



For the final presentation of the *Making a Great Lake Superior 2007* conference, John Austin of the Brookings Institute spoke about the economic benefits of restoring the Great Lakes basin.

Photo credit: Elizabeth LaPlante, US EPA.



## **Proceedings from Making a Great Lake Superior 2007: A Conference Linking Research, Education and Management**

**October 29-31, 2007  
Duluth, MN**

### **Summary**

Planning for the *Making a Great Lake Superior 2007* Conference began in 2006, with the goal of bringing all the partners—researchers, educators, and managers—working on Lake Superior issues together to discuss the critical issues facing the lake. A workgroup was formed to help with the brainstorming, decision-making, and preparations for the event. Workgroup members included members of the Lake Superior Work Group, Task Force, Binational Program, Binational Forum and representatives from the Sea Grant Programs in Minnesota, Wisconsin, and Michigan. Minnesota Sea Grant led the conference preparations and functioned as the event planner. An Executive Committee, consisting of mayors, managers, industry officials and others involved with education, research, and management in Lake Superior, was established to help guide the workgroup. Various sub-committees were formed around particular issues such as communication and “green” conferencing.

### **Conference Goals**

The overall conference goal was to work toward better integration of research, education, and management around Lake Superior so as to address those issues most critical to the lake. Issues selected included Areas of Concern, sustainability, toxic pollutants, non-point source pollution, water levels, watershed stewardship, human health, invasive species, habitat, fisheries, climate change and information management. Efforts were made to have equal numbers of talks on management, research, and education within each topic and to have balanced attendance at the conference from each of these audiences. To further the goal of integration, the main objective was to promote discussions on:

- Integrating research results into effective protection and restoration of Lake Superior;
- How management approaches and projects reflect priorities;
- The information needs of land and resource managers, and how this information could best be provided;
- The role of educators in ensuring that accurate information about Lake Superior is reaching the right audiences in the right way; and
- The role of citizen groups in protecting Lake Superior.

Several steps were taken to help achieve these objectives: ensure balance in the presentations between research, education, and management; schedule 30 minute breaks, an evening reception, and a banquet to allow for greater networking time during the conference; and schedule 90 minute workgroup sessions for researchers, educators, outreach staff, and managers to discuss issues, new ideas, and priorities within their group. Pre- and post-conference events were offered to attendees.

## Topic Development

A team of “topic shepherds” was identified for each of the 12 main topics addressed at the conference. The topic shepherds, selected from experts in the field, were given the task of developing a plan for their session to include discussions on education, management, and research, while covering the most important and current issues under that topic. Topic shepherds were also responsible for encouraging other experts to present, recommending the abstracts to be accepted for their session, and organizing the talks within the session. Overall, the session presentations were balanced nearly equally between research (30 abstracts accepted), education (29 abstracts accepted), and management (34 abstracts accepted).

## Attendee Characteristics

Over 440 people attended all or part of the conference, representing 72 communities in Canada and the U.S. Most participants were from Minnesota (187), Wisconsin (112), and Ontario (64), but with significant numbers from Michigan (28) and Illinois (17), and others from 10 additional states. Conference attendees were fairly equally distributed between land or resource managers (33%), educators (24%), and researchers (19%), with fewer local elected officials, non-profit organization representatives, consultants, and others. Attendees came from a variety of organizations, including universities (22%), federal and state/provincial governments (20% and 15%, respectively), non-profits and non-governmental organizations (9%), local governments (8%), K-12 educational institutions (7%), commercial/business/industry (6%), and tribes (5%), with 8% not listing an affiliation.

## Getting the Word Out

Advertising and marketing of the conference was largely limited to electronic means. A conference website was developed and updated with new information as needed. The website also included an e-mail sign-up for conference updates, which grew to 198 contacts. Existing listservs, such as the Great Lakes Information Network (GLIN), and the e-mail networks of everyone involved in conference planning were used to spread the word about the call for abstracts, registration, and other conference information. Many participating organizations also included conference announcements in their newsletters and/or on their websites. No paid advertising was used. Nearly half of evaluation respondents indicated that they heard about the conference through electronic means, with another 36% hearing about the event through personal communications with another individual. Residents, educators, and researchers were slightly more likely to have heard about the event through electronic means, while land managers were evenly split between electronic and personal communication.

## Public Involvement

Knowing that this event would be targeted toward those who have a professional interest in Lake Superior, some activities for the general public were scheduled to provide the public with opportunities to learn about the lake. Several events that were open to both conference attendees and interested members of the public were organized. For example, a kite-making workshop at the Great Lakes Aquarium was organized on the afternoon of October 28, 2007. This was led by

students and staff from Northland College. That same evening, collaborations with the non-profit organization Fresh Energy helped to bring polar explorer Will Steger to Duluth for an evening seminar on global warming. Mr. Steger was joined by several other speakers, including Dr. Lucinda Johnson from the Natural Resources Research Institute (University of Minnesota Duluth), who also co-chaired the climate change session at the conference. Monday evening (October 29, 2007), photographer Craig Blacklock gave a public presentation, using some of his newest art and video of Lake Superior, and spoke about the need for conservation along the coast. During the entire conference, an art room was open for public and participant use, featuring Lake Superior-themed art from over 24 regional artists, and screenings of 10 Lake Superior-related videos. All events were well-attended, with approximately 200 participants attending the global warming seminar.

### **Green Conference**

From the beginning, it was agreed upon that the event would have the smallest impact on the environment possible. The conference environmental statement included aspects of waste management, using locally-grown and/or produced foods, and making the event carbon-neutral through minimizing energy requirements and purchasing offsets. This “green” approach affected many conference decisions, including the hotel chosen, menus, printing and advertising, and the conference venue.

The conference was held at the Duluth Entertainment and Convention Center (DECC), a leader in environmental stewardship. All food waste from the event was composted, everything that could be recycled was recycled, bulk containers were used in place of single-serving disposable packages for such things as sugar, cream, cream cheese, butter, fruit juice, and yogurt, and all surplus food from the meals and breaks was donated to the local food bank. The DECC sought out new suppliers for many food items served at the conference, in an attempt to use as many locally-grown or produced products as possible. In the end, of 84 menu items, 62 (74%) were locally grown or produced (within MN or WI). Of the 22 items (26%) that were not local, half were certified organic.

Carbon emissions from the event were estimated at 75 tons, covering travel of participants, materials used and produced for the conference, and energy required for food production. (Considering that locally-grown and produced foods were used as much as possible, it is expected that this number may be an overestimate but significant research is required to confirm this). Offsets totaling 75 tons are being purchased from Native Energy to build wind energy projects. As an additional carbon offset, but also to replace trees used for paper used at and in preparation for the conference, 300 trees and fencing for tree protection are also being purchased for the Flute Reed Partnership, a local watershed group in Hovland, MN, to plant in the spring of 2008.

Other steps were taken to reduce the overall impact of the conference. The hotel was chosen based on its distance to the conference center, the fact that it was connected directly to the DECC through the skywalk system in case of unfavourable weather, and because it had shuttles to and from the local airport. Bags and folders were not provided to participants, but publications of interest were available for those who were interested. A book of abstracts or list of attendees

were not printed for the event, but were made available online instead, along with the presentations. Attempts were made to organize carpools, and chartered buses, but these drew little interest. Prizes were offered for those who traveled the farthest distance under their own power, which led to bikers, walkers, carpoolers, roller skiers, and “scooterers”. Participants were asked to bring their own nametags to the event, with additional prizes given to the most interesting nametags. Materials were made available onsite for those who forgot to bring a nametag.

### **Plenary Session Day One: Setting the Stage (October 29, 2007)**

Each day of the conference began in plenary session, with day one setting the background for discussing the most the critical issues facing the lake. After a welcome from Duluth’s Mayor Herb Bergson, U.S. EPA Region 5 Regional Administrator Mary Gade charged the participants to find ways to “protect, preserve, and maintain this international treasure,” while working together across boundaries. The opening keynote speaker, G. Tracy Mehan III, the former U.S. EPA Assistant Administrator for Water and former director of Michigan’s Office of the Great Lakes, spoke of the need to find new ways to address problems by looking for new partnerships across disciplines. He also advocated pursuing technical and social innovation so as to adapt to and mitigate a changing environment. He concluded with the thought that mitigating and adapting to climate change will require resilience in communities and technical, economic, and social improvisation to meet the challenges that arise.

Mr. Mehan’s talk was followed by a panel offering perspectives on past and future states of Lake Superior. Mark Ebener, from the Inter-Tribal Fisheries and Assessment Program (Chippewa/Ottawa Resource Authority), described how the Lake Superior fishery has changed over time, while relating the effects of new species on the ecosystem. He also described how stormwater runoff has had, and continues to have, a big impact on the ecosystem. Dr. Deborah Swackhamer, with the University of Minnesota’s Institute on the Environment, described the legacy of toxic contaminants in Lake Superior and how Lake Superior is different than the other Great Lakes. She described how our understanding of the lakes has changed over time, and the growing concern over many contaminants of emerging concern, such as fire retardants, pharmaceuticals, plasticizers, and personal care products. Dr. Swackhamer message concluded with the hope that we will learn from our past and carefully evaluate new chemicals before they are released into the environment. Dr. Carl Richards, from the U.S. EPA Mid-Continent Ecology Division, wrapped up the session with a discussion about the ongoing work to assess how the Lake Superior ecosystem is functioning and predictions about how it will change in the future. He also raised questions about whether the right things are being measured in the right way, and whether there is infrastructure in place to share this information effectively.

### **Day One Concurrent Sessions**

#### *Geographic Information Systems, Great Lakes Observing System, and Information Management*

Tom Kralidis, with Environment Canada, kicked off the GIS session with a discussion of how the Open GIS Consortium (OGC) has changed how governments and other organizations use

spatial data. The session delved into internet applications and web feature service, online spatial data, and interactivity, with examples including the COASTAL GIS and Lake Superior GIS Projects, the Lake Superior Circle Tour, COASTWATCH, and GLIFWC-MAPS.ORG. Critical needs identified include addressing long-term funding and management, and acquiring new data across the basin. Extension education and outreach using GIS data, and making data more readily available for use by the public and decision-makers were discussed as key opportunities that should be pursued.

### *Sustainability*

The Sustainability Session began with a discussion on a paradigm shift in economic development that is driven by sustainability. This “Fourth Wave” offers a new lens through which individuals and public, private, and non-profit organizations can look through during their decision-making processes. Measuring sustainability was featured during the session as well, with Martin Nantel of Environment Canada discussing the Binational Program’s Sustainability Framework, and Sarah Brace (Puget Sound Partnership) describing how Puget Sound uses ecosystem indicators to describe “What is Happening?”, “How Does This Affect Me?”, and “What Can I Do?”. Speakers also described several local initiatives and opportunities for sustainable development, such as the Sustainable Chequamegon Initiative, focusing on creating a sustainable regional community. The importance of moving toward a sustainable future was a common theme throughout the session, with serious ramifications to our environment, economy, and social institutions if this isn’t considered.

### *Non-Point Source Pollution/Stormwater Runoff*

Presentations in this session were varied and included nitrate levels in Lake Superior, interactive real-time water quality data visualization, regional stormwater education partnerships, managing woodlands, constructing rain gardens, sand beach dune protection and restoration, and watershed management. Each presentation related directly to how Lake Superior lands are being used, how this use is affecting Lake Superior, and what can be done to reduce these impacts, either on private lands or in the communities. Best Management Practices (BMPs) are vital to reducing these impacts, but they must work on clay and shallow bedrock soils (which requires effective assessment and monitoring of these BMPs), and they must be maintained (which requires funding). Education, in particular hands-on approaches, can be very effective at helping youth and the public understand how they can help protect Lake Superior. Watershed approaches, as employed by the Regional Stormwater Protection Team and used in the Marengo River Watershed Test Case, can be effective from both educational and management perspectives.

### *Toxic Pollutants*

As highlighted in the plenary session, toxic contaminants continue to pose threats to humans, wildlife, aquatic species and other organisms in the Lake Superior basin. Contaminants of emerging concern, endocrine disruptors, and mercury were highlighted in this session, as well as monitoring, reduction strategies, and community activities to deal with these and other contaminants. Some good news was reported: the levels of substances of emerging concern, while increasing in Lake Superior, are lower than in the other Great Lakes, and community level

activities to improve access to recycling and proper disposal of household hazardous wastes are occurring in many communities. Difficult challenges still exist, however, with little community ability and activity to deal with toxic contaminants in the numerous small communities all around the basin. Important new research shows that effluent effects on reproduction in Lake Superior fish are similar to the effects of fish exposed to high levels of female hormones, i.e., reproductive and developmental problems.

### *Fisheries and Aquatic Ecology*

Given that there are entire conferences focusing on the Lake Superior fishery, this session focused on key elements of the ecosystem, and some of the major efforts occurring around the lake to manage, monitor, and rehabilitate the fishery. Dr. Mary Balcer (UW-Superior) started the session by discussing Lake Superior's lower trophic levels, the organisms that provide the major source of food to support fish populations in the lake. While other Great Lakes are experiencing dramatic declines in these organisms, Lake Superior's populations have remained relatively stable, potentially due to the inability of zebra or quagga mussels to thrive in the deepwater portions of the lake. The nearshore zone of the lake was discussed in detail as well, a critical part of the lake which comprises less than 18% of the area but is a critical area of productivity and which has been the focus of most commercial and recreational fishing pressure. This area is recovering from past food web perturbations and moving toward a more natural state, but the existence of invasive species will likely prevent full recovery. States, tribes, and federal governments are active in fisheries work on Lake Superior, with significant efforts to rehabilitate brook trout, walleye and lake sturgeon populations. Key legislation such as the *Canadian Species At Risk Act*, which protects rare or endangered species in Lake Superior, such as the kiyi, shortjaw cisco, blackfin cisco, deepwater sculpin, and lake sturgeon, has been passed, and significant work has occurred on engaging the public in making fisheries management decisions.

### *Water Levels and Withdrawals*

During 2007, Lake Superior reached all-time record low-water levels. Speakers in this session shed light on historical lake levels, how water levels are managed in the lake, and impacts of low water levels to wetlands and shipping, in particular. Since 1921, outflows of Lake Superior have been completely regulated by the international Lake Superior Board of Control. Current targets are aimed at keeping Lake Superior and Lakes Huron and Michigan within historic ranges, while preventing Lake Superior from rising above, or falling below, certain limits. Full control of Lake Superior water levels is not possible, however, since runoff, precipitation, and evaporation cannot be controlled or accurately predicted. Climate change scenarios generally predict lower water levels throughout the Great Lakes (though uncertainty exists); dredging cost estimates to maintain shipping channels at these predicted levels range from \$75 to \$125 million, but specific limits exist on dredging depths, and other infrastructure and dredge spoil issues remain. Dr. Richard Stewart (University of Wisconsin-Superior) outlined these issues, and how the Great Lakes shipping community can adjust to these changes. Wetlands are also affected by even small lake level changes, but Doug Wilcox (U.S. Geological Survey) presented information showing how coastal wetlands along Lake Superior have adapted to fluctuating water levels, and even require fluctuations to maintain a diverse range of habitats that can support numerous species of fish and wildlife. In concluding this session, William Werrick described the recently



commenced International Upper Great Lakes Study, as initiated by the International Joint Commission, to “investigate improvements to the regulation of the outflow of Lake Superior given the impacts regulation may have on water levels, flows, and consequently affected resources throughout the upper Great Lakes system.” The final report is expected in 2012.

## **Plenary Session Day Two: Climate Change in Lake Superior (October 30, 2007)**

From stormwater to human health, each and every topic discussed at the conference was affected to some extent by climate change. This session was organized to help participants understand the effects of climate change on the Lake Superior ecosystem from a broad perspective. More detailed discussions were saved for the climate change concurrent session following the morning plenary. Dave Phillips of Environment Canada described the changes being seen from a meteorological perspective, and discussed the social issues about the perception of and adaptation to climate change. Mr. Phillips ended with a call for action to reduce carbon emissions and adapt to a changing climate, while maintaining a message of hope that what needs to be done can be done. Linda Mortsch of Environment Canada described the latest results from the United Nation’s International Panel on Climate Change (IPCC), and what climate change means for the Lake Superior basin. According to the IPCC, “warming of the climate system is unequivocal...” and requires a balanced response, including mitigation to reduce emissions and adaptation to respond to the impacts to infrastructure and ecosystems. Impacts in the Great Lakes basin, predicted and observed, include warmer air temperatures, more precipitation, less snowpack, more intense rain events, greater evaporation, warmer water temperatures, changes in thermocline development, and reduced winter ice cover, among others. Past climate is no longer a reliable guide to the future, according to Ms. Mortsch; climate change information needs to be mainstreamed into planning and decision-making. Dr. Joel Scheraga of the US EPA focused on the necessary adaptations to climate change. He also focused on the need for cities, municipalities and others to incorporate climate change into planning and decision-making, and to take adaptation actions now. US EPA is currently undertaking a major assessment of the impacts of climate change on the nation’s water quality.

## **Day 2 Concurrent Sessions**

### *Areas of Concern*

Lake Superior has eight Remedial Action Plan (RAP) Areas of Concern (AOCs): three in the U.S. – St. Louis River shared by Minnesota and Wisconsin, and Torch Lake and Deer Lake in Michigan; four in Canada (Ontario) – Thunder Bay, Nipigon Bay, Jackfish Bay, and Peninsula Harbour; and one binational AOC – the St. Marys River. The AOCs are in different phases of planning, assessment, and implementation of remedial actions. This session emphasized four common priority themes across the AOCs: contaminated sediment; habitat degradation; community engagement; and delisting criteria/beneficial use impairment (BUI) assessment. Speakers presented on contaminated sediment assessment and management issues/processes; fish and wildlife habitat assessment and restoration; community engagement processes, including both Public Advisory Committee/Council perspectives and those of other stakeholders; and delisting criteria/BUI assessment processes. Case studies highlighted the Thunder Bay, St. Marys River, and St. Louis River AOCs’ public involvement and participation.

### *Watershed Stewardship*

Watersheds provide a geographically-defined, ecologically-based unit for managing water quality and associated natural resources. In addition, watersheds are a logical unit for addressing many types of human activities and impacts. Speakers in this session described their educational programs to help landowners, local officials, students, and teachers understand watersheds and how they function, and help them make decisions to protect water resources. Dr. Ron Sundell (Northern Michigan University) focused on the importance of communication between researchers, educators, and resource managers around the lake, and he proposed developing a collaborative strategy to link the various institutions around Lake Superior, in an attempt to foster greater dialogue and communication.

### *Human Health*

The Human Health session included beach monitoring and sources of *E. coli*, amphibole mineral fiber issues, fish consumption advisories, and rip currents. Some highlights include the benefits of eating whitefish from Lake Superior, given their relatively low level of contaminants and high amounts of beneficial omega-3 fatty acids, and the information shared on how to identify, avoid, and escape rip currents. One particularly interesting proposal was the development of a cisco and whitefish fishery, which would benefit the tribes and provide a healthy alternative fish source to the market. The challenge of communicating health risks without resulting in a complete avoidance of the behavior was a critical point of discussion—fish consumption, swimming with the possibility of rip currents or *E. coli* all present as risks to the “user,” even though the risks are low. There is a need to ensure that messages are presented accurately, so that citizens take the appropriate steps to minimize risks, but don’t become so overly fearful that they avoid fish consumption or swimming altogether.

### *Habitat Conservation and Species Management*

This topic area included a wide variety of presentations relating to terrestrial and aquatic plants, animals, and their habitats. The session addressed issues relating to status and trends, along with associated inventory and monitoring efforts and needs, research and management results and case studies, and educating students, the public, and decision-makers about habitat and species to ensure that decisions now and in the future are informed by knowledge about these issues. Three key messages regarding public-private partnerships emerged from the session: government cannot do it all alone; landowners need to be in the information loop so they understand what’s going on and their permission must be sought for any actions that affect their properties; and local officials must be made aware of activities in their communities. Educational needs include a desire to make presentation materials such as those used during this session available for educators, and the value in having researchers come to classrooms to describe their research to students.

## *Invasive Species*

Presentations focused on the history, ecology, economic impacts, and control of invasive species in Lake Superior. In the lake, 31 plants, 25 fish, 22 invertebrates, and 9 diseases have been discovered that are not native, with 55% of invasive species being introduced unintentionally. Invasive species have been introduced in a variety of ways: 36% in ballast water, 22% through cultivation, and 14% were stocked. Unfortunately, the rate of introduction has been steadily increasing in the past 30 years, from 0.7 per year to 1.8 per year. Sea lamprey and smelt are the two most significant invasive species in Lake Superior, but others are causing ecological harm as well. New technologies are helping with control; pheromones are being explored for use in controlling sea lampreys. The economic cost of invasive species in Lake Superior is significant. Speakers listed public education as a priority, with the suggestion that education is more important than regulations in controlling invasive species introductions. Suggested management implications included using climate change information in new aquatic invasive species policies, and addressing all mechanisms of introduction.

## *Climate Change*

The first half of this session described specific impacts of climate change in the region, followed by presentations addressing adaptation and mitigation efforts. Ice cover on inland lakes has decreased in past decades as winter temperatures have increased; earlier ice breakup and later ice-on dates have been documented on lakes around the region. Water temperatures in Lake Superior have also warmed in the past decades, and this trend was shown to be closely linked to ice cover on the lake. Phytoplankton and amphibian populations may also see changes under warmer climates. Darryl Matson described the City of Thunder Bay's efforts to mitigate climate change through energy reduction, energy conservation, and recycling. Al Douglas described how communities can assess their vulnerability to climate change and develop adaptation plans, and Cindy Hagley (University of Minnesota Sea Grant Program) described *A View From the Lake*, an educational program that focuses on climate change, discussing how the message can be shaped to help participants understand the importance of both mitigation and adaptation.

## **Facilitated Workgroups Results**

At the conclusion of the concurrent sessions, 90-minute workgroup sessions were held for each of the conference's target audiences: researchers, land or resource managers, outreach and public education, and K-12 educators. Each session was designed to build off of the information presented at the conference up to that point, and to give each of these separate audiences a chance to discuss the important pieces they had picked up, and share any needs, gaps, or opportunities that they see.

## Plenary Session Day Three: Next Steps, Sustainable Communities and Economics (October 31, 2007)

The final day commenced with leaders from each facilitated workgroup sharing the main points of their discussions the prior day. David Ullrich, Executive Director of the Great Lakes and St. Lawrence Cities Initiative, talked about his work with Great Lakes cities' mayors to protect and restore the Great Lakes. He then introduced a panel of local government representatives from the Cities of Duluth, Bayfield, Superior, and Thunder Bay, and Fond du Lac Band of Lake Superior Chippewa. Each speaker shared thoughts on how their community is attempting to work towards sustainability and protect Lake Superior. It is clear that each community recognized the importance of protecting Lake Superior, and each has taken important steps to this end.

John Austin, of the Brookings Institute, provided the final presentation, discussing the economic future of the Great Lakes. According to Mr. Austin, The Great Lakes region has unique attributes that really matter in today's economy: an educated population, transportation infrastructure, fresh water, and natural attributes that are amazingly valuable in today's economy. Being on the water is one of the engines of today's economy: people want to be near water. Waterfronts, transit and transport, historic buildings, urban streets, and civic and cultural institutions are all amenities that young professionals want in the places they live; our older industrial cities have (or can have) all of these. Economic analysis of the Great Lakes region found that if the main parts of the Great Lakes Regional Collaboration (GLRC) Strategy were accomplished, including fixing sewer overflows, protecting wetlands, and cleaning up all AOCs, at a current cost of \$26 billion, the economic benefit would be \$80-100 billion for the region. Mr. Austin recommends the following blueprint for renewing the Great Lakes region: growing the talent our nation needs to compete in the world, fund the research and development to create new, clean, and sustainable technologies, sustainably develop the "freshwater coast" by following up on the GLRC, developing the infrastructure such as transit and urban housing needed for this renewal, fuel the binational Great Lakes economy, initiate universal pensions and health care, and provide workforce training and encourage labor adaptability.



Figure E-1. David Ullrich, Executive Director of the Great Lakes and St. Lawrence Cities Initiative welcoming Lake Superior mayors, tribes and local elected officials at the MAGLS conference. Photo credit: Elizabeth LaPlante, US EPA.

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