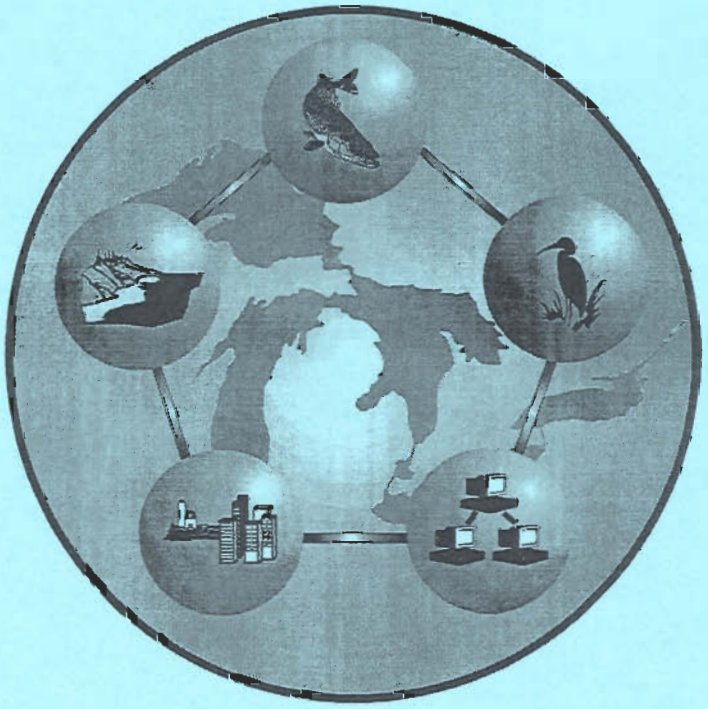
US EPA ARCHIVE DOCUMENT

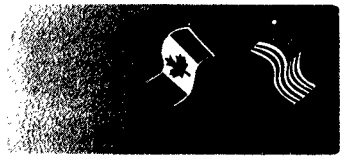
STATE OF THE LAKES ECOSYSTEM CONFERENCE '96

November 6-8, 1996



CONFERENCE PROCEEDINGS

SOLEC '96 - The Year of the Nearshore



COOPERATING TO IMPLEMENT THE GREAT LAKES WATER QUALITY AGREEMENT
MISE EN OEUVRE DE L'ACCORD SUR LA QUALITÉ DE L'EAU DES GRANDS LACS

March 1997

Dear SOLEC '96 Participant,

Please find enclosed a copy of the Conference Proceedings from SOLEC '96. These proceedings represent the first step in the information dissemination process following SOLEC '96. Reactions and comments from participants have been summarized, and contributions from keynote speakers have been captured.

This is not a scientific document. The intent is to provide the reader an opportunity to evaluate and discuss the ideas presented at the conference. From here, the authors will evaluate, discuss, and test the comments against other information and knowledge, and incorporate the ideas into the conference papers as appropriate. A copy of these proceedings can also be accessed via the SOLEC website at <http://www.cciw.ca/solec/>.

Although the 1996 State of the Lakes Ecosystem Conference is over, the SOLEC process continues. We look forward to working with you to continue moving the Great Lakes agenda forward.

Sincerely,

Harvey Shear
SOLEC '96 Co-chair

Paul Horvatin
SOLEC '96 Co-chair

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FEEDBACK REQUEST

As a follow-up to the 1996 State of the Lakes Ecosystem Conference, the SOLEC '96 steering committee is interested in finding out how/if participants are making use of the information which was presented. If you could take a moment to forward a brief response to this question (e.g. detailing how your organization's programs or activities were influenced by the information from SOLEC '96), it would be greatly appreciated.

**** Thanks to those who responded to the e-mail version of this notice. ****

PLEASE FORWARD RESPONSES TO

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STATE OF THE LAKES ECOSYSTEM CONFERENCE

SOLEC 96 - The Year of the Nearshore

November 6-8, 1996

CONFERENCE PROCEEDINGS

PREPARED BY:

Nicole Swerhun and The LURA Group, Toronto

FOR:

Environment Canada
United States Environmental Protection Agency

January 1997

Ce document est aussi disponible en français.

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DISCLAIMER

THIS IS NOT A SCIENTIFIC DOCUMENT

These proceedings contain a summary of the information exchanged at the 1996 State of the Lakes Ecosystem Conference. Reactions and comments from participants have been summarized, and contributions from keynote speakers have been captured. The intent is to provide the reader an opportunity to evaluate and discuss the ideas presented at the conference. Publication of these proceedings does not imply that the governments of Canada or the United States endorse their contents.

1.0 INTRODUCTION

From November 6 to 8, 1996, the governments of the United States and Canada hosted the second, biennial State of the Lakes Ecosystem Conference (SOLEC '96). SOLEC '96 represents an important component of the ongoing commitment between the governments of Canada and the United States to report on the progress of their efforts to protect and restore the quality of the Great Lakes ecosystem.

1.1 CONTEXT

Canada and the United States have worked cooperatively to manage the Great Lakes basin ecosystem for decades. Commitments which were made under the 1909 Boundary Waters Treaty were intensified in 1972 with the signing of the Great Lakes Water Quality Agreement (GLWQA). In signing the original GLWQA (and the subsequent revised Agreement of 1978 and the amending Protocol of 1987), the two governments committed to restoring and maintaining "the chemical, physical and biological integrity of the waters of the Great Lakes basin Ecosystem."

Under the GLWQA, Canada and the US also agreed to adopt an ecosystem approach to management of this important resource. This means that the two governments have a commitment to improve understanding of the complex ecological relationships that comprise the Great Lakes basin, and to use that understanding to minimize the negative impact of human activities on the Great Lakes ecosystem. *SOLEC was created as part of the process by which those commitments would be met.*

1.2 SOLEC '94

The first SOLEC was held in October, 1994 in Dearborn, Michigan. Setting the purpose and tone for future conferences, SOLEC '94 brought together leaders and decision makers from all sectors of society to discuss and exchange information on the Great Lakes ecosystem in an informal, productive, and collaborative manner. At that time it was concluded that:

- Although the state of the Great Lakes ecosystem had generally improved, full restoration was still a distant goal;
- Over the previous 30 years, dramatic achievements had been made in a number of areas, such as: nutrient reduction, improvements in public health, declines in contaminant levels in fish and wildlife, and a resurgence of some fish and wildlife populations;
- Habitat loss, species and genetic loss, and exotic species introductions had impacted the Great Lakes ecosystem;

- Problems persisted in several areas including: degraded aquatic community health, the continuing loss of wetlands, fish consumption advisories, and effects of chemicals on fish, wildlife, and possibly humans.

SOLEC '94 also illustrated the importance of examining the nearshore areas of the basin in greater detail.

1.3 SOLEC '96

Building on the findings of SOLEC '94, SOLEC '96 focused on the nearshore areas of the Great Lakes basin. The nearshore zone includes the relatively warm and shallow waters near the shore, coastal wetlands, and the land areas directly affected by lake processes. These areas represent the most diverse and productive parts of the Great Lakes ecosystem, and provide support for the most intense human activity. As a result, the areas that contain the greatest biological resources are subject to the greatest stress.

The objectives of SOLEC '96 were to:

- Inform local decision-makers of environmental issues that affect nearshore areas of the Great Lakes basin;
- Provide information on the state of the nearshore ecosystem to help strengthen decision-making and management within the basin;
- Develop support for an integrated environmental information system to help direct plans and programs;
- Provide information on existing Great Lakes strategies and build cooperative actions needed to strengthen and complement them; and
- Provide a forum for improved communication and network building for involved groups and individuals within the basin.

The SOLEC '96 process began with the development of five binational working papers addressing the following key subject areas: nearshore waters; coastal wetlands; the land by the lakes (terrestrial nearshore); changing land use; and information and information management. An integration paper identified crosscutting issues from each background paper, synthesized key themes, and introduced major ideas for consideration during the conference.

The next step in the SOLEC '96 process was the conference itself. Assessing the state of an ecosystem is a complex task at the smallest scales - attempting to get an accurate description of the state of the entire Great Lakes ecosystem is an even larger challenge. The key to successfully meeting that challenge hinges on information exchange between stakeholders. At SOLEC '96, information was contributed in a number of

different forms, by a number of different stakeholders (see Appendix A for full SOLEC '96 agenda):

- The authors of the background papers laid the foundation for discussion by presenting the key findings from their research regarding the nearshore;
- Keynote speakers shared insight gained through years of dealing with environmental issues;
- Displays profiled the diversity of efforts currently dedicated to the Great Lakes ecosystem;
- Three different sets of workshops gave participants the opportunity to share their experiences and insights regarding issues facing the Great Lakes nearshore; and
- A panel session of individuals from five different sectors reflected on what they had learned from SOLEC '96, and answered questions from conference participants.

Although the 1996 State of the Lakes Ecosystem Conference is over, the SOLEC *process* continues. The information presented at SOLEC is created through ongoing efforts to prioritize research needs, to allocate resources to meet those needs, and to disseminate the results. The information available to assess the state of the Great Lakes is always changing, and the SOLEC process is intended to insure that decision makers are made aware of those changes.

These Proceedings represent the first step in the information dissemination process following SOLEC '96. The authors of the five background papers will use information from the conference to produce final versions of the background papers, and in the summer of 1997, the Parties to the GLWQA will publish the second State of the Lakes Report.

Throughout all these years of binational cooperation, we have learned to recognize and to respect each other's differences. And there can be no denying that these years of open dialogue made substantial progress in the Great Lakes basin possible.

SOLEC '96 continues that binational dialogue. And it can only enrich and strengthen our partnership as we approach the 21st century, searching for common ground and seeking lasting solutions to problems that continue to plague the Great Lakes ecosystem.

Valdus V. Adamkus
Regional Administrator
U.S. EPA Region 5

2.0 PARTICIPANT PROFILE

Sharing ideas and knowledge between stakeholders strengthens decision-making and management within the Great Lakes basin. To encourage the involvement of individuals with a number of different interests, SOLEC '96 targeted participants from the following sectors: lakeside municipalities, recreation associations, wildlife conservation groups, commercial fishing businesses, non-government organizations (health, labour, environment), agriculture organizations, industry, academia and educators, and professional associations. A total of 482 individuals participated at the Conference. A breakdown of participation by country and by sector, is presented below.

PARTICIPATION BY COUNTRY

	Number of Delegates	Percent
Canada	216	45%
US	263	55%
Mexico	3	0.1%
Total	**482**	**100%**

PARTICIPATION BY SECTOR

	Number of Delegates	Percent
Federal Governments	123	25.6%
Provincial/State Governments	74	15.4%
Municipalities	45	9.2%
Quasi-Government/IJC	44	9.1%
Industry	39	8.1%
Academia/Research	30	6.2%
Wildlife/Conservation	27	5.6%
Environmental	23	4.8%
Public Advisory	11	2.3%
Professional Associations/Societies	10	2.1%
Recreation/Commercial Fishing	10	2%
Foundations	8	1.7%
Native/Aboriginal	7	1.5%
Health	4	0.8%
Agriculture	3	0.6%
Other	23	4.8%
Total	**482**	**100%**

3.0 KEY THEMES FROM SOLEC '96

Much valuable information was exchanged at SOLEC '96. Two and a half days of discussion among hundreds of participants generated many ideas, issues, and priorities regarding the Great Lakes nearshore. The key themes listed below (in no particular order) arose repeatedly throughout SOLEC '96.

Dealing with the urgent issues

The decision to focus on the nearshore proved timely. Nearshore areas represent the most diverse and productive parts of the Great Lakes ecosystem. These areas also provide support for the most intense human activity. As a result, the areas that contain the greatest biological resources are subject to the greatest stress.

Urgency for action

Now is the time to act. Immediate action is needed on two fronts. Where there is agreement on steps needed to protect and restore the ecosystem, those steps should be taken now. Action is also needed to protect areas where restoration efforts have already yielded successful results. Where existing information is not sufficient to support decisions and implementation, immediate action must be taken to identify information gaps and obtain the information needed.

Locally based action

It is essential that ecosystem management happen at the local/community level, with support from all levels of government. Municipal governments have a key role to play in this.

Indicators

A common set of Great Lakes ecosystem health indicators is needed to measure progress. Indicators currently in use need to be brought together, and the development of new indicators needs to be coordinated throughout the basin. The indicators need to be quantifiable and results oriented. The rationale used to select the indicators needs to be transparent, and consideration needs to be given to the relevance of different indicators at different scales.

Land use	Current land use practices represent the single largest threat to the Great Lakes basin ecosystem. Land use needs to be more efficient and development needs to be more sustainable.
Resources are declining	Both financial and human resources are in short supply. Public and private sector budgets are shrinking, and it is becoming increasingly important to prioritize where resources are dedicated. Cost effectiveness based upon environmental results needs to be incorporated into decision-making processes.
Cooperation and partnerships are key	Given the complexity of issues challenging the nearshore area, a multidisciplinary approach is needed if solutions are to be found. The establishment of new partnerships is essential in bringing new ideas and new approaches to the problem solving process. Efforts need to be integrated within a multi-stakeholder context in pursuit of agreed upon objectives.
Need long term perspective	In order to recognize changes in the health of the Great Lakes nearshore, it is necessary to compare the current state of the ecosystem with the state of the ecosystem at earlier dates. Commitments to long term monitoring and data collection are necessary for assessing progress and reprioritizing efforts.
Need quantifiable information	Conclusions regarding the state of the Great Lakes ecosystem need to be based on high quality qualitative and quantitative information.
Need ecosystem goals	Before we can work toward a desirable end state for the Great Lakes ecosystem, we first have to agree on what end state would be most desirable. It must also be recognized that with respect to ecosystem health, end results are difficult to predict.
Focus on prevention and preservation	Years of reactive measures to ecosystem problems have provided results. The time has come to build on the success of restoration efforts, and focus on preserving and protecting the less impacted areas which remain.

Need to improve communication	Communication within agencies and between agencies needs to be improved. This can be achieved by using a common vision and common vocabulary to define and to address key issues. The public and all other interested parties must be better informed and more involved in this process.
Importance of decision-making scale	Ecosystem management must be integrated at a number of different scales, from local watershed management to management of whole ecoregions.
Non-point sources of pollution	Action is well underway to address point sources of pollution. The time has come to focus more efforts on non-point sources.

This gathering is targeting on the right issues, and in the right context...It's good to see the broader conservation community in the Great Lakes turning its collective eyes landward...

...The fact is, the Great Lakes region ranks as an important global conservation priority. It supports more than 130 species and ecological communities that are rare or imperiled, with more than half of these species endemic to the Great Lakes region...there can be no question of the collective significance of these populations, nor of the region's value as a conservation target.

John Sawhill
President & CEO
The Nature Conservancy

4.0 WORKSHOPS

SOLEC '96 workshops focused on three different perspectives: the background papers, lake-by-lake issues, and priority issues crosscutting the entire Great Lakes basin. Each of these three perspectives was further subdivided in order to give participants an opportunity to interact in smaller groups with others who shared similar interests. A summary of the discussions from each workshop is presented here.

4.1 BACKGROUND PAPER WORKSHOPS

This section presents highlights from each of the background papers that were prepared for SOLEC '96. In their entirety, the background papers describe in detail the current status and major trends in their respective subject areas (see Appendix B for list of papers and lead authors).

SOLEC participants had an opportunity to comment on the contents of each of the papers during facilitated workshops dedicated to each paper. A summary of the discussions which occurred during the workshops immediately follows the highlights from each background paper. Where participants have been identified as "agreeing", this refers to activity in individual workshops, as opposed to the overall Conference itself.

4.1.1 NEARSHORE WATERS

Key messages from the Working Paper

- The nearshore waters are a distinct physical zone where pollutant effects are restricted from mixing easily with open waters.
- Beach closings, while fewer in number, are still occurring.
- Blooms of blue green algae have started to occur in western Lake Erie.
- Impingement and entrainment of larval and juvenile fish in power plants is still a major stress in some lakes.
- Non-native species represent a major stress on nearshore waters.

Highlights of Participant Feedback

Key steps to developing better measures of nearshore waters ecosystem health include:

- Better defining of ecosystem health;
- Seeking agreement on what is expected from nearshore waters;

- Varying the scales at which objectives are set (e.g. basinwide, lakewide, regionwide);
- Developing indicators and measuring them;
- Developing monitoring programs which are linked to management decisions; and
- Improving the "gas gauge" approach to indicators by showing the direction in which change has occurred relative to a defined endpoint.

Good indicators share the following attributes:
- Developed on a scientific basis;
- Meaningful to the public and politicians;
- Reflect public values, including economics;
- "Transparent" development; and
- Clear causal relationships to ecosystem stressors.

Potential stressors inadequately addressed in the Working Paper include:
- Livestock management;
- Forestry practices;
- Mineral extraction;
- Airborne sources (e.g. deposition of mercury from coal fired power plants);
- Natural stressors;
- Contaminated sediments;
- Loss of root mass; and
- Extraction of logs from the lake bottom (e.g. Lake Michigan and Lake Superior).

Key steps needed to address sustainable development in the nearshore include:
- Developing and using a consistent definition of sustainable development;
- Using existing tools (e.g. sewage treatment, low flow toilets, ploughing practices) to put our knowledge to practice;
- Developing economic incentives to facilitate behaviour change;
- Overcoming our reluctance to make judgment calls without perfect information.

Investments in sewage treatment plants have not prevented beach closings and drinking water pathogens because:
- Non-point sources such as surface run-off, livestock management, bather density, gull droppings, combined sewer outflows, contaminated sediments and air toxics contribute to the problems;
- Bacteria in the natural environment make bacteria-free bathing unrealistic;
- Policies for beach closings can be inconsistent; and
- Natural eutrophication may contribute to the problems.

Key actions:

- Define an overall vision for the Great Lakes ecosystem;
- Define the goal towards which we are working ("pristine" condition may be unreasonable);
- Develop ecosystem indicators;
- Assess what "ecosystem" would emerge if all jurisdictions fulfilled their commitments (what future is already on the books?);
- Educate people about what needs to be done to control non-point sources; and
- Look at 20 year trends in ecosystem health data and assess anomalies.

4.1.2 THE COASTAL WETLANDS

Key messages from the Working Paper

- Wetlands are generally defined as land that is saturated with water long enough to promote aquatic processes as indicated by poorly drained soils, water-loving vegetation, and various kinds of biological activity adapted to wet environments. Coastal wetlands are also known as marshes, swamps, and peatlands.
- Human activity has increasingly degraded and destroyed coastal wetlands over the last century. Efforts to mitigate the stress on wetlands have had varied success. It is estimated that 83 percent of the original 3900 hectares of western Lake Ontario marshland has been lost forever, generally due to urbanization.
- Natural stressors on coastal wetlands, such as fluctuating water levels, are essential to the proper functioning of wetlands. Regulation of lake levels is the most pervasive stressor of Great Lakes coastal wetlands.
- Coastal wetlands provide a sanctuary for living communities. For example, more than 90 percent of the approximately 200 fish species found in the Great Lakes are directly dependent on coastal wetlands for survival at some point in their life cycles.

Highlights of Participant Feedback

Water levels

Just as fires are necessary in certain terrestrial ecosystems, natural alternations in water levels are vital to the health of wetlands.

Biodiversity

Loss of biodiversity was recognized as the single largest consequence of water level regulation on wetlands. Other consequences include:

- Damaging impacts on growth of vegetation;
- Reduction in size/width of wetlands; and
- Reduction in productivity.

Human activities which have affected wetlands include:

- draining
- filling
- dredging
- diking
- armoring
- dam construction
- jetty construction
- road construction
- bridge construction

Potential mitigation measures suggested were:

- Incorporating wetlands management concepts into community planning and regional development;
- Increasing education/awareness of wetland values;
- Giving people better access in order to increase appreciation of wetlands;
- Using volunteer monitoring programs;
- Plugging old farm drains, filling ditches, and restoring hydrology;
- Establishing stewardship programs;
- Improving strength and enforcement of laws;
- Learning more about what First Nations and tribes are doing to preserve wetlands;
- Providing incentives to preserve wetlands;
- Identifying a leader to spearhead preservation of wetlands;
- Managing wetlands with respect to the surrounding ecosystem;
- Looking at cumulative effects of human activity; and
- Having politicians address environmental issues.

Indicators

It will be hard to identify cost-effective indicators of wetland quality. It is easier, but incomplete, to develop indicators of quantity. Both types of indicators are needed.

The following needs were identified:

- A common and generally accepted definition of "wetlands";
- Early warning indicators of wetlands distress;
- Indicators that address quantity and quality; and
- Community based indicators.

Participants also indicated that:

- There may be a need for different indicators for different decision makers (e.g. municipal level, federal level);
- Simple standards such as vegetative density, key wetland species, and percentages can be used to build straightforward monitoring programs;
- Monitoring programs should be standardized;
- It would be useful to designate benchmark sites for comparing wetlands;
- A system for monitoring habitat health needs to be developed; and
- Wetland quantity also has to be addressed.

4.1.3 NEARSHORE TERRESTRIAL - LAND BY THE LAKES

Key messages from the Working Paper

- The Great Lakes have approximately 16,000 kilometers of shoreline. Nearshore terrestrial zones (the land by the lakes) can be as narrow as a beach or as wide as a forest or dune field that extends many kilometers inland.
- The land by the lakes has historically been a focus for human habitation, recreation, and industry, and these uses will continue in the future. The health of the land by the lakes is degrading throughout the Great Lakes basin. A unique three-level approach, to evaluate the health of the land by the lakes, led to the following conclusions:

  The health of the nearshore terrestrial zone in four of the five Great Lakes was rated as deteriorating or poor. Only Lake Superior was rated positively.

  Over half of the 17 ecoregions in the Great Lakes basin are experiencing moderate to severe degradation.

  The health of 10 of the 12 types of ecological communities which are unique to the nearshore terrestrial area received a grade of C or lower (where F represents a failing grade).
- Reversing this trend will require a concerted international effort to establish a core set of protected areas along the Great Lakes coast, and coordinated shoreline management measures between these core areas.

Highlights of Participant Feedback

Still need to:

- Address sand transport and deposition;
- Check Illinois assessment of Lake Michigan to ensure a complete report (this is a missing piece);
- Include air deposition component;
- Address shoreline erosion rate;
- Include traditional knowledge from tribes and First Nations;
- Translate regional threats into a sustainable development plan;
- Clarify/recognize difference between human and natural stresses (e.g. water level flux); and
- Identify and address "killer stressors" or threshold stress levels beyond which the system/resource is lost.

Indicators
Indicators need to emphasize management decisions. Although some questions where raised regarding what data was used to determine ratings, the message was clear - nearshore terrestrial ecosystems are truly degrading.

How do we translate the paper into action?
- Plan at the local/regional level;
- Work with existing community leaders/groups;
- Integrate existing working paper into LaMPs and other existing programs;
- Develop directory of case studies/stewardship examples;
- Inventory and analyze all data from "biodiversity investment areas";
- Celebrate Great Lakes/Great Places Heritage Security Areas;
- Use existing communication tools; and
- Foster partnerships.

4.1.4 LAND USE

Key messages from the Working Paper

- Land use has become a key determinant of ecosystem health in the Great Lakes basin. *The varied uses representing industrial, commercial, residential, agricultural and transportation-related activities carry specific, significant and cumulative impacts for the Great Lakes, their tributary waters and nearshore areas.*
- About three-quarters of the Great Lakes basin's population lives in coastal communities and these places include areas of extensive residential and industrial development. *Land use in coastal areas of the Great Lakes is changing in response to the region's evolving economy and industrial restructuring as well as the relentless forces of urban sprawl.*
- Although it constitutes less than 10% of the land mass of the Great Lakes basin, the built environment poses one of the most significant stresses on the nearshore. Continuing growth of major metropolitan areas and the virtually uncontrolled sprawl of low-density residential areas and other development, result in increased air and water pollution and an irreversible commitment of land resources. *The adoption of a more compact urban form that relies on higher population densities, more mixed uses at the neighbourhood level and brownfields redevelopment, all within prescribed boundaries and existing infrastructure capacity, will make communities more sustainable.*
- Agriculture is a significant part of the basin ecosystem, however, land classified as farmland declined in the Great Lakes basin by 9.6 percent or more than 1.8 million hectares (4.5 million acres)between 1981 and 1992. *If significant levels of farmland conversion continue in the Great Lakes basin, the agricultural production base will decline and, along with it, the agri-food sector of the economy.*

- Though the intent of a land use planning process is to empower local governments to meet the needs of their communities, the result has been highly fragmented decision making, with little or no coordination to consider regional needs or regional consequences of local action or inaction. *Greater regional coordination and planning is needed so that local governments can work together and realize the benefits of regional planning as a part of the local planning process.*

- Planning systems that are intended to bring order to and ensure balance in development have not been able to overcome the current economic incentives and subsidies that promote inefficient urban sprawl. *More and consistent use of full cost, user pay development charges or impact fees and re-establishing the primacy of the comprehensive land-use plan for land-use and related hydrologic resource planning can help curb uncontrolled sprawl and degraded water resources as well as recreate unique and vibrant communities.*

Highlights of Participant Feedback

Shifting development from 'greenfields' to 'brownfields'

- Remove barriers to brownfield redevelopment by reducing environmental liabilities without lowering environmental standards;
- Ensure that the full costs of greenfield development are applied;
- Ensure that tax, development charges and other costs associated with development are applied fairly among communities and across jurisdictions;
- Promote the adoption and use of purchase of development rights for greenfields protection;
- Provide incentives for lenders to finance projects that have environmental risks;
- Establish creative tax policies and other financial and lending mechanisms that encourage and even link brownfields redevelopment and greenfields protection;
- Replace current zoning regulations that promote inefficient land use with those that promote efficient land use, such as encouraging mixed land uses at the neighborhood level, multi-family units, narrower streets, and multi-story buildings to increase the function and compactness of already developed areas;
- Make redevelopment areas more attractive through provision of good transportation, services, housing, and urban and social planning; and
- Educate developers, planners, politicians and residents (consumers) about the benefits of redeveloped communities and efficient lifestyles.

Integrating land Use Planning and Water Quality

- Ensure concurrency between water-related infrastructure and new development (i.e. ensure that new development, including roads and buildings, does not occur unless water-related infrastructure such as water and sewer lines and treatment plants are available or are planned for with adequate financing to serve that development);

- Protect water quality standards from rollbacks and strengthen/develop new standards for riparian corridor and urban stream protection;
- Encourage watershed-based land use planning where development is guided by the natural features and capacities of the watershed;
- Make development accountable for the full costs it imposes on the watershed;
- Engage in basinwide networking, education and information sharing within and among all sectors;
- Incorporate RAPs into local land use planning process and coordinate local planning throughout the basin through LaMPS;
- Collect water quality data that can be integrated into the land use process; and
- Design and redesign/retrofit development to meet water quality goals and objectives, such as reducing the amount of impervious surface, setback standards for wetlands and waterways, and separating storm and sewer water delivery systems.

Promoting Efficient Urban Form

- Educate residential and industrial/commercial market place, including voters, politicians and planners about the benefits of efficient development;
- Plan for land use based on preservation of natural systems as criteria;
- Ensure that full costs of new development are applied, including cumulative basin wide effects and intangibles such as transportation congestion; and
- Remove all subsidies, grants, tax breaks and other incentives that favour greenfield development.

4.1.5 INFORMATION AND INFORMATION MANAGEMENT

Key messages from the Working Paper

- Timely access to reliable data is critical for determining the past and current state of nearshore ecosystems. It is also necessary for defining and achieving future ecosystem management goals.
- Widely agreed upon indicators for measuring the state of the nearshore do not exist. Data which do exist have generally been collected for specific purposes by individual agencies. Their value in system wide assessments is questionable.
- Integrating data sets becomes important when participating in a multidisciplinary activity such as SOLEC, or lakewide management planning. In order for data to be useful, they must be collected and automated to specified and agreed to standards.
- Standard methods for collecting, storing and maintaining Great Lakes data should be developed and made consistent across a range of computer systems. One option is to establish a database on the World Wide Web that contains references for all available Great Lakes data.

Highlights of Participant Feedback

New Data Bases
Some key additions to the list of databases were made.

Major Data Gaps
It is difficult to determine what the gaps are without an assessment of data needs. This needs to be related to the management goals and the indicators. This assessment should be an iterative process (i.e. repeated regularly) involving decision makers and researchers.

Other gaps which were identified:
- Wetlands, especially on the Canadian side;
- Streams and groundwater;
- Climate and hydrology data; and
- Data chronology (ongoing monitoring needed).

Information and information management needs include:
- Metadata collection (data about the data i.e. the researcher, date, accuracy, method), and mechanisms for disseminating it.
- Tools to integrate data, and a need for mechanisms to share data.
- Continue and expand data collection. (current trend is to discontinue).
- Establish a consortium/process for dialogue and cooperation on major data issues, including: data needs assessment; development of common indicators; and a metadata standardization process.

4.1.6 INTEGRATION PAPER

In addition to summarizing the findings from each of the background papers, the Integration Paper also identified four management challenges for the Great Lakes nearshore ecosystem. The four challenges are listed on the following page, followed immediately by the feedback which was received from the participants.

Management Challenge #1: Bringing together nearshore information in accessible GIS (geographic information system) based formats. *SOLEC '96 participants agreed, although some caution was expressed relating to how this challenge will be met. Next steps are:*
- Identify demand/incentives to do this;
- Identify who is responsible and what resources and information are needed;
- Agree on vision, management needs for which information is needed;
- Develop standards for information collection;
- Collect and categorize data; and
- Assess quality and usefulness before entering into the GIS.

Management Challenge #2: Developing easily understood indicators to support understanding of the state of the system and obtaining widespread agreement on what needs to be done. *SOLEC '96 participants agreed and identified four next steps:*

- Establish responsibility, and institutional arrangements to do this;
- Identify desired "end states" and reasonable measures for these;
- Identify "levels"/categories of indicators needed; and
- Develop indicators through multi-stakeholder processes.

Management Challenge #3: Integrating the concepts of biodiversity and habitat into existing programs traditionally devoted to pollution control or natural resources management for harvest. *SOLEC '96 participants agreed and identified actions needed:*

- Define what we mean by biodiversity and habitat;
- Set goals and targets for implementing these concepts;
- Inventory programs which address habitat and biodiversity (programs in the inventory can act as examples for those programs which currently don't address these issues);
- Identify barriers to integrating these concepts; and
- Define what needs to be done for biodiversity and habitat and modify existing programs.

Management Challenge #4: Integrating Lakewide Management Plans (LaMPs), Fisheries Management Plans and Remedial Action Plans (RAPs) for Areas of Concern so that they become fully viable management mechanisms, useful for decision makers throughout the great Lakes basin ecosystem in taking action and assessing results. *SOLEC '96 participants agreed and identified actions needed:*

- Inventory all processes under way and categorize activities;
- Improve communications and strive to integrate processes where appropriate by: seeking common ground (goals, objectives, actions); avoiding conflicts; sharing information; initiating community outreach.

Other Key Management Challenges

- Integrating programs/policies into state of lakes or basinwide assessments;
- Dealing with land use issues;
- Involving Tribes/First Nations in SOLEC process; and
- Integrating information about socio-economic values, trends and their impacts on programs at all levels.

4.2 LAKE - BY - LAKE WORKSHOPS

Never underestimate the power of the conservation movement - it will leave a legacy for your children.

David Crombie
Chair, Waterfront Regeneration Trust

This section presents an overview of the discussions which took place during the lake-by-lake workshops. The three hour session gave SOLEC participants an opportunity to discuss a number of issues from a lake-by-lake perspective. The goal was to identify key nearshore issues for each lake, and to determine priorities for action related to those issues. A more detailed recount of the discussions which took place during the lake-by-lake workshops is presented in Appendix C.

Key changes since SOLEC '94

Shoreline development has continued and the range of many exotic species has expanded throughout the Great Lakes since SOLEC '94. Protection and preservation of nearshore habitat has become a priority in many areas, and as a result, increases in some fish and wildlife populations have been reported. Increases in algae levels have led to taste/odour problems in some areas.

Current problems

Development pressures are disrupting shoreline ecosystems of the Great Lakes. Concerns regarding the ongoing hardening of shoreline, the loss of bluffs and barrier beaches, the loss of habitat for many fish and wildlife species, the loss of wetlands, and the degradation of tributary watersheds were widely reported. Problems related to the presence of contaminated sediments were also identified.

Recommended actions to address nearshore problems

Preservation of high quality areas and improved communication between stakeholders in the Great Lakes basin were two actions recommended repeatedly by SOLEC '96 participants. Steps can be made toward addressing nearshore problems through commitments to ecosystem conservation and stewardship. In order to meet those commitments, communication within and between agencies needs to be improved, and members of local communities (e.g. landowners, politicians, the public) need to be educated about the importance of the Great Lakes ecosystem. Public support through local efforts must feed into, and be consistent with, basinwide goals.

4.3 PRIORITY ISSUE WORKSHOPS

This section presents an overview of the discussions which took place during the priority issue workshops. The three hour session gave SOLEC participants an opportunity to discuss a number of issues which do not fall into any single Working Paper area, but cut across several areas or aspects of the Great Lakes Ecosystem.

Each workshop started with a presentation delivered by individuals with expertise on a particular issue. Although the content of each of the presentations differed, many presenters provoked discussion by asking participants to respond to a conclusion or proposition which they put forward. A more detailed recount of the discussion during these workshops is presented in Appendix D.

Nuisance Exotic Species

In order to focus on preventing the introduction of exotic species (as opposed to controlling the dispersal of established exotic populations), technological developments and policy improvements are needed. Similar technological and policy tools are also necessary in order to improve emergency responses to the dispersal of exotic species. Risk assessments should be conducted for specific target species that have potential for accidental introduction.

High Quality Areas

The concept of preserving high quality natural areas around the Great Lakes received unanimous support from the participants in this workshop. There was a general sense that data is adequate to identify a first round of sites that might be preserved. Success of a protection programs would be dependent on the support of both the highest levels of government and local residents.

Climate Change and Variability

Climate change will have a dramatic effect on water levels, flows, temperatures, shorelines, and wetlands in the Great Lakes nearshore. Assessing the impact of climate change will require additional research on carbon "sinks." Research should also identify the most likely scenario of change, in order to give the public and policy makers a clearer understanding of the impact of climate change.

Indicators

Discussion focused on the relationship between ecosystem goals and indicators. Is an indicator meaningful if it is not viewed in relation to an objective? Workshop participants agreed that setting ecosystem objectives is at least as important as identifying indicators of ecosystem health for the Great Lakes nearshore. Identifying a common set of indicators for the Great Lakes nearshore is practical if the indicators are derived from comparable measures across nearshore areas.

Protection and Restoration of the Nearshore Environment

Since no one organization has a broad enough mission to protect and restore whole ecosystems, success will depend on coordination and cooperation across agencies and organizations. SOLEC can assist this process by identifying priority issues, consequences of action, and options for improving management in the Great Lakes ecosystem. The sciences of "edge ecology" and ecosystem management should be used to guide restoration and assess management actions in the nearshore. Research should be cross disciplinary, and should focus on physical and biological integrity.

Great Lakes Research Priorities

In the face of declining resources, Great Lakes researchers need to seek innovative funding alternatives. Efforts should be made to improve data integration, multi-agency cooperation, and communication with the public. In particular, researchers should market the value of their research in terms relevant to the general public. Finally, a long term commitment to research of nearshore processes is fundamental to interpreting spatial and temporal variability in the Great Lakes nearshore ecosystem.

New Approaches to Growth Management

In order to manage growth pressures, barriers to growth management must be identified and removed. Providing information to the public is one way to increase the political profile given to growth management issues, a step which can lead to positive policy changes. Increasing the efficiency of urban developments will require municipalities to consider, among other things, policies that encourage the concentration of industry, and the removal of subsidies for greenfield development.

If the business community doesn't champion environmental progress, then the standards slip for everyone. Taking leadership in the environmental arena is both the right thing and the smart thing to do. We simply cannot be as effective or as productive unless we continue to take a strategic approach to corporate environmental responsibilities. This includes sharing resources and knowledge, and working together to champion the link between environmental protection and economic prosperity. When the term "sustainable development" is simply another way of saying "doing business," then industry will truly have moved into the 21st century.

David Buzzelli
Vice President and Corporate Director
Environment, Health & Safety
The Dow Chemical Company

5.0 OPEN FORUM ON NEARSHORE ISSUES

On the final morning of SOLEC '96, all of the conference participants came together for an open forum on nearshore issues. A panel of five individuals, representing five different sectors, began the session by sharing their perspectives on what they had heard during the conference. The concise manner in which each panelist synthesized his/her thoughts was extremely effective in highlighting many of the key issues discussed at SOLEC '96.

Select comments from each of the panelists have been presented below.

Tom Bailey
Executive Director
Little Traverse Conservancy

"...I have heard a lot of frustration on shrinking government budgets, and the problem with the lack of funding. This is not a new problem. The need for change presents the need to cultivate creative approaches and perhaps less reliance on formal mechanisms. We need to start thinking a little more informally and be a little more freewheeling..."

Werner Braun
Dow Chemical Company

"...I see a trend to try and get out ahead of issues. In the past we have been saddled with so many of the things that have been historic, and we have had to go out and do a lot of firefighting. Today I see us thinking about how we can we can get out ahead and do fire prevention, to prevent the damage before it occurs..."

"...Clearly the focus of this meeting has been to try to find those places where we agree. Because in those areas we can move the environmental needle ahead. We need to stop arguing about the place on the extreme - there's plenty to be done on the things we agree on, if we utilize our resources there..."

"...There is real strength in diversity of opinion. All of us bring different perspectives, and in those different perspectives there are strengths because that is the only way that we're going to get a clear picture of the entire challenge facing us. Not one of us has all the answers, and our perspectives tend to be narrow from our particular glimpse..."

Chris Wright
Grand Traverse Bay Watershed Initiative

"...When we begin articulating what the landscape should look like, we have to keep in mind that there are people who live in subdivisions who are very pleased with what they have. There is always, in the back of my mind, this concern about equity. When we decide that we know what we would like the landscape to look like, it is incredibly important that we always leave people the opportunity to have choices..."

"...The Mexican participants reminded me of the need for technical assistance. So often we take for granted the incredible resources that are at our disposal. If we can't figure this out - it's our own fault. When there are countries that have such limited resources, we have to remind ourselves to have a respect for the fundamental understanding that we have..."

George Francis
Professor, Department of Environment and Resource Studies
University of Waterloo

"...these are examples of what I see as a long-standing Great Lakes tradition - if anything needs to be done that requires even modest institutional change and cooperation across different boundaries, then the process of achieving this is decades long..."

"...please put the box back under your pyramid [economics; social values; institutions; laws; policies; and programs]. I really think that we have to try and make those connections. We have to see how programs are having an effect on what is happening in the lakes..."

Pamela Blais
Metropole Consultants

"...Despite the costs, we still go on building with the same development patterns that we have used for the last four or five years - and if anything it's probably getting a little more expansive, a little less dense, and a little more land consumptive. The flipside of this pattern is that we're not making use of the land development potential that is available in inner city areas..."

"...The market is the context in which people make decisions. And there's been a lot of discussion about market oriented approaches. True cost pricing of direct costs associated with urban development would be one significant step towards changing the urban pattern we see evolving - and that's even before we get to pricing externalities like pollution and so on..."

5.1 PARTICIPANT FEEDBACK

Following the panelists' opening remarks, the floor was opened to participants who wished to pose a question to the panel. Aaron Freeman (WBEZ-FM, Chicago) moderated the session.

The following issues were raised by participants:

- Concern over the cut backs in both Canadian and American federal government budgets. Is the provision of technical assistance an important way of showing stakeholders throughout the basin that there are services for them?

- Concern over the lack of representation from environmental groups at the SOLEC and the absence of a "sense of urgency" during the conference.

- Questions regarding the ecosystem goals towards which SOLEC is working and concern over what the next steps are in addressing the state of the Great Lakes ecosystem.

- Praise regarding the effectiveness with which NGO's use government funds.

- Concern regarding the spreading of IJC listed priority pollutants on roads as dust suppressants.

- Identification of a need to develop an effective way of communicating the results from SOLEC in words that any politician would understand. There are many decision makers who would be eager to listen to the type of information presented at SOLEC.

- Reminder of the valuable Great Lakes ecosystem information which resides with the aboriginal and tribal people.

- Concern over the reduced profile of the gas gauge as a communication tool regarding the state of the Great Lakes. A need to continue asking basic questions like "Can I swim in the lakes? Can I eat the fish in the lakes?" was identified.

- Recognition that in the past 20 years we've come a long way in our efforts to link environmental and economic concerns. How does the panel see the many stakeholders at SOLEC addressing environmental and economic issues symbiotically?

Panelist responses:

- A "we need more" approach is not going to work when looking for resources from government. We need look at things we can stop doing and get creative with what we can do.

- In order to continue with the process of improving the state of the Great Lakes, it would be helpful to define what it is that we're really trying to work towards. We also need a forum suitable for finding the answer to that question.

- It is important to prioritize the areas where ecosystem management efforts are directed. It does not make sense to continue with programs that run at cross-purposes to other programs. We must avoid reaching the point where we continue to seek diminishing returns on a particular effort even though there are more pressing problems that warrant our scarce resources.

- The information from SOLEC '96 will be put into a form understandable to the general public.

- It is important to recognize the wisdom of traditional knowledge. One panelist has *"been amazed at the insight that their [First Nations and tribes] understanding can give to the science which other people have."*

- Observation that, unlike the environment, economics and markets are a construct of the human mind. We are very slow to recognize that the economy is a slave to the human mind - and that we can change it far more quickly then we can change our natural environment.

- Suggestions on ways to address environmental and economic issues at the same time included: focusing on creating community value while at the same time addressing environmental issues (e.g. get community value out of brownfields); and showing industry that it is possible to devote capital investment to environmental improvement and generate a return on that investment.

In spite of budget cuts and fiscal restraint, work under the Agreement remains a priority.

John Mills
Regional Director General
Environment Canada, Ontario Region

6.0 CLOSING REMARKS

Closing remarks for SOLEC '96 were delivered by John Mills, Regional Director General for Environment Canada - Ontario Region. In his remarks, Mr. Mills shared a few of his observations from the three day conference, and reflected on a number of issues which were raised:

High energy level of the participants The high energy level exhibited by the participants during SOLEC '96 was extremely impressive. That energy speaks to the commitment which all participants have to Great Lakes issues, and to the creativity and innovation which was present during the workshops.

Success at identifying gaps We now know that there are some gaps in our understanding of terrestrial ecosystems, land use practices, and decision-making processes, in relation to the nearshore.

Local level Participation by a number of municipal decision makers was instrumental in bringing SOLEC discussions to the local level. This was encouraging to see.

Separating the science from the programs It is important that SOLEC maintain its role as a science review of the state of the Great Lakes. The information generated from the SOLEC process can then be used by decision makers to adjust programs as needed. The need for an appropriate accountability mechanism for programs, particularly as it relates to binational activities, will be explored.

Indicators A very strong message was heard regarding the need for indicators. Questions remain regarding indicator complexity, hierarchy, and consistency. Efforts need to be directed at building on the efforts which have already gone into indicator development.

Communication Communication within agencies and between agencies needs to be improved. Information shared with the broader Great Lakes community needs to use vocabulary which is understandable to the general public.

Action Participants communicated a strong desire to take action on information presented during the conference. We need to move forward in those areas where we can succeed, and put to use the creative and useful ideas brought forward at SOLEC.

Another SOLEC? Yes. Canada and the US will continue to use SOLEC as a valuable exercise to identify where knowledge gaps exist, and where science needs to be focused.

APPENDIX A. Conference Agenda

SOLEC '96

WHY SOLEC '96?

SOLEC '96 is an important component of the ongoing commitment between the governments of Canada and the United States (the Parties to the *Great Lakes Water Quality Agreement*) to communicate their progress on Great Lakes clean up and restoration. SOLEC '96 continues the successful process initiated in 1994. The focus of SOLEC '96 is the state of the nearshore zone including water, wetlands and the land by the lakes. The impact of changing land use in this zone as well as the state of information and information management for the nearshore will also be examined.

SOLEC '96 OBJECTIVES

- Inform local decision-makers of environmental issues that affect nearshore areas of the Great Lakes basin;
- Provide information on the state of the nearshore ecosystem to help strengthen decision making and management within the basin;
- Develop support for an integrated environmental information system to help direct plans and programs;
- Provide information on existing Great Lakes strategies and build cooperative actions needed to strengthen and complement them;
- Provide a forum for improved communication and network building for involved groups and individuals within the basin.

SOLEC '96

STEERING COMMITTEE

Steering Committee members represent a wide variety of agencies from around the Great Lakes:

Agency for Toxic Substances and Disease Registry

Council of Great Lakes Industries

Environment Canada

Great Lakes Commission

Great Lakes Fishery Commission

Great Lakes States
(Illinois, Indiana, Michigan, Minnesota, New York, Pennsylvania, Ohio, Wisconsin)

Health Canada

International Joint Commission

Northeast-Midwest Institute

Ontario Ministry of Agriculture, Food & Rural Affairs

Ontario Ministry of Environment and Energy

Ontario Ministry of Natural Resources

Sea Grant Network

U.S. Environmental Protection Agency

U.S. Fish and Wildlife Service

U.S. Geological Survey - Biological Resource Division

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For additional information please contact:

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Environment Canada - Ont. Region
867 Lakeshore Rd.,
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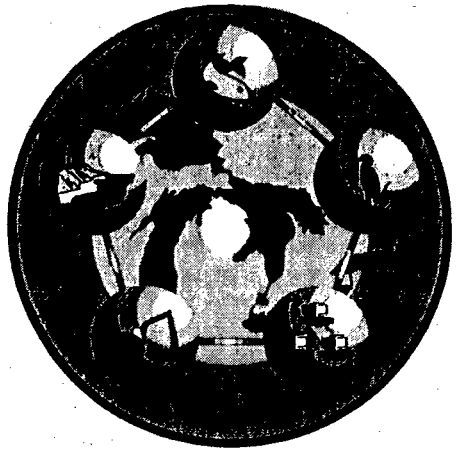
Great Lakes National
Program Office - US EPA
77 West Jackson Blvd.,
Chicago, IL 60604
ph: 312-886-4360

State Of The Lakes Ecosystem Conference

1996 - Year of the Nearshore



November 6-8, 1996

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Cleary International Centre
Windsor, Ontario

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Distribution of Conference Materials
(for pre-registered participants)
Tuesday, November 5 (5 p.m. - 10 p.m.)
Wednesday, November 6 (7 a.m. - 12 p.m.)

United States Environmental Protection Agency

~

Environment Canada

DAY ONE - Wednesday, November 6, 1996

8:30 Welcome / Opening Remarks
Valdas Adamkus, *Great Lakes Program Manager, U.S. EPA*
John Mills, *Regional Director General, Ontario Region, Environment Canada*
Canadian Club Room "B"

9:00 Presentation of Working Papers and Integration Paper
- Nearshore Waters
- Coastal Wetlands
- Land by the Lakes
- Impacts of Changing Land Use
- Information & Information Management
- Integration Paper

20-minute break is scheduled at 10:30a.m.

12:00 Lunch - Guest Speaker: Dave Buzzelli
Executive V-P, Dow Chemical Co.
Canadian Club Room "A" and "B"

1:30 & 3:30 Workshops by Working Paper Topics including the Integration Paper
Scientific resource people will be available at each workshop to explain findings in more detail. Participants may select 2 different workshops.

30-minute break at 3:00p.m. Adjourn at 5:00p.m.

6-8:00 Evening Reception and Success Stories Recognitions
Presentation at 6:30p.m. by the Consuls General
Greg Johnson, Toronto
Don Wismer, Detroit

Hors d'oeuvres provided - Cash bar
Canadian Club Room "B"

DAY TWO - Thursday, November 7, 1996

8:30 Plenary Session - Update on Day 1
Canadian Club Room "B"

9:00 Lake-by-Lake Workshop Sessions
To examine what is known about the state of the nearshore of each lake and suggestions for improvements. (Separate session for each lake which will include connecting channels)
- What has happened since SOLEC '94
- The state of the nearshore ecosystem integrity
- What is known about stressors and their impacts
- Areas of Concern
- Report cards evaluating the state of knowledge and gaps, using indicator concept
- Where do we go from here

20-minute break is scheduled at 10:30a.m.

12:00 Lunch - Guest Speaker : John Sawhill
President and CEO, The Nature Conservancy
Canadian Club Room "A" and "B"

1:30 Breakout Sessions on Priority Topic
- Research, assessment and analysis
- New approaches to growth management
- Protection & restoration of the nearshore environment
- Nuisance exotic species
- Inventory of high quality areas
- Indicators
- Climate change and variability

15 minute break. Adjourn at 4:30p.m.

6-8:00 Dinner - Guest Speaker : David Crombie
Chair, Waterfront Regeneration Trust
Canadian Club Rooms "A" and "B"

DAY THREE - Friday, November 8, 1996

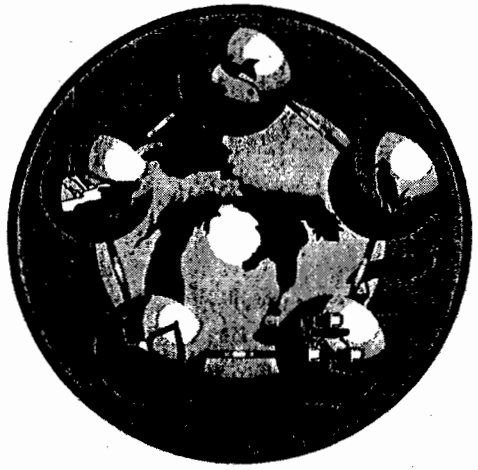
8:30 Plenary Session - Update on Day 2
Canadian Club room "B"

9:00 Open Forum on Nearshore Issues

Moderator: Aaron Freeman
Radio commentator (WBEZ-FM, Chicago) and stage actor.

Panellists

Pamela Blais - *Metropole Consultants*
George Francis - *University of Waterloo*
Rod Witlow - *Association of First Nations EAGLE Project*
Chris Wright - *Grand Traverse Bay Watershed Initiative*
Werner Braun - *Dow North America*
Tom Bailey - *Little Traverse Conservancy*



Visit our web site at **http://www.cciw.ca/solec/**

Wednesday and Thursday

Continuous demonstrations and hands-on training of Internet access and environmental software programs in Taqtaq Room. Presented by Great Lakes Information Network, Great Lakes Information Management Resource, and the Great Lakes National Program Office.

State of the Lakes displays and exhibits presented by participating organizations will be featured in the Dieppe Room

APPENDIX B. List of Background Papers and Lead Authors

Nearshore Waters:	Murray Charlton Tom Edsall
Coastal Wetlands:	Laurie Maynard Doug Wilcox
Land by the Lakes:	Ron Reid Karen Holland
Land Use:	Steve Thorp Ray Rivers Victoria Pebbles
Information and Information Management:	Wendy Leger Rich Greenwood
Integration Paper:	Kent Fuller Harvey Shear

APPENDIX C. Lake by Lake Workshops

The following summaries were prepared by the SOLEC facilitators, and reflect their perspectives on the key session outcomes and highlights. It should be noted that the summaries provide discussion points from individual sessions, and not the conference as a whole. The statements provided below have not been subject to peer review or scientific validation.

1. LAKE ERIE

Key Changes Since SOLEC '94

- Taste and odour problems associated with blue/green algae increasing in certain areas;
- Expanded range for round goby;
- Many changes in relationships, mainly among algae, zebra mussels, productivity, water clarity, phosphorus levels;
- Increase in benthic invertebrates (e.g. mayflies); and
- Wetlands and shoreline changes.

Current Problems

- Beach closings;
- River mouths/port areas/wetlands/tributary mouths;
- Political climate/policy changes/regulations;
- Continued introduction of exotic species/decline of native species;
- Urban sprawl/changing land use;
- Fisheries management/spawning habitat; and
- Contaminated sediments.

Where Do We Go From Here?

Pressing Information/Data Needs

- Immune system pathology/reproductive and exposure markers;
- Fish index that public can understand;
- Methods to trace indicator problems back to sources;
- Trend analysis/more investment in monitoring;
- Consider Natural Step Program as alternative to indicators;
- Determine what ecosystem states are possible/feasible/sustainable;
- Ensure that human carrying capacity is considered; and
- Use models - define their role and how results will be validated.

Recommended Actions to Address Nearshore Problems

- Identify location and composition of contaminated sediments (especially while dredging for navigational purposes);
- Develop wetlands inventory and preserve remaining habitat;
- Educate/communicate with public on goals, issues, options;
- Need more redevelopment policies (brownfields); and build additional combined disposal facility capacity.

2. LAKE ONTARIO

Key Changes Since SOLEC '94

- Water clarity improved due to zebra mussels;
- Habitat restoration increasing due to implementation of strategies and projects;
- Increase in fish and wildlife as a result of improved habitat (e.g. cormorant populations increased by 15-20%);
- Increased awareness among municipal politicians;
- Human use and enjoyment increasing due to new projects (e.g. Waterfront Trail in Greater Toronto Area; U.S. Canal System);
- Impending urban expansion and associated infrastructure;
- Cooperation between agencies improving; and
- Funding and regulatory changes at all levels - redefinition of government.

Current Problems

- Diversity of coastal wetlands continues to decline due to water level regulation;
- Ongoing hardening of shoreline;
- Loss of bluffs and barrier beaches;
- Barriers (e.g. dams) are stressing streams and tributaries;
- River mouth habitat is static; and
- Lack of relation between actions taken for the lake and upstream watershed.

Where Do We Go From Here?

Pressing Information/Data Needs

- Better understanding of tributary pollutant loadings and tie to management actions;
- More bathymetric data;
- Lake-by-lake analysis would be helpful;
- More information on longshore sediment processes and shore treatment; and
- Need historical information mapped and benchmarks developed in order to measure change.

Recommended Actions to Address Nearshore Problems

- Need to set ecosystem goals in order to direct research efforts;
- Explain meaning and implications of research information to community and local politicians;
- Support LOWIS (Lower Ontario Watershed Information System) in the US and Canada;
- Identify species and land forms in imminent risk and develop action plans for protection; and
- Mobilize public support - need to develop community goals and visions that would be consistent with lakewide goals.

3. LAKE SUPERIOR

Key Changes Since SOLEC '94

- Increasing residential growth and development of second homes;
- Expanded range of exotic species;
- Good habitat restoration projects under way;
- Improved practices and discharges in pulp and paper industry;
- Some key areas have been protected and preserved;
- Increased populations of walleye, sturgeon, coaster brook trout, cormorants, bald eagles; and
- Increased boating/ angling pressure leading to degraded vegetation in specific areas.

Current Problems

- Ballast water introductions in ports;
- Woodland caribou threatened;
- Deformities present in amphibians;
- Loss of habitat for colonial birds (piping plover, black tern);
- Increase in rusty crayfish (exotic species);
- Ruffe displacing perch; and
- Sand beaches, dunes, coastal wetlands under development pressure.

Where Do We Go From Here?

Pressing Information/Data Needs

- Sediment contamination, assessment, and effects on biological elements, etc., need to be dealt with;
- Need information on coastal wetlands and nursery functions (physical processes, biological functions); and
- Need nearshore wetland inventories.

Recommended Actions to Address Nearshore Problems

- Link land use decisions with whole lake, nearshore, and watershed;
- Identify key habitats/ecosystems;
- Protect and conserve key habitats/ecosystems/features;
- Improve and implement ballast water management technology;
- Promote landowner education/stewardship; and
- Ensure that local efforts feed into basinwide goals - need enhanced communication.

4. LAKE HURON

Key Changes Since SOLEC '94

- Invasion and proliferation of exotic species, including river ruffe and more profoundly, zebra mussels - there are secondary effects on productivity, community composition, and population shifts;
- Mirex has been detected in lake water (editor's note: scientific data to be confirmed); and
- Increased populations of cormorants and yellow perch a positive sign.

Current Problems

- Intensification of shoreline development;
- Land use changes from rural and agricultural practices to urban uses;
- Second home development;
- St. Mary's River fish communities at risk due to navigational practices; and
- Lake trout and walleye populations not yet self-sustaining.

Where Do We Go From Here?

Pressing Information/Data Needs

- Data on atmospheric inputs of trace contaminants, including mirex (to be confirmed);
- Data on land use changes to assist in predicting and tracking ecosystem impacts;
- Socioeconomic information, costs associated with degradation, benefits associated with rehabilitation and protection; and
- Water level fluctuations are a priority for research and management.

Recommended Actions to Address Nearshore Problems

- Most important action is to develop a clear commitment to long-term monitoring programs with associated reporting to the public, regardless of the indicators chosen;
- Protection of and attention to "areas of quality" should complement work on AOCs;
- The public requires a summary of information on the Lake Huron ecosystem to prioritize actions and effect change;
- Develop specific targets for the quantitative indicators, related to restoration goals;
- Provide policy direction regarding land-use planning, and integrating ecosystem rehabilitation needs; and
- Initiate a "Lake Huron Alliance" of researchers, implementors, community groups, and other interested parties in the absence of a Lake Huron LaMP.

5. LAKE MICHIGAN

Key Changes Since SOLEC '94

- Increasing rate of development ("dockominiums", cottages, sprawl, casinos), resulting in negative impacts on shoreline;
- Increasing rate of change of exotic species (numbers and impacts) - impacts due to exotics include increased water clarity, community structure quality, along with decreases in wetlands and nearshore aquatic species;
- Taste and odour problems in drinking water due to algae; and
- Composition of fish community out of balance (e.g. perch population 95% male; alewives re-emerging).

Current Problems

- Tributary watersheds are degraded from land use, exotics, pollution;
- Nearshore aquatic species (benthic and fish) in trouble due to contaminated sediments, water level changes, armouring of shorelines, sedimentation throughout the lake; and
- Coastline ecosystems (sand dunes and bars) are in trouble as a result of sand mining, urban development, recreation, erosion, and sand transport.

Where Do We Go From Here?

Pressing Information/Data Needs

- Habitat/biodiversity/natural resources inventory;
- Data on landscape level processes and baseline data;
- Data on development trends and impacts; and
- Standardized methods for data collection.

Recommended Actions to Address Nearshore Problems

- More sustainable land-use development;
- Ecosystem conservation and stewardship;
- Creation of information repository (including historical information) to integrate, coordinate information and disseminate to stakeholders; and
- Establish incentive for consistent data collection through grants (economic incentive).

6. LAKE ST. CLAIR/ST. CLAIR RIVER/DETROIT RIVER

Key Changes Since SOLEC '94

- Fish: improved perch size; declining walleye numbers; increasing bass numbers; rotifers dying off; changes in abundance of small bottom-feeding fish;
- Beach closings (e.g. at St. Clair Shores in summer of '96 due to E. coli);
- Development: population relatively stable, but sprawl continues;
- Increases in shoreline hardening, surface runoff;

- Changing fertilization patterns (suburban vs. agricultural patterns); and
- Varying success in dealing with combined sewer overflows in St. Clair, Clinton, Rouge and Detroit Rivers and Lake St. Clair.

Current Problems

- Loss of native unionid clams in Lake St. Clair and Detroit River due to zebra mussels - there is a resulting disruption of ecological balance;
- Vegetation: significant loss of natural wetlands along Detroit River; increase in Eurasian milfoil in Lake St. Clair; loss of prairie savannahs due to fire suppression, drainage, and economic development;
- Health: problems with fish tumours and drinking water contamination;
- Beach closings; and
- Shoreline development an ongoing concern.

Where Do We Go From Here?

Pressing Information/Data Needs

- More science which specifically addresses large river management;
- There has been too much emphasis on river mouths (e.g. loadings) - we need to look at the entire watershed, including upland areas;
- How to integrate connecting channel issues within the overall planning framework for the ecoregion;
- Need to better integrate human health with ecosystem health;
- Need accessible, binational GIS information base; and
- Need to evaluate the impact of chloride.

Recommended Actions to Address Nearshore Problems

RAPs in the area should be used as an umbrella for watershed planning and to implement as many of the following actions as appropriate:

- Manage the connecting channel area as a binational resource;
- Evaluate and protect high-quality areas;
- Lake St. Clair not included in a RAP or LaMP - need a process to address issues in the lake;
- Ensure that waterfront redevelopment and habitat restoration are done concurrently
- Educate/involve communities in environmental protection, perhaps through watershed "report card" development;
- Develop a more coordinated approach to research, and ensure research is focused on problem-solving and tied to program implementation and monitoring (could do a pilot project to address this, perhaps in Windsor/Essex and Grassy Island);
- Press for further reductions in loadings;
- Consider new institutional arrangements to facilitate action/implementation (i.e. beyond planning);
- Deploy students/educational institutions to collect data and do monitoring; and
- Industry would like more binational harmonization of regulatory and voluntary approaches.

APPENDIX D. Priority Issue Workshops

The following summaries were prepared by the SOLEC facilitators, and reflect their perspectives on the key session outcomes and highlights. It should be noted that the summaries provide results from individual sessions, and not the conference as a whole.

1. NUISANCE EXOTIC SPECIES

Session Conclusion #1: Prevention of species introductions is far better than control, but we still lack important tools to do the job.

In particular, immediate attention should be directed to:

Technology:

- Develop technological tools to replace ballast exchange as a way to reduce ballast-mediated transfers of exotic species into and within the Great Lakes system;
- To develop new/better tools, we need political education to allocate funding;
- Current ballast-exchange system is limited; need to improve it and do research to develop better technology; and
- Need to develop technological tools for other vectors (beyond ballast).

Policy:

- Establish state/provincial and federal policy tools that promote sound decision-making on planned introductions of exotic species.
- Use fisheries protocol as a model to develop similar approaches for other vectors (e.g., food industry, climate change, horticulture).
- Need a policy for accidental introductions (as well as planned ones).
- Authority for planned introductions lies with the states and province, which have agreed under the 1980 Joint Strategic Plan for Management of Great Lakes Fisheries to coordinate this management authority via management committees of the Great Lakes Fishery Commission. One product from these committees are written procedures for consulting other jurisdictions to achieve consensus before proceeding on planned introductions.

Session Conclusion #2: Similar technological policy tools should be developed to improve emergency response to dispersal of nuisance species. More explicitly, we need to develop a common protocol to examine issues, pros and cons, and assist decision-making. As well, we need to develop a binational mechanism to provide scientific support and technical advice to assist local government to make good decisions. We should provide a "reward" system to ease costs at the local level, e.g., emergency response systems.

A number of debates emerged relating to policy issues. Some of the discussion elements are framed below:

- Is eradication possible? Is it worth trying?
- Should we deal with this on a case by case basis or develop a common protocol?

- Need to weigh risks, benefits, and assess acceptability of control measures.
- Small window of opportunity (no time for consensus).
- Do we need federal authority? ("Binational Strike Team")

Session Conclusion #3: Risk assessments to identify target source regions, target species and most susceptible receiving systems are more useful for preventing intentional introductions of alien species than accidental introductions, for which a blanket precautionary approach may be most efficient. We also need to do risk assessment for each vector to decide whether blanket precautions are necessary and how to do them, and to support political decisions. Risk assessments should be conducted for specific target species that have potential for accidental introduction.

2. HIGH QUALITY AREAS

SOLEC '96 participants in this workshop unanimously supported the concept of preserving high-quality natural areas around the Great Lakes. There was a general sense that data are adequate for at least a first round of sites that might be preserved. The programs would need support of both the highest levels of government and local residents to be successful.

Three propositions agreed to by the group:

1. That the International Great Lakes Community initiate a high-profile program on a scale comparable to the RAP/restoration programs to secure high-quality shoreline areas that contribute significantly to biodiversity.
2. Redirect and re-energize existing programs and initiate new programs to protect and restore biodiversity on privately held shoreline lands on the Great Lakes.
3. In the context of a shoreline conservation strategy, we need to direct the highest priority towards the most threatened and unprotected species and communities on sites with intact ecological processes.

3. CLIMATE CHANGE AND VARIABILITY

This group responded to four major questions regarding climate change. Their deliberations are reported below.

What is your perception of climate change with respect to the Great Lakes' nearshore?

1. Climate change will have a dramatic effect on water levels, flows, temperatures, shorelines and wetlands.
2. There is an increased variability in temperature and precipitation already happening. This is experienced in extremes or spikes. A local farmer noted that more energy is needed to produce the same amount of food as a result of these extremes.

3. Great Lakes fish will be able to adapt to changes in climate. There will be implications for fish in some tributaries due to shoreline changes.
4. It is politically difficult to reduce CO_2 emissions globally and nationally.

What information do we need in order to be able to assess the impacts of climate change on the Great Lakes nearshore?

1. There is a need for additional research on carbon "sinks". This is especially true for wetlands, which are carbon sinks. Much research is being done on ocean "sinks" but wetlands have not been studied. Canada has the second largest percentage of wetlands in the world, which makes this need much greater.
2. Research should identify the most likely scenario of change so public and policy makers have clearer understanding of the impacts of climate change.

What management actions are required to address impacts in the nearshore from climate change?

1. Take a "no regrets" approach to management actions. That is, do things that make sense even if climate change doesn't happen. Some examples of this are: water conservation; conservation tillage; energy conservation; and adaptation strategies.
2. Communicate effectively to the public and indicate a clear sense of urgency.
3. Need to think long-term and shift thinking from dollars to environment as bottom line. Need to continue to provide funds for environmental protection/monitoring.
4. Experts should play a watchdog role.

4. INDICATORS

The following conclusions were reached by this group:

Setting ecosystem objectives is more important than identifying indicators. Some agreed with the conclusion and some thought that setting ecosystem objectives and identifying indicators are equally important.

Collecting too much data can be as unrewarding as collecting too little. Group agreed that what we do with the data is as important as the data themselves. **Group consensus.**

A "common" set of indicators for the nearshore environment is not practical. Group discussion result: a common set of indicators is practical if they are derived from comparable measures across nearshore areas. Causality will be lost. Cause-effect relationships will normally be derived from specific areas. Management actions will be guided by specific nearshore indicators.

Indicator recommendations for SOLEC '98:

1. Greater focus on indicators.
2. Start task actions right now for bringing together indicators binationally already existing. Use SOLEC to review and comment on these.
3. Get something going to co-ordinate the development of common indicators.

5. PROTECTION AND RESTORATION OF THE NEARSHORE ENVIRONMENT

Participants responded to a number of suggested strategies.

Strategy 1: *Science of edge ecology and ecosystem management should be used to guide restoration and assess management actions, cutting across persistent disciplinary solitudes.*

- Increase research on ecotones, transitional zones, connectivity, contiguity to define attributes of size, diversity, abundance and productivity.
- It is critical to understand the consequences of actions and to define/refine management strategies (e.g. water level management).
- Dynamics of nearshore environments complicate monitoring, research and management decisions.
- Research should emphasize physical and biological integrity.
- Cross discipline research (co-ordination and cooperation) is needed.
- Funding will be/is a key constraint.

Strategy 2: *Lake Ecosystem Action Plans (LEAPs) should focus on ecotones (land-stream, land-lake, land-wetland-lake, nearshore-offshore, pelagic-benthic, littoral-profundal, forest-pasture, air-water), especially nearshore edges. These logical successors of the AOC RAPs (Area of Concern Remedial Action Programs) will require conservation, restoration and recreation actions.*

- LaMPs tend to lack an action agenda and focus on toxic substance impacts.
- We don't need a separate planning effort or new initiative.
- Transform LaMPs into true lake ecosystem plans with a nearshore component for ecosystem integrity that recommends conservation and restoration actions (land-use planning should logically evolve from LaMPs).

Strategy 3: *We should integrate activities across institutions and agencies, and find a logical government level to consolidate coordinated actions.*

- Strategic planning is best done at a lakewide level and action planning/implementation depends on regional/local involvement.
- Cross-discipline and cross-agency/government coordination and cooperation is essential and depends on forming consensus on goals/objectives.

- No one organization has a broad enough mission to protect and restore whole ecosystems (or nearshore systems). We must depend on coordinated actions by many, including private or non-profit entities.
- Formal and informal mechanisms are needed to share expertise across agencies (binational too) and organizations.
- Binational Executive Committee (BEC) or another forum is needed to promote coordinated program planning and budget requests that address priorities, reduce duplication, and lead to more efficient/effective environmental results.

Strategy 4: *We should transform the SOLEC process by shifting from passive, underfunded reporting to active, resourced problem-solving, producing the catalysts for change.*

Role of SOLEC should be to:

1. Report on state of Great Lakes ecosystem;
2. Identify priority issues, consequences of actions, and options for improving management; and,
3. Communicate above to decision makers.

Results of SOLEC (priorities and strategies) must be communicated from scientists and resource managers to top administrative levels.

6. GREAT LAKES RESEARCH PRIORITIES

The following themes emerged from the session:

- The research community should market the value of their research in terms relevant to the general public.
- In face of declining resources, innovative funding alternatives should be sought. Improved data integration and multi-agency cooperation was advocated.
- Finally, a long-term commitment to research nearshore processes is fundamental to interpreting spatial and temporal variability in the nearshore Great Lakes environment.

1. **Cost saving strategies**. In many areas, researchers have already pursued integration and cost saving strategies and there is no further room for cuts. However, we can:
   - Systematically improve data intercompatibility including complete inventory and consolidation;
   - Quantify the value of research and data;
   - Involve the lake committees of the Great Lakes Fishery Commission (GLFC) in LaMPs and other activities;
   - Advertise plans for research vessels;
   - Link with student training and volunteer monitoring;
   - Seek untapped and alternative funding mechanisms; and
   - Seek partnership opportunities which emerge from areas undergoing change (e.g. redevelopment).

2. **Research Needed**. We need to realize that nearshore technology and scale is very different from open lake. Given this we need:
   - Improved understanding of watershed dynamics/processes including socio-economic processes;
   - Better understanding of nearshore dynamics;
   - Indicator endpoints linked to ecosystem goals;
   - Better monitoring guided by modelling; and
   - Integration among laboratories and across media.

3. **RAP/LaMP Research Needs.** At present, RAP/LaMP research needs are poorly defined. However, we need:
   - Contaminated sediment clean-up technology;
   - Methods of habitat restoration;
   - Common loading protocols;
   - Tools to connect cause of use impairment and of effect;
   - Quantitative targets to serve as indicators of restoration;
   - RAP endowment for research and implementation;
   - Improved RAP/LaMP coordination e.g., loadings; and
   - Expert system to identify research needs.

4. **Complex Research Topics.** Realizing that not all research topics require a multidisciplinary approach, we should:
   - Define research questions for combined approaches such as "nearshore physical/ecological processes";
   - Establish a mechanism to form specific groups to address specific problems;
   - Establish basinwide, geo-referenced data base to help coordinate projects;
   - Coordinate among agencies in advance of a project;
   - Organize a biennial, binational research coordination workshop;
   - Foster trust for more effective data sharing; and
   - Put the onus on research managers to focus research topics.

5. **Research Funding Reductions.** Academic institutions need to be included in these decisions. We need:
   - To protect human resources and institutional knowledge above all else;
   - A culture and paradigm shift must occur to: recognize science as part of policy, and incorporate advice from the result of scientific study into decision-making process;
   - A regular review of recommendations should be done (e.g. IAGLR);
   - To inventory the research community and identify critical mass; and
   - To quantify the value of research.

7. NEW APPROACHES TO GROWTH MANAGEMENT

To Manage Growth pressures, we need to:

- Educate, inform and raise awareness among local officials, businesses and citizens about the negative impacts of uncontrolled growth and about the need for and benefits of growth management;
- Manage where people can live based on a community-inspired vision of land use that considers current and projected growth pressures;
- Show what the future holds--what urban areas, neighborhoods, recreation areas, etc.-- if current trends continue unabated;
- Pinpoint barriers to growth management and remove them;
- Create plans and regulations that encourage more efficient use of land and other natural resources and human and financial capital; and
- Share success stories from other areas with planned growth experiences.

To curtail the outflow of jobs to the suburbs and redevelop inner city areas, municipalities should:

- Reinvest/reinvest in neighborhoods that provide access to jobs and housing and social and recreational opportunities;
- Provide incentives for businesses to remain in inner city areas where workforces exist;
- Discourage industrial urban sprawl and encourage higher-density industrial development in the inner city;
- Improve and maintain old and outdated inner city infrastructure;
- Correct inequities in funding to ensure quality inner city schools;
- Eliminate subsidies and other incentives for greenfield development; and
- Raise about awareness about the continued drawbacks of the outflow of jobs.

To better manage development, urban planning should:

- Be based on watersheds and ecoregions rather than political boundaries;
- Recognize the regional nature of many growth issues and share responsibilities accordingly between local and regional planning entities;
- Plan for the longer term;
- Encourage public participation in the planning process;
- Make environmental issues a priority and constraint for development;
- Allow flexibility of zoning to encourage more sustainable and efficient development ;
- Reward efficient and sustainable development; and
- Regulate use of cars and parking in urban areas.

APPENDIX E. Success Stories

The SOLEC '96 Steering Committee recognized some of the exceptional achievements in Great Lakes ecosystem improvement.

Successful projects were chosen because their they encompassed all or most of the following elements:

- Showed improvement in the Great Lakes ecosystem and a net gain for the nearshore;
- Forged linkages among the economy, the environment, and the community;
- Created a "win-win" solution;
- Formed strong partnerships;
- Implemented sustainable plans; and
- Encouraged community involvement.

The following projects were chosen for recognition:

Grand Traverse Bay Watershed Initiative
The Grand Traverse Bay Watershed Initiative is a community sponsored watershed protection program. The Initiative was established to protect the water quality of Grand Traverse Bay, Michigan, and the surrounding water resources. Using a partnership approach with more than ninety organisations, the Initiative is protecting water resources based on watersheds.

Among the many activities of the Initiative, teachers and students participate in a school-based water-quality monitoring program, twenty hotels participate in a guest room signage program to promote water conservation practices, and three regional land conservancies have protected more than seventeen miles of combined shoreline.

A second closely related organisation is New Designs for Growth. This novel coalition of twenty businesses and business associations, education and environmental organisations and local units of government is responding to surging growth in the area. The group is a strong user and supporter of *The Grand Traverse Bay Region Development Guidebook.* The Guidebook, developed with support from the Grand Traverse Bay Chamber of Commerce, provides model ordinances and guidelines for growth management.

Together, the two organisations provide new and exciting approaches to dealing with changing land use.

Ojibway Park and Nature Centre
The City of Windsor, with the help of numerous partners, has set aside 66 hectares (162 acres) of protected land. Ojibway Park consists of Pin Oak forest, savannah and tallgrass prairie habitats, all of which provide a rich diversity of plant and animal life. Cultivated prairie wildflower gardens enhance the grounds near the Nature Centre.

The unique and rare qualities of the Ojibway Park and Nature Centre attract visitors from all over the world. Exhibits, special programs for schools, and pedestrian trails provide an opportunity to learn more about the local ecology.

Nothern Indiana Public Service Company (NIPSCO)
As one of the largest industrial landowners in Indiana, NIPSCO is an outstanding example of industry adopting an active role in local environmental initiatives.

With its various partners, NIPSCO assists in the environmental management of the Grand Calumet River Corridor and Area of Concern. NIPSCO facilitated the preservation of four environmentally significant sites along the nearshore and has made multiple donations of land. The company participates in the Indiana Biodiversity Initiative, and works closely with The Nature Conservancy to restore prairie and wetland habitat on its land. It also works with the U.S. Fish and Wildlife Service and the Indiana Department of Natural Resources to manage its lands to support two federally endangered species - the Karner blue butterfly and the peregrine falcon.

In addition, NIPSCO has voluntarily committed to undertake twenty-one specific projects to reduce greenhouse emissions.

The Friends of Second Marsh

Second Marsh is one of the few remaining Lake Ontario Shoreline Wetlands adjacent to a sizable urban centre with special features including its ranking as a provincially Significant Wetland, and its status as an Area of Natural and Scientific Interest (ANSI). The marsh is home to a tremendous diversity of flora and fauna, including 361 plant species and 265 bird species. In the spring and fall the marsh is an important migratory stopover and staging area for waterfowl marsh and land birds.

Second marsh began as a restoration plan whose support grew to encompass the community and beyond. The Friends of Second Marsh, an active volunteer corps, continues to grow as members of the community step forward to demand an opportunity to be effective stewards in their community.

Cleveland: the city, the county and the RAP

Working together, the City of Cleveland, Cuyahoga County, and the State of Ohio have brought about the rebirth of the Cleveland Waterfront. The result is the creative re-use of old lakeshore port and industrial areas for parks, a Great Lakes Science Centre, museums, and a dynamic riverside restaurant zone. During the past three years the redevelopment of old sites has been strengthened by the Cuyahoga County Brownfields Redevelopment Project, a collaboration of public, private, and civic entities.

Beyond the immediate redevelopment area, the Cuyahoga Coordinating Committee (CCC) and others in the Remedial Action Plan (RAP) program are working to improve water quality in the Cuyahoga River Watershed. The CCC is a not-for-profit corporation with a thirty-three member stakeholder committee appointed by the Ohio Environmental Protection Agency to support the RAP. It is involved in many aspects of water quality, public involvement, and stewardship.

This has led to a broadly based revitalization of the downtown lakefront by redevelopment of brownfields and building widespread support for clean-up of the Cuyhoga River. The lakefront has become a popular destination and the groundwork has been laid for a better sense of community.

Task Force to Bring Back the Don

The Task Force to Bring Back the Don is a twenty-three member citizens group sponsored by the City of Toronto. Together, these partners are working towards "bringing back" a clean, green, and accessible Don River Watershed. The Task Force is committed to a citizen-driven process while working in co-operation with government agencies and non-governmental organisations on the restoration of the Don.

Since 1989, the Task Force has spearheaded the planting of over 24,000 trees and shrubs along with thousands of wildflowers in the Lower Don Watershed. The Task Force initiated the Chester Springs Marsh, a wetland that will provide habitat for water-based wildlife. Along with initiating community education and involvement projects, the Task Force has worked to make the Lower Don safe and accessible for all to enjoy.

The Ontario Dune Coalition

The Ontario Dune Coalition is an alliance of twenty-nine private property owners' Associations, non-profit organizations, local governments, and state and federal agencies. The freshwater dune system extends along seventeen miles of Lake Ontario shoreline in northern New York State, spanning two counties and three towns. The Coalition promotes and supports the protection, stabilisation, restoration, and optimum public use in keeping with private property rights of the Eastern Lake Ontario dunes and related water resources. By focusing on heightened awareness, partnerships, and educational and technical assistance, the Coalition has fostered tremendous progress in dune conservation in the Eastern Lake Ontario region.

APPENDIX F. Speakers Notes

David T. Buzzelli
Vice President and Corporate Director, Environment, Health & Safety
The Dow Chemical Company

Sustainable Development and the Bottom Line:
A Business Perspective on Environmental Protection

Good afternoon. I am happy to be here with you today, and honored to be asked to speak at SOLEC.

This conference represents a continuation of a process that began in 1994. It demonstrates the ongoing commitment between our two countries to address the environmental needs of the Great Lakes region. And, most powerfully, it fosters information exchange and active participation among local, state, provincial and non-governmental groups involved in environmental preservation.

I say "most powerfully" because over the years that I have been involved in environmental stewardship issues, I have seen that local input and the participation of all responsible stakeholders are key success factors for achieving real and lasting environmental protection. Nowhere has that been more clearly demonstrated than in the work of the President's Council on Sustainable Development, on which I have the honor to serve as co-chair.

Three years ago, President Clinton brought together 25 leaders chosen from government and business, environmental and civil rights organizations. Our charge was to develop a strategy for incorporating economic, environmental and social equity concerns into national environmental policy. Many observers, and participants too, were skeptical. Could a group of such historically opposed forces actually yield recommendations acceptable to business interests and environmentalists alike? I must confess, I wondered too.

The Council's report to the President was released last March with some surprising recommendations. Perhaps most surprising was the degree to which we agreed. One of the most powerful experiences for me was how three years of meetings, task forces, public hearings and sometimes heated discussion kept leading all of us in a new direction. What emerged is an approach that has been too long and too often overlooked: a "consensus" ideology based on economic prosperity, environmental protection and greater community involvement.

That was the true impact of the Council's report: this coalescence of a new political force around a set of shared values. What the Council offered is less like a blueprint for environmental regulatory policy than it is a vision for the Council's future. Someone once said, "Vision is the ability to see what's not there." In our case, the vision was all around us, in the work being done by individuals, by community groups, by local businesses and by agencies like those represented today.

What's next? The President has asked the Council to continue to work to find ways of putting some of our recommendations into practice. Vice President Gore is leading these efforts within the Administration. The White House and federal agencies are lending support to the U.S. Conference of Mayors and the National Association of Counties in establishing a new Joint Center on Sustainable Communities. This new partnership is working to implement one of the report's recommendations in communities around the nation.

So what is sustainable development? Admittedly, it's one of those concepts that is easier to grasp intuitively than it is to define. The definition the Council tried to keep before us was that of the World Commission on Environment and Development: to meet the needs of the present without compromising the ability of future generations to meet their own needs.

As an illustration, I will cite an example important to me, both as a member of the Council of Great Lakes Industries and as a proud resident of the Great Lakes areas. Over the last year, The Great Lakes Commission and the Council of Great Lakes Industries have been working cooperatively with the National Wildlife Federation on the proposal to identify obstacles to the redevelopment of brownfields. The Great Lakes basin contains thousands of these former industrial sites, where once-thriving manufacturing operations have become areas of neglect and, in many cases, sources of continuing pollution. For example:

- Cuyahoga County in Ohio has more that 10 percent of its land area - roughly 50,000 acres - categorized as brownfields.
- In Cook County, Illinois, officials have identified more than 300 polluted industrial sites, many of which are abandoned.
- In Toledo, Ohio, more than half of all commercial and industrial real estate transactions are reportedly encumbered by environmental problems.

In problem sites like these, new development is deferred, or shifted to outlying agricultural or open-space greenfields because of clean-up costs and lingering uncertainty over liability issues. The proposal seeks to make brownfields redevelopment more attractive by providing regulatory flexibility, reducing process barriers and making sure that greenfields development accurately reflects necessary infrastructure costs.

When completed the project will yield:

- an inventory and analysis of brownfields policies, practices and innovative programs in the Great Lakes basin,
- a case-study analysis of success stories,
- development of strategic actions for government and private-sector interests, and
- an on-line brownfields information network

The project will also strengthen and expand the existing network of brownfields interests, and provide educational and outreach programs. I thought this example was fitting for several reasons. First, it's a Great Lakes project, and that's an interest we all share. Secondly, the project emphasizes aspects of environmental problem solving that dovetail nicely with SOLEC's perspectives:

- the involvement of local decision makers and a wide range of constituents,
- an emphasis on information-sharing and network-building, and
- a search for cooperative, positive solutions that incorporate economic and social goals, along with environmental concerns.

All of these points, by the way, are key elements of sustainable development as articulated by the President's Council. Local, inclusive, voluntary, flexible, cost-effective: these are words that occur again and again throughout our final report. The Great Lakes brownfields project strives to implement the recommendations for national policy on a regional basis. Most of all, this project demonstrates a willingness to work together to find consensus on tough issues. This has been the toughest barrier of all to break: asking diverse groups of people to sit down together and work out common strategies and goals.

Arriving at those common strategies and goals, I submit, can be accomplished more effectively by keeping four guidelines in mind:

1. Set priorities based on scientific findings.

No one will deny that it's virtually impossible to make any sound environmental decision without a scientific basis. But too often in our historically adversarial approach, science has been either compromised or brushed aside. We can't afford to let this "us vs. them" mentality persist. The scientific community operates by consensus: there's a lot of give-and-take, occasionally some name-calling and cries of foul, but finally a consensus does emerge. This process can and should be a key component of the new consensus ideology I referred to earlier in our search for sustainability. SOLEC's Integration Paper and the

Working Papers on which it is based cite numerous areas in which basic research and data collection are needed.

2. Set priorities from an ecosystem perspective.
Repeated consumer surveys over the last 10 years show that support for environmental protection is now a widely accepted value. Hopefully, this should mean that we can move away from the toxic-of-the-week scare tactics to ongoing efforts like the brownfields project I cited that seeks the "big picture" solutions. These solutions will have to take into account the intricate and delicate relationships within ecosystems and with human communities. SOLEC's Integration Paper identifies several challenges connected with the ecosystem approach, not the least of them being the need to move beyond the linear and turf battle tendencies of traditional policy- and decision-making.

3. Set public policy based on cost/benefit and risk/benefit analysis.
This has been resisted because such analyses have been seen as taking too long or being difficult to do, or as attempts to evade environmental responsibility or de-value natural resources. But we have seen the results of hasty or not fully thought-out environmental policies: they can do as much harm as good to communities and to ecosystems. We must keep in mind that the resources available to provide environmental protection are also limited and must be husbanded to get us the most environmental protection for our money. If the cost/benefit of an environmental policy or technology is clear - as it often is in pollution reduction, for example, or in resource recovery - smart companies will embrace it as part of their efforts to stay competitive.

A major issue we all must face is getting the costs right in order for risk/benefit to work properly. I have been a longtime proponent of full-cost pricing, which needs to be developed further. This approach means that we include all of the environmental costs in an analysis.

4. Set public policy by using the multi-stakeholder approach.
In SOLEC's words, the ecosystem approach requires round-table, interdisciplinary, interjurisdictional and intersectoral approaches to decision-making - approaches that aim for consensus among stakeholders. This point is perhaps the crux of the new environmental paradigm, the shift from adversarial to consensual environmental policy-making. In this approach all parties come to the table. Full participation is difficult, it's messy, it's time-consuming: but the ultimate results are strategies and policies that have buy-in from the start. That's the best prescription for effective and long-lasting environmental protection. I believe it is also the basis for a fundamental and inevitable evolution in how individuals live, in how communities govern, and in how companies do business.

Many of you know about the chemical industry's Responsible Care initiative. It started in Canada and has spread to nearly 30 countries. Let me repeat to you what I told a gathering of business leaders from around the world at a Responsible Care conference in Beijing six weeks ago. My message to my colleagues and competitors: sustainable development is an idea whose time has come, precisely because it's a global approach. Looking at the opportunities for development in China and other emerging economies, business has the opportunity to do it right from the ground up. This time, based on hard-won knowledge, we can avoid many of the problems that industrial development caused in the past. And while we are doing the environment good, we are also providing our companies the strongest competitive position for the next century. Believe me, the business environment will be increasingly competitive on service, on quality, on price and on reputation for corporate social and environmental stewardship.

Environmental progress yields economic benefits. Look at the best-selling management books; they focus on maximizing productivity and efficiency, eliminating structural and process waste. At Dow, our Waste Reduction Always Pays program was successfully built on two assumptions: first, that pollution costs money; and second, that cutting pollution - whether by process changes, better storage, recycling of wastes or recapturing of energy - cuts costs.

Recently, we announced a very demanding set of environmental health and safety goals to be accomplished by 2005. These goals are different in that they demand large improvements and will save us money. For example, we have a goal to reduce our workplace injuries by a factor of 10. This will also save us $50 million dollars over the next 10 years. We have set a goal to reduce primary containment spills by 90 percent and expect this to save us $34 million dollars over 10 years. The total we expect to spend is $1 billion dollars to reach these goals, but we will get a return of at least 30 percent on that investment.

If the business community doesn't champion environmental progress, then the standards slip for everyone. Taking leadership in the environmental arena is both the right thing and the smart thing to do. We simply cannot be as effective or as productive unless we continue to take a strategic approach to corporate environmental responsibilities. This includes sharing resources and knowledge, and working together to champion the link between environmental protection and economic prosperity. When the term sustainable development is simply another way of saying doing business, then industry will truly have moved into the 21st century.

Those who harbor suspicion of industry's increasing interest in sustainable development say it's an excuse to slow down or thwart environmental protection. In fact, the opposite is true. Companies who want to survive and thrive in the 21st century will have to manage for global competitiveness by cutting waste, reducing emissions, preventing spills and incidents, and by supporting forward-thinking environmental policy-making. Hopefully, we have learned enough over the last few decades about the staggering cost of prescriptive, command-and-control regulation and remediation - the kind of legal and regulatory tangle exemplified by Superfund. We have a huge economic incentive to perform responsibly, while building the industrial infrastructure that globalization requires.

That's the emerging consensus that the President's Council both crystallized and will help shape. Some things must grow - jobs, productivity, wages, capital, savings, profits, information, knowledge and social equity. Other things - pollution, waste and poverty - must decline. Sustainable growth is essential to create the economic resources we need to protect and restore the environment.

Those of us who live and work in the Great Lakes basin see all around us the glories of a rich and bountiful natural environment. We also see the damage that has been done in the name of growth by ignorant or irresponsible use of those resources. There has to be a better way. I consider myself - as vice president of Dow, as co-chair of the President's Council for Sustainable Development, as a member of the Council of Great Lakes Industries - privileged to be part of this evolution.

And all of you, as participants in SOLEC, are also critical players in this effort to find solutions. We must develop a way to incorporate science into policy ... to balance costs and risks against needs and benefits ... and to make room at the table for all those with a stake in the issue. That will be, by far, our best and most lasting contribution to the future.

Thank you.

John Sawhill
President & CEO
The Nature Conservancy

Thank you. I'm glad to be here in Windsor today, and let me begin by expressing my thanks both to our Canadian hosts and to the U.S. EPA's Great Lakes Office for inviting me to join you this afternoon. I was delighted to accept. I had heard a lot of favorable things about your meeting in 1994, especially in regard to controlling exotic species, and I also remember being impressed by the remarkable diversity of organizations that attended that first SOLEC conference. It struck me as absolutely the best approach for addressing the environmental challenges of the Great Lakes region: bring together representatives of government, business, academia, and non-profits, from both sides of the border, and focus them on a common set of issues.

Of course, SOLEC brings more than simply the right cross-section of interests to the table. This gathering is targeting on the right issues, and in the right context. The issues are the fundamental questions that govern conservation everywhere: the interplay of land-use patterns, economic development, and environmental protection. The context is the entire Great Lakes region: the ecologically integrated basin that stretches from Duluth to Montreal. I find this really encouraging. Over the past several years, The Nature Conservancy has also been expanding our focus, working at larger scales and trying to harness market forces for conservation. It's reassuring to see that we're on the same track.

Let me also mention two other factors that make this session important for The Nature Conservancy. First, the SOLEC process represents a pioneering effort to address conservation on a truly regional scale and with a wide array of public and private partners. In part out of necessity, but also out of foresight, the Great Lakes region was "thinking like an ecosystem" long before "ecosystem management" became fashionable in conservation circles. Having recently embarked on a region-wide initiative of our own to conserve biodiversity in and around the Great Lakes, the Conservancy is eager to learn from your experiences and to engage in a discussion about our goals and objectives.

Second, by choosing to focus this meeting on nearshore issues, you are drawing the attention of land managers and decision-makers from across the basin to the Conservancy's core business: habitat protection and biodiversity. In a moment, I will expand on the importance of terrestrial systems to the diversity of the Great Lakes, but these special places and the rare species that live there have long been targets for Conservancy action. Such biologically significant areas as the Door Peninsula on Lake Michigan, the freshwater dunes and marshes of eastern Lake Ontario, the shoreline of northern Lake Huron, and Kakagon Sloughs on Lake Superior are irreplaceable parts of our natural heritage. It's good to see the broader conservation community in the Great Lakes turning its collective eyes landward.

As we all know, of course, there was a time not very long ago when many people would have scoffed at a conference dedicated to conserving biodiversity in the Great Lakes. All the media attention in the late 1960s and early 1970s on water pollution in the Great Lakes left a seemingly indelible impression in the mind of the public about the environmental health of this region. People remember fires catching on the surface of Lake Erie; they forget that those events happened almost thirty years ago and that things have changed drastically, and for the better.

Now, this optimistic attitude may sound a bit unusual coming from the leader of the world's largest private conservation organization. After all, they say that environmentalists are professional pessimists -- people who can find the dark lining in a silver cloud. But personally, I find the environmental tendency toward doom and gloom counterproductive. It reminds me of Woody Allen's famous Speech to the Graduates.

"More than at any time in our history," he said, "mankind stands at a crossroads. One path leads to despair and utter hopelessness. The other, to total extinction. Let us hope that we have the wisdom to choose wisely."

I am here to argue that when it comes to conserving the environment, and particularly the Great Lakes region, we do not face this Hobson's Choice. Rather, we have *real* choices, with real consequences. If we continue to work together, we can ensure that this region enjoys the twin benefits of economic prosperity and environmental protection over the long run. In this regard, local governments and other stakeholders in the Great Lakes region deserve great credit for embracing this powerful vision of the future.

Turning this cooperative vision into reality, however, will likely prove a different matter. We still have much to learn about the Great Lakes ecosystem, about conservation on these scales, and about each other. So in my remarks, I want to start by explaining why The Nature Conservancy believes that the Great Lakes are a biodiversity conservation priority. Then I want to outline what we believe comes next – what the Conservancy hopes to contribute through its work in the region, and how we hope to integrate our efforts with other initiatives. But first, because many of you may not be familiar with The Nature Conservancy, I want to begin with a brief introduction to our organization.

For 45 years, The Nature Conservancy has been taking direct action to conserve the Earth's rarest and most threatened plants, animals, and natural communities. We are a large, international organization, but I believe that the secret to our effectiveness can be captured in a single statistic. The Conservancy operates out of more than 250 offices around the world. This is unprecedented for a conservation nonprofit. In practice, it means that we maintain an on-the-ground presence in the communities where we work. I cannot overemphasize how important this is to long-term success. When The Nature Conservancy sets up shop in a community, our goal is to become a trusted neighbor and to work in partnership with local people to achieve lasting, meaningful conservation results.

Just here in the Great Lakes region, for example, we have staff not only in the state capitals but also on the ground, in places from Fish Creek, Indiana to Cedarville, Michigan. Our Great Lakes regional program may be based in Chicago, but Helen Taylor, Sue Crispin, and the rest of the staff can draw on our resources in the crescent of states from Minnesota to New York.

We are nonetheless an international organization, and our "multi-local" structure is buttressed by a coherent, consistent set of principles. In essence, three basic principles define the Conservancy's approach to conservation.

First, we are science-driven. This means that we base our conservation actions on the best available science and not simply because an opportunity exists or for scenic values. To this end, the Conservancy has assembled the most comprehensive database in the Western Hemisphere of the locations and status of rare species. Administered by the state Heritage programs in the U.S. and provincial Conservation Data Centres in Canada, this information ensures that we work on the most ecologically important areas.

Further, we constantly reevaluate and adapt our on-the-ground actions to new information. As you probably know, conservation science is a rapidly developing field, and the Conservancy is at the forefront of applying these advances to meet the practical challenges of carrying out on-the-ground conservation projects. With expertise in such fields as fire ecology, invasive species, and biohydrology, the Conservancy is constantly testing new approaches to managing, restoring, and conserving land and water.

The Conservancy's second key principle is non-confrontation. A long time ago we made the strategic decision that we could be most effective by developing mutually beneficial partnerships with anyone who shared our goals. As a result, today we work in partnership with people and organizations ranging from multinational oil companies to individual farmers and ranchers. And in general, we prefer market-based solutions to regulation. After all, buying land for conservation – what we do best -- is about as market-oriented as you can get. In the Great Lakes basin alone, for example, we have helped conserve more than 100,000 acres of ecologically sensitive land. In fact, just a couple of weeks ago I was in the Upper Peninsula of Michigan with our very able Michigan state director, Tom Woiwode, to dedicate a preserve that protects more than three miles of shoreline along Lake Huron.

Now, although buying land is certainly effective, it is not the only solution and in many cases not necessarily the best solution. This brings me to the third basic principle about the Conservancy. We are entrepreneurial. The word "entrepreneurial" gets misused a lot these days, but I cannot think of a better way of expressing the Conservancy's emphasis on creative approaches to conservation problems. Perhaps the best thing to do is to relate a quick story about the how the Conservancy gets things done.

This example concerns our Fish Creek project in Indiana, where the Conservancy is working to protect a number of globally imperilled fish and mussels that live in this creek. It turns out that the biggest threat to these species is soil erosion from nearby farm fields. Every time it rains, the creek turns chocolate-brown from the runoff, which smothers the mussels and drives away the fish.

But what to do? You can't "buy" a creek, and even an organization with our resources cannot afford to acquire all the farms that line this waterway. So instead, we set up our own little incentive program. If local farmers agree to switch to "no-till" planting techniques, which cause far less erosion than traditional plowing, then we will agree to subsidize the additional cost for new equipment. The farmers love this idea, and as a result we have been able to affect land-use patterns over thousands of acres throughout the watershed.

In addition to illustrating our creative side, the Fish Creek project also serves as a good example of how our work has evolved in recent years. In the past, the Conservancy was known for acquiring land and setting it aside in preserves. Today, we still acquire land, but our goals, strategies, and programs reach far beyond the boundaries of our preserves. Instead, in places like Fish Creek, we seeking to conserve whole watersheds -- intact landscapes where people and nature coexist in productive harmony. This represents a sea-change for the Conservancy, and has compelled us to reach out aggressively to local communities and to form new partnerships.

Our conservation goals have evolved over time as well. As a first step, the Conservancy decided to ignore geopolitical boundaries in our conservation planning and instead to organize our conservation programs around ecologically derived regions. And second, instead of focusing exclusively on rarity, we are now seeking to conserve viable populations of all native species and communities within each of the ecoregions where we work. Those of you familiar with our Great Lakes Initiative will not be surprised to learn that its success played a key role in persuading us to adopt an ecoregional approach organization-wide.

Now, I think that the Conservancy's Great Lakes Initiative has performed another valuable service -- highlighting the distribution of biodiversity in the region. With so much emphasis on the Lakes themselves, some people have lost sight of remarkable diversity of life in the surrounding watersheds. In the second part of my talk, let me spend a few moments expanding on this.

The fact is, the Great Lakes region ranks as an important global conservation priority. It supports more than 130 species and ecological communities that are rare or imperilled, with more than half of these species endemic to the Great Lakes region. There are a lot of different reasons to account for this high concentration of rare species -- fluctuations in water level, microhabitats left over from the Ice Age, and so forth. But there can be no question of the collective significance of these populations, nor of the region's value as a conservation target.

These findings are drawn from a Conservancy project that began in the early 1990s to inventory the biodiversity of the Great Lakes. We assembled detailed data from eight states and from Ontario, making it one of the largest-scale assemblages of biodiversity information ever attempted. And even we were surprised by the results -- not only by the volume of rare species and communities, but also by the tremendous potential for conservation that we perceived for this region.

In retrospect, I realize that our surprise was largely a function of our own preconceptions that the Lakes were irretrievably damaged. But when we mapped out the biodiversity data and looked at the system as a whole, it became clear that the battle to conserve the natural heritage of the region was far from lost. We

could see that excellent opportunities remained to conserve key coastal areas, such as sand dunes, as well as biologically rich marshes, estuaries, and lakeplain areas.

This is not to say, of course, that the Great Lakes region is in pristine environmental condition. The Conservancy's analysis also began identifying the critical threats to the biodiversity of the Great Lakes, and we came up with many of the issues that you would expect: unsustainable land-management practices; impacts from agriculture, primarily non-point source runoff; and of course the invasion of exotic species, such as the zebra mussel. I know that the 1994 SOLEC meeting concentrated on this last issue, and I think that we have seen some progress in slowing the spread of these pernicious species. For example, I take heart from the collaborative efforts of ship owners, engineers, state government officials, and biologists to test new shipboard ballast systems that would screen out mussels before a ship moves from port to port.

But although exotic species are certainly a pressing issue for the Great Lakes system, the two biggest threats to biodiversity we found regionwide were habitat conversion and altered hydrology.

Habitat conversion -- the permanent loss of natural areas for commercial, residential, and second-home development -- is an obvious enough source of stress on biodiversity. Eliminate habitat and you eliminate species; in many cases, simply fragmenting an otherwise contiguous expanse of habitat accomplishes the same effect. The altered hydrology of both the surface and groundwaters across the region is more complicated. But as people all across the Great Lakes basin have dug wells, built diversion or irrigation dams, filled in wetlands, and constructed canals, the natural hydrology of the system has changed dramatically. In turn, these shifts have imperilled several species and communities that depend on certain water levels at certain times of year.

It would be foolish to assume that any of these threats are going to magically disappear any time soon. Indeed, it is safe to assume that the pressures on the native plants and animals of the Great Lakes will only increase. After all, 10 percent of the U.S. population and 30 percent of the Canadian population live in the Great Lakes basin, and the region remains one of the world's major industrial powerhouses. Economic development in the Great Lakes is not a question of if, but when.

But the good news is that we still have an excellent opportunity to conserve and restore the ecological integrity of the Great Lakes system. In certain densely developed places, things may not look too promising, but region-wide, enough of the natural processes and native habitat remain intact to justify taking concerted action to preserve the ecological fabric of this landscape. Time may be short, but there is still time.

Even more important, we also seem to have the public and private will required to pursue this goal region-wide. Much of the credit for this must go to the business community. Instead of resisting regional conservation efforts, the industries of the Great Lakes have really taken a leadership position in many instances. They recognize that a healthy economy depends on a healthy environment, and that what is good for the environment is also good for the bottom line. Your speaker yesterday, my good friend David Buzzelli of Dow Chemical, undoubtedly went into greater detail about the movement toward what he calls "eco-efficiency." My point is that active cooperation of the private sector adds whole dimensions to the conservation opportunities available in the Great Lakes.

And finally, opportunity rests in the region's strong existing environmental infrastructure, which was set up originally to address water-quality issues. Because the Lakes are a connected system -- because what happens in one part of the system will eventually affect all others "downstream" -- you have been forced to take an ecosystem approach from the beginning. In many places, we find ourselves spending a lot of time persuading stakeholders that it is in their interest to address environmental issues on a broad scale. Here in the Great Lakes, that is just the starting point.

I should add that an essential part of that environmental infrastructure are the network of strong regional non-governmental organizations, many of them represented here today. The non-profit sector has a central role to play to meet conservation challenges on this scale, and we look forward to working with them as we move forward. In that regard, I want to single out the efforts of one of the Conservancy's key partners in our eastern Lake Ontario project, the Ontario Dune Coalition. Recognized last night as an outstanding example of effective grassroots conservation, this coalition has been a powerful and persuasive voice for protecting the ecological integrity of these dunes for the past 11 years. Along with the other groups honored yesterday, the Ontario Dune Coalition represents the best traditions of local activism, and any successful region-wide conservation initiative will need to draw on the resources and talents of these nonprofits.

Let me also say a word on behalf of my old Conservancy colleague Russ van Herik, now of the Great Lakes Protection Fund. An $80 million endowment established by seven governors from states bordering on the Lakes, the Fund has as its mission promoting regional action to protect the health of the Great Lakes ecosystem. Not only is this an innovative approach to funding conservation projects, but it also serves as a fine model for addressing conservation issues on a regional basis.

This combination of factors gives me hope for the future. We have most of the necessary ingredients to make good conservation happen across a meaningful piece of the landscape. We have good scientific information and a trusting relationship between governments, business, and non-profit groups. We have public support and enough time to act. With so much opportunity, the question is, what next?

In the final part of my remarks, I have a few thoughts along these lines. Let me concentrate first on what The Nature Conservancy intends to do.

For one, we have made an institutional commitment to the protection of biodiversity in the Great Lakes region by establishing our Great Lakes program. As I mentioned, this program is one of the first Conservancy initiatives that seeks to plan and carry out conservation on a regional scale. We will look to this program as a learning laboratory for how this type of work should be done.

Second, we are working to upgrade the information we collected about the distribution and status of biodiversity in the region. As comprehensive as our first analysis was, the information was still incomplete and we have been working since then to fill the gaps. Some of the results of this work have been discussed during this meeting, and I can report now that an important outcome of this work has been to focus institutional attention and efforts on a little-known but unique ecosystem, the coastal habitat called "alvar."

Third, the Conservancy and our partners are in the process of implementing a series of landscape-scale conservation projects across the region. These projects focus on areas of unarguable biological importance and include many of the region's richest ecosystems -- coastal dunes, marshes and rockshores, lakeplain prairies and savannas, tributaries and forests.

At a local level, these on-the-ground conservation projects address the same issues that are relevant basinwide. For example, each of these projects seeks to demonstrate how to balance economic and environmental concerns. Consequently, in these places we have a wide array of compatible economic development programs involving such industries as agriculture, timber, and tourism. In addition, at each of these sites we are working with partners to build a powerful local consensus supporting conservation. And with each project we understand the ecology of the entire system a little bit better.

And last, we are working to stimulate cooperation and coordination of conservation efforts across the basin. Building partnerships is something that the Conservancy has always concentrated on, but here in the Great Lakes we want to take this time-tested strategy to new heights. Simply put, conserving the native species and habitats of this region is far too ambitious a task for any one group, or government

agency, or corporation. To the contrary: preserving the natural heritage of this sprawling, wonderful, and complex system will require that all of us step up to the plate.

Indeed, I think that this question of scale represents the single biggest challenge that we face in conserving the Great Lakes system. How do we design a network of conservation areas that will collectively conserve the full range of species and communities found in the Great Lakes? No one has ever really tried on this scale. Even if we develop a good design, how do we implement it? What will it cost and who will pay? And how should we set priorities for action among the many deserving places in and around the region?

I realize that I just asked a bunch of questions in a row, none of them with easy answers. But that should not be a cause for despair. In fact, I take it as a positive sign that we can even ask these questions about a region as large and developed as the Great Lakes. It means we are making progress. Progress, too, will come from meetings like this gathering of SOLEC. After all, in your deliberations here this week, you can help chart a course for conserving the biological legacy of the Great Lakes region.

Ultimately, of course, the task of protecting our natural heritage comes down to individuals -- you and me. Every day we make decisions that affect the environment, and every day we must take responsibility for our actions. And we are also the people who will be held accountable by future generations for the quality of our decisions and the effectiveness of our actions.

So how will our generation be judged by our descendants? Will we make good choices and pass down a natural heritage as robust as the one that we inherited? The answer, I think, is yes. If people work together, if they seek compromise and not division, then we can conserve the rich diversity of life on Earth. We have an obligation to ourselves -- and those who follow -- to do no less. For in the long run, our society will be defined run not only by what we create, but by what we refuse to destroy. Thank you.

Honourable David Crombie
Chair
Waterfront Regeneration Trust

Significant historical forces are acting on large urban areas and waterfronts across North America. Changes are occurring in four major ways:

Change in economics:

- There is a fundamental shift in the economic basis of Greater Toronto in the way they create wealth and make a living.
- The trick is to figure out how much of the old way we should keep (e.g. what elements of traditional manufacturing) and how much of the new way we should learn and use.

Change in demographics:

- There have been 75,000 new people added to Toronto every year for the past 50 years, including people of all shapes, sizes, colours and creeds.
- We now have 110 weekly newspapers which are published in a language other than English. A multi-cultural framework is not a policy, it is a reality.
- We live in a time of significant movement of peoples around the globe.
- The baby boomer generation has marched through society, determining many changes and claiming many conditions for themselves (see David Foote's Boom, Bust or Echo).
- There is also a gender revolution and we must face this reality; it is changing home/work relationships.

Change in attitudes towards the environment:

- In 1961, Rachel Carson wrote Silent Spring, and it started the conservation movement of our time; it was written 35 years ago, and it still makes sense.
- We have absolutely changed our attitude towards the environment; and this has changed government, industry, business and personal attitudes.
- Never underestimate the power of the conservation movement: it will leave a legacy for your children.
- Canadians have a unique relationship with the environment; we are the only country in the world with a leaf on our flag, not symbols of our history or our ideology - just nature. Think about that.

Change in the role of government:

- It is hard for governments to cope with these changes; it is impossible to do the new jobs that are required, in the old way.
- No one knows who does what; one thing we do know is that slowly responsibilities are being pushed down to municipalities.
- The Remedial Action Plans that work are the ones that have community and agency staff support at the local level, and buy-in at the senior levels of government.
- Governments are based on maps and boundaries, but the borders and boundaries have fundamentally changed in our generation. We are trying to figure out what our new maps are, bringing together ecology, economy and community.

At the Waterfront Regeneration Trust, we try to use an ecosystem approach in all of our work. When we were the Royal Commission on the Future of the Toronto Waterfront, we developed an understanding of what we meant by an ecosystem approach. The knuckles of an ecosystem approach are:

- Everything is connected to everything else.
- Human beings are a part of nature and can not be separated from it.
- We are responsible for the consequences of our actions.

Therefore, the concept of moving in, using up, throwing away, and moving on is unacceptable.

One last thought on how to get there: We're not really good at learning without doing; we can't separate the projects from the learning. And learning new ways of doing things is the only way to deal with historical change.

APPENDIX G. Participant's List

Alan Abelsohn	Ontario College of Family Physicians
Valdus Adamkus	US Environmental Protection Agency
Dennis Albert	Michigan National Features Inventory
Kathy Allan	Green Saver
Rod Allan	National Water Research Institute
Paul Alsenas	Cuyahoga County Planning Commission
Janet Amos	Region of Halton
Janette Anderson	Environment Canada
Jim Atkinson	Ontario Ministry of Natural Resources
Viriginia Aveni	Cuyahoga County Planning Commission
Milena Avramovic	Ontario Ministry of Municipal Affairs
Ron Baba	Oneida Planning Dept
Lois De Backer	CS Mott Foundation
Edward Bailey	International Joint Commission
Tom Bailey	Little Traverse Conservancy
Bruce Baker	Wisconsin Dept of Natural Resources
Thomas Baldini	International Joint Commission
Helen Ball	Pisces Consultants
Bruce Bandurski	International Joint Committee
Linda Barbetti	Ontario Ministry of Natural Resources & Lincoln Waterways
Anne Barnes	Bad Band River of Lake Superior Chippewa
Suzanne Barrett	Waterfront Regeneration Trust
Vicki Barron	Credit Valley Conservation Auth
Jon Bartholic	Michigan State University
Dan Bauer	US Dept of the Interior
Paul Baumann	The Ohio State University
Susan Bayh	International Joint Commission
Judy Beck	US Environmental Protection Agency
Laura Beer	Great Lakes Commission
Pierre BJland	International Joint Commission
Tim Bendig	Windsor-Essex County Health Unit
Mike Berman	US Environmental Protection Agency
Paul Bertram	US Environmental Protection Agency
Victor Bierman	LTI-Limnotech Ltd, Inc.
Marcel Blais	Town of Tecumseh
Pamela Blais	Metropole Consultants
Merilee Blowers	
William Booty	Environment Canada
Lee Botts	Inst. for Internat'l Env. Governance
Michael Boyce	Michigan Environmental Council
Peter Boyer	International Joint Commission
Stephen Brandt	SUNY College at Buffalo
M.P. Bratzel	International Joint Commission
Werner Braun	The Dow Chemical
Jim Bredin	Michigan Office of the Great Lakes
Mark Breederland	SE Michigan District Agent
Lee Bridges	Indian Dept of Environmental Management
Timothy Brown	Clean Sites
Bob Budd	County of Huron
Kelly Burch	Pennsylvania Dept of Environment Protection
Thomas Burnett	INCO Ltd
Robert Burris	US Dept of Agriculture
Tom Burton	Town of Tecumseh
Dieter Busch	US Fish & Wildlife Service
Jeff Busch	Ohio Lake Erie Office
Jeffrey Busch	Ohio Lake Erie Office & Ohio Lake Erie Commission
Thomas Busiahn	US Fish & Wildlife Service
Frank Butterworth	Institute for River Research International
David Buzzelli	Dow Chemical Co.
Mary-Lou Byrne	Wilfrid Laurier University
Tanya Cabala	Lake Michigan Federation
Vic Cairns	Great Lakes Lab for Fisheries and Aquatic Sciences
Daniel Campbell	
Allegra Cangelosi	Northeast-Midwest Institute
Kristine Carre	Grand Portage Band of Chippewa
Robert Carson	Medical Officer of Health
Karen Cedar	Windsor Parks and Recreation
Alice Chamberlin	International Joint Commission
Murray Charlton	Canada Centre for Inland Waters
Peter Charlton	Lake Erie Lamp Binational Public Forum
Michael Chrzastowski	Illinois State Geological Survey
Murray Clamen	International Joint Commission
Renata Claudi	Ontario Hydro
Lynn Cleary	Environment Canada
Catherine Cobden	Avenor Inc.
Pat Collins	Minnesota Dept of Natural Resources
John Cooley	Fisheries and Oceans Canada
Dick Coote	
Rick Coronado	Citizens Alliance
George Costaris	Canadian Consulate General
Rick Cowan	Ontario Fruit & Vegetable Growers' Association
David Cowgil	US Environmental Protection Agency
Susan Crispin	The Nature Conservancy
David Crombie	Waterfront Regeneration Trust
Peter Croskery	
Ken Cullis	Ontario Ministry of Natural Resources
Nancy Cunningham	Town of Parry Sound
Shannon Daher	Environment Canada
Thomas Dahl	US Fish & Wildlife Service
Charles Daniels	Geon Company
Myfanwy Davies	CBC Radio
Jennifer Day	Ohio Environmental Protection Agency
Laura Rose Day	National Wildlife Federation
C. Jose de Anda	CIATEJ
Don DeBlasio	US Environmental Protection Agency
Leo DeLoyde	City of Burlington
Leslie Demal	Ontario Ministry of Natural Resources
Michelle Dempsey	Environment Canada
Diane Dennis-Flagler	US Environmental Protection Agency
Joseph DePinto	University of Buffalo
Ron Desjardine	Ontario Ministry of Natural Resources
Dave Dilks	LURA Group
David Dilks	LTI Limno-Tech Inc.
Marg Dochoda	Great Lakes Fisheries Commission
Douglas Dodge	Ontario Ministry of Natural Resources
David Dolan	International Joint Commission
Helen Domske	New York Sea Grant
Michael Donahue	Great Lakes Commission
Patrick Donnelly	Lambton County Planning
Matt Doss	Great Lakes Commission
Mary Beth Doyle	Ecology Center
Victor Doyle	Ministry of Municipal Affair and Housing
Dennis Draper	D.W. Draper & Associates Ltd
James Drummond	Ontario Ministry of Environment & Energy
W.R. Drynan	City of Windsor
Lesley Dunn	Environment Canada
Tracey Easthope	Ecology Centre
Roger Eberhardt	Michigan Dept of Environmental Quality
Tim Eder	National Wildlife Federation
Donald Edmunds	American Automobile Manufacturers Assoc.
A. Forester Einarsen	US Army Corps of Engineers
Hugh Eisler	Canadian Chlorine Coordinating Council
Mary Elder	Regional Municipality of Haldimand-Norfolk
Ron Emaus	Great Lakes Commission
Danny Epstein	Environment Canada
Kathy Evans	Muskegon Conservation District
David Ewert	The Nature Conservancy
Amie Fausto	CH2M Gore and Storie Ltd
Jared Fein	E.B. Eddy Forest Products Ltd
Michael Finney	Oneida Planning Dept

F.C. Fleischer	Ontario Ministry of Environment & Energy
Eileen Foley	Environment Canada
Stewart Forbes	Great Lakes Pollution Prevention Centre
Pat Fowler	US Department of Agriculture
George Francis	University of Waterloo
Brian Fredrickson	Minnesota Pollution Control Agency
Paul Freedman	LTI Limno-Tech Inc
Aaron Freeman	
Adele Freeman	Metro. Toronto Regional Conservation Auth.
Jeffrey Freeman	Hey and Associates, Inc.
Rosaline Frith	Environment Canada
Kent Fuller	US Environmental Protection Agency
Mark Gaden	Great Lakes Fisheries Commission
John Gannon	National Biological Survey
Roger Gauthier	US Army Corps of Engineers
Sandra George	Environment Canada
Rhae Giacoma	US Coast Guard
Kyle Gifford	Canadian Coast Guard
Michael Gilbertson	International Joint Commission
Kent Gilges	The Nature Conservancy
Ian Gillespie	Environment Canada
Mary Ginnebaugh	International Association for Great Lakes Research
Ron Glenn	Grey County Planning Dept
Chris Goddard	Great Lakes Fishery Commission
Alice Godsey	City of Lima
Herman Goertz	Environment Canada
Michael Goffin	Environment Canada
Cheryl Gonsalves	Emergy Creek Environmental Assoc
Rob Graham	Ontario Fish Producers Assoc
Emily Green	Sierra Club Midwest Office
Larry Green	Kodak Canada Inc
Richard Greenwood	US Environmental Protection Agency
Barry Greer	Environment Canada
Donald Greer	Ontario Ministry of Natural Resources
Margaret Guerriero	US Environmental Protection Agency
Gary Gulezian	US Environmental Protection Agency
Basil Gurusinghe	Ministry of Municipal Affairs and Housing
Sheridan Kidd Haack	US Geological Survey
Andy Hagen	Canadian Wildlife Service
Doug Haines	Health Canada
Kenneth Hall	Bay Area Restoration Council
Larry Halyk	Ontario Ministry of Natural Resources
D.A. Hames	Dow Chemical Canada Inc.
Jim Hamilton	Ontario Ministry of Natural Resources
Moyra Haney	Metro Toronto Remedial Action Plan
Howard Hankin	US Dept of Agriculture
Vicky Harris	Wisconsin Dept of Natural Resources
John Hartig	International Joint Commission
Richard Hassinger	Minnesota Dept of Natural Resources
Gordon Hayward	Peninsula Township
Robert Heath	Kent State University
Duane Heaton	US Environmental Protection Agency
Carl Held	Town of Lincoln
Daniel Helwig	Minnesota Pollution Control Agency
Dale Henry	Ontario Ministry of Environment & Energy
Tom Henry	Toledo Blade
Heraline Hicks	Agency for Toxic Substances & Disease Registry
Jonathan Higgins	The Nature Conservancy
Gregory Hill	Wisconsin Dept of Natural Resources
Harry Hirvonen	Environment Canada
Walter Hoagman	Michigan Sea Grant
Raymond Hoff	Environment Canada
Robert Hoffman	Ducks Unlimited
Jeff Holec	LURA Group
Karen Holland	US Environmental Protection Agency Great Lakes
William Horns	Wisconsin Dept of Natural Resources
Eric Horvath	City of Elkhart
Paul Horvatin	US Environmental Protection Agency
Robbin Hough	Oakland University
Maureen Houghton	Michigan Dept of Environmental Quality
Andrew Houser	Ontario Ministry of Natural Resources
Jim Houston	International Joint Commission
Todd Howell	Ontario Ministry of Environment and Energy
Michael Hurst	City of Windsor
Noel Hutchinson	City of Oshawa
Timothy Huxley	Stelco Inc.
Charles Isely	Waukegan Citizens Advisory Grp.
Ed Iwachewski	Ontario Ministry of Natural Resources
Julie Jack	American Forest and Paper Assoc.
Edith Jacobson	
Wade Jacobson	US Environmental Protection Agency
Ian Jarvis	Agriculture and Agri-Foods Canada
Jon Jensen	The George Gund Foundation
Douglas Jester	Michigan Dept Natural Resources
Joe St. John	St. Clair Shores Waterfront Advisory Committee
Gary Johnson	Ontario Ministry of Environment & Energy
Gregory Johnson	
Peggy Johnson	Lake Erie LAMP Forum Clinton River RAP PAC
Mike Jorna	City of Stratford
L. Raymond Tuttle	New York State Electric & Gas
James Justice	Northeast Ohio Regional Sewer District
Rimas Kalinauskas	Environment Canada
Patricia Kalles	Waterloo Regional Health Unit
Peter Kauss	Ontario Ministry of Environment & Energy
Bob Kavetsky	US Fish & Wildlife Service
Kelly Kelly	Canton Township
John Kelso	Fisheries and Oceans Canada
Joanna Kidd	LURA Group
Mary Kirby	Ontario Ministry of Environment & Energy
Chris Kirchner	Clean Water Alliance
Bruce Kirschner	International Joint Commission
Michael Kledinger	Michigan Sea Grant
Mike Klepinger	Michigan State University
Steven Klose	Ontario Ministry of Environment & Energy
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