



## State of the Lakes Ecosystem Conference 2008 NEARSHORE AREAS OF THE GREAT LAKES

### Draft for Discussion

Prepared for  
Participants at the  
State of the Lakes Ecosystem Conference  
Niagara Falls, Ontario  
22-23 October 2008

### Notice to Readers

This background paper is intended to provide a concise overview of the status of the nearshore conditions in the Great Lakes. The information presented by the authors has been selected as representative of the much greater volume of data, and therefore does not include all research or monitoring information available. The Chapters were prepared with input from many individuals representing diverse sectors of the Great Lakes community.

The intent of this paper is to provide the basis for discussions at SOLEC 2008. Participants are encouraged to provide additional specific information and references for use in preparing the final, post-conference version of the paper. Together with the information provided by SOLEC discussants, the paper will become part of the 2009 State of the Great Lakes reports. These reports will provide key information required by managers to make informed environmental decisions.

### The Nearshore Areas of the Great Lakes 2008

The theme for SOLEC 2008 is “The Nearshore.” In 1996, SOLEC focused on the nearshore lands and waters of the Great Lakes where biological productivity is greatest and where humans have maximum impact. In 2008, the conference will concentrate on what has changed with respect to the nearshore environments since 1996. Additional conditions and issues not evaluated in 1996 will also be addressed.

Several Great Lakes indicators have been identified for the SOLEC grouping “Coastal Zones,” but only a few have been reported. To enhance the discussions by participants at SOLEC 2008, a more comprehensive summary about the current environmental conditions in the nearshore area was desired. This background paper on the current status of nearshore areas of the Great Lakes, authored by Great Lakes expert researchers and managers, strives to provide this summary.

For SOLEC 1996, four background papers about the nearshore zones were prepared: *Impacts of Changing Land Use* (Thorp et al. 1997); *The Land by the Lakes: Nearshore Terrestrial Ecosystems* (Reid and Holland 1997); *Coastal Wetlands* (Maynard and Wilcox 1997); and *Nearshore Waters of the Great Lakes* (Edsall and Charlton 1997). They are summarized in the document “*State of the Lakes Ecosystem Conference 1996: Highlights of Background Papers*,” available at [www.epa.gov/glnpo/solec/solec\\_1996](http://www.epa.gov/glnpo/solec/solec_1996).

For SOLEC 2008, the chapters in this background paper focus on the question, “What has changed since 1996?” Assessments of current environmental conditions or issues that were not evaluated in 1996 are also included. Each chapter was intended to include:

- an assessment of the State of the Ecosystem, which describes the status (good, fair, poor, or mixed) and trends (improving, deteriorating, or remaining the same) of the ecosystem component in question, presented lake-by-lake, if appropriate
- a discussion of current and future pressures that could be expected on the nearshore environment
- suggested management implications to mitigate the pressures.

For this paper, “nearshore” is defined as beginning at the shoreline or the lakeward edge of the coastal wetlands and extending offshore to the deepest lakebed depth contour where the thermocline typically intersects with the lake bed in late summer or early fall (Edsall and Charlton 1997, Figure 1).

### Progress from 1996-2008

In 1996, the authors of the *Nearshore Waters* paper commented that among the most destructive human activities for the nearshore waters has been the introduction of exotic species. In 1996, there were ~166 documented invasions of non-indigenous aquatic species in the Great Lakes since the early 1800s. In 2008, at least 184 invasions have now been reported. Although nutrient loadings to the Great Lakes have been reduced in the past 30 years, many physical, chemical and biological changes to the nearshore environment remain. The 2008 authors discuss the emerging issues of botulism, harmful algae blooms, viral hemorrhagic septicemia (VHS), and shoreline development, among other stressors.

The authors of 1996 *Nearshore Terrestrial-Land by the Lakes* paper concluded that the most pressing need for this ecosystem component was a conservation strategy that would protect ecologically significant ecosystems within 19 geographic “biodiversity investment areas.” In 2006, The Nature Conservancy Great Lakes Program and the Nature Conservancy of Canada Ontario Region released the Binational Conservation Blueprint for the Great Lakes. The Blueprint identified 501 areas across the Great Lakes that are a priority for biodiversity conservation for their exceptionally unique and diverse species, communities and physical features.

The main finding of the 1996 *Impacts of Changing Land Use* paper was that development of farm and natural lands in both urban and rural areas presented the single largest threat to the Great Lakes basin ecosystem. Indeed, in 2008 the author of the Impacts of Land Use Change on the Nearshore chapter noted that the continued rapid expansion and growth of urban and suburban areas and associated infrastructure is the single most significant land use/land cover change (~60%) within the U.S. portion of the Great Lakes basin over the last decade. Much of the newly developed land was converted from agricultural or early successional vegetation lands. Moreover, in the Chicago area, changes in urban and suburban land use between 1992 and 2001 (19%) far exceeded those predicted based on population growth (2.2%). The role that higher crop prices (driven by investments in biofuel production) may play in the decline in the loss of agricultural lands is also explored.

The authors of the 1996 *Coastal Wetlands of the Great Lakes* paper acknowledged that although the more than 216,000 hectares (534,000 acres) of Great Lakes coastal wetlands are a considerable ecological, biological, economic and aesthetic resource, there were not enough detailed and comprehensive data about the coastal wetlands to report confidently on their current conditions and trends in viability, health, or success of current protection and restoration efforts. They suggested the development of coastal wetland indicators in the following categories: physical and chemical, individual and population level, wetland community, landscape, and social and economic. They also suggested the following management challenges:

- “There is no comprehensive inventory and evaluation of Great Lakes coastal or even inland wetlands.”
- In the US, “Individual states have also completed wetland inventories and evaluations, however methodologies are not consistent and the level of detail and amount of field-based data varies.”
- “Work has been initiated to develop indicators for wetland degradation and to choose monitoring sites and appropriate monitoring strategies. However, there is no international consensus on these matters.”

In 2000, the U.S. EPA Great Lakes National Program Office funded the creation of the Great Lakes Coastal Wetlands Consortium to expand the coastal wetland monitoring and reporting capabilities of the U.S. and Canada under the Great Lakes Water Quality Agreement. The purpose of the Consortium was to design a long term, binational coastal wetland monitoring program. Indicators suggested through the SOLEC process were evaluated and protocols tested. In early 2008, a final report detailed indicators, protocols for monitoring, and costs. Major accomplishments include:

- A map of the more than 216,000 hectares of known coastal wetlands
- A new classification system consisting of three major categories: lacustrine, riverine, and barrier-protected that was then applied to the mapped coastal wetlands
- Field-tested sampling protocols
- A statistical sampling design
- A database that will house future data

These and other improvements in assessing coastal wetlands from 1996 to the present day are detailed in this report in the chapter *Great Lakes Coastal Wetland Ecosystem*.

## Information Sources

Edsall, T.A. and M.N. Charlton. 1997. Nearshore Waters of the Great Lakes. State of the Lakes Ecosystem Conference 1996 Background Paper.

Maynard, L. and D. Wilcox. 1997. Coastal Wetlands. State of the Lakes Ecosystem Conference 1996 Background Paper.

Reid, R. and K. Holland. 1997. The Land by the Lakes: Nearshore Terrestrial Ecosystems. State of the Lakes Ecosystem Conference 1996 Background Paper.

Thorp, S., R. Rivers, and V. Pebbles. 1997. Impacts of Changing Land Use. State of the Lakes Ecosystem Conference 1996 Background Paper.

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Figure 1. Nearshore waters of the Great Lakes (from Edsall and Charlton 1997).



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