

Special Issue on Great Lakes Shoreline Management in Ontario

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Introduction

The over 3,000 kilometers of Great Lakes shoreline in Ontario is home to several million people. It is a rich complex natural ecosystem with a diversity of natural features and landforms ranging from steep vertical rock cliffs, sandy beaches and dunes, glacial till shorelines, to wetlands. The Great Lakes shoreline has also experienced tremendous land use pressures and human activities most notably deforestation, agriculture, urbanization, industry, and seasonal residential cottage development. The range of management and planning issues includes habitat fragmentation, ecosystem health impacts, water quality and pollution concerns, sedimentation, loss of aquatic diversity and habitats, flooding and erosion hazards, and water diversions.

Over twenty years have passed since the record high water levels on the Great Lakes created such public and political concern regarding the impacts of this natural hazard to development and infrastructure along the shorelines of the Great Lakes in Ontario, Canada. One significant outcome from this event was the establishment of a Great Lakes Shoreline Management Program by the provincial government of Ontario which would result in the preparation of shoreline management plans by Conservation Authorities and Ontario Ministry of Natural Resources Districts¹. In addition, many other government agencies and organizations, such as the International Joint Commission and Environment Canada have undertaken the development of numerous research and policy programs to address specific issues regarding the Great Lakes shoreline. Parks Canada and Ontario Parks have developed research and land management programs for land and ecosystem conservation with national park planning and the Heritage Coast respectfully.

A variety of related land use planning initiatives have been undertaken by local and regional municipalities in the

province as well as non-government agencies, most notably Great Lakes United and The Nature Conservancy. The federal government and Province of Ontario have supported Great Lakes regional initiatives such as the Great Lakes Water Quality Agreement, lakewide management plans, remedial action plans for Areas of Concern, and the 2001 Annex of the Great Lakes Charter. Water quality, contaminated sediments, rural non-point pollution, exotic aquatic species, wetland loss and degradation, water diversions and withdrawals, historic low water levels, and shoreline land use development remain serious concerns.

The articles contained in this special issue on "Great Lakes Shoreline Management in Ontario" provide an overview of recent progress on addressing a range of scientific, policy, and public concerns related to human activities and their impacts on shoreline environs. The authors were solicited due to their participation as presenters in special sessions on topics of Great Lakes shorelines organized at the 2003 Latornell Conservation Symposium and 2003 Canadian Coastal Science and Engineering Conference. All the papers as compiled for this special issue have been revised and updated for publication in the Great Lakes Geographer. The aim is to provide the reader an understanding of efforts to examine the complex human and environmental aspects of the Great Lakes shoreline and how attempts are underway to better address key issues in regards to management and planning for this resource. Each article provides an opportunity to consider changes to the ecosystem in which millions of people live and enjoy and the needs to develop a more sustainable approach to our collective uses and adaptation to the shore. A brief introduction and review of each paper provides for a clearer prospective on its contribution to this special issue.

To begin, McRae and Watt examine the efforts of the Cataraqui Region Conservation Authority in addressing natural hazards along the eastern shoreline of Lake Ontario. Revisions to the Ontario Planning Act, Provincial Policy Statement, and the preparation of technical guidelines for natural hazards on the Great Lakes shoreline have all resulted in significant changes to the management

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For more information on the development of shoreline management plans in Ontario the reader is referred to: Lawrence, P.L. (1995). Development of Great Lakes Shoreline Management Plans by Ontario Conservation Authorities. *Ocean & Coastal Management* 26(3), pp. 205-223; Lawrence, P.L. (1995). Great Lakes Shoreline Management in Ontario. *The Great Lakes Geographer* 2(2), pp. 1-20.

of shoreline land uses in areas prone to flooding and erosion hazards. The responsibility for addressing these natural hazards is a relatively new aspect of planning activity for the Conservation Authority, presenting a unique set of management and administrative issues. The authors review four case studies where attempts have been undertaken to deal with site specific planning issues along the shoreline. The paper discusses the challenges and opportunities presented when attempting to transfer and apply provincial standards and guidelines to the local scale. Several recommendations and best management practices are identified as essential for the successful application of land use planning methods.

In the following paper, Taylor, Gray, and Schiefer discuss the adaptation of climate change by Great Lakes coastal communities. A myriad of environmental, social and cultural implications are associated with the potential impacts of a changing climate within the basin. The paper examines a study undertaken to evaluate climate change scenarios and the consideration of possible responses for the Great Lakes coastal zone. Increases in regional mean annual air temperatures would alter the aquatic ecosystem structure, distribution of plants and animals, biophysical and thermal conditions of the lake water, river flows, lake hydrology, and many human activities associated with climate including winter season skiing and summer recreational boating. The natural characteristics of shoreline parks and protected areas would be altered, and changes in the limnology of the lakes would impact coldwater fish species such as lake trout. The capacity and ability of local communities, government programs, and citizens will be a critical factor in determining adaptation to climate change. The paper concludes with several observations in terms of a protocol for adaptation build around science, education, innovative planning tools, partnerships and engagement.

The important role of the International Joint Commission (IJC) is examined by Krantzberg, Bratzel, and McDonald. Although the primary responsibilities of the Commission address water quality issues as directed by the 1909 Boundary Waters Treaty and more recently the 1972 Great Lakes Water Quality Agreement, a significant number of policy and planning aspects of the IJC have a direct and important influence on the Great Lakes shoreline in Ontario. The paper examines the structure and functions of the IJC and its unique place as a Great Lakes binational organization. The many contributions of the Commission are considered in terms of the noted improvements to the basin ecosystem. Issues that have been at the focus of activities by the IJC are examined in detail including nutrient loadings, airborne

pollutants into the basin, trace chemicals in water and fish, addressing contaminated sediments, ecosystem modeling efforts, and the introduction of alien aquatic invasive species. The authors consider the responses of the IJC to references from the federal governments of the United States and Canada in addressing these issues, the mechanisms and structures by which the Commission functions, and the involvement of the IJC with other regional planning initiatives such as Annex 2 and the Great Lakes Areas of Concern.

Next, Peach considers the issues and options associated with efforts to improve sand dune management along the Great Lakes shoreline with a paper examining planning and education activities underway by the Lake Huron Centre for Coastal Conservation. The work of this non-governmental organization provides a view into the role and functions of such groups and their important place in the Great Lakes basin community. Coastal dune systems are one of the most significant ecosystems in the world and have been identified as important natural features associated with many kilometers of Great Lakes shoreline. The author discusses the major coastal dune systems as found along the south-eastern shoreline of Lake Huron which have experienced human alteration. The history of dune conservation in this region is considered with a focus on land protection activities with the establishment of the Pinery Provincial Park, but perhaps more importantly recent community driven efforts to address increasing recreational pressures at non-protected shorelands. Examples of local projects are provided which highlight the involvement of the Centre and also the engagement of local municipal governments and concerned citizens. The role and importance of good applied science, the use of a range of management and planning tools, addressing a balance of access and protection, and improvements in education and engagement are discussed.

Finally, Lawrence focuses on the need to improve community awareness and understanding of the variety of management issues facing Great Lakes shoreline environments by better organization, assessment and distribution of information. The use of spatial mapping techniques, geographic information systems, remote sensing technology, digital imagery, advances in information gathering, and the internet allow for recent innovative opportunities to provide the necessary range of data, study results, published and unpublished research, and related mapping to assist in local decision-making by government and citizens. A review of the preparation of

the Long Point environmental folio for a region on the north shore of Lake Erie illustrates how environmental, social, economic, and cultural resources of an area can be examined, analyzed, and synthesized. The folio is seen as having important roles in raising awareness of critical environmental issues, placing historical and current land uses into perspective, and advancing participatory based planning for Great Lakes communities.

The papers represent efforts to improve our understanding, awareness and actions in regards to undertaking restoration and ecosystem improvements with the basin. Many complex environmental problems face our society related to the Great Lakes, activities and achievements have been noted and acknowledged, and the notice of new and emerging issues provided. As we focus on the waters and aquatic ecosystems of the lakes we should never disregard the relationship of the shoreline environment and land. The connection between land and water within the basin lies at the center of many planning and management concerns and will need to continue to be considered in our efforts to address the Great Lakes. Finally, perhaps the most fundamental message to be taken from these articles is the focused efforts by a variety of government programs, community groups, academics, and citizens in attempts to address and mitigate numerous issues associated with the impacts of human activities on the Great Lakes shoreline.

In addition to the many agencies and organizations currently working to address Great Lakes shoreline management in Ontario it should also be noted that in 1999 the Coastal Zone Canada Association (CZCA) designated the Great Lakes as a regional area of focus for its efforts to assist in community coastal management and raising awareness of coastal issues. For more on the programs and activities of the CZCA the reader is referred to www.czca-azcc.org. The 2002 Coastal Zone Canada (CZC) Conference was held in

the Great Lakes Basin for the first time. This conference examined transboundary ecosystem management under the theme of “Managing Shared Waters” and was a cooperative effort with Pollution Probe and Environment Canada. More than 400 participants from the Great Lakes basin and coastal regions from Canada, the United States and over twenty other countries attended this international event. A conference statement and a resource kit were produced from the experiences in the Great Lakes and other similar transboundary coastal ecosystems as a guide to improving our understanding and management of such unique and significant human and natural regions. More information on CZC 2002 and its outcomes and products can be found at:

(<http://www.pollutionprobe.org/managing.shared.waters/>.)

In response to the activities of the CZCA in the Great Lakes, and reflecting the need to provide for a forum or network to share and exchange ideas, expertise and experience in addressing coastal management and planning issues and concerns, the Great Lakes Coastal Zone has recently been established. This web site based organization, www.greatlakescoastalzone.com will allow for improved education, public awareness, engagement, cooperation, and the involvement of agencies, groups, citizens, professionals and all those other individuals interested in – or working on – the Great Lakes shoreline. Please visit and take the opportunity to participate.

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