



Heritage Resources Centre
Centre des ressources du patrimoine

Preparing an Environmental Folio for the Long Point Biosphere Reserve and Region



Long Point Environmental Folio
Publication Series

Working Note 1

Long Point Environmental Folio Publication Series
Managing Editors: J. Gordon Nelson and Patrick L. Lawrence

A study team at the Heritage Resources Centre is developing an Environmental Folio for the Long Point Biosphere to assist management agencies and local citizens in understanding the human and natural components of the ecosystem. The folio will consist of a series of maps and text that would outline current major management issues and areas of concern. A series of project publications is being prepared to accompany the folio. These reports will consist of supplementary information collected during the study. This project is supported by the Royal Canadian Geographic Society and the Social Sciences and Humanities Research Council of Canada.

**Preparing an Environmental Folio for the
Long Point Biosphere Reserve and Region ¹**

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Ron Stenson, Andy Skibicki, Chi Ling Yeung, and Kerrie Pauls

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Introduction

A study team from the Heritage Resources Centre at the University of Waterloo is currently conducting a study of the Long Point region in preparation for the development of an Environmental Folio for the Long Point Biosphere on Lake Erie (Figure 1). This site was designated as a World Biosphere Reserve by the UNESCO Man and Biosphere Program in 1987. The Long Point Biosphere Environmental Folio initially would consist of maps and text built around the major issues facing the people of the area and Biosphere planning and management. The folio is seen as a means of presenting important land use, resource, and environmental information in a manner useful to area residents, managers, and public officials; the intent is to present existing information in the Folio in a reasonably understandable fashion. The resulting folio or information base should be a strong aid to improved understanding and coordination of the efforts of the diverse array of federal, provincial and local agencies and private groups and individuals concerned with the Long Point area.

The Long Point area is of unusual importance because it is the largest area of wildland remaining along the developed shores of the lower Great Lakes. Today as a result of growth in population, industrial and economic changes, increases in recreation and tourism and other activities, the Long Point ecosystem is under increasing pressure and is beginning to change in ways that are not always well understood, but are of increasing concern to residents and other interested people. One way that a university can assist in such circumstances is to collect, analyze, and interpret information that bears upon and can help people deal with issues of concern to them.

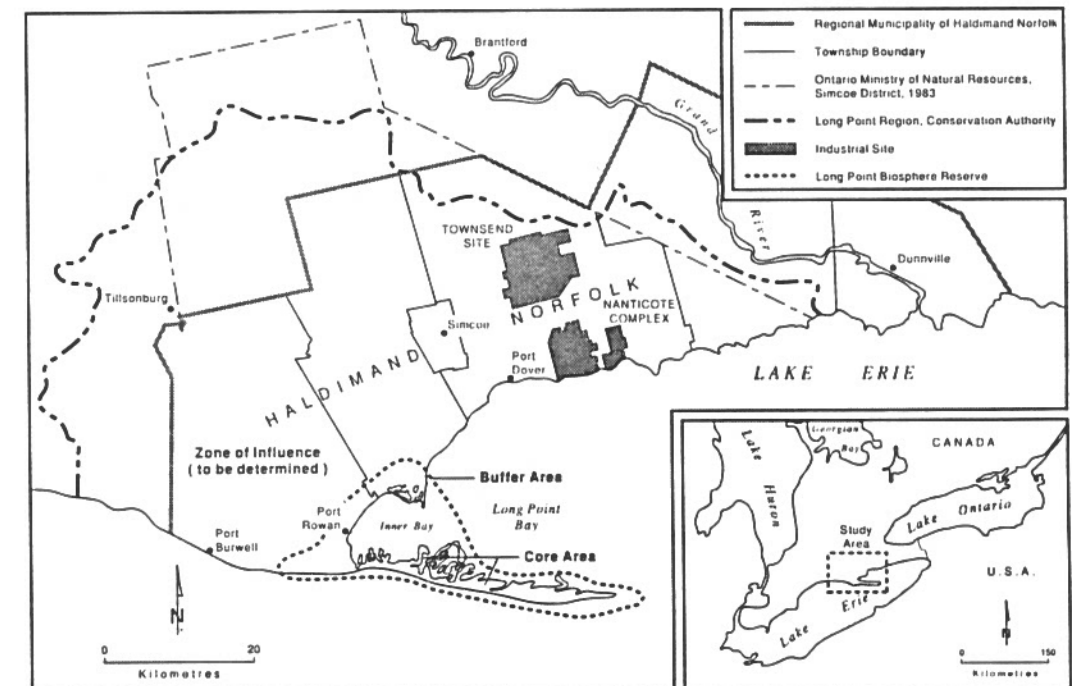


Figure 1 Study Area: Long Point Biosphere Reserve and Region

Background:

The folio project is seen as a part of a growing general interest in ecosystem management of coastal, shoreline, marine, and ocean environments in Canada and other countries. Several recent initiatives in the Great Lakes basin (Ontario Ministry of Natural Resources, 1987; IJC, 1989; Royal Commission on the Future of the Toronto Waterfront, 1992) have focused on the development of coastal management strategies based upon an understanding of ecosystem linkages and the importance of land use changes. The goal is to better understand the elements and processes within coastal ecosystems and address appropriate institutional and management arrangements.

In the context of this study the word, environment, is used in the broad sense, including natural and human aspects, in the spirit of sustainable development. By sustainable development is meant the addressing of concerns raised by recent United Nations studies highlighting the need to achieve a balance between development and conservation (IUCN, 1980; World Commission on Environment and Development, 1987). Several ideas introduced by the United Nations studies include the need to protect biological diversity, preserve essential processes, maintain productivity, and to provide for equal access to resources for present and future generations. It is also critical to recognize the important economic activities that sustain people and to attempt to find a balance between these and environmental concerns.

The folio work and associated studies are supported by grants from the Royal Canadian Geographical Society, the Donner Foundation, and the Social Sciences and Humanities Research Council of Canada. A study team has been assembled for the project which consists of Gordon Nelson (project director) and graduate students from the Department of Geography; Karen Beazley, Patrick Lawrence, Kerrie Pauls, Andy Skibicki, Ron Stenson, and Ling Yeung, each with different research skills and interests. George Francis and Richard Knapton from the Department of Environmental Resource Studies at the University of Waterloo and Reid Kreutzwiser, University of Guelph, have also been involved in project consultations.

Study Area:

Several previous initiatives have undertaken to assess the available information and consider the establishment of a coordinated management strategy for the Long Point region (Nelson and Needham, 1979; Nelson and Jesson, 1980; Francis et al., 1985; Rawson Academy, 1990). Beginning in 1982 consultations were held with local agencies and organizations responsible for management within the Long Point region to discuss nominating the area as a World Biosphere Reserve. A nomination document for Long Point as a World Biosphere Reserve was prepared and submitted in 1985 (Francis, 1985a). The Canada / MAB program approved the nomination of Long Point as a biosphere reserve in June 1985 and forwarded the

recommendation to UNESCO. In 1986 the Long Point Biosphere Reserve was officially designated by the Man and Biosphere Program of UNESCO (Francis, 1985b).

The biosphere reserve concept originated within the UNESCO Man and Biosphere Program of the International Union for Conservation of Nature and Natural Resources (IUCN). A biosphere reserve is intended to link ecosystem conservation directly to issues of sustainable resource use (Hough, 1988). This is accomplished by developing research, monitoring, education, and training activities and relating them directly to issues of sustainability for the region. The UNESCO / MAB program goal of creating a global network of biosphere reserves can be viewed as an essential measure needed to implement the World Conservation Strategy (Francis, 1985b). As of December 1989, there were 276 biosphere reserves in 71 countries, with 6 in Canada (Canada / MAB, 1990).

The Long Point Biosphere Reserve (Figure 1) consists of a core protected area (Long Point National Wildlife Area), buffer area (defined by the 10 metre depth contour offshore and the regulatory 1:100 year flood line onshore) and a undefined "zone of cooperation" (Canadian / MAB, 1990). The shoreline is characterized by 30 to 40 metre high eroding clay bluffs to the west, the 40 kilometer long sandy spit environment of Long Point with its associated dune and wetland systems, and low-lying beaches, wetlands and bluffs to the east. The dune and wetland systems have an exceptionally rich mix of habitats consisting of an open lake, shallow bays, sand bars, beaches, dunes, forests and scrub, ponds, and marshes. The region is host to a variety of land use and resource conflicts and to many significant species and habitats (Barrett, 1981; Heathcote, 1981).

On the Long Point sand spit some 20 distinct biotic communities have been described (Heffernan and Nelson, 1979). About 700 species of vascular plants have been recorded; 90 species are considered to be rare in Ontario and at least four occur nowhere else in Canada (Canada / MAB, 1990). The Long Point complex is a major staging area for migrating waterfowl and small migrating birds. Over 300,000 birds of 273 different species have been banded over the past 28 years by the Long Point Bird Observatory (McCracken et al., 1981).

Considerable field research has been completed over the last thirty years within a variety of scientific disciplines as reflected by the compilation of a research bibliography with over five hundred references (Canadian Wildlife Service, 1989). Major areas of research have included quaternary history (Coakley, 1983), wave energy (Wood, 1960; Liard, 1973; Conliffe-Reid, 1991), beach and nearshore sediments (Watts, 1962; Stewart and Davidson-Arnott, 1988; Armstrong, 1990), sediment transport (LeDrew and Franklin, 1987; Rukavina and Zeman, 1987), beach dune formation (Davidson-Arnott and Law, 1990; Saunders and Davidson-Arnott, 1990; Fisher and Davidson-Arnott, 1992), vegetation studies (Chanasyk, 1970; Heffernan, 1979; Gartshore et al., 1987), wetlands (Hardy, 1979; Hamley, 1981; Jessen et al., 1983;), migratory birds (McCracken et al., 1981), waterfowl and aquatic fish species (Whillans, 1979; Leach, 1981), recreation and water use (Barrett, 1981;

Kreutzwiser, 1981), water quality (OME, 1989) and management regulations and policies (Nelson and Jessen, 1980; Val and Nelson, 1983; Nelson and Day, 1985).

Through public meetings and discussions in the Long Point area, Weller (1989) identified the key management issues as land use change, fishing, wildlife and wetland preservation, water quality, boating, and public access to coastal resources and environments. Current proposals for shore development, including marinas and residential complexes have raised concerns about effects on wetlands and impacts on aquatic environments. The region experiences severe shoreline flooding and erosion and a variety of attempts have been made to resolve the impacts and costs of such events. (Fraser et al., 1977). Extensive use of protection structures, such as seawalls and revetments are common in areas of residential development along the shoreline.

A Shoreline Management Plan (Philpott, 1990) has recently been completed by the Long Point Conservation Authority under the Ontario provincial shoreline management program to attempt to address shoreline hazards (OMNR, 1987). A draft Class Environment Assessment for Remedial Flood and Erosion Projects has also been prepared by the Authority to review impacts from proposed development. Local management programs also have been developed by the various agencies with responsibility for land use planning and regulations including the Regional Municipality of Haldimond-Norfolk (1983), Long Point Provincial Park (OMNR, 1989), and Long Point National Wildlife Management Area (CWS, 1983).

Research Plan

A study of the Long Point region on Lake Erie provides an opportunity to examine environmental issues, land use history, development, coastal hazards, water quality and management strategies in the context of future planning and management. The project has several key objectives:

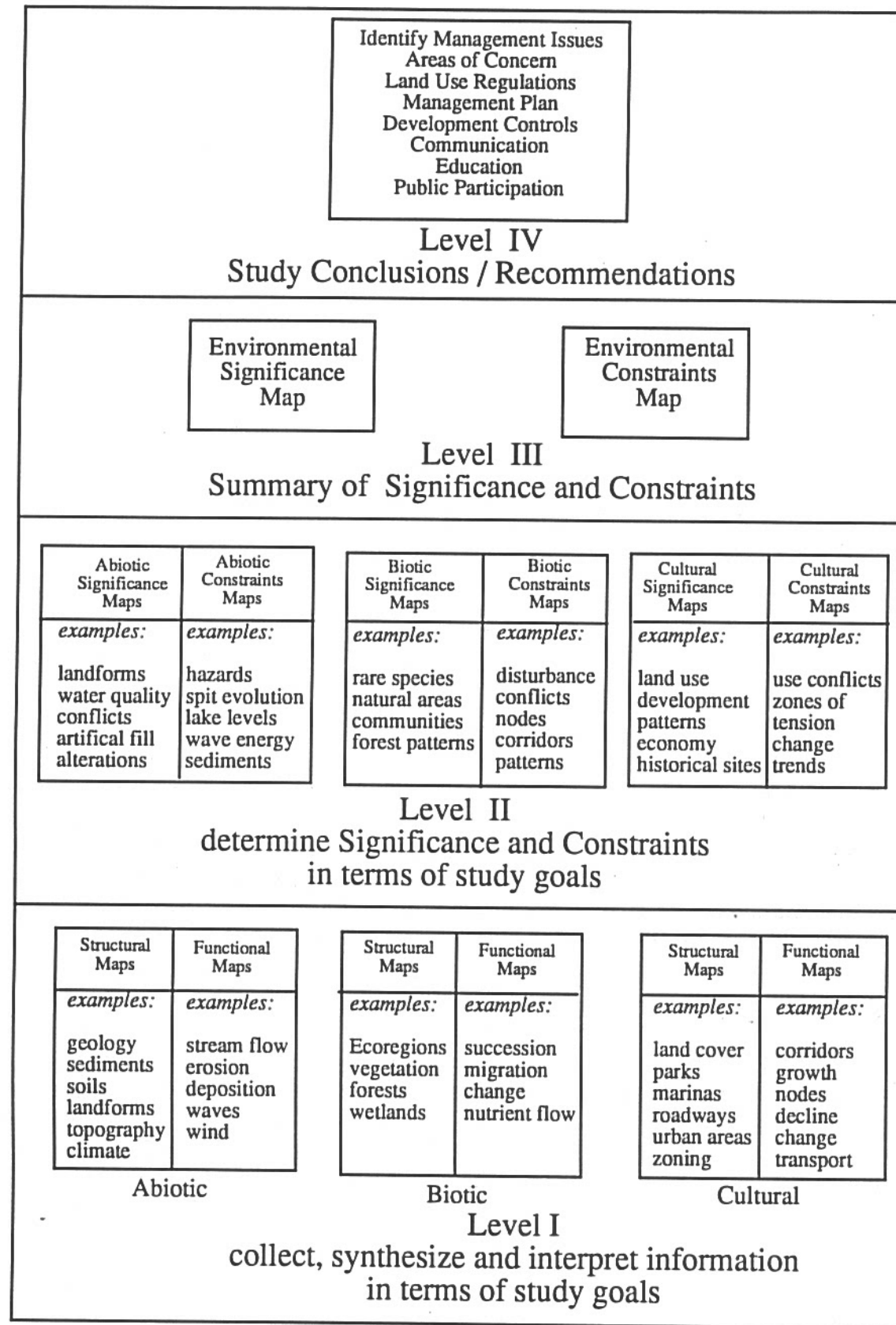
1. Collection and assessment of current information on the Long Point Biosphere and region for inclusion in an Environmental Folio;
2. mapping of key management issues and areas of concern related to the Long Point Biosphere;
3. development of a professional and public consultation and education process through a series of information-communication workshops and public open houses;
4. preparation of an information document highlighting the existing knowledge base, areas requiring planning attention and issues requiring further research.

The environmental folio is a means of synthesizing and graphically displaying natural and human information on the Long Point area for use in planning and management. The preparation of the folio has the approval and support of the local Long Point Biosphere Reserve Committee which consists of government officials and people living in the area. The Committee wants to have available information on the area put in a form where it is more widely intelligible and useful than is currently the case with scientific and scholarly articles and bibliographies.

The folio initially would consist of maps and text built around the major concerns and issues facing the people of the area and Biosphere planning and management. A list of issues has been prepared by reviewing the literature, workshops, and consultations with local people and includes water quality, erosion and flooding hazards, water use, industrial development, recreational activities, and preservation of wetlands and marshes. The folio will be prepared in such a manner that additional maps and text on other issues can be added as time and resources permit. In addition the information will be stored in a computer data base format (Macintosh) with possible future transfer into a geographical information system (GIS-SPANS).

The ABC Resource Survey Method (Bastedo et al., 1984; Nelson et al., 1988; Nelson, 1991) is being used to collect, analyze and synthesize the information assembled for the folio. The method is a four-part process for assessing a wide range of information needed for a comprehensive view of the geological (Abiotic), biological (Biotic), and human (Cultural) features and processes involved in environmental, resources, and land use planning and management problems, including those in the coastal zone. This method has recently been used to examine the impact of development on the Frenchman's Bay on the Toronto waterfront (Nelson et al., 1991), to evaluate existing information for the development of a shoreline management plan by the Saugeen Valley Conservation Authority along the Lake Huron shoreline (Lawrence and Nelson, 1992) and in assessing environmental changes in the Segara Anakan coastal region of Indonesia (Nelson et al., 1992).

In the first stage (Level I) available data are collected and mapped on the geological (abiotic), biological (biotic) forms and processes at work in the study area (Figure 2). Level II consists of the preparation of environmental significance and constraint maps in terms of the study goals and objectives and relevant criteria. Such criteria include maintenance of natural processes, rarity, diversity, representativeness, productivity, and equity. At Level III, the information on significance and constraints for abiotic, biotic, and cultural data may be synthesized, although often studies proceed directly to Level IV. The final step (Level IV) links the Level II and III information to goals and objectives and to current or potential institutional arrangements. The focus is on existing institutional arrangements, their actual and potential applicability, as well as any information gaps, and/or needs for new institutional arrangements or management approaches.



Discussion

The emphasis in year one has been on assembling a data base from existing information with an initial emphasis on the terrestrial landscape within the Long Point watershed. Work has focused on the collection of existing data from government reports, published literature, and scientific studies. Level I ABC resource survey maps are being prepared which provide an overview of the current knowledge on several key issues including geomorphology and geology, shoreline processes, hazards, development (urban, rural, recreational, industrial), forest cover (present and historical), wetlands, institutional and management arrangements (land use regulations, planning and zoning designations) and environmental monitoring systems.

Lack of information has been noted on water quality, stream flow and sediment transport, mammal species and habitat, dredging activities, economic impact of tourism activities (recreational fishing and bird watching), and monitoring of fish species in the Inner Bay. Areas of concern with the study area include Nanticoke, Port Dover, Turkey Point, north shore of the Inner Bay, and the community of Long Point.

Remote sensing analysis, with the use of Landsat imagery, available aerial photography, historical maps and other data, have been used to develop a land cover classification and assist with estimations of historical changes for the period 1954 to 1990. The greatest land cover changes, notably associated with marina development, are occurring along the Inner Bay from Turkey Point to the Long Point community. The development in this area has also resulted in concern for several issues including flooding and erosion hazards, water quality, sewage treatment, public access, and the fragmentation of natural habitats.

The information collection has been supported by a series of meetings with government agencies, citizen groups and a public open house. Consultations with professionals in academia and public agencies, including the Canadian Wildlife Service, Long Point Region Conservation Authority, Ontario Ministry of Natural Resources (Aylmer District, Simcoe, Ontario), Ontario Hydro and the Regional Municipality of Haldimond-Norfolk have also assisted in data collection.

Figure 2 ABC Resource Survey Method

It is anticipated that year two will see a focus on the study of the Long Point spit and Inner Bay including wetlands, birds, fish species and habitat, and human activities in the Inner Bay, such as marina development, recreational and commercial fishing, oil and gas exploration, tourism and recreation. Collection of information and summary maps will be produced on several topics including wildlife, migratory birds, aquatic and vegetation. Analysis of 1990 Landsat remote sensing imagery and evaluation of land cover changes along the Inner Bay will continue.

The project reflects the need in many areas for collection, analysis and interpretation of existing information in a manner useful to managers, citizens, and the whole array of stakeholders in decision making. The sources or data are widespread and cross traditional professional or political lines. Dissemination of information to the public and responsible agencies in a concise, organized fashion is critical. Understanding what we know is as important as understanding what we don't know. Gaps in the knowledge base must be identified to dispel misunderstanding and to focus funding on the most necessary research. Involving the public and providing a forum for communication, understanding, and education is an essential goal of such environmental research. The folio project is seen as a forum for promoting informed decision making and increasing awareness on the uniqueness and significance of the Long Point area.

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- Technical Note 1. Analysis of Land Use/Land Cover Change of the Long Point Region from 1974 to 1984 Using Landsat MSS Images
by Chi Ling Yeung
- Working Paper 1 The Historical Economies of the Long Point Area
by Steven Wilcox