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Lake Ontario Coastal Initiative Action Agenda

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LAKE ONTARIO COASTAL INITIATIVE

ACTION AGENDA

JANUARY, 2006

LAKE ONTARIO COASTAL INITIATIVE
MISSION STATEMENT

The mission of the Lake Ontario Coastal Initiative (LOCI), encompassing all New York State North Coast stakeholders from the Niagara River to the St. Lawrence River, is to enlist and retain broad public commitment for remediation, restoration, protection, conservation and sustainable use of the coastal region. This mission will be accomplished by securing funds and resources to achieve scientific understanding, educate citizens, and implement locally supported priorities, programs and projects as identified through this Initiative.

Adopted by the Lake Ontario Coastal Initiative Steering Committee
January 20, 2004

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January, 2006

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LAKE ONTARIO COASTAL INITIATIVE PARTNERS

Center for Environmental Information

Working for environmental protection and sustainable use of NY's Lake Ontario Region.

The Center for Environmental Information (CEI) is a private, non-profit 501(c) 3, educational organization, founded in Rochester, New York, in 1974. CEI provides information and communication services, publications, and educational programs in order to:

- *advance* public understanding of environmental issues;
- *act* as a communication link among scientists, educators, decision makers and the public;
- *advocate* informed action based on the free exchange of information and ideas.

Finger Lakes-Lake Ontario Watershed Protection Alliance

The Finger Lakes – Lake Ontario Watershed Protection Alliance (FL-LOWPA) is an alliance of 25 New York State counties wholly or partially in the Lake Ontario Basin. The purpose of FL-LOWPA is to protect and enhance water resources by:

1. promoting the sharing of information, data, ideas, and resources pertaining to the management of watersheds in New York's Lake Ontario Basin;
2. fostering dynamic and collaborative watershed management programs and partnerships;
3. emphasizing a holistic, ecosystem-based approach to water quality improvement and protection based on continuous improvement.

Each county participating in FL-LOWPA develops and carries out a water quality program based on local needs which contributes to and is informed by the regional alliance. County water quality programs include implementation of non-point source pollution control measures and Best Management Practices; research and monitoring; and public education. Inter county programs are encouraged through FL-LOWPA's Special Projects Program and the Water Resources Board, the governing body of FL-LOWPA.

State University of New York at Brockport

The State University of New York College at Brockport is committed to advancing teaching, scholarship, creative endeavors, and service to the College community and to the greater society by supporting the activities of an outstanding faculty and staff. The College, through the Department of Environmental Science and Biology and the Department of Earth Sciences, has a long, successful history of environmental grantsmanship and research. In addition, the College supports environmental outreach opportunities by housing a New York Sea Grant Extension Office, supports a Lake Ontario research vessel, is a founding institution of the Great Lakes Research Consortium, is developing a research facility on the shores of Lake Ontario and looks forward to the development of long-term efforts to improve the coastal region of Lake Ontario. These efforts represent important aspects of the College Mission to serve the Greater Rochester and New York State community.

LAKE ONTARIO COASTAL INITIATIVE STEERING COMMITTEE

Center for Environmental Information

Ecology and Environment, Inc.

Environmental Advocates of New York

Finger Lakes-Lake Ontario Watershed Protection Alliance

Great Lakes Research Consortium

International Lake Ontario-St. Lawrence River Study

Lake Plains Resource Conservation and Development

Monroe County Fishery Advisory Board

NY Sea Grant

NYS Department of Environmental Conservation

NYS Department of State, Division of Coastal Resources

Rochester Institute of Technology, College of Engineering

Save Our Sodus

SUNY Brockport, Department of Environmental Science and Biology

The Nature Conservancy, Central Western New York Chapter

Tug Hill Commission

US Army Corps of Engineers, Buffalo District

Village of Fair Haven

Wayne County Soil and Water Conservation District

FUNDERS AND COSPONSORS OF ONE OR MORE LOCI PROGRAMS (2002-2005)

Canadian Consulate General

Cayuga County Planning Department

Center for Environmental Information *

City of Rochester

Cornell University Center for the Environment

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Environmental Advocates of New York *

Finger Lakes-Lake Ontario Watershed Protection Alliance *

Genesee-Finger Lakes Regional Planning Council

Great Lakes Commission

Great Lakes Research Consortium *

Great Lakes United

Greece Citizens for a Clean Environment

International Freshwater Resource Center

International Lake Ontario-St. Lawrence River Study Board *

Jefferson County Water Quality Coordinating Committee

Lake Plains Resource Conservation and Development *

Larsen Engineers

Monroe County Fishery Advisory Board *

Monroe County Water Quality Coordinating Committee

New York Sea Grant *

New York State Department of Environmental Conservation *

New York State Department of State *

New York State Energy Research and Development Authority

New York State Office of Parks, Recreation and Historical Preservation

Niagara County Center for Economic Development

Niagara County Soil and Water Conservation District

NYS Department of State *

Orleans County Soil and Water Conservation District

Oswego County Planning Board

Oswego County Water Quality Coordinating Committee

Rochester Area Community Foundation

Rochester Institute of Technology, College of Engineering *

Save Our Sodus (SOS) *

Save the River

Sodus Bay Improvement Association

SUNY Brockport, Department of Environmental Science and Biology *

The Nature Conservancy, Central Western New York Chapter *

Tug Hill Commission *

U.S. Army Corps of Engineers, Buffalo District *

U.S. Environmental Protection Agency

Village of Fair Haven *

Water Education Collaborative

Wayne County Soil and Water Conservation District *

Wayne County Water Quality Coordinating Committee

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Bold indicates a funding co-sponsor

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EXECUTIVE SUMMARY

Momentum has been building in recent years, in both the U.S. and Canada for a large scale restoration effort for the Great Lakes Basin ecosystem. President Bush's 2004 call for creation of an Interagency Task Force and a Regional Collaboration of National Significance to coordinate restoration efforts has increased the profile and likelihood that such a large-scale Great Lakes effort will happen.

LAKE ONTARIO'S COASTAL REGION—A CRITICAL ISSUE

The U.S. portion of Lake Ontario's shoreline and watershed lies wholly in New York State. Despite significant water quality improvements in the open, offshore waters of the Lake over the last three decades, the 300 miles of shoreline, river and creek mouths, and embayments suffer from many impairments that limit their recreational use, elevate the cost of drinking water withdrawals that serve over a million customers, including the Rochester and Syracuse metropolitan areas, and affect the region's recreation and tourism based economy and property values, reliant on high quality water resources.

THE LAKE ONTARIO COASTAL INITIATIVE ACTION AGENDA

The Lake Ontario Coastal Initiative, a public/private, grassroots, regional partnership, proposes a fifteen year, multi-million dollar program to remediate, restore, protect and enable sustainable use of Lake Ontario's southern and eastern coastal region—New York's North Coast.

The Action Agenda advocates recognition that the coastal zone and the watershed, where most people live, work and recreate, need the same level of attention which the open, offshore waters of the Lake have beneficially received in the previous thirty years.

The Action Agenda is intended to complement and enhance ongoing international, federal and state programs. A bi-national approach is suggested that allows Canada and the United States to take a true ecosystem approach to the management of Lake Ontario.

The Action Agenda proposes remediation and restoration through collaborative practices and programs directed toward the sources of point and non-point impairments—inadequate septic systems; sewage treatment plant and combined sewer effluent; agricultural, urban and road run-off; toxic contaminants; erosion and sedimentation—and mitigation of impairments such as algae blooms, weeds, turbidity and habitat destruction.

The Action Agenda is based on a three year extensive public participation process involving a variety of stakeholders throughout the region—government officials and agencies at all levels, the research community, environmental and civic organizations, businesses, and concerned citizens.

The Action Agenda includes:

- Mapped characterizations of the coastal region's attributes;
- Identification of key issues gleaned from regional workshops;
- Recommendations for a research and monitoring program to inform adaptive management approaches;
- An outreach program;
- Framework for implementation.

CHAPTER 1

INTRODUCTION

BACKGROUND

"The Great Lakes are a national treasure constituting the largest freshwater system in the world," said President George W. Bush as he signed a May, 2004 Executive Order recognizing the national importance of the Great Lakes and calling for the creation of an Interagency Task Force to coordinate restoration of the Great Lakes and for a Regional Collaboration of National Significance. Momentum has been building in recent years in both the U.S. and Canada for a large-scale restoration effort for the Great Lakes Basin ecosystem. The President's actions increased the profile and likelihood that such a large-scale Great Lakes restoration effort will happen.

RECENT ACTIONS ON THE U.S. FEDERAL LEVEL

In recent years there has been widespread federal recognition that the Great Lakes merit a renewed and significant commitment to restore and protect freshwater resources of vital importance.

1. In 2000, the Great Lakes Commission began advocating for focused federal funding to the Great Lakes with its **Great Lakes Program to Ensure Environmental and Economic Prosperity** and has since published annual editions.
2. In 2002, the EPA's U.S. Policy Committee introduced the **Great Lakes Strategy** that pledged to work together to protect and restore the chemical, physical and biological integrity of the Great Lakes Basin Ecosystem, listing several ambitious, key objectives for achieving these goals.
3. In 2002, the Council of Great Lakes Governors began the **Great Lakes Priority Initiative** that drafted priorities for the development of restoration strategies for the lakes. These priorities target such issues as Great Lakes shoreline and economic development, fisheries and invasive species, water quality, pollution prevention, and ensuring the sustainable use of resources. These priorities have been widely adopted across the region as the framework for organizing Great Lakes restoration and protection planning.
4. In 2002, the **Great Lakes Legacy Act** was passed by Congress and signed by the President, authorizing funding of $270 million over five years for remediation of contaminated sediments in Great Lakes Areas of Concern.
5. In 2002, the **Great Lakes Provision of the Farm Bill**, The Farm Security and Rural Investment Act of 2002 included provisions for a Great Lakes Basin Program for Soil Erosion and Sediment Control. The Bill called for the Secretary of Agriculture to coordinate with the Great Lakes Commission and others in carrying out sediment and erosion control activities.
6. In July 2003, members of Congress introduced bills to fund **Great Lakes Restoration**. More than 120 members of Congress, along with mayors and governors of the eight Great Lakes states, currently support Great Lakes Restoration bills that call for a $4 to $6 billion restoration plan.
7. In 2003 and 2004, the Great Lakes Commission and Sea Grant sponsored a series of public meetings around the Basin, including one in Rochester, to develop a list of Priorities for **Great Lakes Restoration**. Documents developed during these proceedings were shared with Great Lakes leadership and the entire community of stakeholders to promote consensus and unity of purpose in restoration and protection initiatives.
8. In 2006, the Great Lakes Water Quality Agreement (GLWQA), most recently revised in 1987, will be reviewed by the Great Lakes Bi-national Executive Committee, co-chaired by Environment Canada and the U.S. Environmental Protection Agency. The GLWQA between Canada and the U.S. expresses the commitment of each country to restore and maintain the chemical, physical and biological integrity of the Great Lakes Basin ecosystem.

IMPETUS FOR THE LAKE ONTARIO COASTAL INITIATIVE (LOCI)

Lake Ontario, at the eastern end of the Great Lakes system, is the 14th largest lake in the world. The U.S. portion of the Lake and its 300-mile shoreline lie wholly in New York State. Several important federal and state plans, strategies and policy initiatives address restoration and prevention of adverse impacts: the Great Lakes Water Quality Agreement, Lakewide Management Plan (LaMP) for Lake Ontario, Remedial Action Plans for Areas of Concern, the Great Lakes Regional Collaboration, and NYS's Clean Water Act program plans, draft Comprehensive Wildlife Conservation Strategy, Finger Lakes - Lake Ontario Watershed Protection Alliance, Local Waterfront Development Plans, local watershed protection plans and community-based initiatives and more.

Lake Ontario coastal waters are a valuable resource for drinking water, recreational boating, fishing and swimming, tourism, and waste water processing, and a key asset in the economic revitalization of upstate New York. **Despite significant water quality improvement in the open waters of the Lake over the last three decades, the 300 miles of New York's Lake Ontario shoreline and embayments—bays, river and creek mouths and their associated wetlands—are suffering from many persistent impairments that severely limit their recreational use and ultimately affect the economic development of the region.** These impairments include algae blooms; erosion, sedimentation and associated nutrient enrichment; turbidity; navigational impairments; erosion resulting in property loss; invasive species; fish consumption advisories due to toxicants; and habitat destruction.

Remediation efforts have been fragmented, with projects, communities, and counties competing for attention of state and federal agencies and limited funds. While communities and local governments are generally aware of water quality problems affecting health, commerce, and quality of life along the coastline, there is agreement that additional resources are needed to enable local governments, businesses, researchers, and citizen partners to achieve restoration goals.

The Lake Ontario Coastal Initiative (LOCI) is based on a 2000 report, *New York's North Coast- A Troubled Coastline*, prepared by Dr. Joseph Makarewicz of the State University of New York (SUNY) Brockport and supported by a Special Projects Grant from the Finger Lakes- Lake Ontario Watershed Protection Alliance. The *North Coast* report summarizes the environmental problems associated with the embayments, harbors, ponds, creeks, and rivers of each county bordering Lake Ontario and advocates "the creation of a broad-based and adequately funded program targeted on improving water quality of the embayments and tributaries of the North Coast." The *North Coast* report acknowledges that the coastal area of the Lake Ontario ecosystem holds special value as a boundary between lake and land, a place supporting recreation, wildlife habitat, major upstate New York industries and scores of communities.

The Initiative (LOCI), a public/private partnership, was then spearheaded by the Rochester-based Center for Environmental Information in cooperation with the Finger Lakes-Lake Ontario Watershed Protection Alliance (FL-LOWPA) and SUNY Brockport. LOCI is a response to the public perception of a three-decade lack of progress in remediation and restoration of well-defined pollution problems along the coastal region of Lake Ontario. An important aspect of the Initiative's mission statement is "**To enlist and retain broad public commitment for remediation, restoration, protection, conservation, and sustainable use of Lake Ontario's coastal region—New York's North Coast….**" Steps toward this goal have included the development of a Steering Committee of key stakeholders, conferences, a series of public meetings along the lakeshore, and this Action Agenda. A summary of milestones in the evolution of LOCI is given in Appendix A.

LOCI'S GUIDING PRINCIPLES

The LOCI Action Agenda is based on twelve principles:

1. **Partnership:** The foundation of the Lake Ontario Coastal Initiative is partnership. Because available funding is becoming ever more scarce, the strong message that has come to the Initiative from prospective federal and state funders is that we must seek ways to jointly identify priorities and to seek funds that can be allocated or distributed in the most cost-effective manner. The likelihood of individual municipalities receiving funds for needed projects is diminishing. On the other hand, the cumulative effect of local organizations, agencies, and municipalities seeking funds

for restoration, protection, and sustainable development of the Lake Ontario coastal region is compelling and has wide support.

2. **Support for continuing local input and efforts**: Local involvement is the key to an effective partnership. Given the 300 mile coastline of Lake Ontario and specific local situations, LOCI will attempt to enhance, not compete with or duplicate, local opportunities and initiatives and support the work of existing regional agencies, where appropriate.

3. **Public participation:** The Initiative recognizes that government alone cannot address or solve all problems encompassed in the LOCI mission. It will strive to keep civic leaders, professional experts, businesses, nonprofit environmental groups and citizens actively involved in the work of the Initiative.

4. **Fair share of federal dollars:** LOCI will work on behalf of all North Coast stakeholders to insure that a fair share of available federal dollars destined for Great Lake communities is allocated for Lake Ontario needs. Although the LOCI Action Agenda recognizes and supports the urgent need for additional funds to accomplish identified priorities, LOCI will focus initially on assembling and applying funds available from existing programs.

5. **International cooperation:** An effective partnership, such as the Lakewide Management Plan (LaMP), will be developed with Canadian groups dealing with Lake Ontario coastal issues to include nearshore as well as offshore remediation and restoration goals for Lake Ontario.

6. **An evolving plan:** LOCI will set its course based on the proposed Action Agenda. The Action Agenda is viewed as an evolving plan, subject to annual review and bi-annual revision, as new information about the state of the North Coast becomes available. The Agenda proposes an annual meeting of stakeholders to review information and provide input for needed changes.

7. **Setting funding priorities:** Funding for remediation of existing impairments and for restoration projects is LOCI's first priority. Funding of projects and strategies to prevent new or additional problems and to afford sustainable use of the coastal region will also be given priority. The LOCI Board of Representatives, which will include a full range of stakeholders from the public and private sector, will work through its governing committees to set general priorities for funding, as well as annual ranking of priority projects for implementation. Research and monitoring that assists adaptive management strategies, and outreach activities, including education, communication, and public participation opportunities, will be part of this priority-setting process.

8. **A monitoring plan:** LOCI will continue to monitor and evaluate the environmental health of coastal Lake Ontario by measurements of water quality using standard US EPA protocols and will report and distribute this information.

9. **Research plan:** LOCI will continue its research grants program as an initiative for developing and focusing academic and agency research, including new technologies, on issues pertinent to coastal Lake Ontario and its watersheds.

10. **Seeking funds:** LOCI will use its resources to provide assistance, through existing organizations where appropriate, to municipalities and organizations for grant-writing and other funding techniques for projects that are consistent with LOCI- recommended coastal priorities.

11. **Community capacity building:** LOCI will use its resources to support community capacity for sound land use and economic planning that helps towns and villages deal with causes, rather than symptoms, of impairments.

12. **Bridging political boundaries:** As shown on the back cover of this Action Agenda, there is a "disconnect" between political boundaries of towns, villages and counties and topographical boundaries of the sub-watersheds that cut across political and administrative jurisdictions. LOCI is committed to working with multiple jurisdictions and encouraging intergovernmental solutions to help address their mutual and overlapping water quality issues.

CHAPTER 2

DESCRIPTION OF LAKE ONTARIO COASTAL INITIATIVE PROJECT AREA—MAPS AND NARRATIVE

INTRODUCTION

Over fifty characteristics of the LOCI project area are displayed on a set of 11 maps (more detailed information on map sources is available in the LOCI Data Dictionary, Ecology and Environment Inc. in the Reference section of this report, Pg 81). The maps portray basic locations, units of government, population, environmental features, land use regulations, and indicators of resource use and concerns on the south and east shores of Lake Ontario. A set of three maps portraying New York State and federal legislative districts is included as Appendix B.

Map 1. LOCI Project Area—Major Population Centers and Municipal Governments

The Lake Ontario Coastal Initiative, encompasses a coastal watershed area of 3415.53 square miles with a length of about 322.52 miles of Lake Ontario shoreline and a width varying from 10 to 35 miles and averaging 15 miles. The coastal portions of 7 counties (Niagara, Orleans, Monroe, Wayne, Cayuga, Oswego and Jefferson) and small portions of 4 watershed counties (Ontario, Onondaga, Lewis, and Genesee) are located in the project area, representing a multitude of small streams and direct drainages to the lake. The project area is between two and four towns deep and includes 94 towns, 45 villages, and 5 cities (Lockport, Rochester, Oswego, Fulton and Watertown). There are about 4,000 miles of rivers and streams and 200 lakes in the project area.

For three major tributaries to Lake Ontario, the Genesee, Oswego and Black River systems, only their river-mouth segments are addressed in this plan. River-mouth segments are defined as the sections downstream of the first major tributary.

The City of Rochester is by far the largest population center in the project area, though Syracuse and Buffalo-Niagara Falls exercise a regional influence as well.

The West, Central and East designations are based on hydrological units and are included as potential focus areas for intermunicipal projects.

Map 2. Population by Census Block Groups

Though the overall population of the area (700,000) has changed little in 30 years, the population's location has changed. Most cities have been losing population as movement to the suburbs continues. There has been little population change, and little is forecast in the more rural areas of the watershed, except as movement from the population centers at Niagara Falls-Buffalo, Rochester, and Syracuse to suburban towns. According to the 1990 and 2000 Census figures, of the seven shoreline counties, only Orleans (5.6%), Monroe (3%), and Wayne (5.2%) Counties grew during the period. Of the four watershed counties, only Ontario County (5.4%) showed more than 1% growth.

Though transportation corridors are not shown, population densities mapped indicate their presence. These corridors include: NYS Rte. 31 in Niagara, Orleans and Monroe Counties; NYS Rte. 104 in Monroe and Wayne Counties; NYS Rte. 481 in Oswego County; and NYS Rtes. 81 and 11 in Oswego and Jefferson Counties.

Aside from Rochester and its suburbs, the LOCI project area could be characterized as rural-residential.

Map 3. Detailed Surface Water

The LOCI project area may be further divided into 37 tributary and direct drainage areas, shown with their HUC (Hydrologic Unit Code) watershed numbers. All of the subwatersheds mapped here are 11-digit HUCs, the smallest watershed unit currently used. Seventeen tributary streams are shown: Twelvemile Creek, Eighteenmile Creek, Johnson Creek, Oak Orchard Creek, Lower Genesee River, Allens Creek,

Sodus Creek, Lower Oswego River, Grindstone Creek, Lower Salmon River, Salmon River Reservoir, Upper Salmon River, South Sandy Creek, Sandy Creek, Lower Black River, Perch River, and Chaumont River. Appendix C gives a more complete listing of the tributary streams to Lake Ontario, together with indications of their water quality status.

Map 4. Topography

The topographic range of the project area is not great and the whole project area could be characterized topographically as "lake plain." Lake Ontario lies at an average elevation of about 244 feet above mean sea level (msl). Ridges which define the southern boundary of the watershed area are at about 820 feet msl in Genesee County and 575 feet msl in Wayne County. Maximum elevations in the eastern part of the project area are about 1800 feet msl in southwestern Lewis County.

The physical and topographical proximity of Lake Ontario produces a climate-tempering effect visible in the "fruit belt" of Niagara, Orleans, Wayne, Oswego and western Monroe Counties.

The Adirondack Mountain barrier traps lake-effect snows in the eastern portion of the project area and the Tug Hill Plateau.

Map 5. Land Use Types

Most of the land is in some form of agricultural use. Population centers are visible as urban or built-up land, especially in the Rochester area. There is little forest generally and no extensive forests in the western or central regions, except for that in the Hamlin area, eastern Wayne County, and the Sterling-Hannibal area. Forests remain in areas too wet to farm or to clear for other purposes. In the eastern region, there are extensive forests in the towns of Albion, Williamstown, Parish and Amboy of Oswego County; Osceola, Pinckney and Montague in Lewis County; and Worth, Lorraine and Rodman of Jefferson County. Oswego County, within the watershed, is at least 50% forested. The south-eastern corner and Stony Point by Henderson Bay in Jefferson County are heavily forested.

Agricultural land use predominates in Niagara, Orleans, Genesee, the rural part of Monroe, Wayne and Cayuga Counties. Agricultural land use is much less intense and more scattered in Oswego County. West-central and northern Jefferson County is dominated by agricultural use. With proper management, the agricultural soils of the project area are as productive of fruits, vegetables, hay and grains as any in the Northeastern U.S. Much of the land most intensely used for agriculture supports dairy-farming.

Map 6. Wastewater Treatment Plants

Because sewer service is targeted to population centers, less than 5% of the land area, but more than half of the population of the project area, is served by sewers and wastewater treatment. Most treatment is secondary, meaning that though solids are removed and the effluent is sanitized, the nutrient content of treated effluent can be high.

Forty-two municipal sewage treatment plants are located in the LOCI project area, and the effluent from fourteen of them flows directly to Lake Ontario. A list of the facilities is included in Appendix D.

The multi-year, multi-million dollar Monroe County Pure Waters Program has resulted in the replacement of Monroe County's outdated and inefficient sewage treatment plants that previously discharged to Irondequoit Creek and the Genesee River. Old plants have been de-commissioned and replaced by a system that better separates flows in storm sewers from sanitary sewers and conducts sanitary sewage to modern plants for treatment. Two of the largest sewage treatment plants, VanLare (6) and Northwest Quadrant (27), use an activated sludge process to remove dissolved and colloidal organic matter and chemical precipitation to remove phosphorus to meet U.S. E.P.A. effluent standards.

Map 7. Public Land

Public land means those lands publicly accessible, either through public ownership or through private ownership by non-profit organizations dedicated to land protection.

Public lands owned by the State of New York may be managed by the Department of Environmental Conservation (as Wildlife Management Areas, Unique Areas and State Forests) or the Office of Parks, Recreation and Historic Preservation (as State Parks and State Historic Sites). Land owned by the federal government in the Iroquois National Wildlife Refuge is managed by the Department of the Interior Fish and Wildlife Service. Counties, towns, villages, and cities also own and manage public parks. An initial estimate indicates that about 4.55% of the LOCI project area is protected land, and the majority of such lands are in State Forests and Wildlife Management Areas in the coastal watershed but not connected to the shoreline.

Many protected lands, while managed for resource conservation purposes, also have a substantial public access/use component. Common uses of protected land include hunting, fishing, boating and swimming.

Examples of private non-profit land protection organizations active in the project area are Western New York Land Trust, Genesee Land Trust, 1000 Island Land Trust, Save the County, Tug Hill Tomorrow Land Trust, Trust for Public Land, and The Nature Conservancy. Most of these organizations own properties managed as nature preserves or hold conservation easements on properties that limit their future use. Land trust activity in the project area has been limited, and as of 2005 only The Nature Conservancy has mounted a substantial campaign to protect habitat in the Eastern Lake Ontario areas of El Dorado, North and South Sandy Ponds, Tug Hill and Chaumont Barrens.

Many of the private nonprofit organizations cooperate with State and federal agencies, as well as local municipalities, to accomplish public access, recreation, and resource protection goals.

Under the 1974 NYS Freshwater Wetlands Act, wetlands of over 12.4 acres or of special significance have been mapped by the NYS DEC. In the early 1990s, the US Fish and Wildlife Service began mapping freshwater wetlands of all sizes to extend protection to “federal-jurisdiction” wetlands regulated by the U.S. Army Corps of Engineers. In the case of both State and federally designated wetlands, however, alterations may be permitted and field-delineation of regulated wetlands determines the actual protection/alteration permitted.

Listings of currently protected areas and public access points for boat launching are provided in Appendix E.

Map 8. Status of Municipal Land Use Controls

The project area is made up of all (55) or a substantial part (39) of 94 towns, 45 villages, and 5 cities, a total of 144 local governments, located in 11 counties. Small parts of other municipalities in the project area will not be discussed here. A primary source of information analyzed is the NYS Legislative Commission on Rural Resources’ Land Use Planning & Regulations: A Survey of New York State Municipalities published in July 2004. The data was gathered in December, 2003, so some changes may have occurred in the interim.

Basic land use regulations, such as comprehensive plans and zoning, are prevalent in the project area. All five cities have written comprehensive plans, zoning, subdivision regulation, site plan review and planning boards. The municipalities in Niagara, Orleans and Monroe Counties employ a full range of land use regulations.

Four villages (Red Creek, Sandy Creek, Altmar, Lacuna) and 13 towns (Butler, Conquest, Scriba, New Haven, Sandy Creek, Redfield, Orwell, Albion, Williamstown, Amboy, Palermo, Lorraine, and Wolcott) lack zoning regulations (9% of villages and 13% of the towns of the project area). A cluster of municipalities in northeastern Oswego County and southern Jefferson County appears to be making limited use of land use regulations.

Of the three types of municipalities present in the area, villages exhibit fewer land use regulations; this is most frequently due to lack of a written comprehensive plan (19 villages) and subdivision regulations (16). Cities make more use of land use regulations.

Municipalities located at the Lake Ontario shoreline tend to have more land use regulations compared to those away from the shoreline. Municipalities wholly in the watershed more commonly have land use regulations than those only partly in the watershed.

Though basic land use regulation tools are widely used in the LOCI project area, the status of water quality-related regulations, such as erosion control and stormwater management, are not known and will need to be investigated. Barriers to the adoption and use of pertinent land use regulations should also be investigated.

Map 9. Coastal Priority Waterbodies and Areas of Concern

Since the mid-1980s, with the help of county agencies and organizations, the NYS DEC has been compiling lists of water bodies with problems, categorizing the degree of impairment, verifying conditions and publishing results. The most recent (2004) published report from DEC includes an updated classification system for New York State waters. Map 9 shows waters in the LOCI project area that DEC classifies as Impaired and Requiring a Total Maximum Daily Load (TMDL). These waters are included on DEC's 2004 303(d) list. The TMDL is a pollutant input reduction plan required when a primary pollutant (such as phosphorus) is recognized as causing the resource impairment. Among this group of waters in the project area are the length of the Lake Ontario shoreline, Chaumont Bay, Guffin Bay, Henderson Bay, Little Sodus Bay and Irondequoit Bay.

Map 9 also shows waters DEC classifies as impaired on its 305(b) list, but which do not require development of a TMDL, and local priorities that are identified in county water quality strategies. County priorities tend to be consistent with DEC's classification of waters. The local priorities shown are not classified by DEC as impaired but rather as having minor impacts or needing verification or more assessment.

Great Lakes Areas of Concern (AOC) are severely degraded geographic areas within the Great Lakes Basin. They are defined by the International Joint Commission (IJC) U.S.-Canada Great Lakes Water Quality Agreement (Annex 2 of the 1987 Protocol) as "geographic areas that fail to meet the general or specific objectives of the agreement where such failure has caused or is likely to cause impairment of beneficial use of the area's ability to support aquatic life." AOCs are locations where the accumulation of toxic materials requires special remediation efforts. The three located on New York's Lake Ontario Coast are Eighteenmile Creek in Niagara County, the Rochester Embayment of the Genesee River in Monroe County, and the Oswego River Embayment in Oswego County. A fourth, the Niagara River, falls just outside the project area but is indicated on our maps because it is pertinent.

Each Area of Concern (AOC) also has a Remedial Action Plan (RAP) which identifies problems specific to the AOC and describes the methods for correcting these problems.

1. The Eighteenmile Creek AOC is located in the Town of Newfane Niagara County and includes Olcott Harbor and extends about two miles upstream to near Burt Dam. Problems have included contaminated sediments, contaminated fish, impacts on benthos and loss of habitat in the lower reach of Eighteenmile Creek. The 1997 RAP includes assessment of creek sediments, evaluating possible PCB and other contaminant sources, remediating inactive hazardous waste sites, correcting combined sewer overflows, and continuing surveillance activities. Contaminants include PCBs, dioxin, metals and cyanide and pesticides.
2. The Rochester Embayment AOC is an area of Lake Ontario formed by the indentation of the Monroe County shoreline between Bogus Point in the Town of Parma and Nine Mile Point in the Town of Webster. The AOC extends from the line between these two points for six miles upstream to the Lower Falls of the Genesee River. The 1997 RAP identified 14 use impairments including restriction on fish and wildlife consumption, tainting of fish and wildlife flavor, degradation of fish and wildlife populations, fish tumors or other deformities, bird or animal deformities or reproductive problems, degradation of the benthos, restrictions on dredging activities, eutrophication or undesirable algae, restrictions on drinking water consumption or taste and odor, beach closings and recreational access, degradation of aesthetics, added cost to industry and agriculture, degradation of phytoplankton and zooplankton populations, and loss of fish and wildlife habitat. Contaminants of concern include PCBs, mirex, dioxin, chlordane, DDT, metals, excessive nutrients, and fecal coliform bacteria.
3. The Oswego River AOC is centered in the City of Oswego, NY and includes the harbor and the lower segment of the river up to the Varick dam. The 1990 and 1991 RAPs identified problems as restrictions on fish and wildlife consumption, degradation of fish and wildlife populations,

eutrophication or undesirable algae, and loss of fish and wildlife habitat. Contaminants of concern include PCBs, mirex, dioxin, power dam impairments, and excessive nutrients. The Oswego River AOC has moved through the RAP process so that Stage 3 (de-listing) is under consideration.

4. The Niagara River AOC is located in Erie and Niagara Counties and extends from Smokes Creek at the southern end of the Buffalo Harbor north to the mouth of Niagara River on Lake Ontario. The 1994 RAP includes problems with restrictions on fish and wildlife consumption, degradation of fish and wildlife populations, fish tumors or other deformities, bird or animal deformities or reproductive problems, degradation of benthos, restrictions on dredging activities, and loss of fish and wildlife habitat. Contaminants include PCBs, mirex, chlordane, dioxin, dibenzofuran, hexachlorocyclo-hexane, PAHs, pesticides, and metals and cyanides in sediments.

Taken together, the AOCs, DEC's listed impaired waters and the county priorities are considered surface waters of special interest in the project area and the focus of remediation, protection, and/or monitoring efforts.

Map 10. Industrial and Municipal Permitted Discharges and Drinking Water Intake Locations

The National Priorities List (NPL) is established by the US EPA pursuant to Section 105 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980. Revised each year, hazardous waste sites listed on the NPL are eligible for US EPA remedial actions.

The Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS), is a database containing information on hazardous waste sites, potentially hazardous waste sites and remedial activities. It displays information for National Priority List (NPL) sites, including sites proposed for listing, listed and/or deleted from the NPL. Superfund site data locating, characterizing, and detailing the clean-up of the nation's worst hazardous waste sites is kept on CERCLIS. Twenty-two federally-designated Superfund Sites are located in the project area, including clusters along the Genesee River and the Oswego River.

The Permit and Compliance System (PCS) contains data on the National Pollution Discharge Elimination Systems (NPDES) permit-holding facilities. PCS contains information on the permitted facility, compliance schedule, outfall schedule, permit limits, discharge monitoring reports, enforcement actions, and violations. Facilities listed may be major or minor.

Facilities with NPDES or SPDES permits are shown on the map. The National Pollution Discharge Elimination System (NPDES) is a federal permit system covering pollutants discharged from a point source and specifying an acceptable level of the pollutant discharged. NPDES was established under Section 402 of the Clean Water Act. The State Pollution Discharge Elimination System (SPDES) is New York State's permit system covering pollutants discharged from a point source and specifying an acceptable level of the pollutant discharged. SPDES is broader in scope than NPDES in that it controls point source discharges to ground as well as surface water. SPDES permits may be for major or minor discharges. Major discharges are those of great toxicity or over 10,000 gallons per day. Permit holders are required to monitor discharges for quantity and quality and report to the NYS DEC.

Combined sewer overflows (CSO) refers to developed areas in which storm sewers and sanitary sewers are both present. Because of lack of capacity, age, damage or lack of maintenance, the flows in these systems, which should be separate, become intermixed. Heavy flow conditions during storms may hamper the capacity of sewage treatment plants to properly treat waste and/or lead to discharges of untreated sanitary waste through storm sewers to waterways.

Fourteen municipal drinking water intakes are identified on the coast of Lake Ontario in the project area. Several others are located on tributary streams or aquifers within the project area.

Two of the largest drinking water suppliers withdrawing water from Lake Ontario are the Monroe County Water Authority (MCWA) at the Shoremont Plant in Greece, NY and the Metropolitan Water Board (Onondaga County Water Authority or OCWA) located near the City of Oswego. In 2004, the MCWA withdrew an average of 58.8 million gallons per day to serve 650,000 customers. In 2004, the OCWA withdrew 22.9 million gallons per day to serve 340,000 customers.

Map 11. Bedrock and Unconsolidated Aquifers

Two characteristics of the project area with direct relation to groundwater resources are mapped: bedrock types and aquifer location. The LOCI project area contains three main types of bedrock, and each will yield groundwater, though of very different qualities and quantities.

The three bedrock types mapped are sandstone, carbonate (limestone), and shale, as they appear from north to south. Generally, carbonate rock is the most productive of groundwater, sandstone is second, and shale is the least productive.

“Aquifer” refers to an underground stratum of earth, gravel or porous stone that contains water. Aquifers are productive, and the groundwater in them moves relatively quickly. Usually groundwater flows in the same direction, as surface water, but much more slowly. Groundwater and surface water can be complexly related in a landscape in which surface flows drop into bedrock, or aquifers add to flows of streams and lakes. High-yielding aquifers often act as sources for municipal drinking water withdrawals.

CHAPTER 3

IDENTIFICATION OF LOCAL PRIORITIES FOR RESTORATION, PROTECTION AND SUSTAINABLE USE OF THE LAKE ONTARIO COASTAL AREA

INTRODUCTION

The Lake Ontario Coastal Initiative is designed to secure and distribute funding for the implementation of locally supported projects to restore, protect and sustain the Lake Ontario coastal area. Several factors will be integrated into a LOCI strategy and the prioritization process for targeting LOCI funding to implementation projects. These include information gathered by the LOCI coastal monitoring and research program (Chapter 4), information needs identified in Chapter 7, mapping and associated area descriptions (Chapter 2) and by public involvement and stakeholder consultation, the subject of this chapter.

In 2003, three stakeholder meetings were held across the project area to introduce LOCI and to document stakeholder concerns about the coastal environment. These workshops gave the LOCI steering committee a clearer understanding of the range of issues of concern to stakeholders across the 300-mile coastline (see Appendix F). The LOCI Executive Committee also realized that research, planning, implementation and education were ongoing in the seven coastal counties and that the county water quality coordinating committees, present in each of the counties, would provide valuable knowledge of local coastal water quality priorities. Following the second public LOCI conference held in May 2005, it was evident that a broader array of issues was important in communities along the coast, such as sustainable development, infrastructure, wildlife habitat, and water-based recreation.

In June and July 2005, seven county workshops were held to elicit local priorities for "restoring, protecting, and guiding the sustainable use of the Lake Ontario coastal environment." The primary objective of these workshops was to bring together Lake Ontario coastal stakeholders that share a piece of the coastline to brainstorm, discuss and rank priorities for local action. These ranked priorities can be factored into the development of a Request for Proposals for Implementation Projects using FY 2005 LOCI funding, helping to ensure that LOCI will meet its mission of targeting funding to locally supported projects. Secondary objectives of the workshops included dissemination of information about LOCI, expanding the network of contacts, and education for all participants about the viewpoints and concerns of other stakeholders.

PROCESS FOR CONVENING WORKSHOPS

The Finger Lakes – Lake Ontario Watershed Protection Alliance (FL-LOWPA) representative from Niagara, Orleans, Monroe, Wayne, Cayuga, Oswego, and Jefferson Counties served as the workshop host for their respective counties. These individuals are public servants who are actively involved in their respective county water quality coordinating committee and have knowledge of Lake Ontario stakeholders and local issues. As hosts, these individuals scheduled meeting spaces and times, provided refreshments, and invited stakeholders to their workshops.

The workshop hosts were given some guidance from LOCI regarding the myriad of stakeholders that should be notified about the workshop. These included water-based businesses like marinas, tourism representatives, local elected officials, county agencies, other agencies (federal, state, regional, local) in the county, agricultural producers, environmental organizations, higher education and research institutions, civic groups, and landowners.

A flyer and invitation letter was sent to identified stakeholders, a public meeting notice was placed in local newspapers, and a workshop schedule was placed on the LOCI web site. The workshops were facilitated by Betsy Landre, FL-LOWPA Program Coordinator and LOCI Executive Committee member, and John Terninko, Program Director at Center for Environmental Information. Workshops were designed to be two hours in length, with flexibility to spill over to continue informal discussion.

Workshop Agenda

The agenda for each workshop included the following elements:

1. **Introductions**. All participants were asked to introduce themselves.
2. **Overview of LOCI and the Workshop.** To assist participants in understanding how each workshop fit into the development of the Action Agenda for LOCI and how workshop results would be used, the overview included:
   a. Brief history of the initiative including its impetus and adopted mission statement and the geography of the program area
   b. Status of FY 2004 federal funding for development of an Action Agenda for the North Coast
   c. Status of FY 2005 federal funding for local implementation and monitoring projects
   d. Explanation of the workshop including the purpose, process to be used, expected output, and use of output

   The Nominal Group Technique was used to generate many ideas within the group setting while giving each person an equal chance to participate and to develop a ranked set of priorities. This process included Steps 3 through 6.
3. **Individual Brainstorming**. Each participant was asked to think about and complete the following statement:

   "My priorities for restoring, protecting, conserving and/or encouraging sustainable use of the Lake Ontario Coastal environment are …"

   Participants were asked to include a key action word or verb in each response (e.g., to reduce erosion or to educate boaters or to adopt regulations, etc.). If an idea was site-specific (as opposed to county or watershed-wide), participants were asked to identify the location in their response. Participants were able to generate as many responses as they wished and wrote their responses down during a quiet, individual brainstorming session that ended when most, if not all, individuals stopped writing.
4. **Sharing and Recording of Ideas**. Going around the room in a round-robin fashion, each individual was asked to share one idea on his or her list. These ideas were not discussed in detail but were recorded on flip charts in front of the group. Each individual was then asked to share a second priority, and so on until all ideas were shared and recorded.
5. **Discussion, Clarification and Synthesis of Ideas.** The group then reviewed the list of ideas presented. Questions were asked, meanings were clarified, and details were given. The group was asked if any ideas could be logically combined to reduce the number of ideas. Similar ideas were combined based on group consensus.
6. **Ranking of Ideas**. Individuals were asked to identify and rank their top ten priorities from the final set of priorities as defined by the group through the steps above. The highest priority received a score of ten and so on down to one. These individual rankings were collected by the facilitators and tallied. The priority with the highest summed score was the top priority.

   The agenda and process were consistent in each workshop, with a few deviations to accommodate group size. Participants totaled 133 at the workshops, representing multiple stakeholder interests (See Appendix G).

TOP PRIORITIES IDENTIFIED AT COUNTY WORKSHOPS

The top ten priorities identified for each workshop are included in Appendix H. Using the frequency with which issues were mentioned within the top ten priority list across the seven counties, the **most common local concerns** were inferred:

1. **Invasive Species** (a top ten priority in five counties: Niagara, Monroe, Wayne, Cayuga, and Jefferson)
2. **Public Access to Waterfront** (top ten in four counties: Niagara, Orleans, Monroe, and Oswego)
3. **Wastewater Treatment Infrastructure and Sewering** (also a top priority in four counties: Cayuga/Fair Haven, Jefferson/Henderson Harbor, Monroe, and Wayne)
4. **Failing Septic Systems** (a top priority in Niagara, Orleans, and Jefferson Counties)
5. **Assistance to Agriculture for Nutrient Management** (a top priority in three counties: Niagara, Oswego, and Jefferson)
6. **Riparian Corridors and Erosion Control along Tributaries** (top in Niagara, Monroe, and Jefferson Counties)
7. **Sustainable Development using tools of Land-use planning, Zoning, and Open Space** (rated a top priority in three counties: Cayuga, Oswego, and Jefferson)
8. **Public Education** (Three counties named it a top priority: Niagara, Jefferson, and Cayuga)

A second tier of priorities mentioned by two counties in their top ten lists includes:

- **Stormwater Management**
- **Shoreline Erosion Control**
- **Remediation of Historical Toxics**
- **Database Development**

Several themes related to the setup and operation of LOCI emerged from the workshop series. While not necessarily ranked as priorities, the following discussion items should be considered as LOCI develops and better defines its role and capacity.

- **Support existing plans, organizations, and programs.**
- **Provide information on roles, jurisdictions, and regulations of key federal, state and Great Lakes agencies and organizations.**
- **Play a technical assistance role for planning, grant and permit applications, and skill/knowledge development**
- **Develop a regional GIS database that communities can access and use**

LOCI can use this information to help guide distribution of funding in a manner consistent with its mission statement for locally supported projects and LOCI public outreach and technical assistance efforts. Some efforts, such as the regulation of ballast water that introduces non-native species and the control of shoreline erosion, rely on international cooperation and are beyond the scope of LOCI. Smaller projects, such as public education about these same issues, may be suitable for LOCI. Projects such as agricultural nutrient management are supported by existing programs, but LOCI could assist with needed matching funds. Major capital projects such as the Fair Haven and Henderson Harbor sewer systems will need assistance from a variety of sources, and LOCI may be able to assist with garnering those funds.

The categories of implementation projects which LOCI selects for funding in each program cycle will be informed by the stakeholder consultation process in addition to data collected through monitoring programs and communication with other key local, state and federal agencies. A Request for Proposals for FY 2005 funding of implementation projects will be developed by the LOCI Implementation Committee, with initial assistance from FL-LOWPA's experience in coordinating a nonpoint source remediation program in the wider Lake Ontario watershed. Projects will be selected by the Implementation Committee and approved by the LOCI Board of Representatives.

COST OF IMPLEMENTATION PROJECTS

Using information gathered at workshops and knowledge of local programs and projects in the region, cost estimates were assigned to proposed county priority projects, assuming two years of programming to complete initial projects. The initial need is estimated at $15,000,000 for the first 24-month cycle. This figure estimates only $1 million each in support for two major sewer projects (Henderson Harbor and Fair Haven). If the capital cost of these two sewer projects and other capital projects prioritized in workshops is factored into the cost of implementation figures, the estimated need grows to $40 million. It is safe to assume that costs will grow as more infrastructure and capital projects are undertaken at the local level. As remediation and restoration goals are achieved, there will be a greater need to fund projects that ensure prevention of adverse impacts and sustainable use of coastal resources.

Estimation of need is also affected by the capacity of communities to carry out projects and expend funds. The workshops revealed that capacity exists in many locations to efficiently use additional funds to complete projects in a timely fashion in the near-term (first two-year cycle). However, the capacity to manage and expend resources over several cycles of programming should be factored into estimating long-term needs (over fifteen years).

CHAPTER 4

RESEARCH AND MONITORING TO INFORM AN ADAPTIVE MANAGEMENT APPROACH

A SCIENTIFIC APPROACH

Watershed management efforts are best undertaken from a solid scientific basis. Careful identification and analysis of water quality problems allows the selection of the most effective remedial actions, sound discussion on the application of measures, and careful analysis and evaluation of results of remediation and restoration projects.

Before actions are recommended or undertaken, a scientific analysis of the problems to be addressed is absolutely necessary. Not every problem presents itself directly, and solutions must be tailored to target problems as specifically as possible to avoid unintended consequences. Interdisciplinary analysis is needed in complex areas, such as lake or watershed management, where limited analysis provides neither sufficient data nor an accurate picture of the interrelationship of various factors.

The Lake Ontario watershed has been intensively studied for decades, but information gaps are readily apparent (see Information Needs for Better Management in Chapter 7) when considering specific management techniques.

CURRENT ENVIRONMENTAL CONSIDERATIONS

A systematic set of environmental data does not exist for the south shore of Lake Ontario. The information that does exist is dated, spatially limited, and generally focused on the offshore region of the lake. In the first year of LOCI funding (FY2004), a preliminary evaluation of nutrient and chlorophyll levels in the coastal region and the many embayments of Lake Ontario was initiated.

Preliminary results of the eighteen embayments and streams tested indicate that ambient phosphorus levels (Figure 1) in the coastal region exceed N.Y.S. Guidelines and that abundance of nuisance algae (Figure 2) are significantly higher than offshore regions of Lake Ontario. Our preliminary study provides scientific evidence that the shoreline, creeks and embayments of Lake Ontario are plagued by summer nuisance algae blooms limiting the use of cottages, offending recreational users and detrimentally affecting tourism. The long-term goal of LOCI is to develop baseline data on the water quality of coastal Lake Ontario and expand the monitoring plan for Lake Ontario spatially to focus on nutrient and other contaminant levels in the coastal region including numerous streams, rivers and embayments.

Data gained during the first year of LOCI funding will serve three purposes:

A. To identify and confirm areas of contaminants of concern, especially the high concentrations of the nutrient phosphorus, the nutrient determining the extent of nuisance algal blooms along the Lake Ontario coast.

B. To serve as a baseline marker of current conditions in Lake Ontario, allowing the LOCI project to determine the effectiveness of future management practices and restoration efforts. The success or failure of these practices and efforts will serve as the basis for an adaptive management strategy.

C. Additional water quality testing data will help identify new problem areas and potential sources of pollutants.

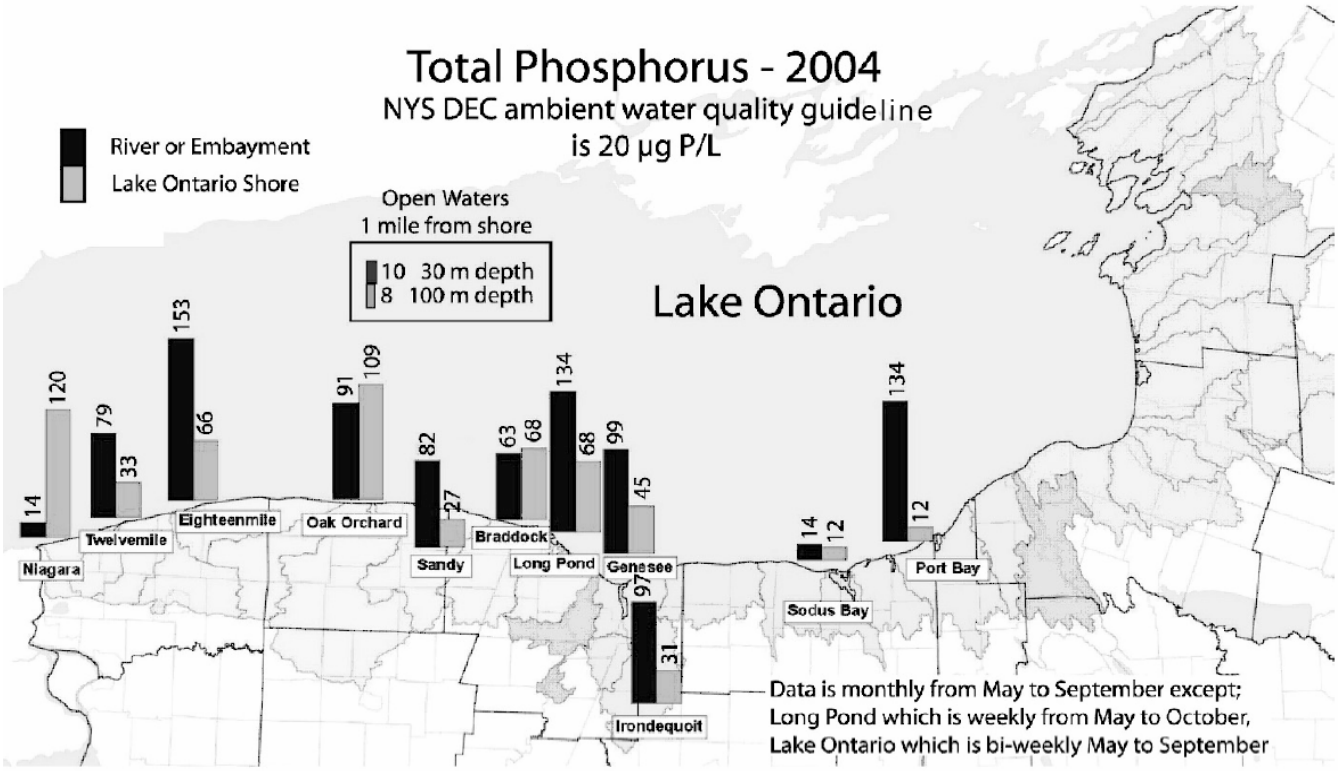


Figure 1. Ambient levels of phosphorus in the coastal region of Lake Ontario.

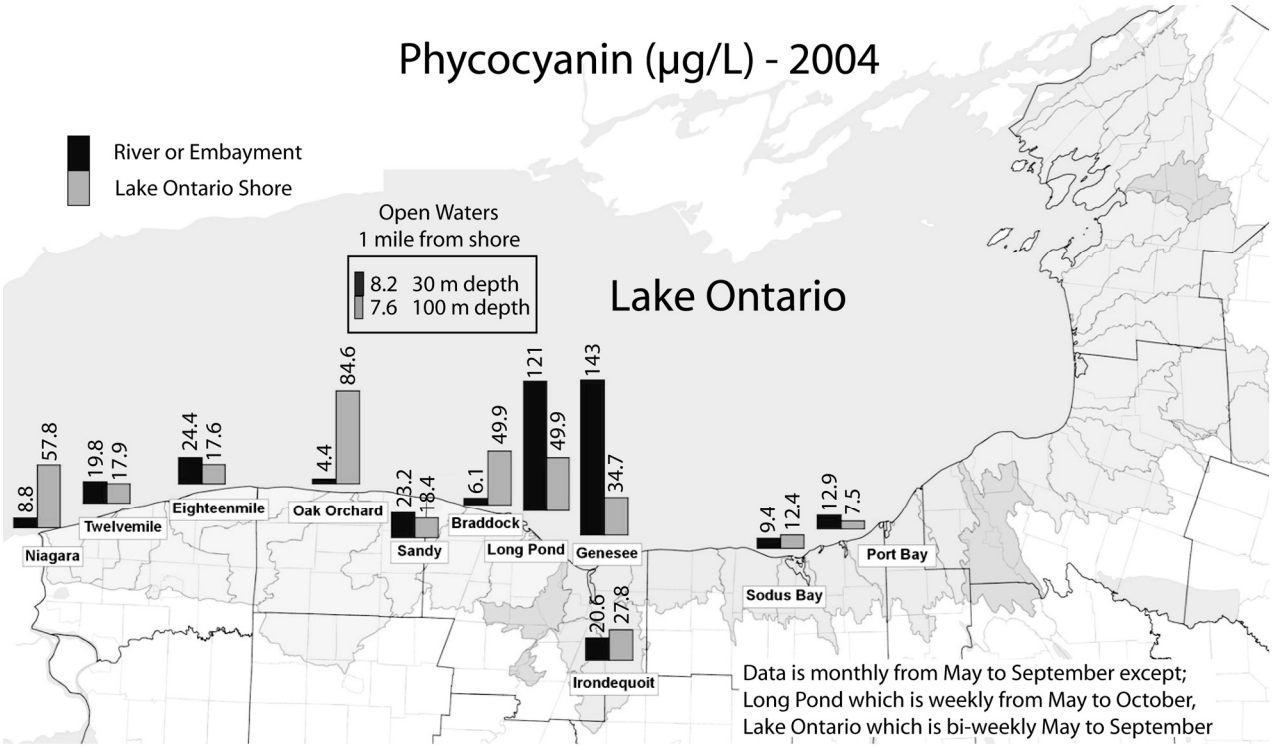


Figure 2. Ambient levels of nuisance blue-green algae.

WORKSHOP ON RESEARCH PRIORITIES

Research priorities for the LOCI Action Agenda are derived from the following assessments of academic and agency scientists, especially in connection with two workshops held as part of the Great Lakes Research Consortium meeting regarding Lake Ontario research. The research priorities are proposed for integration with priorities identified from community workshops and other sources (Chapter 3 and Appendix H). Criteria to be developed for initial funding priorities for FY 2005 LOCI-supported projects should incorporate the research priorities as part of an adaptive management approach.

On March 18, 2005, a Workshop for Developing a Research Agenda for New York's Participation in Great Lakes Restoration was held at the SUNY College of Environmental Science and Forestry in Syracuse (See Appendix A and I). The establishment of the research program was open and inclusive as the Great Lakes Research Consortium (mostly academic scientists), NYS Department of Environmental Conservation, county Soil and Water Conservation District personnel, and others were invited to a series of workshop sessions. Participants in this Workshop included academic scientists and agency personnel, brought together to discuss the research necessary to support future restoration activities in New York's Great Lakes. Thirty-five scientists attended, including those from state agencies (NYSDEC, NYSDOH, NYS Sea Grant) and several universities (SUNY Binghamton, SUNY Brockport, SUC Buffalo, Cornell, SUNY ESF, Hobart and William Smith, SUNY Oswego, RIT, and SUNY Buffalo). Participants reviewed a draft outline of research needs, discussed changes, and proposed future activities necessary to ensure that New York maintains a leadership role in any restoration efforts. The program was highlighted by four talks on the North Coast Initiative, Open Water Research, Sea Grant Priorities, and Lake Ontario. This was followed by eight sets of breakout sessions pertaining to Lake Ontario.

RESEARCH RECOMMENDATIONS

Two workshop sessions, "Coastal Health" and "Non-Point Sources," were identified to participants as applying especially to the Lake Ontario Coastal Initiative. The results are reported in Appendix A. Thirty-one percent of the participants (11 of 35) attended and provided input to each of these LOCI sessions.

Three types of research approaches, related to the Lake Ontario Coastal Initiative and including the watersheds that support creeks, were identified at the workshop sessions:

A. Long-term monitoring to establish baseline data sets and to determine spatial and temporal trends;

B. Topical short-term projects that address local problems or questions; and

C. Research and monitoring required for adaptive management. At a minimum, adaptive management would require pre- and post- monitoring of restoration and remediation projects funded by the Lake Ontario Coastal Initiative (National Research Council, 2004).

A. Long-Term Research Details

1. Long-Term Monitoring of Lake Ontario

A sustained effort to establish a long-term data set for the North Coast of New York is needed. The primary pollutant causing the eutrophication of the offshore waters of Lake Ontario is phosphorus. In the past 25 years, US EPA's phosphate abatement program has successfully reduced levels of offshore phosphorus and chlorophyll (Makarewiz, 2000; Mills, et. al., 2003). More recently, Makarewicz (2000) has suggested that the cause of the algae blooms in embayments and streams along the southern shore is elevated levels of the "limiting" nutrient phosphorus. However, no systematic nutrient data sets exist for the southern shore of Lake Ontario. Existing data is dated and spatially limited.

A long-term data set should establish a baseline or benchmark from which to measure future trends; such data will be the basis for an adaptive management strategy for remediation and restoration of Lake Ontario. Long-term monitoring efforts should include the following:

a. The data should come from a diverse set of sampling sites so as to adequately represent the variations of the North Coast in terms of habitat, physical topography, and geography

1) Sites should be located along the shoreline of Lake Ontario.

2) Sites should include the major tributaries.

3) Sites should include the major embayments and ponds.

b. Links to other historical databases should be considered when selecting site locations and parameters. Examples of other data sets that will add significance to the data set include:

1) Great Lakes National Program Office (GLNPO) phytoplankton, water chemistry and zooplankton,

2) Brockport's historical offshore data

3) United States Geological Survey (USGS) cruise data

c. Parameters that should be monitored include, but are not limited to:

1) Phosphorus

2) Other nutrients

3) Discharge and loading from tributaries

4) Chlorophyll a

5) Clarity- Secchi disk

6) Harmful algae blooms (neurotoxins and heptatoxins)- microcystin, anatoxin

7) Macrophyte beds in the embayments- aerial photography

8) Phytoplankton and zooplankton

9) Distribution of algae mats

2. Identify Lake Ontario Watersheds for Remediation through the Development of Rank Order

The health of the North Coast is determined in large part by the magnitude of the components in the discharges of watersheds in the system. Development of scientifically supported priority lists, especially nutrient loading and N.Y.S. Priority Waterbodies Lists (PWL), would provide the guidance necessary to ensure that remediation and restoration efforts and funds are used most effectively. The following items should be considered:

a. Discharge

b. Nutrient loading

c. Remedial Action Plan (RAP) status

d. Priority Waterbodies List

e. Land use

f. Soil loss

g. Toxic loading

h. Remediation impact

3. Conduct Segment Analysis of Watersheds

Segment analysis can be used to track down the source of E. coli beach closings, toxic point discharges, and/or non-point nutrient loadings. Point and non-point sources of nutrients, soils, and salts within a watershed may be identified through a process called "segment analysis" or in its fullest development "stressed stream analysis" (Makarewicz, 1999). Stressed stream analysis is an integrative, comprehensive approach for determining the environmental health of a watershed and its constituent streams. Within a subwatershed, stressed stream analysis is an approach for determining how and where a stream and its ecological community are adversely affected by a

pollution source or other disturbances. It is a technique that identifies the sources, extent, effects and severity of pollution in a watershed.

In segment analysis, the stream is used to monitor the "health" of the watershed. Because nutrients are easily transported by water, they can be traced to their source by systematic geographic monitoring of the stream. Segment analysis is a technique that divides the impacted subwatershed into small, distinct geographic units. Samples are taken at the beginning and end of each unit of the stream to determine if a pollutant source occurs within that reach of the stream. High pollutant levels at the downstream location and low at the upstream indicates a pollutant source within that segment. By systematically narrowing the size of the segment a source can be identified. At completion, the cause and extent of the pollution have been identified.

If needed the severity of the pollution within the impacted subwatershed and/or the entire watershed can then be evaluated by spatial analysis of the quantity and quality of biological indicators, such as fish and invertebrates, and by biological examination of structural and functional changes in individual organisms and populations in affected communities. Once identified, sources of chemical pollutants may be corrected using education, "best management practices" (bmp) or enforcement actions.

4. Creation of a Central Location/Library for North Coast Reports and Data

A centrally located digital compilation of research, results and data of both aquatic and nearshore areas including biotic, abiotic, and pollution variables is needed. Considerable information is known to exist in the "gray literature," and open peer-reviewed literature on coastal issues of Lake Ontario. By consolidating and centralizing this information, we can efficiently use our time and funds to prevent redundancy in future research while making use of historical data sets for trend analyses in local areas. Information from the following sources should be considered for inclusion in a centralized location:

a. Local universities

b. Masters and PhD theses

c. Research projects

d. Town, County and State government agencies

e. N.Y.S.D.E.C.

f. U.S. Fish and Wildlife Service

g. U.S.G.S.

h. International Joint Commission

i. Great Lakes Research Consortium

j. FL-LOWPA projects at the county level

k. Landowner and bay associations

l. New York Sea Grant

m. Social science research pertinent to management issues

n. Anecdotal history

5. Quantification of Natural Resources through Geographic Information Systems (GIS) of the Coastal and Embayment Areas

Geographic Information Systems (GIS) should be accessed to develop maps that visually quantify the natural resources within the Lake Ontario direct-drainage area. Maps developed should be regularly reviewed and updated. The goal would be to create a GIS inventory of:

a. Sensitive areas/habitat

b. Prioritized subwatersheds by nutrient loading according to criteria developed in consultation with FL-LOWPA, county water quality coordinating committees (WQCC) and NYS DEC and based on existing data sources such as WQCC strategies, NYS DEC's Priority Waterbodies List and 303(d) list, local water quality monitoring programs, and/or stressed stream analyses

c. Inactive hazardous waste sites

d. Septic systems- distribution and codes

e. Wastewater treatment plants- levels of treatment, violations, combined sewer overflows (CSO)

f. Stream bank and road bank surveys

g. Locations of algae and invasive exotic species

B. Topical Short-Term Research Program

Various workshops and discussion groups have identified the need for research of a short-term topical nature in specific regions. To tackle these issues, a small competitive grants project will be initiated to fund prioritized items developed from the workshop research list for Lake Ontario. A goal is to develop and administer a small grants program that will provide funds to conduct research on topical issues of the coastal zone, including the watershed of Lake Ontario. A process for awarding these grants is still under development but will likely have a two-tiered approach utilizing external reviewers and a panel identified by the LOCI Executive Committee.

C. Adaptive Management

The adaptive management concept is being used to manage water resources in several locations in the United States. For example, Congress has expressly required the use of adaptive management in the Florida Everglades ecosystem restoration project. Adaptive management is also a core concept of plans to restore Louisiana's coastal ecosystems and has been recommended by the National Academy of Sciences to both the Army Corps of Engineers (NASP, 2005) and the International Joint Commission's Lake Ontario/St. Lawrence River Lake Regulation Plan. Adaptive management promotes flexible decision-making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood (National Research Council, 2004). Careful monitoring of these outcomes both advances scientific understanding and helps to adjust policies, operations, or management practices as part of a cost-effective iterative learning process.

Adaptive management also recognizes the importance of variability in contributing to ecological resilience and productivity. It is not a "trial and error" process but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to modify decision and management practices, to make more effective decisions. Its true measure is in how well it helps meet environmental social and economic goals, increases scientific knowledge, and reduces tensions among stakeholders. The approach holds promise to better accommodate shifting social preferences and new scientific knowledge so that management strategies can be adjusted to ensure progress toward economic and environmental goals.

1. LOCI and Adaptive Management

The "North Coast" initiative has adopted the adaptive management approach. We will establish pre-restoration and post-remediation conditions through pertinent testing. In fact, the process has already begun on a broad scale as pre-remediation monitoring of the entire New York coastline of Lake Ontario began in the summer of 2004 in anticipation of the LOCI grant (See Figures 1 and 2). Post-remediation monitoring will continue for the entire shoreline to determine the overall effectiveness of management and remediation programs along the entire coastline and to determine if other environmental issues develop. This effort will be directed by SUNY Brockport.

In addition, each local project will be required to have a pre- and post-remediation monitoring effort, where appropriate, to determine effectiveness of a local remediation effort. Scientific

assistance in planning the monitoring protocols will be provided by SUNY Brockport and other research agencies. The required monitoring will need to be included in the request for restoration/remediation funds. A final report of restoration/remediation efforts will include an evaluation of the effectiveness of management plans with suggestions for further improvements, additions and their applicability elsewhere.

2. Evolution of Research Topics and Priorities

With time, any research agenda has to be modified and changed as remediation and restoration projects are identified and as new issues arise. Through a combination of workshops, attendance at societal meetings, reading pertinent literature, input from the public, professional experience, etc., the research agenda will be formally reviewed and updated. Research agendas will be reviewed in the context of priorities identified by other granting agencies such as Sea Grant, US EPA, USFWS, USDA, USGS, NYS DEC, etc. and will provide decision-making criteria for the Small Grants Program.

Though a focus on nutrient management, especially phosphorus, is highly recommended, other areas of research—health effects of endocrine disrupters, nutrients such as nitrogen, toxic substances such as mercury, and watershed issues such as habitat destruction—should also be encouraged and supported by LOCI.

3. Monitoring and Follow-Up

A final step in implementing this Action Agenda is assuring the quality of the actions by setting benchmarks on the way to goals and monitoring success/failure in performance. Monitoring is not only a means of discovering and targeting water quality problems; monitoring changes in water quality that may result from actions implemented is equally important (Bliss, et. al., 2001).

Monitoring progress is important for measuring the efficacy of programs, selecting new directions, and ensuring accountability to the public. If goals are not being met by current priorities, priorities will have to be adjusted. Benchmarks set for reductions in the priority pollutants are measurable steps on the way to the goal of improving the quality of Lake Ontario's coastal waters.

Yearly reviews by the participating agencies, organizations and municipalities involved in the Lake Ontario Coastal Initiative will be used in conjunction with reports from the monitoring program to ensure that public expenditures are having the proper effect. The Action Agenda and subsequent specific plans developed from it should be reviewed annually and adjusted as necessary as part of the adaptive management approach.

CHAPTER 5

OUTREACH PLAN

The future health of Lake Ontario ultimately depends on the people who live within its basin and utilize its waters. Their appreciation of the resource, desire to protect and improve conditions, and willingness to take effective action are essential for the restoration, protection, and sustainable use of the Lake Ontario Basin. **A key challenge will be providing and communicating credible scientifically defensible information so that stakeholders can make informed choices when developing policies, adopting local rules, and taking personal action.** This Outreach Plan is a long-term vision of what will be needed to meet the challenge.

The Lake Ontario Coastal Initiative (LOCI) seeks to enlist and retain broad public commitment for improving conditions in the Lake Ontario coastal waters and embayments. Local decisions and actions cumulatively can make a difference on a much larger scale; regional, state, and federal decisions and policies can help focus and support local action. Informed choices at all levels will foster public participation and provide the best chance for significant progress in the efforts to preserve, protect, and improve Lake Ontario.

GOAL

To promote a better understanding and appreciation of Lake Ontario including its coastal zone, embayments, surrounding watersheds, and resources in order to encourage greater public participation, individual responsibility, and collaborative action to protect these resources (adapted from *Opportunities for Action- An Evolving Plan for the Future of the Lake Champlain Basin*, April 2003).

OBJECTIVES (progress to be evaluated annually)

1. Foster relationships and collaboration with and among other Lake Ontario and Great Lakes organizations
2. Establish regular communication with the media and the public by gathering, organizing and disseminating information
3. Improve communication and information exchange with and among local governments and other decision makers and the research community
4. Expand educational opportunities

ACTIONS

1. **Foster relationships and collaboration with and among other Lake Ontario and Great Lakes organizations**
    a. Identify, support and promote agencies, community groups, organizations and other programs that target or can have an impact on the Lake Ontario coastal waters, directly or indirectly.
    b. Participate in state and federal Lake Ontario and Great Lakes programs, for example the Great Lakes Regional Collaboration, Annex 2001, the Lake Ontario Area Management Plan, and New York State's Great Lakes Research Consortium.
    c. Aid NY Sea Grant with the creation of a LOCI presentation that Sea Grant educators will present around the Lake Ontario coastal region.
    d. Help promote and participate in the meetings and events of local groups and organizations active in the coastal region such as FLLOWPA and Wayne County Water Quality Coordinating Committee meetings.
    e. Establish a liaison with the environmental Non-Governmental Organizations (NGO) committees concerned with Lake Ontario and/or Great Lakes issues.

f. Create a directory that includes agencies with regulatory authority or planning jurisdiction over all or part of Lake Ontario (Great Lakes), and of NGOs that play a role along the North Coast.

g. Utilize and build upon the work of existing resources by gathering, organizing, and disseminating information about:

1) State and federal Lake Ontario/Great Lakes programs;

2) Remedial Action Plans from the Areas of Concern in the Lake Ontario Direct Drainage Basin (Eighteenmile Creek, Rochester Embayment, and the Oswego River);

3) Watershed management plans of various groups (e.g. Oak Orchard Creek, Oatka Creek, Irondequoit Bay, Sodus Bay, and Salmon River);

4) Shoreline and coastal area resources in need of protection, prioritized by The Nature Conservancy, Trust for Public Land, and other land protection organizations.

2. Establish regular communication with the media and the public

a. Strengthen LOCI relationship with the media. Develop at least one contact for each of the media markets along the North Coast (Buffalo, Rochester, Syracuse, Oswego, and Watertown).

b. Maintain a current media master list (daily and weekly papers, newsletters, radio, television, and other publications).

c. Distribute items of interest to the public and media: scientific information, policy news, significant projects, new funding opportunities, and “news you can use”.

d. Enhance the LOCI website to serve as a clearinghouse for reference and referral for Lake Ontario information.

1) Post information about LOCI including: news, events, publications, projects, and priorities

2) Create a graphical index of remediation, protection, or restoration efforts related to the condition in the coastal waters or embayments. The list would include:

(a) relevant projects: past 5 years; present: planned; source of funding; other information

(b) project location

(c) details on the type of project and techniques used

(d) source of funding

(e) contact information

3) Dates, times, locations of events and non-project activities of other organizations and agencies around Lake Ontario and the Great Lakes

4) Useful links to other groups and agencies where quality information can be found (e.g. the Great Lakes Research Consortium)

5) On-going information and results of relevant research being done on and around Lake Ontario, and where appropriate, around the Great Lakes

6) List of current laws, ordinances, and/or documents relevant to water quality that impact Lake Ontario coastal communities

7) Contact information for local, state, and federal representatives

8) Maps of the coastal region including: watersheds, political representation, and coastal resources

9) A listing of sources and deadlines for government and private grants for projects

10) Data on economic impacts of Lake Ontario in New York State, nationally, and globally

e. Examine the value of creating a North Coast list-server.

f. Investigate the possibility of creating a "North Coast Report" radio and television spot.

g. Create a Speaker's Bureau.

h. Create and distribute a packaged presentation on Lake Ontario to be used as networking tool.

i. Hold an annual meeting and/or a biannual "State of the Lake" conference to provide updates on current activities, research and monitoring results, networking, and a forum for dialog.

3. Improve communication and information exchange with and among decision makers

a. Inform decision makers at all levels of government about local and regional North Coast issues and developments.

b. Meet once a year with coastal town supervisors and village mayors.

c. Identify local "champions" who can participate and provide a local perspective.

d. Facilitate communication between local stakeholders and state and federal representatives.

4. Expand educational opportunities (see Appendix J for a listing of educational programs in existence around New York's Lake Ontario Basin)

a. Provide referrals to educational programs and training in the region.

b. Provide referrals to training and learning materials on water quality, stream ecology and other related topics for teachers and other groups, e.g. youth, religious, recreational, and civic.

CHAPTER 6

FRAMEWORK FOR IMPLEMENTATION

Since the summer of 2002 when the Lake Ontario Coastal Initiative was envisioned and begun, the group has been led by the Executive Committee made up of three partners, the Center for Environmental Information (CEI), Finger Lakes – Lake Ontario Watershed Protection Alliance (FLLOWPA), and the State University of New York at Brockport, and a Steering Committee made up of diverse groups of stakeholders concerned with New York's Lake Ontario shoreline.

CEI has served as the host organization during the organization of LOCI, taking responsibility for obtaining and administering grants and providing outreach and administrative staff time, while the Executive Committee and Steering Committee positioned LOCI to fulfill its mission. Due to these efforts, in 2006 LOCI will be able to support remediation projects, water quality monitoring, and an outreach program. The informal coalition which has been LOCI offers this framework for transition to a formalized, independent organization led by an inclusive Board of Representatives soon to be formed.

LOCI GOVERNANCE

1. Under the FY2005 workplan, the LOCI Steering Committee will immediately begin transition to a Board of Representatives responsible for decisions about the Initiative. The transition will include creation and adoption of Operating Principles.
2. The Board will select its Chair and Vice-Chair. One representative from the Center for Environmental Information will serve as Secretary-Treasurer of the Board. The Board will organize itself into an Executive Committee and standing committees. A core structure of standing committees will be responsible for (a) project implementation, (b) research and monitoring, including allocations and recommendations on research grants and priorities, and (c) outreach and education.
3. The Board will operate through recommendations of its appointed committees to set general priorities for funding and will endorse annual ranking of priority projects for implementation. Other functions of the Board will be described in the Operating Principles.
4. The LOCI Executive Committee will provide project leadership by working with the LOCI Director to develop policy, budget and direction of the LOCI effort.
5. Initial make-up of the Executive Committee will include representation from FL-LOWPA, SUNY Brockport, and CEI, standing committee chairs, and the LOCI Director (upon hiring). Replacements or additions for Board member organizations will be nominated by the Executive Committee and approved by the full Board of Representatives.

HOST ORGANIZATION

1. CEI, a nonprofit 501(c) 3 organization, will serve as the host organization for LOCI under the FY2005 workplan and until the LOCI Board determines that LOCI would be better served by an alternate structure. CEI will be responsible for grant management and administration, workplan coordination and timeline, financial records, required submission of financial and workplan reports, and office support.
2. CEI will also assume the following staff functions under the FY2005 workplan:
    a. support for: writing and adoption of Operating Principles;
    b. support for the orientation and training for Board members;
    c. support for the expansion or change of organizational contacts or member agencies and organizations;
    d. support for institutional advancement and funding networks;

e. support for meetings of the Board, Executive and other committees; communication at and between meetings, recording, writing, and distribution of minutes and related necessary details.

f. coordination, with FL-LOWPA, of tasks required to organize and operate the project grants program.

BOARD OF REPRESENTATIVES: COMPOSITION AND STRUCTURE

1. Currently there are nineteen members of the Steering Committee. Eleven are representatives of federal, state and local government agencies or officials; three are education/research affiliates; four are environmental affiliates; one is business-related.
2. Geographically, among the nineteen Steering Committee members, three are based in Buffalo/Niagara County (two are federal agencies), one in Orleans, six in Monroe, two in Wayne, one in Cayuga and one covers Jefferson and Oswego. Five members are from the region or the state outside of the seven coastal counties. Niagara, Orleans, Oswego and Jefferson counties should each have two representatives. The additional five representatives should be drawn from items 4 and 5 following.
3. Currently, the stakeholders represented on the Steering Committee include three from research/education, four from environmental conservation organizations, five from local or regional agencies, three from State agencies, two from federal/international agencies, and one from the business sector.
4. The business community is under-represented. Numerous sources have emphasized that the one significant stakeholder group that is lacking and essential for success of the Initiative is the business community. Based on Steering Committee recommendations, representation from the utility, food processing, agriculture, tourism-recreation, and marine trades should be included, taking into account geographic representation.
5. Action Team Leaders from the three sub-watershed regions should be identified and included on the Board, taking into account geographic distribution.
6. The following federal and state agencies with important program interests or responsibilities for Lake Ontario are not represented: U.S. Fish and Wildlife Service and U.S. Geological Survey; NYS Agriculture and Markets, Parks Recreation and Historic Preservation, Health, and Transportation.
7. LOCI represents the south and east shore of Lake Ontario, but programs are also in place or under development along the Canadian shore. A representative from Canada should be considered.

STAFF

1. LOCI staff functions currently being performed by CEI require different sets of skills and qualifications and are summarized approximately as follows:

   a. Director/Coordinator (50%)—Administer grant(s), coordinate LOCI functions and programs; identify and network with funding sources.

   b. Program Assistant (20 to 25%)—Coordinate mechanics of re-grants, assist with mechanics of LOCI, including annual meeting, board and committee communications.

   c. Support Staff (20 to 25%)—office management, secretarial, mailings, bookkeeping.

   The Initiative is estimated to need core staffing at approximately one full time equivalent position in the future. Funds required for staff, benefits, and associated office and administrative expenses are estimated at $75-$80,000 for FY 2005-06. In addition, up to 5% of project implementation funds will need to be allocated for project management and accountability.

2. LOCI recognizes the need for a regional technical assistance program, including staff with (a) capabilities to assist local governments and nonprofits to obtain funds, and (b) circuit rider(s) to assist municipalities with local land use planning that addresses protection, sustainability, and

sources of impairments. This assistance could be provided with funding support to existing agencies, where applicable, or through additional LOCI staffing.

FUNDING

Without funding and a dependable revenue stream, LOCI cannot achieve its mission. The Action Agenda makes the following estimates of minimum funds needed over 15 years to achieve goals and objectives:

Cost Estimations (2006 dollars)

	Average Annual**	**15 Year Total**
Project Costs* for Restoration, Protection, Sustainability	$7,500,000	$112,500,000
Research and Monitoring	$150,000	$2,250,000
Outreach	$70,000	$1,050,000
LOCI Administration/Management	$80,000	$1,200,000
Technical and Planning Assistance Staff	$200,000	$3,000,000
Totals	**$8,000,000**	**$120,000,000**
Long-term Capital (15 years, estimated)		$25,000,000
15 Year Total		**$145,000,000**

* Includes up to 5% of project costs for management and accountability.

Revenue Sources

Most of the funding for LOCI projects and programs will come from federal and state sources. Certain capital projects and others require local matches, though often these can be calculated in-kind.

Funding models include dedicated revenue streams, dedicated federal or state budget line items, competitive grants from agencies or foundations.

** The average annual cost is expected to fluctuate within the 15 year total estimate and is currently well within existing known resources for Great Lakes programs.

CHAPTER 7

PRELIMINARY LIST OF INFORMATION NEEDS FOR IMPROVED WATERSHED MANAGEMENT AS IDENTIFIED THROUGH LOCI ACTION AGENDA PLANNING PROCESS AND RESEARCH WORKSHOPS

In a few cases, truly "new" information would need to be generated, but in many cases, information exists in fragmented form and isolated locations and needs to be collected, collated, analyzed and shared.

INFORMATION NEEDS (NOT PRIORITIZED)

1. **Lake Coastal Zone Monitoring**
    a. Long-term monitoring of embayments, rivers and nearshore areas must be continued and enhanced.
2. **Tributary Sampling Program**
    a. Improved data coverage of pollutant concentrations, especially nutrients and sediments, and stream flows is crucial to understanding the hydrologic and nutrient budgets of coastal Lake Ontario and its watershed. Protection of water quality at Lake Ontario's shoreline cannot be achieved without a better understanding of tributary stream and direct drainage water quality.
    b. Remediation should be targeted on ranked subwatersheds with attention to Total Maximum Daily Loads (TMDL) standards.
    c. Segment analysis should be used to identify pollution sources.
3. **Watershed Mapping**
    a. GIS maps of the project area need to be developed and refined. Land Use, Land Cover, and Water Quality maps should be developed.
    b. Land Use maps detailing development activities and types of agricultural uses would be particularly useful.
    c. Land Cover maps of forest and other vegetation types would be useful in estimating the impact of timber harvest activities and identifying unique natural areas needing protection.
    d. Water Quality maps would integrate the information gained from lake monitoring, tributary sampling, and land use modeling to prove graphic representations of current conditions.
4. **Nearshore Mixing**
    a. Knowledge of the circulation and sequestration of lake water and mixing of runoff from various tributaries is important for determining how the actual loading of nearshore waters works and what results to expect from management changes.
5. **Sediments**
    a. Sediment deposits in embayments and at the mouths of tributaries should be analyzed to determine if the re-circulation of nutrients, specially phosphorus, is contributing to accelerated eutrophication.

6. **Watershed Modeling**

    a. Numerous land use-based computer models for watersheds exist. By entering generalized land use and climate data derived from the LOCI project area, modelers can learn the relative importance of pollutants delivered as compared to other subwatersheds, providing a basis for the prioritization of remediation. Information needed to calibrate models can only be gained by monitoring these conditions in the LOCI project area.

7. **Information Storage and Sharing**

    a. Develop a central repository and means to share Lake Ontario's coastal zone and embayment literature.

8. **Waste**

    a. **Municipal Sewage Treatment**
    Though sewage treatments plants are mapped, needs remain to map and analyze actual service areas, population centers needing municipal service, estimates of the function of existing plants (including age and capacity), and estimates of needs to improve existing functions.

    b. **State Pollution Discharge Elimination System (SPDES)**
    Assess reports of existing permitted discharges.

    c. **Septic Systems**
    Estimate numbers and generalize locations, identify soil types with major restrictions.

    d. **Licensed Sanitary Landfills**
    Identify locations and report status.

    e. **Unlicensed Landfills and Dumps**
    Identify locations and report status.

    f. **Hazardous Waste Sites**
    Report details on materials, status.

    g. **Spills**
    Identify locations, quantities and materials spilled.

9. **Streambanks**

    a. Develop inventory of severely unstable conditions in streams of the LOCI project area.

10. **Groundwater Resources**

    a. Determine locations of aquifers, highly productive wells, municipal withdrawals and recharge areas in the project area. Integrate groundwater and surface water flow models.

11. **Drinking Water**

    a. Collect and analyze reports generated by the 18 municipal drinking water purveyors in the project area.

    b. Assess current and future costs of drinking water withdrawals.

12. **Invasive Exotic Species**

    a. Identify locations of major existing populations of invasive, exotic species including plants, invertebrates and vertebrates in the LOCI project area and review strategies for control/containment.

13. **Target**

    a. A "trophic target" like that used in the Irondequoit Basin Report of 1986-88 could be used to track annual changes in overall trophic status of Lake Ontario's nearshore waters through time.

14. **Transportation**
    a. Map highways and local roads. Identify corridors undergoing changes in development activity.
    b. Quantify the extent of maintenance activities and the condition of highway drainage ditches.
    c. Identify areas used for salt storage and quantify salt usage.
15. **Land Use Regulations**
    a. Though municipalities of the LOCI project area have generally adopted basic land use regulatory tools such as zoning, more detailed information is needed. A range of land use regulations can be employed to protect water quality, such as erosion control and stormwater management. Municipalities should be surveyed for their use of these tools.
16. **Demographic Information**
    a. Obtain and analyze more detailed data, especially on housing units, occupancy rates, areas of change, and seasonal fluctuations of occupancy.
    b. Estimate real property values of lake-influenced properties.
17. **Natural Areas Requiring Protection**
    a. Integrate information available from the NYS Open Space Plan, Land Trust Priorities, County Plans and others to develop a LOCI- area Plan.
18. **Toxic Substances**
    a. **Petroleum and Chemical Bulk Storage**
    Locate and characterize material stored.
    b. **Pesticides**
    Identify major agricultural and residential storage and usage areas.
    c. **Industrial**
    Analyze the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) and the National Priority List (NPL) information mapped.
19. **Urban Runoff**
    a. Determine status and condition of Combined Sewer Overflows mapped.
    b. Determine status of Phase II Stormwater requirements for stormwater management in urbanized areas, including TMDLs.
20. **Economic Development**
    a. Assess current capacity for public access to water resources for recreation.
    b. Inventory and assess current county and regional tourism approaches.
    c. Locate and assess facilities and organizations currently performing economic development functions.

COST-BENEFIT ANALYSIS

The cost of the proposed LOCI program should be assessed in comparison with benefits to be derived from reductions in cost of drinking water treatment, rises in property values, and increased tourism and recreation-based economic development.

CHAPTER 8

SUMMARY

Over the past forty years, numerous long- and short-term efforts have been made to address water quality problems in the Great Lakes Basin. Some of these efforts have been quite successful, but new expressions of old problems remain and new problems arise, such as the spread of exotic species. Restoration and remediation efforts focusing on toxic substances have been promoted at the State, federal and international levels, but little has been done to address Lake Ontario coastal issues. The Lake Ontario Coastal Initiative (LOCI), a "grassroots" regional effort, is designed to augment and complement ongoing programs such as the Lakewide Management Plan for Lake Ontario.

Lake Ontario and its watershed are immensely valuable and complexly inter-related. Hundreds of billions of gallons of Lake Ontario water are withdrawn annually for drinking water. Though treatment is usually available, cost of treatment is directly related to impairments, and most drinking water withdrawal points are located in the coastal zone most vulnerable to watershed-based pollutants. A large and growing part of the area's economy is based on recreation and tourism, both reliant on high quality water resources. Lake Ontario coastal land and improvements in New York State have an assessed value of $1.5 billion according to a 2005 draft report by Baird & Associates Coastal Engineers Ltd to the International Lake Ontario - St. Lawrence River Study Board. Many more billions in real property values of watershed land, whether used for residence, agriculture, industry, or recreation, are susceptible to the threat of pollution. Most of the general public comes in contact with Lake Ontario's waters in the coastal zone and its associated watershed, including embayments, creeks, ponds, river and the shoreline itself.

Though the general effect of remediation efforts has been to improve the quality of Lake Ontario's offshore water, coastal areas have proven more difficult to remediate. Impairments of drinking water quality, shoreline property values, and the attractiveness of the lakeshore to shoreline residents, the general public using the beaches and walking the shoreline, tourists and boaters are continuing concerns. Preliminary testing indicates that the shoreline and embayments are still plagued by cultural eutrophication with high nutrient levels leading to the unwanted growth of algae and other water quality problems. The principal nutrient of concern, phosphorus, comes from a variety of point and nonpoint sources, including domestic animal waste, fertilizers (from lawn, garden, and agriculture), soil loss, combined sewer effluent, leaky septic systems, and sewage treatment plant effluent.

Management of a complex ecosystem like a lake or watershed requires a cooperative, partnership approach. The LOCI effort adopts a watershed management approach to protecting and improving the coastal water quality of Lake Ontario. A watershed management approach requires that symptoms be traced back to sources and that sources be remediated. Since neither pollutants nor the water carrying them respect political boundaries, a successful water quality improvement plan must use watershed boundaries for effective management. Because the lake and its watershed are linked by water running through the landscape, solutions to water quality problems must be applied on a watershed basis to have a real and lasting effect.

With proper levels of funding, the Lake Ontario Coastal Initiative will address and remedy water quality issues identified by the communities of the project area as barriers and threats to the environmental health, beauty and economic prosperity of the valuable North Coast of New York State, the south shore of Lake Ontario. It is time to unify and refocus our conservation efforts to enable and protect sustained use and to restore and remediate pollution problems in the embayments, ponds, rivers and creeks located along the Lake Ontario coastline.

APPENDIX A

LAKE ONTARIO COASTAL INITIATIVE 2002-2005 MILESTONES AND SOURCES FOR INPUT AND PUBLIC PARTICIPATION

2000 "New York's North Coast: A Troubled Coastline", report prepared by Dr. J. Makarewicz, SUNY Brockport and published by Finger Lakes – Lake Ontario Watershed Protection Alliance.

2002 "New York's North Coast: A Troubled Coastline" conference, organized by Center for Environmental Information in Rochester—34 co-sponsoring agencies and organizations, 176 participants from 112 affiliations. (Appendix M)

2002-03 U.S. EPA Wetlands Program Grant, "Protecting Wetlands and Aquatic Resources of New York's North Coast: A Community-based Regional Approach," supplemented with small grant from Rochester Area Community Foundation, to develop network list (over 1000 identified in first year); organize stakeholder workshops in three sub-watersheds (58 attended); set up website to provide focal point for LOCI information; and begin outreach program to North Coast. (Appendix H)

Steering Committee with representatives of public and private stakeholders is assembled and adopts LOCI name and Mission Statement in January, 2004.

2004 NYS Department of State, Division of Coastal Resources Grant, "A Proposal to Provide Partial Support for Phase Two of the Lake Ontario Coastal Initiative," for outreach and input from thirty-six town and village officials in coastal municipalities and for developing the framework for a strategic planning process with partners.

2004-2005 FY 2004 U.S. EPA Grant, "Strategic Plan for Lake Ontario Coastal Region," advocated by Congressman James Walsh, has enabled the following actions:

1. Governance Workshop, March 2005—"Learning from Experience", for steering committee and guests. Presentations and information on Onondaga Lake Partnership, Tug Hill Commission, Canandaigua and Keuka Watershed plans, led by Langdon Marsh of the National Center for Collaborative Watershed Planning .
2. Research Agenda Workshop, March 2005, "Developing a Research Agenda for New York's Participation in Great Lakes Restoration," held at SUNY College of Environmental Science and Forestry and co-sponsored with Great Lakes Research Consortium, Sea Grant and Congressman James Walsh. (Appendix I)
3. Workshops to identify priorities in Niagara, Orleans, Monroe, Wayne, Cayuga, Oswego, and Jefferson Counties, June-July, 2005—133 persons attended. (Appendices B and C)
4. Conference, "Saving New York's North Coast: The Lake Ontario Coastal Initiative", May 2005, with twenty-five co-sponsoring organizations and agencies and 146 participants from 108 affiliations (Appendix N)
    a. Three workshops with feedback from local government, business, and environmental perspectives
    b. Evaluations from conference participants, 25% response
    c. Input from speakers representing similar models:
        1) Tug Hill Commission, Lake Champlain Basin Program, Onondaga Lake
        2) Partnership, Hudson River Estuary Program, Hamilton Harbor

d. Conference Executive Summary, published 2005

e. Development of the Action Agenda

2002-2005

1. Twenty-five presentations to groups and organizations—1932 people reached
2. Contacts/ input from elected officials and staff: federal (6), state (24).
3. Steering Committee meetings (16) and Executive Committee meetings (18).

Federal FY 2005 U.S. EPA Grant, advocated by Congressman James Walsh, will begin implementation of the Action Agenda.

APPENDIX B

FEDERAL AND STATE LEGISLATIVE DISTRICTS IN LOCI PROJECT AREA

New York State Assembly Districts

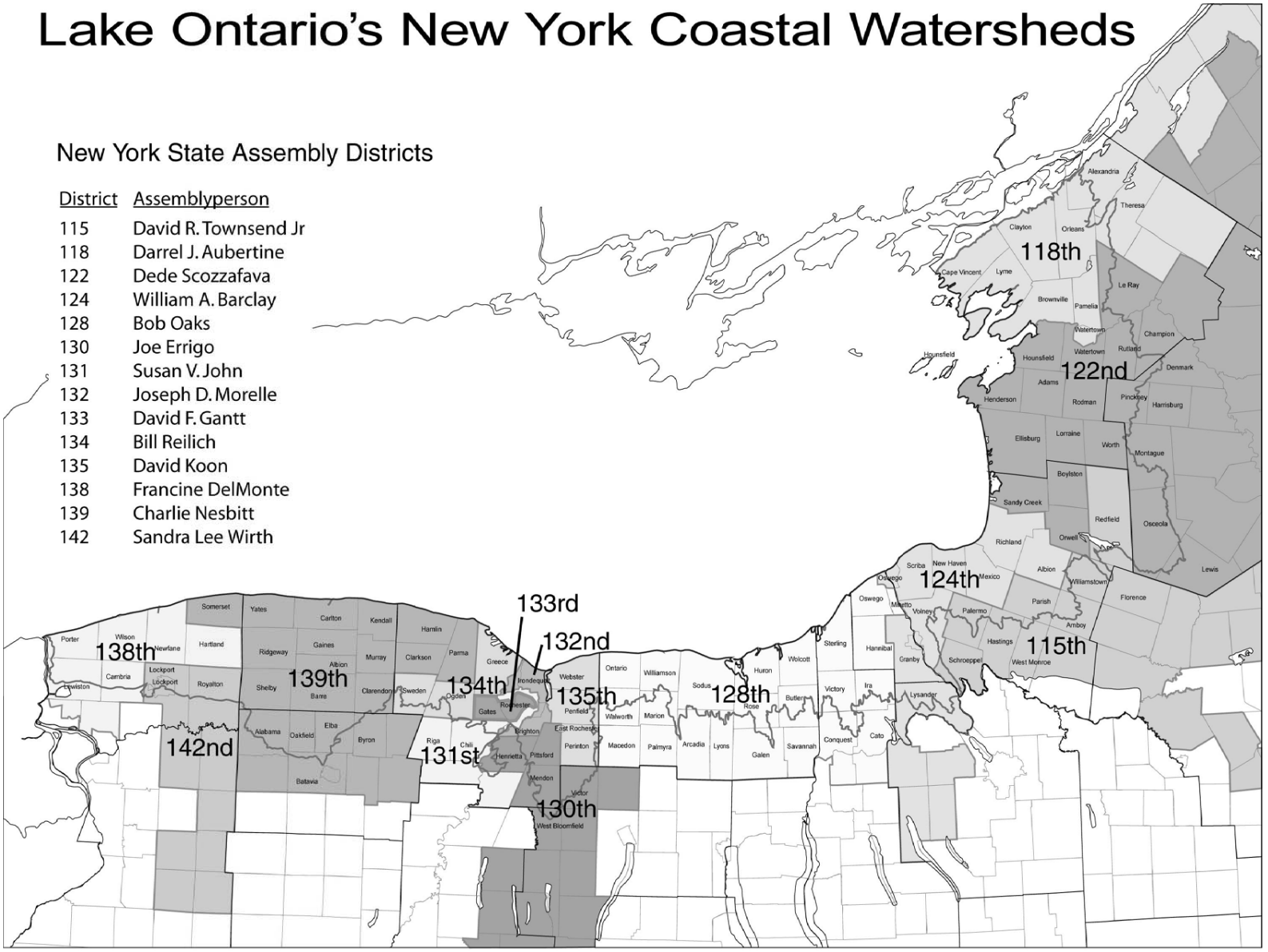
New York State Senate Districts

United States Congressional Districts

Lake Ontario's New York Coastal Watersheds

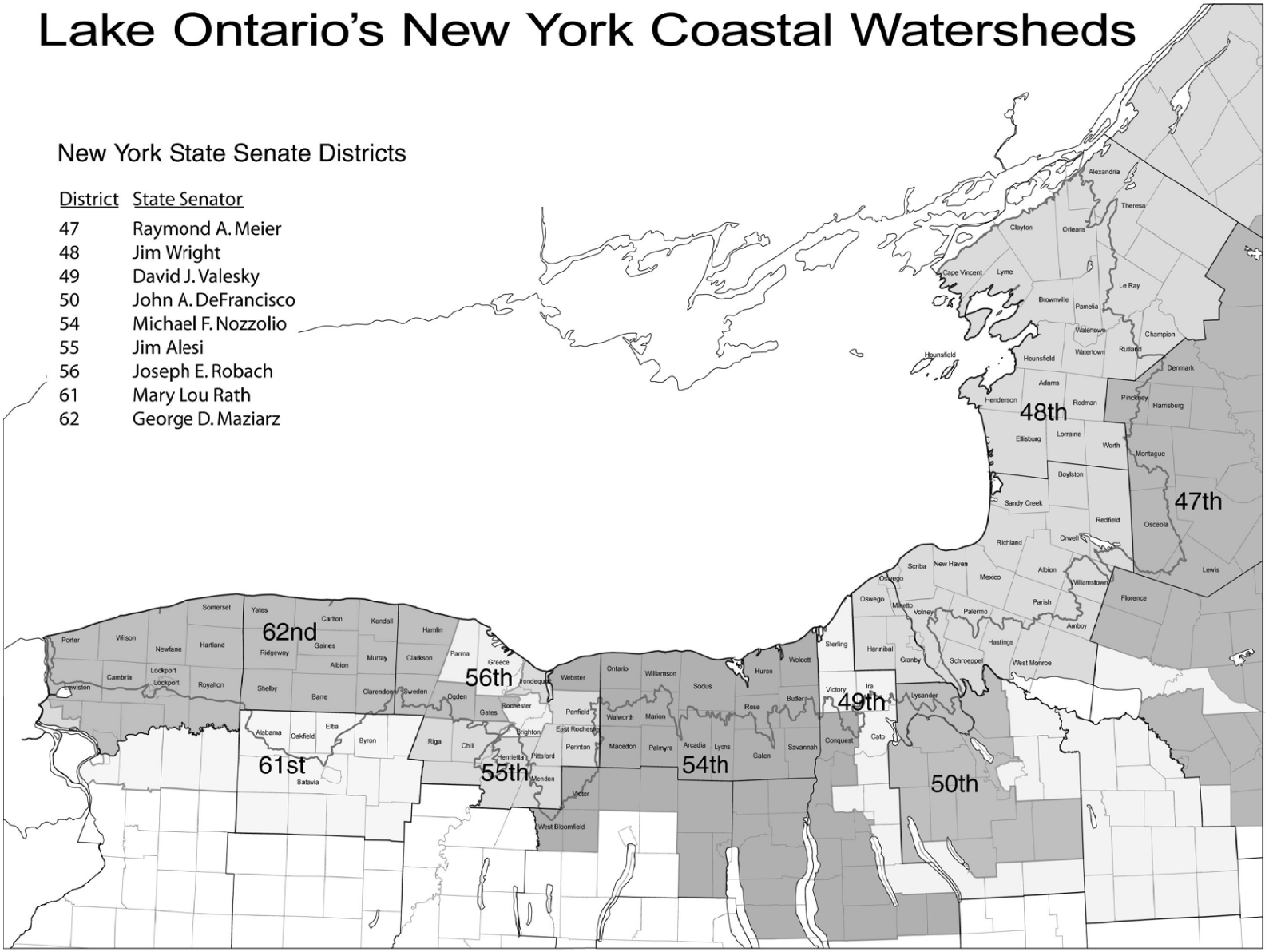
New York State Assembly Districts

District	Assemblyperson
115	David R. Townsend Jr
118	Darrel J. Aubertine
122	Dede Scozzafava
124	William A. Barclay
128	Bob Oaks
130	Joe Errigo
131	Susan V. John
132	Joseph D. Morelle
133	David F. Gantt
134	Bill Reilich
135	David Koon
138	Francine DelMonte
139	Charlie Nesbitt
142	Sandra Lee Wirth



This map was produced with financial assistance provided by the Coastal Zone Management Act of 1972, as amended, administered by the Office Of Ocean And Coastal Resource Management, National Oceanic and Atmospheric Administration in conjunction with the New York State Coastal Management Program.
Data courtesy of Genesee - Finger Lakes Regional Planning Council

Lake Ontario's New York Coastal Watersheds



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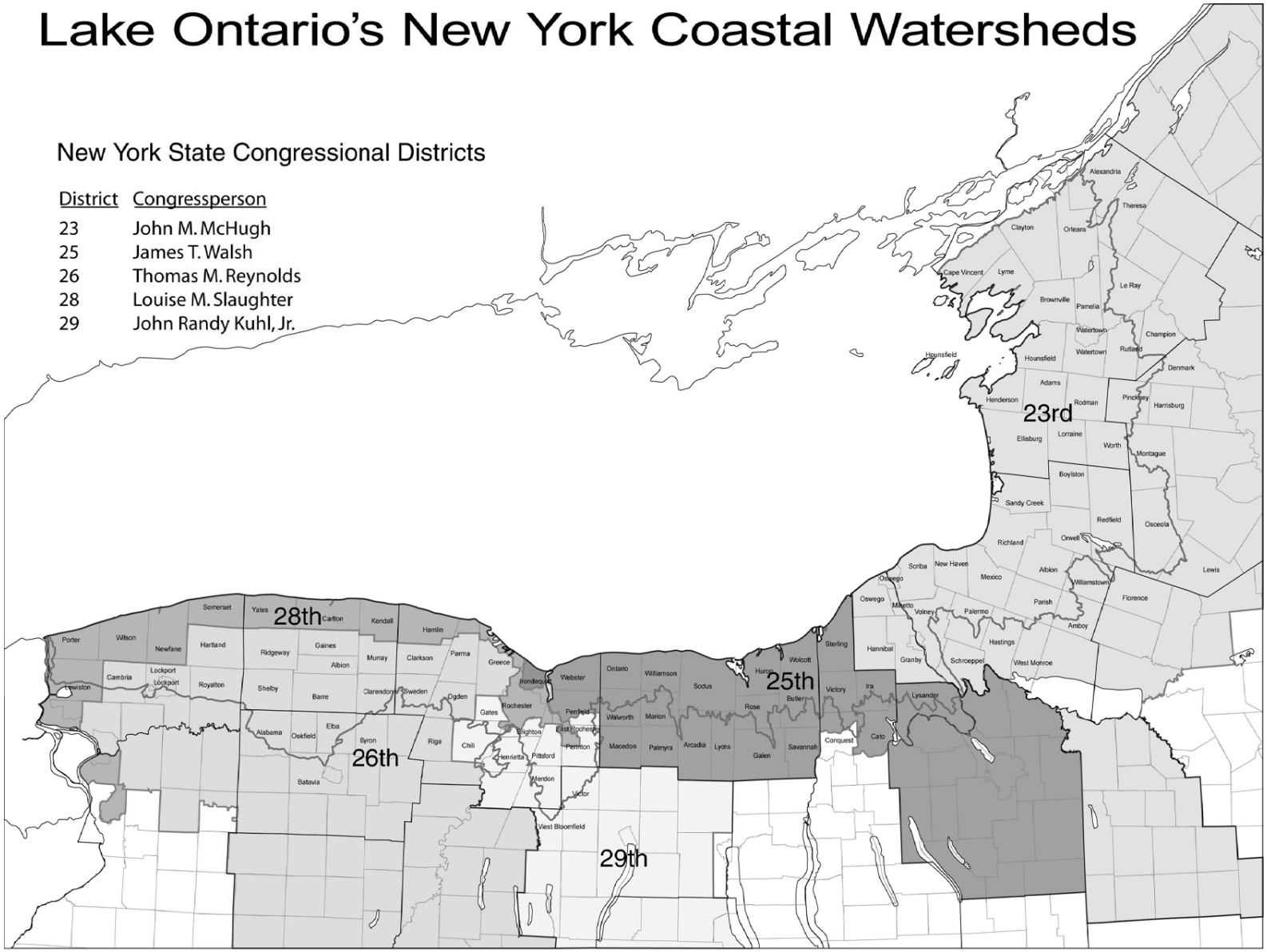
Data courtesy of Genesee - Finger Lakes Regional Planning Council

Lake Ontario's New York Coastal Watersheds



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Data courtesy of Genesee - Finger Lakes Regional Planning Council

APPENDIX C

PARTIAL INVENTORY OF STREAMS TRIBUTARY TO LAKE ONTARIO IN LOCI PROJECT AREA

Streams are listed by county and as they appear west to east. Waterbodies with Water Quality Classifications listed are those included in the NYS DEC Section 305(b) Report of 2004 as having water quality problems.

NIAGARA COUNTY

Fourmile Creek- B
Sixmile Creek
Twelvemile Creek
East Branch
Hopkins Creek- C
Eighteenmile Creek- B, C and D
    East Branch- C
Keg Creek
Fish Creek
Golden Hill Creek- C

ORLEANS COUNTY

*Johnson Creek- C
    Mud Creek
Marsh Creek
    Jeddo Creek- C
Syren Creek
*Oak Orchard Creek- C
    Otter Creek- C
    Beardsley Creek
    Marsh Creek
    Fish Creek- C
    Whitney Creek
Bald Eagle Creek- C

MONROE COUNTY

Yanty Creek- B
*Sandy Creek- C
    West Branch- C
    East Branch- C
Cowsucker Creek
Brush Creek
East Creek
Braddock Bay- B
    West Creek- C*
        Moorman Creek
    Salmon Creek- C*
        Brockport Creek- C
        Otis Creek
        Spring Creek
    Buttonwood Creek- C*
Cranberry Pond- B
Long Pond- B
    *Black Creek
        Northrup Creek- C*
Buck Pond- B
    Smith Creek
        Larkin Creek- C
Round Pond- C
    Round Pond Creek- C
        Kirk Creek
        Paddy Hill Creek
Slater Creek- C
Fleming Creek
Rochester Embayment- A
    *Lower Genesee River

Little Black Creek
Black Creek
Mill Creek- B
Hotel Creek
Oatka Creek
Irondequoit Bay- B
Irondequoit Creek- B and C
Thomas Creek- B
White Brook- C
Allens Creek- B
Shipbuilders Creek- C*
Mill Creek
Fourmile Creek

WAYNE COUNTY

Deer Creek
Mill Creek
Dennison Creek
Salmon Creek
Mink Creek
Sill Creek
Salmon Creek
Sodus Bay- B
First Creek
Second Creek
Third Creek
Sodus Creek- C(T)
Mudge Creek- C
Beaver Creek
East Bay- B
Wolcott Creek- C
Port Bay- B
Red Creek-C
Little Creek
Black Creek
Blind Sodus Bay- B
Blind Sodus Creek

CAYUGA COUNTY

Little Sodus Bay- B
Sterling Creek- B
Sterling Valley Creek
Little Sodus Creek

OSWEGO COUNTY

*Ninemile Creek- C
Eightmile Creek
Snake Creek
Rice Creek
*Lower Oswego River
Black Creek
Waterhouse Creek
Lake Neatahwanta
*Wine Creek- C
Otter Creek
Catfish Creek
Butterfly Creek
Little Salmon River- C
Black Creek
North Branch
South Branch
Sage Creek
Snake Creek
Grindstone Creek
Little Grindstone Creek
Mud Creek
*Salmon River- C (T)
Spring Brook
Trout Brook
Orwell Creek
Pekin Brook
Salmon River Reservoir
Pennock Brook
Coey Creek
Pine Creek

Beech Creek
Cottrell Creek
North Branch
Mad River
Rat Creek
Beaver Creek
Gillman Creek
Willow Creek
McDougal Creek
Slide Creek
Roaring Brook
Cold Brook
Twomile Creek
Castor Brook
Grindstone Brook
Mill Stream
Stony Brook
Line Brook
Prince Brook
Mulligan Brook
Little Baker Brook
Baker Brook
Fall Brook
Crooked Brook
Twomile Creek
Threemile Creek
Smith Brook
Keese Brook
Finnegan Brook
West Fork
Pickens Brook
East Fork
Pine Meadows Creek
Beaver Dam Brook
North Brook

Little Deer Creek
Deer Creek
Alder Creek
North and South Sandy Pond- B
*Little Sandy Creek- C(T)
Stinson Creek
Blind Creek
Mud Creek

JEFFERSON COUNTY

Lindsey Creek
Jacobs Brook
South Brook
Skinner Creek
Big Deerlick Creek
South Sandy Creek- C
Little Deerlick Creek
Bear Creek
Raystone Creek
Taylor Brook
Fox Creek
Big Brook
Clora Creek
Abiyah Creek
Mud Brook
*Sandy Creek- C(T) and C
North Branch
Staplin Creek
Boynton Creek
Jacobs Creek
Stebbins Creek
Freeman Creek
Fish Creek
Gulf Stream
Denning Creek
Shingle Gulf
Bear Gulf
Grunley Creek

Little Stony Creek- C

*Stony Creek- C(T) and C

Bedford Creek

Mill Creek

Muskellunge Creek

Philomel Creek

Trout Creek

*Lower Black River

Perch Creek

Perch Lake

Stone Mills Creek

Carter Creek

Miller Creek

Sucker Creek

Kelsey Creek

Gill Creek

Sherwin Creek

Guffin Creek

Horse Creek

Chaumont Bay- C

*Chaumont River- C

Lucky Star Lake

Buttermilk Creek

Three Mile Creek

Shaver Creek

Little Fox Creek

Fox Creek

Kents Creek

Scotch Brook

Wheeler Creek

French Creek

Barrett Creek

McCarn Creek

Black Creek

Mullet Creek

Otter Creek

*NYS DEC Priority Streams

Water bodies with classifications are those included on the NYS DEC Waterbody Inventory/Priority Waterbodies List.

LAKE ONTARIO

Lake Ontario is designated as Class A or Class A(S) water.

BEST USE CLASSIFICATIONS

The New York Water Quality Standards are the foundation for the State's water pollution control and water quality protection efforts. The standards provide the specific criteria for the management and protection of New York's waters. Both surface and groundwater standards are developed in accordance with State administrative practices, including public hearings. They are approved by the State Environmental Board prior to filing as regulations with the Secretary of State. Adoption of the surface water standards must also conform with Federal Regulations 40 CFR Part 131.

Surface water quality standards are embodied into 6 NYCRR Parts 700, 701, 702 and 704 and include general and numerical values that correspond to several classes of use. The values are considered surrogates, presuming that if the standards are met for a waterbody of a class, the use associated with that class can be served. The six major classes and their significant uses are:

FRESH WATER CLASSIFICATION

Class N – Natural

Class AA – Drinking (culinary or food processing, coliform <50/100 ml

Class A – Drinking (culinary or food processing, coliform <5,000/100 ml

Class B – Bathing

Class C – Fish propagation

Class D - Fishing

APPENDIX D

SEWAGE TREATMENT FACILITIES FOUND ON MAP 6

WWTP ID	FACILITY NAME	FACILITY ADDRESS	CITY	COUNTY
1	CWM Chem SVC LLC	1550 Balmer Road	Model	Niagara
2	East Side Wastewater Treatment Plt	71 Mercer St	Oswego	Oswego
3	Spencerport V WWTP	27 West Ave	Spencerport	Monroe
4	Albion Joint Mun Ind Pol Contrl	14740 Densmore St	Albion	Orleans
5	Sodus Point V WPC Faclty	8120 Lake Road	Sodus Point	Wayne
6	Frank E Van Lare STP	700 Pinegrove Ave	Rochester	Monroe
7	Lockport C WWTP	611 West Jackson St	Lockport	Niagara
8	Ontario T STP	2200 Lake Road	Ontario	Wayne
9	Minetto SD WPCP	Snell Road - Box 220	Minetto	Oswego
10	Adams V WWTF	63 Liberty St	Adams	Jefferson
11	Medina Waste Water Treatment Plt	200 Gulf St	Medina	Orleans
12	Newfane Waste Water Treatment Plt	6349 East Lake Road	Olcott	Niagara
13	Oakfield Village Of	19 Irving Parkway	Oakfield	Genesee
14	Holley Sewage Treatment Plt	Frisbee Terrace	Holley	Orleans
15	Middleport Village Of Treatment Plt	3825 North Hartland St	Middleport	Niagara
16	Oswego West Side STP	1st Ave & West Schuyler St	Oswego	Oswego
17	Sackets Harbor Sewage Treatment Plt	Hill St	Sackets Harbor	Jefferson
18	Lyndonville V WWTP	30 Railroad Ave	Lyndonville	Orleans
19	Williamson T STP	Box 24 4100 East Main St	Williamson	Wayne
20	Watertown T SD Number 1	6873 Brookside Dr Mun Bldg	Watertown	Jefferson
21	Gasport SD Number 1 WWTP	4244 Bolton Road	Gasport	Niagara
22	Somerset Barker SD WWTP	8500 Lower Lake Road	Barker	Niagara
23	Wolcott V WWTP	31 West Port Bay Road	Wolcott	Wayne
24	Pulaski V STP	48 Riverview Drive	Pulaski	Oswego
25	Fulton City Of Sewage Treatment Plt	West River Road North Rt 48	Fulton	Oswego
26	Brownville V STP	State St	Brownville	Jefferson
27	Northwest Quadrant STP	170 Payne Bch Road	Hilton	Monroe
28	Webster Town Of WWTP	226 Phillips Road	Webster	Monroe
29	Depauville STP	Caroline St	DePauville	Jefferson
30	Lafargeville WWTF	Sunrise Ave	Lafargeville	Jefferson
31	Parish V WWTP	Red Mill Road	Parish	Oswego
32	Mexico V STP	PO Box 309	Mexico	Oswego
33	Dexter V STP	Water St	Dexter	Jefferson
34	Clayton V STP	Gardener St	Clayton	Jefferson
35	Sodus V WWTP	Mud Lane	Sodus	Wayne
36	Elba V WWTP	Mechanic St	Elba	Genesee
37	Watertown Water Pollution Contrl Plt	700 William T Field Drive	Watertown	Jefferson
38	Cape Vincent Village	PO Box 337	Cape Vincent	Jefferson
39	Phoenix Sewage Treatment Plt	821 North Main St	Phoenix	Oswego
40	Wilson V WWTP	109 Ontario St	Wilson	Niagara
41	Sleepy Hollow SD	Box 68a Johnson Road	Oswego	Oswego
42	Orleans Alexandria Joint WWTF	NYS Route 12 Collins Lndg	Alexandria Bay	Jefferson

APPENDIX E

PROTECTED LANDS/PUBLIC ACCESS

Protected lands means those publicly owned or privately owned by a non-profit organization dedicated to land protection.

AT LAKESHORE

Jefferson County

Robert Wehle State Park, Henderson- 17,000' shoreline, 1067 a.

Waterston State Park, Fineview

Canoe-Picnic Point State Park, NE end of Grindstone Island, Clayton

Southwick Beach State Park, Henderson- 500 a.

El Dorado Nature Preserve, Ellisburg, Nature Conservancy, 360 a.

Keewaydin State Park, Alexandria Bay

Wellesley Island State Park, Fineview, 2600 a.

Grass Point State Park and Beach, Alexandria Bay

Cedar Point State Park, Clayton

Burnham Point State Park, Cape Vincent

Long Point State Park, Rte. 12E, Three Mile Bay

Cedar Island and Mary Island State Park, Alexandria Bay

De Wolf Point State Park, Fineview

Sacketts Harbor Battlefield State Historic Site, Sacketts Harbor

Dexter Marsh Wildlife Management Area, 1339 a.

Westcott Beach State Park, Sacketts Harbor, 3000' frontage, 170 a.

Black Pond State Wildlife Management Area- 526 a.

Henderson Shores Unique Area, 1160 a.

Lakeview Wildlife Management Area, State Rte. 3, Henderson, 25,000' frontage, 3461 a.

Oswego County

Eastern Lake Ontario Dunes and Wetlands, 5000' frontage, Nature Conservancy

Selkirk Shores State Park, 3 mi. w. of Pulaski on Rte. 3, 980 a.

Sandy Island Beach State Park, Co. Rd. 15, Sandy Creek, 13 a.

Fort Ontario State Historic Site, Oswego

Battle Island State Park, 3 mi. n of Fulton

North and South Sandy Ponds, Oswego Co.

Sandy Pond Beach Natural Area, Nature Conservancy

North and South Colwell Ponds, Oswego Co.

Mexico Point State Park, Texas

Oswego County Nature Park at Camp Zerbe, Williamstown, 364 a.

Scriba Town Park, O'Connor Rd., Scriba

Cayuga County

Cayuga County West Barrier Bar Park, Fair Haven

Fairhaven Beach State Park and Sterling Pond, Rte. 104A, 2 mi. n. of Fair Haven

Sterling Nature Center, 1.9 miles shoreline, 1200 a.

Wayne County

Chimney Bluffs State Park, Huron, 597 a.

Beechwood State Park, 3500', 150 a.

B. Forman Park, Pultneyville, 25 a.

Sodus Point Park Beach, Sodus Point

Lakeshore Marshes Wildlife Management Area, east of Sodus Bay, 6179 a

Wolcott Falls Park, Wolcott

Monroe County

Webster Park, Monroe County, Holt Road, 550 a.

Ellison Park, Irondequoit Bay, 447 a.

Tryon Park, Irondequoit Bay, 82 a.

Durand-Eastman Park, Rochester, 5000' frontage, 965 a.

Ontario Beach Park, Lake Avenue, Rochester, 39 a.

Braddock Bay Fish and Wildlife Management Area, 2402 a.

Island Cottage Woods, Genesee Land Trust, 61 a.

George Badgerow Park, Monroe Co., Dewey Ave., 65 a.

Hamlin Beach State Park, 1223 a.

Orleans County

Lakeside Beach State Park, Lake Ontario State Parkway, Waterport

Niagara County

Golden Hill State Park, Rte. 269, Barker

Fort Niagara State Park

Wilson-Tuscarora State Park, Rte. 18, 1 mi. w. of Wilson, 395 a.

Four Mile Creek State Park and Campsite, 4 mi. e. of Youngstown on Rte. 18F

IN COASTAL WATERSHED

Littlejohn Wildlife Management Area, T. of Boylston & Redfield, 8020 a., Jefferson and Oswego Co.

Perch River Wildlife Management Area- 7862 a., Jefferson Co.

Gould Corners State Forest, east of Adams, 2045 a., Jefferson Co.

Ashland Flats Wildlife Management Area, 2037 a., Jefferson Co.

French Creek Wildlife Management Area, T. Clayton, 2265 a., Jefferson Co.

Chaumont Barrens, 4000 a. Nature Conservancy, Jefferson Co.

Deer Creek Marsh Wildlife Management Area- 1200 a., Oswego Co.

Happy Valley Wildlife Management Area, T. Albion, Williamstown, Parish, Amboy, 8645 a., Oswego Co.

Winona State Forest, east of Rte. 81, Boylston & Lorraine, 9233 a., Jefferson and Oswego Co.

Pinckney State Forest,, 2091 a., Lewis Co.

Salmon River State Fish Hatchery, Rte. 13, Altmar, Oswego Co.

Salmon River State Forest, Redfield, Oswego Co.

Trout Brook State Forest, T. Sandy Creek & Boylston, Oswego Co.

Rice Creek Field Station of SUNY Oswego, 400 a., Oswego County

Thousand Acre Swamp, Penfield, Nature Conservancy, 500 a., Monroe Co.

Greece Canal Park, 577 a., Monroe Co.

Northampton Park, Monroe Co., Sweden-Ogden, 973 a., Monroe Co.

Iroquois National Wildlife Refuge- 10,818 a., Genesee and Orleans Co.

Tonawanda Wildlife Management Area, Rte. 77, 5600 a., Genesee and Niagara Co.

Oak Orchard Wildlife Management Area, Rte. 9, 2545 a., Genesee Co.

Bond Lake Niagara Co. Park, Lewiston, 545 a., Niagara Co.

Hartland Swamp Wildlife Management Area- 385 a., Niagara Co.

Erie Canal- Barge Canal Trail, various co.

PUBLIC BOAT LAUNCHES

Wayne County- 6

Sodus Bay, Rte. 14, 20 cars

East Bay south site, Slaght Road, 5 cars

East Bay North site, North Huron Road, 8 cars

Port Bay West Site, West Port Bay Rd., 35 cars

Port Bay South site, West Port Bay Road, 10 cars

Black Creek site, in Lakeshore Marshes WMA, 5 cars

Orleans County- 3

Oak Orchard State Marine Park West, Rte. 18 Carlton, 96 cars

Oak Orchard State Marine Park East, Carlton, 25 cars

Orleans County Marine Park and Public Boat Launch- 71 cars

Monroe County- 8

Hamlin Beach State Park, Hamlin, 3 cars

Braddock Bay State Park

Sandy Creek site, Hamlin, 50 cars

Slater Creek site, Beach Avenue, Greece, 80 cars

Genesee River site, Lake Avenue, 100 cars

Irondequoit Bay State Marine Park, Culver Road, 28 cars, 2000' frontage

Irondequoit Bay Marina Park, Monroe Co.

Irondequoit Bay South site, Empire Blvd., 12 cars, 2000' frontage

Cayuga County- 1

Fair Haven Beach State Park, 150 cars

Jefferson County- 8

Stony Creek, Rte. 3, 80 cars

Westcott Beach State Park, Rte. 3, 35 cars

Henderson Harbor, Rte. 178, 84 cars

Chaumont Bay, Rte. 12E, 100 cars

Long Point State Park, 20 cars

Perch River, 10 cars

Black River Bay, 20 cars

Golden's Marina, Lyme, 30 cars

Niagara County- 3

Golden Hill State Park, Somerset, 50 cars

Fort Niagara State Park, 44 cars

Wilson Tuscarora State Park, 30 cars

Oswego County- 1

Mexico Point, Rte. 104B, 105 cars

Total Capacity of Public Boat Launches: 1306 cars

PRIVATE MARINAS ON LAKE ONTARIO

LOCATION	# MARINAS	#WET SLIPS	#TRANSIENT SLIPS	PUMP OUT AVAILABLE
Black River Bay	1	41	4	Yes
Blind Sodus Bay	1	60	10	No
Braddock Bay	4	490	27	Yes
Chaumont Bay	9	318	59	Yes
Genesee River	7	958	42	Yes
Henderson Harbor	9	460	47	Yes
Irondequoit Bay	8	908	11	Yes

LOCATION	# MARINAS	#WET SLIPS	#TRANSIENT SLIPS	PUMP OUT AVAILABLE
Little Salmon River	4	344	30	Yes
Little Sodus Bay	7	318	37	Yes
Mud Bay	1	120	20	No
North Sandy Pond	8	358	44	Yes
Oak Orchard Creek	11	431	51	Yes
Olcott Harbor	2	123	5	Yes
Oswego Harbor	3	389	147	Yes
Perch Creek	1	48	4	Yes
Port Bay	4	30	7	Yes
Pultneyville	4	67	2	Yes
Sackets Harbor	6	350	26	Yes
Salmon Creek	1	35	2	No
Salmon River	2	58	8	Yes
Sandy Creek	7	308	2	Yes
Sodus Bay	25	1830	257	Yes
Stony Creek	1	31	3	No
Tuscarora Bay	5	393	38	Yes
TOTAL	**131**	**8468**	**1081**	**---**

(Source: NY Sea Grant)

SUMMARY AND DISCUSSION

In the LOCI project area, which covers New York State's entire Lake Ontario coastline, there are 131 private marinas with the capacity of 8468 wet slips and 1081 transient slips for boats.

In the same area, there are 30 public boat launches with the capacity to park 1306 car-trailer units.

Though there may in fact be more public boat launch capacity than officially stated, the disparity in sheer numbers would seem to indicate a need for more public launch facilities.

APPENDIX F

LOCAL WORKSHOPS SUMMARY (2003)

As part of the on-going effort to find ways to protect and remediate the Lake Ontario coastal waters and embayments, the Center for Environmental Information (CEI) and the Lake Ontario Coastal Initiative (LOCI) Steering Committee sponsored three local stakeholder workshops. The workshops were funded with grants from the U.S. EPA and the Rochester Area Community Foundation.

Each two-hour workshop targeted a different area of the North Coast region:

- Albion, November 14, 2003 (Niagara, Orleans, Monroe Counties)
- Village of Sodus Point, November 18, 2003 (Monroe, Wayne, Cayuga Counties)
- Pulaski, December 12, 2003 (Oswego, Jefferson Counties)

The purpose of the workshops was to:

- Inform and answer questions about the Lake Ontario Coastal Initiative and how stakeholders can take part in this effort;
- Discuss the obstacles to remediation of known problems, how to negotiate some of those challenges, and explore ways to increase attention and funding for addressing these problems;
- Encourage stakeholder input and collect information for the LOCI Steering Committee to use in the creation of a coastal alliance; and
- Provide stakeholders with an opportunity to meet and network with other citizens, groups, agencies, and municipal leaders concerned with the Lake Ontario coastal zone and the local water resources that drain into Lake Ontario.

There were 58 attendees representing 45 affiliations, other than CEI. They came from each of the seven coastal counties. The affiliations included representatives of college and university research programs, state and local agencies, civic and environmental groups, local and state government elected officials or their representatives and business owners.

The notes from all three workshops have been gathered, categorized, and synthesized to create a readable summary of what was said at the local workshops. The transcribed notes are available upon request.

Problems Facing the North Coast

(51 comments)

After introductions the workshop participants were given the opportunity to share with the group the water quality related issues they're facing locally and challenges and obstacles to taking the appropriate action.

1. The primary source of frustration expressed at the workshops is an inability to obtain funds for identified projects and personnel necessary to undertake the projects.
2. The second most commonly mentioned challenge is the need to educate local citizens and officials about science-based understanding of causes and effects, who is responsible for what, and what is required to protect and improve the coastal water resource.
3. The third most common comment was the lack of the political will and/or manpower to enforce regulations already in place.
4. Septic systems and sewer systems were the most frequently mentioned source of pollution identified by the workshop participants.
5. Other non-point sources of nutrients and pollutants from lawns, agriculture and development were the second most frequently cited problem for the region.

6. Many other topics were mentioned including the need for research, dredging, problems with invasive species, lake levels and more.

Support for Regional Approach

(12 comments)

Among the three workshops there seemed to be a consensus that a regional approach should be supported. Participants recognized the benefits: many of the issues are the same throughout the coastal region; it can help to cross over political boundaries, create a team approach that would draw from existing research, and create a connection for greater collective dollars. By consolidating, the region will look more attractive to funders who prefer to support large projects.

Doubts about another Organization

(7 comments)

There were concerns about creating another organization. The primary concern is about duplication of effort since there are existing groups and agencies already involved in efforts to "clean-up" Lake Ontario e.g. FL-LOWPA, EPA, NYS DEC, and the IJC. Why go through the time and cost of creating a new group when those resources could be funneled into an existing structure?

Who else Should be Involved or Contacted

(12 comments)

There was broad agreement that all stakeholders should be involved from the very beginning. Including everyone in the process is essential for the success of the Lake Ontario Coastal Initiative.

Questions about the LOCI

(20 comments)

Participants had many questions about the LOCI. The most frequently expressed questions were about the mission of such an organization and its goals. How would this be accomplished? How would a public and private partnership function? How would the resources be divided? Members of the LOCI steering committee replied that many of the answers would be decided with the help of the stakeholders who wish to be involved.

Organizational Structure

(34 comments)

At each of the workshops a member of the LOCI steering committee proposed a possible structure for the LOCI. The proposal called for the Lake Ontario coastal region to be divided into three action teams, geographically split by the major tributaries (Genesee R. and the Oswego R.). Proposals would originate from the action teams and be passed onto a regional committee with representation from the three areas. Final decisions would occur at this level.

This proposal prompted plenty of debate and suggestions. Participants expressed concerns about:

1. Splitting up Monroe County into two different action teams.
2. Not including the entire Lake Ontario Basin
3. The need for more groups and organizations to be included in the decision-making process.
4. How to distribute funds equitably and yet still be able to fund large projects.
5. Utilizing a competitive grant process. There was concern about wasted time on unfunded grant proposals.

Tactics and Recommendations

(35 comments)

There were many recommendations about how and what could be done to help the coastal waters and embayments, generate support for the LOCI. Education of the public, local officials and other stakeholders heavily emphasized. Other representative recommendations include:

1. Making use of existing groups, organizations, agencies, and others.
2. Making sure that funds get delivered to the local level and that local priorities be taken into account.
3. The organization needs to demonstrate its relevance to the stakeholders (local governments)
4. Local citizens should make contact with local officials in support of the LOCI.
5. Create a traveling presentation about the LOCI that can be used by local advocates of the Initiative to educate others about the Initiative.

APPENDIX G

2005 WORKSHOP SCHEDULE WITH PARTICIPANT NUMBERS AND AFFILIATIONS

Niagara County, June 2, Olcott Fire Hall, 1- 3 p.m.

19 participants representing anglers association, NYSDEC, private consulting firms, US ACE, Orleans County SWCD, Niagara County SWCD and WQCC, Niagara County Dept. of Public Works, agricultural producer, economic development organization, local government, local planning board, NYS OPRHP, USDA NRCS, lakeshore property owners

Orleans County, June 23, Albion Middle School, 7-9 p.m.

53 participants representing lakeshore property owners, Orleans and Genesee County agencies (planning, SWCDs, tourism) and WQCCs, Oatka Creek Watershed Alliance, SUNY Brockport, USDA NRCS, environmental interests, local government/planning boards

Monroe County, June 12, Town of Penfield Town Court Building, 7-9 p.m.

6 participants representing town and village governments, private business sector, Monroe County WQCC and Health Dept., non-profit environmental group, private citizen

Wayne County Workshop, June 28, Sodus Point Village Hall, 9:30 – 11:30 a.m.

10 participants representing County Water Quality Coordinating Committee, local government, civic organizations, lakeshore property owners, Wayne County Sewer Authority and SWCD, Congressman Walsh's office, Harbor Management Committee)

Cayuga County, June 7, Sterling Nature Center, 7-9 p.m.

7 participants representing local government, Cayuga County planning and water quality management agency (WQCC), marina operator, private environmental and education organization (nature center), and lakeshore property owners association

Oswego County, June 14, Eddie's Cove Restaurant, Sandy Pond, 7-9 p.m.

24 participants representing NYS OPRHP, Anglers Association, local government, town planning board, The Nature Conservancy, Tug Hill Commission, Oswego County Legislature, county tourism agency, Seaway Trail, local nonprofit environmental organization, SUNY Oswego, Operation Oswego County, civic organization, NY Sea Grant, Oswego County SWCD and Planning and WQCC, resort owner, lakeshore property owner

Jefferson County, July 18, Jefferson County SWCD, Watertown 10 a.m. – 12 Noon

14 participants representing NYS DEC, USDA NRCS, Tug Hill Commission, Jefferson County SWCD and Water Quality Coordinating Committee, local government, Jefferson County Federation of Lake Associations (lakeshore property owners)

Total: 133 participants

APPENDIX H

SUMMARY OF TOP LOCI COUNTY WORKSHOP PRIORITIES (2005)

(items given the same ranking within a county list represent a tie)

NIAGARA COUNTY

1. Restore/enhance riparian corridors and natural floodplains in the smaller tributaries (12-Mile, Keg, and 4-Mile Creeks)
2. Support the de-listing of the 18- Mile Creek Area of Concern (restoration of use impairments)
    a. Identify sources and sinks of PCBs and other contaminants behind Burt Dam
    b. Eliminate areas of contaminated sediments – hot spots
3. Protect against shoreline erosion– need mechanism to correct shoreline erosion quickly, minimize problems early
4. Implement public education and outreach on several topics: erosion, lake levels, hydraulics, invasive species
5. Investigate and control nuisance and invasive species, including cormorants, geese, zebra mussel, round goby, invertebrates, plants)
6. Remove or restore old hotel piers/coastal restoration (in Towns of Olcott and Wilson)
7. Mitigate failing septic systems
8. Attract/promote businesses that support sustainability and eco-tourism opportunities
9. Assist agricultural community with nutrient management planning
10. Improve handicapped-access to shoreline

ORLEANS COUNTY

1. Involve state and federal authorities at local community level to hear and address concerns
    a. Establish better two-way communication with Army Corps of Engineers
    b. Create a mechanism for property owners to have a greater voice in decisions, e.g., create a political action committee for seasonal residents
2. Mitigate shoreline erosion and impacts
    a. Make options known to homeowners for shoreline erosion prevention and restoration
    b. Provide financial assistance for shoreline protection and restoration
    c. Establish mechanism for tax relief for property loss due to shoreline erosion
    d. To prevent shoreline erosion, slow the Fast Ferry
3. Improve and maintain Lake Ontario water quality to meet standards
4. Make available easily accessible information on the roles of the regulating agencies and their jurisdictions (ACE, EPA, DEC, IJC, etc.)
    a. Establish a clearinghouse for information: regulatory, policy, and lake level controls
5. Remedy failing septic systems along lakeshore
6. Identify, prioritize, and remediate point and nonpoint sources of nutrients and other pollutants

7. Control human garbage/trash that washes onto shore
8. Adopt and enforce tighter controls over ballast water releases to reduce the introduction of exotic species
9. Increase public access and swimming beaches
10. Reduce emissions from power plants, e.g., Somerset (Niagara County)

MONROE COUNTY

1. Control algae growth in near-near shore areas (less than 10 meters depth) by reducing phosphorus
2. Examine feasibility of restoring eutrophic waterbodies to a more natural state – Long Pond
3. Develop constructed wetlands for stormwater mitigation, nutrient reduction, slowing flow into treatment plants (Northrup Creek and Long Pond, other locations)
4. Implement/support erosion control measures on Allens, Northrup, and Irondequoit Creeks
5. Remediate historical dump sites (Town of Penfield)
6. Improve public access to lake through boardwalks, trails, land purchases – Define existing access around lake
7. Conduct a feasibility study on use of constructed wetlands to address point source discharges
8. Control weed growth in coastal areas and ponds, through phosphorus control
9. Study the significance of the impact of the Genesee River (water quality) on local beaches, take action as recommended
10. Define and mitigate historical toxic contamination at Round Pound

WAYNE COUNTY

1. Better control of lake levels within the maximum and minimum goals
2. Support implementation of the Wayne County watershed and Sodus Bay harbor management plans – support natural resources and open space protection, public access, recreational opportunities as recommended in plans
3. Control/reduce invasive and nuisance aquatic vegetation
4. Collect information and GIS data for entire coastal region that could be used in local management plans - a data source for locals to use, make connections to and learn from each other
5. Create a Wayne County watershed manager position to oversee multiple programs
6. Develop a plan to get local communities to tie into the regional wastewater treatment plant(s) (expand sewering)
7. Revisit potential for dredging by revisiting the coastal dredging report - relevant to 17 Lake Ontario embayments
8. Reduce nutrient sources to embayments/lake
9. Upgrade local wastewater treatment to accept septage, grey and black water (RVs)
10. Provide technical assistance for embayments regarding chemical treatments for aquatic weeds, e.g., permitting, products, learning from experience

CAYUGA COUNTY

1. Fund and construct WTP/sewer system for Fairhaven
2. Enhance and protect public access while promoting responsible and appropriate recreational opportunities

3. Educate property owners about what they can do to protect water quality
4. Adopt land use controls that protect water quality - zoning, subdivision codes
5. Manage invasive plants, include educational component, on Little Sodus Bay
6. Educate public to increase acceptance of regulations that protect lakefront
7. Support Sterling Nature Center - staff, programs, operations - as major educational resource
8. Develop and promote clean boat program with fueling and pump out stations
9. Support education and technical assistance to towns and villages on Phase II stormwater compliance
10. Develop interpretive displays to educate public about invasive species, habitat, interaction with lake, water quality, and watersheds

OSWEGO COUNTY

1. Provide technical assistance to local communities for strategic planning
2. Develop and maintain public facilities, access to water and parks
3. Achieve "safe harbor" designation for Sandy Pond—involves public access, breakwall , dredging
4. Study impacts of liquid manure on lake water quality
5. Provide funds for septic system rehabilitation and education
6. Establish baseline data for watersheds—use local volunteers, students
7. Fund existing plans that promote coastal resources/lake as a destination
8. Increase habitat for shorebirds
9. Maximize collaboration between groups and communities in projects
10. Promote/fund better planning for infrastructure and sustainable growth—conduct a study of the local impact of installing water lines (on water table, growth scenarios)

JEFFERSON COUNTY

1. Provide funds to the agricultural sector (farmers, agencies) to improve quality of water leaving the farm
2. Increase public education
    a. Include several topics: natural ecosystems and cycles, marine regulations, management practices and alternative behaviors/actions that are environmentally-friendly, invasives, and stormwater
3. Create a sustainable development, Smart Growth plan for the rural, nearshore area that looks at zoning and identifies resources unique to the rural areas
4. Promote open space planning, update zoning and support local organizations like land trusts
5. Identify and control invasive species (Eurasian watermilfoil, zebra mussels, and swallowort at Robert Wehle State Park)
6. Promote public sewer for Henderson Harbor (a documented problem, estimated cost $13 million)
7. Implement streambank stabilization and restoration in the Sandy Creek watershed
8. Provide incentives for upgrades/repairs for septic systems.

9. Promote the fisheries resources in the eastern basin of Lake Ontario/St. Lawrence River
    a. support the sport fishing industry by protecting/managing the resource
    b. support Cape Vincent hatchery
10. Create an outlet for water quality data that is easy to use and understand
11. Expand cormorant research into St. Lawrence River/Cooperative research program with Canada

APPENDIX I

RESEARCH AGENDA WORKSHOP

REPORT ON THE WORKSHOP FOR DEVELOPING A RESEARCH AGENDA FOR NEW YORK'S PARTICIPATION IN GREAT LAKES RESTORATION

Sponsored by
Center for Environmental Information
Great Lakes Research Consortium
New York State Sea Grant
Congressman James Walsh

Joseph C. Makarewicz

Department of Environmental Science and Biology

SUNY Brockport

This workshop was convened to bring together participants to discuss the research necessary to support future restoration and remediation activities of New York's Great Lakes (Appendix A for the Announcement and background). On 18 March 2005 (8:30 to noon), a workshop for Developing a Research Agenda for New York's Participation in Great Lakes Restoration was held at the State University of New York College of Environmental Science and Forestry. Thirty-five scientists attended from State Agencies (NYDEC, NYSDOH, NYS Sea Grant) and several colleges (Binghamton, Brockport, Buffalo State, Cornell, ESF, Hobart and Smith, Oswego, RIT and the University at Buffalo). The program was highlighted by four talks on the North Coast Initiative, Open Water Research, Sea Grant Priorities, and the Lake Ontario LAMP. This was followed by two sets of breakout sessions as follows.

Set 1	Set 2
Persistent Bioaccumulative Toxics	Sustainable Development
Invasive Species Research	Habitat Species/Research
Coastal Health	Areas of Concern
Indicators and Information Research	Nonpoint Sources Research

Participants were asked to divide themselves by interest area. Within each group, the participants identified and ranked the research priorities.

Two sessions "Coastal Health" and "Non-point Sources" were identified to participants as applying to the Lake Ontario Coastal Initiative (North Coast Initiative) and are reported on here. Thirty one percent of the participants (11 of 35 people) attended and provided input to each of these "LOCI sessions". The ranked participant results are summarized in Table 1. In addition, each participant was asked to rank a list of projects developed by LOCI (Table 2).

Sixty percent of Workshop participants identified long term monitoring (26.7%), ranking of watersheds by nutrient loading (13.1%), segment analysis (10.4%) and GIS mapping of the North Coast (10%) as their top research priorities for the coastal region and for non-point source research. Ten other categories were identified. Of this group, refinement of a nearshore hydrodynamic model (6.8%), identification of causes of algal mats (6.8%) and fishery issues (5.9%) were the next three most important areas of research.

The participant's ranking of the list of potential projects developed by LOCI provided some similar results and some unique issues not developed by the participants. For example, as with the participant developed list, monitoring was by far the highest ranked project goal, followed by quantification of the natural

resources and GIS mapping. However, the third highest ranked need was the development of a central library for housing publications on Lake Ontario.

Combining the two lists, the top five ranking for projects on the coastal zone of Lake Ontario and its embayments would be as follows.

1. Long-term monitoring of the coastal zone and embayments.
2. Creating a rank order of watersheds for remediation based on nutrient loading, RAP status, etc.
3. Segment analysis of sub-watersheds to identify location of pollution sources.
4. Development of a central location of literature, especially "grey" literature, pertaining to Lake Ontario coastal zone and embayments.
5. Quantification of natural resources through GIS of the coastal and embayment areas.

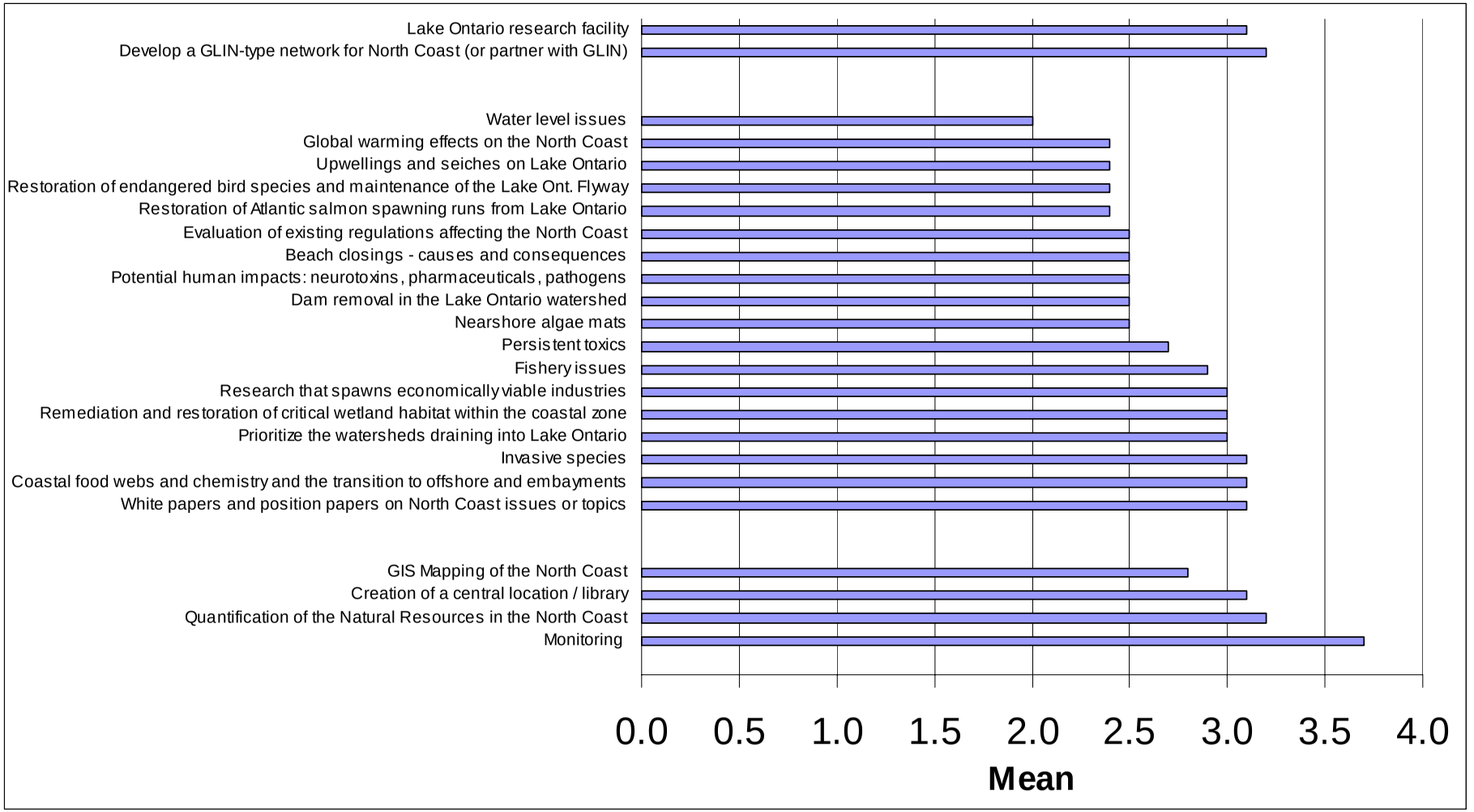
Table 1. Coastal Research Priorities. Derived from the Lake Ontario Research Priorities for Restoration, Syracuse, NY. Results are based on 220 votes cast by participants.

1. (26.7%) Long-term monitoring from a diverse set of sampling locations to adequately represent the coastal areas in terms of habitat, physical topography and geography including phosphorus, discharge and loading for the tributaries, chlorophyll a, Secchi disk, microcystin, anatoxin, macrophyte beds for the embayments, phytoplankton and zooplankton.
2. (13.1%) Prioritize the watersheds by discharge nutrient loading, (future impact) RAP status, PWB listing, land use, soil loss, toxic discharge, and remediation impact.
3. (10.4%) Segment analysis of watershed - source of coliforms, nutrients, etc.
4. (10%) GIS mapping of the North Coast. A digital database of both the aquatic and near shore areas.
5. (6.8%) Refinement of hydrodynamic model for near coast areas.
6. (5.9%) Fishery issues. Restore native species and spawning habitat restoration especially in the watersheds. Forage fish base, access for fishermen, and promotion of underutilized species
7. (5.9%) Quantify the problem, identify causes and suggest remediation efforts of near shore algae mats – beach closings.
8. (4.5%) Global warming effects on coastal resources.
9. (3.6%) Upwelling and seiches and Lake Ontario. What affects to these phenomena have on the North Coast? Are the causes of fish kills, algae die-offs, beach closings, etc…? What is the frequency and economic impacts of upwelling and seiches? Can we better forecast these events? Modeling.
10. (3.2%) Potential Human Impacts: Neurotoxins, pharmaceuticals, pathogens, bacterial levels in the near shore and embayment? How high? Do they exist? Spatial and seasonal occurrence.
11. (2.7%). Develop white papers on economic potential and environmental impact of wind farms, aquaculture potential, boat races, promotion of underutilized fish species, preservation of critical habitat, bluff preservation, lighthouse preservation, diving on shipwrecks.
12. (2.2%). Beach closings? Cause and consequences. Investigate the predictive model used by the City of Rochester?
13. (2.2%). Quantification of the natural resources in coastal areas. The assigning of both a geographic component (i.e. square miles or percent of the nation's coastal marshes) as well as an economic component to this quantification will serve to help determine the 'worth' of this ecosystem. Identification and quantification (environmentally and economically) of the coast's resources.
14. (1.8%) Watershed soil transport - sediment/turbidity.

Table 2. Prioritization of research ideas developed from the "Developing a Research Agenda for New York's Participation in Great Lakes Restoration", March 2005. Results are ranking of a list of potential issues developed by LOCI.

Structure and Function		Respondents	Mean	Mode
	Monitoring	11	3.7	4.0
	Quantification of the Natural Resources in the North Coast	11	3.2	4.0
	Creation of a central location / library	11	3.1	3.0
	GIS Mapping of the North Coast	11	2.8	3.0
Research				
	White papers and position papers on North Coast issues or topics	10	3.1	3.0
	Coastal food webs and chemistry and the transition to offshore and embayments	11	3.1	3.0
	Invasive species	11	3.1	4.0
	Prioritize the watersheds draining into Lake Ontario	11	3.0	3.0
	Remediation and restoration of critical wetland habitat within the coastal zone	11	3.0	3.0
	Research that spawns economically viable industries	11	3.0	3.0
	Fishery issues	11	2.9	3.0
	Persistent toxics	11	2.7	2.0
	Nearshore algae mats	11	2.5	3.0
	Dam removal in the Lake Ontario watershed	11	2.5	3.0
	Potential human impacts: neurotoxins, pharmaceuticals, pathogens	11	2.5	2.0
	Beach closings - causes and consequences	11	2.5	2.0
	Evaluation of existing regulations affecting the North Coast	11	2.5	3.0
	Restoration of Atlantic salmon spawning runs from Lake Ontario	11	2.4	2.0
	Restoration of endangered bird species and maintenance of the Lake Ont. Flyway	11	2.4	2.0
	Upwellings and seiches on Lake Ontario	11	2.4	3.0
	Global warming effects on the North Coast	11	2.4	2.0
	Water level issues	11	2.0	2.0
Facilities / Networks				
	Develop a GLIN-type network for North Coast (or partner with GLIN)	11	3.2	4.0
	Lake Ontario research facility	11	3.1	4.0

Figure 1. Ranking of Lake Ontario coastal research ideas from "Developing a Research Agenda for New York's Participation in Great Lakes Restoration", March 2005.



For Restoration Workshop Proceedings, see http:///www.glc.org/restwkshp/pdf/NYproceedings.pdf

WORKSHOP PARTICIPANTS

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APPENDIX J

INVENTORY OF WATER-RELATED EDUCATION AND OUTREACH ACTIVITIES IN THE 7 LAKE ONTARIO COASTAL COUNTIES OF NEW YORK (PLUS GENESEE COUNTY)

Further information about the programs and contact information is available on the Lake Ontario Coastal Initiative website which is located at http://www.ceinfo.org.

Niagara County

Cornell Cooperative Extension of Niagara County

Fort Niagara State Park Nature Center

Newfane Intermediate School

Niagara County Soil and Water Conservation District

Orleans County

Byron-Bergen Central School District

Cornell Cooperative Extension of Orleans County

Holley High School

Iroquois National Wildlife Refuge

Orleans County Soil and Water Conservation District

Genesee County

Cornell Cooperative Extension of Genesee County

Genesee County Soil and Water Conservation District

Monroe County

Bird Studies Canandaigua

Cornell Cooperative Extension, Monroe County

Friends of the Genesee

Helmer Nature Center

League of Women Voters

Life Science Learning Center, University of Rochester

Monroe County BOCES #1

Monroe County Department of Health

Monroe County Department of Planning & Development

Monroe County Soil & Water Conservation District

P.E.T.E (Protecting the Environment Through Education)

Penfield High Environmental Club, Penfield Trails, and DEC

Rochester Committee for Scientific Information

Rochester Museum & Science Center

Seneca Park Zoo

Shoremont Water Treatment Plant Tours

Tinker Nature Park/Hansen Nature Center

Van Lare Wastewater Treatment Facility

Water Education Collaborative

Wayne County

Cornell Cooperative Extension of Wayne County

Wayne County Soil and Water Conservation District

Wayne County Water Quality Coordinating Committee

Cayuga County

Cayuga County Soil and Water Conservation District

Cornell Cooperative Extension of Cayuga County

Sterling Nature Center

Oswego County

Cornell Cooperative Extension of Oswego County

Oswego County Soil and Water Conservation District

Rice Creek Field Station, State University College at Oswego

Salmon River Fish Hatchery

Selkirk Shores State Park Recreation Center

Jefferson County

Cornell Cooperative Extension of Jefferson County

Jefferson County Soil and Water Conservation District

Minna Anthony Common Nature Center

New York State Living Museum

Tug Hill Commission

Tug Hill Tomorrow Land Trust

Regional Programs

Cornell Cooperative Extension

Finger Lakes/Lake Ontario Watershed Protection Alliance (FL/LOWPA)

Lake Ontario Coastal Initiative

New York Sea Grant

NYS Wetlands Forum

The Finger Lakes Institute

College/University Programs

Buffalo State

Clarkson University

Cornell University

Finger Lakes Community College

Genesee Community College

Hobart and William Smith Colleges

Niagara University

Roberts Wesleyan College

Rochester Institute of Technology

St. Lawrence University

SUNY at Brockport

SUNY at Buffalo

SUNY at Oswego

SUNY at Potsdam

SUNY College of Environmental Science and Forestry

There are a myriad of colleges and universities within the Lake Ontario basin with programs and research related to Lake Ontario and/or the Great Lakes. One unifying programs that ties many of these programs together is the Great Lakes Research Consortium. This is a valuable resource which includes a list of member campuses and researchers. Although many of these educational institutions have degree programs that relate directly to the Lake Ontario resource, often individual researchers from different disciplines are also involved. The Consortium is a great way to identify these other important participant.

Contact Information:

Great Lakes Research Consortium
1 Forestry Drive SUNY ESF
24 Bray Hall
Syracuse, NY 13210
phone: 315-470-6816
fax: 315-470-6970
http://www.esf.edu/glrc/#

APPENDIX K

HEALTH ADVISORIES ON THE CONSUMPTION OF FISH FROM THE LOCI AREA

Eighteenmile Creek (Niagara County)

There is an advisory to eat none of the species from Eighteenmile Creek because of PCB contamination.

Irondequoit Bay (Monroe County)

There is an advisory to eat no carp from Irondequoit Bay because of PCB and Mirex contamination.

Lake Ontario (including Niagara River below the falls)

There is an advisory to eat no American eel, channel catfish, lake trout over 25", brown trout over 20" and Chinook salmon and to eat no more than one meal per month of white sucker, rainbow trout, smaller lake trout, smaller brown trout, and coho salmon over 25".

West of Point Breeze, eat no white perch, and east of Point Breeze eat no more than one meal per month of white perch because of PCB, Mirex and Dioxin contamination.

Oswego River (Oswego County, from Oswego power dam to upper dam at Fulton)

There is an advisory to eat no more than one meal of channel catfish per month because of PCB contamination.

Salmon River (Oswego County, to Salmon River Reservoir)

There is an advisory to eat no more than one meal per month of smallmouth bass because of PCB and Mirex contamination.

Salmon River Reservoir (Oswego County)

There is an advisory to eat no more than one meal per month of largemouth and smallmouth bass because of mercury contamination.

Source: *Chemicals in Sport and Game Fish, 2005-06 Health Advisories, NYS Department of Health*

APPENDIX L

COMMENT LETTER ON GREAT LAKES REGIONAL COLLABORATION

September 9, 2005

Great Lakes Regional Collaboration
c/o U.S. Environmental Protection Agency
Great Lakes National Program Office
77 W. Jackson Boulevard (G-17J)
Chicago, Illinois 60604-3511

Dear GLRC Executive Committee:

THE LAKE ONTARIO COAST INITIATIVE (LOCI) is pleased to submit the following comments regarding the Great Lakes Regional Collaboration and the Great Lakes Restoration and Protection Strategy.

LOCI is a public-private partnership to restore, remediate, protect, conserve, and sustainably use New York's North Coast, the 300 mile Lake Ontario coastal region that stretches from the Niagara River to the St. Lawrence.

A report prepared by Dr. Joseph Makarewicz of SUNY Brockport in 2000 and published by the Finger Lakes-Lake Ontario Watershed Protection Alliance, a coalition of county water quality agencies, noted that despite significant water quality improvement in the open waters of Lake Ontario over the last three decades, the shoreline, embayments, river and creek mouths, and associated wetlands are suffering from impairments that severely limit their recreational use and ultimately affect the economic development of the region.

The Center for Environmental Information in Rochester, NY then spearheaded formation of LOCI, including a Steering Committee to encompass representatives of local, state, and federal agencies and governments, environmental, and civic organizations, research and education affiliations, and businesses.

Beginning in November, 2004, with EPA funds supported by Congressman James Walsh to develop a strategic plan to guide restoration, remediation, protection and sustainable use of New York's North Coast, the LOCI partners have carried out research and monitoring, organized a workshop to identify research priorities, convened seven county level workshops to identify project needs and priorities, produced a working characterization/inventory of the direct drainage, including maps, provided for continuing communication and information products and outreach, organized a two day conference that provided public participation opportunities and input and involvement of Congressman Reynolds, Senator Clinton, EPA Assistant Administrator Ben Grumbles, NYS Secretary of State Daniels, and staff from Senator Schumer and Representatives Walsh, McHugh, and Slaughter.

We will complete the coastal action agenda this fall, including an estimate of needed funding for identified restoration projects and strategies. With additional EPA funds earmarked by Congressman Walsh, we will continue research and outreach. In addition, the first LOCI funds will be allocated to carry out priority programs and projects, identified regionally.

Although our focus is on the nearshore water quality of Lake Ontario where most people live, work, and recreate, and which has not received the attention of the open waters and fisheries, we recognize the importance of, and links to, the other Lake Ontario programs, including the Lake Ontario Management Plan, the Great Lakes Water Quality Agreement, and New York State's Clean Water Act program plans, Comprehensive Wildlife Conservation Strategy, Invasive Species Task Force and Local Waterfront Development plans, among others.

We strongly endorse the Administration's and the Congress' support for Great Lakes Restoration and Regional Collaboration, and the general principles embodied in the eight strategies, though we have not reviewed the provisions specifically. We cannot emphasize enough that despite stringent priority setting, additional funding will be necessary for Great Lakes Restoration.

LOCI is demonstrating that we know the area, the stresses, the issues, the priorities of federal, state, and local governments and the stakeholders. We stand ready to work with the Great Lakes Regional Collaboration to further your important goals.

Sincerely on behalf of the LOCI Steering Committee and the LOCI Partners,

Cindy M. Stachowski
Executive Director

cc: Honorable Congressman John M. McHugh
Honorable Congressman Thomas M. Reynolds
Honorable Congresswoman Louise M. Slaughter
Honorable Congressman James T. Walsh
Mr. John P. Cahill, Secretary to Governor Pataki
Mr. Charles Fox, Deputy Secretary for Governor, Energy and the Environment, NY
Mr. Randy Daniels, Secretary of State, NY
Ms Denise M. Sheehan, Acting Commissioner, NYSDEC
Ms Lynette M. Stark, Deputy Commissioner, Natural Resources, NYSDEC
Ms. Sandy Allen, Director, Division of Water, NYSDEC
Mr. George Stafford, Director, NY Division of Coastal Resources
Mr. Donald Zelazny, Great Lakes Coordinator, NYSDEC
Mr. Sean Hanna, Region 8 Director, NYSDEC
Lake Ontario Coastal Initiative Steering Committee
CEI Board of Directors

APPENDIX M

CONFERENCE PROGRAM
NEW YORK'S NORTH COAST: A TROUBLED COASTLINE

May 3, 2002

Welcome

Elizabeth Thorndike - Center for Environmental Information

Opening Remarks

Honorable George D. Maziarz - New York State Senate (R), 61st District

Session I - The North Coast in the State and the State of the North Coast

Joseph Makarewicz - State University of New York at Brockport

Session II - Importance of the Embayments and Coastal Region

Moderator: Margaret Peet - Monroe County Department of Health

ECOLOGICAL

Edward Mills - Cornell University Biological Field Station

TOURISM/RECREATION

Diane Keuhn and David MacNeill - New York Sea Grant

INDUSTRY/ECONOMICS

Christine Whitman - Greater Rochester Enterprise

Session III - Thirty Years of the Clean Water Act: Federal and State Programs Available for Research, Restoration and Remediation

Philip DeGaetano - Acting Director, Division of Water
NYS Department of Environmental Conservation

Session IV - Restoration and Remediation: Challenges Facing Managers and Implementers

Moderator: Linda Gibbs - Tug Hill Commission

Robert Williams - Wayne County Soil and Water Conservation District

Leo Downey - New York State Office of Parks, Recreation, and Historical Preservation

Wayne Hale, Jr. - Orleans County Planning Department

Lunch and Keynote Speaker

Introductions: S. Ram Shrivastava, Chairman, Board of Directors - Center for Environmental Information

Presentation of 2002 NOAA Environmental Hero Award to Edmund Sander

Greetings: Honorable John D. Doyle, Monroe County Executive

Speaker: Honorable Randy A. Daniels, New York Secretary of State

Session V – Solutions: What Works? What are the Options? Panel Discussion and Audience Questions

Moderator: Theodore Hullar - The Atlantic Philanthropies (USA) Inc.

Mario DelVicario - Community and Ecosystem Protection Branch, U.S. Environmental Protection Agency, Region 2

Anthony Eberhardt - International Lake Ontario - St Lawrence River Study Board

Steven Eidt - New York State Department of Environmental Conservation

Margaret Peet - Monroe County Department of Health

Ed Wheeler - Save Our Sodus

Margaret Wooster - Great Lakes United

Session VI - Conference Summary: Turning Awareness into Action

What are the models? Regionalism; Linear Partnerships; Refocus of old programs; New programs; Is legislation needed?

Robert Brower - The Institute for the Application of Geospatial Technology at Cayuga Community College

Creating an Action Framework - Next Steps

Theodore Hullar - The Atlantic Philanthropies (USA) Inc.

APPENDIX N

CONFERENCE PROGRAM
SAVING NEW YORK'S NORTH COAST
THE LAKE ONTARIO COASTAL INITIATIVE

May 5 & 6, 2005

Welcome

S. Ram Shrivastava, Chairman, CEI Board of Directors

Keynote Speaker

Randy A. Daniels, New York Secretary of State

Session I - The Lake Ontario Coastal Initiative

Moderator: Elizabeth Thorndike

History of LOCI

Elizabeth Thorndike, Center for Environmental Information

The State of the North Coast of New York: The South Shore of Lake Ontario

Joseph Makarewicz, SUNY Brockport

Local Priority Projects

Betsy Landre, Finger Lakes-Lake Ontario Watershed Protection Alliance

Education/Outreach Program

John Terninko, Center for Environmental Information

Session II - Learning from Experience

Moderator: Betsy Landre

The Lake Champlain Basin Program Experience: Lake Basin Management Through a Non-regulatory Partnership

William Howland

NYS DEC Hudson River Estuary Program

Fran Dunwell

Onondaga Lake Partnership

Susan Miller

Bringing Back the Bay: The Remediation of Hamilton Harbour

Mary Lou Tanner

Keynote Speaker

Benjamin H. Grumbles, US Environmental Protection Agency

Session III - Protecting New York's North Coast

Moderator: Joseph Makarewicz

New York's Lake Ontario Watershed: A Blueprint for Conservation

David Klein, The Nature Conservancy

The Trust for Public Land

Clark Wallace, Trust for Public Land

Session IV - Work Sessions: Your Role in Saving New York's North Coast

Moderator: Elizabeth Thorndike

Facilitated discussions on how businesses, local governments, and the environmental community can contribute to, and benefit from, the LOCI effort.

Keynote Address – Perspectives on Restoration, Remediation, Protection, and Sustainable use of the Great Lakes

Michael J. Donahue, Ph.D., Vice President, Water Resources and Environmental Services at URS Corporation (formerly President/CEO, Great Lakes Commission)

Session V - Concurrent Sessions

A. What's New with Science and Management

Moderator: Joseph Makarewicz

Lake Ontario Biocomplexity Project

Mark Bain, Cornell University

Results from the Lake Ontario/St. Lawrence River Criteria Review Study

Frank Sciremammano, Rochester Institute of Technology

B. Legislative Initiatives for Remediation and Restoration

Moderator: Langdon Marsh

The Need for Reform of New York's Septic System Laws

Peter Bauer, Residents' Committee to Protect the Adirondacks

Reforming New York's Wetlands Law

David Higby, Environmental Advocates

Keynote Address – Congressman Thomas M. Reynolds – The Great Lakes Restoration Act of 2005

Session VI - Policy and Planning Challenges for Sustainable Use

Moderator: Langdon Marsh

The Tug Hill Commission

Kevin Smith, Tug Hill Commission

Collaborative Governance: How Can We Make and Implement Good Decisions Together

Langdon Marsh, National Policy Consensus Center

Commitment to the North Coast – Senator Hillary Rodham Clinton (by video)

APPENDIX O

COMMITMENT TO THE RESTORATION, REMEDIATION, PROTECTION, CONSERVATION AND SUSTAINABLE USE OF NEW YORK'S NORTH COAST

WHEREAS New York's North Coast—Lake Ontario's 300 miles of southern and eastern shoreline, embayments, river and creek mouths, wetlands and ponds stretching from the Niagara River to the St. Lawrence—is a significant part of the unique Great Lakes ecosystem;

WHEREAS the coastal waters provide habitat for most Great Lakes aquatic species, influence the levels of nutrients and other pollutants entering the open waters, support diverse and productive wetland vegetation, and provide very desirable locations for water-oriented human activities and communities;

WHEREAS, in our water-rich state, Lake Ontario's coastal waters provide drinking water for millions, and the coastal region offers scenic vistas, tourism, sport fishing, boating and other recreation opportunities;

WHEREAS this world-class resource is a key asset in the economic revitalization of Upstate New York;

WHEREAS the open waters of Lake Ontario have seen significant improvement in the last 30 years as a result of federal and state programs to restore water quality;

WHEREAS the coastal waters, embayments and their watersheds are suffering from many impairments that severely limit their recreational use and ultimately affect the economic development of the region;

WHEREAS remediation efforts are fragmented, with projects, communities, and counties competing for attention of state and federal agencies and limited funds;

WHEREAS, in 20 years, our vision is an aesthetically pleasing and environmentally improved coastal region along New York's North Coast and its watershed;

WHEREAS our vision foresees a local institutional environment in which town, village, and city governments, businesses, and civic and environmental organizations have embraced policies and practices which support economic viability through improvement and maintenance of water quality and water resources;

THEREFORE be it resolved that we hereby pledge our commitment to the goals of the Lake Ontario Coastal Initiative, a growing partnership of civic and environmental organizations, educational and research institutions, businesses and industries, farmers, recreation seekers, property owners, and citizens, and local, state, and federal agencies and elected officials:

to enlist and retain broad public commitment for remediation, restoration, protection, conservation, and sustainable use of the coastal region;

to secure funds and resources to achieve scientific understanding, educate citizens, and implement locally supported priorities, programs, and projects

.

Name (please print) Signature Date

Return to **CEI, 55 St Paul Street, Rochester, NY 14604** or by fax at **585-262-4156**

REFERENCES

Bain, Mark and Biocomplexity Research Team, "The Lake Ontario Biocomplexity Project, May 2005.

Baird & Associates Coastal Engineers Ltd., " Draft Report on Baseline Economics – Report to the International Lake Ontario – St. Lawrence River Study Board," 2005.

Bliss, John, Greg Aplet, et. al., "Community-Based Ecosystem Monitoring," Journal of Sustainable Forestry, 2001.

Dru Associates, "Sustainable Economic Development Plan, Salmon River Greenway Corridor Community Enhancement and Development Plan, September 2003

ESF Student Workshop Team, "Sodus Bay: A Vision for the Future," Landscape Architecture, SUNY ESF, May 2001.

Finger Lakes-Lake Ontario Watershed Protection Alliance, "The State of the New York Lake Ontario Basin: A Report on Water Resources and Local Watershed Management Programs," 2000.

Finger Lakes-Lake Ontario Watershed Protection Alliance, "SFY 2004-05 Program Plan and Budget," February, 2004.

Flugel, Doug, "Public Lands are Overlooked Treasures of Oswego County," August 2004.

Genesee-Finger Lakes Regional Planning, "The Genesee River Basin Action Strategy," for the US ACE, October, 2004.

Genesee Land Trust, "Land Preserves," n.d.

GLIN, "Areas of Concern in the Great Lakes Region," n.d.

GLIN, "Remedial Action Plans (RAPs) for the Great Lakes Areas of Concern," n.d.

Great Lakes Commission, "Great Lakes Restoration Priorities Workshop - Proceedings, Rochester, New York, April 27, 2004," http://www.glc.org/restwkshp/pdf/NY_restoration_proceedings.pdf (as of Dec. 2005)

Lewandowski, Stephen, Ed., "Saving New York's North Coast – The Lake Ontario Coastal Initiative" Executive Summary, Center for Environmental Information, 2005.

LOCI Data Dictionary. Ecology & Environment Inc., 368 Pleasant View Dr., Lancaster, NY 14086. http://www.ene.com. For questions regarding the Data Dictionary please contact: Jenny Gnanendran. Tel. (716) 684-8060. Link to the Data Dictionary is available on the CEI website: http://www.ceinfo.org/loci/documents/datadictionary.pdf

Makarewicz, Dr. Joseph, "A Report on the Workshop for Developing a Research Agenda for New York's Participation in Great Lakes Restoration," 2005.

Makarewicz, Dr. Joseph, "Stressed Stream Analysis," Waterworks. 7:1-4, 1999.

Makarewicz, Dr. Joseph, "New York's North Coast: A Troubled Coastline. Lake Ontario Embayment Initiative," Finger-Lakes-Lake Ontario Watershed Protection Alliance. 33pp, November, 2000.

Mills, L., Casselman, R. Dermott, J.D. Fitzsimons, G. Gal, K.T. Holeck, .A. Hoyle, O.E. Johannsson, B.F. Lantry, J.C. Makarewicz, E.S. Millard, I.F. Munawar, M. Munawar, R. O'Gorman, R.W. Owens, L.G. Rudstam, T. Schaner, and T.J. Stewart. 2003. Lake Ontario: food web dynamics in a changing ecosystem (1970-2000). Can. Jour. Fish. Bio. Aquat. Sci. 60: 471-490.

Monroe County Department of Environmental Services, "Wastewater: collection and Treatment by Monroe County-operated Facilities, n.d.

Monroe County, "Monroe County Parks," n.d.

Monroe County Water Authority, "2004 Annual Water Quality Report," 2005

National Academy of Sciences Press, “Adaptive Management for Water Resources Project Planning, Washington, DC: NASP, 2005.

National Research Council. 2004. Adaptive Management for Water Resources Project Planning. National Research Council of the National Academies. The National Academies Press, Washington, D.C.

NYS DEC, “Boat Launching Sites,” n.d.

NYS DEC, “List of New York State Wildlife Management Areas,” n.d.

NYS DEC, “Final New York State 2004 Section 303 (d) List of Impaired Waters Requiring a TMDL (Total Maximum Daily Load), September 24, 2004.

NYS DEC, “Section 305(b) Report- The Lake Ontario (Minor Tributaries) Basin,” 2004.

NYS DEC, “Oak Orchard and Tonawanda Wildlife Management Areas, n.d.

NYS DEC, “The Genesee River Drainage Basin, Sampling Years 1999-2000, Rotating Integrated Basin Study,” February, 2004.

NYS DEC, “The 1996 Priority Waterbodies List for the Oswego-Seneca-Oneida River Basin,” September, 1996.

NYS DEC, “The 1998 Black River Basin Waterbody Inventory and Priority Waterbodies List, July, 1999.

NYS DEC, “Waterbody Inventory for the Genesee River Basin, including portions of Lake Ontario Drainage,” n.d.

NYS DEC, “Oswego River Remedial Action Plan, Stage 3 Delisting,” August 2004.

NYS DOH, “Chemicals in Sportfish and Game, 2005-06 Health Advisories.

NYS Legislative Commission on Rural Resources, “Land Use Planning and Regulations- A Survey of New York State Municipalities,” July 2004.

NYS Office of Parks, Recreation and Historic Preservation, “State Parks,” n.d.

Onondaga County Water Authority, “Water Sources and Treatment,” 2005.

Ontario (CN) Ministry of the Environment, “Lake Ontario Fisheries Management: The Offshore Zone,” n.d.

Oswego County, “Oswego County Comprehensive Plan, n.d.

Oswego County Water Quality Coordinating Committee, “Oswego County Water Quality Strategy, Revised August 2002.

“Town of Sandy Creek Strategic Planning Committee Goals and Strategy Development,” May 2005.

Sandy Pond Resource Management Committee, “Sandy Pond Resource Management Report- Final Report,” August 1989.

Save the County Land Trust, “Nature Preserves,” n.d.

Sciremammano, Frank, “Initial Results, Lake Ontario- St. Lawrence River Criteria Review Study,” May 6, 2005.

SUNY ESF Council for Community Design Research, “Sodus Bay Waterfront Initiative,” December 2001.

The Nature Conservancy, “Saving the Last Great Places in Central and Western New York,” n.d.

Thousand Islands Land Trust, “Nature Preserves,” n.d.

US Census Bureau, “Census 2000 New Census Block Strategy,” August 29, 2002.

USDA/Economic Research Service, ”Recreation, Tourism, and Rural Well-Being/ERR-7,” August 2005.

US EPA, “Amendment to the National Oil and Hazardous Substance Contingency Plan; National Priorities List,” Federal Register Notice, May 8, 1984.

US EPA, “Superfund Information Systems- CERCLIS Database,” August 18, 2005.

US EPA, “Table II. EPCRA Section 313 Chemical List for Reporting Year 2004.”

US EPA, “Lakewide Management Plan for Lake Ontario- Executive Summary,” August 2002.

US EPA, “Barrier Dune Protection- Eastern Lake Ontario Conservation Initiative, January 1998.

US EPA, “Lake by Lake: Ontario, Drinking Water,” n.d.

US EPA, “Eighteenmile Creek Area of Concern,” n.d.

US EPA, “Rochester Embayment Area of Concern,” n.d.

US EPA, “Oswego River Area of Concern,” n.d.

US EPA, “Niagara River Area of Concern,” n.d.

USGS and Monroe County Environmental Health Lab., “The Oatka Creek Watershed Committee,” Summer, 2001.

USGS and Monroe County Environmental Health Lab., “The Black Creek Watershed Coalition,” Fall. 2002.

Wayne County, “Wayne County Parks,” n.d.

Wayne County, “Lakeshore Embayments Resource Preservation and Watershed Enhancement Plan,” Wayne Co. SWCD and Wayne County WQCC, 2004.

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***Current Steering Committee member*

MAPS

Lake Ontario's New York Coastal Watersheds

North Coast West

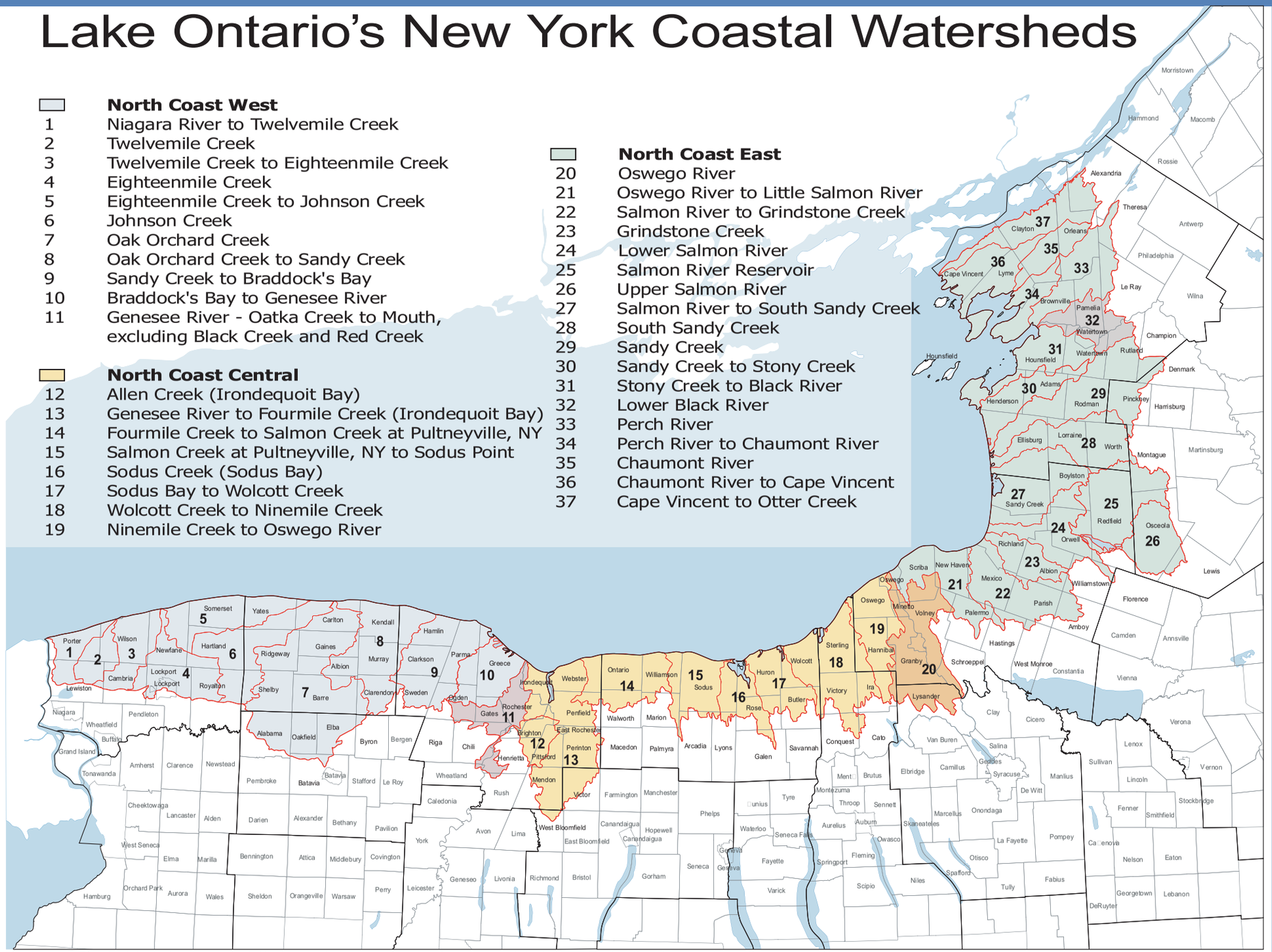
1 Niagara River to Twelvemile Creek
2 Twelvemile Creek
3 Twelvemile Creek to Eighteenmile Creek
4 Eighteenmile Creek
5 Eighteenmile Creek to Johnson Creek
6 Johnson Creek
7 Oak Orchard Creek
8 Oak Orchard Creek to Sandy Creek
9 Sandy Creek to Braddock's Bay
10 Braddock's Bay to Genesee River
11 Genesee River - Oatka Creek to Mouth, excluding Black Creek and Red Creek

North Coast Central

12 Allen Creek (Irondequoit Bay)
13 Genesee River to Fourmile Creek (Irondequoit Bay)
14 Fourmile Creek to Salmon Creek at Pultneyville, NY
15 Salmon Creek at Pultneyville, NY to Sodus Point
16 Sodus Creek (Sodus Bay)
17 Sodus Bay to Wolcott Creek
18 Wolcott Creek to Ninemile Creek
19 Ninemile Creek to Oswego River

North Coast East

20 Oswego River
21 Oswego River to Little Salmon River
22 Salmon River to Grindstone Creek
23 Grindstone Creek
24 Lower Salmon River
25 Salmon River Reservoir
26 Upper Salmon River
27 Salmon River to South Sandy Creek
28 South Sandy Creek
29 Sandy Creek
30 Sandy Creek to Stony Creek
31 Stony Creek to Black River
32 Lower Black River
33 Perch River
34 Perch River to Chaumont River
35 Chaumont River
36 Chaumont River to Cape Vincent
37 Cape Vincent to Otter Creek



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