

NEW YORK'S GREAT LAKES BASIN:

Interim ACTION AGENDA



Coordinated by
New York State Department of Environmental Conservation
Great Lakes Watershed Program

In partnership with state and federal agencies, municipalities, academic institutions, non-profits, and community partners throughout NYS's Great Lakes basin



Andrew M. Cuomo - Governor



Joe Martens - Commissioner

New York State Department of Environmental Conservation

Assistant Commissioner

Office of Water Resources, 14th Floor

625 Broadway, Albany, New York 12233-1010

Phone: (518) 402-2794 • Fax: (518) 402-8541

Website: www.dec.ny.gov



Joe Martens
Commissioner

July 28, 2014

To everyone who loves our Great Lakes -

The Department of Environmental Conservation (“Department”) is often asked by our citizens, non-government organizations, businesses and scientific researchers what else can be done to restore, protect, conserve or enhance our invaluable Great Lakes natural resources. We recognize the goal of environmental health in our Great Lakes watersheds is directly linked to the vitality of our economy and the quality of our communities. New York State agencies, communities and organizations are proud to have many programs and initiatives in-place which continue to make positive improvements. But the Great Lakes ecosystem, like our communities and economy, are constantly changing. As a result, there is always much more work to be done!

On behalf of the Department and various other state agencies striving to improve the Great Lakes region of New York, I am pleased to share this action-oriented agenda with you. The *Interim Great Lakes Action Agenda* blends the goals and objectives of current state program plans with federal and state initiatives to produce a fully integrated and comprehensive course of action we can all pursue. Consistent with the New York Ocean and Great Lakes Ecosystem Conservation Act of 2006, this agenda seeks to apply ecosystem-based approaches and existing program authorities to achieve truly sustainable environmental solutions. Guided by the principles of ecosystem-based management (EBM), this agenda responds to the region’s most pressing issues and assists state agencies and other stakeholders in focusing and coordinating our attention and resources to achieve measureable results.

This document is considered “interim” because there are several critically-linked activities that currently are being either revised, re-aligned or await further definition and implementation. These include, as examples, the U.S. federal inter-agency Great Lakes Restoration Initiative (GLRI) Action Plan, the U.S./Canada Great Lakes Water Quality Agreement, U.S. Regional Conservation Program Partnerships, and State initiatives that will have significant influence on the planning, funding and implementation of EBM efforts throughout New York’s Great Lakes watersheds. Therefore, this is a dynamic document, adaptive to ongoing program accomplishments to remain relevant, and open to new partners interested in promoting key objectives and actions.

We encourage you to use this document as a guide to (a) learn what type of actions New York State is promoting to advance our Great Lakes goals, many of which we share with other states and Canadian partners; (b) identify possible activities you or your community can assist with and which organization is taking a lead role; (c) demonstrate New York’s commitment and alignment to project applications that offer federal and state funding assistance; and, (d) to inspire everyone to help restore the greatness to New York’s Great Lakes region!


James Tierney
Assistant Commissioner, Office of Water Resources

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Joe Martens, Commissioner

NYS Department of Environmental Conservation

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Inquiries regarding this plan may be directed to:

Great Lakes Watershed Program
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2915

Phone: 716-851-7070

Facsimile: 716-851-7009

e-mail: glakes@gw.dec.state.ny.us

website: <http://www.dec.ny.gov/lands/25562.html>

TABLE of CONTENTS

LIST of ABBREVIATIONS and ACRONYMS.....	1
EXECUTIVE SUMMARY	4
VISION	5
INTRODUCTION	5
WATERSHEDS of NEW YORK’S GREAT LAKES BASIN.....	9
NEW YORK’S GREAT LAKES ACTION AGENDA.....	10
PRIORITY GOALS.....	11
CROSS-CUTTING PRIORITIES.....	12
AGENDA ORGANIZATION	14
Goal 1: Virtually Eliminate Discharges of Persistent Toxic Substances.....	16
Goal 2: Control Sediment, Nutrient and Pathogen Loadings	19
Goal 3: Accelerate the Delisting of New York’s Areas of Concern	23
Goal 4: Combat Invasive Species.....	25
Goal 5: Conserve and Restore Native Fish and Wildlife Biodiversity and Habitats	28
Goal 6: Conserve Great Lakes Water Supplies	31
Goal 7: Enhance Community Resiliency and Ecosystem Integrity.....	33
Goal 8: Promote Smart Growth, Redevelopment and Adaptive Reuse	37
Goal 9: Enhance Recreation and Tourism Opportunities.....	39
Goal 10: Plan for Energy Development	41
COORDINATION APPROACH: GREAT LAKES BASIN PARTNERSHIP (GLBP)	43
FUNDING APPROACH.....	52
REFERENCES	55
Appendix 1: Integrating Existing Plans and Strategies	57
Appendix 2: Ecosystem-based Management Vision, Goals and Objectives of Lake Ontario Lakewide Management Plan (LaMP).....	61
Appendix 3: Ecosystem-based Management Vision, Goals and Objectives of Lake Erie Lakewide Management Plan (LaMP).....	63
Appendix 4: Beneficial Use Impairment (BUI) Indicators of NYS AOCs – January 2014.....	66

LIST of ABBREVIATIONS and ACRONYMS

ACOE	U.S. Army Corps of Engineers
AOC	Area(s) of Concern
BCA	Bird Conservation Area
BMP	Best Management Practice(s)
BNRK	Buffalo Niagara Riverkeeper
BUI	Beneficial Use Impairment
CC	Climate Change
CFA	Consolidated Funding Application
CFGB	Community Foundation for Greater Buffalo
CREP	Conservation Reserve Enhancement Program
CSC	Climate Smart Communities
CSO	Combined Sewage Overflow
CSP	Conservation Stewardship Program
CWSRF	Clean Water State Revolving Fund
DNR	(Cornell) Department of Natural Resources
EAB	Emerald Ash Borer
EBM	Ecosystem-Based Management
EEA	Environmental Energy Alliance of New York
EFC	NYS) Environmental Facilities Corporation
EFC-SU	Environmental Finance Center at Syracuse University
EPA	Environmental Protection Agency
EPF	Environmental Protection Fund
FCO	Fish Community Objectives
FEMA	Federal Emergency Management Agency
FL-LOWPA	Finger Lakes – Lake Ontario Watershed Protection Alliance
GFLRPC	Genesee – Finger Lakes Regional Planning Council
GHG	Greenhouse Gas
GL	Great Lakes
GLAA	Great Lakes Action Agenda
GLBAC	Great Lakes Basin Advisory Council
GLBP	Great Lakes Basin Partnership
GLC	Great Lakes Commission
GLFC	Great Lakes Fishery Commission
GLPF	Great Lakes Protection Fund
GLRC	Great Lakes Research Consortium
GLRI	Great Lakes Restoration Initiative
GLST	Great Lakes Seaway Trail
GLWQA	Great Lakes Water Quality Agreement
GRW	Genesee River Wilds, Inc.
HAB	Harmful Algal Blooms
IBA	Important Bird Area
IJC	International Joint Commission
IS	Invasive Species
LaMP	Lakewide Management Plan
LAMP	Lakewide Management and Action Plan (formerly LaMP)
LE	Lake Erie
LEWPA	Lake Erie Watershed Protection Alliance
LO	Lake Ontario

MPO	Metropolitan Planning Organization
NDZ	No Discharge Zone
NGC	Niagara Greenway Commission
NGO	Non-Governmental Organization
NYNHP	New York Natural Heritage Program
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
NYACD	New York Association of Conservation Districts
NYS	New York State
NYSCC	New York State Canal Corporation
NYSDAM	New York State Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOS	New York State Department of State
NYSDOT	New York State Department of Transportation
NYSERDA	New York State Energy Research and Development Authority
NYSG	New York Sea Grant
NYSP2I	New York State Pollution Prevention Institute
NYSPSC	New York State Public Service Commission
ODW	Ohio Division of Wildlife
OGS	New York State Office of General Services
OMNR	Ontario Ministry of Natural Resources
OPRHP	New York State Office of Parks, Recreation, and Historic Preservation
PAH	Polycyclic Aromatic Hydrocarbons
PBDE	Polybrominated Diphenyl Ethers
PCB	Polychlorinated Biphenyls
PFBC	Pennsylvania Fish and Boat Commission
PRISM	Partnerships for Regional Invasive Species Management
PUSH	People United for Sustainable Housing
RAC	Remedial Advisory Committee
RAP	Remedial Action Plan
REDC	Regional Economic Development Council
RIBS	Rotating Integrated Basin Studies
RPC ¹	Regional Planning Council
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SLRWP	St. Lawrence River Watershed Partnership
SRMT	St. Regis Mohawk Tribe
SSO	Sanitary Sewer Overflow
SUNY ESF	State University of New York College of Environmental Science and Forestry
SWCD	Soil and Water Conservation District
TMDL	Total Maximum Daily Load
TNC	The Nature Conservancy
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WWTP	Wastewater Treatment Plant

¹ Within New York's Great Lakes basin, the primary regional planning councils or entities that this term refers to include the Southern Tier West Regional Planning and Development Board, Genesee-Finger Lakes Regional Planning Council, Central New York Regional Planning and Development Board and the Tug Hill Commission.

“The Great Lakes are one of America’s most important—and often overlooked—natural features... restoration of the Great Lakes would yield numerous direct, specific economic benefits. (It would) lead to \$6.5-11.8 billion dollars from tourism, fishing, and recreation alone...raise coastal property values \$12 to \$19 billion by remediating Areas of Concern (AOCs)...(and) reduce costs to municipalities by \$50 to \$125 million dollars...All told, the direct economic benefits of restoring the Great Lakes (would) total at least \$50 billion.”

“Is an expenditure of this magnitude [\$26 billion] worth it? With so much at stake, the restoration plan [Great Lakes Restoration Strategy] clearly seems to be a worthwhile, indeed necessary, investment.”

John C. Austin, Soren Anderson, Paul N. Courant, Robert E. Litan, September 2007, "Healthy Waters, Strong Economy: The Benefits of Restoring the Great Lakes Ecosystem" and "America's North Coast: A Benefit-Cost Analysis of a Program to Protect and Restore the Great Lakes," The Brookings Institution.

EXECUTIVE SUMMARY

Numerous government and private organizations have worked for many years to achieve economic renewal and environmental restoration within New York's Great Lakes Basin. In 2009, the federal government reinvigorated the national priority of restoring the Great Lakes through the Great Lakes Restoration Initiative (GLRI). Answering the call to action under the GLRI, New York has made significant progress. This action agenda brings together many existing environmental, social and economic goals previously identified for New York's Great Lakes – St. Lawrence River region, using an integrated ecosystem-based management approach. New investment and coordinated action can improve the health of the ecosystem, enhance economic vitality across the region, and yield important benefits for major upstate urban centers such as Buffalo, Rochester, Syracuse and Watertown, as well as waterfront communities all along the lakes and rivers of the region. We must continue to strengthen partnerships to attain identified goals and to leverage needed funding from federal, state and other sources.

This action agenda is not a new planning exercise but rather is a synthesis of numerous existing plans, developed over many years, that established a range of important restoration, protection, and sustainable development goals for New York's Great Lakes – St. Lawrence River region. The ten priority goals, and many of the identified actions, are drawn from those plans, and are aligned with the priorities in the GLRI. These goals establish a framework for New York's near-term priorities.

This agenda:

- ✓ Highlights the most urgent actions needed to achieve resiliency, restoration, and sustainable management outcomes for New York's Great Lakes to benefit our communities
- ✓ Promotes coordination between the multiple entities implementing these actions
- ✓ Seeks to leverage the capacity and financial resources needed to take action

Regular engagement with the region's stakeholders is critical for identifying the most appropriate and highest-priority actions needed to accomplish each goal. Clearly, no one agency or entity has the resources to single-handedly achieve the region's desired ecosystem outcomes.

This action agenda seeks an integrative approach by bringing together and rallying the diverse capacity and talents of the region's stakeholders, including federal and state agencies, local government, not-for-profit organizations, academia, business and citizens.

Goals

Virtually Eliminate Discharges of Persistent Toxic Substances

Control Sediment, Nutrient and Pathogen Loadings

Accelerate Delisting of New York's Areas of Concern

Combat Invasive Species

Conserve and Restore Native Fish and Wildlife Biodiversity and Habitats

Conserve Great Lakes Water Supplies

Enhance Coastal Resiliency and Ecosystem Integrity

Promote Smart Growth, Redevelopment and Adaptive Reuse

Enhance Recreation and Tourism Opportunities

Plan for Energy Development

Cross-Cutting Priorities

Partnerships and Coordinated Action

Coordinated Science, Monitoring and Information Management

Environmental Education and Outreach

Climate Change Adaptation and Mitigation

VISION

To ensure that the quality of life and standard of living of people are improved by evolving a shared vision of the Great Lakes ecosystem so that society's actions and attitudes strengthen the viability and sustainability of this ecosystem's unique and valuable resources

This vision, developed through extensive stakeholder input and coordination efforts, was first published in 1992 in New York State's 25-Year Plan for the Great Lakes. It is still relevant today and continues to embrace multiple government and private sector goals and objectives for improving the overall quality of the state's Great Lakes region. Similar to this action agenda, the vision statement above is intended to both inform and motivate the public and, therefore, remains a shared ambition among the many stakeholders and residents committed to advancing progress in New York's Great Lakes basin.

INTRODUCTION

*"THAT sentiment of the human heart which experiences pleasure in the sublime and the beautiful in nature, can find on the waters of the Great Lakes and in their environment a wealth of enjoyment that is offered nowhere else on the globe."*²

The Great Lakes – St. Lawrence River basin is an incredible asset of state, national and international significance. The freshwater resources of the Great Lakes are invaluable to two countries. The drainages of Lakes Ontario and Erie and the Niagara and St. Lawrence rivers are complex ecosystems that support important habitats and biological communities, and comprise a vital part of New York's natural and cultural heritage and economy. Within New York, these basins total over 700 miles of shoreline and 40% of the state's surface area—second largest among all Great Lakes states. These watersheds encompass much of the geography of New York State and consist of a rich diversity of communities and natural resources. The combination of diverse topography and geologic formations with abundant precipitation forms the basis for a complex system of groundwater and surface waters, which sustains an array of dependent ecosystems, including springs, streams, wetlands, nearshore and offshore habitats. Over four million New Yorkers use the region's waterbodies as a source of drinking water, for recreational activities, to support agricultural production and to transport people and goods, and for countless other activities.

Attention to the ecological health of the Great Lakes has a long history. The Boundary Waters Treaty of 1909 was the first to establish principles for international cooperation to sustainably manage shared waters. The treaty was followed by the bi-national Niagara River Water Diversion Treaty of 1950; the Convention on Great Lakes Fisheries of 1954, which created the Great Lakes Fishery Commission; and the Great Lakes Basin Compact of 1955, which created the Great Lakes Commission and yielded the Great Lakes - St. Lawrence River Ecosystem Charter in 1995.

Concerns in the early 1960s about deteriorated conditions in the lakes led to lengthy negotiations between the national governments of the United States and Canada. The groundbreaking 1972 Great Lakes Water Quality Agreement (GLWQA) established cooperative programs to address water quality impairments, particularly phosphorus and bacteria from municipal and industrial sources. The agreement set, on a bi-national basis, basin-wide water quality objectives and included commitments to design, implement and

² *History of the Great Lakes*, J. B. Mansfield, ed., Volume I, 1899, p. 10.

monitor municipal and industrial pollution control programs in conjunction with state and provincial governments. A revised agreement, signed in 1978, added the goal of “virtually eliminating” the discharge of persistent toxic substances, as well as a broader goal “to restore and maintain the chemical, physical, and biological integrity of the waters of the Great Lakes Basin Ecosystem.” In 2012, the agreement was once again amended to include an expanded bi-national focus on addressing the nearshore environment, aquatic invasive species, habitat degradation, and the effects of climate change. The updated agreement also supports continued work on harmful algal blooms, toxic and other chemicals of mutual concern, and discharges from vessels. The GLWQA guides many of our activities, and new provisions will have a direct bearing on the goals and actions outlined in New York’s Great Lakes Action Agenda. Therefore, as program guidance for implementation of the expanded GLWQA annexes is developed over the next few years, it will be incorporated into the GLAA.

A solid body of good work and environmental improvement has been accomplished since the bi-national agreements were first signed. An array of governance structures, advisory bodies and scientific organizations has been established. Numerous analyses and studies have been done, and an equivalent number of plans and strategies have been prepared to point the way to progress. Government at all levels, academia, and non-governmental organizations on both sides of the border have dedicated significant financial resources and have successfully acted to improve environmental conditions in the Great Lakes.

Despite this progress, considerable work remains to fulfill the many restoration and protection goals for the basin. Unfortunately, as a result of piecemeal implementation activities and limited funding over many years, our collective efforts have yet to achieve the fundamental promise of the Clean Water Act “to restore and maintain the chemical, physical and biological integrity of the Nation’s waters.” Emerging issues, such as climate change, environmental justice concerns, deposition of air-borne toxics, sustainable water quantity management, invasive species, and pharmaceuticals found in our water bodies have brought attention to the need to address growing threats to human and ecosystem well-being. Adequate public funding has not been consistently available to tackle the many actions identified in various Great Lakes plans, programs and strategies. President Obama’s Great Lakes Restoration Initiative (GLRI), enacted in 2009, brought a renewed federal commitment to restoring and protecting the Great Lakes-St. Lawrence River. Sustained federal investments in GLRI on a multi-year basis will be important to effectively implement plans for Great Lakes revitalization.

Over many decades, the Great Lakes region has been in economic transition. The region’s urban centers share many of the same characteristics and problems experienced by other older industrial urban economies throughout the “rust belt.” The economic stalwarts of the past—manufacturing and the use of waterways for transportation—have declined. Contaminated industrial sites, job loss, demographic shifts, vacant property, and suburbanization have contributed to the economic stress and challenges faced by the region’s urban centers. By emphasizing urban redevelopment, making important strategic investments, and drawing on their existing competitive economic assets, these communities can accomplish their locally driven community and economic goals consistent with the environmental restoration goals envisioned by the GLWQA.

To meet the challenges we still face in the Great Lakes basin and to use our limited funding most effectively, New York’s Great Lakes Action Agenda will promote successful environmental protection, restoration and sustainable development in a manner that: 1) addresses needed actions on a priority basis, 2) provides for maximum coordination and collaboration among the many implementing entities throughout the region, and 3) seeks to identify the capacity and financial resources needed to act on identified priorities.

Climate change, sound science and ecosystem-based management are key cross-cutting state priorities integrated into this action agenda. Overwhelming scientific evidence shows that New York State’s air and

water quality, forests, fish and wildlife habitats, and people and communities are at risk from climate change³. Continental-scale changes in climate may result in such impacts as changing lake conditions and lake levels, decreased winter ice cover, increased lake-effect snow events, and related water-management, navigation and hydroelectric production issues. Longer shipping seasons may provide more opportunity for the introduction of invasive species.⁴ Changes in the region's temperatures could affect fish communities, commercial and recreational fishing and the tree composition of the region's forests. Recognizing the relationship between the Great Lakes ecosystem and climate change, the action agenda seeks to support the state's dual climate change goals to mitigate climate change through reductions in greenhouse gas (GHG) emissions and enhancement of carbon sinks, and to adapt to the expected effects of climate change.

In an effort to promote a more integrated response to complex ecosystem problems, a 2006 New York State law⁵ directed state agencies to employ ecosystem-based management (EBM) principles in state agency programs. Ecosystem-based management is an emerging, integrated approach to natural resources management that considers the entire ecosystem, including humans, to achieve improved environmental conditions and sustained ecosystem services that support human needs and social goals. As directed by this law, an interagency report⁶ was developed that recommends ways in which New York can further strengthen an EBM approach through existing state programs and new partnerships.

One recommendation was for New York State to establish place-based action programs for our Great Lakes. This agenda achieves this vision by providing a mechanism to apply the nine principles of ecosystem-based management (see side bar on following page) to future sustainable development and resource management decisions. A collaborative, regionally focused approach will ensure that this agenda is responsive to communities and issues at the local, sub-watershed level while maintaining important alignment with key state priorities and funding programs.

Sound scientific information and decision making is the underpinning that supports all Great Lakes Action Agenda goals and actions. Because of its relative importance to numerous objectives, this EBM principle has been specifically identified as a cross-cutting priority.

"Ecosystem-based management means an integrated approach to management that considers the entire ecosystem, including humans, to achieve improved environmental conditions and sustained ecosystem services that support human needs and social goals. Ecosystem-based management differs from current approaches that usually focus on a single species, sector, activity or concern; it considers the cumulative impacts of different sectors, including human, social and economic activities."

from the "Scientific Consensus Statement on Marine Ecosystem-Based Management" (2005)

³Climate change refers to any significant change in the measures of climate (e.g., temperature, precipitation, wind patterns, etc.) lasting for an extended period. ([EPA](#))

⁴Rosenzweig, C., W. Solecki, A. DeGaetano, M. O'Grady, S. Hassol, P. Grabhorn (Eds.). 2011. [Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation](#). Synthesis Report. New York State Energy Research and Development Authority (NYSERDA), Albany, New York.

⁵"New York Ocean and Great Lakes Ecosystem Conservation Act," Article 14, New York State Environmental Conservation Law.

⁶[Our Waters, Our Communities, Our Future](#), The New York Ocean and Great Lakes Ecosystem Conservation Council, April 2009.

All state agencies, local governments, scientific and educational institutions and other stakeholders are key partners that can help achieve the action agenda goals and priority actions. Through collaborative governance and ecosystem-based decision making, we will be more effective in planning and implementing our identified protection, restoration and development objectives. Integrating international, national, state and local goals and objectives will help ensure successful long-term sustainability and ecosystem health. Through a successful, coordinated effort, New York's Great Lakes region will be economically stronger and more ecologically resilient for future generations.

***Principles of
Ecosystem-based Management***

Place-based focus

Protection of ecosystem structure, function and key processes

Interconnectedness within and among systems

Integration of ecological, social, economic and institutional perspectives

Sustainable human use of the ecosystem

Stakeholder involvement

Collaboration

Scientific foundation for decision-making

Adaptive management

WATERSHEDS of NEW YORK'S GREAT LAKES BASIN

Place-based, integrated and scientifically grounded management of natural resources, human activities and environmental quality are fundamental elements of EBM which guide this action agenda. Because the role of water is at the core of all ecological evolution and social history, many state and federal programs have increasingly recognized that specific ecosystem resources can be more effectively managed through planning and implementation on a watershed scale. Using this approach, managers have the advantage of being able to consider common variables, geographic features, history and the many linkages and relationships among aquatic environments, their associated terrestrial watersheds and the range of human activities affecting those areas.

New York's portion of the Great Lakes basin can be divided into four sub-basins (Fig. 1) to more effectively organize future implementation efforts and to address important characteristics unique to each of them: Lake Erie (including the Niagara River); Southwest Lake Ontario (including the Genesee River); Southeast Lake Ontario (including the Seneca, Oneida, and Oswego rivers); and Northeast Lake Ontario (including the St. Lawrence and Black rivers).⁷

Figure 1. New York's Great Lakes Sub-Basins



Each of these sub-basins or watersheds consists of multiple sub-watersheds, defined by the relationship between their topography and hydrology. The sub-watershed scale is most practical for local planning and management.

⁷Geographic descriptions can be found at: <http://www.dec.ny.gov/animals/30483.html>.

NEW YORK'S GREAT LAKES ACTION AGENDA

The ten priority goals and corresponding actions identified in this action agenda are drawn from numerous existing plans, developed over many years, which have established restoration, protection, and sustainable development goals for the Great Lakes and New York State. The agenda is aligned with the priorities and goals identified in President Obama's Great Lakes Restoration Initiative (GLRI), as well as numerous New York state plans, including the *New York Ocean and Great Lakes Report*, the *New York State 25-Year Plan for the Great Lakes*, the *ClimAID Report*, the Regional Economic Development Council strategic plans, the *New York State Open Space Plan*, and the *New York State Energy Plan*, among many others listed in Appendix 1.

By virtue of the fact that the Great Lakes Action Agenda pulls together goals from many other existing plans and multiple agencies' efforts, it inherits a substantial body of prior stakeholder outreach and collaboration undertaken over many years. Development of the majority of these documents included extensive outreach and stakeholder engagement processes on a regional, interstate, and often bi-national basis. For example, the 2009 state-led *Ocean and Great Lakes Report* and its recommendations were finalized only after many local public engagement sessions were held. Likewise, the earlier (2011) draft of this action agenda was circulated to numerous state agencies and stakeholder organizations seeking input and reaction to the identified goals and proposed action areas. The authors of this document recognize the expressed desire of those involved in prior efforts to move from a planning mode to one of action and results. Such is the purpose of this document.

To be effective, we need to move beyond the aspirational goals and objectives embodied in existing plans for the Great Lakes and define the most urgent actions and measurable targets that should be undertaken over the next five years. To be successful, we must build on the many achievements that have already been accomplished by engaging more people and organizations in our efforts and by celebrating progress as we work together to advance key projects listed in the action agenda.

Given the ever changing and complex nature of Great Lakes issues, the Great Lakes Action Agenda is intended to be a living document that will be updated on a regular basis through a participatory public review process. Active stakeholder engagement will ensure the agenda evolves and adapts to new information, opportunities, and challenges and will contribute to identification of additional priority actions. As highlighted in the Coordination Approach section of this document, work plans will be developed by regionally focused workgroups to guide implementation of the action agenda at the local level. These work plans will be based on the priority goals and actions set forth in this document but will be locally relevant and include detailed project-level information such as timelines, project lead information, and total funding required per project. Projects identified in these work plans will seek to promote EBM principles. As an increasing number of projects demonstrating these principles are achieved, momentum for this approach can be sustained and strengthened.

PRIORITY GOALS

CLEAN UP POLLUTION SOURCES and RESTORE BENEFICIAL USES

1. Virtually eliminate discharges of persistent toxic substances to protect biological and human health.
2. Control sediment, nutrient and pathogen loadings so that water quality is protected, desired aquatic biotic communities flourish, humans and wildlife are protected from coastline health hazards, and natural processes are sustained.
3. Accelerate the Delisting of New York's Areas of Concern⁸ (AOCs) by implementing actions focused on restoring beneficial uses impaired by pollutants.

CONSERVE NATURAL RESOURCES

4. Combat invasive species to sustain a healthy Great Lakes ecosystem and to maintain diverse economic and recreational opportunities.
5. Conserve and restore native fish and wildlife biodiversity and habitats to achieve and sustain resilient ecosystems and vibrant economies.
6. Conserve Great Lakes water supplies in a manner that recognizes the renewable but finite supply of the waters of the Great Lakes basin for the long-term sustainable use and enjoyment of the public.

PROMOTE RESILIENT COMMUNITIES and SUSTAINABLE DEVELOPMENT

7. Enhance community resiliency and ecosystem integrity through restoration, protection, and improved resource management.
8. Promote smart growth, redevelopment and adaptive reuse to create a sustainable and vibrant economy in the Great Lakes ecosystem.
9. Enhance recreation and tourism opportunities that capitalize on the rivers and lakes and the natural, cultural and visual resources that define the character of the Great Lakes - St. Lawrence River region.
10. Plan for energy development consistent with natural resource conservation and supportive of the state's energy and climate change goals.

⁸Areas of Concern (AOCs) are specific geographic areas where significant pollution problems have been identified as impairing beneficial uses of water and waterways such as swimming, eating fish, or drinking water. New York's current AOCs are the Buffalo River, Niagara River, Eighteen Mile Creek (Niagara County), Rochester Embayment, and St. Lawrence River at Massena. A sixth AOC, Oswego River/Harbor was successfully restored in 2006 to achieve the community's desired uses.

CROSS-CUTTING PRIORITIES

An effective response to Great Lakes challenges demands a broad array of expertise and depth of resources beyond what any single agency or organization can contribute. Furthermore, it requires broad-based public support and a solid understanding of issues and how to address them. To most effectively address the multi-faceted challenges of New York's dynamic Great Lakes basin, three cross-cutting recommendations have been identified to guide and support successful implementation of the agenda's priority goals. Cross-cutting actions are included below each recommendation to provide additional clarity and direction.

➤ **Promote partnerships and coordinated action among stakeholders**

Leveraging resources, expertise, and manpower through partnerships and coordinated action is essential to achieving our shared vision for NY's Great Lakes basin. Organizations working to restore and protect the Great Lakes ecosystem—including federal, state, provincial and local municipalities and agencies, non-profit organizations, educational institutions, and private entities—will require new mechanisms for communication and collaboration that encourage these diverse groups to work collaboratively toward well-known common goals while building organizational capacity.

- ✓ Support regional watershed alliances, local government and other entities to facilitate implementation of more effective and efficient resource actions at the local level.
- ✓ Enhance coordination of watershed plan implementation within the basin.
- ✓ Institute a sustainable mechanism or entity to oversee coordination of the Great Lakes Basin Partnership.
- ✓ Reinvigorate the NYS Coalition of Great Lakes Legislators and the Great Lakes Basin Advisory Council to strengthen state leadership in Great Lakes decision making processes and policy development.

➤ **Enhance coordinated science, monitoring and information management**

To better understand and address our region's most pressing natural resource issues and vulnerabilities, the study, monitoring, and documentation of environmental conditions is required.

Research and monitoring programs are critical in providing information on air deposition of pollutants, climate change, the status of wildlife and habitats, invasive species and water quality, and to increase management effectiveness. The findings of scientific research and long-term monitoring will inform better management planning and decision making for Great Lakes resources. The wealth of scientific information and plans for the Great Lakes may be compelling, but their value will not be realized if they are not accessible, widely known, and put to good use. Furthermore, projects that employ an adaptive management approach, where practitioners "learn by doing," achieve the most impressive and sustainable outcomes, while also contributing to improved future project designs.

- ✓ Identify and prioritize research needs that are consistent with state and federal priorities, foster collaboration, and support adaptive management activities.
- ✓ Enhance the use of SUNY Centers of Excellence and extension programs to provide specialized public policy, scientific and technical assistance.
- ✓ Convene an annual Great Lakes summit to enhance communication, understanding of challenges and application of research findings throughout the basin.

- ✓ Develop information management mechanisms to track and document results of scientific research and conservation projects occurring in NYS's Great Lakes basin.
- ✓ Support citizen science initiatives to prioritize management activities and to engage and inform the general public in the protection of our natural resources.

➤ **Support environmental education and outreach initiatives.**

Environmental education is essential to increase public understanding of Great Lakes resources, build support for needed actions, and encourage future stewardship by basin residents. To make progress in a manner that maintains the strategic vision, stakeholders and the general public need readily accessible information about the state of each lake and its ecosystem, including existing conditions, stressors and their trends, progress over time, and emerging issues. Similarly, support for Great Lakes stewardship efforts will be enhanced through a concerted outreach effort that targets a diversity of audiences, including students, elected officials, and residents throughout the basin.

- ✓ Coordinate and provide learning opportunities for government decision makers at all levels to integrate ecosystem-based management principles into decision-making activities.
- ✓ Celebrate successes through biannual reports and project-specific special events.
- ✓ Increase environmental education staffing to increase understanding of and appreciation for Great Lakes ecosystems.
- ✓ Synthesize and publicize existing information on conditions in Lake Erie and Lake Ontario ecosystems and the Niagara and St. Lawrence Rivers.
- ✓ Develop Great Lakes educational resources, interpretation programs and curriculum development toolkits.
- ✓ Support campaigns that build understanding of and appreciation for Great Lakes ecosystems, environmental stewardship, place-based knowledge, the impact of individual and cumulative human behavior on ecosystem health, and best practices.

➤ **Climate Change Adaptation and Mitigation**

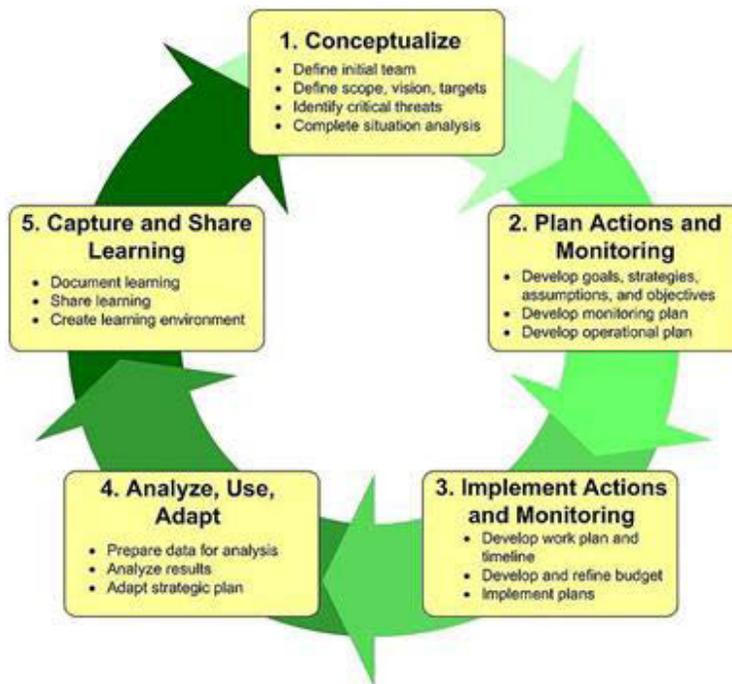
Given the climatic changes projected to occur in the near and distant future, actions to enhance the resiliency of the built and natural environment, and human communities, have been integrated throughout the ten goals of this agenda. Mitigation actions consist of human interventions, such as reductions in greenhouse gases and the enhancement of gas sinks, to reduce human impact on climate. Adaptation refers to the adjustment or preparation of natural and human systems to a changing environment that mitigates impact and takes advantage of potential benefits. A related term used throughout this agenda is “resiliency,” which describes a natural or built feature’s adaptive capacity and strength in the face of climatic and other changes. Actions that address climate change adaptation, mitigation, and resiliency are included in support of multiple state and federal climate change goals and plans, including but not limited to *Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation*, *New York State Climate Action Plan Interim Report*, and the EPA’s *Draft Climate Change Adaptation Plan*. Consistent with New York State climate change adaptation and resiliency goals, this agenda aims to build cooperative partnerships to address inland and coastal flooding hazards and infrastructure resiliency, and to implement solutions rooted in green infrastructure, land-use planning, and restoration opportunities.

AGENDA ORGANIZATION

Adaptive Management

For each goal, priority actions are organized to correspond to the adaptive management cycle as presented by The Conservation Measures Partnership's (CMP) Open Standards for the Practice of Conservation⁹. The CMP is a joint venture of conservation organizations and collaborators committed to improving the practice of conservation through improved project design, management, and assessment. Adaptive management is a structured, iterative decision-making process designed to achieve measurable conservation results while maximizing learning opportunities that inform future project development. It is also a leading principle of ecosystem-based management, recognizing the importance of scientifically based decision making and stakeholder involvement and outreach.

Diagram 1. The five main steps within an adaptive management cycle.



Priority actions listed under each goal below are organized sequentially to correspond to the five steps of the adaptive management cycle.

Adaptive Management Step	Action Agenda Strategy	Key*
1. Conceptualize	Research/Assessment	
2. Plan Actions and Monitoring	Monitoring/Planning	
3. Implement Actions and Monitoring	Action by Category	
4. Analyze, Use, Adapt	Evaluation	
5. Capture and Share Learning	Education/Outreach	

*For printed black and white copies, please note this is a color-coded key.

⁹The Conservation Measures Partnership (2007). *Open Standards for the Practice of Conservation*. <http://www.conservationmeasures.org/initiatives/standards-for-project-management>.

Challenge Statement, Goals and Actions

In the following pages, challenge statements for each goal provide background information and help to further define the issues. The goals are intended to establish a framework for specific strategic actions that must be undertaken in the near term. Actions are drawn from numerous existing plans, including state and federal initiatives, as identified in Appendix 1.

Milestones

The Milestones column exemplifies which deliverables might help achieve each action. They will be further refined and modified on a regional basis by basin workgroups.

Desired Outcome

The desired Outcome column specifies the intended and desired outcome of the action and associated deliverables.

Initial Lead

The Initial Lead column lists organizations that are already addressing the corresponding action or, based on their organization's or agency's mission, that may be a likely partner or co-lead addressing the listed action. **Initial Leads are suggestions only and will be further refined and finalized on a regional basis by basin workgroups.**

Supports Goal/Action

The purpose of this column is to show the cross-cutting nature of the actions, many of which directly support multiple goals and other actions listed in the agenda. As work plans are developed and projects are implemented to pursue specific actions, it will be important to consider cross-cutting actions to ensure that effective inter-relationships are being addressed.

Goal 1: Virtually Eliminate Discharges of Persistent Toxic Substances to protect biological and human health.

Challenge

Throughout much of the 20th century, industrial development supported the economy and prosperity of the Great Lakes region. One unfortunate legacy of this industrial activity is the well-documented contamination in places such as Buffalo, Niagara Falls, Rochester and Massena. Persistent, bioaccumulative toxic substances that were released into the environment include mercury, polychlorinated biphenyls (PCBs), Mirex, chlorinated dioxins, dieldrin, dioxins/furans, and others. The occurrence of these substances in the environment has necessitated restrictions on human consumption of fish and disposal of dredged sediments, and poses continued risks to the public's health and to wildlife. Due to the persistence of these contaminants, removal of new inputs will not suffice to eliminate the ecological impacts of formerly discharged substances. Continued source control and additional remediation activities are needed. In certain cases, natural attenuation or biodegradation and periodic monitoring may be the most viable responses.

While the presence of legacy pollutants in waters and sediments of the Great Lakes basin has generally been declining, a variety of new "substances of emerging concern" could significantly impact biological and human health within the region. Chemicals used in manufacturing, agriculture, and domestic settings that may have negative human and/or ecological health effects are now being detected in Great Lakes fish and other media. These chemicals include brominated flame retardants, brominated degreasing and dry-cleaning fluids, chlorinated compounds, fluorinated compounds, pharmaceuticals, personal care products, current-use pesticides, and other compounds. Although the presence of these chemicals is well documented, a greater understanding of how they may adversely impact aquatic organisms, other wildlife, and humans is needed. A combination of research studies, risk assessments, and source-tracking activities is essential to better understand and ultimately address this complex water quality issue.

The continued presence of toxic substances—both emerging and legacy contaminants—in Great Lakes fish serves as a reminder that despite the many regulatory and remediation efforts of past decades, there is much more work to do. Additional cleanup and prevention of exposure to past discharges remains a fundamental priority.

Goal 1 - Priority Actions

To achieve the goal of virtually eliminating discharges of persistent toxic substances, implementation of the following priority actions is needed.

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
1.1	Assessment/ Research	Research the sources and effects of emerging chemicals and other substances of concern (e.g., pharmaceuticals, microplastics) on NY's Great Lakes people, fish and wildlife.	Complete research study.	Understand the effects of emerging chemicals of concern on people, fish and wildlife.	GLRC	3, 5

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
1.2	Assessment/ Research	Complete a basin-wide characterization of WWTP effluent to assess levels of legacy (PCBs) and emerging contaminants (PBDEs, pharmaceuticals, microplastics) that are discharged.	<ul style="list-style-type: none"> Complete study. Use study results to evaluate effectiveness of treatment processes, collection programs and other contaminant reduction strategies. 	Quantify contaminant levels discharged from WWTPs.	NYSDOH, NYSDEC	5, 9
1.3	Monitoring/ Planning	Investigate the use of coal tar within the Great Lakes basin, and develop strategies to reduce/prevent associated polycyclic aromatic hydrocarbon (PAH) contamination.	Investigation completed and reduction/prevention strategies identified.	Understand coal tar's impact on local PAH levels.	NYSDEC	3
1.4	Monitoring/ Planning	Identify areas of contaminated sediments and groundwater, and quantify discharge to surface waters to direct remedial actions where needed and feasible.	<ul style="list-style-type: none"> Assessments in high-priority areas completed. Remediation actions underway. 	Remediation of contaminated areas within AOCs.	NYSDEC	3, 9
1.5	Monitoring/ Planning	Assess the concentrations and significance of contaminants (e.g., persistent organic pollutants, mercury, pesticides, metals) and emerging chemicals of concern (e.g., pharmaceuticals) in NY's Great Lakes fish, wildlife, and vulnerable fish-consuming populations.	<ul style="list-style-type: none"> Assessments completed for all AOCs Ongoing: Assess other high-priority areas, including areas with contamination not attributed to AOCs. 	A better understanding of legacy and emerging contaminant exposure levels, and the geographic and temporal trends of contaminants in Great Lakes wildlife and human populations.	NYSDEC, NYSDOH, NYSERDA	3, 5, 9
1.6	Action - Project	Remediate high-priority contaminated sites (e.g., posing risk to public health, vulnerable to climate change impacts, etc).	Remediation projects underway.	Prevent toxic discharges to benefit public and environmental health.	NYSDEC	3, CC ¹⁰
1.7	Action - Project	Reduce discharge of chemicals of concern from stormwater and CSOs through integrated strategies (e.g., green infrastructure, infrastructural solutions, etc.)	Implement stormwater control projects.	Reduced chemical discharges from stormwater.	Various	2, 3, 5, 8, 9
1.8	Action - Project	Significantly reduce toxic chemical use from industrial and commercial sources by providing tax incentives, loans and grants to New York businesses, and direct technical assistance through the New York State Pollution Prevention Institute, the state's network of Manufacturing Extension Partnership centers, and other programs.	Reduce toxic chemical use from 10 industrial or commercial sources.	Decreased toxic chemical use across basin.	NYSP2I	3
1.9	Education/ Outreach	Provide outreach and education to the community, schools and other institutions on green chemistry, green engineering, other pollution-prevention practices, and the impact of pollution on our health and ecosystems.	Hold 20 outreach/educational events.	Pollution prevention practices are implemented by target groups.	NYSDEC, NYSP2I	XC ¹¹
1.10	Education/ Outreach	Enhance NYSDOH Consumption Advisory communication and outreach.	Ongoing: Expand and continue collaborating with a diverse network of partners—including state, federal, tribal, and local partners—to increase outreach capacity.	Inform all anglers and everyone who eats sport fish about NYSDOH fish consumption advisories; increase understanding of advisories; increase the number of people who follow advisory guidance.	NYSDOH, BNRK, NYSDEC	XC

¹⁰CC indicates this action supports climate change adaptation and/or mitigation strategies.

¹¹XC indicates this action supports cross-cutting priorities (pg 12).

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
1.11	Education/ Outreach	Ensure safe disposal of e-waste and household hazardous waste through community education and collection programs and promotion of product stewardship initiatives.	Pounds of e-waste collected.	Increased trends in proper waste disposal.	NYSDEC	XC
1.12	Education/ Outreach	Prevent the discharge of pharmaceuticals from major sources through community education and collection programs and by promoting best management practices and process changes at health care institutions, livestock and food industries, and other manufacturers.	Discharges from major sources prevented or reduced.	Reduced pharmaceutical discharges.	NYSDEC, NYSDOH, NYSP2I	XC

Goal 2: Control Sediment, Nutrient and Pathogen Loadings so that drinking water quality is protected, desired aquatic biotic communities flourish, humans and wildlife are protected from coastline health hazards, and natural processes are sustained.

Challenge

Although water quality in the open waters of the lakes has greatly improved in recent decades, it remains an ongoing concern in the nearshore environment, where most people interact with the water. Poor water quality in nearshore areas, including embayments (bays, river mouths and wetlands), impacts aquatic life, limits recreational use, and ultimately affects economic development in the region.

Both Lakes Ontario and Erie are impacted by nutrient loading, algal blooms, and pathogens. A certain level of nutrients is necessary to support the aquatic ecosystem, but an overabundance of phosphorus (the limiting factor for algae growth) in Lake Erie and the nearshore waters of Lake Ontario have led to seasonal widespread blooms of nuisance algae and localized blooms of harmful algae in NYS waters. Since the mid-1980s, phosphorus levels in the offshore waters of Lake Ontario have remained at or below the target level of 10 parts per billion set in the Great Lakes Water Quality Agreement. However, in the nearshore area of the lake, which is naturally more productive, phosphorus levels are much higher. In Lake Erie, total phosphorus inputs have remained relatively constant over the past 15 years, but there has been a significant increase in dissolved reactive phosphorus, a type of phosphorus that is readily bioavailable and has been implicated in the recent increase of harmful algal blooms in the lake's western basin. Monitoring and research undertaken by U.S. and Canadian federal, state, and provincial agencies and academic partners has begun to uncover the complexity of nearshore nutrient cycling and the interactions between tributary inflows, stormwater and wastewater management processes, lake currents, invasive quagga and zebra mussels, and the effects of climate change. It is important to consider that conditions in Lake Erie influence conditions in Lake Ontario, which receives 83% of its inflow from Lake Erie.

Sediments, nutrients, and pathogens are some of the most common non-point sources of pollution, or pollution that originates from many diffuse sources, including land runoff, precipitation, atmospheric deposition, sewage treatment plant outfalls, combined sewer overflows, waste sites, on-site septic systems, contaminated sediment and groundwater discharge from urban and agricultural areas. Therefore, diverse strategies are required to adequately manage these unwanted inputs. Priorities for controlling sediment, nutrient, and pathogen loadings include the following:

- ✓ Gain a better understanding of nearshore effects from nutrient loading and links to land-based sources to inform target locations for management actions.
- ✓ Reduce excessive nutrient runoff and shoreline erosion through point-source and non-point source pollution control.
- ✓ Develop watershed plans (e.g., EPA Nine-Element plans) to reduce nutrient and pathogen loadings, including development of any data needs for those plans.
- ✓ Develop mitigation plans for combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs) to reduce microbiological contamination found at beaches and resulting beach closures. Mitigation plans should account for the expected increase of severe weather events and increases in microbiological contamination resulting from climate change.
- ✓ Invest in land-use planning and management, water reuse and recycling, "green" infrastructure¹² and traditional engineered solutions to improve wastewater management.

¹²Green infrastructure is a stormwater management approach that promotes the use of natural systems, such as vegetation and soil along with engineered systems, to manage rainwater where it falls, as opposed to gray stormwater infrastructure that uses pipes to

- ✓ Investigate the causes of harmful algal blooms to develop more effective control strategies.

In summary, the actions contained within this goal can be viewed as a prescription for restoring where necessary and maintaining everywhere, the health of our waters. To be effective, both chronic and acute threats to waterbody health must be addressed. Similar to general health advice to eat a balanced diet, get regular exercise, and avoid smoking, this goal includes broad recommendations to reduce nutrient pollution, promote the use of stream buffers and other best management and preventative practices that can benefit all waters. But, the actions below are also intended to address waters with more serious impacts, such as impaired waterbody segments included in New York State Waterbody Inventory/Priority Waterbodies lists¹³, by targeting diagnostic tools and restoration strategies that are waterbody-specific. Successful outcomes for such waterbodies require coordination among a team of state and federal agencies, regional/watershed programs and local partners to marshal the necessary monitoring, assessment, problem diagnosis, strategy development, funding, and implementation actions that make up a waterbody restoration plan.

Goal 2 - Priority Actions

To achieve the goal of controlling sediment, nutrient and pathogen loadings, implementation of the following priority actions is needed.

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
2.1	Assessment/ Research	Study point and non-point sources of pathogens and nutrients that have resulted in closures of town, county, and state park beaches.	Conduct sanitary surveys/water quality monitoring at public beaches to identify pollution sources; recommend pollution remediation measures; and develop predictive models of beach water quality based on the measurement and analysis of environmental factors.	Prioritization of sources/beaches for remediation.	NYSDOH, NYSDEC, others	9
2.2	Assessment/ Research	Study land-based sources of nutrients and correlative parameters (including spatial and temporal trends) and their effects on the near shore zone.	•Conduct monitoring in LO tributaries and nearshore. •Develop correlative and causal parameters and effects.	Prioritization of watersheds with nutrient issues.	NYSDEC, EPA, USGS, others	3, 9

dispose of rainwater. This approach provides multiple ecosystem services, including but not limited to flooding mitigation, community revitalization, wildlife habitat, climate change adaptation, and air quality management. Examples of green infrastructure include rain gardens, bioswales, constructed and natural wetlands, infiltration and container planters, porous pavers, green roofs, street trees, riparian buffers, and downspout disconnection among others.

¹³The following documents include lists of impaired waters within the Great Lakes Basin:

- http://www.dec.ny.gov/docs/water_pdf/pwblcklist.pdf
- http://www.dec.ny.gov/docs/water_pdf/pwlgneslist.pdf
- http://www.dec.ny.gov/docs/water_pdf/pwllontlist.pdf
- http://www.dec.ny.gov/docs/water_pdf/pwlniag10list.pdf
- http://www.dec.ny.gov/docs/water_pdf/pwlorfillist.pdf
- http://www.dec.ny.gov/docs/water_pdf/pwlstlwlist.pdf

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
2.3	Assessment/ Research	Develop a coordinated research program to better understand, analyze and forecast blooms of toxin-producing algae (e.g., toxic blue-green algae).	Develop HAB research agenda.	Better understanding of causes, impacts, and solutions to proactively address HABs.	NYSDEC, NYSDOH, GLRC	9
2.4	Monitoring/ Planning	Complete watershed plans for high-priority coastal watersheds that follow existing EPA and/or DOS-DEC guidance ¹⁴ , and incorporate ecosystem-based management principals.	<ul style="list-style-type: none"> Identify priority watersheds. Secure funding for two plans. 	Restoration and protection of water quality and biodiversity; EBM approach effectively integrates economic development, green infrastructure, smart growth, heritage conservation strategies, etc.	GFLRPC, FL-LOWPA, LEWPA, NYSDEC	5, 8
2.5	Monitoring/ Planning	Develop nutrient and sediment reduction strategies for sub-watersheds within priority watersheds (e.g., Genesee R. and direct tributaries) that do not have a TMDL.	<ul style="list-style-type: none"> Compile and analyze available monitoring data. Develop nutrient and sediment reduction strategies for 3 priority sub-watersheds. 	Reduced nutrient and sediment loadings.	NYSDEC, other	3, 9
2.6	Action - Capacity	Assist counties and municipalities in reviewing local codes and adopting provisions that promote on-site stormwater management and green infrastructure.	Provide outreach and/or technical assistance to 10 municipalities.	Reduced stormwater runoff.	RPCs, others	8, XC
2.7	Action - Funding	Secure and leverage funding to upgrade aging water and wastewater infrastructure.	<ul style="list-style-type: none"> Identify highest priority infrastructure projects. Secure funding for priority projects within each GL sub-basin. 	Infrastructure upgrades directly support multiple water quality and sustainable development goals.	Various	1, 3, 5, 6, 7, 8, 9
2.8	Action - Project	Protect sensitive lands in priority watersheds through available land-use controls (easements, acquisitions, regulatory protections, etc.) emphasizing riparian restoration and green infrastructure.	<ul style="list-style-type: none"> Identify priority lands and protection mechanisms. Implement 3 green infrastructure pilot projects. Protect/restore 100,000 linear ft. of riparian buffers. 	Increase infiltration capacity and reduce stormwater flows.	Various	5, 7
2.9	Action - Project	Accomplish needed water infrastructure improvements that abate or eliminate CSO/SSOs contributing to chemical and biological pollution within NY GL watersheds.	Twenty CSOs are abated or SSOs are eliminated through infrastructure improvements, consent orders, green infrastructure, etc.	Reduce deficient public and commercial septic systems; abate or eliminate CSO/SSOs.	Various	3, 5, 9
2.10	Action - Project	Implement urban and agricultural best management practices in priority watersheds, as determined by basin stakeholders.	Acquire/leverage funding and implement 3 projects.	Restore natural sediment and phosphorus cycles in nearshore waters.	NRCS, SWCDs, NYSDAM	5, 9
2.11	Action - Project	Develop an agricultural soil health initiative that provides incentives and technical assistance to implement practices such as cover cropping, nutrient management, conservation tillage, and conservation cropping systems.	Initiate partnership with USDA to develop and implement program.	Improve soil health to increase infiltration/water retention capacity, reduce stormwater runoff, reduce need for pesticides, and improve drought tolerance and carbon sink properties.	NYSDAM, USDA, SWCDs	CC, 1, 5, 6, 7

¹⁴Watershed management planning guidance is currently available from a variety of sources, including the EPA's [Nine-Element Guidance](#) and the NYS Department of State's [Watershed Planning Guidebook](#). Selection of a guidance template may vary depending on watershed condition, project goal, and intended funding source for implementation, among other factors.

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
2.12	Action - Project	Remediate point and non-point source pollution that has resulted in closures of town, county, and state park beaches.	Remediate 3 sources to reduce nutrient loads (e.g., mitigating outfalls and expanding capacity at sewage pump stations, implementing water quality improvement projects, etc.).	Reduced beach closures.	Various	1, 3, 5, 9
2.13	Action - Project	Implement actions to achieve numerical nutrient standards within waterbody segments designated as nutrient impaired on New York State's 303d list (e.g., TMDL implementation).	Achieve numerical standards for TP TN.	Effective TMDL implementation results in reduced loadings.	NYSDEC	3, 9
2.14	Action - Project	Conduct projects that support implementation of nutrient reduction standards and evaluate nutrient BMP effectiveness.	<ul style="list-style-type: none"> Map and assess MS4 sewersheds for TMDL development. Document and evaluate CAFO BMP implementation. 	Nutrient loads are reduced through effective nutrient reduction standards and BMP implementation.	Various	9
2.15	Action - Regulation	Ensure appropriate point-source permits for nutrients are implemented and enforced for municipal and industrial wastewater treatment facilities, concentrated animal feeding operations (CAFO) and municipal separate storm sewer systems (MS4) within priority watersheds.	Demonstrate decreasing trends in number of permit violations.	Decreased nutrient concentrations in waterways.	NYSDEC	3, 9
2.16	Action - Regulation	Establish and enforce "No Discharge" zones throughout the state's Great Lakes waters to prevent dumping of biological wastes and harmful bio-treatment chemicals.	Establish and enforce NDZs for NY Great Lakes basin.	NDZs are established for target areas in GL basin.	NYSDEC, EPA	9
2.17	Evaluation	Document the benefits achieved through implementation of the new state law which bans phosphorous in detergents and fertilizers.	Report benefits of regulation.	Increased public support for nutrient regulations.	GLRC	
2.18	Education/ Outreach	Enhance and publicize incentives for farmer participation in agriculture environmental management (AEM) and conservation programs (e.g., CREP, CSP).	Identify incentives and distribute incentive information to farmers.	Increased participation in and implementation of AEM and conservation programs.	NYS DAM , USDA, SWCDs	CC, 5
2.19	Education/ Outreach	Implement educational programs to encourage homeowners and land care providers to adopt organic land care practices through the "Be Green in the Great Lakes" project and other similar efforts.	Implement 5 educational programs.	Reduced nutrient loads from residential sources.	NYSDEC, others	1, XC
2.20	Education/ Outreach	Develop a web-based GIS application that lets the public query local water bodies for data, including summarizing information on water quality and threats, fish contaminants, pollution sources, and emerging issues requiring research and surveillance.	Develop comprehensive information management tools.	Increase awareness of water quality and related issues.	GLC, NYSDEC, OGS	9, XC

Goal 3: Accelerate the Delisting of New York's Areas of Concern by implementing actions focused on restoring beneficial uses impaired by pollutants.

Challenge

"Areas of Concern" (AOCs) were first designated on a bi-national list more than 20 years ago to focus federal, state and local government efforts within those designated geographic areas most impacted by chemical and other pollution. Since then, the Oswego River and Presque Isle Bay are the only AOCs in the U.S. to have been officially delisted. To achieve full delisting of New York's other five AOCs, (i.e., Buffalo River, Niagara River, Eighteenmile Creek¹⁵, Rochester Embayment and the St. Lawrence River at Massena) many implementation projects are needed to eliminate the identified beneficial use impairments (BUIs) specific to each AOC.

In each AOC, the state in cooperation with the Remedial Action Plan (RAP) coordinator and local citizens' Remedial Advisory Committee (RAC), has developed a Stage 2 Addendum¹⁶, or action plan, that describes the causes and problems of the impairments and recommends various remedial or regulatory measures to satisfactorily resolve problems so conditions in the AOC are no longer significantly worse than other comparable areas in the region. Priority actions needed to restore beneficial uses are described in the Stage 2 RAP addendums for each AOC and are available on DEC's Great Lakes webpage (<http://www.dec.ny.gov/lands/25562.html>). These plans will be essential in directing federal funding to accomplish local restoration projects within each AOC.

To support a delisting proposal, New York must complete needed management, remedial/restorative and preventative actions and demonstrate a beneficial use is no longer impaired. When the data show all BUI delisting targets have been achieved, DEC will submit a proposal to the EPA and IJC for their review and concurrence to determine whether the AOC designation for that area can be removed in its entirety. New York has created a handbook, *Guidance for (Re-designation) Delisting of Great Lakes Areas of Concern (AOCs) and their Beneficial Use Impairment (BUI) Indicators in New York State*, to guide local communities and advisory committees through the documentation and review process.

The ideal approach to RAP implementation is rooted in ecosystem-based management principles, and effectively integrates AOC projects and associated pollutant reduction strategies with other related community redevelopment efforts, including local waterfront revitalization plans, brownfield restoration efforts, and environmental justice initiatives to be mutually supportive of local priorities and plans.

¹⁵Eighteenmile Creek was included on the federal Superfund National Priorities List in 2012.

¹⁶In 2012, each AOC developed a Stage 2 Addendum, which is an update to the original Remedial Action Plan that summarizes existing impairments and their causes, and identifies various actions needed for full restoration.

Goal 3 - Priority Actions

To accelerate the delisting of New York's AOCs, implementation of the following priority actions is needed.

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
3.1	Monitoring/ Planning	Establish an integrated monitoring program based on GLAA goals to: 1) support implementation of RAPs and LaMPs; 2) detect contaminant trends in stream water quality and biological indicators (e.g., fish, wildlife, and vulnerable human populations); 3) track down sources of toxics and contaminants of concern; 4) assess management practices and biological indicators; 5) support existing NYSDEC monitoring efforts by RIBS and F&W programs.	Compile existing data and establish integrated monitoring program.	Enhanced understanding, protection, and management of NY's portion of Lake Erie, Lake Ontario, Niagara River, St. Lawrence River, and each AOC. Data informs AOC remediation and delisting actions.	NYSDEC, NYSDOH	1, 2, 5
3.2	Action - Project	Implement strategic actions listed in Stage 2 RAP Addenda (http://www.dec.ny.gov/lands/25562.html) to accomplish BUI removal for each NYS Area of Concern.	<ul style="list-style-type: none"> • Complete delisting documents for 7 BUIs among 5 AOCs. • Delisting of Rochester Embayment AOC. 	Removal of BUIs and delisting of NY AOCs.	NYSDEC, RAP Coordinating Orgs	1, 2, 5
3.3	Action - Project	Lead aggressive efforts to remediate contaminated sediments that are the most significant cause of BUIs in each AOC.	Remediation projects underway in each AOC.	Removal of BUIs and delisting of NY AOCs.	NYSDEC	1, 5, 9
3.4	Action - Project	Develop, maintain and manage an information management system, available via DEC's website, to report progress and inform and engage the general public on local projects.	Develop AOC-specific information management system.	Enhanced tracking and public outreach capacity.	NYSDEC	XC
3.5	Evaluation	Evaluate progress toward restoring BUIs in AOCs.	Ongoing	Removal of BUIs.	RAP Coordinating Orgs ¹⁷	5, 9
3.6	Education/ Outreach	Promote collaboration and public outreach to achieve strategic approach, consensus and beneficial results.	Ongoing: Quarterly RAC meetings • Develop AOC-specific outreach plan.	Collaborative process leverages capacity and resources to achieve delisting criteria.	AOC Coordinating Orgs	XC

¹⁷Buffalo River – Buffalo Niagara Riverkeeper; Niagara River – NYSDEC; Eighteenmile Creek – Niagara County SWCD; St. Lawrence River at Massena – NYSDEC; Rochester Embayment – Monroe County Department of Health

Goal 4: Combat Invasive Species to sustain a healthy Great Lakes ecosystem and to maintain diverse economic and recreational opportunities.

Challenge

Throughout the Great Lakes, invasive species are considered among the most significant causes of impairment to water quality and healthy fish and wildlife populations and habitats.

Impacts on native community structure and ecosystem function can lead to dramatically altered environmental conditions with serious socio-economic impacts, and in some instances, may have implications for human health and safety. Furthermore, in many cases, effective prevention and management of aquatic and terrestrial invasive species will determine the degree of success that can be achieved among the agenda's other focal areas, including recreation and tourism, coastal resiliency, fish and wildlife habitat, and water quality.

The ecosystems of the Great Lakes have been altered by past invasive species introductions and remain vulnerable to future introductions through numerous pathways, such as maritime commerce, aquaculture, trans-basin canals and waterways, recreational activity and commercially sold organisms. More than 180 non-native aquatic species have become established in the Great Lakes, including zebra and quagga mussels, sea lamprey, and round goby. Hydrilla and water chestnut are now included among recent arrivals to New York's Great Lakes basin. Terrestrial invasive species include the emerald ash borer, hemlock woolly adelgid, and feral pigs. In recent decades, the average rate of discovery has been one species every eight months, and economic losses in the multi-state Great Lakes Basin are estimated at \$5 billion annually.

Preventing the introduction of new invasive species populations is a key state priority for achieving lakewide and landscape-based ecosystem quality and biodiversity objectives, and for revitalizing urban communities through the preservation of urban green space. Species with a high potential for introduction in the near future include Asian carp, golden mussel, and northern snakehead. Newly introduced species often go undetected until their populations are large and well established, facilitated by a lack of natural predators, pests and parasites in the new location; thus, eradication is rarely a viable option. Rapid response and control programs are currently the most effective mechanisms for managing invasive species. But reacting to these species on a haphazard, case-by-case basis places an unacceptable burden on existing program resources and funding. PRISMs, or Partnerships for Regional Invasive Species Management, represent a unique, integrated effort to achieve more strategic and efficient invasive species management. PRISMs are regionally based stakeholder groups responsible for coordinating partner efforts, recruiting and training citizen volunteers, conducting education and outreach, establishing early detection monitoring networks and implementing direct eradication and control efforts. The majority of New York's Great Lakes basin is covered by four PRISMs: Adirondack Park Invasive Plant Program, Finger Lakes PRISM, Western PRISM, and St. Lawrence-Eastern Lake Ontario PRISM.

In addition, anticipated changes in environmental conditions due to climate change will have consequences throughout the ecosystems of the Great Lakes basin. These include land-use and water quality changes, as well as human-induced disturbances which may result in new or altered transport and introduction mechanisms with the potential to increase introduction, establishment and distribution of invasive species. A changing climate underscores the need to build and restore resilient ecosystems and to effectively conduct early detection and rapid-response activities as capabilities allow.

Goal 4 - Priority Actions

To achieve the goal of combating invasive species to sustain a healthy Great Lakes ecosystem, implementation of the following priority actions is needed.

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
4.1	Assessment/ Research	Evaluate technical alternatives (i.e., <i>in-situ</i> barriers, boat lifts, etc.) and their potential legal/social/economic implications to ensure the region's canals and waterways are not vectors for spreading invasive species.	Evaluation completed.	Development of enhanced management alternatives for canal system.	NYS Canal Corp., GLRC, TNC	5, 9, XC
4.2	Assessment/ Research	Conduct a study on the economic impact of invasive species and potential control strategies in New York State.	Study completed.	Understanding of economic impacts informs prioritization of control efforts.	GLRC	5, 9, XC
4.3	Assessment/ Research	Conduct research to improve early detection and management of invasive species (e.g., identification of likely pathways of invasion, seed-source trackdown, development of innovative control tools).	<ul style="list-style-type: none"> Identify priority research needs. Five studies are completed or underway. 	Improved detection and management capabilities.	Invasive Species Research Institute/ Cornell U.	5, 9, XC
4.4	Monitoring/ Planning	Develop an early detection and monitoring initiative to focus on the most probable entry points (e.g., canals, ports) of invasive species to Great Lakes watersheds.	<ul style="list-style-type: none"> Develop a geospatial database of species most likely to invade NYS GL region. Develop innovative monitoring techniques (e.g., eDNA). 	Develop near real time rapid-monitoring capability to support early detection and rapid response.	PRISMs, NYNHP, Invasive Species Research Institute/ Cornell U.	5, 9
4.5	Monitoring/ Planning	Develop rapid response strategies to address high priority invasive species (e.g., Asian carp, hydrilla).	<p>Ongoing: Complete strategies for high-priority species.</p> <ul style="list-style-type: none"> Finalize Asian carp response plan. 	Reduced risk of introduction and spread of invasives.	NYSDEC, PRISMs	5, 9
4.6	Action - Capacity	Increase state, regional and local capacity to respond to new or additional invasive species discoveries.	<ul style="list-style-type: none"> Secure funding for response activities. Facilitate creation of 5 regional rapid response teams. 	Enhanced state and local response coordination and capacity.	PRISMs, OPRHP, other	5, 9
4.7	Action - Capacity	Provide technical and financial assistance to Great Lakes basin communities impacted by invasive species.	Conduct 3 assistance projects (i.e., remove EAB-infested or at-risk trees, identify and chemically treat high-value urban trees, restore green infrastructure by replacing impacted trees with non-host species).	Communities have increased capacity to address invasive species.	NYSDEC, PRISMs	5, 9
4.8	Action - Funding	Secure sustainable funding for boat steward programs in the Great Lakes watershed.	Identify and secure funding source.	Expansion of boat steward programs in GL watershed.	NYSDEC	5, 9
4.9	Action - Project	Implement early detection, monitoring and control strategies for high-priority species such as hydrilla, European frog-bit, water chestnut, and phragmites.	Eradicate hydrilla in verified Great Lakes locations.	Achieve near real time rapid-monitoring capability.	PRISMs, NYSDEC	5, 9

New York's Great Lakes Action Agenda: Interim

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
4.10	Action - Project	Facilitate the development, testing and implementation of shipboard ballast water treatment technology for use in freshwater by participation in the Great Ships Initiative and Ballast Water Collaborative.	<ul style="list-style-type: none"> • Monitor ballast water to determine risk and establish baseline. • Develop and test two new technologies. 	Development and implementation of effective ballast water treatment technology.	NYSDEC	5, 9, XC
4.11	Action - Project	Implement integrated control strategies to address high-priority aquatic and terrestrial invasive species (e.g., sea lamprey, hydrilla, etc.).	Develop and implement an integrated control strategy.	Reduce impacts of invasives on fisheries, recreation, and native habitat.	NYSDEC, OPRHP, GLFC, other	5, 9
4.12	Action - Project	Continue and expand programs to install boat-cleaning stations and informational kiosks regarding invasive species at high-priority public boat launches, marinas and other likely points of entry.	Install 50 educational kiosks at high-use boat landings.	Reduced spread of invasives.	NYSDEC, OPRHP, Paul Smith's College, NYSG, Finger Lakes Institute	5, 9, XC
4.13	Education/ Outreach	Increase knowledge of and compliance with existing and proposed laws and regulations (e.g., ballast water management, live bait, firewood import/movement restrictions and EAB quarantine regulations).	Develop and distribute information.	Increased compliance with laws and regulations.	NYSDEC	5, 9
4.14	Education/ Outreach	Improve invasive species data management efforts (e.g., document the distribution of existing invasive species, conduct forest and water body inventories, survey for invasive species and diseases in Great Lakes watersheds).	Support Natural Heritage Program's iMapinvasives initiative and Cornell Cooperative Extension's Invasive Species Program.	Improved data management supports control efforts.	Natural Heritage Program, Cornell Cooperative Extension IS program	9
4.15	Education/ Outreach	Support bi-national, federal, multi-state, and regional invasive species outreach, education, and collaboration initiatives.	Support 10 initiatives.	Reduced introductions and enhanced response capacity.	Various	5, 9, XC
4.16	Education/ Outreach	Develop and implement collaborative social marketing campaigns to reduce introduction of invasive species by live bait.	Develop and implement a social marketing campaign.	Reduced introductions by live bait.	PRISMs, other	5, 9, XC

Goal 5: Conserve and Restore Native Fish and Wildlife Biodiversity and Habitats to achieve and sustain resilient ecosystems and vibrant economies.

Challenge

The Great Lakes' diverse habitats throughout open lake, coastal, and watershed locales are vitally important, providing important habitat for fish and wildlife, improving water quality, and supporting recreational and other human uses. Wetlands and riparian buffers serve an important role in filtering contaminants from runoff, maintaining water quality, and slowing stormwater flows. Freshwater wetlands also provide important food sources for many organisms, offer refuge for migratory waterfowl, and serve as breeding, spawning, and nursery grounds for native fish and wildlife species. Tributaries and nearshore habitats in the lakes are critical to the reproduction of many Great Lakes fish during their most vulnerable life stages. In addition, our diverse Great Lakes ecosystems support a range of ecosystem services or benefits for human communities that include hunting, fishing, wildlife observation, water filtration, flood control, and nutrient cycling.

Significant amounts of nearshore and wetland habitats have been lost or fundamentally altered in the Great Lakes due to development, incompatible land use, altered hydrology, increased runoff of nutrients and sediment, invasion by non-native species and artificial flow management. In addition, changing storm frequencies and intensities, and altered temperature patterns resulting from projected climatic changes will likely place additional stress on sensitive nearshore and coastal areas. Coastal erosion, sediment transport regimes, and stream flow characteristics may be significantly altered as a result of these changes. Furthermore, warmer water temperatures may lead to a northward shift in the distribution of both coldwater and warmwater fisheries, while making conditions more favorable for the spread of invasive species.

It is essential to preserve and restore natural systems and functions to ensure that the full range of ecosystem services and uses, including biological, recreational, and scenic values, are maintained and enhanced into the future. Some key conservation priorities for conserving and restoring biodiversity and habitats include the following:

- ✓ Habitat restoration and improvements in aquatic habitat connectivity have been identified as key objectives for the restoration of Atlantic salmon, lake sturgeon, American eel and lake trout in the 2005 State Comprehensive Wildlife Conservation Strategy.
- ✓ Implementation of Fish Community Objectives (FCOs), designed to balance competing human uses, include the restoration of native fish populations such as lake trout and deepwater ciscoes, while maintaining a viable, productive sportfishery.
- ✓ Implementation of the Lake Ontario LAMP and Bi-national Biodiversity Conservation Strategy, which aims to address five critical threats: incompatible development, invasive species, dams and barriers, non-point source pollution, and climate change. A bi-national biodiversity strategy has also been developed for Lake Erie to complement the Lake Erie LAMP.

Successful fish and wildlife management and conservation in the Great Lakes basin are dependent on managing assemblages of species and their habitats, typically on a landscape conservation scale. This requires an inter-jurisdictional, holistic view of ecosystems and strategic habitat conservation which fully considers relationships among species and their habitat needs over the course of their lifecycles. The cumulative impacts of human activities and land uses, established and high-risk invasive species, and factors related to projected climatic changes must be adequately considered and accordingly addressed.

Goal 5 - Priority Actions

To achieve the goal of conserving and restoring native fish and wildlife biodiversity and habitats, and to sustain resilient ecosystems and vibrant economies, implementation of the following priority actions is needed.

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
5.1	Assessment/ Research	Assess possible spawning areas for lake herring in the southern embayments of Lake Ontario, to increase fish diversity and to provide an alternative prey source for native top predators.	Secure project funding and initiate project.	Increased understanding of lower food web dynamics.	NYSDEC, USGS, TNC, Cornell DNR	9
5.2	Assessment/ Research	Conduct research study to understand how epilimnetic zooplankton declines and changes in zooplankton community structure/distribution are affecting prey fish.	Complete research study.	Increased understanding of lower food web dynamics.	GLRC, TNC, USGS, Cornell DNR	9, XC
5.3	Assessment/ Research	Define the trophic pathway of botulism toxin to fish and birds. In particular, a rapid, sensitive, and inexpensive assay for quantification of the botulism toxin must be developed for tracking the toxin's transmission pathway through the aquatic food web.	Complete research study.	Development of management practices to prevent and/or predict botulism outbreaks.	GLRC, TNC, USGS, Cornell DNR	9, XC
5.4	Assessment/ Research	Assess presence and population effects of environmentally available endocrine disruptors by determining the prevalence of intersex individuals in fish populations in the Great Lakes and selected tributary streams.	Complete research study.	Understanding of impacts of endocrine disruptors on fish populations.	GLRC	1, XC
5.5	Monitoring/ Planning	Develop an adaptive monitoring plan to detect, record, and analyze changes in fish and wildlife populations, species range, habitat composition, natural cycles, and fish and wildlife health to assess the impacts of climate change.	<ul style="list-style-type: none"> • Create web-based climate change data repository for NYS. • Develop monitoring plan. 	Enhanced understanding of impacts to wildlife as a result of climate change.	NYSDERDA, NYSDEC, others	CC, XC
5.6	Monitoring/ Planning	Identify lands and waters essential for improving terrestrial and aquatic habitat connectivity.	<ul style="list-style-type: none"> • Identify target habitats. • Implement projects to enhance connectivity. 	Enhanced connectivity to facilitate species movement and adaptation to climatic changes.	Various	CC
5.7	Action - Project	Restore aquatic connectivity (e.g., removal and/or modification of fish passage barriers and dams, redesign of road-stream crossings and culverts, improve in-stream habitat, restore wetland/upland areas) in support of LAMP, RAP and other biodiversity strategies.	Fifteen projects are completed or underway.	Enhanced aquatic connectivity and ecosystem resiliency.	NYSDEC, ACOE, others	CC, 7
5.8	Action - Project	Conserve, restore, and acquire high-priority unprotected and vulnerable lands (e.g., wetlands, shorelines, tributary floodplains, islands and lands buffering coastal and aquatic systems, and other high priority lands).	<ul style="list-style-type: none"> • Identify and secure funding, especially for land acquisition. • Implement 5 priority projects in each sub-basin, as identified by Bi-national Biodiversity Conservation Strategies, NYS Open Space Conservation Plan, and other relevant plans. 	Enhanced conservation of natural systems to support wildlife habitat, water quality, resiliency efforts, recreation, and economic development.	OPRHP, USFWS, TNC, BNRK, others	2, 7

New York's Great Lakes Action Agenda: Interim

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
5.9	Action - Project	Implement management guidance for state Bird Conservation Areas and Important Bird Areas in the Great Lakes basin.	Implement projects at 3 target BCAs/IBAs.	Enhanced protection of native birds and their habitats.	NYSDEC, OPRHP, Audubon, BNRK, others	9
5.10	Action - Project	Expand riparian enhancement programs (e.g., Trees for Tribes, NYS CREP) in the Great Lakes basin. To the extent possible, native, pollinator supporting plants should be used.	<ul style="list-style-type: none"> Secure funding. Initiate Trees for Tribes program in GL basin. 	Reduce streambank erosion, increase habitat, enhance connectivity, and facilitate adaptation to extreme weather events.	NYSDEC	CC, 2, 3
5.11	Action - Project	Continue efforts to monitor and restore selected native fish species, including lake trout, Atlantic salmon, lake sturgeon, American eel, sauger, herring, and deepwater ciscoes. Efforts include development and/or implementation of restoration plans, and assessment of the effectiveness of various stocking strategies, habitat enhancements, species strains, and mitigation measures.	<ul style="list-style-type: none"> Secure needed funding and staff. Expand and/or implement new monitoring/restoration efforts. 	Native fish populations are increasing.	NYSDEC, USGS, TNC, OMNR, PFBC, ODW, MDNR, SRMT	XC
5.12	Action - Project	Map freshwater wetlands for enhanced regulatory protection and restoration.	Complete mapping in high-priority sub-watersheds.	Enhance regulatory protection and inform restoration.	NYSDEC	7
5.13	Action - Project	Incorporate wildlife habitat needs into the design and re-use of land reclamation and brownfield redevelopment activities.	Include habitat needs in 5 project designs.	Enhance habitat value of reclaimed lands.	NYSDEC, BNRK, others	8
5.14	Evaluation	Evaluate the creation of a wetlands and natural systems mitigation banking program to offset damage or loss.	Evaluate mitigation banking program.	Ensure that impacts to wetlands and natural systems are minimized.	To be determined	5
5.15	Evaluation	Assess mitigation of potential adverse impacts to wildlife associated with alternative energy development (e.g., wind, hydropower) and other land uses (e.g., mining, landfills).	Complete assessment.	Identification of best mitigation techniques by development type.	NYSDEC, USFWS, NYSERDA, GLRC, Audubon	10
5.16	Education/ Outreach	Engage sportfishing stakeholders to enlist public support for the restoration of native species.	Reach 5,000 stakeholders.	Increased public support.	NYSDEC, NYSG	XC

Goal 6: Conserve Great Lakes Water Supplies in a manner that recognizes the renewable but finite supply of the waters of the Great Lakes basin for the long-term sustainable use and enjoyment of the public.

Challenge

Although New York is a water-rich state, it must continue to strengthen its capabilities to better understand and manage its water resources in the Great Lakes region. This is especially true given the growing demand for water, including water for human consumption and energy production. As other parts of the country experience large changes in drought frequency and intensity, New York's water resources may become a defining economic asset, resulting in the migration of people and businesses into the state. This may bring economic benefits but will also present new challenges as demand for water resources increases. To maximize potential economic development benefits while conserving precious water resources into the future, New York should conduct a comprehensive assessment of its water supplies and uses to better understand the availability, limitations, and allocations of water and how this "water budget" intersects with economic and energy development, population growth, and ecological health.

The potential for greater demand and perhaps unsustainable use of Great Lakes water resources led to international actions to ensure that effective safeguards were put into place to protect these resources on a regional basis. On December 13, 2005, the Great Lakes governors and premiers signed two agreements to protect the waters of the Great Lakes: 1) *Great Lakes-St. Lawrence River Basin Sustainable Water Resources Agreement*, and 2) *Great Lakes-St. Lawrence River Basin Water Resources Compact*. In 2008, New York joined the other Great Lakes states and Congress in ratifying the *Compact*. The *Compact* provides a comprehensive management framework for achieving sustainable water use and resource protection in the Great Lakes basin, including both its surface and groundwater resources. The *Agreement* and the *Compact* deal with water supply issues, including out-of-basin diversions, the management and regulation of water withdrawals, and the assessment of significant impacts due to water withdrawals and consumptive uses.

New York has fulfilled its water management and regulation commitments, consistent with the *Compact's* requirements and as codified in Environmental Conservation Law ECL 21-100. These commitments include development of water conservation and efficient use goals and objectives, development and implementation of a water conservation and efficiency program, and establishment of a water resources inventory, registration and reporting requirement.

Recent deliverables achieved under the *Compact* include the following:

- New York established baseline volumes for existing water withdrawals in December 2009.
- A new water withdrawal law was passed in August 2011 and became effective beginning February 2012. This law extends DEC's permitting authority to withdrawals of 100,000 gallons per day (gpd) or greater for any purpose throughout the state, and includes registration of existing agricultural withdrawals greater than 100,000 gpd and of major basin water diversions of greater than 1,000,000 gpd. This program seeks to enhance consistency in water supply management on a statewide basis, consistent with the provisions of the *Compact*.
- New York has developed water conservation guidance for public water and non-potable water supplies.
- At the interstate level, the parties to the *Compact* and the *Agreement* have established "Goals and Objectives for Water Conservation and Efficient Use," and "Water Withdrawal Information

Reporting and Management Protocols” to be used across the basin. Work is currently under way to develop protocols for cumulative impact assessment of water withdrawals and consumptive uses.

Goal 6 - Priority Actions

To achieve the goal of conserving Great Lakes water supplies, implementation of the following priority actions is needed.

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
6.1	Assessment/ Research	Assess New York State’s “water budget,” including groundwater and surface water supplies.	Develop an assessment protocol and initiate implementation.	Identify water-rich and water-deficient areas to inform REDC and regional sustainability plans.	NYSDEC, USGS	5, 8, 9
6.2	Monitoring/ Planning	Develop and adopt strategies to protect and sustain source waters, water supply aquifers and critical watershed supplies.	Identify target locations and protection strategies.	Protection of water quality and quantity.	Various	5, 8, 9
6.3	Monitoring/ Planning	Develop a stream flow monitoring system to collect data for statistical analyses, gauging networks and estimation tools to evaluate the hydrological impacts of climate change, individual and cumulative water withdrawals, and unsustainable land uses upon aquatic biodiversity and water supply.	Develop a stream flow monitoring system, guidelines and information technology tools to comply with <i>Compact</i> commitments.	Maintain hydrologic flows in tributary streams and groundwater systems that are consistent with ecological and human needs.	USGS, TNC, NYSDEC, Cornell U.	5, XC, CC
6.4	Action - Project	Continue to fund and work with the Great Lakes-St. Lawrence River Basin Water Resources Compact Council and Regional Body to achieve the shared vision for sustainable water resource management.	Ongoing	Sustainable water resource management.	NYSDEC	XC
6.5	Action - Project	Implement the water withdrawal and diversion management program and water conservation/efficient use program pursuant to the <i>Compact</i> and statewide water resource management objectives.	Ongoing	Improved management of withdrawals, diversions, and water conservation.	NYSDEC, USGS	5
6.6	Action - Project	Establish and promote incentives for business, residential, and agricultural water users to increase water use efficiency and conservation through leak detection programs, low-flow devices, rainwater harvesting, and equitable water-pricing programs.	<ul style="list-style-type: none"> • Identify incentives. • Promote incentives to large water users. 	Increased water conservation incentives.	NYSDEC	8
6.7	Action - Project	Map high-priority aquifers in the Great Lakes basin.	Map high-priority aquifers.	Understand aquifer hydrology and implications for local water supplies.	NYSDEC, USGS	6.1
6.8	Education/ Outreach	Increase understanding of water conservation practices and policy among NYS GL basin water users.	<ul style="list-style-type: none"> • Develop outreach materials. • Reach 5,000 users. 	Enhanced understanding promotes greater conservation of water resources.	NYSDEC	XC
6.9	Education/ Outreach	Work with New York manufacturers and other large water users to reduce their water “footprint” in production processes beyond regulation requirements.	<ul style="list-style-type: none"> • Complete 3 pilot projects to reduce water use. • Report water and cost savings by industry. 	Increase water use efficiency and conservation.	Various	8

Goal 7: Enhance Community Resiliency and Ecosystem Integrity through restoration, protection, and improved resource management.

Together, the shorelines of Lakes Erie and Ontario comprise New York's "north coast," spanning approximately 700 miles across these two lakes and two international rivers—the Niagara and the St. Lawrence. Although varied in geography and geology, these shorelines are similarly vulnerable to storm surges, coastal flooding, shoreline erosion and overdevelopment that place both human and natural communities at risk. In recent years, warmer lake temperatures and decreased winter ice cover brought on by warmer temperatures, have increased the risk of flooding and shoreline erosion. At the same time, the loss of coastal wetlands over the last century as a result of development, degradation, and unnatural water flow management has significantly reduced the natural protective functions and flood-absorption capacity of these ecosystems, placing natural and human communities at considerable risk. These risks are not unique to the coastal region, and many inland communities deal with similar flooding and erosion issues as a result of wetland loss and degradation, improper stream management, and excessive development of floodplains.

To enhance the resilience of Lake Ontario and Lake Erie's environment, economy, and communities, an integrated management approach, or resiliency strategy, that considers human uses of these resources must be developed and implemented. Community resiliency, as described in the NYS 2100 Commission report¹⁸, and ecosystem integrity will be enhanced through a combination of efforts, including restoration of coastal wetlands, beaches, and dune communities; improvements to hard infrastructure protections; promotion of "soft" infrastructure and living shorelines¹⁹; offshore wave attenuation and habitat-friendly breakwaters; and development of land-use recommendations that encourage high-risk properties to reduce vulnerabilities. Other key priorities for promoting community resiliency and ecosystem integrity include the following:

- ✓ Protect critical infrastructure in Great Lakes coastal communities by using natural and engineered measures to improve resiliency where possible.
- ✓ Reduce inland vulnerability to extreme weather events by promoting wetland protections in flood-prone areas, evaluating a wetlands and natural systems mitigation banking program to promote restoration, and expanding green infrastructure and urban forests to slow storm runoff.
- ✓ Strengthen drinking and wastewater infrastructure to reduce vulnerability to flooding, drought, and other extreme weather events.
- ✓ Explore benefits and disadvantages of adapting to unnatural water flow management plans for the Niagara and St. Lawrence Rivers that supports nearshore ecosystem restoration and property resiliency initiatives.
- ✓ Adapt to threats caused by climate change by restoring ecosystem biodiversity, increasing habitat connectivity, and supporting resiliency initiatives for natural and built environments.

¹⁸ [Recommendations to Improve the Strength and Resilience of the Empire State's Infrastructure](#), NYS 2100 Commission, 2012.

¹⁹ Living shorelines, also commonly referred to as soft shorelines or natural infrastructure, provide erosion-control benefits; protect, restore, or enhance natural shoreline habitat; and maintain coastal processes through the strategic placement of plants, stone, sand fill, and other structural organic materials (e.g., biologs, oyster reefs, etc.). (NOAA)

Goal 7 - Priority Actions

To achieve the goal of enhancing community resiliency and ecosystem integrity, implementation of the following priority actions is needed.

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
7.1	Assessment/ Research	Conduct a coastal property and ecosystem vulnerability analysis to predict the potential impacts of flooding, erosion, and altered precipitation patterns that may occur, and their effects on human and natural communities.	<ul style="list-style-type: none"> Complete coastal property analysis (e.g., analysis of improvements to hard infrastructure protections along the lakes, restrictions on the reconstruction of public infrastructure and other buildings in high-risk flood and erosion zones). Complete coastal ecosystem analysis. 	Assess vulnerability of built and natural coastal infrastructure to inform and prioritize coastal resiliency planning and project implementation.	NYSDEC, NYSDOS, others	8, 9, CC
7.2	Monitoring/ Planning	Identify appropriate "soft" shoreline protection techniques and the economic and ecological costs/benefits associated with each for Lake Ontario, Lake Erie, and the Niagara and St. Lawrence Rivers.	Complete guidance manual of techniques deemed suitable for NY's GL system.	Understand which soft shoreline techniques are suitable for implementation on NY's GL system.	NYSDEC, NYSDOS, OPRHP, NYSG, ACOE, NYSERDA	5, 9
7.3	Monitoring/ Planning	Support development of a bi-national integrated remote environmental monitoring system to track and forecast hydrologic, climatic, and meteorological conditions to inform conservation science, public safety, and adaptive management initiatives.	Develop monitoring system.	Information will inform adaptive management of St. Lawrence River/Lake Ontario water flow regulation, support evaluation of cumulative water withdrawals from the basin, address water quality issues, and monitor habitat and fisheries management projects.	GLRC, NYSDOS, NYSDDEC, NOAA, Environment Canada	6, XC, CC
7.4	Monitoring/ Planning	Develop a Great Lakes coastal restoration and resilience strategy to alleviate flood and erosion impacts to built and natural shorelines and improve overall coastal ecology.	Complete draft of strategy.	Strategy that proposes implementable actions to increase coastal resiliency.	NYSDEC, NYSDOS, OPRHP	5, 8, 9
7.5	Monitoring/ Planning	Continue and expand coastal wetland monitoring to support restoration, protection, and adaptive management.	Secure funding.	Inform development of landscape-scale wetland restoration plan.	NYNHP	5
7.6	Action - Capacity	Provide technical assistance to shoreline communities for infrastructure improvements and improved shoreline stewardship that promotes natural, resilient shorelines, while recognizing natural erosion processes.	<ul style="list-style-type: none"> Identify management techniques and measures that promote naturalized shorelines (e.g., offshore wave attenuation, "soft engineering" methods, conservation easements). Develop and disseminate guidance on shoreline erosion-control options. 	Increased awareness and implementation of sustainable shoreline practices and coastal resiliency efforts.	NYSDOS, NYSDDEC, NYSG, BNRK	5, XC
7.7	Action - Funding	Enhance shoreline community access to financial resources that support coastal restoration and resiliency efforts.	Develop a public guide to state and federal resources.	Increased implementation of coastal restoration and resiliency efforts.	NYSDEC, NYSDOS	CC

New York's Great Lakes Action Agenda: Interim

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
7.8	Action - Project	Develop land-use guidance that reduces the number of at-risk structures and promotes storm-resistant structures and setbacks.	Develop 3 land-use planning tools or recommendations that promote coastal resiliency.	Enhanced coastal resiliency.	RPCs, Municipalities, others	CC
7.9	Action - Project	Evaluate the benefits and impacts of adapting to water flow management plans for Lake Ontario and its connecting channels that considers extreme fluctuations in supplies in order to effectively balance the multiple needs and dependent uses of Lake Ontario and the St. Lawrence River.	Support domestic and binational adaptive management efforts.	Improved coastal results in environmental (enhanced flood capacity, wave and storm buffers, enhanced habitat quality, stormwater filtering) and economic benefits (increased property values, tourism, recreation, and economic development).	NYSDEC, NYSDOS	5
7.10	Action - Project	Create, restore, and preserve natural shoreline protections, including construction of offshore artificial reefs, restored beaches, dunes, and habitat-friendly breakwaters.	<ul style="list-style-type: none"> Identify priority sites for protection, restoration, and/or acquisition. Actions underway to conserve/restore 5 sites. 	Reduced impacts from storm surges and wave forces on unprotected shorelines.	TNC, GLRC, BNRK, others	5, 8
7.11	Action - Project	Promote and expand green infrastructure and urban forests, especially in flood-prone areas.	Implement 50 green infrastructure/urban forestry projects.	Reduce flood hazard, preserve water quality, promote aquifer/reservoir recharge, provide natural habitat, etc.	Various	2, 5
7.12	Action - Project	Identify drinking water and aquifer systems vulnerable to drought, monitor the quantity of water in those systems, develop water efficiency guidance, and identify alternative supplies.	Identify and assess vulnerable drinking water and aquifer systems.	Reduce vulnerability of drinking water and aquifer systems.	NYSDEC, EFC	6
7.13	Action - Project	Strengthen vulnerable wastewater infrastructure by requiring installation of disinfection systems and back-up power, update design standards for wastewater systems, and improve long-term maintenance and planning.	<ul style="list-style-type: none"> Identify vulnerable wastewater infrastructure. Implement 10 risk-reduction activities. 	Strengthen vulnerable wastewater infrastructure.	Municipalities, EFC	2
7.14	Action - Project	Develop and implement a landscape-scale active restoration and management plan for coastal wetlands.	<ul style="list-style-type: none"> Secure funding to continue and expand coastal wetland monitoring. Develop active restoration plan for coastal wetlands, based on monitoring data (action 7.5). 	Enhance coastal resiliency, restore aquatic habitat and biodiversity.	NYSDEC, NYNHP, OPRHP, others	CC

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
7.15	Action - Project	Work with pertinent federal agencies to develop sediment budgets (identifying sources of sediment and "sinks" where sediment should accumulate) for Lake Erie and Lake Ontario watersheds. These efforts should: (1) identify shoreline and tributary reaches particularly susceptible to flooding and erosion under more varied climate conditions; (2) assemble seamless topo-bathymetry of the shorelines of NYS's Great Lakes to enable effective modeling and assessment of the probable impacts of climate change on them; and 3) evaluate shoreline stretches for beach nourishment.	Complete sediment budgets.	Understanding of coastal vulnerabilities, climate change impacts, and location of critical nearshore habitats.	ACOE, FEMA, NYSDEC, NYSDOS	10, CC
7.16	Education/ Outreach	Encourage municipalities and (agricultural) landowners to implement flood mitigation actions (e.g., soil health practices, natural infrastructure, wetland restoration/protection, etc.) to reduce peak flows in high-risk streams.	Outreach to 50 municipalities/landowners	Reduce stormwater runoff, sedimentation, and flood risk.	NYSDAM, RPCs, others	7, XC
7.17	Education/ Outreach	Undertake community-based stewardship and education activities (e.g., coastal debris prevention, habitat restoration, etc).	Implement coastal stewardship/education projects.	Enhanced public stewardship of coastal resources.	BNRK, others	9, XC
7.18	Education/ Outreach	Promote living shorelines and coastal/riparian stewardship on public and private lands to improve aquatic habitat and enhance coastal resiliency.	Complete 3 living shoreline restoration/outreach projects.	Enhanced coastal resiliency for natural and human communities.	NYSDOS, NYSDEC, NYSG, BNRK, others	CC, 2, 3

Goal 8: Promote Smart Growth, Redevelopment and Adaptive Reuse to create a sustainable and vibrant economy in the Great Lakes ecosystem.

Challenge

Over the course of several decades, many Great Lakes urban centers have experienced a dramatic decline of the manufacturing sector, population out-migration, suburbanization, shrinking tax revenues and overall economic distress. Cities in the region host many underused “brownfield” sites, vacant industrial buildings, and distressed or abandoned residential buildings. A focus on re-development of urban centers offers the opportunity to improve the economy and ecosystem health, and address environmental justice at the same time.

New York State agencies have been exploring how to use good planning to create livable communities, protect natural resources, build resilient infrastructure, and promote sustainable economic growth. Through the application of smart-growth principles, state and municipal government can use planning, zoning, property tax, and infrastructure investment policies²⁰ to encourage redevelopment and concentrate new development near transportation centers and existing infrastructure, promote the use of public transit, avoid sprawl, and move communities toward sustainability and resiliency. Smart-growth approaches have clear environmental benefits: improved air and water quality, reduction of greenhouse gas emissions, greater habitat and open space protection, storm resiliency, farmland preservation, cleanup and re-use of brownfield sites, elimination of blight, and fish and wildlife protection²¹.

By strategically focusing state financial support and sustainable land-use development in existing urban areas and other municipal and regional centers, the Great Lakes region can accomplish its economic development goals, leverage the value of existing infrastructure, reduce development pressure in green belts²², and support the state’s climate change mitigation and adaptation goals. Also, smart-growth development patterns can have the benefit of reducing the costs of providing public infrastructure and delivering services, thereby enhancing the region’s economic competitiveness.

Although many of the actions identified under this goal primarily focus on what should be done from the state perspective, the important role of county and local governments is recognized and respected. Land-use decision-making processes will continue to be accomplished at the local level through existing authorities and mechanisms and will likely be driven by local priorities for smart growth.

Goal 8 - Priority Actions

To achieve the goal of promoting smart growth, redevelopment and adaptive reuse, implementation of the following priority actions is needed.

²⁰In August 2010, the "State Smart Growth Public Infrastructure Policy Act" was enacted (Chapter 433). The new law established state smart-growth criteria to direct public infrastructure investments toward existing infrastructure, developed areas and municipal centers, such as downtowns, main streets, central business districts and brownfield areas.

²¹[Environmental Benefits of Smart Growth](#), EPA, October 2012.

²²Greenbelts are areas of largely undeveloped, wild, or agricultural land surrounding or adjacent to urban areas.

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
8.1	Monitoring/ Planning	Encourage communities to develop integrated comprehensive plans and land-use practices that incorporate sustainability and resiliency actions, climate change adaptation goals, and that are aligned with regional planning initiatives (e.g., LAMPs, Regional Economic Development Council (REDC) strategic plans, Cleaner, Greener Communities (CGC) sustainability plans, and Regional Transportation Plans).	<ul style="list-style-type: none"> Identify funding options and technical assistance resources to assist communities. Five communities develop integrated comprehensive plans. 	Integrated plans support community revitalization, ecological restoration, climate resiliency, and sustainable economic growth.	NYSDOS, NYSERDA, REDC, RPCs, others	CC, 7, 9, 10
8.2	Monitoring/ Planning	Identify underused or vacant areas for reclamation, restoration and/or protection consistent with smart-growth principles (e.g., greenways, floodplain preservation, wildlife corridors and riparian buffers, etc.).	Inventory and prioritize locations in 5 communities.	Urban green spaces benefit water quality, habitat, and community revitalization.	Municipalities, BNRK, RPCs, MPOs, others	1, 2, 5, 7, 9
8.3	Action - Project	Identify and develop zoning guidance, model ordinances and cost-benefit analysis methodologies to support implementation of smart-growth principles and plans.	Develop 3 resources to support local decision-making.	Enhance local capacity to implement smart-growth principles.	NYSDOS, NYSERDA, RPCs	5, 7, 9
8.4	Action - Project	Support implementation of integrated local and regional plans and smart-growth principles in the Great Lakes region.	Implement 30 smart-growth projects.	Reduce GHG emissions, enhance climate resiliency, and support sustainable economic growth.	NYSDOS, NYSERDA, REDC, BNRK, others	CC, 7, 9, 10
8.5	Action - Project	Promote local programs that invest in affordable housing and residential energy conservation/efficiency, water conservation and green infrastructure in existing buildings.	Implement 20 programs.	Increased energy and water conservation in support of community revitalization efforts	NYSERDA, EFC, PUSH, CFGB	6, 10
8.6	Action - Project	Implement sustainable transportation policies and programs.	Identify options to expand public transit to support smart growth.	Reduce vehicle miles traveled.	NYSDOT, NYSDOS, REDC, RPCs	10, CC
8.7	Action - Project	Redevelop brownfields to incorporate green infrastructure and environmentally sound development principles.	Redevelop 3 brownfields in urban GL communities.	Reduce development pressure on greenbelts and support smart growth.	Various	1
8.8	Action - Project	Implement an ecosystem-based management (EBM) pilot project that integrates pollutant reduction strategies with ecosystem and brownfield restoration, urban redevelopment, and environmental justice community revitalization.	Complete EBM demo project.	Highlight the value of EBM to community leaders.	NYSDEC, NYSDOS, BNRK, others	All
8.9	Education/ Outreach	Encourage municipalities to undertake climate-smart resiliency planning and participate in the Climate Smart Communities Program to reduce greenhouse gas emissions and save taxpayer dollars through climate-smart actions that also promote community goals of health and safety, affordability, economic vitality and quality of life.	<ul style="list-style-type: none"> Enroll 35 GL communities in the CSC program. Five GL communities commence climate smart resiliency planning. 	Increased adaptation and mitigation implementation.	NYSDEC, NYSERDA, NYSDOS, NYSPSC, NYSDOT, NYSDOH	CC, XC
8.10	Education/ Outreach	Encourage businesses to adopt sustainable facility designs and practices that reduce pollution, enhance worker safety, and support urban greening efforts.	Ten businesses adopt sustainable facility designs and/or practices.	Great Lakes-friendly business design and operation.	REDC, NYSERDA, NYPI	2

Goal 9: Enhance Recreation and Tourism Opportunities that capitalize on the rivers and lakes, scenic beauty, and natural and cultural resources that define the character of the Great Lakes-St. Lawrence region.

Challenge

New York's Great Lakes region offers outstanding tourism and recreation opportunities: world-class freshwater fishing and boating; eco-tourism and agri-tourism experiences, such as birding, winery tours, hiking, biking, skiing and snowshoeing trails; heritage tourism; and beautiful state parks. Lakefront communities are increasingly seen as attractive places, with municipalities emphasizing waterfront revitalization as a key economic development strategy.

Visitors and residents alike make substantial contributions to the regional economy through participation in a variety of recreational activities. Based on the 2007 New York Statewide Angler Survey, the New York Great Lakes sport fishery was valued at \$170 million annually. In total, over 4 million angler days were spent fishing on Great Lakes waters, representing about 22% of all freshwater fishing in New York. Similarly, recreational boating in the region provides substantial positive economic impact. Expenditures related to recreational boating in New York areas bordering the Great Lakes and Finger Lakes amounted to \$600 million in 2003.²³ According to a report by the Outdoor Foundation, bicycling contributes \$4.8 billion to the economy of the Mid-Atlantic region (NY, NJ, PA)²⁴. In addition, kayaking and canoeing are among the fastest-growing outdoor recreation sports in North America, with participation rates soaring over the last ten years. A regional outdoor recreation study (that included New York State) found that kayaking had grown in popularity by 169% in the time period from 1995-2005²⁵. These trends highlight the rapidly growing demand for greenways, blueways²⁶ and outdoor recreation opportunities that depend on clean water and healthy ecosystems.

Priorities for enhancing recreation and tourism opportunities in New York's Great Lakes region include the following:

- ✓ Securing additional access to local waterways for swimming, boating, shore fishing and other recreational activities throughout the region
- ✓ Increasing biking, hiking, kayaking/canoeing, and skiing/snowshoeing/snowmobiling infrastructure and connections to village and town centers through the development and enhancement of greenways and blueways
- ✓ Promoting and capitalizing on the varied landscapes (Tug Hill Plateau, Finger Lakes, St. Lawrence-Thousand Island region, etc.) and their underlying recreational and tourism assets to drive regional economic growth.
- ✓ Increasing public appreciation and stewardship of the natural and historical resources of the Great Lakes region by providing educational resources and interpretation opportunities
- ✓ Pursuing recreation and sustainable development opportunities in parks and recreation areas, while ensuring the protection of natural resources

²³*Great Lakes Recreational Boating's Economic Punch*, Great Lakes Commission, July 2007; *Recreational Boating Expenditures in 2003 in New York State and Their Economic Impact*, New York Sea Grant, Sept 2004.

²⁴*The Active Outdoor Recreation Economy: A \$730 Billion Annual Contribution to the U.S. Economy*, Outdoor Industry Foundation, 2006.

²⁵*Outdoor Recreation in the 21st Century: The Pennsylvania Wilds*. PA DCNR and Fermata, Inc., 2005.

²⁶Blueways are water trails developed with launch points, camping locations and other amenities and attractions for canoeists and kayakers.

Goal 9 - Priority Actions

To achieve the goal of enhancing recreation and tourism opportunities, implementation of the following priority actions is needed.

#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
9.1	Assessment/ Research	Study and compile information on deposition rates, sedimentation loads, sediment sources, etc. to inform dredge management plans for harbors.	Complete study.	Better informed dredge management plans for small harbors.	ACOE	2
9.2	Monitoring/ Planning	Identify opportunities to expand public fishing, wildlife viewing, swimming, hiking, biking, boating/kayaking/canoeing, and skiing/snowshoeing/snowmobiling access along waterfronts and riparian corridors consistent with natural resource protection and that enhances access for underserved communities.	Identify locations to expand recreational access based on SCORP and local demand.	Increased access to recreational amenities.	NYSDEC, NYSDOS, NYSDOT, OPRHP, BNRK	5, 8
9.3	Monitoring/ Planning	Create long-term dredge management plans for commercial and recreational harbors along Lakes Ontario and Erie.	Create management plan.	Maintain commercial and recreational harbors.	NYSDOS	2, 7, 8
9.4	Action - Funding	Secure and leverage funding to advance community recreational needs as identified in SCORP.	Implement 10 projects consistent with SCORP priorities.	Increase and enhance desired recreational amenities.	OPRHP, others	8
9.5	Action - Project	Ensure that state and federal scenic designation programs in the Great Lakes region preserve visual resources along scenic areas and corridors.	Ongoing	Protection of visual resources.	NYSDEC, NYSDOS	8
9.6	Action - Project	Dredge inlets/harbors and address beach breaches.	<ul style="list-style-type: none"> • Dredge 5 high-priority inlets/harbors. • Address beach breaches as needed. 	Economically viable and resilient coastal communities.	Various	7, 8
9.7	Action - Project	Consider Great Lakes habitat restoration and shoreline resiliency initiatives in all plans for park and recreation areas in the basin.	Initiatives are integrated into park and recreation plans.	Enhanced coastal habitat and resiliency.	OPRHP, NYSDOS	5, 7, CC
9.8	Action - Project	Develop and enhance trail networks (blueways and greenways) and public parks that connect communities, cultural resources, and natural systems.	Develop and/or enhance 5 trail networks and/or public parks.	Enhanced connectivity supports tourism, smart growth, and habitat and water quality protection.	NGC, NYSCC, NYSDOT, GLST, BNRK, GRW	1, 2, 5, 7, 8, CC
9.9	Evaluation	Support the implementation and evaluation of coastal cleanup and litter prevention programs.	Assess the volume and trends in coastal debris/litter cleaned up from coastal stewardship programs.	Inform strategic prevention efforts.	Various	5
9.10	Education/ Outreach	Provide educational resources and interpretation opportunities at tourism/recreation destinations.	Create 5 new resources and/or interpretation opportunities.	Increase public appreciation and stewardship of GL natural resources.	NYSG, BNRK, GLST, others	XC
9.11	Education/ Outreach	Promote "branding" of the Great Lakes - St. Lawrence region as a domestic and international tourism and recreational destination through regional marketing efforts.	<ul style="list-style-type: none"> • Conduct surveys to identify best mechanisms for public outreach. • Develop and distribute marketing materials (e.g., website, brochures, kiosks, etc.). 	Branding and marketing of GL region support increased tourism and recreational use.	I Love NY campaign, NYSCC, BNRK, GRW, others	8

Goal 10: Plan for Energy Development consistent with natural resource conservation and supportive of the state's energy and climate change goals.

Challenge

Energy is critical to the future of the Great Lakes region by supporting the local economy, creating jobs, and providing energy for the state. As the energy market continues to evolve, New York must find ways to balance increasing energy demands with the promotion of energy efficiency and the use of renewable technologies consistent with the state's climate change goals.

There are currently over 200 operating land-based wind generators taking advantage of Lake Erie and Lake Ontario winds; several nuclear and coal-fired power plants that use lake water for cooling; hydroelectric dams on the Niagara and St. Lawrence rivers; and a biofuel plant in Oswego. Many proposals are being considered for additional generation and transmission facilities in the Great Lakes region, including lake-based offshore wind energy production²⁷. It is important to acknowledge that all energy-related activities in the region will affect Great Lakes ecosystems in some way. It is essential that a comparison of life-cycle impacts²⁸ be considered in decision making and that the siting of new facilities and upgrading of existing technologies be evaluated for local, regional, national and global impacts.²⁹

There are two core challenges facing the energy sector. The first is to determine how existing energy facilities can be modified to reduce their human and environmental impacts while maintaining their regional and local benefits. The second challenge is to develop new energy-generating facilities that incorporate EBM principles, consider potential climate-change impacts and build resilience for meeting peak demand. Recommendations to address these and other key energy-related challenges have been included in several statewide planning efforts, including the New York Energy Highway Blueprint, the NYISO 2013 Congestion Assessment and Resource Integration Study, and the 2013 New York State Energy Plan currently under development.

While future changes to the climate of the Great Lakes Basin are difficult to quantify, it is clear that expected higher seasonal average temperatures and increased frequency of extreme heat events will result in increased energy use and/or increased reliance on demand response mechanisms, energy storage and other energy resources to meet peak electrical demand. New York's existing and future energy development projects must balance the need to meet the demands of the energy marketplace and provide jobs and local tax revenue while minimizing environmental impacts and being resilient to climate change effects. It is imperative to assess the cumulative impacts of existing and future energy projects in New York through the application of EBM principles.

²⁷[New York's Offshore Wind Energy Development Potential in the Great Lakes: Feasibility Study](#). NYSERDA. April 2010.

²⁸NYSERDA's 2009 report, [Comparison of Reported Effects and Risks to Vertebrate Wildlife from Six Electricity Generation Types in the New York New/England Region](#), provides a relevant reference on life-cycle impacts.

²⁹Examples of direct impacts include disruption of fish life-cycle stages, habitat fragmentation, point-source thermal discharge, and avian strikes. Indirect impacts include acid and mercury deposition, degradation of air quality and aquatic habitats, and diminished habitat connectivity.

Goal 10 - Priority Actions

To achieve the goal of planning for energy development, implementation of the following priority actions is needed.

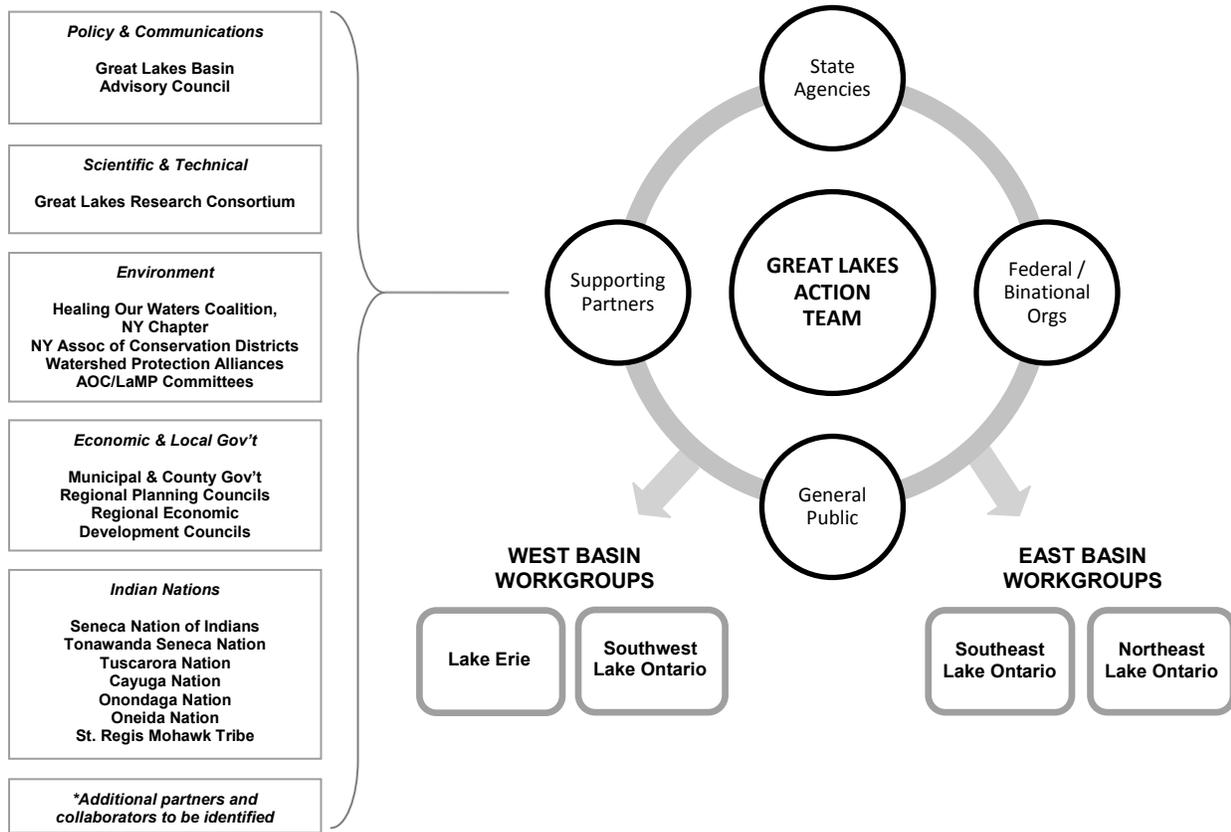
#	Strategy	Action	Milestone	Desired Outcome	Initial Lead	Supports Goal/ Action
10.1	Assessment/ Research	Assess benefits and impacts to Great Lakes communities and ecosystems that may result from new energy developments, including fossil fuels, hydropower, nuclear energy, wind energy, etc.	Cost-benefit analysis is underway.	Identify least impactful and most feasible energy development options.	GLRC, NYSERDA	5
10.2	Assessment/ Research	Assess how energy facilities may be affected by projected climate changes.	Identify vulnerabilities and recommend resiliency and adaptation measures.	Enhance resiliency of energy infrastructure.	NYSERDA	7, 8
10.3	Monitoring/ Planning	Implement offshore and watershed-based spatial planning to inform potential energy generation and transmission, siting criteria, lands for habitat protection and other uses. Comprehensive analyses should address costs and benefits to shoreline communities, impacts on habitats and biota, visual aesthetics, sound-related issues, commercial and recreational fishing, recreational boating, shipping and transportation, submerged cultural resources, and cumulative impacts.	<ul style="list-style-type: none"> • Develop goals for planning process. • Complete spatial planning for onshore areas and develop siting guidance. • Complete spatial planning for high-priority shorelines and offshore areas and develop siting guidance. 	Identification of least impactful energy development sites and/or corridors.	NYSDOS, NOAA, NYSDEC, NYSERDA, TNC, NYNHP, NYSDAM, EEA	5, 7, 9, XC
10.4	Monitoring/ Planning	Develop and implement best management practices for the siting, extraction, transmission, and efficient use of renewable and non-renewable energy resources.	<ul style="list-style-type: none"> • Develop BMPs for priority energy resources (e.g., NY's offshore economic zone). • Implement 2 pilot projects using BMPs. 	BMPs reduce impacts to natural resources and maximize energy efficiency.	GLRC, NYSERDA, EEA	1, 2, 5, 6
10.5	Action - Project	Incorporate best available projections of changes in seasonal average temperatures and increased frequency of extreme heat events in near- and long-term demand forecasting for electricity and natural gas.	Ongoing: Use seasonal projections to inform demand forecasting.	Demand forecasting projections are based on best available information.	NYSERDA, others	CC
10.6	Action - Project	Expand local implementation of demand response and energy efficiency measures, distributed generation, energy storage, other energy-supply technologies, and smart-grid technologies.	Implement 5 actions.	Meet regional demand growth, improve system resiliency and reduce energy usage and GHG emissions.	NYSERDA, NYSPPSC	CC
10.7	Action - Project	Pursue the development and deployment of emerging renewable fuel-based energy technologies (e.g., methane generated by solid waste landfills, concentrated animal feeding operations and using digesters for on-site energy generation for agricultural, wastewater and food industry operations).	<ul style="list-style-type: none"> • Evaluate the environmental, social, and economic impacts of new technologies. • Develop/deploy new technologies and/or improve existing technologies and processes. 	Increase development and deployment of renewable fuel-based energy technologies.	NYSERDA, NYSDAM	CC

COORDINATION APPROACH: GREAT LAKES BASIN PARTNERSHIP (GLBP)

The Great Lakes Basin Partnership will be a collaborative of state agencies, stakeholder organizations, and the public that will work together, guided by this Agenda, to implement priority projects and address key needs essential for achieving environmental protection and sustainable development goals within New York's Great Lakes Basin. The principles on which this collaborative governance approach is based are summarized below.

- **Inclusiveness.** The GLBP will provide a structure for meaningful involvement of a highly diverse group of Great Lakes stakeholders and constituents to support collaboration and sound decision making essential to achieving the goals highlighted in the Great Lakes Action Agenda. The complexity of the Great Lakes basin and the issues it faces require this Partnership be a cross-region, multi-agency, cooperative effort, relying on the participation of a diverse constituency, including supporting partners from multiple state agencies, regional planning entities, academia, non-profit organizations, and others.
- **No New Governance.** The Partnership will largely draw its membership from existing entities and organizations, maximizing the efficacy of these groups by integrating them into a basin-wide decision-making process that will support their individual organizational missions as well as the Partnership's shared priorities for action.
- **Facilitation.** As a well-structured, broad-based collaboration, the purpose of the Great Lakes Basin Partnership is to facilitate information sharing, leverage limited financial resources, and maximize human capital to directly support the work of core programs within many agencies.
- **Support Existing Policy.** The GLAA is intended to promote the application of EBM to existing state policies, rather than propose new policy or regulation. Furthermore, the Great Lakes Basin Partnership will support New York's commitments to bi-national and federal treaties, agreements, strategies and management plans focused on conserving the entire Great Lakes basin.

Diagram 2. Great Lakes Basin Partnership Organizational Structure



I. GREAT LAKES ACTION TEAM

Statement of Purpose

The Great Lakes Action Team will provide the vision and strategic direction for the restoration and protection of New York's Great Lakes basin and will guide the work of the basin workgroups. The Great Lakes Action Team is the lead entity for overall planning, coordination, monitoring, and reporting. The Action Team will provide the leadership to build public support for the Partnership effort and strive for optimum flexibility and cost efficiency.

Responsibilities

- Advance ecosystem-based management practice, principles, and policy.
- Coordinate communications among supporting partners and the public.
- Guide the direction of program resources to support the work of supporting partners, workgroups, and project teams.
- Collaborate with U.S. and Canadian federal agencies, states and provinces to achieve bi-national program goals and objectives.
- Establish and maintain productive partnerships to collaboratively implement GLAA and GLRI.
- Enhance regional and local involvement to increase individual and organizational ownership of watershed goals.
- Identify priority projects and provide support to accomplish projects.
- Track and report progress of GLAA implementation to the public.
- Identify goalkeepers to monitor and coordinate to advance specific goals.
- Update and revise GLAA as necessary over time.
- Recommend annual budget needs and core program work plan requests, reflective of GLAA priorities.
- Lead outreach and public education efforts targeted to diverse audiences.
- Coordinate adaptive management and program evaluation to improve program performance and resource alignment.
- Facilitate formation of basin workgroups to implement region-specific GLAA projects.

Membership

The Great Lakes Action Team will consist of representation from state agencies, federal and bi-national organizations, supporting partners, the general public, and other stakeholders (e.g., non-governmental organizations, academic institutions, and other interests). Administration and coordination of the Action Team will be directly supported by DEC staff and can be augmented with other state agency staff. Ideally, each member's role and participation will be solidified in and supported through his or her respective agency or organization's work plan.

1. **State agency** representation may include, but is not limited to, the following agencies: Department of State, Department of Agriculture and Markets, Office of General Services, Office of Parks, Recreation, and Historic Preservation, Empire State Development, NYS Energy Research and Development Authority, Department of Transportation, Department of Health, and the State University of New York.

2. **Federal agencies and bi-national organizations** with which New York State is authorized to participate and/or share common missions and objectives may participate in the Great Lakes Action Team and basin work groups, or serve in an advisory role or action lead as deemed suitable. Examples of federal and bi-national organizations that may support implementation of the Great Lakes Action Agenda include the Great Lakes Commission, Great Lakes Fishery Commission, Environmental Protection Agency, and the U.S. National Oceanic and Atmospheric Administration.
3. Members of the **general public** may participate in the Great Lakes Action Team, as appropriate and productive. In many cases, these members will be affiliated with an NGO or other community organization. In other circumstances, unaffiliated individuals may simply be interested in becoming involved or have expertise in a relevant issue or project.
4. **Supporting partners** will be invited to integrate their particular interests and perspectives into the implementation of the Great Lakes Action Agenda and basin-specific work plans. These organizations may provide guidance and resources, consistent with areas of expertise and organizational missions, to support the efforts of the Great Lakes Action Team, workgroups, and project teams. Participation of these entities will ensure that restoration activities are scientifically grounded and connected with regional community and economic priorities. While supporting partners and other organizations will play a pivotal role in the development and implementation of EBM approaches, policy-making and advocacy activities will not be a charge under this agenda.

SUPPORTING PARTNERS

Great Lakes Basin Advisory Council (GLBAC) – Policy & Communications Guidance

The GLBAC was created by Article IX, §21-0917 of New York State's Environmental Conservation Law to advise the Governor and NYSDEC's Commissioner on matters relating to the state's role in regional, federal, and international activities aimed at the protection of the quality and quantity of water in the Great Lakes, domestic, municipal, industrial and agricultural water supplies, navigation, hydroelectric power and energy production, recreation, fish and wildlife habitat, and a balanced ecosystem. The GLBAC is required to meet at least twice annually and report once annually to the Governor and the Legislature.

The GLBAC is composed of 13 public and 6 agency members. Members are appointed by the Governor and the Legislature. Council members are selected as follows:

- Nine Governor Appointees
 - Three from the environmental sector
 - Three from the business/labor sector
 - Two from the local government sector
 - One from the academic sector
- Two members are appointed by the State Senate
- Two are State Assembly appointees
- Six representatives from NYS agencies (All six are *ex-officio* members)
 - DEC
 - Health

- Transportation
- Power Authority
- State
- Economic Development
- Non-voting observers
 - NYS Office of Parks, Recreation & Historic Preservation
 - Office of Emergency Management
 - Great Lakes Research Consortium
 - NYSG

Great Lakes Research Consortium (GLRC) – Scientific Guidance

The GLRC is a collection of colleges and universities working together to facilitate research, outreach, and education. The GLRC’s stated mission is “to improve the understanding of the Great Lakes ecosystem, including the physical, biological, and chemical processes that shape it, as well as the social and political forces that affect human impact on the lakes and their associated economic resources.”

The group is comprised of 18 campuses in New York, with nine affiliate campuses in Canada (see table below). It is headquartered at the SUNY ESF Campus in Syracuse, NY. The group is organized into task forces designated to specific areas of study. In addition, it holds seminars and an annual conference to facilitate public outreach and education.

Table 1. Great Lakes Research Consortium Membership

New York Members	Canadian Affiliate Members
<ul style="list-style-type: none"> • Binghamton University • Buffalo State College • Clarkson University • Cornell University • Hobart William Smith Colleges • Rochester Institute of Technology • St. Lawrence University • SUNY Brockport • SUNY Environmental Science and Forestry • SUNY Fredonia • SUNY Oswego • SUNY Plattsburgh • SUNY Potsdam • SUNY Cortland • SUNY Geneseo • Syracuse University • University at Albany • University at Buffalo 	<ul style="list-style-type: none"> • Brock University • McMaster University • Queen's University • Ryerson University • University of Toronto • University of Guelph • University of Ottawa • University of Waterloo • University of Windsor

Healing Our Waters Coalition, NY Chapter – Environmental Guidance

Formed in 2005, National Wildlife Federation and the National Parks Conservation Association are at the head of this organization on a basin-wide level. Under the banner of “Healthy Lakes, Healthy Lives,” this coalition of 115 environmental, non-government organizations (NGO) is focused on a common goal of restoring and protecting the Great Lakes. The Coalition is made up of

environmental, conservation, and outdoor recreation organizations, zoos, aquariums and museums. Its mission is “to secure a sustainable [Great Lakes restoration plan](#) and the funding needed to implement it.” It consults with a technical advisory committee of Great Lakes researchers for scientific guidance and strives to maintain an active presence in both the Great Lakes region and Washington, D.C. A number of organizations, with leadership from New York Audubon, participate in the Coalition on behalf of New York State.

New York Association of Conservation Districts – Environmental Guidance

Incorporated in 1958, the New York Association of Conservation Districts, Inc. (NYACD) provides education and information to private property owners on conservation, orderly development and wise use of the state's natural resources. The Association, a non-governmental, non-partisan, volunteer organization, represents the county soil and water conservation districts. NYACD implements programs that encourage proactive, cooperative alliances with others to promote environmental stewardship and sustainability.

Finger Lakes – Lake Ontario Watershed Protection Alliance (FL-LOWPA), Lake Erie Watershed Protection Alliance (LEWPA), and St. Lawrence River Watershed Partnership (SLWRP) – Environmental Guidance

These regional organizations collaborate to promote the sharing of information, foster collaborative watershed management programs and partnerships, and apply a holistic, ecosystem-based approach to water quality improvement and protection. Membership of each alliance consists of representatives from counties wholly or partially within each respective watershed, and includes participation from county soil and water conservation districts.

Municipal and County Government – Economic & Local Government Guidance

Municipal and county governments are essential partners in watershed management. As a home rule state, these entities shape the built and natural environment of New York through land-use planning, zoning, watershed planning, and infrastructure development. Within New York State's Great Lakes basin, as depicted in Figure 1, there are 33 counties and over 700 towns, villages, and cities partly or wholly encompassed within the drainage basin. County and municipal government representatives will be key players in advancing efforts to implement the GLAA while ensuring that projects and programs are well aligned with local needs and priorities.

Regional Planning Councils – Economic & Local Government Guidance

The primary function of regional planning councils is to study the needs and conditions of an entire region and to develop strategies which enhance the region's communities. New York's regional planning councils provide comprehensive planning for the coordinated growth and development of their regions. This involves conducting studies to assess needs, promoting the region's economic climate, environmental health, recreational opportunities, etc., and providing technical assistance to communities within the region. By presenting a regional perspective, these councils promote intergovernmental cooperation and serve as a liaison among the state and federal governments and municipalities. Councils within New York's Great Lakes Basin that may serve as potential advisory network members include the Southern Tier West Regional Planning and Development Board, Genesee/Finger Lakes Regional Planning Council, Central New York Regional Planning and Development Board, and the Tug Hill Commission.

Regional Economic Development Councils – Economic & Local Government Guidance

This Governor-created initiative divides New York into ten distinct economic development regions with the purpose of developing region-specific strategies that most effectively direct public resources and investments to support jobs and economic growth throughout New York. The Councils are responsible for developing long-term strategic plans for economic growth in their respective regions. A regional focus allows the councils to further their goals of job creation and community development using a community-based, bottom-up approach.

These Councils are cooperative associations consisting of local experts and stakeholders from business, academia, local government, and non-governmental organizations.

The Great Lakes basin is contained within six of New York's regional economic development councils, including Western New York, Finger Lakes, Central New York, North Country, and portions of the Southern Tier and Mohawk Valley.

There is considerable synergy and overlap among the priorities of the regional economic development councils, as outlined in the REDC strategic plans and regional sustainability plans, and those outlined in the Great Lakes Action Agenda.



Indian Nations – Collaboration

Representatives of Indian Nations recognized by the U.S. and state government will be invited to collaborate on a government-to-government basis on environmental and cultural resource issues of mutual concern. In New York, seven recognized Indian nations are located within the Great Lakes basin; they are: the Seneca Nation of Indians, the Tonawanda Seneca Nation, the Tuscarora Nation, the Cayuga Nation, the Onondaga Nation, the Oneida Nation, and the St. Regis Mohawk Tribe.

II. WORKGROUPS

West Basin Work Groups

The West Basin workgroups will include the sub-basins of Lake Erie and southwestern Lake Ontario, consistent with the Great Lakes sub-basins map shown below. The geographic focus of these workgroups overlaps with NYSDEC Regions 8 and 9.

East Basin Work Groups

The East Basin workgroups will include the sub-basins of southeastern Lake Ontario and northeastern Lake Ontario–St. Lawrence, consistent with the Great Lakes sub-basins map shown below. The geographic focus of these workgroups overlaps with NYSDEC Regions 6, 7, and 8.

Statement of Purpose

Given the breadth of geography and diversity of interests that the Great Lakes basin covers in New York, implementation will be more easily managed through two sub-basin workgroups. Each workgroup will be formed to oversee the development and implementation of work plans specific to that region's values, environment, issues, and opportunities. Their individual work plans will be based on the overarching goals and strategies of the Great Lakes Action Agenda but will be regional in scope, identifying specific projects and actions needed within a particular portion of New York's Great Lakes basin.

Responsibilities

- Oversee development of regional work plans that support implementation of the GLAA
- Review and report findings of program work plans, performance measures, and indicators of program progress to the Great Lakes Action Team
- Integrate state policy, education/outreach, science-based decision-making processes, climate change considerations, and adaptive management into work plans
- Establish project teams on an *ad-hoc* basis to implement or assist other stakeholders with GLAA initiatives, based on workgroup priorities and project opportunities

Membership

Each workgroup will be led by a chairperson. Membership will include staff from all of the Great Lakes Basin Partnership organizations, including staff from regional state agency offices, non-governmental organizations, supporting partners and other organizations involved in project implementation.

Participation of DEC and other state agency staff at this level will be essential to linking workgroup and project team members to available state resources, providing technical support and informing project development. Ideally, the work of these groups and project teams will directly support core state agency programs by providing additional project implementation capacity and resource support. Relevant regional associations, planning councils, and local government bodies will be invited to join the work group relevant to their area of focus. For example, the West Basin workgroups may include representation from FL-LOWPA, LEWPA, Genesee-Finger Lakes Regional Planning Council, etc. The East Basin workgroups may include representation from FL-LOWPA, SLRWP, Tug Hill Commission, et cetera.

Workgroup membership should be representative of the diversity of interests in the basin and reflect the priority goals of the GLAA. Specifically, members should have expertise in one or more of the following focus areas addressed in the GLAA:

1. Water Quality
 - Eliminate discharge of toxic substances from point and non-point sources

- Control sediment, nutrient, and pathogen loadings
- Accelerate the delisting of New York's areas of concern
- 2. Biodiversity & Habitats
 - Conserve and restore biodiversity and fish and wildlife habitats
 - Combat invasive species
- 3. Water Conservation
 - Conserve Great Lakes water supplies
- 4. Recreation & Tourism
 - Enhance recreation and tourism opportunities
- 5. Sustainable Development
 - Coastal resiliency
 - Promote environmentally sustainable smart growth, redevelopment, and adaptive reuse
 - Plan for energy development

Designated workgroup members will serve as goalkeepers for each GLAA goal to track implementation progress.

As *ad-hoc* project teams are formed to address GLAA priorities and project opportunities, workgroup members with relevant expertise may be called upon to serve as acting chairs of these teams, to ensure that projects are consistent with the workgroup's plan and are completed in a timely manner.

III. PROJECT TEAMS

Statement of Purpose

Project teams, or *ad-hoc* committees, may form to develop and/or implement short-term projects that support their basin's respective work plan and implementation of the GLAA. Project teams are intended to promote collaboration and are, thereby, inclusive of all interested parties. Therefore, members of project teams may consist of organizations and individuals outside a workgroup, working to implement a relevant project or opportunity. Examples of such members include staff from local non-profit organizations, soil and water conservation districts, local government, academic institutions, state agencies, and interested citizens.

FUNDING APPROACH

The goals, strategies, and objectives highlighted in this Action Agenda are ambitious on many fronts. They will require not only a significant amount of organizational resources and commitment, but a considerable amount of funding, including additional staff support. Full implementation of this Agenda will rely on a combination of state and federal funding programs, existing organizational resources, and public-private partnerships. Some of the funding approaches that will be sought, used, and leveraged in support of this Action Agenda are highlighted below.

Funding Programs

- **Great Lakes Restoration Initiative (GLRI).** This is a multi-year, multi-million-dollar federal investment to support projects and programs related to: 1) toxic substances and areas of concern; 2) invasive species; 3) nearshore health and non-point source pollution; 4) habitat and wildlife protection and restoration; and 5) accountability, education, monitoring, evaluation, communication and partnerships. New York's Great Lakes Action Agenda is aligned with the priorities identified in the GLRI's action plan (see plan at http://greatlakesrestoration.us/pdfs/glri_actionplan.pdf), developed by a task force of 11 federal agencies. More information is available at <http://glri.us/>.
- **Environmental Protection Fund (EPF).** New York's Environmental Protection Fund supports projects related to land protection and acquisition, public land stewardship, water quality improvement, and invasive species eradication. EPF monies are used by state agencies and distributed to municipalities and non-profits through grant-making programs. More information is available at <http://keepprotectingny.com/the-epf.html>.
- **Great Lakes Action Agenda Mini-Grants Program.** Starting in 2014, NYSDEC and New York Sea Grant will be working collaboratively to develop, administer and implement a mini-grants program focused on actions needed to advance the Great Lakes Action Agenda's goals for water quality, water conservation, biodiversity/habitat, recreation/tourism and sustainable/resilient coastal communities, as well as other goals outlined in pertinent Great Lakes planning documents.
- **Great Lakes Protection Fund (GLPF).** The GLPF is an endowment created by seven of the eight Great Lakes states. New York uses a portion of the earned interest to fund regional and statewide research projects that support the restoration of New York's Great Lakes ecosystem. Funds are provided to government, academia, non-governmental and environmental groups through small and large grant programs. The fund is administered by DEC with input from the New York State Great Lakes Basin Advisory Council. More information is available at <http://www.dec.ny.gov/lands/25582.html>.
- **New York Great Lakes Protection Fund (NYGLPF).** The New York State Great Lakes Protection Fund is a source of funds for regional and statewide research projects that protect, restore and improve the health of the Great Lakes ecosystem in New York. The Fund was created in 1990 by legislation that allows New York to use a portion of the earned interest on an endowment created by seven of the eight Great Lakes states. It supports projects among government, academia, non-governmental and environmental groups to conduct research and exchange/apply information about remediating and sustaining the health of plant, animal, and human elements of New York's

Great Lakes ecosystem. More information is available at <http://www.dec.ny.gov/lands/25582.html>.

- **Consolidated Funding Application (CFA).** The CFA is a support mechanism that allows access to multiple state funding sources through one application. State funding sources that can be accessed through the CFA and are relevant to Great Lakes restoration objectives include the following categories: watershed planning; agriculture; waterfront revitalization; economic and community revitalization; parks, historic preservation, and heritage areas; energy improvements; environmental improvements; and sustainability. More information is available at <https://apps.cio.ny.gov/apps/cfa/>.
- **Other Funding Programs.*** Depending on the project focus, a variety of funding and technical support may be available through the following programs, among others:
 - ✓ Environmental Facilities Corporation - <http://www.nysefc.org>
 - ✓ Cleaner, Greener Communities Program - <http://www.nyserda.ny.gov/Statewide-Initiatives/Cleaner-Greener-Communities.aspx>
 - ✓ Environmental Finance Center, Syracuse University - <http://efc.syracusecoe.org/efc/sub.html?skuvar=5>
 - ✓ EPA water grants - http://water.epa.gov/grants_funding/
 - ✓ EPA smart-growth grants - <http://www.epa.gov/smartgrowth/grants/>
 - ✓ USFWS grants - <http://www.fws.gov/grants/>
 - ✓ National Fish & Wildlife Foundation Sustain Our Great Lakes Program - <http://www.nfwf.org/greatlakes/Pages/home.aspx>
 - ✓ National Oceanic and Atmospheric Association Habitat Conservation grants - <http://www.habitat.noaa.gov/funding/index.html>

**This is not intended to be an all-inclusive list of funding programs.*

Public-Private Partnerships

Implementation of this Agenda will rely on the collaborative efforts of stakeholder groups across the region, including the private sector. Many private sector companies have corporate sustainability programs that aim to conserve energy and water, reduce the use of toxics, and promote community sustainability efforts within their service areas. Public-private partnerships may be formed on a project-by-project basis or as part of a larger regional sustainable development effort such as New York's Regional Economic Development Councils. Developing and maintaining strong public-private partnerships will be key to implementing many actions contained within this Agenda, as well as ensuring that broad stakeholder involvement is accomplished at the local and regional levels.

This project funding strategy has been successfully employed throughout the basin, providing a strong foundation for further expanding this approach. For example, a community-supported effort under way in Sodus Point aims to leverage public funding with private sector support to complete a vulnerability assessment and adaptation planning project. Another well-cited example is the case of the Buffalo River remediation and revitalization efforts, which have successfully leveraged nearly \$75 million through a productive public, private and non-profit collaboration model. These cases exemplify just some of the ways in which public and private interests are successfully working together to implement local projects with lasting ecological and economic benefits.

Organizational Resources

Through effective collaboration, the Great Lakes Basin Partnership will leverage the organizational resources and capacity of our partners, including state agencies, non-profit organizations, academic institutions, municipalities, and other stakeholders, to achieve the actions set forth in this plan. Many of the actions highlighted support core program responsibilities and organizational missions of NY's Great Lakes stakeholders. Coordination of these groups through the Great Lakes Basin Partnership will support enhanced communication, including the strategic alignment of organizational work plans, to maximize limited staff capacity and financial resources while leveraging in-kind support to achieve the goals in this Agenda.

REFERENCES

- [A Strategic Plan for the Rehabilitation of Lake Trout in Lake Erie, 2008-2020](#) (December 2008)
- Atlantic Coast Joint Venture [Waterfowl Implementation Plan](#) (2005 revision); [Strategic Plan](#) (2009 update)
- [Buffalo River Remedial Action Plan](#) (RAP) (1989; 2005 Status Report)
- [Eighteenmile Creek Remedial Action Plan](#) (RAP) (1997; 2001 Update)
- [Fish-Community Goals and Objectives for Lake Erie](#) (2003)
- Fish-Community Objectives for Lake Ontario ([1999](#); [2003 Update](#))
- [Fish-Community Objectives for the St. Lawrence River](#) (December 14, 2001 draft)
- [Great Lakes Binational Toxics Strategy](#): Canada - United States Strategy for the Virtual Elimination of Persistent Toxic Substances in the Great Lakes (April 7, 1997; December 2008 status report)
- [Great Lakes Restoration Initiative Action Plan, FY2010-2014](#) (February 2010)
- [Great Lakes Regional Collaboration Strategy](#) (December 2005)
- [Great Lakes-St. Lawrence River Basin Water Resources Compact](#)
- [IJC Biennial Reports on Great Lakes Water Quality](#)
- [Joint Strategic Plan for Management of Great Lakes Fisheries](#) (1981; revised 1997)
- [Lake Erie Environmental Objectives](#) (2005)
- [Lake Erie Lakewide Management Plan](#) (LaMP) (2000; 2008 Update)
- [Lake Erie Millennium Plan](#)
- Lake Ontario Lakewide Management Plan (LaMP) ([1998](#); [2008 Update](#))
- [National Assessment of Water Availability and Use: Great Lakes Basin Pilot](#)
- [New York Energy Highway Blueprint](#)
- [NYS 2100 Commission: Recommendations to Improve the Strength and Resilience of the Empire State's Infrastructure](#) (2012)
- [New York State 25-Year Plan for the Great Lakes](#) (June 1992)
- [New York State Climate Action Plan Interim Report](#) (November 2010)
- New York State [Comprehensive Wildlife Conservation Strategy](#) (September 2005)
- [New York State Energy Plan](#) (2013)
- [New York State Open Space Conservation Plan](#) (2009)
- [New York Statewide Trails Plan](#) (2009)
- [Niagara River Toxics Management Plan](#) (November 1998; 2009 Annual Status Report)

[Niagara River Remedial Action Plan](#) (RAP) (2000)

[North American Waterfowl Management Plan](#) (1986; 1998 update; 2004 Implementation Framework; 2012 Revision)

NYISO 2013 Congestion Assessment and Resource Integration Study (CARIS)

[Our Great Lakes Water Resources: Conserving and Protecting Our Water Today for Use Tomorrow](#) (July 2009)

[New York Ocean and Great Lakes Report](#) (April 2009)

Regional Economic Development Council Strategic Plans (2012) and Progress Reports (2011-2013): [Western New York](#), [Finger Lakes](#), [Central New York](#), [North Country](#).

[Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation](#) (2011)

[Rochester Embayment Remedial Action Plan](#) (RAP) (Stage 1, 1993; Stage 2, 1997)

[State of the Lakes Ecosystem Conference](#) (SOLEC) reports (1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009)

[Statewide Comprehensive Outdoor Recreation Plan](#) (SCORP) (2009 – 2013)

[St. Lawrence River at Massena Remedial Action Plan](#) (RAP) (Stage 1, 1990; Stage 2, 1991; 2006 Status Report)

[The Beautiful Lake: A Biodiversity Conservation Strategy for Lake Ontario](#) (April 2009; update July 2009)

[The Importance of Ground Water in the Great Lakes Region](#) (U.S. Geological Survey, 2000, N.G. Grannemann,

R.J. Hunt, J.R. Nicholas, T.E. Reilly, and T.C. Winter)

[U.S. Environmental Protection Agency Climate Change Adaptation Plan](#) (June 2012)

Appendix 1: Integrating Existing Plans and Strategies

New York State recognizes its existing obligations and commitments to the many federal, interstate, regional and bi-national programs, plans and strategies developed over the past 20 years for the Great Lakes. This Agenda is not intended to create a new planning process but, rather, seeks to synthesize the

BENEFICIAL USE IMPAIRMENTS

As defined by the GLWQA, "impairment of beneficial use(s)" is a reduction in the chemical, physical, or biological integrity of the waters of the Great Lakes sufficient to cause any of the following:

1. Restrictions on fish and wildlife consumption
2. Tainting of fish and wildlife flavor
3. Degradation of fish and wildlife populations
4. Fish tumors or other deformities
5. Bird or animal deformities or reproductive problems
6. Degradation of benthos
7. Restrictions on dredging activities
8. Eutrophication or undesirable algae
9. Restrictions on drinking water consumption, or taste and odor problems
10. Closing of beaches
11. Degradation of aesthetics
12. Added costs to agriculture or industry
13. Degradation of phytoplankton and zooplankton populations
14. Loss of fish and wildlife habitat

goals of the range of existing plans into one common strategic agenda for action. Key goals and priority actions from the various existing plans have been integrated into this Action Agenda. Having a shared set of priorities will help to stimulate a more effective process for implementing existing plans and should foster greater collaboration among involved organizations.

Lakewide Management Plans (LaMPs)³⁰

LaMPs are key mechanisms for the United States and Canada to fulfill their commitments under the Great Lakes Water Quality Agreement (GLWQA). LaMPs prioritize critical pollutants impairing "beneficial uses," and identify the actions necessary to restore those beneficial uses. Through LaMPs, coordinated bi-national analyses of the biological, chemical and physical problems facing the lakes have been undertaken, leading to the formulation of ecosystem objectives for each lake. Over time, those objectives have been refined, and the plans have evolved to define goals for each lake's whole ecosystem, not just specific pollutants. Actions have been identified to restore beneficial uses of each lake, including those focusing on landscape and community-based actions that can be implemented through Local Waterfront Revitalization Programs, Agricultural Environmental Management Plans and farm best management practices (BMPs), protection of tributary streams, prevention of non-point and point source pollution, conservation of coastal wetlands and other upland habitats, and water infrastructure improvements (traditional as well as "green" infrastructure) within New York.

The Lake Ontario LaMP was first issued in 1998 following an extensive period of analysis, and the most recent update was in 2008. A list of ecosystem goals, objectives, impairments and initiatives are identified in the Lake Ontario LaMP and are summarized in Appendix 2.

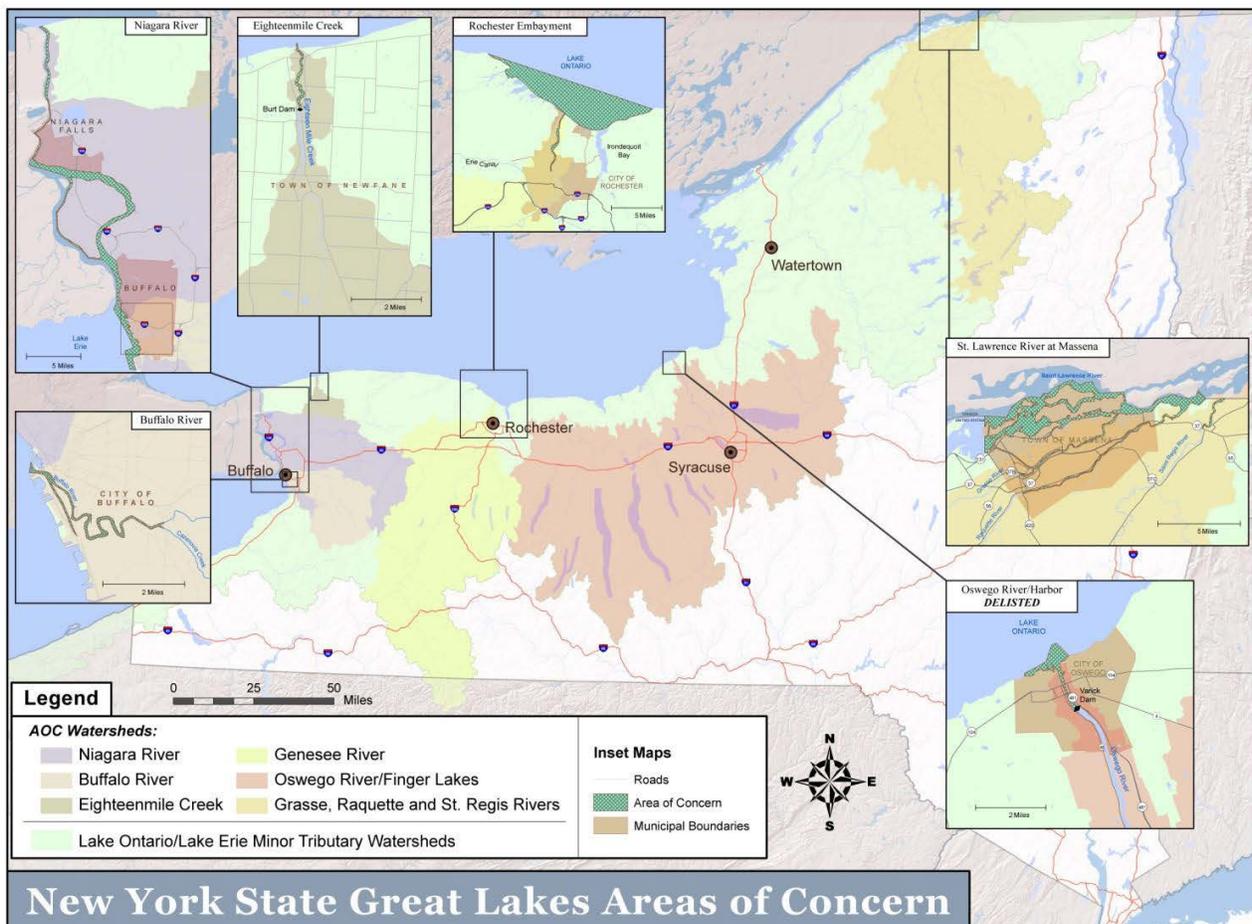
The Lake Erie LaMP was issued in 2000, following a similar period of analysis, and was updated in 2008. A list of ecosystem goals, objectives, impairments and initiatives are identified in the Lake Erie LaMP (see Appendix 3).

³⁰Under Annex 2 of the amended 2012 Great Lakes Water Quality Agreement, Lakewide Management Plans (LaMPs) are now referred to as Lakewide Action and Management Plans (LAMPs). Work is currently under way to integrate new Annex 2 updates into the existing Lakewide Management Plan structure. Once this work is complete, this document will be updated to reflect the revised LAMP process.

Remedial Action Plans (RAPs)

The GLWQA also required the development of Remedial Action Plans (RAPs) to restore the environmental quality and impaired beneficial uses within an Area of Concern (AOC). RAPs are locally designed, ecosystem approaches used to identify remedial and preventative actions such as improvements to municipal and industrial discharges, environmental sampling of water or sediment, and remediation of contaminated soil or sediments and the restoration of wetlands. A priority objective within this Action Agenda is to identify the actions necessary to restore beneficial uses and delist all of New York's AOCs. An AOC is a specific area where significant pollution has been identified as impairing one or more beneficial uses, such as swimming, eating fish, or drinking water, as well as environmental impairments relating to fish and wildlife habitat and populations.

New York's AOCs include the Buffalo River, Niagara River, Eighteen Mile Creek, Rochester Embayment, St. Lawrence River at Massena and Oswego River/Harbor. To date, the Oswego AOC is the only U.S. AOC to have its beneficial uses restored and delisted. Although the Oswego AOC has been delisted, continued attention must be given to assure past impairments do not recur. Beneficial uses can be restored and AOCs delisted through the RAP process, which develops a coordinated multi-stakeholder partnership involving federal/state/provincial governments and local community-based organizations, to effectively initiate actions needed. The current status of beneficial use impairments for each New York AOC is listed in Appendix 4.



Great Lakes Fisheries Management

The Great Lakes Fishery Commission was established in 1955 by the Canadian/U.S. Convention on Great Lakes Fisheries. The commission coordinates fisheries research, controls the invasive sea lamprey, and facilitates cooperative fishery management among state, provincial, tribal, and federal management agencies. In 1997, the commission issued "A Joint Strategic Plan for Management of Great Lakes Fisheries," which calls for an ecosystem-based approach to fisheries management and the need to influence all practices having the potential to affect attainment of the desired fish communities.

This strategic plan established the Council of Lake Committees, which is composed of representatives from state, tribal, and provincial agencies represented on Lake Committees for each of the Great Lakes. New York participates on two Lake Committees:

- Lake Ontario Committee (LOC) - New York, Ontario
- Lake Erie Committee (LEC) - New York, Ohio, Ontario, Michigan, Pennsylvania

The Committee's purposes are to:

- Consider issues pertinent to, or referred by, the Great Lakes Fishery Commission
- Consider issues and problems of common concern to member agencies
- Develop and coordinate joint management programs and research projects to support lake-specific Fish Community Objectives (FCOs).

FCOs are intended to provide a shared approach for multiple fishery management agencies, providing a common set of goals:

“To secure fish communities, based on foundations of stable self-sustaining stocks, supplemented by judicious plantings of hatchery-reared fish, and provide from these communities an optimum contribution of fish, fishing opportunities and associated benefits to meet needs identified by society for: wholesome food, recreation, cultural heritage, employment and income, and a healthy aquatic ecosystem”³¹

FCOs consider historical conditions, the current and most complete scientific understanding of each lake's ecosystem, the interrelationship of species and extant environmental stressors, and seek to be responsive to the social, economic, and cultural needs and preferences of stakeholders.

For Lake Erie and Lake Ontario, DEC holds annual “State-of-the-Lake” public meetings to convey the status, trends and developments in fish populations, angler activity, fish catch and harvest and ecological stressors. These meetings are also used to solicit public input on proposed changes to fisheries management regulations and to involve the public on necessary responses to emerging fisheries management and ecological issues.

Lake Erie historically supported an important commercial lake trout fishery. Lake trout were once an important native species in Lake Erie that were extirpated but are now the focus of bi-national rehabilitation efforts. The Lake Erie Lake Trout Restoration Plan was adopted in 1985 and has been revised several times since, reflecting a considerable body of new research and the impacts of invasive mussels and sea lamprey predation.

³¹Great Lakes Fishery Commission 1980 and 1997

Decisions for lake trout restoration may require tradeoffs that reflect broader fish community goals for the lake. The Lake Erie Committee is also contemplating efforts to restore native populations of lake herring.

An important goal for Lake Ontario is restoration of naturally reproducing populations of lake trout. While natural reproduction is occurring, abundance of lake trout is well below targeted levels, and the number of adult fish has declined since the early 1990s. Numbers of stocked lake trout have been reduced, and the survival of stocked fish remains low, likely due to changes to the offshore food web caused by invasive species. A revised management plan, which recommends increased stocking and improving strain diversity, is currently under review. The Lake Ontario Committee is also engaged in research supporting the reintroduction of native deepwater ciscoes. Draft plans supporting this effort, lake sturgeon restoration and American eel recovery are currently under review.

Other Applicable Plans and Programs

There are many other plans, strategies and policies that have direct bearing on the goals of this Action Agenda. These include:

- New York State 25-Year Plan for the Great Lakes (1992)
- New York State Energy Plan (2009)
- Executive Order 24, which established a state goal to reduce the emission of greenhouse gases by 80% from 1990 levels by 2050 and required development of a Climate Action Plan to address greenhouse gas mitigation and climate change adaptation
- New York State Comprehensive Wildlife Conservation Strategy (2005)
- North American Waterfowl Management Plan
- New York State Open Space Conservation Plan (2009)
- Statewide Comprehensive Outdoor Recreation Plan (2009-2013)
- New York State Non-point Source Management Program
- New York State Coastal Non-point Pollution Control Program (approved 2006)
- New York State Priority Waterbodies List
- New York's Eastern Lake Ontario Dune and Wetland System: Guidelines for Resource Management in the 21st Century (December 2007)
- Upstate New York Groundwater Management Program (Final 1987)
- New York State Coastal Management Program
- Local Waterfront Revitalization Programs
- Regional Economic Development Council Strategic Plans
- Cleaner, Greener Communities Regional Sustainability Plans
- Promulgation of 6NYCRR Part 246, Mercury Reduction Plan for Coal-fired Electric Utility Steam Generators
- Northeast Regional Mercury Total Maximum Daily Load (TMDL) Strategy
- Baseline Mercury Deposition Monitoring Grant from the USEPA
- New York State's Air Toxic Monitoring Network
- Numerous watershed management plans, regional and municipal plans

Appendix 2: Ecosystem-based Management Vision, Goals and Objectives of Lake Ontario Lakewide Management Plan (LaMP)³²

Ecosystem Goals:

- The Lake Ontario ecosystem should be maintained and, as necessary, restored or enhanced to support self-reproducing and diverse biological communities.
- The presence of contaminants shall not limit uses of fish, wildlife and waters of the Lake Ontario basin by humans, and shall not cause adverse health effects in plants and animals.
- We, as a society, will recognize our capacity to cause great changes in the ecosystem, and we will conduct our activities with responsible stewardship for the Lake Ontario basin.

Ecosystem Objectives:

- Aquatic Communities - The waters of Lake Ontario will support diverse and healthy, reproducing and self-sustaining communities in dynamic equilibrium, with an emphasis on native species. Also, support Lake Ontario Committee's Fish Community Objectives.
- Wildlife - The perpetuation of a healthy, diverse and self-sustaining wildlife community that uses the lake habitat and/or food will be ensured by attaining and sustaining the waters, coastal wetlands, and upland habitats of the Lake Ontario basin in sufficient quantity and quality.
- Human Health - The waters, plants and animals of Lake Ontario will be free from contaminants and organisms resulting from human activities at levels that affect human health or aesthetic factors, such as tainting, odor and turbidity.
- Habitat - Lake Ontario offshore and nearshore zones, surrounding tributary, wetland and upland habitats will be of sufficient quality and quantity to support ecosystem objectives for the health, productivity and distribution of plants and animals in and adjacent to Lake Ontario.
- Stewardship - Human activities and decisions will embrace environmental ethics and a commitment to responsible stewardship.

Ecosystem Indicators:

- Critical Pollutant Concentrations in: (a) offshore waters, (b) young-of-year fish, (c) herring gull eggs, (d) lake trout, and (e) as compared to existing agency guidelines
- Lower Foodweb Status & Trends in: (a) nutrients, (b) zooplankton and phytoplankton, and (c) prey fish
- Upper Foodweb Status & Trends in the health of: (a) herring gulls, (b) lake trout, (c) bald eagles, and (d) mink and otter populations
- Coastal Wetlands: (a) periodicity of low-level events, (b) percent meadow marsh cover, and (c) changes in total wetlands surface area

³²<http://epa.gov/greatlakes/ontario.html>

**Beneficial Use Impairment (BUI) Indicators
Lake Ontario – 2006**

Use Impairment	Lake Ontario
Restrictions on Fish and Wildlife Consumption	I
Tainting of Fish and Wildlife Flavor	N
Degradation of Fish and Wildlife Populations	I
Fish Tumors or Other Deformities	N
Bird/Animal Deform. or Reproductive Problems	I
Degradation of Benthos	I
Restrictions on Dredging Activities	N
Eutrophication or Undesirable Algae	N
Drinking Water Consumption Restrictions, or Taste and Odor Problems	N
Beach Closings	N
Degradation of Aesthetics	N
Added Costs to Agriculture or Industry	N
Degradation of Phytoplankton and Zooplankton Populations	I
Loss of Fish and Wildlife Habitat	I

BUI Indicator Status Key
I= Impaired
N= Not Impaired

Lake Ontario LaMP Work Plan

The bi-national Lake Ontario LaMP Work Plan directs limited resources, identifies priorities, and maintains progress toward achieving the goals and objectives of the LaMP. It identifies agency activities according to four major work areas: chemical contamination and monitoring; physical and biological impacts and environmental assessments; public outreach, consultation, reporting, and communicating actions; and other action initiatives (e.g., the nearshore and climate change).

The 2008 LaMP identifies the following work plan activities as near-term priorities:

- Conducting Lake Ontario Intensive Cooperative Monitoring during 2008
- Continuing reduction of critical pollutant loadings to Lake Ontario
- Reporting on ecosystem indicator status and invasive species efforts
- Evaluating sediment and tributary samplings
- Broadening partnerships to implement habitat conservation strategies
- Conducting public outreach to benefit stakeholders and LaMP
- Incorporating nearshore plans into LaMP planning
- Continuing to assess impact of climate change on Lake Ontario

See Chapter 12 of the full LaMP at http://epa.gov/glnpo/LAMP/lo_2008/index.html for complete work plan.

Appendix 3: Ecosystem-based Management Vision, Goals and Objectives of Lake Erie Lakewide Management Plan (LaMP)³³

Vision – A Lake Erie basin ecosystem is where...

- All people, recognizing the fundamental links among the health of the ecosystem, their individual actions, and economic and physical well-being, work to minimize human impact in the Lake Erie basin and beyond.
- Natural resources are protected from known, preventable threats.
- Native biodiversity and the health *and* function of natural communities are protected and restored to the greatest extent feasible.
- Natural resources are managed to ensure that the integrity of existing communities is maintained or improved.
- Human-modified landscapes provide functions that approximate natural ecosystem processes.
- Land and water are managed so water flow regimes and the associated amount of materials transported mimic natural cycles.
- Environmental health continually improves due to virtual elimination of toxic contaminants and remedial actions at formerly degraded and/or contaminated sites.

Ecosystem Management Objectives:

➤ Land Use

Strategic Objective (SO) – Land-based activities enhance native biodiversity and ecosystem integrity.

Tactical Objective (TO) – Land-use activities result in gains in the quantity and quality of natural habitat to support the maximum amount of native biodiversity and community integrity that can be achieved and be sustained for the benefit of future generations.

➤ Nutrients

SO – Nutrient levels are consistent with ecosystem goals (watershed and basin wide).

TO – Nutrient inputs from both point and non-point sources are managed to ensure that ambient concentrations are within the bounds of sustainable watershed management and consistent with the Lake Erie vision.

➤ Natural Resource Use and Disturbance

SO – Ecologically wise and sustainable use of natural resources

³³ <http://epa.gov/greatlakes/erie/html>

TO – Natural resource use (e.g., commercial and sport fishing, hunting, trapping, logging, water withdrawal, mining, etc.) and disturbances by human presence or activity are managed to ensure that the integrity of existing healthy ecological communities is maintained and/or improved, to provide long-term benefits to consumers, and to support the Lake Erie Committee's Fish Community Objectives.

➤ Chemical & Biological Contaminants

SO – Virtual elimination of toxic chemicals and biological contaminants

TO – Toxic chemicals and biological contaminant concentrations within the basin must be continually reduced.

➤ Non-native Species

SO – Prevent further invasions of non-native species. Control existing invasive non-native species where possible.

TO – Non-native invasive species should be prevented from colonizing the Lake Erie ecosystem. Existing non-native invasive species should be controlled and reduced where feasible and consistent with other objectives.

➤ Areas of Concern (AOC)

SO – Delist all designated Areas of Concern within the Lake Erie basin.

TO – Restore the Beneficial Use Impairments (BUI) designated within each AOC's Remedial Action Plan (RAP) to meet their respective target objectives.

**Beneficial Use Impairment (BUI) Indicators
Lake Erie – Updated 2004**

Use Impairment ³⁴	Lake Erie
Restrictions on Fish and Wildlife Consumption	I
Tainting of Fish and Wildlife Flavor	N
Degradation of Fish and Wildlife Populations	I
Fish Tumors or Other Deformities	I
Bird/Animal Deform. or Reproductive Problems	I
Degradation of Benthos	I
Restrictions on Dredging Activities	I
Eutrophication or Undesirable Algae	I
Drinking Water Consumption Restrictions, or Taste and Odor Problems	N
Recreational Water Quality Impairments	I
Degradation of Aesthetics	I
Added Costs to Agriculture or Industry	N
Degradation of Phytoplankton and Zooplankton Populations	I
Loss of Fish and Wildlife Habitat	I

BUI Indicator Status Key
I= Impaired
N= Not Impaired

Lake Erie LaMP Work Plan

The Lake Erie LaMP Work Plan directs limited resources, identifies priorities, and maintains progress toward achieving the goals and objectives of the LaMP. In addition, LaMP partners are encouraged to develop, implement and track agency-specific work plans in support of LaMP goals.

Priority actions identified in the 2008 work plan for Lake Erie include the following:

- Developing a bi-national nutrient management strategy for Lake Erie
- Planning and implementing the 2009 Cooperative Monitoring Year
- Completing and approving Lake Erie LaMP ecosystem indicators
- Reviewing and implementing recommendations to reorganize the LaMP structure to reflect its emerging implementation focus

See Chapter 12 of the full LaMP at http://www.epa.gov/greatlakes/LAMP/le_2008/index.html for the complete work plan.

³⁴Indicates an impairment is occurring somewhere in the basin but not necessarily throughout the entire basin referenced

Appendix 4: Beneficial Use Impairment (BUI) Indicators of NYS AOCs – January 2014

Use Impairment	Niagara River (U.S.)	St. Lawrence at Massena (U.S.)	Eighteen-mile Creek	Rochester Embayment	Buffalo River	Oswego River (Delisted '06)
Restrictions on Fish and Wildlife Consumption	I	I	I	I	I	D
Tainting of Fish and Wildlife Flavor	N	N	N	I	I	D
Degradation of Fish and Wildlife Populations	I	I	I	I	I	D
Fish Tumors or Other Deformities	I	I	N	I	I	D
Bird/Animal Deform. or Reproductive Problems	I	I	I	I	I	D
Degradation of Benthos	I	I	I	I	I	D
Restrictions on Dredging Activities	I	N	I	I	I	N
Eutrophication or Undesirable Algae	N	N	N	I	N	D
Drinking Water Consumption Restrictions, or Taste and Odor Problems	N	N	N	D	N	N
Beach Closings	N	N	N	I	N	N
Degradation of Aesthetics	N	N	N	I	I	D
Added Costs to Agriculture or Industry	N	N	N	D	N	N
Degradation of Phytoplankton and Zooplankton Populations	N	U	N	I	N	D
Loss of Fish and Wildlife Habitat	I	I	N	I	I	D

BUI Indicator Status Key

I= Impaired

D= Delisted

N= Not Impaired

U= Unknown/Additional Assessment/Investigation needed