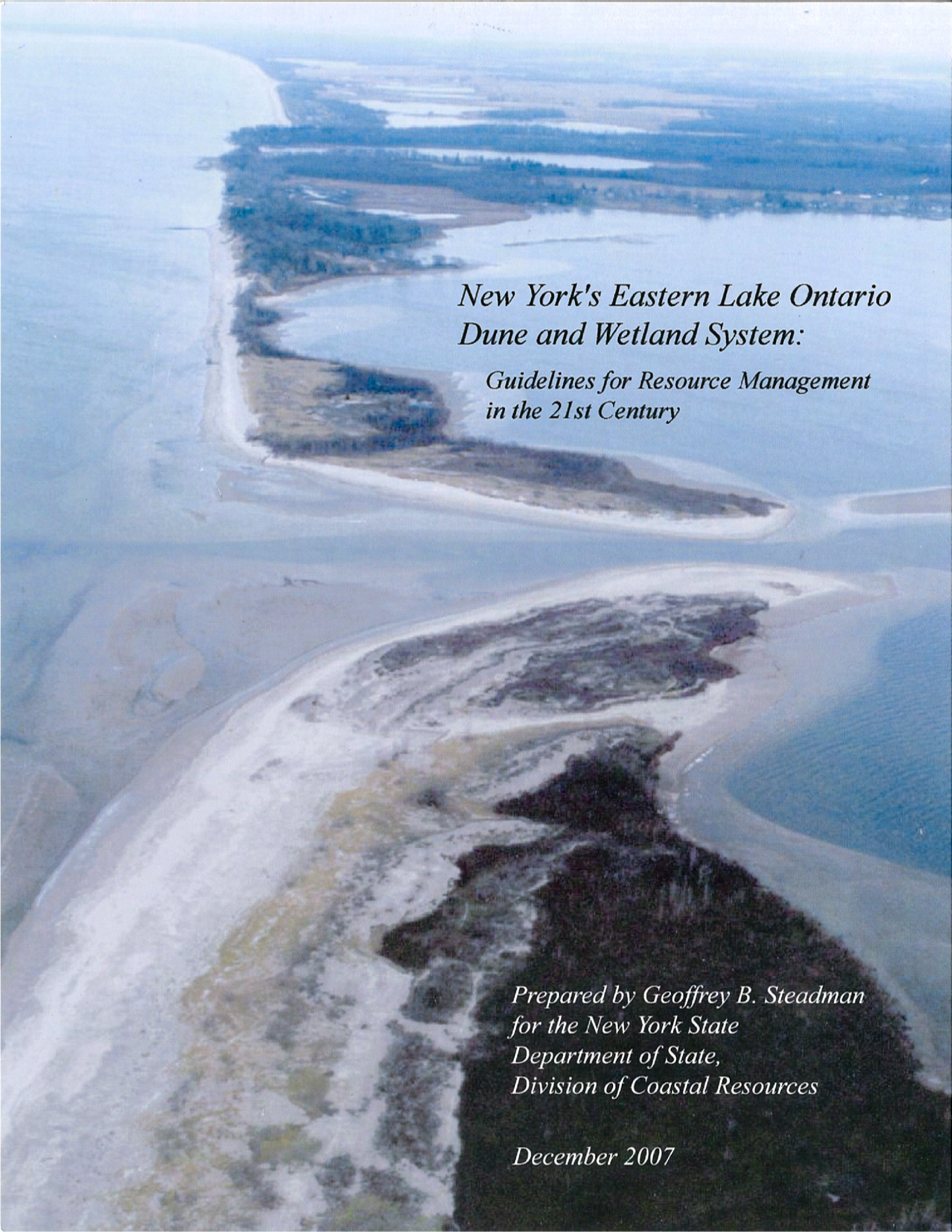

New York's Eastern Lake Ontario Dune and Wetland System:

Guidelines for Resource Management in the 21st Century

Prepared by Geoffrey B. Steadman for the New York State Department of State, Division of Coastal Resources

December 2007

NEW YORK'S EASTERN LAKE ONTARIO DUNE AND WETLAND SYSTEM:

GUIDELINES FOR RESOURCE MANAGEMENT IN THE 21ST CENTURY

Prepared For:

NEW YORK STATE DEPARTMENT OF STATE
DIVISION OF COASTAL RESOURCES
Albany, New York

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December 2007

This document was prepared as part of New York State's Great Lakes Coastal Watershed Restoration Program with funding appropriated by Congress and provided through the Coastal Zone Management Act of 1972, as amended, and administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, in conjunction with the New York State Coastal Management Program.

FOREWORD

This report summarizes the results of a special study of the Eastern Lake Ontario Dune and Wetland System in New York State. The study was conducted in the period 2003-2006 with funds provided by the New York State Department of State Division of Coastal Resources (DCR). The DCR is the coastal management agency of the State of New York, responsible for administration and implementation of the New York Coastal Management Program which covers the vast and diverse coastal areas of the state, including the New York shore of Lake Ontario.

The study, known as the 2007 Dune and Wetland System Study, is one of five program elements of the ''Eastern Lake Ontario Coastal Watershed Restoration Project'' developed by the Oswego County Soil and Water Conservation District (SWCD). The SWCD applied for and received a grant from the DCR to support work on the five program elements. That grant was made possible with funds available from the National Oceanic and Atmospheric Administration's ''Great Lakes Coastal Watershed Restoration Program'' which in New York State is administered by the DCR in cooperation with the New York State Department of Environmental Conservation.

The study was undertaken with recognition of the irreplaceable environmental, economic, recreational, cultural, and other public values provided by the Eastern Lake Ontario Dune and Wetland System. In addition, it is recognized that the actions of the citizens who live in and visit the Dune and Wetland System and of the towns, counties, agencies, and organizations with jurisdictions and interests in the system have, and will continue to have, a significant impact on the Dune and Wetland System.

The study was conducted as a follow-up to the 1989 report funded and directed by the DCR entitled *New York's Eastern Lake Ontario Sand Dunes: Resources, Problems, and Management Guidelines*, commonly known as the ''Dunes Report.'' Over the past 18 years, the Dunes Report has confirmed the importance of a balanced, long-range vision for beneficial use and conservation of the Dune and Wetland System. It also has provided a strong foundation for the coordinated efforts of a number of resource management agencies, not-for-profit organizations, and private landowner associations to protect, restore, and enhance the coastal resources of the eastern shore of Lake Ontario. Those agencies, organizations, and associations are all members of The Ontario Dune Coalition (TODC)—a voluntary alliance whose mission is to promote and support the conservation and optimum public use of the Dune and Wetland System while respecting the rights of private property owners.

Goals of the study were to: 1) provide an update on current conditions in the Dune and Wetland System; 2) describe the progress made and lessons learned in implementing the recommendations of the 1989 Dunes Report; and 3) establish goals and priorities for future efforts to protect and manage the unique and irreplaceable natural system of coastal resources along the eastern shore of Lake Ontario. This final report is not intended to replace the 1989 Dunes Report. Much of the background information and many of the recommendations of the Dunes Report remain valid in 2007 and may be reviewed in conjunction with this 2007 report.

Findings and recommendations from the Dune and Wetland System Study were presented on behalf of the DCR and TODC at the Sea Grant-sponsored first Great Lakes Sand Dunes Conference held in Traverse City, Michigan, October 3-4, 2006.

ACKNOWLEDGMENTS

Many persons contributed to the Dune and Wetland System Study and to preparation of this report. The study was conducted at the direction of the New York State Department of State Division of Coastal Resources with input and guidance provided by The Ontario Dune Coalition and its member agencies and organizations.

From the DCR, Mike Corey served as the initial project manager and Ken Smith managed the study to completion. Both provided vital direction, advice, and information throughout the course of the work.

Coordination for the study was provided by the Oswego County Soil and Water Conservation District and a project implementation committee including representatives of the SWCD, New York Sea Grant, DCR, and other members of TODC.

Throughout the study, TODC members shared their knowledge and insights of conditions and uses in the Dune and Wetland System. While there is not space here to name all of the individuals who contributed, representatives of the following agencies and organizations are among those that provided especially important assistance throughout the work: Oswego County SWCD; New York Sea Grant; DCR; New York Office of Parks, Recreation and Historic Preservation; New York Department of Environmental Conservation, Regions 6 and 7; The Nature Conservancy; the Friends of Sandy Pond Beach; and the Town of Sandy Creek. In addition, the author wishes to acknowledge the important contributions of the Eastern Lake Ontario Dune Stewards and the Private Landowners Committee of TODC.

The TODC Executive Board met on a number of occasions to review interim reports, provide thoughtful comments for improving those reports, and otherwise help to advance the goals of the study.

Geoffrey Steadman of Westport, Connecticut served as consultant to the SWCD and conducted the Dune and Wetland System Study. Mr. Steadman is the author of the final report and all interim reports. Photographs in the report are provided by Mr. Steadman unless otherwise noted. Aerial photos are from an aerial reconnaissance conducted by Mr. Steadman on November 20, 2004 unless otherwise noted. All other photos are from the period 2003-2006. Report maps are by Roberge Associates Coastal Engineers, LLC of Stratford, Connecticut, prepared by Beth Santa.

Special appreciation is extended to all study participants and to all those citizens who have long expressed and demonstrated their commitment to stewardship of the Dune and Wetland System and who continue to support efforts to ensure the continued beneficial use and conservation of the system's vital coastal resources.

The Dune and Wetland System Study was conducted as part of New York State's Great Lakes Coastal Watershed Restoration Program with funding appropriated by Congress and provided through the federal Coastal Zone Management Act of 1972, as amended, and administered by the Office of Ocean and Coastal Resource Management, National Oceanic and Atmospheric Administration, in conjunction with the New York State Coastal Management Program.

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1

Introduction and Summary

The sand dunes along the eastern shore of Lake Ontario are an integral part of a coastal barrier environment that consists of beaches, sand dunes, embayments, and wetlands. This barrier system contains the largest and most extensive freshwater sand dune formations in New York State.

The coastal barrier, associated wetlands and near-shore waters are especially important to maintain the natural productivity of the coastal environment and provide invaluable habitats for fish and wildlife. In addition, this area contains rare plants, animals, and natural communities that are restricted to this type of shoreline area. The marshes and bays protected by the barriers are among the most valuable and productive of all ecosystems. The extensive aquatic habitats behind the barriers developed only after the barrier was formed and would be quickly destroyed if the barrier were eroded and lost. This barrier also provides aesthetic and cultural values, with numerous recreational opportunities which contribute to making the eastern Lake Ontario shoreline a desirable place to live and visit.

New York Sea Grant Program

NEW YORK'S EASTERN LAKE ONTARIO DUNE AND WETLAND SYSTEM
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Chapter Cover Photo: ''High''dunes on the North Pond barrier

The Eastern Lake Ontario Dune and Wetland System

The Eastern Lake Ontario Dune and Wetland System is a unique and irreplaceable natural area in the coastal area of New York State and the larger Great Lakes basin. Covering about 16 miles of Lake Ontario shoreline in a zone of harsh winter climate in northern New York, the Dune and Wetland System is one of the last relatively undeveloped regions of the New York coast. The southern boundary of the system is about 35 miles north of the Syracuse metropolitan area; the northern boundary about 20 miles south of Watertown, New York.

On the south, the Dune and Wetland System is bounded by the Salmon River; on the north by Black Pond and the area known as El Dorado Beach. New York Route 3 (part of the New York State Seaway Trail and the nationally designated recreational highway system) generally follows the Lake Ontario shoreline a short distance inland from the Dune and Wetland System.

Along the eastern shore of Lake Ontario, the Dune and Wetland System blends barrier beaches and sand dunes, wetlands and embayments, nearshore lake waters, and the mainland shoreline into an ecological system of inter-related parts. Among the sand dunes are distinct areas of ''high'' dunes that rise 50 to 70 feet above the beach. These dunes are described as the largest in the state and second largest (behind those on Cape Cod, Massachusetts) in the northeastern United States. The Dune and Wetland System is sometimes described as a coastal barrier system. Its beaches and dunes form a ''coastal barrier'' protecting landward features and resources from the direct effects of waves, currents, and high water caused by normal conditions and severe storms.

The coastal resources of the Dune and Wetland System are valuable for many different uses, including boating, fishing, hunting, swimming, camping, nature observation, and shorefront residential development. They also provide fundamental natural values. In addition to acting as a buffer against flooding and erosion, they help maintain water quality, provide significant natural ecological communities and essential habitat for fish and wildlife, provide scenic values, and contribute to the traditional character and quality of life in the eastern Lake Ontario region.

Figure 1-1: The Great Lakes Basin. (Source: USACE.)

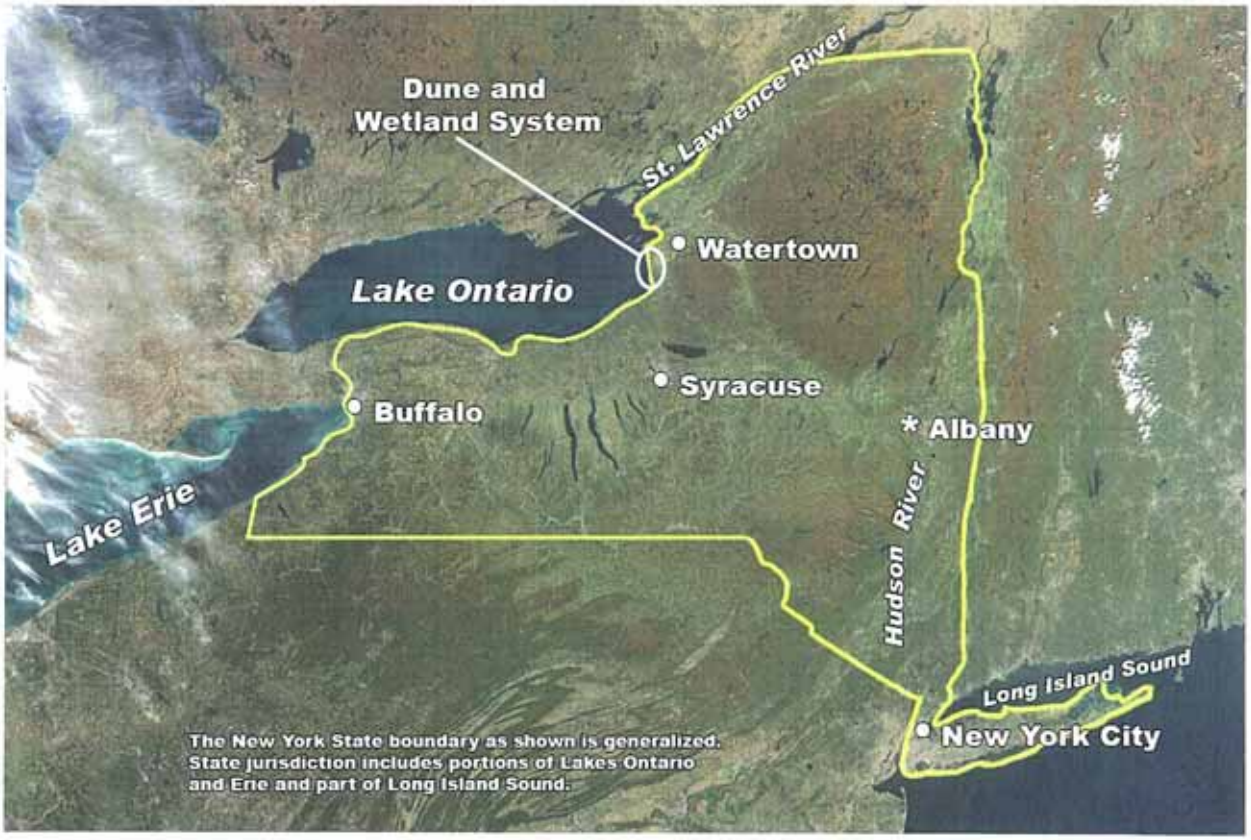

Figure 1-2: The Eastern Lake Ontario Dune and Wetland System in the coastal area of New York State.

The beaches and dunes of the Dune and Wetland System contain sedimentary material constantly moved by wind, waves, currents, storm surge, and other forces. As a result, the shoreline is dynamic; its size, shape, and relative position can shift over time. If the beaches and dunes are eroded and breached, extensive aquatic habitat and shoreline properties now sheltered by these resources would eventually be directly exposed to Lake Ontario and possibly lost to erosion.

To understand the history of the present beaches and sand dunes it is necessary to go back in time at least a few thousand years to when a wide beach of perhaps three miles in width extended along Lake Ontario's eastern shore. This exposure of sand enabled westerly winds to form substantial sand dunes along the shore, including the high dunes that remain today. Concerns over the future of the Dune and Wetland System, and of the high dunes in particular, are underscored by the fact that climatic and geomorphic conditions under which the dunes were formed no longer exist.

Three towns (Ellisburg, Richland, and Sandy Creek), two counties (Jefferson and Oswego), and many local, state, and federal governmental agencies have jurisdiction in the Dune and Wetland System. The shoreline consists of privately owned land and land owned by the State of New York, including two state parks (Southwick Beach and Sandy Island Beach) and three state wildlife management areas (Black Pond, Lakeview, and Deer Creek). The Nature Conservancy (TNC) also owns natural areas in the Dune and Wetland System. About half of the total shoreline along Lake Ontario is developed for residential, commercial campground, and park use.

The Stewardship Partners

Due to its uniqueness on the New York shore of Lake Ontario, the value of its natural resources, and pressures for its use and development, the Dune and Wetland System is the subject of special planning and management attention by a number of governmental agencies, not-for-profit organizations, and private landowner associations. Those agencies, organizations, and associations are all members of The Ontario Dune Coalition (TODC) and may be thought of as ''stakeholders'' in matters concerning the Dune and Wetland System.

Formed in 1985, TODC is a voluntary alliance whose mission is to ''promote and support the protection, stabilization, restoration, and optimum public use of eastern Lake Ontario sand dunes and related land and water resources while respecting the rights of private property owners.'' Among its activities in pursuit of its mission, TODC promotes the development and sharing of information, provides technical assistance for land management projects, and provides a forum for public comments and discussions concerning the use and conservation of the Dune and Wetland System.

TODC members promote the concept of environmental stewardship whereby all citizens, officials, agencies, and organizations with an interest or authority pertaining to the Dune and Wetland System would consider themselves as stewards responsible for care of the system. That care would be for the purpose of ensuring that the natural, cultural, social, and economic values of the system are not just utilized for short-term gain but instead are sustained for the benefit of future generations. As a result, TODC members are herein referred to as ''stewardship partners.''

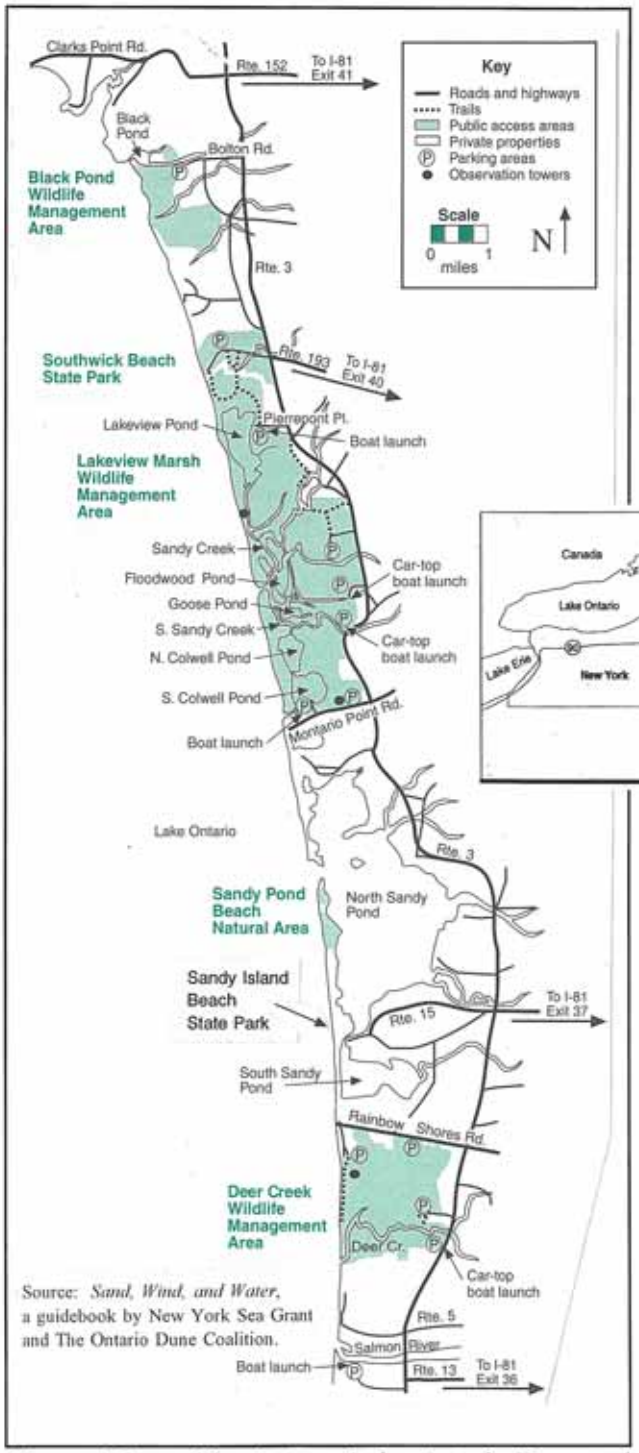

Figure 1-3: The Eastern Lake Ontario Dune and Wetland System.

Not-for-profit members of TODC include TNC, Onondaga Audubon Society, Seaway Trail, Inc., and the Friends of Sandy Pond Beach. State member agencies include the New York State Department of State (DOS) acting through its Division of Coastal Resources (DCR). The DCR is the coastal management agency of the State of New York, responsible for administration and implementation of the New York Coastal Management Program which covers the vast and diverse coastal area of the state, including the New York shore of Lake Ontario.[1] Other state agency members of TODC are the Department of Environmental Conservation (DEC) and Office of Parks, Recreation and Historic Preservation (OPRHP). New York Sea Grant is also a member. Federal members include the U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (USEPA), and U.S. Fish and Wildlife Service (USFWS). Town and county agencies are members; so too are private landowner associations.

A Foundation for Resource Management

To increase public awareness of the importance of the Dune and Wetland System, a comprehensive study of the system was funded and directed by the New York State Department of State in the late 1980's. The ensuing 1989 report—*New York's Eastern Lake Ontario Sand Dunes: Resources, Problems and Management Guidelines*—established guidelines for conservation and use of the Dune and Wetland System. The report, often called the ''Dunes Report,'' was not prepared as a prescriptive plan, nor as an effort to impose new land-use regulations. Instead, its purpose was to increase public awareness and understanding of the important natural values provided by the Dune and Wetland System (referred to in the Dunes Report as ''the eastern Lake Ontario coastal barrier system'') and of the various threats to the system posed by natural forces and human activities. In addition, the Dunes Report provided recommendations for cooperative, voluntary actions that can be undertaken by concerned citizens, governmental agencies, and private organizations to protect the system's natural values while providing opportunities for public access and recreational use.

Over the past 18 years, there has been significant progress in advancing the guidelines and recommendations of the 1989 Dunes Report. That progress is reflected in many accomplishments and ongoing initiatives, including but not limited to: stabilization of eroded sand dunes; public acquisition of previously degraded properties; scientific research to increase public understanding of natural processes; numerous education and outreach programs to develop public support and awareness; development and application of a variety of effective land man-

Figure 1-4: Sandy Island Beach State Park.

[1] The coastal area of New York State covers the shores of lakes Ontario and Erie, the Niagara and St. Lawrence rivers, New York City, Long Island, Long Island Sound, the tidal portion of the Hudson River, the Atlantic shoreline, and associated coastal embayments.

agement techniques; and provision of enhanced opportunities for recreational use of the Dune and Wetland System. TODC and its member agencies, organizations, and citizens have played an important role in the success of all these initiatives.

Figure 1-5: Sandy Pond Beach Natural Area.

One of the most prominent accomplishments, and a model of the positive changes that can be achieved through intergovernmental cooperation with public support and a common vision, is the establishment of Sandy Island Beach State Park. Establishment of the Sandy Pond Beach Natural Area to protect sensitive habitat and provide recreational opportunities is another success; so too is the establishment and growth of the Dune Steward Program to monitor activities in the Dune and Wetland System and educate visitors and others.

It is clear the 1989 Dunes Report has had, and continues to have, a major and beneficial influence on the success of stewardship initiatives in the Dune and Wetland System. It is also clear that in 2007 the report retains its significant value as a guidance document providing important information and still-valid recommendations for use and conservation of the system. There is now significantly more public awareness of the ecological values and sensitivity of the Dune and Wetland System than existed in 1989. The recommended guidelines, objectives, and implementation opportunities from the Dunes Report have provided a solid framework—the foundation—for guiding the coordinated efforts of the stewardship partners to protect, restore, and enhance the unique coastal resources associated with the eastern shore of Lake Ontario.

The Dunes Report is a prominent example of the benefits that can be realized from a study sponsored by a state's coastal management agency. This sort of study—to promote voluntary management guidelines instead of attempting to mandate behavior—can increase public awareness and establish the basis for a variety of effective actions to advance the public interest for conservation and beneficial use of coastal resources.

In addition, the success of the Dunes Report has confirmed the importance of a balanced, long-range vision for resource use and conservation. That balance is in keeping with the national objectives established by the 1972 Federal Coastal Zone Management Act to promote both environmental conservation and economic development of the Nation's coasts.

At the same time as the progress and accomplishments for beneficial use and conservation of the Dune and Wetland System are recognized, natural forces and human activities continue to affect and in some instances threaten the system. As a result, the need for continuing stewardship is recognized by all of the interested agencies, organizations, and citizens, including TODC and its members.

The Dune and Wetland System in 2007

The need to adapt resource management programs and strategies in the face of changing circumstances has long been apparent to the members of The Ontario Dune Coalition. Toward that purpose, the stewardship partners participated in a three-year review of conditions in the Dune and Wetland System. This review, known as the Dune and Wetland System Study and completed in 2007, had three principal goals: 1) to provide an update on current conditions in the system; 2) to describe the progress made and lessons learned in implementing the recommendations of the Dunes Report; and 3) to establish stewardship goals and priorities for the next ten years to protect and manage the system.

The Dune and Wetland System Study was conducted as one of five elements of the "Eastern Lake Ontario Coastal Watershed Restoration Project" developed by the Oswego County Soil and Water Conservation District (SWCD).[2] The SWCD applied for and received a grant from the Division of Coastal Resources to support work on the five program elements.[3] That grant was made possible with funds available from the National Oceanic and Atmospheric Administration's "Great Lakes Coastal Watershed Restoration Program." New York's share of this federal program is administered by the DCR in cooperation with the DEC.

Figure 1-6: High dune in the Deer Creek WMA stabilized by beach grass.

The Dune and Wetland System Study was coordinated by the Oswego County SWCD and a project implementation committee including representatives of the DCR, New York Sea Grant, and other members of TODC.

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[2] The "Eastern Lake Ontario Coastal Watershed Restoration Project" was conducted to help advance the "Great Lakes Coastal Watershed Restoration Program" whereby federal funds are provided through the National Oceanic and Atmospheric Administration to Great Lakes states to support projects that protect and restore coastal resources in Great Lakes watersheds.

[3] In addition to the Dune and Wetland System Study, program elements included: 1) an analysis of recreational trends in the Dune and Wetland System and development of a protocol for assembling information on recreational uses; 2) development of educational materials for private landowners concerning use and conservation of the system; 3) an evaluation of the feasibility of establishing a new mechanism for funding resource management initiatives in the system; and 4) monitoring of shoreline changes in selected areas of the system.

Information considered in the study was obtained from several main sources: 1) relevant reports, studies, maps, photographs, and other documents obtained from agencies, organizations, and citizens with an interest in the Dune and Wetland System; 2) personal interviews with TODC members, including agencies and organizations responsible for specific properties and projects in the system; 3) input from TODC members and the general public during regularly scheduled TODC meetings held throughout the study; 4) input from the TODC Executive Committee during special meetings held throughout the study; 5) a low altitude aerial photo reconnaissance of the system; 6) land-based visual inspections of the system during the four seasons of the year; and 7) vessel-based visual inspections of conditions in the system.

This ensuing report, *New York's Eastern Lake Ontario Dune and Wetland System: Guidelines for Resource Management in the 21st Century*, is herein presented to summarize the results of the Dune and Wetland System Study. A review of current conditions in the Dune and Wetland System, including its physical features and resource areas, the existing institutional framework for resource management, and prominent issues affecting that management, is included in chapters 2, 3, and 4, respectively; chapter 5 includes a summary of the many positive actions over the past two decades to advance beneficial use and conservation of the system as well as a review of some ''lessons learned'' from those actions. The concluding chapters 6 and 7 set forth, respectively, a Stewardship Vision for the future use and conservation of the Dune and Wetland System and a strategy for implementing that vision.

Figure 1-7: Lakeview WMA looking south.

The review of current conditions has shown that a number of issues identified in the 1989 Dunes Report have been effectively addressed through the coordinated efforts of the stewardship partners. In 1989, major, site-specific threats to sensitive resources, for example, were identified at Sandy Island Beach; on the undeveloped section of the south spit at North Sandy Pond; and in the Deer Creek Wildlife Management Area (WMA). Those threats have now been largely addressed through, respectively, the development of Sandy Island Beach State Park, establishment of the Sandy Pond Beach Natural Area, and application of effective conservation measures in the Deer Creek WMA.

One of the biggest challenges ahead concerns how to build and sustain personal stewardship actions in the Dune and Wetland System by both landowners and visitors to the system, including actions that would be based on awareness of the impacts that everyday activities can have on the system. In addition, there continues to be a significant need, as there was in 1989, to reduce and avoid adverse impacts on the Dune and Wetland System caused by willful and inadvertent activities that violate the laws and regulations controlling use, development, and protection of the system's resources.

In addition, several new, site-specific priorities have emerged. These include the need to: 1) address issues concerning maintenance of the North Pond inlet which provides a navigable connection between North Pond and Lake Ontario; and 2) manage public use of the Black Pond WMA in a manner consistent with the capacity of the area to support that use in a safe, enjoyable, and environmentally sound manner.

In summary, while significant accomplishments have been achieved with regard to protecting the resources of the Dune and Wetland System, environmental stewardship is herein recognized as an inherently ongoing process that does not end with the success of any one initiative. Today, there are not only continuing challenges but also new issues to address. As the stewardship partners look to the years ahead, their response to the following overarching questions will help determine in large part the future of the Dune and Wetland System:

1. WHAT IS THE *CARRYING CAPACITY* OF THE SYSTEM?
2. HOW SHOULD *CUMULATIVE IMPACTS* ON THE SYSTEM BE ADDRESSED?
3. TO WHAT EXTENT SHOULD WE TRY TO INFLUENCE *NATURAL PROCESSES* AFFECTING THE SYSTEM?
4. WHAT IS THE RIGHT *BALANCE* BETWEEN USE AND CONSERVATION?
5. WHAT ACTIONS SHOULD WE TAKE TO HELP *SUSTAIN* THIS UNIQUE RESOURCE FOR THE BENEFIT OF FUTURE GENERATIONS?

Figure 1-8: North Pond inlet.

Looking to the Future

Through the Dune and Wetland System Study, a Stewardship Vision based on 16 ideals has been set forth to provide a perpetual guiding framework for the actions of all agencies, organizations, and citizens concerned with the future use and conservation of the Dune and Wetland System.

The vision, summarized below and presented in more detail in chapter 6, is consistent with the findings and recommendations presented in the 1989 Dunes Report and with the initiatives developed and pursued by the stewardship partners since that report was published and since formation of The Ontario Dune Coalition. The vision organizes the basic principles for resource stewardship developed by the partners over the years but which heretofore were not set forth in any one document and formally adopted or otherwise endorsed.

The Stewardship Vision recognizes that stewardship initiatives in the Dune and Wetland System have evolved significantly over the past two decades and must continue to evolve as conditions change and our understanding of the system increases.

When the 1989 Dunes Report was published, stewardship initiatives focused primarily on protection of threatened sand dunes; on conservation of natural resources and values; and on public outreach and education. Those initiatives have evolved over time and in 2007 and the years to follow may have a wider focus that will:

Figure 1-9: Black Pond WMA beach.

1) *address issues concerning management of the larger ecological systems of which the sand dunes are part;*
2) *consider not only resource conservation but also opportunities for local and regional economic growth in the Dune and Wetland System; and*
3) *encourage and support not only public outreach and education, but also preparation and implementation of formally adopted plans for beneficial use and conservation of Dune and Wetland System resources.*

The Stewardship Vision will not be useful without an effective implementation strategy. It is recognized that such a strategy must be pursued as an ongoing process that will continue to evolve over time. The recommendations provided in the concluding chapter of this report are intended to begin that process. Included is a ten-year plan consisting of several major and measurable initiatives to advance the Stewardship Vision. As a first step for implementation, the stakeholder agencies and organizations—the stewardship partners—should endorse the vision and to the extent possible incorporate its principles into their programs and decisions affecting the Dune and Wetland System, including their applicable planning programs.

Figure 1-10: Beach pavilion under construction at Sandy Island Beach State Park.

Ideals of the Stewardship Vision for the Eastern Lake Ontario Dune and Wetland System

1) *Public recognition of Dune and Wetland System resources and values.*
2) *Active management of areas and resources through long-range planning, effective regulation, and nonregulatory measures.*
3) *Recognition of ecological systems within the Dune and Wetland System and eastern Lake Ontario watershed.*
4) *Effective coordination and partnerships among all stakeholders.*
5) *Public interest, support, and awareness for establishing and implementing the stewardship vision.*
6) *Balance among goals for: public health, safety, and welfare; environmental conservation and enhancement; recreational use; and residential and other private uses.*
7) *Sustainable economic benefits, to the local communities and region, associated with beneficial uses of the Dune and Wetland System.*
8) *Increased understanding of the "carrying capacity" of the Dune and Wetland System to support beneficial use in a safe and environmentally sound manner.*
9) *Effective shoreline management, including planning for nonstructural erosion control measures.*
10) *Educational and scientific activities, including activities to increase understanding of natural processes and resource carrying capacity.*
11) *Informed and effective planning on a regional, town-wide, and site-specific basis.*
12) *Effective regulations to guide use and development in the Dune and Wetland System.*
13) *Cultural enrichment, including preservation of the existing character and cultural heritage associated with the eastern Lake Ontario region.*
14) *Individual actions for effective stewardship, including actions to reduce and avoid destructive impacts on natural systems and values.*
15) *Dedicated and reliable sources of public and private funds to implement aspects of the Stewardship Vision.*
16) *Effective response to changing conditions through adjustment of the Stewardship Vision and implementation strategy as necessary.*

A Ten-Year Plan for Implementing the Stewardship Vision 2007-2017

1) *Presentation and distribution of the Stewardship Vision.*
2) *Endorsement of the Stewardship Vision.*
3) *Preparation of the North Pond inlet management plan.*
4) *Adoption of the Sandy Pond Resource Management Study.*
5) *Preparation of management plans for public areas.*
6) *Feasibility investigation of special coastal area designation.*
7) *Feasibility evaluation of outdoor sports and environmental awareness facility.*
8) *System-wide evaluation of species and habitat.*
9) *Preparation of system-wide plan for controlling invasive species.*
10) *Feasibility evaluation of managed habitat for shorebirds.*
11) *Establishment of dedicated source of funds.*
12) *Enhancement of project review capabilities.*
13) *Improvement of procedures for reporting violations.*
14) *Establishment of program to monitor shoreline change.*

Figure 1-11: Beach and dunes on the Lake Ontario shoreline.

2

The Dune and Wetland System in 2007

Dunes, sandy and gravelly barrier beaches, and the offshore sand sheet of the eastern shore of Lake Ontario make up a sedimentary system which is the result of shoreline and lake floor evolution spanning 12,000 years since the retreat of Pleistocene glaciers. Sand presently found on the beaches and lake floor is largely inherited from the shores of predecessor lakes which occupied the Lake Ontario basin while the gravel is more likely a local erosion product. Little sand is being added to the lake from upland or in-lake sources today. Topographic maps, bathymetric maps, and aerial photographs demonstrate that the present-day barriers and dunes have occupied their present position for at least 140 years. An exception to this record of stability is the shifting of pond-inlet positions which, at North Pond, has occurred at least three times in the last 100 years.

"Eastern Lake Ontario Sand Transport Study (ELOSTS) Final Report"

NEW YORK'S EASTERN LAKE ONTARIO DUNE AND WETLAND SYSTEM
December 2007

Chapter Cover Photo: Black Pond and wetlands at the northern boundary of the Dune and Wetland System.

The Dune and Wetland System in 2007

This chapter provides an overview of the physical features of the Eastern Lake Ontario Dune and Wetland System in 2007, including descriptions of natural processes affecting the system and the four major "resource areas" traditionally recognized within the system.

The most comprehensive description of conditions in the Dune and Wetland System is found in the 1989 report *New York's Eastern Lake Ontario Sand Dunes: Resources, Problems and Management Guidelines* (Dunes Report). Another helpful reference is the guidebook "Sand, Wind and Water: A Recreational Guide to Eastern Lake Ontario's Dunes and Wetlands." The reader can refer to these and other sources listed in Appendix B for additional information.

Coastal Resources and Natural Values

The Eastern Lake Ontario Dune and Wetland System is an ecological system of inter-related parts—a unique and valuable natural area in the coastal zone of New York State and the larger Great Lakes—St. Lawrence River system. Within the larger system, Lake Ontario is the lowest and smallest of the Great Lakes in terms of elevation and surface area, respectively. It receives outflow from the other lakes—Superior, Michigan, Huron, and Erie—as water moves through the Great Lakes basin to the Atlantic Ocean via the St. Lawrence River.

On the eastern shore of Lake Ontario, the Dune and Wetland System is a natural blend of barrier beaches and sand dunes, wetlands, creeks, and embayments, nearshore lake waters, underwater lands, and the mainland shoreline. The beaches and dunes form a "coastal barrier" protecting the landward features and resources—including extensive and relatively undisturbed wetlands and other aquatic habitats—from the direct effects of Lake Ontario's waves, currents, and high water. The coastal resources of the Dune and Wetland System provide vital natural functions and values as well as opportunities for a variety of recreational, residential, and other uses. The system's living resources—its plants, fish, and wildlife—are significantly diverse, abundant, and productive.

The Dune and Wetland System is bounded on the north by Black Pond and on the south by the Salmon River. To the east, New York Route 3 (part of the New York State Seaway Trail) follows the Lake Ontario shoreline and helps to frame, for management purposes, an easily recognized eastern boundary for the system. Offshore in Lake Ontario, the Dune and Wetland System includes the indeterminate zone of littoral sediment transport affecting the shoreline, a zone influenced by fluctuating lake levels and other considerations. The Dune and Wetland System's Lake Ontario shoreline is slightly more than 16 miles long measured between Black Pond's outlet to Lake Ontario on the north and the main (south) jetty at the mouth of the Salmon River and Port Ontario Harbor on the south.

Figure 2-1: Looking south over the coastal barrier at North Pond.

The coastal barrier of the Dune and Wetland System consists of bay barriers, barrier spits, and barrier islands and exhibits distinctive foredune, swale, secondary dune, and back dune environments in some sections. There are four separate areas of "high" sand dunes with elevations estimated at 50 to 70 feet above the beach. These are found in the Black Pond area, on the north and south barrier spits at North Pond, and in the Deer Creek area and are described by the New York State Department of State Division of Coastal Resources (DOS DCR) as the largest in the state and the second largest, behind those on Cape Code in Massachusetts, in the northeastern United States. Some of the high dunes are covered in part with mature forest vegetation and are associated with lower foredunes. Other high dunes have steep, exposed slopes directly facing the lake. The high dunes are often described as "relict" dunes formed thousands of years ago when, as the current evidence indicates, lake levels were much lower.

Behind the coastal barrier, sheltered from Lake Ontario, is an extensive and diverse network of freshwater wetlands, creeks, and ponds, including the largest barrier-pond ecosystem on the New York shore of Lake Ontario—the North and South ponds ecosystem. The creeks and ponds are connected with Lake Ontario via a major inlet in the coastal barrier (the North Pond inlet) and several smaller outlets, some of which flow through to the lake only during certain times of the year.

The aquatic resources of the Dune and Wetland System provide a variety of ecologically important functions, including support of significant natural communities and provision of essential habitat for a variety of fish and wildlife species. Most of the aquatic resource areas have been designated as Significant Coastal Fish and Wildlife Habitats by the State of New York. Among the most important habitat values are those in support of large concentrations of avian species, including migratory shorebirds and songbirds, raptors, waterfowl, and wading birds. The abundance and diversity of pond- and lake-based fisheries resources in the Dune and Wetland System is also remarkable.

The coastal barrier is an integral part of the Dune and Wetland System's vital fish and wildlife habitat. Sand flats and barrier spits, for example, are heavily used as feeding and resting areas by large numbers of migratory shorebirds, common and Caspian terns, and gulls. The undeveloped sand dunes also provide valuable resting areas for many migratory bird species.

Figure 2-2: The main jetty at the mouth of the Salmon River marks the south boundary of the Dune and Wetland System.

The extensive wetland areas behind the coastal barrier, along with the wetlands associated with the tributary streams draining into the Dune and Wetland System, provide important ecological functions related to maintaining and improving water quality. The wetlands trap sediments, restrict the passage of toxins and heavy metals, attenuate the effects of nutrients, and generally serve as nutrient "sinks," thereby protecting water quality in all of the surface water bodies in the Dune and Wetland System.

The state water quality classifications assigned by the New York Department of Environmental Conservation (DEC) to each stream and water body in the Dune and Wetland System are based on consideration of their best usage, including their traditional and existing uses for fishing, boating, and swimming. While there are some identified impairments affecting those uses, no existing violations of water quality standards are currently identified in the Dune and Wetland System. It is recognized, however, that conditions upstream in the eastern Lake Ontario watershed and land-use conditions in and adjoining the Dune and Wetland System may affect the quality of surface water in the system's ponds and embayments. As a result, a number of agencies and organizations have conducted or are currently conducting water quality- and habitat-related studies to identify potential sources of impairments.

Moving landward through the Dune and Wetland System toward Route 3, the shoreline and upland areas adjoining the system's aquatic habitats consist largely of glacial drift shaped into a gently rolling to almost flat landscape. That landscape is dissected by many small water courses that drain from the watershed of eastern Lake Ontario and flow into and through the Dune and Wetland System. Many of these creeks carry a state water quality classification of C or C(T) meaning they are considered fish habitat waters and include waters that support native trout populations.

In addition to providing fundamental natural values, the coastal resources of the Dune and Wetland System support many different human uses, including boating, fishing, hunting, swimming, camping, nature observation, environmental education, and shorefront residential development. These resources contribute significantly to the traditional character and quality of life in the eastern Lake Ontario region and their use for recreational and other purposes provides economic benefits of local and regional significance. In summary, the Dune and Wetland System's resources serve as vital aesthetic and recreational resources, essential habitat, water purifiers, shore stabilizers, and storm barriers.

Natural History and Processes

A complex mix of inter-related natural phenomena affect the Eastern Lake Ontario Dune and Wetland System and contribute to long-term and sudden modifications of the system. Wind, waves, currents, storm surges, fluctuating lake levels, ice movement, climate change, isostatic uplift, and other forces all continue to shape the Dune and Wetland System as they have for thousands of years. Descriptions and discussions of these natural littoral processes[1] are included in a number of reports and papers, including the final report of the Eastern Lake Ontario Sand Transport Study (ELOSTS) and the 1997 report "Eastern Lake Ontario Littoral Processes: Review of Information and Management Implications." The following sections concerning natural history and processes are based largely on information from those two reports.

Formation of the Dune and Wetland System

The origin and natural history of the Dune and Wetland System have long been the subject of discussion and hypotheses. It is well recognized that the system developed as the result of shoreline and lake floor evolution spanning the 12,000 years since retreat of the last continental ice sheet. Further, it is understood that the different water levels of post-glacial lakes in the Ontario basin had a major impact on development of the Dune and Wetland System. The various stages of that development followed the draining of proglacial Lake Iroquois. Sandy sediments of the Lake Iroquois shoreline were subsequently exposed, eroded, and dispersed along the post-Lake Iroquois, pre-modern Lake Ontario shorelines. As the water level continued to drop during that period, littoral processes shaped the sediments into a coastal barrier along the eastern shore, and westerly winds formed substantial sand dunes on the barrier, including the high dunes that remain today.

Figure 2-3: Some "high" dunes have steep and exposed slopes directly facing the lake.

Investigations from the ELOSTS have provided new information concerning this shoreline evolution. Radiocarbon ages indicate that deposition of the existing offshore sand sheet was underway at least 8,400 years ago; researchers hypothesize that a beach-dune complex was in place at that time along an eastern shore that was as much as 80 feet below the modern lake level. As the lake level then rose toward modern levels, the beach-dune complex moved landward to near its present position by 2,500 years ago. This date is inferred from radiocarbon ages showing wetland development approximately 2,500 years ago in one location on the current eastern shore. Most likely, such development would not have occurred without the presence of a barrier beach to shelter the wetland from Lake Ontario.

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[1] The term "littoral" is used in this report to refer to matters and conditions concerning the shore of Lake Ontario. Littoral processes include but are not limited to the natural effects of wind, waves, ice, and currents that influence the movement of sediment onto and along the shore.

An important point to be made in discussing the natural history of the Dune and Wetland System is that the climatic and geomorphic conditions under which the system's coastal barrier was formed no longer exist. As a result, if the barrier and its dunes are significantly damaged or destroyed, the natural values lost can not be easily replenished, if at all.

Ongoing Forces and Impacts

Information regarding the origin and natural history of the Dune and Wetland System provides additional insight concerning the natural processes currently affecting the system and the possible future of the system. A widely held hypothesis has been that past sources of sediment no longer exist for replenishing the system's barrier beaches and sand dunes as they are eroded, and therefore the Lake Ontario shoreline will be subject to continuing recession.

The effects of current erosive forces are clearly evident in a number of locations. For example, reports from the 1970's describe a continuous sandy beach along the entire Lake Ontario shoreline in the Dune and Wetland System. Today, however, substantial amounts of cobbles are found along the southernmost 3.75 miles of the barrier beach shoreline, from the mouth of the Salmon River north to Sandy Island Beach State Park. That distance is about 23% of the total length of the lake's shoreline in the Dune and Wetland System. The generally accepted hypothesis is that the cobbles are a lag deposit being exposed by the progressively northward erosion of overlying sand in the southern part of the system.

Figure 2-4: The seasonally open outlet at Black Pond marks the northern boundary of the Dune and Wetland System.

The dynamic nature of the Dune and Wetland System is evident throughout the system as the shoreline's size, shape, and relative position are naturally modified over time. As the shoreline continues to undergo change, adverse impacts on the various habitat components of the Dune and Wetland System, including physical, chemical, and biological components, may be anticipated. In the most dramatic circumstance imagined, if the beaches and dunes are completely eroded and breached, the extensive wetlands and shoreline properties now sheltered by the coastal barrier would be directly exposed to the natural forces of Lake Ontario and subject to the most accelerated erosion.

Due to their complexity, some aspects of the operation and impacts of the littoral processes affecting the shoreline continue to be less than well understood and many questions concerning those processes do not lend themselves to precise answers. While wind-driven waves are the principal forces modifying the shoreline, fluctuating lake levels and other forces also have a significant influence. Prior to the ELOSTS, there was a lack of quantitative data concerning

those processes, including data on the sources, direction, and quantity of sediment transport in the littoral zone.

Movement of Sand in the Littoral Zone

The ELOSTS investigations indicate that only small amounts of sand are being added to the Dune and Wetland System at the present time from upland, shoreline, and in-lake sources. Most of the existing sand, both onshore and offshore, is believed to be inherited from the earlier, higher stands of post-glacial lakes in the Ontario basin. Offshore, for a distance of at least three miles, a lake-bed sand sheet of variable thickness (generally six to ten feet) and covering an area of about 70 square miles has been identified. The northern boundary of the sand sheet is off Black Pond where a bedrock outcrop rising nearly to the surface of the lake acts as a dam preventing any further northward movement of sand. On the south, the boundary of the sand sheet is less distinct but described as being offshore in the vicinity of the Salmon River mouth.

The sand remaining in the Dune and Wetland System continues to be moved along the shoreline as well as offshore and on to the beach by natural littoral processes, with the exception of sand that becomes "stranded" in inlet-mouth bars, ponds, wetlands, and dune "blow-outs." Waves and wind-driven currents are the principal forces causing the littoral transport of sand along the beach and offshore. It is generally accepted that the predominant direction of sediment movement along the eastern shore of Lake Ontario is from south to north along the southern part of the Dune and Wetland System. It has been the general opinion of most observers that littoral transport of sediment in the central and northern parts of the system is subject to reversals, dependent in large part on wind speed and direction, with no predominant transport direction observable. Recent information considered in the course of the Lake Ontario-St. Lawrence River Water Level Regulation Study, however, indicates net longshore sediment transport to the south along the northern and central parts of the Dune and Wetland System.

Figure 2-5: The coastal barrier shelters an extensive and diverse network of wetlands, creeks, and ponds.

Adding to the complexity, the ELOSTS findings indicate that the direction of longshore sand transport varies according to the time of the year. At most locations during the warmer months, sand seems to move northward from the beaches and the offshore sand sheet as well as onshore from shore-parallel bars, while in the colder months it appears that sand moves southward and offshore into shore-parallel bars. During storms, sand may move either north or south along the beaches and on the lake floor depending on the direction of the wave-driven longshore drift, and offshore into the bars. The lack of ongoing sand accumulation in Lake Ontario off Black Pond at the northern limit of the Dune and Wetland

System suggests that sand must be moved south during the winter storms to offset the northerly transport seen during the summer.

Sand is also transported by wind from the beaches to the dunes; to and from the inlet-mouth bars on the coastal barrier at North Pond; and into ponds and wetlands behind the coastal barrier. Sand stranded in the bars, ponds, and wetlands is essentially lost from the active littoral zone and no longer available for natural renourishment of the beaches and dunes. Slow infilling of the ponds appears to be a continuing process associated with storm washovers, wind transport of sand past the dunes, and input from streams. The ELOSTS concluded that under present climatic and lake level management conditions (see below), the current sand supply to the Dune and Wetland System about balances the sand lost from the system. Further, it is hypothesized that the amount of sand lost from the barrier beaches is of the same order of magnitude as the volume of sand that has accumulated in North Pond over the past 140 years.

Fluctuating Lake Levels

Water levels on the Great Lakes can vary significantly and unpredictably. The fluctuating level of Lake Ontario has a significant influence on the shoreline and littoral processes in the Dune and Wetland System. Relatively low lake levels generally result in decreased erosion rates and promote sand dune replenishment along much of the shoreline. When lake levels are lower, more offshore sand may be exposed to wave action and littoral transport, and more sand is exposed on the beach and available to be moved landward by the wind and onto the dunes. Conversely, higher lake levels result in narrower beaches and increased rates of shoreline erosion.

In addition to influencing erosion rates (of much interest to shoreline property owners) and the movement of sediment along the shoreline, Lake Ontario water levels affect navigation on the lake and St. Lawrence River. Water levels also influence fish and wildlife habitat and hydropower generation on the river.

Like the other Great Lakes, Lake Ontario exhibits water levels subject to short-term, seasonal, and long-term fluctuations. The most dramatic short-term changes in water levels are caused by severe storms and other meteorological events and can last from a few hours to several days. Seasonal fluctuations reflect the annual hydrologic cycle and generally result in higher lake levels in late spring to mid-summer and lower levels in winter. The yearly fluctuation in lake level is about two feet according to data published by the U.S. Army Corps of Engineers (USACE) Detroit District.

Long-term, unpredictable fluctuations in water levels spanning several years, decades, or centuries and caused by long-term precipitation and climate variability also affect Lake Ontario. The DCR and other agencies and organizations recognize that global climate change may significantly impact the long-term levels of the Great Lakes. Science-based predictions of such impact, however, have not been developed to the same extent as the predictions concerning the possible effects of climate change on ocean levels.

Over the past century, the range from extreme high water to extreme low water levels on Lake Ontario has been measured at over six feet. Since modern lake level measurements began in 1860, extreme high water periods have occurred in the late 1920's, mid-1940's, early 1950's,

early 1970's, mid-1980's, and mid-1990's. The average lake levels recorded in 2006 were very close to the long-term average of 244.6 feet measured with reference to International Great Lakes Datum (IGLD) of 1985.

While the principal influences on water levels in the Great Lakes are the natural influences of precipitation, evaporation, and outflow, water levels are also regulated to an extent by man-made control works at the outlets of Lake Superior and Lake Ontario. With regard to Lake Ontario, the control works at power generation and navigation facilities on the St. Lawrence River affect the outfall and level of the lake and are managed to provide some measure of buffering against high and low water levels. Following completion of the St. Lawrence Seaway and Power Project in 1960, the outflow of Lake Ontario has been regulated by the International St. Lawrence River Board of Control under a water management plan approved by the International Joint Commission (IJC). The current plan, now being reviewed by the IJC for possible revision, calls for the level of the lake to be regulated within a target range of 243.29 feet to 247.29 feet IGLD 1985.

Although this regulation can partially alter or alleviate water level extremes, the most critical factors affecting the level of Lake Ontario remain natural factors such as precipitation over the entire Great Lakes Basin. Persistently high or low precipitation over several years is seen as the main natural factor causing extreme high or low water levels. Nevertheless, the recent Lake Ontario-St. Lawrence River Study prepared for the IJC to evaluate options for regulating levels and flows in the Lake Ontario-St. Lawrence River system has provided information giving credence to the effects that such regulation can have on the Dune and Wetland System shoreline.

Other Considerations

Tilting of the Lake Ontario basin is another natural factor affecting water levels along the shoreline of the Dune and Wetland System. This tilting, sometimes called isostatic uplift, has been occurring since the retreat of the last glacier and establishment of the present lake outlet through the St. Lawrence River. Essentially, the basin is tilting because the outlet is rebounding more rapidly from the weight of the glacier than the rest of the basin, resulting in progressively higher water levels along the southern and eastern shores of the lake.

Modern ice also has an impact, the precise extent of which is currently not certain. Under one hypothesis, ice may have a protective influence on the Lake Ontario shoreline, protecting the shoreline from wave erosion in early winter when the lake is mostly open. According to another hypothesis, ice may enhance erosion by displacing severe winter wave energy from the beach to the upland shoreline and by entraining sediment and transporting it both along the shore and in an offshore direction.

Discussion of littoral processes affecting the eastern Lake Ontario shoreline would not be complete without considering the history of inlet formation at North Pond. The processes of inlet formation and wave overwash have long been part of the natural environment of the coastal barrier at the pond.

Five different inlet locations since the early 1800's have been identified. Historical evidence suggests that the older inlets closed over time because outflow from the pond can only support a single opening. The older inlets eventually closed completely, leaving a widened barrier as they

closed and filled in with sand, as soon as a new opening broke through the barrier elsewhere. As new inlets developed, considerable amounts of sand from the lake shoreline were transported into the pond. The ELOSTS concluded that inlets in the North Pond barrier have the effect of providing a sink for littoral sediment, essentially removing it from the longshore system and trapping it in the pond.

Figure 2-6: The widest section of the coastal barrier at North Pond marks an historical inlet location.

In summary, a complex and dynamic mix of inter-related natural phenomena affect the eastern Lake Ontario shoreline, and episodic major events such as extreme storms can cause sudden and dramatic changes. The natural processes can be influenced or altered by human actions. Of concern are actions that would interrupt littoral transport, remove sediment from the active littoral zone, or reduce the input of sediment to the littoral zone. Such actions would include construction of harbor protection structures and navigation channels; development of erosion control measures that harden the shoreline; and dredging of aquatic areas and dredged material disposal. Pedestrian and vehicle movements and poorly planned development activities that would disturb sensitive upland portions of the coastal barrier are also of concern. In addition, the potential impact of human regulation of Lake Ontario water levels may have significant effects on shoreline conditions in the Dune and Wetland System.

The ELOSTS findings show that the shoreline position of the barrier beaches in the Dune and Wetland System, excepting the position of the North Pond inlet, has been relatively stable over the past 140 years. Those findings also show, however, that no significant amounts of sand are currently being added to the system. Further, it is clear that geomorphic conditions for natural replenishment of the "high" sand dunes no longer exist.

Major Resource Areas

For the purpose of reviewing conditions in the Dune and Wetland System and discussing issues and opportunities for resource management, four major "resource areas" have been identified in the system. These areas were first described in the 1989 Dunes Report and are now well recognized by resource managers and others concerned with use and conservation of the Dune and Wetland System. The resource areas are in large part defined, from north to south, by the substantial aquatic and barrier beach environments associated with Black Pond, Lakeview Marsh, North and South Ponds, and Deer Creek. (See maps 1, 2, and 3.) All four resource areas contain expansive areas of aquatic habitat designated as Significant Coastal Fish and Wildlife Habitat by the State of New York.

Additional information concerning the resource areas, including a review of successfully completed and ongoing initiatives for resource management in each area, is included in chapter five of this report.

Figure 2-7: Looking north over the Black Pond WMA shoreline.

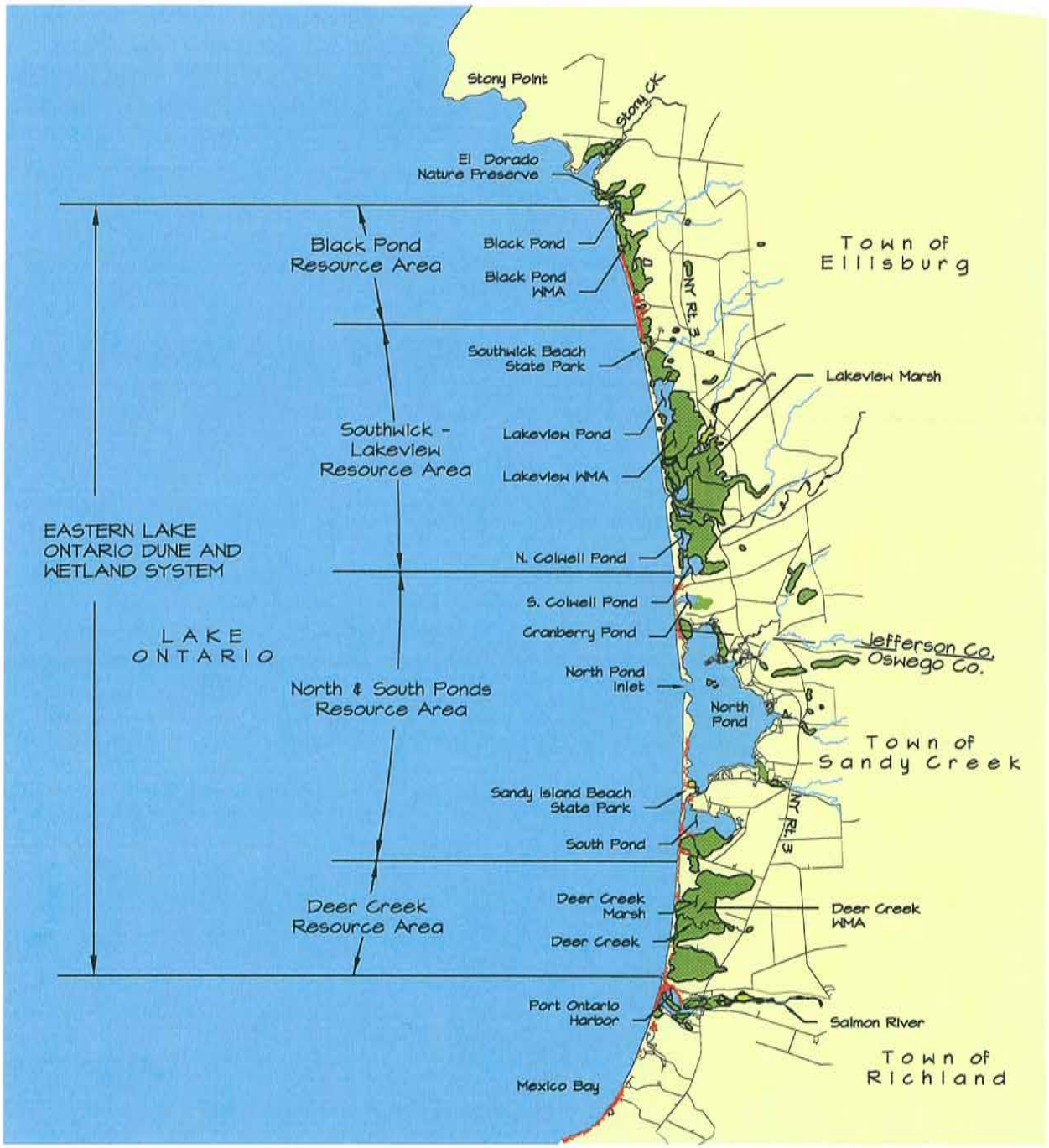
Black Pond Resource Area

The seasonally open outlet to Lake Ontario at Black Pond marks the northern boundary of the Dune and Wetland System. There is a dramatic contrast between the bedrock shoreline north of the outlet and the sandy shoreline of the Dune and Wetland System to the south. From the Black Pond outlet south to Southwick Beach State Park, the Lake Ontario shoreline of the Black Pond Resource Area measures about 2.8 miles. This is about 18% of the total lake shoreline in the Dune and Wetland System. The entire resource area is within the Town of Ellisburg in Jefferson County.

Included in the resource area are: part of The Nature Conservancy's El Dorado Preserve (most of the 360-acre preserve is north of the Black Pond outlet); the State of New York's Black Pond Wildlife Management Area (WMA) managed by the New York State Department of Environmental Conservation (DEC) Region 6; and lakeshore residential areas. The preserve and WMA are included in the El Dorado Beach and Black Pond Wetlands Significant Coastal Fish and Wildlife Habitat Area designated by the State of New York. In addition, the WMA is part of the designated Eastern Lake Ontario Marshes Bird Conservation Area.

The resource area is especially notable for the "high" sand dune formations bridging the El Dorado Preserve and WMA and for the preserve's regionally significant habitat for large concentrations of shorebirds, waterfowl, and wading birds during spring and fall migrations. Arctic migrating shorebirds, for example, feed on the dense populations of insects and other invertebrates attracted to algae blooms in and near the shoreline of the preserve. The area is well-documented as one of the major concentration areas for migratory shore and water birds on Lake Ontario, attracting bird-watchers from throughout central New York.

Figure 2-8: "High" dunes bridge the El Dorado Preserve and Black Pond WMA.



MAP 1:
EASTERN LAKE ONTARIO DUNE AND WETLAND SYSTEM AND MAJOR RESOURCE AREAS
December 2007

Legend:
- Wetlands
- Lake Shore Residential Areas

Source:
Map developed from the New York State Department of Transportation Quadrangle Maps including: Pulaski, Ellisburg, and Henderson Quadrangles

Funding assistance from NOAA's "Great Lakes Coastal Watershed Restoration Program" through New York State Department of State Division of Coastal Resources.

GRAPHIC SCALE

0 8,750 17,500 35,000

(IN FEET)

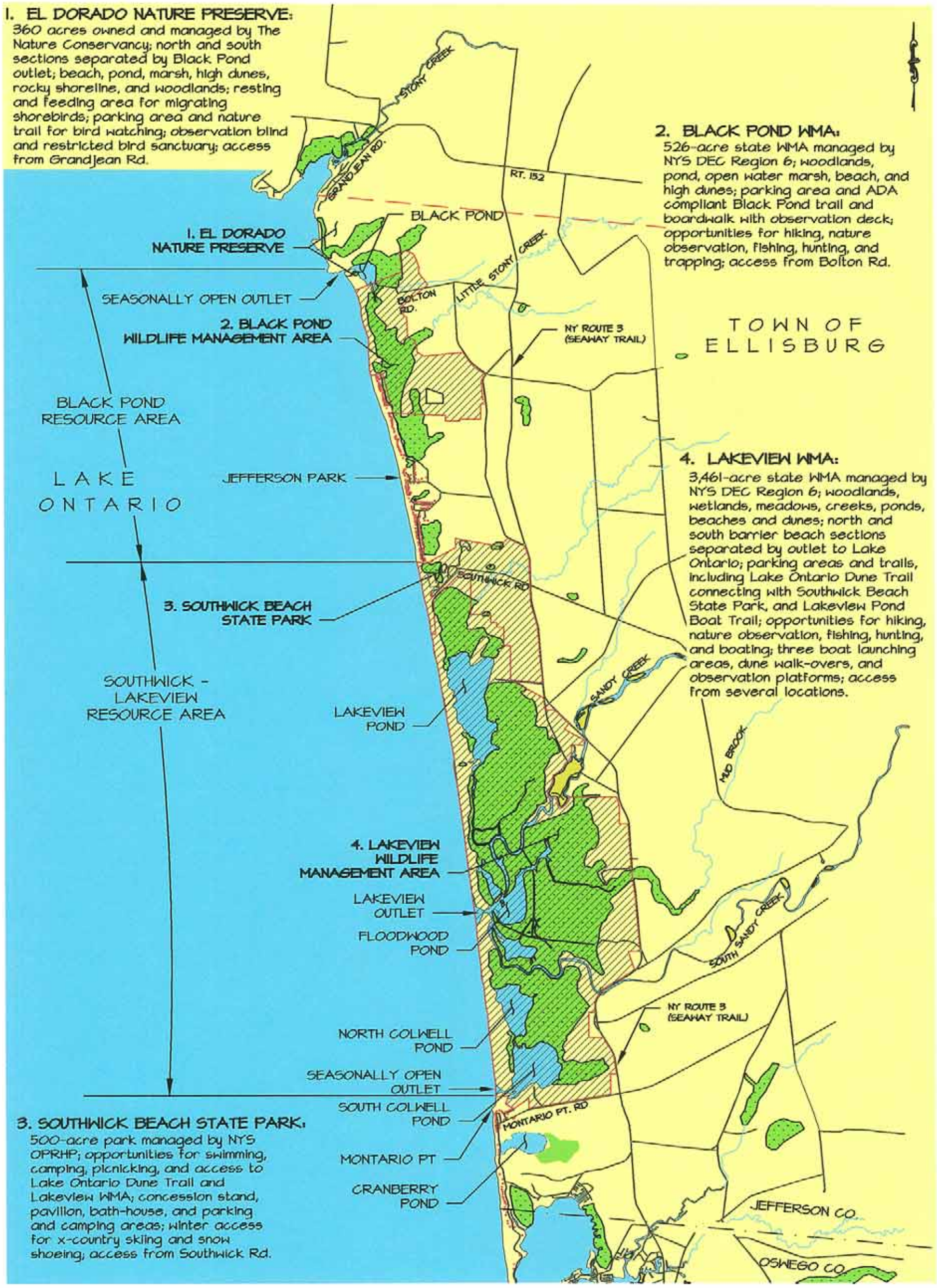
1 inch = approx. 17,500 ft.

1. EL DORADO NATURE PRESERVE:
360 acres owned and managed by The Nature Conservancy; north and south sections separated by Black Pond outlet; beach, pond, marsh, high dunes, rocky shoreline, and woodlands; resting and feeding area for migrating shorebirds; parking area and nature trail for bird watching; observation blind and restricted bird sanctuary; access from Grandjean Rd.

2. BLACK POND WMA:
526-acre state WMA managed by NYS DEC Region 6; woodlands, pond, open water marsh, beach, and high dunes; parking area and ADA compliant Black Pond trail and boardwalk with observation deck; opportunities for hiking, nature observation, fishing, hunting, and trapping; access from Bolton Rd.

4. LAKEVIEW WMA:
3,461-acre state WMA managed by NYS DEC Region 6; woodlands, wetlands, meadows, creeks, ponds, beaches and dunes; north and south barrier beach sections separated by outlet to Lake Ontario; parking areas and trails, including Lake Ontario Dune Trail connecting with Southwick Beach State Park, and Lakeview Pond Boat Trail; opportunities for hiking, nature observation, fishing, hunting, and boating; three boat launching areas, dune walk-overs, and observation platforms; access from several locations.

3. SOUTHWICK BEACH STATE PARK:
500-acre park managed by NYS OPRHP; opportunities for swimming, camping, picnicking, and access to Lake Ontario Dune Trail and Lakeview WMA; concession stand, pavilion, bath-house, and parking and camping areas; winter access for x-country skiing and snow shoeing; access from Southwick Rd.



Legend:
- Wetlands
- 1,2,3,4 Public Access Areas
- Lake Shore Residential Areas
- State Lands
- Town Boundary
- County/Town Boundary

Source:
Map developed from the New York State Department of Transportation Quadrangle Maps including: Pulaski, Ellisburg, and Henderson Quadrangles

MAP 2:
BLACK POND AND SOUTHWICK - LAKEVIEW RESOURCE AREAS
December 2007

GRAPHIC SCALE
0 — 2,250 — 5,000 — 10,000
(IN FEET)
1 inch = approx. 5,000 ft.

Notes:
For more detailed maps and descriptions of public access opportunities in the Eastern Lake Ontario Dune and Wetland System, see the booklet "Sand, Wind, and Water: A Recreational Guide to Eastern Lake Ontario's Dunes and Wetlands" prepared by New York Sea Grant.

Funding assistance from NOAA's "Great Lakes Coastal Watershed Restoration Program" through New York State Department of State Division of Coastal Resources.

5. NORTH AND SOUTH PONDS:
Opportunities for boating and fishing with access from North Pond marinas and public "car-top" ramp at Sandy Island Beach State Park.

SOUTH COLWELL POND

SEASONALLY OPEN OUTLET

MONTARIO POINT

CRANBERRY POND

RENSHAW BAY

NORTH SPIT

NORTH POND INLET

NORTH AND SOUTH PONDS RESOURCE AREA

LAKE ONTARIO

6. SANDY POND BEACH NATURAL AREA

SOUTH SPIT

7. SANDY ISLAND BEACH STATE PARK

5. SOUTH POND

RAINBOW SHORES

8. DEER CREEK WILDLIFE MANAGEMENT AREA

DEER CREEK RESOURCE AREA

DEER CREEK

SEASONALLY OPEN OUTLET

BRENNAN BEACH CAMPGROUND

• PORT ONTARIO HARBOR

• SELKIRIK SHORES STATE PARK

MONTARIO PT. RD

SKINNER CREEK

LINDSEY CREEK

TOWN OF ELLISBURG

JEFFERSON CO.

OSWEGO CO.

CARL IS.

5. NORTH POND

TOWN OF SANDY CREEK

BLIND CREEK

NY ROUTE 3 (SEAWAY TRAIL)

RT. 15

LITTLE SANDY CREEK

RAINBOW SHORES RD.

TOWN OF RICHLAND

RT. 5

SALMON RIVER

NY ROUTE 3 (SEAWAY TRAIL)

6. SANDY POND BEACH NATURAL AREA:
Recreation area and wildlife preserve owned and managed by NYS DEC Region 7; opportunities for beach use, hiking, and bird watching; restricted bird sanctuary at northern tip of south spit; accessible by boat; string-fenced trail to bird observation area; dune walk-over from Lake Ontario to North Pond.

8. DEER CREEK WMA:
1,195-acre state WMA managed by NYS DEC Region 7; woodlands, wetlands, creek, beach, and high dunes; parking areas, hiking trail, dune walk-over, observation platform, and "car-top" boat launch; opportunities for hiking, nature observation, fishing, hunting, and canoeing; access from several locations including Rainbow Shores Road.

7. SANDY ISLAND BEACH STATE PARK:
Managed by NYS OPRHP; opportunities for swimming, picnicking, and boating access to North Pond; parking areas, ADA-compliant dune walk-over, and bath-house; "car-top" boat launching area; access from County Route 15.

Legend:
- Wetlands
- 5,6,7,8 Public Access Areas
- Lake Shore Residential Areas
- State Lands
- Town Boundary
- County/Town Boundary

Source:
Map developed from the New York State Department of Transportation Quadrangle Maps including: Pulaski, Ellisburg, and Henderson Quadrangles

MAP 3:
NORTH AND SOUTH PONDS AND DEER CREEK RESOURCE AREAS
December 2007

GRAPHIC SCALE
0 — 2,250 — 5,000 — 10,000
(IN FEET)
1 inch = approx. 5,000 ft.

Notes:
For more detailed maps and descriptions of public access opportunities in the Eastern Lake Ontario Dune and Wetland System, see the booklet "Sand, Wind, and Water: A Recreational Guide to Eastern Lake Ontario's Dunes and Wetlands" prepared by New York Sea Grant.

Funding assistance from NOAA's "Great Lakes Coastal Watershed Restoration Program" through New York State Department of State Division of Coastal Resources.

Another notable feature is the large amount of shell debris from zebra mussels (*Dreisenna polymorpha*) that is mixed with sand on the beach and offshore.

When the Dunes Report was published in 1989, the resource area was experiencing increased recreational use by boaters who launched their vessels from the nearby state boat launching site at Stony Creek north of the Dune and Wetland System. In 2007, there are additional pressures for recreational use, now supported by public access facilities constructed in the Black Pond WMA by the DEC in 2001. The access road, parking area, and Black Pond Trail with its elevated boardwalk to Lake Ontario have made the WMA a major attraction for beach recreation in the Dune and Wetland System.

The 526-acre Black Pond WMA contains woodlands, wetlands, beaches, and sand dunes, including the northernmost marsh area in the Dune and Wetland System. Several rare plant species are found in the WMA.

Figure 2-9: The WMA beach on Lake Ontario.

The WMA provides seasonal opportunities for hiking, nature observation, fishing, hunting, and trapping. A fishing and observation deck adjoin Black Pond which is a shallow, approximately 25-acre water body supporting a significant warm-water fish community. Many visitors to the WMA's beach on Lake Ontario use the handicapped-accessible Black Pond Trail and boardwalk; others anchor small boats offshore; and some visitors walk into the WMA from the El Dorado Preserve and the residential areas adjoining the WMA to the south. Vehicle access to the WMA parking area is from Bolton Road.

South of the WMA's beach, residential areas known as North Jefferson Park, Jefferson Park, Sunset Bluff, and Eastman Tract have been developed on the barrier beach. The residential shoreline is about 1.8 miles long and includes lake shore cottages (most are occupied on a seasonal basis) built on small lots typically 50 feet in width. There is no well-formed dune system in the residential areas although embryonic dunes stabilized by beach grass have formed in several locations.

Southwick-Lakeview Resource Area

The Southwick-Lakeview Resource Area is within the Town of Ellisburg in Jefferson County and contains Southwick Beach State Park and the State of New York's Lakeview Wildlife Management Area. The resource area's Lake Ontario shoreline extends from the northern boundary of the state park to the seasonally open outlet to Lake Ontario at South Colwell Pond and is entirely owned by the State of New York. The shoreline covers about five miles and represents about 31% of the total lake shoreline in the Dune and Wetland System. There is no residential development on the coastal barrier in this resource area.

Figure 2-10: Looking south over residential areas in the Black Pond Resource Area.

Southwick Beach State Park is a major recreational attraction in the eastern Lake Ontario region; it is one of four state parks in the region and one of the two state parks (Sandy Island Beach State Park is the other) in the Dune and Wetland System. The 500-acre park with a .7-mile long beach on Lake Ontario is managed by the New York Office of Parks, Recreation and Historic Preservation (OPRHP) and is part of the OPRHP's Thousand Islands Region.

The park provides opportunities for swimming, camping, picnicking, cross-country skiing, snow-shoeing, nature observation, environmental education, and access to the Lake Ontario Dune Trail which links the park with the Lakeview WMA. Park facilities include a beach pavilion, concession, bathhouse facility, picnic areas, parking areas, and beach and inland camping sites. By planting beach grass and establishing snow-fencing and dune walk-over structures, the OPRHP has protected and encouraged the development of sand dunes near the beach camping area. Vehicle access to the park is from Southwick Road off New York Route 3.

The 3,461-acre Lakeview WMA, managed by the DEC Region 6, is the largest WMA in the Dune and Wetland System and contains extensive aquatic habitat, including wetlands, creeks, and ponds (such as Lakeview, Floodwood, Goose, North Colwell, and South Colwell ponds) supporting many different species of fish and wildlife. The WMA also has barrier beaches and sand dunes as well as meadow and woodland habitats. Larger dunes and more mature vegetation are found on the WMA's coastal barrier nearer the state park. The barrier narrows and the dunes become progressively lower further south in the WMA. Large beach "cusps" which give the shoreline a scalloped appearance are often seen along the WMA's Lake Ontario shoreline.

The WMA is a recreational fisheries resource of major economic significance in the eastern Lake Ontario region. Two major watercourses in the eastern Lake Ontario watershed—Sandy Creek and South Sandy Creek—flow through the WMA, converge at the Lakeview outlet to Lake Ontario, and support both warmwater and coldwater fish species. The outlet provides an

Figure 2-11: Southwick Beach State Park on Lake Ontario.

open connection to the lake even during low flow periods of the year and is a traditionally popular destination for boaters.

Figure 2-12: The Lakeview outlet separates the WMA's coastal barrier into north and south sections.

The Lakeview outlet separates the WMA's coastal barrier into north and south sections. The northern section, a barrier spit, is about 2.6 miles long from the state park to the outlet. The southern barrier section measures about 1.7 miles from the Lakeview outlet to the seasonally open outlet at South Colwell Pond. The depth and volume of flow through the Lakeview outlet prevents pedestrian movement between the north and south sections of the WMA's coastal barrier.

The Lakeview WMA is the major part of the Lakeview Marsh Significant Coastal Fish and Wildlife Habitat Area designated by the State of New York. The WMA is also part of the designated Eastern Lake Ontario Marshes Bird Conservation Area. In addition, the Lakeview Marsh and barrier beach have been designated a National Natural Landmark by the U.S. Department of the Interior. The DEC has designated the barrier beach portion of the WMA as a "natural beach area" within which special regulations for public use of the area are applied.

Figure 2-13: Beach "cusps" give the WMA shoreline a scalloped appearance.

In addition to providing extensive habitat and other natural resource values, the WMA provides a variety of opportunities and facilities for recreational use, including opportunities for boating, hiking, nature observation, fishing, hunting, and trapping. Public access to the WMA is available from several roads and trails off New York Route 3. In addition, visitors may enter the WMA through Southwick Beach State Park via the Lake Ontario Dune Trail.

Three boat launching areas for small motorboats as well as canoes and kayaks are provided in the WMA. Dune walk-overs and observation platforms also enhance public use and enjoyment of the WMA. The first dune walk-over in the Dune and Wetland System was constructed in the WMA in 1988 and is now part of the Lake Ontario Dune Trail.

The southern section of the WMA's coastal barrier is accessible by small boat; by foot it is only accessible from the Montario Point residential area and only when the natural outlet of South Colwell Pond is closed during

periods of low flow. As a result, the southern section is less disturbed by human use than the northern section of the coastal barrier. The outlet of South Colwell Pond marks the southern boundary of the Southwick—Lakeview Resource Area.

North and South Ponds Resource Area

This resource area centered around North Pond encompasses the largest barrier-pond ecosystem on the New York shore of Lake Ontario. Most of the area is in the Town of Sandy Creek in Oswego County; the northernmost part is in the Town of Ellisburg in Jefferson County. The resource area's Lake Ontario shoreline measures about 5.7 miles from the outlet of South Colwell Pond near Montario Point on the north to Rainbow Shores Drive on the south. This distance is about 36% of the total lake shoreline in the Dune and Wetland System.

Figure 2-14: The seasonally open outlet at South Colwell Pond marks the southern boundary of the Southwick-Lakeview Resource Area.

The Montario Point area, which includes lakeshore residential development as well as Cranberry Pond, is physically separated from the aquatic habitat of North Pond. Cranberry Pond is shallow and separated from Lake Ontario by a narrow barrier. North Pond, also known as North Sandy Pond and Big Sandy Pond, has about 2,300 acres of open water with dense beds of submerged aquatic vegetation. The pond's maximum north-south length is almost 3.5 miles; its greatest width is 1.5 miles. Much of the pond is no deeper than 10-12 feet and the submerged vegetation effectively reduces those depths throughout much of the pond. The entire pond is part of the North and South Sandy Ponds Significant Coastal Fish and Wildlife Habitat Area designated by the State of New York.

Recent investigations as part of the ELOSTS indicate that the pond is gradually becoming more shallow due to sediment deposition from tributaries and overwash of the coastal barrier. The pond is connected to Lake Ontario by the shallow and shifting North Pond inlet which is flanked on both sides by barrier spits known as the north and south spits. These barrier formations contain extensive and well-developed sand dune formations, including "high" dunes on both the north and south spits.

Figure 2-15: Looking north over the South and North Ponds.

Figure 2-16: Cranberry Pond.

Several creeks—Little Sandy, Blind, Lindsey, and Skinner creeks—drain into North Pond from the eastern Lake Ontario watershed. Sizeable areas of emergent wetlands have formed in the lower reaches of these tributaries and in small sheltered bays at the north (Renshaw Bay) and south ends of the pond. Portions of Little Sandy, Lindsey, and Skinner creeks are designated as Significant Coastal Fish and Wildlife Habitat Areas by the State of New York. These streams, among the few free-flowing, coldwater tributaries in the Lake Ontario coastal area, support naturally reproducing salmonid populations. The streams drain from forested headwaters and flow through rural residential and agricultural areas before they enter the pond.

The length of the coastal barrier from Montario Point south to the North Pond inlet, including the north barrier spit, is about 2.2 miles. The north spit, which has a maximum width of about 1,200 feet, contains some of the largest sand dunes in the Dune and Wetland system as well as sand flats near the inlet. In the northern part of the spit, seasonally occupied homes have been built in high, vegetated dunes. Further south, high dunes, some with steep, exposed slopes directly facing the lake, extend along the barrier for a distance of about .75-mile. The north spit also includes the largest wind-caused dune ''blow-out'' in the Dune and Wetland System. South of the high dunes, the barrier flattens and narrows leading to the undeveloped sand flat, often over-washed by high water, north of the North Pond inlet. A portion of the sand flat is state-owned and part of the Sandy Pond Beach Natural Area.

Figure 2-17: Sand flats at the North Pond inlet.

The current North Pond inlet and the sand flats on either side of the inlet represent the most dynamic section of the coastal barrier in the Dune and Wetland System. Five different inlet locations since the early 1800's have been identified and are graphic evidence of an active history of inlet formation and movement on the North Pond barrier.

The south spit extends for about 2.25 miles from the inlet to and including the shoreline of Sandy Island Beach State Park. The south spit includes, in addition to the state park, the Sandy Pond Beach Natural Area and residential areas. Barrier widths range from about 300 feet to 1,200 feet. The wider sections of the barrier represent ''recurve'' spits and deltas associated with historical inlet locations that filled in with sand before they closed.

The high dunes on the south spit also have steep, exposed slopes directly exposed to the lake. The high dune area extends about .75-miles northward from Sandy Island Beach State Park and contains mature forest vegetation.

The Sandy Pond Beach Natural Area encompasses about 77 acres, including the Sandy Pond Beach Bird Sanctuary on the sand flats adjacent to the inlet at the north end of the south spit. The natural area also includes a relatively small portion of the sand flat at the southern tip of the north spit.

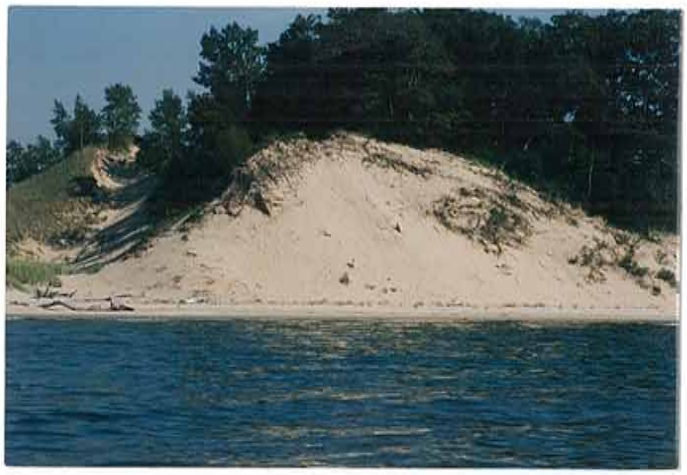


Figure 2-18: "High" dunes with steep slopes directly facing Lake Ontario.

The natural area is managed by the DEC Region 7 for the purposes of: a) preserving and restoring sand dune resources; b) protecting vital habitat for migratory and breeding birds; and c) providing public recreation opportunities compatible with conservation goals. A dune walk-over allows visitors who arrive by boat at the traditionally popular "boat beach" on the North Pond side of the natural area to cross over the dunes to reach the Lake Ontario shore. The natural area is part of the designated Eastern Lake Ontario Marshes Bird Conservation Area.

Seasonally occupied homes have been built on the south spit, south of the Sandy Pond Beach Natural Area. While there is no formal road access to these homes, access is possible by small boat from the pond side of the coastal barrier and by walking or driving on the beach on the lake side when the lake level is low enough to permit such access. In an effort to protect property against erosion, some home owners have added riprap and gabion structures at the base of the high dunes.

Figure 2-19: Lake Ontario shoreline at Sandy Pond Beach Natural Area.

Sandy Island Beach State Park at the south end of the south spit is a major recreational attraction in the eastern Lake Ontario region and one of two state parks (Southwick Beach State Park is the other) in the Dune and Wetland System. The park, managed by the New York OPRHP in the OPRHP's Central Region, provides opportunities for swimming, picnicking, fishing, nature observation, environmental education, boating, and other recreational activities.

Park facilities include a beach pavilion with a community room and bath-house; picnic areas; parking areas; and a ''car-top'' boat launching area for access to North Pond. Sand dunes in the park have been restored and protected by the OPRHP. Vehicle access to the park is from County Route 15 off Route 3.

Adjoining the park is a substantial state-owned sand dune restoration site managed by the DEC where a large dune ''blow-out'' previously encroaching into North Pond was stabilized and remediated in conjunction with establishment of the park.

Figure 2-20: The coastal barrier at Sandy Island Beach State Park.

South Pond, also known as South Sandy Pond, contains about 300 acres of open water separated from Lake Ontario by a narrow barrier approximately one mile long developed with seasonally occupied homes near the privately owned Rainbow Shores Campground. On the south, the pond adjoins an approximately 220-acre wetland that provides habitat for a number of rare plants and exhibits bog characteristics unique in the eastern Lake Ontario region. The wetland is part of The Nature Conservancy's Rainbow Shores Preserve. The pond and wetland are both part of the North and South Sandy Ponds Significant Coastal Fish and Wildlife Habitat Area designated by the State of New York.

There is no direct exchange of water between South Pond and Lake Ontario but the pond is connected to North Pond by a shallow and narrow channel navigable by small boats. The coastal barrier separating South Pond from Lake Ontario is generally 300 to 400 feet wide. The Sandy Island Beach residential area is located on the northern part of this barrier and the Rainbow Shores residential area and campground are found on and near the southern part.

The North and South ponds provide vital habitat for both pond and lake-based fisheries. The abundance and diversity of the fisheries resources in the two ponds provide significant opportunities for recreational fishing. Important habitat for many wildlife species is also provided, with the highest diversity occurring in the largest undisturbed wetland areas in each pond. The coastal barrier between the ponds and Lake Ontario is an integral part of the fish and wildlife habitat.

Figure 2-21: Sandy Island Beach State Park.

The barrier spits are heavily used as feeding and resting areas by large numbers of migrant shorebirds and the sand dunes provide valuable resting areas for many migratory bird species. The abundance and diversity of bird species occurring in the North and South Ponds Resource Area is remarkable and the area is regarded as critical avian habitat and one of the prime bird watching locations in the Great Lakes coastal region.

Excluding the above-noted state-owned properties on the coastal barrier, virtually all of the land surrounding the two ponds is privately owned and much of it is developed for seasonal and year-round residential use. North Pond, because it is protected from the open waters of Lake Ontario by the coastal barrier, provides sheltered conditions for recreational boating facilities, including several privately owned marinas that provide boating access to the pond.

Figure 2-22: North Pond inlet with north and south spits "recurving" into North Pond.

The shallow and shifting channel through the North Pond inlet provides navigation access to and from the pond and lake. This channel is subject to natural and ongoing shoaling caused by the longshore movement of sand, wave overwash, and delta formation. In an effort to maintain a safe navigation connection between the pond and lake, the channel was dredged by Oswego County in 2000 and by the private Sandy Pond Channel Maintenance Association in the period 2004-2007. Aids to navigation marking the channel are placed by the OPRHP.

Deer Creek Resource Area

The Deer Creek Resource Area, bounded on the north by Rainbow Shores Drive and on the south by the Salmon River, is within the Town of Richland in Oswego County. Much of the resource area's 2.5-mile Lake Ontario shoreline (this is about 16% of the total lake shoreline of the Dune and Wetland System) is comprised of cobbles. The cobbles are indicative of the generally recognized south to north longshore drift and erosion of beach sand in this southern part of the Dune and Wetland System. The resource area includes lakeshore residential areas, the state's Deer Creek Wildlife Management Area managed by the DEC Region 7, that part of the Deer Creek marsh known as the Selkirk Fen, and commercial campgrounds.

An eroding, bluff-type shoreline is found near Rainbow Shores Drive. Lakeshore development south of Rainbow Shores Drive to the northern entrance to the Deer Creek WMA includes private homes and the Rainbow Shores Hotel and Restaurant. A commercial campground is inland from the lake, just south of Rainbow Shores Drive.

The 1,195-acre Deer Creek WMA contains diverse wetland, woodland, beach, and sand dune habitats, including the major part of the Deer Creek Marsh, a densely vegetated wetland providing fish and wildlife habitat of special significance in the eastern Lake Ontario region. The coastal barrier and wetlands in the WMA, as well as the Selkirk Fen wetland outside of the WMA, are designated as a Significant Coastal Fish and Wildlife Habitat Area by the State of New York. The WMA is also part of the designated Eastern Lake Ontario Marshes Bird Conservation Area. The abundance and diversity of fish and wildlife species in the WMA provide important opportunities for recreational use.

Figure 2-23: The shoreline of the Deer Creek Resource Area extends south to the mouth of the Salmon River.

Deer Creek, a slow-moving, warmwater stream, flows through the WMA's wetlands and enters Lake Ontario just north of the Brennan Beach campground. The Deer Creek outlet to Lake Ontario closes during low flow periods, enabling pedestrians to walk along the beach to the WMA from the campground. ''High'' dunes vegetated with mature trees are a notable feature of the WMA. Near the Deer Creek outlet, the dune system is relatively wide and the creek cuts a north-south channel through the dunes.

Historical dune formations in the most northern section of the coastal barrier in the WMA were graded for development of campsites prior to acquisition of this land by the State of New York and establishment of the WMA.

Figure 2-24: Deer Creek is a slow-moving, warmwater stream that flows through the Deer Creek WMA.

The WMA provides seasonal opportunities for hiking, nature observation, boating, fishing, hunting, and trapping, with access from four designated access points with small parking areas off Route 3 and Rainbow Shores Drive. Many visitors follow the WMA's main trail that runs the length of the coastal barrier through its center. From the trail, a dune walkover structure provides access to the beach and an observation platform offers panoramic views of the Deer Creek Marsh. In addition, an area for launching nonmotorized, ''car-top'' vessels is accessible from Route 3.

Just south of the WMA is the commercial campground known for many years as Brennan Beach. This is the most intensely developed area in the Dune and Wetland System. Prior to development of the campground in the late 1960's, the natural sand dune environment was altered by sand-mining operations; further alteration took place when higher dunes were removed and the site was graded to provide campsites. Over 1,000 carefully organized campsites for recreational vehicles and trailers are now provided. Many of the campsites are rented seasonally; the remainder are available for transients.

Figure 2-25: The main trail in the WMA runs south through the center of the coastal barrier.

The campground's beach on Lake Ontario is the major site attraction for campers. Walkways to the beach from higher campsites are provided, and a concrete sidewalk behind a steel retaining wall runs along the back of the beach. In the southern part of the property the beach has eroded close to the sidewalk. The northern boundary of the campground's beach is marked by the Deer Creek outlet to Lake Ontario. During low flow periods, campers often walk across the outlet to enter the Deer Creek WMA. Signs at the boundary of the WMA and materials provided by the campground operator inform campers of regulations for use of the WMA. Changes in ownership of the campground that occurred during the course of the Dune and Wetland System Study are reminders of the possibility that future changes in the use of the campground property may occur.

Figure 2-26: Brennan Beach campground is the most intensely developed area in the Dune and Wetland System.

South and east of the campground and south of the Deer Creek WMA is the Selkirk Fen, a wetland of special ecological significance that includes forested, shrubby, and open fen habitats and which supports one of the few bog buckmoth populations in the world. Most of the wetland was acquired by the State of New York in 2005 and is managed by the DEC; a portion is owned and managed by TNC.

Lakeshore homes are found on the coastal barrier between the campground and Salmon River. The Salmon River, one of the largest coldwater tributaries of Lake Ontario and a focal point of the State of New York's efforts to promote the region's sport fishing industry, marks the southern

boundary of the Dune and Wetland System. The Salmon River and its tributaries provide one of the pre-eminent salmonid fisheries in the northeastern United States. The entire river channel and associated wetlands extending approximately 16 miles upstream from the mouth of the river are designated as a Significant Coastal Fish and Wildlife Habitat by the State of New York.

Figure 2-27: Much of the resource area's shoreline is comprised of cobbles.

The mouth of the river is the site of the Port Ontario Harbor of Refuge Project established and maintained by the U.S. Army Corps of Engineers to provide a refuge for cruising craft and sport fishermen along the eastern shore of Lake Ontario. Harbor improvements include a 1,350-foot long jetty on the south side of the river, a 340-foot long jetty on the north side, and a dredged navigation channel extending upriver.

The effect of the jetties on longshore sediment transport patterns has been of interest to the USACE and resource managers since the structures were being planned but that effect is not readily apparent. The shoreline south of the Salmon River is gravelly and armored and therefore not a significant source of sand for longshore transport northward into the Dune and Wetland System. Immediately south of the Salmon River mouth and therefore outside of the Dune and Wetland System are lakeshore homes and the Selkirk Shores State Park.

Figure 2-28: The mouth of the Salmon River marks the southern boundary of the Dune and Wetland System.

Summary of Lakeshore Uses

Of the approximately 16 miles of Lake Ontario shoreline in the Eastern Lake Ontario Dune and Wetland System, about 7.8 miles (49%) are publicly owned and about 8.2 miles (51%) are privately owned. Almost seven miles (88%) of the publicly owned shoreline are within three state wildlife management areas (Black Pond, Lakeview, and Deer Creek) and a state-owned natural area (Sandy Pond Beach Natural Area); less than one mile (12% of the remaining publicly owned shoreline) is associated with two state parks (Southwick and Sandy Island Beach). Of the privately owned shoreline along Lake Ontario in the Dune and Wetland System, about 6.5 miles (79% of the privately owned shoreline) adjoin residential areas; about .25-mile (less than 1%) is in commercial campground use; and the remainder, about 1.4 miles (18%), is undeveloped.

Approximately 7.7 miles or 48% of the Lake Ontario shoreline in the Dune and Wetland System are developed (residential, commercial campground, and state park use); 7.1 miles or 44% of the total shoreline are undeveloped and protected (wildlife management areas and natural preserves); and about 1.2 miles or 8% of the total shoreline are undeveloped, privately owned, and unprotected from development.

The principal changes in shoreline uses over the past two decades have resulted from the establishment of Sandy Island Beach State Park and the Sandy Pond Beach Natural Area which added a little over one mile of publicly owned shoreline.

Figure 2-29: Lindsey Creek at North Pond.

3

The Institutional Framework for Resource Management

Few places dramatize the crucial interrelationships of living things to their environment as well as sand dunes... The process of one plant community replacing another over time, so vividly displayed in the dunes, is called succession. Great Lakes coastal dunes can be divided into four distinct zones or habitats—beach, foredune, trough, and backdune. The basis for this division is the presence of particular plant and animal species commonly associated with certain land features and microclimates. Some animals inhabit more than one zone, depending on their habits or the season. Some plants may thrive in one zone but appear only occasionally in another. What is most striking about the dune zones is the sharp contrast in plant communities from zone to zone, despite their great proximity.

"Discovering Great Lakes Dunes"

NEW YORK'S EASTERN LAKE ONTARIO DUNE AND WETLAND SYSTEM
December 2007

Chapter Cover Photo: Dune Stewards at Black Pond WMA.

The Institutional Framework for Resource Management[1]

This chapter describes the institutional framework for resource management in the Eastern Lake Ontario Dune and Wetland System. That framework consists of a number of agencies and private organizations as well as many laws, regulations, plans, and programs that affect the use and conservation of the coastal resources in the Dune and Wetland System. Governmental agencies at the town, county, state, and federal levels have roles and authorities affecting the system. Private organizations, including conservation and educational organizations, also have vital interests. In addition, the general public and private landowners in the Dune and Wetland System have significant rights and interests that are part of the institutional framework.

Town Agencies and Authorities

The Dune and Wetland System is within the jurisdiction of three towns: Richland and Sandy Creek in Oswego County and Ellisburg in Jefferson County. Town authorities in the Dune and Wetland System are influenced by a number of state laws that enable, require, or restrict the types of authorities that the towns may carry out. All three towns participate in stewardship initiatives in the Dune and Wetland System and are members of The Ontario Dune Coalition (TODC). (See page 3-11.)

Figure 3-1: North Pond inlet in the Town of Sandy Creek.

In each town, the principal executive and legislative body is the town board. The town boards are responsible for the general management and control of town finances and have power to acquire land for public purposes. The boards may also enact, amend, and repeal various ordinances, laws, and regulations, including but not limited to, a building code, local law controlling design and installation of septic tanks and other waste disposal systems, zoning and subdivision regulations, and regulations concerning the operation of vessels on navigable water.

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[1] Some of the information in this section is updated from the 1989 report *New York's Eastern Lake Ontario Sand Dunes: Resources, Problems and Management Guidelines* (Dunes Report). The information in this section is not intended to be a comprehensive review of all agencies, organizations, laws, regulations, and programs directly and indirectly affecting the Dune and Wetland System. The institutional framework for resource management in the system is subject to change from time to time. Persons affected by or otherwise interested in the institutional framework should consult the web sites and other sources of information listed in appendix B of this report and contact the appropriate agency or organization directly for information on the status of current laws, regulations, and programs.

Figure 3-2: Lakeshore homes in the Black Pond Resource Area.

Of the three towns with jurisdiction in the Dune and Wetland System, Richland has a planning board and code enforcement officer and has adopted zoning regulations; Sandy Creek also has a planning board (Sandy Creek Regional Planning Board) as well as a code enforcement officer responsible for ensuring compliance with the town's sanitary code and issuing building permits, but the town has no zoning or subdivision regulations; and in Ellisburg the Town Board acts as the planning board and the town has adopted zoning regulations enforced by a zoning enforcement officer. None of the towns have prepared Local Waterfront Revitalization Programs (LWRPs) authorized by Article 42 of the New York Executive Law and only Ellisburg has assumed local responsibility for implementing the Coastal Erosion Hazard Areas Act (CEHAA).

Under the State Environmental Quality Review Act (SEQRA), the Town of Sandy Creek has designated all of the area west of New York Route 3 including the North and South Ponds area as a "critical environmental area." As a result, any private or governmental development proposal within this area is automatically a "Type 1" action under SEQRA. (See the following section on State Agencies and Authorities.) The town, acting through its planning board and with assistance from the Central New York Regional Planning and Development Board (CNY RPDB), in 2007 is preparing a comprehensive town plan for development and land-use.

The Town of Sandy Creek, with jurisdiction over most of the largest barrier-pond ecosystem on the New York shore of Lake Ontario (the North and South ponds ecosystem) historically has assumed an active role for sponsoring or otherwise participating in a number of stewardship initiatives in the Dune and Wetland System. The town, for example, conducted a special study of the area of the ponds (the Sandy Pond Resource Management Study); has served as the required municipal applicant for several governmental grants awarded for resource management initiatives in the Dune and Wetland System; has participated with other agencies and organizations on those initiatives; and in 2007 recognizes the need to address the significant issues concerning maintenance of the North Pond inlet providing the navigable connection between North Pond and Lake Ontario.

County and Regional Agencies and Authorities

The Dune and Wetland System is within parts of Oswego and Jefferson Counties. The legislative body in each county is the County Legislature, responsible for enacting county laws and overseeing county government operation. County-based agencies with roles and responsibilities in the system include the planning departments, sheriff's departments, and soil and water conservation districts in each county as well as the Oswego and Jefferson County Environmental

Management Councils and the Oswego County Health Department. The county planning departments, soil and water conservation districts, and emergency management councils are all members of TODC and participate in stewardship initiatives in the Dune and Wetland System.

Figure 3-3: Dune stewards with visitors to the Black Pond WMA.

The primary function of the county planning departments is to provide technical assistance on planning and development matters to local governments including, for example, assistance relative to the formulation and enactment of local land-use controls and assistance for meeting the requirements of state and federal programs. Both counties have developed county land-use plans. The Oswego County Comprehensive Plan recognizes the opportunities for beneficial uses that are provided by the Dune and Wetland System and the need for proper planning of those uses to avoid adverse impacts on the system's natural resources. Among the prominent county planning initiatives that have addressed the Dune and Wetland System, the Oswego County Department of Planning and Community Development administered, in conjunction with Seaway Trail, Inc., the 1997 Sandy Island Beach Park Feasibility Study that preceded the establishment of Sandy Island Beach as a first a county park and then later a state park. (See page 5-7.)

The primary objectives of the Soil and Water Conservation Districts (SWCDs) in both Oswego and Jefferson counties concern the protection of soil and water resources and the agricultural resources dependent on soil and water. In the Dune and Wetland System, the SWCDs have provided technical assistance to concerned landowners regarding the establishment of appropriate erosion control measures. Among the SWCD's contributions to stewardship initiatives in the Dune and Wetland System, the Oswego County SWCD has provided leadership for the activities of The Ontario Dune Coalition (TODC) and developed and supervised the Eastern Lake Ontario Coastal Watershed Restoration Project of which the Dune and Wetland System has been one element. (See page 1-6.)

The Oswego and Jefferson County Environmental Management Councils are county-authorized citizen advisory boards. Their primary functions are to advise citizens and local government officials on matters affecting the management of each county's natural resources.

The Oswego County Health Department conducts inspections of sewerage facilities for conformance with standards established by the New York State Department of Health. Within the Dune and Wetland System, these inspections are carried out in the towns of Richland and Sandy Creek.

Figure 3-4: Black Pond WMA.

The Oswego and Jefferson County sheriff's departments have law enforcement authorities in the Dune and Wetland System, including authorities for enforcement of the state Navigation Law and any local laws that might be enacted pertaining to boating. The sheriff's departments share law enforcement jurisdiction with the state police and other state law enforcement agencies, including the law enforcement divisions of the New York State Department of Environmental Conservation (DEC) and Office of Parks, Recreation and Historic Preservation (OPRHP).

In addition to the above agencies of county government, the Central New York Regional Planning and Development Board is a regional public agency involved with stewardship initiatives in the Dune and Wetland System. The CNY RPDB was established by five central New York counties, including Oswego County, and provides planning services to communities in the region including, for example, assistance to the Town of Sandy Creek in 2007 for preparation of the town's comprehensive plan for development and land use. The CNY RPDB is a member of TODC.

State Agencies and Authorities

On the state level, a number of agencies, laws, regulations, and programs affect the Dune and Wetland System. The principal State of New York agencies with roles and responsibilities affecting the system are the Department of State (DOS), Department of Environmental Conservation, and Office of Parks, Recreation and Historic Preservation. These agencies are members of TODC and have long participated in stewardship initiatives in the Dune and Wetland System. Other state agencies are also involved and there are numerous state laws, regulations, and programs that affect the system, including state grant programs such as those authorized by the Environmental Bond Act and Environmental Protection Act that have been used to fund a variety of stewardship initiatives. (See chapter five.) The DOS, DEC, OPRHP and other state agencies serve on the Ocean and Great Lakes Ecosystem Conservation Council which is charged with coordinating programs and activities that will help to protect and restore the state's coastal ecosystems. The Council was established by the New York Ocean and Great Lakes Ecosystem Act of 2006.

Department of State

The DOS through its Division of Coastal Resources (DCR) administers the New York State Coastal Management Program (CMP) and coordinates activities essential to the program's implementation. Authority for the CMP was established by the New York Waterfront Revitalization and Coastal Resources Act (Article 42 of the New York Executive Law) which enables the state to manage its coastal resources pursuant to the provisions of the federal Coastal Zone Management Act. The CMP covers the New York shores of lakes Ontario and Erie, the

Niagara and St. Lawrence rivers, New York City, Long Island, Long Island Sound, the tidal portion of the Hudson River, the Atlantic shoreline, and associated coastal embayments.

The CMP establishes 44 management policies to carry out the legislative intent that a balance be established between economic development and coastal resource protection in the State's coastal area. Under the CMP, each coastal area municipality may prepare a Local Waterfront Revitalization Program based on local needs and objectives for promoting beneficial waterfront development balanced with resource protection in accordance with the CMP policies. (As noted above, the three towns with jurisdiction in the Dune and Wetland System have not prepared LWRPs as of 2007.)

Figure 3-5: Lakeview WMA.

Pursuant to its responsibilities for administering the CMP, the DCR's major roles pertinent to resource management in the Dune and Wetland System include: review of proposed development activities for consistency with the CMP; designation of special resource areas; and provision of planning and funding assistance for special projects.

All major actions proposed in the coastal area of New York State by federal agencies or by entities requiring federal permits (from the U.S. Army Corps of Engineers (USACE), for example) must be consistent with the management policies established in the CMP and in any applicable LWRP that may have been prepared. The DCR evaluates the consistency of federal activities with the policies set forth in the CMP, If a proposed action is judged inconsistent by the DCR, a permit cannot be issued. In addition to federal activities, state agency initiatives are also required to be consistent with the CMP and any applicable LWRP.

Under the provisions of the Waterfront Revitalization and Coastal Resources Act, the DOS is responsible for assuring the protection of coastal fish and wildlife habitats, scenic areas, and agricultural lands of statewide significance. With regard to significant fish and wildlife habitats, state regulations establish criteria applied by the Department of Environmental Conservation to evaluate habitats which then may be designated by the New York Secretary of State as ''significant coastal fish and wildlife habitats.'' Noted in chapter two, significant habitats have been so designated in the Dune and Wetland System, and the system is recognized as containing one of the highest concentrations of designated habitats in the state as well as some of the highest valued habitats.

The DCR has provided significant funding for a number of special projects to advance stewardship initiatives in the Dune and Wetland System, notably the 1989 Dunes Report (see page 1-4) and then continuing through the Eastern Lake Ontario Sand Transport Study conducted with funds provided under the Environmental Protection Act; the Eastern Lake Ontario Coastal Watershed Restoration Project conducted as part of the state's Great Lakes Coastal Watershed Restoration Program; and the DCR's ongoing efforts to promote ecosystem-based management planning for the eastern Lake Ontario watershed pursuant to the New York Ocean and Great Lakes Ecosystem Act.

Department of Environmental Conservation

Figure 3-6: Stewardship partners during break at TODC meeting.

The DEC has both resource management and regulatory responsibilities in the Dune and Wetland System. Management responsibilities are directed toward managing fish and wildlife resources and focus on the three state wildlife management areas and designated "natural area" in the Dune and Wetland System. (See chapter two.) Regulatory responsibilities include permit authority over activities affecting freshwater wetlands and navigable waters; authority for protecting water quality and coastal erosion hazard areas; and other authorities.

Within the Dune and Wetland System, the Black Pond and Lakeview wildlife management areas (WMAs) which are in Jefferson County are managed by DEC Region 6, and the Deer Creek Wildlife Management Area and Sandy Pond Beach Natural Area which are in Oswego County are managed by DEC Region 7. The DEC's environmental conservation officers have law enforcement authority for enforcing the management rules and regulations established by the DEC for these areas. In conjunction with its responsibility for managing the WMAs and Natural Area, the DEC also implements the Eastern Lake Ontario Marshes Bird Conservation Area (BCA) program to conserve the diversity of bird species using the area and to promote research and management of those species. The BCA encompasses the three WMAs and the Natural Area.

In 2007, the DEC has proposed designating all state-owned land in the Dune and Wetland System as a natural heritage area. In coordination with the Department of State and Office of Parks, Recreation and Historic Preservation, the DEC also prepares the *New York State Open Space Conservation Plan* which recognizes the exceptional natural resource values and opportunities for recreational use provided by the public lands in the Dune and Wetland System. In addition, the DEC in 2007 is pursuing development of a five-year Watershed Action Plan for the southeast Lake Ontario watershed, including the Dune and Wetland System, that will serve to implement the state's Comprehensive Wildlife Conservation Strategy.

The DEC has the major responsibility for protecting natural resources in the coastal area of the state and exercises this responsibility through a number of regulatory programs authorized by state legislation. For example, the DEC reviews proposed development activities with the potential for significant environmental impact in accordance with the requirements of: the State Environmental Quality Review Act, which establishes a comprehensive review process applicable to all actions of state and local agencies and private interests that may have significant effects on the environment; the Freshwater Wetlands Act, which authorizes the DEC to map and classify freshwater wetlands and regulate their use and development; the Stream Protection Act whereby the DEC regulates dredging and filling in navigable waters and adjacent wetlands; the Water Pollution Control Act, whereby the DEC assigns state water quality classifications to streams and water bodies and has adopted water quality standards for each class of waters, including the streams and water bodies in the Dune and Wetland System; and the Coastal Erosion Hazard Areas Act whereby the DEC has mapped erosion hazard areas and adopted regulations (to be implemented by the DEC, affected county, or local government) to control certain activities and development in these areas, including the ''natural protective feature areas'' mapped in the Dune and Wetland System.

The DEC also administers state grant programs including those authorized by the Environmental Bond Act and Environmental Protection Act and which can be used by municipalities to fund projects for land preservation and improvement projects and other stewardship initiatives in the Dune and Wetland System. In addition, the DEC cooperates with the DOS Division of Coastal Resources to administer funds available through the National Oceanic and Atmospheric Administration's Great Lakes Coastal Watershed Restoration Program.

Figure 3-7: Lake Ontario beach on the south spit at North Pond.

The DEC also provides support, in partnership with New York Sea Grant, TNC, and OPRHP, for the Eastern Lake Ontario Dune Steward Program. Through this program, the dune stewards interact with visitors to the WMAs, the Natural Area, the state parks, and the El Dorado Nature Preserve during the period May through Labor Day, providing information, monitoring use, assisting resource managers with maintenance of the areas, and otherwise promoting environmentally sound use of the public recreation areas in the Dune and Wetland System.

Office of Parks, Recreation and Historic Preservation

The main responsibility of the OPRHP is to operate and maintain a statewide system of parks and historic sites and to meet the recreational needs of the people of New York State. The State Parks and Recreation Law authorizes the OPRHP to acquire, establish, operate, and maintain state parks, parkways, historic sites, and state recreational facilities.

Figure 3-8: Sandy Island Beach State Park.

The OPRHP establishes rules and regulations for state park use, including rules and regulations for Southwick Beach State Park and Sandy Island Beach State Park in the Dune and Wetland System and Selkirk Shores State Park just south of the system. These parks are managed and their rules and regulations are implemented by regional OPRHP offices. Southwick Beach State Park is within the jurisdiction of the Thousand Islands Regional Office; Sandy Island Beach and Selkirk Shores state parks are within the jurisdiction of the Central New York Regional Office.

As part of its efforts to manage the state parks in accordance with its goals for conservation and enhancement of Dune and Wetland System resources, the OPRHP provides support, in partnership with the DEC, New York Sea Grant, and TNC, for the Eastern Lake Ontario Dune Steward Program which includes Southwick Beach and Sandy Island Beach state parks.

The OPRHP is also responsible for marine and recreational vehicles programs and facilities and for administration of the state's Navigation law. The OPRHP's Bureau of Marine and Recreational Vehicles has general responsibility for boating safety in New York State and provides funding and training for marine law enforcement as well as boating education programs. Also, under the Navigation Law and New York Town Law, no local law or ordinance pertaining to the regulation of vessels and/or the establishment of a vessel regulation zone can take effect until it has been submitted to and approved by the Commissioner of Parks, Recreation and Historic Preservation. The OPRHP maintains the aids to navigation that currently mark the navigation channel between North Pond and Lake Ontario.

Other State Agencies

Other state agencies also have roles and authorities that may affect resource management in the Dune and Wetland System. These include, but are not limited to: the Office of General Services which is the proprietor of state lands, including lands under water and can issue grants, easements, and leases for private use of submerged lands within the public domain including those generally below mean low water in Lake Ontario (see the later section on the General Public); the Department of Health which enforces the Public Health Law and state Sanitary Code; the DOS Codes Division which administers the state's Uniform Fire Prevention and Building

Code that provides the minimum requirements that must be met in local building codes; and the Tug Hill Commission which is responsible for studying the Tug Hill region east of Lake Ontario and recommending means for protecting the region's environment and strengthening its economy, and which in 2007 is assisting the DCR, in partnership with TNC, in the development of an ecosystem-based strategic management plan for the Sandy Creek watershed which drains into the Dune and Wetland System. This effort is known as the Sandy Creeks Ecosystem-based Management Demonstration Project.

Federal and International Agencies and Authorities

The U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) are two federal agencies with significant roles and responsibilities in the Dune and Wetland System and are both members of TODC. In addition, other federal agencies have authorities affecting the system and the authority of the International Joint Commission (IJC), including authority affecting the water level of Lake Ontario, is also significant.

Figure 3-9: Beach camping area at Southwick Beach State Park.

U.S. Army Corps of Engineers

The Dune and Wetland System is within the jurisdiction of the USACE's Buffalo District with headquarters in Buffalo, New York. The USACE regulates structures in or affecting navigable waters of the United States as well as excavation (e.g., dredging) and deposition of materials in navigable waters. The USACE is also responsible for evaluating applications for Department of the Army permits to deposit dredged and/or fill material into waters of the U.S., including adjacent wetlands. These regulatory programs, originating from Section 10 of the River and Harbor Act of 1989 and Section 404 of the Clean Water Act of 1977, do not directly address the upland portions of the Dune and Wetland System but instead focus on the navigable waters, aquatic habitat, and wetland areas in the system. In general, a permit must be obtained from the USACE for any filling of wetlands and navigable waters; placement of structures in navigable waters; and dredging and disposal of dredged materials.

The USACE is also responsible for constructing and maintaining federal navigation projects such as channels, jetties, and anchorage basins authorized by Acts of Congress. The one federal navigation project affecting the Dune and Wetland System is the Port Ontario Harbor of Refuge Project at the mouth of the Salmon River. Under its authority to assist communities in small navigation improvements, the USACE previously conducted an appraisal of the feasibility of establishing a dredged channel to provide improved navigation access between North Pond and Lake Ontario. That appraisal determined that the benefits of such a project did not justify its cost.

The USACE's Detroit District provides monthly bulletins on Great Lakes water levels, including information and forecasts on long-term lake levels.

U.S. Environmental Protection Agency

Figure 3-10: Eroding dunes and underlying cobbles.

The EPA has several responsibilities affecting the Dune and Wetland System; these are related primarily to maintaining water quality values and include responsibility for reviewing and commenting on applications submitted to the Corps of Engineers for permits to dredge and/or fill aquatic areas. In addition, the EPA provides funds for stewardship initiatives, including water quality initiatives to be developed and applied on a watershed-wide basis. The EPA's Great Lakes National Program Office provides funding pursuant to the federal Clean Water Act to advance national goals to restore and maintain the chemical, physical, and biological integrity of the Great Lakes Basin. One such Great Lakes Ecosystem Protection Grant, for example, was provided to TNC to support TNC's Eastern Lake Ontario Conservation Initiative involving a variety of research, planning, and monitoring to help achieve long-term conservation of the Dune and Wetland System. EPA funds have also been used for very site-specific projects including construction of the handicapped accessible dune walkover structure at the Sandy Pond Beach Natural Area.

Other Federal Agencies

Several other federal agencies also have roles and authorities affecting the Dune and Wetland System. These include: the U.S. Fish and Wildlife Service which reviews permit applications submitted to the USACE and then comments on potential impacts to fish and wildlife and which has recognized the Dune and Wetland System as containing especially significant waterfowl habitat; the National Park Service which administers the National Natural Landmarks Program which includes the Lakeview Wildlife Management Area; the Federal Emergency Management Agency which administers the National Flood Insurance Program; and the National Oceanic and Atmospheric Administration which administers the Federal Coastal Zone Management Program and administers the Great Lakes Coastal Watershed Restoration Program whereby federal funds are provided to Great Lakes states, including New York, to support projects that protect and restore coastal resources in Great Lakes watersheds.

International Joint Commission

The IJC was established by the Boundary Waters Treaty of 1909 between the United States and Canada to prevent and resolve disputes over the use of the two countries' shared waters. The IJC oversees regulation by the International St. Lawrence River Board of Control of the outflow of

Lake Ontario through the St. Lawrence River. (See page 2-8.) A five-year study by the IJC's International Lake Ontario-St. Lawrence River Study Board initiated in 2000 examined the effects of water level and flow variations in the Lake Ontario-St. Lawrence River system and developed options for a revised plan of outflow regulation intended to provide the most desirable balance among all user groups and interests in the system, including navigation and resource protection groups and interests. Input for the study, which has given additional credence to the effects that regulation of the outflow of Lake Ontario can have on the shoreline of the Dune and Wetland System, was provided from all interested parties, including members of TODC. The IJC will hold public hearings in 2008 before a final decision is made concerning adoption by the IJC of a new plan for regulating Lake Ontario outflows.

Conservation, Education, and Other Not-for-Profit Organizations

In addition to the various local, county, state, and federal agencies with roles and authorities affecting the Dune and Wetland System, several conservation and education organizations also have active roles and authorities, most notably The Ontario Dune Coalition, New York Sea Grant, and The Nature Conservancy. Several other organizations are also involved.

The Ontario Dune Coalition

Formed in 1985, TODC is a voluntary alliance of private property owners' associations, not-for-profit organizations, local governments, and state and federal agencies, all of whom have an ownership, regulatory, or management interest in the Eastern Lake Ontario Dune and Wetland System. The mission of TODC is to "promote and support the protection, stabilization, restoration, and optimum public use of eastern Lake Ontario sand dunes and related land and water resources while respecting the rights of private property owners." Among its activities in pursuit of its mission, TODC promotes the development and sharing of information, provides technical assistance for land management projects, and provides opportunities for public comments and discussions concerning the use and conservation of the Dune and Wetland System.

Figure 3-11: Dune walkover in Black Pond WMA.

Not-for-profit members of TODC include TNC, Onondaga Audubon Society, Seaway Trail, Inc., and the Friends of Sandy Pond Beach. State member agencies include the New York State Department of State acting through its Division of Coastal Resources. Other State agency members of TODC are the Department of Environmental Conservation and Office of Parks, Recreation and Historic Preservation. New York Sea Grant is also a member. Federal members include the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, and U.S. Fish

and Wildlife Service. Town and county agencies are members; so too are private landowner associations (see the following section on Private Landowners).

TODC has established standing committees to address issues regarding resource management in the Dune and Wetland System, including committees to address educational, technical, and legislative matters as well as the concerns of private landowners. The Snow Memorial Library in Pulaski, New York serves as a repository of information assembled by TODC. Although TODC is not able to accept funds for resource management initiatives, its member agencies and organizations have applied for and received grants to support a number of resource management initiatives to advance stewardship goals in the Dune and Wetland System. Representatives of TODC's member agencies and organizations provide leadership for those initiatives and otherwise actively participate in them.

New York Sea Grant Program

The New York Sea Grant Program is established under the National Sea Grant Program which provides funds to state institutions for marine research, education, and advisory services. The program also receives operating funds from the State of New York. Program goals include the conservation, proper management, and balanced use of marine resources. The program provides science-based information to agencies, organizations, and officials making and influencing decisions for the wise development, management, and use of coastal resources. Toward this end, the program has been involved, through extensive research, information exchange, and public education and outreach programs, with a variety of stewardship initiatives in the Dune and Wetland System. The program's office at the State University of New York College at Oswego provides leadership for TODC and has participated in all of the major stewardship initiatives that have affected the Dune and Wetland System since TODC's formation in 1985.

Stewardship initiatives in the Dune and Wetland System for which the Sea Grant Program has provided leadership, organization, and technical assistance include the preparation and distribution of numerous fact sheets, publications, and visual-media presentations to provide educational information on a variety of topics to local residents, town officials, visitors to the system, and the general public, including the interpretive guidebook ''Sand, Wind, and Water''; planning and design of interpretive signs throughout the system; organization and management of public meetings and workshops to review ongoing research and the results of completed stewardship initiatives in the system; establishment and maintenance of the Eastern Lake Ontario Dunes and Wetlands web site (www.nysgdunes.org); distribution of information concerning the potential impacts of Lake Ontario water level regulation; and development (as an element of the Eastern Lake Ontario Coastal Watershed Restoration Project) of educational materials for private landowners concerning use and conservation of the Dune and Wetland System.

The Sea Grant Program also coordinates the Eastern Lake Ontario Dune Steward Program in partnership with the Department of Environmental Conservation, Office of Parks, Recreation and Historic Preservation, and TNC.

The Nature Conservancy

Figure 3-12: Sandy Pond Beach Natural Area.

TNC is a national conservation organization whose mission is to preserve natural diversity by protecting lands and waters supporting the best examples of all types of natural environments. A membership organization, TNC's interest in the Dune and Wetland System extends beyond its ownership and management of its El Dorado Beach and Selkirk Fen preserves. TNC has long recognized the Dune and Wetland System's ecological significance and is concerned with the protection of rare natural communities and species as well as biological diversity throughout the system. Through the active involvement of its Central and Western New York Chapter in the Ontario Dune Coalition, TNC has long supported informed management and conservation of the system and has participated in all of the major stewardship initiatives that have affected the system since TODC's formation in 1985.

The Dune and Wetland System is an important area of focus of TNC's Great Lakes Program. To help achieve this program's goal of protecting biodiversity and the integrity of ecological systems throughout the Great Lakes basin, TNC's Great Lakes state chapters, including the Central and Western New York Chapter, continue to work on projects to address various threats to the basin's natural systems. In this regard, TNC promotes conservation initiatives that address not only specific resource locations but also the larger ecological systems of which the locations are part.

The Great Lakes Program includes work to better assess biologically significant areas and expand the scientific knowledge of how key ecological systems function. The eastern Lake Ontario area is one of the demonstration project areas selected by TNC for development of locally based efforts for Great Lakes ecosystem conservation.

Some of the major stewardship initiatives in the Dune and Wetland System for which TNC has provided leadership and/or funding include: initial purchase and subsequent transfer of the properties that would become the Sandy Pond Beach Natural Area and Sandy Island Beach State Park; development and administration of the Eastern Lake Ontario Sand Transport Study and the Eastern Lake Ontario Conservation Initiative; and development of, and ongoing participation in, the Eastern Lake Ontario Dune Steward Program. In addition, TNC is a partner with the DCR and Tug Hill Commission in the ongoing Sandy Creeks Ecosystem-based Management Demonstration Project and has served on two IJC technical committees to review the potential environmental impacts of Lake Ontario water level regulation.

Other Organizations

Figure 3-13: Hydraulic dredge for maintenance of North Pond inlet channel.

Other organizations with active interests in the Dune and Wetland System include: the Onondaga Audubon Society, a chapter of the National Audubon Society and member of TODC, which promotes the wise use and conservation of Dune and Wetland System resources, including the protection of habitat for all bird species in the system; the voluntary organization Friends of Sandy Pond Beach, another member of TODC, originally formed to assist with management of the Sandy Pond Beach Natural Area and which has developed, applied, and shared significant technical knowledge with regard to the use of beachgrass planting for dune stabilization and the use of property management techniques to guide visitors in sensitive resource areas; the Sandy Pond Channel Maintenance Association formed by water-dependent businesses and residents to raise and apply funds for maintenance of the navigation channel in the North Pond inlet, and which has conducted maintenance dredging in the channel in the period 2004-2007; Seaway Trail, Inc., a member of TODC, whose mission is to increase tourism revenues and enhance the economic well-being and quality of life in the Seaway Trail corridor that connects historic communities and scenic landscapes along Lake Ontario, the St. Lawrence River, Niagara River, and Lake Erie, and which has provided funding support for a number of stewardship initiatives in the Dune and Wetland System, including the Sandy Island Beach Park Feasibility Study that preceded the establishment of Sandy Island Beach as first a county park and then later a state park; and a number of Colleges and Universities that conduct research in the Dune and Wetland System, including but not limited to Colgate University, Cornell University, Hobart and William Smith Colleges, the State University of New York (SUNY) at Buffalo, SUNY Oswego, the SUNY College of Environmental Science and Forestry at Syracuse, and Syracuse University, which have participated in such research initiatives as the Eastern Lake Ontario Sand Transport Study (see chapter two) and the ongoing National Science Foundation-funded Lake Ontario Biocomplexity Project, and whose students may participate in a number of stewardship initiatives, including the Dune Steward Program.

The General Public

The general public has important rights to use the navigable waters and public recreation areas in the Dune and Wetland System and the navigable waters of Lake Ontario. Consistent with the Public Trust Doctrine (the body of law pertaining to waters subject to the ebb and flood of the tide as well as navigable freshwaters) individuals and groups do not own the navigable waters, plant and animal life inhabiting those waters, and the submerged lands in Lake Ontario and the Dune and Wetland System (with the exception of submerged lands in the North and South ponds which, according to the New York Office of General Services, were conveyed by the state to

private interests in the 1700's). The State of New York owns these resources and holds them in trust for the benefit of all residents of the state.

The rights of the general public for use of navigable waters, including the waters of Lake Ontario and in the Dune and Wetland System, are generally classified under three major headings: 1) transportation and navigation; 2) recreational activities; and 3) commercial and consumer use of ''sea products'' (e.g., fishing). The use of public waters for navigation is the central and essential public right and generally takes precedence over other rights. The public has the right to pass and repass on navigable waters without interference or obstruction.

To the extent that members of the public can gain access to navigable waters without trespassing on the adjoining uplands of private landowners (see below) they may use navigable waters for recreational purposes, including boating, fishing, swimming, and related activities.

When discussing public rights for use of navigable waters, questions concerning the public's right of access to these waters are particularly important. Where title to the land adjoining navigable waters is in private ownership, the property owner may deny access across his or her land to the Public Trust area. Described below, the right of access to public waters is one of the most significant rights associated with the ownership of lands bordering navigable water; possession of this right distinguishes the waterfront property owner from members of the general public.

Private Landowners

Certain rights — referred to as riparian or littoral rights[2] — are inherent in the ownership of lands bordering navigable water. One of the most important of these rights is the right of access to navigable water. A property owner's littoral/riparian right of access to a navigable water course is totally distinct from the right of the general public to use that water body or water course. New York courts have held that the owner of upland property adjacent to navigable water has certain exclusive yet qualified rights and privileges in the adjoining submerged land and navigable waters, including the exclusive right to build docks and piers from the upland to reach deep water (often referred to as ''wharfing out''). These structures, however, must not unreasonably interfere with the public's right of navigation and must be acceptable under applicable regulatory statutes, including the statutes that protect natural resources. In other words, the exercise of the littoral/riparian right must not interfere with the rights and interests of the state and the general public and with the federal interest in navigation.

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[2] With regard to water rights law, water rights arise when property either abuts or contains water. If the water in question is flowing (e.g., river or stream) the rights are said to be riparian. If the property is subject to the ebb and flood of the tide, or is located on a lakeshore such as Lake Ontario's, the rights are said to be littoral rights. Despite these distinctions, the terms ''riparian'' and ''littoral'' are commonly used interchangeably.

Figure 3-14: Little Sandy Creek at North Pond.

Described above, both the Corps of Engineer and the New York Department of Environmental Conservation regulate the construction of docks and piers and other activities in navigable waters. The state and federal regulatory programs help to ensure that the exercise of littoral/riparian rights is consistent with the public's interest in those waters.

A waterfront property owner can not exclude the general public from lawful uses of the Public Trust area adjoining the owner's property. Also, all littoral/riparian rights must be exercised with due regard for the rights of other littoral/riparian owners; the waterfront property owner can not wharf out from the shore, for example, in a manner that encroaches on the littoral/riparian area of an abutting waterfront property owner.

In the Dune and Wetland System, many property owners concerned with the quality of life in their communities are members of landowner associations formed to address issues of common interest including, for example, issues concerning shore protection, fluctuating lake levels, and the use and development of public and private lands. These associations, including the Eastman Place Association, North Jefferson Park Landowners Association, North Rainbow Shores Landowners Association, North-South Sandy Pond Association, Renshaw Beach Association, Sandy Island Beach Property Owners Association, and the Selkirk Beach Association, are all members of TODC.

4

Resource Management Issues and Concerns

A complex mix of inter-related natural phenomena, including wind, waves, currents, storm surges, fluctuating Lake levels, postglacial tilting of the Ontario basin, ice movement, climate change, and other forces influence littoral transport and contribute to modification of the eastern Lake Ontario shoreline; wind-driven waves are the principal driving forces for littoral transport and shoreline modification. Human actions affect the natural processes and accelerate natural erosion rates. Of concern are actions that interrupt littoral transport, remove sediment from the littoral zone, and reduce input of sediment to the littoral zone. These actions include: dredging and dredged material disposal; construction of harbor protection structures; and development of erosion control measures that ''harden'' the shoreline. Pedestrian and vehicle movements that disturb sensitive upland portions of the coastal barrier are also of concern.

''Eastern Lake Ontario Littoral Processes:
Review of Information and Management Implications''

NEW YORK'S EASTERN LAKE ONTARIO DUNE AND WETLAND SYSTEM
December 2007

Chapter Cover Photo: High dunes with eroded ''notch'' created by foot traffic.

Resource Management Issues and Concerns

This chapter reviews some of the key issues and concerns affecting management of the Dune and Wetland System in 2007. The 1989 report *New York's Eastern Lake Ontario Sand Dunes: Resources, Problems and Management Guidelines* (Dunes Report) described a number of issues and concerns regarding use and conservation of the Dune and Wetland System. Management concerns were listed for specific locations within each of the four major resource areas: Black Pond; Southwick-Lakeview; North and South Ponds; and Deer Creek. The concerns ranged from such threats and problems as ''human disturbance of sand dune vegetation and formations'' to ''trespassing ATVs [all-terrain vehicles]'' and ''lack of homeowner awareness of resource values and natural processes.''

In addition, the 1989 Dunes Report described issues not tied to specific geographic areas but relevant throughout the entire system. Broad, system-wide issues were identified concerning: 1) the general lack of understanding of natural processes and values in the Dune and Wetland System; 2) the adverse impacts on the system caused by human activities; and 3) the ineffectiveness of some management programs for protecting the system and guiding its use.

Figure 4-1: ''Structural'' shore protection measures.

Described in the following chapter 5, a review of current conditions in the Dune and Wetland System has shown that significant progress has been made in response to a number of the previously identified issues and concerns. In fact, some of the most pressing site-specific problems identified in the 1989 Dunes Report have been effectively addressed. Major threats to sensitive resources in 1989, for example, were identified at Sandy Island Beach; on the undeveloped section of the south spit at North Sandy Pond; and in the Deer Creek Wildlife Management Area (WMA). Those problems have now been largely corrected through, respectively, the development of Sandy Island Beach State Park, establishment of the Sandy Pond Beach Natural Area, and application of effective conservation measures in the Deer Creek WMA.

Success in addressing some of the system-wide issues, however, remains elusive and the accomplishments have not reduced the need for continued attention to the variety of issues and concerns that continue to affect use and conservation of the Dune and Wetland System. As emphasized throughout this report, environmental stewardship is recognized by resource managers, including members of The Ontario Dune Coalition (TODC), as an inherently ongoing process that does not end with the success of any one initiative. Today, there are not only continuing challenges but also new issues to address.

System-Wide Issues

Issues and concerns affecting resource management in the Dune and Wetland System in 2007 can be grouped into several categories related to: 1) ***public health, safety, and welfare***; 2) ***natural resources and environmental quality***; 3) ***economic growth and benefits***; 4) ***public use and access***; 5) ***private use and access***; 6) ***management coordination and planning***; 7) ***research and education***; 8) ***public support and awareness***; and 9) ***shoreline change and management***.

Some basic issues and concerns in each category are summarized below and on the following pages. The categories are numbered for reference, not to denote priority, and their purpose is to organize discussion. Inter-relationships among the categories, as well as among the issues and concerns within each category, should be recognized. Environmental quality in the Dune and Wetland System, for example, can be adversely affected by public and private use and access; public safety must be maintained to support beneficial uses which in turn can generate positive economic impacts; and effective coordination and planning to guide use and conservation of the system requires public support and awareness.

Public Health, Safety, and Welfare

Maintaining the health, safety, and welfare of all visitors and residents in the Dune and Wetland System is a matter of priority concern because of the critical relationship among: a) the public's health, safety, and welfare; b) opportunities for beneficial use of the system; and c) the quality of life in the eastern Lake Ontario region. Visitors to the public recreation areas should expect to have safe and enjoyable experiences, and residents should expect to live in safe and peaceful communities.

In the Dune and Wetland System, the issue of resource carrying capacity[1] is significant with regard to public health, safety, and welfare as well as protection of the environment (see the following section on Natural Resources and Environmental Quality). Carrying capacity considerations apply to the capacity of the land and water resources in the system to accommodate recreational, residential, and other beneficial uses in a *safe and enjoyable manner*, just as they apply to the capacity of the resources to accommodate such uses in an *environmentally sound manner*. Carrying capacity, for example,

Figure 4-2: Sandy Island Beach filled to capacity in the 1950's. (Photo provided by Town of Sandy Creek.)

[1] "Carrying capacity" is a term that refers to the amount of use or development that a particular area or resource can accommodate before unacceptable impacts on environmental quality, public safety, beneficial use, or other conditions occur.

may be discussed with respect to the capacity of navigable water areas to safely accommodate boating and other water uses, and to the capacity of the state parks, WMAs, and other areas to accommodate safe and enjoyable use and access. As with environmental carrying capacity, however, it is difficult to precisely determine the amount of future use and development that can occur on navigable waters and public lands before public safety and enjoyment are affected.

An important consideration for maintaining public health, safety, and welfare in the Dune and Wetland System involves achieving compliance with applicable laws and regulations, including laws and regulations concerning environmental conservation, land-use, and use of the state parks, WMAs, and other public areas. To achieve that compliance, it continues to be necessary to facilitate: 1) institutional coordination and agency capabilities; 2) public support and awareness; and 3) effective enforcement actions as necessary by law enforcement and regulatory agencies.

Conditions that affect safe navigation, including navigation by motorized, hand-powered, and other vessels, require ongoing attention and have economic and environmental consequences as well as public safety implications. The shifting and shoaling navigation channel in the North Pond inlet provides a prominent example of this issue. The risk of coastal flooding and erosion and the vulnerability of waterfront properties to such hazards is another public safety issue of ongoing concern.

Natural Resources and Environmental Quality

The Dune and Wetland System consists of unique and irreplaceable natural resources, including barrier beaches and sand dunes, wetlands and embayments, and other coastal resources. As a result, environmental considerations are inherent in all of the management issues historically and currently affecting the system. It was recognition of the fundamental natural values provided by the natural resources in the Dune and Wetland System, along with concerns about threats and impacts to those resources, that led to formation of TODC in 1985 and publication of the Dunes Report in 1989. Among the recognized resource values are values related to the buffering of flood and erosion impacts, provision of essential habitat for fish, plants, and wildlife, and the maintenance of water quality.

Figure 4-3: The Dune and Wetland System provides vital habitat for variety of shoreline-using birds.

While the early stewardship initiatives focused on the protection of sand dunes, those initiatives have now evolved to the extent that issues concerning the use and conservation of the larger ecological systems encompassing the Dune and Wetland System and the eastern Lake Ontario watershed are now appreciated. Because of the ecological inter-relationships among resources and areas in the Dune and Wetland System and watershed, adverse impacts affecting any one part of these larger ecological systems can affect other parts of the systems as well. As a result, it is recognized by resource managers that effective stewardship initiatives must address not only individual areas within the Dune and Wetland System but also the larger ecological systems of which the areas are part. To be successful, those initiatives require continuing coordination among agencies and organizations as well as widespread public support and awareness.

One of the most basic management issues concerns the need to achieve and maintain balance between goals for conservation of environmental quality in the Dune and Wetland System and goals for beneficial use of the system. The natural environment provides vital ecological functions and opportunities for beneficial uses that can have important economic and cultural benefits, but the environment can be damaged by those same uses. As a result, the importance of understanding and applying the concept of environmental carrying capacity is particularly significant when making decisions affecting the Dune and Wetland System. How to apply that concept, however, remains a difficult question because it is not easy to precisely determine the amount of future use and development that can occur before adverse environmental impacts become unacceptable. A related question concerns how to address the cumulative impacts that can result from individually minor but collectively significant actions that take place over time and which may have a significant effect on natural resources and environmental quality.

Figure 4-4: The cumulative impacts of human activities on sensitive sand dune resources can be significant.

Numerous other environmental quality-related issues continue to be of interest in the Dune and Wetland System in 2007. These include but are not limited to issues concerning: protection of the system's barrier beaches and sand dunes from erosion caused by natural forces and human activities; conservation of wetland resources and their associated fish and wildlife habitat; maintenance and improvement of surface water quality in the system's embayments and tributaries, including reduction of nonpoint sources of pollution caused by stormwater runoff; identification and protection of plant, fish, and wildlife species of special concern; control of invasive species; and protection of scenic quality and cultural values related to the Dune and Wetland System.

The Dune and Wetland System continues to be affected by natural forces and human activities. Wind-driven waves are the principal forces modifying the shoreline but fluctuating lake levels and other forces are also at work. The natural littoral processes are extremely complex; some aspects of them remain less than well understood; and the base of knowledge and information concerning these processes requires continued attention and expansion. Human actions adversely affecting the Dune and Wetland System include both inadvertent and willful activities, some of which are in violation of existing laws and regulations. Such actions require continued attention through public education and outreach initiatives as well as effective compliance efforts. While human actions continue to have significant impacts, those actions may be more susceptible to modification than are the natural forces.

Economic Growth and Benefits

Economic considerations are inherent in many of the issues affecting use and conservation of the Dune and Wetland System. Use of the system for recreational and other beneficial purposes, including use of the state parks and WMAs, for example, provides opportunities for positive economic impacts of local and regional significance. When pursuing those benefits, a basic issue concerns how to determine and maintain the appropriate balance between use of the Dune and Wetland System for beneficial purposes on the one hand and conservation of the system's natural resources and values on the other. There is no simple formula for achieving that balance which is needed to ensure that the natural resources and values providing opportunities for use and enjoyment are not damaged by those same uses. How to allow recreational and other uses of the Dune and Wetland System to occur at a sustainable level that will not result in overuse or diminishment of the system's resource base is a key question with system-wide economic and environmental implications.

To answer this question, and to advance opportunities for economic growth and benefits, additional information and awareness concerning economic issues in the Dune and Wetland System is needed, including better understanding and recognition of the linkage between the system's natural areas and the local and regional economies. Additional information is needed concerning: 1) current *economic impacts* (measured as revenues or expenditures) associated with the various uses of the Dune and Wetland System; and 2) the *economic values* of the system's natural coastal resources.

Figure 4-5: Recreational use of the Dune and Wetland System generates positive economic impacts.

It is much more difficult to quantify the economic values of the natural resources and environmental quality of the Dune and Wetland System than it is to quantify economic impacts. For example, tourism in the eastern Lake

Ontario region depends in large part on the natural environmental quality of the Dune and Wetland System, as do the values of residential properties. In addition, the natural resources of the Dune and Wetland System provide ecological functions related, for example, to storm protection, fish and wildlife habitat, recreational opportunities, cultural values, and water quality functions. Such functions have an economic value themselves that may be described as "ecosystem services" or "natural capital;" without them the human economy would not exist. The work of economists who are addressing the question of how to assign a dollar value to ecological functions and ecosystem services may have particular relevance for the Dune and Wetland System in the future.

Public Use and Access

Public use of the Dune and Wetland System provides opportunities for many benefits, including recreational, cultural, and economic benefits of local and regional significance. A basic, ongoing issue concerns how to manage public use and access—particularly at the state parks, WMAs, and natural areas open to the public—in order to protect sensitive resources, maintain safe and enjoyable recreational experiences, and provide optimum benefits. Resource managers recognize that specific plans to guide recreational use and environmental conservation in the public areas are generally lacking, notably in the three WMAs where maintaining an appropriate balance between resource use and conservation is especially important. Examples of the issues and conflicts that must be addressed in order to maintain that balance are now seen in the Black Pond WMA where opportunities for public access have been significantly increased in recent years.

Figure 4-6: Recreational boating on North Pond.

To achieve the appropriate balance between resource use and conservation while pursuing opportunities for enhancing public use and access in the Dune and Wetland System it is necessary to address the difficult question, noted above, of *"What is the carrying capacity of the system to accommodate public use in a safe and environmentally sound manner?"* A related issue concerns how to address the cumulative impacts of public use and access. Attention must also be given to the continued educational, regulatory, and other efforts needed to avoid and reduce the adverse impacts of public activities on sand dunes, wetlands, and other natural resources, including efforts to ensure compliance with applicable laws and regulations. Another basic issue concerns how to maintain the most appropriate balance between public and private uses of the Dune and Wetland System in order to ensure that public uses do not infringe on private rights and interests or otherwise adversely affect the quality of life in residential areas.

Private Use and Access

Private uses of the Dune and Wetland System, including residential and water-dependent commercial uses, add to the vitality and quality of life associated with the system. The private landowners have important rights and interests that must be recognized and respected in the design and implementation of stewardship initiatives. Noted above, a basic resource management issue concerns the need to maintain an appropriate balance between public and private use of the Dune and Wetland System so that private rights and interests are protected. At the same time, it must be recognized that private uses, like public uses, can have adverse impacts on the natural environment. As a result, the same issues concerning resource carrying capacity and cumulative impacts that must be addressed to best manage public use of the Dune and Wetland System also apply to private use. In addition, shore protection issues, including how to protect existing residential development from flooding and erosion without causing unacceptable adverse impacts on the shoreline (see the later section on Shoreline Change and Management), are particularly significant when considering private development in the Dune and Wetland System.

In 2007, many private landowners in the Dune and Wetland System continue to demonstrate a lack of awareness of the impacts their actions can have on the system. As a result, continuing attention must be given to the educational and other initiatives needed to avoid the adverse impacts of private development and other human activities in the Dune and Wetland System. Improved efforts to ensure compliance with applicable laws and regulations controlling land-use and development are needed. Attention should also be given to the current need for effective town plans and regulations to guide private use and development in the Dune and Wetland System. Sound land-use policies and guidelines are needed to guide the actions of the private landowners, along with an effective program for ensuring compliance with the applicable land-use regulations.

Figure 4-7: Lakeshore residential development.

Management Coordination and Planning

There are a number of "institutional framework" issues that affect use and conservation of the Dune and Wetland System. The extensive institutional framework, summarized in chapter three, includes three towns, two counties, a number of state and federal agencies, and private organizations, all with significant roles and authorities in the Dune and Wetland System. In addition, the general public and private landowners are part of the institutional framework. As a result, a basic resource management issue concerns how to achieve and maintain the most effective coordination and cooperation among all of the different jurisdictions, agencies, organizations, and interests for the purpose of accomplishing stewardship goals. Another basic

issue concerns how to most effectively achieve compliance with the various laws, regulations, and programs affecting use and conservation of the Dune and Wetland System.

As stewardship initiatives in the Dune and Wetland System have continued to evolve from their original focus on public education and outreach, the benefits of resource management plans are receiving more attention. There is increased awareness by agencies and officials that such plans can provide important guidance for the use and conservation of specific areas, including the state parks and WMAs, as well as guidance on both town-wide and system-wide levels. The challenge now is to translate that increased awareness into the preparation, adoption, and implementation of useful plans. A related issue concerns how to blend planning initiatives with regulatory and nonregulatory programs to achieve the most effective management of Dune and Wetland System areas and resources. Other institutional framework issues that continue to require attention include how to provide adequate funds to support stewardship initiatives; how to provide for the continued effective use of volunteers for assisting with those initiatives; and how to maintain effective organizational structures and capabilities for resource management in response to changing conditions and circumstances.

Research and Education

Issues and considerations pertaining to research and education in the Dune and Wetland System are of interest because: 1) the system provides important opportunities for the study of natural history, resources, and processes; and 2) research and educational programs not only provide benefits for their participants, they can also help to develop scientific and other information needed to support stewardship initiatives and effective management of the system.

Figure 4-8: "High" dune on Lake Ontario.

A number of research projects may be ongoing at any one time in the Dune and Wetland System, including projects investigating natural conditions and human use of the system, and including projects conducted by different university groups, governmental agencies, and private organizations. Some important issues concern how to make sure that beneficial research continues and that such research: 1) builds upon and advances the knowledge gained from previous investigations; 2) is coordinated to the extent practical; 3) is shared among interested stakeholders and disseminated to the public as appropriate; 4) is designed to have practical applications for management purposes; and 5) is planned to advance specific management goals, including, for example, the goal of increasing knowledge concerning the natural processes affecting the Dune and Wetland System.

Public Support and Awareness

Public support and awareness is the cornerstone of all stewardship initiatives in the Dune and Wetland System. While those initiatives continue to evolve from their original focus on public outreach and protection of sand dunes, the need for public support and awareness remains constant and is just as important today as it was in 1989 when the Dunes Report was published. Noted above, not all visitors and private landowners in the Dune and Wetland System demonstrate adequate awareness of the impacts their actions can have on the system nor do they demonstrate support for stewardship initiatives. As a result, attention must be given to developing and applying more effective educational initiatives and other outreach efforts directed toward the general public and designed to increase awareness of, among other things: 1) natural resources and values; 2) existing and potential threats to those resources and values; 3) the applicable laws and regulations for conservation and land use; and 4) the need and opportunities for personal stewardship actions.

Ongoing considerations for resource managers and governmental officials include how to: 1) continue to develop well-prepared materials and programs to inform the general public about a variety of topics concerning the Dune and Wetland System; 2) most effectively distribute those materials and involve the public in those programs; and 3) provide all persons and groups that have an interest regarding the Dune and Wetland System with meaningful opportunities to express their ideas and concerns. In that regard, the need for public support to implement resource management plans and other stewardship initiatives remains constant, along with the need for opportunities for the public to provide input in the development of those plans and initiatives. When involving the public, resource managers and governmental officials must anticipate encountering different points of view with regard to a particular issue, and appreciate the need to recognize and respect different, legitimate viewpoints. In addition, it should be anticipated that no matter how well-designed the educational and outreach efforts may be, some landowners and visitors will remain disinterested and unsupportive.

Shoreline Change and Management

The dynamic character of the Dune and Wetland System shoreline gives rise to one of the most fundamental questions of interest to resource managers and governmental officials: *"To what extent should natural forces be allowed to shape and modify the system without human intervention to try to stabilize the shoreline?"*

Figure 4-9: Wind-driven waves are the principal natural forces for shoreline modification. (Photo by Nick Stowell.)

Coastal erosion is a perpetual and natural process throughout the Dune and Wetland System. The shoreline is subject to long-term modifications and short-term changes caused by wind-driven waves and a variety of other natural forces. As a result, lake-

shore homeowners strive to protect their properties from erosion. Structural approaches for erosion control such as retaining walls and rock revetments, however, may be effective in the short-term but in the long-term they typically result in accelerated erosion of other properties and cause adverse impacts on sand dunes and other coastal resources. How to encourage and apply effective shore protection measures to provide a suitable level of shore protection for existing developed areas is another fundamental concern. These measures would include nonstructural methods such as the planting of dune-stabilizing vegetation as well as structural measures such as the use of appropriately designed dune ''walk-overs.'' Another issue is how to avoid—through public education, improved compliance with existing regulations, and other means—the construction of unauthorized (not properly permitted or not in compliance with permit conditions) shore protection projects in the Dune and Wetland System.

Figure 4-10: North Pond inlet.

Perhaps the most prominent current example of the issues and potential conflicts associated with shoreline change in the Dune and Wetland System is provided by the North Pond inlet. While the importance of maintaining safe navigation between North Pond and Lake Ontario through the inlet is well recognized by boaters, Town of Sandy Creek officials, and resource managers, there are many considerations that must be addressed when planning any future efforts to dredge or stabilize a navigation channel through the inlet. Those considerations include: *Where to place the dredged material? What are the economic and environmental costs associated with maintaining a navigation channel relative to the benefits of doing so? What should be done if the inlet naturally ''closes''?* These considerations highlight the fundamental issues concerning the extent to which human efforts to stabilize the shoreline against the effects of natural forces should be pursued.

Fundamental Issues in 2007

In 2007, there are a number of fundamental issues concerning use and conservation of the Dune and Wetland System that will continue to require attention. As resource managers look to the years ahead, their response to the following overarching questions will help determine in large part the future of the system:

1. WHAT IS THE *CARRYING CAPACITY* OF THE SYSTEM?
2. HOW SHOULD *CUMULATIVE IMPACTS* ON THE SYSTEM BE ADDRESSED?
3. TO WHAT EXTENT SHOULD WE TRY TO INFLUENCE *NATURAL PROCESSES* AFFECTING THE SYSTEM?
4. WHAT IS THE RIGHT *BALANCE* BETWEEN USE AND CONSERVATION?
5. WHAT ACTIONS SHOULD WE TAKE TO HELP *SUSTAIN* THIS UNIQUE RESOURCE FOR THE BENEFIT OF FUTURE GENERATIONS?

In responding to these questions, one of the biggest challenges in 2007 concerns how to enhance and sustain the public support and long-term commitment needed for personal stewardship actions and other initiatives to avoid adverse impacts caused by willful or inadvertent violations of the laws and regulations controlling use, development, and protection of the Dune and Wetland System.

Figure 4-11: Black Pond WMA beach looking north.

In addition, several new, site-specific priorities have emerged. These include, most prominently, the need to: 1) address issues concerning maintenance of the ***North Pond inlet*** providing the navigable connection between North Pond and Lake Ontario; and 2) manage the increased public use of the ***Black Pond WMA***, which has increased dramatically in recent years, in a manner consistent with the capacity of the area to support that use in a safe, enjoyable, and environmentally sound manner. Both of these site-specific issues have public safety, economic, and environmental implications requiring thoughtful planning, institutional coordination, and public support to address.

Figure 4-12: Black Pond WMA beach looking south during period of active use.

5

Stewardship Accomplishments, Initiatives, and Lessons

There are many natural and human factors that influence the dune ecosystem found along the eastern shore of Lake Ontario. Comprehensive stewardship and coordinated management of this fragile resource is essential to its wise use and preservation. One way to accomplish this goal is by participating in activities designed to enhance our understanding of this unique system. It is only with an increase in our awareness and understanding of the dune system that the value of this irreplaceable natural resource can be recognized, protected and used wisely.

"Our Lake Ontario Sand Dunes: A Resource Notebook"

NEW YORK'S EASTERN LAKE ONTARIO DUNE AND WETLAND SYSTEM
December 2007

Chapter Cover Photo: Dune walk-over on Lake Ontario Trail in Lakeview WMA

Stewardship Accomplishments, Initiatives, and Lessons

This chapter reviews stewardship accomplishments in the Eastern Lake Ontario Dune and Wetland System since publication of the 1989 report *New York's Eastern Lake Ontario Sand Dunes: Resources, Problems, and Management Guidelines* (Dunes Report). Also included is a summary of some of the ongoing initiatives for resource management in the Dune and Wetland System. These accomplishments and initiatives, many of which are based on recommendations from the 1989 Dunes Report, are summarized in this chapter with respect to: 1) area-specific accomplishments and initiatives affecting each of the four resource areas identified in the Dune and Wetland System; and 2) system-wide accomplishments and initiatives benefiting the entire system. In addition, the chapter reviews some of the principal ''lessons learned'' by the stewardship partners in the course of pursuing the objectives, guidelines, and recommendations set forth in the Dunes Report.

Resource Area Accomplishments and Initiatives

Guidelines for resource management in the Black Pond, Southwick-Lakeview, North and South Sandy Ponds, and Deer Creek resource areas are included in chapters three, four, five, and six, respectively, of the 1989 Dunes Report. The reader can refer to those chapters which include, in addition to the suggested guidelines, additional information that remains pertinent to stewardship initiatives in 2007, including descriptions of management issues and physical features in the resource areas. A number of the recommendations included in the guidelines presented in the Dunes Report have been successfully implemented; others continue to be pursued through ongoing stewardship initiatives.

Black Pond Resource Area

Included in this resource area, bounded on the north by the outlet of Black Pond and on the south by Southwick Beach State Park, are the coastal barrier portion of The Nature Conservancy's (TNC's) El Dorado Preserve; the Black Pond Wildlife Management Area (WMA); and the lakeshore residential areas on the barrier beach south of the WMA. (See page 2-10.)

Among the management guidelines for the Black Pond Resource Area from the 1989 Dunes Report are recommendations for:

- *Increased attention to protect the ''high'' dunes in the El Dorado Preserve and WMA;*
- *Improved monitoring of recreational activities and enforcement of applicable regulations, particularly in the WMA;*
- *Placement of signs and barriers to protect sensitive resources and guide recreational use;*
- *Preparation of a detailed management plan for the WMA; and*
- *Increased use of nonstructural erosion control measures by the lakeshore residents.*

Figure 5-1: Entrance to Black Pond Trail at Black Pond WMA.

A number of these previous recommendations have been affected by development of substantial public access facilities in the Black Pond WMA by the New York State Department of Environmental Conservation (DEC) in 2001. The access road, parking area, and Black Pond Trail with its elevated boardwalk to Lake Ontario have made the WMA a major attraction for beach recreation in the Dune and Wetland System. The increase in visitors to this area is one of the most significant changes in the Dune and Wetland System in recent years. Along with the public enjoyment and other benefits associated with greater opportunities for recreational use, however, have come increased pressures on the natural environment, including beach and dune resources, in both the WMA and the adjoining El Dorado Preserve. As a result, the need for active and coordinated management of the two areas, long recognized by the DEC and TNC has been heightened. That heightened recognition has increased the attention given to protection of the high dunes, to monitoring of recreational activities, and to pursuit of improved compliance with DEC regulations for use of the WMA.

In addition, the Dune Steward program now has an important role for advancing these ongoing initiatives through the stewards': 1) personal communications with visitors; 2) observations of conditions in the Black Pond WMA and preserve; 3) collection of information concerning recreational use; and 4) placement of appropriate signs and barriers, including snow-fencing between the beach and sensitive sand dune areas where recreation is not permitted. In addition, effective "string-fencing" (see page 5-16) has been placed to identify trails that guide beach users away from essential shorebird habitat in the preserve. Interpretive displays concerning the Eastern Lake Ontario Marshes Bird Conservation Area have been established at the entrance to the Black Pond Trail. Signs have been placed to identify protected sand dune areas and the boundaries of the WMA and preserve; signs also post regulations for public use of the two areas.

Figure 5-2: Dune stewards placing snow-fencing between beach and dune areas.

Figure 5-3: Interpretive sign at El Dorado Preserve, looking toward Black Pond WMA.

In 2007, the DEC, TNC, and other stewardship partners recognize that more attention should be given to determining the capacity of this resource area to accommodate recreational use in a safe, enjoyable, and environmentally sound manner. Although a detailed management plan has not been prepared for recreational use of the Black Pond WMA, the resource managers recognize the need for such a plan to guide public use in a manner consistent with the carrying capacity of the area. They also recognize that these issues represent a new and important challenge for resource management in the Dune and Wetland System.

In the residential areas along the Lake Ontario shoreline south of the Black Pond WMA's beach and north of Southwick Beach State Park, some property owners have encouraged sand dune protection in front of their homes, demonstrating support for stewardship initiatives and awareness of the value of effective nonstructural and other appropriate methods of shore protection.

Southwick-Lakeview Resource Area

This resource area encompasses Southwick Beach State Park and the Lakeview Wildlife Management Area, including the WMA's north and south barrier beach sections separated by the Lakeview outlet to Lake Ontario. (See page 2-11.)

Among the management guidelines for the Southwick-Lakeview Resource Area from the 1989 Dunes Report are recommendations for:

- *Improved coordination between the New York State Office of Parks, Recreation, and Historic Preservation and the Department of Environmental Conservation for management of the state park and WMA;*
- *Preparation of management plans for the park and WMA;*
- *Stabilization of eroding sand dunes in the WMA;*
- *Encouragement of appropriate recreational use in the northern part of the WMA near the park;*
- *Improved monitoring of recreational activities and enforcement of applicable regulations; and*
- *Placement of signs and barriers to protect sensitive resources and guide recreational use.*

Due to the inter-relationship between use of the state park and Lakeview WMA, the advancement of all these recommendations has been made possible through the coordination developed between the OPRHP and DEC. That coordination is a prominent example of an effective stewardship partnership between state agencies to guide and achieve beneficial use and conservation of the Dune and Wetland System.

Figure 5-4: Entrance to Lake Ontario Dune Trail at Southwick Beach State Park.

Among the accomplishments, the Lake Ontario Dune Trail with handicapped access has been constructed to provide an opportunity for enjoying a variety of natural areas, including beach, dune, and wetland areas in the northern part of the Lakeview WMA. The trail can be entered from the state park or WMA and includes the first dune walk-over constructed in the Dune and Wetland System. Additional walk-over structures as well as observation platforms have been constructed in the WMA and a network of other trails provides opportunities for hiking and nature observation. The additional walk-overs have helped stabilize sand dunes in the WMA previously impacted by uncontrolled pedestrian use. In addition, the OPRHP with assistance from volunteer groups has re-established sand dunes near the park's beach camping area and continues to expand the dunes in this area. These dunes are highly visible to park visitors and as a result have a significant educational value.

Figure 5-5: Restored sand dunes near beach camping area in Southwick Beach State Park.

Interpretive and directional signs have been placed in a number of locations throughout the state park and Lakeview WMA to guide resource use and identify sensitive natural areas. Signage includes interpretive displays concerning the Eastern Lake Ontario Marshes Bird Conservation Area as well as signs identifying protected sand dune areas and displaying regulations for public use of the state park and WMA.

The Dune Steward program now has an important role for advancing a number of ongoing management initiatives in the resource area through the stewards': 1) personal communications with visitors, 2) observations of conditions in the Lakeview WMA, and 3) collection of information concerning recreational use.

Figure 5-6: Boating access in Lakeview WMA.

A number of points of recreational access, including access for trailered and car-top vessels, have been established in the Lakeview WMA and identified as such in widely distributed publications and other materials. The Lakeview outlet at the confluence of Sandy Creek and South Sandy Creek into Lake Ontario remains a popular recreation destination for visiting boaters in both motorized and hand-paddled vessels.

While a detailed management plan for recreational use of the Lakeview WMA has not been developed, the OPRHP has prepared, following public review and hearings, a Master Plan for Southwick Beach State Park which recognizes the park's dune shoreline as a significant natural habitat to be preserved within the overall Dune and Wetland System.

North and South Sandy Ponds Resource Area

The North and South Sandy Ponds (North and South Ponds), the north and south barrier spits separating North Pond from Lake Ontario, and the North Pond inlet are the most prominent natural features of this resource area which includes Sandy Island Beach State Park and Sandy Pond Beach Natural Area. (See page 2-14.)

Among the management guidelines for the North and South Sandy Ponds Resource Area from the 1989 Dunes Report are recommendations for:

- *Increased attention to protect the ''high'' dunes on the north and south spits;*
- *Encouragement of beachgrass plantings in residential areas to stabilize dune formations;*
- *Protection of large undeveloped and unmanaged sections of the north and south spits;*
- *Increased involvement by the Town of Sandy Creek for guiding resource use and conservation;*
- *Effective management and restoration of Sandy Island Beach;*
- *Stabilization of the large dune blow-outs;*
- *Reducing the erosion risk on the South Pond barrier; and*
- *Maintaining safe navigation between North Pond and Lake Ontario while avoiding any adverse impacts associated with channel maintenance.*

These recommendations formed the basis for some significant projects that have not only successfully conserved and protected sensitive resources previously subject to misuse but have also provided increased opportunities for public use and enjoyment of the Dune and Wetland System. The most prominent accomplishments are seen in the development of Sandy Island

Beach State Park and establishment of the Sandy Pond Beach Natural Area. These two areas serve as models for the positive changes that can be achieved through intergovernmental cooperation with public support and a common vision.

Figure 5-7: Sandy Island Beach State Park.

The 1989 Dunes Report identified major threats to sensitive resources at Sandy Island Beach and on the undeveloped section of the south spit at North Pond. The Sandy Island Beach property, then privately owned, had been abused and neglected for many years during which time its sand dunes were excavated and bulldozed. The property was essentially an unsafe eyesore covered with broken glass and debris. An undeveloped, privately owned property on the south spit was also heavily disturbed by human use, including uncontrolled use by all-terrain vehicles (ATVs).

Figure 5-8: Sandy Pond Beach Natural Area near dune walkover.

The 1989 Dunes Report included recommendations highlighting the opportunity for establishing a public recreation facility at Sandy Island Beach while actively managing the area to protect and restore beach and sand dune resources. In addition, the report recommended measures to protect the undeveloped section of the south spit as a valuable natural habitat while providing appropriate recreational opportunities.

In 1994, the south spit property was acquired by TNC and the Sandy Pond Beach Natural Area was established. Management of the area for beach recreation and environmental conservation began in cooperation with the DEC and the newly formed volunteer group the Friends of Sandy Pond Beach. Subsequently, a management plan was prepared; a handicapped accessible dune walkover was constructed in 1996 with funds provided to TNC by the U.S. Environmental Protection Agency (USEPA); and ownership of the property was transferred to the DEC in 1997. In addition, appropriate signs were placed to guide visitors, dune stabilizing vegetation was planted, and the Sandy Pond Beach Bird Sanctuary was established on the sand flats in the natural area adjacent to the North Pond inlet. The Sandy Pond Beach Natural Area was the site of one of the first major beachgrass planting projects in the Dune and Wetland System, resulting in significant technical knowledge that has since been applied to similar beachgrass planting projects throughout the system.

Sandy Pond Beach Natural Area now supports beach recreation use in balance with protection of vital natural habitat. Visitors who arrive by boat at the traditionally popular "boat beach" on the North Pond side of the south spit can cross the dunes on the elevated walkway to reach the Lake Ontario shore.

Figure 5-9: "Boat beach" near dune walkover to Lake Ontario in Sandy Pond Beach Natural Area.

The Dune Steward Program and the Friends of Sandy Pond Beach have important roles for maintaining "balance" in the area through personal communications with visitors, observations of conditions in the area, collection of information concerning recreational use, and maintenance of appropriate signs and barriers, including string-fencing to guide visitors in the area of the bird sanctuary and sensitive sand dunes. Following establishment of the Sandy Pond Beach Natural Area, there was a significant need to educate and inform visitors to the area regarding the rules and requirements for recreational use and conservation. The dune stewards provided an important function in that regard. As a result, the current Dune Steward Program as it now operates throughout the Dune and Wetland System evolved in large part from the experience of the dune stewards in the Sandy Pond Beach Natural Area.

Figure 5-10: Bath-house with community room under construction at Sandy Island Beach State Park.

The Sandy Island Beach property was acquired for public use in 1999 with strong and virtually unanimous public support through a partnership involving TNC, Oswego County, and the DEC. The property was purchased by TNC and then divided into two separate parcels, subsequently acquired from TNC by the county and DEC, respectively, with the aid of a New York State Clean Water Clean Air Bond Act grant. A Federal Intermodal Surface Transportation Efficiency Act grant was used for feasibility planning and the EPA provided funds for dune restoration and protection.

Substantial restoration and stabilization of the large dune "blow-out" encroaching into North Pond from the DEC-acquired parcel was accomplished in 1999. That work, which involved the redistribution of sand within the blow-out, the placement of snow-fencing, and the planting of stabilizing vegetation, was subsequently

completed with volunteer assistance from the Friends of Sandy Pond Beach. This project has also resulted in much knowledge concerning techniques for dune stabilization and restoration applicable throughout the Dune and Wetland System. That knowledge continues to be expanded through ongoing monitoring and maintenance of the restoration site.

In 1999, a beach park development and dune restoration plan was completed for the county-owned parcel at Sandy Island Beach. Necessary permits for park development and dune restoration were then obtained. Dune restoration on the county parcel commenced in April 2000 in accordance with a three-phase plan.

Figure 5-11: Dune restoration in area of former "blow-out" near Sandy Island Beach State Park.

Phase one involved pre-restoration planning and coordination with input from member organizations of The Ontario Dune Coalition (TODC). Procedures were determined for coordinating dune restoration work with construction of public beach facilities. In *phase two*, the county's Department of Public Works (DPW) excavated predetermined quantities of sand from a designated location in the area of the large dune blow-out on the DEC parcel and transported that sand to specific dune restoration sites on the county parcel. The DPW then used earth-grading equipment to shape the sand into desired dune profiles. *Phase three* involved stabilization of the restored dunes through a combination of snow-fencing and vegetation planting. Volunteers planted the indigenous variety of American beachgrass (Champlain beachgrass transplanted from a nearby TNC "beachgrass plantation") to help stabilize the restored dunes.

Sandy Island Beach was opened for public use as an Oswego County Park in June 2000. In 2005, ownership of the beach was transferred from the county to the State of New York for operation of the facility as a state park. Now managed by the Office of Parks, Recreation and Historic Preservation (OPRHP), Sandy Island Beach State Park provides opportunities for public access to Lake Ontario and North Pond for beach recreation, car-top boat launching, and other recreational activities while protecting and enhancing the natural resources that make these opportunities possible.

Both Sandy Island Beach State Park and the Sandy Pond Beach Natural Area are located in the Town of Sandy Creek which supported the planning and establishment of both areas. Beginning with its 1989 "Sandy Pond Resource Management Study" which set forth recommendations for use and conservation of the pond areas, the town has participated in and encouraged a variety of stewardship initiatives in the Dune and Wetland System. In 2007, the town is pursuing completion of a town-wide Comprehensive Plan which may be used as an instrument for

establishing and advancing the recommended goals and other stewardship provisions previously set forth in the Resource Management Study. In addition, town officials recognize the need to address the present issues concerning maintenance of the North Pond inlet channel which is within the jurisdiction of the town. (See below.)

Also in this resource area, beachgrass plantings in residential areas have been encouraged to stabilize dunes, particularly on the north and south spits, through demonstration projects and distribution of educational materials. In addition, information on dune walk-overs suitable for homeowners has been prepared and distributed. Some homeowners on the north and south spits have planted beachgrass and built walk-overs to stabilize dunes in front of their homes, thereby demonstrating support for stewardship initiatives and awareness of the value of nonstructural methods of shore protection. Others, however, have built decks, walk-overs, and retaining walls in inappropriate locations, resulting in damage to sand dunes and demonstrating their lack of knowledge or their disregard for applicable laws and regulations concerning construction in the Dune and Wetland System. The Friends of Sandy Pond Beach have provided beachgrass to some property owners as well as guidance for planting it.

Figure 5-12: North Pond inlet and navigation channel; North Pond in foreground.

In recent years increased attention has been given to the economic and environmental impacts associated with maintaining the navigation channel between North Pond and Lake Ontario in the North Pond inlet. Emergency dredging to maintain navigation access was conducted by the Oswego County DPW in accordance with state and federal permits in 2000 using land-based equipment. The dredged material was placed on the south spit for beach and dune nourishment. Subsequently, the Sandy Pond Channel Maintenance Association was formed in 2004 to raise and apply funds for channel maintenance; major contributors are marinas and other channel-dependent businesses as well as residents. The association conducted maintenance dredging in the channel in accordance with its own state and federal permits in the period 2004-2007. Hydraulic equipment was used to pump dredged material to nearshore locations in Lake Ontario for redistribution in the active littoral system.

Town officials, resource managers, channel-dependent businesses, and property owners in the North and South Ponds area now have an increased awareness of the issues associated with dredging and/or stabilizing the navigation channel in the inlet. As a result, inlet maintenance has become a significant concern in the Town of Sandy Creek with important economic and environmental implications. This matter is recognized by town officials, resource managers, and local citizens as a new and important challenge for resource management in the Dune and Wetland System.

Another conservation achievement in the resource area is the establishment by TNC in 1997 of the Rainbow Shores Preserve. The preserve encompasses the approximately 220-acre wetland that exhibits bog characteristics and provides habitat for a number of rare plants adjoining South Pond.

Deer Creek Resource Area

The Deer Creek Resource Area is bounded on the north by Rainbow Shores Road and on the south by the Port Ontario Harbor of Refuge at the mouth of the Salmon River. The resource area includes Deer Creek, the Deer Creek Wildlife Management Area, and the Selkirk Fen as well as the Brennan Beach campground which is the most intensively developed area in the Dune and Wetland System. (See page 2-18.)

Figure 5-13: "High" dune in Deer Creek WMA stabilized with beachgrass.

Among the management guidelines for the Deer Creek Resource Area from the 1989 Dunes Report are recommendations for:

- *Increased attention to protect the "high" dunes in the WMA;*
- *Preparation of a management plan for the WMA;*
- *Measures to better manage recreational use in the WMA;*
- *Placement of dune walk-over structures;*
- *Improved monitoring of recreational activities and enforcement of environmental regulations;*
- *Placement of signs and barriers to protect sensitive resources and guide recreational use; and*
- *Additional management controls at Brennan Beach.*

The 1989 Dunes Report identified a major threat to sensitive resources in the Deer Creek WMA, where the impacts on sand dunes caused by human use were seen to be more severe than in the Black Pond and Lakeview WMAs. Pedestrian pathways were worn throughout the dunes; snow-fencing was ineffectual and vandalized; and significant adverse impacts were being caused by persons who were camping at Brennan Beach and walking into the WMA from the south.

Those conditions have now been largely addressed through increased management attention and the application of effective conservation measures, including beachgrass planting to stabilize the eroded high dunes and other dunes in the Deer Creek WMA. An observation platform with panoramic views of the Deer Creek marsh has been constructed by the DEC along with a walk-

over structure to the WMA's Lake Ontario beach from the trail near the platform. String-fencing has been placed to mark the main trail through the WMA and guide visitors away from sensitive dune areas. Facilities for hand-paddled boating access to Deer Creek have also been provided, including a boat launch for car-top vessels.

In addition, increased attention has been given to providing information concerning the Deer Creek WMA to Brennan Beach campers. String-fencing has been employed to guide visitors who enter the WMA from the campground to and along the main trail in the WMA. The recent sale of the campground property, during the course of the Dune and Wetland System Study, is seen to provide an opportunity for development of additional coordination between the new owners and the DEC for ensuring beneficial public use of the WMA while protecting the area's sensitive resources.

Figure 5-14: Main trail marked by string-fencing in Deer Creek WMA.

Interpretative and directional signs have been placed in the Deer Creek WMA to guide resource use, including signs identifying sensitive resources and the boundaries of the WMA and displaying regulations for public use.

Figure 5-15: Observation platform in Deer Creek WMA.

The Dune Steward program now has an important role for advancing a number of ongoing management initiatives through the stewards': 1) personal communications with visitors; 2) observations of conditions in the Deer Creek WMA; and 3) collection of information concerning recreational use.

Another conservation achievement is the protection of that part of the Deer Creek wetland known as the Selkirk Fen. This wetland of special ecological significance supports one of the few bog buckmoth populations in the world. Potential impacts on the wetland from the nearby Brennan Beach campground and from the nearby golf course just east of Route 3 led to an agreement in 2005 to transfer the wetland from private ownership to the State of New York. Management responsibility now rests with the DEC. A portion of the wetland is owned by TNC.

System-wide Accomplishments and Initiatives

Some issues concerning resource management in the Dune and Wetland System are not tied to specific geographic areas but are relevant throughout the entire system.

Chapter seven of the 1989 Dunes Report describes broad, system-wide issues concerning:

- THE LACK OF UNDERSTANDING OF NATURAL PROCESSES AND VALUES IN THE DUNE AND WETLAND SYSTEM;
- THE ADVERSE IMPACTS ON THE SYSTEM CAUSED BY HUMAN ACTIVITIES; AND
- THE INEFFECTIVENESS OF SOME MANAGEMENT PROGRAMS FOR PROTECTING THE SYSTEM AND GUIDING ITS USE.

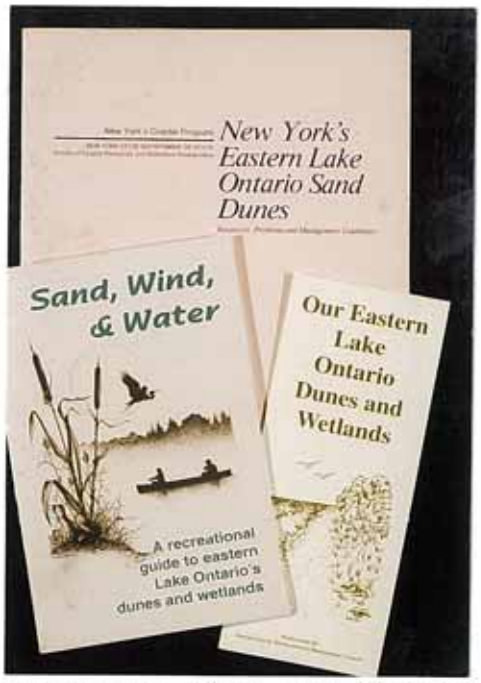

Figure 5-16: Dune and Wetland System publications.

The 1989 Dunes Report also sets forth a series of recommendations (presented as management objectives) to address the system-wide issues. Those recommendations have since led to progress in addressing the issues through: 1) education and outreach programs; 2) the development of new information for decision-making; and 3) the establishment of more effective management programs.

Education and Outreach

Programs to develop and provide educational materials to the public are a cornerstone of stewardship initiatives in the Dune and Wetland System. There is now more public awareness and understanding of the ecological values and sensitivity of the system's resources, and of the need to manage the use and conservation of those resources, than existed prior to formation of The Ontario Dune Coalition and publication of the 1989 Dunes Report. Although the education and outreach programs require continued attention and enhancement, the heightened public awareness and understanding is a major accomplishment resulting from the stewardship initiatives that began with TODC and the Dunes Report.

Numerous materials and programs have been developed to provide information on a variety of topics to local residents, town officials, visitors to the Dune and Wetland System, and the general public. Those materials and programs, for example, provide information on natural resources and values; on opportunities for individual stewardship actions to protect the system; and on public recreation areas and facilities in the system.

Successful public outreach has been achieved and continues through a variety of means, including: publications; signs and displays; special events; public meetings; school programs; and

use of the media. In addition, the Dune Steward Program has a significant role for informing and educating the public through the stewards' personal communications with visitors to the beach recreation areas in the Dune and Wetland System.

- **Publications:** A variety of publications concerning the Dune and Wetland System have been prepared and widely distributed, including but not limited to TODC newsletters, fact sheets on Dune and Wetland System resources; information on invasive plant species; information on laws and regulations for use of properties within the system; and brochures and guidebooks on areas and resources such as the interpretive guidebook "Sand, Wind, and Water," the brochure "Our Eastern Lake Ontario Dunes and Wetlands," and brochures for Sandy Island Beach State Park, Southwick Beach State Park, the Sandy Pond Beach Natural Area and Bird Sanctuary, and The Nature Conservancy's El Dorado Preserve. All of these brochures and guidebooks include information on the natural resources of the Dune and Wetland System and how visitors can assist with resource conservation. A key challenge now concerns how to improve the distribution of these materials to the widest audience, including property owners in the Dune and Wetland System.

  In addition to providing information to recreational visitors and the general public, efforts have been made to provide educational materials to private landowners in the Dune and Wetland System, including materials concerning how to stabilize and protect sand dunes; advisories concerning impacts of high lake levels and the regulation of water levels and flows in the Lake Ontario-St. Lawrence River system; and information on laws and regulations that concern use and development in the Dune and Wetland System.

- **Signs and Displays:** Interpretive signs and displays have been placed in all of the areas available for public recreation in the Dune and Wetland System, including the state parks, WMAs, and nature preserves, to provide educational information on natural resources and values. Other signs identify the boundaries of public areas, protected resource areas where recreation is not permitted, and rules for use of the areas. Among the more prominent displays are fiberglass embedded signs placed in public parking areas and displaying maps of the entire Dune and Wetland System. The interpretive signs describing the Eastern Lake Ontario Marshes Bird Conservation Area are also prominent. Small, "Dunes are Fragile" signs have been provided for use by private landowners and have been placed on both public and private lands throughout the Dune and Wetland System.

Figure 5-17: Signs displaying information on Dune and Wetland System and rules for public use at entrance to Deer Creek WMA.

The basis for many of the signs and displays was the report "Interpretive Recommendations for the Eastern Lake Ontario Sand Dune and Wetland Area" by New York Sea Grant. The main goal of the interpretive program is to decrease visitor impacts on sensitive sand dune resources through public education.

- **Special Events:** Special events are also used to increase awareness of Dune and Wetland System resources, develop support for stewardship initiatives, and encourage public participation in those initiatives. Sand Dune Appreciation Day sponsored by TODC and involving presentations, demonstration projects, and field trips is an example of such an event; so too are programs involving guided walks and tours of shoreline and wetland habitats and the "Lore of the Shore" series of events that have involved local residents presenting stories of the Lake Ontario shoreline.

  Another example is the "Dune Fest" event at Southwick Beach State Park providing an educational program for school children sponsored by the Office of Parks, Recreation and Historic Preservation with assistance from other stewardship partners. Other programs, including local community events, provide opportunities for presentations and updates on stewardship initiatives. In addition, dedication ceremonies for new public facilities in the Dune and Wetland System, including the formal dedication of Sandy Island Beach State Park and dune walk-over structures on public lands, have provided significant opportunities to highlight stewardship goals and initiatives.

- **Public Meetings:** Information is also distributed through public meetings and workshops open to all. Public participation is encouraged, for example, at the regular quarterly meetings and special meetings of TODC. Those meetings have provided an opportunity for the exchange of information and ideas. Workshops on specific topics with invited participants are also held by TODC and other organizations and agencies, including, for example, workshops to review the status of ongoing research and the results of completed studies in the Dune and Wetland System.

Figure 5-18: Public participation is encouraged at meetings of The Ontario Dune Coalition.

- **School Programs:** Educational programs such as the "Dune Fest" event noted above have been designed to educate local students on the natural resources and values of the Dune and Wetland System and to help develop grassroots support for stewardship initiatives. Other educational efforts are also ongoing, including a program by the Friends of Sandy Pond Beach in local schools to teach young students about sand dune ecology. That program makes use of a mechanical model designed and built by volunteers (known as the "dune machine") that demonstrates how dunes are formed and how they are eroded and stabilized.

- **Use of the Media:** Other means of communication that reach the general public, including newspapers and television, are also used to distribute information concerning the Dune and Wetland System, publicize the success of stewardship initiatives, inform residents who may not have been involved with those initiatives, and provide information on special events, public meetings, and educational programs.

The official repository of information concerning the Dune and Wetland System has been established at the Snow Memorial Library in Pulaski, New York. In addition, the Eastern Lake Ontario Dunes and Wetlands web site (www.nysgdunes.org) maintained by New York Sea Grant provides a variety of information concerning the system with links to other sites of interest.

Information for Decision-Making

Another notable accomplishment of stewardship initiatives in the Dune and Wetland System is the significant expansion of the base of scientific and other information concerning the system. Prior to TODC and the 1989 Dunes Report, there was considerable misunderstanding as well as a lack of information regarding natural coastal processes and their effects on the Dune and Wetland System. Fundamental research regarding those natural processes has since been conducted and continues. That research has increased the base of knowledge available to support science-based management decisions and the development of short and long-term management strategies.

Figure 5-19: Natural processes associated with Lake Ontario have a profound effect on the North Pond inlet.

In addition, substantial information has been developed concerning public use of the Dune and Wetland System, including information concerning public attitudes and the demographics of visitors to the system's recreation areas.

- **The Natural Environment:** Based on recommendations from the 1989 Dunes Report, research projects funded through state and federal grant programs and by nongovernmental agencies have investigated littoral processes including the direction, quantity, and sources of sediment transport affecting the Dune and Wetland System. Among the goals of this research are to increase understanding of the natural processes affecting the system; to help determine trends in coastal barrier erosion and sand dune development; and to develop information on littoral transport processes useful for managing individual properties and the entire system.

Initiated by The Nature Conservancy and conducted using TNC, State of New York, and federal funding with local town sponsorship, these research efforts began with review of existing information concerning eastern Lake Ontario littoral processes (see the 1997 report "Eastern Lake Ontario Littoral Processes: Review of Information and Management Implications") and led to the principal research effort known as the Eastern Lake Ontario Sand Transport Study (ELOSTS).

Figure 5-20: Significant knowledge concerning the use of beachgrass for dune stabilization has been gained through field research.

The ELOSTS included a number of investigations conducted by personnel from New York colleges and universities, Environment Canada, and consultants to address: lake currents; sediment type, distribution, internal structure, and thickness in the lake and on the barrier beaches; size variation of sand on the lake floor and on the beaches; water level in North Pond; shoreline evolution as seen in charts, maps, and aerial photos; and carbon-dating of sediments to provide a chronology for the changes observed. The results of this work are presented in the 2002 report "Eastern Lake Ontario Sand Transport Study (ELOSTS): Final Report on Sediment Transport Patterns and Management Implications for Eastern Lake Ontario."

In addition to research on the littoral and other natural processes affecting the Dune and Wetland System, a number of studies have assessed the Dune and Wetland System's flora and fauna, including research on the native Champlain variety of American beachgrass, on invasive species, and on rare plants and significant natural communities, including the globally imperiled bog buckmoth.

- **Dune Stabilization and Restoration Techniques:** Considerable field research concerning sand dune stabilization and restoration techniques and methods to direct visitors away from sensitive areas has also been conducted. Through efforts to stabilize and encourage dune growth at locations throughout the Dune and Wetland System, particularly at Sandy Island Beach State Park and the Sandy Pond Beach Natural Area, substantial knowledge has been gained regarding beachgrass planting and the use of snow-fencing for dune stabilization as well as techniques for providing barriers ("string-fencing," for example) between public areas and sensitive resources. Field research has also provided information for efforts to control invasive species such as Purple Loosestrife (*Lythrum salicaria*) in the Dune and Wetland System.

- **Public Attitudes and Demographics:** In addition to the development of information on natural processes and conditions, information concerning visitors to the Dune and Wetland System has also been assembled. Surveys, questionnaires, and personal interviews have been used to develop information concerning public attitudes and the demographics of visitors to the public recreation areas, including the state parks and WMAs.

Figure 5-21: Much knowledge concerning the use of snow-fencing for dune stabilization has also been gained.

  A survey of beach visitors, for example, was conducted by New York Sea Grant, TNC, and the Department of Environmental Conservation with the aid of the dune stewards to determine the effectiveness of the "Interpretive Recommendations for the Eastern Lake Ontario Sand Dune and Wetland Area." More recent surveys of beach users at the public recreation areas have also been conducted by the dune stewards to identify key demographic features of visitors; assess how visitors perceive conservation efforts; evaluate the effectiveness of ongoing education efforts; and generally monitor the type and extent of recreational use in each area.

  A number of other studies have also expanded the base of information for management decisions including, for example, the feasibility study conducted by Seaway Trail, Inc. to develop an environmental interpretive center to educate the public about the Dune and Wetland System. (See the 1991 report "Eastern Lake Ontario Dune Wetland Environmental Interpretive Center.")

- **Lake Level Regulation:** In addition, information concerning the effects of Lake Ontario water level changes on the Dune and Wetland System has been gained through participation by private landowner associations and other members of TODC in the International Lake Ontario-St. Lawrence River Study by the International Joint Commission to review the criteria for regulating water levels and flows in the Lake Ontario-St. Lawrence River system.

- **Information from Other Jurisdictions:** The base of information for decision-making has also been expanded through efforts to learn from the experience of other groups and jurisdictions concerned with the use and conservation of sand dune resources. Organized trips involving resource managers and property owners, including trips sponsored by TODC and New York Sea Grant to other Great Lakes and Atlantic Ocean locations, have enabled the sharing of information and the application of initiatives developed in other locations, thereby enhancing stewardship initiatives in the Dune and Wetland System.

Management Programs

Significant advances for managing the coastal land and water resources of the Dune and Wetland System through planning, regulatory compliance, and nonregulatory measures have been achieved since formation of TODC and publication of the 1989 Dunes Report. As a result, damaging human impacts have been reduced; management programs have evolved to recognize ecological systems; and coordination for resource management has been improved. Much of this progress, it should be noted, has occurred with respect to the publicly owned areas in the Dune and Wetland System. In addition, there have been important technical advances with respect to application of conservation measures; the Dune Steward Program has evolved to have a major role for resource management; and public support for stewardship initiatives has been expanded.

- **Damaging human activities have been reduced.** At the time of publication of the 1989 Dunes Report, damaging human impacts, including impacts caused by ATVs, vandalism of protective features (snow-fencing, for example), and trampling of dune-stabilizing vegetation, occurred fairly regularly in a number of locations. Those types of impacts have been reduced through a combination of measures, including: improved public awareness (through the public outreach efforts noted above) of applicable laws and regulations concerning use and development of public and private lands; improved compliance with those laws and regulations; construction of dune walk-over structures to manage pedestrian traffic; placement of effective signs and barriers to guide resource protection and public use; and encouragement of positive human activities including establishment of dune stabilization measures on some private lands. The Dune Steward Program has provided vital assistance for reducing damaging human impacts on the public lands in the Dune and Wetland System (see below).

Figure 5-22: Dune walkover and "dunes are fragile" sign in Southwick Beach State Park.

Although compliance with the laws and regulations for use of privately owned and state-owned properties can still be improved, there has been better communication among resource managers, the various law enforcement agencies with jurisdiction in the Dune and Wetland System, and private landowners. As a result of meetings involving local, county, and state enforcement agencies and the landowners, the enforcement agencies have become more aware of the types of violations occurring, and the landowners and resource managers are now more knowledgeable of applicable laws and regulations and who to contact to report observed violations. The dune stewards and the Friends of Sandy Pond Beach have also contributed to increased compliance through their public outreach efforts and ability to report observed violations. A key challenge in 2007 concerns how to continue to improve the regulatory compliance needed to sustain Dune and Wetland System resources.

- **Resource management programs recognize the Dune and Wetland System as an ecological system of inter-related parts.** Prior to formation of TODC and publication of the 1989 Dunes Report, management efforts in the Dune and Wetland System were focused on specific properties. Those efforts generally were not based on considerations that the properties are components of a larger ecological system. Over time, however, recognition that the Dune and Wetland System is an ecological system of inter-related parts has become reflected in virtually all management programs. The public outreach initiatives noted above describe and emphasize the Dune and Wetland System as a unique part of the Lake Ontario shoreline consisting of beaches, sand dunes, embayments, wetlands, and other coastal resources. Published materials regarding specific recreation areas such as the state parks and WMAs describe those areas as part of the larger Dune and Wetland System. Research and investigations have been designed to advance the base of information to support management of the entire system as well as management of individual properties within the system.

- **Coordination among agencies and organizations for effective management has been improved.** Coordination among all levels of government, nongovernmental organizations, and private landowners with regard to management of the Dune and Wetland System was considered poor when the 1989 Dunes Report was published. That coordination has been improved due in large part to the public outreach programs mentioned above and the programs and efforts of TODC. Many if not most of the successful stewardship initiatives have been achieved through effective partnerships involving several agencies and organizations working together for a common goal. In addition, TODC member organizations have provided public forums to enable the expression of public concerns related to the use and conservation of the Dune and Wetland System. Those forums have helped to maintain essential communication and foster coordination.

Figure 5-23: String-fencing has proved to be an effective and inexpensive barrier for guiding public use in sensitive areas.

- **Technical advances for resource conservation have been achieved.** Significant technical advances with respect to stabilizing and restoring sand dunes and guiding recreational use of the Dune and Wetland System have been achieved through field research, scientific investigations, ongoing monitoring of conservation projects, knowledge gained from other jurisdictions, and the general experience of the stewardship partners implementing specific projects over the past two decades. Those advances may be described with respect to techniques for beachgrass planting; establishment of beachgrass nurseries; knowledge concerning the native Champlain variety of beachgrass; and techniques and materials for effective use of snow-fencing for sand stabilization. In addition, significant experience has

been gained constructing dune walk-overs for use on public lands and for use by homeowners. Techniques for providing barriers between public areas and sensitive resources have also been advanced. The use of "string-fencing," for example, has proved to be a simple and inexpensive technique for marking trails and otherwise guiding visitors through sensitive resource areas. A key challenge in 2007 concerns how to make all of this information readily available to landowners in the Dune and Wetland System and to a wider audience, including visitors to the system.

- **The Dune Steward Program has evolved into a program with a major role for resource management**. The Dune Steward Program which began in 1985 with sponsorship of a single intern—known as the Dune Naturalist Intern—to conduct research on dune activities and educate dune users, has evolved into a program with significant outreach, information-gathering, and other management functions. While the principal role of the dune stewards is to promote environmentally sound use of Dune and Wetland System resources through public education and outreach to visitors in the public recreation areas, the stewards also contribute to effective resource management through installing and maintaining dune-stabilizing vegetation, protective fencing, and dune walk-overs; monitoring recreational use; and otherwise assisting DEC and OPRHP staff and other agencies.

Stewardship Lessons

The concept of resource stewardship described in this report envisions that all agencies, organizations, and citizens with an interest or authority pertaining to the Eastern Lake Ontario Dune and Wetland System would consider themselves responsible for care of the system. That care would be for the purpose of ensuring that the natural, cultural, and economic values of the Dune and Wetland System are sustained for the benefit of future generations.

Considerable experience concerning resource management has been gained over the past two decades by the members of The Ontario Dune Coalition and others in pursuing TODC's mission and working to advance the guidelines and recommendations of the 1989 Dunes Report. Some of the significant lessons learned through that experience are summarized on the following pages. (See also the box on the following page.)

Figure 5-24: Walk-over structure in Lakeview WMA.

These lessons are of interest not only to the public officials, resource managers, property owners, and others concerned with the Dune and Wetland System, but also to those who may be thinking about stewardship initiatives in other locations. The following "stewardship lessons" are numbered for reference and not to denote priority.

STEWARDSHIP LESSONS FROM THE EASTERN LAKE ONTARIO DUNE AND WETLAND SYSTEM

1. VOLUNTARY PUBLIC-PRIVATE PARTNERSHIPS CAN HAVE A SIGNIFICANT ROLE FOR ADVANCING THE EFFECTIVE MANAGEMENT OF NATURAL AREAS AND RESOURCES.
2. A STUDY OF NATURAL RESOURCES CAN ESTABLISH THE FOUNDATION FOR A VARIETY OF EFFECTIVE ACTIONS FOR RESOURCE MANAGEMENT.
3. RESOURCE STEWARDSHIP IS AN ONGOING PROCESS THAT DOES NOT END WITH THE SUCCESS OF ANY ONE INITIATIVE.
4. ECONOMIC CONSIDERATIONS ARE INHERENT IN MANY OF THE ISSUES CONCERNING USE AND DEVELOPMENT OF NATURAL SYSTEMS AND RESOURCES.
5. "CARRYING CAPACITY" CONSIDERATIONS ARE ALSO INHERENT IN MANY OF THE ISSUES CONCERNING USE AND DEVELOPMENT OF NATURAL SYSTEMS AND RESOURCES.
6. CONSIDERATION OF CUMULATIVE IMPACTS IS AN ESSENTIAL PART OF DECISION-MAKING PROCESSES AFFECTING NATURAL SYSTEMS AND RESOURCES.
7. EFFECTIVE MANAGEMENT OF COASTAL RESOURCES INVOLVES AN APPROPRIATE AND SUSTAINABLE BALANCE BETWEEN CONSERVATION OF THOSE RESOURCES AND BENEFICIAL USE.
8. EFFECTIVE MANAGEMENT OF COASTAL RESOURCES REQUIRES LONG-RANGE PLANNING AND OTHER NONREGULATORY INITIATIVES, IN ADDITION TO REGULATORY MEASURES.
9. EXPANDING THE BASE OF KNOWLEDGE AND INFORMATION IS NECESSARY TO MAINTAIN EFFECTIVE MANAGEMENT.
10. RESEARCH WITH A PRACTICAL APPLICATION, SHARED AND COORDINATED, IS MOST BENEFICIAL.
11. PUBLIC SUPPORT AND PARTNERSHIPS PROVIDE AN ESSENTIAL FOUNDATION FOR EFFECTIVE STEWARDSHIP.
12. NOT EVERYONE WILL SUPPORT STEWARDSHIP GOALS.
13. VOLUNTEERS ARE ESSENTIAL PARTNERS IN THE STEWARDSHIP PROCESS.
14. MANAGEMENT DECISIONS BASED ON SCIENCE ARE DESIRABLE BUT SOME STEWARDSHIP INITIATIVES REQUIRE "ART" AS WELL AS SCIENCE TO BE SUCCESSFUL.
15. SOME STEWARDSHIP GOALS CAN BE ACHIEVED WITH LITTLE OR NO COST TO TAXPAYERS; MONEY IS NEEDED FOR OTHER INITIATIVES, AND FUNDING MAY BE AVAILABLE.
16. THE ABILITY OF RESOURCE MANAGERS TO WORK WITH PEOPLE IS JUST AS IMPORTANT TO THE SUCCESS OF STEWARDSHIP INITIATIVES AS FUNDING AND TECHNICAL ABILITIES.
17. FLEXIBLE MANAGEMENT STRATEGIES ARE NEEDED TO RESPOND TO CHANGING CONDITIONS AND CIRCUMSTANCES.
18. REGULAR EVALUATION OF ORGANIZATIONAL EFFECTIVENESS IS ALSO NEEDED TO RESPOND TO CHANGING CONDITIONS AND CIRCUMSTANCES.
19. DOCUMENTING AND PUBLICIZING STEWARDSHIP ACTIVITIES CAN BUILD SUPPORT.

1. Voluntary public-private partnerships can have a significant role for advancing the effective management of natural areas and resources. The experience of TODC over the past two decades is of value to other organizations involved with managing natural resources and to those considering the establishment of such an organization. No other group with as broad a representation of governmental agencies, not-for-profit groups, and private landowners concerned with Great Lakes sand dunes is known to exist in other Great Lakes states. TODC's success demonstrates how a voluntary partnership of interested agencies, organizations, and citizens without any specially authorized regulatory power or other authorities can effectively advance stewardship goals through the development and sharing of information and by providing opportunities for the discussion of ideas and concerns.

2. A study of natural resources can establish the foundation for a variety of effective actions for resource management. The report *New York's Eastern Lake Ontario Sand Dunes: Resources, Problems, and Management Guidelines* funded by the New York State Department of State Division of Coastal Resources was based on a study of coastal resources of special interest. The study report was not prepared in the form of a plan for adoption. Instead, the 1989 Dunes Report presented the results of a study sponsored by the DCR to increase public awareness and understanding and to establish the basis for a variety of stewardship initiatives that could be pursued by local governments, involved agencies and groups, and citizens if they chose to do so. In that regard, the report made an important contribution to advance the public interest for conservation and beneficial use of coastal resources without imposing any mandates. The Dunes Report also demonstrates the importance of establishing a series of implementable recommendations and measurable goals that all stakeholders can voluntarily "buy into" and work toward. Those recommendations and goals, in effect, formed the basis for the first stewardship vision for the Dune and Wetland System.

Figure 5-25: Black Pond looking inland from the El Dorado Preserve.

3. Resource stewardship is an ongoing process that does not end with the success of any one initiative. Experience in the Dune and Wetland System has shown that effective stewardship of coastal resources must be recognized as an ongoing process to be maintained as conditions and circumstances change, as specific initiatives may be successfully completed, and as new and significant issues arise. When the Dunes Report was published in 1989, for example, major threats to sensitive areas were identified at Sandy Island Beach, on the undeveloped section of the south spit at North Pond, and in the Deer Creek Wildlife Management Area. Those threats were subsequently addressed but new challenges have since emerged, including the need to

address issues concerning maintenance of the North Pond inlet and management of expanded recreational use at the Black Pond WMA.

Experience has also shown that some stewardship projects may require significant periods of time to achieve. The planning, land acquisition, and development that led to establishment of Sandy Island Beach State Park is a good example. Such projects require a long-term commitment that must be sustained through periods of frustration, controversy, and other obstacles.

4. Economic considerations are inherent in many of the issues concerning use and development of natural systems and resources. As stewardship initiatives in the Dune and Wetland System have evolved over time from an initial focus on resource conservation to consideration of opportunities for economic growth associated with resource use, it has become apparent that effective stewardship requires understanding of economic issues. When addressing those issues, in the Dune and Wetland System and elsewhere, attention should be given to: 1) the economic impacts (measured as revenues or expenditures) of the various uses of natural areas; and 2) the economic values of the areas' resources.

5. "Carrying capacity" considerations are also inherent in many of the issues concerning use and development of natural systems and resources. Matters concerning the capacity of natural resources to accommodate use and development in a safe, enjoyable, and environmentally sound manner are also inherent in many of the issues concerning use and development of the Dune and Wetland System. A lesson learned is that it is not practical, on a system-wide basis, to attempt to precisely determine the limits of resource carrying capacity in the Dune and Wetland System. As a result, "indirect" approaches for applying the carrying capacity concept are more appropriate.

Figure 5-26: North Pond marina.

Indirect approaches for addressing carrying capacity issues can effectively begin with basic recognition and understanding of the concept by resource managers and others who make decisions concerning use of the Dune and Wetland System. That recognition and understanding can then be reflected in the: a) *planning and review of individual projects to better identify potential impacts as well as measures to mitigate those impacts*; b) *formulation of carrying capacity-related policies for guiding uses of the system and decisions affecting the system*; c) *development of local planning programs to establish those policies*; and d) *establishment of regulatory and nonregulatory programs to implement and otherwise achieve compliance with the policies.*

Figure 5-27: Dune walk-over at Southwick Beach State Park.

6. Consideration of cumulative impacts is an essential part of decision-making processes affecting natural systems and resources. When considering the carrying capacity of the Dune and Wetland System for beneficial use and development, through indirect or other means, attention should be given to the cumulative impacts that can result from individually minor but collectively significant actions that take place over time. To address those impacts, their significance should be recognized and emphasized in planning and decision-making processes and in individual stewardship initiatives. In addition, efforts should be directed toward increasing public awareness of the cumulative impacts that everyday activities can have on the Dune and Wetland System. In doing so, the significance of positive cumulative impacts resulting from increased awareness of the effects of personal actions in the Dune and Wetland System should be effectively emphasized.

7. Effective management of coastal resources involves an appropriate and sustainable balance between conservation of those resources and beneficial use. ''Balance'' and ''sustainability'' are vital concepts that should continue to guide resource management decisions affecting the Dune and Wetland System. Extreme points of view that would preserve the entire system without any use and development on the one hand, or that would give priority to development of the entire system for human use on the other, have generally not been constructive in the Dune and Wetland System. Experience has shown the wisdom of continuing to strive for balance between conservation and beneficial use of the system's coastal resources, while recognizing that some resources should be preserved because of their natural values and sensitivity while other areas are suitable for certain types of use and development. Such balance is in keeping with the national goals for coastal management embodied in the federal Coastal Zone Management Act of 1972 and the state goals set forth in New York's Coastal Management Program.

8. Effective management of coastal resources requires long-range planning and other nonregulatory initiatives in addition to regulatory measures. A resource management program based only on regulatory compliance may be expected to principally react to proposals or issues rather than pursue initiatives that would head off problems before they arise or otherwise effectively advance stewardship goals. In addition, a program perceived to be based primarily on regulation or enforcement may cause disaffection on the part of some stakeholders and discourage voluntary stewardship initiatives. Nevertheless, experience in the Dune and

Wetland System has shown that regulatory measures are sometimes the only effective means for achieving compliance on the part of those persons who may willfully violate applicable laws and regulations for resource use and conservation. That experience has also shown, however, that the most effective program to guide the beneficial use and conservation of coastal resources requires thoughtful, long-range planning and voluntary stewardship initiatives in addition to effective application of laws, regulations, and ordinances.

9. Expanding the base of knowledge and information is necessary to maintain effective resource management. The success of stewardship initiatives depends in large part on knowledge and information, including but not limited to knowledge and information concerning resource conditions and values, natural processes, resource use and development, and the institutional framework for resource management (the applicable laws, regulations, and agencies, for example). Experience in the Dune and Wetland System has resulted in significant appreciation of the complexity of natural processes and the lesson that no matter how experienced or ''expert'' one may be, it is not possible to completely understand those processes nor predict their long-term effects with any great certainty.

Figure 5-28: ''Sand Dunes are Fragile'' sign.

Part of the ongoing, perpetual process of stewardship is the process of expanding the base of information on which to base management decisions and initiatives, especially as conditions and circumstances change. That base of information may be expanded through scientific research, personal learning initiatives, monitoring of resource uses and conditions, and other means, and the information developed should be shared or otherwise disseminated. Information concerning the experiences of groups and organizations involved with management of similar resources in other locations is particularly valuable. In summary, the more that the stewardship partners have learned about the Dune and Wetland System, the more it has become clear that there always will be more to learn.

10. Research with a practical application, shared and coordinated, is most beneficial. Scientific research and other investigations and studies have educational benefits. They can, for example, help increase the awareness and understanding of individuals and groups concerning natural resource functions and values and ecologically-based management efforts. Research should also be designed to have practical applications with regard to expanding the base of knowledge and information useful for science-based management decisions and for other resource management purposes. The Eastern Lake Ontario Sand Transport Study, for example, was intended principally to serve that purpose.

Experience in the Dune and Wetland System has shown that educational institutions may independently use the system for research projects but the results of those projects may not be readily available to others. The lesson is that such projects can make important contributions to stewardship when they are coordinated to the extent possible and their results made available to resource managers, to the public, or otherwise effectively shared.

11. Public support and partnerships provide an essential foundation for effective stewardship. One of the most prominent lessons learned through experience in the Dune and Wetland System concerns the value of partnerships—of agencies, organizations, and individuals working together toward a common goal. In this regard, all interested and affected individuals and groups should have the opportunity to participate in those partnerships along with the professional agencies and organizations. Experience has also shown that it takes hard work and dedication to develop and maintain an effective partnership. The leadership needed to guide the partnership and direct specific projects and initiatives must ensure that all partners feel they are part of the team and not being overshadowed by others.

Figure 5-29: "High" dune on North Pond barrier.

While it is recognized that consensus on every issue is not possible, the different interests and points of view of different stakeholders can be recognized and respected. Participants in the process can avoid "preaching" to other participants and affected parties and otherwise not attempt to impose personal goals and values. Experience has shown that to solve problems affecting the Dune and Wetland System, the stewardship partners, including governmental agencies, environmental organizations, and private landowner associations need to recognize and respect each others' legitimate objectives and strive to work together as partners to address resource management issues in an objective, balanced, and practical manner.

12. Not everyone will support stewardship goals. While striving for consensus and working to build public support and partnerships for effective stewardship, it should be recognized that not all citizens will be supportive. Experience in the Dune and Wetland System has shown that despite the most thoughtful and well-designed programs for public outreach and education, some residents, visitors, and landowners will not seek to learn about or be influenced to understand ecological functions and values, nor will they appreciate the public benefits of guiding land-use and development in an environmentally sound manner. Some landowners and visitors, for example, will remain concerned primarily with their own interests. Further, some will continue to willfully violate land-use and environmental conservation laws and regulations

controlling residential, recreational, and other uses of the Dune and Wetland System. In those instances, regulatory enforcement will remain the only effective means for achieving compliance with the applicable laws and regulations and otherwise ensuring resource protection. Some amount of opposition or lack of support for stewardship initiatives should always be expected and should not discourage the continued public outreach and education programs needed to advance those initiatives.

13. Volunteers are essential partners in the stewardship process. Experience in the Dune and Wetland System shows how volunteers can make vital contributions to the success of specific stewardship initiatives as well as to the development and maintenance of public support for those initiatives. These contributions should be respected and encouraged. The most prominent example is seen in the contributions of the Friends of Sandy Pond Beach. Among the lessons learned concerning volunteers are that volunteer efforts must be properly guided and coordinated to ensure the continued enthusiasm and interest of the volunteers and to avoid potential conflicts between volunteers and supervising agencies. Knowledge of group dynamics and effective interpersonal skills are needed on the part of supervising agencies to ensure the continued beneficial contributions of volunteer groups to effective stewardship.

14. Management decisions based on science are desirable but some stewardship initiatives require "art" as well as science to be successful. A prominent example of this lesson is seen in the successful sand dune restoration work at Sandy Island Beach State Park. The use of earth-moving equipment to shape dune forms and the use of snow-fencing and vegetation to stabilize and maintain those forms required creativity as well as technical knowledge—in other words, art as well as science. Field adjustments were made to originally prepared restoration plans, and equipment operators were guided not by precise surveys and engineered specifications, but by photographs of the natural profiles of sand dunes elsewhere in the Dune and Wetland System. Similarly, the effective placement of snow-fencing and planting of stabilizing vegetation were achieved through the efforts of volunteers, including the Friends of Sandy Pond Beach, and required periods of observation and adjustment.

Figure 5-30: Lake Ontario beach at Lakeview WMA.

15. Some stewardship goals can be achieved with little or no cost to taxpayers; money is needed for other initiatives and funding may be available. Experience in the Dune and Wetland System has shown that many stewardship goals can be achieved through personal actions and the informed decisions of agencies and organizations in the normal course of their business, with little or no added cost to taxpayers. Other initiatives, however, require the expenditure of funds for studies, engineering, plan formulation, equipment, construction, and maintenance, for example. Experience shows that the need for funds should not discourage the pursuit of stewardship goals. Funds for stewardship initiatives in the Dune and Wetland System have been obtained from state and federal grant programs and private organizations, with matching funds in the form of in-kind services provided locally.

Figure 5-31: South Colwell Pond in Lakeview WMA.

An important lesson for pursuing sources of funds concerns the importance of building on previous efforts. For example, the 1989 Dunes Report provided the basis for a number of projects for advancing beneficial use and conservation of the Dune and Wetland System. Many of those projects have since been implemented with the support of governmental and private grants. Similar reports and planning documents can be used to establish priority lists of projects and initiatives to achieve stewardship goals. Those lists can reflect careful review of needs and conditions and help to demonstrate the commitment needed to achieve the listed projects. As a result, opportunities for receipt of governmental and private grants to implement the projects can be enhanced.

16. The ability of resource managers to work with people is just as important to the success of stewardship initiatives as funding and technical abilities. Building public support, maintaining partnerships and the interest and enthusiasm of volunteers, and pursuing projects that may require significant periods of time require more than funds and technical information. Such elements of stewardship and resource management require the ability of resource managers to work effectively with people, including local officials and community leaders. In fact, experience has shown that this ability is the most important requirement for the success of many if not most stewardship initiatives.

17. Flexible management strategies are needed to respond to changing conditions and circumstances. This lesson is especially applicable to planning initiatives intended to guide resource conservation and beneficial use. Experience in the Dune and Wetland System has shown that planning documents and guidelines can not anticipate every concern or issue that may arise, nor can they provide a definitive answer to every problem. The need for case by case

decision-making will remain but the plans and guidelines can provide a framework to guide that decision-making. The framework, however, must be flexible because it will require modification over time as conditions change and responses to complex issues continue to evolve.

18. Involved agencies and organizations need to respond to changing conditions and circumstances to remain effective. Regular evaluation of organizational effectiveness is needed to respond to changing conditions and circumstances. Experience in the Dune and Wetland System has shown that as conditions and circumstances change, including natural and institutional conditions, the organizations and agencies with relevant roles and authorities in the system need to adapt to those changes. Nongovernmental organizations in particular, including but not limited to TODC, need to evolve appropriately and accept change as necessary to maintain their effectiveness. The lesson is that all organizations must change in order to maintain effectiveness and that the most opportune time to affect change is before that effectiveness may diminish.

19. Documenting and publicizing stewardship activities can build public support. Stewardship initiatives and the success of those initiatives should be effectively documented and publicized to aid in building and maintaining public support, maintaining the interest and enthusiasm of all stewardship partners, including volunteers, and otherwise helping to instill the concept of stewardship in all stakeholders. Experience in the Dune and Wetland System has shown the value of public outreach programs to highlight initiatives and successes in the media, during special events, and through public exhibits.

Figure 5-32: Sandy Pond Beach Natural Area. (Dune walk-over connecting North Pond and Lake Ontario beach in center of photo.)

6

A Stewardship Vision for Resource Conservation and Beneficial Use

The coastal barrier system has been significantly altered by both natural forces and man's activities. This system, however, contains the least altered and most impressive barrier system resources in New York State. The value of these resources to the local residents, and to the citizens of New York, is priceless. Although the opportunity exists now to protect this resource, if action is not taken, today's opportunity may someday be a past memory...

from *New York's Eastern Lake Ontario Sand Dunes: Resources, Problems and Management Guidelines*, 1989

NEW YORK'S EASTERN LAKE ONTARIO DUNE AND WETLAND SYSTEM
December 2007

A Stewardship Vision for Resource Conservation and Beneficial Use

Chapter Cover Photo: Southwick Beach State Park

A Stewardship Vision for Resource Conservation and Beneficial Use of the Eastern Lake Ontario Dune and Wetland System

This chapter presents a vision for the future use and conservation of the Eastern Lake Ontario Dune and Wetland System. The vision is based on the concept of perpetual stewardship whereby citizens, governmental officials, agencies, and organizations with an interest or authority pertaining to the Dune and Wetland System would think of themselves as stewardship partners responsible for care of the system. That care would be for the purpose of ensuring that the natural, cultural, social, and economic values of the Dune and Wetland System are not consumed for short-term gain but instead are sustained for the benefit of future generations.

The Stewardship Vision is consistent with the findings and recommendations presented in the 1989 report *New York's Eastern Lake Ontario Sand Dunes: Resources, Problems, and Management Guidelines* (Dunes Report) published by the New York State Department of State. Many of those findings and recommendations are still applicable in 2007. The vision is also consistent with the stewardship initiatives developed and pursued by stakeholders since the 1989 Dunes Report and since formation of The Ontario Dune Coalition (TODC) in 1985. The vision organizes the basic principles for resource stewardship developed by the stakeholders over the years, but heretofore not set forth in any one document and formally adopted or otherwise endorsed.

Figure 6-1: Lakeview Wildlife Management Area.

The vision is based on 16 ideals that apply to resource management throughout the entire Dune and Wetland System, including the four previously defined resource areas: 1) Black Pond; 2) Southwick-Lakeview; 3) North and South Sandy Ponds; and 4) Deer Creek. (See chapter two.) The ideals are intended to establish a guiding framework — a foundation — for future planning efforts and other decisions and actions by the different town, county, state, and federal agencies with programs or authorities that directly or indirectly affect the Dune and Wetland System; they are also intended to help guide the actions of the environmental organizations, volunteer groups, and private landowners participating in stewardship of the system. The ideals are directed toward achieving balance between the conservation of natural coastal resources and their ecological functions on the one hand, and promotion of beneficial use of the Dune and Wetland System for recreation and other appropriate purposes on the other.

The Stewardship Vision will not be useful without an effective implementation strategy. Such a strategy is included in chapter seven of this report. It is recognized that an effective implementation strategy must be pursued as an ongoing process that will continue to evolve over time. The recommendations provided in chapter seven are intended to begin that process. The stakeholder agencies, organizations, and citizens—the stewardship partners—are urged to embrace the vision and incorporate its ideals into their programs, decisions, and actions affecting the Dune and Wetland System.

Ideals of the Stewardship Vision

The Stewardship Vision consists of the following ideals which are numbered for reference purposes, not to denote priority.

1. Public Recognition of the Vital Resources and Values of the Eastern Lake Ontario Dune and Wetland System.

In the Stewardship Vision, public recognition of the important habitat, water quality, flood protection, scenic, and other natural values provided by the Eastern Lake Ontario Dune and Wetland System would be widespread; so too would be recognition of the economic, cultural, and social values of the system's resources, and of the importance of those resources and their values to the quality of life in the eastern Lake Ontario region. Governmental officials, local residents, visitors to the Dune and Wetland System, and private landowners in the system would also recognize the importance of effectively managing the system's resources—including the barrier beaches, sand dunes, nearshore lake waters, wetlands, embayments, and underwater lands—to ensure their future conservation and beneficial use.

Figure 6-2: South spit at North Pond, looking south.

The extent of public appreciation of the natural resources and values of the Dune and Wetland System would be equal to the public's appreciation of the recreational opportunities provided by the system, including but not limited to the opportunities for fishing, hunting, and beach recreation.

2. Active Management of Areas and Resources to Guide their Use and Conservation.

Use and conservation of the Dune and Wetland System would be actively managed in the public interest, for the benefit of all local residents, visitors, and the general public. Such management would be accomplished through: a) thoughtful, long-range *planning* to guide beneficial public and private use along with the conservation of natural coastal resources (see no. 11 below); b) effective *regulation* of that use and conservation, as necessary, through appropriate measures to ensure compliance with local, state, and federal laws and regulations (see no. 12 below); and c) *nonregulatory measures* for coastal resource management. The nonregulatory measures would include but not be limited to personal stewardship actions and continued education and information initiatives involving the stewardship partners, including residents, visitors, landowners, agencies, officials, private organizations, and others.

An effective role for town governments (acting in coordination with county, regional, state, and federal agencies and not-for-profit organizations) to manage activities in the Dune and Wetland System would be established and maintained. Town planning and other initiatives to advance the Stewardship Vision would be for the purpose of not only providing an effective response to problems as they may arise, but also for guiding use of Dune and Wetland System resources in a manner to "head off" or otherwise avoid problems and conflicts before they would otherwise develop.

Figure 6-3: Dune "blow-out" on north spit at North Pond.

3. Recognition of Ecological Systems.

Recognition that the Dune and Wetland System is an ecological system of barrier beaches, sand dunes, wetlands, embayments, and other coastal resources influenced by human activities would be a guiding principle of resource management programs and initiatives. Also, it would be recognized that the Dune and Wetland System is part of a larger environmental system that includes the watershed of eastern Lake Ontario. Resource managers, local residents, and the general public would appreciate that actions in any one part of this ecological system may have important impacts on other parts of the system, or on the system as a whole. As a result, it would be recognized that management of natural resources and environmental quality in specific locations within the Dune and

Wetland System (including state-owned and private properties) is especially influenced by: a) *ecological inter-relationships* among locations; b) the *effects of Lake Ontario*; and c) conditions in the *eastern Lake Ontario watershed*. It would also be recognized that effective resource management initiatives must address not only individual areas and properties but also the larger ecological systems of which the areas and properties are part.

Further, there would be increased understanding of how decisions concerning regulation of lake levels can affect shoreline erosion rates and natural sand dune development while providing for safe navigation.

4. Management Coordination and Partnerships.

Coordination, communication, and cooperation among all town, county, state, and federal agencies, private organizations, volunteer groups, and landowners with responsibilities, interests, and authorities concerning the Dune and Wetland System would be ongoing and effective for the purpose of ensuring the most active and effective management of Dune and Wetland System resources and achievement of the Stewardship Vision. Those agencies, groups, and citizens would cooperate as stewardship partners in the preparation and implementation of resource management plans (see no. 11 below) and other initiatives to guide beneficial use and conservation of the Dune and Wetland System.

Figure 6-4: Dune walk-over in Lakeview WMA.

Through the efforts of the stewardship partners, the most effective application of local, state, and federal laws and regulations concerning use and conservation of Dune and Wetland System resources would be achieved, including but not limited to application of the State Environmental Quality Review Act (SEQRA) and the Coastal Erosion Hazard Areas Act (CEHAA).

5. Public Interest, Support, and Awareness.

The base of public support for coordinated resource management in the Dune and Wetland System would be expanded and maintained, including public support for: a) preparation and implementation of appropriate *resource management plans*; b) effective application of *laws and regulations* as needed; and c) achievement of *other stewardship initiatives*. Public officials and governmental agencies would encourage residents and visitors to express their concerns and ideas with regard to conditions and stewardship initiatives in

the Dune and Wetland System. Appropriate opportunities would be provided for the expression of all such concerns and ideas. In addition, residents and visitors would develop and demonstrate an awareness of how their personal actions can affect the Dune and Wetland System and they would act in a manner that contributes to effective stewardship of the system.

In the Stewardship Vision, new and more effective outreach programs to inform and educate residents and visitors concerning resource values and opportunities for personal stewardship initiatives would be prepared and implemented. Publications, special events, and environmental interpretation programs would be presented more effectively and otherwise better utilized to provide interesting, useful, and easily understandable information to the public.

6. Management Balance.

Private and governmental efforts to guide beneficial use and conservation of the Dune and Wetland System in the public interest would maintain an appropriate balance between use and conservation and among several broad goals of equal importance, including goals to: a) maintain the *public health, safety, and welfare*; b) protect and enhance *environmental quality*; c) provide opportunities for *recreation and other beneficial uses*; and d) encourage and support continued *residential and other private uses*.

Figure 6-5: Restored dune line at Sandy Island Beach State Park.

The concept of management balance would be reflected in the goals and policies of duly adopted resource management plans affecting the Dune and Wetland System (see no. 11 below) and in the decisions by agencies and groups with interests and responsibilities concerning the system. The management balance would serve to advance the national and New York State interests (set forth in the federal Coastal Zone Management Act and the New York Coastal Management Program, respectively) for promoting environmental conservation as well as the economic development of coastal resources.

When pursuing the appropriate balance between equally important goals for use and conservation of the Dune and Wetland System, it would be recognized that, due to the sensitivity of some resources, a balance accommodating both recreational activities and habitat conservation can not be achieved in all areas and at all times.

a. Public Health, Safety, and Welfare.

In the Stewardship Vision, use of the Dune and Wetland System would be planned and regulated as necessary to assure the most orderly and beneficial use of the system and to provide for the continued health, safety, and welfare of those who use, enjoy, and live in the system. The potential impacts of flooding and erosion would be addressed through appropriate measures (see no. 9 below); public safety would be maintained at shorefront park and beach areas and other locations providing opportunities for public access to the Dune and Wetland System; facilities and services to support effective response to emergency situations in the system would be available; and navigation safety would be maintained for all vessels using the Dune and Wetland System, including motorized and nonmotorized vessels navigating on and between North Pond (and other embayments in the system) and Lake Ontario.

b. Environmental Conservation and Enhancement.

The environmental quality, natural resources, and ecological functions associated with the Dune and Wetland System and the larger ecological systems encompassing the Dune and Wetland System, including the eastern Lake Ontario watershed, would be conserved and enhanced, in balance with other public purposes and beneficial uses. The natural integrity of the coastal barrier elements of the Dune and Wetland System, including the barrier beaches and sand dunes providing protection for the wetlands, embayments, and nearshore areas, would be maintained and, where feasible, restored. The natural and significant habitat for native fish, wildlife, and plant species in the Dune and Wetland System would also be maintained and enhanced. The highest reasonably attainable quality of surface water in the Dune and Wetland System would be achieved and maintained through reduction of all sources of pollution, including nonpoint sources of pollution (NPS pollution) in the eastern Lake Ontario watershed.

Figure 6-6: Interpretive sign at El Dorado Beach Preserve

c. Recreational Use.

Opportunities for active and passive recreational uses of the Dune and Wetland System would be maintained and enhanced, in a manner consistent with the carrying capacity of the system to support those uses in appropriate locations (see no. 8 below), and in balance with other public purposes and beneficial uses. Water-dependent uses and facilities that individually and collectively enhance the

environmental quality associated with the Dune and Wetland System, the local and regional economy, and the overall quality of life associated with the Dune and Wetland System would be encouraged, supported, and maintained, including but not limited to boating, fishing, and beach recreation activities. Visitors would be aware of the effect that their actions may have on Dune and Wetland System resources and act in a manner that avoids adverse impacts on the system.

d. Residential and Other Private Uses.

Residential areas in the Dune and Wetland System would continue to be recognized and protected as legitimate uses of the system. In addition, residential use and development would be consistent with the carrying capacity of the Dune and Wetland System to support that use and development in a safe and environmentally sound manner (see no. 8 below). In the Stewardship Vision, property owners would be aware of the effects that their actions may have on Dune and Wetland System resources and they would use and maintain their properties in a manner that enhances the resources and avoids significant adverse impacts. Decisions concerning use and conservation of the Dune and Wetland System would respect and protect the rights of property owners including the littoral/riparian rights of shorefront owners. Proposed uses of the Dune and Wetland System would be carefully planned, reviewed, and regulated to avoid any significant adverse impacts on natural processes and values and the quality of life in residential areas.

7. Sustainable Economic Benefits.

Figure 6-7: Black Pond WMA beach.

In the Stewardship Vision, opportunities for local and regional economic growth and community benefits associated with year-round uses of the Dune and Wetland System—including history-based and nature-based tourism, water-dependent recreational uses, other recreational uses, and environmental education—would be recognized and pursued, consistent with town and regional character and quality of life. That growth and those benefits would be in balance with other public purposes and beneficial uses of the Dune and Wetland System and in harmony with conservation and enhancement of the natural environment. It would be recognized that while the natural environment of the Dune and Wetland System provides opportunities for beneficial uses that provide important economic and social benefits, the natural resources and environmen-

tal quality of the system may be damaged or gradually ''used up'' by those same uses. As a result, decisions and actions affecting the Dune and Wetland System would emphasize the importance of attaining environmentally sustainable economic benefits that rely on but do not degrade the natural environment.

8. Understanding Resource Carrying Capacity.

In the Stewardship Vision, resource managers would have a greater understanding of the ''carrying capacity'' of the Dune and Wetland System to accommodate beneficial uses in a safe and environmentally sound manner. Stewardship partners, including agencies, organizations, residents, and visitors to the Dune and Wetland System, would appreciate the concept of resource carrying capacity when conducting their activities in the system or making decisions affecting the system. The partners would recognize that the carrying capacity of the coastal land and water resources of the Dune and Wetland System to accommodate recreational and other uses in a safe and environmentally sound manner is not unlimited and that such capacity is subject to change over time.

Decisions and actions affecting the Dune and Wetland System would also take into consideration cumulative impacts on the system's resources and the capacity of those resources to support development and recreational use without significant disruption of the natural environment. In accordance with the Stewardship Vision, it would be recognized and appreciated that cumulative impacts on environmental quality can result from individually minor but collectively significant actions taking place over a period of time.

9. Effective Shoreline Management.

Figure 6-8: North Pond inlet.

Public recognition of the dynamic nature of the Dune and Wetland System would be widespread and reflected in the development and application of effective plans and approaches for shoreline management. Planning for shore protection measures would recognize that the natural protective features of the coastal barrier environment of beaches and sand dunes can be diminished by structural approaches to shoreline stabilization and erosion control, including rock revetments and seawalls.

In accordance with the Stewardship Vision, natural forces would be allowed to continue to shape and modify the overall Dune and Wetland System. Structural measures intended to "fortify" the shoreline against the effects of natural forces and processes would generally be avoided and not constructed except in those instances where: a) no other reasonable alternative exists for protecting existing development; and b) the structures employed do not result in significant adverse impacts on adjacent properties and natural resources and values. Effective nonstructural erosion control and shore protection measures would be widespread in the Dune and Wetland System, including planting and placement of dune-stabilizing vegetation; relocation of threatened structures out of high risk areas where feasible; application of, and compliance with, effective and well-planned land-use controls; and enforcement of applicable laws and regulations, including the CEHAA.

10. Educational and Scientific Use.

In accordance with the Stewardship Vision, use of the Dune and Wetland System for educational and scientific purposes, in a manner consistent with the capacity of the natural environment to support those purposes, would be encouraged and expanded. The awareness and understanding of individuals and groups concerning the natural resources and values of the Dune and Wetland System would be increased through educational and scientific activities; those activities would also provide valuable information for science-based management decisions by the stewardship partners.

Scientific investigations and research initiatives, including initiatives by different organizations and educational institutions, would have practical applications for resource management purposes and be planned and coordinated to the greatest extent possible to increase their utility. Research priorities would be established by the stewardship partners. Results of scientific investigations and research initiatives would be published or otherwise effectively shared and disseminated to help ensure their value for resource management purposes.

Figure 6-9: Little Sandy Creek at North Pond.

In addition, environmental education programs and appropriately designed and located educational facilities would be established to attract visitors to the Dune and Wetland System on a year-round basis and would provide sustainable economic benefits of local and regional significance.

11. Informed and Effective Planning.

Town, state, and regional plans, including plans for specific properties, would be prepared to establish duly adopted public policies for guiding the beneficial use and conservation of the Dune and Wetland System. Those plans, which would address land and water uses in the system, would reflect the basic principles of the Stewardship Vision and serve to implement the vision, including its ideals for encouraging sustainable economic benefits. Plans would be prepared with substantial public input, reflect the general will of the citizens, and include provisions for amendment as needed to respond to changing conditions and circumstances.

Plans for specific areas within the Dune and Wetland System, including but not limited to the areas available for public use, would reflect recognition and understanding of how use and conservation of those areas may affect, or be affected by, the larger ecosystems of which the areas are part.

12. Effective Regulations to Guide Use and Development.

In accordance with the Stewardship Vision, local, state, and federal laws and regulations would be effectively applied to guide use and development in the Dune and Wetland System and minimize or eliminate any adverse impacts of that use and development; compliance with those laws and regulations would be the rule.

Figure 6-10: Lakeshore residential development.

Town boards and state agencies would make use of all available opportunities and authorizing legislation to ensure protection of the resource values provided by the Dune and Wetland System while providing appropriate opportunities for beneficial use and development. Willful and inadvertent violations of existing laws and regulations in the Dune and Wetland System, including but not limited to violations of the CEHAA, would be significantly reduced or eliminated. The effectiveness of existing laws and regulations would be evaluated and new and/or modified laws and regulations, including town land-use controls, would be considered, as necessary, to most effectively advance the Stewardship Vision.

13. Cultural Enrichment.

In the Stewardship Vision, Dune and Wetland System resources with cultural significance, including historic, scientific, and archaeological significance, would be recognized and protected. The existing character and cultural heritage associated with Lake Ontario and its eastern shore would be preserved in concert with promotion of local, regional, and state-wide tourism initiatives and development of year-round educational programs and appropriately designed and located educational facilities. (See no. 10 above.) Continuation of the traditional uses of the Dune and Wetland System region, including fishing, hunting, beach recreation, agriculture, and other uses would be encouraged, supported, and assured.

14. Personal Actions for Effective Stewardship.

All residents and visitors would be aware of the impacts their everyday activities can have on the natural environment of the Dune and Wetland System and demonstrate a strong personal commitment to stewardship. In the Stewardship Vision, all citizens, officials, agencies, and organizations with an interest or authority pertaining to the Dune and Wetland System would consider themselves responsible in some manner for care of the system; that care would be for the purpose of ensuring that the natural and economic values of the system are sustained for the benefit of future generations.

Figure 6-11: Restored dune at Sandy Island Beach State Park.

Adverse impacts on natural systems and values in the Dune and Wetland System caused by willful or inadvertent activities in violation of applicable laws and regulations, including but not limited to any significant adverse impacts on existing sand dunes, littoral processes, natural sand supplies, and water quality, would be reduced, avoided, or otherwise mitigated. That mitigation would occur through a combination of planning and educational initiatives; willful compliance with applicable laws and regulations; more effective enforcement of those laws and regulations as necessary; and other appropriate means embraced by all residents and visitors.

In addition, beneficial human impacts on the Dune and Wetland System would be widespread and effective, including personal actions contributing to enhancement, protection, and restoration of sand dunes and other resources.

15. Adequate Funds for Resource Management.

In the Stewardship Vision, adequate funds would be obtained and allocated to properly manage, maintain, and enhance the Dune and Wetland System (and the public facilities in the system) in the public interest and to otherwise advance the Stewardship Vision. Dedicated and reliable sources of funds to implement aspects of the vision would be established and maintained. All interested organizations and individuals would have the opportunity to contribute resources, including funds, services, and materials, that would be used exclusively for purposes of improving conditions in the Dune and Wetland System, managing system resources in the public interest, restoring and enhancing those resources to the extent practical and desirable, and encouraging and supporting beneficial use of the system.

16. Effective Response to Changing Conditions.

Conditions in the Dune and Wetland System, including the condition of its natural and developed features and the status and effectiveness of stewardship initiatives, would be monitored on an ongoing basis. Resource management plans, regulations, programs, and other initiatives would be amended or otherwise modified with public input to respond most effectively to changing conditions and circumstances, including conditions and circumstances regarding the physical features of the Dune and Wetland System and the institutional framework for managing the system. The organizational structures and missions of stakeholder organizations would be evaluated and modified over time to ensure the most effective advancement of the Stewardship Vision.

Figure 6-12: Shell debris from zebra mussels mixed with beach sand.

7

Setting Goals and Priorities for the Next Decade: A Strategy for Achieving the Stewardship Vision

One of the most significant findings to emerge from the study concerns the surprisingly high level of awareness on the part of local residents as well as government agencies and private organizations as to the uniqueness and importance of the eastern Lake Ontario sand dunes and barrier system. As a result, there is a tremendous opportunity to translate this concern and awareness into specific actions and measures that will serve to protect this resource for the use and enjoyment of future generations.

from *New York's Eastern Lake Ontario Sand Dunes: Resources, Problems and Management Guidelines*, 1989

NEW YORK'S EASTERN LAKE ONTARIO DUNE AND WETLAND SYSTEM
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SETTING GOALS AND PRIORITIES FOR THE NEXT DECADE: A STRATEGY FOR IMPLEMENTING THE STEWARDSHIP VISION

Cover Page Photo: Dune Walkover at Black Pond WMA

Setting Goals and Priorities for the Next Decade: A Strategy for Implementing the Stewardship Vision

This chapter presents a strategy for implementing the Stewardship Vision, set forth in chapter six, for resource conservation and beneficial use of the Eastern Lake Ontario Dune and Wetland System.

A strategy for advancing the public interest for conservation and beneficial use of the Dune and Wetland System was first developed through the guidelines and recommendations contained in the 1989 report *New York's Eastern Lake Ontario Sand Dunes: Resources, Problems and Management Guidelines* (Dunes Report) published by the New York State Department of State. Those guidelines and recommendations are directed toward cooperative, voluntary actions that can be undertaken by governmental agencies, private organizations, and concerned citizens. It was envisioned that the volunteer actions would help ensure future protection of the natural values of the Dune and Wetland System while providing appropriate opportunities for public access and recreational use.

Figure 7-1: North Pond inlet and south and north spits looking north.

Over the past 18 years, there has been much progress to advance the guidelines and recommendations of the 1989 Dunes Report. That progress is reflected in the accomplishments and ongoing initiatives described in chapter five of this 2007 report. These include but are not limited to: *stabilization of eroded sand dunes*; *public acquisition of previously degraded properties*; *scientific research to increase public understanding of natural processes*; *numerous education and outreach programs to develop public support and awareness*; *development and application of a variety of effective land management techniques*; and *provision of enhanced opportunities for recreational use of the Dune and Wetland System.*

The implementation strategy in this chapter is consistent with the guidelines and recommendations of the 1989 Dunes Report and is based, as that report is, on cooperative, voluntary actions by the agencies, organizations, and citizens with interests and authorities in the Dune and Wetland System, including members of The Ontario Dune Coalition (TODC). These agencies, organizations, and citizens, sometimes called stakeholders, are herein referred to as the stewardship partners.

When considering an implementation strategy in 2007 for achieving the Stewardship Vision, it should be recognized that an effective strategy must be pursued as an ongoing process that will continue to evolve over time, as conditions and circumstances change. The following elements of the implementation strategy are intended to begin and advance this vital process over the next ten years. Included is a ten-year plan consisting of several major and measurable initiatives to advance the Stewardship Vision.

Elements of the Implementation Strategy

The strategy for implementing the Stewardship Vision consists of the following elements. Elements 1 and 2 concerning promulgation and endorsement of the vision are the first priorities; the other elements are numbered for reference purposes and not to denote priority.

1. Present and Distribute the Stewardship Vision.

Dissemination of this Study Report, including the Stewardship Vision, to the widest possible audience of stakeholders and interested parties should be the first priority for implementing the vision. Through meetings, presentations, and other means, the Stewardship Vision, along with the report's other findings and recommendations, should be provided to persons with decision-making responsibilities in the Dune and Wetland System, including town, county, and state elected officials and the directors of resource management agencies and organizations. The report and vision should also be made available to the general public, including residents, landowners, and visitors in the Dune and Wetland System. In addition to making the report available to read on the Eastern Lake Ontario Dunes and Wetlands web site (www.nysgdunes.org) and providing copies in libraries, town halls, and other public locations, the stewardship partners should utilize other means for presenting and distributing the report and Stewardship Vision to the public. Consideration should be given to preparing summary brochures and/or other documents suitable for mass distribution, including distribution at public recreation areas and other locations in the Dune and Wetland System. Consideration should also be given to holding local public meetings to present the Stewardship Vision and hear public comments; presenting the vision at special events and meetings of community groups; and using newspaper, television, and other media to distribute information.

2. Endorse the Stewardship Vision.

The stewardship partners, including the towns, agencies, organizations, citizens, and businesses with interests and/or authorities in the Dune and Wetland System, should consider and review the Stewardship Vision set forth in chapter six of this report. Acting either individually or in concert, the partners should adopt or otherwise endorse the vision to give it formal standing as the policy of the endorsing agency or organization. To the extent possible, the partners should incorporate the principles of the vision into their programs and decisions affecting the Dune and Wetland System, including their applicable planning and/or regulatory programs. The partners should also consider the implementa-

tion strategy herein presented and, to the extent possible, incorporate its elements into their programs and decisions.

3. *Encourage and Support the Achievement of Economic Benefits Associated with Use of the Dune and Wetland System.*

In addition to advancing environmental conservation goals, resource management initiatives by the stewardship partners should encourage and support opportunities for local and regional economic growth and benefits that may be achieved through appropriate use of the Dune and Wetland System. Additional information concerning uses of the Dune and Wetland System and their existing and potential economic impacts and benefits should be assembled, analyzed, and distributed to assist economic development planning. Recreational opportunities, including opportunities for history- and nature-based tourism, should be promoted through publications and other initiatives, including county tourism promotions and local chamber of commerce programs. Consideration should be given to establishing new educational and recreational programs and appropriately designed and located facilities to attract visitors to the Dune and Wetland System on a year-round basis. (See no. 11 below.)

Figure 7-2: North Pond boating facilities.

4. *Emphasize Ecological Systems.*

Through their existing programs and new initiatives, the stewardship partners should emphasize the significance of ecological systems within the Dune and Wetland System and begin to address the relationship of the system to the eastern Lake Ontario watershed and the ''sub-watersheds'' associated with the different tributaries draining into the Dune and Wetland System. Those tributaries include, but are not limited to, the Salmon River, Deer Creek, Little Sandy Creek, Skinner Creek, South Sandy Creek, Sandy Creek, and Stony Creek. Stewardship initiatives should continue to evolve and progress from their initial focus on sand dunes to also address relevant issues concerning management of the larger ecological systems of which the sand dunes are part. Issues concerning conservation and enhancement of fish and wildlife habitat and control of invasive and nuisance plant and wildlife species should be addressed. In addition, when considering the ecological systems encompassing the Dune and Wetland System, it should be recognized and emphasized that human activities are an integral part of those systems.

5. Encourage and Support Resource Management Plans.

In addition to advocating natural resource conservation and beneficial use of the Dune and Wetland System through research, public outreach, and education, the stewardship partners should now encourage and support the preparation, adoption, and implementation of formal plans for land and water use and resource management. Those plans should be science-based and reflect the knowledge of natural systems gained through completed and ongoing research initiatives concerning the Dune and Wetland System; they should also reflect awareness of the opportunities for economic growth and benefits associated with appropriate use of the system.

Figure 7-3: Deer Creek in the Deer Creek WMA.

Preparation of town plans addressing land and water use in the Dune and Wetland System should be encouraged along with management plans for state-owned and privately owned properties, including the state parks (Southwick Beach and Sandy Island Beach) and wildlife management areas (Black Pond, Lakeview, and Deer Creek) and properties managed as natural areas (El Dorado Beach and Sandy Pond Beach). Priority attention for planning purposes should be given to addressing issues concerning maintenance of the North Pond inlet connecting North Pond (North Sandy Pond) with Lake Ontario (see no. 16 below) and updating the Sandy Pond Resource Management Study for inclusion by the Town of Sandy Creek in an appropriate town plan (see no. 17 below).

6. Continue to Emphasize Personal Stewardship Initiatives.

The stewardship partners should not lose focus on the importance of continuing to advance basic stewardship activities including, for example, public outreach and education efforts, dune stabilization projects, monitoring programs, and personal initiatives by homeowners and visitors to the Dune and Wetland System. It should be recognized and emphasized that stewardship does not end with the success of any one project or initiative but is an inherently ongoing process to be carried out in perpetuity. Attention should be given to maintaining the organizations, interest, information, and long-term commitment needed for effective, ongoing stewardship. In addition, it should be recognized that an important key to achieving the Stewardship Vision is an increased level of awareness and support on the part of private landowners in the Dune and Wetland System.

Public outreach and education efforts should emphasize that personal stewardship initiatives begin with recognition of the impacts that everyday activities, including property maintenance and development activities as well as recreational pursuits, can have on Dune and Wetland System resources.

Figure 7-4: El Dorado Beach Preserve and Black Pond WMA.

The stewardship partners should stress the point that seemingly minor actions can, when added over time to other, similar actions, have significantly adverse cumulative impacts on the Dune and Wetland System and those who reside in or visit the system. Public outreach and education efforts should provide information on how landowners and visitors can act in ways that avoid or significantly reduce adverse impacts, by not trampling on protective beach grass, for example, and not contributing to nonpoint source pollution. Outreach and education efforts should also describe specific opportunities for actively advancing stewardship initiatives through, for example, planting protective beach grass, reporting observed violations of environmental regulations, volunteering for environmental enhancement projects, and attending public meetings to express ideas and concerns.

7. ***Maintain and Expand the Involvement of Volunteers***

Continued volunteer support from groups and individuals should be a key element of the strategy for implementing the Stewardship Vision. Governmental agencies and private organizations should encourage and support volunteer efforts to advance the vision. Those agencies and organizations should demonstrate the appropriate management skills needed to maintain the enthusiasm and effectiveness of the volunteers they may work with. Establishment of volunteer groups with specific, agreed-upon missions regarding specific properties, including the state-owned lands, throughout the Dune and Wetland System should be encouraged by the agencies responsible for those properties. The agencies and volunteer groups should formalize their relationships, including their respective responsibilities, through written agreements where necessary.

8. *Pursue Project Funding through Existing Sources.*

Figure 7-5: South Sandy Creek in the Lakeview WMA.

The stewardship partners should continue to pursue all appropriate sources of funds to support stewardship initiatives, including but not limited to: planning initiatives and feasibility studies; projects to construct public recreation facilities; and projects to monitor shoreline changes and other conditions in the Dune and Wetland System. Preparing a management plan for the North Pond area and inlet, for example, may require that professional services not available locally must be retained. Funds for that purpose should be pursued through existing State of New York grant programs and other governmental and private sources. The New York State Environmental Protection Fund, funding programs administered by the Department of Environmental Conservation, and the federal Great Lakes Protection Fund are examples of existing funding sources that may be pursued by the stewardship partners who should continue to donate in-kind services where needed to help provide the local ''match'' required for available grants.

9. *Establish New Funding Source(s).*

Figure 7-6: Water birds in the Sandy Pond Beach Natural Area.

New approaches for funding resource stewardship projects in the Dune and Wetland System, including educational and public outreach projects, should be pursued. A mechanism should be established whereby interested organizations and individuals will have the opportunity to contribute funds that will be used exclusively for stewardship projects. Consideration should be given to establishing a new, not-for-profit entity with the ability to receive funds and provide grants to governmental agencies and not-for-profit organizations and to private individuals and organizations pursuing stewardship initiatives within the Dune

and Wetland System. Based on information developed for the "Eastern Lake Ontario Coastal Watershed Restoration Project," it is anticipated that establishment of such an entity may be feasible and that sufficient resources may be provided from private sources to establish a new and viable source of funds for projects to help advance the Stewardship Vision. It should be recognized, however, that a long-term commitment will be needed to establish this new funding source and that several years of fund-raising will likely be required to build sufficient resources to enable disbursement of meaningful amounts.

10. Pursue Special Coastal Area Designation.

The feasibility of a special coastal area designation for the Dune and Wetland System to be achieved through new state legislation, an amendment to the New York State Coastal Management Program, or an appropriate federal program such as the National Estuary Research Reserve Program should be evaluated. Such designation should be considered for the purpose of advancing the Stewardship Vision and improving opportunities for obtaining funds for resource management and economic development purposes in the Dune and Wetland System. It should be considered whether or not such a designation may be expected to result in local and regional economic and conservation benefits without adding significant local mandates and/or burdens.

Figure 7-7: Kiosk displaying information on natural history at Southwick Beach State Park.

11. Pursue Establishment of Year-Round Outdoor Sports and Environmental Awareness Center.

The feasibility of establishing a multi-purpose educational and recreational facility providing opportunities for outdoor sports and environmental education on a four-season basis for adults and children, as previously suggested by the New York State Department of State and considered in an evaluation by Seaway Trail, Inc., should be re-evaluated. Consideration should be given to the potential economic benefits that could be generated by such a facility that would attract additional visitors to the region. The potential recreational and educational activities and programs considered should be consistent with, and representative of, the cultural history of the area and the unique ecology of the Dune and Wetland System.

12. Conduct System-Wide Evaluation of Plant, Fish, and Wildlife Species and Habitats.

Plant, fish, and wildlife species and habitats throughout the Dune and Wetland System should be evaluated to: a) identify species and habitat of special concern; b) identify existing and potential threats to species and habitat; and c) develop and implement plans and methods to maintain and enhance plant, fish, and wildlife habitats, including appropriate measures for control of invasive species. Included in this evaluation should be an assessment of the habitat requirements of all shoreline-using birds, including but not limited to Arctic migrating shorebirds.

The stewardship partners should evaluate the feasibility of establishing a protected habitat for Arctic migrating shorebirds. Consideration should be given to creating a managed wetland area, inland of the Lake Ontario shoreline and west of Route 3, that would provide suitable habitat while avoiding the potential conflicts between migrating birds and beach recreation activities that exist on the shoreline. Appropriate opportunities for habitat observation for recreational, educational, and scientific purposes should be considered.

13. Adapt to Changing Conditions and Circumstances.

Agencies and organizations with interests and authorities concerning the Dune and Wetland System, including the individual members of The Ontario Dune Coalition and TODC itself, should pursue ''adaptive management'' strategies. These stewardship partners should regularly evaluate the effectiveness of their plans, programs, and organizational structures and consider any changes that may be needed to maintain and enhance effectiveness. The stewardship partners should evaluate their strengths, weaknesses, and opportunities and consider appropriate changes that may be needed to most effectively endorse and implement the Stewardship Vision and respond to changing conditions and circumstances in the Dune and Wetland System.

14. Continue to Advance the Development, Maintenance, and Sharing of Information Concerning the Dune and Wetland System.

As a basic element of ongoing stewardship (see no. 6 above), the stewardship partners should continue to encourage and support the development, maintenance, synthesis, and sharing of information concerning the Dune and Wetland System. Lessons learned through dune stabilization work (including beach grass planting techniques) and other conservation initiatives, including initiatives encouraged and supported by The Ontario Dune Coalition, should be shared with those planning similar projects in other jurisdictions.

Information should be shared with agencies and organizations involved with management of sand dunes and related coastal resources in other Great Lakes states and Canadian provinces. Continued fundamental research regarding coastal processes affecting the Dune

and Wetland System should be encouraged for the purpose of providing information useful for science-based management decisions and educational purposes. Information should be shared through interpretive signs placed throughout the Dune and Wetland System, publications for general distribution, and other appropriate means.

15. Continue to Reduce Human Impacts on Natural Systems, Resources, and Values.

Stewardship partners should continue to focus their attention on reducing and avoiding adverse human impacts on the Dune and Wetland System, including impacts caused by both inadvertent and willful actions that may damage natural systems, resources, and values. When describing the importance of avoiding adverse human impacts, the partners should emphasize the finite nature of the existing littoral sand supply and the sensitivity of aquatic resources. Initiatives should include continued educational programs directed at shorefront property owners and recreational users of the Dune and Wetland System as well as studies focused on specific areas including the North Pond inlet and the Black Pond and Deer Creek wildlife management areas where management decisions may be expected to have particularly significant long-term impacts on the system.

When pursuing new and enhanced educational programs, it should be recognized that such programs alone can not result in the elimination of adverse impacts on the Dune and Wetland System caused by inadvertent and willful human actions. As a result, the stewardship partners should continue to encourage the most effective and consistent enforcement of the laws and regulations affecting development and use of the system.

Figure 7-8: Erosion of high dunes caused by human impacts.

In addition, research should be directed at increasing understanding of resource carrying capacity and cumulative impacts on the Dune and Wetland System. Policies reflecting an awareness of carrying capacity and cumulative impact considerations should be included in local- and state-prepared resource management plans. (See no. 5 above.) Priority attention should be given to carrying capacity assessments in the Black Pond and Deer Creek wildlife management areas and to planning for inlet maintenance at North Pond (see no. 16 below).

16. Prepare a Management Plan for the North Pond Inlet.

A study should be conducted to assess the costs and benefits of dredging and other methods of maintaining the existing inlet channel and any future inlet that may be formed providing a navigable connection between North Pond and Lake Ontario. The study should develop information for decision-making concerning inlet maintenance and beneficial use of dredged material from the inlet channel, including use of that material for beach nourishment. The study should also provide information to facilitate decision-making to address any future sudden or gradual changes in inlet geomorphology.

In addition to addressing navigation-related issues, the study should consider water quality and other environmental issues, including issues that would be associated with reduced or increased exchange of water between North Pond and Lake Ontario through the existing or any future inlet. Information developed through the study should be used to prepare an inlet management plan for adoption as town policy of the Town of Sandy Creek. (The Town of Ellisburg should also participate in the formation of the inlet management plan.) Such policy should be considered for inclusion in any Town of Sandy Creek plan that may result from updating of the Sandy Pond Resource Management Study (see no. 17 below). In the interim, timely maintenance dredging of the inlet channel as necessary to maintain safe navigation and as authorized by existing state and federal permits should be encouraged and supported.

17. Update and Adopt the Sandy Pond Resource Management Study.

The Town of Sandy Creek, with technical and other assistance from the stewardship partners, should revisit the 1989 Sandy Pond [North Pond] Resource Management Study conducted by the town's Sandy Pond Resource Management Committee. The study's proposed goals, objectives, policies, and recommendations for beneficial use and natural resource protection in the North Pond area were never formally adopted by the town. The provisions were prepared for inclusion in a comprehensive Town Plan, Local Waterfront Revitalization Program, or town Harbor Management Plan. The study's findings and proposals should be reviewed, updated where necessary (to include policies for inlet management, for example), and incorporated in an appropriate town planning document.

Figure 7-9: North Pond looking south.

18. Enhance Local Capabilities for Reviewing Development Proposals.

Town officials, boards, and agencies should be prepared to effectively review any future plans for significant new or modified uses on properties located in or otherwise affecting the Dune and Wetland System. The purpose of that review should be to guide the most beneficial use and/or development of those properties, consistent with town goals and requirements, and to avoid or mitigate any significant adverse impacts that might otherwise affect the Dune and Wetland System. The towns of Richland, Sandy Creek, and Ellisburg should evaluate and enhance as necessary their town plans, codes, and technical capabilities for reviewing proposed projects affecting the Dune and Wetland System. Such evaluation and enhancement should be achieved with assistance from appropriate county and state agencies.

19. Improve Procedures for Reporting and Recording Violations; Improve Compliance with Existing Regulations.

Procedures should be established to enable homeowners, visitors, and other stewardship partners to effectively report—to the appropriate agency—any observed violations of local, state, and federal laws, regulations, and ordinances concerning use of the land and water resources in the Dune and Wetland System. Widespread public awareness of those procedures should be achieved, along with awareness of the activities that constitute violations, and the means for reporting them.

Figure 7-10: Outlet of South Sandy and Sandy Creeks in the Lakeview WMA.

Particular attention should be given to any work in violation of the Coastal Erosion Hazards Area Act and any unauthorized construction or other work in navigable waters or wetlands. Applicable laws, regulations, and ordinances should be posted in appropriate locations. A data base of reported violations should be established to provide useful information concerning patterns of violations and the effectiveness of efforts to address those violations. The stewardship partners should continue to encourage and support: a) prompt response by the appropriate regulatory and law enforcement agencies to all reported violations; and b) effective and consistent enforcement of the laws and regulations affecting use and development in the Dune and Wetland System.

20. *Establish a Program to Monitor Shoreline Change.*

An effective, long-term program to monitor, record, and analyze changes and trends affecting the dynamic shoreline of the Dune and Wetland System should be established. That program should include: a) establishment of fixed sites for developing a photographic record of key Dune and Wetland System features; b) regular assembly and review of aerial photographs; c) use of Global Positioning System (GPS) instruments to record shoreline features to be plotted in plan view; and d) development of baseline mapping that can be used to depict and measure trends concerning shoreline size, shape, and relative position. To the extent practical, volunteers should be utilized to collect shoreline change data. Collected data should be utilized to identify trends and problems and to provide data useful for resource management decisions.

21. *Establish and Implement a Ten-Year Plan for Advancing the Stewardship Vision*

A ten-year plan for advancing the Stewardship Vision should be established by the stewardship partners involving several major and measurable action items from the above-described implementation elements. These items should include:

A. **Presentation and Distribution of the Stewardship Vision**. Achieve broad dissemination of the Stewardship Vision, to the widest possible audience of stakeholders and interested parties, giving special attention to presenting and distributing the vision to persons with decision-making responsibilities in the Dune and Wetland System.

B. **Endorsement of the Vision.** Achieve endorsement of the Stewardship Vision by the stewardship partners in a manner appropriate to each of the individual towns, agencies, organizations, businesses, and individuals with interests and/or authorities in the Dune and Wetland System.

C. **Preparation of the North Pond Inlet Management Plan.** Conduct the North Pond Inlet Management Study to provide information for decision-making regarding inlet maintenance and other issues. Apply information from the study to prepare an inlet management plan for adoption as town policy of the Town of Sandy Creek.

D. **Adoption of the Sandy Pond Resource Management Study.** Update the Sandy Pond [North Pond] Resource Management Study and adopt the study's recommendations, along with recommendations developed for inlet management, as the policy of the Town of Sandy Creek.

E. **Preparation of Management Plans for Public Areas.** Prepare, adopt, implement, and update as necessary management plans for all lands available for public use in the Dune and Wetland System including state-owned properties and properties owned by nongovernmental organizations and available for public use.

Figure 7-11: Sandy Island Beach State Park.

F. **Evaluation of the Feasibility of Special Coastal Area Designation.** Evaluate the feasibility of applying a special area designation to the Dune and Wetland System through state legislation, an amendment to the New York Coastal Management Program, or appropriate federal program. Accomplish such designation if it is determined to be feasible and desirable; if public benefits are expected; and if such designation will not infringe on private property rights.

G. **Evaluation of the Feasibility of Outdoor Sports and Environmental Awareness Facility.** Evaluate the feasibility of developing a year-round outdoor sports and environmental awareness center to attract visitors to the Dune and Wetland System; accomplish such development if determined to be feasible.

H. **Evaluation of Species and Habitat on System-wide Basis.** Evaluate plant, fish, and wildlife species and habitat throughout the Dune and Wetland System to identify species and habitat of special concern and existing and potential threats to species and habitat and to develop and implement plans and methods to maintain and enhance habitat.

I. **Preparation of a Plan for Controlling Invasive Species.** Establish priorities for controlling invasive plant and animal species; prepare a plan for achieving effective control.

J. **Evaluation of the Feasibility of a Managed Habitat for Migrating Shorebirds.** Evaluate the feasibility of establishing a protected and managed wetland habitat for shorebirds inland of the Lake Ontario shoreline; accomplish such establishment if determined to be feasible.

K. **Establishment of a Dedicated Source of Funds.** Establish a dedicated local source of funds for supporting projects that may be proposed by local agencies, organizations, and individuals for the purpose of advancing the Stewardship Vision.

L. **Enhancement of Project Review Capabilities.** Review town plans, codes, and technical capabilities for evaluating proposed projects in the area west of Route 3 in the Dune and Wetland System; enhance local capabilities as necessary.

M. **Improvement of Procedures for Reporting Violations.** Establish improved procedures for effective reporting of any observed violations of local, state, and federal laws, regulations, and ordinances concerning use and development in the Dune and Wetland System; achieve widespread awareness of those procedures; establish data base of reported violations.

N. **Establishment of a Program for Monitoring Shoreline Change.** Establish a program utilizing volunteers to monitor, record, and analyze changes and trends affecting the shoreline of the Dune and Wetland System.

Figure 7-12: "The Sheltering Dunes."