INTERPRETIVE RECOMMENDATIONS FOR THE EASTERN LAKE ONTARIO SAND DUNE AND WETLAND AREA

Prepared for

NEW YORK SEA GRANT
By

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I - INTRODUCTION

The eastern Lake Ontario coastal barrier system is approximately 17 miles long and contains beaches, sand dunes, wetlands, and ponds (Figure 1). Of this 17 miles, approximately 7 miles (41%) is publicly owned. The remaining 10 miles of the coastal barrier system consists of vacation-cottage communities, campgrounds, trailer parks, and a nature preserve.

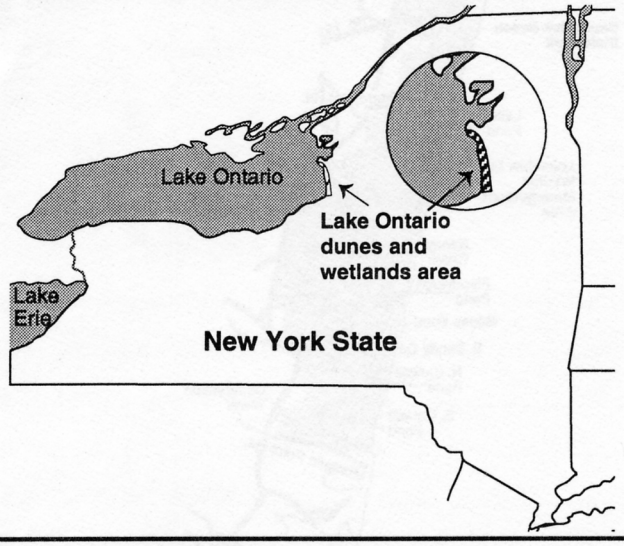

Figure 1. Map of New York state with the dune and wetland area indicated.

New York Sea Grant, in conjunction with The Ontario Dune Coalition (TODC), determined the need for developing recommendations for interpretation for the four New York state-owned properties in this area:

1. Black Pond Wildlife Management Area (WMA), a dune and wetland area managed by the NYS Department of Environmental Conservation (DEC)-Region 6;
2. Southwick Beach State Park, a coastal area managed by NYS Office of Parks, Recreation, and Historic Preservation (OPRHP)-Thousand Islands Region;
3. Lakeview Marsh WMA, a dune and wetland area managed by DEC-Region 6; and
4. Deer Creek WMA, a dune and wetland area managed by DEC-Region 7.

The four state-owned properties are accessible by car and boat. The major vehicle and boat access points to the sand dune and wetland area are shown in Figure 2.

Previous literature supports the idea of developing interpretation for the dune and wetland areas. A study of the eastern Lake Ontario sand dunes (Johnston and Associates, 1989) notes as management problems the increasing recreational use and the lack of public awareness and education about the dune environment. The *Oswego-Eastern Shore Communities Tourism Development Plan* (Brown et al., 1990) recommends the development of thematic interpretation and access to these areas while managing for visitors' environmental impact.

In addition, several recent SUNY College of Environmental Science and Forestry (ESF) projects have been done for two of these areas: Southwick Beach State Park and Lakeview Marsh WMA. A feasibility study and concept plan for an interpretive center was developed by T. Barney (1991). This study has been

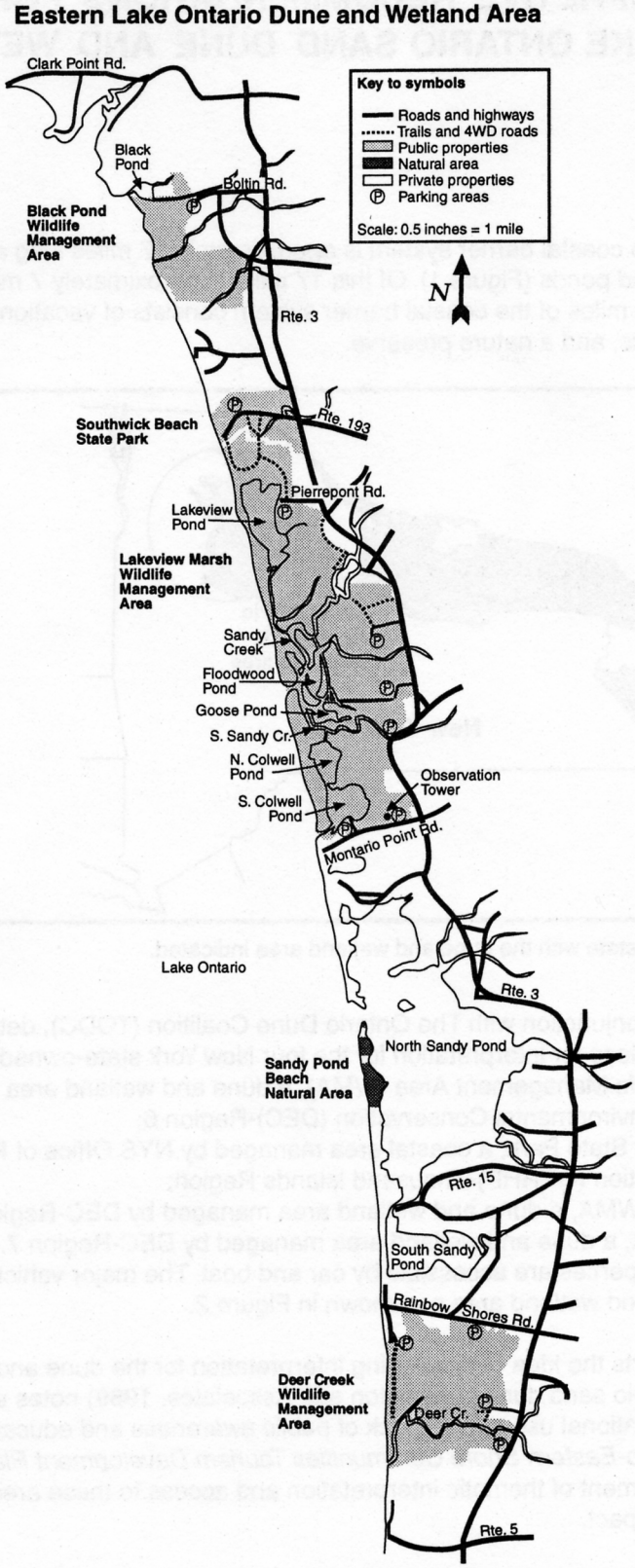

Figure 2. Map of eastern Lake Ontario sand dune and wetland area with major access points indicated (scale: 0.4 inches = 1 mile).

reviewed and, where appropriate, incorporated into this new interpretive plan. The *Dune Trail Interpretive Guide* (Ravenscroft, 1990) was developed for the Lakeview/Southwick trail system. Information on recreational usage (Schrader, 1989) and a study on the effects of recreation on the dune vegetation (Bonanno, 1992) have been valuable for estimating the ability of the dune and wetland areas to absorb additional recreational development. The brochure *Our Lake Ontario Sand Dunes: Their Value and Protection* is being updated by another ESF student and should be completed by 1995.

II - INTERPRETATION FOR EASTERN LAKE ONTARIO SAND DUNES AND WETLANDS

Priorities for the area's interpretation were determined from discussions during the June 5, 1994, TODC meeting and subsequent meetings with the DEC and the OPRHP. Interpretation designs given high priority were developed first, along with supporting infrastructure, and are described below. Table 1 (pages 14 and 15) contains this prioritized list.

The proposed interpretation includes the development of informational and educational kiosks and signs, a guide with area maps and access information, and the expansion of existing trails with interpretive signs. A centralized interpretive center for the entire area and an on-site interpreter should be considered at a future time. No audio, video, or other electronic components will be developed for these areas because they would not be feasible without a sheltered interpretive center. The recommended interpretive signs and kiosks will be outdoors and must be able to withstand the harsh Lake Ontario weather.

THEME

The first step in developing an interpretive plan is the development of an interpretive theme (Table 1). The overall recommended theme for this program is: "With a little understanding and care, the sand dunes and wetlands of eastern Lake Ontario can be preserved for both wildlife and people." The aim of this theme is to educate and inform visitors about sand dunes and wetlands, to indicate accessible areas, and to promote nondestructive use of these areas.

EROSION-PREVENTION SIGNS

High priority was given to developing interpretation to keep visitors off the dunes. Three small signs have been developed, which could be placed on fencing along the beach throughout the dune area (Table 1). These are 8-1/2" x 11" fiberglass-embedded signs mounted on aluminum posts with backing plate (the top end of the hollow post is capped to prevent water accumulation).

Below is the title, wording, and suggested illustration for each erosion-prevention sign. The typeface Helvetica is recommended for the signs. Type sizes to be used on the panels will be: titles - 48 point and the body of the text - 24 point. Bold and italics will be used where indicated below.

1. Sign: **Dune Erosion** - Recommend continued use of the DEC sign presently being used. If additional signs are needed, the following is suggested.

Wording: **Dunes Are Fragile!** (Title)
Foot and vehicle traffic on the dunes damages the beach grass which holds the sand in place. Please stay off the dunes!

Illustration: Beach grass

2. Sign: **Poison Ivy**

Wording: **Poison Ivy Alert!** (Title)
Poison ivy grows here. Avoid touching it or clothing that has touched it.

Illustration: Poison ivy stem with leaves and berries

3. Sign: **Dune Blowout**

Wording: **Dune Blowout!** (Title)
These gaping holes form when the wind erodes dunes damaged by foot or vehicle traffic. Please keep off!

Illustration: Dune blowout

KIOSKS

The installation of interpretive kiosks is recommended for seven major sand dune and wetland access points. Since most visitors enter or exit from these locations, interpretation at these points would be very effective. Kiosks are recommended for the following locations:

1. Southwick Beach State Park/Lakeview Marsh WMA beach access;
2. Southwick Beach State Park trailhead;
3. Lakeview Marsh WMA trailhead at Pierrepont Place;
4. Deer Creek WMA northern beach access;
5. Black Pond WMA northern beach access;
6. Black Pond WMA Boltin Road access; and
7. Southwick Beach State Park lookout/concession area.

The first three locations on the above list are the most heavily used and have been given high priority for installing a kiosk (Table 1). The remaining kiosks could be built at a later date when funds are available. To decrease the cost, the total number of copies for each kiosk panel should be printed and stored until the kiosks can be built. The placement of these kiosks is discussed in Section III - Sites.

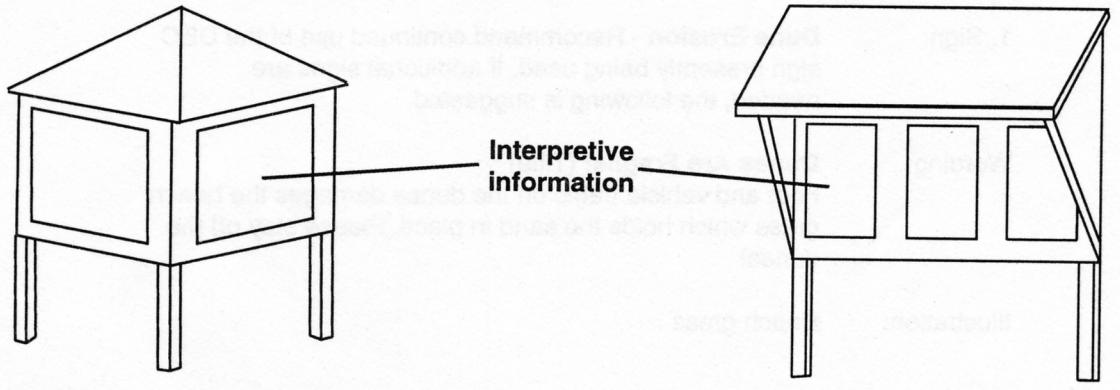

Figure 3. Sketch of two recommended kiosks: three-sided kiosk (on left) and flat kiosk (on right)

Two types of kiosks are being considered for the area (Figure 3): 1) a three-sided kiosk similar to the Seaway Trail kiosks presently being used at several locations in the area, and 2) a large, flat display kiosk with an overhang. The second option would be used in locations where the visitor is not able to walk around the kiosk.

The following is recommended for each kiosk:

1. One or two panels interpreting the sand dune and wetland ecosystem;
2. An area map with boundaries, trails, access points, canoe routes, swimming, picnic, and parking areas indicated; and
3. DEC and/or OPRHP rules and regulations.

Below is the title, wording, size, suggested illustration, and, where appropriate, the subtheme for each panel of the kiosk. The typeface Helvetica is recommended for the panels. Type sizes to be used on the panels will be: titles - 72 point; subtitles - 48 point; body of the text - 24 point; and captions - 18 point. Bold and underline will be used where indicated.

1. Panel: **Dune and Wetland Ecology Panel**

Subtheme: The beach, sand dunes, and wetlands support a diversity of life.

Wording: **Look at All That Life!** (Title)
Many different plants and animals live along the beach, and in the dunes and wetlands. Listed below are some of the wildlife living here.

BEACH

Birds
- killdeer
- ring billed herring gull
- black tern
- Caspian tern

Plants
- searocket
- beach clotbur

Other Animals
- zebra mussel
- snapping turtle

DUNES

Plants
- beach grass
- beach pea
- poison ivy
- dune willow
- eastern cottonwood

Birds
- yellow warbler
- song sparrow

Insects
- spiders
- ants
- ant lion

WETLANDS

Plants
- cattail
- water lily
- sedges

Birds
- black tern
- wood duck
- great blue heron
- American bittern

Other Animals
- northern leopard frog
- muskrat
- carp
- beaver

Illustration: Sketch of dune area from beach to wetland; categories to line up below or fit above the respective areas of drawing

2. Panel: **Rules and Regulations Panel**

Wording: **Help Protect Our Dunes and Wetlands!** (Title)

- Stay off the dunes.
- Picnic only at Southwick Beach.
- Swim only at Southwick Beach with a lifeguard.
- Stay on designated trails.
- Take out whatever you bring in.
- Leave everything you find (except litter).
- Hunt and fish away from the dunes.
- Make fires only in designated areas.
- Camp only at Southwick Beach.
- Land boats only in designated areas.

3. Panel: **Dune Erosion Panel**

Subtheme: Sand dunes are very fragile and easily eroded.

Wording: **Dune Erosion: One Grain at a Time** (Title)
Sand dunes are very fragile and easily eroded. Step on them, sit on them, or pick the beach grass and they will not survive long. Where there is no beach grass or other plants holding the dune together, the sand is loose and easily blown away.

What can I do? (Subtitle)
Please stay on designated trails, on the dune walkover, and out of the dunes!

Illustration: Dune walkover

4. Panel: **Habitat Diversity Panel**

Subtheme: There are many different types of habitats along the Lake Ontario shoreline.

Wording: **Many Places to Live** (Title)
The Lake Ontario coast has many types of habitats (areas to live in) from sand and pebble beaches to muddy wetlands, streams, ponds, and wooded forests. The Filmore Brook/Lake Ontario Dune Trail will guide you through these.

How have the different plants and animals adapted or become specialized to these different habitats? Beach grass continues to grow even if covered in sand. Cattails have special airways in their stems that bring oxygen down to their roots since they live in wetland soil that has no oxygen. Ducks and beavers have webbed feet so they can swim.

Illustration: Duck swimming along surface, half underwater and half above

INTERPRETIVE SIGNS

Several interpretive and informational signs have been designed for use throughout the sand dune and wetland areas. Possible locations for these signs are discussed in Section III - Sites.

Fiberglass-embedded signs mounted on rustic wooden stands are recommended. The wooden base for the signs will be designed with the rustic nature of the area in mind and be consistent with the planned kiosks and any informational signs already on site. The signs should be removable for winter storage. To decrease the cost of printing, the total number of copies of each sign should be printed at the same time and stored until funds are available for base materials and installation.

The title, wording, size, suggested illustration, and the subtheme for each sign is given below. The typeface Helvetica is recommended for the signs. Type sizes to be used on the signs will be: titles - 72 point; subtitles - 48 point; body of text - 24 point; and captions - 18 point. Bold will be used where indicated below.

1. Sign: **Dune and Wetland Ecology**

Subtheme: Lake Ontario's sand dunes and wetlands are ever-changing natural resources.

Wording: **Dynamic Duo** (Title)
Sand dunes and wetlands are part of Lake Ontario's ever-changing coastal barrier system. Why is it called a barrier system? Because the dunes act as a barrier that shelters the wetlands from flooding and harsh weather. The wetlands, in turn, protect the upland farms, homes, and woods.

Sand dunes grow and change as windblown sand is trapped by plants. Wetlands become more lush as water levels change, and plants die and decay into the soil. Dunes and wetlands are also a rich storehouse of plants and wildlife, from shore birds and cottonwood to egrets and duck weed.

Illustration: Cross section of a high dune with wetlands behind

2. Sign: **Lake Ontario Ecology**

Subtheme: Lake Ontario is one of the five Great Lakes in North America.

Wording: **What Makes This Lake So Great?** (Title)
Lake Ontario is so big you can't even see the other side! There are five Great Lakes of varying sizes and depths in North America: Superior, Michigan, Huron, Erie, and Ontario. Lake Ontario is the smallest, but not the shallowest (Lake Erie is). Lake Ontario has about a quarter of the surface area and half the depth of Lake Superior.

Near the Great Lakes, the air is actually slightly warmer than further inland. The water in the lakes holds in heat, which warms the air. Because this warm air is more humid, a lot of rain and snow (called "lake effect" precipitation) fall in this area.

Illustration: Map of Great Lakes region or satellite photo

3. Sign: **Dune Ecology**

Subtheme: Sand dunes are held together by plants.

Wording: **Much More Than a Pile of Sand** (Title)
At first glance, sand dunes seem to be long ridges of wind-blown sand. But look again and you'll see that the sand on shore is held together by plants. One of these, American beach grass, has leaves that trap the sand and branching roots that prevent the sand from blowing away. When covered, beach grass grows up through the sand and sprouts new roots that anchor the sand.

As the dunes get larger and more stable, different plants such as artemisia, eastern cottonwood, poison ivy, and sand dune willow take root and add to the staying power of the dune.

Illustration: Beach grass, artemisia and/or eastern cottonwood

4. Sign: **Wetland Ecology**

Subtheme: Wetlands are an important natural resource.

Wording: **Wonderful 'n Wet** (Title)
Behind the dunes of Lake Ontario, you will find marshes, swamps, bogs, and other water-logged areas. These wetlands are important and beautiful natural resources.

Wetlands help to: 1) improve water quality; 2) reduce flood and storm damage; 3) provide natural habitat for fish, plants, and animals; and 4) provide an area for recreational activities such as boating, hunting, and bird watching.

Illustration: Riverbank with cattails and sedges

4. Sign: **Field Ecology**

Subtheme: Many birds live along the edges of fields, hedges, and open woods.

Wording: **Living On The Edge** (Title)
Think living on the edge can be dangerous? Some birds, including the eastern bluebird, ruffed grouse, American goldfinch, and northern cardinal actually make their homes on the edge ... the edge of woods and fields, that is!

The edges are the best of two habitats — open and sheltered. Open, grassy areas are important places for birds to hunt and gather seeds. Sheltered, wooded areas provide places for birds to build nests, hide from predators, and find shelter from bad weather.

Illustration: Edge of woods opening up into field; outline of bird flying from woods

6. Sign: **Observation Tower View**

Subtheme: A better understanding of the benefits of dunes and wetlands can be gained by viewing the area from a distance.

Wording: **Tapestry of Life** (Title)
Look around and what do you see? A crazy quilt of different colors, textures, and shapes. To the west you can see Lake Ontario beaches and dunes; to the east, the upland woods and farm fields; and in between, the marshes and wetlands.

From this distance, you can almost see how the dunes act as barrier or buffer, protecting inland areas from high water, waves, winds, or bad weather coming across Lake Ontario. The wetlands, on the other hand, act like a sponge, holding in water and preventing flooding of upland woods, fields, and homes.

Illustration: View from the observation tower with an arrow pointing north

7. Sign: **Bank Swallow**

Subtheme: Bank swallows nest in riverbanks and can be easily disturbed by people.

Wording: **Don't Bank Here!** (Title)
A colony, or group, of bank swallows is living in the steep sides of these dunes and they don't like visitors! Bank swallows build their nests by digging or burrowing into the cliff. When disturbed they leave the nest, endangering their young. Look for a small, brown bird with a white breast, a brown band across its chest, and a forked tail.

Please do not walk in or disturb this area!

Illustration: Bank swallows going into cliff nest

GUIDEBOOK

An interpretive guidebook of the area, *Sand, Wind, and Water: Lake Ontario Dunes and Wetlands*, has been designed. It will be a 5-1/2" x 8-1/2" booklet with 20 pages plus cover. Green and black inks and sandy-colored paper are recommended for printing. Included in this guidebook are the following:

1. Interpretation of the sand dune and wetland ecosystem and its flora and fauna;
2. Illustrations of flora and fauna;
3. Area maps with boundaries, trails, access points, canoe routes, swimming, picnic, and parking areas indicated; and
4. DEC and OPRHP rules and regulations.

This guidebook is to be distributed at the Southwick Beach entrance booth, local visitor information centers, and member agencies of The Ontario Dune Coalition.

SOUTHWICK / LAKEVIEW TRAIL SIGNS

A nature trail, beginning near the entrance booth of Southwick Beach State Park, passes through an abandoned orchard and wooded area into Lakeview marsh and ends at the dune walkover to the beach. A spur of the trail leads to the Pierrepont Place boat launch.

Replacing the present numbered posts and interpretive guide with trailhead kiosks and interpretive signs should be considered. The agency responsible for their maintenance should be decided prior to installation. The placement of these signs is discussed in Section III - Sites.

Fiberglass embedded signs mounted on rustic wooden stands are recommended for each stop on the trail. The signs will be about 2.5 feet wide by 1.5 feet high. The signs will be mounted at a 45° angle on square posts approximately 3 feet above the ground. The wooden bases for the signs will be designed with the rustic nature of the area in mind and be consistent with the planned kiosks and signs.

The suggested overall theme: "With a little understanding and care, the sand dunes and wetlands of eastern Lake Ontario can be preserved for both wildlife and people" has been narrowed down into the following theme for the trail: "Transition through a diversity of natural areas can be seen on the Southwick/ Lakeview Trail." Wording for the trailhead kiosk panels and trail signs has been developed using this theme. One kiosk panel (page 6) discusses the concept of habitat diversity, while each trail sign discusses a different habitat. In addition to the six signs listed below, the "Dune Ecology" and "Wetland Ecology" signs (pages 8 and 9) can be included on the trail. The title, subtheme, wording, and suggested illustration for each sign is given below.

1. Trail Sign: **Soil Habitat**

Subtheme: Soil is the home of many small and microscopic creatures.

Wording: **Living Soil?** (Title)
Do you think the soil under your feet is just dirt? Well, look again. There are all kinds of creatures, such as moles, earthworms, and ants, making it their home. Some of them, such as bacteria, are so small you can't see them with the naked eye!

Soil is a mixture of bits and pieces of pebbles, sand, minerals, clay, silt, water, and organic material (leaves, twigs, and the decomposed remains of plants and animals). Different plants grow in different soil mixtures.

Illustration: Cross section of ground showing soil layers;
Place sign near decomposing log.

2. Trail Sign: **Birch Habitat**

Subtheme: Soil conditions near Lake Ontario are unfavorable for many tree species.

Wording: **How Did That Birch Get So Big?** (Title)
Soil near the coast of Lake Ontario is poor because sand is constantly being added to it, making it too sandy for most trees to grow in. Birch are usually the first type of tree to grow here because they can grow in poor soil. As birch leaves and branches fall and rot, the soil becomes much richer. As other trees sprout in the now-richer soil, the birch get crowded out. The birch trees near Lake Ontario, however, are lucky because the soil stays poor! The maple or beech, which usually crowd them out, need better soil to grow.

Illustration: Birch tree

3. Trail Sign: **Aquatic and Emergent Plant Habitats**

Subtheme: Two kinds of plants can live in watery environments, aquatic plants and emergent plants.

Wording: **Water-Loving Plants** (Title)
All plants need water to live, but not all plants can live in water! Can you see the two basic kinds of plants living in the wetlands?

"Aquatic" plants such as duck weed and water lily, live in and float on the water. "Emergent" plants, such as cattails, have only their roots and part of their stem in the water. Unlike aquatic and emergent plants, most trees, shrubs, and grasses can't survive being covered in water for long periods of time.

Illustration: Duck weed, water lily and/or cattail plant

4. Trail Sign: **Meadows**

Subtheme: Many different types of plants and wildlife live in Lake Ontario's meadows.

Wording: **Hiding in Plain Sight** (Title)
The tall grasses, weeds, and sedges of the meadow are the perfect hiding place for many different types of wildlife including mice, rabbits, moths, and chipmunks. In the summer, you can't take a step without grasshoppers leaping out from under your feet!

Meadows are generally located in areas where seedlings will not grow into trees. These areas may be too wet or

too cold when seeds sprout or, if the seeds do sprout, the fast-growing grasses and weeds may prevent sunlight from reaching the sprout.

Illustration: Grasshopper on a stem of tall grass

5. Trail Sign: **Abandoned Orchard/Farm Field**

Subtheme: Agricultural use of the area has had an effect on the Lake Ontario environment.

Wording: **Slowly Returning to Nature** (Title)
At one time Lake Ontario's coastal areas were changed by people clearing woods and filling in wetlands for farms and orchards. The orchards and farms in this area, abandoned years ago, are slowly returning to a natural state with native plants and wildlife.

Without the farmer's attention, grasses, weeds, and sun-loving trees like the red cedar took over this old farm field. Nearby you can see an abandoned orchard, where the shade- and moisture-loving green ash has crowded out most of the apple trees.

Illustration: Old stone wall with overgrown field

6. Trail Sign: **Cedar-Maple Habitat**

Subtheme: Red cedar trees protect maple seedlings and help them get established.

Wording: **Tree Nurseries** (Title)
Did you know that the red cedar is also known as the "nurse tree?" That's because the red cedar nurses maple seedlings that sprout under its protective branches by shielding them from hungry cows and deer (which don't like the taste of cedar).

This favor is not returned by the maples, though. As the maple trees mature, they begin to block the sun from reaching the red cedar trees, slowly killing them.

Illustration: Red cedar branch protecting maple seedling

Table 1. Prioritized List of All Recommended Interpretive Media in the Area

1. Approve/change recommended interpretive theme for the Lake Ontario sand dune and wetland area interpretation project; p. 3
2. Develop and place erosion-prevention signs on fencing along the beach throughout area to decrease destructive use by visitors; pp. 3 and 16
3. Kiosk for Southwick State Park/Lakeview Marsh WMA beach access; pp. 4 and 18
4. Kiosk for Southwick State Park trailhead; pp. 4 and 20
5. Kiosk for Lakeview Marsh WMA trailhead at Pierrepont Place; pp. 4 and 20
6. Design and print a guidebook, *Sand, Wind, and Water: Lake Ontario Sand Dunes and Wetlands* , for the area; p. 10
7. Interpretive sign for Deer Creek WMA southern beach access by Brennan's Beach; p. 27
8. Kiosk for Deer Creek WMA northern beach access from Rainbow Shores Road; pp. 4 and 27
9. Kiosk for Black Pond WMA northern beach access from El Dorado Preserve; pp. 4 and 17
10. Directional signs for the following 4 locations:
    a. to Black Pond WMA at junction of Route 3 and Boltin Road (p.17);
    b. to Deer Creek WMA at junction of Route 3 and Rainbow Shores Rd (p. 28);
    c. to Deer Creek WMA at fork by Rainbow Shores Hotel (p. 28); and
    d. to Deer Creek WMA at junction of Route 3 and Kelley Road (p. 29)
11. Interpretive sign for Lakeview Marsh WMA observation tower on Montario Point Road; pp. 10 and 26
12. Interpretive sign for Lakeview Marsh WMA Montario Point Road boat launch; p. 24
13. Interpretive sign for Lakeview Marsh WMA South Sandy Creek boat launch and fishing area; p. 25
14. Interpretive sign for Deer Creek WMA canoe/car-top boat launch on Route 3; p. 30
15. Interpretive sign for Black Pond WMA southern beach access from Jefferson Park community; p. 17

Table 1 (continued). Prioritized List of All Recommended Interpretive Media in the Area.

16. Interpretive sign for Southwick Beach State Park northern beach access from Jefferson Park community; p. 18

17. Interpretive sign for Lakeview Marsh WMA southern beach access from Montario Point community; p. 23

18. Interpretive sign for Lakeview Marsh WMA north side of Lake Ontario outlet near Floodwood Pond; install boat tie-up posts; p. 24

19. Interpretive sign for Lakeview Marsh WMA south side of Lake Ontario outlet near Floodwood Pond; install boat tie-up posts; p. 24

20. Enhance part of the Southwick Beach State Park/Lakeview Marsh WMA nature trail for physically challenged persons; p. 21

21. Sign for Southwick Beach State Park lookout/concession area; p.18

22. Design and install interpretive signs for the Southwick Beach State Park/Lakeview Marsh WMA nature trail; pp . 11 and 20

23. Interpretive sign for Lakeview Marsh WMA bank swallow nesting site by Lake Ontario outlet near Goose Pond; pp. 10 and 24

24. Interpretive sign for Lakeview Marsh WMA bank swallow nesting site by Lake Ontario outlet to South Colwell Pond; pp. 10 and 25

25. Trail development for Deer Creek WMA field lookout off Rainbow Shores Road; p. 29

26. Interpretive sign for Deer Creek WMA field lookout off Rainbow Shores Road; p. 29

27. Trail development/enhancement for Deer Creek WMA at Kelley Road; p. 28

28. Interpretive sign for Deer Creek WMA, Kelley Road parking area; p. 29

29. Trail development for Black Pond WMA at Boltin Road; p. 17

30. Expand the parking area at the end of Boltin Road in Black Pond WMA; p. 17

31. Kiosk for Black Pond WMA at Boltin Road; pp. 4 and 17

32. Interpretive sign for Lakeview Marsh WMA trail near old observation tower site; relocate bee hives away from entrance to trail; pp. 23 and 24

33. If the planned walkovers at Lakeview Marsh WMA are built, design and place interpretive signs for them; p. 23

III - SITES

Maps of each area indicate the location of the recommended interpretation. Each recommended interpretation, except the erosion-prevention signs, is numbered. The number of the interpretation corresponds to the number on the site maps in Figures 4 through 20. Please refer to the appropriate map while reading the following recommendations.

LAKE ONTARIO DUNE AREA

At all three coastal WMAs and Southwick Beach State Park, the fragile sand dunes are very accessible from their beaches. Snow fencing and string-and-post fences have been used successfully in dune areas to deter visitors from entering the dune areas. Some visitors, however, have been known to cross the beach fences and enter the dunes. Interpretive signs along the fencing would help visitors understand the need for limiting access to further decrease the destruction of the dunes.

Signs placed on fencing. A fence should be erected along the entire length of the dune in all wildlife management areas. Breaks in the fencing should be made only where dune access is needed, such as the present and planned dune walkovers in Lakeview Marsh WMA, or where trails direct visitor traffic from access points to the beach. Movable trails made from recycled rubber mats could be used to steer visitors toward a single path and decrease the erosion of the dune by foot traffic. If a continuous fence is not feasible, the fencing should be concentrated on the dune borders closest to the major access points.

The following erosion-prevention interpretive signs are suggested for posting along the fence: 1) "Dunes Erosion;" 2) "Poison Ivy;" and 3) "Dune Blowout." In addition, agency "Rules and Regulations" need to be posted for visitors entering the area by boat from Lake Ontario or area ponds and rivers. These four signs are discussed further on page 3.

A sign should be posted either on the fence or on aluminum posts approximately every 200 yards along the beach. "Rules and Regulations," "Poison Ivy," and "Dunes Erosion" signs should be posted alternately and where appropriate. "Dune Blowout" signs are to be posted near dune blowout sites along the sand dune.

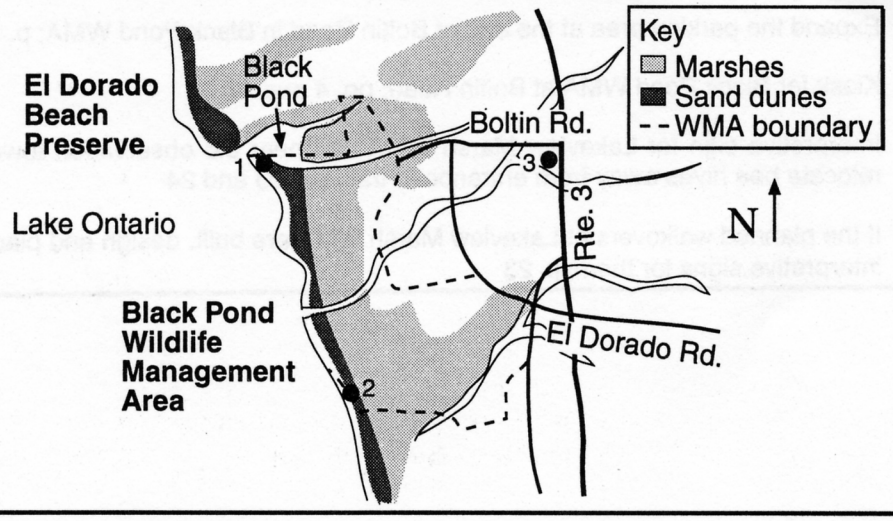

Figure 4. Black Pond Wildlife Management Area (scale: 1.1 inches = 1 mile).

BLACK POND WILDLIFE MANAGEMENT AREA

Figure 4 is a map of Black Pond WMA showing access points and the placement of the following numbered interpretation. Further access to Black Pond WMA is suggested to allow for interpretation and use by visitors. At present, the only access to Black Pond WMA is by walking along the beach from privately owned land, by boat, or by bushwhacking through the marsh.

1. Kiosk for northern beach access. Many Black Pond WMA visitors erroneously use The Nature Conservancy (TNC) El Dorado Beach Preserve parking facilities and trail to access the beach and walk to the WMA. In order to inform and educate the visitors about the area as they enter, a flat kiosk should be erected between TNC El Dorado Beach Preserve and Black Pond WMA (Figure 4). The kiosk should be erected on the beach perpendicular to the shore, above the high-water line but not in the dune. The south-facing side of the kiosk will have panels related to Black Pond WMA and the north-facing side will be available for use by The Nature Conservancy. The following panels will be included in the kiosk: 1) "Dune and Wetland Ecology;" 2) Black Pond WMA Map, and; 3) "Rules and Regulations." If a kiosk is not possible, then a "Dune and Wetland Ecology" sign could be used in place of a kiosk. (See page 4 for discussion of the kiosk and panels.)

2. Sign for southern beach access. Visitors also arrive at the southern border of Black Pond WMA beach by walking from the Jefferson Park community. In order to reach these visitors, a west-facing "Dune Ecology" sign should be placed on the beach above the high-water line but not in the dune (Figure 4). A description of this sign is given on page 8. A site-specific sign should be used if possible.

3. Directional sign. A directional sign for Black Pond WMA should be placed at the intersection of Route 3 and Boltin Road (Figure 4).

4. Trail development. To prevent visitors from trespassing on private land, the DEC should consider developing a trail for Black Pond WMA (Figure 5). The trail should start at Boltin Road, go through the relatively flat fields, wetlands, and wooded areas, over a dune walkover or movable rubber mat trail to Lake Ontario, and then return to Boltin Road. Further research would be needed to determine if there is a way through the marsh. This area would be excellent for bird watching and for seeing plants and wildlife. The map below shows the approximate placement of the trail. The old road leading to the TNC preserve should not be used as this would lead visitors back to private land. The parking area at the end of Boltin Road would have to be enlarged to accommodate additional visitor use.

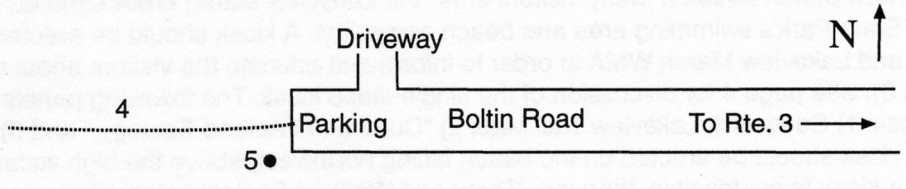

Figure 5. Illustration of existing Boltin Road access to Black Pond WMA. Numbers refer to recommended interpretation (not to scale).

5. Kiosk: Whether or not a trail is built from Boltin Road, a kiosk should be placed next to the parking area (Figure 5). The following panels will be included in the kiosk: 1) "Dune and Wetland Ecology;" 2) "Rules and Regulations;" and 3) Black Pond WMA map. The three-sided kiosk should be facing northwest near the WMA identification sign. (See page 4 for description of kiosk and panels.)

SOUTHWICK BEACH STATE PARK

Southwick Beach State Park is a highly used recreation area which would be greatly enhanced by additional interpretation. The map of Southwick Beach State Park in Figure 6 shows the park's access, trails, parking, picnicking, and swimming areas, as well as the placement of the following interpretation.

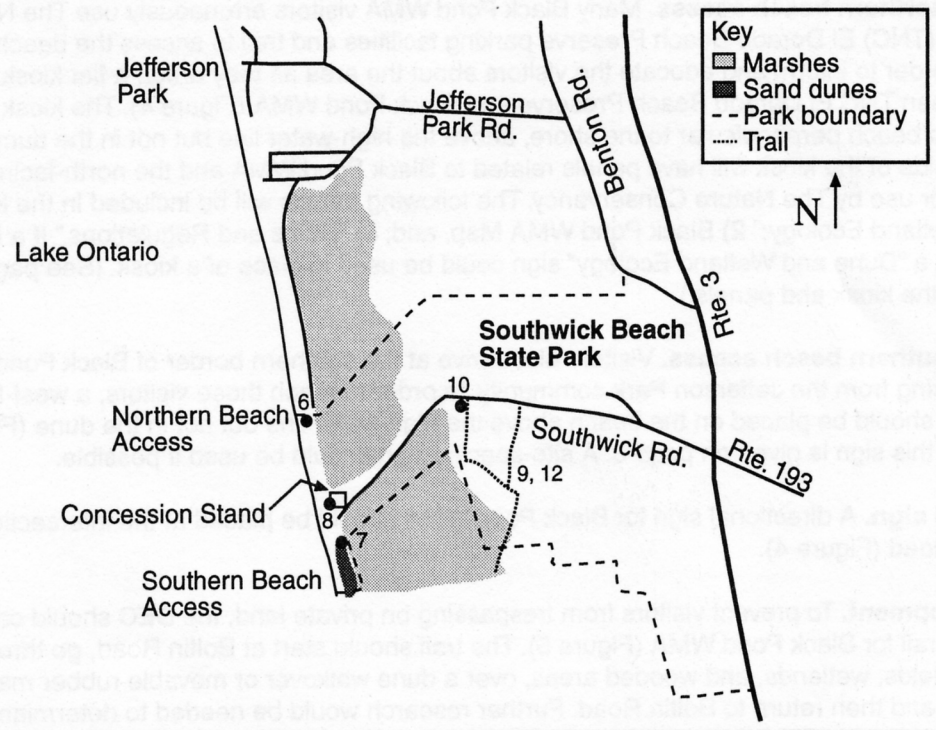

Figure 6. Southwick Beach State Park (scale: 2.1 inches = 1 mile).

6. Sign for northern beach access. A "Dune Ecology" sign is recommended for the border of Southwick Beach State Park and the Jefferson Park community to reach visitors walking south along the beach (Figure 6). See page 8 for information on the sign. The sign should be placed facing Lake Ontario, above the high-water line but not in the dune.

7. Kiosk for southern beach access. Many visitors enter the Lakeview Marsh WMA sand dune from Southwick Beach State Park's swimming area and beach campsites. A kiosk should be erected between Southwick Beach and Lakeview Marsh WMA in order to inform and educate the visitors about the area as they enter (Figure 6). See page 4 for discussion of the single-sided kiosk. The following panels will be included in the kiosk: 1) Southwick/Lakeview Trail Map; 2) "Dune and Wetland Ecology;" and 3) "Rules and Regulations." The kiosk should be erected on the beach facing northwest, above the high water line but not in the dune. If a kiosk is not feasible, then the "Dune and Wetland Ecology" sign, discussed on page 7, could be used in place of a kiosk.

8. Sign. Many visitors to Southwick Beach State Park visit the concession stand. This would be the ideal location for the interpretive sign "Lake Ontario Ecology." The sign should be placed near the north side of the building, facing west, to be seen by visitors going to the swimming area from the restrooms and concession stand (Figure 7). See page 8 for description of sign.

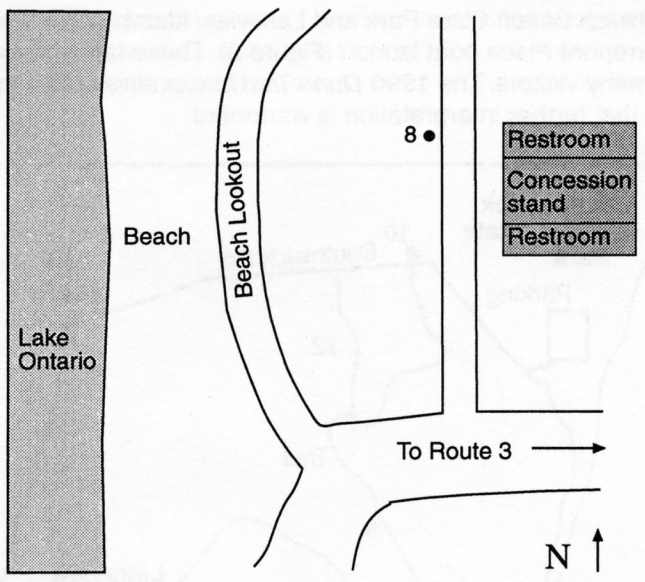

Figure 7. Sketch of Southwick Beach lookout and concession area. Number refers to recommended interpretation (not to scale).

SOUTHWICK BEACH/LAKEVIEW MARSH TRAIL SYSTEM

Along the border of Southwick Beach State Park and Lakeview Marsh WMA there is a loop trail with a spur that goes to the Pierrepont Place boat launch (Figure 8). These trails give us a great opportunity to interpret the area for its many visitors. The 1990 *Dune Trail Interpretive Guide* for the area was very successful and indicates that further interpretation is warranted.

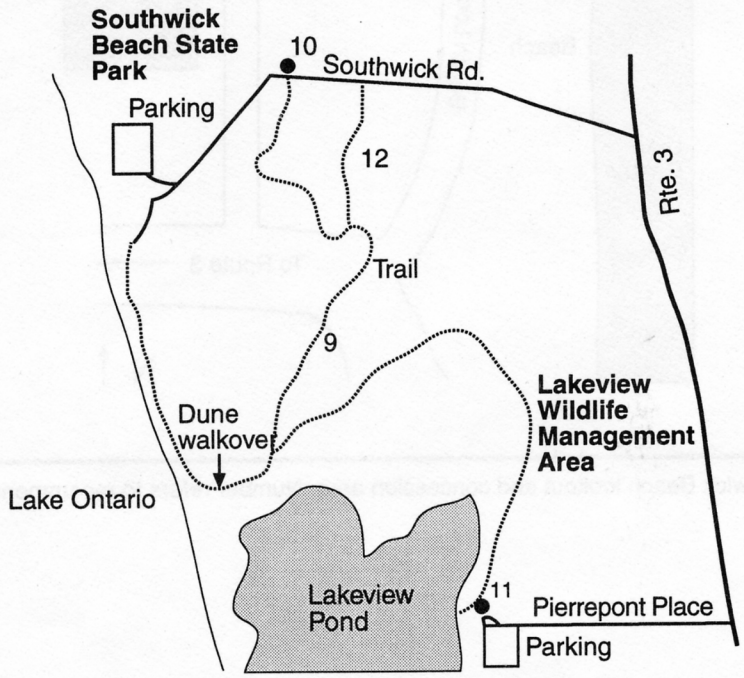

Figure 8. Map of Southwick Beach/Lakeview Trail (not to scale).

9. Southwick/Lakeview trail enhancement. Interpretive signs for the existing Southwick/Lakeview trail system have been designed (Figure 8). The theme for this trail is: "Transition through a diversity of natural areas can be seen on the Southwick/Lakeview Trail." The signs should face north or northwest to prevent sun damage (i.e., fading). As part of the interpretive trail, a "Dune Ecology" sign should be placed at the west end of the Lakeview Marsh WMA dune walkover, and a "Wetland Ecology" at the east end. (See page 11 for further information on the signs.)

10. Kiosk for Southwick trailhead. An interpretive kiosk has been designed for the trailhead at Southwick Beach State Park (Figure 8). This single-sided kiosk should replace the old kiosk at the trailhead. (See page 4 for information on the kiosk.) The following panels will be included: 1) Southwick/Lakeview Trail Map; 2) "Habitat Diversity" and; 3) "Rules and Regulations." The kiosk should be placed facing northeast on the west side of the trailhead. A similar kiosk will be place at the Lakeview Marsh trailhead.

11. Kiosk for Lakeview trailhead. An interpretive kiosk has been designed for the trailhead at Lakeview Marsh WMA Pierrepont Place boat launch (Figures 8 and 9). See page 7 for information on the single-sided kiosk. The following panels could be included: 1) Southwick/Lakeview Trail Map; 2) "Dune and Wetland Ecology;" and 3) "Rules and Regulations." The kiosk could be located at the east side of the trailhead facing southwest. A kiosk is also recommended for the Southwick Beach State Park trailhead.

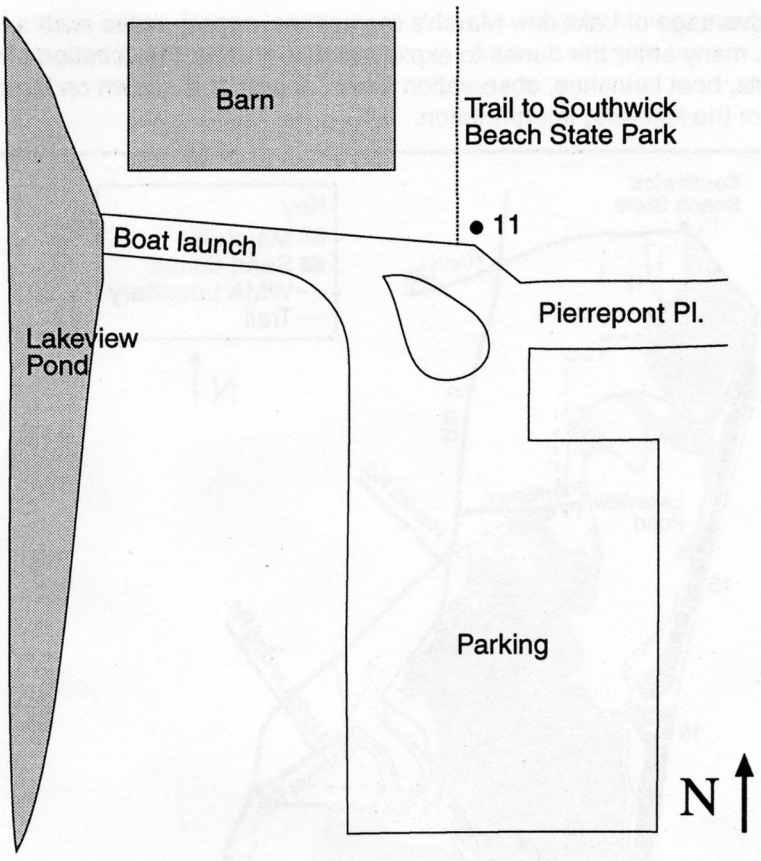

Figure 9. Lakeview Pond boat launch area (off Pierrepont Pl.) showing trailhead location (not to scale).

12. Trail for the physically challenged. The Southwick Beach State Park should consider enhancing part of the trail system as a state-of-the-art trail for physically challenged persons. This would include widening and hardening of the existing trail to allow for wheelchair access and the addition of a curb which can be followed with a cane. See Figures 8 and 10 for the location of the trail for physically challenged persons.

LAKEVIEW MARSH WILDLIFE MANAGEMENT AREA

Many visitors take advantage of Lakeview Marsh's recreational opportunities such as hunting, boating, and hiking. However, many enter the dunes to explore and sunbathe. The location of Lakeview Marsh's parking, access points, boat launches, observation tower, and trails is shown on Figure 10. The map also shows the locations of the following interpretation.

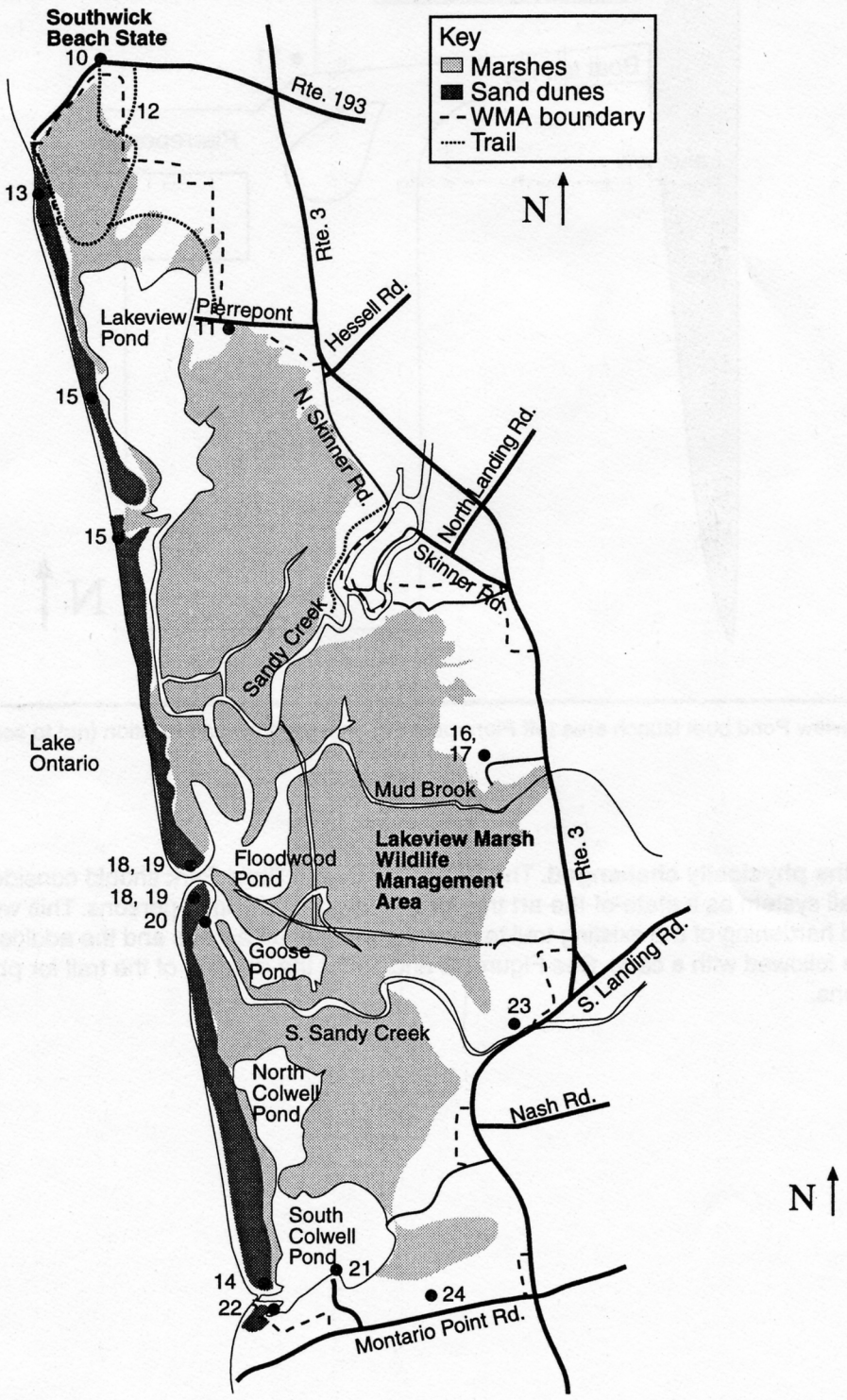

Figure 10. Map of Lakeview Marsh Wildlife Management Area (scale: 1.3 inches = 1 mile).

13. Kiosk for northern beach access. As stated in the Southwick Beach State Park discussion, a kiosk has been developed for the border of Southwick Beach State Park and Lakeview Marsh WMA (Figure 10). See page 18 for discussion of the kiosk.

14. Sign for southern beach access. Many visitors arrive at Lakeview Marsh WMA via the beach from the Montario Point community. A "Dune and Wetland Ecology" sign is recommended for this area (Figure 10). The sign should be facing southwest, above the high-water line but not in the dune. See page 7 for description of this sign.

15. Planned walkovers. Two additional dune walkovers are planned for Lakeview Marsh WMA by the DEC (Figure 10). The first walkover will be located approximately one mile south of the present walkover and would lead to Lakeview Pond. The second walkover would be an observation platform overlooking the Marsh about one mile further south. Building these walkovers is encouraged because it would give beach-walking visitors a place to go and direct them toward less destructive ways to cross the dune.

16. Trail enhancement. The DEC should consider enhancing and pointing out to visitors an existing informal trail in Lakeview Marsh WMA (Figure 11). At present, there is a parking lot off Route 3 and a good gravel road leading to this area. However, since the removal of the tower, the area has not been used frequently. The trail goes through fields and wooded areas, then returns to Route 3 about a half mile north of the parking lot. This area would be excellent for bird watching and for seeing plants and wildlife. A sign at the trailhead would indicate the route of the trail and discuss "Field Ecology." (See page 9 for discussion of this sign.) The map below shows the approximate location of the trail.

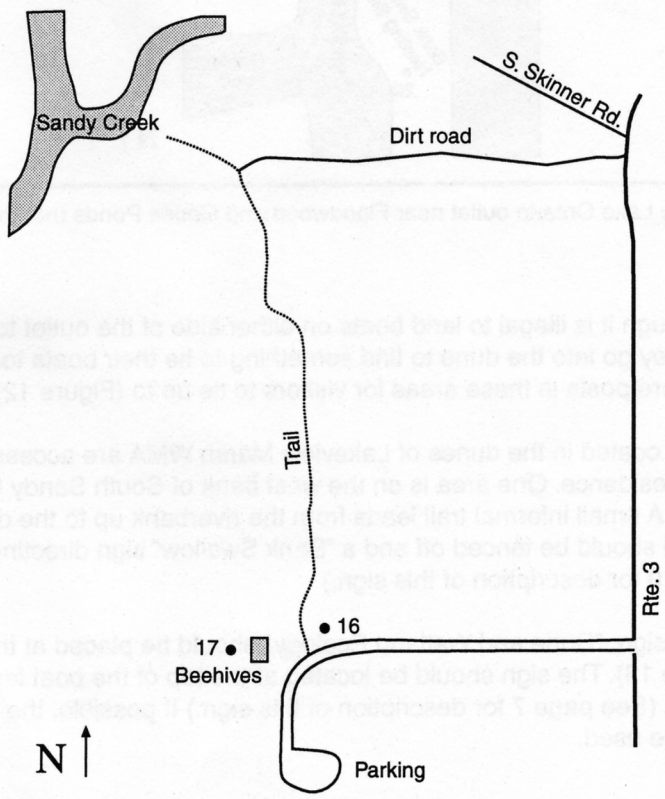

Figure 11. Map showing meadow trail off Route 3 (not to scale).

17. Beehive relocation. There are several beehives at the head of the trail (Figure 11). The DEC should consider having the beekeeper relocate the hives so that visitors who are allergic to bees would be able to use the area.

18. Signs. "Dune Ecology" signs are recommended for the north and south sides of the Lake Ontario inlet into Floodwood and Goose Ponds to reach visitors arriving by boat and landing on the beaches (Figure 12). If possible, site-specific wording should be used for the signs. (See page 8 for information on the signs.) The sign on the north side of the inlet should be placed facing south, above the high-water line but not in the dune. The sign for the south side of the inlet should also be located on the beach above the high-water line but facing north.

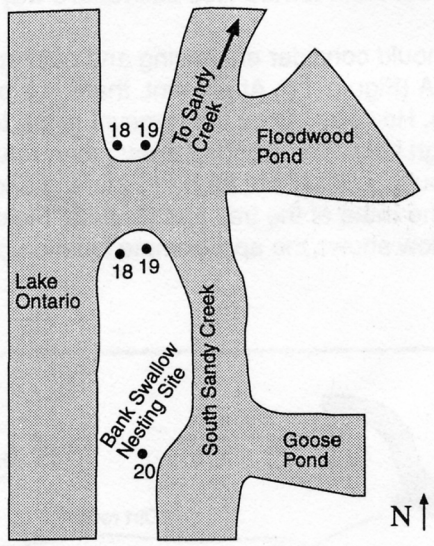

Figure 12. Map showing the Lake Ontario outlet near Floodwood and Goose Ponds (not to scale).

19. Boat tie posts. Although it is illegal to land boats on either side of the outlet to Lake Ontario, many visitors do. Once there they go into the dune to find something to tie their boats to. The DEC should consider installing off-shore posts in these areas for visitors to tie up to (Figure 12).

20. Bank swallow site. Located in the dunes of Lakeview Marsh WMA are accessible areas where bank swallows have taken up residence. One area is on the west bank of South Sandy Creek, near the outlet of Goose Pond (Figure 12). A small informal trail leads from the riverbank up to the dune, passing very near the nesting site. This trail should be fenced off and a "Bank Swallow" sign directing visitors away from this area posted. (See page 10 for description of this sign.)

21. Sign. An interpretive sign, "Dune and Wetland Ecology," should be placed at the WMA Montario Point Road boat launch (Figure 13). The sign should be located at the top of the boat launch ramp, on the right side, and face southwest. (See page 7 for description of this sign.) If possible, the sign specific to Lakeview Marsh should be used.

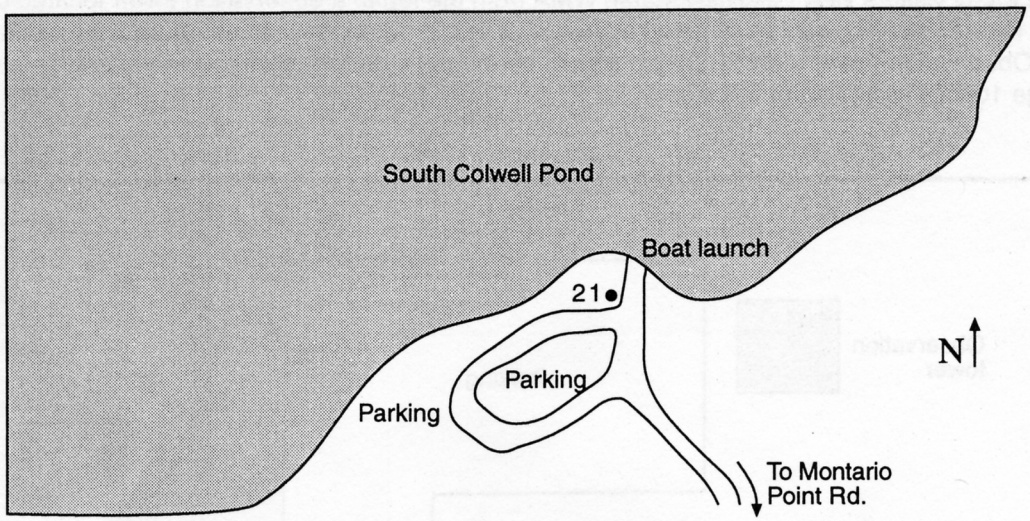

Figure 13. Montario Point Road boat launch (not to scale).

22. Bank swallow site. Bank swallows also live in another site in the dunes at the outlet of Lake Ontario near South Colwell Pond (Figure 10). This site is easily accessible from the beach. A "Bank Swallow" sign that directs visitors away from this area should be posted. (See page 10 for description of this sign.)

23. Sign. Lakeview Marsh WMA is accessible by small boats from the South Sandy Creek fishing access site (Figure 14). A "Dune and Wetland Ecology" sign is recommended for this area. If possible, one panel of the Seaway Trail kiosk already at this location could be used for the interpretive sign (one kiosk panel is presently being used as a bulletin board). If not, the sign should face southwest and be located between the boat launch and the fishing platform. (See page 7 for description of this sign.)

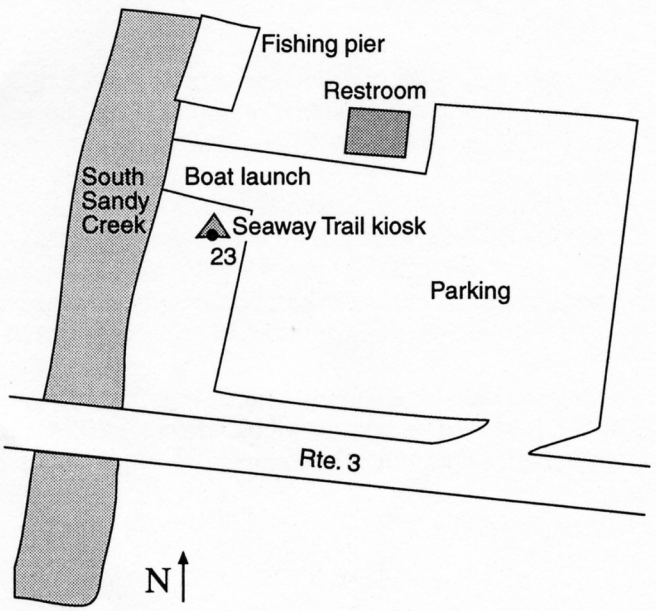

Figure 14. South Sandy Creek boat launch site (not to scale).

24. Sign. Many visitors view Lakeview Marsh WMA from the top of a observation tower located on Montario Point Road (Figure 15). The top of the tower would be an ideal place for an interpretive sign entitled "Observation Tower View." The sign should be mounted directly onto the railing and face the WMA. (See page 10 for description of this sign.)

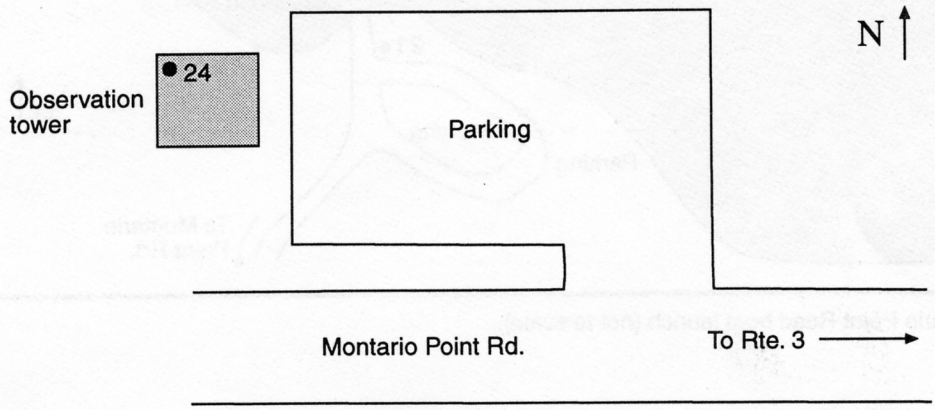

Figure 15. Illustration of observation-tower site. Number indicates location of recommended sign (not to scale).

DEER CREEK WILDLIFE MANAGEMENT AREA

Deer Creek WMA has much to offer the visitor. The area, however, has many informal trails throughout its dunes. Further interpretation and directional signs are needed to decrease the erosion of the dunes and draw visitors away from fragile areas. Refer to the map of Deer Creek WMA access points below for placement of the recommended interpretation (Figure 16).

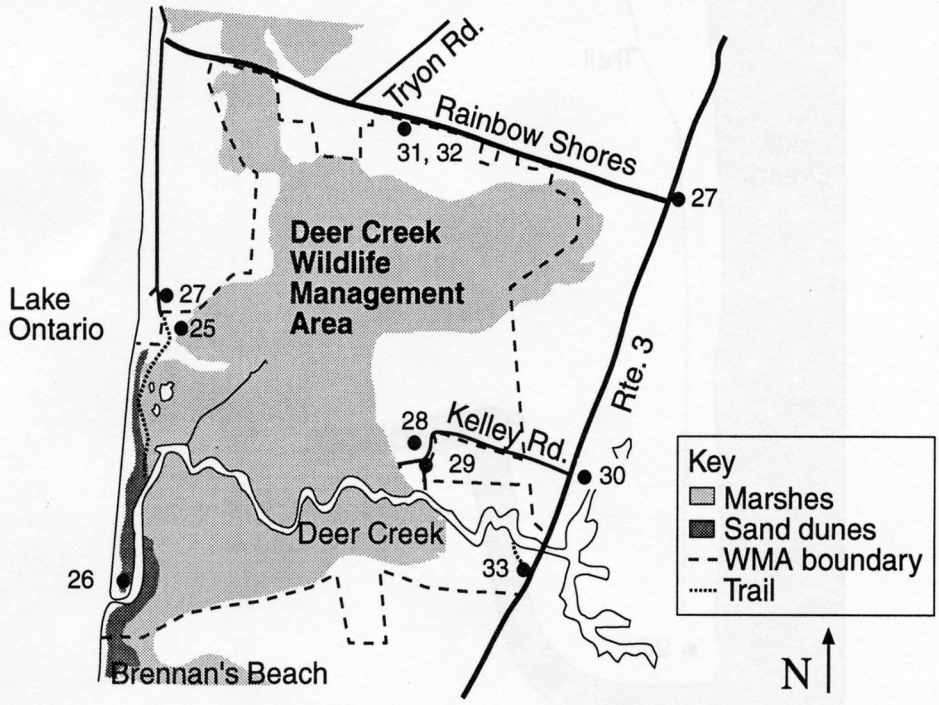

Figure 16. Deer Creek Wildlife Management Area (scale: 1.4 inches = 1 mile).

25. Kiosk for northern beach access. In order to inform and educate the visitors about the area as they enter, a three-sided kiosk should be erected at the Rainbow Shores Road parking area to Deer Creek WMA (Figures 16 and 17). See page 4 for discussion of the kiosk. The following panels will be included in the kiosk: 1) "Dune and Wetland Ecology;" 2) Deer Creek WMA Map; and; 3) "Rules and Regulations." The kiosk should be erected next to the barrier of the parking lot, facing northwest. If a kiosk is not possible, then a "Dune and Wetland Ecology" sign could be used in place of a kiosk.

26. Sign for southern beach access. Many visitors enter Deer Creek WMA from the privately-owned Brennan's Beach campground. In order to inform and educate the visitors about the area as they enter, a "Dune and Wetland Ecology" sign should be erected on the north side of the beach between Deer Creek WMA and Brennan's Beach (Figures 16 and 17). See page 7 for discussion of the sign. The sign should be erected on the beach facing southwest, above the high-water line but not in the dune.

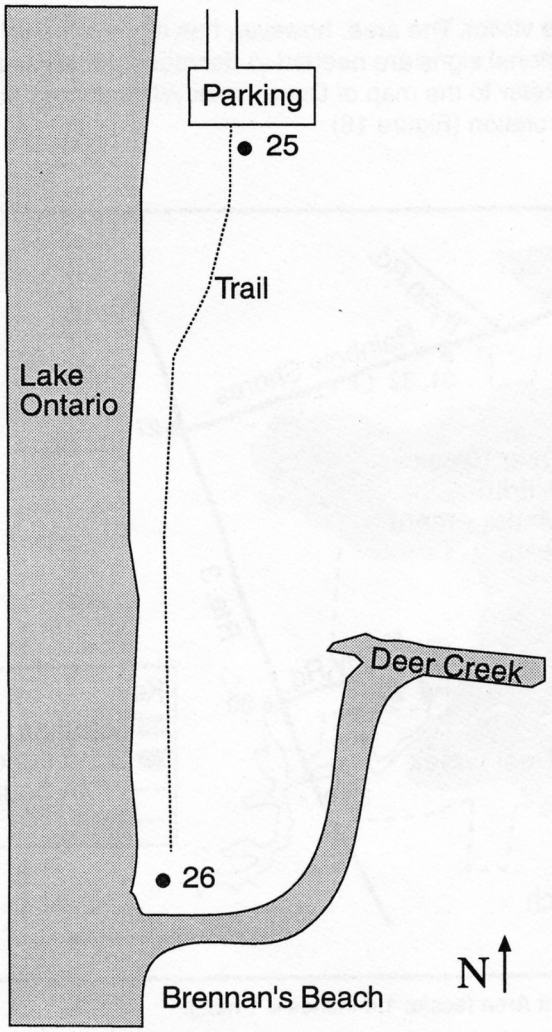

Figure 17. Beach trail at Deer Creek WMA (not to scale).

27. Directional signs. Directional signs are needed for the following locations of Deer Creek WMA: 1) at the junction of Route 3 and Rainbow Shores Road; and 2) across from the Rainbow Shores Hotel entrance (Figure 16).

28. Trail development. The development of a loop trail on Kelley Road is recommended (Figure 18). Presently, this is a dirt road off Route 3 leading to an open parking area; the road becomes rougher, goes through a wooded area, and then splits into two forks. One fork leads to Deer Creek and its surrounding wetlands. The other fork ends on top of a knoll. The proposed trail would link these two forks by taking the visitor through the woodland area and up the knoll. A three-foot-wide boardwalk could be constructed as a spur off the loop trail into the marsh area, ending in an observation platform or blind for viewing wildlife. A "Wetland Ecology" interpretive sign could be placed at the junction of the loop trail and the boardwalk. (See page 9 for description of this sign.) The boardwalk could be built at a later date if funding is not available for such a project. Four-wheel-drive vehicles presently use these trails; a vehicle barrier could be constructed at the parking area if vehicular traffic is no longer wanted.

29. Sign. A "Wetland Ecology" interpretive sign is recommended for Kelley Road (Figure 18). The interpretive sign should be placed at the trailhead off the parking area, facing northeast. (See page 9 for description of this sign.) If possible, a sign specific to Deer Creek WMA should be used.

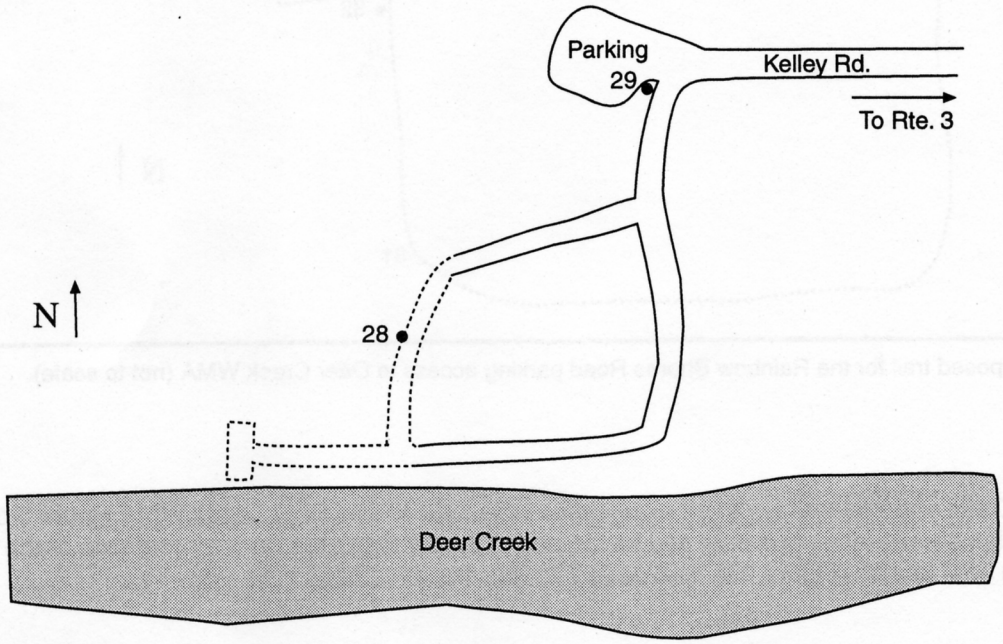

Figure 18. Kelley Road entrance to Deer Creek Wildlife Management Area (not to scale).

30. Directional sign. A directional sign is needed for the Route 3 Deer Creek WMA entrance to Kelley Road (Figure 16). At present there is no indication that Kelley Road is an access point to the WMA .

31. Trail development. On Rainbow Shores Road between Route 3 and Lake Ontario, there is a small parking area with a view of a field and the WMA's upland vegetation. Development of a short loop trail through this field would be of interest to visitors who enjoy hiking and bird watching. The trail would lead to a small blind for observing wildlife. This area slopes downhill but is not a steep grade. (See Figure 19 for the possible route of this trail.)

32. Sign. Whether or not a trail is developed, a sign is recommended for the field lookout off Rainbow Shores Road (Figure 19). The "Field Ecology" sign should be located next to the parking area, just beyond the railing, facing north. (See page 9 for description of this sign.)

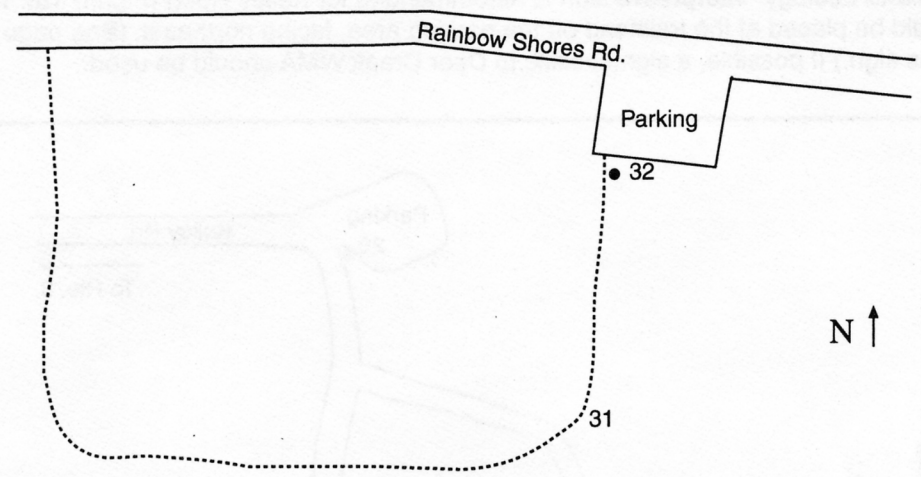

Figure 19. Proposed trail for the Rainbow Shores Road parking access to Deer Creek WMA (not to scale).

33. Sign. A "Dune and Wetland Ecology" sign is recommended for the Deer Creek WMA Route 3 boat launch. The sign should face southeast and be located in the parking area on the north side of the trail leading to the boat launch (Figure 20). See page 7 for description of sign.

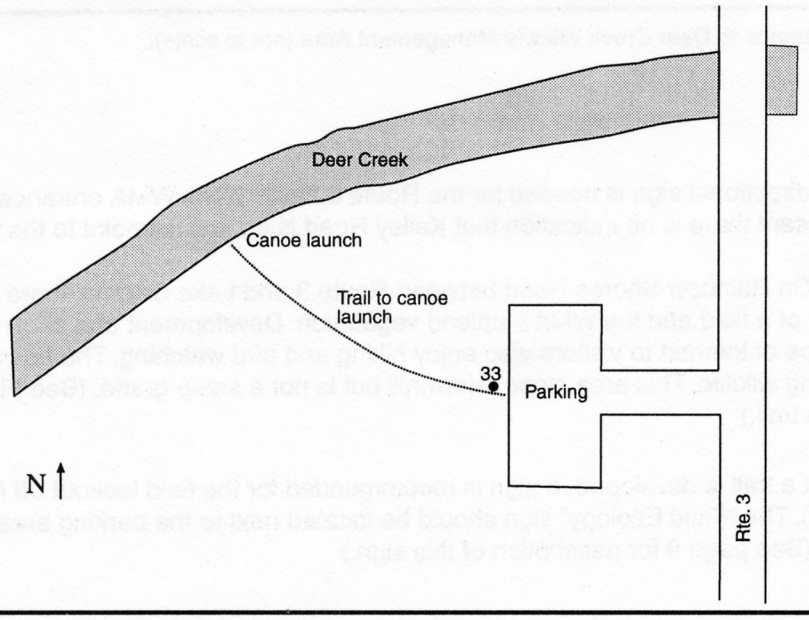

Figure 20. Deer Creek WMA boat launch site (not to scale).

SANDY POND BEACH NATURAL AREA

Sandy Pond Beach Natural Area, just north of Deer Creek WMA, is a sand dune area owned by The Nature Conservancy and managed by the DEC (Figure 2). Although management plans for the area are still preliminary, relevant interpretation discussed in this report will be used in the area. Erosion-prevention signs along the beach are recommended. (See page 3 for description of these signs.)

IV - FUTURE INTERPRETATION FOR THE LAKE ONTARIO SAND DUNES AND WETLANDS

Several interpretive recommendations for the dune and wetland area were beyond the scope of this report. They are given below.

VISITORS' CENTER

A visitors' interpretive center is encouraged for the Lake Ontario sand dune and wetland area for use by school groups and visitors. The center, if developed, could be located at the Southwick Beach State Park where resources and facilities for large visitor groups are already in place and minimal disturbance of fragile environment will occur. Design plans for the center need to be further developed by OPRHP, landscape architects, and interpreters. The OPRHP master plan being developed for the Southwick Beach State Park includes an option for development of the visitor center.

EDUCATION CURRICULUM

A sand dune and wetland ecology education curriculum should be developed for use by elementary school teachers in conjunction with a designated class field trip to Lake Ontario's barrier system. The development of the educational material is, however, beyond the scope of these recommendations. The Nature Conservancy is in the initial stages of developing such a program and should be encouraged to continue.

INTERPRETIVE STAFF

Although it may not be economically feasible to hire interpretive staff at this time, the DEC and OPRHP should consider hiring a roving interpreter for the area in the future. This person could be responsible for developing interpretive programs and materials, working with school groups, and interpreting for visitors during the peak-use season in the four public areas. If the visitors' center is developed, the staff person could be based there.

V - CONCLUSION

Many people visit the eastern Lake Ontario sand dunes and wetlands area every year. Over the years visitor use has stressed these areas, causing the need for improved visitor management and interpretation. Interpretation, by educating the visitors about the fragile dune environment, could help alleviate some of the stresses. Although interpretation involves communicating access to visitors, it also emphasizes the correct use of the area. At present, visitors are not directed to proper access points and are not educated about the area.

The interpretive program outlined here includes the development of interpretive kiosks, signs, and a guidebook. This interpretation is designed to educate the visitors as they enter the area. Promotion of the area should *not* be a focus of the program, in order to keep visitor impacts on the environment to a minimum. The potential for expanding this program to include an interpretive center and staff could be considered in the future.

The preservation of this fragile area depends on the cooperation of visitors, local community groups, and local, regional, and state agencies. Without this cooperation, this unique and fragile area would not be able to exist. Interpretation can provide a means to help manage this area.

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