



**BLUEWATER BEACH ENVIRONMENTAL RESTORATION  
PLAN**

**PHASE 2 REPORT**

**Submitted to:**

**The Corporation of the Township of Tiny  
130 Balm Beach Road West  
Perkinsfield, Ontario  
L0L 2J0**

**Submitted by:**

**AMEC Earth & Environmental  
a division of AMEC Americas Limited  
160 Traders Blvd. East, Suite 110  
Mississauga, Ontario  
L4Z 3K7**

**TC 61406  
March 2007**

March 20, 2007  
TC61406

Mr. Henk Blom  
Township of Tiny  
130 Balm Beach Road  
Perkinsfield, Ontario  
L0L 2J0

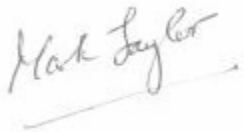
Dear Mr. Blom:

**Re: Bluewater Beach Restoration Plan – Phase 2 Report**

We would like to provide you with a draft copy of our Phase 2 report for the Bluewater Beach Restoration Plan that we completed this winter. It includes a summary of the plant communities and a plan for the next five years. We have provided additional information in the appendices which may be used as part of the public education program. We were delighted to be able to present our findings to the Mayor and Council last month and trust that the final report will be useful in planning for the next five years.

If you have any questions, please do not hesitate to contact me at (250) 658-9346 or Ms. Megan Hazell at (905) 568-2929.

Yours sincerely,  
**AMEC Earth & Environmental**  
**a division of AMEC Americas Limited**



Mark E. Taylor, Ph.D.  
Senior Environmental Scientist



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## **1.0 INTRODUCTION**

Bluewater Beach is located in the Township of Tiny on the southeast shore of Georgian Bay (Figure 1). The 7.1 ha park is owned by the municipality and is the most intact dune landscape in public ownership within the township. The park provides an access point to the waterfront for residents and visitors.

In 2005, Meridian Planning, together with Planning Partnerships and AMEC Earth & Environmental, undertook the development of a Management Plan in conjunction with township residents (Meridian Planning et al. 2005). This Plan was submitted and approved by Council on January 30, 2006.

The Management Plan proposes that the land identified as Bluewater Beach be restored as a natural area and that a proper biological survey be undertaken prior to the development of specific restoration initiatives.

A Request for Proposal PW001/06 was prepared by the township and selected firms invited to bid on the project. AMEC Earth & Environmental, in conjunction with Planning Partnership, submitted a proposal on March 28, 2006 and was awarded the project. The Phase 1 report was presented in October 2006 and provided details of the vegetation communities and recommendations for some fencing to protect the most vulnerable locations. This Phase 2 report completes the requirement to undertake a biological survey of the site, to suggest methods by which the dune system could be protected and restored, and to provide information for the township to use in public education programs. This report outlines a 5-year plan for the stabilization and restoration of the dune system at the Bluewater Beach site.

## **2.0 Methods**

### **2.1 Literature Review**

A literature review relating to the protection and restoration of sand dune systems was undertaken. The emphasis is on Great Lakes dune systems though examples from maritime systems are comparable. Because the area is a public park, certain considerations related to park planning, the movement and activities of people are considered, as well as the task of restoring a degraded dune system. A number of standard ecological texts (Kendeigh 1974, Odum 1971) were also referred to. A considerable amount of recent information is available on line at sites such as the Lake Huron Centre for Coastal Conservation (<http://lakehuron.on.ca/>).

### **2.2 Field Work**

Field visits were undertaken to the site to map the plant communities according to the Ecological Land Classification system (Lee et al. 1998). Plant communities were identified and mapped with a GPS unit. Plant species were identified to determine whether there were any rare species present. Dune systems are rare in southern Ontario. Observations regarding dune stability and instability were noted and recommendations for restoration prepared.

### **2.3 Consultation**

Discussions were undertaken between team members, the township staff and members of the Advisory Committee.

A preliminary meeting, including site visits, was held with the Advisory Committee on June 16, 2006 to identify immediate restoration objectives. Field visits for plant and community identification and to identify trail and fencing needs were undertaken throughout the summer. Additional visits were also made in the winter of 2007.

### **3.0 SITE DESCRIPTION**

#### **3.1 Bio-physical Conditions**

The vegetation communities are described following the methods laid out in the Ecological Land Classification (Lee et al. 1998) and are illustrated in Figure 2. The detailed vegetation descriptions of the site are provided in Appendix 1.

##### **3.1.1 Beach**

The beach has a shallow slope and the littoral zone is gently sloped such that there are a number of exposed boulders. The beach is composed of approximately 10% small cobbles and stones and the rest is sand. It is classified as an open mineral beach.

There is little debris on the upper beach and it is generally devoid of organic matter. Beaches normally have a strand line where branches, tree trunks, and other material are left during winter storms. On parts of the Great Lakes there may be a build-up of algae later in the year, but it does not look as if this is a common occurrence at Bluewater Beach, which would indicate that the local conditions were generally oligotrophic (low nutrient status).

##### **3.1.2 Fore Dune**

The fore dune system is fragmented and while there are still some patches of vegetation, it is in serious need of protection. This is evident in the photograph of the fore and mid dune area identified as Little Bluestem-Switchgrass-Beachgrass Open Dune (Appendix 1). Numerous tracks lead through the fore dunes and an instability in this area results in instability further landward. The commonest grass is American beach grass but there are also other species of grass, wormwood, balsam poplar and sedges.

##### **3.1.3 Mid-Dune**

The mid-dune system is patchy and is identified as the shrub sand dune ecosite. The mid-dune is generally heavily eroded and trampling and wheeled vehicles have destabilized the system. There are remnant patches of vegetation in this area with the characteristic plants but normally this area would have higher dunes, well vegetated with dune grasses and other herbaceous plants and shrubs such as silverweed, wild pea, sand cherry, and shrubby cinquefoil.

Depending on the local wind conditions, sand sources and water table, wetland areas, called dune swales may form between dunes in the mid-dune area (Sjogren and Sjogren undated). There is no evidence in 2006 that the water table or moisture conditions would allow for the development of swales at this time. Therefore the restoration of a wetland area will not be recommended in this report, but may be considered in the future.

### **3.1.4 Back Dune**

The back dunes are the treed high dunes on the east side of the property and they are covered with a variety of deciduous and coniferous trees and shrubs such as basswood, white pine, red oak, black oak, red maple, juniper and grape. The transition from the mid-dune area to the back dune is for the most part very steep due to the absence of a functional mid-dune system. As a result of this lack of protection, wind is able to erode the windward surface of these dunes, causing blowouts in places and allowing sand to carry over the back dune. In places, these blowout conditions are exacerbated by the presence of paths, particularly the one from the pump house to the beach with its median handrail, parallel to prevailing winds.

### **3.2 Rare Plants and Plant Communities**

There are three provincially rare grass species located at Bluewater beach: porcupine grass (*Stipa spartea*), American beachgrass (*Ammophila breviligulata*) and hairy puccoon (*Lithospermum caroliniense*) (Appendix 2). All of these plants are S3 species, meaning that they are rare to uncommon in Ontario with only between 20 and 100 occurrences in the entire province.

There are also two rare, provincially ranked plant communities at Bluewater Beach:

- Sand Cherry Shrub Dune Type; and,
- Little Bluestem-Switchgrass-Beachgrass Open Dune Type.

Both of these communities are ranked as S2 level communities, meaning that they are very rare in Ontario, usually between 5 and 20 occurrences in the province or remaining hectares. The Sand Cherry shrub dune communities are in polygons 4, 5, and 11 (Figure 2). The Little Bluestem-Switchgrass-Beachgrass open dune type is in polygon 3 (Figure 2).

A complete list of plants found at Bluewater Beach is found in Appendix 3. It is recommended that the town develop some information packages and signage to ensure protection of these rare community types and explain why protective fencing is installed. The design for such interpretive signage is illustrated in Figure 3.

### **3.3 Buildings, Facilities, Roads and Paths**

#### **3.3.1 Building**

The pump house on Nicole Boulevard is owned and maintained by the township. It is subject to sand blowing in from the beach and may require periodic sand removal. A major blowout to the south of the pump house threatens to swamp the building and also is allowing sand to blow onto the driveway of one of the houses on Nicole Boulevard. Stabilizing this sand movement is essential.



### **3.3.2 Toilets**

Portable toilets are provided at the entrance to the park at the end of Trew Avenue. They are installed in May and removed at the end of September. It is recommended that they be placed to the west side of the entrance way so they are not quite so obvious when approaching the property.

### **3.3.3 Garbage Containers**

Garbage containers are provided at the end of Trew Avenue and on Nicole Boulevard. They are emptied weekly.

### **3.3.4 Road**

The only road within the park area is Trew Avenue. There is a certain amount of garden refuse disposed of on the south side of Trew Avenue and this should be discouraged. Parking by permit and open parking is currently permitted along this stretch of road as was proposed in the Management Plan.

### **3.3.5 Paths**

The major paths to the beach are from Trew Avenue, Nicole Boulevard, and Glen Avenue North. These provide the main access routes. There are one or two private paths that have been constructed between residential properties and the beach but these do not appear to be in use and do not have a major impact on the dune system.

## **4.0 DUNE RESTORATION**

The sand dunes at Bluewater Beach will in all likelihood restore themselves if protected from trampling and vehicles (bicycles, ATVs and snowmobiles). The natural dune vegetation does not tolerate disturbance very well and we recommend fencing off the most vulnerable areas with wooden slatted snow fencing (Figures 4 and 5). The major impacts are caused by two and four-wheeled vehicles, snowmobiles, and people playing on the dune face. Sand is normally stabilized by specialized dune vegetation to create a series of parallel dune system oriented parallel to the beach and perpendicular to the prevailing wind direction. The majority of sand is blown during the spring and fall equinoctial gales, particularly in the fall when lake water levels are lower and the sand is drier, although it may be blown at any time when wind speeds reach approximately 7 m/sec and the sand is dry (Vanhee et al. 2002).

There needs to be information about the dune recovery program provided to users of the Bluewater Beach area. There should be an involvement of people in the monitoring and participating in the recovery strategy. "There is no greater way to get people to internalize a biodiversity ethic than to have them participate in ecological stewardship" (Schwartz 2006).

Exclosures are fenced areas that are designed to keep animals and/or people out of an area so that one can determine what the effect of removing the effect of trampling, grazing or any other disturbance is on the vegetation (Figures 7 & 8). It is our suggestion to use two exclosures to demonstrate the effectiveness of removing trampling on the restoration of vegetation within the dune system. One exclosure should be placed in the fore-dune and one in the mid-dune, in areas where they will be visible from the boardwalk.

There are three general areas to deal with:

1. Beach dune interface - this is where the stone/sand beach merges into the fore dune area. It may be reached by waves during storms under high water conditions.
2. Mid-dune area - this area has some large patches totally devoid of vegetation.
3. Blowout areas - there are several areas along the back dunes with blowouts, in which sand is blowing back onto properties behind Bluewater Beach.

### **4.1 Fore Dune**

A major problem with dune systems and peoples use of them, are the multiple paths that develop across the dunes. This is very evident at places like Sauble Beach where access from parked cars along the roads tends to be directly over the dunes to the beach (Anon 2003). Sauble Beach has successfully instituted boardwalk crossover points at several locations to reduce this impact. Parks such as Presqu'île Provincial Park and Pelee National Park have found that having a few dedicated access points to the beach that are easy to use, results in a

reduction of the number of multiple paths that may develop. We recommend two access points to the beach (Figure 4) and snow fencing installed along the beach front.

In the long term, we suggest that a stout fence is installed along the beach dune interface area constructed of 8' cedar poles at approximately 8' centres with two or three rails be nailed horizontally to the posts (Figure 6). On the dune side of the rail fence, wooden slatted snow fencing should be attached. The fencing with two access points to paths leading to the streets will protect the fore dune area and will start the process of trapping sand blowing down the beach.

The effectiveness of this fence will depend upon the availability of sand that can come from the beach area. This is a function of the sand source, particle size, wind direction and speed, and moisture content. It is expected that sand will start to accumulate around the fence during the fall (2006) and spring (2007) period, though the fencing will prevent trampling and allow vegetation to start recovering. There are already several patches of dune grasses that will probably start expanding during the summer.

#### **4.2 Mid-Dune Area**

The access area from Trew Avenue is exposed to drifting sand and we recommend installing a boardwalk through this area when monies are available. A design is suggested so that the boardwalk can be lifted up as sand is deposited beneath it and the dune system restored in this area.

#### **4.3 Back Dune Area**

The back-dune area is the largely treed area on the east side of the study area. It is well vegetated with trees, shrubs and herbaceous plants. There are two or three areas where the blowout areas extend into the back dunes and blowing sand is serving to bury and kill some of the plants and potentially impact infrastructure such as buildings and roads. Protection of the fore and mid dunes will result in protection of the back dunes.

#### **4.4 Blowout Areas**

The major blowout areas indicated in Figure 4 should be dealt with immediately. It is recommended that two parallel lengths of snow fencing be installed across slope approximately half way up the slope separated by some 10'. Between the two lengths of fencing we recommend laying small (6 to 8') cut conifers (native species only - red or white pine) horizontally to further act as sand traps (Figure 9). These conifers should be tied down with rope so that they do not get blown out. Scots pine (*Pinus sylvestris*) should not be used (White et al. 1993).

The path from Nicole Avenue runs past the pump house and directly down slope towards the Lake. The roots of the trees and shrubs along the top are badly exposed by trampling and wind

and sand are funneled through this path. The path to the beach has a median handrail that serves to direct people directly down the slope. We recommend changing the angle of approach so the path goes diagonally down the slope between snow fencing on both sides (Frid and Evans 1995) or as a zigzag path with some hand rails. Wind fences have been found to be effective up to 22.5 degrees from perpendicular to the wind and this should therefore be a guiding design parameter in designing approach paths.

## **4.5 Public Access**

### **4.5.1 Trampling**

Dune vegetation is very sensitive to trampling by people and animals and will not recover unless this pressure is removed. We agree with providing three proposed access points (Trew Avenue, Nicole Boulevard and Glen Avenue North) that are identified in the Bluewater Beach Management Plan (Meridian Planning *et al.* 2005) We suggest there are two access points to the beach.

Board walks provide a comfortable surface for people to walk on and will reduce the impact of pedestrians on dune areas. Boardwalks in active dune systems are not often recommended as there is a tendency for them to be buried under drifting sand. However, where we are trying to build up a depleted dune system, a board walk can be elevated to allow wind and sand to blow underneath. This has been undertaken at Sauble Beach to allow people to cross the dunes from the street parking. Boardwalks should be wide enough to allow wheelchairs, strollers, etc., to move safely and allow passing of other pedestrians, recommended width (0.9 to 1.2 m).

We would like to suggest that a length of boardwalk that extends the length of the cut area in the sand dune be constructed from Trew Avenue towards the beach for approximately 15 m. We suggest that the boardwalk be approximately 0.5 m above the ground and built in sections. Each 8' section would rest on movable pads that can be raised up, as the dune beneath builds up (Figure 5). Lifting of the sections would be undertaken when necessary in the spring.

### **4.5.2 Access from Nicole Boulevard**

The access down the slope from Nicole Boulevard is steep and unstable and if left in its current orientation will continue to funnel sand. Paths are recommended to be oriented diagonally to the prevailing wind to prevent further erosion. We suggest that a zigzag route down slope is preferred with a hand rail on one side and snow fencing on the other (Figure 4). A gradient of no more than 7 degrees is recommended.

### **4.5.3 Access from Glen Road North**

At present there are a series of large boulders defining the southerly edge of the park property and access is across a rough area. According to residents, this access route is frequently used. The gullying or blowout area is not bad along this path.

#### **4.5.4 Beach Access**

We recommend two access points between the paths and the beach. These could well be gateways providing a visual indication of the approved pathways across the dune system. We recommend that a post and rail fence be installed along the beach at a similar distance from the water to the property boundaries on either side of the beach (Figure 6). Such a fence would connect to the fences of the adjacent properties. On the landward side of the fence, snow fencing would be attached to provide sand entrapment and a build-up of the fore dunes. It is expected that in three to five years this fence may well be buried, though this will depend on Lake Huron water levels, wind events and the sand supply from along the coast.

#### **4.6 Vehicular Control**

The most damage to the dune system is caused by wheeled vehicles and it is imperative that all wheeled vehicles be prohibited from the beach. This includes non-motorized dirt bikes, as well as any motorized vehicles. The best way to undertake this control is by signage, informing all the local residents that it is unacceptable behaviour, if they wish to preserve the dune system and prevent sand from blowing onto their properties. It is therefore in their best interests to educate and discuss this with the offenders. Signage has been erected by the township (Figure 10).

The preferred method of control is through making it difficult to access the area and we suggest the use of large boulders as already exists at Trew Avenue and Glen Avenue North, but that these are flanked by chain link fencing adjacent to private properties. While it will be advisable to install chain link fencing round the whole perimeter of the park in the long-term, the most vulnerable area currently is from the end of Trew Avenue.

#### **4.7 5-year Management Plan**

Table 1 shows the 5-year plan - recommended activities for restoration of Bluewater Beach

##### **4.7.1 Year 1 (2007)**

A phased implementation plan is proposed in this document. The Phase 1 report provided a biological description of the area together with recommendations for protection in 2006. Some fencing was implemented in the late summer and signage erected (Figures 11 and 12)

The effect of the preliminary fencing was assessed to determine whether it has stood up well to the weather and has started to accumulate sand around its base. The fencing generally appeared to be in good shape. One snow fence across the blow out section by Nicole Avenue had been tampered with, however the Bluewater Beach committee was aware of this damage

and will fix it in the spring of 2007. All of the snow fences had a minimum of 6 to 8" of sand built up around their bases (Figures 13 and 14).

### **Fencing / Exclosure Construction**

If any of the erected fencing is down or damaged it should be replaced. If there are any locations where vehicles are gaining access to the area, these locations should be fenced with stout fencing and signage erected indicating vehicles are prohibited for using the beach area.

We recommend that two exclosures be erected in areas that represent locations where dune grasses will predominate and where a mixture of grasses and shrubs will dominate. Exclosures should be constructed in the same way that the sand stabilization fences are built with wooden slatted snow fencing and t-bar stakes with the fencing wired to the stakes. It is recommended that the exclosures be approximately 12' x 12' and be located in bare sand areas, one adjacent to the fore dunes and one adjacent to the mid dune area. Once installed, the amount of vegetation should be recorded both with a drawing of the distribution of plants and a photograph, with information as to the date erected and when the first survey was done. We recommend that the revegetation inside the exclosure be monitored twice a year, in early spring and late summer. Information from the revegetation can be used for educational purposes, as well as providing guidance as to whether any actual replanting of the dunes might be required. If no colonization occurs in the exclosures after two summer seasons, then plans should be made for some revegetation using native grasses.

### **Clean-up**

We recommend that the community liaison group organize a spring clean-up on site to remove any garbage that might have accumulated through the winter months. It is strongly suggested that coordination with the municipality occur and that if larger items of garbage are found, they be removed by municipal staff.

### **Monitoring**

It is very important that a standardized method be established for measuring the progress of the restoration of the site. It is recommended that vegetation be survey undertaken annually for five years to determine whether the various initiatives that are implemented work properly and are maintained. This provides information to management on a regular basis and facilitates adaptive management if required to accommodate changing circumstances.

Identify non-native invasive trees and shrubs on the site. Such vegetation may be important for stabilizing sand and be valuable aesthetically in the short term. However, plans to replace such vegetation with native material would enhance the value of the site and may be undertaken within the 5-year plan.

## **Fundraising**

The municipality is planning to apply for funding to assist in the cost of building boardwalks and fencing to assist in restoring and maintaining the dune features of this park. It is also recommended that the advisory committee work with the residents and other interested parties to undertake fund-raising to assist the community in achieving their goals.

## **Reporting**

A report should be provided to the Mayor and council on an annual basis for the following five years to report on the various initiatives for restoring the park. This will provide valuable information regarding the success of the various initiatives and will inform the larger community on what can be achieved in stabilizing and improving natural areas along the shoreline.

### **4.7.2 Year 2**

## **Fencing Construction**

Review the site in the spring and repair any fencing on site as necessary.

## **Clean-up**

We recommend that the community liaison group organize a spring clean-up on site to remove any garbage that might have accumulated through the winter months. It is strongly suggested that coordination with the municipality occur and that larger items of garbage, if located, be removed by municipal staff.

## **Pathway/Stairs**

If funding has been obtained, the boardwalks and handrails may be installed. Discussion over the best access method from Nicole Boulevard should be undertaken, i.e., zigzag pathway with handrail or stairs. The boardwalk from Trew Avenue should be constructed to allow the dune system to start rebuilding.

## **Monitoring**

The monitoring program should be implemented with results provided for the annual report at the end of the summer.

## **Planting**

Depending on the location, it may be reasonable to plant some trees and shrubs where removals of invasive, non-native species are anticipated. The removal of non-native species can take place when new stock becomes established.

## **Fundraising**

The success of the fundraising should be reviewed and additional initiatives embarked upon should the sources of funding be insufficient for accomplishing the major goals.

## **Reporting**

An annual report should be provided to council in the fall. The report should provide details on the results of fundraising, the changes to the dune vegetation and any other information that would be useful in modifying the management actions for the subsequent year. Budget requirements for the following year should also be included.

### **4.7.3 Year 3**

#### **Fencing Construction/ Park Entrance**

If necessary, additional fencing may be required to control sand movement in the blow out areas, and between the fore and back dune systems. Depending on the success of the implementation plans to date plans for perimeter fencing should be undertaken and budget estimates prepared together with potential revenue sources. Requests for grants and other sources of money should be prepared and submitted.

It is suggested that park entrances be installed at least at Nicole Boulevard and Trew Avenue to provide a sense of place and that one is entering a special site. The design and costing should be worked out if this is generally accepted as a valuable contribution.

#### **Clean-up**

We recommend that the community liaison group organize a spring clean-up on site to remove any garbage that might have accumulated through the winter months. It is strongly suggested that coordination with the municipality occur and that larger items of garbage if located be removed by municipal staff.



## **Pathway/Stairs**

It is assumed that these will have been constructed in year two, but if not they should be undertaken now. At least biannual walks through the property should be undertaken to identify any remedial management activities that may be required.

## **Planting**

It may be possible at this time to plant trees and shrubs in various areas, either to assist with the restoration or to improve the aesthetics.

## **Monitoring**

The monitoring program should be implemented with results provided for the annual report at the end of the summer.

## **Fundraising**

Proposals for fencing the perimeter of the park should be undertaken and estimates obtained. Applications to various organizations and agencies should be planned to ensure that sufficient funding is obtained.

## **Reporting**

An annual report should be provided to council in the fall. The report should provide details on the results of fundraising, the changes to the dune vegetation and any other information that would be useful in modifying the management actions for the subsequent year. Budget requirements for the following year should also be included.

### **4.7.4 Year 4**

## **Fundraising**

It is assumed that the fundraising for fencing and other management activities was successful. If not, the other sources should be sought and new applications prepared and submitted.

## **Fencing Construction**

Providing funding is available, perimeter fencing should be undertaken to delineate the property. The design of such fencing will depend to an extent upon an assessment of the need for it and upon available funding.

### **Clean-up**

We recommend that the community liaison group organize a spring clean-up on site to remove any garbage that might have accumulated through the winter months. It is strongly suggested that coordination with the municipality occur and that larger items of garbage if located be removed by municipal staff.

### **Monitoring**

The monitoring program should be implemented with results provided for the annual report at the end of the summer.

### **Reporting**

An annual report should be provided to council in the fall. The report should provide details on the results of fundraising, the changes to the dune vegetation and any other information that would be useful in modifying the management actions for the subsequent year; budget requirements for the following year should also be included.

#### **4.7.5 Year 5**

### **Fencing Construction**

The perimeter fencing should be completed if it was not able to be undertaken completely in year four. It may be possible to remove some fencing, if the revegetation has been rapid. However, it is likely that the sand fencing should remain until it is either buried by sand or revegetation has been sufficiently successful that it is no longer required. It should probably be removed after 10 years at the most.

### **Clean-up**

We recommend that the community liaison group organize a spring clean-up on site to remove any garbage that might have accumulated through the winter months. It is strongly suggested that coordination with the municipality occur and that larger items of garbage if located be removed by municipal staff.

### **Monitoring**

The monitoring program should provide results for the 5-year report at the end of the summer. If the restoration has been successful it may be possible to cease monitoring on an annual basis, but to return every five years for an assessment.

## **Fundraising**

It is assumed that the fundraising by both the township and the community has been successful. Decisions as to whether it should be continued would be made by staff and the advisory group and recommendations provided in the 5-year report.

## **Reporting**

A consolidated report should be prepared that outlines all the activities undertaken during the previous five years including the successes and failures of the restoration plan. This will provide a framework for other ecological restoration activities that the township may wish to embark upon.

## **5.0 CONCLUSIONS**

### **5.1 Dune Protection**

The primary goal of the project is to protect the dune and beach system from any further degradation. This will be accomplished by the installation of various types of fencing that will limit access to wheeled vehicles, and reduce trampling through the dunes and the number of paths that are made within the dune system.

### **5.2 Signage**

Some basic signage has already been erected to explain to people why fencing is being installed and how they can help to protect the fragile dune ecosystem. Further signage will be developed to address the educational aspect of dune protection and why this is important.

### **5.3 Education**

The majority of damage to the dune system is a result of human activities. To protect the system and restore it requires education of all visitors. Information will be prepared which can be used by the Township of Tiny and the Bluewater Beach Conservation Group. This will be an ongoing task.

It is recommended that the local schools also become involved, for although many of the visitors do not attend local schools, an improved awareness of the ecology of the system will be transmitted to all visitors and acceptable behaviour encouraged.

## 6.0 REFERENCES

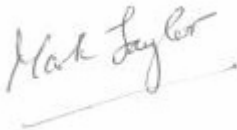
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Prepared by:

Reviewed by:



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Mark Taylor  
Senior Environmental Scientist

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Andreas Stenzel  
Head, Environmental Assessment



**Figure 1: Location map for Bluewater Beach**





Figure 2: Vegetation community polygons



# Bluewater Beach Signage Recommendations

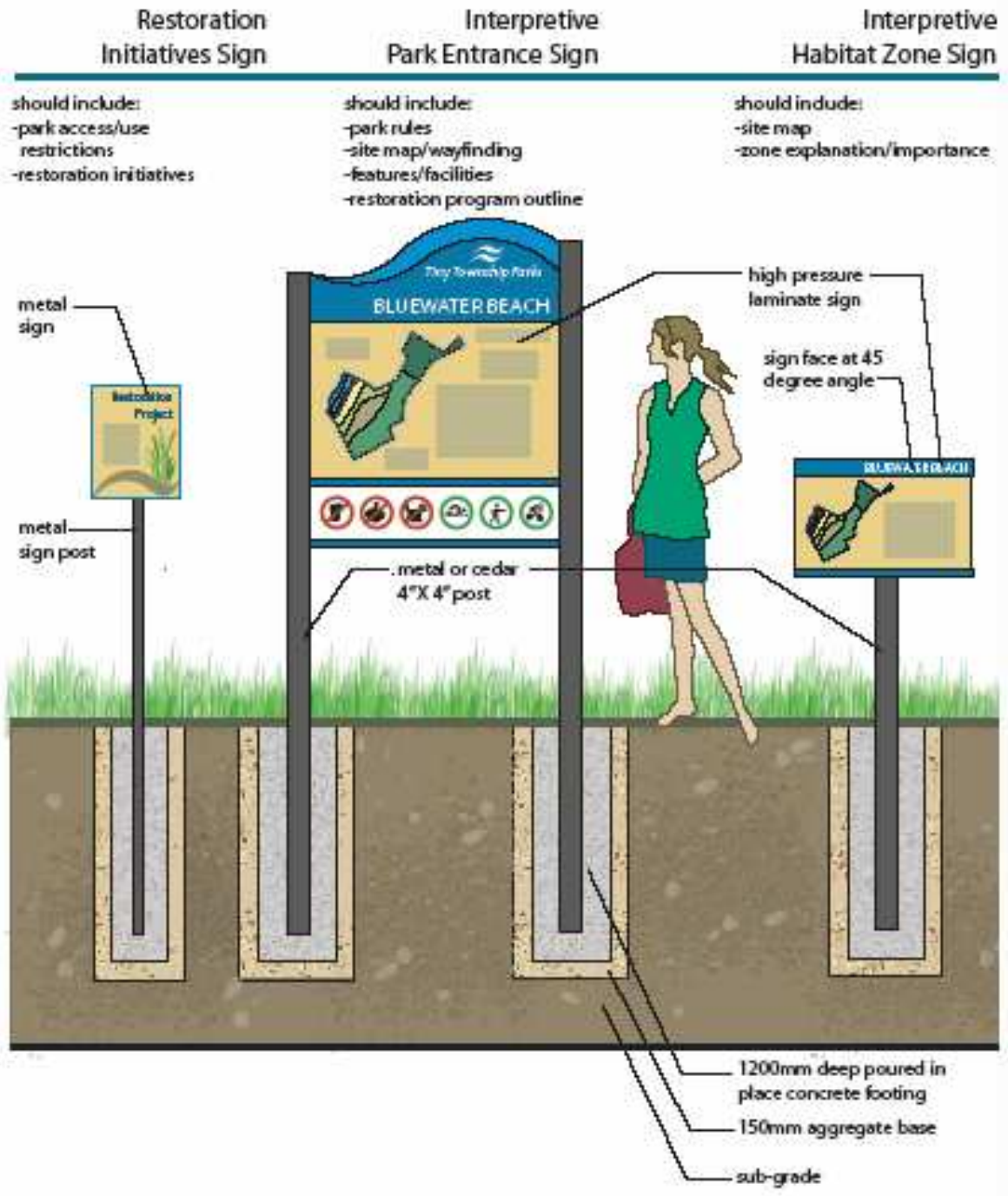


Figure 3: Interpretive signage for Bluewater Beach



Figure 4: Restoration areas map showing fencing locations

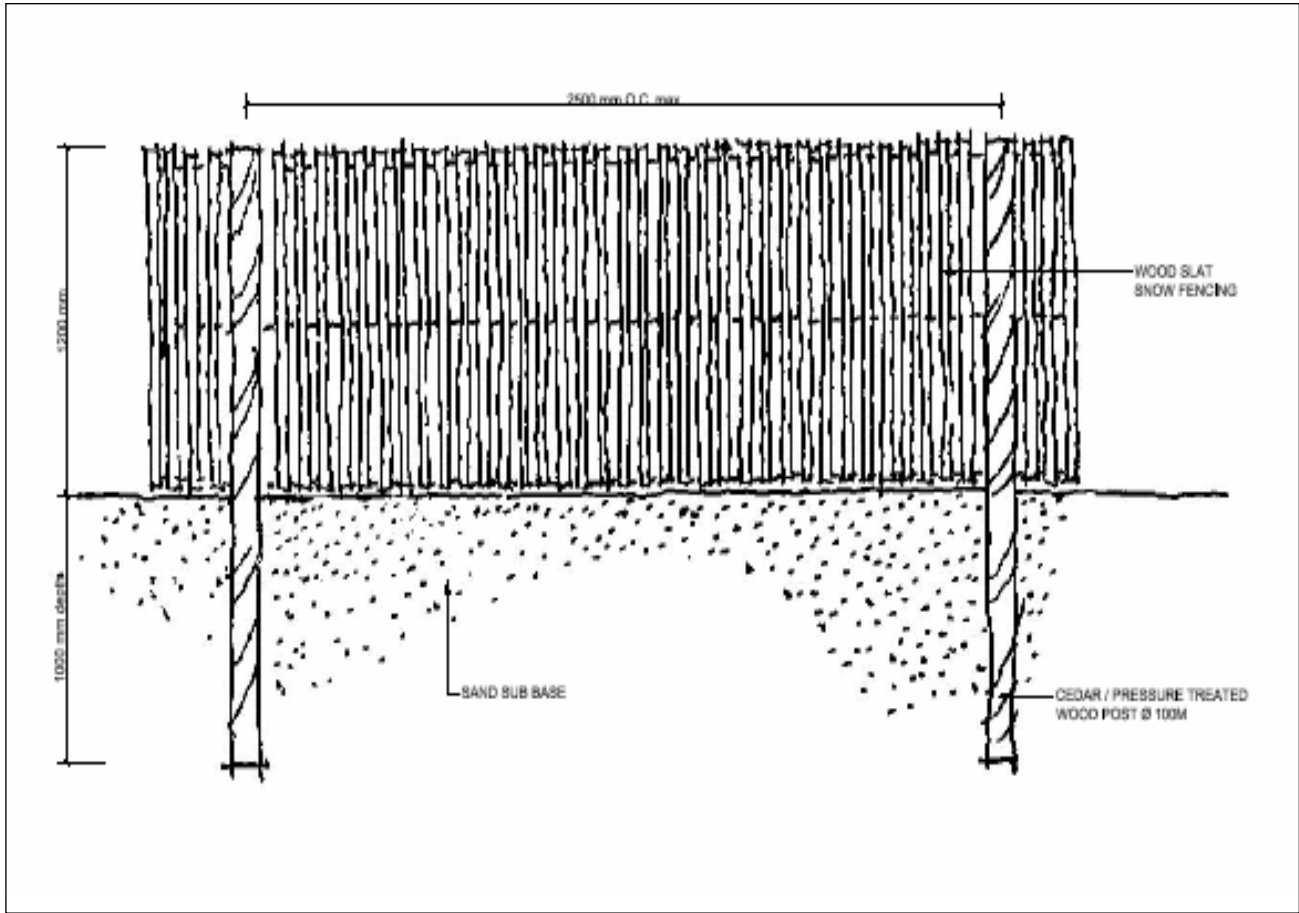
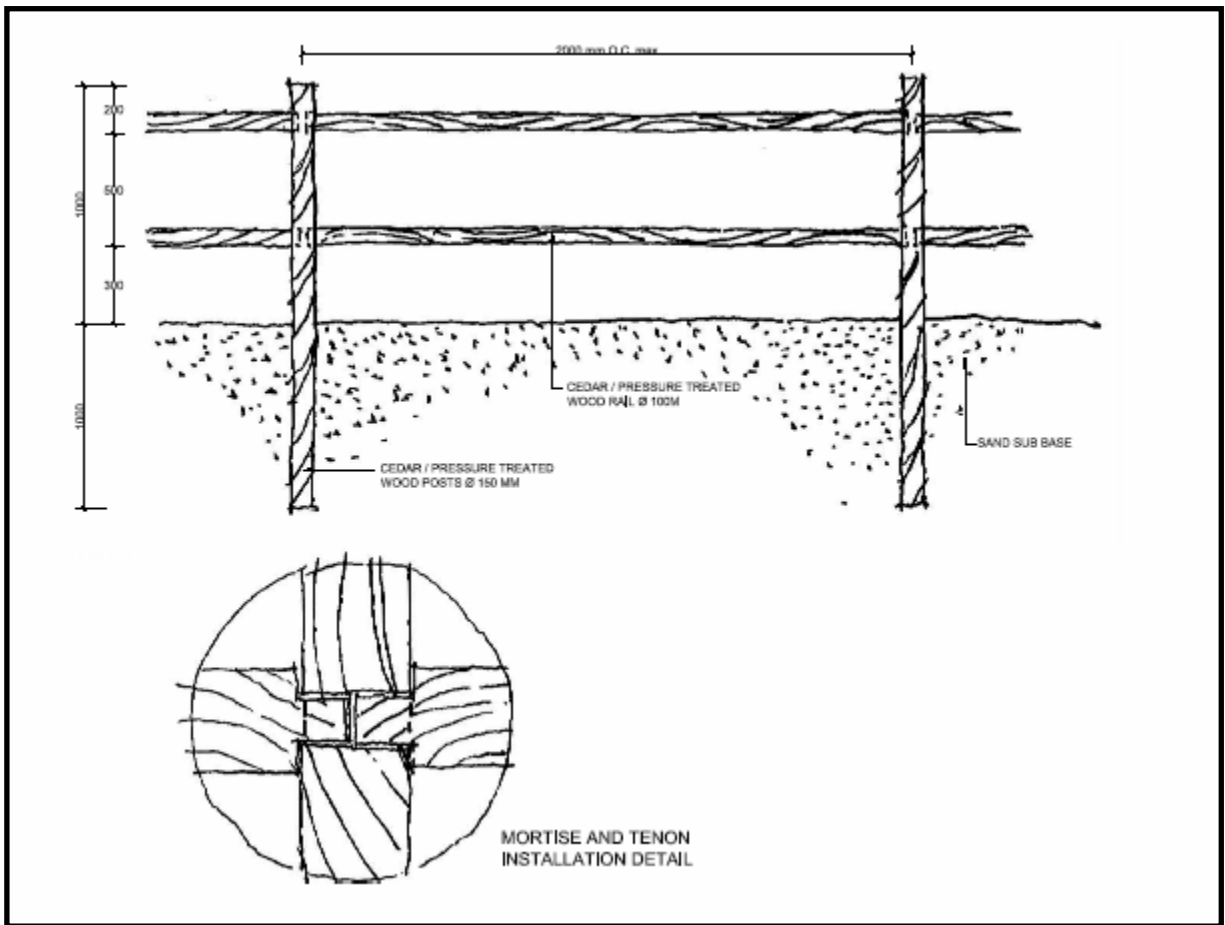


Figure 5: Detail of snow fencing



**Figure 6: Farm fencing detail between beach and dune system and for the end of Trew Avenue**





**Figure 7: An example of an exclosure**



**Figure 8: An Example of an exclosure**

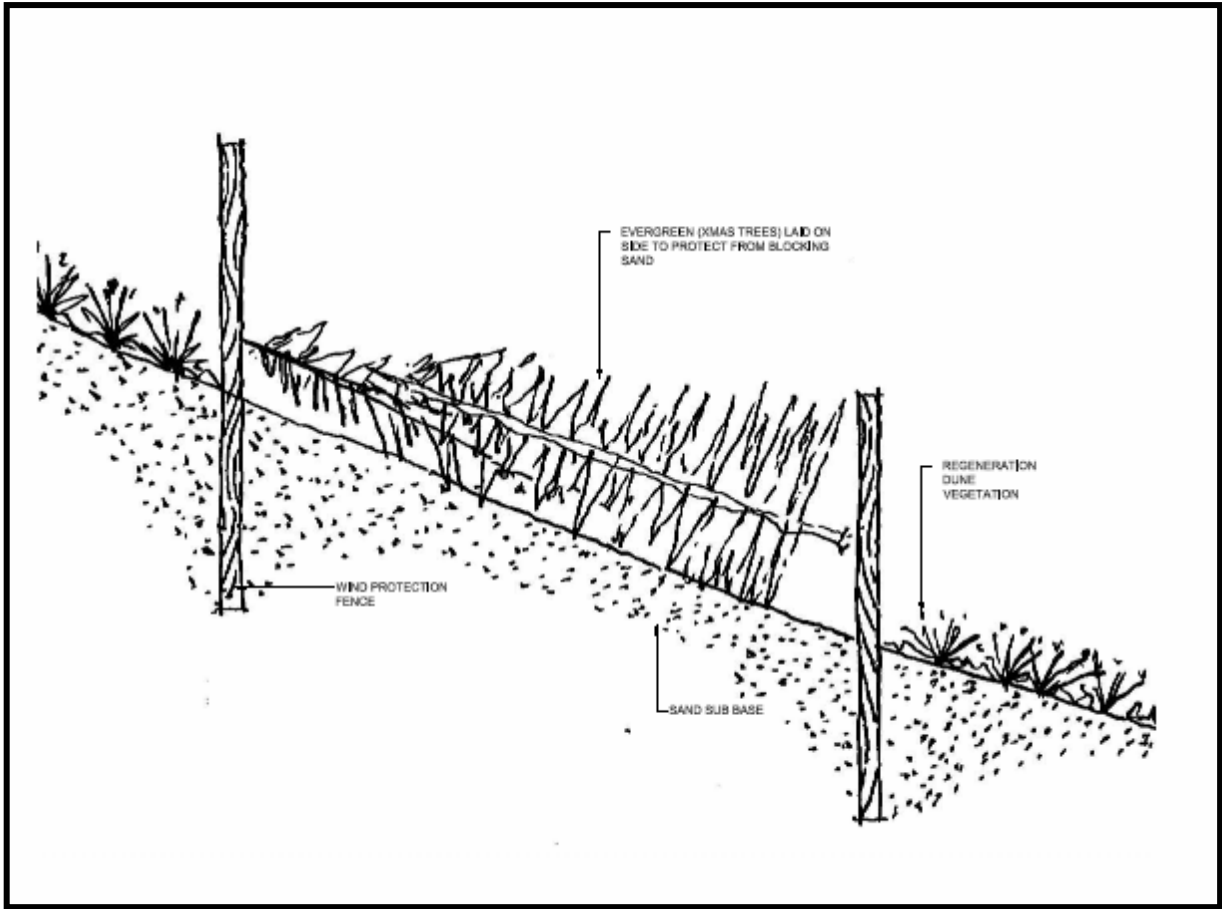


Figure 9: Detail of fencing for blow out areas



Figure 10: Signage of Bluewater Beach



**Figure 11: Snow fences erected at Bluewater Beach in the fall 2006**



**Figure 12: Snow fences erected at Bluewater Beach in the fall 2006**





**Figure 13: Sand build-up as a result of snow fence**



**Figure 14: Sand build-up as a result of snow fence**

**TABLE 1  
5-YEAR PLAN - RECOMMENDED ACTIVITIES FOR RESTORATION OF BLUEWATER BEACH**

<b>Activity</b>	<b>Year 1 (2007)</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>
<b>Township</b>					
Funding	Develop funding strategy and initiate applications, prepare 5-year budget plan.	Review expenditures, implementation costs	Develop application for perimeter fencing		
Fencing	Install two exclosures, fencing to prevent vehicular access.	Review 2006 fencing, fence major bare areas	Install park entrance ways.	Install perimeter fencing	Complete perimeter fencing
Paths	Construct paths (and steps?) from Nicola to beach.	Construct board walk from Trew Avenue	Improve path from Glen Avenue north		Review paths and boardwalks
Communications and signage	Provide spring information package for newsletter, review signage on site	Continue communications on annual basis	Continue communications on annual basis	Continue communications on annual basis	Continue communications on annual basis
Planting	Identify non-native trees for replacement	Remove non-native and replace with native trees and shrubs	Planting trees and shrubs as necessary		
Monitoring	Develop monitoring program to evaluate effectiveness of fencing, boardwalks and exclosures	Monitor plant growth in exclosures and by sand fences	Monitor plant growth in exclosures and by sand fences	Monitor plant growth in exclosures and by sand fences	Monitor plant growth in exclosures and by sand fences
Reporting	Combined report of advisory committee and staff to Council in fall	Combined report of committee and staff to Council in fall	Combined report of committee and staff to Council in fall	Combined report of committee and staff to Council in fall	Combined 5-year report of committee and staff to Council in fall
<b>Community</b>					
Site clean-up	Spring clean-up of garbage	Spring clean-up of garbage	Spring clean-up of garbage	Spring clean-up of garbage	Spring clean-up of garbage
Fundraising	Develop goals for fundraising	Fundraise	Fundraise	Fundraise	
Monitoring	Assist township as required	Assist township as required	Assist township as required	Assist township as required	Assist township as required
Planting			Depending on effect of exclosures to permit regeneration planting of native grasses	Depending on effect of exclosures to permit regeneration planting of native grasses	

## APPENDIX 1

### PLANT COMMUNITY DESCRIPTIONS FOR BLUEWATER BEACH

#### Bluewater Beach

**Polygon:** 1

**Community Type:** Open Water - OAO

**Description:**

The open water of Lake Huron.



## **Bluewater Beach**

**Polygon:** 2

**Community Type:** Open Mineral Beach – BB01

### **Description:**

An open mineral beach along the edge of Georgian Bay. This beach is distinctive in that it has a strip of cobblestones running parallel to the Lake.



## Bluewater Beach

**Polygon:** 3

**Community Type:** Little Bluestem-Switchgrass-Beachgrass Open Dune Type-SD01-1

### **Description:**

An open sand dune system comprised of American Beach Grass (*Ammophila breviligulata*), Spotted Knapweed (*Centaurea maculosa*), Lance-leaved Coreopsis (*Coreopsis lanceolata*), Poverty Oat Grass (*Danthonia spicata*), Little Bluestem (*Schizachyrium scoparium*), Mossy Stonecrop (*Sedum acre*), Canada Goldenrod (*Solidago canadensis*), Goat's beard (*Tragopogon dubius*), Tufted Vetch (*Vicia cracca*), Riverbank Grape (*Vitis riparia*), Canadian Wild Rye (*Elymus canadensis*), Eastern Bracken Fern (*Pteridium aquilinum*), Poison Ivy (*Rhus radicans*), Helleborine (*Epipactis helleborine*), Scouring rush (*Equisetum hyemale*), Star-flowered Solomon's-seal (*Maianthemum stellatum*), White Sweet Clover (*Melilotus alba*), Balsam poplar (*Populus balsamifera*), Choke Cherry (*Prunus virginiana*), Staghorn Sumac (*Rhus typhina*).





## Bluewater Beach

**Polygon:** 4, 5, and 11

**Community Type:** Sand Cherry Shrub Sand Dune – SDS1-1

### Description:

A shrubby sand dune community dominated by Northern Dwarf Cherry (*Prunus pumila*). Other species include; American Beach Grass (*Ammophila breviligulata*), Hairy Puccoon (*Lithospermum caroliniense*), Tall Wormwood (*Artemisia campestris*), Common Milkweed (*Asclepias syriaca*), Bebb's Sedge (*Carex bebbii*), Spotted knapweed (*Centaurea maculosa*), Seaside Spurge (*Chamaesyce polygonifolia*), Canadian Wild-rye (*Elymus canadensis*), Quack Grass (*Elymus repens*), Field Horsetail (*Equisetum helleborine*), Rocky Mountain Fescue (*Festuca saximontana*), Baltic Rush (*Juncus balticus*), Common Gromwell (*Lithospermum officinale*), Peppermint (*Mentha x piperita*), Common Evening-primrose (*Oenothera biennis*), Silverweed (*Potentilla anserina*), Shrubby Cinquefoil (*Potentilla fruticosa*), Little Bluestem (*Schizachyrium scoparium*), Canada Goldenrod (*Solidago canadensis*), Perennial Sowthistle (*Sonchus arvensis*), Sand Dropseed (*Sporobolus cryptandrus*), Colts foot (*Tussilago farfara*), Riverbank grape (*Vitis riparia*), Manitoba maple (*Acer negundo*), Green Ash (*Fraxinus pennsylvanica*), Scots Pine (*Pinus sylvestris*), Balsam poplar (*Populus balsamifera*), Carolina Poplar (*Populus x canadensis*), Shining Willow (*Salix lucida*).



## Bluewater Beach

**Polygon:** 6, 7, and 8

**Vegetation Type:** Shrub Sand Dune - SDT1

### Description:

A shrubby dune system on a steep embankment that divides the treed dune system from the open dune system. Species include; Smooth rose (*Rosa blanda*), Little Bluestem (*Schizachyrium scoparium*), Canada Soapberry (*Sheperdia canadensis*), Sand Dropseed (*Sporobolus cryptandrus*), Porcupine Grass (*Stipa spartea*), Riverbank Grape (*Vitis riparia*), Tall Wormwood (*Artemisia campestris*), Canadian Wild-rye (*Elymus Canadensis*), Star-flowered Solomon's-seal (*Maianthemum stellatum*), Common Evening-primrose (*Oenothera biennis*), Shrubby cinquefoil (*Potentilla fruticosa*), Red Osier Dogwood (*Cornus stolonifera*), Common Juniper (*Juniperus communis*), White Spruce (*Picea glauca*), Eastern White Pine (*Pinus strobus*), Balsam poplar (*Populus balsamifera*), Sand Cherry (*Prunus pumilla*), Choke cherry (*Prunus virginiana*).





## Bluewater Beach

**Polygon:** 9, 10

**Vegetation Type:** Treed Sand Dune- SDT1

### **Description:**

A treed sand dune system largely dominated by a heterogenous mix of conifer and deciduous tree species. Species include; Bracken fern (*Pteridium aquilinum*), Wild pea (*Lathyrus japonicus*), Starry Solomons Seal (*Maianthemum stellatum*), Wild grape (*Vitis sp*), Milkweed (*Asclepias syriaca*), Buffaloberry (*Shepherdia canadensis*), Smooth Wild Rose (*Rosa blanda*), Poison Ivy (*Rhus radicans*), Wormwood (*Artemisia caudata*), Basswood (*Tilia americana*), White pine (*Pinus strobus*), White spruce (*Picea glauca*), Pin cherry (*Prunus pennsylvanica*), Green ash (*Fraxinus pennsylvanica*), Mountain maple (*Acer spicatum*), Round- leaved dogwood (*Cornus rugosa*), Red oak (*Quercus rubra*), Paper birch (*Betula papyferous*), Black oak (*Quercus velutina*), Cedar (*Thuja occidentalis*), Red maple (*Acer rubrum*), Beaked hazel (*Corylus cornuta*), Red Osier dogwood (*Cornus stolonifera*), Serviceberry (*Amelanchier sp*).





## APPENDIX 2

### NATURAL HERITAGE INFORMATION CENTRE (NHIC) RANKING OF PLANT COMMUNITIES AND PLANT SPECIES

#### ***Provincial Rank (SRANK)***

These ranks are based on rarity and are used for both the species and community scale. The provincial ranks are based on; the estimated number of occurrences, the estimated community and aerial extent and the estimated range of the community within the province.

The provincial ranks are defined as follows:

- **S1**- Extremely rare in Ontario; usually 5 or fewer occurrences in the province, or very few remaining hectares.
- **S2**- Very rare in Ontario; usually between 5 and 20 occurrences in the province, or remaining hectares.
- **S3**- Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with some extensive examples remaining.
- **S4/S5**- These communities are considered provincially secure.

#### ***Global Community Ranks (GRANK)***

These global ranks are based on the U.S Nature Conservancy system that has been adopted by the Ontario Ministry of Natural Resources (OMNR). These ranks are used for ranking the rarity of communities. The two major criteria used in determining a community rank are the total number of occurrences and the total aerial extent of the community wide range. Secondary factors that are considered include; trends in status (such as expanding or shrinking range), trends in condition (e.g., declining condition of the remaining extent), threats and fragility (Grossman et al. 1994). The global ranks are based on The Nature Conservancy (U.S) (Natural Heritage Information Centre accessed July 25, 2006; [www. http://nhic.mnr.gov.on.ca/nhic\\_.cfm](http://nhic.mnr.gov.on.ca/nhic_.cfm)).

Global ranks are defined as follows:

- **G1**– Critically imperiled globally because of extreme rarity (5 or fewer occurrences very few remaining hectares) or because of some factors making this community particularly vulnerable to extinction.
- **G2**- Imperiled globally because of extreme rarity (6 to 20 occurrences or few remaining hectares) or because of some factor (s) making it very vulnerable to extinction throughout the range.
- **G3**- Either very rare and local throughout the range or found locally (even abundant in some locations) in a restricted range. In terms of occurrences
- **GQ**- Communities where there is uncertainty as to the validity of the global community rank.
- **G?**- An interim rank given until more information on the community becomes available.
- **G2Q**- A temporary assignment of G2 (some uncertainty surrounding this assignment.
- **G4/G5**- These communities are considered globally secure.

#### ***Provincially Ranked species at Bluewater Beach***

There are three provincially rare grass species located at Bluewater beach; Porcupine Grass (*Stipa spartea*), American Beachgrass (*Ammophila breviligulata*) and Hairy Puccoon

(*Lithospermum caroliniense*). All of these plants are S3 species, meaning that they are rare to uncommon in Ontario with only between 20 and 100 occurrences in the entire province (Natural Heritage Information Centre accessed July 25<sup>th</sup> 2006; [http://nhic.mnr.gov.on.ca/nhic\\_.cfm](http://nhic.mnr.gov.on.ca/nhic_.cfm))

**(1) Porcupine Grass (*Stipa spartea*)**



(Photo: US

environmental  
protection agency)

**(2) American Beachgrass (*Ammophila breviligulata*)**



(Photo E.R Degginger)

**(3) Hairy Puccoon (*Lithospermum caroliniense*)**



(Photo Mark Taylor)

***Provincially Ranked Communities at Bluewater Beach***

There are two rare, provincially ranked plant communities at Bluewater Beach:

- Sand Cherry Shrub Dune Type (Natural Heritage Information Centre accessed July 25, 2006; [http://nhic.mnr.gov.on.ca/nhic\\_.cfm](http://nhic.mnr.gov.on.ca/nhic_.cfm))
- Little Bluestem-Switchgrass-Beachgrass Open Dune Type (Natural Heritage Information Centre accessed July 25<sup>th</sup> 2006; [http://nhic.mnr.gov.on.ca/nhic\\_.cfm](http://nhic.mnr.gov.on.ca/nhic_.cfm)).

Both of these communities are ranked as S2 level communities, meaning that they are very rare in Ontario; usually between 5 and 20 occurrences in the province, or remaining hectares (Natural Heritage Information Centre accessed July 25, 2006; [http://nhic.mnr.gov.on.ca/nhic\\_.cfm](http://nhic.mnr.gov.on.ca/nhic_.cfm)). The Sand Cherry shrub dune communities are in polygons 4, 5, and 11 (Figure 1). The Little Bluestem-Switchgrass-Beachgrass open dune type is in polygon 3 (Figure 1).



## APPENDIX 3

### PLANT LIST FOR BLUEWATER BEACH

#### Bluewater Beach Complete Plant Species List and Rarity Rankings

<u>Family</u>	<u>Scientific Name</u>	<u>Common Name</u>	<u>GRANK</u>	<u>SRANK</u>
Aceraceae	<i>Acer negundo</i>	Manitoba Maple	G5	S5
Aceraceae	<i>Acer rubrum</i>	Red Maple	G5	S5
Rosaceae	<i>Amelanchier</i> sp.	Serviceberry sp.		
Poaceae	<i>Ammophila breviligulata</i>	American Beachgrass	G5	S3
Ericaceae	<i>Arctostaphyllum uva-ursi</i>	Evergreen Bearberry	G5	S5
Asteraceae	<i>Artemisia campestris</i>	Tall Wormwood	G5T5	S4S5
Asclepiadaceae	<i>Asclepias syriaca</i>	Common Milkweed	G5	S5
Betulaceae	<i>Betula papyrifera</i>	Paper Birch	G5	S5
Poaceae	<i>Bromus inermis</i>	Awnless Brome	G5T?	SE5
Cyperaceae	<i>Carex bebbii</i>	Bebb's Sedge	G5	S5
Celastraceae	<i>Celastrus scandens</i>	Climbing Bittersweet	G5	S5
Asteraceae	<i>Centaurea maculosa</i>	Spotted Knapweed	G?	SE5
Euphorbiaceae	<i>Chamaesyce polygonifolia</i>	Seaside Spurge	G5?	S4
Asteraceae	<i>Coreopsis lanceolata</i>	Lance-leaved Coreopsis	G5	S4
Cornaceae	<i>Cornus rugosa</i>	Round-leaved Dogwood	G5	S5
Cornaceae	<i>Cornus stolonifera</i>	Red Osier Dogwood	G5	S5
Poaceae	<i>Danthonia spicata</i>	Poverty Oat Grass	G5	S5
Poaceae	<i>Elymus canadensis</i>	Canadian Wild-rye	G5	S4S5
Poaceae	<i>Elymus repens</i>	Quack Grass	G5	SE5
Orchidaceae	<i>Epipactis helleborine</i>	Helleborine	G?	SE5
Equisetaceae	<i>Equisetum arvense</i>	Field Horsetail	G5	S5
Equisetaceae	<i>Equisetum hyemale</i>	Scouring-rush	G5T5	S5
Asteraceae	<i>Erigeron annuus</i>	Annual Fleabane	G5	S5
Poaceae	<i>Festuca saximontana</i>	Rocky Mountain Fescue	G5	S4
Rosaceae	<i>Fragaria virginiana</i>	Wild Strawberry	G5	S5
Oleaceae	<i>Fraxinus americana</i>	White Ash	G5	S5
Oleaceae	<i>Fraxinus pennsylvanica</i>	Green Ash	G5	S5
Juncaceae	<i>Juncus balticus</i>	Baltic Rush	G5	S5
Cupressaceae	<i>Juniperus communis</i>	Common Juniper	G5	S5
Leguminosae	<i>Lathyrus japonicus</i>	Beach Pea	G5	S4
Boraginaceae	<i>Lithospermum officinale</i>	Common Gromwell	G?	SE5
Boraginaceae	<i>Lithospermum carolinense</i>	Hairy Puccoon	G4/G5	S3
Liliaceae	<i>Maianthemum stellatum</i>	Star-flowered Solomon's-seal	G5	S5
Leguminosae	<i>Melilotus alba</i> Medikus	White Sweet Clover	G5	SE5
Lamiaceae	<i>Mentha x piperita</i>	Peppermint	HYB	SE4
Onagraceae	<i>Oenothera biennis</i>	Common Evening-primrose	G5	S5
Betulaceae	<i>Ostrya virginiana</i>	Ironwood	G5	S5
Pinaceae	<i>Picea glauca</i>	White Spruce	G5	S5
Pinaceae	<i>Pinus strobus</i>	Eastern White Pine	G5	S5
Pinaceae	<i>Pinus sylvestris</i>	Scots Pine	G?	SE5
Salicaceae	<i>Populus balsamifera</i>	Balsam Poplar	G5	S5
Salicaceae	<i>Populus deltoides</i>	Eastern Cottonwood	G5T5	SU
Salicaceae	<i>Populus x canadensis</i>	Carolina Poplar	HYB	SE1
Rosaceae	<i>Potentilla anserina</i>	Silverweed	G5	S5

## Bluewater Beach Complete Plant Species List and Rarity Rankings

<u>Family</u>	<u>Scientific Name</u>	<u>Common Name</u>	<u>GRANK</u>	<u>SRANK</u>
Rosaceae	<i>Potentilla fruticosa</i>	Shrubby Cinquefoil	G5	S5
Rosaceae	<i>Prunus pumila</i>	Sand Cherry	G5T?	S4?
Rosaceae	<i>Prunus virginiana</i>	Choke Cherry	G5	S5
Dennstaedtiaceae	<i>Pteridium aquilinum</i>	Eastern Bracken-fern	G5	S5
Fagaceae	<i>Quercus rubra</i>	Red Oak	G5	S5
Anacardaceae	<i>Rhus radicans</i>	Poison Ivy	G5T5	S5
Anacardaceae	<i>Rhus typhina</i>	Staghorn Sumac	G5	S5
Rosaceae	<i>Rosa blanda</i>	Smooth Rose	G5	S5
Polygonaceae	<i>Rumex triangulivalvis</i>	Willow-leaved Dock	G5	S4
Salicaceae	<i>Salix eriocephala</i>	Missouri Willow	G5	S5
Salicaceae	<i>Salix lucida</i>	Shining Willow	G5	S5
Poaceae	<i>Schizachyrium scoparium</i>	Little Bluestem	G5	S4
Cyperaceae	<i>Schoenoplectus pungens</i>	Common Three-square	G5	S5
Crassulaceae	<i>Sedum acre</i>	Mossy Stonecrop	G?	SE5
Eleagnaceae	<i>Shepherdia canadensis</i>	Canada Soapberry	G5	S5
Asteraceae	<i>Solidago canadensis</i>	Canada Goldenrod	G5T?	S5
Asteraceae	<i>Solidago juncea</i>	Early Goldenrod	G5	S5
Asteraceae	<i>Solidago nemoralis</i>	Gray Goldenrod	G5T?	S5
Asteraceae	<i>Sonchus arvensis</i>	Perennial Sowthistle	G?T?	SE5
Poaceae	<i>Sporobolus cryptandrus</i>	Sand Dropseed	G5	S4
Poaceae	<i>Stipa spartea</i>	Porcupine Grass	G5	S3
Asteraceae	<i>Symphyotrichum lanceolatum</i>	Panicled Aster	G5T5?	S5
Cupressaceae	<i>Symphyotrichum</i> sp	Aster sp.		
Cupressaceae	<i>Thuja occidentalis</i>	Eastern White Cedar	G5	S5
Tiliaceae	<i>Tilia americana</i>	American Basswood	G5	S5
Asteraceae	<i>Tragopogon dubius</i>	Goat's-beard	G?	SE5
Asteraceae	<i>Tussilago farfara</i>	Colt's-foot	G?	SE5
Ulmaceae	<i>Ulmus americana</i>	American Elm	G5?	S5
Scrophulariaceae	<i>Verbascum thapsus</i>	Common Mullein	G?	SE5
Leguminosae	<i>Vicia cracca</i>	Tufted Vetch	G?	SE5
Vitaceae	<i>Vitis riparia</i>	Riverbank Grape	G5	S5