



MARS ISLAND REPORT

March 2010

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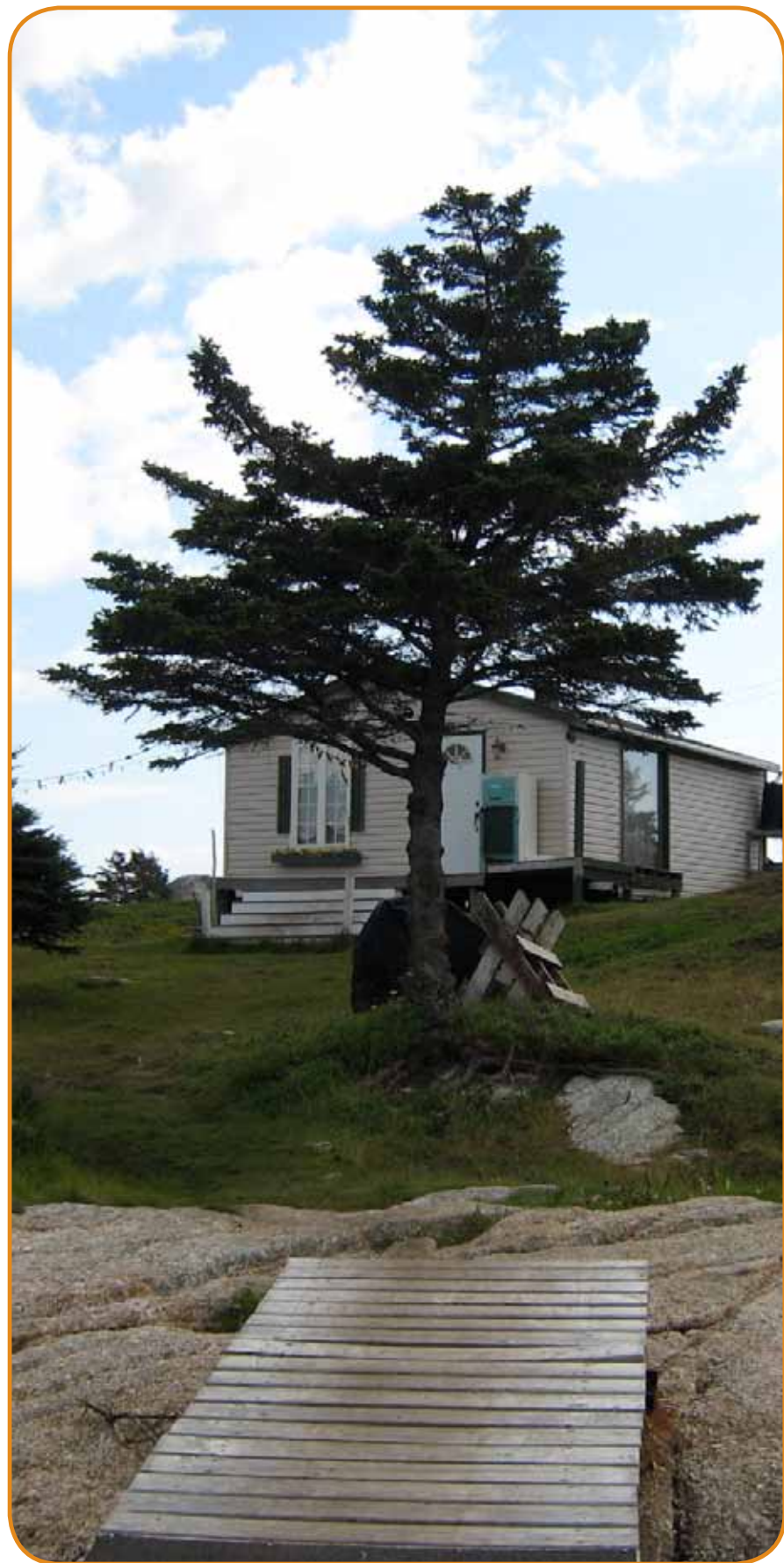
in Association with:
John Zuck & Associates



EKISTICS PLANNING & DESIGN



CONTENTS



CHAPTER 1: BACKGROUND 1

Island Narrative 1

Existing Usage 2

CHAPTER 2: PLANNING 5

Additional planning concerns 5

Development Opportunities and Constraints..... 5

Slope..... 5

Opportunities and Constraints..... 8

1..... Conservation: 8

3..... Potential Wharves: 8

4..... Potential Build Sites: 8

APPENDICES 11

Appendix 1..... 11

Planning District 4 Municipal Planning Strategy
Islands Designation/Land Use Policies 11

Appendix 2..... 11

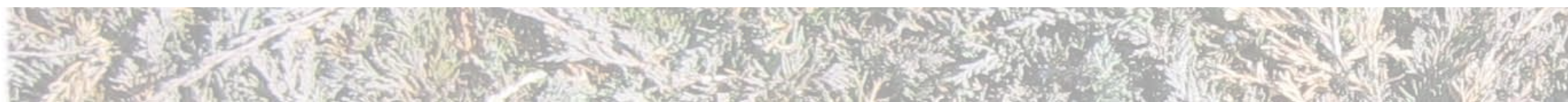
Planning District 4 Land Use Bylaw 11

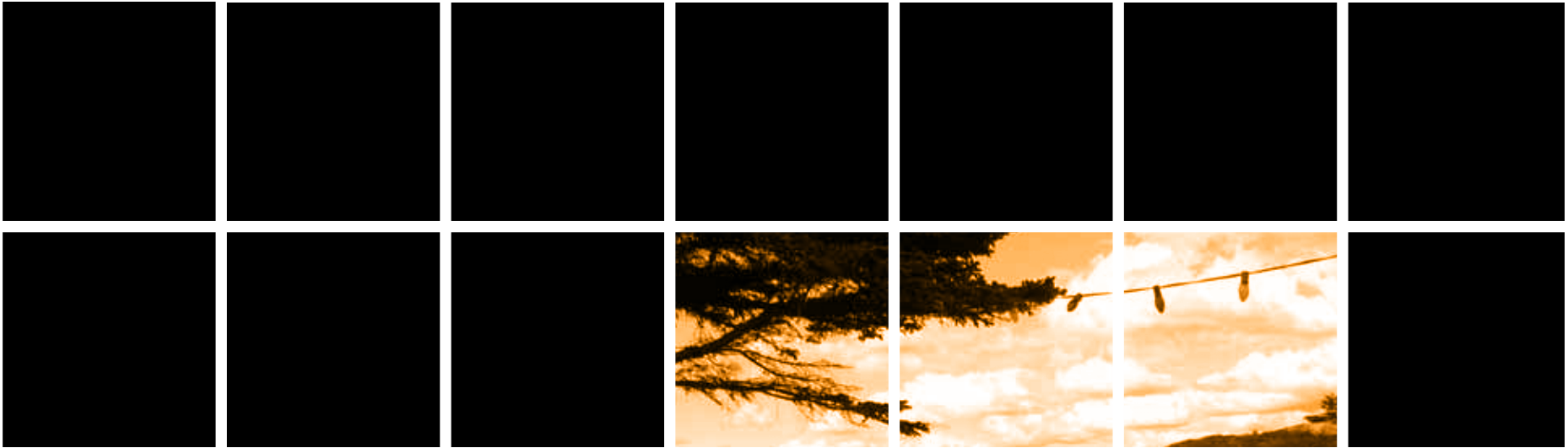
Appendix 3..... 12

Planning District 4 Land Use Bylaw 12

Appendix 4..... 12

Habitat and Botanical Survey of Mars Island by JACQUES WHITFORD LIMITED
Mike Crowell, M.Sc. Terrestrial Ecologist 12





CHAPTER 1: BACKGROUND

This study includes Mars Island (also known as Mosher Island) and the smaller Norris Island, among several islands lying in the approaches to Saint Margarets Bay near Lower Prospect, Nova Scotia. Mars Island is well-known locally as the site of the wreck of the SS Atlantic in 1873. Despite the heroism of local residents, there was an enormous loss of life.

Mars Island is accessible by small boat in most weather because the passage from the public landing area at Lower Prospect is relatively sheltered by islands and shoals. Although a small boat could be landed in several places on the landward side of Mars Island, there is one good anchorage that can be used by larger vessels. Most of the shoreline of this island is rock rising from the water, but there is a small sandy, beach in a cove on the eastern side that is a popular location for landing small boats.

The purpose of this report is to summarize biophysical and planning information about Mars Island in preparation for a discussion of the opportunities and constraints related to the long-term use and protection of the Island. This analysis concentrates on Mars Island because Norris Island is small and entirely exposed to the wind, waves, and salt spray.

In this phase of work, we have assembled base mapping from the Canadian Hydrographic Service navigation chart, Nova Scotia Department of Natural Resources (NSDNR) topographic mapping with five metre contours on the land, and NSDNR aerial photography. This base map was used to make a three-dimensional model that helps visualize the

landscape, views, and sun exposure.

We have also explored the island on foot. In October 2008, John Zuck and Peter Klynstra visited the island to have a preliminary look at the island and consider possibilities for access. In late October 2008, we returned with Mike Crowell, a senior terrestrial biologist, and spent a day walking most of the Island. Mike’s report is attached.

Based on our site visits and the biological survey of the island, we have prepared several maps to help interpret opportunities and limitations for future use of the island.

Island Narrative

Mars Island is a granite island of approximately 39 hectares with a generally steep, resistant shoreline.

The thin, rocky till supports extensive coastal bogs and barrens that provide habitat for rare arctic-alpine plants. The entire shore is exposed to the ocean, but the most extensive area directly affected by waves and spray is on the western side of the island. The most sheltered areas are found on the northern, landward side of the island. The spray zone is mostly bare rock, generally bare of vegetation. This area is above the normal high-water mark, but it is regularly scoured by storm waves and frequently receives salt spray. A low shrub coastal barren is found landward of the spray zone, but it is exposed to salt spray during storms, and is, at times, inundated by storm surge. A large part of the remainder of

the island is a tall-shrub coastal barren that provides a transition zone between the low shrub coastal barrens and the spruce-fir forest stands that occupy some of the more sheltered locations. Several wetlands have formed in depressions on the island, where drainage is restricted by topography and impervious bedrock.

The cove on the eastern side of the island is sheltered enough that it has a sandy bottom and a sandy beach. The beach is backed by a low dune and relatively low land behind that. The dune supports typical grasses and forbs, and the slack behind the dune includes poison ivy.

*Conservation Option:
Consider the possible advantages of future conservation easements, or donation of Norris Island, to a conservancy organization.*



Existing Usage

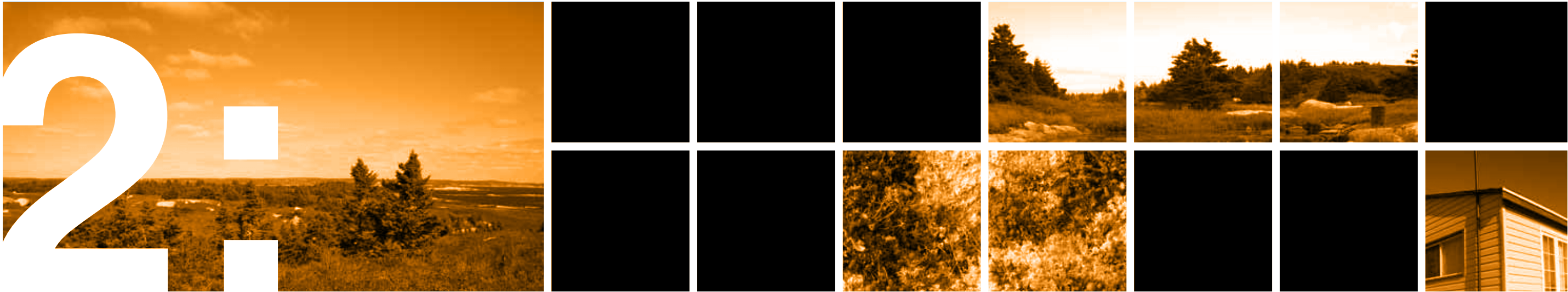
Several cabins have been built for seasonal use near the landward shore, facing the sheltered waterway and surrounding the deep, sheltered cove. Some of these cabins are accessed directly from the shore, but at least one has a wharf. There is evidence that there have been other wharf structures in this area. The cabin with the wharf structure is sited on a small cove and has a yard that is obviously cared for. Footpaths connect all of the cabins and provide access to the remainder of the island.

The sandy cove on the eastern side of the island seems to be a popular destination for people in small boats such as kayaks. Although there is evidence of use, including paths leading away from the beach, there is no sign of abuse related to beach use.









CHAPTER 2: PLANNING

Planning on Mars Island is governed by both the Regional Municipal Planning Strategy (RMPS) and the local Municipal Planning Strategy (MPS). Where there is any difference in provisions, the more stringent policy or bylaw applies. Planning policy in the RMPS and the MPS express the intention “to protect the natural environment of its islands and to prevent impact on neighbouring coastal communities by limiting the type and scale of development.” Although the MPS expresses the preference that islands should be publicly owned, both the MPS and the RMPS mandate land use controls that limit new development to residential uses on large lots. In addition, both plans specify that development permits will be considered by development agreement. The RMPS places Mars Island in the “Rural Commuter Designation” which provides an option for cluster development. The RMPS sets out additional policy that shall be considered in development agreements for islands:

S-18HRM shall consider residential development on islands within the Rural Commuter and Rural Resource Designations by development agreement. The development agreement shall consider the types of land uses to be included in the development which may only include single unit dwellings, aids to marine navigation and existing uses. In considering approval of such development agreements, HRM shall consider the following:

- (a) where provided, requirements for shore land parking areas for island residents;

- (b) the density of residential units on the site do not exceed 1 unit per 1.5 hectares;
- (c) that the proposed development does not significantly impact on natural features and that sufficient buffering between any natural features and the proposed development is provided;
- (d) the retention or provision of public access points, boat landing areas and waterfront parkland;
- (e) that no public roads are to be constructed on the island;
- (f) that no bridge, causeway or other permanent vehicular access with the mainland shall be constructed; and
- (g) requirements for any other matter relating to the impact of the development upon surrounding uses or upon the general community, as contained in Policy IM-15.

In addition, the RMPS requires a minimum 20 metre buffer zone around watercourses and along the coastline with the intention of protecting property, water quality, and wildlife habitat. Although the policy prohibits development within the buffer zone, it does provide for access, marine-dependent uses, and small-scale accessory buildings or structures. Along the coastline, a 2.5 metre vertical buffer zone is also

required with the additional intention of protecting property from rising sea level and storm surge.

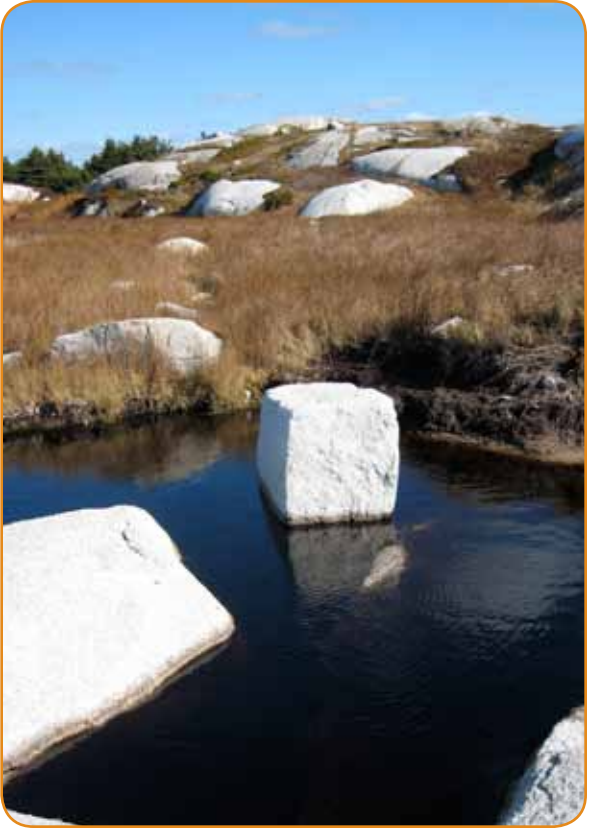
Excerpts from the relevant policy and bylaw documents are included in appendices to this report.

Additional planning concerns

Although they are not explicitly mentioned in island development policy, any development agreement would likely consider other public issues, including areas of cultural significance and areas of archaeological potential. Maps published as part of the RMPS indicate that the island has a relatively high cultural significance, and that there is significant potential for archaeological resources. The development agreement process might require an assessment of cultural value and evidence that it is being respected, and may require that any building site is assessed for archaeological value.

Development Opportunities and Constraints

Several factors can be mapped to inform a discussion of the opportunities and constraints related to the long-term use and protection of the Island. Opportunities are superimposed on each map to illustrate the relationship to the constraints.





0 75 150m



legend

Slope Mapping

- 0 - 2% Slope
- 2 - 12% Slope
- 12 - 100% Slope

Mars Island





0 75 150m



legend

Habitat Delineations

- Purple Crowberry
- Spray Zone
- Low Shrub Coastal Barrens
- Tall Shrub Coastal Barrens/Thicket
- Coastal Spruce
- Dunes
- Wetlands

Mars Island

March 2009

HABITAT PLAN



Slope

The slope map is based on our aerial photographic interpolation of the NSLF five metre contours. The slope map indicates areas of less than 2% slope that may be poorly drained; areas with slopes from 2% to 12%, which are most capable of development; and slopes greater than 12%, which in this sensitive environment we suggest should not be disturbed.

Habitat

The habitat map is based on Mike Crowells’ work, and delineates six main habitat areas. The map also indicates one known location of Purple Crowberry, the one rare, protected plant that indicates a sensitive habitat. Mike Crowell’s report is attached.

Opportunities and Constraints

This plan is based on eight assumptions:

1. The Primary Spray Zone is not suitable for development.
2. Wetlands are not suitable for development.
3. The low shrub coastal barrens are a very sensitive habitat containing some rare and protected plants and should, generally, be avoided.
4. Steep topography should be avoided.
5. The Halifax Regional Municipality (HRM) horizontal coastal setback requirement of twenty metres should be increased to at least thirty metres to preserve important coastal buffer vegetation, and the HRM required 2.5 metre vertical buffer should be increased to at least 5 metres.
6. A new wharf will be required. A private road will link any residential development on the island to the wharf.
7. Any residential development will maintain visual privacy.
8. You may wish to give permission for public access to the island.

With these factors in mind, we mapped five potential uses:

1. Conservation:

This area includes sensitive habitats and coastal setbacks. This area is about 29 hectares, or 75% of the Island.

2. Potential Build Zone:

This includes three areas inside the dashed red lines, totaling about 10 hectares, or 25% of the Island.

3. Potential Wharves:

Two areas appear to be suitable for wharf construction. Any small craft access would be from the north because of sea conditions. A suitable landing area would offer some protection from normal winds, reasonable on-shore topography, and acceptable water depth. Three existing landings are located on the north side of the Island. Two of them are located at the sites indicated on the plan for potential wharves. The third existing wharf is in the small cove at the extreme north-west end of the island off the Norris Passage, a very sheltered cove that can be reached by very shallow draft craft and by shallow draft craft at high tide. The channel to this wharf is dotted with large boulders that represent navigational hazards for anything much larger than a kayak. The other two locations have less shelter from the north-east, but have good shelter from summer and winter prevailing winds and from many of the storm winds of recent years. We have suggested a possible private road alignment that connects these wharf locations to potential build sites.

4. Potential Build Sites:

We have indicated, for discussion purposes, eleven fine home or cottage sites. These sites were selected for shelter, relative privacy, views, and, with the exception of site eleven, good access to the wharf. If we were to add “absolute visual privacy” as a site selection criteria, four of these sites would be removed from consideration. If visual privacy was not a consideration we could expand the number of units.

Because development must proceed by development agreement, planning policy must be respected, but particular zoning requirements may be modified. Any use other than single unit dwellings would require an amendment of the MPS and the RMPS.

5. Potential Public Access:

The small cove off of Norris Passage offers a safe landing place for small, very shallow draft boats in good weather. This landing offers access to a potential public trail system through the proposed conservation areas. The sandy beach is accessible by small craft in calm conditions. This landing could provide access to the beach amenity and a potential trail system through the proposed conservation areas





0 75 150m

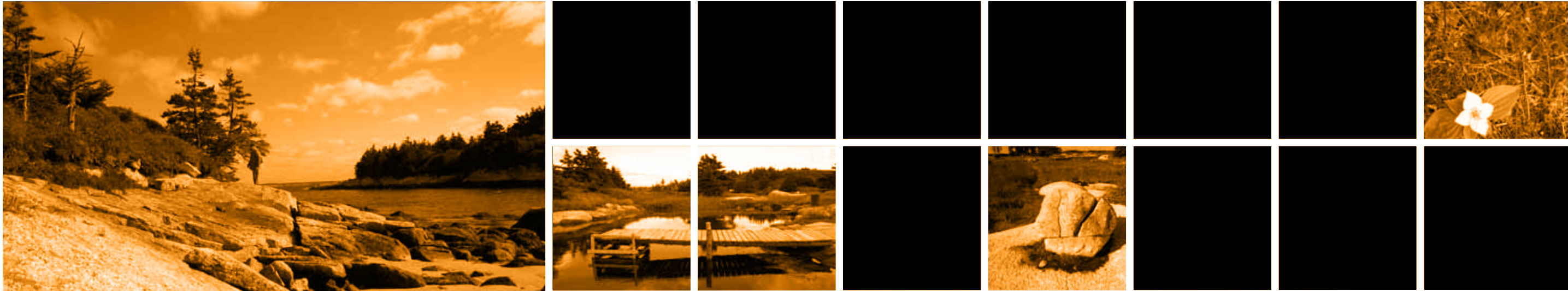
legend

- Potential Build Sites
- Potential Wharves
- Build Zone
- Potential Roads
- Potential Access Trail
- 30m Buffer
- Existing Cottage
- Contours (2.5m Interval)



Mars Island





APPENDICES

Appendix 1

Planning District 4 Municipal Planning Strategy Islands Designation / Land Use Policies

The Islands Designation is primarily intended to preserve this highly valued and sensitive natural environment and to protect the coastal communities of Planning District 4, by limiting the type and density of future development. The islands are considered incapable of supporting intensive development due to the limited soil cover and lack of freshwater supply. Intensive development can also generate excessive traffic and parking demands in the coastal communities which are serviced by narrow private lanes and contain limited vacant land areas. Such development can also destroy the delicate natural environment upon which many valued species of wildlife depend. The Islands Designation will, therefore, limit future development to single unit dwellings located on a minimum lot area of three acres, aids to marine navigation and all existing uses.

I-1 It shall be the intention of council to establish the Islands Designation as shown on Map1- Generalized Future Land Use. It shall be the intention of this designation to preserve the natural environment of this area and to protect the coastal communities of Planning District 4 by limiting the type and density of future development.

I-2 Within the Islands Designation, it shall be the intention of Council to create an islands zone which permits single unit dwellings on lots no less than three (3) acres in size, aids to marine navigation and all existing uses.

These undeveloped islands also contribute to the maintenance of the rural environment which is highly valued by local residents and the thousands of tourists who visit Planning District 4 annually. This in addition to the inherent natural value which these islands provide for wildlife, make these lands suitable for public acquisition. The Department of Natural Resources is, therefore, encouraged to acquire these privately owned islands for public purposes through a crown land exchange or any other means possible.

I-3 It shall be the intention of council to request the Nova Scotia Department of Natural Resources to acquire the privately owned islands located off the coast of Planning District 4.

Appendix 2

Planning District 4 Land Use Bylaw

3.16 USES CONSIDERED BY DEVELOPMENT AGREEMENT

Notwithstanding Section 3.15, certain uses which may not be listed as permitted uses in a zone may be considered in accordance with the development agreement provisions of the Planning Act. As provided for by Policies of the Municipal Planning Strategy for Planning District 4, such uses are:

As provided for in the Regional Municipal Planning Strategy for Halifax Regional Municipality, the following uses may be considered by development agreement on lands designated Rural Commuter:

- (i) a mix of residential, associated community facilities, home-based offices, day cares, small-scale bed and breakfasts, forestry and agricultural uses on new roads up to a maximum density of one unit per hectare, as per policy S-15 of the Regional Municipal Planning Strategy;
- (ii) a mix of residential, associated community facilities, home-based offices, day cares, small-scale bed and breakfasts, forestry and agricultural uses on new roads up to a maximum density of one unit per 4000 square metres, as per policy S-16 of the Regional Municipal Planning Strategy; and
- (iii) residential development on islands, as per policy S-18 of the Regional Municipal Planning Strategy. (RC-Jun 27/06; E-Aug 26/06)

Appendix 3

Planning District 4 Land Use Bylaw

PART 37: I (ISLANDS) ZONE

37.1 I USES PERMITTED

No development permit shall be issued to any I (Islands) Zone except for the following:

Single unit dwellings

Aids to marine navigation

All existing uses

37.2 I (ZONE REQUIREMENTS)

In any I Zone, no development permit shall be issued except in conformity with the following:

Minimum Lot Area 130,680 square feet (12 140 m2)

Minimum Frontage 250 feet (23.2 m)

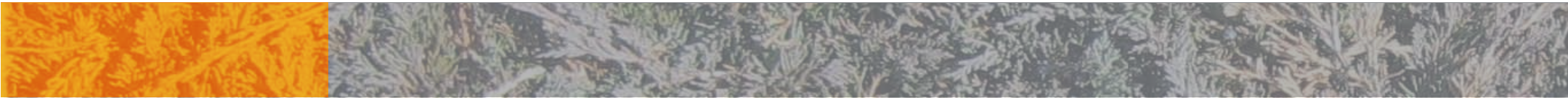
Minimum Front orFlankage Yard 30 feet (9.1 m)

Minimum Rear Yardor Side Yard 50 feet (15.2 m)

Appendix 4

Habitat and Botanical Survey of Mars Island by JACQUES WHITFORD LIMITED
Mike Crowell, M.Sc. Terrestrial Ecologist

Attached





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Project No. 1045378

December 17, 2008

Mr. Peter Klynstra
Ekistics Planning and Design
Suite 347, 15 Alderney Drive
Dartmouth, NS B2Y 2N2

Dear Mr. Klynstra:

Re: Habitat and Botanical Survey of Marrs Island

This report describes the results of a habitat and botanical survey conducted on Marrs Island on October 23, 2008. During the survey, all vascular plants encountered on the island were identified and recorded. The population status of each of the recorded species was assessed using the Atlantic Canada Conservation Data Centre (ACCDC) and Nova Scotia Department of Natural Resources (NSDNR) general status ranks. In instances where rare or sensitive species were encountered the location where the plants were found were recorded using a hand held global positioning system and the number of plants present were counted, where possible.

Terrestrial habitats present on the island were identified and described during the field survey. The locations where habitat descriptions were made were recorded using a hand held global positioning system. These locations were then transferred onto georeferenced satellite imagery of the island and were used to help determine the distribution of the habitats on the island.

Botanical Survey

Table 1 lists the 116 vascular plant species encountered on Marrs Island during the botanical survey. This is not an exhaustive list of vascular plants for the Island since many species would have senesced by the time of the survey. One of the plants encountered during the survey, purple crowberry (*Empetrum rubrum*) is “Yellow” listed by NSDNR indicating that the Nova Scotia population is considered to be sensitive to human activities and natural events. ACCDC lists this species as S2S3 indicating that it is considered to be rare to uncommon in Nova Scotia. Purple crowberry is found on headlands, barrens and bogs in Nova Scotia. It is most often found growing on rocky coastal barrens. On Marrs Island it was found growing in low shrub coastal barrens habitat at the edge of a small area of bedrock outcropping (Figure 1). Several shoots were observed at this location. It is likely that it is more abundant on the island than this one record would indicate. It was growing in close association with black crowberry (*Empetrum nigrum*) which is the most abundant species in the low shrub coastal barrens habitat type on Marrs Island. The two *Empetrum* species are similar in appearance and require close inspection of young shoots to distinguish them apart.

Habitat Survey

The results of the field survey revealed the presence of several terrestrial habitat types on Marrs Island including spray zone, low shrub coastal barrens, tall shrub coastal barrens, tall shrub thicket, dunes and wetlands. Each habitat is described in the following sections.

Spray zone

The spray zone is found on the most exposed areas of the island. It is most abundant on the eastern side of the island that faces the open Atlantic Ocean (Figure 1). This habitat is exposed to sea spray and overwash during storm events. It is also exposed to heavy winds. This extreme environment is characterized by low plant cover and low species richness. Plants persist in sheltered nooks and in fissures in the bedrock where soils can develop. Species that persist in this habitat are typically those that are tolerant of exposure to sea spray and strong winds or are weedy species that are adapted to highly disturbed habitats. These weedy species are able to quickly recolonize the habitat following disturbance rather than surviving the disturbance. Trees cannot survive in this habitat and few shrubs can persist here. The shrubs that can survive here are low trailing species that stay in the warmer and somewhat more sheltered boundary layer close to the ground surface. The most abundant shrub species of this habitat type are creeping juniper (*Juniperus horizontalis*) and black crowberry. The most abundant ground vegetation species include red fescue (*Festuca rubra*), bog goldenrod (*Solidago uliginosa*), Scot's lovage (*Ligusticum scoticum*), and roseroot stonecrop (*Sedum rosea*).

Low Shrub Coastal Barrens

The low shrub coastal barrens habitat is found landward of the spray zone habitat (Figure 1). This habitat is also exposed to heavy wind but is less exposed to sea spray than the spray zone habitat. This habitat type is chracterized by a nearly continuous mat of low shrub cover. Most of the shrub cover is less than 10 cm tall and the tallest shrub cover is generally less than 1 m tall. Black crowberry is the most abundant shrub species. Other common shrub species include northern bayberry (*Myrica pensylvanica*), late lowbush blueberry (*Vaccinium angustifolium*), Labrador tea (*Ledum groenlandicum*), and ground juniper (*Juniperus communis*). Tree cover is very sparse and consists of a few stunted white spruce (*Picea glauca*) growing in sheltered microsites. Ground vegetation cover is also fairly sparse and consists of species that are able to grow in peaty soils. Many of the dominant species are species that are typically found in bogs. The most abundant ground vegetation species found in this habitat type are bog goldenrod, Pickering's reed bent-grass (*Calamagrostis pickeringii*), cinnamon fern (*Osmunda cinnamomea*), blue-flag iris (*Iris versicolor*) and tufted leafless-bulrush (*Scirpus caespitosus*). It was in this habitat that the rare purple crowberry was found. The cool summer temperatures and exposure to heavy winds mimics the conditions found in arctic and alpine habitats. As such, these low shrub coastal barrens often provide habitat for a variety of arctic/alpine plant species. This habitat type is the most sensitive one on the island due to its ability to support rare vascular plant species.

Tall Shrub Coastal Barrens

Tall shrub coastal barrens are found in more sheltered areas than the low shrub coastal barrens and tend to form a band on the landward side of the low shrub coastal barrens (Figure 1). This habitat type typically forms a transition zone between the low shrub coastal bog and coastal spruce/fir forest. This habitat type is characterized by a dense cover of tall and low shrub species. Shrub height ranges from approximately 1 m to 2 m tall. The most abundant shrub species include green alder (*Alnus viridis*), possum-haw viburnum (*Viburnum nudum*), black huckleberry (*Gaylussacia baccata*), northern bayberry, black chokeberry (*Aronia melanocarpa*), and black holly (*Ilex verticillata*). Tree cover is more abundant than in the low shrub coastal barrens and consists of small patches of white spruce.

Tall Shrub Thicket

Tall shrub thicket habitat is found on relatively sheltered sites on the landward side of the island. This habitat is characterized by a dense canopy of tall shrubs, the most abundant of which are American mountain-ash (*Sorbus americana*), possum-haw viburnum, green alder, and mountain holly (*Nemopanthus mucronata*). The ground vegetation understory is well developed and consists largely of spinulose shield fern (*Dryopteris carthusiana*), marsh blue violet (*Viola cucullata*), dwarf dogwood (*Cornus canadensis*), and red raspberry (*Rubus idaeus*). Tree cover consists of small patches of white spruce. Tall shrub thicket is uncommon on the island and is difficult to distinguish from tall shrub coastal barrens on the aerial photography. As such, tall shrub thicket and tall shrub coastal barrens have been mapped as one unit on the habitat mapping (Figure 1).

Coastal Spruce/fir Forest

Coastal spruce/fir forest is present on the most sheltered locations on the island and forms a broad band of vegetation on the landward edge of the island where exposure to wind and salt spray are reduced substantially (Figure 1). Forest stands on the island are typically stunted and under 6 m in height. Trees are limby and there is often damage to the upper branches particularly on taller trees. The stands are composed almost entirely of white spruce and balsam fir (*Abies balsamea*) with scattered paper birch (*Betula papyrifera*) and red maple (*Acer rubrum*) also present. The shrub layer consists mainly of balsam fir seedlings with a few American mountain-ash and green alder scattered about. The ground vegetation layer consists of an almost continuous moss carpet that is punctuated by small patches of spinulose shield fern.

Dunes

A low dune system is present at the head of a long cove near the center of Marrs Island (Figure 1). The dune is very low with a relief of less than 50 cm. The vegetation of this habitat is characterized by a moderately dense cover of grasses and forbs with a patchy cover of low shrubs. Dominant ground vegetation species include American beachgrass (*Ammophila breviligulata*), slender wheatgrass (*Elymus trachycaulus*), red fescue (*Festuca rubra*), beach

pea (*Lathyrus maritimus*), Virginia rose (*Rosa virginiana*), and wild radish (*Raphanus raphanistrum*). Dune systems are typically sensitive to human activities due to the sensitivity of the vegetation and underlying sand substrate to physical disturbance. This particular dune system is less sensitive than most due to the very low height of the dune. Nevertheless, the vegetation in the habitat is sensitive to disturbance. In addition, this habitat contains large numbers of northern poison oak (*Toxicodendron rydbergii*) which causes severe dermatitis in many people. Sensitive individuals may develop dermatitis if they contact resins in the plants that have been released as a result of crushing the plants. The resins can also be volatilized and inhaled if the plants are burned resulting in pulmonary edema in sensitive individuals which can lead to death.

Wetlands

Six wetlands were encountered during the field survey. The locations of these wetlands are presented in Figure 1.

Wetland 1 is a small wetland complex composed of brackish marsh and wet meadow. The wetland is located at the northern end of the island on an isthmus that separates two small headlands. The brackish marsh is located adjacent to the shore and is exposed to seawater on very high tides. The vegetation of this wetland type consists of a graminoid sward composed largely of black-grass rush (*Juncus gerardii*), seaside goldenrod (*Solidago sempervirens*), freshwater cordgrass (*Spartina pectinata*), and blue-joint reedgrass (*Calamagrostis canadensis*). The second wetland type in this wetland complex is wet meadow which occurs on the landward side of the wetland where groundwater seepage and surface water inputs keep the groundwater fresh. This wetland type is characterized by a heavy cover of grass, moss and forbs, the most abundant of which are blue-joint reedgrass, sphagnum moss (*Sphagnum* spp.), rough goldenrod (*Solidago rugosa*), New Belgium American-aster (*Aster novi-belgii*), and freshwater cordgrass.

Wetland 2 is a marginal bog located just south of Wetland 1 in a low flat area. The wetland was relatively dry and contained only shallow peat deposits typically less than 30 cm thick. The plant species composition of the wetland was typical of that found in coastal bogs; however, sphagnum moss was notably absent. The adjacent low shrub coastal barrens habitat shared many of the same plant species making it difficult to differentiate the two habitats. Because wetlands are afforded a measure of legal protection in Nova Scotia, this marginal wetland was for the purposes of this report considered as wetland habitat. Wetland 2 is characterized by a dense cover of low shrubs. The most common shrub species include leatherleaf (*Chamaedaphne calyculata*), bog rosemary (*Andromeda glaucophylla*), black crowberry, creeping juniper, and large cranberry (*Vaccinium macrocarpon*). The ground vegetation layer is moderately well developed and consists mainly of narrow-leaved cotton-grass (*Eriophorum polystachion*), bog goldenrod, bog aster (*Aster nemoralis*), and Pickering's reed bent-grass.

Wetland 3 is another marginal coastal bog. This bog is found in a depression on a headland at the southern end of the island. It too supported little sphagnum moss cover and was relatively dry. Dominant shrub species include black



crowberry, northern bayberry, black huckleberry, and late low-bush blueberry (*Vaccinium angustifolium*). The ground vegetation layer is poorly developed and consists mainly of cinnamon fern (*Osmunda cinnamomea*), bog goldenrod, and Pickering's reed bent-grass.

Wetland 4 is a marginal low shrub basin swamp located in a shallow depression near the center of the island. Like other marginal wetlands on the island, this wetland is characterized by relatively dry conditions and low sphagnum moss cover. Trees are not present in the wetland and shrub cover consists of a dense cover of low shrubs including sweet bayberry (*Myrica gale*), leatherleaf, red raspberry, black chokeberry (*Aronia melanocarpa*), and northern bayberry. Ground vegetation cover is very sparse and consists mainly of small patches of sphagnum moss and crested shield-fern (*Dryopteris cristata*).

Wetland 5 is also located near the center of the island. It is a small coniferous treed basin swamp. This wetland has an open tree canopy composed of stunted balsam fir and black spruce. Under the tree canopy is a shrub layer composed of a mixture of tall shrubs including black holly (*Ilex verticillata*), possum-haw viburnum, northern bayberry, and green alder as well as saplings of black spruce. The ground vegetation layer consists of a moss carpet that is punctuated by small patches of ferns and forbs. The most abundant ground vegetation species include sphagnum moss, broom moss (*Dicranum* sp.), Schreber's moss (*Pleurozium schreberi*), whorled aster (*Aster acuminatus*), cinnamon fern, and twinflower (*Linnaea borealis*).

Wetland 6 is a coastal bog situated on a headland at the southern end of the island. The presence of this wetland was noted during the field survey but no description of the wetland was made. It is possible that other wetlands may be present on the island particularly in the forested areas. Small coniferous treed swamps such as Wetland 5 are difficult to distinguish from the surrounding forest habitat.

In Nova Scotia, wetlands are protected by the *Environment Act* (Activities Designation Regulations, 2007). Any project with potential to alter a wetland (filling, draining, flooding or excavating), including direct and indirect impacts, requires a Water Approval from Nova Scotia Environment prior to starting work. If the alterations exceed two hectares in area, the project is also subject to registration under the Environmental Assessment Regulations.

If the Water Approval is granted, wetland compensation is typically required to offset the loss of wetland habitat associated with the project. This can be a very expensive and time consuming process.

Wildlife

Incidental wildlife observations were made during the field survey. The timing of the survey (October 23) was not ideal for detecting wildlife, particularly migratory birds. The windy weather encountered during the field survey also limited the ability to detect wildlife. Three mammal species and nine bird species were noted during the field visit. Mammals recorded on the island included White-

tailed Deer (*Odocoileus virginianus*), Red Fox (*Vulpes vulpes*) and American Mink (*Mustela vison*). None of these species is considered to be rare or sensitive to human activities in Nova Scotia. All three of these species are quite tolerant of the presence of humans in their habitat.

Nine species of bird were encountered during the field survey including Short-eared Owl (*Asio flammeus*), Boreal Chickadee (*Poecile hudsonicus*), American Crow (*Corvus brachyrhynchos*), Blue Jay (*Cyanocitta cristata*), Pine Siskin (*Carduelis pinus*), Double-crested Cormorant (*Phalacrocorax auritus*), American Black Duck (*Anas rubripes*), Herring Gull (*Larus argentatus*), and Great Black-back Gull (*Larus marinus*). Two of these species, Short-eared Owl and Boreal Chickadee are species of conservation concern in Nova Scotia.

Short-eared Owls are listed as a species of "Special Concern" under the federal *Species at Risk Act* (SARA). This species is also "Yellow" listed by the Nova Scotia Department of Natural Resources (NSDNR) indicating that it is sensitive to human activity or natural events. Short-eared Owls nest in open habitats such as dyked wet meadows, marshes and bogs. They are usually found in coastal areas in Nova Scotia. Short-eared Owl numbers fluctuate substantially between years possibly in response to availability of important prey items such as meadow voles. Given the timing of the field survey, it is not possible to determine whether or not Short-eared Owls nest on Marris Island. This species can occur in the province at any time of the year and the Island provides suitable nesting habitat so there is potential for this species to nest on Marris Island. The low shrub coastal barrens habitat provides the best habitat for Short-eared Owls on Marris Island. During the field survey one Short-eared Owl was flushed from this habitat type near Wetland 3 at the southern end of the island.

Boreal Chickadee has recently been "Yellow" listed by NSDNR. Boreal Chickadees nest in coniferous forest and to a lesser extent mixedwood forest. They are cavity nesters and use woodpecker holes or rotten branch stubs as nesting sites. They are able to nest in young conifer stands but require older stands as winter habitat. This species is still fairly common in Nova Scotia; however, there are concerns regarding its future in Nova Scotia due to loss of mature coniferous forest and possible declines in boreal forest cover in Nova Scotia due to global warming. A small flock of Boreal Chickadees was encountered in the ecotone between tall shrub coastal barrens and coastal spruce/fir forest at the southern end of the island. The coastal spruce/fir forest that occupies much of the northern half of Marris Island provides suitable nesting and wintering habitat for Boreal Chickadees.

Conclusions and Recommendations

The results of the field survey revealed the presence of seven terrestrial habitat types on Marrs Island including spray zone, low shrub coastal barrens, tall shrub coastal barrens, tall shrub thicket, dunes, and wetlands. The field survey revealed the presence of one rare plant species (purple crowberry) and two rare or sensitive bird species (Short-eared Owl and Boreal Chickadee). Varying levels of sensitivity were associated with the various habitat types present on Marrs Island.

The low shrub coastal barrens have the highest level of sensitivity. It provides habitat for Short-eared Owl and purple crowberry. There is also high potential for other arctic/ alpine plant species to be present in this habitat type. The low shrub cover and peat substrate associated with this habitat type are also easily damaged by moderate to heavy foot traffic.

The wetland habitats present on Marrs Island are not particularly valuable in relation to other wetlands in Nova Scotia and most wetlands on the island are marginal. Nevertheless all wetland habitat in Nova Scotia is protected and approval must be granted by the province before any direct or indirect disturbance of wetland habitat can occur. The process of applying for approval and subsequent development and implementation of wetland compensation plans following granting of approval can be expensive and time consuming. As such, it is generally best to avoid developing wetland habitats wherever possible.

Dune habitats are fragile and are easily damaged by trampling. The dune habitat on Marrs Island is not notable in comparison to other dune systems on the Atlantic coast of Nova Scotia given the small area of this habitat type and the low height of the dune. Nevertheless, this habitat is sensitive to human activities and the presence of large numbers of northern poison oak poses safety concerns for people working or playing in this area.

The coastal spruce/fir forest provides breeding and wintering habitat for Boreal Chickadees which are "Yellow" listed in Nova Scotia by NSDNR. This species is not particularly sensitive to the presence of humans and the construction of a single home in this habitat is unlikely to have a significant adverse effect on the Boreal Chickadee population on the island. This habitat type is fairly resilient to trampling damage. The coastal spruce/fir habitat would be a good location to place a home.

Tall shrub coastal barrens and tall shrub thicket do not have any environmental constraints associated with them and would be suitable for home construction. These habitat types are difficult to walk through as a result of dense vegetation and as such tend to be less subject to trampling damage.

Similarly, no environmental constraints were noted in the spray zone habitat. Although no rare plant species were found here, there is relatively high potential for several rare plant species to be present. In addition, this habitat is regularly exposed to sea spray and overwash and any structure built here would be in danger of being damaged or destroyed during storms. As such, this habitat type is considered to have low potential as a site to build a home.

Closure

If you have any questions or require additional information, please do not hesitate to contact me at (902) 468-7777.

Yours very truly,

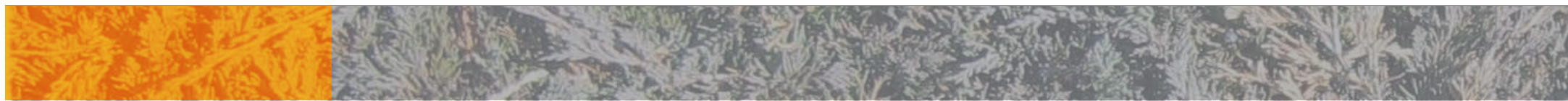
JACQUES WHITFORD LIMITED

ORIGINAL SIGNED BY

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MC/mh
Enclosures

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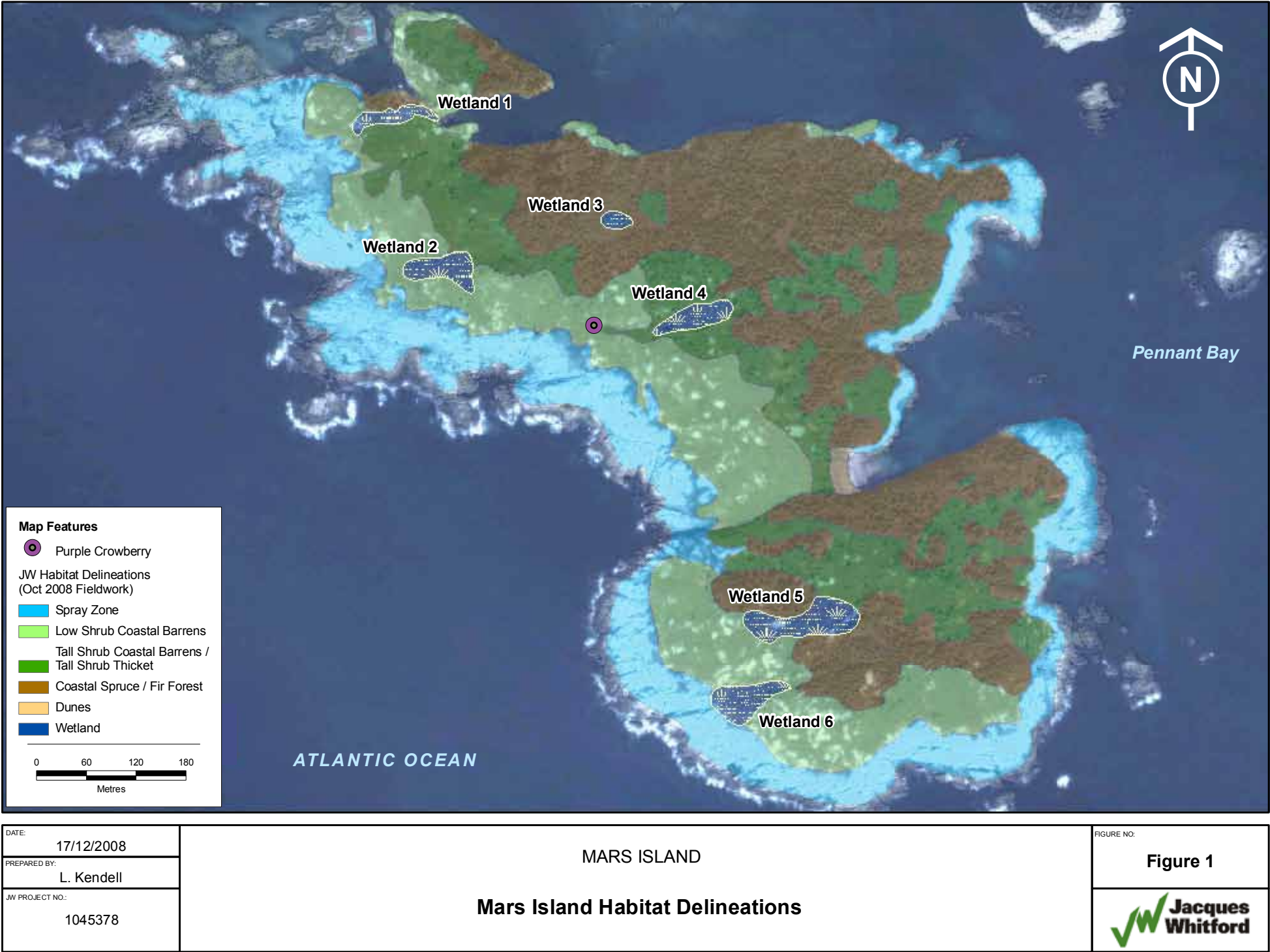


Table 1 Vascular Plant Species Found on Marrs Island and their General Population Status

Common Name	Scientific Name	ACCDC General Status Rank	NSDNR General Status Rank
Balsam Fir	<i>Abies balsamea</i>	S5	GREEN
Red Maple	<i>Acer rubrum</i>	S5	GREEN
Common Yarrow	<i>Achillea millefolium</i>	S5	GREEN
Rough Bentgrass	<i>Agrostis hyemalis</i>	S5	GREEN
Spreading Bentgrass	<i>Agrostis stolonifera</i>	S5SE	GREEN
Green Alder	<i>Alnus viridis</i>	S5	GREEN
Shadbush	<i>Amelanchier sp.</i>	n/a	n/a
American Beachgrass	<i>Ammophila breviligulata</i>	S5	GREEN
Pearly Everlasting	<i>Anaphalis margaritacea</i>	S5	GREEN
Bog Rosemary	<i>Andromeda glaucophylla</i>	S5	GREEN
Wild Sarsaparilla	<i>Aralia nudicaulis</i>	S5	GREEN
Bearberry	<i>Arctostaphylos uva-ursi</i>	S4	GREEN
Grove Sandwort	<i>Arenaria lateriflora</i>	S5	GREEN
Black Chokeberry	<i>Aronia melanocarpa</i>	S5	GREEN
Whorled Aster	<i>Aster acuminatus</i>	S5	GREEN
Bog Aster	<i>Aster nemoralis</i>	S5	GREEN
New Belgium American-Aster	<i>Aster novi-belgii</i>	S5	GREEN
Paper Birch	<i>Betula papyrifera</i>	S5	GREEN
Blue-Joint Reedgrass	<i>Calamagrostis canadensis</i>	S5	GREEN
Pickering's Reed Bent-Grass	<i>Calamagrostis pickeringii</i>	S4S5	GREEN
Hedge Bindweed	<i>Calystegia sepium</i>	S5	GREEN
Black Sedge	<i>Carex nigra</i>	S5	GREEN
Sea-Beach Sedge	<i>Carex silicea</i>	S4S5	GREEN
Three-Seed Sedge	<i>Carex trisperma</i>	S5	GREEN
Leatherleaf	<i>Chamaedaphne calyculata</i>	S5	GREEN
Broom Crowberry	<i>Corema conradii</i>	S4	GREEN
Dwarf Dogwood	<i>Cornus canadensis</i>	S5	GREEN
Pink Lady's-Slipper	<i>Cypripedium acaule</i>	S5	GREEN
Poverty Oat-Grass	<i>Danthonia spicata</i>	S5	GREEN
Eastern Hay-Scented Fern	<i>Dennstaedtia punctilobula</i>	S5	GREEN
Crinkled Hairgrass	<i>Deschampsia flexuosa</i>	S5	GREEN
Roundleaf Sundew	<i>Drosera rotundifolia</i>	S5	GREEN
Mountain Wood-Fern	<i>Dryopteris campyloptera</i>	S5	GREEN
Spinulose Shield Fern	<i>Dryopteris carthusiana</i>	S5	GREEN
Crested Shield-Fern	<i>Dryopteris cristata</i>	S5	GREEN
Slender Wheatgrass	<i>Elymus trachycaulus</i>	S4?	GREEN
Black Crowberry	<i>Empetrum nigrum</i>	S5	GREEN
Purple Crowberry	<i>Empetrum rubrum var. eamesii</i>	S2S3	YELLOW
Trailing Arbutus	<i>Epigaea repens</i>	S5	GREEN
Willow-herb	<i>Epilobium sp.</i>	n/a	n/a
Narrow-Leaved Cotton-Grass	<i>Eriophorum polystachion</i>	S5	GREEN
Red Fescue	<i>Festuca rubra</i>	S5	GREEN
Virginia Strawberry	<i>Fragaria virginiana</i>	S5	GREEN
Teaberry	<i>Gaultheria procumbens</i>	S5	GREEN
Black Huckleberry	<i>Gaylussacia baccata</i>	S5	GREEN
Dwarf Huckleberry	<i>Gaylussacia dumosa</i>	S4	GREEN
Cow Parsnip	<i>Heracleum lanatum</i>	S4S5	GREEN
Black Holly	<i>Ilex verticillata</i>	S5	GREEN
Blueflag	<i>Iris versicolor</i>	S5	GREEN
Baltic Rush	<i>Juncus arcticus</i>	S5	GREEN
Toad Rush	<i>Juncus bufonius</i>	S5	GREEN
Canada Rush	<i>Juncus canadensis</i>	S5	GREEN
Black-Grass Rush	<i>Juncus gerardii</i>	S5	GREEN
Slender Rush	<i>Juncus tenuis</i>	S5	GREEN
Ground Juniper	<i>Juniperus communis</i>	S5	GREEN
Creeping Juniper	<i>Juniperus horizontalis</i>	S4	GREEN
Sheep-Laurel	<i>Kalmia angustifolia</i>	S5	GREEN
Beach Pea	<i>Lathyrus maritimus</i>	S5	GREEN
Common Labrador Tea	<i>Ledum groenlandicum</i>	S5	GREEN
Scot's Lovage	<i>Ligusticum scoticum</i>	S5	GREEN
Twinflower	<i>Linnaea borealis</i>	S5	GREEN
Northern Bugleweed	<i>Lycopus uniflorus</i>	S5	GREEN
Swamp Loosestrife	<i>Lysimachia terrestris</i>	S5	GREEN
Wild Lily-of-The-Valley	<i>Maianthemum canadense</i>	S5	GREEN
Corn Mint	<i>Mentha arvensis</i>	S5	GREEN
Sweet Bayberry	<i>Myrica gale</i>	S5	GREEN
Northern Bayberry	<i>Myrica pensylvanica</i>	S5	GREEN
Mountain Holly	<i>Nemopanthus mucronata</i>	S5	GREEN

Table 1 Vascular Plant Species Found on Marrs Island and their General Population Status

Common Name	Scientific Name	ACCDC General Status Rank	NSDNR General Status Rank
Common Evening-Primrose	<i>Oenothera biennis</i>	S5	GREEN
Cinnamon Fern	<i>Osmunda cinnamomea</i>	S5	GREEN
Panic-grass	<i>Panicum sp.</i>	n/a	n/a
White Spruce	<i>Picea glauca</i>	S5	GREEN
Black Spruce	<i>Picea mariana</i>	S5	GREEN
Seaside Plantain	<i>Plantago maritima</i>	S5	GREEN
Silverweed	<i>Potentilla anserina</i>	S5	GREEN
Three-Toothed Cinquefoil	<i>Potentilla tridentata</i>	S5	GREEN
Three-Leaved Rattlesnake-root	<i>Prenanthes trifoliolata</i>	S5	GREEN
Bracken Fern	<i>Pteridium aquilinum</i>	S5	GREEN
Wild Radish	<i>Raphanus raphanistrum</i>	SE	EXOTIC
Rhodora	<i>Rhododendron canadense</i>	S5	GREEN
Bristly Black Currant	<i>Ribes lacustre</i>	S5	GREEN
Virginia Rose	<i>Rosa virginiana</i>	S5	GREEN
Bristly Dewberry	<i>Rubus hispidus</i>	S5	GREEN
Bristly Dewberry	<i>Rubus hispidus</i>	S5	GREEN
Red Raspberry	<i>Rubus idaeus</i>	S5	GREEN
Dwarf Red Raspberry	<i>Rubus pubescens</i>	S5	GREEN
Dock	<i>Rumex sp.</i>	n/a	n/a
Alpine Dock	<i>Rumex acetosella</i>	SU	EXOTIC
Northern Pitcher-Plant	<i>Sarracenia purpurea</i>	S5	GREEN
Tufted Leafless-Bulrush	<i>Scirpus caespitosus</i>	S5	GREEN
Cottongrass Bulrush	<i>Scirpus cyperinus</i>	S5	GREEN
Roseroot Stonecrop	<i>Sedum rosea</i>	S4	GREEN
Three-Leaf Solomon's-Plume	<i>Smilacina trifolia</i>	S4S5	GREEN
Rough-Leaf Goldenrod	<i>Solidago rugosa</i>	S5	GREEN
Seaside Goldenrod	<i>Solidago sempervirens</i>	S5	GREEN
Bog Goldenrod	<i>Solidago uliginosa</i>	S5	GREEN
American Mountain-Ash	<i>Sorbus americana</i>	S5	GREEN
Narrow-Leaf Burreed	<i>Sparganium angustifolium</i>	S4S5	GREEN
Narrow-Leaf Burreed	<i>Sparganium angustifolium</i>	S4S5	GREEN
Saltwater Cordgrass	<i>Spartina alterniflora</i>	S5	GREEN
Salt-Meadow Cordgrass	<i>Spartina patens</i>	S5	GREEN
Fresh Water Cordgrass	<i>Spartina pectinata</i>	S5	GREEN
Narrow-Leaved Meadow-Sweet	<i>Spiraea alba</i>	S5	GREEN
Tall Meadow-Rue	<i>Thalictrum pubescens</i>	S5	GREEN
Northern Poison Oak	<i>Toxicodendron rydbergii</i>	S5	GREEN
Northern Starflower	<i>Trientalis borealis</i>	S5	GREEN
Red Clover	<i>Trifolium pratense</i>	SE	EXOTIC
Broad-Leaf Cattail	<i>Typha latifolia</i>	S5	GREEN
Late Lowbush Blueberry	<i>Vaccinium angustifolium</i>	S5	GREEN
Large Cranberry	<i>Vaccinium macrocarpon</i>	S5	GREEN
Velvetleaf Blueberry	<i>Vaccinium myrtilloides</i>	S5	GREEN
Mountain Cranberry	<i>Vaccinium vitis-idaea</i>	S5	GREEN
Possum-Haw Viburnum	<i>Viburnum nudum</i>	S5	GREEN
Marsh Blue Violet	<i>Viola cucullata</i>	S5	GREEN
Smooth White Violet	<i>Viola macloskeyi</i>	S5	GREEN
Atlantic Canada Conservation Data Centre Species Rank Definitions			
S1	Extremely rare throughout its range in the province (typically 5 or fewer occurrences or very few remaining individuals). May be especially vulnerable to extirpation.		
S2	Rare throughout its range in the province (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors.		
S3	Uncommon throughout its range in the province, or found only in a restricted range, even if abundant at some locations. (21 to 100 occurrences).		
S4	Usually widespread, fairly common throughout its range in the province, and apparently secure with many occurrences, but the Element is of long-term concern (e.g., watch list).		
S5	Demonstrably widespread, abundant, and secure throughout its range in the province, and essentially ineradicable under present conditions.		
S#S#	Numeric range rank: A range between two consecutive numeric ranks. Denotes uncertainty about the exact rarity of the species (e.g., S1S2).		
S#?	Inexact or uncertain ranking.		
B	Breeding: Basic rank refers to the breeding population of the element in the province.		

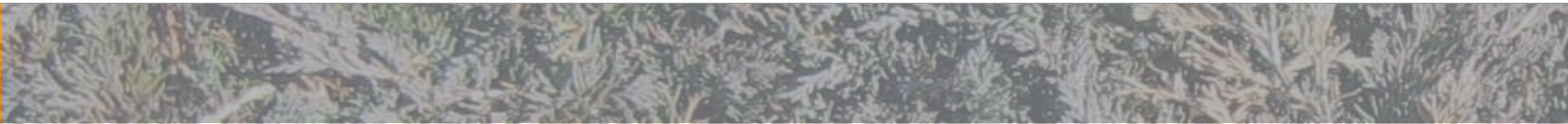


Table 1 Vascular Plant Species Found on Marrs Island and their General Population Status

Common Name	Scientific Name	ACCDC General Status Rank	NSDNR General Status Rank
N	Non-breeding: Basic rank refers to the non-breeding population of the element in the province.		
M	Migratory: Basic rank refers to the migratory population of the element in the province.		
Nova Scotia Department of Natural Resources General Status Ranks			
Red	Known to be or thought to be at risk.		
Yellow	Sensitive to human activities or natural events.		
Green	Not believed to be sensitive, or at risk.		

Source: ACCDC 2007; NSDNR 2007

