MOUNT ARTABAN NATURE RESERVE
MANAGEMENT PLAN

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for the
Islands Trust Fund
Victoria BC

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Approved by the Trust Fund Board
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EXECUTIVE SUMMARY

The Islands Trust Fund’s Mount Artaban Nature Reserve was established in June 2008. The property is 107 hectares (264 acres) in area. It includes the summit of Mount Artaban, which is a significant landmark of Gambier Island and the adjacent area. The property is rugged and steep, spanning an elevation range of approximately 531 metres (1742 feet) from its lowest point at the Northeast corner to the summit of Mount Artaban at 614 metres (2015 feet) elevation. The reserve is mostly covered in second-growth forest of Douglas-fir, western hemlock, western redcedar, red alder and bigleaf maple, that originated by natural regeneration after logging and/or wildfires approximately 70 years ago, and a smaller area regenerated after logging about 55 years ago. The higher elevation areas are occupied by an un-logged forest, primarily of smaller diameter shore pine and Douglas-fir trees, ranging in ages up to about 100 years old. There are older “veteran” trees throughout the reserve.

The Mount Artaban property was held as Provincial Crown Land for many years, and was transferred in June 2008 through the provincial Free Crown Grant program to the Islands Trust Fund to be managed as a nature reserve. The Gambier Island Conservancy partnered with the Islands Trust Fund to fundraise over $40,000 to cover the costs of the land survey and a management plan.

The Islands Trust Fund is the conservation land trust that works in the Howe Sound and Gulf Islands. The Islands Trust Fund Board Five-Year Plan (2008-2012) requires that a management plan be developed for all properties that it owns or manages.

A community consultation process was undertaken for Gambier Island residents and property owners, as well as other interested parties, to participate in setting objectives, identifying issues, and proposing strategies for inclusion in this Management Plan.

The management objectives for management of the Mount Artaban Nature Reserve are:

• to conserve the key natural ecosystem values of the reserve;
• to permit only uses that do not significantly impair the natural condition of the reserve or its special features;
• to protect the water quality and flow regimes of all streams within the reserve;
• to accommodate, but not promote, low-impact use of the reserve for hiking, nature appreciation and similar activities; and
• to allow natural ecological processes to function without human interference, except in the case of wildfire.

The key conservation values of the Mount Artaban Nature Reserve are associated with the following features:

• A significant area of mid-seral forest belonging to two red-listed natural ecological communities with potential to develop ecological attributes of old growth forest over time.
• Mount Artaban, a prominent geological feature of Gambier Island, including its summit, rock outcrops and cliffs, and the associated vegetation and wildlife habitats on these landforms.
• The situation of Mount Artaban Nature Reserve in terms of being part of a large contiguous natural area within the Coastal Western Hemlock Very Dry Maritime (CWHxm) and Coastal Western Hemlock Dry Maritime (CWHdm) subzones
• The hiking trail to the summit of Mount Artaban and the exceptional views from several viewpoints including the summit of Mount Artaban.
• Freshwater features, including two small seasonal streams that originate within the reserve and a small unique pond located near the top of Mount Artaban.

The management issues identified for Mount Artaban Nature Reserve include:
• Wildfire Hazard Management
• Acceptable and Unacceptable Activities
• Hunting and Firearms
• Hiking Trail – Access, Signage and Marking
• Signs
• Fire Tower Debris
• Monitoring Program

Recommended management actions and strategies are provided with respect to these issues. Key actions recommended in the short term (1 – 5 years) include:
• ITF to work with the Gambier Island Conservancy to improve trail marking on the Mount Artaban trail.
• Post signs at trail-head locations.
• Clean up debris of old fire lookout tower.
• ITF to consider entering into a management agreement with the Gambier Island Conservancy.

CONTACT INFORMATION
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1 INTRODUCTION

This document is a management plan for the Islands Trust Fund’s Mount Artaban Nature Reserve (MANR), established in June 2008. The property is 107 hectares (264 acres) in area. It includes the summit of Mount Artaban, which is a significant landmark of Gambier Island and the adjacent area of Howe Sound. The property is physically rugged and steep, spanning an elevation range of approximately 531 metres (1742 feet) from its lowest point at the Northeast corner to the summit of Mount Artaban at 614 metres (2015 feet) elevation. The reserve is mostly covered in second-growth forest of Douglas-fir, western hemlock, western redcedar, red alder and bigleaf maple that originated by natural regeneration after logging and/or wildfires approximately 70 years ago, and a smaller area regenerated after logging about 55 years ago. The higher elevation areas are occupied by an un-logged forest, primarily of smaller diameter shore pine and Douglas-fir trees, ranging in ages up to about 100 years old. There are scattered older “veteran” trees throughout the reserve.

1.1 PROPERTY LOCATION AND LEGAL DESCRIPTION

The Mount Artaban Nature Reserve is located on Gambier Island, British Columbia, at 49° 28’ North and 123° 20’ West (Map1). The legal description of the property is District Lot 8095, Group 1, New Westminster Land District, Gambier Island. The PID number is 027-522-539. The property was surveyed in 2007 by Penonzek Land Surveying Ltd. The Association of British Columbia Land Surveyors exempted the survey from several customary requirements of legal land survey, specifically:

• Cutting and blazing of boundary lines,
• Marking new bearing trees,
• Posting east-west boundaries adjacent to Park and unsurveyed Crown land.

During field surveys for this management plan, five survey markers (3 capped posts and 2 bronze disks set in the rock) were found. Each marker was marked with flagging tape and the location was recorded using a hand-held GPS. The Survey Plan of the property is included in this document as Appendix 8.

1.2 THE ISLANDS TRUST FUND

The Islands Trust Fund (ITF) is a conservation land trust established in 1990 to preserve and protect unique ecological or cultural properties in the Islands Trust Area. As one of British Columbia's leading conservation trusts, the ITF works with the community to protect special places in perpetuity through voluntary land donations, conservation covenants, land acquisition and public education. The Islands Trust Fund currently has 75 protected areas established and carefully managed for conservation. More than $33 million worth of land and cash has been donated and the Islands Trust Fund now protects properties on 12 of the 13 main islands within the Islands Trust Area. The mission of the ITF, as an active regional land trust, is to protect special places by encouraging, undertaking and assisting in the voluntary conservation initiatives within the Islands Trust Area. More information on the Islands Trust Fund is available at www.islandstrustfund.bc.ca.
Map 1. Location and Local Context of the Mount Artaban Nature Reserve
1.3 **PURPOSE OF THIS PLAN**
The Islands Trust Fund Board Five-Year Plan (2008-2012) requires that a management plan be developed for all properties that it owns or manages. Management Plans are required to address the following matters:

- purpose and objectives for the site;
- background information including the site history and local and regional context;
- environmental inventory;
- management issues such as the extent and nature of protection required, appropriate uses and level of use, research guidelines, risk management, special needs at the site;
- strategies and actions to achieve the purpose and objectives for the site and to address management issues and needs; and
- traditional use.

Management Plans are also intended to provide long term direction regarding allowable public use, risks to public safety, ecological values and other significant features.

1.4 **ACCESS**
Legal road access to the Mount Artaban Nature Reserve is available to the northeast corner of the reserve via the Brigade Bay subdivision road. The Mount Artaban hiking trail provides access to the reserve from the Camp Fircom area in the south via Halkett Bay Provincial Marine Park, and to the north via the Brigade Bay subdivision. A new access trail from the Brigade Bay subdivision road was built through the Long Bay Wetland Nature Reserve in the winter of 2009 to avoid crossing private land and a new sign was placed at the trail head. Map 2 shows the road access to the nature reserve and the hiking trail within the nature reserve.

1.5 **LOCAL GOVERNMENT AND PLANNING**
Gambier Island is within the Islands Trust Area. Local planning and land use goals, objectives, policies and bylaws are adopted by the Gambier Island Local Trust Committee. Applicable land use objectives and policies are provided in the Gambier Island Official Community Plan, Bylaw Number 73, 2001, and land use regulations are provided in Gambier Island Land Use Bylaw Number 86, 2004 (Appendix 1).

1.5.1 **Conservation Objectives**
Establishment of the Mount Artaban Nature Reserve is compatible with all applicable regulations and policies of the Gambier Island Land Use Bylaw, and is specifically supported by the Gambier Island Official Community Plan Bylaw Number 73, 2001, Advocacy Policy 6.17, which states that Crown Land areas of particular importance for park and conservation purposes, including Mount Artaban, may be protected as park for such purposes.
Map 2. Hiking Trail, Access, Topography, Fresh Water and Other Features

SCALE 1:8000

Mt. Artaban Trail

Streams

Contour Interval: 20m
Establishment of the Mount Artaban Nature Reserve also represents a significant step towards realizing the following goals of the Islands Trust Fund Board Five-Year plan (2008-2012):

- To protect at least two parcels of land of at least 50 ha within the Bowen Island Municipality, Gambier or Lasqueti Local Trust Area;
- To work with partners to achieve at least 15% protection of the total area of each local trust area and island municipality, including modified ecosystems on islands with few natural areas; and
- To protect at least four properties adjacent to protected areas.

1.5.2 Local Designation and Zoning

Under the Gambier Island Official Community Plan Bylaw No. 73, 2001 the MANR is within the Wilderness Conservation (WC) designation. Appendix 1 provides a quotation from Bylaw 73 of the applicable policies within the WC designation.

Under the Gambier Island Land Use Bylaw Number 86, 2004, the MANR is within the Wilderness Conservation (G1) Zone. Appendix 1 provides a quotation from Bylaw 86 of the applicable regulations within the G1 zone.

The Islands Trust Fund Board Five-Year Plan 2008 –2012 states that “The Trust Fund Board will request, where necessary, that the Local Trust Committee or Municipality redesignate and rezone Trust Fund Board lands to the most appropriate designation and zone for nature protection when it is reviewing its Official Community Plan and/or Land Use Bylaw and will work with the Local Trust Committee to determine the most appropriate designation and zone.”

The permitted uses within the Wilderness Conservation (G1) Zone include several uses that are not compatible with the objectives for the MANR, such as “wilderness camping” and “woodlot use and timber harvesting use”. However, the fact that the Land Use Bylaw lists these as permitted uses in the G1 zone does not obligate the ITF to permit these or other incompatible uses within the MANR. As the landowner and the manager of the MANR, the Islands Trust Fund has the authority to set additional restrictions on land uses, and may prohibit uses that are permitted under local bylaws. It appears that the current WC designation and the G1 zoning are the most appropriate designation and zone, so there is no need for redesignation or rezoning.

1.6 HISTORY

Gambier Island, along with other islands in Howe Sound is within the traditional territory of the Squamish First Nation, and there is evidence of First Nations use and occupancy of land and resources in the Howe Sound islands dating back many thousands of years. European settlement began in the mid to late 1800’s, primarily in low elevation coastal areas considered suitable for farming and homesteading. It is likely that prospectors in search of minerals visited and collected samples from the Mount Artaban area.

According to Akrigg and Akrigg (1997) Mount Artaban “takes its name from the nearby Camp Artaban (Anglican Church in Canada). This camp, in turn, was named after a
character in Henry Van Dyke’s *The Story of the Other Wise Man.*” Camp Artaban was established in 1923 (Errico et al. 2005).

A BC Forest Service fire history map of the Mount Artaban area (Map 3) was provided by John Parminter, RPF. This map indicates that the entire reserve area was burned by a human-caused fire which ignited on July 9, 1922 (shown in red as Fire # 459). Mr. Parminter’s explanation of the map is as follows:

“Your area was burned by a man-caused fire (# 459) which ignited on July 9, 1922 and is shown in red.

There were two other spot fires around Halkett Bay (the crosses) in 1942 and 1949. The orange-coloured fire to the north was a slashburn, hence the S.B. label, in 1949 (it's inside another big fire from 1921 or 1922 - hard to make out the boundaries). The northern map shows a small lightning fire (in yellow) in the northwest corner so we can't rule out a long-term lightning fire regime.

These maps cover the period from 1919 to 1949 at least. There may have been other fires after 1950 but I think the big fire of 1922 is probably the most important one.”
Stumps with spring-board notches indicate that some of the reserve was logged in the pre-World War II period, perhaps as post-fire salvage logging. Tree core samples indicate that most of the current forests originated between 1938 and 1940, probably as trees that seeded naturally following the fire and logging. Some forest stands in the lower elevation northern part of the reserve originated around 1953, and stumps cut with chain saws in this area are consistent with early post-War “Cat-logging” methods. Mount Artaban has long been a popular hiking destination. A tree core sample from a western hemlock tree with a trail blaze indicates the blaze was cut around 1946.

The fire lookout tower at the summit of Mount Artaban was established in 1957 (John Parminter, personal communication) and was probably one of the first Forest Service fire towers to be pre-fabricated off-site and lifted to the site by helicopter as pre-assembled panels. The date when the tower was last used is not known, but was probably around 1970. The tower has fallen down but the remains of it are still in place.

The Mount Artaban property was held as Provincial Crown Land for many years, and was transferred on June 6, 2008 through the provincial Free Crown Grant program to the Islands Trust Fund to be held and managed as a nature reserve. To satisfy the province’s conditions for the transfer, the Gambier Island Conservancy partnered with the Islands Trust Fund to fundraise over $40,000 to cover the costs of the land survey and a management plan. In addition to the support of the Islands Trust Fund, the Gambier Island Conservancy, the Sunshine Coast Regional District, and over 80 contributions were made by individuals, businesses and community groups.

1.7 LOCAL CONTEXT

The Mount Artaban Nature Reserve is located in the centre of a peninsula in the southeast part of Gambier Island. Much of the private land in the area has been, or is eligible to be subdivided into waterfront or semi-waterfront lots for residential development. However there are several significant blocks of un-subdivided Crown land in the area, as well as Halkett Bay Provincial Marine Park, Pete Shields Regional District Park, and the Long Bay Wetland and Brigade Bay Bluffs Nature Reserves.

The boundaries of the Mount Artaban Nature Reserve with adjacent lands are as follows: Starting at the northeast corner and going clockwise, it shares about 1422 m of boundary to the east with Pete Shields Regional District Park. It shares approximately 1338 m of boundary on the south with Halkett Bay Provincial Marine Park. This boundary includes a 100 m by 200 m rectangular bulge, which includes the summit of Mount Artaban. To the west, it shares about 655 m of boundary with a block of Crown land. To the north, it shares about 359 m of boundary with private land belonging to the Gambier Island Sea Ranch society. Along the same property line to the north, it shares about 402 m of boundary with a parcel of Crown land designated as a “Watershed Reserve”, and then to the west, it shares about 798 m of boundary with the same parcel. The term “Watershed Reserve” means that the Provincial government has placed a ‘map notation’ on this property, such that no new tenures or alienation of the land may occur without consultation and agreement with the local water user’s group. Finally, to the North, it
The Mount Artaban Nature Reserve serves to complete a significant block of contiguous lands managed for conservation in this part of the island: the Long Bay Wetland Nature Reserve to the north, Pete Shields Regional Park (Sunshine Coast Regional District) to the east, and Halkett Bay Provincial Marine Park to the south. The Mount Artaban Nature Reserve, when combined with these neighbouring parks and nature reserve creates a continuous protected area of 525 hectares (1297 acres.) Map 1 illustrates the local context of the nature reserve.

1.8 MANAGEMENT OBJECTIVES

The following objectives for the Mount Artaban Nature Reserve were derived by a synthesis of statements from the following sources:

- Documents and information posted on the Gambier Island Conservancy website;
- The Islands Trust Fund Board Five-Year Plan (2008-2012), including statements of the vision, mission, 5-year priorities, related goals and specific and general policies;
- Consultation with public stakeholders including members of the Gambier Island community, via a survey mailed to all Gambier property owners, and through public consultation meetings;
- Communication with Islands Trust Fund staff; and
- Gambier Island Official Community Plan.

The management objectives for management of the Mount Artaban Nature Reserve are:

- to conserve the key natural ecosystem values of the reserve;
- to permit only uses that do not significantly impair the natural condition of the reserve or its special features;
- to protect the water quality and flow regimes of all streams within the reserve;
- to accommodate, but not promote, low-impact use of the reserve for hiking, nature appreciation and similar activities; and
- to allow natural ecological processes to function without human interference, except in the case of wildfire.
2 ECOLOGICAL DESCRIPTION AND ASSESSMENT

2.1 GEOLOGY, LANDFORMS, AND SOILS

Geologically, most of Gambier Island is underlain by mafic volcanic strata and associated sediments of the Lower Cretaceous Gambier Group (approximately 100 million years old). Granitic rocks of the Jurassic to Cretaceous Coast Plutonic Complex (approximately 160 million years old) underlie the southern part of the island. (BC Ministry of Energy, Mines and Petroleum Resources 2009) According to the map compiled by Armstrong (1965) the boundary between these two rock formations lies just south of the summit of Mount Artaban, indicating that the bedrock geology of the nature reserve belongs to the Gambier Group (Map 4). This complex geological group is primarily of volcanic origin; however, this does not mean that Mount Artaban was originally a volcano. Rather, these rocks originated in an ancient eruption and have since been moved by plate tectonics from their original location. In the process, they have collided with other terranes\(^1\), undergoing considerable deformation and other changes (Clague and Turner 2003). The Gambier Group also occurs in the vicinity of Britannia Beach on the mainland shore of Howe Sound, an area with significant mineral deposits that were mined for many years. However, the BC Minerals Title Online website (on-line mapping of mineral tenures at http://www.mtonline.gov.bc.ca/mto/home.do) shows no current or historical mineral titles covering any part of the Mount Artaban Nature Reserve.

The Howe Sound region was covered by glaciers from about 29,000 to about 12,000 years ago. During glaciation, the weight of the ice depressed the land surface so that some lower elevation portions of Gambier Island were below sea level. As the glaciers retreated and the land rebounded, marine and coastal processes eroded loose materials from the higher and steeper parts of the island and laid down finer-textured soil parent materials on many of the lower-lying and more gently sloping areas of the island.

The Mount Artaban Nature Reserve has predominantly rocky and steep landforms with shallow, coarse-textured soils. Colluvial deposits (rocky material that has been moved down-slope by gravity) occur on the steep slopes and at the bases of the many cliffs. Soils on the sides and tops of the hills vary from bare rock to morainal deposits (mixed material deposited by the glaciers), typically shallow, coarse-textured, and rapidly drained. Soils are somewhat deeper in the several narrow stream valleys that dissect the slopes of Mount Artaban. In the more gentle terrain of lower slopes of the mountain, soil deposits are up to several metres deep and consist of morainal material as well as finer-textured material deposited in a marine environment during the retreat of the glaciers.

\(^1\) A “terrane” is a fragment of the earth’s crust, with its own distinctive geological history, that has been transported laterally by plate tectonics. See “Terrane” at www.Wikipedia.org for more detail.

Scale 1: 32,000


Legend

Legend entry for the Gambier Group

JURASSIC AND CRETACEOUS

Upper Jurassic and Lower Cretaceous

GAMBIER GROUP: tuff, breccia, agglomerate, andesite, argillite, greywacke, quartzite, and conglomerate; minor schist, granulite, limestone, lime-silica rock, skarn

Approximate boundaries of Mount Artaban Nature Reserve
2.2 CLIMATE

Gambier Island lies within the Coastal Western Hemlock (CWH) biogeoclimatic zone, a broad ecological zone encompassing most of the coastal temperate rainforest of the BC coast (Green and Klinka 1994). Two subzones of the CWH zone occur in the MANR: the Coastal Western Hemlock Very Dry Maritime (CWHxm) subzone occurs in the northeast part of the reserve below about 200 m elevation, while the slightly cooler and moister Coastal Western Hemlock Dry Maritime (CWHdm) subzone occurs in the remainder of the reserve. The climate of these subzones is somewhat influenced by the rain shadow effect of the Vancouver Island Ranges, and experiences similar temperatures and precipitation to the North Shore of Vancouver. In the summer, periods of drought and high temperatures over 4 weeks long are common. Winters are typically rainy and mild. At lower elevations, most winter precipitation occurs as rain. In the higher elevation parts of the reserve, there can be significant accumulations of snow, although rain in the winter is also common here.

In winter the prevailing winds are from the southeast. Winter storms often involve winds up to 30 or 40 knots, which can blow for several days at a time. In summer, warm fair weather is usually associated with steady northwesterly winds, although southeasters can blow in summer too. Gambier is sometimes subject to a strong, and sometimes very cold, outflow wind that blows from the north down Howe Sound, known locally as a “Squamish” wind. These winds are more prevalent in the winter and stronger, especially when there is an Arctic high pressure system in the B.C. Interior.

Long-term climate data for Mount Artaban is not available. The nearest station listed on the Environment Canada website is at Gambier Harbour; however, only precipitation data is provided, not temperature.

The nearest Environment Canada weather observations come from Pam Rocks, an automatic weather station in Howe Sound just off the coast of the NE corner of the MANR (49° 29.400' N, 123° 18.000' W, 4.90 m a.s.l.), which has been in operation since 1991. In the short and incomplete climate record of Pam Rocks, the mean precipitation in the driest month (August) is 35.8 mm (12 years of data) and during the wettest month (November) is 220.8 mm (7 years of data). Temperature data at Pam Rocks shows the mean temperature in the warmest month (August) to be 18.6 °C (12 years of data) and in the coldest month (January) to be 5.6 °C (13 years of data). Taking into consideration the more pronounced maritime influence at Pam Rocks and the period of record, these data are not inconsistent with the model-derived values for the NE corner of the MANR shown in Table 1.

While specific local data is not available, an approximation of local climate information can be generated using the Climate BC computer model (Wang et al. 2006) which interpolates climate data between stations and adjusts for the effects of elevation and terrain. Table 1 provides a summary of climatic variables for the Northeast corner of the MANR (the point of lowest elevation within the reserve) generated by Climate BC software, based on 1971-2000 averages.
Table 1. Climate data for the Northeast corner of Mount Artaban Nature Reserve, generated by Climate BC software (Wang et al. 2006) based on 1971-2000 averages.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean annual precipitation</td>
<td>1831 mm</td>
</tr>
<tr>
<td>Mean precipitation of the driest month</td>
<td>58 mm (August)</td>
</tr>
<tr>
<td>Mean precipitation of the wettest month</td>
<td>275 mm (November)</td>
</tr>
<tr>
<td>Precipitation as snowfall</td>
<td>76 mm</td>
</tr>
<tr>
<td>Mean annual temperature</td>
<td>9.9 °C</td>
</tr>
<tr>
<td>Mean temperature of the warmest month</td>
<td>17.4 °C (August)</td>
</tr>
<tr>
<td>Mean temperature of the coldest month</td>
<td>3.4 °C (January)</td>
</tr>
</tbody>
</table>

There is considerable variation of climate within the reserve, as the elevation ranges from 83 m in the northeast corner to 614 m at the summit. Figure 1 shows a comparison of monthly temperature and precipitation between the northeast corner of the reserve and the summit of Mount Artaban, generated by Climate BC software, based on 1971 - 2000 averages. Temperatures are lower and precipitation is greater throughout the year at the top of Mount Artaban than at lower elevations within the reserve.

**Figure 1. Climate Variation within Mount Artaban Nature Reserve, generated by Climate BC software, based on 1971-2000 averages.**

Due to global climate change, the local climate on Gambier Island is expected to become warmer during coming decades. Figure 2 shows a comparison of monthly temperature and precipitation at the Northeast corner of the reserve between the present (represented by 1971 - 2000 averages) and future (represented by predicted the CGCM-A2x scenario for the year 2080), as generated by Climate BC software. The key differences are an increase in temperature of about 2 Celsius throughout the year, an increase in winter precipitation (though with less snow) and a decrease in summer precipitation.

**Figure 2. Climate Variation within Mount Artaban Nature Reserve, generated by Climate BC software, based on 1971-2000 averages and future predictions for 2080.**
The combination of higher temperature with less rain in summer is expected to cause increased moisture stress for plants and may lead to death of some trees and other plants, as well as an increased risk of wildfire, plant diseases and epidemics of insects that attack plants. The precise course of such changes is unpredictable, and as such is not easily amenable to specific management strategies to reduce the risks. A more general management strategy to reduce the risks associated with climate change is to maintain the overall diversity and integrity of ecosystems. This strategy is essentially equivalent to the management objectives for the reserve stated in Section 1.8.

2.3 SITE SERIES

In ecological terminology, a site is defined as an area of land that is relatively uniform in climate, topography, soils, and other critical aspects of the physical environment. Site Series, as shown on Map 5 are portions of the land that have similar physical characteristics, and are thus able to support a certain characteristic community of plants and animals, and to undergo certain characteristic patterns of ecological change. More information about site classification, and about the site series that occur on the Mount Artaban Nature Reserve, is provided in Appendix 2. As Map 5 illustrates, the nature reserve includes a diverse range of sites and hence supports a wide variety of plants and animals. While plant communities may change over time due to natural or human-caused disturbances, the pattern of site series on the reserve can be considered permanent and fixed, although in the very long term (many thousands of years) sites may be altered by processes such as glaciation and weathering of bedrock.
2.4 **FRESHWATER RESOURCES**

The major freshwater features within the Mount Artaban Nature Reserve are shown on Map 2. There are two small seasonal streams that originate within the reserve (or on adjacent Crown land) and flow roughly northwards, through the Long Bay Wetland Nature Reserve and Brigade Bay subdivision, entering Howe Sound a short distance south of Brigade Bay. (Photo 1 shows the more easterly of these two streams) These streams do not support resident or anadromous salmonid populations, probably because the summer and autumn flow levels are low to minimal, and the gradients are too steep for fish to swim up. In addition to these two well-defined streams, there are many small ephemeral streams that flow during periods of heavy rainfall.

There is also a unique pond, measuring about 40 m long and 8 m wide, located near the top of Mount Artaban about 35m southeast of the summit (Photo 2). The pond is unusual in that it retains water year round even though it is located near the summit of the mountain, and is surrounded by steep, rapidly drained rocky outcrops and shallow coarse-textured soils. Apparently, this pond is fed by water that seeps into the rock formations above it and seeps out into the pond throughout the year.

There is a designated Community Watershed in the Fircom Creek watershed which lies to the south of the MANR on Crown land, private land, and the Halkett Bay Provincial Marine Park. It is likely that a small area at the extreme northern end of the MANR also drains into Fircom Creek even though it lies outside the mapped Community Watershed. Several other small streams within the reserve also are used by local residents as water supply sources for individual residences. Protecting the water quality and flow regimes of all streams within the reserve is an important objective in this plan. This can be accomplished by maintaining forest cover and not allowing activities that could jeopardize water quality, such as camping, fires or motorized recreation.
2.5 Vegetation Types

Six distinct Vegetation Types were delineated within the nature reserve. Each Vegetation Type is unique with respect to at least one of the following criteria: the species, age, or height of the dominant trees, or the species of understory plants. Tree ring cores were taken from some of the second growth trees to establish stand ages. Cores were not taken from the larger and older trees, to avoid any risk of injuring them, so the age estimates given for the older stands are approximate.

The abundance and vigour of plants is strongly affected by the physical environment. As a result, each Vegetation Type occurs on a limited range of Site Series. Plant communities are also affected by the particular local history of disturbance, recovery, and succession that have occurred, and may also be affected by interactions with wildlife (e.g., browsing by deer). Each Vegetation Type generally has a distinctive disturbance regime, and can be expected, in future, to follow a distinct path of changes, such as growth and succession. Because these processes will continue in the future, plant communities are not necessarily permanent, although they may be stable over periods of many centuries. Plant communities are a major factor in determining the wildlife populations of an area, because plants are such a critical element of the habitats for many species.

Map 5 shows the Vegetation Types of the Mount Artaban Nature Reserve. Table 2 provides a summary of these key features of the Vegetation Types. Detailed descriptions of each Vegetation Type are provided in Appendix 3.

Table 2. Mount Artaban Nature Reserve Vegetation Types

<table>
<thead>
<tr>
<th>#</th>
<th>Description</th>
<th>Main Tree Species</th>
<th>Age Range</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Second-growth red alder on fresh to moist sites and riparian areas</td>
<td>Red alder (Douglas-fir, western hemlock, western redcedar)</td>
<td>50 - 55</td>
<td>Post-logging, mostly near stream in lower area.</td>
</tr>
<tr>
<td>2</td>
<td>Young second-growth Douglas-fir on slightly dry to fresh sites</td>
<td>Douglas-fir (western hemlock, western redcedar)</td>
<td>50 - 55</td>
<td>Post-logging, on lower slopes near northeast corner.</td>
</tr>
<tr>
<td>3</td>
<td>Over-mature second-growth red alder and conifers on slightly dry to fresh sites</td>
<td>Red alder (Douglas-fir, western hemlock, western redcedar, bigleaf maple)</td>
<td>70 – 85, plus vets</td>
<td>Regenerated after fire and/or logging. Over-mature alder trees are dying off. Conifers are growing up under, but in some places heavily browsed by deer</td>
</tr>
<tr>
<td>4</td>
<td>Second-growth mixed forest, with veteran trees, on moderately dry to fresh sites</td>
<td>Douglas-fir, western hemlock, western redcedar, red alder, bigleaf maple</td>
<td>70 – 85, plus vets</td>
<td>Regenerated after fire and/or logging. Mixed occurrence of the red-listed western hemlock - Douglas-fir / Oregon beaked-moss community and the blue-listed western redcedar / sword fern Very Dry Maritime communities, in mid-seral condition.</td>
</tr>
<tr>
<td>5</td>
<td>Second growth Douglas-fir on drier sites</td>
<td>Douglas-fir (shore pine, western hemlock, western redcedar)</td>
<td>70 – 85, plus vets</td>
<td>Regenerated after fire.</td>
</tr>
</tbody>
</table>
Map 5. Vegetation Types and Site Series

Scale 1:8000

Legend

Sample polygon label

Vegetation Type

Site Series

Two numbers separated by a slash indicates the polygon is a complex of two site series. The first number is the predominant site series in the polygon.
2.6 RED AND BLUE-LISTED ECOLOGICAL COMMUNITIES

The British Columbia Conservation Data Centre (CDC) has a system of ranking for species and ecological communities, and maintains two “lists” of species and ecological communities with similar rankings that are of conservation interest. The red list includes species and ecological communities that have been legally designated as Endangered or Threatened under the Wildlife Act of British Columbia, are extirpated, or are candidates for such designation. The blue list includes species and ecological communities not immediately threatened, but of concern because of characteristics that make them particularly sensitive to human activities or natural events. Three red-listed and four blue-listed ecological communities occur in the Mount Artaban Nature Reserve, as shown in Table 3.

Table 3. Red- and blue-listed ecological communities of the Mount Artaban Nature Reserve. (Source: BC Species and Ecosystem Explorer.)

<table>
<thead>
<tr>
<th>English Name</th>
<th>BC Status</th>
<th>BEC Subzone and Site Series</th>
<th>Vegetation Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>western hemlock - Douglas-fir / Oregon beaked-moss</td>
<td>Red</td>
<td>CWHxm/01</td>
<td>4</td>
</tr>
<tr>
<td>Douglas-fir - lodgepole pine / oceanspray / reindeer lichens</td>
<td>Red</td>
<td>CWHdm/02</td>
<td>6</td>
</tr>
<tr>
<td>western redcedar / three-leaved foamflower Very Dry Maritime</td>
<td>Red</td>
<td>CWHxm/07</td>
<td>1</td>
</tr>
<tr>
<td>western hemlock / flat-moss</td>
<td>Blue</td>
<td>CWHdm/01</td>
<td>2,4,5</td>
</tr>
<tr>
<td>Douglas-fir - western hemlock / salal Dry Maritime</td>
<td>Blue</td>
<td>CWHdm/03; CWHxm/03</td>
<td>5</td>
</tr>
<tr>
<td>western redcedar / sword fern Very Dry Maritime</td>
<td>Blue</td>
<td>CWHdm/05</td>
<td>3, 4</td>
</tr>
<tr>
<td>western redcedar / sword fern Dry Maritime</td>
<td>Blue</td>
<td>CWHdm/05</td>
<td>3, 4</td>
</tr>
</tbody>
</table>

2.6.1 Element Occurrence Ranking

The CDC ranks the conservation value of individual occurrences of red-listed ecological communities based on three factors: size, condition, and landscape context. Each of the three factors are rated in a four class ranking system (Excellent, Good, Fair and Poor), as explained in Appendix 4.

Table 4 shows the occurrences of red-listed ecological communities in the MANR, the estimated size (area) of the occurrences, and the ranking in terms of condition and landscape context. Note that digitized mapping of the ecological communities has not been completed, so estimates of area are rough approximations only. The same ranking for Landscape Context applies to all occurrences within the property, and is ranked as “Good”. For this purpose, the context is assumed to be the southeastern peninsula of Gambier Island.

Table 4. Element Occurrence Rankings for three red-listed ecological communities in the Mount Artaban Nature Reserve.

<table>
<thead>
<tr>
<th>Red-listed Ecological Communities</th>
<th>Area (ha)</th>
<th>Condition</th>
<th>Landscape Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western hemlock - Douglas-fir / Oregon beaked-moss</td>
<td>30</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Douglas-fir - lodgepole pine / oceanspray / reindeer lichens</td>
<td>10</td>
<td>Good</td>
<td>Good</td>
</tr>
<tr>
<td>Western redcedar / three-leaved foamflower Very Dry Maritime</td>
<td>1</td>
<td>Fair</td>
<td>Good</td>
</tr>
</tbody>
</table>
2.6.2 Descriptions of Element Occurrences

- The red-listed western hemlock - Douglas-fir / Oregon beaked-moss community occurs in mid-seral condition as an element of Vegetation Type 4.
- The red-listed Douglas-fir - lodgepole pine / oceanspray / reindeer lichens community occurs in mid-seral condition in Vegetation Type 6.
- The red-listed western redcedar / three-leaved foamflower Very Dry Maritime community does not occur, but has potential to develop over time, within a limited area in the riparian zones of the small streams near the northern end of the reserve, in Vegetation Type 1.
- The blue-listed western hemlock / flat-moss community occurs in early to mid-seral condition, as an element of Vegetation Types 2, 4 and 5.
- The blue-listed Douglas-fir - western hemlock / salal Dry Maritime community occurs in mid-seral condition as the main element in Vegetation Type 5
- The blue-listed western redcedar / sword fern Dry Maritime and Very Dry Maritime communities occur in early to mid-seral condition, as elements of Vegetation Types 3 and 4.

2.7 Understorey Plants

Although Vegetation Types are primarily defined in terms of the trees, there is also a great diversity of understory plants that occur in typical patterns on the various sites. Understory plants often serve as indicators of site factors such as the availability of nutrients and moisture. Also, there are many more species of understory plants than of trees, so these contribute greatly to the overall diversity of the ecosystems. There are many plant species that usually occur at low densities, even though they are not rare or endangered. Some of the less common plants within the Mount Artaban Nature Reserve occur in very specific habitats, including:

- Moist, shaded cliff faces, where licorice fern (*Polypodium glycyrrhiza*) occurs along with flowering plants such as Siberian miner’s lettuce (*Claytonia sibirica*) and a variety of mosses and liverworts.
- Dry, rocky outcrops near the summit of Mount Artaban, where Davidson’s penstemon (*Penstomen davidsonii*) occurs along with drought-tolerant mosses (mainly *Rhacomitirum canascens*) and lichens.

The Mount Artaban Nature Reserve has a good diversity of moss and lichen species, particularly in the understorey of drier forested sites and on rock outcrops. Older bigleaf maple trees also support a very diverse community of epiphytic mosses and lichens.

2.8 Non-native Invasive Plants

No significant occurrences of any non-native invasive plant species were noted during the field assessment. A few plants of English Holly (*Ilex aquifolium*) were observed. These do not currently pose a significant threat to native vegetation; however it would be desirable to remove them (by cutting or up-rooting) whenever feasible, for example, during trail maintenance operations.
2.9 **RED AND BLUE-LISTED PLANT SPECIES**

Table 5 shows red- and blue-listed plant species which might potentially occur within the Mount Artaban Nature Reserve. (This list was generated in BC Species and Ecosystem Explorer by searching all red- and blue-listed plant species that occur within the Sunshine Coast Forest District and in the CWHxm and CWHdm subzones.) The field work for this management plan did not include a formal survey for red- and blue-listed plant species. Every effort was made to look for unusual plants, but no plants on this list were found.

<table>
<thead>
<tr>
<th>Scientific Name</th>
<th>English Name</th>
<th>BC Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Botrychium ascendens</em></td>
<td>upswept moonwort</td>
<td>Red</td>
</tr>
<tr>
<td><em>Carex feta</em></td>
<td>green-sheathed sedge</td>
<td>Red</td>
</tr>
<tr>
<td><em>Lathyrus littoralis</em></td>
<td>grey beach peavine</td>
<td>Red</td>
</tr>
<tr>
<td><em>Rubus nivalis</em></td>
<td>snow bramble</td>
<td>Red</td>
</tr>
<tr>
<td><em>Agrostis pallens</em></td>
<td>dune bentgrass</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Allium amplectens</em></td>
<td>slimleaf onion</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Anagallis minima</em></td>
<td>chaffweed</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Botrychium simplex</em></td>
<td>least moonwort</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Carex scoparia</em></td>
<td>pointed broom sedge</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Convolvulus soldanella</em></td>
<td>beach bindweed</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Epilobium glaberrimum ssp. fastigiatus</em></td>
<td>smooth willowherb</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Heterocodon rariflorum</em></td>
<td>heterocodon</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Hypericum scouleri</em> ssp. nortoniae*</td>
<td>western St. John's-wort</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Isoetes nuttallii</em></td>
<td>Nuttall's quillwort</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Malaxis brachypoda</em></td>
<td>white adder's-mouth orchid</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Ophioglossum pusillum</em></td>
<td>northern adder's-tongue</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Sanguisorba menziesii</em></td>
<td>Menzies' burnet</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Senecio macounii</em></td>
<td>Macoun's groundsel</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Toxicodendron diversilobum</em></td>
<td>poison oak</td>
<td>Blue</td>
</tr>
<tr>
<td><em>Woodwardia fimbriata</em></td>
<td>giant chain fern</td>
<td>Blue</td>
</tr>
</tbody>
</table>

2.10 **WILDLIFE AND HABITATS**

The main wildlife mammal species occurring on Gambier include Black-tailed Deer, Black Bears, Cougars, Raccoons, Squirrels, Chipmunks, Mice, Shrews, and Voles. Black-tailed Deer make use of a range of habitat features on the reserve, including browsing on understory plants and tree seedlings. In some parts of the reserve, deer browsing is holding back the growth of coniferous trees seedlings, especially western redcedar. This is most noticeable in Vegetation Type 3, where the existing canopy of red alder is thinning and moving toward a more open structure due to age-related mortality. The suppression of understorey development by deer browsing should not be regarded as an
ecological problem, it simply means there will be some canopy gaps in the forest, providing more overall diversity of species and habitats.

Numerous bird species, migratory and resident, are found in the area. Four species of cavity excavators nest in the area: Pileated Woodpecker, Hairy Woodpecker, Downy Woodpecker and Northern Flicker. These species perform a keystone role in the wildlife community, in that the holes they excavate are used by secondary cavity nesters, such as the Western Screech Owl. The continued presence of these species depends on an ongoing supply of standing dead trees (snags) of sufficient diameter for their use. At present, snags are in adequate supply. Some large Douglas-fir and cedar standing dead trees (snags) are present, mostly in Vegetation Types 3 and 4, and there is currently an abundant supply of dead and dying red alder trees in Vegetation Type 3, although these will eventually become less common, as there is not an ongoing recruitment of new alder trees in these stands. However, natural mortality in all Vegetation Types will create an adequate supply of snags over time.

Although the entire reserve was burned in the 1922 fire, there are many large, old Douglas-fir and cedar trees in the reserve that survived the fire, mostly in Vegetation Types 3 and 4 (Photo 3). These “veteran” trees are a valuable habitat feature in the forest. They may be used for nest trees by Ospreys or Bald Eagles, or serve as perch trees for Ospreys, Bald Eagles, Red-tailed Hawks, and other species. Mature and old growth conifer stands are valuable habitat for resident songbirds including Golden-crowned Kinglets and Black-capped Chickadees. Many migratory bird species also use specific habitat features in the Mount Artaban Nature Reserve.

2.11 RED- AND BLUE-LISTED ANIMALS

The Mount Artaban Nature Reserve has not been formally surveyed for red- and blue-listed animal species. Table 6 shows red- and blue-listed animal species which might potentially occur there. (This list was generated in BC Species and Ecosystem Explorer by searching all red- and blue-listed animal species that occur within the CWHxm and CWHdm subzones and the Sunshine Coast Forest District.)

![Photo 3](image-url)
2.12 Provincial Conservation Significance

There are several provincially significant conservation values present in the Mount Artaban Nature Reserve, including:

- a significant area of mid-seral forest belonging to two red-listed natural ecological communities (See Section 2.6),
- the size of the reserve, (107 ha, which is relatively large for a natural area in the CWHxm and CWHdm subzones), and its contribution to a larger natural area in conjunction within adjacent protected areas.

The Conservation Data Centre website does not list any records for known locations of Red and Blue-listed species or ecological communities in the Mount Artaban area.

Table 6. Red- and blue-listed animal species potentially occurring in the MANR.

<table>
<thead>
<tr>
<th>English Name</th>
<th>BC Status</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marbled Murrelet</td>
<td>Red</td>
<td>Birds</td>
</tr>
<tr>
<td>Northern Goshawk, <em>laingi</em> subspecies</td>
<td>Red</td>
<td>Birds</td>
</tr>
<tr>
<td>Peregrine Falcon, <em>anatum</em> subspecies</td>
<td>Red</td>
<td>Birds</td>
</tr>
<tr>
<td>Threaded Vertigo</td>
<td>Red</td>
<td>Gastropods</td>
</tr>
<tr>
<td>Coastal Tailed Frog</td>
<td>Blue</td>
<td>Amphibians</td>
</tr>
<tr>
<td>Red-legged Frog</td>
<td>Blue</td>
<td>Amphibians</td>
</tr>
<tr>
<td>Band-tailed Pigeon</td>
<td>Blue</td>
<td>Birds</td>
</tr>
<tr>
<td>Canada Goose, <em>occidentalis</em> subspecies</td>
<td>Blue</td>
<td>Birds</td>
</tr>
<tr>
<td>Double-crested Cormorant</td>
<td>Blue</td>
<td>Birds</td>
</tr>
<tr>
<td>Great Blue Heron, <em>fannini</em> subspecies</td>
<td>Blue</td>
<td>Birds</td>
</tr>
<tr>
<td>Peregrine Falcon, <em>pealei</em> subspecies</td>
<td>Blue</td>
<td>Birds</td>
</tr>
<tr>
<td>Purple Martin</td>
<td>Blue</td>
<td>Birds</td>
</tr>
<tr>
<td>Western Screech-Owl, <em>kennicottii</em> subspecies</td>
<td>Blue</td>
<td>Birds</td>
</tr>
<tr>
<td>Pacific Sideband</td>
<td>Blue</td>
<td>Gastropods</td>
</tr>
<tr>
<td>Scarletback Taildropper</td>
<td>Blue</td>
<td>Gastropods</td>
</tr>
<tr>
<td>Western Thorn</td>
<td>Blue</td>
<td>Gastropods</td>
</tr>
<tr>
<td>Dun Skipper</td>
<td>Blue</td>
<td>Insects</td>
</tr>
<tr>
<td>Townsend's Big-eared Bat</td>
<td>Blue</td>
<td>Mammals</td>
</tr>
</tbody>
</table>

2.13 Key Conservation Values

The key conservation values of the Mount Artaban Nature Reserve are associated with the following features:

- A significant area of mid-seral forest belonging to two red-listed natural ecological communities (See Section 2.6), with potential to develop ecological attributes of old growth forest over time.
- Mount Artaban, a prominent geological feature of Gambier Island, including its summit, rock outcrops and cliffs, and the associated vegetation and wildlife habitats on these landforms.
- The situation of Mount Artaban Nature Reserve in terms of being part of a large contiguous natural area within the Coastal Western Hemlock Very Dry Maritime
(CWHxm) subzone and the Coastal Western Hemlock Dry Maritime (CWHdm) subzone.

• The hiking trail to the summit of Mount Artaban and the exceptional views from several viewpoints including the summit of Mount Artaban.

• Freshwater features, including two small seasonal streams that originate within the reserve (or on adjacent Crown land) and a unique pond, measuring about 40 m long and 8 m wide, located near the top of Mount Artaban.
3 MANAGEMENT PLAN

3.1 COMMUNITY CONSULTATION PROCESS

A community consultation process was undertaken for Gambier Island residents and property owners, as well as other interested parties, to participate in setting objectives, identifying issues, and proposing strategies for inclusion in this Management Plan. A notice of public meetings was mailed to all Gambier property owners inviting community members to attend the two scheduled consultation meetings, or if unable to attend, to contact the contractor by telephone or email to discuss any concerns or issues. A one-page survey questionnaire was included in the mailing (Appendix 5). Twenty-four completed questionnaires were returned. Results are summarized in Appendix 6.

The first community consultation meeting was held on January 24, 2009 at the Gleneagles Community Centre in West Vancouver. The meeting was attended by 16 people. Jan Hagedorn (Gambier Island Local Trustee) opened the meeting, thanked everyone for attending, and expressed appreciation for the efforts of the Gambier Island Conservancy in fund-raising and other steps necessary for the transfer of the property from the Provincial Government to the Islands Trust Fund. Kate Emmings (Ecosystem Protection Specialist, Islands Trust Fund) provided an overview of the Islands Trust Fund and its objectives and mandate, particularly as related to development of the Management Plan. Doug Hopwood presented an overview description of the nature reserve, and identified a short list of potential management issues for the consideration of those present. An informal discussion followed, in which community members asked questions and expressed their views.

Most of the discussion focused on what uses would be appropriate within the reserve. There was a general consensus among those present that only low-impact non-motorized recreational uses should be permitted. Hunting, mountain-biking, camping, campfires, horseback riding, and motorized access of any kind were all considered inappropriate. All issues identified at the meeting and in the survey questionnaires are addressed in more detail in Section 3.2 of this Plan.

A second community consultation event, consisting of a hike through the reserve to the summit of Mount Artaban, held on April 11, 2009, was attended by twelve people in total including Kate Emmings and Doug Hopwood on behalf of the Islands Trust Fund. Participants had an opportunity to see key areas of the reserve for themselves and provide their input on management issues. All input provided as part of this event was consistent with the recommendations included in Section 3.2.

3.1.1 Adjacent Landowners

All of the landowners of adjacent private properties were provided with the opportunity to review the preliminary draft of the management plan. The Review Draft of Management Plan was provided in March 2009 to BC Parks, the Integrated Land Management Bureau and the Gambier Island Sea Ranch council for comment. No comments were received from these agencies.
3.1.2 First Nations Communication

Gambier Island is within the traditional territory of the Squamish First nation.

The name for Gambier Island in the Squamish Nation language is "Cha7elkwnch." The Squamish Nation is comprised of descendants of the Coast Salish Aboriginal peoples who lived in the present day Greater Vancouver area; Gibson’s landing and Squamish River watershed. After contact with European settlers, 16 Squamish speaking tribes amalgamated to form one unit called the Squamish Indian Band. The amalgamation was signed on July 23, 1923 and it was established to guarantee equality to all Squamish people and to ensure good government. The Nation’s population is scattered among nine communities stretching from North Vancouver to the northern area of Howe Sound. 2,239 of the 3,324 Squamish Nation members live on-reserve. (Squamish Nation 2009)

The Squamish Nation is seeking a resolution for the long outstanding claim to their traditional territories. Squamish Nation’s Statement of Intent to negotiate was accepted by the British Columbia Treaty Commission in December, 1993. This is the first of six stages of the British Columbia Treaty Commission’s process. Presently, Squamish Nation is in the third stage of the process. (Stage Three: Framework Agreement)

The Squamish Nation’s traditional territory includes some of the present day cities of Vancouver, Burnaby and New Westminster, all of the cities of North Vancouver and West Vancouver, Port Moody and all of the District of Squamish and the Municipality of Whistler. These boundaries embrace all of Howe Sound, Burrard Inlet and English Bay as well as the rivers and creeks that flow into these bodies of water, and the various islands located in Howe Sound.

A letter has been sent by Island Trust Fund staff to the Squamish Nation asking for any information related to First Nations values or uses of the nature reserve that should be considered in the Management Plan. The Review draft of Management Plan was provided to the Squamish First Nation in March 2009 for comment. No comments were received from the Squamish First Nation. The Islands Trust Fund remains open to discussion with the Squamish Nation of issues related to management of the nature reserve.

3.1.3 Review Process

A Review version of the management plan was circulated for comment in March 2009 to Islands Trust Fund, Gambier Island Local Trust Committee, Gambier Island Conservancy and the Squamish First Nation. The draft Management Plan was posted on the Islands Trust Fund web-site, with an invitation for the public provide comments. BC Parks, Sunshine Coast Regional District, Integrated Land Management Bureau (BC Crown lands), and Gambier Island Sea Ranch Council were contacted and specifically invited to comment.

The Gambier Island Conservancy provided detailed comments with many suggestions for improvements of the draft plan, all of which were incorporated into this final version. No
major changes in management strategies were suggested. One other review comment was received from a member of the public who expressed concern that annual monitoring might not be frequent enough to detect any misuse of the reserve. Kate Emmings replied to this member of the public, explaining that in addition to the formal annual monitoring visit the Islands Trust Fund attempts to develop agreement with a local person or group who will act as an on-island management group or warden, and keep an eye on the nature reserves on a regular basis.

3.2 MANAGEMENT ISSUES
The management issues identified for Mount Artaban Nature Reserve include:
- Wildfire Hazard Management
- Acceptable and Unacceptable Activities
- Hunting and Firearms
- Hiking Trail
- Signs
- Fire Tower Debris
- Monitoring Program
- Management Group

3.2.1 Wildfire Hazard Management
As in all forested areas of Gambier Island, there is a significant risk of wildfire within the Mount Artaban Nature Reserve. According to ecological principles, it might be desirable to have a policy of allowing any fire that occurs in the Mount Artaban Nature Reserve to burn, as fire is an important element of the natural disturbance regime for the area. However, such a policy would not be practical because there are homes in the area, so property and personal safety of community members would be at risk if the fire spread. In any case, if a fire occurs in the nature reserve, it is almost certain that local or Provincial fire-fighters would respond quickly without taking the time to consult the ITF or any Management Plan. So it can be assumed that the effective policy will be to act quickly to extinguish any fires that occur in the Mount Artaban Nature Reserve.

The risk of human-caused fire can be reduced by posting signs informing hikers that there is a no camp-fires policy in the reserve. However, there is still risk of lightning-caused fires, or spread of human-caused fires onto the reserve from adjacent lands.

Recommended Management Actions or Strategies
Short Term (1 - 5 years)
- See Acceptable and Unacceptable Activities and Signage (no camping, no fires).

3.2.2 Acceptable and Unacceptable Activities
All permitted uses of the Mount Artaban Nature Reserve must be compatible with the management objectives. In other words, permitted uses should not have an adverse impact on the natural ecosystems of the Mount Artaban Nature Reserve. The main permitted uses that are anticipated are hiking, nature appreciation and related activities (e.g., photography) and any restoration activities approved by the ITF. Unacceptable
activities include use of motorized vehicles, commercial recreation in guided groups, camping, camp-fires, partying, mountain biking, rock climbing that involves use of climbing aids, tree cutting, hunting or discharge of firearms, fishing, and removal or alteration of any vegetation, and any activity that could be destructive to the natural environment.

**Recommended Management Actions or Strategies**

**Ongoing or Annual**

- The routine annual monitoring process which the ITF undertakes on all properties will generally be sufficient to detect any unacceptable activities if they occur in the future.
- Members of the Gambier community are encouraged to report observations of any unacceptable activities to the ITF.
- See Section 3.2.5, “Signage”.

**3.2.3 Hunting and Firearms**

Gambier Island is a popular area for hunting. Local residents report that they quite often encounter hunters in the Mount Artaban area. Hunting is not a permitted or acceptable use in the nature reserve, so it would be appropriate to include a clear “No Hunting” message in any signs put in place for the reserve.

**Recommended Management Actions or Strategies**

**Short Term (1 - 5 years)**

- See “See Section 3.2.5, “Signage”.

**3.2.4 Hiking Trail**

The summit of Mount Artaban is a popular hiking destination on Gambier for the local community and off-island visitors, and is listed in several popular hiking guide books. In addition to the splendid view from the peak of Mount Artaban, which is one of the major attractions of this hike, there are two interesting viewpoints further down the mountain within the reserve, just off the main trail, one giving a view to the west and the other a view to the north and east which may tempt hikers to make a short excursion off the main trail to the viewpoints. There is currently no trail or markings leading to these viewpoints.

It is difficult to estimate how many hikers visit the Mount Artaban Nature Reserve. Nine out of 17 people who responded to the public survey said they have hiked to Mount Artaban, so it seems to be quite a popular hike at least locally. The Gambier Island Conservancy has published a map brochure showing the network of trails which they are active in marking and maintaining on Gambier Island, including the Mount Artaban trail. There is only one established trail within the reserve, as shown on Map 2.

The hiking trail itself is on relatively gentle terrain. There are a few spots where hikers will want to use hand-holds, but no technical rock-climbing is involved, and the trail is a typical BC coastal hiking route that would be rated “moderate” difficulty. However, the terrain to either side of the trail is steep and potentially hazardous, and any hiker who wanders off the trail could be at risk of falling. The trail is generally easy to follow in
good daylight, but could easily be lost in more challenging conditions such as at twilight or night-time, in heavy fog, or when snow is on the ground. Some minor marking of the trail with flagging tape has occurred, but trail markers are absent on much of the trail. The safety of the hiking public would be well served by having clear trail markings along the entire length of the Mount Artaban trail (not just the portion within the MANR).

The Halkett Bay Provincial Marine Park Master Plan (BC Parks 1989) lists “signed hiking trails to Halkett Point and to the summit of Mt. Artaban” as an approved “Phase II” activity. This would suggest it may be possible to secure the cooperation of BC Parks in installing appropriate signs and trail markers.

**Recommended Management Actions or Strategies**

**Short Term (1 - 5 years)**

- It is recommended that ITF staff work with the Gambier Island Conservancy to improve the marking of the hiking trail within the reserve. Ideally, trail marking should be consistent along the length of the trail as it passes through different land ownerships, and should provide clear marking while being visually unobtrusive (e.g., small fluorescent metal tags fastened to trees).

- It is recommended that markings and appropriate signage should be created leading to the two viewpoints. This would enhance the safety of hikers and minimize damage to the environment by keeping them on a trail.

### 3.2.5 Signage

Given the broad public interest in hiking on Mount Artaban, and given that the hiking trail crosses or passes near to land owned and managed by several different agencies, it would seem desirable for all agencies involved to cooperate on a coordinated strategy for posting signs in the vicinity of the Mount Artaban trail.

**Recommended Management Actions or Strategies**

**Short Term (1 - 5 years)**

- It is recommend that ITF staff work with Gambier Island Conservancy, BC Parks, ILMB and the SCRD Parks Department on a coordinated signage strategy as per the Islands Trust Fund Sign Policy (TFB 96011). Signs should be placed at the trail-heads in the Camp Fircom area and near the dock in Halkett Bay Park, similar to the one placed at the trailhead near the Brigade Bay subdivision road. Signs could include a map of the general Mount Artaban area, identifying all the conservation lands in the area and showing the main hiking trails in the area. Signs should also indicate where camping and fires are allowed (and not allowed), prohibited uses (motorized vehicles, hunting or discharging firearms), hiking times and elevation, safety information (cougars, bears, changeable weather, steep terrain).

- Experience has shown that signs are subject to vandalism, especially signs that say a particular activity is prohibited. It is recommended that graphics rather than text be used to indicate prohibited activities, and that such signs be posted separately from information about the reserve, hiking trails, etc., and that a graffiti-proof coating be applied to signs.
Ongoing or Annual

- In order to minimize liability risks associated with ownership of the Mount Artaban Nature Reserve and allowing public access, it is recommended that the ITF itself should not promote recreational use of the Mount Artaban Nature Reserve by hikers, other than by assisting with trail marking as recommended in Section 3.2.4 and by posting trail signs as recommended in Section 3.2.5.

3.2.6 Fire Tower Debris

The disused Forest Service Fire Tower at the summit of Mount Artaban has collapsed some years ago, leaving a pile of lumber and fragments of glass and metal on the ground. Boards are scattered around the area, including floating in the pond near the summit. There is also some wire cable on the slope down to the pond. These waste materials are unsightly and detract from the recreational enjoyment of the summit area.

Recommended Management Actions or Strategies

Short Term (1 - 5 years)

- It is recommended that ITF work with the Gambier Island Conservancy to arrange for the remains of the Fire Tower to be cleaned up. This could be on a volunteer or contract basis. Options for disposal of the lumber include burning (subject to seasonal restrictions and fire safety precautions), piling in the woods a short distance away from the summit, or removal by helicopter. The expense of the latter option is probably not justified. The recommended option is to remove the wood material to a point in the woods where it can be neatly piled out of sight and left there to rot away. Other rubbish (glass, metal, wire cable, etc.) could be buried in the woods nearby or carried out.

3.2.7 Monitoring Program

The ITF undertakes a program of annual monitoring on all of its properties. This is an official visit to the properties in which photographs are taken and notes made about any impacts and changes occurring on the land. The ITF also has a policy that requires it to attempt to recruit a local group or local individual to act as an on-island management group or warden for ITF properties. The purpose of this policy is to ensure that there is someone or some group of people keeping an eye on ITF nature reserves on a regular basis.

Recommended Management Actions or Strategies

Ongoing or Annual

- The routine monitoring process will be sufficient to detect any impacts or issues that are likely to occur. The monitoring route should include annual visits to the usual public access route via Brigade Bay subdivision road and the hiking trail including the summit of Mount Artaban. In addition, approximately once every five years, the monitoring procedure should include visiting the northeast and northwest property corners and renewing the flagging at the corners.
3.2.8 Management Group

The Islands Trust Fund Board Five-Year Plan (2008-2012) states that: “The Trust Fund Board will seek volunteer assistance from local community groups to implement management plans and, where appropriate, will request such groups to enter into management agreements with the Board regarding management operations and responsibilities.” The Gambier Island Conservancy played a key role in the acquisition of the Mount Artaban Nature Reserve property and the development of this plan.

Recommended Management Actions or Strategies

Short Term (1 - 5 years)

- It is recommended that ITF consider entering into an agreement with the Gambier Island Conservancy for the conservancy to act as a local management group for the reserve. Such an agreement might also cover the Long Bay Wetland and the Brigade Bay Bluffs reserves.

3.3 SUMMARY OF RECOMMENDED MANAGEMENT ACTIONS OR STRATEGIES

3.3.1 Short Term Actions or Strategies (1 - 5 years)

- It is recommended that ITF staff work with a local hiking and or conservation group to improve the marking of the hiking trail within the reserve, to a BC Parks standard. Ideally, trail marking should be consistent along the length of the trail as it passes through different land ownerships.
- It is recommended that markings and appropriate signage should be created leading to the two viewpoints. This would enhance the safety of hikers and minimize damage to the environment by keeping them on a trail.
- It is recommend that ITF staff work with BC Parks, ILMB and the SCRD Parks Department on a coordinated signage strategy.
- Signs should be placed at the trail-heads in the Camp Fircom area and near the dock in Halkett Bay Park.
- Signs should include a map of the general Mount Artaban area, identifying all the conservation lands in the area and showing the main hiking trails in the area. Signs should also indicate where camping and fires are allowed (and not allowed), prohibited uses (motorized vehicles, hunting or discharging firearms), hiking times and elevation, safety information (cougars, bears, changeable weather, steep terrain).
- It is recommended that ITF work with the Gambier Island Conservancy to arrange for the remains of the Fire Tower to be cleaned up. This could be on a volunteer or contract basis. Options for disposal of the lumber include burning (subject to seasonal restrictions and fire safety precautions), piling in the woods a short distance away from the summit, or removal by helicopter. The expense of the latter option is probably not justified. The recommended option is to remove the wood material to a point in the woods where it can be neatly piled out of sight and left there to rot away. Other rubbish (glass, metal, wire cable, etc.) could be buried in the woods nearby or carried out.
• It is recommended that ITF consider entering into an agreement with the Gambier Island Conservancy for the conservancy to act as a local management group for the reserve. Such an agreement might also cover the Long Bay Wetland and the Brigade Bay Bluffs reserves.

3.3.2 Ongoing or Annual Actions or Strategies

• The routine annual monitoring process which the ITF undertakes on all properties will generally be sufficient to detect any unacceptable activities if they occur in the future.
• Members of the Gambier community are encouraged to report observations of any unacceptable activities to the ITF.
• In order to minimize liability risks associated with ownership of the Mount Artaban Nature Reserve and allowing public access, it is recommended that the ITF itself should not promote recreational use of the Mount Artaban Nature Reserve by hikers, other than by assisting with trail marking as recommended in Section 3.2.4 and by posting trail signs as recommended in Section 3.2.5.
• The routine monitoring process will be sufficient to detect any impacts or issues that are likely to occur. The monitoring route should include annual visits to the usual public access route via Brigade Bay subdivision road and the hiking trail including the summit of Mount Artaban. In addition, approximately once every five years, the monitoring procedure should include visiting the northeast and northwest property corners and renewing the flagging marking at the corners.
4 REFERENCES

Akrigg, G.P.V., and Helen B.Akrigg. 1986. One Thousand and One British Columbia Place Names. Sono Nis Press, Victoria, B.C., Canada


Appendix 1. Land Use Policies And Regulations Under Local Bylaws

A. Official Community Plan - Policies for the Wilderness Conservation (G1) Designation.

Under the Gambier Island Official Community Plan Bylaw No. 73, 2001 the Mount Artaban Nature Reserve is within the Wilderness Conservation (WC) designation. The following is a quotation from Gambier Island Official Community Plan Bylaw No. 73, 2001 of the applicable policies within the WC designation. Note, this quotation does not represent a certified true version of the bylaw.

Policy 7.25 Large crown land parcels are designated Wilderness Conservation. These lands are shown in Schedule B (the Land Use Designation map).

Policy 7.26 The permitted uses in the Wilderness Conservation designation should be:
   i. preservation and conservation of large areas of undisturbed open space;
   ii. open space to permit water recharge;
   iii. provincial or regional park;
   iv. low impact recreation (including hiking and wilderness camping);
   v. restoration and rehabilitation of natural ecosystems and biodiversity;
   vi. sustainable harvesting of trees including woodlot and community forest use.

Policy 7.27 No buildings or structures should be constructed on a parcel in the Wilderness Conservation designation, except those required for fire protection or public recreation purposes.

Policy 7.28 Land Use Bylaw regulations should limit further subdivision of these lands by the creation of a large minimum lot area.

Policy 7.29 Development permit requirements for the protection of the natural environment, its ecosystems and biological diversity should be applied to all areas designated Wilderness Conservation to preserve the ecological values derived from old growth forests, and to preserve habitat values and biological diversity associated with area wetlands and the headwaters of planning area streams.

Advocacy Policy 7.30 Provincial Ministries or Crown Corporations, including Ministry of Sustainable Resource Management, Ministry of Forests, Ministry of Energy and Mines and British Columbia Assets and Land Corporation are encouraged to enter into protocol agreements with the Islands Trust regarding consultation processes leading to the issue of any permits or tenures, other than mineral tenures, for lands within the Wilderness Conservation land use designation and to not issue such tenures or permits until such protocols have been established.

Advocacy Policy 7.31 The Ministry of Forests is requested to prevent any timber harvesting activity within the Wilderness Conservation designation. The Ministry of Forests is requested to consider objectives 7.7 to 7.12 and policies 7.8 to 7.23 of this Plan for any lands in the Wilderness Conservation designation, if such lands are licensed for any timber harvesting activity.
B. Land Use Bylaws- Regulations for the Wilderness Conservation (G1) Zone.

Under the Gambier Island Land Use Bylaw Number 86, 2004, the Mount Artaban Nature Reserve is within the Wilderness Conservation (G1) Zone. The following is a quotation from Gambier Island Land Use Bylaw No. 86, 2004 of the applicable regulations within the G1 zone. Note, this quotation does not represent a certified true version of the bylaw.

The purpose of the Wilderness Conservation Zone is to provide regulations to maintain wilderness and ecological values, ecosystems and unique areas of undisturbed large parcels.

Permitted Uses
(1) The following uses are permitted, subject to the regulations set out in this Section and Part 3, and all other uses are prohibited:
   (a) Natural open space use;
   (b) Water recharge use;
   (c) Park use;
   (d) Trail use;
   (e) Wilderness camping;
   (f) Woodlot use and timber harvesting use;
   (g) Accessory uses including but not limited to fire protection.

Permitted, Buildings, Structures and Density
(2) No buildings except for outhouses, protective shelters and fire protection and fire fighting facilities are permitted.

(3) Structures are limited to:
   (a) Pedestrian trail bridges, stairs, boardwalks, rails and culverts;
   (b) Signs and sign shelters;
   (c) Railings and fencing;
   (d) Benches;
   (e) Fire protection and firefighting facilities.

(4) The maximum lot coverage for all buildings and structures is 1% of the total lot area.

Siting and Size
(5) The minimum setback for any building or structure is 7.5 metres from all lot lines.

(6) The maximum height for all buildings and structures is 5 metres.

Conditions of Use
(7) Wilderness camping and trail use are not permitted in areas that have been identified in the Official Community Plan, Schedules C and F, as environmentally sensitive.

(8) Protective shelters shall be open on at least one side.

(9) Pedestrian trail use is limited to non-vehicular pedestrian trail use except for emergency service.

Subdivision Lot Area Requirements
(10) The minimum lot area is 20.0 hectares.

(11) The minimum average lot area is 20.0 hectares.
Appendix 2. Biogeoclimatic Ecosystem Classification And Description Of Site Series

Ecosystem classification, using the Biogeoclimatic Ecosystem Classification (BEC) system, provides the basis for describing the ecological diversity of the Mount Trematon Nature Reserve in this plan, and for identifying ecosystems of particular conservation significance (i.e. red- and blue-listed natural plant communities). The BEC Regional and Local levels of classification are used in this plan.

REGIONAL LEVEL
The regional level of classification is based on regional climate, as inferred from characteristic plant communities and soil/vegetation relationships. A subzone has a distinct climax plant association on zonal sites (sites that are neither strongly water-shedding nor water-receiving, thus reflecting the influence of the regional climate.)

The Mount Artaban Nature Reserve falls within the Coastal Western Hemlock (CWH) zone. Two subzones of the CWH zone occur in the reserve: the Coastal Western Hemlock Very Dry Maritime (CWHxm) subzone occurs in the northeast part of the reserve below about 200 m elevation, while the slightly cooler and moister Coastal Western Hemlock Dry Maritime (CWHdm) subzone occurs in the remainder of the reserve. The climate of these subzones is somewhat influenced by the rain shadow effect of the Vancouver Island Ranges, and experiences similar temperatures and precipitation to the North shore of Vancouver. In the summer, periods of drought and high temperatures over 4 weeks long are common. Winters are typically rainy and mild. At lower elevations, most winter precipitation occurs as rain. In the higher elevation parts of the reserve, there can be significant accumulations of snow, although rain in the winter is common here too.

LOCAL LEVEL
Within an area having a uniform regional climate (such as the CWHdm subzone), local features such as topography, soils, aspect, and slope act together to create an environment with a certain potential to support plants. A forest site is defined as an area of the landscape that is relatively uniform in climate, topography, soils, etc., and so has the potential to support a certain characteristic plant community.

A site series is the group of all sites within a subzone that have similar physical properties, and the same vegetation potential. For example, all sites in the CWHdm subzone with the potential to develop a climax community dominated by western hemlock with an understorey of flat moss and other characteristic species would belong to the CWHdm/Western hemlock – Flat moss site series. Site series are also designated by numbers. The zonal site series (a site that is intermediate in moisture and nutrient regime and best reflects the effects of the regional climate) is always numbered “01”.

Vegetation Tables

Tables A2 - 1 and A2 – 2 show the main plants present, and their relative abundance, in the typical climax plant community that occurs on each site series within the CWHdm and CWHxm subzones. Note that the tree species or understorey plant for which the site is named may be absent from the site if the vegetation is not at late seral or climax conditions. For example, sites in the 07 - CWHdm/Western redcedar – Foamflower site series are often dominated by red alder originating after logging. However, it is anticipated that in the course of time, and barring any influences that deflect the ordinary course of ecological succession, western redcedar will come to dominate such sites.

Table A2 - 1. Vegetation Summary Table for the CWHdm Subzone

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<th>Site Series</th>
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<th>03</th>
<th>04*</th>
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*Less than 4 plots.
EDATOPIC GRID

A terrestrial ecosystem is composed of vegetation, animals, microorganisms, and their physical environment. The physical environment (the site) can be conceptually simplified into three main elements: climate, soil moisture regime, and soil nutrient regime. Within a subzone, climate is relatively uniform. Therefore, the two main variables that describe local differences in forest sites are soil moisture regime and soil nutrient regime. The relation between these two variables can be drawn on a graph, called an **edatopic grid**, illustrating how soil moisture and nutrient regimes vary among the different site series (Figures A2-1 and A2 -2). Typically, these two soil properties tend to vary together. In other words, dry sites are often poor in nutrients, and moist sites are usually richer. For example, the moderately dry and nutrient poor sites (03, FdHw – Salal) occur much more often than the moderately dry, nutrient-rich site series (04, Fd – Sword fern).
Figure A2-1. Edatopic Grid for the CWHdm subzone.

Figure A2-1. Edatopic Grid for the CWHxm subzone.
SITE SERIES DESCRIPTIONS

CWHdm/Western hemlock – Flat moss site series (01; Hw - Flat moss), and
CWHdm/Western hemlock – Kindbergia site series (01; Hw - Kindbergia)

These two very similar site series represent the zonal site series of their respective subzones. In other words, they are neither strongly water-receiving nor a water-shedding sites, so the climax plant community reflects the effects of the regional climate. They have a moderately dry soil moisture regime and a very poor to medium nutrient regime. The climax vegetation on these sites is theoretically dominated by western hemlock, but, due to disturbance history, Douglas-fir is also often a major tree species, with minor amounts of shore pine and western redcedar. Common shrubs include salal, red huckleberry, baldhip rose, and sometimes ocean spray. The moss layer is well developed in some areas, and includes Plagiothecium undulatum, Kindbergia oregana, Hylocomium splendens and Rhytidiadelphus loreus.

These site series occur on gentle to steep upper and middle slopes. The soils are shallow deposits overlying bedrock (less than 50 cm deep) derived primarily from morainal and colluvial deposits, and are well-drained, with sandy to loamy textures and variable coarse fragment content. Trees may reach heights of 35 metres or more, and some older trees may reach diameters over one metre. Tree growth rates are moderate.

Critical site factors: Moderately deep to shallow soils, sometimes rough terrain
Major tree species: western hemlock, Douglas-fir
Minor tree species: western redcedar and shore pine

CWHdm/Douglas-fir - Shore pine - Cladina site series (02; FdPl - Cladina)

This site series has a very dry soil moisture regime, and a very poor to medium (but most commonly poor) soil nutrient regime. The tree canopy is discontinuous because of frequent rock outcrops and patches of very shallow soil. The tree canopy is dominated by Douglas-fir and shore pine. Western redcedar may be present in pockets of deeper soil, but it is not vigorous. Trees seldom reach over 15 metres in height, although some old Douglas-firs may be over a meter in diameter and achieve a certain venerable and gnarled magnificence. The sparse shrub layer may include ocean spray, baldhip rose, and red huckleberry. The moss layer is well developed, and includes Polytrichum juniperinum, Hylocomium splendens, Pleurozium schreberii, and Rhacomitrium canascens. The reindeer lichens (Cladina species) are a common to predominant ground cover.

This site series occurs on ridges, upper slopes, and rock outcrops, where soils are shallow and coarse textured. Sites in this series often have very high aesthetic value, but the moss, lichen, and herbaceous communities developed on shallow soils are sensitive to heavy recreational use.
**Critical site factors**: Shallow soil, rocky terrain, slow growth, regeneration difficulties, conservation value, high aesthetic and recreational values, sensitive to heavy traffic.

**Major tree species**: Douglas-fir, shore pine.

**CWHdm/Douglas-fir – Western hemlock - Salal site series (03; FdHw- Salal)**

This site series has a moderately dry moisture regime and a very poor to medium nutrient regime. Douglas-fir is usually the dominant tree species, and variable amounts of western hemlock and western redcedar are usually present.

This site series usually occurs on gentle to steep upper slopes, ridges, and rock outcrops, where soils are shallow and coarse textured. The soils are shallow deposits overlying bedrock (less than 50 cm deep) derived primarily from morainal and colluvial deposits, and are well-drained, with sandy to loamy textures and variable coarse fragment content. Trees may reach heights of 25 metres or more, and some older trees may reach diameters over one metre. Tree growth rates are slow to moderate.

The dominant understorey shrub is salal (often associated with decaying wood) Oregon-grape, red huckleberry, bracken and sword fern also occur. The moss layer is well developed in some areas, and includes *Plagiothecium undulatum*, *Kindbergia oregana*, *Hylocomium splendens* and *Rhytidiadelphus loreus*.

**Critical site factors**: Shallow soil, rocky terrain, slow growth, regeneration difficulties, conservation value, high aesthetic and recreational values

**Major tree species**: Douglas-fir, western hemlock, western redcedar.

**CWHdm/WESTERN REDCEDAR – SWORD FERN (05; CW SWORD FERN), AND CWHxm/Western redcedar – Sword fern (05; Cw Sword fern)**

These site series have a slightly dry to fresh soil moisture regime, and a rich to very rich soil nutrient regime. These sites typically occur on gentle mid slopes to lower slopes, where soils are deeper and finer textured. Climax vegetation is dominated by western redcedar, Douglas-fir and western hemlock in the tree canopy, but red alder often forms dense stands after logging or other disturbances. Bigleaf maple is often present. Trees can reach heights of 40 m or more and up to 2 min diameter. Sword fern, Oregon grape, salal, and red huckleberry are common understory plants. The moss layer is well developed in some areas, and includes *Kindbergia oregana*, *Hylocomium splendens* and *Plagiothecium undulatum*.

**Critical site factors**: Moderate to high productivity, potentially high aesthetic value of large diameter trees.

**Major tree species**: Western redcedar, Douglas-fir, Western hemlock

**Minor tree species**: Red alder, bigleaf maple.
CWHxm/Western redcedar - Foamflower site series (07; Cw - Foamflower)

This site series has a moist to very moist soil moisture regime, and a rich to very rich soil nutrient regime. The original forest on these sites included very large Douglas-fir and western redcedar trees over 2 metres in diameter, as well as variable amounts of western hemlock and bigleaf maple. Douglas-fir is unlikely to grow well beneath an intact forest canopy on this site series, and probably depended on periodic fire or windstorm disturbances to create good conditions for its regeneration. Western redcedar occurs as a tolerant understorey species, and its growth is slow until an opening occurs in the canopy above. In some cases these sites are now occupied by successional stands of red alder which regenerated after logging. Alder grows well on these sites and can reach large dimensions. Conifer species may occur under the alder canopy. In this case, the conifers rely heavily on photosynthesis in winter when the alders are bare. Conifer growth is slow under an alder canopy.

These sites occur on gentle to moderate lower slopes or in stream valleys. Soils are generally quite deep and fine textured. These sites are very productive for tree growth.

Ordinarily these sites have a vigorous and dense cover of sword fern. The herb layer includes three-leaved foamflower and trailing blackberry. The moss layer is not always well developed but may include *Kindbergia oregana*, *Hylocomium splendens*, *Leucolepis menziesii* and *Plagiommium insignes*.

**Critical site factors**: High productivity, moderate soil compaction hazard, moderate brush competition hazard for conifers, high conservation value, often associated with streams, potentially high aesthetic value of large diameter trees.

**Major tree species**: Western redcedar, Douglas-fir, red alder.

**Minor tree species**: Western hemlock, bigleaf maple.
## Appendix 3. Descriptions Of Vegetation Types

<table>
<thead>
<tr>
<th>Vegetation Type # 1</th>
<th>5 SECOND-GROWTH RED ALDER ON FRESH TO MOIST SITES AND RIPARIAN AREAS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Tree Canopy</strong></td>
<td>Red alder (western redcedar, Douglas-fir, western hemlock)</td>
</tr>
<tr>
<td>• <em>Age range</em></td>
<td>50 – 55 years</td>
</tr>
<tr>
<td>• <em>Height and dbh range</em></td>
<td>18 – 25 m</td>
</tr>
<tr>
<td>• <em>Canopy cover</em></td>
<td>40 – 70%</td>
</tr>
<tr>
<td><strong>Secondary Layers</strong></td>
<td>Western hemlock, western redcedar, bigleaf maple</td>
</tr>
<tr>
<td>• <em>Age range</em></td>
<td>1 – 25 years</td>
</tr>
<tr>
<td>• <em>Height and dbh range</em></td>
<td>1 – 6 m; 1 – 10 cm</td>
</tr>
<tr>
<td>• <em>Canopy cover</em></td>
<td>0 – 40 %</td>
</tr>
<tr>
<td><strong>Understorey layers:</strong></td>
<td><strong>Height, cover %, species</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Variability</strong></td>
<td>Some canopy gaps, species mix varies, understorey variable</td>
</tr>
<tr>
<td><strong>Site series and factors</strong></td>
<td>05, (07, 01) Occurs in small valleys with streams, on gentle</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Wildlife habitat features</strong></td>
<td>Snags and wildlife trees, some large old veteran trees,</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>History</strong></td>
<td>Burned 1922, Cat-logged about 1953, natural regeneration.</td>
</tr>
<tr>
<td><strong>Natural disturbance factors</strong></td>
<td>Infrequent stand replacement by fire and wind disturbance.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Expected changes</strong></td>
<td>Future dying off of red alder will provide more light for</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Critical factors, conservation values, and management issues</strong></td>
<td>Riparian ecosystems, adjacent to small streams. Where</td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Photo A4-1.
Vegetation Type 1

Photo A4-2.
Vegetation Type 1
<table>
<thead>
<tr>
<th>Vegetation Type # 2</th>
<th>Immature second-growth Douglas fir on slightly dry to fresh sites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Tree Canopy</strong></td>
<td>Douglas-fir (western hemlock, western redcedar)</td>
</tr>
<tr>
<td>• <strong>Age range</strong></td>
<td>50 – 55 years</td>
</tr>
<tr>
<td>• <strong>Height and dbh range</strong></td>
<td>20 – 30 m; 25 – 60 cm</td>
</tr>
<tr>
<td>• <strong>Canopy cover</strong></td>
<td>50 – 80%</td>
</tr>
<tr>
<td><strong>Secondary Layers</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td>• <strong>Age range</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td>• <strong>Height and dbh range</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td>• <strong>Canopy cover</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Understory layers:</strong></td>
<td></td>
</tr>
<tr>
<td>Height, cover %, species</td>
<td>Shrubs: 0.2 – 1.0 m, 0 – 5 %, red huckleberry, salal</td>
</tr>
<tr>
<td></td>
<td>Ferns: &lt; 1 m, 0 - 5 %, sword fern</td>
</tr>
<tr>
<td></td>
<td>Mosses: 10 -50%, KIND ORE, RHYT LOR, HYLO SPL</td>
</tr>
<tr>
<td><strong>Variability</strong></td>
<td>Relatively uniform</td>
</tr>
<tr>
<td><strong>Site series and factors</strong></td>
<td>05, 01 Mostly gentle to moderate slopes.</td>
</tr>
<tr>
<td><strong>Wildlife habitat features</strong></td>
<td>Some veteran trees, few understorey plants</td>
</tr>
<tr>
<td><strong>History</strong></td>
<td>Burned 1922, Cat-logged about 1953, natural regeneration.</td>
</tr>
<tr>
<td><strong>Natural disturbance factors</strong></td>
<td>Infrequent stand replacement by fire and wind disturbance. Gap dynamics.</td>
</tr>
<tr>
<td><strong>Expected changes</strong></td>
<td>Stand self-thinning due to density-related mortality. Slow development of old forest characteristics through tree growth and development of gaps by natural mortality and wind.</td>
</tr>
<tr>
<td><strong>Critical factors, conservation values, and management issues</strong></td>
<td>Over the long term, may develop elements of the red-listed western hemlock - Douglas-fir / Oregon beaked-moss community and the blue-listed western redcedar / sword fern Very Dry Maritime community. Has value as part of large area of forest contiguous with areas of similar forest on adjacent Crown and private lands.</td>
</tr>
</tbody>
</table>
Photo A4-3. Vegetation Type 2.
<table>
<thead>
<tr>
<th>Vegetation Type # 3</th>
<th>Over-mature second-growth red alder and conifers on slightly dry to fresh sites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Tree Canopy</strong></td>
<td>Red alder (Douglas-fir, western redcedar, western hemlock, bigleaf maple)</td>
</tr>
<tr>
<td>• <strong>Age range</strong></td>
<td>70 – 85 years</td>
</tr>
<tr>
<td>• <strong>Height and dbh range</strong></td>
<td>18 - 25 m; 20 – 60 cm.</td>
</tr>
<tr>
<td>• <strong>Canopy cover</strong></td>
<td>30 – 70 %</td>
</tr>
<tr>
<td><strong>Secondary Layers</strong></td>
<td>Western redcedar, western hemlock</td>
</tr>
<tr>
<td>• <strong>Age range</strong></td>
<td>All ages to about 40 years</td>
</tr>
<tr>
<td>• <strong>Height and dbh range</strong></td>
<td>0.5 – 10 m; 1 – 15 cm.</td>
</tr>
<tr>
<td>• <strong>Canopy cover</strong></td>
<td>0 – 25 %</td>
</tr>
<tr>
<td><strong>Understory layers:</strong></td>
<td>Rumours: 0.2 – 1.0 m, 0 – 10 %, Salal, red huckleberry</td>
</tr>
<tr>
<td>Height, cover %, species</td>
<td>Ferns: &lt; 1 m, 5- 50 %, sword fern, deer fern</td>
</tr>
<tr>
<td></td>
<td>Mosses: 5 – 25%, PLAG INS, KIND ORE, RHYT LOR</td>
</tr>
<tr>
<td><strong>Variability</strong></td>
<td>Some canopy gaps, species mix varies, understory variable</td>
</tr>
<tr>
<td><strong>Site series and Site factors</strong></td>
<td>05 (01, 07) Mostly gentle to moderate slopes</td>
</tr>
<tr>
<td><strong>Wildlife habitat features</strong></td>
<td>Snags and wildlife trees, some large old veteran trees, understory plants provide forage.</td>
</tr>
<tr>
<td><strong>History</strong></td>
<td>Burned 1992, some logging in 1930s, natural regeneration.</td>
</tr>
<tr>
<td><strong>Natural disturbance factors</strong></td>
<td>Infrequent stand replacement by fire and wind disturbance.</td>
</tr>
<tr>
<td><strong>Expected changes</strong></td>
<td>Continued dying off of red alder will provide more light for understory conifers to grow. In areas with heavy deer browsing, conifers may be impeded and an open stand or gap may result. Slow development of old forest characteristics through tree growth and development of gaps by natural mortality and wind.</td>
</tr>
<tr>
<td><strong>Critical factors, conservation values, and management issues</strong></td>
<td>Where redcedar is able to replace the alder, may develop into blue-listed western redcedar / sword fern Dry Maritime community. Has value as part of a large area of forest, contiguous with areas of similar forest on adjacent properties.</td>
</tr>
</tbody>
</table>
Photo A4-4. Vegetation Type 3.

Photo A4-5. Vegetation Type 3.
<table>
<thead>
<tr>
<th>Vegetation Type # 4</th>
<th>Second-growth mixed forest, with veteran trees, on moderately dry to fresh sites</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main Tree Canopy</strong></td>
<td>Douglas-fir, western hemlock, western redcedar, red alder, bigleaf maple</td>
</tr>
<tr>
<td><strong>Age range</strong></td>
<td>70 – 85 years</td>
</tr>
<tr>
<td><strong>Height and dbh range</strong></td>
<td>25 – 35 m; 30 – 90 cm</td>
</tr>
<tr>
<td><strong>Canopy cover</strong></td>
<td>50 – 80%</td>
</tr>
<tr>
<td><strong>Secondary Layers</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Age range</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Height and dbh range</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Canopy cover</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Understory layers:</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Height, cover %, species</strong></td>
<td></td>
</tr>
<tr>
<td>Shrubs:</td>
<td>0.2 – 1.0 m, 0 – 5 %, red huckleberry, salal</td>
</tr>
<tr>
<td>Ferns:</td>
<td>&lt; 1 m, 0 - 50 %, sword fern</td>
</tr>
<tr>
<td>Mosses:</td>
<td>10 -50%, KIND ORE, RHYT LOR, HYLO SPL</td>
</tr>
<tr>
<td><strong>Variability</strong></td>
<td>Diverse, species mix varies, some gaps</td>
</tr>
<tr>
<td><strong>Site series and factors</strong></td>
<td>05, 01, 03 Mostly moderate to steep middle to lower slopes, often with cliff bands and rocky outcrops.</td>
</tr>
<tr>
<td><strong>Wildlife habitat features</strong></td>
<td>Some veteran trees, sparse to moderate understorey development.</td>
</tr>
<tr>
<td><strong>History</strong></td>
<td>Burned 1922, Cat-logged about 1953, natural regeneration.</td>
</tr>
<tr>
<td><strong>Natural disturbance factors</strong></td>
<td>Infrequent stand replacement by fire and wind disturbance. Gap dynamics.</td>
</tr>
<tr>
<td><strong>Expected changes</strong></td>
<td>Stand self-thinning due to density-related mortality. Red alder component will gradually die off. Slow development of old forest characteristics through tree growth and development of gaps by natural mortality and wind.</td>
</tr>
<tr>
<td><strong>Critical factors, conservation values, and management issues</strong></td>
<td>Mixed occurrence of the red-listed western hemlock - Douglas-fir / Oregon beaked-moss community and the blue-listed western redcedar / sword fern Very Dry Maritime communities, in mid-seral condition. Has value as part of large area of forest contiguous with areas of similar forest on adjacent Crown and private lands.</td>
</tr>
</tbody>
</table>
Photo A4-6.
Vegetation Type 4.

Photo A4-7.
Vegetation Type 4.
**Vegetation Type # 5**

<table>
<thead>
<tr>
<th>Main Tree Canopy</th>
<th>Douglas-fir (shore pine, western hemlock, western redcedar)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age range</strong></td>
<td>70 – 850 years</td>
</tr>
<tr>
<td><strong>Height and dbh range</strong></td>
<td>28 – 30 m; 20 – 60 cm</td>
</tr>
<tr>
<td><strong>Canopy cover</strong></td>
<td>40 – 70%</td>
</tr>
<tr>
<td>Secondary Layers</td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Age range</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Height and dbh range</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td><strong>Canopy cover</strong></td>
<td>n.a.</td>
</tr>
<tr>
<td>Understory layers:</td>
<td></td>
</tr>
<tr>
<td>Height, cover %, species</td>
<td>Shrubs: 0.2 – 1.0 m, 0 – 5 %, red huckleberry, salal Ferns: &lt; 0.5 m, 0 - 5 %, sword fern Mosses: 0 - 40%, KIND ORE, RHYT LOR, HYLO SPL, PLAG UND</td>
</tr>
<tr>
<td>Variability</td>
<td>Relatively uniform</td>
</tr>
<tr>
<td>Site series and factors</td>
<td>03, 01 Mostly moderate to steep middle and upper slopes, some cliff bands and rock outcrops.</td>
</tr>
<tr>
<td>Wildlife habitat features</td>
<td>Some veteran trees, few understorey plants.</td>
</tr>
<tr>
<td>History</td>
<td>Burned 1922, natural regeneration.</td>
</tr>
<tr>
<td>Natural disturbance factors</td>
<td>Infrequent stand replacement by fire and wind disturbance. Gap dynamics.</td>
</tr>
<tr>
<td>Expected changes</td>
<td>Stand self-thinning due to density-related mortality. Slow development of old forest characteristics through tree growth and development of gaps by natural mortality and wind.</td>
</tr>
<tr>
<td>Critical factors, conservation values, and management issues</td>
<td>Blue-listed Douglas-fir - western hemlock / salal Dry Maritime ecological community in early- to mid-seral condition. Has value as part of large area of forest contiguous with areas of similar forest on adjacent Crown and private lands.</td>
</tr>
</tbody>
</table>
Photo A4-8. Vegetation Type 5.
## Vegetation Type # 6

### Shore pine and Douglas-fir on dry rocky ridges

<table>
<thead>
<tr>
<th>Main Tree Canopy</th>
<th>Shore pine (Douglas-fir)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age range</strong></td>
<td>Uneven age to 85 years</td>
</tr>
<tr>
<td><strong>Height and dbh range</strong></td>
<td>6 – 18 m; 10 – 50 cm</td>
</tr>
<tr>
<td><strong>Canopy cover</strong></td>
<td>0 – 40%</td>
</tr>
</tbody>
</table>

### Secondary Layers
- **Age range** n.a.
- **Height and dbh range** n.a.
- **Canopy cover** n.a.

### Understory layers:
- **Height, cover %, species**
  - Shrubs: 0.1 – 0.8 m, 0 – 5 %, red huckleberry, salal
  - Ferns:
  - Mosses: 0 - 60%, KIND ORE, RHAC CAN, HYLO SPL,
  - Lichens: 10 - 50%, Cladina species
- **Variability** Relatively uniform, some gaps
- **Site series and factors** 02, 03 gentle to steep upper slopes and ridges, some cliff bands and rock outcrops.
- **Wildlife habitat features** Some veteran trees, few understorey plants
- **History** Burned 1922, natural regeneration.
- **Natural disturbance factors** Infrequent stand replacement by fire and wind disturbance.
- **Expected changes** Stand self-thinning due to density-related mortality. Slow development of old forest characteristics through tree growth and development of gaps by natural mortality and wind.
- **Critical factors, conservation values, and management issues** Red-listed Douglas-fir - lodgepole pine / oceanspray / reindeer lichens ecological community in mid-seral condition. Has value as part of large area of forest contiguous with areas of similar forest on adjacent Crown and private lands. Includes Mt. Artaban summit, with high recreational value.
Photo A4-9. Vegetation Type 6.
Appendix 4. Ranking Criteria for Element Occurrences of Red-listed Ecological Communities

The CDC ranks the conservation value of individual occurrences of red-listed ecological communities based on three factors: size, condition, and landscape context. Each of the three factors are rated in a four class ranking system (Excellent, Good, Fair and Poor).

**LANDSCAPE CONTEXT**

Landscape context considers both the abiotic and biotic features of the geographic area adjacent to and surrounding the patch of a given red-listed ecological community.

Table 2. Criteria for ranking the Landscape Context of occurrences of red-listed ecological communities.

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent (4)</td>
<td>The surrounding landscape has little to no fragmentation (&lt;5%) due to anthropogenic influences (no roads, other transportation corridors, rural settlement or urban developments, no industrial activity or recent forest harvesting). The EO occurs within a larger landscape that has some formal protected status (e.g., Federal or Provincial park/reserve). There may be some de facto protection where no future development is foreseen, e.g., access restricts use, or there is no known plan to develop or disturb present conditions, or the site is protected by conservation covenants.</td>
</tr>
<tr>
<td>Good (3)</td>
<td>Up to 25% of the surrounding landscape is fragmented. The larger landscape context provides some protection from anthropogenic disturbance (e.g., park land or crown land rather than private land) but changes in natural disturbance regimes and harvesting may influence the element occurrence (e.g., fire suppression within a landscape previously dominated by frequent fire).</td>
</tr>
<tr>
<td>Fair (2)</td>
<td>More than 25% of the surrounding landscape is fragmented and affected by anthropogenic influences. Current management and development of the surrounding landscape may affect the continued existence of the element occurrence, i.e. removal of vegetation, hydrological changes, invasive alien species, etc.</td>
</tr>
<tr>
<td>Poor (1)</td>
<td>Less than 25% of the surrounding landscape consists of natural or semi-natural vegetation. Fragmentation is due to urban and agricultural land use, or other cultural vegetation. Current plans will result in significant alteration or destruction of the element occurrence, e.g., development plans, harvesting plans, mining operations, anthropogenic structures.</td>
</tr>
</tbody>
</table>

**SIZE**

Size refers to the area of the patch of a given ecological community. The importance of size varies based on the type of ecosystem. Size is relatively unimportant in small patch or linear ecosystems. Ranking criteria for size specific to each ecological community have not yet been developed, but in general, larger patches have higher conservation value than smaller ones. Patches as small as 1 ha of certain communities can be significant and a patch greater than about 10 ha of a red-listed ecological community in good or excellent condition can be very significant.


**CONDITION**

Condition is an assessment of the composition, structure, and ecological function of the ecological community. Condition can be thought of as the degree of departure from the structure, function, and distribution of late seral ecological communities prior to European settlement.

Table 1. Criteria for ranking the Condition of occurrences of red-listed ecological communities.

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Criteria</th>
</tr>
</thead>
</table>
| **Excellent (4)** | a. Typical climax vegetation.  
   b. No anthropogenic disturbances or changes to natural disturbance regimes have altered the EO (including fire exclusion or flood control), no vegetation or soil removal has occurred. Forested ecological communities are generally late seral vegetation. Wetland and riparian communities have intact hydrologic regimes. There is minimal influence of domestic grazing.  
   c. No alien species occur at the site.  
   d. No artificial structures occur at the site.  
   e. There is little or no internal fragmentation (<5%) of the occurrence. |
| **Good (3)** | a. Typical mature seral vegetation.  
   b. For forested communities, there has been no soil removal or disturbance to soil surface; little or no influence of old road beds or skid tracks, no construction evidence, old selection harvesting only, minimal changes to natural disturbance regimes (including fire exclusion or flood control). Forested ecological communities are late seral or mature, or younger if originating from natural disturbance. Wetland and riparian communities have largely intact hydrologic regimes. There is low-moderate influence of domestic grazing.  
   c. Minor cover of alien species (<5% except <20% in grasslands) may occur at the site. Some earlier successional species occur.  
   d. Some artificial structures may occur at the site (<2% of total area of occurrence).  
   e. There is little or no internal fragmentation (<5%) of the occurrence. |
| **Fair (2)** | a. Anthropogenic disturbances and changes to natural disturbance regimes have occurred. Forested ecological communities are young seral stages after harvesting. There is moderate to high influence of domestic grazing in grassland ecological communities. There may be significant alterations to the hydrologic regime in wetlands and riparian ecosystems.  
   b. Significant cover of alien species occurs (5-20% in forests and riparian systems, up to 60% in grasslands). Most of the plants in grassland communities are early successional species.  
   c. Some artificial structures may be present (less than 10% of total area).  
   d. There is minor internal fragmentation (<5%) of the EO. |
| **Poor (1)** | a. Significant anthropogenic disturbances have occurred, particularly removal or disturbance of soil materials and vegetation. There are significant alterations to the hydrologic regime of wetlands and riparian ecosystems.  
   b. Alien species may dominate a vegetation layer or may total more than 20% (>60% for grasslands) cover overall.  
   c. Significant artificial structures occur (>10% of total area of occurrence).  
   d. The element occurrence is fragmented by artificial structures or barriers. |
Appendix 5. Community Consultation Questionnaire

A notice of public meetings was mailed to all Gambier property owners inviting community members to attend the two scheduled consultation meetings, or if unable to attend, to contact the contractor by telephone or email to discuss any concerns or issues. A one-page survey questionnaire was included in the mailing (see next page). Twenty-four completed questionnaires were returned. Results are summarized in Appendix 6.
Mount Artaban Nature Reserve - Public Survey

Please fill out this survey on the management of the Islands Trust Fund’s Mount Artaban Nature Reserve on Gambier Island, and return to Doug Hopwood at the address below.

1.) Have you ever visited the Mount Artaban Nature Reserve? If YES, how often?

______________________________________________________________________________

2.) How do you access the Mount Artaban Nature Reserve? Please describe how you travel to Gambier Island (scheduled water taxi, charter, own boat, etc.) where you land on Gambier, and how you reach the reserve from that point (foot, car, other). Please indicate if you stay overnight on Gambier or come as a day trip. If applicable, indicate your route(s) on the map on the back of this sheet.

______________________________________________________________________________

3.) As a current or future visitor to the Mount Artaban Nature Reserve, please list activities that you enjoy pursuing there (e.g., walking, snow-shoeing, wildlife viewing, photography, other).

______________________________________________________________________________

4.) What are the special features most important to you in the Mount Artaban Nature Reserve? Please list and indicate locations on the map on the back of this sheet.

______________________________________________________________________________

5.) Are there any activities you think are incompatible with protecting the natural features of the Mount Artaban Nature Reserve?

______________________________________________________________________________

6.) Have you viewed wildlife or special plants while visiting the Mount Artaban Nature Reserve? Please list or describe below and indicate the location.

______________________________________________________________________________

Please provide any additional comments, concerns or suggestions you may have about management of the Mount Artaban Nature Reserve.

______________________________________________________________________________

Your name and address (Optional)

______________________________________________________________________________

Please return completed survey to Doug Hopwood, Lennie Road, Lasqueti Island BC, V0R 2J0 or bring to the Public Meeting (January 24, 2009) or Site Visit (April 11, 2009) Questions? Call Doug Hopwood, 250-333-8876 or email dhopwood@island.net
Appendix 6. Summary of Community Consultation Questionnaire Results

As part of the community consultation process, a one-page survey questionnaire was mailed to all Gambier property owners. Twenty-four completed questionnaires were returned. In Question 1 of the survey, respondents were asked how often they have visited Mount Artaban Nature Reserve. Results from Question 1 are summarized in Table A6-1 below.

Table A6-1. Survey respondents - number of visits.

<table>
<thead>
<tr>
<th>Number of times respondents have visited the MANR</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>10</td>
</tr>
<tr>
<td>1 or 2 times</td>
<td>3</td>
</tr>
<tr>
<td>More than 2 times</td>
<td>11</td>
</tr>
</tbody>
</table>

Question 3 asked respondents what activities they enjoy or would enjoy in the future on the MANR, and Question 5 asked which uses respondents consider incompatible with protecting the natural features of the Mount Artaban Nature Reserve. Results from Questions 3 and 5 are summarized in Table A6-2 below.

Table A6-2. Acceptable and unacceptable uses.

<table>
<thead>
<tr>
<th>Potential Use</th>
<th>Number of respondents who have enjoyed or would enjoy this activity on MANR</th>
<th>Number of respondents who consider this activity unacceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiking, snow-shoeing, wildlife viewing, photography, etc.</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>Mountain biking</td>
<td>1 maybe</td>
<td>9</td>
</tr>
<tr>
<td>Horseback riding</td>
<td>1 maybe for horse logging</td>
<td>2</td>
</tr>
<tr>
<td>Motorized recreation</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td>Camping</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Hunting</td>
<td>1 (bow hunting only)</td>
<td>4</td>
</tr>
</tbody>
</table>

Other important points gathered from the survey were:

- There is a high level of support and appreciation for nature conservation as the highest priority management objective for the MANR.
- Several respondents take their domestic water supply from streams or ground water sources that are downstream from the MANR, and so there is strong concern that activities on the MANR should not compromise the quality or flow regimes of these sources.
- Many respondents would like to have easier, more convenient, or more clearly marked access to the hiking trail on the reserve.
Appendix 7. Summary Of Public Consultation And Review Process

1. Public Consultation Meeting
   Gleneagles Community Centre - Whytecliff Room
   6262 Marine Drive, West Vancouver BC
   Saturday, January 24, 2009 - 1:30pm to 3:00pm

   Key points:
   • Attended by 16 people.
   • General consensus that only low-impact non-motorized recreational uses should be permitted.
   • Hunting, mountain-biking, camping, campfires, horseback riding, and motorized access of any kind were all considered inappropriate.
   • Support for trail marking, signs, and clean-up of fire lookout tower.

2. Site Visit / Public Consultation Meeting
   On-site at Mount Artaban Nature Reserve - hike to summit
   Saturday, April 11, 2009

   Key Points:
   • Attended by 12 people.
   • General consensus that only low-impact non-motorized recreational uses should be permitted.
   • Hunting, mountain-biking, camping, campfires, horseback riding, and motorized access of any kind were all considered inappropriate.
   • Support for trail marking, signs, and clean-up of fire lookout tower.


   A Review Draft version of the management plan was circulated for comment in March 2009 to Islands Trust Fund, Gambier Island Local Trust Committee, Gambier Island Conservancy and the Squamish First Nation. The draft Management Plan was posted on the Islands Trust Fund web-site, with an invitation for the public provide comments. BC Parks, Sunshine Coast Regional District, Integrated Land Management Bureau (BC Crown lands), and Gambier Island Sea Ranch Council were contacted and specifically invited to comment.

   Key Points:
   • No comments received from government agencies or the Squamish First Nation.
   • The Islands Trust Fund remains open to discussion with government agencies and the Squamish First Nation of issues related to management of the nature reserve.
   • The Gambier Island Conservancy provided detailed comments with many suggestions for improvements of the draft plan, all of which were incorporated into this final version. No major changes in management strategies were suggested.
Appendix 8. Survey Plan