

**ISLANDS TRUST FUND
Bowen Island**

**FAIRY FEN NATURE RESERVE
MANAGEMENT PLAN**



Whitehead Environmental Consultants Ltd.

July 29, 2011

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Prepared for

Islands Trust Fund
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29 July 2011

Executive Summary

This document presents a management plan for the Islands Trusts Fund's **Fairy Fen Nature Reserve** on Bowen Island. The 18 hectare (44 acre) property was acquired through the Province of British Columbia's Free Crown Grant Program on March 25th 2010. The main reason for the establishment of the Reserve was to protect the regionally significant wetland known as Fairy Fen. The property, which was protected in partnership with the Bowen Island Conservancy, is one of three nature reserves and three covenant areas protected by the Islands Trust Fund on Bowen Island. These protected areas complement the 397 hectare Ecological Reserve 48, established by the provincial government in 1973.

The management planning process documented in this report has included identification of the purpose and management objectives for the Reserve, a compilation of property information, an ecological inventory, consultation with the public regarding their interest in and wishes for the Reserve, and development of an action plan covering tasks to be completed in the immediate future (18 months to 2 years), as well as short term (3 –to 5 years) and long term (5 to 10 years).

The purpose of the Reserve is to preserve the area's ecosystems in their natural state, in accordance with the Islands Trust Fund Board's Five Year Plan (2008-2012) and the Bowen Island Official Community Plan. The Reserve's main management objectives are to:

- protect the plant and animal communities and ecosystem processes of Fairy Fen and its headwaters forest in perpetuity;
- allow the natural ecological processes and functions to proceed without human interference, except in the case of wildfire or other situations where remediation is considered imperative;
- accommodate the continued low-impact use of the Reserve for pedestrian visitation, nature appreciation, education and scientific research;
- permit only uses that do not significantly impair the natural condition of the Reserve or its special features.

The Reserve is located on southwestern flank of Bowen Island within the Huszar Creek watershed, spanning an elevation range of 163 m above sea level in the southwest to 239 m in the northeast. Most of the Reserve is covered in a mature second-growth coniferous forest of Western hemlock, Douglas-fir and western redcedar, with smaller areas of mixed forest including red alder and bigleaf maple. The area was last logged in the early to mid 20th century. The last wildfire in the reserve is thought to have occurred in the late 1920s.

Nine ecosystem types have been documented in the Reserve, belonging to the dry maritime and very dry maritime units of the Coastal Western Hemlock biogeoclimatic zone. All of these ecosystems are classified as sensitive by the Islands Trust Fund's Sensitive Terrestrial Ecosystem Mapping project. A total of 69 plant and 42 animal species have been identified to date in the Reserve; however, many more are anticipated to be found in the future. Among the species at risk designated by the provincial and federal governments, only the Red-legged frog (*Rana aurora*, Blue-list) was confirmed to occur in the Reserve; the Western Screech-Owl (*Megascops kennicottii kennicottii*) and Sooty Grouse (*Dendrapagus fuliginosus*), both Blue-listed, may also occur.

A total of 17 management action items for the Reserve have been identified. These range from installation of signage and prohibition of access by motorized vehicles, cyclists and horses, and securing an easement for legal access from Thompson Road in the immediate term; to installing interpretive signage in the medium term; and the potential installation of a viewing structure at Fairy Fen and continuation of biological and ecological inventories in the long term.

It is anticipated that this first management plan for Fairy Fen Nature Reserve will be updated in ten years, in 2021.

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The assistance of the following persons and groups in the preparation of this management plan is also gratefully acknowledged: Peter Drake, Everhard Van Lidth de Jeude and Owen Plowman of the Bowen Island Conservancy; Jeff Ralph, Natalie Tamosiunas, Nuala Murphy and Mark Van Bakel of the Islands Trust Fund; Martin Harrichhausen of Arbutus Land Surveying Inc.; Wil Hilsen of the Bowen Island Municipality; and the many Bowen Islanders and other guests who participated in the public consultation. The report was written by Alan Whitehead, M.Sc., R.P.Bio.

1.0 Introduction

This document presents a management plan for the Islands Trusts Fund's **Fairy Fen Nature Reserve** on Bowen Island. The 18 hectare (44 acre) property was acquired through the Province of British Columbia's Free Crown Grant Program on March 25th 2010.¹

The Reserve lies in the headwaters of the Huszar Creek watershed and contains the regionally significant wetland known as Fairy Fen. The property was protected in partnership with the Bowen Island Conservancy and is one of three nature reserves and three covenant areas protected by the Islands Trust Fund on Bowen Island. These protected areas complement Bowen Island's 397 hectare (981 acre) Ecological Reserve 48, established by the provincial government in 1973.

1.1 Islands Trust Fund

The Islands Trust Fund (ITF) was established in 1990 as a regional conservation land trust for the Islands Trust area. The Islands Trust Fund currently owns and manages 20 nature reserves and holds over 60 conservation covenants, permanently protecting over 1,000 hectares of land in the Gulf and Howe Sound Islands.

The ITF “envisions the islands and waters of the Strait of Georgia and Howe Sound as a vibrant tapestry of culture and ecology where humans live and work in harmony with the natural world. This special place has a network of protected areas that preserve in perpetuity the native species and natural systems of the islands. Engaged residents and conservation partners work together to protect large natural areas and key wildlife habitat.” (ITF 2010a).

The administration of Islands Trust Fund is provided by the Islands Trust. The Islands Trust is a unique federation of independent local governments, including Bowen Island Municipality, which plans land use and regulates development in the trust area. The object of the Islands Trust's mandate is *“to preserve and protect the Trust Area and its unique amenities and environment for the benefit of the residents of the Trust Area and of British Columbia generally, in cooperation with municipalities, regional districts, improvement districts, other persons and organizations and the government of British Columbia”* (Islands Trust Act).

1.2 Islands Trust Fund Management Planning

The ITF works to achieve their vision by helping islanders to acquire and protect core conservation areas² that have high biodiversity values. Guided by the ITF's Regional

¹ A copy of the Order in Council granting the property to the Islands Trust Fund is included in Appendix 6.

² Core conservation areas include lands with formal/legal conservation status such as: ecological reserves, nature reserves/sanctuaries held by conservation organizations, parks held for the purpose of protecting natural features (i.e., not including sports fields and recreational areas), watershed protection lands, conservation covenant lands, etc. They do not include undesignated Crown Lands or areas protected through land use planning tools like Environmental Development Permit Areas. (ITF 2010a)

Conservation Plan 2011 – 2015 (ITF 2010a), these areas are evaluated, managed and monitored to preserve their natural features. Management plans for each property are typically developed within one year of its acquisition and updated every five to ten years.

The purpose of a management plan for an ITF nature reserve is to provide long term direction regarding allowable public use, risks to public safety, ecological values and other significant features. The Islands Trust Fund Board Five-Year Plan (2008 – 2012) requires that the following matters are identified and acted upon:

- 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.

1.3 Nature Reserve Purpose

The purpose of establishing the Fairy Fen Nature Reserve is to:

- preserve and protect the natural values of Fairy Fen and its watershed;
- allow natural succession of the Reserve's ecosystems to occur unimpeded; and
- protect the site in accordance with the objectives of the Islands Trust, Islands Trust Fund and Bowen Island Municipality.

1.4 Nature Reserve Objectives

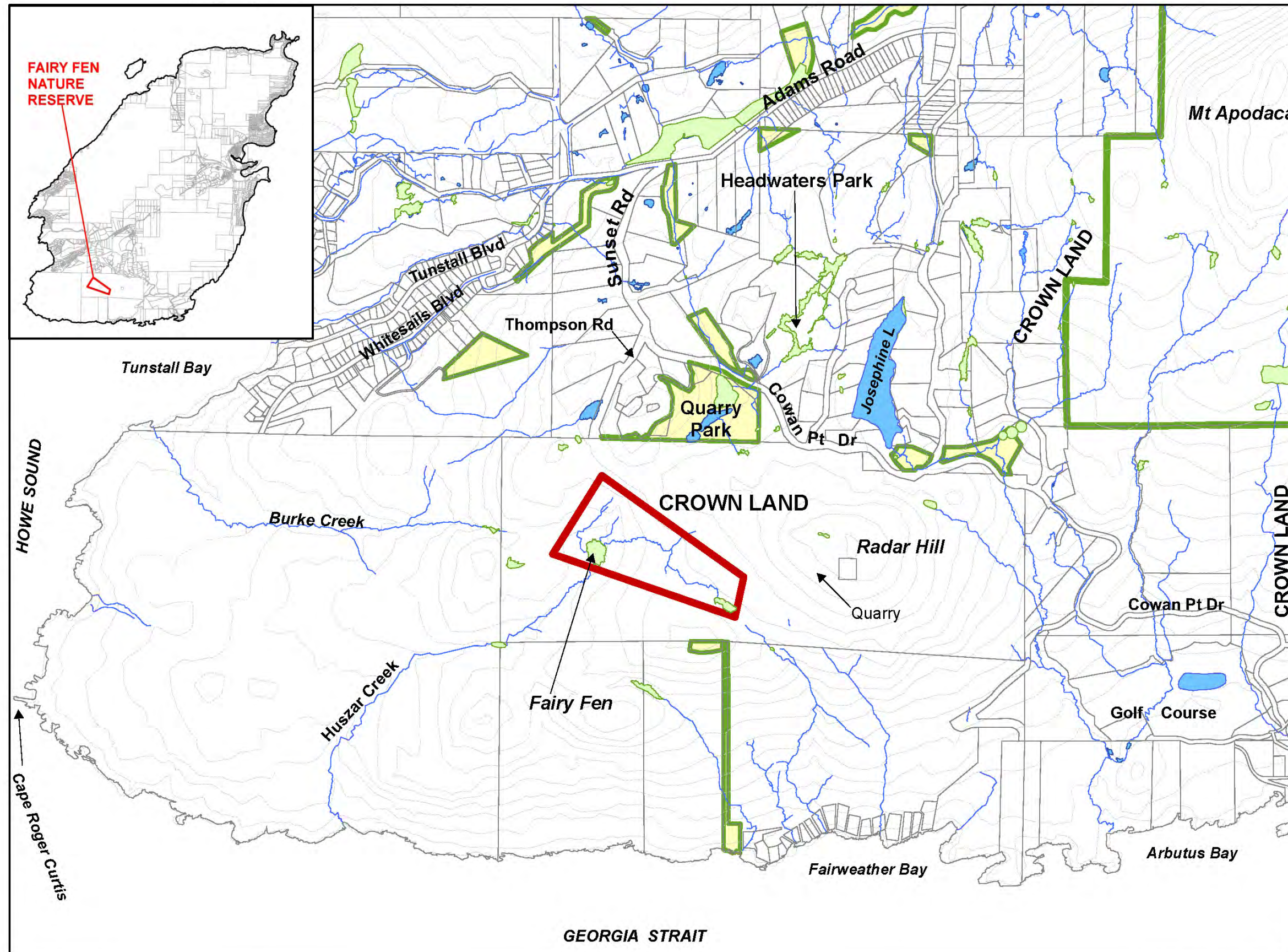
The Islands Trust Fund objectives for the management of Fairy Fen Nature Reserve are to:

- preserve the natural features and functions of the site;
- protect and, where necessary, restore the plant and animal communities and ecological processes at the site;
- accommodate the continued low-impact use of the Reserve for pedestrian visitation, nature appreciation, education and scientific research;
- permit only uses that do not significantly impair the natural condition of the Reserve or its special features; and
- allow the natural ecological processes and functions to proceed without human intervention, except in the case of wildfire or other exceptional situations where remediation is considered imperative.

2.0 Property Information

2.1 Location

Fairy Fen Nature Reserve is located on Bowen Island, Howe Sound, British Columbia, on the southwest side of a mountain known locally as Radar Hill (Figure 1). The geographic coor-



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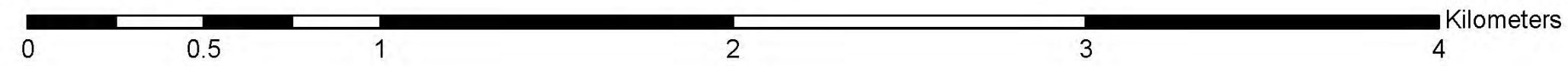
- Watercourse
- Wetland
- Pond, lake
- Properties
- Park, municipal
- ITF Reserve
- Ecological Reserve



**Figure 1.
Location Map:
Fairy Fen
Nature Reserve,
Bowen Island**

Prepared by:
Whitehead Environmental Consultants Ltd.
18 July 2011

Base map courtesy of the Bowen Island
Conservancy and Bowen Island Municipality.
Contour interval = 20 m.
All feature locations are approximate.



dinates at the centre of the property are 49.345° North and 123.399° West (UTM Zone 10N: Easting 471025, Northing 5465910).

2.2 Legal Description

The legal description of the property is District Lot 8142, New Westminster District, Bowen Island (BCGS 92G.034). The lot was created within a block of unsurveyed Crown land specifically for the purpose of establishing this nature reserve. The parcel was surveyed on March 26th 2009 by Martin Harrichhausen, BCLS, of Arbutus Land Surveying Inc., Gibsons, B.C. A copy of the legal survey plan for the property is included in Appendix 7.

2.3 Local and Regional Context

The Reserve is located within the Bowen Island Municipality, the Greater Vancouver Regional District (GVRD, also known as MetroVancouver) and the Islands Trust.

Bowen Island is accessed by ferry from Horseshoe Bay, West Vancouver. The Reserve is accessible from the end of Thompson Road and from an unnamed former logging road off Cowan Point Drive (Figure 2).

Fairy Fen Nature Reserve lies within the watershed of Huszar Creek, which drains south to Georgia Strait at the entrance of Howe Sound. The Reserve encompasses the headwaters of Huszar Creek, including two wetlands (Figure 2).³

2.4 Adjacent Land Use and Connectivity

The Reserve lies within an area of undeveloped mature second-growth forest (cover photo). Logging and, to a much lesser extent, hunting have been the main historical land uses (Howard 1973). Logging is thought to have started in the early 1900s and ended possibly as recently as the 1960s. Hunting was ongoing until as recently as 2001. The summit and upper northeast part of Radar Hill, approximately 400 to 600 m to the east of the Reserve, contains a number of Crown tenures (leases), used for communications infrastructure (radio, radar, microwave), a water tank and, since 2006, a rock quarry. These leases all lie outside of the Huszar Creek watershed.

Present land uses within the Reserve and in the contiguous lands are limited to recreation, including hiking and, increasingly since approximately 2005, mountain biking, motorcycling and off-road driving (ATV and 4x4)^{4,5}. Firewood extraction is also known to occur in the Crown lands; however this use has not been documented within the Reserve lands.

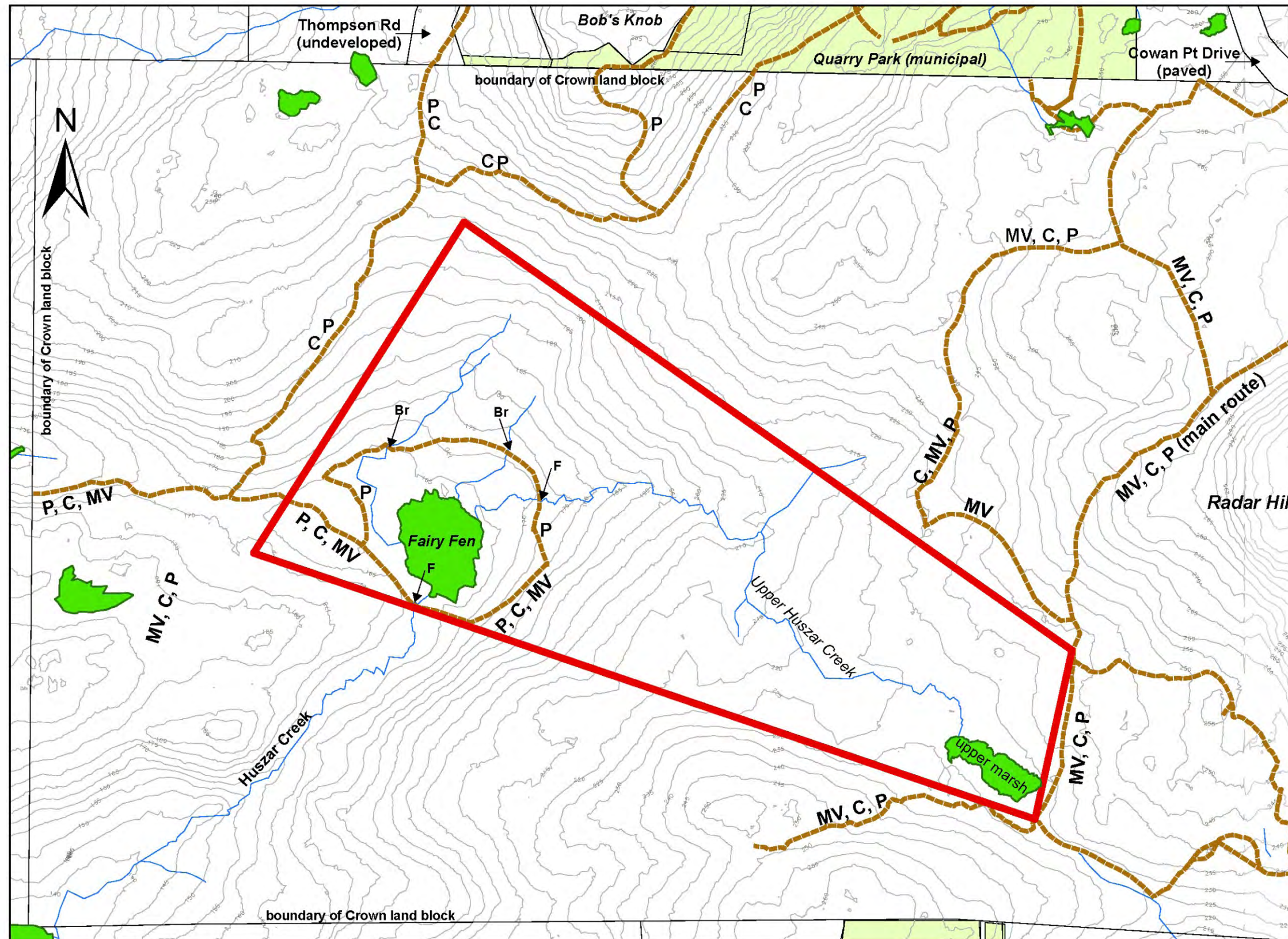
³ The location of Fairy Fen Nature Reserve within the Huszar Creek watershed is shown in Appendix 5.

⁴ ATV = all terrain vehicle; 4x4 = four-wheel drive vehicle; together with trail motorcycles, these are collectively referred to as off-road vehicles and their use as “off-roading.”

⁵ We have been unable to confirm whether or not some of the cycling trails in the surrounding Crown land block have been created or maintained as part of commercial recreational enterprise.

Built infrastructure within the Reserve and adjacent Crown land is limited to the remains of a road network, presumably created or last expanded during periods of logging in the mid-20th century. The known uses of the existing road and trail network that has been mapped to date are indicated in Figure 3.

The only trail access to the Reserve lands, as recently as 1995, was an abandoned logging track from Radar Hill (Figure 3). Additional trails have, by and large, all become established incidentally (i.e., without actual construction) through the effects of repeated pedestrian and vehicular traffic. However, mountain biking and off-roading enthusiasts have been creating new routes through much of the Radar Hill area including lands that are now within the Reserve. In some places, plank bridges have been built for cycling or trees have been cut and logs placed to facilitate passage of ATVs and 4x4s.



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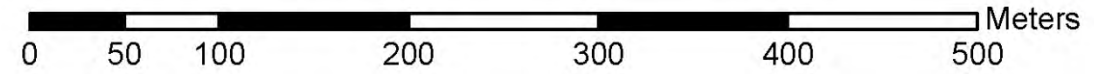
- P Pedstrian
- C Cyclist
- MV Motorized vehicle
- F open crossing (ford)
- B plank bridge
- Wetland
- ITF Reserve
- Track or trail
- Watercourse

Notes:
 MV includes motorcycles, ATVs and 4X4s.
 Not all existing trails are mapped.
 Trail or track uses are listed in descending order of use intensity as interpreted in the field.

**Figure 3.
 Trail Network
 and Known Uses
 at Fairy Fen
 Nature Reserve,
 Bowen Island**

Prepared by:
 Whitehead Environmental Consultants Ltd.
 18 July 2011

Base map courtesy of the Bowen Island Conservancy and Bowen Island Municipality.
 Contour interval = 5 m, based on LIDAR imagery.
 All feature locations are approximate.



2.5 Site History

Bowen Island lies within the traditional territory of the Squamish First Nation. The history of the lands in and around Fairy Fen Nature Reserve is largely undocumented. Presumably, the site was known to aboriginal peoples long before the arrival of the Europeans and their descendants in the late 19th century (Howard 1973). The closest known archaeological sites to the Reserve are shell middens located at Arbutus Bay and Tunstall Bay; no inland sites have been recorded (Hall 2006). No culturally modified trees or other archaeological remains in the Reserve and the surrounding Crown lands were observed during the preparation of this management plan.

The Reserve area contains numerous tree stumps showing the characteristic spring-board cuts (Photo 1), which are evidence of historical logging in the late 1800s and early 1900s before the advent of the chain-saw. Similarly, some areas on the east side of the Reserve also contain shorter stumps that confirm the presence of chain-saw based logging in the mid-20th Century.⁶



Forest fires are known to have occurred on Bowen Island in the early part of the 20th century. Several of the older Douglas-fir trees and standing dead trunks show evidence of fire (Photo 2). The BC Ministry of Forests records indicate that there have been no major wild fires on Bowen Island since at least 1950, the earliest year for which formal records are available (Rob Crookshank, Ministry of Forests, personal communication).



Hunting for deer and, possibly, grouse, is also known to have taken place. Although grouse hunting has not taken place for decades, deer hunting on Crown land continued until approximately 2000, when hunting on public lands was prohibited by the recently formed municipal government.⁷

In the late 1980s and early 1990s, the main wetland, now known as Fairy Fen, was identified as the preferred site for the creation of a water reservoir to serve a proposed residential and golf course development on the Cape Roger Curtis lands to the west (Busby Bridger Architects 1992). The proposed reservoir design included the construction of two dams, one on the west and the other on the southwest side of the fen to create a large impoundment that

⁶ BC Ministry of Forests online records indicating the last known commercial logging under permit on Bowen Island were not located.

⁷ Hunting on Bowen Island is only allowed on private property with the owner's permission, and only using simple long bows (Bowen Island Municipality Bylaw No. 21, 2000).

would have flooded the fen. This proposal was later discontinued when the Busby project was withdrawn.

Recreational and conservation interests in the area have arisen out of increasing visitation by naturalists in the early 1990s and, more recently, active use of the area by mountain bikers and off-road vehicle enthusiasts.

The regional importance of the main wetland in the Reserve was highlighted in the *Bowen Island Wetland Inventory*, prepared for the Bowen Island Conservancy with support from the Islands Trust Fund (Golinski 2002). The description in that report, which included the statement that Fairy Fen “*should probably be protected as an Ecological Reserve,*” strongly bolstered the efforts of the island’s naturalist community to achieve the permanent protection of the wetland and its surrounding forest.⁸

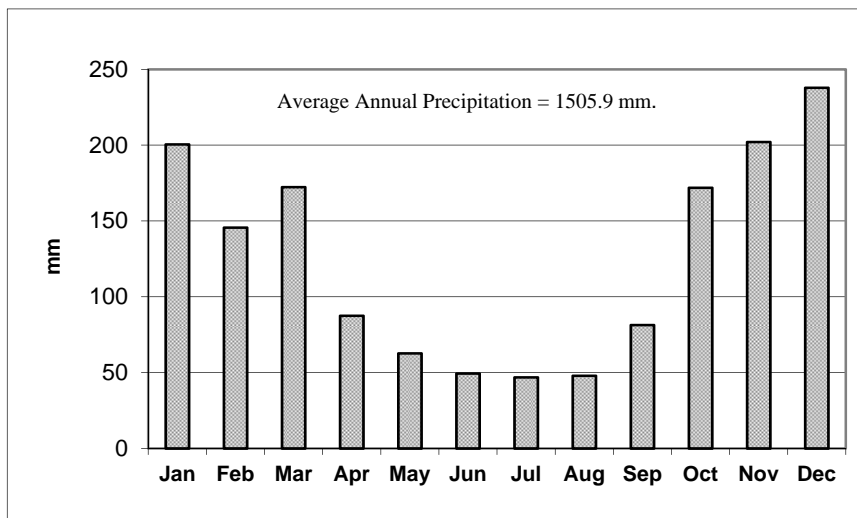
Mountain biking and off-roading began in the early 2000s and, with the growing popularity of vehicle-centred outdoor recreation, has been increasing throughout Bowen Island on undeveloped private parcels and Crown lands.

3.0 Ecological Inventory

3.1 Climate

The climate in the Reserve is typical of the southwest flank of Bowen Island. Precipitation averages 1506 mm per year, of which approximately 3.3% falls as snow (Environment Canada 1994; based on records from Bowen Bay, 1966 to 1992). The site is moderately exposed to the south-easterly and westerly winds from the Strait of Georgia, which tend to bring the strongest storms and precipitation (Environment Canada 1994, Lange 1998), and is sheltered from the northerly and easterly winds. Precipitation data for Bowen Bay⁹ from 1966 to 1992 are shown in Figure 4.

Figure 4. Average monthly precipitation recorded at Bowen Bay, Bowen Island, 1966 - 1992. (Environment Canada 1994)



Air temperatures average

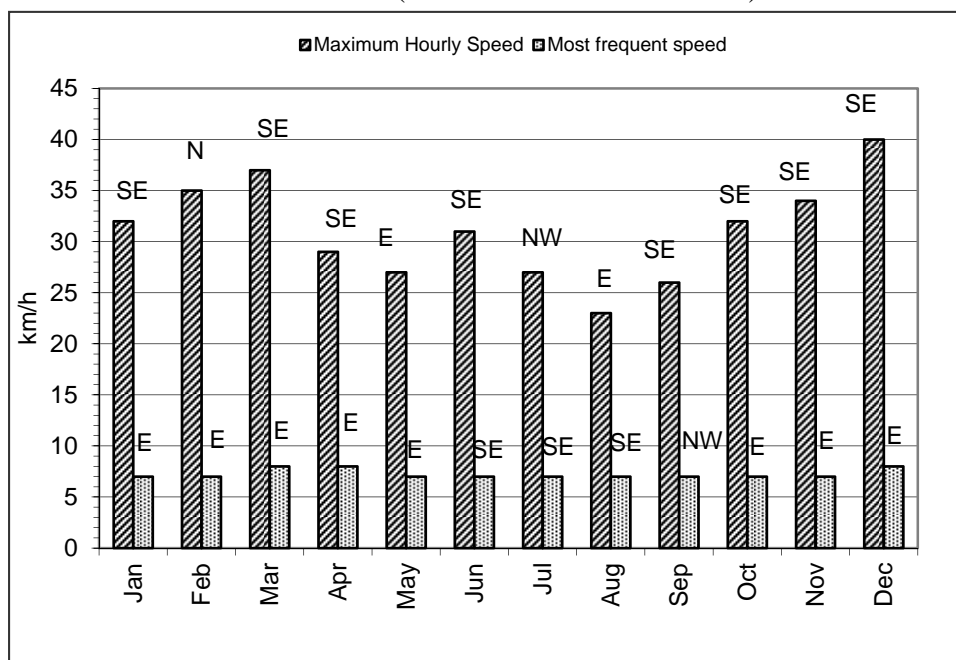
⁸ A brief history of place names in the Reserve is provided in Appendix 3.

⁹ Bowen Bay is located approximately 3.3 km NW of Fairy Fen.

around 10° C annually; summers are generally cool and hot periods short-lived; winters are typically cold with infrequent periods of freezing weather, the latter usually associated with Arctic outflow winds in Howe Sound. Temperature extremes recorded in the region reach 33.3° C in July and August and -17.8° C in December and January (Taylor & Langlois 2000).

The closest weather station with wind data is UBC at Point Grey (Environment Canada 1994). The most commonly occurring wind direction is easterly from October through May, south-easterly from June through August, and north-westerly in September, with wind speeds usually less than 7 km/h. The strongest winds tend to occur during the fall through spring; the highest hourly wind speeds range between approximately 23 km/h in August and 32 to 40 km/h in October through March.

Figure 5. Wind speed and prevailing direction at Vancouver UBC Station, 1957 – 1990. (Environment Canada 1994)



3.2 Geology and Physiography

The subsurface geology on Bowen Island consists of Coast Plutonic hornblende diorite and granodiorite which has intruded into a thick assemblage of altered volcanic rocks and minor interbedded sediments of the Bowen Island Group (Roddick 1965, Maynard 1979, Armstrong 1990). Exposed bedrock surfaces, where visible, tend to be smooth and rounded by glaciation. Within the Reserve, bedrock outcrops occur in places; however, they tend to be relatively small (<50 m²).

The land surface within the Reserve can be characterized as undulating within a northwesterly trending, gently to steeply sloping valley that originates and ends in flat water-receiving sites. The elevation ranges from 239 metres above sea level in the northeast corner

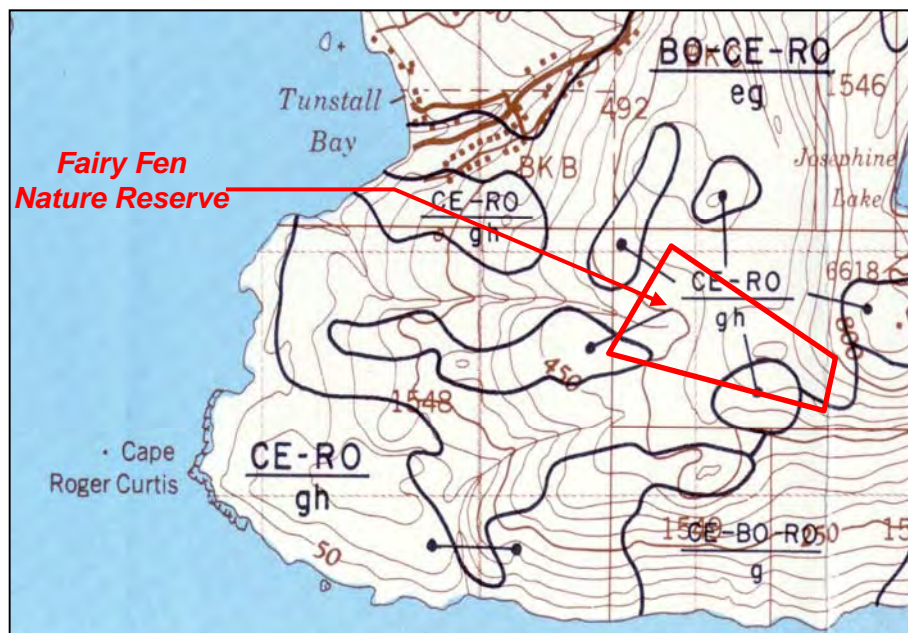
to 163 masl at the outlet of Fairy Fen. The detailed topography of the Reserve, based on a 1-m elevation contour interval, is shown in Figure 6.

The hillside to the north of Fairy Fen appears to be an area of slope failure and land slippage, which has formed a horseshoe-shaped depression marked by an abrupt slope change at the upper edge and seepage-fed watercourses along the sides (Figure 6).

3.3 Soils

Figure 7 shows the distribution of soils on southwest Bowen Island, as mapped by the Provincial government (Luttmerding 1980, 1981). Soils in the area of the Reserve are described as a complex consisting of two soil classes plus exposed bedrock. The wetland soils are not identified in that survey due to the broad scale of mapping.

Figure 7. Soils map of South-western Bowen Island
(adapted from Luttmerding 1980)



The predominant soil type is a complex of Bose, Cannel and bedrock classes (BO-CE-RO).

Bose (BO) soils are described as follows: “Soil bearing capacities for houses and similar construction are good (varies to moderate where glaciomarine deposits occur in the subsoil), however low subsoil permeability and often strongly sloping topography limit sewage effluent disposal from septic tanks.”

Cannel (CE) soils are described as: “poorly suited for urban and other construction because of shallowness to bedrock and steep slopes. Although foundation conditions are good because they can be placed directly on bedrock, basements, underground utilities and other excavations are difficult to install. Septic tanks are unsuitable because of lack of soil depth

for effluent disposal, and steep slopes. Roads are difficult and expensive to construct.” (Luttmerding 1981).

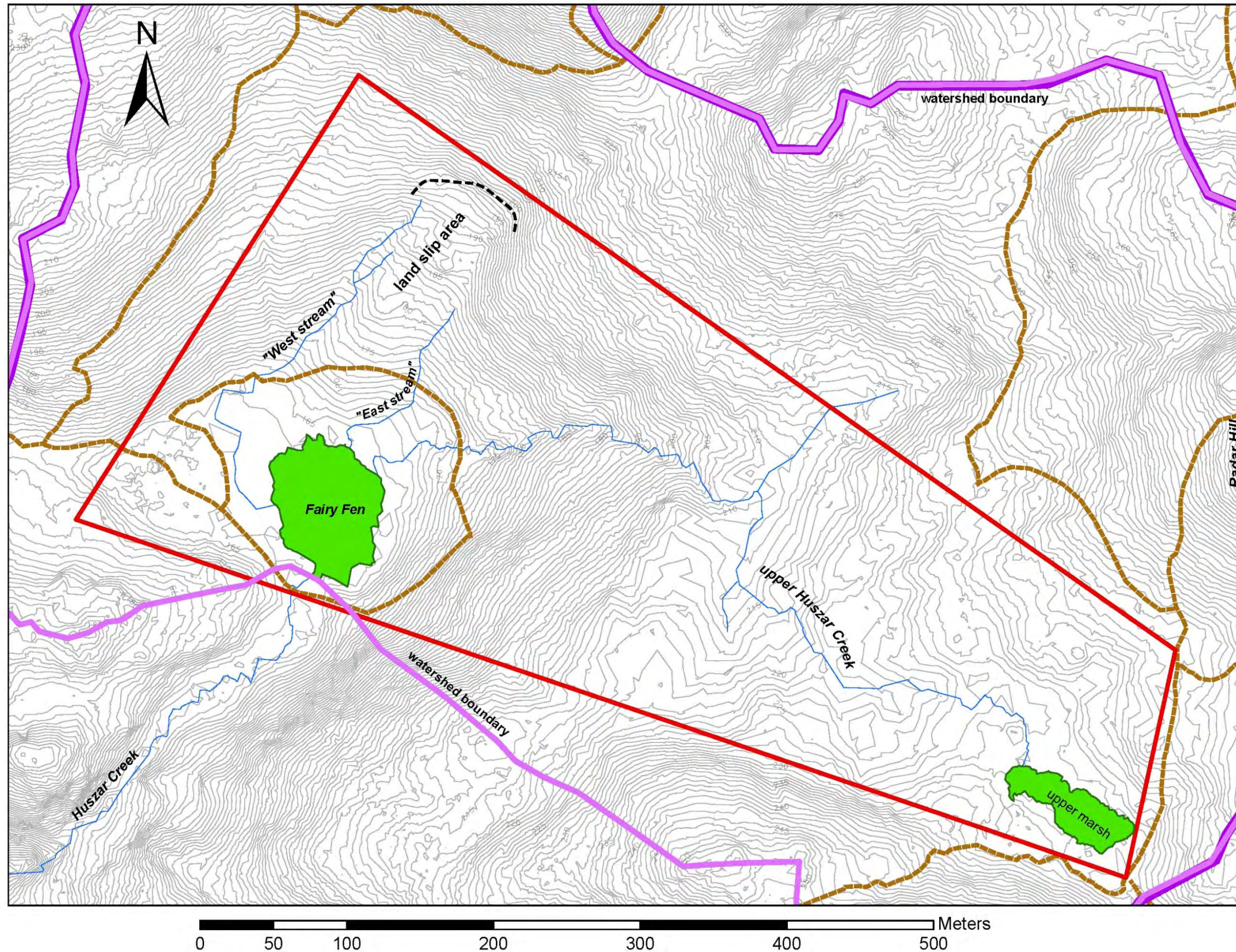
Table 1 provides additional descriptions of these soil classes.

Table 1. Description of the major soil types reported to occur in the area of Fairy Fen Nature Reserve. (after Luttmerding 1980, 1981)

Soil Name (map symbol)	Material	Drainage and water retention	Soil Classification
Bose (BO)	Gravelly sandy loam or gravelly sandy loam at surface. 130 to 160 cm of moderately to very stony gravelly lag or glaciofluvial deposits over moderately coarse-textured glacial till and some moderately fine-textured glaciomarine deposits.	Well to moderately-well drained; low water-holding capacity; rapidly pervious in the upper, gravelly layers, slowly pervious in the compacted underlay; lateral seepage along top of compacted subsoil is common after prolonged, heavy rain.	Duric, Ferro-Humic Podzol
Cannell (CE)	Sandy loam or gravelly loam; moderately to exceedingly stony. 10 to 100 cm of moderately coarse-textured glacial till or colluvium over bedrock (usually granitic)	Well to rapidly drained; low to moderate water holding capacity; rapidly pervious; lateral seepage along surface of underlying bedrock where latter is unfractured	Orthic Humo-Ferric Podzol
Rock Outcrop (RO)	Areas of bedrock exposed or with less than 10 cm of organic or mineral soils on the surface.	Rapidly drained; no moisture holding capacity; impervious; fast surface runoff.	n.a.

The wetland soils within Fairy Fen consist of a deep deposit of peat in excess of 3 m deep.

Soils in the other wetlands of the Reserve have not been characterized to date.



LEGEND

- Slope failure line
- Watercourse
- Track or trail
- Wetland
- ITF Nature Reserve
- Watershed boundary:**
- Fairy Fen
- Huszar Creek

**Figure 6.
 Topography
 of
 Fairy Fen
 Nature Reserve,
 Bowen Island**

Prepared by:
 Whitehead Environmental Consultants Ltd.
 18 July 2011

Base map courtesy of the Bowen Island Conservancy
 and Bowen Island Municipality.
 Contour interval = 1 m, based on LIDAR imagery.
 All feature locations are approximate.

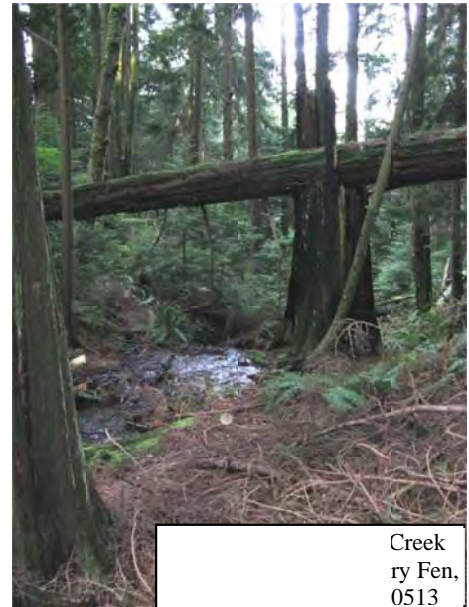
3.4 Hydrology

Fairy Fen Nature Reserve is situated within the upper headwaters of Huszar Creek (Appendix 5). The watershed of Huszar Creek covers approximately 128 hectares (ha), of which the catchment area of Fairy Fen is approximately 50 ha or 39%. The 18.3 ha encompassed within the Fairy Fen Nature Reserve occupies approximately 37% of the Fairy Fen watershed and 14% of the Huszar Creek watershed. Water bodies within the Reserve include several small streams and two main wetlands.

Streams

Fairy Fen is fed by three separate streams, all of which are seasonal (Figure 2). Upper Huszar Creek (Photo 3) originates at the upper marsh and flows over a distance of approximately 685 m to Fairy Fen. Upper Huszar Creek has three reaches, defined for present purposes on the basis of channel gradient. The upper reach is gently sloping and the channel tends to be poorly defined and meandering; the bank-full width is usually ~1 m but can reach up to 3 m in places; water depth is typically less than 10 cm, except in occasional pools formed behind individual logs and small debris jams. The channel in the middle reach, which is steeper, is confined in the bottom of a small, V-shaped ravine approximately 3 to 4 m deep; the bank-full width seldom exceeds 1 m and water depth is typically less than 10 cm, except in occasional pools. A small tributary joins the lower end of this middle reach from the northeast. The lowest reach is gently sloping as it approaches Fairy Fen; in this area, the channel again becomes poorly defined (Photo 4), with meanders and distributaries being common. The bank-full width is typically ~1 m but can reach up to 2 m in places; water depth is usually less than 10 cm, except in occasional pools.

The two other watercourses, which are much smaller, originate on either side of the land-slip area to the north of Fairy Fen (Figure 2). For present purposes, they are called “West Stream” and “East Stream”. Both are fed by seepage from the land slippage area and runoff from the adjacent forest. West Stream (Photos 5,6) is approximately 315 m long and East Stream is approximately 140 m long. Both have a steeper upper reach and a flatter lower reach. The upper reach flows in well-defined channels up to 0.5 m wide, with water depth seldom exceeding 10 cm except in occasional drop pools. Once these streams enter the flatter area





beside Fairy Fen, the channels become less well defined. The lower ~140 m of West stream is mostly underground, threading through the forest floor, following an arc that ultimately enters the fen from the west side (Figure 7). In contrast, East Stream (Photos 7, 8) follows a more perpendicular route into the fen; however, in the flattest terrain near the fen, it forms several distributaries in the forest floor and within the outer edge of the fen.



The Reserve also includes a short segment of lower Huszar Creek (~15 m) where this stream forms the outlet of Fairy Fen (Photo 9). Lower Huszar Creek contains flow almost year-round, except in late summer and early fall after prolonged periods of dry weather. The channel lies within a small floodplain up to ~10 m wide; bank-full width ranges between approximately 1.5 and 3 m, and the water depth is commonly over 20 cm.



Wetlands

The Reserve contains two main wetlands: its namesake Fairy Fen at the west (lower) end and a small marsh at the east (upper) end. For present purposes, this marsh is referred to as “upper marsh” (Figure 2).

Fairy Fen (Photo 10) is broadly oval-shaped with dimensions of approximately 70 m east-to-west and 97 m north-to-south, and a surface area of approximately 0.54 ha (1.3 acres). Its surface water sources have been described above. Within the fen itself, “West stream” and “East stream” present as distinct watercourses, approximately 65 m and 50 m long, respectively, around the wetland’s perimeter. The channels of these streams within the fen are vertically-sided, approximately 0.4 to 0.7 m wide, and up to 0.6 m deep. The two streams join near the outlet into one channel within the fen, approximately 8 m long, forming the uppermost part of Huszar Creek.



Upper marsh (Photo 11) is an elongated wetland, measuring approximately 95 m long by 25 m wide and a surface area of approximately 0.21 ha (0.5 acre). Surface water inputs are mainly the runoff from the road adjacent road on Radar Hill, which can be heavily laden with sediment when rainy weather coincides with vehicular traffic (Photo 12). The outlet of this marsh is the origin of upper Huszar Creek.



Other minor wetlands also exist, particularly in the west corner of the Reserve, in the flat terrain immediately west of Fairy Fen (Photos 13 and 14), and in the land slippage area between East and West streams.



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3.5 Ecosystems

Bowen Island lies within the Georgia Lowlands Ecosection of British Columbia. The landscape within Fairy Fen Nature Reserve is composed of a mature, second-growth coniferous forest (Photos 15, 16), with smaller areas of young coniferous forest (Photo 17) or mixed-coniferous-deciduous forest (Photo 18), as well as wetlands (Photos 10,11,13,14) and streams (Photos 3-10).



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According to several background studies, the area occupied by the Reserve lies within the Dry Maritime (CWHdm) and Very Dry Maritime eastern variant (CWHxm1) units of the Coastal Western Hemlock biogeoclimatic zone (Klinka 2005, Diamond Head Consulting 2005, Islands Trust Fund 2010b). Overall, the CWHxm1 unit in Howe Sound is described to occur at elevations below 150 m while the CWHdm typically occurs above (Green and Klinka 1994). On this basis, the predominant ecosystem within the Reserve is CWHdm.

Terrestrial ecosystem mapping (TEM) completed by the Islands Trust Fund identifies nine ecosystem polygons, as listed below in Table 2 and shown in Figure 8 (ITF 2010b). Six of these are CWHdm and three are CWHxm1.

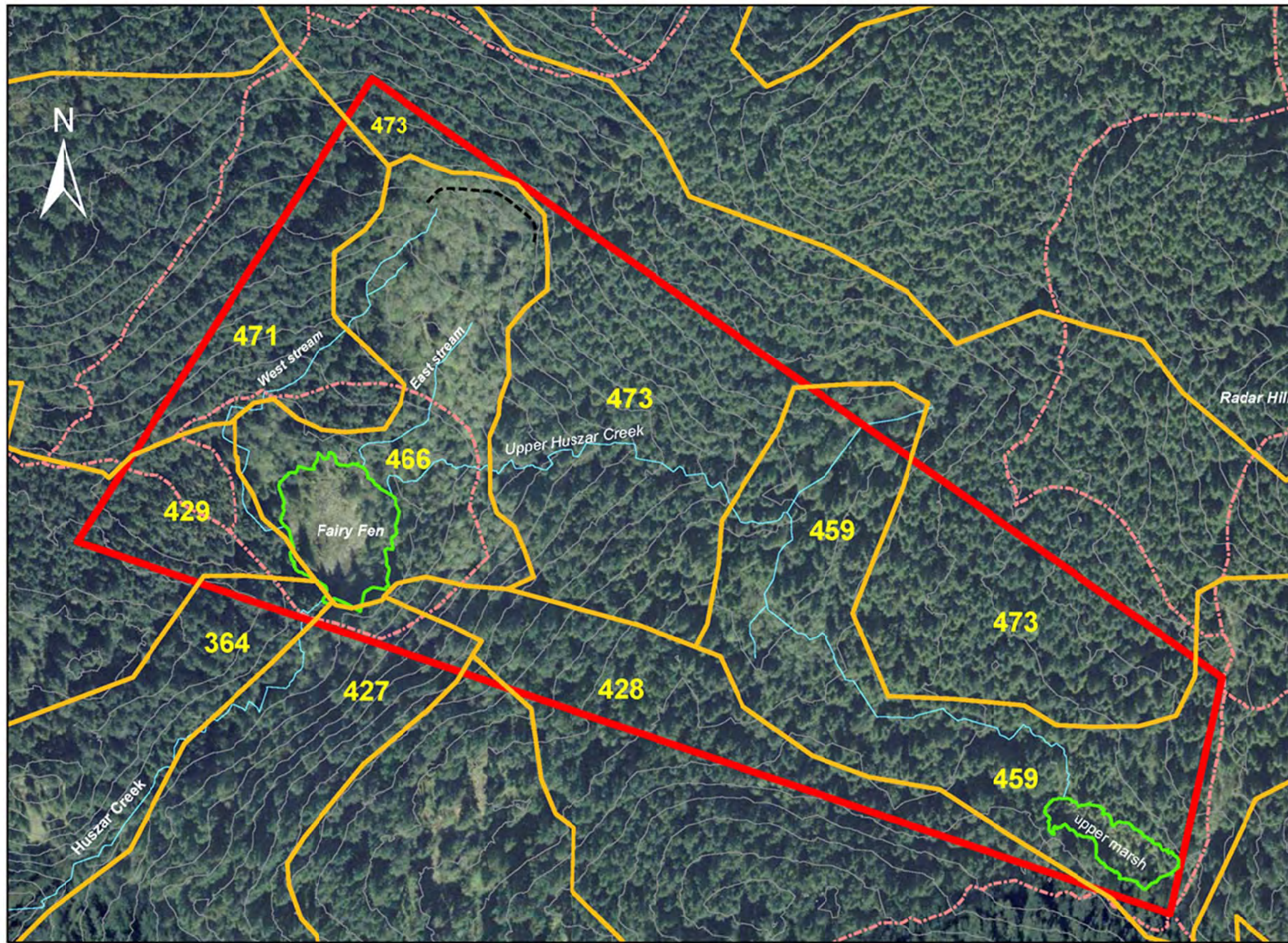
3.6 *Vegetation*

The plant species inventory of the Fairy Fen Nature Reserve has been initiated, with a primary focus on trees, shrubs, forbs, and particularly in Fairy Fen, grasses, sedges and ferns. Mosses, grasses and sedges elsewhere in the Reserve, as well as lichens and fungi have not been surveyed in detail.

Information sources, in addition to the present study and prior personal observations, have included previous reports for Bowen Island generally (Hirvonen 1976, Block 1978, Green Zone Technical Subcommittee [undated, ca. 1990], ITF 2010b) and for specific properties, such as the Cowan Point (Searing *et al.* 1989, CBA *et al.* 1999, Dunster & Associates Environmental Consultants Ltd. 1999, Whitehead Environmental Consultants Ltd and Novatec Consultants Inc. 2003) and Cape Roger Curtis development projects (Taylor 1991, Busby Bridger Architects 1992, Diamond Head Consulting Ltd. 2005, Klinka 2005, Pottinger Gaherty Environmental Consultants Ltd. 2008). A key information source on Fairy Fen was the Bowen Island Wetland Inventory (Golinski 2002).

A total of 69 vascular plant species, including 9 trees, 11 shrubs and 49 herbaceous and other species were recorded in the Reserve. A summary of the number of species by vegetation type confirmed to occur in each of the three broad ecosystems categories in the Reserve is shown in Table 3. Many other species, particularly herbaceous species, have been recorded elsewhere on Bowen Island and may, therefore, also be present in the Reserve.

The confirmed and potential flora of the Reserve is listed in Appendix 1. Additional botanical inventory work is needed.



LEGEND

- Slope failure line
- TEM Polygon
- Watercourse
- Wetland
- Track or trail
- ITF Reserve

**Figure 8.
Terrestrial,
Aquatic
and Wetland
Ecosystems
of Fairy Fen
Nature Reserve,
Bowen Island**

Prepared by:
Whitehead Environmental Consultants Ltd.
18 July 2011

Terrestrial Ecosystem polygons obtained from the Islands T1 Terrestrial Ecosystem Mapping. Base map courtesy of the Bowen Island Conservancy and Bowen Island Municipality. Contour interval = 5 m, based on LIDAR imagery. Date of aerial photography approx. May 2005. (unconfirmed) All feature locations are approximate.



Table 2. Descriptions of Islands Trust Terrestrial Ecosystem Mapping polygons occurring in Fairy Fen Nature Reserve, Bowen Island. (adapted from ITF 2010b)

SEM Polygon No.	SEM Map Label	Primary Ecosystem (site series)	Secondary Ecosystem (site series)	Tertiary Ecosystem (site series)	Notes
364	CWHxm1 10MF:co HK 6	Mature coniferous forest 100%; Western Hemlock – Douglas-fir – Oregon beaked moss (01)	(none identified)	(none identified)	1
427	CWHxm1 7MF:co HK 6 2MF:co RF 6 1WN:sp RC5	Mature coniferous forest 70%; Western Hemlock – Douglas-fir – Oregon beaked moss (01)	Mature coniferous forest 20%; Western redcedar – Foamflower (07)	Wetland 10%; Western redcedar – Skunk cabbage (12)	2
428	CWHdm 7MF:co HM 6 3MF:co RS 6	Mature coniferous forest 70%; Western hemlock – Flat Moss (01)	Mature coniferous forest 30%; Western redcedar – Swordfern (05)	(none identified)	3
429	CWHxm1 8MF:co HK 6 2MF:co DF 6	Mature coniferous forest 80%; Western Hemlock – Douglas-fir – Oregon beaked moss (01)	Mature coniferous forest 20%; Douglas-fir – Swordfern (01)	(none identified)	4
459	CWHdm 5MF:mx HD 6 3MF:mx RS 6 2MF:co	Mature mixed forest 50%; Western hemlock – Western redcedar – Deerfern (06)	Mature mixed forest 30%; Western redcedar – Swordfern (05)	Mature coniferous forest 10%; (not described)	5
466	CWHdm 5WN:sp RC 5 3YF:mx RS5 2WN:fn	sedge, sphagnum Wetland 50%; Western redcedar – Skunk cabbage (Ws53, 12)	Young mixed forest 30%; Western redcedar – Swordfern (05)	fen Wetland 20%; (Wb50)	6
471	CWHdm 7MF:co HM 6 3MF:co DF 6	Mature coniferous forest 70%; Western hemlock – Flat Moss (01)	Mature coniferous forest 30%; Douglas-fir – Swordfern (01)	(none identified)	7
473	CWHdm 8MF:co HM 6 2MF:co RS 6	Mature coniferous forest 80%; Western hemlock – Flat Moss (01)	Mature coniferous forest 20%; Western redcedar – Swordfern (05)	(none identified)	8

Notes:

- 1 - occupies a very small portion of the Reserve, on a low, SW aspect ridge beside Huszar Creek southwest of Fairy Fen;
- 2 - occupies a very small portion of the Reserve, at foot of a NE aspect ridge;
- 3 - occupies much of the slope along the south edge of the Reserve, N-NW aspect;
- 4 - occupies the flat bottomland immediately west of Fairy Fen, very high water table;
- 5 - upper Huszar Creek corridor in gently sloping terrain; also contains the upper marsh, which was not identified in SEM.
- 6 - contains Fairy Fen and the SSW aspect slump area to the north; map label “sp” not explained in legend or accompanying report.
- 7 - occupies much of the slope along the west edge of the Reserve, SE aspect;
- 8 - occupies much of the Reserve’s central and eastern portions, as well as the NW corner, generally steep, mostly NW to SW aspect.

The map label legend is as follows:

Sensitive Ecosystem (SE) Class:

MF = Mature forest; YF = young forest; WN = wetland

SE Subclass:

co = coniferous; mx = mixed; sp = sphagnum; fn = fen

Structural stage:

- 5 = young forest. Self-thinning and canopy differentiation initiated, typically 40-80 years since disturbance.
- 6 = Mature forest. Mature tree canopy, typically 80 – 250 years since disturbance.

Map codes are explained in the Primary, Secondary and tertiary ecosystem columns.

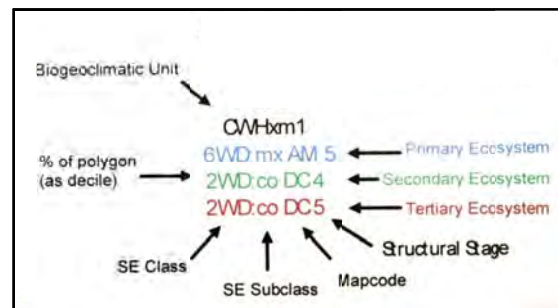


Table 3. Numbers of plant species in the ecosystems of Fairy Fen Nature Reserve, Bowen Island.

Description	Coniferous forest	Mixed forest	Wetland	Notes
	(number of species confirmed)			
Trees, total	9	7	5	
- coniferous	7	4	4	
- deciduous	2	3	1	
Shrubs	6	7	7	Shrubs are perennial woody plants smaller than a tree, usually with many stems.
Forbs	7	6	15	Forbs are broad-leaved herbs other than grass.
Grasses & Sedges	1	2	8	Forest grasses & sedges inventory is incomplete
Ferns	4	5	4	
Mosses and allies	2	1	11	Forest moss inventory is incomplete
Lichens	*	*	1	Lichen inventory is incomplete for all ecosystem types

3.7 Wildlife Species

The inventory of wildlife species in the Reserve has been initiated. A total of 42 animal species of, including 37 birds, 2 mammals and 3 amphibians have been confirmed to occur in the Reserve. No reptiles have been found to date. Numerous additional species are likely to be found with further observation. A summary of the number of animal species confirmed to occur in each of the broad ecosystems categories in the Reserve is shown in Table 4, below.

The confirmed and potential fauna of the Reserve, including birds, mammals, amphibians, reptiles and invertebrates, is listed in Appendix 2. Additional faunal inventory is needed, particularly for small mammals, amphibians, reptiles and invertebrates.

Table 4. Number of wildlife species by major grouping in the forest and wetland ecosystems of Fairy Fen Nature Reserve, Bowen Island.

Description	Forest	Wetland	Notes
Birds	25	6	No strictly wetland species recorded to date
Mammals	2	1	
Amphibians	2	2	
Reptiles	0	0	
Invertebrates	(not counted)	(not counted)	
- Arthropods	Many species of insects, spider and others	several species of dragon-flies and damselflies	Golinski 2002; present study
- Molluscs	Slugs and snails	Slugs and snails	

3.8 Red and Blue Listed Species

The baseline information on native plants, animals and vegetation communities in the Reserve was reviewed and compared to the current lists that are published on the Internet by Environment Canada under the federal Species at Risk Act Registry (SARA), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2011), the B.C. Conservation Data Centre (CDC 2010), the federal-provincial Sensitive Ecosystem Inventory (SEI) (McPhee *et al.* 2000) and the Islands Trust draft Sensitive Terrestrial Ecosystem Mapping (ITF 2010b). An overall list of species and ecosystems at risk was compiled from a search of the CDC's database for the Bowen Island Municipality, Greater Vancouver Regional District and Chilliwack Forest District. The search results were revised as necessary to exclude records that are not expected to occur within the Reserve.

Under the British Columbia classification system, Red-listed species or plant communities are considered endangered or threatened, while Blue-listed ones are considered vulnerable (Harper *et al.* 1994). Red-listed species have been designated as Endangered or Threatened under the B.C. Wildlife Act and may be legally protected under certain circumstances (Vennesland *et al.* 2002); in the case of plant communities however (as opposed to individual plant or animal species), the protection status of Red-listed communities is not defined by law (Michael Willcox, personal communication).

Plant species and communities that have been identified as a potential conservation concern on Bowen Island and, potentially, within Fairy Fen Nature Reserve are described below. At this juncture, however, it is very important to note that additional botanical investigation during the growing season is necessary to confirm with greater certainty whether any plant species or ecosystems of concern are present in the Reserve. Additional information on Vegetation Communities is provided below in Section 3.9.

3.8.1 Plants

Macoun's meadow-foam (*Limnanthes macounii*) is the only plant species classified as at-risk on Bowen Island (Taylor 1991, Pottinger Gaherty Environmental Consultants Ltd. 2005). It has been recorded to date only in coastal bluff habitat, which does not exist in the Reserve.

3.8.2 Animals

Fairy Fen Nature Reserve is not known to support any animal species that are federally listed as extirpated, endangered or threatened, under Schedules 1 or 2 of SARA. Under the provincial classification system, there are no Red-listed animal species in the Reserve; however, one Blue-listed species, the Red-legged Frog (*Rana aurora*) was confirmed to be present, and others may also occur.

There are seven wildlife species considered to be at-risk or of special concern on Bowen Island that are present or potentially present within the Reserve. These are discussed individually below.

Red-legged Frog (*Rana aurora*) is Blue-listed and was ranked as vulnerable-apparently secure by the CDC in 2007; classified as a special concern by COSEWIC since November 2004; and is listed under SARA Schedule 1. The existing provincial and federal listings are due to habitat destruction and degradation, particularly in the more populated areas of the Lower Mainland and Vancouver Island, possibly including competition from the introduced Bullfrog (*Rana catesbiana*¹⁰) (CDC 2010). Its preferred habitats include forest swamps and pools and associated moist riparian habitats; it requires waters ≥ 0.5 m deep for reproduction. It is commonly observed on Bowen Island, and is known to reproduce in Fairy Fen (Photo 19).



Photo 19. Red-legged frog egg mass in East stream within Fairy Fen near the fen outlet. 110505

Blue (Sooty) Grouse (*Dendrapagus fuliginosus*) is Blue-listed by the CDC, is not listed under COSEWIC or SARA. The Sooty Grouse was formerly abundant on Bowen Island, preferring relatively open, mixed and south-aspect coniferous forest habitats. The frequency of observations has declined in areas subject to development. This species has been observed and heard on the east side of the Cape Roger Curtis lands, within less than 1.5 km of the Reserve. No birds were observed or heard in the Reserve during our investigations.

Great Blue Heron (*Ardea herodias fannini*) is Blue-listed by the CDC, was re-listed as a special concern under COSEWIC in 2008, and is included in SARA Schedule 1. It is ranked as vulnerable for breeding populations, and apparently secure or possibly declining for non-breeding populations (CDC 2010). The Great Blue Heron is common on Bowen Island, where it is often observed feeding along the marine and freshwater shorelines and, to a lesser extent, along stream corridors, wetlands and in open meadow habitats. This species is known to nest on Bowen Island at Snug Cove and, historically, at Tunstall Bay. The breeding population is subject to heavy predation by Bald Eagle during the nesting season (personal observations; Bowen Heron Watch). No individual birds or nests were observed in the Reserve during our investigations.

Western Screech Owl (*Megascops kennicottii kennicottii*) (formerly known as genus *Otus*) is Blue listed provincially, identified as a species “of special concern” by COSEWIC in 2002, and listed in SARA Schedule 1. It is known to occur in south coastal B.C. including Bowen Island (personal observation; Bowen Nature Club). This owl is most commonly observed in mature coniferous forest at low elevations and often near water; however, significant numbers have also been recorded in young coniferous and mature mixed forest habitats (Robertson *et al.* 2000). Predation by the Barred Owl, which is becoming more abundant in south-western B.C. (and is common on Bowen Island), may be a potentially important factor

¹⁰ There are no confirmed reports of Bullfrog occurring on Bowen Island.

in the decline in screech owl abundance, in addition to habitat loss and degradation. The Western Screech Owl has not been observed in the Reserve to date. The species is difficult to detect unless it is heard. Additional field observations are needed.

Band-tailed Pigeon (*Patagioenas fasciata*) (formerly known as genus *Columba*) is Blue-listed by the CDC, due mainly to decreasing numbers moderately threatened by habitat loss (CDC 2010). It is ranked as “vulnerable – apparently secure” for breeding populations and “widespread and more abundant, with range possibly expanding” for non-breeders (CDC 2010); is listed as a special concern by COSEWIC in 2008; and is not listed under SARA. This species is common on Bowen Island and includes a resident population as well as seasonal migrants. The species is known to breed on the island; however, it has not been observed in the Reserve to date. The berries of arbutus (which is common on inland bluff habitats though not recorded within the Reserve) dogwood (not observed) and red elderberry are an important food source for this species in the fall.

Lewis’s Woodpecker (*Melanerpes lewisi* pop.1) was listed as threatened by COSEWIC in April 2010 and is listed under Schedule 1 of SARA as a special concern. At present, the Georgia Depression population of this species is Red listed provincially (i.e. Endangered and Threatened) and is presumed to be extirpated due to loss of breeding habitat (CDC 2010), especially large standing snags (Fraser *et al.* 1999) and possible nest-site competition with starlings (NatureServe 2010). The species has been recorded on Bowen Island (personal observation 1989) in open, mixed forest habitats during the summer, including residential areas. It feeds on a wide variety of insects, fruits and nuts, adapting opportunistically depending on local availability. Lewis’s Woodpecker has not been observed in the Reserve nor has it been recorded on Bowen Island for many years.

Townsend’s Big-eared Bat (*Corynorhinus townsendii*) (formerly known as genus *Plecotus*) is not listed under SARA. Under COSEWIC, this bat was described as a “lower priority candidate species”¹¹ for listing (COSEWIC 2011). Provincially, the big-eared bat is Blue-listed by the CDC and is considered a species of special concern, vulnerable to extirpation or extinction (CDC 2010). The species is found in south coastal B.C. associated with a variety of habitats from coastal forests to arid grasslands of the interior (Nagorsen & Bingham 1993). Its elevational range in the province is from sea level to 1070 metres, although most occurrences are from low elevations. Usually found in the drier biogeoclimatic zones of the southern coast, its preferred hibernating habitat is cold caves and underground mines; buildings are also used as summer roosting habitat (CDC 2010). Although their biology is not well known, it is believed that these bats feed almost entirely on moths (CDC 2010).

Butterflies have not been inventoried in the Reserve to date. A number of rare butterfly species have been identified as potentially occurring on Bowen Island (BC’s Wild Heritage 2007). Their presence in the Reserve lands is unknown at this time. This list of species is included in Table 4 of Appendix 2 for completeness. Additional investigation would be necessary in order to confirm whether or not any of these species occur in the Reserve.

¹¹ COSEWIC candidate species are those that are suspected of being in some COSEWIC category of risk of extinction or extirpation at the national level, before being examined through the status assessment process (COSEWIC 2011)

3.9 Red and Blue Listed Plant Communities

There are on Bowen Island 15 Red-listed and 19 Blue-listed plant communities reported on Bowen Island (CDC 2010). Of these, one Red-listed and three Blue-listed communities have been found to occur in Fairy Fen Nature Reserve (Table 5).

Three of the known listed plant communities (one Red, two Blue) occur in wetland ecosystems and one (Blue) occurs in forest.

An additional one Red-listed and four Blue-listed communities may also occur in the Reserve. However, we have been unable to confirm their presence during the present ecological inventory. Additional communities may also be found to be present as the plant species inventory becomes more complete. Of those that are potentially present, three occur in wetland, one in forest, and one in wetland and forest.

Table 6 lists the management “Action Group” assigned to each plant community under the Ministry of Environment’s Conservation Framework. The definitions of each action group are provided in Table 6. (Recommended management actions for the Reserve are described in Section 6.

Table 5.
Red- and Blue-listed Plant Communities existing or potentially present in Fairy Fen Nature Reserve, Bowen Island.
 (adapted from BC Species and Ecosystems Explorer 2011).

BC List Status	Common Name	Scientific Name	Ecosystem Group	Biogeoclimatic Unit	Management Action Group (see Table 6)
Known:					
Red	slender sedge - white beak-rush	<i>Carex lasiocarpa - Rhynchospora alba</i>	Wetland, Herbaceous	CWHxm1/Wf53	Monitor trend
Blue					
Blue	Labrador tea / western bog-laurel / peat-mosses	<i>Ledum groenlandicum / Kalmia microphylla / Sphagnum spp.</i>	Wetland, Shrub	CWHvm1/Wb50; CWHxm1/Wb50	Monitor trend
Blue	Douglas-fir - western hemlock / salal Dry Maritime	<i>Pseudotsuga menziesii - Tsuga heterophylla / Gaultheria shallon</i> Dry Maritime	Forest	CWHdm/03; CWHxm1/03	Eco Protect; Inventory; Plan; Private Land
Blue	common cattail Marsh	<i>Typha latifolia</i> Marsh	Wetland, Herbaceous	CWHdm/Wm05; CWHxm1/Wm05	Eco Protect; Eco Restore; Plan; Private Land; Status Rpt
Potential:					
Red	western redcedar / salmonberry	<i>Thuja plicata / Rubus spectabilis</i>	Forest, Riparian	CWHdm/13;CWHxm1/13	Classification; Eco Protect; Inventory; Plan; Private Land
Blue	western redcedar - Sitka spruce / skunk cabbage	<i>Thuja plicata - Picea sitchensis / Lysichiton americanus</i>	Wetland, Forest	CWHdm/12; CWHxm1/12	Eco Protect; Inventory; Plan; Private Land
Blue	Douglas-fir / sword fern	<i>Pseudotsuga menziesii / Polystichum munitum</i>	Forest	CWHdm/04; CWHxm1/04	Eco Protect; Inventory; Plan; Private Land; Review Use
Blue	Labrador tea / western bog-laurel / peat-mosses	<i>Ledum groenlandicum / Kalmia microphylla / Sphagnum spp.</i>	Wetland, Shrub	CWHxm1/Wb50	Monitor trend
Blue	Sitka sedge - Pacific water-parsley	<i>Carex sitchensis - Oenanthe sarmentosa</i>	Wetland, Herbaceous	CWHwm/Wm50; CWHxm1/Wm50	Monitor trend

Table 6.
Conservation Framework Action Groups for species and ecosystems
in British Columbia.

Action groups marked with an * indicate the action is only applicable to species.
All other action groups are applicable to both species and ecosystems.

Conservation Action	Description
Assessing	
Review status rank	Latest trend and threat information may not be incorporated: return to CDC (S-ranks and estimated G ranks) or NatureServe (G-ranks) for re-evaluation.
Compile status report	Compile or update a status report. May require research on threats, trends, habitat use, life history or demography.
Inventory	Inventory the species or ecological community to confirm or determine status rank. May require research on inventory techniques.
Monitor trends	Monitor the species, its habitat, or the ecological community at an interval appropriate to the life history of the organism, or the successional development of the ecological community. May require research on monitoring techniques.
Review taxonomy and classification (Classification)	Invest in taxonomic studies to determine taxonomic validity for species or invest in classification and correlation of newly identified ecological communities.
Planning & Listing (Abbreviation)	
Planning (Plan)	Includes preparing a Management Plan or Recovery Strategy and Action Plan, landscape planning, or updating an existing plan; also includes implementing and monitoring effectiveness of the plan and monitoring the effect on the species' population or habitat or an ecological community. May require research on threats, habitat use, mitigation or recovery techniques.
Send to COSEWIC*	Send to COSEWIC for assessment as a first step to listing under the federal <i>Species at Risk Act</i> as Extirpated, Endangered, Threatened, or Special Concern or for assessment at a higher or lower risk category.
List under Wildlife Act*	List under <i>Wildlife Act</i> as an Extirpated, Endangered or Threatened species. Includes describing residences as per the provisions of the act where warranted.
Acting	
Ecosystem and habitat protection (Eco Protect)	Use legislation, policies and guidelines to protect the ecological community or species' habitat. For example, <i>Forest & Range Practices Act</i> , protected areas, land use orders, stewardship, and best management practices. For species, may require research on habitat needs or inventory to determine suitable areas for protection.
Ecosystem and habitat restoration (Eco Restore)	Apply management and/or restoration techniques to maintain or restore the ecological community or species' habitat. Includes invasive species control, maintaining or restoring natural processes and key structures, fire suppression and prescribed burning.
Private land stewardship (Private Land)	This group contains a subset of ecosystems and species from the ecosystem and habitat protection and restoration action groups that are of conservation concern but occur on private land and /or in situations outside the scope of more traditional legislation, policies, and formal guidelines.
Species and population management*	Assign to appropriate management tools to address non-habitat threats. For example, captive breeding, translocation, disease management, alien predator or competitor control, public education. May require research and monitoring.
Review resource use (Review Use)	Adjust harvest levels and/or increase penalties and enforcement for species. Work in collaboration with resource ministries and land managers to review existing tenures (water use, forestry, grazing, mining etc) and determine where existing tenures are contributing to declines for ecological communities.
No new action	Existing management is effective; no additional conservation action is warranted. Assess whether ongoing programs need to be maintained. May require effectiveness evaluation of existing activities and monitoring of the species, habitat, or ecological community.

3.10 Invasive Species

Invasive species are not yet considered a major concern in Fairy Fen Nature Reserve, as the parcel lies within an undeveloped forest. An exhaustive inventory of invasive plant or animal species in the Reserve has yet not been conducted. However, the species listed in Table 7 have been confirmed to be present in the Reserve or in the surrounding Crown land forest.

**Table 7.
Invasive plant and animal species confirmed or potentially occurring in
Fairy Fen Nature Reserve, Bowen Island**

Plants		Animals	
Common name	Scientific name	Common name	Scientific name
English Holly*	<i>Ilex aquifolium</i>	Eastern Grey Squirrel	<i>Sciurus carolinensis pennsylvanicus</i>
Spurge laurel (Daphne)*	<i>Daphne laureola</i>	Black slug*	<i>Arion ater</i>

* confirmed

Other invasive plant species that are widespread on Bowen Island, such as Scotch broom (*Cytisus scoparius*), Japanese knotweed (*Fallopia japonica*), Great mullein (*Verbascum thapsus*), Gorse (*Ulex europaeus*), all of which are more common in disturbed habitats, have not been observed in the Reserve.

Other alien animal species that occur elsewhere on Bowen Island, such as European Starling (*Sturnis vulgaris*), Rock Dove (*Columba livia*), Ring-necked pheasant (*Phaisanus colchicus*) and rats (at least one of Norway rat, Black rat or Alexandrian rat) have not been observed in the Reserve, probably due to their preference for unforested or otherwise developed habitats close to human activity.

It is likely that a number of additional exotic plants, particularly small forbs, may be spreading along the trail system in the Crown lands around the Reserve. Similarly, a number of introduced animal species such as slugs may also be present. Additional investigation of invasive species is needed.

4.0 Stakeholder Consultation

4.1 Adjacent Landowners

The landowner adjacent to Fairy Fen Nature Reserve is exclusively the Province of British Columbia, from whom the Reserve was obtained by the Islands Trust Fund. Accordingly, no additional consultation with adjacent landowners was undertaken.

4.2 First Nations Communications

Bowen Island lies within the traditional territory of the Squamish First Nation. The Islands Trust Fund has sent a letter inviting the Squamish First Nation to provide information about the traditional values and uses of Fairy Fen Nature Reserve (Jeff Ralph, ITF, personal

communication). The Review draft of Management Plan was provided to the Squamish First Nation in September 2011 for comment. The Islands Trust Fund remains open to discussion with the Squamish Nation on issues related to management of the nature reserve.

4.3 Community Members

The Bowen Island Municipality's vision is *"to strengthen our community and its economy by protecting its natural environment, fostering self-sufficiency, and incorporating resilience - the ability to confront and thrive in an uncertain future."* (Bowen Island Municipality 2010) The implementation of this vision during the course of subdivision projects has led to the establishment of several municipal parks as well as all of the other ITF reserves and covenant areas.

The local community has had a long-standing interest in the wetland that eventually came to be known as Fairy Fen (see Appendix 3). Two community groups in particular, the Bowen Island Conservancy and the Bowen Nature Club, were instrumental in the establishment of the Reserve.

The Bowen Island community was also consulted in the course of preparing this management plan. The consultation included a brief presentation and tour on Saturday, January 22nd 2011, and the dissemination of a questionnaire during the public meeting and also through the Bowen Island Conservancy's website. The public meeting and tour was attended by 20 persons, including members of the public at large and representatives of the Islands Trust, Islands Trust Fund, Bowen Island Conservancy and Bowen Nature Club. The participants represented a broad spectrum of the community, with ages ranging from early 20s to late 80s (Photo 20).



Photo 20. Participants in the field trip to Fairy Fen Nature Reserve during the public consultation event. 110123

Seven responses to the questionnaire were returned, which included one submission by email from an off-island resident who had accessed the questionnaire online. The questions and a summary of the responses are provided in Appendix 4.

4.4 Cultural Significance

The Bowen Island Wetland Inventory (Golinski 2002) includes the following statement, which sets the context for describing the cultural significance of the Reserve.

“Fairy Fen is unique on Bowen Island, and it supports several species of Sphagnum and brown mosses which are generally uncommon in the Islands Trust Area. On a regional scale, Fairy Fen is also exceptional because few marshes in southwestern B.C. are presently being invaded by peatland vegetation. Another notable feature of Fairy Fen is its excellent potential as invertebrate habitat. Its small size and relative isolation might cause Fairy Fen to be overlooked from a conservation standpoint, but its protection should be a top priority.... therefore it is recommended that both the wetland itself and the surrounding catchment be protected. It should probably be protected as an Ecological Reserve.”

The cultural significance of Fairy Fen Nature Reserve lies in the following aspects:

- it is an example of a successful conservation initiative by a small number of people in an island community;
- it is achieving the preservation of a regionally rare and unique ecosystem and its adjacent watershed within a short distance of a major urban centre;
- it provides opportunities for scientific research, including its availability as a benchmark for monitoring the effects of climate change;
- it provides opportunities for ongoing education;
- it provides a special place for aesthetic enjoyment and contemplation in perpetuity; and
- it serves as starting point for continuing efforts toward the preservation of the entire Huszar Creek watershed.

5.0 Management Plan

5.1 Discussion Topics

The management plan presented in this section has been developed on the basis of issues, concerns and topics for discussion identified during the public consultation, field investigations and other research. The following major topics have been identified:

- Access to the Reserve
- The sensitivity of Fairy Fen to human activity
- Damage by cycling (mountain biking) and motorized vehicles (ATV, 4x4, motorcycle) on and off the trail network within the Reserve;
- Unregulated construction of new trails in the Reserve and surrounding Crown forest;
- Need for signage
- Desirability of improvements
- Monitoring

Each topic is addressed where appropriate under the following sections.

5.2 Public Access

There are currently two main routes to access the Crown land block within which the Reserve is located: Thompson Road and Radar Hill (Figure 3). In the event that the status of Crown land surrounding the Reserve were to change, legal access to the Reserve may no longer be guaranteed. It is advisable, therefore, to secure an easement over Crown land to ensure access to the Reserve in perpetuity. The recommended easement route is from Thompson Road as this is the shortest; an alternative route is the Radar Hill logging road, which is longer (Figure 9).

5.3 Trail Use and Location

The existing trail network in the area of Radar Hill is fairly extensive (Figure 1). However, none of the trails crossing the Reserve are part of a legally dedicated or otherwise formalized trail system. Except for the former logging track, all have resulted from repeated recreational use.

As indicated previously, the number of informal trails has been increasing over the past ten years, mostly due to increasing popularity of off-road cycling and, to a lesser extent, recreation with ATVs and 4X4s. These user groups have made alterations, such as cutting of logs and stumps (Photos 21 and 22), and in the case of cyclists only, installation of plank bridges across streams (Photos 7 and 23).

No additional trails are considered necessary in the Reserve. A number of the former mountain-biking trails are already disappearing as a result of disuse. Other trails, particularly on the northwest side of Fairy Fen should either be closed and decommissioned to prevent soil erosion, or realigned.



ATV

It is recommended that trails in the Reserve should be designated for pedestrian use only, in keeping with the primary purpose of ecosystem preservation. No bicycles or motorized vehicles should be permitted. The one exception is ITF-authorized access by motorized vehicles for construction or maintenance activity within the Reserve (See Section 6, Action Item #9).

There is an increasing interest in recreational horse-riding on Bowen Island. However, to date, no evidence of horse riding has been observed in the Reserve. Consequently, it is recommended that horses also be prohibited in the Reserve, mainly to avoid the introduction of potentially invasive species (seeds in the manure) and the soil disturbance due to horse's hooves.



Signage will be necessary to inform visitors of the allowed trail uses within the reserve. The signs should be posted at the trailheads and wherever trails cross the Reserve boundary.

Monitoring, education and some form of enforcement will also be needed to address incidents of unauthorized activities within the Reserve.

A Viewing Structure at Fairy Fen

Fairy Fen is the main attraction for naturalists visiting the Reserve, yet it is also the most sensitive feature. In order to prevent damage to the fen ecosystem by trampling, while still allowing observation and enjoyment, construction of a viewing platform or boardwalk is advisable. A desire for a viewing platform or boardwalk has also been expressed verbally and in the written responses to several of the questionnaires received during the public consultation (Appendix 4). The preliminary conceptual locations for such structures are shown in Figure 9; these locations take into consideration the site-specific sensitivity,

viewing potential (better light if viewed in a northerly orientation), ease of access for construction (closeness to existing trail), and foundation firmness (avoiding areas of deep peat).

5.4 Trail Maintenance

The trail system is likely to receive increasing use over the years, if the Reserve becomes better known and recreational use of the surrounding Crown forest also grows. As a result, it will likely become necessary to maintain some trail segments, particularly at stream crossings and other areas where the soil is soft and subject to disturbance or erosion.

Similarly, trees will continue to fall across the trails over time. In some cases, there will be a need to clear the path to restore passage and prevent the additional disturbance created by detours around the obstructions.

5.5 Permitted Uses

It is recommended that the only permitted uses within the Reserve should include:

- walking and hiking;
- nature appreciation;
- related education and interpretation;
- scientific research; and
- monitoring.

Trail maintenance, removal of hazard trees or invasive species, and trail or boardwalk maintenance, or other activity that may be proposed, shall only be undertaken by, or with the authorization of, the ITF.

5.6 Exotic and Invasive Species

The incidence of exotic and invasive species in the Reserve appears to be very low at present. No areas have been identified to date where there is a pressing need to control existing or incipient infestations.

Continued monitoring is recommended to identify any infestations that may emerge, and deal with them in a timely manner.

5.7 Ecological Restoration

The Reserve's wetland and forest ecosystems are, in general, in a nearly undisturbed condition. As a result, restoration needs are negligible at this time. However, there are some sites that have been affected by human activity to a greater or lesser degree. These sites include:

- forest along the east edge of the upper marsh, which is receiving a high sediment load from storm water runoff the adjacent road (Photo 11);

- trail on the south side of upper Huszar Creek, which has been altered in places for off-road vehicle use (Photo 20);
- trail on the north side of upper Huszar Creek, which been similarly altered in places (Photo 21); and
- trail near the crossing of Huszar Creek below the Fairy Fen outlet (Photo 24).

The recovery of these sites can, in most cases, best be achieved by discontinuing the related human impact (namely, vehicular traffic) and allowing natural processes, such as decomposition and revegetation, to resume and “heal” the site. Nevertheless, continued monitoring will be needed to identify new disturbances and determine any restoration needs.



V
ing

The one exception is the sediment inputs to the upper marsh (Photo 12). Remediation work is needed here to manage drainage from the roadway. Since this road is outside of the Reserve parcel, the work would take place on Crown land. The recommended

action is to work with the Province to ultimately construct a drainage network and a sedimentation basin and, ideally, to add fill to the large puddles in the road bed.

5.8 Protection of Sensitive Ecosystems and Species at Risk

The primary purpose of Fairy Fen Nature Reserve is the protection of the sensitive wetland, its headwaters and surrounding forest. The main management measures to protect sensitive ecosystems and species at risk are, therefore, the exclusion of any human activity that is not compatible with this purpose, and the careful direction of those human activities that do take place within the Reserve. Measures such as limiting the types and locations of human use have been described above in Sections 5.3 and 5.5.

The peat moss communities within Fairy Fen have been identified as being particularly sensitive to trampling (Golinski 2002). To this end, the following measures are recommended:

- install informative signs at strategic points on the on the trail system approaching Fairy Fen;
- install fencing beside Fairy Fen at sites that may receive increased visitation; and
- provide at least one dedicated viewing site, such as a boardwalk or platform, at Fairy Fen as described above in Section 5.3

5.9 Scientific Research and Education

It is recommended that the ITF encourage scientific research and education in Fairy Fen Nature Reserve. However, these activities should only take place in a manner that is in keeping with the conservation mandate.

6.0 Action Items

The following action items are recommended for Fairy Fen Nature Reserve, in order of priority. Immediate actions are intended for completion within 18 months to 2 years of the adoption of this Management Plan, while short- and long term actions are intended for completion within three and ten years, respectively. A summary of the action items is presented in Figure 9.

6.1 Immediate Actions (18 months to 2 years)

1. Publish a summary of the key items from this Management Plan in the local newspaper (The Undercurrent), online media (Bowen Island Forum, Bowen Island Ourselves) and web pages of the Islands Trust Fund and Bowen Island Conservancy, and other appropriate outlets; provide a copy of the Plan to the Bowen Island Library and the Bowen Island Municipality.
2. Install signs (symbol **S** in Figure 9) at all trail boundary crossings into the Reserve (approximately 12 signs), as well as at the four corner pins (4 signs). The location of the Reserve boundary can be determined approximately with a Global Positioning System (GPS) or more accurately by a professional surveyor. Signs should contain the following information (or words to that effect):
 - **“Entering Fairy Fen Nature Reserve”** at trail crossings or **“Fairy Fen Nature Reserve”** at corner pins.
 - “Pedestrians only”;
 - “No horses, bicycles, motorized vehicles, tree cutting, camping, fires or hunting”;
 - a positive message (e.g., “Enjoy this Special Place”), logo or other information at the discretion of the ITF.

The actual wording, format, size, construction materials and installation method should follow ITF standards.

3. Locate the two marker pins on the east side of the Reserve (**M** in Figure 9). If they are no longer present, these pins should be replaced prior to the installation of the signs mentioned above in Action 2.
4. Establish the Fairy Fen Loop as the only formal trail in the Reserve (Figure 9). Close all other trails into the Reserve.

5. Install barriers or fencing at the informal trail crossings that have been used by off-roaders and cyclists (**F1** through **F9** in Figure 9). Of these, priority should be given to sites F1 through F6 on the east side and F7 near Huzsar Creek. Potential construction materials include log barriers and/or 1-m high plastic mesh fencing that extends at least 2 m off the trail on either side.¹²
6. Install low fencing at the southwest edge of Fairy Fen, with signage, in the two areas that are at risk of trampling (**F10** and **F11** in Figure 9). Potential construction materials include split cedar rails (2 to 3 m long) or 1-m wide rolls of plastic mesh (preferably green) supported by wooden stakes (cedar or yellow cedar); the former may be preferable for aesthetic reasons, while the latter would be easier to transport and erect.

The signs on the fences should include words (and possibly appropriate graphics) to the effect of “**Danger. Do not enter – soft ground**” and “**wetland vegetation is sensitive to trampling.**”

7. Complete a hazard tree assessment along the Fairy Fen Loop Trail and remove or otherwise manage any hazards that may be identified.
8. Obtain a legal easement for access to the Reserve from Thompson Road along the existing trail (**Ea1** on Figure 9). An alternative route is from Cowan Point Drive along the existing former logging road (**Ea2** on Figure 9).
9. Establish a Management Group for the Reserve in partnership with the Bowen Island Conservancy and the Bowen Nature Club. A Management Agreement should be developed to undertake the following tasks:
 - a. Monitor human activity in the Reserve on a regular basis (at least every six months) by evaluating the condition of the trails, identifying any incidences of unauthorized activity (e.g., mountain bike or ATV traffic), disturbance or damage (e.g., creation of new trails, cutting of trees, etc.); and identifying any management actions and remediation that may be needed;
 - b. Provide input to interpretive signage;
 - c. Conduct guided educational tours of the Reserve;
 - d. Continue the inventories of breeding and resident birds, other wildlife, plant species and vegetation communities;
 - e. Undertake a survey of invasive plant species and conduct removal on a need basis; and
 - f. Liaise with the ITF regarding any of the above.
10. Start a program of annual monitoring inspections by ITF staff in the Reserve.

¹² It is recognized that the installation fencing or other barriers across the trails may be a largely symbolic deterrent to some people, as these can be readily circumvented. The main protection approach in the long term will need to be through vigilance and public education.

6.2 Short term Actions (within 3 to 5 years)

11. Evaluate the feasibility of constructing a boardwalk and/or viewing platform along the edge of Fairy Fen. This should entail preliminary testing of the depth to a firm substrate, to ascertain where it is feasible to install a boardwalk or other structure(s).
12. Design and obtain a cost estimate for the boardwalk and/or viewing platform. The boardwalk design options to be considered should include pile-supported and/or “floating” structures that do not require the driving of support posts through the peat to the firm substrate.
13. Develop and install one or more interpretive signs. The topics can be about the Reserve in general, Fairy Fen in particular, and the Huszar Creek watershed. The first sign should be placed at or near the outlet of Fairy Fen; additional signs can also be developed and installed, over time, at special features such as watershed divides, bedrock outcrops, streams, large or fire-scarred trees, etc.
14. Continue the annual monitoring inspections in the Reserve.

6.3 Long Term Actions (within 5 to 10 years)

15. Construct a boardwalk and/or viewing structure on the south east edge of Fairy Fen, if found to be feasible.
16. Continue the activities of the Management Group.
17. Continue the annual monitoring inspections in the Reserve by ITF staff.

6.4 Summary Action Item List

1. Publish a summary of the key items from this Management Plan in the local and online media and provide a copy to the Bowen Island Library and the Bowen Island Municipality.
2. Install signage on the trails at the Reserve boundary crossings and at Fairy Fen.
3. Establish the Fairy Fen Loop as the only public trail in the Reserve.
4. Close all other trails and install barriers or fencing at the trails into the Reserve that have been used by motorized vehicles and cyclists.
5. Install low fencing with signage at the southwest edge of Fairy Fen in the two areas that are at risk of damage by trampling.
6. Complete a hazard tree assessment along the trail system within the Reserve and remove any hazards that may be identified.
7. Obtain a legal easement for access to the Reserve along the existing trail from Thompson Road, with the route along the existing former logging road from Cowan Point Drive as an alternative.

8. Establish a Management Group and management agreement for the Reserve, in partnership with the Bowen Island Conservancy and the Bowen Nature Club.
9. Develop and install one or more interpretive signs at selected sites in the Reserve.
10. Evaluate the feasibility of constructing a boardwalk and/or viewing platform along the edge of Fairy Fen and, if determined to be feasible, design and build the structure(s).
11. Start a program of annual monitoring inspections by ITF staff.
12. In collaboration with the Management Group, continue the inventory of plant species and vegetation communities, breeding and resident birds, and other wildlife; complete a detailed survey of invasive plant species and initiate a removal program as needed.

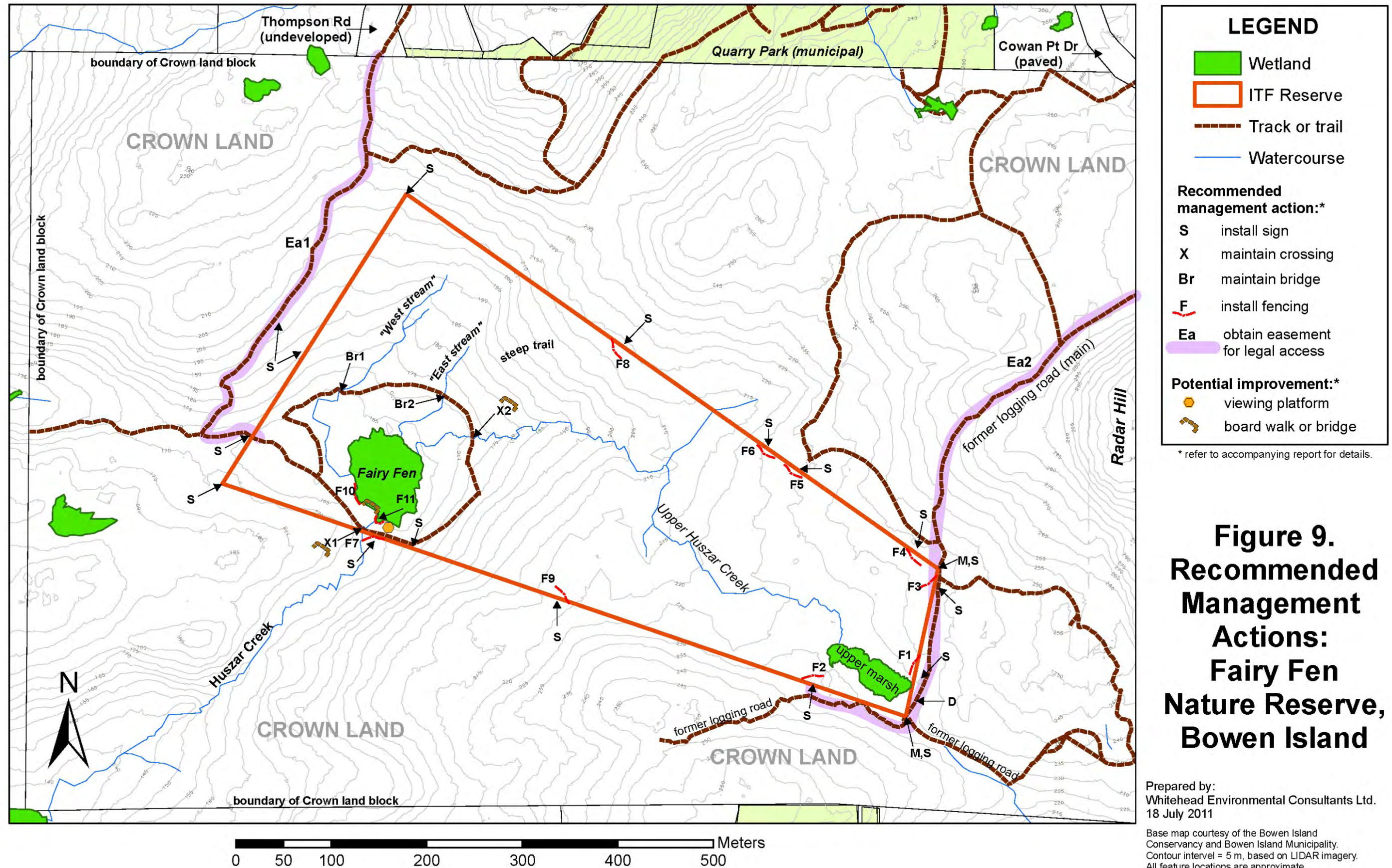
7.0 Conclusion

The establishment of Fairy Fen Nature Reserve on Bowen Island is the culmination of many years of community effort, particularly by the Bowen Island Conservancy. The regionally important wetland of Fairy Fen and a large part of its watershed are now secure under the ownership of the Islands Trust Fund, thanks to the generous support of VanCity Credit Union and the provincial government's Free Crown Grant Program.

The protection and stewardship of the Reserve have been initiated with the completion of this management plan. A number of specific action items have been identified and prioritized for implementation. The ITF, working closely with the local management group, will be implementing this management plan over the next ten years. During this period, it is anticipated that the lands within the Reserve will complete a transition from being a pristine area threatened by unregulated human activity, to being an intentionally protected area, conserved in perpetuity.

With this foundation in place, it can be anticipated that the Reserve will remain as a reservoir of biodiversity, offering a benchmark against which to measure ecological succession and the effects of climate change, and serving as launching point for additional community-led conservation efforts.

The present management plan will be updated in 2021.



8.0 References

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9.0 Appendices

Management Plan: Fairy Fen Nature Reserve, Bowen Island.

Islands Trust Fund. July 29, 2011

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Appendix 1.

Plant species recorded or potentially occurring in Fairy Fen Nature Reserve, Bowen Island.

Common Name	Scientific Name	Forest, Coniferous	Forest, Mixed	Wetland	Notes
Trees					
deciduous					
red alder	<i>Alnus rubra</i>	y	y	y	
Arbutus	<i>Arbutus menziesii</i>				
Bigleaf maple	<i>Acer macrophyllum</i>		y		
Bitter cherry	<i>Prunus emarginata</i>	y	y		
coniferous					
Douglas-fir	<i>Pseudotsuga menziesii</i>	y	y		
Grand fir	<i>Abies grandis</i>	y			
Red alder	<i>Alnus rubra</i>	y	y	y	
Shore pine	<i>Pinus contorta var. contorta</i>				
Sitka spruce	<i>Picea sitchensis</i>	y		y	
Western flowering dogwood	<i>Cornus nutallii</i>				
Western hemlock	<i>Tsuga heterophylla</i>	y	y	y	
Western redcedar	<i>Thuja plicata</i>	y	y	y	
Western yew	<i>Taxus brevifolia</i>	y			
Shrubs					
Baldhip rose	<i>Rosa gymnocarpa</i>	x	x		
Black Gooseberry	<i>Ribes lacustre</i>	x	x		
Common juniper	<i>Juniperus communis</i>				unlikely
Currant	<i>Ribes bracteosum</i>		x	x	
English holly	<i>Ilex aquifolium</i>	y	y		
Evergreen blackberry	<i>Rubus laciniatus</i>		y?		
Falsebox	<i>Pachistima myrsinites</i>				
Hairy honeysuckle	<i>Lonicera hispidula</i>	x			
Hardhack	<i>Spiraea douglasii</i>			y	
Kinnikinnik	<i>Arctostaphylos uva-ursi</i>	x			
Miner's lettuce	<i>Montia parvifolia</i>				
Mock orange	<i>Philadelphus lewisii</i>				
Nootka rose	<i>Rosa nutkana</i>				
Oceanspray	<i>Holodiscus discolor</i>	y			
Oregon grape, dull	<i>Mahonia nervosa</i>	y	y		
Oregon grape, tall	<i>Mahonia aquifolium</i>				
Pacific crabapple	<i>Malus fusca</i>			x	
Pacific ninebark	<i>Physocarpus capitatus</i>			x	
Red elderberry	<i>Sambucus racemosa</i>		y		
Red huckleberry	<i>Vaccinium parvifolium</i>	y	y		
Rocky mountain Juniper	<i>Juniperus scopulorum</i>				
Salal	<i>Gaultheria shallon</i>	y	y	y?	
Salmonberry	<i>Rubus spectabilis</i>		y	y	
Saskatoon	<i>Amelanchier alnifolia</i>	x			
Scotch broom	<i>Cytisus scoparius</i>				
Scouler's willow	<i>Salix scouleriana</i>		x?	x?	
Snowberry	<i>Symphoricarpos albus</i>		x		
Thimbleberry	<i>Rubus parviflorus</i>		x		
Trailing blackberry	<i>Rubus ursinus ssp. macropetalus</i>	y	y	y	
Trumpet honeysuckle	<i>Lonicera ciliosa</i>				
Twinberry	<i>Lonicera involucrata</i>			y	
Twinflower	<i>Linnaea borealis</i>	x			
Forbs (herbs)					
Alaska saxifrage	<i>Saxifraga ferruginea</i>				
American brooklime	<i>Veronica beccabunga ssp. americana</i>			y?	
Blue toadflax	<i>Linaria canadensis var. texana</i>				
Bog cranberry	<i>Vaccinium oxycoccos</i>			y	
Broad-leaved starflower	<i>Trientalis latifolia (T. borealis ssp. latifolia)</i>				
Broad-leaved stonecrop	<i>Sedum spathulifolium</i>				
Bugleweed	<i>Lycopus uniflorus</i>			y	
Canada thistle	<i>Cirsium arvense</i>				
Cattail	<i>Typha latifolia</i>			y	
Camas	<i>Camassia quamash</i>				
Chocolate lily	<i>Fritillaria lanceolata</i>				
Cleavers, Bedstraw	<i>Galium aparine</i>	y	y		
Clover sp.	<i>Trifolium sp.</i>				
Common rush	<i>Juncus effusus</i>	y?	y	y?	
Common burdock	<i>Arctium minus</i>		x		
Common foxglove	<i>Digitalis purpurea</i>	x	x		
y = presence confirmed x = potential but unconfirmed blank cell = recorded elsewhere on Bowen Island					

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Appendix 1, continued.

Common Name	Scientific Name	Forest, Coniferous	Forest, Mixed	Wetland	Notes
Herbs (continued)					
Common harebell	<i>Campanula rotundifolia</i>				
Common horsetail	<i>Equisetum arvense</i>			x	
Cudweed	<i>Gnaphalium</i> sp.				
Death camas	<i>Zygadenus venenosus</i>				
Deervetch	<i>Lotus micranthus</i>				
Desert parsley	<i>Lomatium</i> sp.				
Dovefoot geranium	<i>Geranium molle</i>				
Dwarf owl-clover	<i>Orthocarpus pusillus</i>				
Edible thistle	<i>Cirsium edule</i>				
Field chickweed	<i>Cerastium arvense</i>				
Field (western) parsley-piert	<i>Aphanes arvense (A. occidentalis)</i>				
Foamflower	<i>Tiarella trifoliata</i>	x			
Forget-me-not, common	<i>Myosotis discolor</i>				
Grassland saxifrage	<i>Saxifraga integrifolia</i>				
Hairy cat's-ear	<i>Hypochaeris radicata</i>				
Harvest brodiaea	<i>Brodiaea coronaria</i>	x			
Hooker's onion	<i>Allium acuminatum</i>				
Howell's bluegrass	<i>Poa howellii</i>				
Labrador tea	<i>Ledum groenlandicum</i>			y	
Many-flowered woodrush	<i>Luzula multiflora</i>	x	x		
Marsh willow-herb	<i>Epilobium watsonii</i>			x	
Menzies larkspur	<i>Delphinium menziesii</i>				
Miner's lettuce, small-leaved	<i>Montia parvifolia</i>				
Mint, field	<i>mentha arvensis</i>			y	
Nodding wild onion	<i>Allium cernuum</i>				
Northern starflower	<i>Trientalis arctica</i>			y	
Oregon stonecrop	<i>Sedum oreganum</i>				
Pacific bleeding heart	<i>Dicentra formosa</i>	x	x		
Pearly everlasting	<i>Anaphalis margaritacea</i>				
Purple-leaved willow herb	<i>Epilobium ciliatum</i>			x	
Purselane speedwell	<i>Veronica peregrina var. salapensis</i>				
Rattlesnake plantain	<i>Goodyera oblongifolia</i>	y	y		
Rein orchid	<i>Platanthera</i> sp.				
Self-heal	<i>Prunella vulgaris</i>				
Siberian miner's lettuce	<i>Claytonia sibirica</i>	y	y		
Skunk cabbage	<i>Lysichiton americanum</i>			y	
Slender plantain	<i>Plantago elongata</i>				
Slimleaf onion	<i>Allium amplexens</i>				
Small bedstraw	<i>Galium trifidum</i>				
Small-flowered alumroot	<i>Heuchera micrantha</i>	x	x		
Small-flowered blue-eyed Mary	<i>Collinsia parviflora</i>				
Small-leaved montia	<i>Montia parvifolia</i>				
Spurry knotweed	<i>Polygonum douglasii (P. spergulariiforme)</i>				
St. John's-wort, bog	<i>Hypericum anagalloides</i>			y	
St. John's-wort, western	<i>Hypericum formosum</i>			y	
Stonecrop	<i>Sedum</i> sp.				
Sundew, round-leaved	<i>Drosera rotundifolia</i>			y	
Swamp horsetail	<i>Equisetum fluviatile</i>			x	
Sweet-scented bedstraw	<i>Galium triflorum</i>	y	x		
Tiger lily	<i>Lilium columbianum</i>				
Tomcat clover	<i>Trifolium tridentatum</i>				
Vetch	<i>Vicia</i> sp.				
Violet, unidentified	<i>Viola</i> sp.	y	y	y	
Wall lettuce	<i>Lactuca muralis</i>	y	y		
Water parsley	<i>Oenanthe sarmentosa</i>			y	
Western fescue	<i>Festuca occidentalis</i>				
White-flowered hawkweed	<i>Hieracium albiflorum</i>				
Winged water-starwort	<i>Callitriche marginata</i>			x	
Winter cress	<i>Barbarea orthoceras</i>				
White fawn lily	<i>Erythronium oregonum</i>				
White-tipped clover	<i>Trifolium variegatum</i>				
Wild strawberry	<i>Fragaria virginiana</i>				
Wooly sunflower	<i>Eriophyllum lanatum</i>				
Yarrow	<i>Achillea millefolium</i>				
Yellow pond lily	<i>Nuphar polysepalum</i>			y	
Yerba buena	<i>Satureja douglasii</i>				
y = presence confirmed					
x = potential but unconfirmed					
blank cell = recorded elsewhere on Bowen Island					

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Appendix 1, continued.

Common Name	Scientific Name	Forest, Coniferous	Forest, Mixed	Wetland	Notes
Grasses and sedges					
Beaked spikerush	<i>Eleocharis rostellata</i>				
Beakrush	<i>Rhynchospora alba</i>			y	
Bluejoint	<i>Calamagrostis canadensis</i>			x	
Bristle-stalked sedge	<i>Carex leptalea</i>				
Cheatgrass	<i>Bromus tectorum</i>				
Creeping spike-rush	<i>Eleocharis palustris</i>			x	
Dagger-leaved rush	<i>Juncus ensifolius</i>			y	
Dewey's sedge	<i>Carex deweyana</i>			y	
Early hairgrass	<i>Aira praecox</i>				
Green sedge	<i>Carex viridula</i>			y	
Idaho fescue	<i>Festuca idahoensis</i>				
Lyngby's sedge	<i>Carex lyngbyei</i>				
Poverty oatgrass	<i>Danthonia spicata</i>				
Rattail fescue	<i>Festuca (Vulpia) myuros</i>				
Slender sedge	<i>Carex lasiocarpa</i>			y	
Slough (basket) sedge	<i>Carex obnupta</i>				
Small-flowered bulrush	<i>Scirpus microcarpus</i>			x	
Small-flowered woodrush	<i>Luzula parviflora</i>	y?	y?	x	
Soft-stem bulrush	<i>Scirpus validus</i>		y	y	
Spreading rush	<i>Juncus supiniformis</i>			y	
Star sedge	<i>Carex echinata</i>			y	
Western witchgrass (panic grass)	<i>Panicum occidentale</i> (<i>Dianthelium acuminatum</i>)				
Ferns					
Bracken fern	<i>Pteridium aquilinum</i>	x	y	y	
Deer fern	<i>Blechnum spicant</i>	y	y	y	
Green spleenwort	<i>Asplenium viride</i>	x	x		
Indian's-dream fern	<i>Adiantum densa</i>				
Lady fern	<i>Athyrium filix-femina</i>	y	y	x	
Licorice fern	<i>Polypodium glycyrrhiza</i>		y	y?	
Maidenhair fern	<i>Adiantum pedatum</i>	x			
Maidenhair spleenwort	<i>Asplenium trichomanes</i>	x			
Parsley fern	<i>Cryptogramma crispera</i>				unlikely
Spiny woodfern	<i>Dryopteris expansa</i>	y?	x		
Swordfern	<i>Polystichum munitum</i>	y	y	y	
Mosses, Clubmosses and Liverworts					
Ribbed bogmoss	<i>Aulacomnium palustre</i>			y	
Badge moss	<i>Plagionium insigne</i>			y	
Big red Stem	<i>Pleurozium schreberi</i>				
Black-tufted rockmoss	<i>Racomitrium aciculare</i>	x			
Common haircap moss	<i>Polytrichum commune</i>				
Goose-necked moss	<i>Rhytidiadelphus triquetrus</i>	x	x		
Haircap moss	<i>Polytrichum piliferum</i>				
Juniper haircap moss	<i>Polytrichum juniperinum</i>	y	y		
Lanky moss	<i>Rhytidiadelphus loreus</i>	x	x	y	
moss	<i>Campylium stallatum</i>			y	
moss	<i>Bryum pseudotriquetrum</i>			y	
moss	<i>Bryum miniatum</i>				
moss	<i>Dicranoweisia cirrata</i>				
moss	<i>Dicranum scoparium</i>				
moss	<i>Isoetes (Pseudotaxiphyllum) elegans</i>				
moss	<i>Isoetes stoloniferum</i>				
moss	<i>Plagiothecium sp</i>				
moss	<i>Rhyzomnium glabrescens</i>				
Oregon beaked moss	<i>Kindbergia oregana</i>	x	x		
Roadside rock moss	<i>Racomitrium canescens</i>				
Running clubmoss	<i>Lycopodium clavatum</i>	x	x		
Shaggy sphagnum	<i>Sphagnum squarrosum</i>				
Slender Beaked moss	<i>Kindbergia praelongia</i>				
Spear moss	<i>Calliergonella cuspidata</i>			y	
Sphagnum moss 1	<i>Sphagnum palustre</i>			y	
Sphagnum moss 2	<i>Sphagnum fuscum</i>			y	
Sphagnum moss 3	<i>Sphagnum subnitens</i>			y	
Step moss	<i>Hylocomium splendens</i>	y			
Wallace's selaginella	<i>Selaginella wallacei</i>				
Wavy-leaved (Flat) moss	<i>Plagiothecium undulatum</i>	x	x		
Liverwort 1	<i>Mylia anomala</i>			y	
Liverwort 2	<i>Scapania sp.</i>			y	
Liverwort 3	<i>Calypogeia sp.</i>				
y = presence confirmed					
x = potential but unconfirmed					
blank cell = recorded elsewhere on Bowen Island					

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Appendix 1, completed.

Common Name	Scientific Name	Forest, Coniferous	Forest, Mixed	Wetland	Notes
Lichens					
Beaded bone	<i>Hypogymnia enteromorpha</i>	x	x		
Coastal reindeer	<i>Cladonia mitis</i>				
Questionable rock frog	<i>Xanthoparmelia cumberlandia</i>				
Reindeer lichen	<i>Cladonia portentosa</i> spp. <i>pacifica</i>			y	
Reindeer lichen	<i>Cladonia rangiferina</i>				
Tattered rag	<i>Plastimatia herrei</i>	x	x		
Lichens	<i>Cladonia chlorophaea</i>				
Lichens	<i>Cladonia gracilis</i>				
Lichens	<i>Cladonia macilenta</i>				
Lichens	<i>Coelocaulon aculeatum</i>				
Lichens	<i>Hypogymnia physodes</i>				
Lichens	<i>Parmelia saxatilis</i>				
Lichens	<i>Parmelia sulcata</i>				
Lichens	<i>Peltigera aphthosa</i>				
Lichens	<i>Peltigera membranacea</i> dog lichen				
Lichens	<i>Umbilicaria</i> sp.				
Lichens	<i>Xanthoria</i> sp.				
Fungi					
mushroom	<i>Entoloma</i> sp.				
mushroom	<i>Inocybe</i> sp.				
waxy Laccaria mushroom	<i>Laccaria laccata</i>				
mushroom	<i>Omphalina ericetorum</i>				
y = presence confirmed					
x = potential but unconfirmed					
blank cell = recorded elsewhere on Bowen Island					

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Appendix 2 – Wildlife

Table 1. Bird species observed or potentially occurring in Fairy Fen Nature Reserve, Bowen Island.

Common Name	Scientific Name	Resident	Migratory	Notes
American Dipper	<i>Cinclus mexicanus</i>	y		b,c
American Goldfinch	<i>Carduelis tristis</i>		y	b,c
American Robin	<i>Turdus migratorius</i>			a,b
Anna's Hummingbird	<i>Calypte anna</i>	?	y	c
Bald Eagle	<i>Haliaeetus leucocephalus</i>	y		a,b
Band-tailed Pigeon	<i>Columba fasciata</i>		y	b,c (Blue listed)
Barred Owl	<i>Strix varia</i>	y		b,c
Belted kingfisher	<i>Ceryle alcyon</i>	y		b
Bewick's Wren	<i>Thryomanes bewickii</i>	?		b
Black Swift	<i>Cypseloides niger</i>		y	b,c
Black-capped Chickadee	<i>Poecile atricapilla</i>	y		b,c
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>		y	a,b
Blue (Sooty) Grouse	<i>Debardapus obscurus</i>	y		b,c (Blue listed)
Brown Creeper	<i>Certhia americana</i>	y		a,b
Bushtit	<i>Psaltriparus minimus</i>		y	b,c
Canada Goose	<i>Branta canadensis</i>	y, d		b
Cassin's Vireo	<i>Vireo cassinii</i>		y	a,b
Cedar Waxwing	<i>Bombycilla cedrorum</i>		y	b,c
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	y		a,b
Common Nighthawk	<i>Chordeiles minor</i>		y	a,b
Common Raven	<i>Corvus corax</i>	y		a,b
Cooper's Hawk	<i>Accipiter cooperii</i>	y?		b,c
Dark-eyed (Oregon) Junco	<i>Junco hyemalis</i>	y		a,b
Dark-eyed (Slate-coloured) Junco	<i>Junco hyemalis</i>		?	b
Downy Woodpecker	<i>Picoides pubescens</i>	y		a,b
European Starling	<i>Sturnus vulgaris</i>	y?	?	b,c
Fox Sparrow	<i>Paserella iliaca</i>	y		a,b
Golden-crowned Kinglet	<i>Regulus satrapa</i>	y		a,b
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>		y	b,c
Great Blue Heron	<i>Ardea herodias</i>	y		b,c
Great Horned Owl	<i>Bubo virginianus</i>		y	b,c
Hairy Woodpecker	<i>Picoides villosus</i>	y		a,b
Hammond's Flycatcher	<i>Empidonax hammondi</i>		y	a,b
Hermit Thrush	<i>Catharus guttatus</i>	y		a,b
House Finch	<i>Carduelis mexicanus</i>	?		b,c
Hutton's Vireo	<i>Vireo huttoni</i>		y	b,c (Blue listed)
Lincoln's Sparrow	<i>Melospiza licolnii</i>		y	b,c
MacGillivray's Warbler	<i>Oporornis tolmiei</i>		y	b,c
Mallard	<i>Anas platyrhynchos</i>	y		
Merlin	<i>Falco columbarius</i>	y		b,c
Northwestern Crow	<i>Corvus caurinus</i>	y		a,b
Northern Pygmy Owl	<i>Glaucidium gnoma</i>	?		b,c
Northern (Red-shafted) Flicker	<i>Colaptes auratus</i>	y		a,b

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Northern Saw-Whet Owl	<i>Aegolicus acadicus</i>	?		b,c
Olive-sided Flycatcher	<i>Contopus cooperi</i>		y	b,c (Blue listed)
Orange-crowned Warbler	<i>Vermivora celata</i>		y	a,b
Pacific Slope Flycatcher	<i>Empidonax difficilis</i>		y	a,b
Pileated Woodpecker	<i>Dryocopus pileatus</i>	y		a,b
Pine Siskin	<i>Carduelis pinus</i>	y		a,c
Purple Finch	<i>Carpodacus purpureus</i>	y?	y	b,c
Red Crossbill	<i>Loxia curvirostra</i>		y	b,c
Red-breasted Nuthatch	<i>Sitta canadensis</i>	y		a,b
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>		y	a,b
Red-eyed Vireo	<i>Vireo olivaceus</i>		y	b,c
Red-tailed Hawk	<i>Buteo jamaicensis</i>	y		a,b
Red-winged Blackbird	<i>Agelaius phoeniceus</i>		y	b,c
Ruby-crowned Kinglet	<i>Regulus calendula</i>	?		b,c
Rufous Hummingbird	<i>Selasphorus rufus</i>			a,b
Sharp-shinned Hawk	<i>Accipiter striatus</i>	y		a,b
Song Sparrow	<i>Melospiza melodia</i>	y		b,c
Sparrow, unidentified		y		a
Spotted Towhee	<i>Pipilo macularia</i>	y		a,b
Steller's Jay	<i>Cyanocitta stelleri</i>	y		a,b
Swainson's Thrush	<i>Catharus ustulatus</i>		y	a,b
Townsend's Warbler	<i>Dendroica townsendii</i>	?		a,b
Tree Swallow	<i>Tachycineta bicolor</i>		y	b,c
Turkey Vulture	<i>Cathartes aura</i>		y	a,b
Varied Thrush	<i>Ixoreus naevius</i>		y	a,b
Vaux's Swift	<i>Chaetura vauxi</i>	y		b,c
Violet-green Swallow	<i>Tachycineta thalassina</i>		y	b,c
Virginia Rail	<i>Rallus limicola</i>	y		b
Warbling Vireo	<i>Vireo gilvus</i>		y	a,b
Western Screech Owl	<i>Otus kennicottii</i>	?		b,c
Western Tanager	<i>Piranga ludoviciana</i>		y	a,b
Western Wood-Peevee	<i>Contopus sordidulus</i>		y	b,c
White-crowned Sparrow	<i>Zonotrichia atricapilla</i>	?	y	b,c
Wilson's Warbler	<i>Wilsonia pusilla</i>		y	a,b
Winter Wren	<i>Troglodytes troglodytes</i>	y		a,b
Yellow-rumped Warbler	<i>Dendroica coronata</i>		y	b,c

a – present study (Dec 2010 - Jun 2011). b – Bowen Nature Club database for Bowen Island. c – possible but not confirmed. d – likely to be present. ? – recorded on Bowen island during at least one Christmas Bird Count.

Appendix 2, continued.

Table 2. Mammals known or potentially present in Fairy Fen Nature Reserve, Bowen Island.

Common Name	Scientific Name	Notes
Dusky Shrew	<i>Sorex monticolus</i>	unconfirmed; common on Bowen Is.
Vagrant Shrew	<i>Sorex vagrans</i>	unconfirmed; Blue-listed
Northern Watershrew	<i>Sorex palustris</i>	unconfirmed
Little Brown Bat	<i>Myotis lucifugus</i>	unconfirmed; is the most commonly observed bat on Bowen Is.
Long-legged Myotis	<i>Myotis volans</i>	unconfirmed
California Myotis	<i>Myotis californicus</i>	unconfirmed
Yuma Myotis	<i>Myotis yumanensis</i>	unconfirmed
Big Brown Bat	<i>Eptesicus fuscus</i>	unconfirmed
Hoary Bat	<i>Lasiurus cinereus</i>	unconfirmed
Silver-haired Bat	<i>Lasionycteris noctivagans</i>	unconfirmed
Townsend's Big-eared Bat	<i>Plecotus townsendii</i>	unconfirmed; Blue-listed
Douglas Squirrel	<i>Tamasciurus douglasii</i>	confirmed
Eastern Grey Squirrel	<i>Sciurus carolinensis</i>	unconfirmed; introduced species; population expanding ^a
Flying Squirrel	<i>Glaucomys sabrinus</i>	unconfirmed; recorded on west side of island within 1 km of Reserve
Deer Mouse	<i>Peromyscus maniculatus</i>	unconfirmed; common on island
Townsend's Vole	<i>Microtus townsendii</i>	unconfirmed; found in meadow habitats
Mink	<i>Mustela vison</i>	unconfirmed; very occasional in stream corridors
Feral cats	<i>Felis domesticus</i>	unconfirmed; present island-wide near settled areas
Cougar ^b	<i>Felis (Puma) concolor</i>	not present; very occasional on the island
Black Bear ^c	<i>Ursus americanus</i>	unconfirmed; occasional on the island
Black-tailed Deer	<i>Odocoileus hemionus columbianus</i>	confirmed; very common throughout the island

^a relatively recent arrival to the west side of the island, since approx. 2007

^b cougar and black bear were last observed on Bowen Island in 2008.

^c at least one black bear is present on the island in 2011 to date, possibly having hibernated during the winter of 2010-2011

Appendix 2. continued

Table 3. Amphibians and Reptiles known or potentially present in Fairy Fen Nature Reserve, Bowen Island.

Common name	Scientific name	Notes
Amphibians		
Pacific Tree Frog	<i>Hyla regilla</i>	Heard in forest within Reserve; common on island
Reg-legged Frog	<i>Rana aurora</i>	Egg-mass observed in fen stream; common on island (Blue listed)
Rough-skinned newt	<i>Taricha granulosa</i>	Observed in Fairy Fen outlet stream; common on island
Western toad	<i>Bufo boreas</i>	unconfirmed; present though rare on island
Ensatina salamander	<i>Ensatina eschscholtzi</i>	unconfirmed; present on island
Northwestern salamander	<i>Ambystoma gracile</i>	unconfirmed; present on island
Long-toed salamander	<i>Ambystoma macrodactylum</i>	unconfirmed; recorded on island
Western red-backed Salamander	<i>Plethodon vehiculum</i>	unconfirmed; recorded on island
Reptiles		
Common Garter Snake	<i>Thamnophis sirtalis</i>	unconfirmed; probable; common on island
Northwestern Garter Snake	<i>Thamnophis ordinoides</i>	unconfirmed; common on island
Northern Alligator-Lizard	<i>Gerrhonotus coeruleus</i>	unconfirmed; prefers rock bluff habitat

Appendix 2. continued

Table 4. Potential Rare Butterfly Species for Bowen Island (Source: BC's Wild Heritage 2007)

Scientific Name	Common Name	Status		Habitat and Larva Food Plant	Flight Period
		Prov.	Fed.		
<i>Callophrys johnsoni</i>	Johnson's Hairstreak	Red		Mistletoe (<i>Arceuthobium</i> spp.) ³ in western hemlock	May - June
<i>Cercyonis pegala incana</i>	Common Wood Nymph	Red		Grassy forest openings and meadows. Larval food plant: likely grasses. ³	July - September
<i>Colias occidentalis</i>	Western Sulphur	Blue		Dry grassy slopes & forest edges. Food plant: has used <i>Lathyrus nevadensis</i> ; Vancouver Is.: <i>Lupinus, Vicia</i> ³	Late May - late July
<i>Danaus plexippus</i>	Monarch	Blue	SC ¹ (Nov. 2001)	Low elevation in southern BC. Food plant is showy milkweed.	June - Aug
<i>Erynnis propertius</i>	Propertius Duskywing	Blue		Associated with Garry Oak habitats. Food plant: Garry Oak.	Late April - early July
<i>Euphyes vestris</i>	Dun Skipper	Blue	T ² (Nov. 2000)	Dry open forest edge. Host plant: grasses, sedges.	Late June - mid August
<i>Oeneis nevadensis gigas</i>	Great Arctic	SU		Forest openings and edges of meadows. Food plant unknown.	June - July
<i>Speyeria zerene bremnerii</i>	Zerene Fritillary	Blue		Mesic and xeric meadows. Food plant: violet species.	July - Aug

1- SC = special concern;

2- T = threatened;

3- Food plant is confirmed or likely present in southwest Bowen Island

Appendix 3

A Brief History of Place Names in Fairy Fen Nature Reserve, Bowen Island

The recorded names of the main wetland in the Reserve include Crown Marsh, Mystery Marsh or Mystery Fen and Fairy Fen.

The main wetland was identified in the late 1980s and early 1990s as the site for a water reservoir to serve a proposed residential and golf course development on the Cape Roger Curtis lands to the west (Busby Bridger Architects 1992). The proposed reservoir design included the construction of two dams, one on the west and the other on the southwest side of the fen to create a large impoundment. A copy of the corresponding water licence application, posted to a tree beside the wetland outlet, was observed by members of the Bowen Nature Club during a hike into the fen in 1993 (personal observation). That document referred to the wetland as “Crown Marsh”, presumably because it was located on Crown land. This water licence was later withdrawn when the Busby proposal was discontinued.

Mystery Marsh and Mystery Fen were the names used by the Bowen Nature Club when leading hikes into this area between 1993 and 2002. The change from “Marsh” to “Fen” was adopted as the members became better informed about the different types of wetlands.

The name Fairy Fen was given in 2002 by Flora Dunster, young daughter of Katherine and Julian Dunster, local residents who assisted Karen Golinski during the wetland inventory project. Ms Golinski and her assistants were advised of the then current use of Mystery Fen; however, they chose to rename the fen over the objections of the Bowen Nature Club. In the end, the notoriety brought to the wetland by the Golinski report led to the prevalence of the name Fairy Fen.

Huszar Creek was named by Peter Malkin, a long-time Bowen Islander, during an island-wide stream mapping project undertaken in the mid-1990s by the Bowen Island Forest and Water Management Society (BIFWMS). The reason for using the name was reported as being whimsical (P. Malkin, personal communication). Mr. Malkin was a founding member BIFWMS, a community group that later contributed to the creation of, and was eventually absorbed by the Bowen Island Conservancy.

Appendix 4.

Fairy Fen Nature Reserve Questionnaire and *summary of responses from the public.*

(Individual responses are shown in bullet form where appropriate)

1.) Have you ever visited Fairy Fen (also known as Mystery Fen)? YES **6** NO **1**

If YES, when did you first visit the fen and how often do you return?

- *10 years ago – at least 8 return visits*
- *Mid-80's, lately several times a year*
- *Around 1965 and approx. 3 times since*
- *Saturday, January 22nd 2011 for the first time (2)*
- *Once, Jan. 22 during the public information session and walk*

Please list the activities you enjoy pursuing while there (e.g. walking, wildlife viewing, mountain biking, research, other...)

- *Walking, wildlife viewing, learning about the fen's ecological functions;*
- *Walking, viewing the rain forest and wetland at this time of year, I will certainly come back to photograph wildlife (trees, fungi, ferns and marsh vegetation);*
- *Hiking, walking and viewing the area;*
- *Walking and admiring the rainforest, the creek and the ecosystem of the fen;*
- *It is a unique spot to visit during a walk*
- *Planning the future of Fairy Fen*

Please list the wildlife or unique plants you've observed while at Fairy Fen

Birds, deer, Pileated and other woodpeckers, Labrador tea, grizzled biologists

2.) What are the special features most important to you at Fairy Fen? Please list:

- *The ecosystem services and functions the fen provides; providing information to the public about the fen; protecting wildlife habitat.*
- *The setting of the trails between the trees of the forest as it changes from the rocky formations of Radar Hill to the marsh of fairy fen with the variations of growth and species along the way, as well as the undergrowth when returning to Thompson Rd; the creel and all the water systems it represents and the complexity of the marsh at the centre.*
- *The wetlands, the start of Huszar Creek and the bowl-like feel of the area.*
- *The preservation of a specific ecosystem.*
- *This is a fen with a creek flowing through it, very special! The changing water level at different times in the year allows for a larger variety of plants than in the case of a stable water level.*
- *Transitional state / small size / unique plant communities / deep organic soils.*

3.) What activities do you believe are incompatible with the protection of the natural features of Fairy Fen?

- *Virtually everything except controlled foot access – i.e. boardwalks*
- *Motorized access should be discouraged! I suggest a viewing platform on the edge of the fen rather than a boardwalk. Locate this platform on the north side so one can sit in the sun.*
- *Walking on the moss and the bog – one has to look at it from the borderline – a boardwalk in and out of the forest but nothing on the fen.*
- *Walking on the fen itself, or any activities that would damage the area.*
- *Heavy traffic of ATVs, unlimited access particularly in the marsh area, multiplicity of trails.*
- *Motorized vehicle access to the fen itself; motorized recreation should be designated away from the fen; trampling, walking & biking in the fen; thus a platform or walkway would be preferable.*

4.) Do you know anything about the history, cultural or special features of Fairy Fen that you would like to share? *(one response only)*

Because of its bog-like features, it has been relatively untouched by hikers, cyclists and off-road vehicles.

5.) Parks Canada (National Park Reserve Feasibility Assessment – Bowen Island (Draft)) has demonstrated an interest in including the Fairy Fen Nature Reserve in a proposed National Park on Bowen Island. Are you in favour of the Islands Trust Fund transferring Fairy Fen to Parks Canada in the event the National Park was approved and established on Bowen? Why?

- *Yes. Ability to pay for improvement (boardwalk), protection and enforcement of no 4x4s.*
- *Yes, absolutely – they have the training & the personnel to check it daily and to provide the educational material to potential visitors.*
- *Yes. To gain the support of the large federal institution that Parks Canada is; to develop the infrastructure needed to protect Fairy Fen Nature Reserve; to provide the means of creating trails and view platforms for visitors; education purpose; discouraging 4-wheelers and ATVs; however, the Islands Trust Fund should remain the “moral holder” of the land, to be assured that Parks Canada is respecting its engagements. Trails should be well defined and limited in number to discourage people to trample the forest and marsh everywhere.*
- *The only positive I see is that there would be better policing by PC staff. This may reduce vandalism.*
- *I believe the Islands Trust has a better understanding of the area and what is needed to protect it. However, Parks Canada may be more able (funding etc.) to provide the necessary structures and enforcement. Thus it would be beneficial for the ITF & the Conservancy to include an action plan and suggestions for the National Park before transferring the fen.*
- *Not sure if this is in our favour. Also, if only Fairy fen Nature reserve was considered, maybe yes. Crown land around Fairy Fen has outstanding issues like Thompson Road [extension].*
- *Fairy Fen should remain under the protection of the Islands Trust Fund. Welcome Parks Canada to Bowen Island for their preserve & protect mandate and that all Crown lands surrounding Fairy Fen Nature Reserve be placed in the hands of Parks Canada for protection in perpetuity.*

Please provide any additional comments you may have on this special place below

- *Use the “leave no footprint” use – no activities in Fairy Fen itself – any existing walking trails at higher elevations in the dry forest zoned areas be maintained but no new trails constructed.*
- *The protected area was the maximum permissible under the free Crown Grant process. More area needs to be protected (to the height of land where feasible). A national park including the whole Crown block is the most viable means of doing so. Additionally, it would ensure that no access road to CRC [Cape Roger Curtis] via Thompson Road would be built.*
- *The Fairy Fen area has always been considered as somehow special on Bowen island. It has also been caught up in the issues which it does not deserve, i.e. Thompson Road. I think it would work if Fairy Fen was a national park with a trail from Thompson Road. Allow for Thompson Road extension to CRC as it would create a good boundary to limit access. The trail should end up at a viewing platform assembled like a water tower with three of four legs. One ground level viewing station and one tree top viewing station. The south and east side of the fen should be closed to access. This will keep off-road access away.*
- *Fairy Fen Nature reserve represents a small part of the precious environment that Crown land is for Bowen Island. To have managed to obtain the support of the Islands Trust Fund to protect it from potential development is an achievement. But, to get Parks Canada to protect all the remnant of the Crown land should be our main concern if we want those small precious areas to survive and to preserve the way of life we have had on the island thanks to its natural environment. As we see in the report of the Suzuki Foundation and the parks Foundation, the economic return of protecting the natural environment is considerable; unfortunately Crown lands are not seen in*

that manner by the Provincial government interested in immediate financial potential return it could get out of it in many different ways. Giving preference to Parks Canada over other jurisdictions for all the parks and reserves could secure indefinitely the 40% of natural environment that is left, even if it must limit some of our previous advantages of use of Crown land. We will gain security and stability for many following generations, including the protection and preservation of Fairy Fen amongst other precious areas.

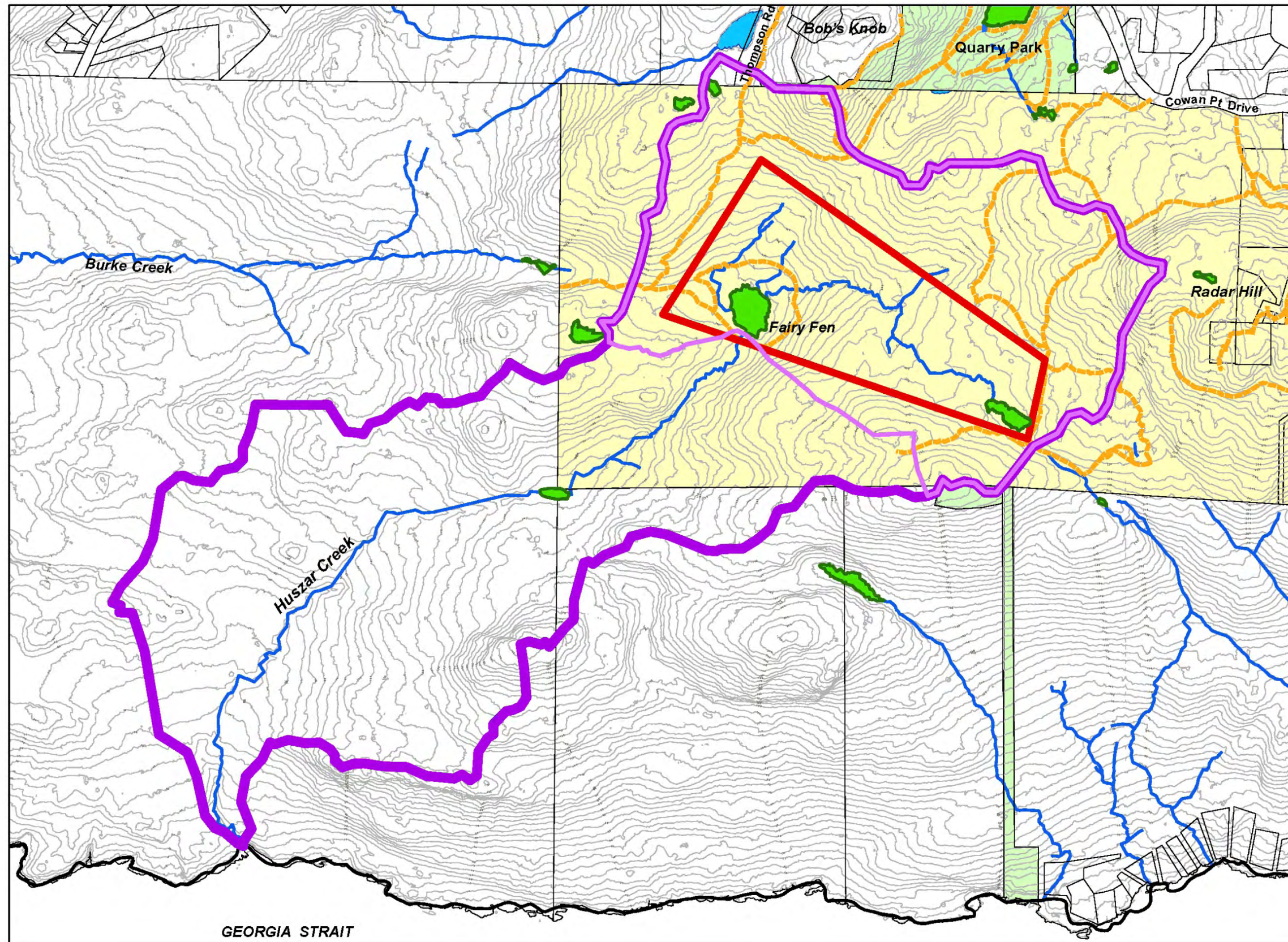
- *I am adamant that Parks Canada preserves in perpetuity the 40% of our island – to me it is a no brainer.*
- *I was very pleased to learn about fairy fen during the public info walk and to learn how rare these areas are on other islands. I would like to see this area protected ecologically but also make the Bowen Island public aware of it and its functions to the ecosystem. It would be important to maintain the somewhat rugged accessibility in order to [illegible] our expectations and to build a viewing area with information available about the sensitivity of the fen.*

Appendix 5.

Watershed Map of Huzsar Creek and Fairy Fen

APPENDIX 5

HUZSAR CREEK WATERSHED BOWEN ISLAND

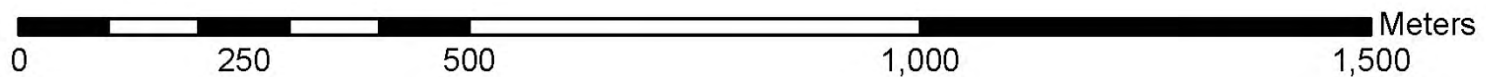


LEGEND

-  Track or trail
-  Wetland
-  ITF Reserve
-  Park, municipal
-  Crown Land
- Watersheds**
-  Fairy Fen
-  Huszar Creek

Prepared by:
Whitehead Environmental Consultants Ltd.
18 July 2011

Base map courtesy of the Bowen Island Conservancy and Bowen Island Municipality.
Contour interval = 5 m, based on LIDAR imagery.
All feature locations are approximate.



Appendix 6.

Copy of Order in Council 166, March 25th 2010, granting the property to the Islands Trust Fund.

PROVINCE OF BRITISH COLUMBIA
ORDER OF THE LIEUTENANT GOVERNOR IN COUNCIL

Order in Council No. 166 . Approved and Ordered MAR 25 2010



~~Lieutenant Governor~~
Administrator

Executive Council Chambers, Victoria

On the recommendation of the undersigned, the ~~Lieutenant Governor~~ ^{Administrator}, by and with the advice and consent of the Executive Council, orders that

- (a) approval is given for the disposal, by free Crown grant, to the Islands Trust Fund Board established under the *Islands Trust Act*, of the Crown land described as District Lot 8142, Group 1, New Westminster District, and shown outlined in bold black on the attached sketch, and
- (b) the disposition under paragraph (a) is a disposition of the fee simple of that Crown land for so long as the land is used only for nature conservation, and is subject to reversion to the government without further instrument or act if the land is not so used.


Minister of Forests and Range and Minister Responsible
for the Integrated Land Management Bureau

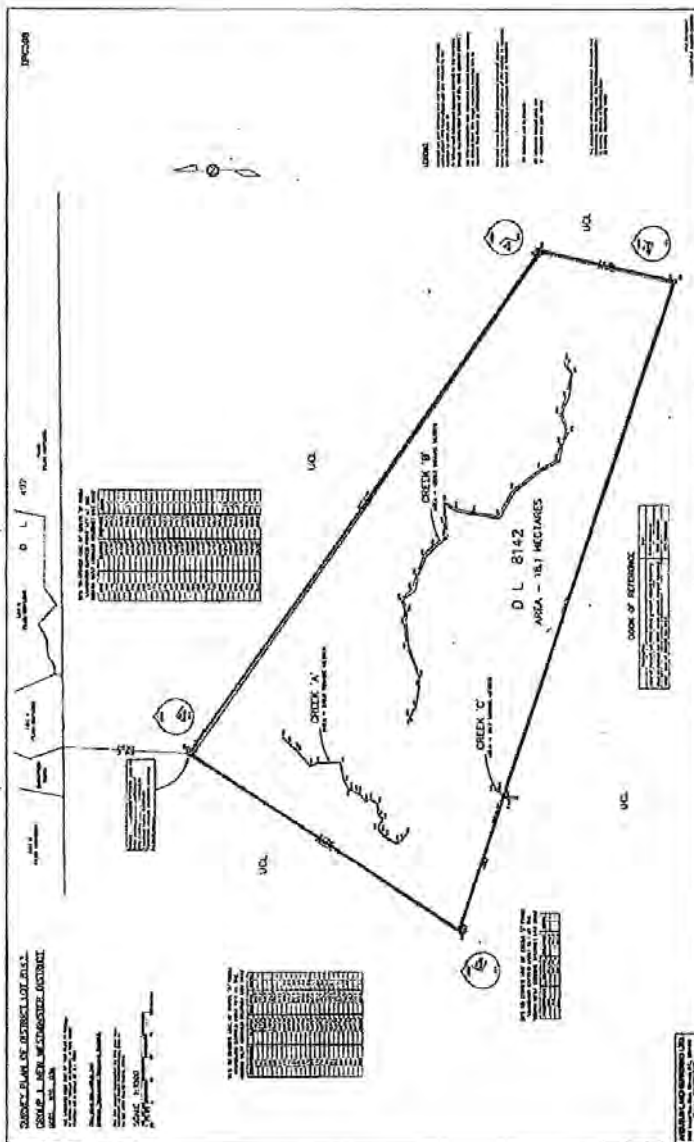

Presiding Member of the Executive Council

(This part is for administrative purposes only and is not part of the Order.)

Authority under which Order is made:
Act and section:- Land Act, R.S.B.C. 1996, c. 245, s. 51
Other (specify):-

February 9, 2010

O/16/2010/4



File 2408755
Survey Sketch Reduced

Appendix 7.

Copy of Legal Survey Plan of Fairy Fen Nature Reserve, Bowen Island.

