Management Plan for
LINDSAY-DICKSON NATURE RESERVE
Denman Island

Prepared for
Islands Trust Fund Board
1627 Fort Street, Victoria BC

by
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Denman Island, BC
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Management Plan For Lindsay-Dickson Nature Reserve

Denman Island, BC.  

April 2002

1.0  Introduction

"The objective of the Islands Trust is to preserve and protect the Trust area and its unique amenities and environment for the benefit of the Trust area and of British Columbia generally, in co-operation with municipalities, regional districts, improvement districts, other persons and organizations and the government of British Columbia."

The Islands Trust Fund (ITF) assists in implementing this objective by establishing nature reserves and nature sanctuaries and by working with interested landowners to protect special features and values on their lands through voluntary conservation initiatives.

The ITF acquired 52 hectares of forested land on Denman Island in 2001, for the purpose of establishing a nature reserve. Denman Conservancy Association was contracted in January 2002 to provide an overview site inventory, conduct a public consultation meeting, and develop a site management plan for the Trust Fund Board. An ITF management plan provides long-term direction and guidance for the management of values and features of significance on properties owned by the ITF. The management plan establishes the nature reserve purpose and management principles, provides a biophysical description of the property, identifies management issues, and recommends management strategies to be implemented.

1.1  Purpose

The purpose of the Lindsay-Dickson Nature Reserve is to maintain the land as a nature reserve for the use, enjoyment and benefit of the residents of BC.

The purpose of this plan is to:
• Provide a summary of environmental attributes of the site.
• Identify management issues.
• Establish management strategies and actions that fulfill the purpose of the reserve and can be implemented over the next ten years.
2.0 Background

The nature reserve consists of approximately 52 hectares of forested land between the foreshore adjacent to East Road and the south end of Jemima Road (Map 1). The Province of British Columbia purchased the property for conservation purposes in April 2001 with a contribution by the Denman Conservancy Association. The property was transferred to the Trust Fund Board in July 2001.

The ITF has adopted Lindsay-Dickson Nature Reserve (LDNR) as the name for the site. Classification of the property as a Reserve reflects the ITF’s anticipation that the community would wish to continue the historic low-impact public use of the land. On ITF’s ‘sanctuary’ lands public use is not permitted.

2.1 Methods

Information gathered for this report was derived from three sources:
- Site visits, studies and field mapping.
- A review of relevant scientific and government publications and databases.
- A public consultation meeting.

A Professional Biologist and experienced survey and mapping subcontractors with expertise in vegetation ecology, fish and wildlife biology, geology, and environmental planning conducted many site visits from January to April 2002.

2.2 Overall Objectives

The objective of the management plan is to provide overall direction that will protect the natural state of the property and allow use and enjoyment of the site by visitors. The objectives for management of the LDNR include:
- Allowing natural ecological processes to function without human interference, except in the case of wildfire or the invasion of non-native species.
- Ensuring that permitted uses will not significantly impair the natural condition of the site or impact on special features or amenities.
- Allowing, but not promoting, such minimal impact use of the reserve in appropriate areas as hiking and nature observation.

2.3 Legal Description

The legal descriptions of the two parcels are:

1/. PID 009-706-071 The SE 1/4 of Sec. 14, Denman Island, Nanaimo District Except part in plan VIP70081

2/. PID 009-705-911 The SW 1/4 of Sec. 14, Denman Island, Nanaimo District Except the Northerly 40 acres and part in Plan VIP70081
2.4 Site History

2.4.1 Archaeology
Evidence of the earliest human activity in the vicinity of Denman Island was found in a midden at Deep Bay, on Vancouver Island, across Baynes Sound from the southern end of Denman Island, where archaeologists uncovered stone "points" believed to have been used to hunt elk and deer in about 3,000 B.C. Subsequent aboriginal occupation of Denman Island is evident in numerous shell middens found along the coastline, most often where creeks empty into the sea. In addition, cairns, indicating burial sites, on the islet off the northern tip of the Island and petroglyphs on Chrome (or Yellow) Island, as well as "earthworks" or trenches in what is now Boyle Point Park also suggest that much of Denman Island was familiar territory for native peoples of the area over a considerable period of time.

On the west coast of Denman Island, or Sla-dai-aich (also Ihaytayich), as it was known by its residents was one of three villages of the Pentlatch people. Massive intricately carved cedar frames, still evident in 1864, suggest that it had once been an extensive and grand settlement before the smallpox epidemic of 1862 took a heavy toll. Those who survived the outbreak in the Denman village resettled on Vancouver Island in the Pentlatch settlement. Subsequently, however, the few survivors of this settlement amalgamated with the Comox people. Eventually, Pentlatch, the language of the original human inhabitants of Denman, slipped into history. [Source: Denman Island Official Community Plan, August 2001]

There are several shell middens recorded in the provincial inventory along the coast adjacent to the LDNR. One of these (DjSe 13) is on the property. It is recorded as a “thin narrow scattering of shells. Not worth salvage, useful perhaps in a distribution study.” Less than 100 metres west of East Road a large red cedar tree appears to have been ‘culturally modified’ many years ago by removal of a tall strip of bark or a plank.

2.4.2 European Settlement
European settlement began on adjacent Hornby Island and in the Comox Valley in the 1860’s but it was not until 1874 that the first British settlers homesteaded on Denman. Their farm was in the Madigan area on the west side of the island immediately across from the LDNR. In 1878 John Graham took up land on what became the Lindsay-Dickson property. The Grahams were from New Brunswick and made their living by a combination of logging and farming. The property was hand logged in the early 1900s, a small orchard was established and for a while the family ran a small dairy farm. Most of their land was left untouched.

The LDNR is the remaining forested portion of the large family holding purchased around the turn of the century by Dr. Frederick Lindsay-Dickson. Dr. Lindsay-Dickson and his wife had visited the island while on a visit from England and he took a fancy to the John Graham place. He was a keen sportsman and was particularly interested in Graham Lake, which bordered his property. He built a new house and lived here in retirement for a number of years before turning the farm over to his son Gerald and returning to England.
Gerald Lindsay-Dickson married a Denman girl, Laura Keenan, and they lived on the farm while their family of three sons and two girls were growing up. Later they moved to Victoria and had hired help run the farm on Denman. The A. Chafer, Bill Schmidt and the Henderson families were employed here for a number of years. Later Mr. and Mrs. Gerald Lindsay-Dickson and their youngest son Clive returned and farmed in a small way. Clive continued to live in the old home that was built around 1920. (Source: substantially from *My Ain Folk* by Winnifred A Isbister, 1976.)

2.4.3 Acquisition for Conservation
Denman Conservancy Association played an active role in the formation of the LDNR. The concept of establishing a reserve at this site was originally proposed to the owners in the late 1980's by the Residents and Ratepayers Association of Denman Island. This was prior to the existence of the Denman Conservancy. When the Conservancy Association was formed in 1990/1 the Lindsay-Dickson forest became one of the initial projects. Little did the original Board members know that the conservation of this property would take ten years of dedicated and often frustrating work. In 1993 the new owner expressed a tentative willingness to sell or trade the land. Over the years six different Environment ministers were actively and successfully petitioned for their support. Scientists, journalists, funding agencies, park representatives, government representatives and many other interested parties were shown parts of the forest and all expressed support. Islanders raised over two hundred thousand dollars. The project became an exercise in patience and perseverance as the owner and the government negotiated endlessly over the value of the property and lands for trade. The Denman Conservancy, supported by the island as a whole, acted as a go between, mediator and cheerleader. The deal was finally closed in 2001, after the owner resorted to selectively logging part of the forest.

2.5 Regional and Local Context
LDNR is situated within the east central portion of Denman Island, with Graham Lake to the southwest and Lambert Channel to the east. The environmentally valuable property stretches from the shoreline of Lambert Channel almost to the shore of Graham Lake, which is connected to the property by two substantial road allowances.

The Land use zoning under the Official Community Plan (OCP) is Public Conservation (CN). The northeast half of the property is in the provincial Agricultural Land Reserve. The water zone seaward of the property is classified W4, Marine Protection to a boundary some 400 meters offshore. Beyond, the zone classification is W1, Marine Conservation.

The importance of the site for nature conservation both regionally and locally was the subject of the following statement from Chris Pielou, noted ecologist:

“The Lindsay-Dickson forest is one of the few surviving fragments of an ecosystem - the Coastal Douglas fir Forest - that is one of the smallest in Canada; it is being obliterated by the ribbon development from Victoria to Campbell River, now spreading to the islands. Total loss of the ecosystem - a real possibility unless we fight to protect it - would entail a serious reduction in biodiversity, as ours is the most
diverse ecosystem in BC.

The importance to human welfare of conserving biodiversity is not well understood by non-scientists. To conserve biodiversity is to conserve the world's genetic capital. The greatest threat to that capital, in the words of the Director of the US Forest Service's Institute of Forest Genetics, is the “loss of local genetic diversity” (emphasis added) and that is exactly what we stand to lose if the Lindsay-Dickson forest is lost. This small forest is an isolated fragment of an endangered ecosystem, and undoubtedly contains some genetic diversity that exists nowhere else, most of it in local populations of tiny, inconspicuous plants and animals that the average person never sees, and certainly wouldn't recognize.

Such local populations, inhabiting a small area, are easily destroyed; and because so little of the Coastal Douglas-fir forest remains, replacements are unlikely to come from elsewhere. The smooth functioning of the natural world depends on tiny organisms. Chief among them are the huge numbers of unseen micro-organisms that maintain the soil in a healthy state.”
3.0 Overview Environmental Inventory

The environmental inventory includes an overview summary of climate, geology and ecology.

3.1 Climate

Climate in the upper Gulf Islands has been described by Chiltern (1975) and reviewed by Preston (1976). While there is some minor local variation, climatic averages are relatively consistent throughout the area. Climate in the Strait of Georgia exhibits a characteristic pattern of warm dry summers and mild wet winters. The maritime influence tends to moderate the effects of elevation, latitude, and aspect on local temperature and precipitation. Temperature on Denman Island is generally moderate. The mean temperature of the warmest month is about 17.5°C and the coldest month is about 2°C.

Annual precipitation is approximately 1340 mm. Precipitation generally increases from sea level to hilltops, and about 80 percent falls between October and March. Around eight percent of winter precipitation falls as snow, which rarely lasts more than a few days on the ground. July is the warmest and driest month.

Warm temperatures and low precipitation in the summer months can lead to soil moisture deficit. Moisture deficits are influenced by aspect, slope, vegetation cover, and the ability of the soil to retain moisture. The moisture deficit usually begins in May and ends with the autumn rains in early October.

References:

3.2 Geology

All of Denman Island is underlain by sediments of the Nanaimo Group. This sequence of rocks is Late Cretaceous age, deposited between about 87 and 55 million years before present. The Nanaimo Group has been subdivided into numerous formations (England & Hiscott, 1991; Muller & Jeletzky, 1970; Mustard, et al, 1999). According to Mustard, et al (1999), the sediments which now form Denman Island were derived from a source to the east and deposited in a deep water environment as submarine fan complexes. The sediments underlying the LDNR property have been assigned to the De Courcy Formation. The De Courcy Formation extends the length of Denman Island and is up to 350m thick. It is a well indurated formation of sandstone and conglomerate which is resistant to erosion.
Its resistive nature is the fundamental reason for the existence of the topographic high which is Denman Island.

The dominant lithology underlying the LDNR is massive sandstone of uppermost De Courcy Formation. Sandstone is exposed in three locations on or near the property: about 100m west of the west boundary of the property, northwest of the end of Jemima Road; in an outcrop in the creek draining the property, ~250m upstream from its mouth; and along the shore of Lambert Channel. Sandstone is composed of grains of quartz, feldspar, mafic minerals and rock fragments. Conglomeratic units, which are stratigraphically below the massive sandstone, are exposed at two locations: in the southwestern part of the property; and at the southeast corner. Conglomerate is composed of well rounded pebble, and lesser cobble size clasts of dominantly mafic volcanic, felsic volcanic, granitic and sedimentary rocks. There is little fine-grained material present, or in geological terminology, the conglomerate is clast supported. There are a few small outcrops of conglomerate on the trail that extend from the end of Jemima Road diagonally across the southwestern corner of the property, a location known as Rocky Meadow (see Map 1). In the area surrounding these conglomerate outcrops there are large angular blocks of massive sandstone float, and both sandstone and conglomerate rubble, indicating this portion of the property is underlain by interbedded sandstone and conglomerate.

There are very few exposures of bedrock within the property itself. However, there is an excellent continuous exposure of the sedimentary sequence along the east boundary of the property and adjacent foreshore of Lambert Channel. On the foreshore, at the southeast corner of the property, one metre of exposed sandy shale is overlain by a two metre thick interval of conglomerate with ~40% sandstone interbeds and lenses. The remainder of the foreshore adjacent to the east boundary of the LDNR is a continuous outcrop of massive, medium- to thick-bedded sandstone. On the foreshore, about 50-60m north of the northeast corner of the LDNR, the contact between De Courcy Formation sandstone and overlying shale (mudstone) of Northumberland Formation is exposed. This contact is gradational over a few metres and strikes ~110°. The basal part of the Northumberland Formation contains 15-20% thin sandstone interbeds and has been intruded by near vertical, clastic (sandstone) dykes up to 20cm thick. All of the sedimentary units exposed along the foreshore at the east property boundary dip gently northeasterly; bedding strikes 110-170° and dips 3-10°. The sedimentary units underlying the LDNR property and surrounding areas likely comprise a gently northeasterly-dipping homocline, which is reflected in the topography and drainage.

Glaciers filled the Strait of Georgia and covered Denman Island to a depth greater than one kilometre as recently as 14,000 years ago (Clague, 1991; Halstead & Treichel, 1966). The ice sheet gouged the land surface, removed rock and surficial material, and transported large rock fragments (erratics) to Denman Island. These erratics, which are usually somewhat rounded, are composed of granitic or volcanic material and were derived from the Coast Mountains on the mainland, or from Vancouver Island. Erratics up to 2m in diameter are scattered over the surface of Denman Island, including the LDNR.
References:

3.3 Ecological Description

This section describes the overall ecology of the property by identifying the significant ecological areas and key features, and by listing some of the resident plant and animal species. Scientific names of all species are given in the attached species lists (see Appendix I). Management recommendations of the consultant biologist to maintain the ecological integrity of these lands are provided as Appendix II.

3.3.1 Overview

The 52 ha of the Lindsay-Dickson Nature Reserve encompass land from Graham Lake to Lambert Channel on the east side of Denman Island, BC (see Map 1. General Information). This land slopes gradually, with some undulations from approximately 55 m to sea level. The aspect is east-northeast. The principal factors governing the current ecological presentation of these lands are time, water, fire and human activities. This land has a minor dry site component but is mainly fresh to moist rich soil habitats of extensive water-receiving areas.

The land's ecosystems, as defined by the BC biogeoclimatic system classification, lie within the Coastal Douglas-fir moist maritime biogeoclimatic zone (CDFmm). Denman Island is the northern extent of that zone and there is evidence of transition between the CDFmm and the Coastal Western Hemlock very dry maritime zone (CWH xm). Smaller ecosystem units on the Lindsay-Dickson lands include three clearly defined "site series" as well as the wet Western redcedar complex ecosystems. The drier Douglas-fir dominated site series tend to grade into the more moist and rich ecosystems.
3.3.2 Major Influencing Factors
The major factors affecting this land: time, water, fire and human activities, determine the significant areas that are described below. Each of these factors has a significant influence on shaping the biology that covers the defining geology (rock structure and soils) of the land.

Time is a major factor in making this property such an important area for protection. The fact that the land has had minimal disturbance means that many of the ecosystems are climax or mature seral. This creates a valuable opportunity to view the components of a mature ecosystem, as well as to accurately classify systems that are fully developed. Examples of mature ecosystems in the CDFmm are rare.

Abundant water influences most of the property. A creek flows through and along the north side of the property, the typical longitudinal Denman wetland drainage pattern is evident on the north side, and in addition, water seepage and catchment areas are evident in all but the dry rocky upland. Graham Lake has a local microsite influence on the western edge of the property, while the sea affects the eastern edge. The water flow brings nutrients to most of the property, with the very rich receiving sites showing their rich site indicator species.

Fire has left scars throughout the property. Natural fires probably produced the original forest structure and species, with the thick-barked Douglas-fir veteran trees resistant to typical burns. In the early stages of human settlement, after the original logging of some of the land, fire was probably used for clearing to burn stumps and debris. These burns may have contributed to the fire scarring of the remaining old trees. The current maturing second growth of 90 to 100+ years old appears unscarred, suggesting that the last major fire was over a hundred years ago. Of interest, the split rail fences show heavy burn scars and it appears they may have been burnt in place. This suggests that there was a major fire after the first hay-fields, protectively encircled by split rail fencing, were established.

Lastly, humans have taken some of the ecosystems on this property back to an earlier stage in the ecological evolutionary process. Early human alterations consisted of the original logging (and/or burning) of some of the western portion of the land, and the complete transformation of three areas, which were probably beaver-flooded ponds, into ditched hay fields. Recently, the small-patch logging of 2000-01 has removed small areas (each less than 0.5 ha) of mature second growth, as well as some individual mature trees throughout the centre of the property.

3.3.3 Significant Ecosystem Areas
The Lindsay-Dickson Nature Reserve can be divided into four major ecosystem areas (see Map 2. Significant Ecosystem Areas). Some of the areas are sub-divided into sections to explain the variations or features present. Each area or section is described in terms of the general ecology, specific features (see Map 3. Features) and the anticipated changes in the next 10 to 25 years. Further details of the vegetation, soils and site series of 12 land units were documented on the property by the Conservation Data Centre in an original report (Conservation Data Centre 1992) (see Map 5. Conservation Data Centre).
A. Rocky Upland
This area, on the western edge of the property, is in an upper slope position and is the driest, rockiest portion of the Lindsay-Dickson Nature Reserve. In an open rocky meadow, sandstone rock lies immediately below the surface and supports principally moss, lichen and lily species. Douglas-fir trees grow as soon as there is sufficient soil for support. The west central border area of the property has the youngest predominantly Douglas-fir stands. These are growing in the poorer site conditions and are small in diameter and dense. The young fir sections blend into other sections where there are large second-growth Douglas-firs and even a few old-growth veterans and a few snags. The understorey is mainly salal, which is an indication of the nitrogen poor character of the soils.

The site series in the Rocky Upland is Douglas-fir - Salal (Fd - Salal). This is the zonal site for the CDFmm, meaning that it is intermediate in soil, moisture and nutrient regimes. This site series, when in the climax stage, is classified as Red-listed by the Conservation Data Centre (CDC). Wildlife species that are particularly adapted to this habitat are Northern alligator lizards and Garter snakes. Predators, which prey on these species, such as the Barred owl, will also spend time here. The trail from Jemima Road to Graham Lake begins in this area.

The area will mature to a well-spaced Douglas-fir forest, although lack of moisture, especially in dry years may affect survival and health of these trees, and blowdown and root-rot will likely occur. In the immediate future, over the next 10 to 25 years, smaller suppressed trees will fall, blowdown and root-rot may re-open small patches. The canopy over some portions will close and the understorey will be suppressed. In other opened-up sites, the understorey, especially the salal, will flourish. The fallen woody debris will contribute slightly to the soil component and gradually the largest well-spaced trees will mature.

B. Lakeside Forest
The Lakeside Forest habitat along the southwest corner of the property is an interesting blend of the Rocky Upland site series (Fd - Salal) and an ecosystem from the adjacent CWH xm, the Douglas-fir Sword fern site series (Fd Sword). The principal variation from the typical CDFmm is that there is a moderate component of Western hemlock in the main canopy and in the understorey. This area slopes southwest towards Graham Lake and, at the eastern edge, slopes slightly southeast towards the sea. The immediate influence of the lake likely creates slightly moister conditions than in the forest to the north. This area also has several old-growth veteran Douglas-fir live trees and tall snags, large second-growth, and considerable large downed logs, which also tend to create a distinct moist microclimate.

The forest consists of Douglas-fir, Western redcedar, Western hemlock and the occasional Grand fir. The understorey is a mix of salal, Oregon grape, Sword fern, moss and bare patches. The large old-growth snags and other suitable trees are being heavily used by woodpeckers of various species for drumming, foraging and nesting. For example, many woodpecker species will use the tallest, loudest hollow-sounding drum to announce their
territory in the late winter and early spring (at the time of this study). This area is also highly suitable for reptiles, as noted in the Rocky Upland. This area is also the site of well-used human trails to Graham Lake from Jemima Road and from Mallard Way.

Over time, this forest will age and the Douglas-fir - cedar component may out-compete the hemlock. Root-rot and blowdown will also be factors here. The generally shallow soils will mean increased stress on the vegetation, as in the Rocky Upland, especially in dry years. In the immediate future, only minor changes with the occasional loss of a few trees would normally be expected.

C. Rich Forest
The majority of the property is in the Rich Forest area. The slope of the property gently grades towards the ocean and becomes increasingly productive. The centrally located Rich Forest stretches from the Rocky Upland to the sea. This forest abuts the Moist Cedar Forest (see Section D below) area on a central plateau. The Rich Forest area is divided into six sections, defined largely by human intervention (age), features, and to some extent on the grading of soil and moisture content. In early settlement days, cattle may have roamed most of this land, particularly west of Road D. Split rail fences probably kept the cows out of the former hay fields (Alder slough - sedge sections of the Moist Cedar Forest).

The site series, Western redcedar/Grand fir - Foamflower (CwBg- Foamflower), reflects the increase in moisture and nutrients in this community. The site series in the climax form, as in the old forest section (C-1), is Red-listed by the CDC and this section is a very valuable example of this Red-listed ecosystem type.

C-1 Old Forest
The old forest is located mainly on the west side, adjacent to East Road and is the oldest section of the Rich Forest. This section stretches west approximately to the slope break, or the western limit of old-growth firs. This section is unlogged and has a large number of old-growth veteran Douglas-fir trees of considerable size above the main canopy. These old veteran trees are heavily fire-scarred. Diameter at breast height (DBH) measurements of seven of these Douglas-firs ranged from 109 cm to 238 cm (Balke 1992).

Douglas-fir, Grand fir and Western redcedar are all present in the main canopy. There are also a number of Big leaf maples in the main canopy. Grand fir, Western redcedar and Big leaf maple are all indicators of nutrient rich, moist sites. The understorey consists mainly of Sword fern, with a variety of other species (Red huckleberry, Oregon grape, Western redcedar, Salal). An apparently culturally modified Western redcedar, DBH 143 cm, is also present in a group of older cedars.

In the next 10 to 25 years little change will probably be noticeable, other than gradual weather and aging damage to the older trees, the incursion of non-native holly will increase and gradually reduce the available habitat for native understorey plants.

C-2 (Lower Creek) Big Fir Creek
The creek is really a feature of the area, but is separated as a section of the Rich Forest area for descriptive purposes. The lower portion or Big Fir Creek drains from the central wetland to the ocean. The creek course begins with a gentle grade. A portion of the creek
near the old barn has been driven in recently and through this portion Road C is the creek. Also near the old barn, a dug pond has been created immediately adjacent to the creek. The creek then turns east and in this portion the grade increases and the creek banks are relatively steep. The creek runs through a culvert under East Road and then drops in a short waterfall to the ocean.

Several old-growth Douglas-firs grow along the creek and a large second-growth Sitka spruce is located on the creek bank at the East Rd culvert. The majority of Big Fir Creek is currently not included in the Nature Reserve.

In the next 10 to 25 years, the creek will slowly cut into the Road C portion; the dug pond will gradually silt in. If the Road C creek portion is not driven on, vegetation will re-grow and it will begin to resemble a creek again.

C-3 Beach Bank
The beach bank section of the Rich Forest is somewhat influenced by the maritime exposure. Some early shoreline logging may have occurred on this site, and the exposure probably resulted in blowdown and snapping off tops of larger trees. There are numerous old-growth Douglas-firs and others are beginning to show old-growth character. Salal is the dominant understorey plant. The rocky slope may create a drier site, with less soil development, lower moisture and drying effects from the prevailing SE winds. This portion of the Rich Forest grades from site series CwBg - Foamflower to approach the zonal site series Fd - Salal. Among the unique coastal vegetation on the backshore, there is the beautiful Gold-backed fern, which is near the northern limit for this plant on the islands. (Also found Read Island - personal observation).

There are three defined human trails to the shoreline from East Road. The northern most is the shortest and steepest, the central trail has a moderate incline, and the southern most is the longest but appears fairly heavily used by humans. English ivy is prominent in this section, especially at the north end where it is present from East Road to the shoreline and from ground level to high up tree trunks.

The next 10 to 25 years will see gradual wear and tear on the older trees due to exposure and some development of the understorey in response to openings and aging. If the ivy remains un-checked it will gradually replace all the other vegetation and begin to kill trees.

C-4 Shoreline
The shoreline itself represents considerable ecological value. The land of the beach bank drops in a moderate to steep grade to the foreshore, which is predominantly rocky, except for a very small beach-like portion near the north end. The shoreline has two convex prominences, both of which have River otter latrine sites, with fresh scat at the time of the survey. River otters create these latrines to define their use of the habitat. River otters eat, rest, groom, and scent mark in these sites. The scats and secretions that they leave advertise their presence to other otters. The foreshore is also used as a foraging area and haulout by marine and coastal birds, including Harlequin ducks, Great blue herons, American widgeons, Belted kingfishers and many others. Harbour seals also haulout on the foreshore. In addition, numerous marine species, particularly marine invertebrates are located in the intertidal zone.
In the immediate future (10 to 25 years), the amount of use of the foreshore by humans will influence the populations of native occupants in this section. Increasing use will gradually damage greater areas of high intertidal plants and animals and may discourage the use of the area by more mobile species such as River otters, particularly if latrine sites are modified.

**C-5 Maturing forest**
The maturing forest stretches from the old forest to the Rocky Upland. Central Road runs through the south side from the old forest to the log landing at the end of Mallard Way. The maturing forest has similar components to the old forest, without the dominant trees. The age of the main canopy Douglas-firs ranges from approximately 65-70 years and up. The rich conditions have created a good site and many trees have old-growth character. The site series begins on the east side as Western redcedar/Grand fir - Foamflower and grades towards the west into Douglas-fir - Salal. This section was maturing seral, although now, due to the logging there will be portions of younger age-classes.

This area was patch-logged in 2000-01 (see Map 4. Logging Impact). Small patches, most of less than 0.5 ha, as well as individual trees were logged. Skidder logging roads extend broadly through the western centre of this section, and a large landing (0.5 ha) was created near the Mallard Way turn-around (see Map 1). The roaded areas vary in the degree of vegetation damage. Central Rd, the landing, and the ends of the roads near the landing are the most damaged. Several areas are heavily rutted. Vegetation is already beginning to re-grow on most of the roads and in the landing, as well as in the logged patches and openings.

The "Buddy trees" are a noticeable feature in this area. On either side of the junction of Central and Road C there are groups of large mixed-species second-growth trees. One group is made up of three stems of both Douglas-fir and cedar; the other is 6 stems including cedar, Grand fir and Douglas-fir. Also, in this section, a May-pole was found, which is a recent cultural artifact.

In the next 10 to 25 years the forb, shrub and finally tree layers will increase and will include native forbs, shrubs, young trees and a variety of introduced plant species. Many of the current non-native species, on or near the roads, were probably transported by the logging machinery from the farm or from other damaged sites. Species growing in the landing will include the light-favouring plants as well as those that can tolerate more soil compaction. Many of the less impacted roads and the openings will quickly re-grow; especially where there is available light. Shaded roads and sites will fill in with more shade-tolerant species.

**C-6 Old Fields**
At the northern border there are several regenerating old fields. Some of this field-land is very wet and is included in the Moist Cedar Forest area, but in some portions the land is better drained and is supporting young Douglas-fir trees. Semi-domestic plums and/or apples (probably wild crosses) are also found in these fields. A split rail fence crosses the fields at the eastern end and heads through the forest between the older forest and the more advanced regenerating fields. The slightly more advanced field regeneration continues along the west side of the sedges, old barn and pond. Here, the forest is approximately 20
years old and is dense. All along the split rail fence line there are very large open-grown trees, mainly Douglas-firs. These trees have huge limbs almost to the ground. Obviously this area was quite open for most of their life. An old north-south road may have run along this split rail fence.

These early seral stages of dense young fir trees with little understorey are included in the Rich Forest area but their evolutionary development will be affected for a considerable period by the previous century or more of human use. In the immediate future, the youngest forest field in this section will increasingly resemble the portion by the old barn. The old barn portion will gradually thin, other tree species will slowly become established and the understorey will slowly begin to re-develop.

**D Moist Cedar Forest**
The Moist Cedar Forest is a complex of lands, which will probably be dominated by Western redcedar (Cw) at climax. On this property, the Moist Cedar Forest area includes sections which are predominantly Red alder at this seral stage, as well as older Cw-dominated forests. The six sections of this forest include a complex mixture of all the communities, two features (wetland and creek), as well as the range in moisture content, from the wettest to the driest cedar habitats.

At least three of the Red alder - Slough sedge and Red alder - Sword fern sections of the Moist Cedar Forest (possible former beaver impoundments) were probably farmed as hay fields. Two of these sections were drained with ditches and were surrounded by split rail fences. The third, which was also ditched, is along the northern border behind the old house and may have had more split rail fencing in the past. Ditches are still evident in the old fields and there is also a small dug pit in (D-1).

No beaver dams were observed on the property at this time, but beaver activity could vastly change the amount of water impounded on the property. Water flows through from the northwest following linear glacier-created drainages. Beaver activity, by damming the flow out of any one of several depressed areas, could flood the land, removing the terrestrial complexity.

**D-1 Complex Community**
A good example of a complex Moist Cedar Forest ecosystem is the eastern one third of the most southerly Moist Cedar Forest area (D-1). This section was probably part of the Graham Creek drainage from Graham Lake, together with the adjacent D-5 and D-6a sections. Now Mallard Way divides these sections from Graham Creek and some of the nutrient flow is probably still obtained from uplands on the Lindsay-Dickson property.

The D-1 portion was never stumped or farmed and there are huge burnt cedar snags and a complex of different habitats, from skunk cabbage through Western redcedar- Vanilla leaf. This section may demonstrate the distant future of many of the "alder bottoms" on Denman. There is a small dug pond in this section, probably 10+ years old. The Pileated woodpeckers have been busy here as well.
D-2 Central Wetland

The Central Wetland is a combination of marsh, swamp and shallow water. The wetland is predominantly swamp with Wild apple, Spirea, Willow, Salmonberry and other shrubs. Much of the north, south and west edges are thick shrubs for 20m+. A few areas of open water are located mainly on the east side of the wetland. In the centre of the central wetland, between the shrubs and open water, is a marsh with emergent sedges and Skunk cabbage.

A Raccoon or possibly Muskrat scat was found on a log in the wetland. A pair of Mallard ducks was observed in the wetland and will probably nest there. In previous surveys, Red-legged frogs, which are Blue-listed, were seen in abundance on the property. This frog is only beginning to emerge in warmer water on Denman at the time of this study and thus was not seen. Both Treefrogs and Red-legged frogs as well as all of the aquatic salamanders on Denman probably breed in this wetland. Future sampling should include fish surveys to assess whether Cut-throat trout are present in this water system. A portion of the split rail fence running north to south through this section is well preserved in the open water of the wetland.

Provided the hydrology remains the same, the immediate change in the wetland in the next 10 to 25 years will be a very gradual silting and filling with decaying organic material. The shrub area may expand slightly as the drier growing substrate increases. Unless beavers become active here, there will be few immediate observable changes.

D-3 (Upper Creek) Skunk Cabbage Creek

The upper creek, Skunk Cabbage Creek, above the Central wetland, is a gentle and slightly meandering creek, approximately two to eight metres wide, that runs from the mid-northern border to the wetland. At the northern border the creek enters the property crowned by Red alder and there is a section of Red alder - Slough sedge habitat. As the creek continues south, the canopy becomes predominantly large second-growth Western Redcedar although there are several old-growth Douglas-firs that reach above the main canopy. In the widest sections, the creek becomes braided through Western Redcedar - Skunk cabbage habitat. The creek substrate contains varying amounts of organic deposits, and Skunk cabbage grows throughout the upper creek. There is considerable logging debris in the creek in areas where the recent logging reaches it. Other sites show evidence of very large woody debris, downed many years ago.

Raccoon tracks were noted in the creek bank and frogs and salamanders may breed in the deeper pool areas. During the summer the moisture provided by this creek habitat is critical for the survival of the Red-legged frog and other amphibians. As the rest of the forest dries, Red-legged frogs can be seen in abundance in close proximity to the creek and wetland.

In the immediate 10 to 25 years, if the hydrology is unaffected, the creek will change little over most of its length, although in the open logged areas there will be increased forb and shrub growth, as well as increased evaporation, particularly in summer. The lowering of water levels due to evaporation in summer will mean that the area will support a lower
abundance of moisture-dependent fauna, such as the Red-legged frog. The Red alder habitat at the northern border will probably age much like the wetter Red alder habitats described below.

**D-4 Cedar Skunk cabbage**

The cedar skunk cabbage habitat is the wettest land within the Moist Cedar Forest area. The best-defined Cedar skunk cabbage habitat is beside the creek, particularly on the west side. The black moist soil is rich with organic material and nitrogen. Skunk cabbage, a nitrophytic plant of nutrient-rich wetlands, is the major species in the understorey and Western redcedar is the dominant species in the canopy. Moving away from the creek the land becomes drier and the forest shades from cedar dominated to an increasing mixture of Western redcedar, Douglas-fir and Grand fir. These drier sites are discussed under the Red alder Sword fern - Western redcedar Vanilla leaf section (D-6).

As noted above, the recent logging made incursions into this ecosystem along the creek, mainly on the west side. These openings will enhance evaporation, which will encourage the growth of open-area vegetation. In the next 10 to 25 years, the logging openings in this section will alter, filling in with ferns, thistle, and other vegetation, that will grow mainly on the raised-hummock areas. As the cedar canopy re-grows the moist habitat will be re-created. Western redcedar with its network of branching roots appears to create pockets of moist surface habitat provided there is water and nutrient inflow. When this water is trapped, pools are created with their associated Skunk cabbage flora.

**D-5 Red Alder Slough Sedge**

The Red alder sections may have been beaver-flooded wetlands prior to farming activity. Then these shallow wetlands were ditched, drained, surrounded by split rail fences and probably farmed for hay. In these slightly depressed areas, Slough sedge is the dominant understorey due to the gleyed soils with little aerated soil depth. At this seral stage, Red alder is the major canopy species. This shade tolerant sedge develops on nitrogen-rich soils and becomes abundant and lush under the shade of the Red alder. As the Red alder ages, dies and falls conifers, primarily Redcedar here, will probably start to fill in, however if flowing water is in the vicinity, beaver may recreate the open-water habitat by harvesting the growing alder and damming water flows.

All of the Moist Cedar Forest areas contain portions of Red alder - Slough sedge habitat. This habitat occurs as patches within the larger Red alder sword fern sections, although some of the younger regenerating sections are mainly Red alder - Slough sedge. At climax, this site series, Red alder - Slough sedge (Dr-Slough sedge), is Red listed. Some of these communities are approaching climax. In the very recently regenerating fields, as noted in the wet fields section, there are still sites where the Reed canary grass is the dominant species and overstorey trees have not yet regenerated.

In 10 to 25 years, these habitats will mature. The Red alder will age, conifers will fill in or beavers will move in and re-create an open-water habitat. If not re-flooded, this habitat may ultimately become more complex with microhabitats ranging from Western redcedar - Skunk cabbage to Western redcedar - Vanilla leaf, as in D-1.
**D-6 Red Alder Sword Fern - Western Redcedar Vanilla Leaf**

As noted above, the Red alder - Sword fern sections are complexed with the Red alder - Slough sedge sections. The large Sword fern portions tend to be drier and have a variety of conifers including Western redcedar, Grand fir and Douglas-fir, often growing on hummocks. The site series is Western redcedar - Vanilla leaf (CW-Vanilla leaf) which is a Red-listed community in climax.

The D-6a sections are at an early stage with Red alder as the main canopy trees and conifers, Western redcedar, Douglas-fir and Grand fir, in the understorey. The major Red alder - Sword fern section in the northwest-central portion of the property shows no sign of recently being farmed even in 1973 air photos. This section follows the distinct diagonal glacial alignment of depressed wetlands across Denman Island.

The sections D-6b are more mature and have primarily Western redcedar in the main canopy, with some Douglas-fir, Grand fir and older climax Red alder. The understorey in this maturing community varies from bare soil, moss, sword fern, and salmonberry near openings. Small open-water ponds are present under the tree canopy in one of the 6b sections. These ponds have Skunk cabbage, Water parsley and Slough sedge. A second-growth Sitka spruce is growing at the edge of one pond. Drier sites have Foam flower, Vanilla leaf, moss and salal. There are also areas with springboard notched stumps.

In the immediate 10 to 25 years, the maturing alder will die and fall and the conifer cover will increase. The ageing alder attract a host of cavity nesters and bark drillers, such as bats, Chestnut-backed chickadees, Red-breasted nuthatches, small owls, and Hairy and Downy woodpeckers. In the more mature cedar-dominated forests, the community will probably change little in the next 10 to 25 years. In some sites the understorey will decrease due to increasing canopy closure and in other sites where the canopy opens, understorey plants will develop. Nutrients flow through these sections and in the future they may also be re-flooded or may develop into the more complex habitat types seen in D-1.

**D-7 Wet Fields**

The wet communities of the regenerating fields behind the old house are very early seral stages with grass, sedge, and Sword fern dominated portions. Reed-canary grass was planted as a hay crop in the early settlement era. This grass survives with wet-feet in winter-flooded fields and is still present in many marshes on Denman Island.

A large sedge area is located along the northern boundary around the creek and to the east. The sedge runs in a diagonal SE along the forest edge. East of the creek, a drainage depression filled with sedges exists between the northern boundary and the main forest to the south. To the east shrubs combine with the sedges. A ditch was dug closer to the forest than this drainage depression, but the two meet near the dug pond. Red alders are just beginning to regenerate in the wet areas of these old home-site fields. In some areas there are apple and plum trees, which may be wild domestic crosses, as well as shrubs and on hummocks, some conifers.
Other than the recently logged area, this section will show the most changes in the next 10 to 25 years. This site will develop along the same pattern as the section D-5 or D-6, and may eventually look similar to section D-1.

3.3.4 Species Lists

Species lists are included in Appendix I. The plant lists include species observed during this project in March 2002 as well as species noted in the CDC report of 1992. A relatively rare lichen Fishnet *Ramalina menziesii* was also noted on the property by the CDC personnel (CDC 1992). The animal species are noted as seen during surveys, possible/probable, or found in the adjacent marine environment. The possible/probable species are found in other similar habitats on Denman Island.

On this property there are 3 Red-listed plant communities and three of the possible/probable animal species are also Red-listed. There is one Blue-listed plant community and three Blue-listed animal species. There are also two possible/probable animal species that are Blue-listed species. (see Table 1)

3.3.5 Literature Cited


Table 1. Red and Blue-listed species on the Lindsay-Dickson Nature Reserve.

<table>
<thead>
<tr>
<th>Red and Blue-listed Species</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Plant communities</strong></td>
<td></td>
</tr>
<tr>
<td>Thuja plicata - Achlys triphylla</td>
<td>Red</td>
</tr>
<tr>
<td>Pseudotsuga menziesii / Gaultheria shallon</td>
<td>Red</td>
</tr>
<tr>
<td>Alnus rubra / Lysichiton Americanum</td>
<td>Blue</td>
</tr>
<tr>
<td>Abies grandis / Tiarella trifoliata</td>
<td>Red</td>
</tr>
<tr>
<td><strong>Animal species seen</strong></td>
<td></td>
</tr>
<tr>
<td>Great blue heron</td>
<td>Blue</td>
</tr>
<tr>
<td>Band-tailed pigeon</td>
<td>Blue</td>
</tr>
<tr>
<td>Red-legged frog</td>
<td>Blue</td>
</tr>
<tr>
<td><strong>Animal species probable or possible</strong></td>
<td></td>
</tr>
<tr>
<td>Townsend's big-eared bat</td>
<td>Blue</td>
</tr>
<tr>
<td>Northern goshawk</td>
<td>Red</td>
</tr>
<tr>
<td>Marbled murrelet</td>
<td>Red</td>
</tr>
<tr>
<td>Western screech owl</td>
<td>Red</td>
</tr>
<tr>
<td>Coastal cutthroat trout</td>
<td>Blue</td>
</tr>
<tr>
<td><strong>Animal species in the adjacent marine environment</strong></td>
<td></td>
</tr>
<tr>
<td>Steller sea lion</td>
<td>Red</td>
</tr>
<tr>
<td>Double-crested cormorant</td>
<td>Blue</td>
</tr>
<tr>
<td>Pelagic cormorant</td>
<td>Red</td>
</tr>
</tbody>
</table>
4.0 Property Management

This section identifies specific management issues, provides background information and describes possible solutions. Management issues and strategies for LDNR were identified and developed by a committee of the DCA and discussed at a public meeting held on 13 March 2002.

4.1 Background of Management Issues

4.1.1 Sharing of Management and Protection Responsibilities
The ITF has proposed that the Denman Conservancy Association become the site manager under an agreement with the ITF. The site manager is responsible for day-to-day oversight of the property and for implementing the Management Plan. The manager is not compensated for general oversight duties.

The ITF Board and Manager work together to determine funding needed for Plan implementation. It is the policy of the ITF Board to register a conservation covenant on the property for added conservation protection. The conservation covenant holder ensures that the conservation objectives and requirements set out in the covenant are upheld. The Board should prepare and register the covenant in the short term.

4.1.2 Monitoring Program
An annual site visit should be conducted by representatives of the covenant holder and the ITF to monitor the condition of the LDNR, the implementation of this Plan and the requirements of the covenant when it is completed.

4.1.3 Public Access and Activities
Acceptable uses within a ‘Nature Reserve’ include walking and quiet appreciation of nature. Any uses that could reasonably pose a threat to vegetation, wildlife or wildlife habitat are not acceptable within the nature reserve.

Activities that may have taken place in the past include picking of salal and other florals for commercial purposes, picking of mushrooms for commercial and recreational purposes and hunting. No harvesting of resources from the Reserve should be permitted in future.

Use of the Reserve by organizations and which entail larger scale activities or uses that require leaving established public trails might have to be regulated by the managing group. Collecting of specimens or creating permanent marks for studies should also be regulated.

Visitors should be expected to keep their pets under control while in the Reserve.

The general public should be made aware of permitted and prohibited uses in some way (brochure, flyer, conservation information night, or newspaper articles). The extent to which tourists should be encouraged to visit the Reserve should be established in this Plan.
For many years the public has used a trail in the southwest corner of the property to walk between Mallard Way and Jemima Road. Continued use of this trail is anticipated. There are also three commonly used trails that provide beach access to the shore of Lambert Channel from East Road, through the property. These trails will continue in use. The Northern-most of these is quite steep and slippery in wet weather. Regrading this trail to a zigzag or construction of a stairway would alleviate this concern.

Picnicking on the beachfront of the property has been a popular activity for many years. This activity is expected to continue. Beach fires lit as part of this activity can be a serious concern under dry summer conditions.

Parking space on East Road is limited. This section of East Road is also designated a Heritage road in an agreement between the Islands Trust and The Ministry of Highways. There is a modest amount of safe parking at and near the turn-arounds at the ends of Mallard Way and Jemima Road.

The management group will need to establish a regular monitoring program to check the property and ensure only acceptable uses are occurring in the Nature Reserve. Such a program may include enlisting community support and establishing a neighborhood watch or volunteer monitors from the surrounding area. In addition, relationships should be established with the RCMP to ensure their assistance if necessary.

Provision of toilet facilities and garbage collection is not required at present. In the future, if the condition of the property as observed during monitoring by the management group suggests otherwise, such facilities may be considered.

4.1.4 Restoration and Logging Trail Stabilization
Selection logging took place in the southwest third of the property in the years 2000 -2001. This has resulted in a log landing area entered from the end of Mallard Way, a few hundred meters of heavily tracked or eroded skidder road and a maze of less disturbed skidder trails. To the north and west of the log landing there is an area of shallow soils where most of the trees have been removed and return to a closed canopy forest will be a very long-term process. Most of the logged area has lesser canopy openings and can be expected to return naturally to a closed canopy forest within a decade or two. Some work by a small earth-moving machine such as a backhoe/front-end-loader to fill in the ruts and restore grades on the heavily worn section of skidder road adjacent to the log landing area could hasten the return to natural forest conditions. There may be a total of a kilometre of road that could benefit from such treatment.

Remains of abandoned wire fencing, plastic flagging tape and other non indigenous materials should be removed as encountered. The decaying split-rail snake fence should be left as it is.

4.1.5 Management of Ecological Changes
In Part 3.3 of this report there is discussion of the potential for significant modification of the plant communities in the wetland areas of the Reserve by beavers. In the event that
beavers colonize an area of the Reserve an evaluation of their effect on the Reserve and possibly on adjacent farmland may be required. Removal of such a beaver colony should only be considered as a last resort if some important natural value of the Reserve is threatened.

4.1.6 Removal of Non-indigenous Vegetation or Wildlife
There are isolated holly shrubs scattered through the forest, a few broom bushes, particularly along the edge of Mallard Way and areas of English ivy growing along the shore below East Road. None of these plants threaten to extensively colonize the Reserve but their removal would enhance opportunities for native plants.

Feral, non-native animals that take up residence (perhaps wild domestic cats) should be removed.

4.1.7 Trail Selection and Nature Interpretation
At present, due to recent and long-ago logging, there is an excess of trails through the Reserve (see Map 4). On the other hand, the area of the oldest trees does not have any direct trail access. A selection should be made of trails that provide a few simple loops for walking, with scope for nature interpretation and, for possible future development, wheelchair access. The walking trail network should be based on the old logging road (called main skidder trail or Central Road). It should avoid the north central wetland area and the undisturbed forest in the northwest. Wetter areas should be avoided to minimize construction and drainage impacts. The remainder of the trails should be closed and allowed to revegetate naturally. A hazard tree assessment should be conducted as part of trail route selection. Hazard trees should be bypassed so that felling them is not necessary.

Public access points to the main block of the reserve, west of East Road, should be from Mallard Way, Owl Crescent and Jemima Road, due to parking and safety constraints on East Road. The trails from these two road ends which provide access to Graham Lake should be maintained and kept on road allowance land rather than encroaching on the Reserve. These road allowances should not be developed for vehicle traffic.

The beach access trail from East Road near the south boundary of the property can be left as is. As part of the trail plan, a safety assessment of the beach access trail near the north boundary will be prepared by the management group. Construction of a zigzag path or stairway may be required.

4.1.8 Signage
At present the only signs marking the property are “Lindsay-Dickson Nature Reserve” signs at the main public access points from Mallard Way and Jemima Road. ‘No Hunting’ signs have also been placed on the perimeter in the hunting season. Signs should be made and placed at the main public access points from Mallard Way and Jemima Road, to identify the Reserve and request visitors to respect the preservation objectives of the Trust. Should a nature interpretation trail be created, additional signs would be required for orientation and information.
4.1.9 Boundary Marking and Buffers
Most of the boundaries of the Reserve are defined by the shoreline and roads or road allowances. The north boundary abuts private property. Agreement should be sought with these two landowners regarding any need for fencing or boundary marking. These properties are in the Agricultural Land Reserve and agriculture can be anticipated as a continuing use on this land.

The Reserve would be better protected if agreement with surrounding landowners could be reached to place covenants on land adjacent to the Reserve that would ensure maintenance of a treed buffer zone and protection of quality and quantity of water flowing towards the Reserve.

This issue merits particular attention in the case of the boundary with the 10 acre parcel containing the Lindsay-Dickson homestead to the northeast of the Reserve. Here there is a stand of mature forest adjacent to the largest trees on the Reserve. In addition the stream draining the Reserve flows through this parcel, close to the Reserve boundary and then runs through a culvert under East Road to the shore of Lambert Channel. Either an adjustment of boundaries or a covenant agreement should be sought which would provide protection to the riparian zone of the stream and the intervening forested land between the stream bank and the Reserve boundary. The Reserve lands, adjacent to the homestead on the west comprise abandoned farm fields. The homestead could benefit by accepting the abandoned fields in exchange for the land containing the creek.

Fencing the property generally is not needed at present. However fencing the west side of East Road to control the access from East Road may eventually be required.

4.1.10 Fire Management
Wild fire is a very rare natural phenomenon in this ecosystem. Any fires should be put out. This conforms to the policies of the Denman Island Volunteer Fire Department, which would like access for their vehicles to be maintained along the skidder trail entering from the log landing at the top of Mallard Way.

The management group should hold a discussion with the Department about their access to the Reserve, methods to be used for suppression of accidental fires and arrangements for closing the forest during extreme fire hazard periods.

4.1.11 Scientific Research/Education
The LDNR could provide excellent scientific research and educational opportunities. Such activities should be permitted and encouraged on the Reserve, but must be in keeping with the overall goals of the ITF and the Management Plan, and assessed on a case-by-case basis as to their merit and appropriateness. Criteria and a review mechanism should be established for this purpose.

As noted at the outset, the ecological description provided in this report constitutes only an overview of the current status of the land based on available information and limited site investigations. In order to create an increasingly comprehensive understanding of the land over time and to provide information that may have implication to the management of the property, the following areas for future study are suggested:

- Development of a more accurate description of the floral ecology of the Reserve by
conducting a detailed terrestrial ecosystem mapping (TEM) procedure at 1:5000. The TEM study should be of sufficient length to conduct a more thorough reconnaissance of red and blue-listed floral species.

- Development of a more representative inventory of faunal species by continued informal field visits to the property and the undertaking of specific surveys on, for example, amphibians in general or rare species, such as Townsend's bat.
- Development/compilation of a seasonal calendar of natural processes: bird migration, nesting, hatching dates; emergence/budding and blooming of different plant species. Such information can be compiled from nature journals of residents adjacent to the Reserve; some can be gathered through individual and some through organized community efforts such as the Christmas bird counts.
- Refine photographic documentation of the property by revisiting photo sites annually as part of the monitoring program and retake photos on the recorded bearings.
- Study of forest regeneration by observing and documenting the development of the Alder meadow (now 25+ years old) into later succession stages

4.1.12 Public Relations

It is generally accepted that greater protection will be afforded over time to the Lindsay-Dickson Nature Reserve if the public is informed and in support of the overall intent of the Reserve and its management goals. With this in mind, outreach in a variety of forms about the ecology of the property, covenants, management activities as well as appeals to the general public to request compliance with permitted uses is expected to aid in bolstering ongoing protection for the property.

As noted in various sections of this plan, signage has been and will likely prove necessary in the future to address a number of needs including, but not limited to, permitted uses, access and trail designation, danger areas, environmental education and user liability. Care should be taken that the use of signs is minimal, sensitive, aesthetic, unobtrusive as possible, and based on clearly defined needs.

4.1.13 Potential Additions to the Reserve

The two undeveloped road allowances adjacent to the southwest corner of the property provide frontage on to Graham Lake. Consideration should be given to seeking the transfer of these lands to the ITF so they can be included in the Reserve and provide lake frontage to the LDNR.

4.2 Public Consultation Report

4.2.1 Public Meeting

A public meeting to discuss management of the LDNR was held in the Community Hall on 13 March, 2002 from 7.00 to 9.30 pm. The meeting was advertised in both the weekly Grapevine and the monthly Flagstone. Posters were put up in the ‘downtown’ area. Kel Kelly was retained to facilitate the meeting. About 35 persons attended. Sarah Gibson was hired to keep the point form notes of the meeting that are attached as Appendix III.

Those present expressed a clear preference for conservation and protection of the natural
ecosystem having precedence over human use of the Reserve. Scientific studies, education and walking were recognized as appropriate uses. The community’s feelings of collective ownership were expressed and permitting modest use would encourage stewardship and make sure inappropriate uses didn’t happen. Traditional use of the beach and access trails is expected to continue as will use of the trail between Mallard Way and Jemima Road through the southwest corner of the Reserve.

There was agreement on the need to reduce the web of existing skidder trails and allow most of them to regenerate. The need for remedial work (filling in the ruts) on the heavily used trails was debated. Resolution of this question seemed to call for more scientific advice.

The suggested retention of the log landing as a car parking area was rejected, as was the need, at present, for a Nature Interpretation trail.

Promotion of the Reserve as an attraction should be avoided as should signs that might induce those driving along East Road to stop and park. No ‘overnight’ uses should be allowed.

Concern was expressed that liability for injuries which could result from public use should be understood by those managing the Reserve. Proper construction of trails and signage is needed.

Granting a covenant to an appropriate organization was identified as an urgent task. The community would like to be consulted on the terms of such a covenant.

4.2.2 **First Nations’ Interest**

Letters were sent to the Comox and Sliammon Bands advising them of the preparation of this management plan and inviting their input. No replies had been received at the time of completion of the Plan.
5.0 Management Plan

Management plans are used to provide long-term direction and guidance for the management of values and features of significance on properties owned by the ITF. In addition the Plan sets out specific actions to be undertaken over the next ten years to ensure the purpose of the LDNR is upheld and to ensure the protection of the natural values for which the Reserve has been established.

5.1 Short-term Management Strategies

Short-term management strategies should be implemented during the first year of management. They include appointing a management group, initiating control of unacceptable use of the reserve, implementing a monitoring program, erecting signage, arranging for rehabilitation of the logging landing and skid road, selection of routes for walking and agreeing on a fire response plan.

5.1.1 Appointment of a Management Group
The ITF will move rapidly to reach agreement with the selected management group to undertake the role of local manager of the LDNR.

5.1.2 Covenant Holder(s)
A covenant holding agency should be sought as soon as possible. Opportunities for input to the covenant terms should be provided to the management group and the Denman Island community.

5.1.3 Controlling Unacceptable Use
The management group will organize a system for volunteers to report occurrences of unacceptable use. A contact phone number(s) will be publicized for this purpose. Criteria will be established for appropriate actions to be taken in response including, in the extreme, calling on the RCMP.

The general public will be made aware, by the management group, of permitted and prohibited uses in local publications from time to time.

Permission from the management group will be required for use of the Reserve by any organization proposing larger scale activities or uses which require leaving marked public trails.

Criteria for uses requiring permission will be established by the management group in consultation with the ITF and, once approved, will be made available to local organizations such as schools, hiking groups and Resident’s Associations.

Collection of specimens or creation of permanent marks for studies will also be regulated by ITF and the management group. (see Section 5.2.7 Scientific Research/Education.)
5.1.4 Monitoring Program
ITF will establish and carry out an annual site visit to monitor the condition of the LDNR and the implementation of the Management Plan. The management group will provide on-site assistance as required in documenting the conditions as noted below. A set of monitoring locations will be selected from established photo locations as sites for long term monitoring. They will be used to take record photos annually.

Monitoring activities should assess and document:
- condition of rehabilitated areas
- condition of public access and trails
- changes of land use in adjacent properties that might affect the Reserve
- evidence of off-trail use or other unacceptable use by the public
- damage to the forest from fire or wind-throw
- condition of Douglas fir and red cedar veteran trees
- condition of the creek in the northeast part of the Reserve
- condition of signage
- area of forest without a closed canopy
- status of non-native species

5.1.5 Signage
Signs will be installed at the ends of Mallard Way and Jemima Road (see Map 1) giving the name of the reserve, that it is owned by ITF and managed by the management group, and indicating what uses are permitted. Sign wording will be agreed on by the ITF and the management group. Once the Board has approved the design, a contract will be let for the preparation and installation of the permanent signs.

Existing ‘No Hunting’ signs will be maintained at appropriate locations on the perimeter.

5.1.6 Rehabilitation
Skid roads affected by recent logging will be mostly left to regenerate naturally. Advice from a professional biologist experienced in forest restoration may be required to determine the best treatment for the areas damaged by the recent logging activity. With ITF approval, a contract may be let for a small earth-moving machine, such as a backhoe/front-end-loader, to fill in the ruts and restore grades on the heavily worn section of skidder road and the log landing area.

5.1.7 Walking Trail
The management group will prepare a trail plan that will include an estimate of costs for any required materials and signs. The trail plan will be submitted for the approval of the ITF.

5.1.8 Fire Management
The management group will prepare a fire management plan in consultation with the Denman Island Volunteer Fire Department.
5.2 Mid- to Long-term Management Strategies

Mid- to long-term management strategies include both initiatives that should be implemented within two to ten years and continuing operations. Mid- to long-term initiatives that should be undertaken include logging road rehabilitation, boundary protection, removal of non-indigenous vegetation, trail construction and signage. These items are not assigned an order of priority at this time.

5.2.1 Logging Road Rehabilitation
Skid roads and areas affected by recent logging will be mostly left to regenerate naturally. ITF may consider plantings of native vegetation if necessary. Once the walking trail route has been selected, and in conjunction with creation of the trail, old skid roads, which are not to be used, will be blocked off with available slash and natural debris to discourage their use. If necessary short term signage may be employed to seek visitors’ cooperation in allowing natural regeneration to occur.

5.2.2 Boundary Protection
All owners of adjacent land, including those separated from the Reserve by an undeveloped road allowance will be approached by the management group to seek their assistance in maintaining conservation values in the Reserve. Agreement on the following will be sought:
• Access to the Reserve lands will be permitted as identified in this Plan.
• Landowners who wish to run livestock on their properties will be asked to maintain adequate fencing to keep their stock out of the Reserve.
• Covenants will be sought to create a Buffer Zone on neighbouring properties to maintain a forested buffer and to protect the quality and quantity of water flowing to the Reserve.
• The owner of the Lindsay-Dickson homestead parcel will be approached regarding a possible boundary adjustment to bring into the Reserve the creek area at the south side of the homestead property in exchange for the former farm fields now in the Reserve to the west of his property.

5.2.3 Removal of Non-indigenous Vegetation, Wildlife and Materials
The management group will consult with a professional ecologist botanist or biologist and organize a volunteer effort to remove non-indigenous vegetation and materials. Trapping and removal of non-indigenous wildlife, if needed, will be done by volunteers under the supervision of a biologist.

5.2.4 Walking Trail
Preparation of the trails, according to the plan approved by the ITF will be done by volunteers under the supervision of the management group. A contract will be let for the preparation and installation of permanent information signs at trail entrances, once the Board has approved a design.

A Nature Interpretation Trail may be considered after experience has been gained with the public use of the walking trail and if demand for such a facility is apparent.
5.2.5 Signage
Signage as described in section 5.1 will be maintained. With the opening of the walking trail, sign boards at the main trail entrance(s) will be installed providing a map as well as the name of the Reserve, that it is owned by ITF and who manages it, and indicating what uses are permitted. Sign wording and graphics will be agreed on by the ITF and the management group. Once the Board has approved the design, a contract will be let for the preparation and installation of the permanent sign(s).

5.2.6 Public Relations
The general public will be made aware of the natural values of the site and permitted and prohibited uses in local publications from time to time by the management group. Advertising of the site will not be undertaken. It should not be promoted as an attraction. No major sign will identify the Reserve to motorists passing through it on East Road.

5.2.7 Scientific Research/Education
The management group, in consultation with the ITF, will establish a Science Committee to regulate, co-ordinate and monitor research studies on the LDNR on an as-needed basis, to ensure that the studies conform to the policies of the ITF and the Management Plan. A copy of reports and findings resulting from any study conducted on LDNR will be provided to the ITF. The Science Committee may promote opportunities to conduct scientific research on LDNR along with research on other Denman Island properties that Denman Conservancy Association manages.

5.2.8 Continuing Operations
The following activities as described in section 5.1 will be continued:
• Monitoring
• Controlling unacceptable use
• Fire Management
6.0 Acknowledgements

The following people have contributed to the work needed to produce this Management Plan. Their assistance is gratefully acknowledged.

Jennifer M.E. Balke RP Bio (biology)
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The Lindsay-Dickson Committee of DCA
Juan Barker, Anne de Cosson, Linda Mather, John Millen and Jerry Thornton

The Board, Denman Conservancy Association

Carolyn Stewart, Islands Trust Fund
Species Lists

Flora of Lindsay-Dickson Nature Reserve

Fauna of Lindsay-Dickson Nature Reserve
Appendix II

Management Recommendations

of J. Balke, consultant biologist, to maintain the ecological integrity of the
Lindsay Dickson Nature Reserve

1.0 General Management Suggestions

Four factors seem key to the immediate future management of this property. These are (1) the value of the Old Forest area, (2) water flow, (3) introduced plants, and (4) roads. This section on management will give a brief introduction on each of the above factors, so that these are taken into consideration, no matter what management actions are taken. Specific issues that were observed during the ecological surveys are addressed in the next section.

1.1 Old Forest

The most important feature on the property for conservation is the small Old forest area immediately west of East Road. Here the large old-growths dominate the forest canopy and the understorey is relatively open and susceptible to considerable disturbance should access increase. Access to the majority of this tiny remnant of Coastal Douglas fir old-growth forest should be minimal. This area is a treasure for Denman Islanders to steward. Given a few hundred years the rest of the property will share the value of the old forest, so that use of the rest of the property needs to be respectful of the ecology.

1.2 Water Flow

This entire property owes most of its character to the rich flow of nutrients that come through from the north. The maintenance of this water flow on this property and on surrounding lands is critical. Future projects could include tracing the upland source of the water and creating a stewardship group for this water catchment area.

1.3 Introductions

Introduced plants are minimal considering the property's long contact with settlement. Nevertheless, both the rapid invaders like ivy and creeping buttercup or the slowly increasing species such as holly will continue to reduce available habitat for native species. Management activities need to be conscious not only of the need to check existing invasive
species under control but also to stop the careless introduction of additional non-native species, particularly with machinery or unclean fill.

1.4 Roads

The property has a number of old roads, some of which were mapped, as well as a variety of recent logging skid tracks, of which the major ones were mapped. Many of these new roads are already growing back and will re-vegetate quickly, but others have more extensive damage. Deciding where access is to be encouraged will be critical, as well as deciding where and how access should be discouraged.
2.0 Specific Management Suggestions

2.1 Central Road as a 'trail'

The following is a detailed review of the possible repairs for Central Road and adjacent road-entrances if it is selected as a future major walking trail (see Map 4). Major considerations include drainage, protection of the surrounding trees and vegetation, as well as safety of the hikers. Sections of this road have very deep ruts caused by a skidder working in wet conditions. As discussed below a small clean machine, working so as not to damage the surrounding trees, their roots and the surface vegetation, could be used to level the ruts. In some sites the new levelled surface may be below the adjacent land due to the combined effects of damage and compaction. Water will collect in these dips. Clean Denman gravel could be used to raise the height of the trail to that of the surrounding land. In addition, as the road runs down slope, surface drainage bars or Big O pipe (angled out into the forest periodically) could be used to prevent water running along the road surface.

Many areas of Central Road are already re-growing and care should be taken not to damage this regenerating vegetation. Damage a second time and the additional compaction may create impacts that are much harder to recover from. Where the surface is level and vegetation growing, these areas can be left alone. A team working by hand could make an initial restoration effort and these volunteers could then flag areas requiring small-machine work.

Local logging debris can be shifted by hand to cover damaged areas and to block unwanted road access. This debris may also be used to delimit the edges of the selected trail. In the landing area, a small machine could be used to gently lift some of the larger stumps and debris from piles around the landing and to relocate this debris back onto the landing and onto junctions of skid roads with the trail. The landing may also benefit from re-vegetation with native plants such as sword ferns and young trees. Non-native species such as the inevitable broom could be removed as they germinate and grow.

2.1.1 Possible Central Trail Repairs:

The trail could run from the Mallard Road turn around to Owl Crescent. As mentioned, a initial volunteer team, working by hand could assess the possible work, mark areas for potential machine assistance. The trail could come into the current landing. The surrounding debris could be moved onto the landing to recreate habitat and vegetation and to delimit the trail edge. This portion of the trail needs minimal upgrading, some minor filling in of holes and levelling. This might be accomplished by hand. The water bar on the landing portion should be retained or up-graded.

The trail could then turn east on Central Rd. The initial portion of this road is deeply rutted and a 'clean' machine would be beneficial in smoothing and levelling the ruts. Gravel-fill may be required to raise the trail to the surrounding ground level to prevent...
channelling and pooling. Also surface drainage needs to be addressed with water bars or something similar. The ruts on the first road to the right, Road 5, should be blocked off with debris and left alone. Where Road 3 joins the trail, hand levelling could be attempted and debris also used to cover and stop access. Careful machine work may be required to make the join less obvious.

Slightly further along the condition of the trail improves and again debris could be used to block off the side-trail. Then more machine work is required but care should be taken to avoid re-vegetated areas. As ruts become lower, hand levelling may suffice. Then again ruts are deeper until get to the beginning of the regenerating field to the south. From here the minor ruts could be filled and the current growth in the middle could be left alone. From here the trail enters the "Avenue" section and further machine work is not required. Debris can continue to be used to block off side trails, replanting of ferns or small trees in junction areas may be warranted.

The trail passes by the Central Wetland and continues east. From an as yet un-designated point, after the trail passes the entire southern Moist Cedar area, a trail could be created heading to the south on the height of land. One of two old-growth veteran trees could be selected for the trail to pass by. The trail would emerge on Owl Crescent. Hikers could then turn down Owl to the beach trails or walk East Road, which also gives the hiker an appreciation of the old-growth trees.

2.2 Beach Trails

Currently there are three trails from East Road to the beach. Preferred areas for access (or unwanted access) to the beach area, and trail routing need to be considered. To tie in with the Central trail, using the most southerly trail to the beach seems logical. The beach itself has several areas of slippery rocks and unstable logjams, such that non-intrepid walkers may actually not want to go too far. Routing hikers up the next beach trail to the north may alleviate some of the problems of safety and minimize disturbance to beach flora and fauna. This route also gives hikers the greatest time in the 'beach bank' section of the Rich Forest.

2.3 Fire

The recent logging has created some logging debris in the forest. As most of the trees were individually selected and only a few small patches were opened, the debris is minimal compared to many of the existing clear-cuts on Denman. Also, this forest is very moist, due to the influence of the creek, various wetlands, as well as the considerable canopy of remaining forest. Lastly, most of the debris is quite small and will decay rapidly. Thus the fire hazard is lower as compared to other logged areas on Denman.

To create the opportunity for addressing summer-fire concerns along the Central trail, a passive approach could be taken. A skidder has already been along most of the trail route,
other than in the Old forest section, therefore most of the trail could be accessible to a small fire truck in summer when the clay substrate is firm. When a trail is designated and prepared, the fire truck access in summer can be left as potential if necessary, by simply not doing any modifications that would totally prevent the access. Fire truck access to the Old forest section of the potential trail is unnecessary as there has been no logging there, and it would be a very undesirable disturbance of this sensitive area.

If a large scale fire were to unfortunately occur in the Lindsay Dickson Nature Reserve, water bombers would be required to extinguish the fire.

2.4 Rock meadow

The character of the rock meadow with its mosses and lichens is derived from the thin soils and exposure. The recent logging has resulted in debris over much of this area. Hand removal of this debris is recommended. The debris may also be used to delimit the western trail to Graham Lake and to assist in habitat creation in the landing.

2.5 Wetlands

A low impact monitoring of the wetlands and general hydrology is recommended. Water levels in the central wetland could be checked twice per year and a general assessment of yearly changes in water flow could be documented. Otherwise no access to the fragile wetland systems is recommended. They should be left alone. Any livestock kept on the private farm should be fenced out of the dug pond and the creek.

2.6 Introduced Plants

Introduced species are evident in all areas of the property. The most noticeable are holly and English ivy. Both should be removed. The beach bank vegetation will continue to be replaced by ivy unless the ivy is cut back. Holly bushes are present throughout but a large patch grows along the edge of the property at the junction of Mallard Way and Owl Crescent. Holly was observed with berries and this plant will continue to gradually spread, usually with the assistance of birds. Holly removal could be part of a fund raiser, holly could be removed and sold by the Conservancy at the Christmas craft faire. Other introduced species, such as Creeping buttercup, Himalayan blackberry, Bull thistle, Herb Robert, Common dandelion and others are found throughout Denman. Minimizing disruptions of the native vegetation and minimizing further introductions of non-native species will help to stop the spread of alien plants. Drier sites should be monitored for the growth of Broom, and any broom plants should be removed.
2.7 Boundary realignment

The lower portion of Big Fir Creek leaves the Lindsay Dickson Nature Reserve and enters the adjacent private lot. This creek is an essential part of the hydrology of the reserve and is in the most ecologically valuable section of the property, the Old Forest. Some of the old-growth veteran Douglas firs grow along the bank of the creek. If possible, a boundary realignment should be sought that would include the creek within the reserve. An equal portion of the regenerating old fields, directly behind the house could be offered in exchange. There is no waterfront available for human use on this creek-portion of the private lot, as the road runs very close to the road. In fact such an exchange would drop the taxes on the private lot and make more useable farm land available. Also the scenic value of the creek and forest, to the private lot, would remain unchanged. Thus there would be gains to both parties if a boundary realignment were completed.

2.8 Other

Sections of new-looking wire are draped from the ground to 5 m up in the trees along Road C just south of the dug pond. This wire is a hazard to humans and wildlife, it should be removed.
Photo 1. Rocky meadow Herb Layer  
Photo 3. Lakeside Forest
Photo 2. Rocky Upland  
Rocky Upland Trail
Photo 4. Old Forest - Western Red Cedar - Douglas Fir

Photo 5. Culturally Modified tree.

Photo 6. Big Fir Creek on skid road
PHOTO PLATE 3

Photo 7.  
Big Fir Creek

Photo 8.  
Northern  
Beach Trail

Photo 9.  
Gold-backed fern and ...  
sedum and liquorice fern.
PHOTO PLATE 4

Photo 10. Rocky shore ... and harlequin ducks

Photo 11. Maturing forest: Buddy trees

Photo 12. Old fields with Douglas firs
PHOTO PLATE 5

Photo 13. Complex community D-1
Massive Western redcedar snag

Photo 14a. Central wetland – shrub-sedge

Photo 14b. Open water with split rail fence

Photo 15. Skunk Cabbage Creek
PHOTO PLATE 6

Photo 16a. Red alder – Slough sedge

16b. Young alder, around split rail fence

Photo 17a. and 17b. Red alder – Sword fern (C-6)
PHOTO PLATE 7

Photo 18. Western redcedar – Vanilla leaf  Photo 19. Wet fields

Photo 20a. English ivy on shore  20b. English ivy on tree